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Project AV 2
Traffic Impact Analysis
Asheville, North Carolina

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TRAFFIC IMPACT ANALYSIS

FOR

PROJECT AV2

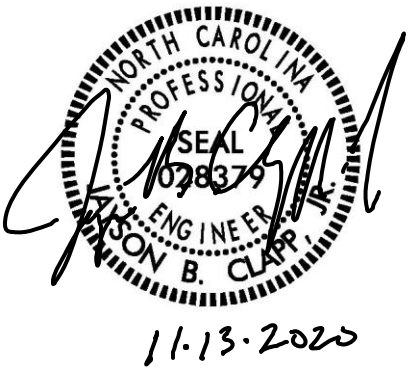
LOCATED

IN

ASHEVILLE, NORTH CAROLINA

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11.13.2020

NOVEMBER 2020

RKA Project No. 20388

Prepared By: TRF

Reviewed By: JBC

EXECUTIVE SUMMARY

This report summarizes the findings of the Traffic Impact Analysis (TIA) that was performed for the Project AV2 development that is to be located south of US 19/23 and to the west of Jacob Holm Way in Asheville, North Carolina. The proposed development, anticipated to be completed in 2021, is assumed to consist of a 118,910 square foot Distribution Center and 180,000 square feet of General Light Industrial space. Access to the site is to be provided to US 19/23 via Enka Heritage and NC 112 via Walk Off Way/Jacob Holm Way.

The purpose of this study is to determine the potential impacts to the surrounding transportation system created by traffic generated by the proposed development, as well as to identify any necessary improvements to mitigate the impacts. To accomplish this objective, the study analyzed existing (2020), no-build (2021), and build (2021) traffic conditions during the weekday AM and PM peak hours.

It is estimated that the proposed development could generate up to 1,978 total trips (989 entering and 989 exiting) during a typical weekday with 341 trips (152 entering and 189 exiting) during the AM peak hour and 282 trips (107 entering and 175 exiting) during the PM peak hour.

All the study area intersections are expected to operate at acceptable levels of service under existing, no-build, and build traffic conditions except for the intersection of US 19/23 and Enka Heritage during the AM peak hour under the build scenario. However, this is primarily the result of the conservative approach that was taken when generating traffic for the proposed development. The anticipated trip generation for the distribution center during the typical weekday peak hours of the surrounding transportation system would decrease the overall traffic impact by a total of 271 trips during the AM peak hour. This reduction would likely result in levels of operation more comparable to the no-build traffic scenario.

In addition, the only queuing issues were observed on US 19/23 at the intersection with Enka Heritage during the AM peak hour where queues on the eastbound and westbound approaches could exceed 1,000 feet on occasions. Upstream and downstream traffic signals could be expected to help meter the arrival of traffic that should result in improved queuing conditions on US 19/23. Furthermore, as previously mentioned, a conservative approach was taken when generating and assigning traffic for the proposed development that considered the distribution center's peak times of generation during the morning and evening hours. When you evaluate the distribution center's traffic generation during the typical weekday peak hours of the surrounding transportation system, the overall traffic impact would be reduced by a total of 271 trips during the AM peak hour and 151 trips during the PM peak hour. This reduction would likely result in conditions comparable to the no-build traffic scenario.

Based on the findings of this study, no additional improvements have been recommended to accommodate the proposed development traffic.

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Appendix A: Approved TIA Scoping Checklist
Appendix B: Existing Traffic Data Information
Appendix C: Signal Plan
Appendix D: Site Traffic Generation Data
Appendix E: NC 112 and Jacob Holm Way/Private Driveway Synchro Reports
Appendix F: Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway Synchro Reports
Appendix G: US 19/23 and Enka Heritage Synchro Reports
Appendix H: Enka Heritage and Walk Off Way Synchro Reports
Appendix I: SimTraffic Reports

TRAFFIC IMPACT ANALYSIS
PROJECT AV2
ASHEVILLE, NORTH CAROLINA

1. INTRODUCTION

The contents of this report present the findings of the Traffic Impact Analysis (TIA) that was performed for the Project AV2 development that is to be located south of US 19/23 and to the west of Jacob Holm Way in Asheville, North Carolina. The purpose of this study is to determine the potential impacts to the surrounding transportation system created by traffic generated by the proposed development, as well as to identify any necessary improvements to mitigate the impacts.

The proposed development, anticipated to be completed in 2021, is assumed to consist of the following uses:

- 118,910 square foot Distribution Center
- 180,000 square feet of General Light Industrial space

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- Existing (2020) Traffic Conditions
- No-Build (2021) Traffic Conditions
- Build (2021) Traffic Conditions

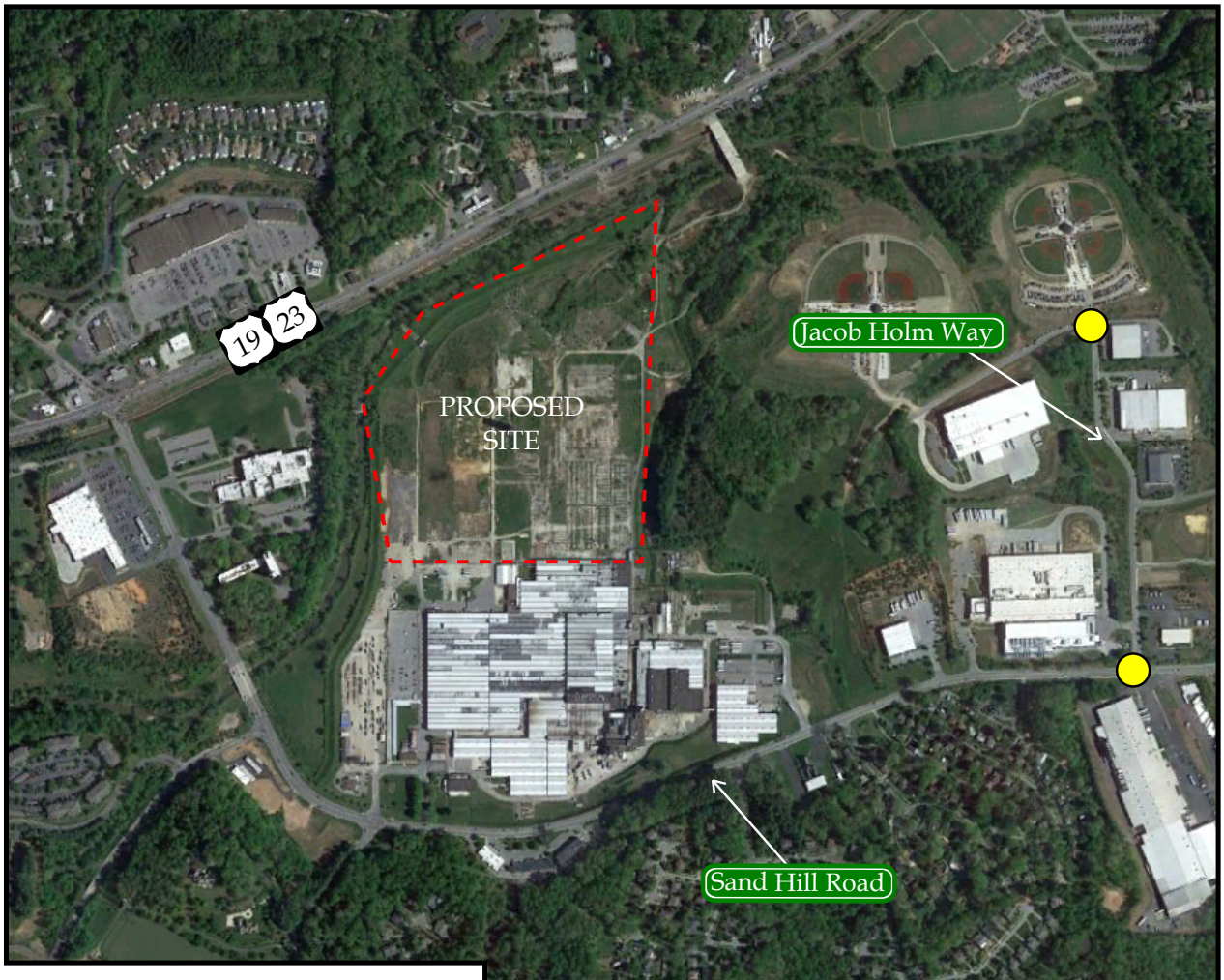
1.1. Site Location and Study Area

The development is to be located south of US 19/23 and to the west of Jacob Holm Way in Asheville, North Carolina. Refer to Figure 1 for the site location map.

The study area for the TIA was determined through coordination with the North Carolina Department of Transportation (NCDOT) and the City of Asheville (City) and consists of the following existing intersections:

- Jacob Holm Way & NC 112
- Jacob Holm Way/Bob Lewis Ballpark & Walk Off Way/Private Driveway
- Enka Heritage & Walk Off Way
- US 19/23 & Enka Heritage

Refer to Appendix A for the approved NCDOT TIA Scoping Checklist.





N

LEGEND

- Proposed Site Location
- Existing Study Intersection
- Study Area

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Project AV2
Asheville, NC

Site Location Map

Scale: Not to Scale | Figure 1

1.2. Proposed Land Use and Site Access

The proposed development, anticipated to be completed in 2021, is assumed to consist of the following uses:

- 118,910 square foot Distribution Center
- 180,000 square feet of General Light Industrial space

Access to the site is to be provided to US 19/23 via Enka Heritage and NC 112 via Walk Off Way/Jacob Holm Way. Refer to Figure 2 for a copy of the preliminary site plan.

1.3. Adjacent Land Uses

The proposed development is located in an area consisting primarily of industrial development as well as the Bob Lewis Ballpark. In additon, the Enka Intermediate School is located off of Jacob Holm Way between Walk Off Way and NC 112.

1.4. Existing Roadways

Existing lane configurations (number of traffic lanes on each intersection approach), storage capacities, and other intersection and roadway information within the study area are shown in Figure 3. Table 1 provides a summary of this information, as well.

Table 1: Existing Roadway Inventory

Road Name	Route Number	Typical Cross Section	Speed Limit	Maintained By	AADT (vpd)
Jacob Holm Way	N/A	2-lane	Not Posted	City	N/A
Smokey Park Highway	US 19/ US 23	5-lane	50 mph	NCDOT	32,000[1]
Sand Hill Road	NC 112	3-lane	35 mph	NCDOT	12,000[2]

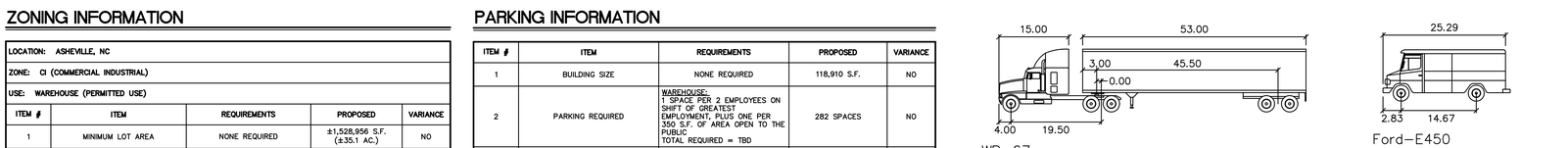
1. 2018 NCDOT Traffic Data
2. 2016 NCDOT Traffic Data

ZONING INFORMATION

LOCATION: ASHEVILLE, NC				
ZONE: CI (COMMERCIAL INDUSTRIAL)				
USE: WAREHOUSE (PERMITTED USE)				
ITEM #	ITEM	REQUIREMENTS	PROPOSED	VARIANCE
1	MINIMUM LOT AREA	NONE REQUIRED	±1,528,956 S.F. (±35.1 AC.)	NO
2	MINIMUM LOT WIDTH	100 FEET	±631 FEET	NO
3	MINIMUM LOT FRONTAGE	NONE REQUIRED	±225 FEET	NO
4	MINIMUM FRONT SETBACK	35 FEET	±264 FEET	NO
5	MINIMUM SIDE SETBACK	NONE REQUIRED	±222 FEET	NO
6	MINIMUM REAR SETBACK	10 FEET	±892 FEET	NO
7	MAXIMUM BUILDING HEIGHT	80 FEET	±36 FEET	NO
8	MAXIMUM BUILDING COVERAGE	NONE REQUIRED	±8 PERCENT	NO

PARKING INFORMATION

ITEM #	ITEM	REQUIREMENTS	PROPOSED	VARIANCE
1	BUILDING SIZE	NONE REQUIRED	118,910 S.F.	NO
2	PARKING REQUIRED	WAREHOUSE: 1 SPACE PER 2 EMPLOYEES ON SHIFT OF GREATEST EMPLOYMENT, PLUS ONE PER 350 S.F. OF AREA OPEN TO THE PUBLIC TOTAL REQUIRED = TBD	282 SPACES	NO
3	MINIMUM HANDICAPPED PARKING SPACES REQUIRED	7 SPACES	7 SPACES	NO
4	MINIMUM PARKING DIMENSIONS	9 FEET X 18 FEET	9 FEET X 18 FEET	NO
5	MINIMUM LOADING DIMENSIONS	250 S.F.	13.5 FEET X 60 FEET	NO
6	MINIMUM AISLE WIDTH	24 FEET – 2–WAY	24 FEET – 2–WAY	NO
7	MINIMUM FRONT SETBACK	35 FEET	±35 FEET	NO
8	MINIMUM SIDE SETBACK	X FEET	±10 FEET	NO
9	MINIMUM REAR SETBACK	X FEET	±30 FEET	NO
10	MINIMUM INTERIOR LANDSCAPING	1 LANDSCAPED ISLAND EVERY 15 SPACE FOR PERIMETER PARKING. 20' MEDIAN EVERY 4 BAYS FOR INTERIOR PARKING AREAS.	1 LANDSCAPED ISLAND EVERY 15 SPACE FOR PERIMETER PARKING. 20' MEDIAN EVERY 4 BAYS FOR INTERIOR PARKING AREAS.	NO



WB–67

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

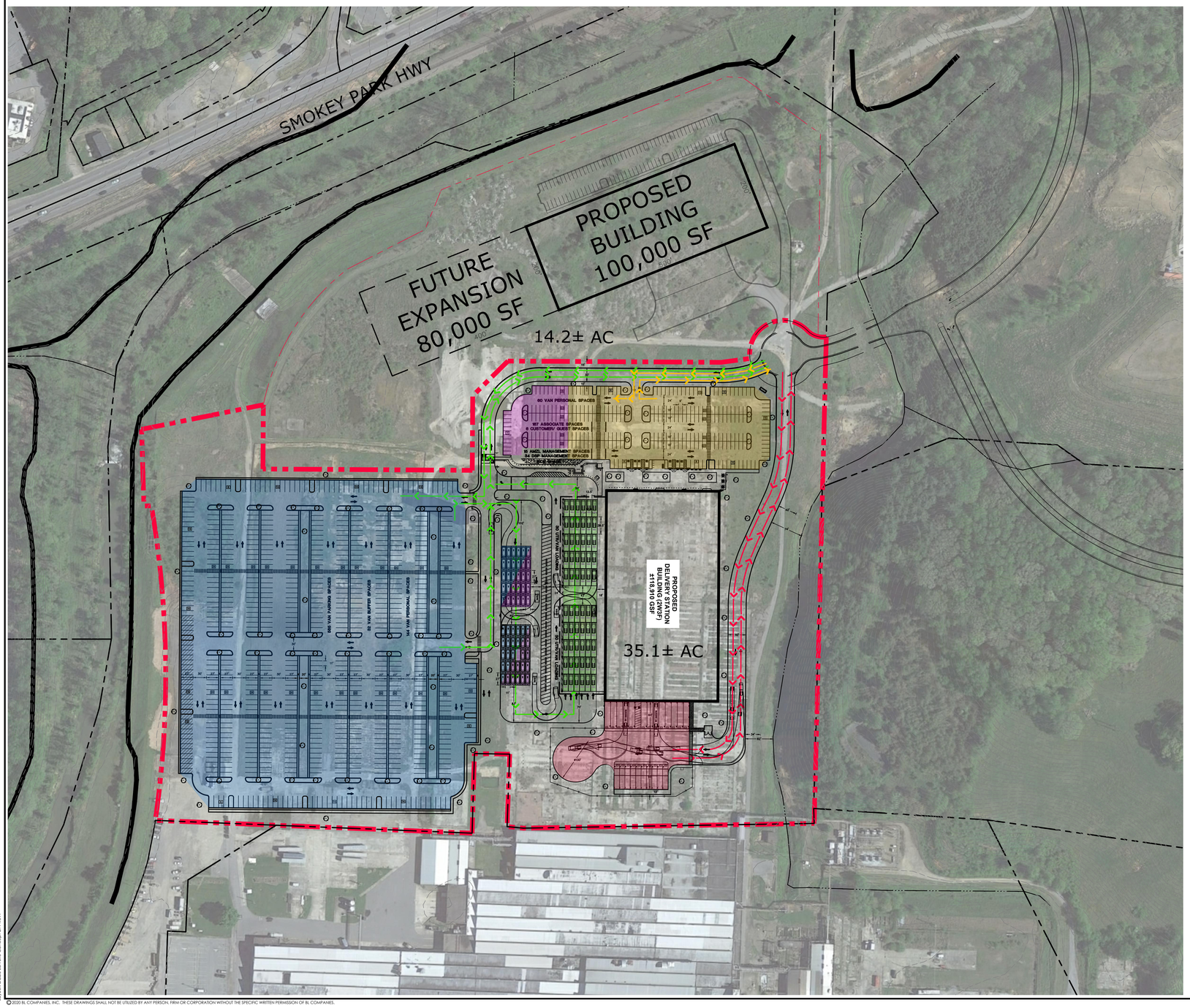
Ford–E450

	feet
Width	: 9.75
Track	: 9.75
Lock to Lock Time	: 6.0
Steering Angle	: 34.3

APPROXIMATE LOT AREA= +/- 35.1 A.C.

PARKING BREAKDOWN

PARKING	REQUIRED	PROPOSED ON–SITE	PROPOSED OFF–SITE	DELTA (+/–)
ASSOCIATE LOT				
ASSOCIATE	167	167	0	0
AMZL MANAGEMENT SPACES	15	15	0	0
DSP MANAGEMENT SPACES	34	34	0	0
CUSTOMER SPACES	3	3	0	0
GUEST SPACES	3	3	0	0
TOTAL AUTO SPACES (9'x18')	222	222	0	0
VAN LOT				
STANDARD VAN SPACES (11'X27')	560	565	0	+5
VAN PERSONAL VEHICLE (11'X27')	144	144	0	0
VAN BUFFER SPACES (11'X27')	32	32	0	0
VAN PERSONAL VEHICLE (9'X18')	72	60	0	–12
STAGING SPACES USED AS PARKING (11'X27')	–72	–60	0	–12
TOTAL VAN SPACES (11'x27')	736	741	0	–19
TOTAL PARKING	**958**	**963**	**0**	**-19**
LOADING AND STAGING AREA				
UTR/ VAN LOADING SPACES	72	60	–	–12
VAN STAGING SPACES	72	60	–	–12
TRUCK YARD				
LOADING DOCK SPACES	9	13	–	+4
TRAILER PARKING SPACES (INCL. HOSTLER)	0	10	–	+10



LEGEND

- ASSOCIATE TRAFFIC FLOW DIRECTION
- DSP/FLEX TRAFFIC FLOW DIRECTION
- TRUCK TRAFFIC FLOW DIRECTION
- INDICATES PAINTED ISLAND
- INDICATES ISLAND THAT NEEDS TO BE LANDSCAPED PER CODE. (TYPE AND QUANTITY TO BE DETERMINED DURING DETAILED DESIGN)
- EXISTING TRAFFIC LIGHT
- STOP BAR
- CROSSWALK
- WALKWAY
- JERSEY BARRIERS
- FENCE
- PROPERTY LINE
- EASEMENT LINE
- BUILDING SETBACK LINE
- PARKING/LANDSCAPE SETBACK LINE
- 100 FEMA 100 YEAR FLOOD LINE
- 500 FEMA 500 YEAR FLOOD LINE
- WETLAND LINE
- EXISTING TREE LINE
- 50 EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- EXISTING GUIDE RAIL
- EXISTING FENCE LINE
- EXISTING OVERHEAD WIRES
- EXISTING GAS LINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER LINE
- EXISTING FIRE–PROTECTION LINE
- EXISTING ELECTRICAL LINE
- E ELECTRICAL TRANSFORMER

GRAPHIC SCALE
100 50 0 100
SCALE IN FEET

Architecture
Engineering
Environmental
Land Surveying

BL Companies

355 Research Parkway
Meriden, CT 06450
(203) 630-1406
(203) 630-2615 Fax

PROPOSED DEVELOPMENT
SAND HILL ROAD
ASHEVILLE, NC

REVISIONS No.	Date	Desc.

Designed	T.A.M.
Drawn	T.A.M.
Reviewed	
Scale	1"=100'
Project No.	2001500
Date	9/30/2020
CAD File	SC200150002

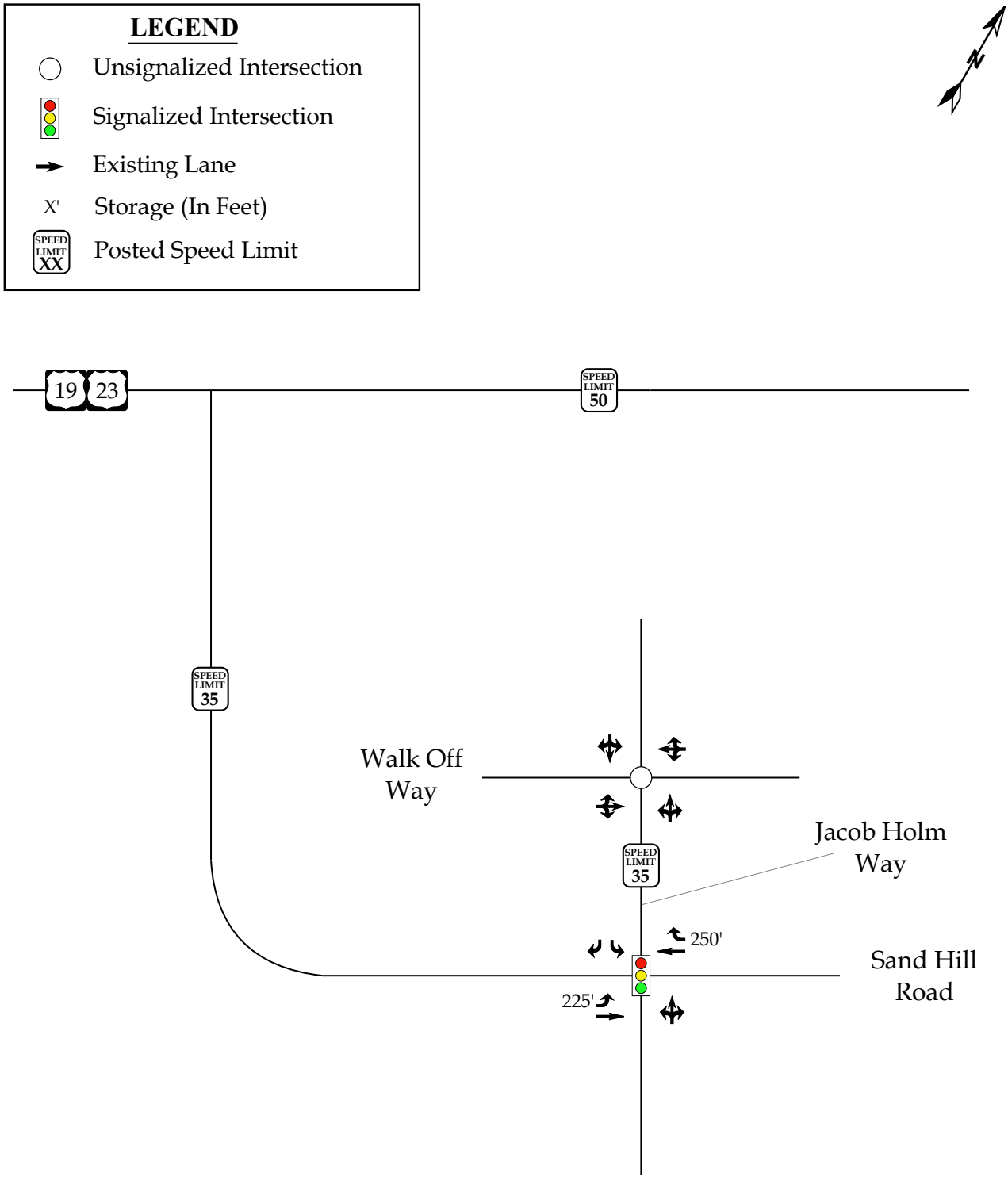
Title
SITE CONCEPT - DCD3

Sheet No.
SC (R1)

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Date/Time: 9/30/2020 2:58pm by Thomas Mc. Cann
Dwg. No.: D:\2001500\DWG\SC200150002.dwg
Layout: DCD3 Last Saved by: thomas.mccann
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Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Existing (2020) Lane Configurations and Traffic Control Scale: Not to Scale | Figure 3

2. EXISTING (2020) PEAK HOUR CONDITIONS

2.1. Existing (2020) Peak Hour Traffic Volumes

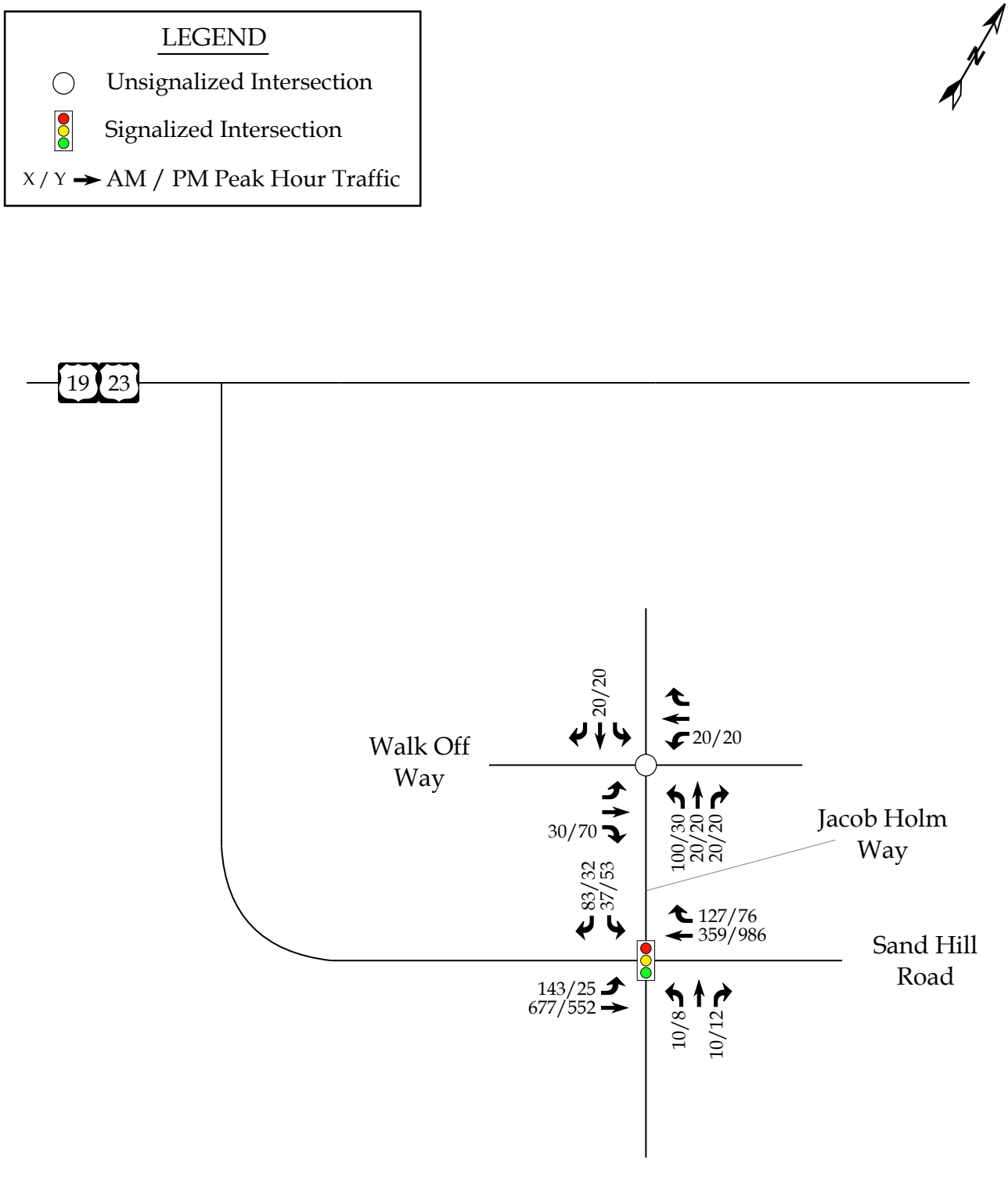
Existing peak hour traffic volumes were determined based on traffic counts conducted at the intersection of NC 112 and Jacob Holm Way/Private Driveway during the weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods by Burns Service, Inc. (BSI) in October of 2020.

Per discussions with NCDOT, the weekday AM and PM peak hour traffic volumes obtained from the traffic counts were increased by 10% and compared to the existing (2014) peak hour volumes [contained within the Enka Center TIA that was prepared by Mattern & Craig] that were projected to 2020 by applying a compounded annual growth rate of 3%. Based on this comparison, it was determined that the recently collected peak hour volumes for the overall intersection [plus 10%] was greater and was therefore utilized for this analysis. Refer to Figure 4 for an illustration of the existing (2020) weekday AM and PM peak hour traffic volumes. Please note that traffic volumes may not balance between intersections due to existing operations located on Jacob Holm Way and Walk Off Way. A copy of the count data, the Enka Center TIA's existing peak hour volumes figure, and a comparison of the peak hour traffic volumes can be found in Appendix B.

Utilizing the Traffic Study Report and Analysis that was prepared by Congestion Management for the Enka Heritage Shortcut, assumptions were made for the peak hour traffic volumes at the intersection of Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway.

2.2. Analysis of Existing (2020) Peak Hour Traffic Conditions

The existing (2020) weekday AM and PM peak hour traffic volumes were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. The plan for the existing signalized intersection was obtained and is included in Appendix C. With Enka Intermediate School located off of Jacob Holm Way, north of NC 112, a PHF of 0.75 was utilized at the intersection of NC 112 and Jacob Holm Way for the eastbound left turn and westbound right turn movements [onto Jacob Holm Way] as well as the southbound turn movements [onto NC 112] during the AM peak hour [as referenced in the Traffic Study Report and Analysis for the Enka Heritage Shortcut]. That study also suggested a heavy vehicle percentage of 10% at this intersection as well as the intersection of Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway to account for trucks within the industrialized area. Therefore, this percentage was assumed for all movements except for the eastbound and westbound through movements on NC 112 and the movements associated with the Bob Lewis Ballpark. The results of the analysis are presented in Section 7 of this report.



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Project AV2
Asheville, NC

Existing (2020) Peak Hour Traffic Volumes

Scale: Not to Scale | Figure 4

3. NO-BUILD (2021) PEAK HOUR CONDITIONS

In order to account for growth of traffic and subsequent traffic conditions at a future year, no-build traffic projections are needed. No-build traffic is the component of traffic due to the growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed development is constructed. No-build traffic is comprised of background traffic growth within the study area, and additional traffic created by approved adjacent developments.

3.1. Ambient Traffic Growth

Through coordination with the City and NCDOT, it was determined that an annual growth rate of 2% would be used to calculate projected (2021) weekday AM and PM peak hour traffic volumes. In order to estimate the peak hour traffic volumes on US 19/23, the 2018 AADT was multiplied by 10% and distributed based on the traffic patterns illustrated in the existing traffic volumes figure [between Brookside Circle and Action Circle] contained within the Enka Center TIA and then projected to the year 2021. Refer to Figure 5 for an illustration of the projected (2021) weekday AM and PM peak hour traffic volumes.

3.2. Approved Development Traffic

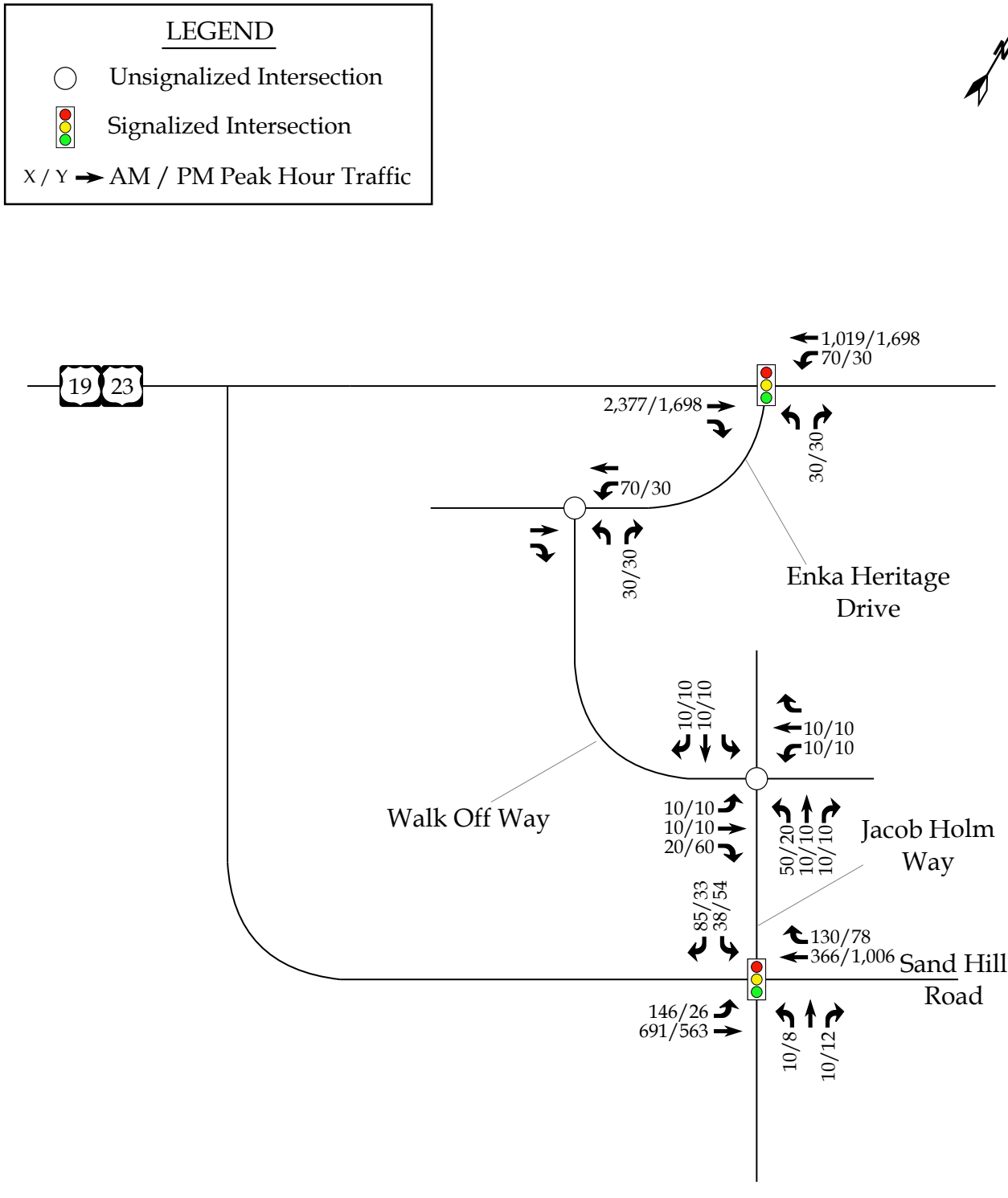
It is understood that there are no approved developments that need to be considered as part of this analysis.

3.3. Future Roadway Improvements

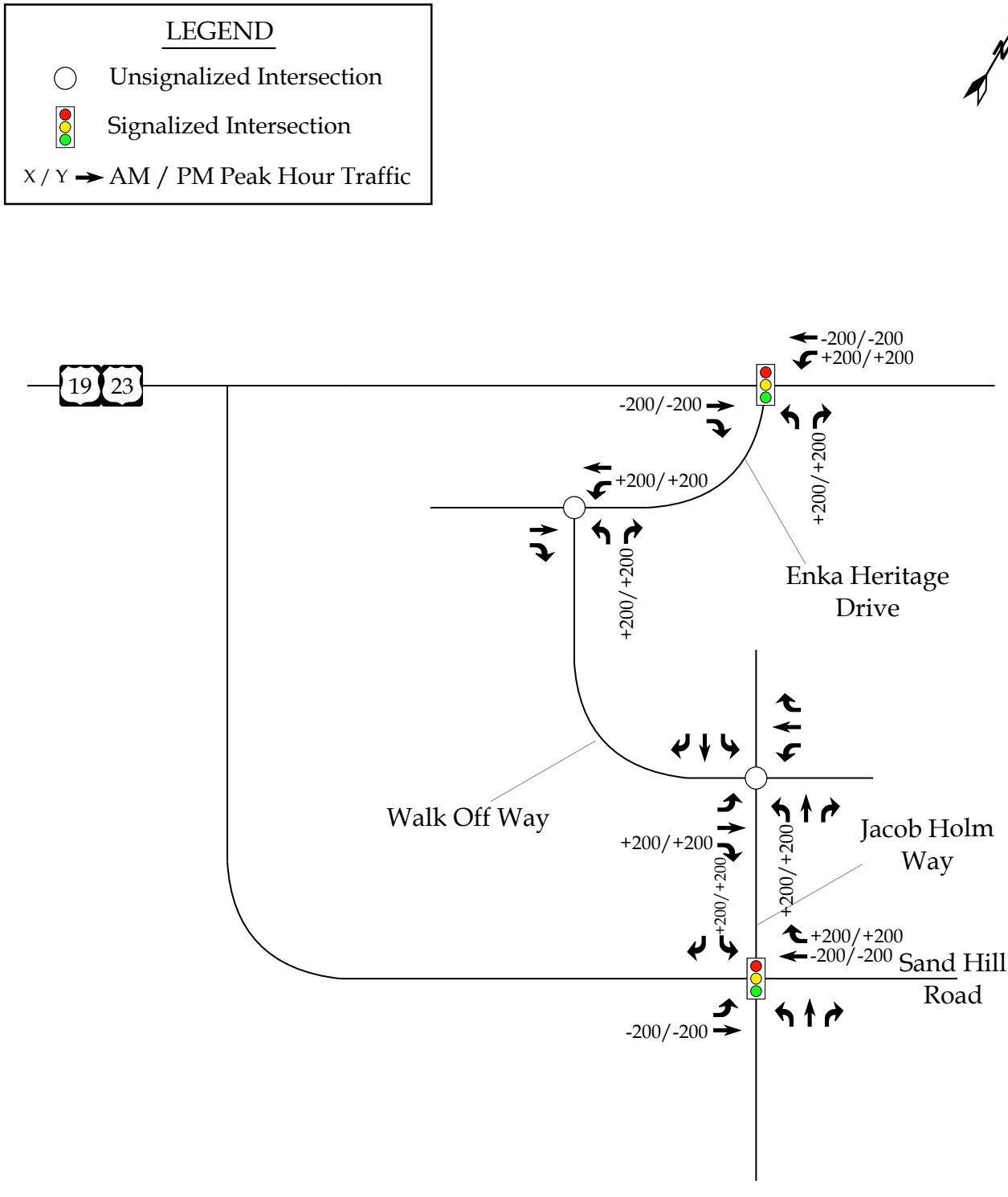
Based on coordination with NCDOT, it is understood that the roadway improvements to be provided as part of State Transportation Improvement Program (STIP) projects U-6230 and U-6251 should be accounted for in this study.

Walk Off Way is to be extended under STIP U-6230. A three-lane roadway is to be constructed from the existing terminus to intersect with Enka Heritage that is to be constructed under STIP U-6251. Enka Heritage is to be constructed from Walk Off Way to the bridge as a three-lane roadway where it will transition to a four-lane cross-section that will connect to US 19/23. A traffic signal is to be installed at the intersection with US 19/23.

With the completion of Walk Off Way and Enka Heritage, a connection is provided between NC 112 and US 19/23. Based on the Traffic Study Report and Analysis for the Enka Heritage Shortcut, it was assumed that 200 vehicles would utilize this route as a shortcut by making a right turn onto Jacob Holm Way [from NC 112] and then US 19/23 [from Enka Heritage] and vice versa with left turns made onto Enka Heritage [from US 19/23] and then NC 112 [from Jacob Holm Way]. Refer to Figure 6 for an illustration of the traffic adjustments associated with the NCDOT STIP projects.



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Projected (2021) Peak Hour Traffic Volumes	
		Scale: Not to Scale	Figure 5



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Peak Hour (2021) Traffic Adjustment Volumes Scale: Not to Scale | Figure 6

3.4. No-Build (2021) Peak Hour Traffic Volumes

The no-build (2021) traffic volumes were determined by combining the projected (2021) peak hour traffic volumes and the traffic adjustments for the new route between NC 112 and US 19/23. Refer to Figure 7 for an illustration of the no-build (2021) peak hour traffic volumes at the study intersections.

3.5. Analysis of No-Build (2021) Peak Hour Traffic Conditions

The no-build (2021) AM and PM peak hour traffic volumes at the study intersections were analyzed with the future roadway improvements and traffic control using the same methodology previously discussed for existing traffic conditions. In addition, a heavy vehicle percentage of 10% was assumed for all movements at the intersections of Walk Off Way and US 19/23 with Enka Heritage except for the eastbound and westbound through movements on US 19/23. The analysis results are presented in Section 7 of this report.

4. SITE TRIP GENERATION AND DISTRIBUTION

4.1. Trip Generation

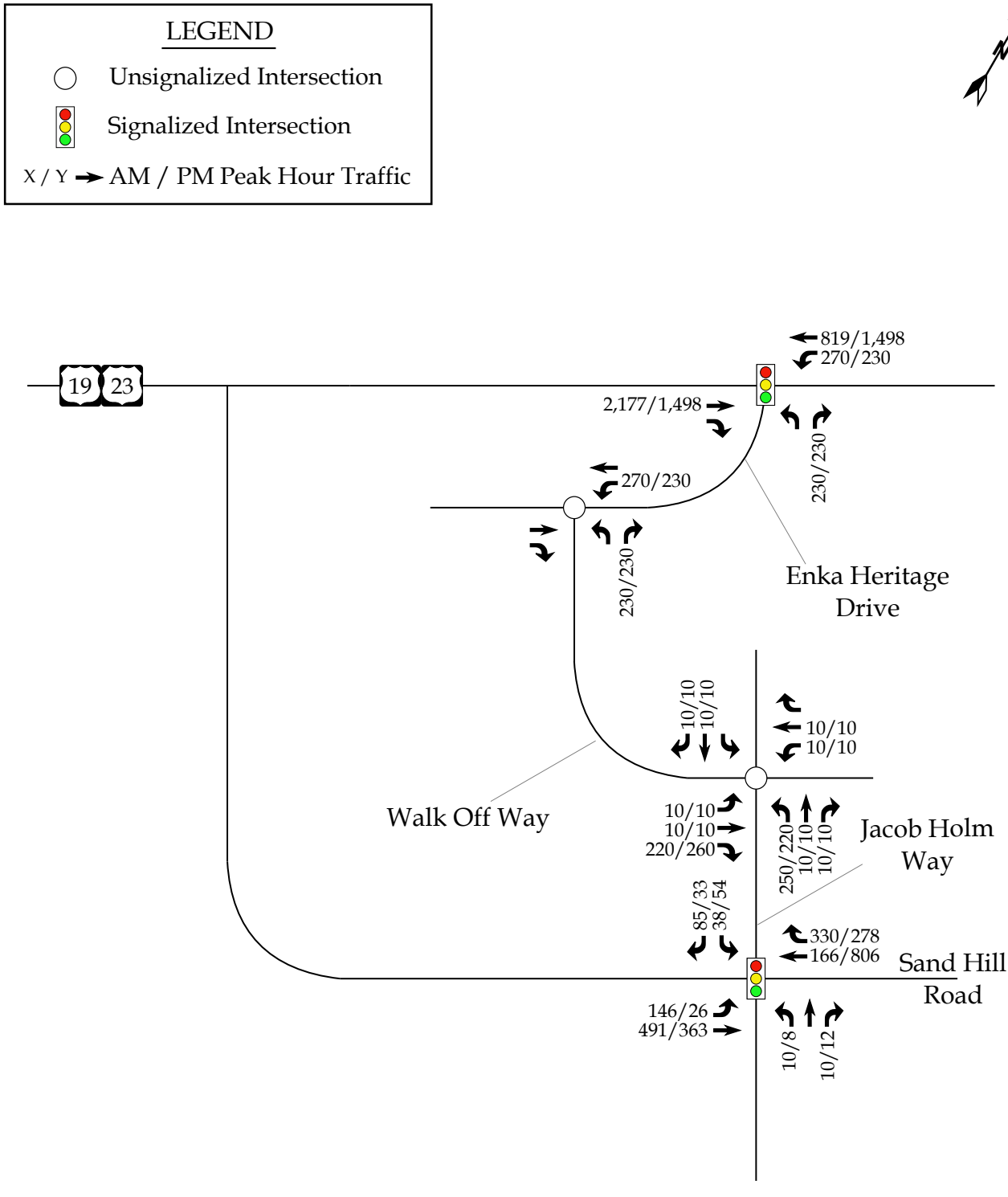
The proposed development is assumed to consist of a 118,910 square foot distribution center and 180,000 square feet of general light industrial space. While site trip generation data was provided for the distribution center (refer to Appendix D), average weekday daily, AM peak hour, and PM peak hour trips for the general light industrial was estimated using methodology contained within the ITE Trip Generation Manual, 10th Edition. Table 2 provides a summary of the trip generation results for the site.

Table 2: Trip Generation Summary

Land Use (ITE Code)	Square Footage	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)		Weekday PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Distribution Center[1]	118,910	1,238	91	181	100	127
General Light-Industrial (110)	180,000	740	61	8	7	48
Total		**1,978**	**152**	**189**	**107**	**175**

1. Peak hour trips based on peak times of the distribution center.

It is estimated that the proposed development could generate up to 1,978 total trips (989 entering and 989 exiting) during a typical 24-hour weekday period Of the daily traffic volumes, it is anticipated that 341 trips (152 entering and 189 exiting) will occur during the weekday AM peak hour and 282 trips (107 entering and 175 exiting) during the weekday PM peak hour.



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	No-Build (2021) Peak Hour Traffic Volumes Scale: Not to Scale | Figure 7

4.2. Site Trip Distribution and Assignment

Trip distribution percentages used in assigning traffic for this development were developed based on existing traffic patterns, population centers, and engineering judgment.

It is estimated that the site trips will be regionally distributed as follows:

- 10% to/from the east via NC 112
- 10% to/from the west via NC 112
- 50% to/from the east via US 19/23
- 30% to/from the west via US 19/23

The site trip distribution is shown in Figure 8 while the site trip assignment is shown in Figure 9.

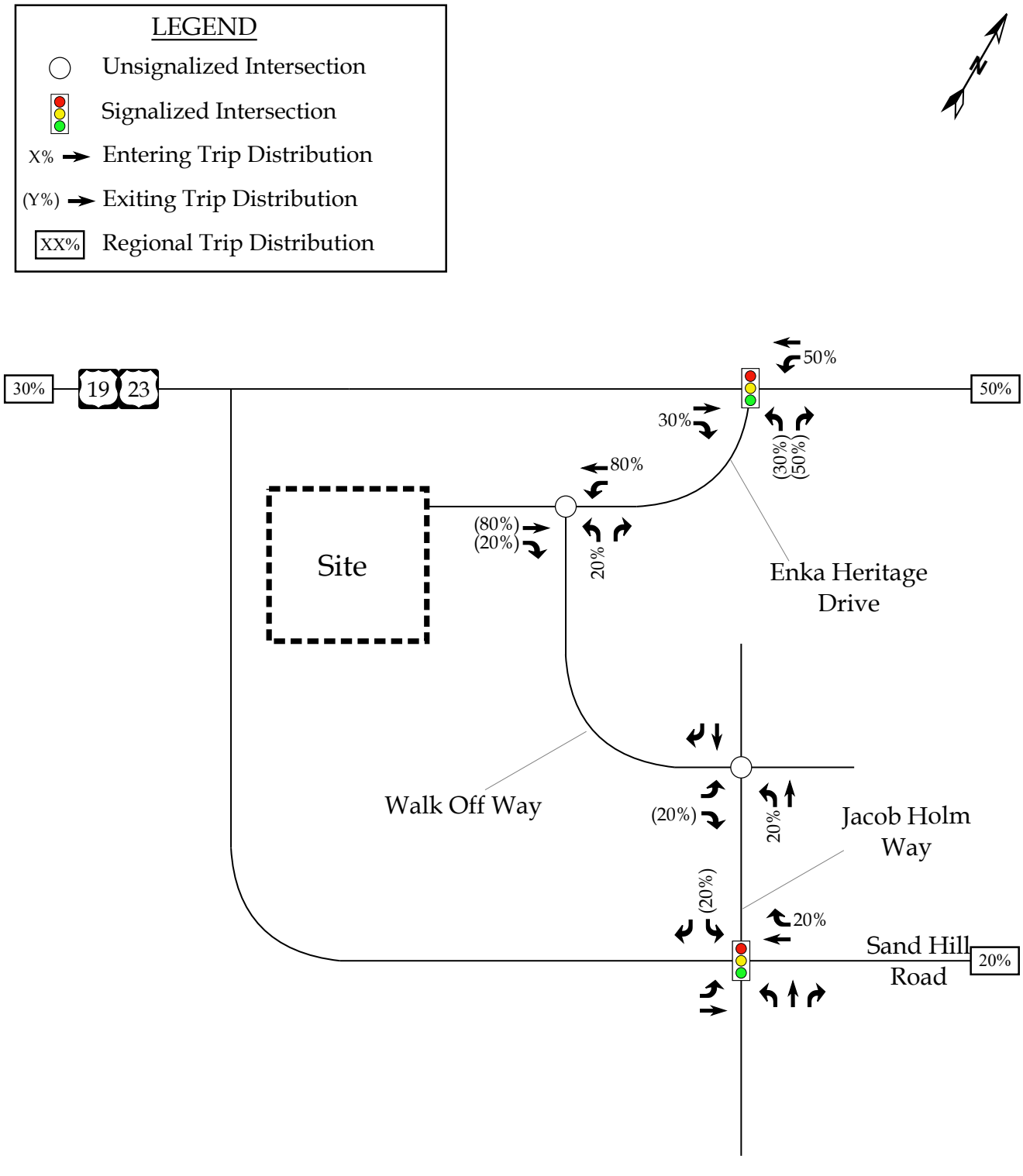
5. BUILD (2021) TRAFFIC CONDITIONS

5.1. Build (2021) Peak Hour Traffic Volumes

To estimate traffic conditions with the site fully built out, the site trips were added to the no-build (2021) traffic volumes to determine the build (2021) traffic volumes. Refer to Figure 10 for an illustration of the build (2021) peak hour traffic volumes with the proposed site fully developed.

5.2. Analysis of Build (2021) Peak Hour Traffic Conditions

Study intersections were analyzed with the build (2021) traffic volumes using the same methodology previously discussed for no-build traffic conditions. The results of the capacity analysis for each intersection are presented in Section 7 of this report.

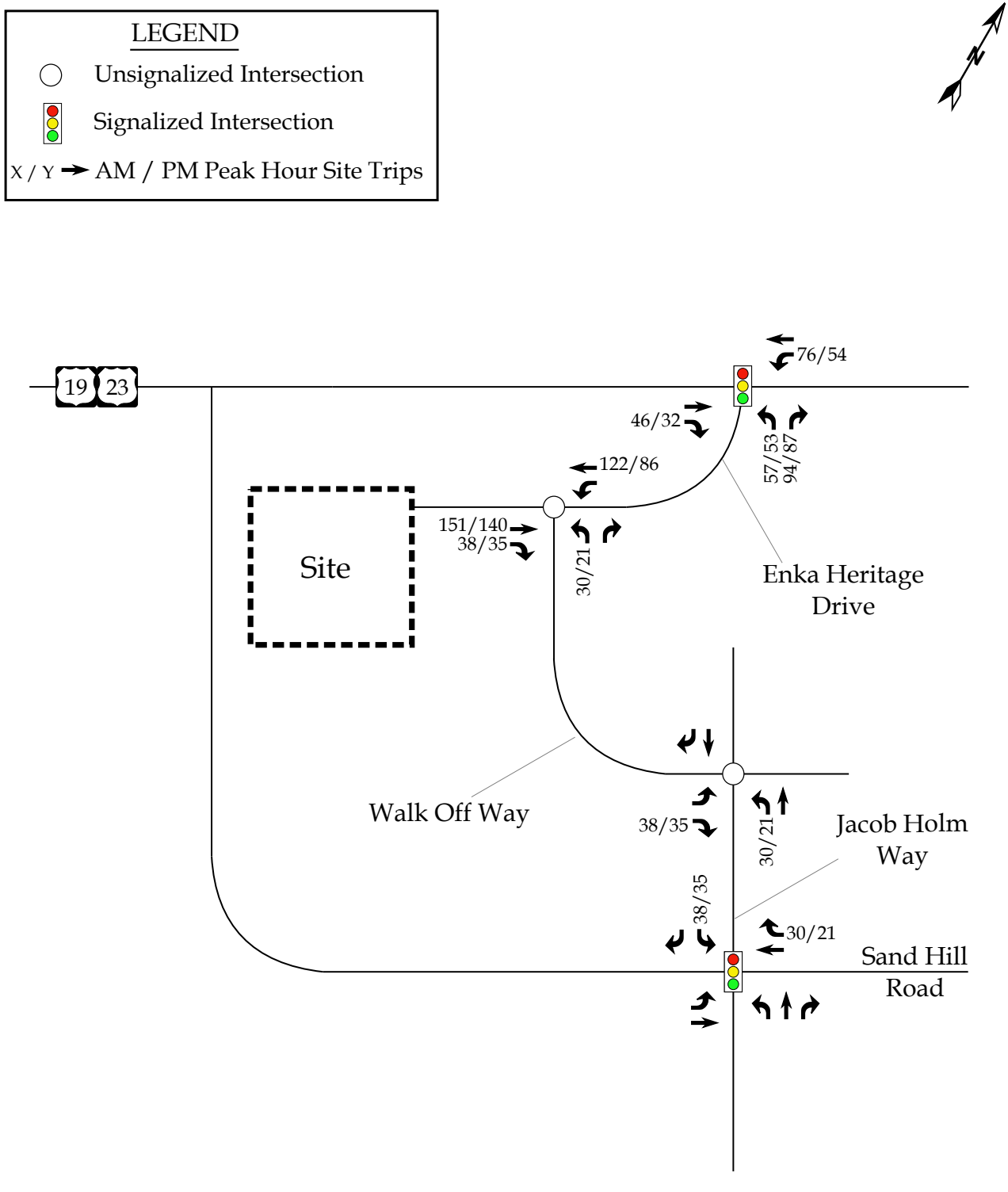


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RKA
RAMEY KEMP ASSOCIATES

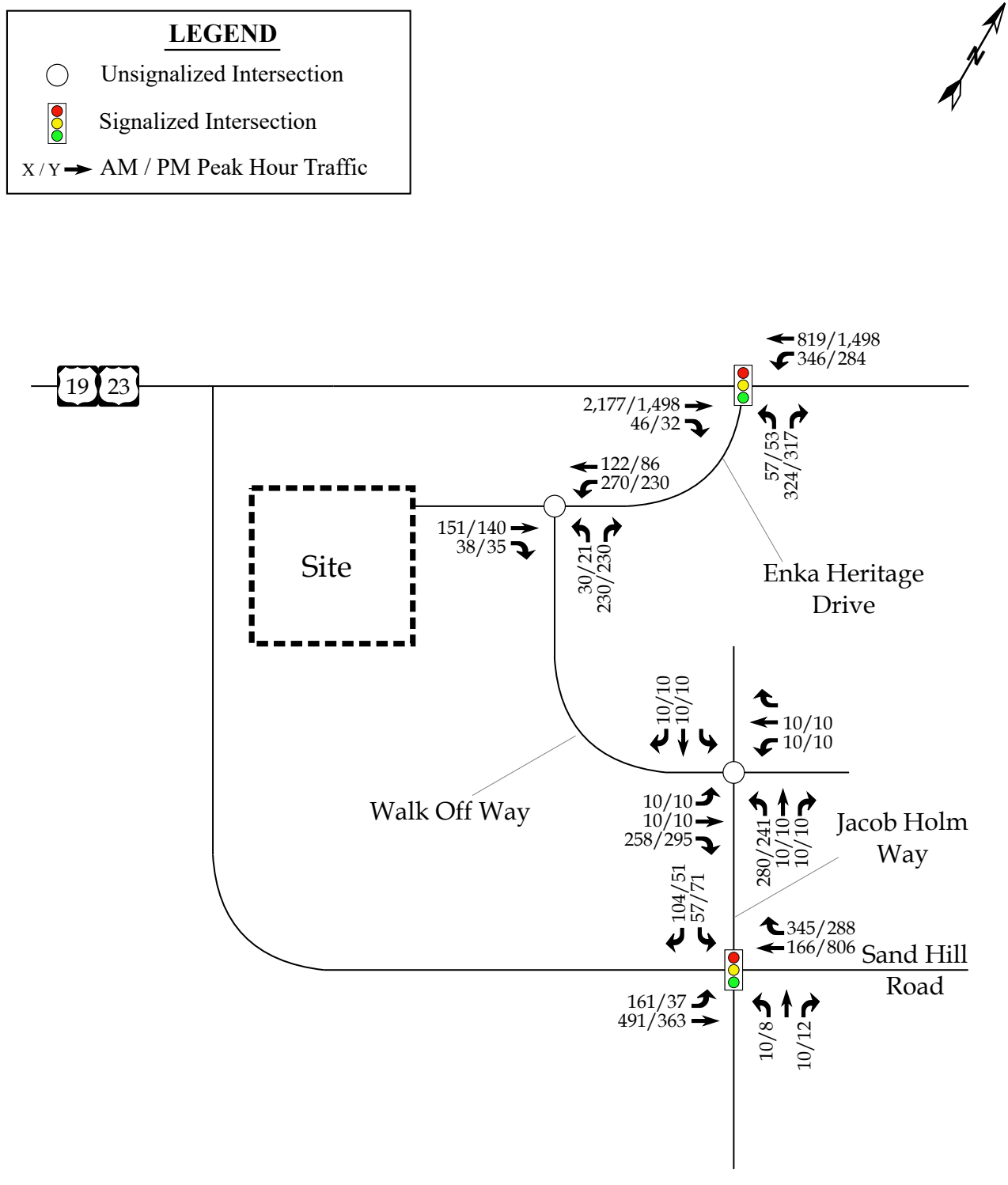
Project AV2
Asheville, NC

Site Trip Distribution

Scale: Not to Scale | Figure 8



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Site Trip Assignment Scale: Not to Scale | Figure 9



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Build (2021) Peak Hour Traiffc Volumes Scale: Not to Scale | Figure 10

6. TRAFFIC ANALYSIS PROCEDURE

Study intersections were analyzed using the methodology outlined in the *Highway Capacity Manual* (HCM) published by the Transportation Research Board. Level of service and delay are the design criteria for this traffic study. A computer software package, Synchro (Version 10.3), was used to complete the analyses for the study area intersections.

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions." Level of service (LOS) is a term used to represent different driving conditions and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers." Level of service varies from Level "A" representing free flow, to Level "F" where greater delays are evident. Refer to Table 3 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by the HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay". An average control delay of 40 seconds at a signalized intersection results in LOS D.

Table 3: Highway Capacity Manual – Levels-of-Service and Delay

SIGNALIZED INTERSECTION		UNSIGNALIZED INTERSECTION	
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)
A	0-10	A	0-10
B	10-20	B	10-15
C	20-35	C	15-25
D	35-55	D	25-35
E	55-80	E	35-50
F	>80	F	>50

6.1. Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the NCDOT Congestions Management Guidelines unless otherwise noted.

7. CAPACITY ANALYSIS

7.1. NC 112 and Jacob Holm Way/Private Driveway

The existing signalized intersection of NC 112 and Jacob Holm Way/Private Driveway was analyzed under existing (2020), no-build (2021), and build (2021) traffic conditions with the lane configurations shown in Table 4. No right turns on red were permitted under all traffic scenarios. In addition, the existing eastbound protected-permissive left turn phasing was analyzed as protected only under no-build and build traffic scenarios. Refer to Table 4 for a summary of the analysis results. Refer to Appendix E for the Synchro capacity analysis reports.

Table 4: Analysis Summary of NC 112 and Jacob Holm Way/Private Driveway

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR		WEEKDAY PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
Existing (2020) Conditions	EB WB NB SB	1 LT, 1 TH 1 TH, 1 RT 1 LT-TH-RT 1 LT, 1 RT	A (4.4) B (13.9) C (21.6) B (15.1)	A (8.9)	A (3.6) B (17.8) D (38.7) D (38.0)	B (14.4)
No-Build (2021) Conditions	EB WB NB SB	1 LT, 1 TH 1 TH, 1 RT 1 LT-TH-RT 1 LT, 1 RT	A (10.0) B (17.8) C (33.4) C (22.0)	B (14.8)	A (4.8) B (10.7) D (37.1) C (34.5)	B (10.9)
Build (2021) Conditions	EB WB NB SB	1 LT, 1 TH 1 TH, 1 RT 1 LT-TH-RT 1 LT, 1 RT	B (12.6) C (21.9) C (33.6) C (24.2)	B (18.1)	A (6.5) B (14.4) D (36.5) D (36.1)	B (14.4)

Capacity analysis of existing (2020) traffic conditions indicates the intersection of NC 112 and Jacob Holm Way/Private Driveway operates at an overall LOS A during the weekday AM peak hour and LOS B during the PM peak hour. Under no-build and build (2021) traffic conditions, the intersection is expected to operate at an overall LOS B during the peak hours. In addition, all intersection approaches are expected to operate at LOS D or better.

While the need for mitigation should be addressed if the level of service degrades by at least one level or the total average delay of the intersection or an individual approach increases by at least 25% while maintaining the same level of service, no mitigation was identified considering that the overall intersection and all approaches are expected to operate at an

acceptable LOS D or better while the increase in delays are expected to be less than 4.5 seconds per vehicle.

7.2. Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway

The existing unsignalized intersection of Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway was analyzed as an all-way stop-controlled intersection under existing (2020), no-build (2021), and build (2021) traffic conditions with the lane configurations shown in Table 5. Refer to Table 5 for a summary of the analysis results. Refer to Appendix F for the Synchro capacity analysis reports.

Table 5: Analysis Summary of Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR		WEEKDAY PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
Existing (2020) Conditions	EB WB NB SB	1 RT-TH-LT 1 RT-TH-LT 1 RT-TH-LT 1 RT-TH-LT	A (7.1) A (7.8) A (8.3) A (7.4)	A (7.9)	A (7.0) A (7.6) A (7.7) A (7.4)	A (7.4)
No-Build (2021) Conditions	EB WB NB SB	1 RT-TH-LT 1 RT-TH-LT 1 RT-TH-LT 1 RT-TH-LT	A (9.2) A (8.5) B (11.3) A (8.0)	B (10.1)	A (9.6) A (8.4) B (11.0) A (8.0)	B (10.1)
Build (2021) Conditions	EB WB NB SB	1 RT-TH-LT 1 RT-TH-LT 1 RT-TH-LT 1 RT-TH-LT	A (10.0) A (8.6) B (12.4) A (8.2)	B (11.0)	B (10.3) A (8.6) B (11.7) A (8.2)	B (10.7)

Capacity analysis of existing (2020) traffic conditions indicates the intersection and all the approaches experience minor overall delays and operate at LOS A during the AM and PM peak hours. Under no-build and build (2021) traffic conditions, the intersection and all the approaches are expected to experience minor overall delays and operate at a LOS B or better during the peak hours.

While the need for mitigation should be addressed if the level of service degrades by at least one level, no mitigation was identified considering that the eastbound approach of Walk Off Way is expected to operate at an acceptable LOS B during the PM peak hour while the increase in delay is expected to be less than a second per vehicle.

7.3. US 19/23 and Enka Heritage

The future signalized intersection of US 19/23 and Enka Heritage was analyzed under no-build (2021) and build (2021) traffic conditions with the lane configurations shown in Table 6. No right turns on red were permitted under the traffic scenarios. In addition, the westbound left turn movement was analyzed as protected only. Refer to Table 6 for a summary of the analysis results. Refer to Appendix G for the Synchro capacity analysis reports.

Table 6: Analysis Summary of US 19/23 and Enka Heritage

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR		WEEKDAY PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
No-Build (2021) Conditions	EB WB NB	1 TH, 1 TH-RT 1 LT, 2 TH 2 LT, 1 RT	C (30.2) C (24.3) E (65.3)	C (30.7)	B (15.9) A (6.5) C (33.8)	B (12.4)
Build (2021) Conditions	EB WB NB	1 TH, 1 TH-RT 1 LT, 2 TH 2 LT, 1 RT	F (92.7) D (41.7) D (54.6)	E (73.1)	C (29.2) B (12.2) C (31.9)	C (21.2)

Capacity analysis of no-build (2021) traffic conditions indicates the intersection of US 19/23 and Enka Heritage and is expected to operate at an overall LOS C or better during the AM and PM peak hours. Under build (2021) traffic conditions, the intersection is expected to operate at an overall LOS E during the AM peak hour and LOS C during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS D or better except for the northbound approach of Enka Heritage [under the no-build scenario] and the eastbound approach of US 19/23 [under the Build scenario] during the AM peak hour.

While the need for mitigation should be addressed if the level of service degrades by at least one level or a LOS F, no mitigation was identified considering the conservative approach that was taken when generating traffic for the proposed development. The distribution center's peak hours of generation during the morning and evening hours where distributed and assigned to the study intersections. When you evaluate the distribution center's traffic generation during the typical weekday peak hours of the surrounding transportation system, the overall traffic impact would be reduced by a total of 271 trips during the AM peak hour

and 151 trips during the PM peak hour. This reduction would likely result in levels of operation more comparable to the no-build traffic scenario.

7.4. Enka Heritage and Walk Off Way

The future unsignalized intersection of Enka Heritage and Walk Off Way was analyzed under no-build (2021) and build (2021) traffic conditions with the lane configurations shown in Table 7. Enka Heritage will provide access to the proposed development west of the Walk Off Way intersection. Refer to Table 7 for a summary of the analysis results. Refer to Appendix H for the Synchro capacity analysis reports.

Table 7: Analysis Summary of Enka Heritage and Walk Off Way

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR		WEEKDAY PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
No-Build (2021) Conditions	EB WB[1] NB[2]	1 TH-RT 1 LT, 1 TH 1 LT, 1 RT	A (0.0) A (7.9) A (9.6)	N/A	A (0.0) A (7.8) A (9.6)	N/A
Build (2021) Conditions	EB WB[1] NB[2]	1 TH-RT 1 LT, 1 TH 1 LT, 1 RT	A (0.0) A (8.5) B (12.7)	N/A	A (0.0) A (8.3) B (11.7)	N/A

1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.

Capacity analysis of no-build and build (2021) traffic conditions indicates the westbound main street left turn movement on Enka Heritage is expected to experience minor delays and operate at LOS A during the AM and PM peak hours. The stop-controlled minor approach of Walk Off Way is expected to experience minor overall delays and operate at LOS B or better.

While the need for mitigation should be addressed if the level of service degrades by at least one level, no mitigation was identified considering that the northbound approach of Walk Off Way is expected to operate at an acceptable LOS B during the AM and PM peak hours while the increase in delays is expected to be less than 3.5 seconds per vehicle.

8. CONCLUSIONS

This Traffic Impact Analysis was performed to determine the potential traffic impact of the proposed development, located south of US 19/23 and to the west of Jacob Holm Way in

Asheville, North Carolina. The proposed development, anticipated to be completed in 2021, is assumed to consist of a 118,910 square foot Distribution Center and 180,000 square feet of General Light Industrial space. Access to the site is to be provided to US 19/23 via Enka Heritage and NC 112 via Walk Off Way/Jacob Holm Way.

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- Existing (2020) Traffic Conditions
- No-Build (2021) Traffic Conditions
- Build (2021) Traffic Conditions

Trip Generation

It is estimated that the proposed development could generate up to 1,978 total trips (989 entering and 989 exiting) during a typical weekday with 341 trips (152 entering and 189 exiting) during the AM peak hour and 282 trips (107 entering and 175 exiting) during the PM peak hour.

Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to NCDOT Congestion Management Guidelines unless otherwise noted.

Capacity Analysis Summary

All the study area intersections are expected to operate at acceptable levels of service under existing, no-build, and build traffic conditions except for the intersection of US 19/23 and Enka Heritage during the AM peak hour under the build scenario. However, this is primarily the result of the conservative approach that was taken when generating traffic for the proposed development. The anticipated trip generation for the distribution center during the typical weekday peak hours of the surrounding transportation system would decrease the overall traffic impact by a total of 271 trips during the AM peak hour. This reduction would likely result in levels of operation more comparable to the no-build traffic scenario.

Queueing Analysis Summary

In addition to the capacity analysis, a queuing analysis was performed utilizing SimTraffic to develop traffic simulation models for the weekday AM and PM peak hours under no-build and build traffic conditions. Based on a review of the maximum queues that are based on an average of five (5) traffic simulation runs and the 95th percentile queues calculated by Synchro, the only queuing issues were observed on US 19/23 at the intersection with Enka

Heritage during the AM peak hour where queues on the eastbound and westbound approaches could exceed 1,000 feet on occasions. However, upstream and downstream traffic signals could be expected to help meter the arrival of traffic that should result in improved queuing conditions on US 19/23. Furthermore, as previously mentioned, a conservative approach was taken when generating and assigning traffic for the proposed development that considered the distribution center's peak times of generation during the morning and evening hours. When you evaluate the distribution center's traffic generation during the typical weekday peak hours of the surrounding transportation system, the overall traffic impact would be reduced by a total of 271 trips during the AM peak hour and 151 trips during the PM peak hour. This reduction would likely result in conditions comparable to the no-build traffic scenario. Refer to Appendix I for the SimTraffic queuing analysis reports.

9. RECOMMENDATIONS

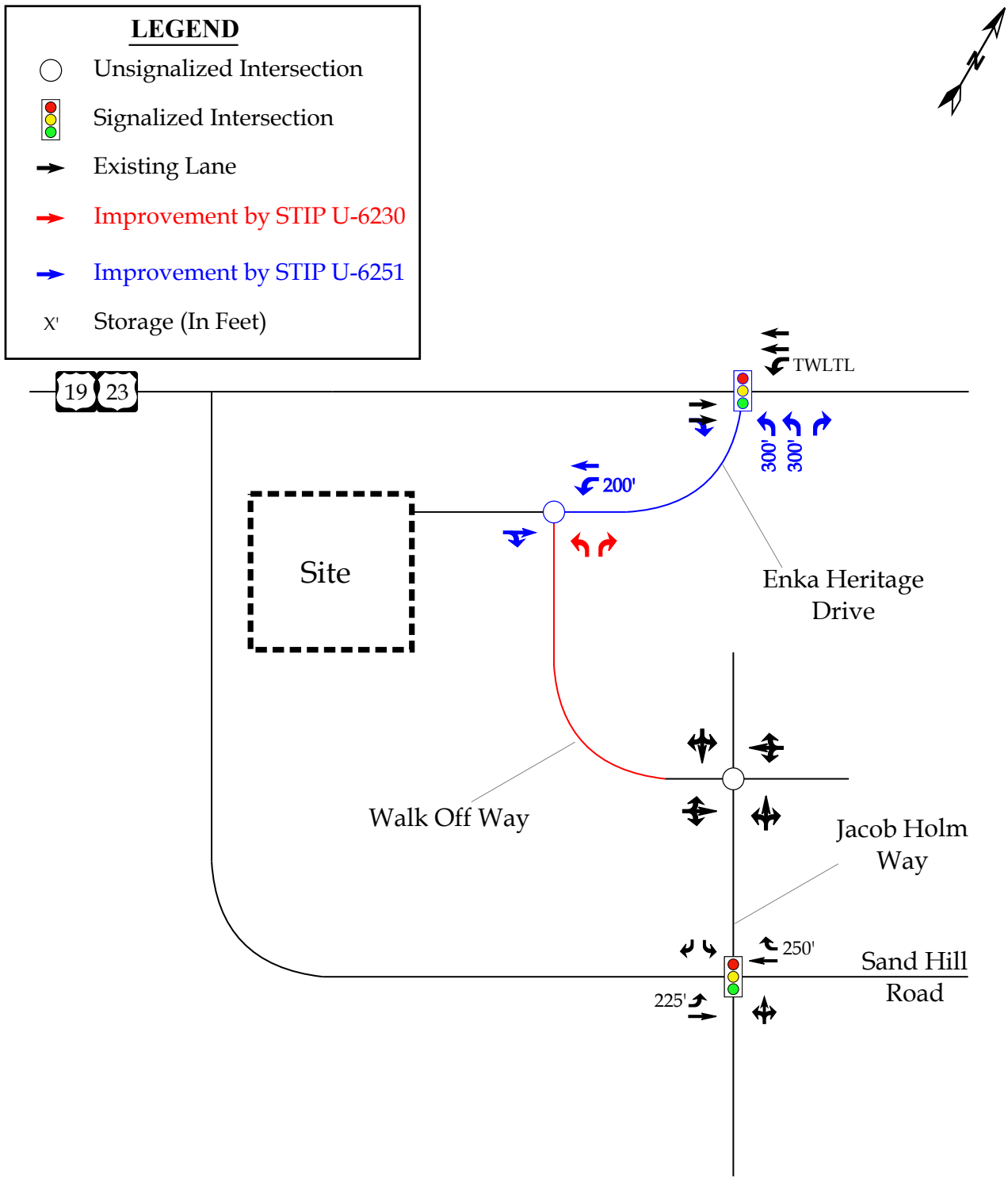
Based on the findings of this study, no additional improvements have been recommended to accommodate the proposed development traffic. Refer to Figure 11 for an illustration of the future lane configurations and traffic control as summarized below.

Improvements by NCDOT STIP U-6230

Walk Off Way is to be extended under STIP U-6230. A three-lane roadway is to be constructed from the existing terminus to intersect with Enka Heritage that is to be constructed under STIP U-6251.

Improvements by NCDOT STIP U-6251

Enka Heritage is to be constructed under STIP U-6251. A three-lane roadway is to be constructed from Walk Off Way to the bridge where it will transition to a four-lane cross-section that will connect to US 19/23. A traffic signal is to be installed at the intersection with US 19/23.



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Future (2021) Lane Configurations and Traffic Control Scale: Not to Scale | Figure 11

TECHNICAL APPENDIX

APPENDIX A

APPROVED TIA SCOPING CHECKLIST

NCDOT Traffic Impact Analysis Need Screening / Scoping Request

TIA Need Screening → TIA Scoping → TIA Submittal

A Traffic Impact Analysis (TIA) may be required for developments based on the site trip generation estimates, site context, or at the discretion of the NCDOT District Engineer. The Applicant or the TIA Consultant shall submit this form along with the site plan to the District Engineer to determine the TIA need and, if a TIA is required, initiate the TIA scoping process. Without an approved scope, the TIA is incomplete and will be rejected until the study is revised to conform to NCDOT's TIA requirements.

Project Name: Project AV2 **Previous Name:** If Applicable

Location: South of US 19/23 west of Jacob Holm Way **County:** Buncombe **Municipality:** Asheville

Project Description: A 118,910 square foot Distribution Center and180,000 square feet of General Light Industrial space

Project Contact:	Applicant	TIA Consultant
Company Name	Samet Corporation	Ramey Kemp Associates
Contact Person	Hunter Nichols	Jay Clapp
Phone Number	336-544-2600	336-725-5470
Email	hnichols@sametcorp.com	jclapp@rameykemp.com
Mailing Address	309 Gallimore Dairy Road, Suite 102 Greensboro, NC 27409	621 Jonestown Road, Suite 221 Winston-Salem, NC 27103

Site Plan Prepared By: Bl Companies **Site Plan Date:** 9/30/2020

See site plan/vicinity map requirements on page 2.

Parcel Size: 35.1 +/- Acre(s) **Anticipated Build-Out Year:** 2021

Weekday Site Trip Generation - Do NOT adjust for mode split, pass-by, internal capture, or diverted trips.

ITE LUC	Proposed Land Use	Size	Unit	Daily Trips	Peak Hour Type	AM Peak Hour Trips			PM Peak Hour Trips			Data Source
						Enter	Exit	Total	Enter	Exit	Total	
	Distribution Center	118910	sq. ft.	1238	Adj. Street	0	1	1	51	25	76	Other Data**
					Generator	91	181	272	100	127	227	Other Data**
110	Light Indistrial	180000	sq. ft.	740	Adj. Street	61	8	69	7	48	55	ITE Equation
Total		298910	sq. ft.	1978		152	189	341	107	175	282	

Refer to the current NCDOT Congestion Management Capacity Analysis Guidelines for acceptable trip calculation methods and data sources.

**Explain local or other data sources, if used: Traffic data from a similar operation was provided by the client.

☐ The estimated site trips meet NCDOT's TIA trip threshold of 3,000 daily trips.

☒ The estimated site trips meet the municipal TIA trip threshold of 100 peak hour trips or more

☐ This project is located in a known STIP and/ or local CIP project # ☐

☐ This project includes a rezoning request.

☐ The proposed site access is located within 1,000 feet of an interchange.

☐ The Applicant requests for a new or modified control-of-access break.

☐ The Applicant requests for a new or modified median break.

Applicant's Signature | Hunter Nichols (Print Name) | 10/21/2020 (Date)

NCDOT Traffic Impact Analysis Need Screening / Scoping Request

TIA Need Screening → TIA Scoping → TIA Submittal

Site Plan/Vicinity Map Requirement for TIA Need Screening: While the site plan may not be finalized during the TIA scoping stage, the graphic representation of the proposed development shall provide adequate details on the development scope and context. More specifically, the site plan/map shall clearly show the location and type of each access point, spacing to adjacent and opposing driveways or intersections, internal street network, proposed buildings/parcels with their anticipated uses and sizes at full build-out and, if applicable, any nearby interstate, US, NC or Secondary Roads (SR).

Project Name: Project AV2 **Project Reference Number:** _____

☒ **A TIA is Required by the Local Government.** In addition, the study area is expected to include NCDOT maintained transportation facilities.

☒ **A TIA is Required by NCDOT,** per the *Policy on Street and Driveway Access to North Carolina Highways*.

If either or both of the boxes above are checked, the Applicant/TIA Consultant is hereby requested to fill out as much as possible of the following TIA scoping checklist, and return it along with the supporting documents to NCDOT prior to the scoping meeting.

☐ **A TIA is NOT required**. This decision is based on the development information presented above. Changes in the development plan will require re-evaluation of the TIA need, and may necessitate a TIA. The Applicant should inform the District Engineer of any significant changes in a timely fashion to avoid delays or rejections of the driveway permit / encroachment agreement applications.

Additional Comments:

The TIA need decision is made by the NCDOT Division ____ District____ on _____.

NCDOT District Representative's Signature | Print Name

Email concurrence may be used in lieu of the signature.

NCDOT TIA Scoping Checklist

TIA Need Screening → TIA Scoping → TIA Submittal

Project Name: Project Av2 **TIA Scoping Date:** 10/21/20

☐ **TIA Need Screening Forms are Attached.** Project Reference #: _____ Decision Date: _____

☒ **Site Plan and Access**

☒ Provide a site plan illustrating site access, internal and external roadways, buildings and land uses.
Refer to NCDOT's *Policy on Street and Driveway Access to North Carolina Highways* pages 14 and 15 for site plan requirements.

☒ Identify site access.

New Access	On Road	Access Type		Driveway Spacing		
	Road Name	Permitted Movements	Traffic Control	Distance (ft)	Direction	Nearest Intersection / Access
Access A	Enka Heritage	Conventional Full-Mvmt	2-Way Stop	400	West	Walk Off Way
Access B						
Access C						
Access D						
Access E						
Access F						
Access G						
Access H						

Existing Access	Existing Intersection of		Access Modification	**Proposed Interconnectivity** (If Applicable)		
	Road A	Road B		Connector #	Road Connected	Adjacent Development
Access 1			Please Select	Connector 1		
Access 2				Connector 2		
Access 3				Connector 3		
Access 4				Connector 4		

☒ Additional access clarifications and provisions (e.g., proposed control-of-access or median breaks, modifications of existing access, loading/unloading area access, bike/pedestrian accommodation).

Access is to be located off Enka Heritage cul-de-sac

☐ **Proposed K-12 School Site**

☐ NCDOT MSTA School Traffic Calculator for Select School Type shall be used.

☐ Peak Hour Factors (PHFs) shall be adjusted/weighted for new school trips (0.5 PHF by default).

☐ Internal school circulation analysis is required, and should be submitted in advance or concurrent with the TIA submittal.

☐ Clarify traffic operation plans (e.g. traffic circulation pattern, pedestrian access, drop-off/pick-up zone location and configuration, queue storage area and, if applicable, staggered start times).

☒ Trip Generation

The TIA Consultant shall prepare trip generation estimates following the current *NCDOT Congestion Management Capacity Analysis Guidelines*, and submit the calculation sheets and supporting information to the District Engineer for approval prior to capacity analysis.

ITE LUC	Proposed Land Use	Size	Unit	Daily Trips	Peak Hour Type	AM Peak Hour Trips			PM Peak Hour Trips			Data Source
						Enter	Exit	Total	Enter	Exit	Total	
	Distribution Center	118910	sq. ft.	1238	Generator	91	181	272	100	127	227	Other Data**
110	Light Industrial	180000	sq. ft.	740	Adj. Street	61	8	69	7	48	55	ITE Equation
Unadjusted Site Trips				1978		152	189	341	107	175	282	
Internal Capture Trips (Attach Calculation Sheets)												Please Select
Internal Capture % of Unadjusted Site Trips				%			%			%		
LUC	Proposed Land Use	Any Internal Trips?		Pass-By % of External Trips								
		Please Select		%			%			%		Please Select
				%			%			%		
				%			%			%		
				%			%			%		
				%			%			%		
Pass-By Trips (Attach Calculation Sheets)												
Adjacent Street Volumes												Please Select
Non-Pass-By Primary Trips												
Diverted Trips, if Applicable and Justifiable												Please Select

**Explain local or other data sources, if used:

Traffic data from a similar operation was provided by the client(attached). Per discussions with NCDOT, it was determined that a conservative approach would be taken and the AM and PM peak hours of the generartor would be used to perform the traffic analysis instead of the typical AM and PM peak hours .

☐ Existing Site Trip Information for Redevelopment Projects (Attach separate sheets as needed)

ITE LUC	Existing Land Use	Size	Unit	Daily Trips	Peak Hour Type	AM Peak Hour Trips			PM Peak Hour Trips			Data Source
						Enter	Exit	Total	Enter	Exit	Total	
					Please Select							Please Select
Total Existing Site Trips												

☒ Trip Distribution

☒ Trip distribution diagrams are submitted concurrently with this document (attach separate sheets).

☐ Trip distribution diagrams will be submitted separately, along with supporting information, to the District Engineer for review and approval prior to capacity analysis. The trip distribution shall be based on the current and anticipated traffic patterns, as well as instructions noted below.

If required by the District Engineer, the following additional diagrams shall also be submitted:

☐ Mixed-Use Developments (separate diagrams for residential, commercial, and office trips)

☐ Inter-Development Trips (if 'internal" trips cross public streets)

☐ Pass-By Trips

☐ Diverted Trips

☐ Each Analysis Period

☐ Mode Split

☐ Provide Data Source and Justification

Mode / Period	Auto		
AM Peak	%	%	%
PM Peak	%	%	%
Daily	%	%	%
	%	%	%

☐ Identify proper infrastructure and accommodation for other modes of travel.

☒ Analysis Peak Periods:

☒ Weekday AM Peak 7:00 - 9:00

☒ Weekday PM Peak 4:00 - 6:00

☐ Weekday Midday Peak _____

☐ Weekday PM School Peak _____

☐ Weekend _____ Peak _____

☐ Other _____

☒ Study Area Intersections and Data Collection

The study area shall include the site access intersections (both new and existing) identified under "Site Plan and Access" on page 1, as well as the following external and, if applicable, internal intersections.

External Intersection	Intersection of		Traffic Control	Intersection Turning Movement Counts			Notes
	Road A	Road B		New / Existing	Date of Counts	Growth Adjustment	
#1	NC 112	Jacob Holm Way	Signal	Use Existing Counts	10/8/20	10%	Per NCDOT
#2	Jacob Holm Way	Walk Off Way	All-Way Stop				See attachment
#3	US 19/23	Enka Heritage	Signal				See attachment
#4	Enka Heritage	Walk Off Way	2-Way Stop				See attachment
#5							
#6							
#7							
#8							
#9							
#10							
#11							
#12							

Internal Intersection	Intersection of		Access Type		Intersection Spacing		
	Road A	Road B	Traffic Control	Permitted Movements	Distance (ft)	Direction	Nearest Intersection
#101			Please Select	Please Select		Please Select	
#102							
#103							
#104							
#105							

The following data will be collected:

☒ New traffic turning movement counts in ☐ 15-min intervals ☒ 5-min intervals (near schools)
Unless otherwise noted above, new traffic counts shall be collected at the existing study intersections during the analysis periods. Weekday counts shall avoid Mondays, Fridays, holidays, school breaks, road closures, and major weather events.

☒ To account for the impact of existing and/or proposed school traffic, PHFs will be adjusted for:

intersections numbered: #1) PHF of 0.75 for EBL, WBR, SBL, and SBR duirng the AM peak hour

and access points numbered: _____

☐ Traffic Forecast Data for TIP: _____

☒ Roadway/Intersection Configuration & Traffic Control

☒ Traffic Signal Phasing & Timing Data

☐ Crash Data: _____ Period: _____

☐ Other:

☒ Future Year Conditions

☒ Project Build-Out Year: 2021

☐ Future Analysis Year(s): _____

☒ Identify below any funded/committed future transportation improvements, as well as any approved but incomplete developments near the site.

Funded STIP / Local CIP Project	Project Description	Year Complete
U-6230	Extend Walk Off Way Enka Heritage	2021
U-6251	Construct Enka Heritage from Walk Off Way to US 19/23	2021

Nearby Approved Development	Location	Future Land Use (exclude any completed phases)	Committed Improvements

☒ Annual Growth Factor: 2 %

Justification/Data Source: Historical AADT traffic data and NCDOT input

☐ Local Comprehensive Transportation Plan Compliance

☐ Identify Applicable Local Transportation Planning Documents

☐ Identify Applicable Roadways inside the Study Area

Road Name	Classification	Speed Limit	Proposed Cross-Section	Proposed Right-of-Way	Compliance Requirements	Affect Study Intersection #

☒ Study Method

The traffic analysis shall follow the current *NCDOT Congestion Management Capacity Analysis Guidelines*, *Policy on Street and Driveway Access to North Carolina Highways*, and use the current approved version of analysis software (e.g. Synchro/SimTraffic, HCS, Sidra Intersection, TransModeler).

The study shall include the following analysis scenarios for each analysis period.

1. Existing Conditions
2. Future No-Build Conditions (existing + background growth + approved developments + committed or funded improvements)
3. Future Build Conditions (future no-build + site trips)
4. Future Build with Improvements Conditions (future build traffic with improvements to mitigate the proposed development's impacts) and, if applicable:

☐ 5. TIP Design Year Analysis Design year analysis not needed. Any traffic forecast should have accounted for site zoning.

☐ 6. Alternative Access Scenario (without proposed control-of-access or median break / modification)

The following additional analysis/outputs should be provided as warranted:

☐ Signal Warrant Analysis for accesses/intersections _____
☐ Multi-Modal Level of Service Analysis
☐ School Loading Zone Traffic Simulation
☐ Phasing Analysis (scope separately as needed)
☐ Safety/Crash Analysis
☐ Control-of-Access Modification Justification
☐ Median Break / Modification Justification
☐ Other _____

☒ Submittals

In addition to the hardcopies required below, the TIA Consultant shall provide the District Engineer and, if required, the local government an electronic copy of the study documents, including the latest site plan, figures and appendices, in searchable PDF files and the original traffic analysis files (e.g., Synchro, HCS). To expedite review, the NCDOT electronic submittals shall also be delivered concurrently to:

☐ Div. Traffic Engr ☐ Regional Traffic Engr ☒ Congestion Management ☒ Other City of Asheville

Submittals	NCDOT		Local Government	
	Electronic	Hardcopy	Electronic	Hardcopy
Trip Generation & Distribution	Required		Please Select	
Draft TIA Report	Required			
Final Sealed TIA Report	Required			

☒ Additional Comments (municipal TIA requirements, approved variations from NCDOT guidelines)

1) Refer to attachment for information regarding the existing and future traffic projections. 2) A heavy vehicle percentage of 10% was assumed for all intersection movements except for the through movements on NC 112 and US 19/23 as well as as the movements associated with the Bob Lewis Ballpark to account for trucks within the industrialized area as referenced in the Traffic Study Report for the Enka Heritage Shortcut.

Agreement by All Parties

The undersigned agree to the contents and methodology described above for completing the required traffic impact analysis for the proposed development identified herein. Any changes to the above methodology contemplated by the Applicant or the TIA Consultant must be submitted to the District Engineer in writing. If approved by NCDOT, then such changes may be accepted for the TIA report. Subsequent revisions to the development plan (e.g. land use, density, site access, or schedule) may require additional scoping and analysis, and may modify the TIA requirements.

This agreement shall become effective on the date approved by NCDOT, and shall expire 12 months after the effective date or upon significant changes to the roadway network and/or development assumptions, whichever occurs first. Once expired, renewal or re-scoping will be required for subsequent TIA submittals.

APPLICANT

Signature	Hunter Nichols Print Name	10/20/2020 Date

TIA CONSULTANT

Signature	Jay Clapp Print Name	10.21.2020 Date

LOCAL GOVERNMENT REPRESENTATIVE (If Applicable)

Signature	Print Name	Date

Email concurrence may be used in lieu of the signature.

NCDOT DISTRICT REPRESENTATIVE

Reviewed and approved by the NCDOT Division ____District____ on _____.

Signature	Print Name

Email concurrence may be used in lieu of the signature.

Jay Clapp

From: Dorato, Nicholas K <nkdorato@ncdot.gov>
Sent: Thursday, November 5, 2020 9:49 AM
To: Jay Clapp
Cc: Medlin, Christopher D; Reese, Michael P; Gallo, Robert S; acibor@ashevillenc.gov; Roberts, James P; Benton, Gregory E
Subject: RE: [External] RE: Project AV2
Attachments: 2020-11-02_Project AV2 Scope Review with Comments.pdf; Updated NCDOT TIA Scoping Checklist for Project AV2.pdf

Mr. Clapp,

NCDOT and COA finds the updated scope to appear reasonable. The District office concurs with the scoping checklist for the proposed Development. This email concurrence may be used in lieu of the approval signature. Please submit TIA in accordance to NCDOT policies and procedures and provide the trip distributions accordingly. Thanks in advance.

Thanks,

Nick Dorato
Engineering Technician III
North Carolina Department of Transportation
Division 13 District 2

8282982741 office
nkdorato@ncdot.gov

11 Old Charlotte Hwy
Asheville, NC 28803

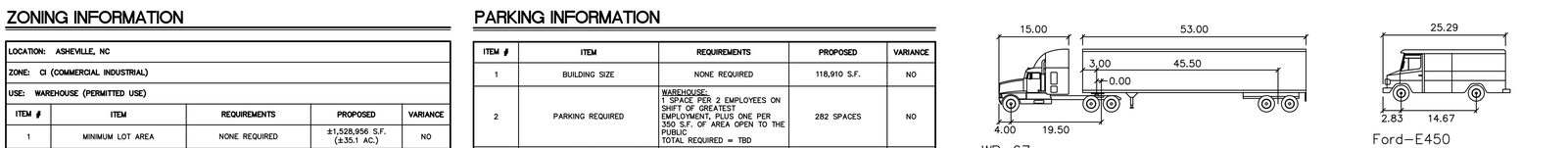
Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties.

ZONING INFORMATION

LOCATION: ASHEVILLE, NC				
ZONE: CI (COMMERCIAL INDUSTRIAL)				
USE: WAREHOUSE (PERMITTED USE)				
ITEM #	ITEM	REQUIREMENTS	PROPOSED	VARIANCE
1	MINIMUM LOT AREA	NONE REQUIRED	±1,528,956 S.F. (±35.1 AC.)	NO
2	MINIMUM LOT WIDTH	100 FEET	±631 FEET	NO
3	MINIMUM LOT FRONTAGE	NONE REQUIRED	±225 FEET	NO
4	MINIMUM FRONT SETBACK	35 FEET	±264 FEET	NO
5	MINIMUM SIDE SETBACK	NONE REQUIRED	±222 FEET	NO
6	MINIMUM REAR SETBACK	10 FEET	±892 FEET	NO
7	MAXIMUM BUILDING HEIGHT	80 FEET	±36 FEET	NO
8	MAXIMUM BUILDING COVERAGE	NONE REQUIRED	±8 PERCENT	NO

PARKING INFORMATION

ITEM #	ITEM	REQUIREMENTS	PROPOSED	VARIANCE
1	BUILDING SIZE	NONE REQUIRED	118,910 S.F.	NO
2	PARKING REQUIRED	WAREHOUSE: 1 SPACE PER 2 EMPLOYEES ON SHIFT OF GREATEST EMPLOYMENT, PLUS ONE PER 350 S.F. OF AREA OPEN TO THE PUBLIC TOTAL REQUIRED = TBD	282 SPACES	NO
3	MINIMUM HANDICAPPED PARKING SPACES REQUIRED	7 SPACES	7 SPACES	NO
4	MINIMUM PARKING DIMENSIONS	9 FEET X 18 FEET	9 FEET X 18 FEET	NO
5	MINIMUM LOADING DIMENSIONS	250 S.F.	13.5 FEET X 60 FEET	NO
6	MINIMUM AISLE WIDTH	24 FEET – 2–WAY	24 FEET – 2–WAY	NO
7	MINIMUM FRONT SETBACK	35 FEET	±35 FEET	NO
8	MINIMUM SIDE SETBACK	X FEET	±10 FEET	NO
9	MINIMUM REAR SETBACK	X FEET	±30 FEET	NO
10	MINIMUM INTERIOR LANDSCAPING	1 LANDSCAPED ISLAND EVERY 15 SPACE FOR PERIMETER PARKING. 20' MEDIAN EVERY 4 BAYS FOR INTERIOR PARKING AREAS.	1 LANDSCAPED ISLAND EVERY 15 SPACE FOR PERIMETER PARKING. 20' MEDIAN EVERY 4 BAYS FOR INTERIOR PARKING AREAS.	NO



WB–67

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

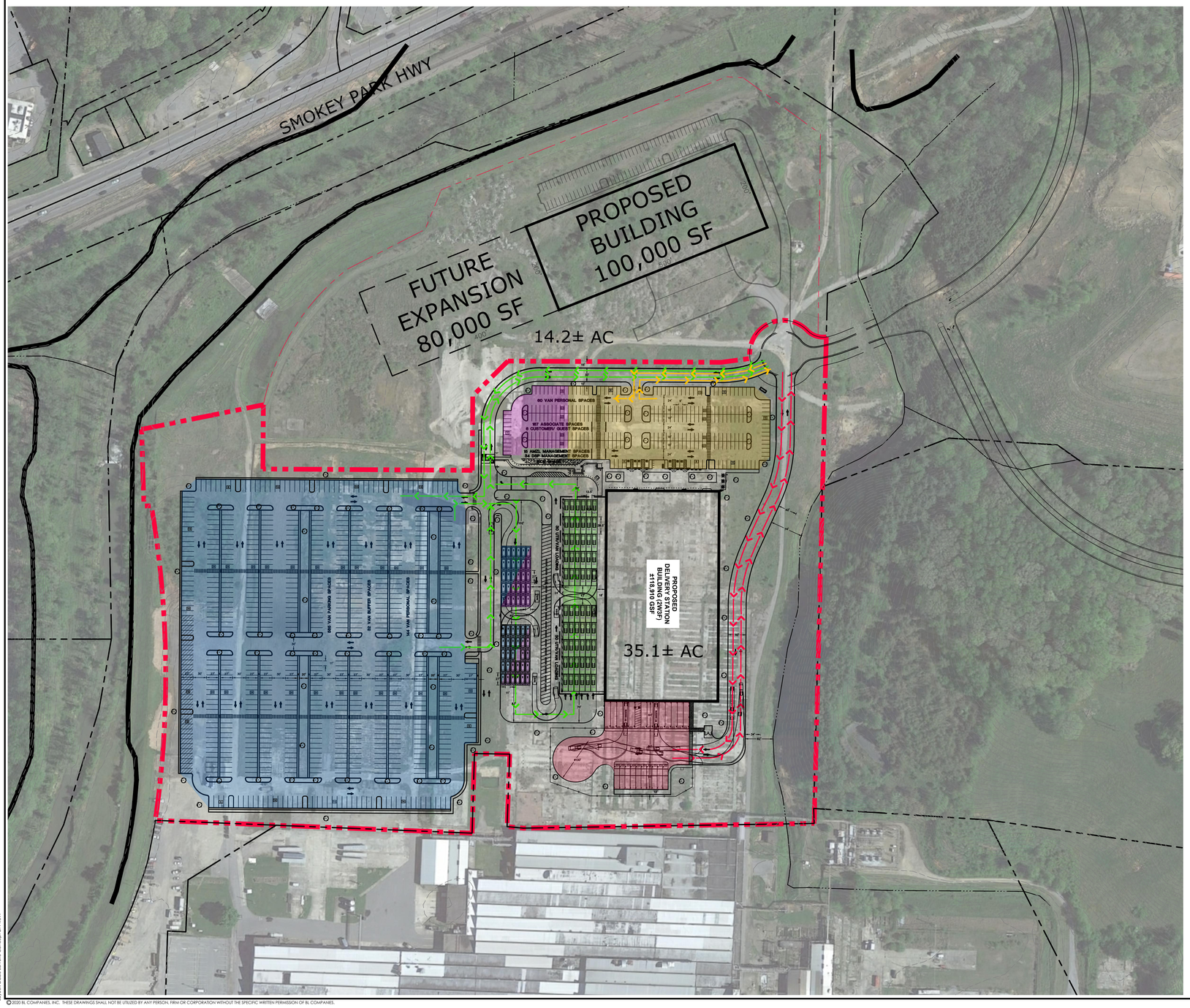
Ford–E450

	feet
Width	: 9.75
Track	: 9.75
Lock to Lock Time	: 6.0
Steering Angle	: 34.3

APPROXIMATE LOT AREA= +/- 35.1 A.C.

PARKING BREAKDOWN

PARKING	REQUIRED	PROPOSED ON–SITE	PROPOSED OFF–SITE	DELTA (+/–)
ASSOCIATE LOT				
ASSOCIATE	167	167	0	0
AMZL MANAGEMENT SPACES	15	15	0	0
DSP MANAGEMENT SPACES	34	34	0	0
CUSTOMER SPACES	3	3	0	0
GUEST SPACES	3	3	0	0
TOTAL AUTO SPACES (9'x18')	222	222	0	0
VAN LOT				
STANDARD VAN SPACES (11'X27')	560	565	0	+5
VAN PERSONAL VEHICLE (11'X27')	144	144	0	0
VAN BUFFER SPACES (11'X27')	32	32	0	0
VAN PERSONAL VEHICLE (9'X18')	72	60	0	–12
STAGING SPACES USED AS PARKING (11'X27')	–72	–60	0	–12
TOTAL VAN SPACES (11'x27')	736	741	0	–19
TOTAL PARKING	**958**	**963**	**0**	**-19**
LOADING AND STAGING AREA				
UTR/ VAN LOADING SPACES	72	60	–	–12
VAN STAGING SPACES	72	60	–	–12
TRUCK YARD				
LOADING DOCK SPACES	9	13	–	+4
TRAILER PARKING SPACES (INCL. HOSTLER)	0	10	–	+10



LEGEND

- ASSOCIATE TRAFFIC FLOW DIRECTION
- DSP/FLEX TRAFFIC FLOW DIRECTION
- TRUCK TRAFFIC FLOW DIRECTION
- INDICATES PAINTED ISLAND
- INDICATES ISLAND THAT NEEDS TO BE LANDSCAPED PER CODE. (TYPE AND QUANTITY TO BE DETERMINED DURING DETAILED DESIGN)
- EXISTING TRAFFIC LIGHT
- STOP BAR
- CROSSWALK
- WALKWAY
- JERSEY BARRIERS
- FENCE
- PROPERTY LINE
- EASEMENT LINE
- BUILDING SETBACK LINE
- PARKING/LANDSCAPE SETBACK LINE
- 100 FEMA 100 YEAR FLOOD LINE
- 500 FEMA 500 YEAR FLOOD LINE
- WETLAND LINE
- EXISTING TREE LINE
- 50 EXISTING MAJOR CONTOUR LINES
- EXISTING MINOR CONTOUR LINES
- EXISTING GUIDE RAIL
- EXISTING FENCE LINE
- EXISTING OVERHEAD WIRES
- EXISTING GAS LINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER LINE
- EXISTING FIRE–PROTECTION LINE
- EXISTING ELECTRICAL LINE
- E ELECTRICAL TRANSFORMER

GRAPHIC SCALE
100 50 0 100
SCALE IN FEET

Architecture
Engineering
Environmental
Land Surveying

BL Companies

355 Research Parkway
Meriden, CT 06450
(203) 630-1406
(203) 630-2615 Fax

PROPOSED DEVELOPMENT
SAND HILL ROAD
ASHEVILLE, NC

REVISIONS No.	Date	Desc.

Designed	T.A.M.
Drawn	T.A.M.
Reviewed	
Scale	1"=100'
Project No.	2001500
Date	9/30/2020
CAD File	SC200150002

Title
SITE CONCEPT - DCD3

Sheet No.
SC (R1)

Xref Fls: XG200150001

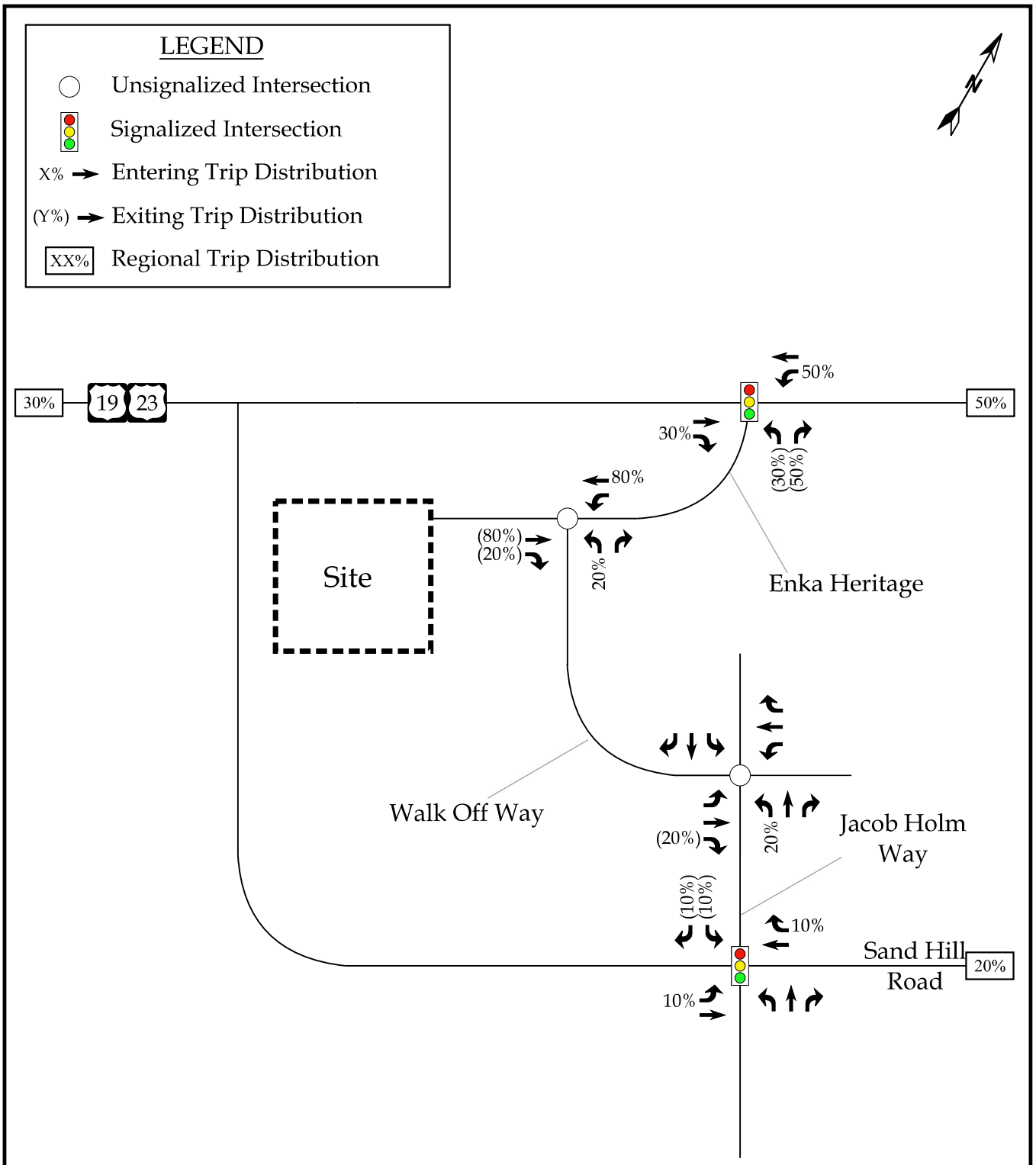
Date/Time: 9/30/2020 2:58pm by Thomas Mc. Cann
Dwg. No.: D:\2001500\DWG\SC200150002.dwg
Layout: DCD3 Last Saved by: thomas.mccann
Xref Fls: XG200150001

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Site Traffic Generation Data

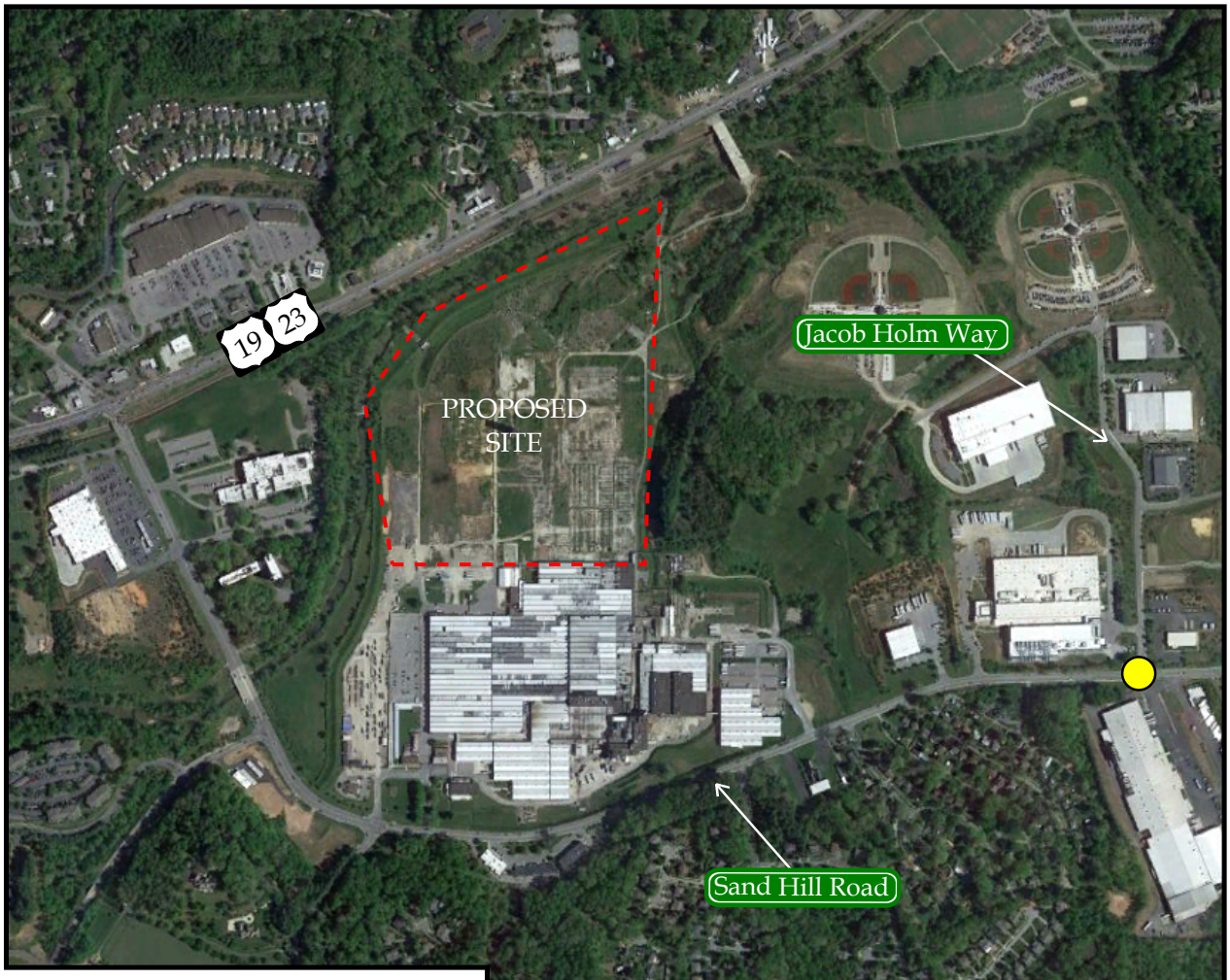
	Autos			Trucks			Vans			Total		
Time	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
00:00	0	0	0	1	2	3	0	0	0	1	2	3
01:00	87	0	87	1	1	2	0	0	0	88	1	89
02:00	0	0	0	1	1	2	0	0	0	1	1	2
03:00	0	0	0	1	1	2	0	0	0	1	1	2
04:00	0	0	0	2	1	3	0	0	0	2	1	3
05:00	28	0	28	1	1	2	0	0	0	29	1	30
06:00	0	0	0	1	1	2	0	0	0	1	1	2
07:00	0	0	0	0	1	1	0	0	0	0	1	1
07:30	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	1	0	1	0	0	0	1	0	1
09:00	100	0	100	1	1	2	0	0	0	101	1	102
10:00	91	0	91	0	1	1	0	180	180	91	181	272
11:00	5	0	5	1	1	2	0	11	11	6	12	18
12:00	0	87	87	0	0	0	0	0	0	0	87	87
13:00	49	0	49	0	0	0	0	0	0	49	0	49
14:00	0	28	28	0	0	0	0	0	0	0	28	28
15:00	0	0	0	0	0	0	0	0	0	0	0	0
16:00	50	0	50	0	0	0	0	0	0	50	0	50
16:30	0	25	25	1	0	1	0	0	0	1	25	26
17:00	0	25	25	0	1	1	0	0	0	0	26	26
17:30	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	21	21	1	0	1	0	0	0	1	21	22
19:00	0	45	45	1	1	2	90	0	90	91	46	137
20:00	0	126	126	1	1	2	99	0	99	100	127	227
21:00	0	20	20	1	1	2	2	0	2	3	21	24
22:00	0	33	33	1	1	2	0	0	0	1	34	35
23:00	0	0	0	1	1	2	0	0	0	1	1	2
Total	**410**	**410**	**820**	**18**	**18**	**36**	**191**	**191**	**382**	**619**	**619**	**1,238**

1st Shift:	2:00 AM	12:30 PM	87	Assoc.
2nd Shift:	6:00 AM	2:30 PM	28	Assoc.
3rd Shift:	1:30 PM	10:00 PM	28	Assoc.
PFSD Shift:	2:00 PM	6:00 PM	21	Assoc.
RTS Shift:	12:00 PM	10:30 PM	5	Assoc.
Drivers:	9:20 AM	9:10 PM	191	Drivers



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Site Trip Distribution Scale: Not to Scale | Figure

Moving forward. RKA





N

LEGEND

- Proposed Site Location
- Study Intersection
- Study Area

Moving forward.

RKA

RAMEY KEMP ASSOCIATES

Project AV2 Asheville, NC	Site Location Map	
	Scale: Not to Scale	Figure

Existing (2020) Traffic Conditions

Existing peak hour traffic volumes were determined based on traffic counts conducted at the intersection of NC 112 and Jacob Holm Way/Private Driveway on October 8, 2020 during the weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods.

Per discussions with NCDOT, the weekday AM and PM peak hour traffic volumes obtained from the traffic counts were increased by 10% and compared to the existing (2014) peak hour volumes [contained within the Enka Center TIA that was prepared by Mattern & Craig] that were projected to 2020 by applying a compounded annual growth rate of 3%. Based on this comparison, it was determined that the recently collected peak hour volumes for the overall intersection [plus 10%] was greater and was therefore utilized for this analysis.

Utilizing the Traffic Study Report and Analysis that was prepared by Congestion Management for the Enka Heritage Shortcut, assumptions were made for the peak hour traffic volumes at the intersection of Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway.

Please note that traffic volumes may not balance between intersections due to existing operations located on Jacob Holm Way and Walk Off Way.

Future (2020) No-Build Traffic Conditions

A growth rate of 3% was applied to the existing traffic volumes to generate projected (2021) weekday AM and PM peak hour traffic volumes. With the construction of STIP projects U-6230 and U-6251, it was assumed that 200 vehicles would utilize this route as a shortcut by making a right turn onto Jacob Holm Way [from NC 112] and then US 19/23 [from Enka Heritage] as well as making a left turn onto Enka Heritage [from US 19/23] and then NC 112 [from Jacob Holm Way] based on the Traffic Study Report and Analysis for the Enka Heritage Shortcut. It was also assumed that vehicles would utilize this route to access existing businesses; therefore, a small adjustment was made to account for this traffic diversion. To estimate peak hour traffic volumes on US 19/23, the 2018 AADT was multiplied by 10% and distributed based on the traffic patterns illustrated in the existing traffic volumes figure from the Enka Center TIA [between Brookside Circle and Action Circle], and then projected to the year 2021 by applying a compounded annual growth rate of 3%.

TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) AM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 1

Groups Printed- Cars + - Trucks

	Jacob Holm Way Southbound				Sand Hill Road Westbound				Multi Use Access Northbound				Sand Hill Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00	0	0	1	1	8	12	0	20	0	0	0	0	0	30	1	31	52
07:05	1	0	0	1	1	17	0	18	0	0	0	0	0	29	3	32	51
07:10	1	0	1	2	12	15	0	27	0	0	0	0	0	42	6	48	77
07:15	0	0	1	1	6	20	0	26	0	0	0	0	0	46	8	54	81
07:20	0	0	3	3	12	35	0	47	0	0	0	0	0	54	9	63	113
07:25	0	0	1	1	12	34	0	46	0	0	0	0	0	42	11	53	100
07:30	6	0	4	10	4	33	0	37	3	0	3	6	0	53	13	66	119
07:35	8	0	5	13	17	23	0	40	1	0	3	4	0	51	10	61	118
07:40	10	0	7	17	13	25	0	38	1	0	0	1	0	67	18	85	141
07:45	11	0	4	15	11	29	0	40	2	0	1	3	0	60	14	74	132
07:50	10	0	4	14	6	22	0	28	0	0	1	1	0	52	18	70	113
07:55	14	0	1	15	13	39	0	52	2	0	0	2	0	44	11	55	124
Total	61	0	32	93	115	304	0	419	9	0	8	17	0	570	122	692	1221
08:00	11	0	3	14	6	26	0	32	0	0	0	0	0	54	9	63	109
08:05	4	0	0	4	3	25	0	28	0	0	1	1	0	50	3	53	86
08:10	0	0	0	0	1	24	0	25	0	0	0	0	0	40	2	42	67
08:15	0	0	2	2	2	21	0	23	1	0	0	1	0	39	1	40	66
08:20	1	0	1	2	0	24	0	24	1	0	2	3	0	38	2	40	69
08:25	2	0	2	4	1	17	0	18	1	0	0	1	0	38	3	41	64
08:30	2	0	3	5	3	26	0	29	1	0	0	1	0	41	4	45	80
08:35	2	0	3	5	2	33	0	35	1	0	0	1	0	31	0	31	72
08:40	5	0	0	5	4	30	1	35	1	0	0	1	0	45	1	46	87
08:45	0	0	2	2	3	20	0	23	0	0	1	1	0	40	0	40	66
08:50	0	0	2	2	3	21	0	24	0	0	0	0	0	32	0	32	58
08:55	2	0	0	2	2	15	0	17	1	0	0	1	0	14	2	16	36
Total	29	0	18	47	30	282	1	313	7	0	4	11	0	462	27	489	860
Grand Total	90	0	50	140	145	586	1	732	16	0	12	28	0	1032	149	1181	2081
Apprch %	64.3	0	35.7		19.8	80.1	0.1		57.1	0	42.9		0	87.4	12.6		
Total %	4.3	0	2.4	6.7	7	28.2	0	35.2	0.8	0	0.6	1.3	0	49.6	7.2	56.8	
Cars +	86	0	43	129	133	570	1	704	9	0	11	20	0	1009	147	1156	2009
% Cars +	95.6	0	86	92.1	91.7	97.3	100	96.2	56.2	0	91.7	71.4	0	97.8	98.7	97.9	96.5
Trucks	4	0	7	11	12	16	0	28	7	0	1	8	0	23	2	25	72
% Trucks	4.4	0	14	7.9	8.3	2.7	0	3.8	43.8	0	8.3	28.6	0	2.2	1.3	2.1	3.5

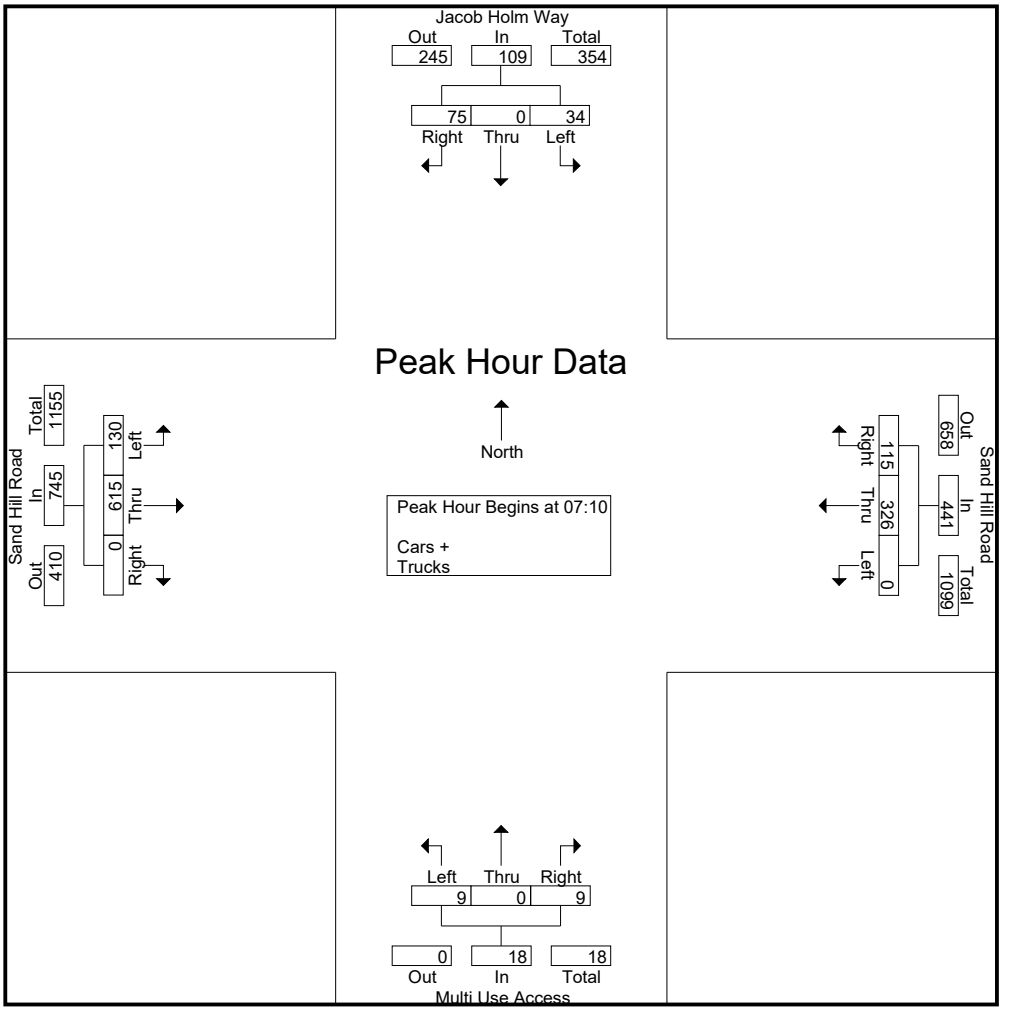
TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) AM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 2

	Jacob Holm Way Southbound				Sand Hill Road Westbound				Multi Use Access Northbound				Sand Hill Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:55 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:10																	
07:10	1	0	1	2	12	15	0	27	0	0	0	0	0	42	6	48	77
07:15	0	0	1	1	6	20	0	26	0	0	0	0	0	46	8	54	81
07:20	0	0	3	3	12	35	0	47	0	0	0	0	0	54	9	63	113
07:25	0	0	1	1	12	34	0	46	0	0	0	0	0	42	11	53	100
07:30	6	0	4	10	4	33	0	37	**3**	0	**3**	**6**	0	53	13	66	119
07:35	8	0	5	13	**17**	23	0	40	1	0	3	4	0	51	10	61	118
07:40	10	0	**7**	**17**	13	25	0	38	1	0	0	1	0	**67**	**18**	**85**	**141**
07:45	11	0	4	15	11	29	0	40	2	0	1	3	0	60	14	74	132
07:50	10	0	4	14	6	22	0	28	0	0	1	1	0	52	18	70	113
07:55	**14**	0	1	15	13	**39**	0	**52**	2	0	0	2	0	44	11	55	124
08:00	11	0	3	14	6	26	0	32	0	0	0	0	0	54	9	63	109
08:05	4	0	0	4	3	25	0	28	0	0	1	1	0	50	3	53	86
Total Volume	75	0	34	109	115	326	0	441	9	0	9	18	0	615	130	745	1313
% App. Total	68.8	0	31.2		26.1	73.9	0		50	0	50		0	82.6	17.4		
PHF	.446	.000	.405	.534	.564	.697	.000	.707	.250	.000	.250	.250	.000	.765	.602	.730	.776

TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) AM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 3





File Name : Asheville(Sand Hill and Jacob Holm) PM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 1

Groups Printed- Cars + - Trucks

	Jacob Holm Way Southbound					Sand Hill Road Westbound					Multi Use Access Northbound					Sand Hill Road 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
16:00	1	0	3	0	4	1	51	1	0	53	0	0	0	0	0	0	58	3	0	61	118
16:05	6	0	5	0	11	2	69	0	0	71	0	0	1	0	1	0	37	0	0	37	120
16:10	2	0	3	0	5	4	76	0	0	80	4	0	2	0	6	0	34	0	0	34	125
16:15	5	0	6	0	11	5	49	0	0	54	3	0	2	0	5	0	51	0	0	51	121
16:20	1	0	1	0	2	2	81	0	0	83	0	0	2	0	2	0	42	0	0	42	129
16:25	2	0	13	0	15	1	59	0	0	60	1	0	0	0	1	0	31	0	0	31	107
16:30	1	0	9	0	10	4	68	0	0	72	1	0	2	0	3	0	43	0	0	43	128
16:35	0	0	2	0	2	4	69	0	0	73	1	0	0	0	1	0	51	0	0	51	127
16:40	0	0	3	0	3	2	74	0	0	76	0	0	0	0	0	0	33	2	0	35	114
16:45	2	0	7	0	9	2	65	0	0	67	1	0	0	0	1	0	31	0	0	31	108
16:50	3	0	3	0	6	4	66	0	0	70	4	0	1	0	5	0	37	1	0	38	119
16:55	3	0	2	0	5	3	71	0	0	74	2	0	0	0	2	0	39	0	0	39	120
Total	26	0	57	0	83	34	798	1	0	833	17	0	10	0	27	0	487	6	0	493	1436
17:00	5	0	7	0	12	0	70	0	0	70	3	0	1	0	4	0	41	0	0	41	127
17:05	5	0	5	0	10	1	71	0	0	72	2	0	0	0	2	0	41	2	0	43	127
17:10	2	0	4	0	6	6	74	0	0	80	3	0	1	0	4	0	48	2	0	50	140
17:15	3	0	5	0	8	8	73	0	0	81	1	0	1	0	2	0	46	1	0	47	138
17:20	1	0	4	0	5	5	76	0	0	81	0	0	2	0	2	0	61	2	0	63	151
17:25	4	0	1	0	5	5	72	0	0	77	1	0	0	0	1	0	41	3	0	44	127
17:30	0	0	3	0	3	5	88	0	0	93	0	0	0	0	0	0	42	2	0	44	140
17:35	1	0	2	0	3	11	71	0	0	82	0	0	0	0	0	0	32	3	0	35	120
17:40	1	0	3	0	4	10	76	0	0	86	0	0	0	0	0	0	32	3	0	35	125
17:45	3	0	0	0	3	6	69	0	0	75	0	0	0	0	0	0	45	3	0	48	126
17:50	2	0	6	0	8	8	77	0	0	85	0	0	1	0	1	0	39	0	0	39	133
17:55	2	0	8	0	10	4	79	0	0	83	1	0	1	0	2	0	34	2	0	36	131
Total	29	0	48	0	77	69	896	0	0	965	11	0	7	0	18	0	502	23	0	525	1585
Grand Total	55	0	105	0	160	103	1694	1	0	1798	28	0	17	0	45	0	989	29	0	1018	3021
Apprch %	34.4	0	65.6	0		5.7	94.2	0.1	0		62.2	0	37.8	0		0	97.2	2.8	0		
Total %	1.8	0	3.5	0	5.3	3.4	56.1	0	0	59.5	0.9	0	0.6	0	1.5	0	32.7	1	0	33.7	
Cars +	49	0	72	0	121	75	1672	1	0	1748	26	0	16	0	42	0	973	27	0	1000	2911
% Cars +	89.1	0	68.6	0	75.6	72.8	98.7	100	0	97.2	92.9	0	94.1	0	93.3	0	98.4	93.1	0	98.2	96.4
Trucks	6	0	33	0	39	28	22	0	0	50	2	0	1	0	3	0	16	2	0	18	110
% Trucks	10.9	0	31.4	0	24.4	27.2	1.3	0	0	2.8	7.1	0	5.9	0	6.7	0	1.6	6.9	0	1.8	3.6

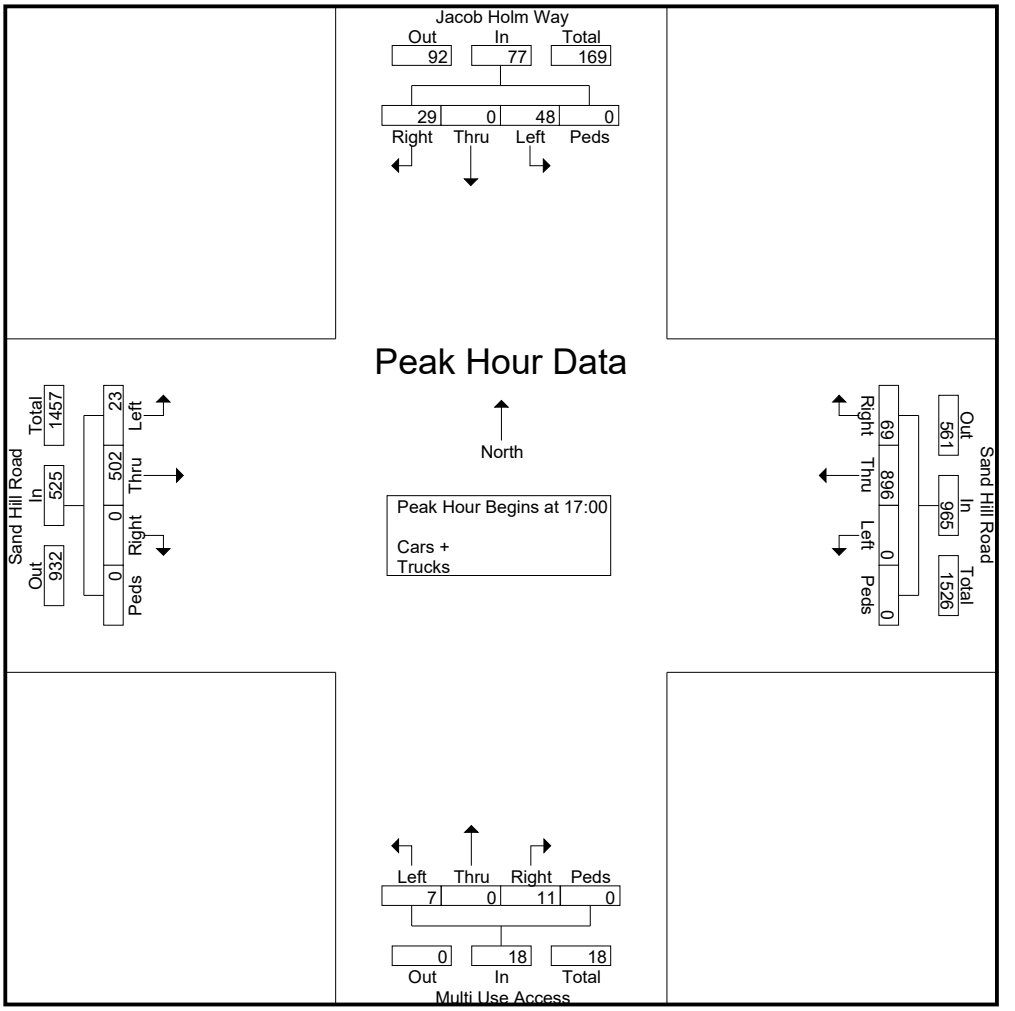
TRAFFIC DATA COLLECTION

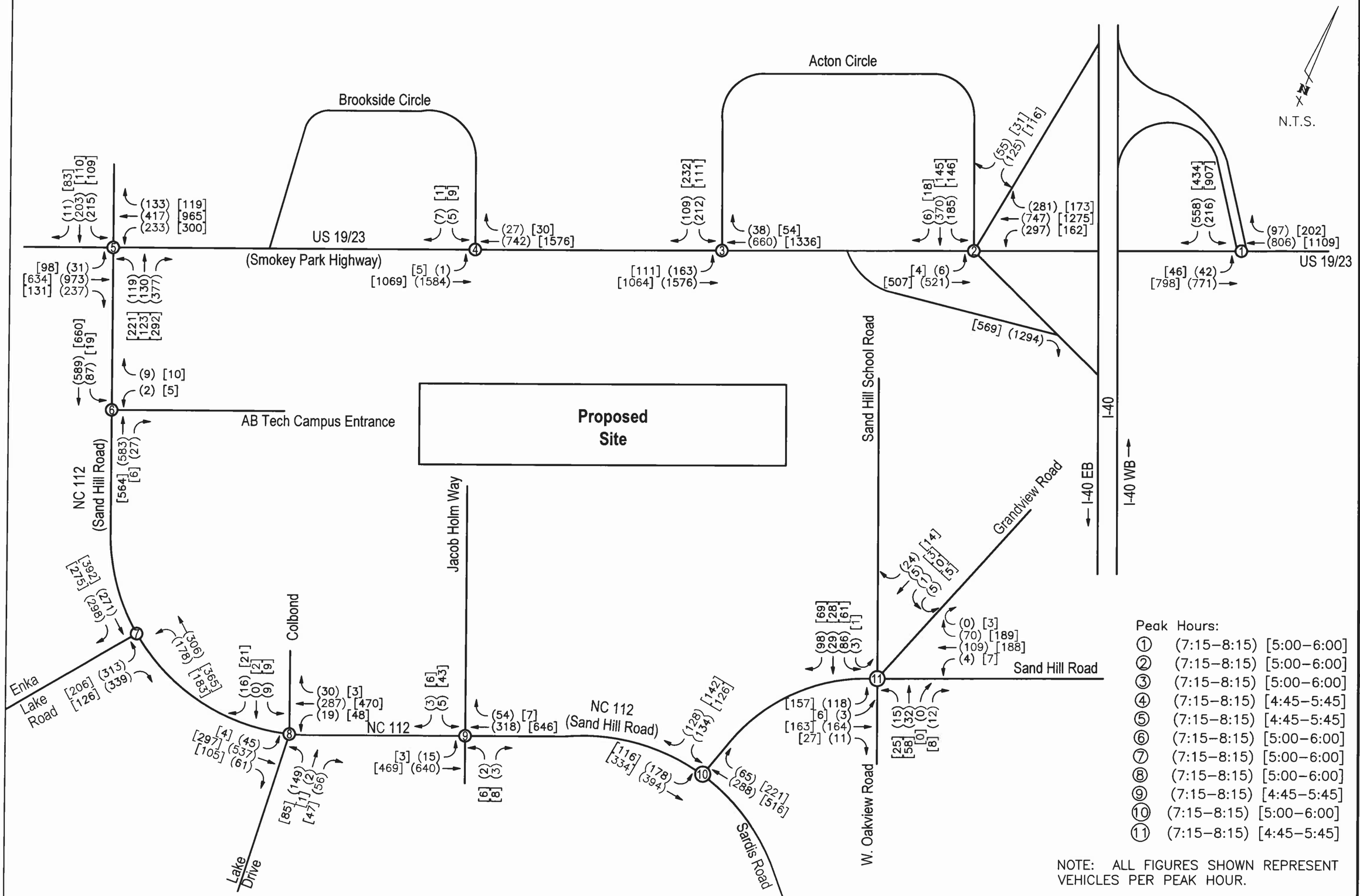
File Name : Asheville(Sand Hill and Jacob Holm) PM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 2

	Jacob Holm Way Southbound					Sand Hill Road Westbound					Multi Use Access Northbound					Sand Hill Road 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 16:00 to 17:55 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	**5**	0	7	0	**12**	0	70	0	0	70	**3**	0	1	0	**4**	0	41	0	0	41	127
17:05	5	0	5	0	10	1	71	0	0	72	2	0	0	0	2	0	41	2	0	43	127
17:10	2	0	4	0	6	6	74	0	0	80	3	0	1	0	4	0	48	2	0	50	140
17:15	3	0	5	0	8	8	73	0	0	81	1	0	1	0	2	0	46	1	0	47	138
17:20	1	0	4	0	5	5	76	0	0	81	0	0	**2**	0	2	0	**61**	2	0	**63**	**151**
17:25	4	0	1	0	5	5	72	0	0	77	1	0	0	0	1	0	41	**3**	0	44	127
17:30	0	0	3	0	3	5	**88**	0	0	**93**	0	0	0	0	0	0	42	2	0	44	140
17:35	1	0	2	0	3	**11**	71	0	0	82	0	0	0	0	0	0	32	3	0	35	120
17:40	1	0	3	0	4	10	76	0	0	86	0	0	0	0	0	0	32	3	0	35	125
17:45	3	0	0	0	3	6	69	0	0	75	0	0	0	0	0	0	45	3	0	48	126
17:50	2	0	6	0	8	8	77	0	0	85	0	0	1	0	1	0	39	0	0	39	133
17:55	2	0	**8**	0	10	4	79	0	0	83	1	0	1	0	2	0	34	2	0	36	131
Total Volume	29	0	48	0	77	69	896	0	0	965	11	0	7	0	18	0	502	23	0	525	1585
% App. Total	37.7	0	62.3	0		7.2	92.8	0	0		61.1	0	38.9	0		0	95.6	4.4	0		
PHF	.483	.000	.500	.000	.535	.523	.848	.000	.000	.865	.306	.000	.292	.000	.375	.000	.686	.639	.000	.694	.875

TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) PM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 3





3

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ASHEVILLE, NORTH CAROLINA 28801
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FAX (828) 254-4562

Comm. No. 3422

EXISTING TRAFFIC VOLUMES

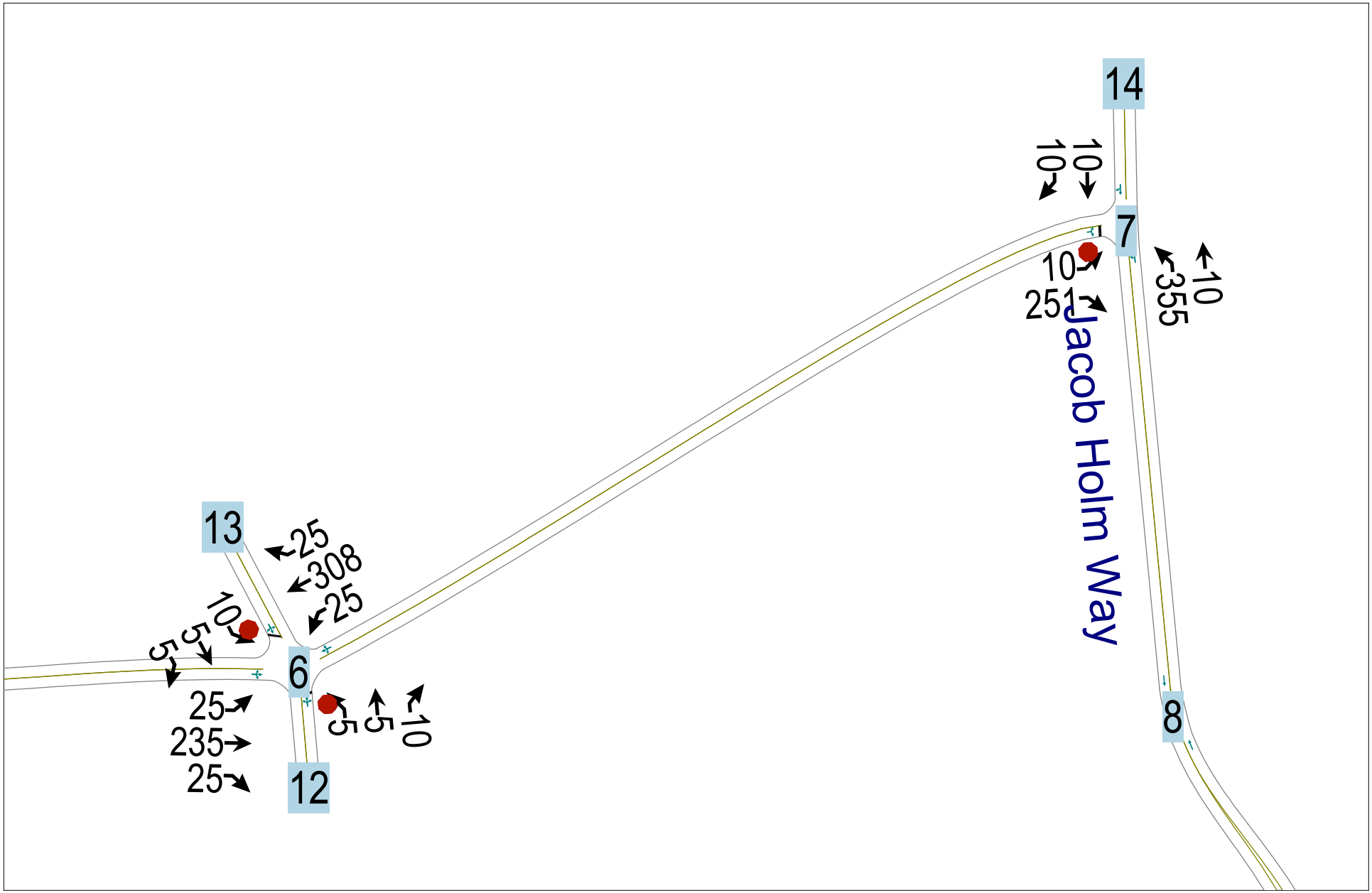
ENKA CENTER MASTER PLAN
ASHEVILLE, BUNCOMBE CO., NORTH CAROLINA

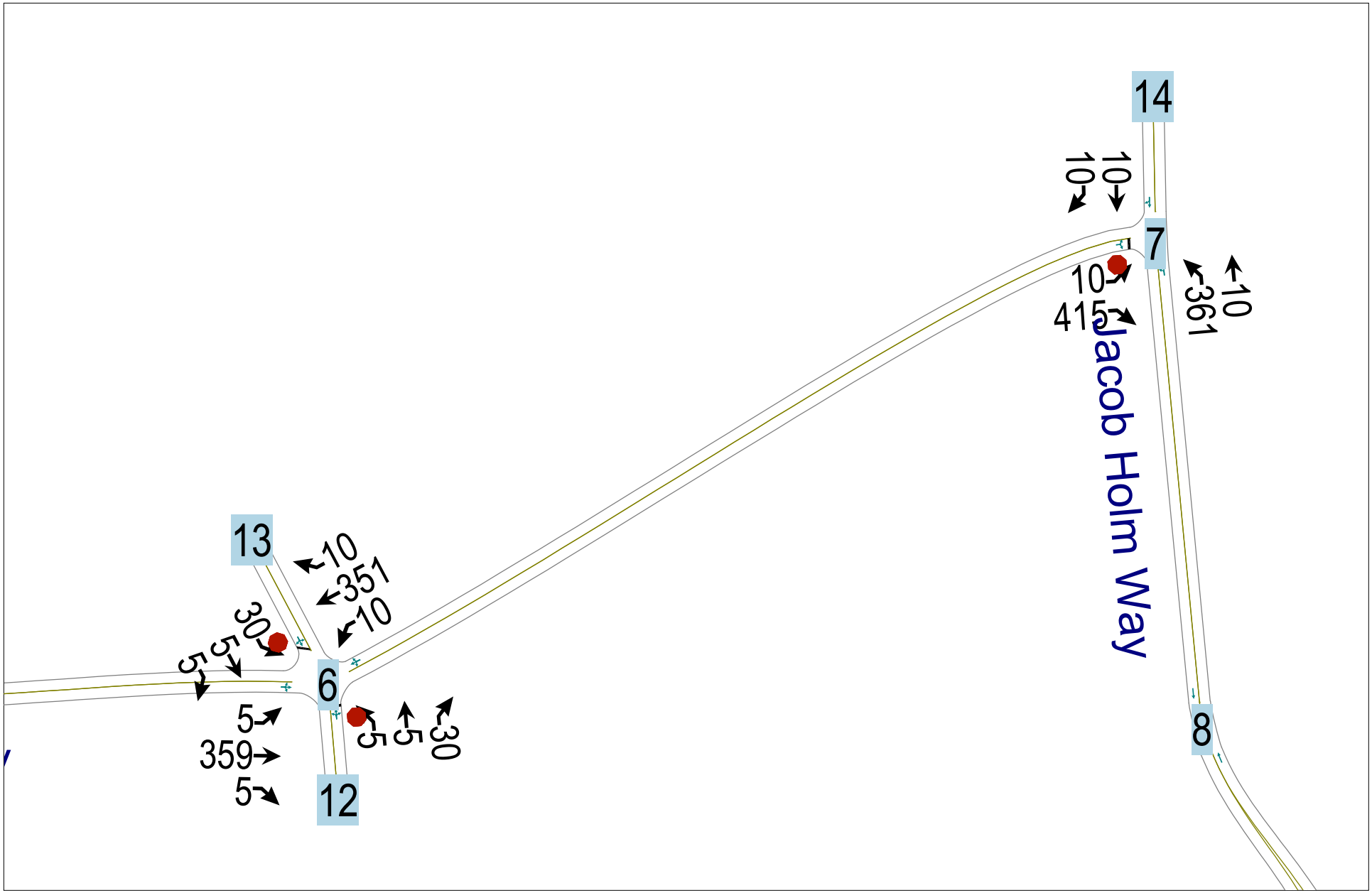
	Jacob Holm Way SB			Sand Hill Road WB			Multi Use Access NB			Sand Hill Road EB			
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
7:10 AM	1	0	1	12	15	0	0	0	0	0	42	6	
7:15 AM	0	0	1	6	20	0	0	0	0	0	46	8	
7:20 AM	0	0	3	12	35	0	0	0	0	0	54	9	
7:25 AM	0	0	1	12	34	0	0	0	0	0	42	11	
7:30 AM	6	0	4	4	33	0	3	0	3	0	53	13	
7:35 AM	8	0	5	17	23	0	1	0	3	0	51	10	
7:40 AM	10	0	7	13	25	0	1	0	0	0	67	18	
7:45 AM	11	0	4	11	29	0	2	0	1	0	60	14	
7:50 AM	10	0	4	6	22	0	0	0	1	0	52	18	
7:55 AM	14	0	1	13	39	0	2	0	0	0	44	11	
8:00 AM	11	0	3	6	26	0	0	0	0	0	54	9	
8:05 AM	4	0	0	3	25	0	0	0	1	0	50	3	
Peak Hour	75	0	34	115	326	0	9	0	9	0	615	130	
+10%	83	0	37	127	359	0	10	0	10	0	677	143	1446

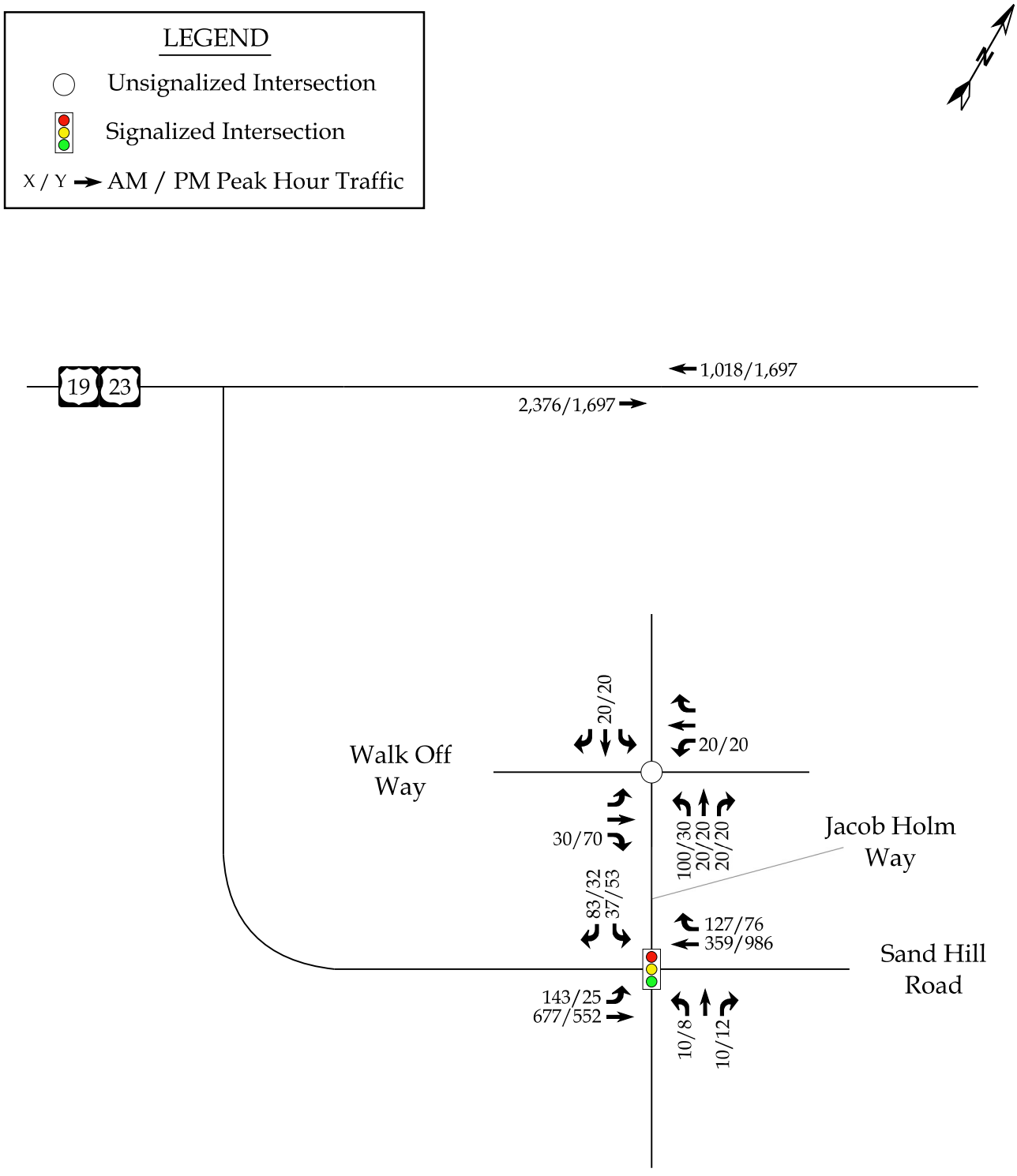
2014	3		5	54	318		3		2		640	15	
2020	4	0	6	64	380	0	4	0	2	0	764	18	1242

	Jacob Holm Way SB			Sand Hill Road WB			Multi Use Access NB			Sand Hill Road EB			
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
5:00 PM	5	0	7	0	70	0	3	0	1	0	41	0	
5:05 PM	5	0	5	1	71	0	2	0	0	0	41	2	
5:10 PM	2	0	4	6	74	0	3	0	1	0	48	2	
5:15 PM	3	0	5	8	73	0	1	0	1	0	46	1	
5:20 PM	1	0	4	5	76	0	0	0	2	0	61	2	
5:25 PM	4	0	1	5	72	0	1	0	0	0	41	3	
5:30 PM	0	0	3	5	88	0	0	0	0	0	42	2	
5:35 PM	1	0	2	11	71	0	0	0	0	0	32	3	
5:40 PM	1	0	3	10	76	0	0	0	0	0	32	3	
5:45 PM	3	0	0	6	69	0	0	0	0	0	45	3	
5:50 PM	2	0	6	8	77	0	0	0	1	0	39	0	
5:55 PM	2	0	8	4	79	0	1	0	1	0	34	2	
Peak Hour	29	0	48	69	896	0	11	0	7	0	502	23	
+10%	32	0	53	76	986	0	12	0	8	0	552	25	1744

2014	6		43	7	646		8		6		469	3	
2020	7	0	51	8	771	0	10	0	7	0	560	4	1418

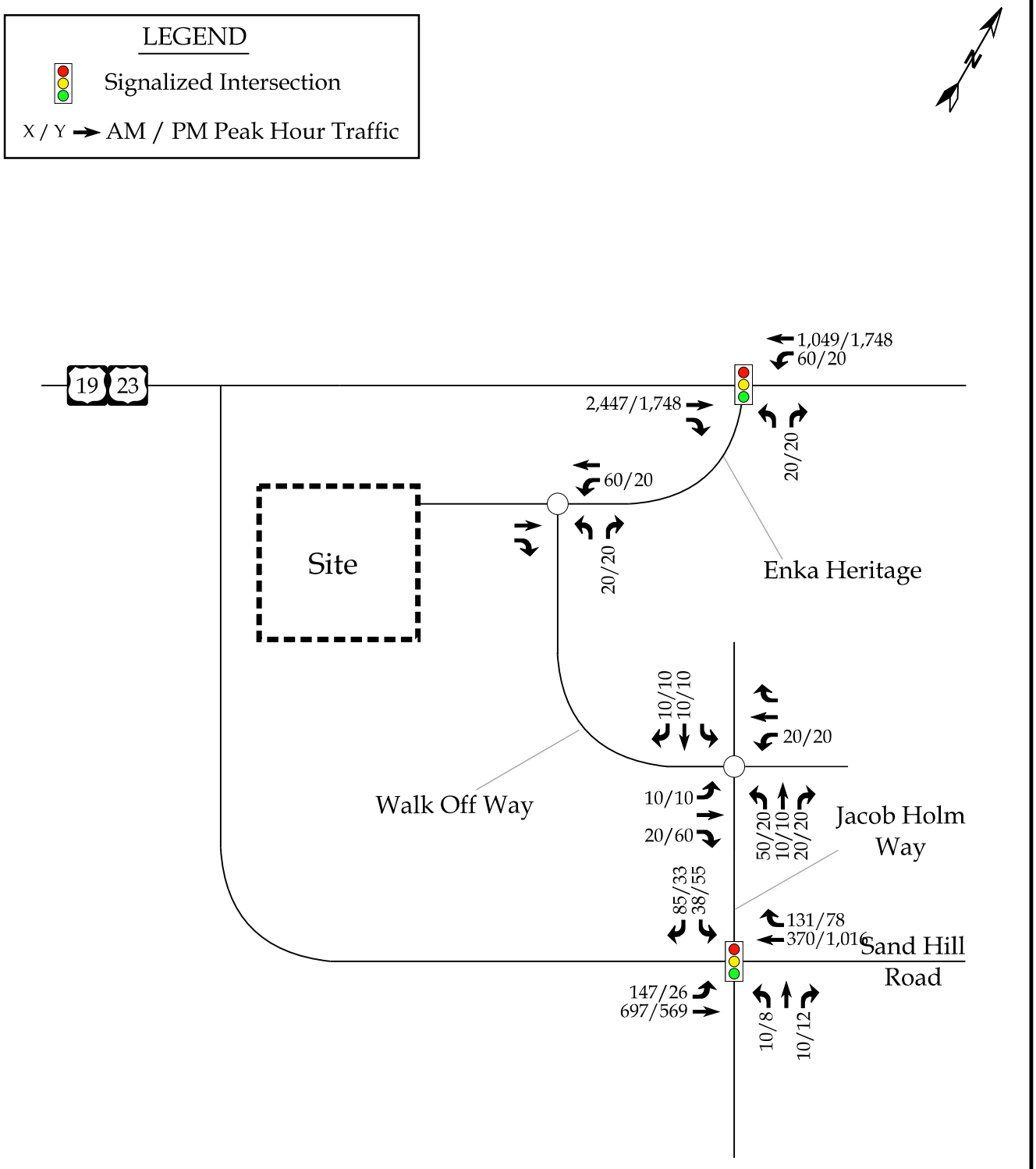

14
10
10
7
10
251
10
355
Jacob Holm Way
13
25
308
25
10
5
5
6
25
235
25
5
5
10
12
8


14
10
10
7
10
415
10
361
Jacob Holm Way
13
10
351
10
30
5
5
6
5
359
5
5
5
30
12
8



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Existing (2020) Peak Hour Traiffc Volumes Scale: Not to Scale | Figure

Moving forward. RKA

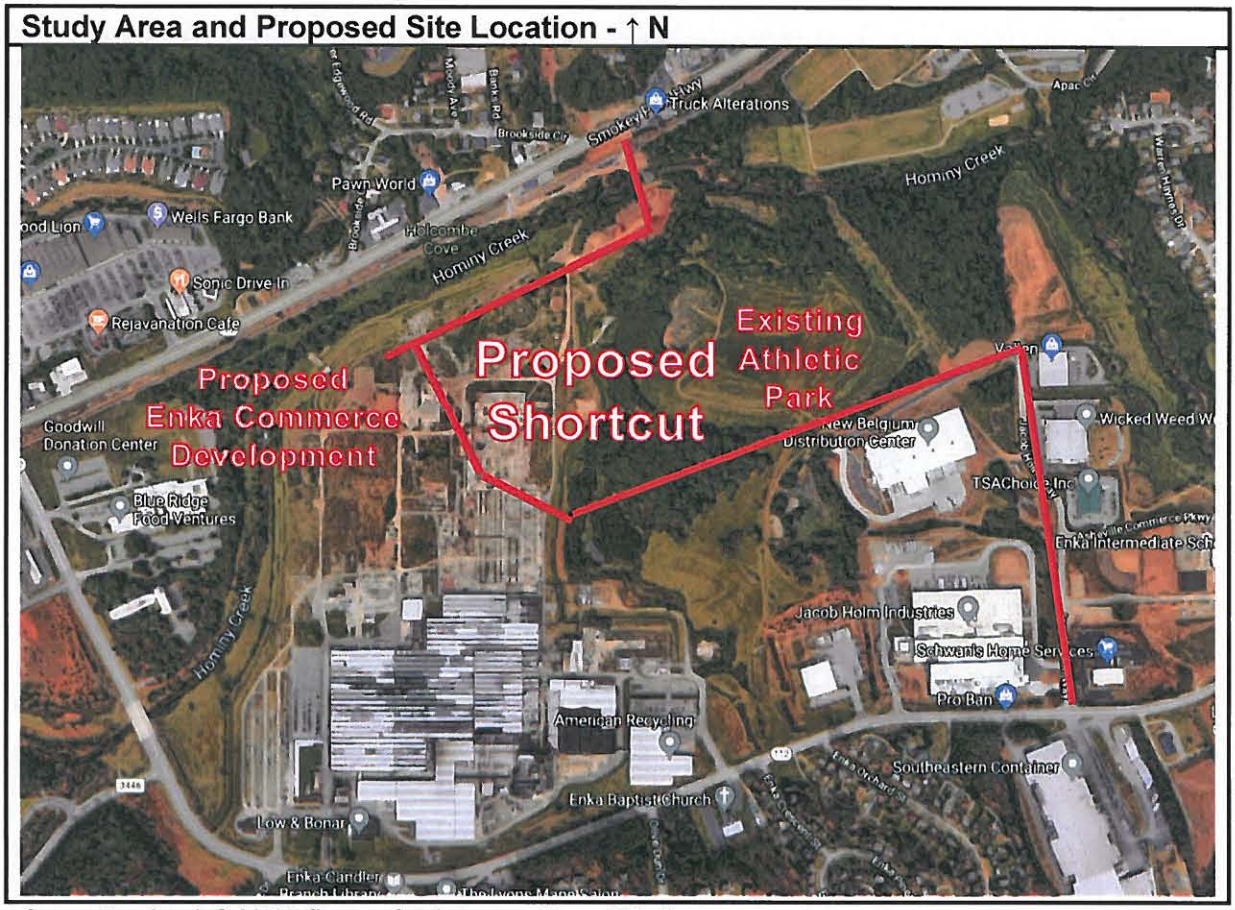


Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Projected (2021) Peak Hour Traiffc Volumes Scale: Not to Scale | Figure

Moving forward. RKA

Study Area

Study Area and Proposed Site Location - ↑ N



See attached CADD figure for intersection details.

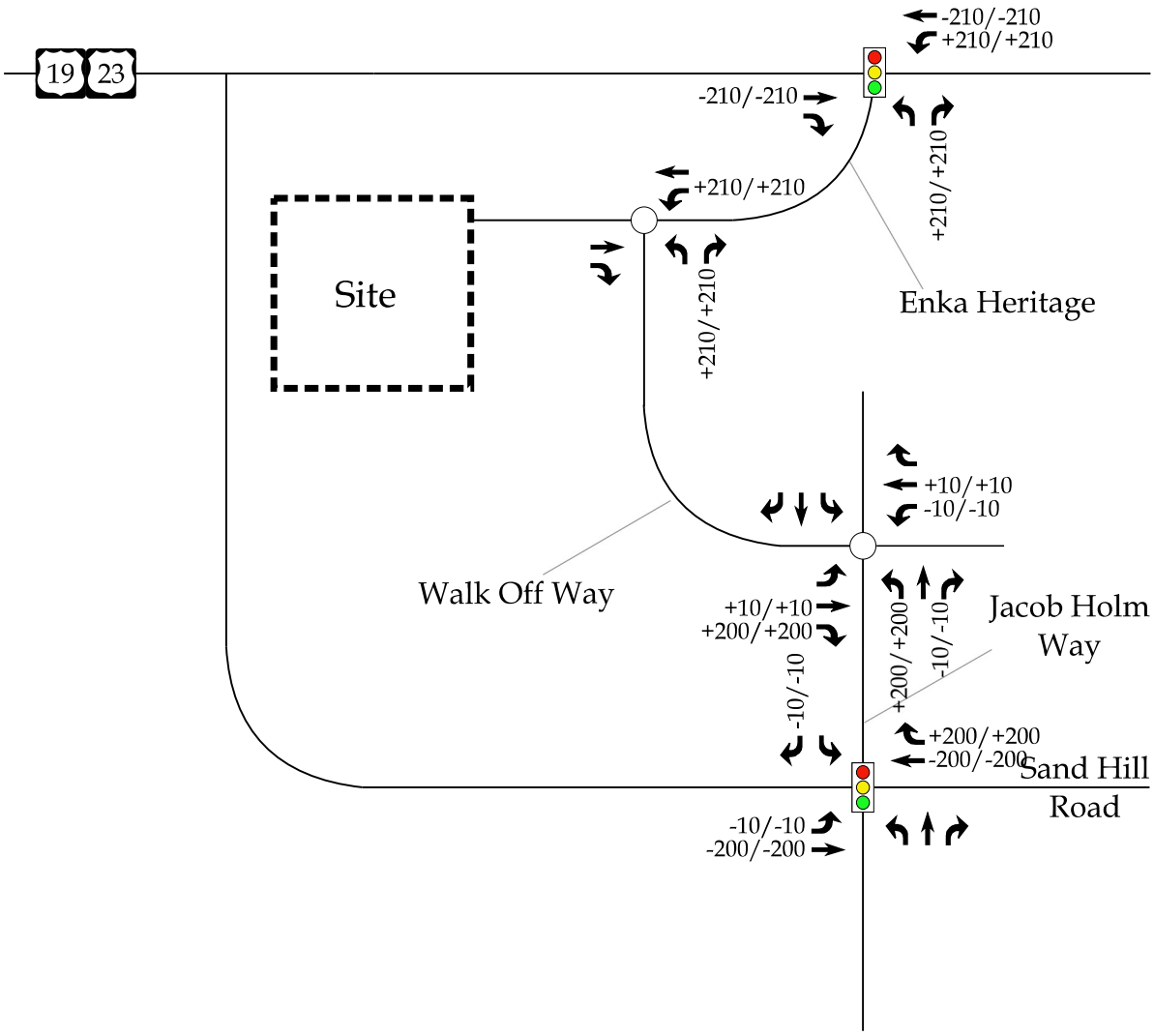
Volume Assumptions

Based on discussions with local authorities, for the purposes of this study we assumed to use the 2024 background traffic volumes from the TIA for the through movements. Other assumptions included using only one-third of the original trip generation volume from TIA study SC-2015-010 (shown on Page 1) and to use an additional 200 vehicles for local cut-through traffic during either peak hour (added as traffic using the shortcut from US 19/23 SB to NC 112 EB or from NC 112 WB to US 19/23 NB). To factor for truck traffic within the industrialized area, all movements within the proposed shortcut corridor factor assume 10 percent truck traffic. Due to the corridor's proximity to Enka Intermediate school, a PHF of 0.75 is used for westbound right and southbound left movements at NC 112/Jacob Holm Way for the AM peak hour while a PHF of 0.5 is used for the school driveway during the AM peak hour. Assumed 2024 AM and PM peak hour volumes were assigned to the proposed shortcut corridor based on these assumptions and engineering judgment.

LEGEND

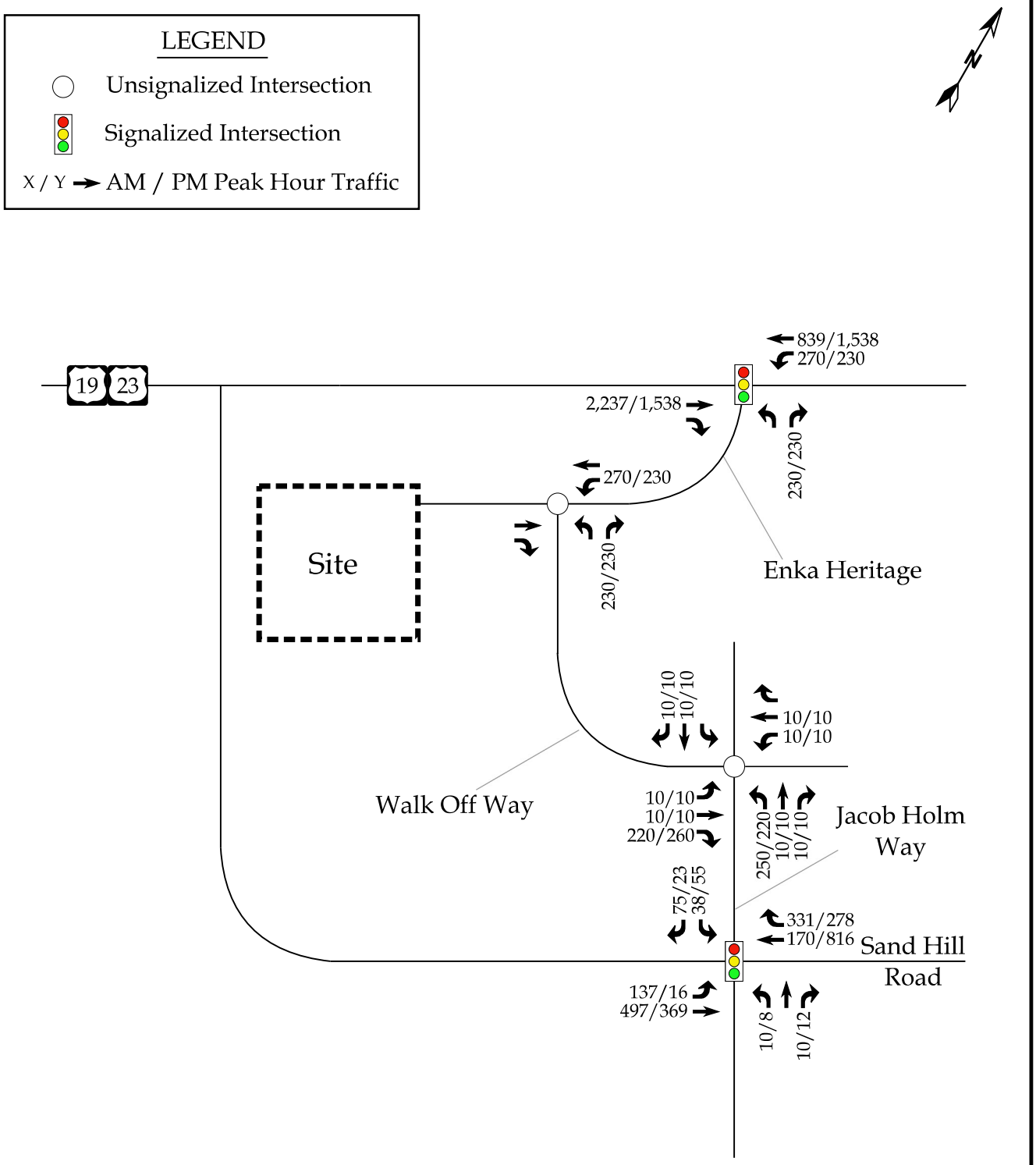
Signalized Intersection

X / Y → AM / PM Peak Hour Traffic



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	Traffic Adjustment Volumes for NCDOT Projects	
		Scale: Not to Scale	Figure

Moving forward. RKA



Moving forward. RKA RAMEY KEMP ASSOCIATES	Project AV2 Asheville, NC	No-Build (2021) Peak Hour Traiffc Volumes Scale: Not to Scale | Figure

Moving forward. RKA

APPENDIX B

EXISTING TRAFFIC DATA INFORMATION

TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) AM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 1

Groups Printed- Cars + - Trucks

	Jacob Holm Way Southbound				Sand Hill Road Westbound				Multi Use Access Northbound				Sand Hill Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00	0	0	1	1	8	12	0	20	0	0	0	0	0	30	1	31	52
07:05	1	0	0	1	1	17	0	18	0	0	0	0	0	29	3	32	51
07:10	1	0	1	2	12	15	0	27	0	0	0	0	0	42	6	48	77
07:15	0	0	1	1	6	20	0	26	0	0	0	0	0	46	8	54	81
07:20	0	0	3	3	12	35	0	47	0	0	0	0	0	54	9	63	113
07:25	0	0	1	1	12	34	0	46	0	0	0	0	0	42	11	53	100
07:30	6	0	4	10	4	33	0	37	3	0	3	6	0	53	13	66	119
07:35	8	0	5	13	17	23	0	40	1	0	3	4	0	51	10	61	118
07:40	10	0	7	17	13	25	0	38	1	0	0	1	0	67	18	85	141
07:45	11	0	4	15	11	29	0	40	2	0	1	3	0	60	14	74	132
07:50	10	0	4	14	6	22	0	28	0	0	1	1	0	52	18	70	113
07:55	14	0	1	15	13	39	0	52	2	0	0	2	0	44	11	55	124
Total	61	0	32	93	115	304	0	419	9	0	8	17	0	570	122	692	1221
08:00	11	0	3	14	6	26	0	32	0	0	0	0	0	54	9	63	109
08:05	4	0	0	4	3	25	0	28	0	0	1	1	0	50	3	53	86
08:10	0	0	0	0	1	24	0	25	0	0	0	0	0	40	2	42	67
08:15	0	0	2	2	2	21	0	23	1	0	0	1	0	39	1	40	66
08:20	1	0	1	2	0	24	0	24	1	0	2	3	0	38	2	40	69
08:25	2	0	2	4	1	17	0	18	1	0	0	1	0	38	3	41	64
08:30	2	0	3	5	3	26	0	29	1	0	0	1	0	41	4	45	80
08:35	2	0	3	5	2	33	0	35	1	0	0	1	0	31	0	31	72
08:40	5	0	0	5	4	30	1	35	1	0	0	1	0	45	1	46	87
08:45	0	0	2	2	3	20	0	23	0	0	1	1	0	40	0	40	66
08:50	0	0	2	2	3	21	0	24	0	0	0	0	0	32	0	32	58
08:55	2	0	0	2	2	15	0	17	1	0	0	1	0	14	2	16	36
Total	29	0	18	47	30	282	1	313	7	0	4	11	0	462	27	489	860
Grand Total	90	0	50	140	145	586	1	732	16	0	12	28	0	1032	149	1181	2081
Apprch %	64.3	0	35.7		19.8	80.1	0.1		57.1	0	42.9		0	87.4	12.6		
Total %	4.3	0	2.4	6.7	7	28.2	0	35.2	0.8	0	0.6	1.3	0	49.6	7.2	56.8	
Cars +	86	0	43	129	133	570	1	704	9	0	11	20	0	1009	147	1156	2009
% Cars +	95.6	0	86	92.1	91.7	97.3	100	96.2	56.2	0	91.7	71.4	0	97.8	98.7	97.9	96.5
Trucks	4	0	7	11	12	16	0	28	7	0	1	8	0	23	2	25	72
% Trucks	4.4	0	14	7.9	8.3	2.7	0	3.8	43.8	0	8.3	28.6	0	2.2	1.3	2.1	3.5

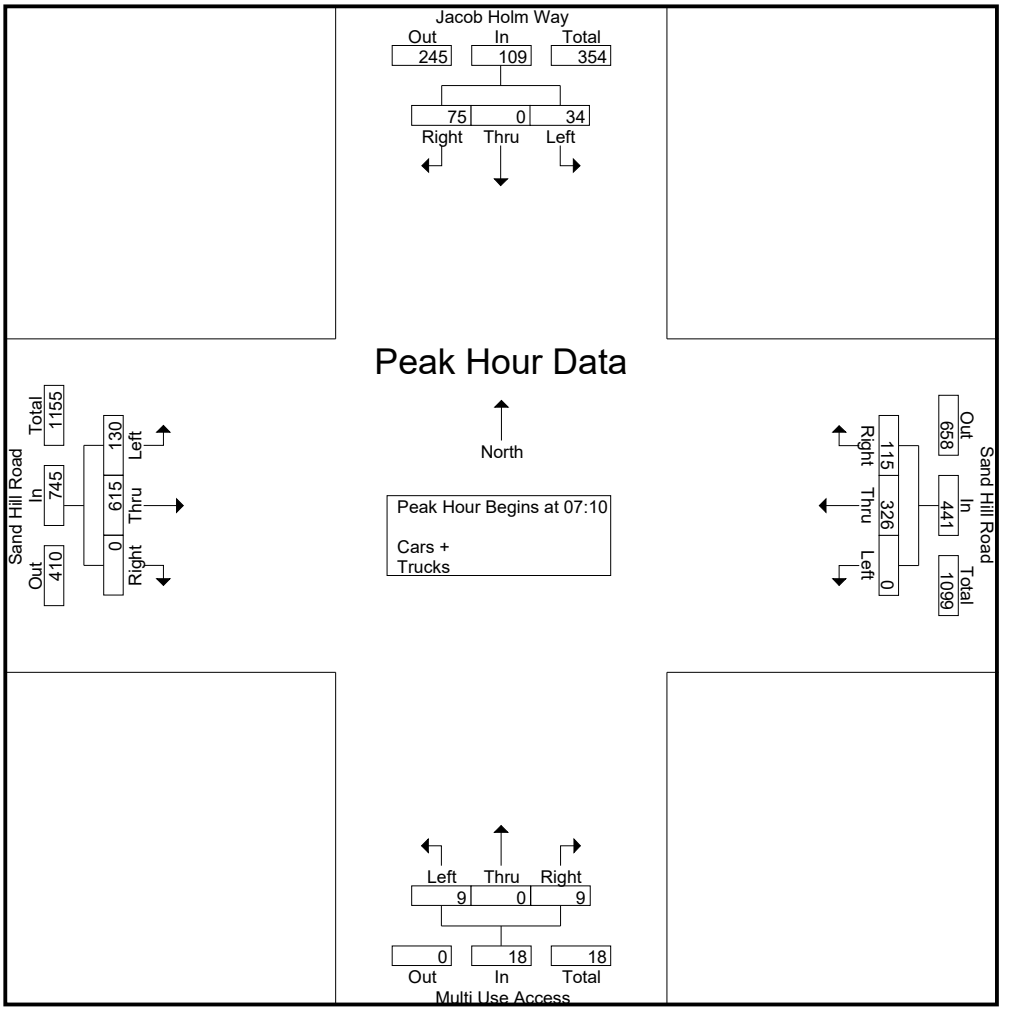
TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) AM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 2

	Jacob Holm Way Southbound				Sand Hill Road Westbound				Multi Use Access Northbound				Sand Hill Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:55 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:10																	
07:10	1	0	1	2	12	15	0	27	0	0	0	0	0	42	6	48	77
07:15	0	0	1	1	6	20	0	26	0	0	0	0	0	46	8	54	81
07:20	0	0	3	3	12	35	0	47	0	0	0	0	0	54	9	63	113
07:25	0	0	1	1	12	34	0	46	0	0	0	0	0	42	11	53	100
07:30	6	0	4	10	4	33	0	37	**3**	0	**3**	**6**	0	53	13	66	119
07:35	8	0	5	13	**17**	23	0	40	1	0	3	4	0	51	10	61	118
07:40	10	0	**7**	**17**	13	25	0	38	1	0	0	1	0	**67**	**18**	**85**	**141**
07:45	11	0	4	15	11	29	0	40	2	0	1	3	0	60	14	74	132
07:50	10	0	4	14	6	22	0	28	0	0	1	1	0	52	18	70	113
07:55	**14**	0	1	15	13	**39**	0	**52**	2	0	0	2	0	44	11	55	124
08:00	11	0	3	14	6	26	0	32	0	0	0	0	0	54	9	63	109
08:05	4	0	0	4	3	25	0	28	0	0	1	1	0	50	3	53	86
Total Volume	75	0	34	109	115	326	0	441	9	0	9	18	0	615	130	745	1313
% App. Total	68.8	0	31.2		26.1	73.9	0		50	0	50		0	82.6	17.4		
PHF	.446	.000	.405	.534	.564	.697	.000	.707	.250	.000	.250	.250	.000	.765	.602	.730	.776

TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) AM Peak
Site Code : 00000000
Start Date : 10/8/2020
Page No : 3





File Name : Asheville(Sand Hill and Jacob Holm) PM Peak
Site Code : 00000000
Start Date : 10/14/2020
Page No : 1

Groups Printed- Cars + - Trucks

	Jacob Holm Way Southbound					Sand Hill Road Westbound					Multi Use Access Northbound					Sand Hill Road 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
16:00	1	0	3	0	4	1	51	1	0	53	0	0	0	0	0	0	58	3	0	61	118
16:05	6	0	5	0	11	2	69	0	0	71	0	0	1	0	1	0	37	0	0	37	120
16:10	2	0	3	0	5	4	76	0	0	80	4	0	2	0	6	0	34	0	0	34	125
16:15	5	0	6	0	11	5	49	0	0	54	3	0	2	0	5	0	51	0	0	51	121
16:20	1	0	1	0	2	2	81	0	0	83	0	0	2	0	2	0	42	0	0	42	129
16:25	2	0	13	0	15	1	59	0	0	60	1	0	0	0	1	0	31	0	0	31	107
16:30	1	0	9	0	10	4	68	0	0	72	1	0	2	0	3	0	43	0	0	43	128
16:35	0	0	2	0	2	4	69	0	0	73	1	0	0	0	1	0	51	0	0	51	127
16:40	0	0	3	0	3	2	74	0	0	76	0	0	0	0	0	0	33	2	0	35	114
16:45	2	0	7	0	9	2	65	0	0	67	1	0	0	0	1	0	31	0	0	31	108
16:50	3	0	3	0	6	4	66	0	0	70	4	0	1	0	5	0	37	1	0	38	119
16:55	3	0	2	0	5	3	71	0	0	74	2	0	0	0	2	0	39	0	0	39	120
Total	26	0	57	0	83	34	798	1	0	833	17	0	10	0	27	0	487	6	0	493	1436
17:00	5	0	7	0	12	0	70	0	0	70	3	0	1	0	4	0	41	0	0	41	127
17:05	5	0	5	0	10	1	71	0	0	72	2	0	0	0	2	0	41	2	0	43	127
17:10	2	0	4	0	6	6	74	0	0	80	3	0	1	0	4	0	48	2	0	50	140
17:15	3	0	5	0	8	8	73	0	0	81	1	0	1	0	2	0	46	1	0	47	138
17:20	1	0	4	0	5	5	76	0	0	81	0	0	2	0	2	0	61	2	0	63	151
17:25	4	0	1	0	5	5	72	0	0	77	1	0	0	0	1	0	41	3	0	44	127
17:30	0	0	3	0	3	5	88	0	0	93	0	0	0	0	0	0	42	2	0	44	140
17:35	1	0	2	0	3	11	71	0	0	82	0	0	0	0	0	0	32	3	0	35	120
17:40	1	0	3	0	4	10	76	0	0	86	0	0	0	0	0	0	32	3	0	35	125
17:45	3	0	0	0	3	6	69	0	0	75	0	0	0	0	0	0	45	3	0	48	126
17:50	2	0	6	0	8	8	77	0	0	85	0	0	1	0	1	0	39	0	0	39	133
17:55	2	0	8	0	10	4	79	0	0	83	1	0	1	0	2	0	34	2	0	36	131
Total	29	0	48	0	77	69	896	0	0	965	11	0	7	0	18	0	502	23	0	525	1585
Grand Total	55	0	105	0	160	103	1694	1	0	1798	28	0	17	0	45	0	989	29	0	1018	3021
Apprch %	34.4	0	65.6	0		5.7	94.2	0.1	0		62.2	0	37.8	0		0	97.2	2.8	0		
Total %	1.8	0	3.5	0	5.3	3.4	56.1	0	0	59.5	0.9	0	0.6	0	1.5	0	32.7	1	0	33.7	
Cars +	49	0	72	0	121	75	1672	1	0	1748	26	0	16	0	42	0	973	27	0	1000	2911
% Cars +	89.1	0	68.6	0	75.6	72.8	98.7	100	0	97.2	92.9	0	94.1	0	93.3	0	98.4	93.1	0	98.2	96.4
Trucks	6	0	33	0	39	28	22	0	0	50	2	0	1	0	3	0	16	2	0	18	110
% Trucks	10.9	0	31.4	0	24.4	27.2	1.3	0	0	2.8	7.1	0	5.9	0	6.7	0	1.6	6.9	0	1.8	3.6

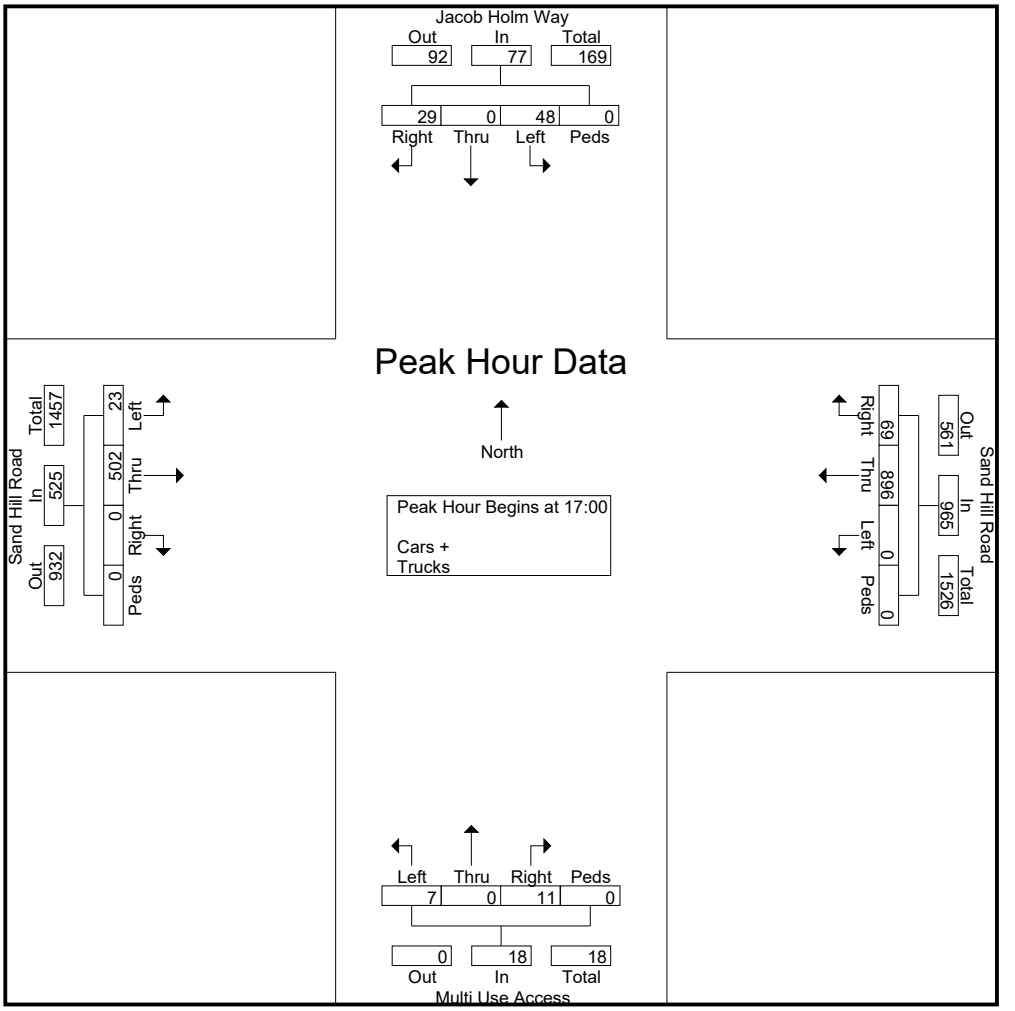
TRAFFIC DATA COLLECTION

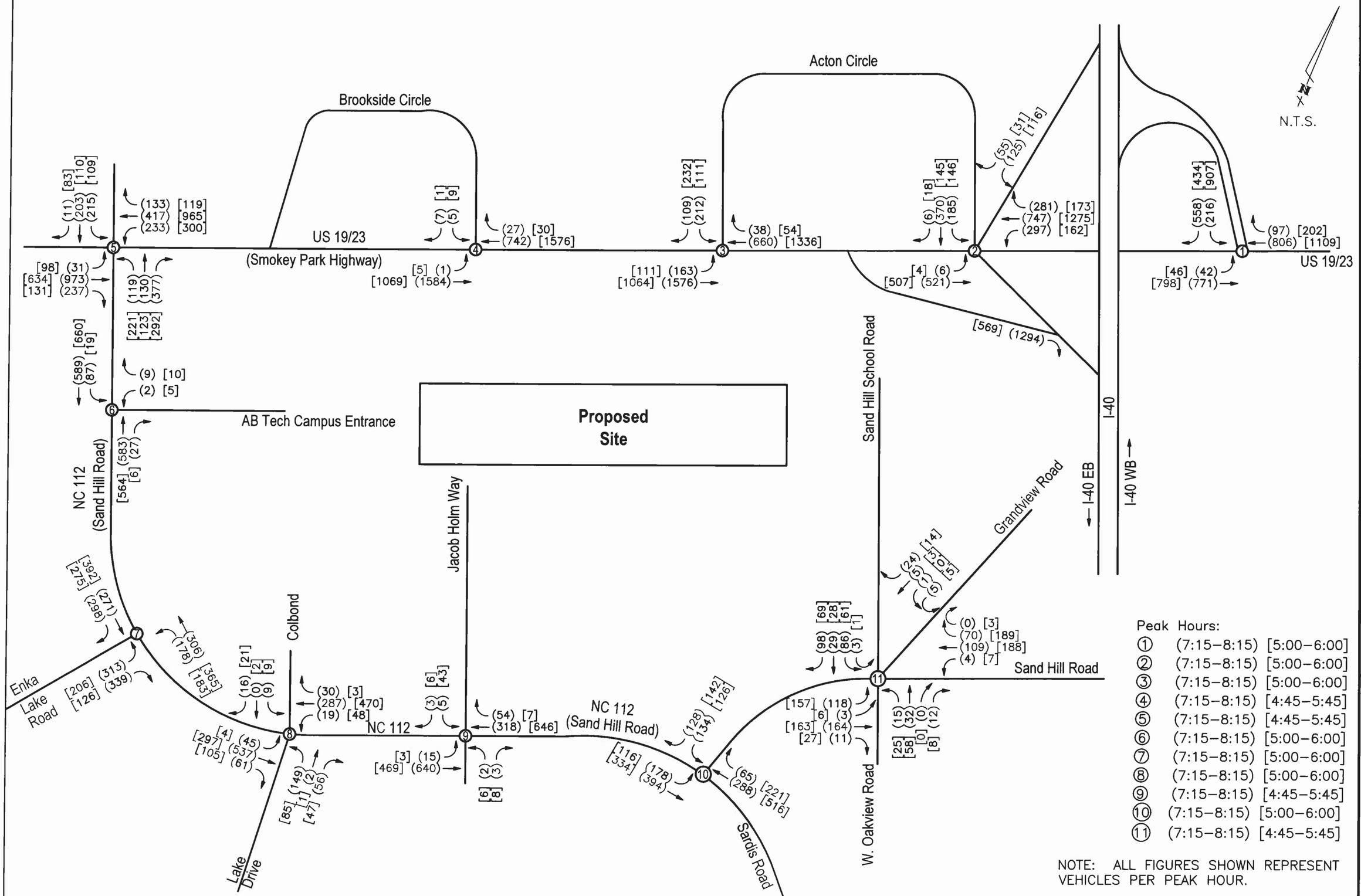
File Name : Asheville(Sand Hill and Jacob Holm) PM Peak
Site Code : 00000000
Start Date : 10/14/2020
Page No : 2

	Jacob Holm Way Southbound					Sand Hill Road Westbound					Multi Use Access Northbound					Sand Hill Road 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 16:00 to 17:55 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	**5**	0	7	0	**12**	0	70	0	0	70	**3**	0	1	0	**4**	0	41	0	0	41	127
17:05	5	0	5	0	10	1	71	0	0	72	2	0	0	0	2	0	41	2	0	43	127
17:10	2	0	4	0	6	6	74	0	0	80	3	0	1	0	4	0	48	2	0	50	140
17:15	3	0	5	0	8	8	73	0	0	81	1	0	1	0	2	0	46	1	0	47	138
17:20	1	0	4	0	5	5	76	0	0	81	0	0	**2**	0	2	0	**61**	2	0	**63**	**151**
17:25	4	0	1	0	5	5	72	0	0	77	1	0	0	0	1	0	41	**3**	0	44	127
17:30	0	0	3	0	3	5	**88**	0	0	**93**	0	0	0	0	0	0	42	2	0	44	140
17:35	1	0	2	0	3	**11**	71	0	0	82	0	0	0	0	0	0	32	3	0	35	120
17:40	1	0	3	0	4	10	76	0	0	86	0	0	0	0	0	0	32	3	0	35	125
17:45	3	0	0	0	3	6	69	0	0	75	0	0	0	0	0	0	45	3	0	48	126
17:50	2	0	6	0	8	8	77	0	0	85	0	0	1	0	1	0	39	0	0	39	133
17:55	2	0	**8**	0	10	4	79	0	0	83	1	0	1	0	2	0	34	2	0	36	131
Total Volume	29	0	48	0	77	69	896	0	0	965	11	0	7	0	18	0	502	23	0	525	1585
% App. Total	37.7	0	62.3	0		7.2	92.8	0	0		61.1	0	38.9	0		0	95.6	4.4	0		
PHF	.483	.000	.500	.000	.535	.523	.848	.000	.000	.865	.306	.000	.292	.000	.375	.000	.686	.639	.000	.694	.875

TRAFFIC DATA COLLECTION

File Name : Asheville(Sand Hill and Jacob Holm) PM Peak
Site Code : 00000000
Start Date : 10/14/2020
Page No : 3





Peak Hours:

①	(7:15–8:15) [5:00–6:00]
②	(7:15–8:15) [5:00–6:00]
③	(7:15–8:15) [5:00–6:00]
④	(7:15–8:15) [4:45–5:45]
⑤	(7:15–8:15) [4:45–5:45]
⑥	(7:15–8:15) [5:00–6:00]
⑦	(7:15–8:15) [5:00–6:00]
⑧	(7:15–8:15) [5:00–6:00]
⑨	(7:15–8:15) [4:45–5:45]
⑩	(7:15–8:15) [5:00–6:00]
⑪	(7:15–8:15) [4:45–5:45]

NOTE: ALL FIGURES SHOWN REPRESENT VEHICLES PER PEAK HOUR.

LEGEND

(XX) = A.M.
[XX] = P.M.

EXISTING
TRAFFIC VOLUMES

ENKA CENTER MASTER PLAN
ASHEVILLE, BUNCOMBE CO.,
NORTH CAROLINA

Mattern & Craig
CONSULTING ENGINEERS • SURVEYORS
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562

Comm. No. 3422

	Jacob Holm Way SB			Sand Hill Road WB			Multi Use Access NB			Sand Hill Road EB			
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
7:10 AM	1	0	1	12	15	0	0	0	0	0	42	6	
7:15 AM	0	0	1	6	20	0	0	0	0	0	46	8	
7:20 AM	0	0	3	12	35	0	0	0	0	0	54	9	
7:25 AM	0	0	1	12	34	0	0	0	0	0	42	11	
7:30 AM	6	0	4	4	33	0	3	0	3	0	53	13	
7:35 AM	8	0	5	17	23	0	1	0	3	0	51	10	
7:40 AM	10	0	7	13	25	0	1	0	0	0	67	18	
7:45 AM	11	0	4	11	29	0	2	0	1	0	60	14	
7:50 AM	10	0	4	6	22	0	0	0	1	0	52	18	
7:55 AM	14	0	1	13	39	0	2	0	0	0	44	11	
8:00 AM	11	0	3	6	26	0	0	0	0	0	54	9	
8:05 AM	4	0	0	3	25	0	0	0	1	0	50	3	
Peak Hour	75	0	34	115	326	0	9	0	9	0	615	130	
+10%	83	0	37	127	359	0	10	0	10	0	677	143	1446

2014	3		5	54	318		3		2		640	15	
2020	4	0	6	64	380	0	4	0	2	0	764	18	1242

	Jacob Holm Way SB			Sand Hill Road WB			Multi Use Access NB			Sand Hill Road EB			
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
5:00 PM	5	0	7	0	70	0	3	0	1	0	41	0	
5:05 PM	5	0	5	1	71	0	2	0	0	0	41	2	
5:10 PM	2	0	4	6	74	0	3	0	1	0	48	2	
5:15 PM	3	0	5	8	73	0	1	0	1	0	46	1	
5:20 PM	1	0	4	5	76	0	0	0	2	0	61	2	
5:25 PM	4	0	1	5	72	0	1	0	0	0	41	3	
5:30 PM	0	0	3	5	88	0	0	0	0	0	42	2	
5:35 PM	1	0	2	11	71	0	0	0	0	0	32	3	
5:40 PM	1	0	3	10	76	0	0	0	0	0	32	3	
5:45 PM	3	0	0	6	69	0	0	0	0	0	45	3	
5:50 PM	2	0	6	8	77	0	0	0	1	0	39	0	
5:55 PM	2	0	8	4	79	0	1	0	1	0	34	2	
Peak Hour	29	0	48	69	896	0	11	0	7	0	502	23	
+10%	32	0	53	76	986	0	12	0	8	0	552	25	1744

2014	6		43	7	646		8		6		469	3	
2020	7	0	51	8	771	0	10	0	7	0	560	4	1418

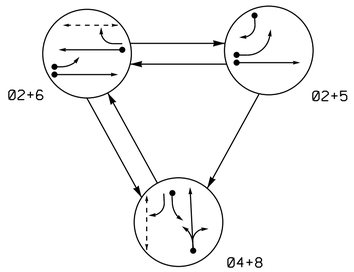
APPENDIX C

SIGNAL PLAN

PROJECT REFERENCE NO.	SHEET NO.
Div	Sig. 1

3 Phase Fully Actuated With EV Preemption Isolated

PHASING DIAGRAM



EV PREEMPT PHASE

(Medium Priority)

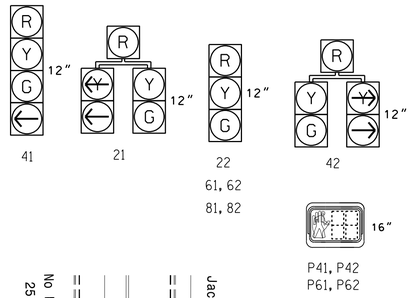


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	Ø2+5	Ø4+8	PRE2	FLASH
21	G	G	R	R	Y
22	G	G	R	R	Y
41	R	R	G	G	R
42	R	R	G	G	R
61, 62	G	R	R	R	Y
81, 82	R	R	G	R	R
P41, P42	DW	DW	W	DW	DRK
P61, P62	W	DW	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

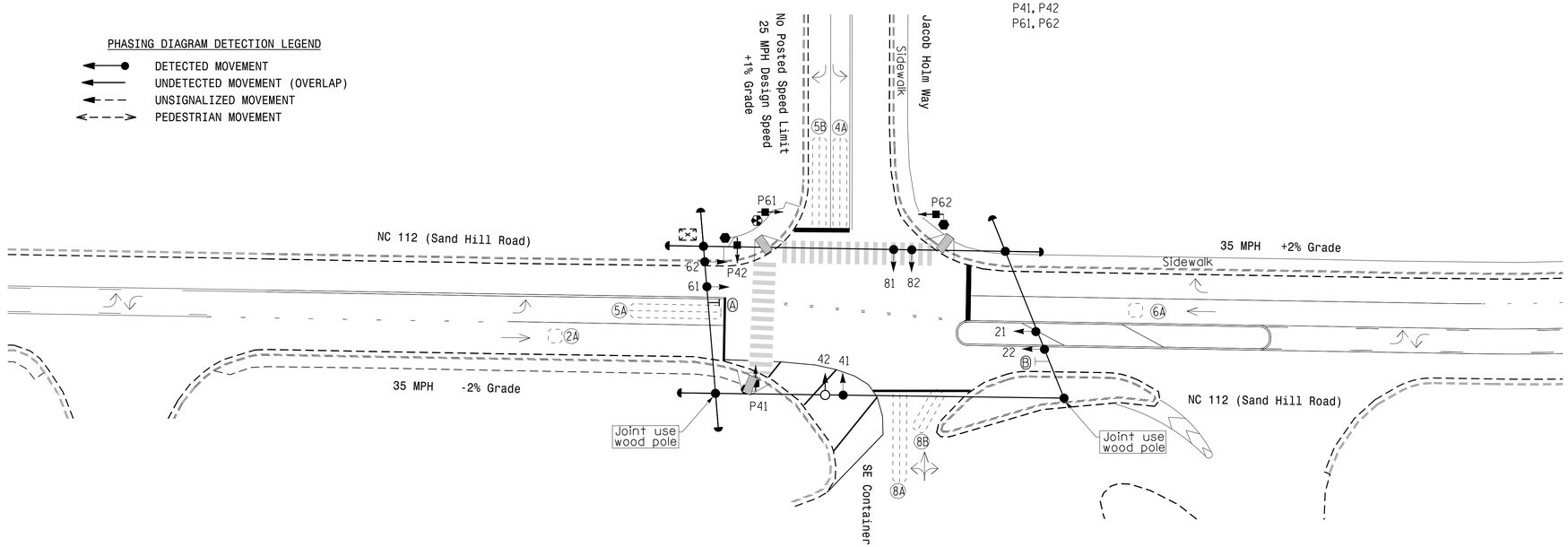
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCHING PHASE	CALLING	EXTENSION	FULL TIME DELAY	SWITCHING DETECTOR	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	3	-	2	-	Y	Y	-	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	-	Y	Y	-	-	-	5	-	-
5A	6X40	0	2-4-2	-	5	-	Y	Y	-	-	-	15	-	-
					2	-	Y	Y	-	-	-	-	-	-
5B	6X40	0	2-4-2	-	5	4	Y	Y	-	Y	-	15	-	-
6A	6X6	70	3	-	6	-	Y	Y	-	-	-	-	-	-
8A	6X40	0	2-4-2	-	8	-	Y	Y	-	-	-	10	-	-
8B	6X20	0	2-4-2	-	8	-	Y	Y	-	-	-	15	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may not lead.
4. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+5 to phase 2+6 by progressing through an all red phase.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. The Division Traffic Engineer will determine the Delay before Preempt and Preempt Dwell Min Green time for the emergency vehicle preemption timing.
10. Program signal heads numbered 41 & 42 to clear to all red before going into preempt.
11. Program controller to allow an Advanced Walk movement before serving the vehicle phase.
12. Program phase 4 ped detector to call phase 4 ped and phase 8 ped.
13. Phase 8 ped is a dummy ped to enable phase 4 leading ped interval.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



OASIS 2070 TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	60	40	20	60	40
Yellow Clearance	4.0	3.2	3.0	4.0	3.2
Red Clearance	1.9	2.6	2.3	1.8	2.6
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	7	7	-	7	7
Don't Walk 1	19	13	-	19	13
Advanced Walk	3	3	-	3	3
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

OASIS 2070 EV PREEMPT

FUNCTION	PRE 2
Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	3.2
Interval 1 – Dwell Red	2.6
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
Exit Phase(s)	2+6
Priority	Medium
Delay Time	* *
Min Green Before Pre	1
Ped Clear Before Pre	0.0*
Yellow Clear Before Pre	0.0*
Red Clear Before Pre	0.0*
Dwell Min Time	* *
Enable Backup Protection	Y
Ped Clear Through Yellow	Y
Omit Overlaps	-

* Time defaults to time used for phase during normal operation
** See Note 9

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
N/A	Wheelchair Ramp	
A	No Left Turn Sign (R3-2)	A
B	No Right Turn Sign (R3-1)	B

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 112 (Sand Hill Road) at Jacob Holm Way / Southeastern Container

Division 13 Buncombe County Enka

PLAN DATE: March 2017 REVIEWED BY:

PREPARED BY: C. Pierce REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 024393 ENGINEER TIMOTHY J. WILLIAMS

DocuSigned by: T. J. Williams 4/12/2017
97AD7D2BE8E345C... DATE

SIG. INVENTORY NO. 13-1218

12-APR-2017 13:48
S:*TASKMITS\Signals\Signal Design Section\Eastern Region\Div-13\WU-4715B (Asheville Signal System)\Signal Designs\13-1218*13218_sig_dsn_2016mxd.dgn
tjwilliams

APPENDIX D

SITE TRAFFIC GENERATION DATA

Site Traffic Generation Data

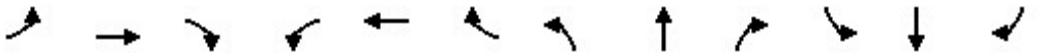
	Autos			Trucks			Vans			Total		
Time	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
00:00	0	0	0	1	2	3	0	0	0	1	2	3
01:00	87	0	87	1	1	2	0	0	0	88	1	89
02:00	0	0	0	1	1	2	0	0	0	1	1	2
03:00	0	0	0	1	1	2	0	0	0	1	1	2
04:00	0	0	0	2	1	3	0	0	0	2	1	3
05:00	28	0	28	1	1	2	0	0	0	29	1	30
06:00	0	0	0	1	1	2	0	0	0	1	1	2
07:00	0	0	0	0	1	1	0	0	0	0	1	1
07:30	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	1	0	1	0	0	0	1	0	1
09:00	100	0	100	1	1	2	0	0	0	101	1	102
10:00	91	0	91	0	1	1	0	180	180	91	181	272
11:00	5	0	5	1	1	2	0	11	11	6	12	18
12:00	0	87	87	0	0	0	0	0	0	0	87	87
13:00	49	0	49	0	0	0	0	0	0	49	0	49
14:00	0	28	28	0	0	0	0	0	0	0	28	28
15:00	0	0	0	0	0	0	0	0	0	0	0	0
16:00	50	0	50	0	0	0	0	0	0	50	0	50
16:30	0	25	25	1	0	1	0	0	0	1	25	26
17:00	0	25	25	0	1	1	0	0	0	0	26	26
17:30	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	21	21	1	0	1	0	0	0	1	21	22
19:00	0	45	45	1	1	2	90	0	90	91	46	137
20:00	0	126	126	1	1	2	99	0	99	100	127	227
21:00	0	20	20	1	1	2	2	0	2	3	21	24
22:00	0	33	33	1	1	2	0	0	0	1	34	35
23:00	0	0	0	1	1	2	0	0	0	1	1	2
Total	**410**	**410**	**820**	**18**	**18**	**36**	**191**	**191**	**382**	**619**	**619**	**1,238**

1st Shift:	2:00 AM	12:30 PM	87	Assoc.
2nd Shift:	6:00 AM	2:30 PM	28	Assoc.
3rd Shift:	1:30 PM	10:00 PM	28	Assoc.
PFSD Shift:	2:00 PM	6:00 PM	21	Assoc.
RTS Shift:	12:00 PM	10:30 PM	5	Assoc.
Drivers:	9:20 AM	9:10 PM	191	Drivers

APPENDIX E

NC 112 AND JACOB HOLM WAY/PRIVATE DRIVEWAY

SYNCHRO REPORTS

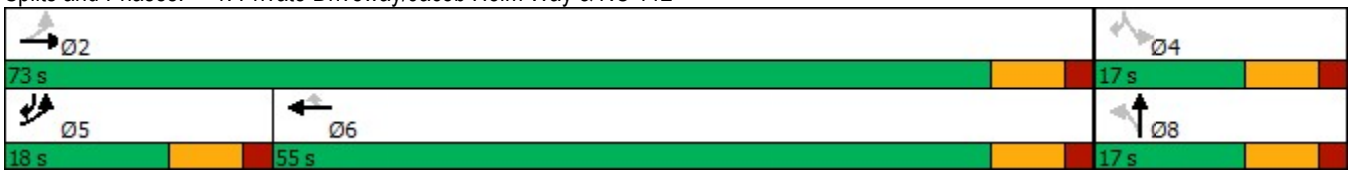


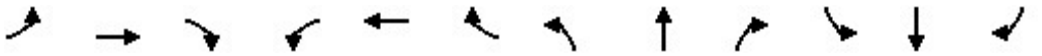
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	677	0	0	359	127	10	4	10	37	0	83
Future Volume (vph)	143	677	0	0	359	127	10	4	10	37	0	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		250	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.943				0.850
Flt Protected	0.950							0.979		0.950		
Satd. Flow (prot)	1641	1863	0	0	1863	1468	0	1595	0	1641	0	1468
Flt Permitted	0.346							0.979		0.833		
Satd. Flow (perm)	598	1863	0	0	1863	1468	0	1595	0	1439	0	1468
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			20			35	
Link Distance (ft)		1000			1046			436			878	
Travel Time (s)		15.2			15.8			14.9			17.1	
Peak Hour Factor	0.75	0.90	0.90	0.90	0.90	0.75	0.90	0.90	0.90	0.75	0.90	0.75
Heavy Vehicles (%)	10%	2%	2%	2%	2%	10%	10%	10%	10%	10%	2%	10%
Adj. Flow (vph)	191	752	0	0	399	169	11	4	11	49	0	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	752	0	0	399	169	0	26	0	49	0	111
Turn Type	pm+pt	NA			NA	Perm	Perm	NA		Perm		pm+ov
Protected Phases	5	2			6			8				5
Permitted Phases	2					6	8			4		4
Detector Phase	5	2			6	6	8	8		4		5
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0		7.0		7.0
Minimum Split (s)	14.0	17.0			17.0	17.0	14.0	14.0		14.0		14.0
Total Split (s)	18.0	73.0			55.0	55.0	17.0	17.0		17.0		18.0
Total Split (%)	20.0%	81.1%			61.1%	61.1%	18.9%	18.9%		18.9%		20.0%
Maximum Green (s)	11.0	66.0			48.0	48.0	10.0	10.0		10.0		11.0
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0		-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0		5.0
Lead/Lag	Lead				Lag	Lag						Lead
Lead-Lag Optimize?	Yes				Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	Min			Min	Min	None	None		None		None
Act Effct Green (s)	37.6	41.6			20.6	20.6		10.5		10.6		16.5
Actuated g/C Ratio	0.78	0.87			0.43	0.43		0.22		0.22		0.34
v/c Ratio	0.26	0.47			0.50	0.27		0.07		0.15		0.22
Control Delay	3.7	4.6			14.5	12.5		21.6		21.9		12.1
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0		0.0
Total Delay	3.7	4.6			14.5	12.5		21.6		21.9		12.1
LOS	A	A			B	B		C		C		B
Approach Delay		4.4			13.9			21.6			15.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C			B	
Queue Length 50th (ft)	0	0			54	20		5		9		20
Queue Length 95th (ft)	36	226			196	69		29		38		46
Internal Link Dist (ft)		920			966			356			798	
Turn Bay Length (ft)	225					250				100		
Base Capacity (vph)	777	1861			1696	1336		433		391		581
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	0.25	0.40			0.24	0.13		0.06		0.13		0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 47.9			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Private Driveway/Jacob Holm Way & NC 112





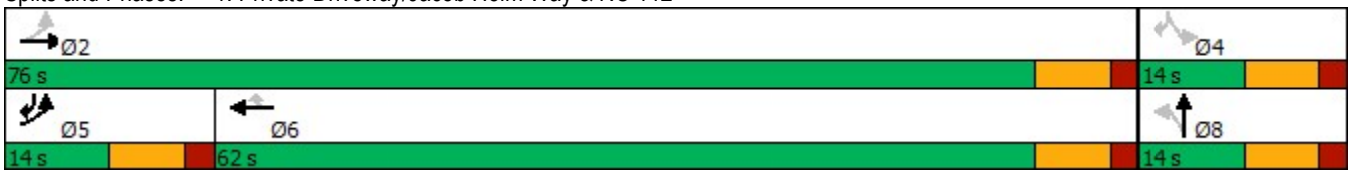
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	552	0	0	986	76	8	4	12	53	0	32
Future Volume (vph)	25	552	0	0	986	76	8	4	12	53	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		250	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.932				0.850
Flt Protected	0.950							0.983		0.950		
Satd. Flow (prot)	1641	1863	0	0	1863	1468	0	1582	0	1641	0	1468
Flt Permitted	0.078							0.983		0.740		
Satd. Flow (perm)	135	1863	0	0	1863	1468	0	1582	0	1278	0	1468
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			20			35	
Link Distance (ft)		1000			1046			436			878	
Travel Time (s)		15.2			15.8			14.9			17.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	2%	2%	2%	2%	10%	10%	10%	10%	10%	2%	10%
Adj. Flow (vph)	28	613	0	0	1096	84	9	4	13	59	0	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	613	0	0	1096	84	0	26	0	59	0	36
Turn Type	pm+pt	NA			NA	Perm	Perm	NA		Perm		pm+ov
Protected Phases	5	2			6			8				5
Permitted Phases	2					6	8			4		4
Detector Phase	5	2			6	6	8	8		4		5
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0		7.0		7.0
Minimum Split (s)	14.0	17.0			17.0	17.0	14.0	14.0		14.0		14.0
Total Split (s)	14.0	76.0			62.0	62.0	14.0	14.0		14.0		14.0
Total Split (%)	15.6%	84.4%			68.9%	68.9%	15.6%	15.6%		15.6%		15.6%
Maximum Green (s)	7.0	69.0			55.0	55.0	7.0	7.0		7.0		7.0
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0		-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0		5.0
Lead/Lag	Lead				Lag	Lag						Lead
Lead-Lag Optimize?	Yes				Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	Min			Min	Min	None	None		None		None
Act Effct Green (s)	62.9	64.7			57.3	57.3		9.7		9.7		19.8
Actuated g/C Ratio	0.80	0.83			0.73	0.73		0.12		0.12		0.25
v/c Ratio	0.09	0.40			0.80	0.08		0.13		0.37		0.10
Control Delay	2.7	3.7			18.7	6.2		38.7		45.2		26.1
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0		0.0
Total Delay	2.7	3.7			18.7	6.2		38.7		45.2		26.1
LOS	A	A			B	A		D		D		C
Approach Delay		3.6			17.8			38.7			38.0	

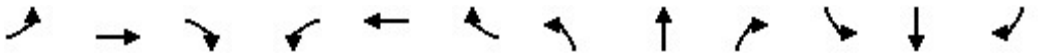
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D			D	
Queue Length 50th (ft)	3	83			500	17		14		32		16
Queue Length 95th (ft)	7	123			#844	34		39		72		40
Internal Link Dist (ft)		920			966			356			798	
Turn Bay Length (ft)	225					250				100		
Base Capacity (vph)	295	1593			1362	1073		196		158		371
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	0.09	0.38			0.80	0.08		0.13		0.37		0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 78.4			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 76.1%		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.

Splits and Phases: 1: Private Driveway/Jacob Holm Way & NC 112



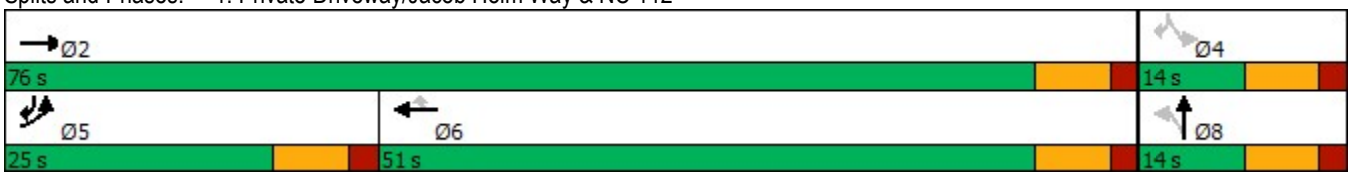


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	491	0	0	166	330	10	4	10	38	0	85
Future Volume (vph)	146	491	0	0	166	330	10	4	10	38	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		250	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.943				0.850
Flt Protected	0.950							0.979		0.950		
Satd. Flow (prot)	1641	1863	0	0	1863	1468	0	1595	0	1641	0	1468
Flt Permitted	0.950							0.979		0.741		
Satd. Flow (perm)	1641	1863	0	0	1863	1468	0	1595	0	1280	0	1468
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			20			35	
Link Distance (ft)		996			1046			436			878	
Travel Time (s)		15.1			15.8			14.9			17.1	
Peak Hour Factor	0.75	0.90	0.90	0.90	0.90	0.75	0.90	0.90	0.90	0.75	0.90	0.75
Heavy Vehicles (%)	10%	2%	2%	2%	2%	10%	10%	10%	10%	10%	2%	10%
Adj. Flow (vph)	195	546	0	0	184	440	11	4	11	51	0	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	195	546	0	0	184	440	0	26	0	51	0	113
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm		pm+ov
Protected Phases	5	2			6			8				5
Permitted Phases						6	8			4		4
Detector Phase	5	2			6	6	8	8		4		5
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0		7.0		7.0
Minimum Split (s)	14.0	17.0			17.0	17.0	14.0	14.0		14.0		14.0
Total Split (s)	25.0	76.0			51.0	51.0	14.0	14.0		14.0		25.0
Total Split (%)	27.8%	84.4%			56.7%	56.7%	15.6%	15.6%		15.6%		27.8%
Maximum Green (s)	18.0	69.0			44.0	44.0	7.0	7.0		7.0		18.0
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0		-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0		5.0
Lead/Lag	Lead				Lag	Lag						Lead
Lead-Lag Optimize?	Yes				Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	Min			Min	Min	None	None		None		None
Act Effct Green (s)	15.2	52.5			28.4	28.4		10.2		10.2		22.0
Actuated g/C Ratio	0.25	0.85			0.46	0.46		0.17		0.17		0.36
v/c Ratio	0.48	0.34			0.21	0.65		0.10		0.24		0.22
Control Delay	29.0	3.2			12.5	20.0		33.4		35.2		16.0
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0		0.0
Total Delay	29.0	3.2			12.5	20.0		33.4		35.2		16.0
LOS	C	A			B	B		C		D		B
Approach Delay		10.0			17.8			33.4			22.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	71	70			47	145		10		19		27
Queue Length 95th (ft)	131	104			92	198		38		52		64
Internal Link Dist (ft)		916			966			356			798	
Turn Bay Length (ft)	225					250				100		
Base Capacity (vph)	600	1764			1418	1118		262		210		698
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	0.33	0.31			0.13	0.39		0.10		0.24		0.16

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 61.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 14.8		Intersection LOS: B	
Intersection Capacity Utilization 46.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Private Driveway/Jacob Holm Way & NC 112

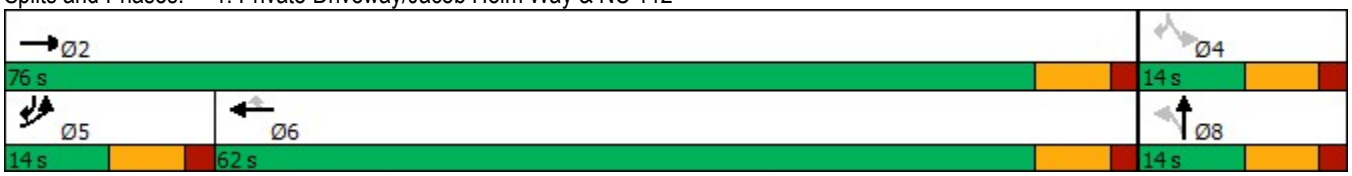


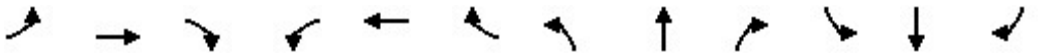
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	363	0	0	806	278	8	4	12	54	0	33
Future Volume (vph)	26	363	0	0	806	278	8	4	12	54	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		250	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.932				0.850
Flt Protected	0.950							0.983		0.950		
Satd. Flow (prot)	1641	1863	0	0	1863	1468	0	1582	0	1641	0	1468
Flt Permitted	0.950							0.983		0.755		
Satd. Flow (perm)	1641	1863	0	0	1863	1468	0	1582	0	1304	0	1468
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			20			35	
Link Distance (ft)		996			1046			436			878	
Travel Time (s)		15.1			15.8			14.9			17.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	2%	2%	2%	2%	10%	10%	10%	10%	10%	2%	10%
Adj. Flow (vph)	29	403	0	0	896	309	9	4	13	60	0	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	403	0	0	896	309	0	26	0	60	0	37
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm		pm+ov
Protected Phases	5	2			6			8				5
Permitted Phases						6	8			4		4
Detector Phase	5	2			6	6	8	8		4		5
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0		7.0		7.0
Minimum Split (s)	14.0	17.0			17.0	17.0	14.0	14.0		14.0		14.0
Total Split (s)	14.0	76.0			62.0	62.0	14.0	14.0		14.0		14.0
Total Split (%)	15.6%	84.4%			68.9%	68.9%	15.6%	15.6%		15.6%		15.6%
Maximum Green (s)	7.0	69.0			55.0	55.0	7.0	7.0		7.0		7.0
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0		-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0		5.0
Lead/Lag	Lead				Lag	Lag						Lead
Lead-Lag Optimize?	Yes				Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	Min			Min	Min	None	None		None		None
Act Effct Green (s)	10.4	59.5			52.8	52.8		10.4		10.4		17.0
Actuated g/C Ratio	0.15	0.87			0.77	0.77		0.15		0.15		0.25
v/c Ratio	0.12	0.25			0.62	0.27		0.11		0.30		0.10
Control Delay	36.9	2.5			11.9	7.2		37.1		40.2		25.2
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0		0.0
Total Delay	36.9	2.5			11.9	7.2		37.1		40.2		25.2
LOS	D	A			B	A		D		D		C
Approach Delay		4.8			10.7			37.1			34.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D			C	
Queue Length 50th (ft)	13	47			324	73		12		29		14
Queue Length 95th (ft)	42	71			489	119		39		73		41
Internal Link Dist (ft)		916			966			356			798	
Turn Bay Length (ft)	225					250				100		
Base Capacity (vph)	248	1665			1483	1169		239		197		365
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	0.12	0.24			0.60	0.26		0.11		0.30		0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 68.5			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 66.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Private Driveway/Jacob Holm Way & NC 112



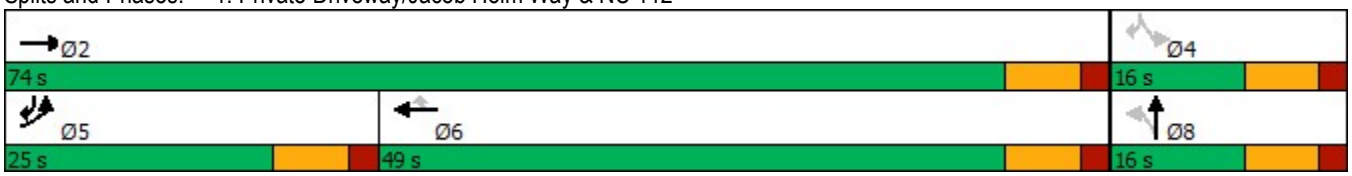


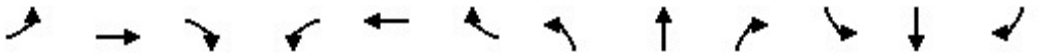
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	491	0	0	166	345	10	4	10	57	0	104
Future Volume (vph)	161	491	0	0	166	345	10	4	10	57	0	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		250	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.943				0.850
Flt Protected	0.950							0.979		0.950		
Satd. Flow (prot)	1641	1863	0	0	1863	1468	0	1595	0	1641	0	1468
Flt Permitted	0.950							0.979		0.740		
Satd. Flow (perm)	1641	1863	0	0	1863	1468	0	1595	0	1278	0	1468
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			20			35	
Link Distance (ft)		1000			1046			436			878	
Travel Time (s)		15.2			15.8			14.9			17.1	
Peak Hour Factor	0.75	0.90	0.90	0.90	0.90	0.75	0.90	0.90	0.90	0.75	0.90	0.75
Heavy Vehicles (%)	10%	2%	2%	2%	2%	10%	10%	10%	10%	10%	2%	10%
Adj. Flow (vph)	215	546	0	0	184	460	11	4	11	76	0	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	215	546	0	0	184	460	0	26	0	76	0	139
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm		pm+ov
Protected Phases	5	2			6			8				5
Permitted Phases						6	8			4		4
Detector Phase	5	2			6	6	8	8		4		5
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0		7.0		7.0
Minimum Split (s)	14.0	17.0			17.0	17.0	14.0	14.0		14.0		14.0
Total Split (s)	25.0	74.0			49.0	49.0	16.0	16.0		16.0		25.0
Total Split (%)	27.8%	82.2%			54.4%	54.4%	17.8%	17.8%		17.8%		27.8%
Maximum Green (s)	18.0	67.0			42.0	42.0	9.0	9.0		9.0		18.0
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0		-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0		5.0
Lead/Lag	Lead				Lag	Lag						Lead
Lead-Lag Optimize?	Yes				Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	Min			Min	Min	None	None		None		None
Act Effct Green (s)	16.4	53.9			29.7	29.7		11.4		11.4		27.7
Actuated g/C Ratio	0.24	0.78			0.43	0.43		0.17		0.17		0.40
v/c Ratio	0.55	0.37			0.23	0.73		0.10		0.36		0.24
Control Delay	33.4	4.4			14.3	24.9		33.6		38.5		16.4
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0		0.0
Total Delay	33.4	4.4			14.3	24.9		33.6		38.5		16.4
LOS	C	A			B	C		C		D		B
Approach Delay		12.6			21.9			33.6			24.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	87	81			52	171		10		32		37
Queue Length 95th (ft)	148	120			97	219		38		70		76
Internal Link Dist (ft)		920			966			356			798	
Turn Bay Length (ft)	225					250				100		
Base Capacity (vph)	541	1685			1234	972		289		231		725
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	0.40	0.32			0.15	0.47		0.09		0.33		0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 68.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 48.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Private Driveway/Jacob Holm Way & NC 112





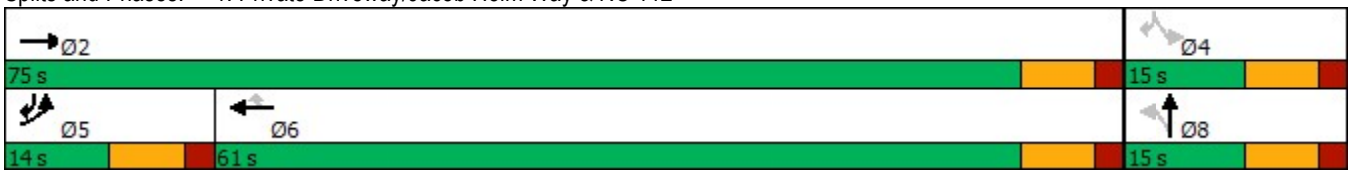
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	363	0	0	806	288	8	4	12	71	0	51
Future Volume (vph)	37	363	0	0	806	288	8	4	12	71	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		250	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.932				0.850
Flt Protected	0.950							0.983		0.950		
Satd. Flow (prot)	1641	1863	0	0	1863	1468	0	1582	0	1641	0	1468
Flt Permitted	0.950							0.983		0.740		
Satd. Flow (perm)	1641	1863	0	0	1863	1468	0	1582	0	1278	0	1468
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			20			35	
Link Distance (ft)		1000			1046			436			878	
Travel Time (s)		15.2			15.8			14.9			17.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	2%	2%	2%	2%	10%	10%	10%	10%	10%	2%	10%
Adj. Flow (vph)	41	403	0	0	896	320	9	4	13	79	0	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	403	0	0	896	320	0	26	0	79	0	57
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm		pm+ov
Protected Phases	5	2			6			8				5
Permitted Phases						6	8			4		4
Detector Phase	5	2			6	6	8	8		4		5
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0		7.0		7.0
Minimum Split (s)	14.0	17.0			17.0	17.0	14.0	14.0		14.0		14.0
Total Split (s)	14.0	75.0			61.0	61.0	15.0	15.0		15.0		14.0
Total Split (%)	15.6%	83.3%			67.8%	67.8%	16.7%	16.7%		16.7%		15.6%
Maximum Green (s)	7.0	68.0			54.0	54.0	8.0	8.0		8.0		7.0
Yellow Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0		-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0		5.0
Lead/Lag	Lead				Lag	Lag						Lead
Lead-Lag Optimize?	Yes				Yes	Yes						Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	Min			Min	Min	None	None		None		None
Act Effct Green (s)	10.2	59.9			49.9	49.9		10.9		10.9		20.9
Actuated g/C Ratio	0.14	0.81			0.67	0.67		0.15		0.15		0.28
v/c Ratio	0.18	0.27			0.71	0.32		0.11		0.42		0.14
Control Delay	38.3	3.3			16.2	9.4		36.5		44.2		24.9
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0		0.0
Total Delay	38.3	3.3			16.2	9.4		36.5		44.2		24.9
LOS	D	A			B	A		D		D		C
Approach Delay		6.5			14.4			36.5			36.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			D			D	
Queue Length 50th (ft)	20	50			336	80		12		39		21
Queue Length 95th (ft)	54	76			507	128		38		#99		55
Internal Link Dist (ft)		920			966			356			798	
Turn Bay Length (ft)	225					250				100		
Base Capacity (vph)	226	1626			1375	1084		242		195		414
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	0.18	0.25			0.65	0.30		0.11		0.41		0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 74.1			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 66.6%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Private Driveway/Jacob Holm Way & NC 112



APPENDIX F

JACOB HOLM WAY/BOB LEWIS BALLPARK AND WALK OFF WAY/PRIVATE DRIVEWAY

SYNCHRO REPORTS

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	4	30	20	4	4	100	20	20	4	20	4
Future Vol, veh/h	4	4	30	20	4	4	100	20	20	4	20	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	10	10	10	10	2	10	2	10	2	2	2
Mvmt Flow	4	4	33	22	4	4	111	22	22	4	22	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.1	7.8	8.3	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	71%	11%	71%	14%
Vol Thru, %	14%	11%	14%	71%
Vol Right, %	14%	79%	14%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	38	28	28
LT Vol	100	4	20	4
Through Vol	20	4	4	20
RT Vol	20	30	4	4
Lane Flow Rate	156	42	31	31
Geometry Grp	1	1	1	1
Degree of Util (X)	0.185	0.046	0.04	0.036
Departure Headway (Hd)	4.28	3.945	4.599	4.124
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	834	913	783	856
Service Time	2.326	1.946	2.6	2.205
HCM Lane V/C Ratio	0.187	0.046	0.04	0.036
HCM Control Delay	8.3	7.1	7.8	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.1	0.1	0.1

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	4	70	20	4	4	30	20	20	4	20	4
Future Vol, veh/h	4	4	70	20	4	4	30	20	20	4	20	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	10	10	10	10	2	10	2	10	2	2	2
Mvmt Flow	4	4	78	22	4	4	33	22	22	4	22	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7	7.6	7.7	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	43%	5%	71%	14%
Vol Thru, %	29%	5%	14%	71%
Vol Right, %	29%	90%	14%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	78	28	28
LT Vol	30	4	20	4
Through Vol	20	4	4	20
RT Vol	20	70	4	4
Lane Flow Rate	78	87	31	31
Geometry Grp	1	1	1	1
Degree of Util (X)	0.091	0.087	0.038	0.036
Departure Headway (Hd)	4.213	3.618	4.384	4.142
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	846	978	809	858
Service Time	2.259	1.685	2.452	2.2
HCM Lane V/C Ratio	0.092	0.089	0.038	0.036
HCM Control Delay	7.7	7	7.6	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.1	0.1

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	10	220	10	10	4	250	10	10	4	10	10
Future Vol, veh/h	10	10	220	10	10	4	250	10	10	4	10	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	10	10	10	10	2	10	2	10	2	2	2
Mvmt Flow	11	11	244	11	11	4	278	11	11	4	11	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.2	8.5	11.3	8
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	4%	42%	17%
Vol Thru, %	4%	4%	42%	42%
Vol Right, %	4%	92%	17%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	270	240	24	24
LT Vol	250	10	10	4
Through Vol	10	10	10	10
RT Vol	10	220	4	10
Lane Flow Rate	300	267	27	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.409	0.315	0.038	0.035
Departure Headway (Hd)	4.909	4.259	5.193	4.749
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	732	843	687	749
Service Time	2.954	2.288	3.243	2.807
HCM Lane V/C Ratio	0.41	0.317	0.039	0.036
HCM Control Delay	11.3	9.2	8.5	8
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2	1.4	0.1	0.1

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	10	260	10	10	4	220	10	10	4	10	10
Future Vol, veh/h	10	10	260	10	10	4	220	10	10	4	10	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	10	10	10	10	2	10	2	10	2	2	2
Mvmt Flow	11	11	289	11	11	4	244	11	11	4	11	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	8.4	11	8
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	92%	4%	42%	17%
Vol Thru, %	4%	4%	42%	42%
Vol Right, %	4%	93%	17%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	280	24	24
LT Vol	220	10	10	4
Through Vol	10	10	10	10
RT Vol	10	260	4	10
Lane Flow Rate	267	311	27	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.37	0.361	0.038	0.036
Departure Headway (Hd)	4.989	4.177	5.158	4.801
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	717	862	691	740
Service Time	3.04	2.206	3.211	2.865
HCM Lane V/C Ratio	0.372	0.361	0.039	0.036
HCM Control Delay	11	9.6	8.4	8
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.7	1.7	0.1	0.1

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	10	258	10	10	4	280	10	10	4	10	10
Future Vol, veh/h	10	10	258	10	10	4	280	10	10	4	10	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	10	10	10	10	2	10	2	10	2	2	2
Mvmt Flow	11	11	287	11	11	4	311	11	11	4	11	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10	8.6	12.4	8.2
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	4%	42%	17%
Vol Thru, %	3%	4%	42%	42%
Vol Right, %	3%	93%	17%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	300	278	24	24
LT Vol	280	10	10	4
Through Vol	10	10	10	10
RT Vol	10	258	4	10
Lane Flow Rate	333	309	27	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.464	0.373	0.04	0.036
Departure Headway (Hd)	5.015	4.353	5.355	4.91
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	713	825	664	722
Service Time	3.075	2.391	3.422	2.991
HCM Lane V/C Ratio	0.467	0.375	0.041	0.037
HCM Control Delay	12.4	10	8.6	8.2
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2.5	1.7	0.1	0.1

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	10	295	10	10	4	241	10	10	4	10	10
Future Vol, veh/h	10	10	295	10	10	4	241	10	10	4	10	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	10	10	10	10	2	10	2	10	2	2	2
Mvmt Flow	11	11	328	11	11	4	268	11	11	4	11	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	8.6	11.7	8.2
HCM LOS	B	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	92%	3%	42%	17%
Vol Thru, %	4%	3%	42%	42%
Vol Right, %	4%	94%	17%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	261	315	24	24
LT Vol	241	10	10	4
Through Vol	10	10	10	10
RT Vol	10	295	4	10
Lane Flow Rate	290	350	27	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.409	0.413	0.039	0.037
Departure Headway (Hd)	5.083	4.243	5.283	4.935
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	705	847	673	718
Service Time	3.148	2.279	3.349	3.017
HCM Lane V/C Ratio	0.411	0.413	0.04	0.038
HCM Control Delay	11.7	10.3	8.6	8.2
HCM Lane LOS	B	B	A	A
HCM 95th-tile Q	2	2	0.1	0.1

APPENDIX G

US 19/23 AND ENKA HERITAGE

SYNCHRO REPORTS

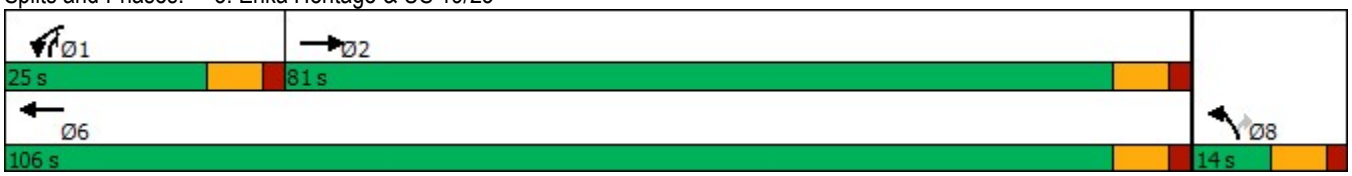
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2177	4	270	819	4	230
Future Volume (vph)	2177	4	270	819	4	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	800		300	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3539	0	1641	3539	3183	1468
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	0	1641	3539	3183	1468
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	35	
Link Distance (ft)	1075			1040	472	
Travel Time (s)	16.3			15.8	9.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	10%	2%	10%	10%
Adj. Flow (vph)	2419	4	300	910	4	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2423	0	300	910	4	256
Turn Type	NA		Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Detector Phase	2		1	6	8	1
Switch Phase						
Minimum Initial (s)	12.0		7.0	12.0	7.0	7.0
Minimum Split (s)	19.0		14.0	19.0	14.0	14.0
Total Split (s)	81.0		25.0	106.0	14.0	25.0
Total Split (%)	67.5%		20.8%	88.3%	11.7%	20.8%
Maximum Green (s)	74.0		18.0	99.0	7.0	18.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		None	Min	None	None
Act Effct Green (s)	76.2		20.0	105.4	9.0	22.6
Actuated g/C Ratio	0.70		0.18	0.97	0.08	0.21
v/c Ratio	0.98		0.99	0.27	0.02	0.84
Control Delay	30.2		95.9	0.7	48.5	65.6
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	30.2		95.9	0.7	48.5	65.6
LOS	C		F	A	D	E
Approach Delay	30.2			24.3	65.3	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach LOS	C			C	E	
Queue Length 50th (ft)	675		204	0	1	172
Queue Length 95th (ft)	#1237		#440	72	7	265
Internal Link Dist (ft)	995			960	392	
Turn Bay Length (ft)			800		300	
Base Capacity (vph)	2478		302	3427	264	304
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	0.98		0.99	0.27	0.02	0.84

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 108.8			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 30.7		Intersection LOS: C	
Intersection Capacity Utilization 93.6%		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.

Splits and Phases: 3: Enka Heritage & US 19/23



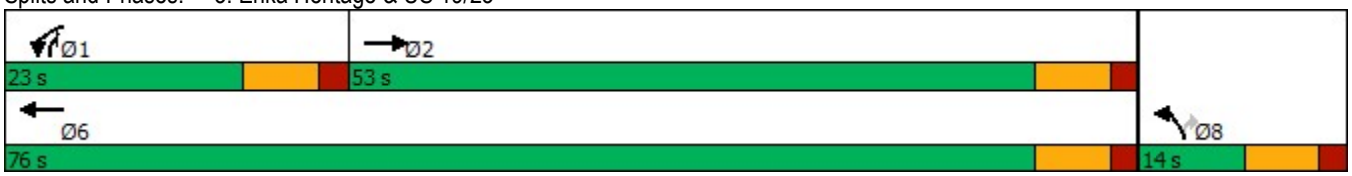
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1498	4	230	1498	4	230
Future Volume (vph)	1498	4	230	1498	4	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	800		300	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3539	0	1641	3539	3183	1468
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	0	1641	3539	3183	1468
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	35	
Link Distance (ft)	1075			1040	472	
Travel Time (s)	16.3			15.8	9.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	10%	2%	10%	10%
Adj. Flow (vph)	1664	4	256	1664	4	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1668	0	256	1664	4	256
Turn Type	NA		Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Detector Phase	2		1	6	8	1
Switch Phase						
Minimum Initial (s)	12.0		7.0	12.0	7.0	7.0
Minimum Split (s)	19.0		14.0	19.0	14.0	14.0
Total Split (s)	53.0		23.0	76.0	14.0	23.0
Total Split (%)	58.9%		25.6%	84.4%	15.6%	25.6%
Maximum Green (s)	46.0		16.0	69.0	7.0	16.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		None	Min	None	None
Act Effct Green (s)	43.6		17.0	70.1	9.2	19.3
Actuated g/C Ratio	0.60		0.23	0.96	0.13	0.26
v/c Ratio	0.79		0.67	0.49	0.01	0.66
Control Delay	15.9		38.3	1.6	33.8	33.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	15.9		38.3	1.6	33.8	33.8
LOS	B		D	A	C	C
Approach Delay	15.9			6.5	33.8	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach LOS	B			A	C	
Queue Length 50th (ft)	254		109	0	1	112
Queue Length 95th (ft)	530		#258	191	6	185
Internal Link Dist (ft)	995			960	392	
Turn Bay Length (ft)			800		300	
Base Capacity (vph)	2378		413	3344	401	415
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	0.70		0.62	0.50	0.01	0.62

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 73.2			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Enka Heritage & US 19/23



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2177	46	346	819	57	324
Future Volume (vph)	2177	46	346	819	57	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	800		300	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	1.00
Frt	0.997					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3523	0	1641	3539	3183	1468
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3523	0	1641	3539	3183	1468
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	35	
Link Distance (ft)	1075			1040	472	
Travel Time (s)	16.3			15.8	9.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	10%	2%	10%	10%
Adj. Flow (vph)	2419	51	384	910	63	360
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2470	0	384	910	63	360
Turn Type	NA		Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Detector Phase	2		1	6	8	1
Switch Phase						
Minimum Initial (s)	12.0		7.0	12.0	7.0	7.0
Minimum Split (s)	19.0		14.0	19.0	14.0	14.0
Total Split (s)	77.0		29.0	106.0	14.0	29.0
Total Split (%)	64.2%		24.2%	88.3%	11.7%	24.2%
Maximum Green (s)	70.0		22.0	99.0	7.0	22.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		None	Min	None	None
Act Effct Green (s)	72.2		24.1	102.4	9.0	35.0
Actuated g/C Ratio	0.62		0.21	0.87	0.08	0.30
v/c Ratio	1.14		1.14	0.29	0.26	0.82
Control Delay	92.7		135.8	2.0	55.2	54.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	92.7		135.8	2.0	55.2	54.5
LOS	F		F	A	E	D
Approach Delay	92.7			41.7	54.6	

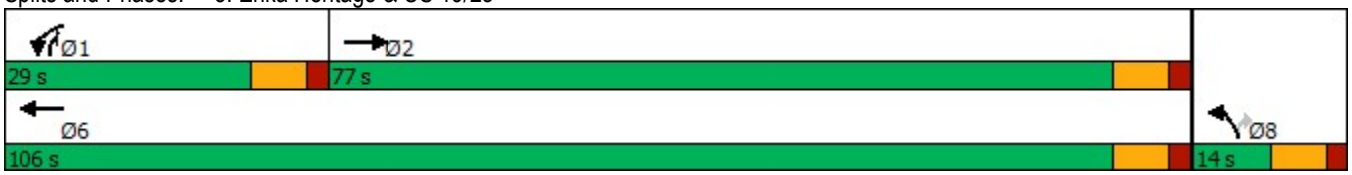
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach LOS	F			D	D	
Queue Length 50th (ft)	~1198		~354	58	24	252
Queue Length 95th (ft)	#1331		#549	72	47	#396
Internal Link Dist (ft)	995			960	392	
Turn Bay Length (ft)			800		300	
Base Capacity (vph)	2169		337	3090	244	438
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	1.14		1.14	0.29	0.26	0.82

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 117.2			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 73.1		Intersection LOS: E	
Intersection Capacity Utilization 99.1%		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.

Splits and Phases: 3: Enka Heritage & US 19/23



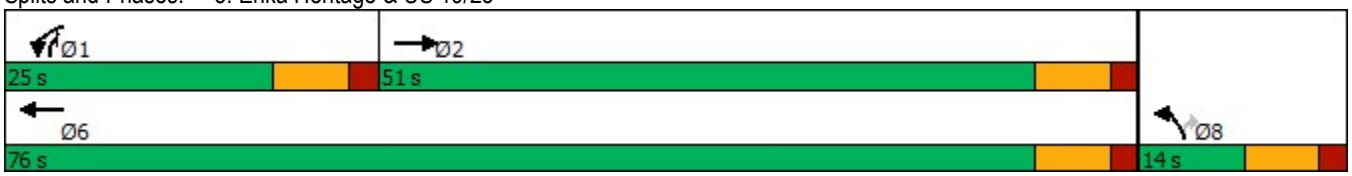
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1498	32	284	1498	53	317
Future Volume (vph)	1498	32	284	1498	53	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	800		300	0
Storage Lanes		0	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	1.00
Frt	0.997					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3523	0	1641	3539	3183	1468
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3523	0	1641	3539	3183	1468
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	35	
Link Distance (ft)	1075			1040	472	
Travel Time (s)	16.3			15.8	9.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	10%	2%	10%	10%
Adj. Flow (vph)	1664	36	316	1664	59	352
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1700	0	316	1664	59	352
Turn Type	NA		Prot	NA	Prot	pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Detector Phase	2		1	6	8	1
Switch Phase						
Minimum Initial (s)	12.0		7.0	12.0	7.0	7.0
Minimum Split (s)	19.0		14.0	19.0	14.0	14.0
Total Split (s)	51.0		25.0	76.0	14.0	25.0
Total Split (%)	56.7%		27.8%	84.4%	15.6%	27.8%
Maximum Green (s)	44.0		18.0	69.0	7.0	18.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		None	Min	None	None
Act Effct Green (s)	44.7		19.6	70.6	9.2	30.1
Actuated g/C Ratio	0.53		0.23	0.83	0.11	0.35
v/c Ratio	0.92		0.84	0.57	0.17	0.68
Control Delay	29.2		54.1	4.2	38.6	30.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	29.2		54.1	4.2	38.6	30.7
LOS	C		D	A	D	C
Approach Delay	29.2			12.2	31.9	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach LOS	C			B	C	
Queue Length 50th (ft)	456		174	150	15	161
Queue Length 95th (ft)	#638		#321	191	35	257
Internal Link Dist (ft)	995			960	392	
Turn Bay Length (ft)			800		300	
Base Capacity (vph)	1938		392	2941	342	533
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	0.88		0.81	0.57	0.17	0.66

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 85			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 21.2		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		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.

Splits and Phases: 3: Enka Heritage & US 19/23



APPENDIX H

ENKA HERITAGE AND WALK OFF WAY

SYNCHRO REPORTS

Intersection	
Int Delay, s/veh	8.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	4	270	4	4	230
Future Vol, veh/h	4	4	270	4	4	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	4	4	300	4	4	256

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	610	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	604	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1561	-	445	1054
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	531	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1561	-	360	1054
Mov Cap-2 Maneuver	-	-	-	-	360	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.7	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	360	1054	-	-	1561	-
HCM Lane V/C Ratio	0.012	0.242	-	-	0.192	-
HCM Control Delay (s)	15.1	9.5	-	-	7.9	-
HCM Lane LOS	C	A	-	-	A	-
HCM 95th %tile Q(veh)	0	1	-	-	0.7	-

Intersection	
Int Delay, s/veh	8.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	4	230	4	4	230
Future Vol, veh/h	4	4	230	4	4	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	4	4	256	4	4	256

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	522	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	516	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1561	-	501	1054
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	583	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1561	-	419	1054
Mov Cap-2 Maneuver	-	-	-	-	419	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	487	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.6	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	419	1054	-	-	1561	-
HCM Lane V/C Ratio	0.011	0.242	-	-	0.164	-
HCM Control Delay (s)	13.7	9.5	-	-	7.8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	1	-	-	0.6	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	151	38	270	122	30	230
Future Vol, veh/h	151	38	270	122	30	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	168	42	300	136	33	256

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	210	0	925	189
Stage 1	-	-	-	-	189	-
Stage 2	-	-	-	-	736	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1314	-	289	833
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	460	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1314	-	223	833
Mov Cap-2 Maneuver	-	-	-	-	223	-
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	355	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	223	833	-	-	1314	-
HCM Lane V/C Ratio	0.149	0.307	-	-	0.228	-
HCM Control Delay (s)	24	11.2	-	-	8.5	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	1.3	-	-	0.9	-

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	35	230	86	21	230
Future Vol, veh/h	140	35	230	86	21	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	156	39	256	96	23	256

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	195	0	784	176
Stage 1	-	-	-	-	176	-
Stage 2	-	-	-	-	608	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1331	-	351	847
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	528	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1331	-	284	847
Mov Cap-2 Maneuver	-	-	-	-	284	-
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	427	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	284	847	-	-	1331	-
HCM Lane V/C Ratio	0.082	0.302	-	-	0.192	-
HCM Control Delay (s)	18.8	11.1	-	-	8.3	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	1.3	-	-	0.7	-

APPENDIX I

SIMTRAFFIC REPORTS

Intersection: 1: Private Driveway/Jacob Holm Way & NC 112

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	T	R	LTR	L	R
Maximum Queue (ft)	148	106	95	224	58	88	117
Average Queue (ft)	59	32	33	97	15	30	38
95th Queue (ft)	110	85	77	179	44	70	83
Link Distance (ft)		960	995		379		803
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	225			250		100	
Storage Blk Time (%)				0		0	0
Queuing Penalty (veh)				0		0	0

Intersection: 2: Jacob Holm Way/Bob Lewis Ballpark & Walk Off Way/Private Driveway

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	136	56	98	40
Average Queue (ft)	80	16	58	19
95th Queue (ft)	124	44	87	45
Link Distance (ft)	974	360	479	432
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Enka Heritage & US 19/23

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	501	487	428	61	46	35	396
Average Queue (ft)	284	250	226	6	3	5	195
95th Queue (ft)	451	422	378	32	21	23	344
Link Distance (ft)	1036	1036		1001	1001	398	398
Upstream Blk Time (%)							1
Queuing Penalty (veh)							1
Storage Bay Dist (ft)			800				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 4: Walk Off Way & Enka Heritage

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	79	35	95
Average Queue (ft)	4	4	52
95th Queue (ft)	45	22	79
Link Distance (ft)			569
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200	200	
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Network Summary

Network wide Queuing Penalty: 2

Intersection: 1: Private Driveway/Jacob Holm Way & NC 112

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	T	R	LTR	L	R
Maximum Queue (ft)	67	86	264	124	52	107	69
Average Queue (ft)	14	28	117	48	17	38	17
95th Queue (ft)	43	68	214	100	44	81	46
Link Distance (ft)		960	995		379		803
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	225			250		100	
Storage Blk Time (%)			0			0	0
Queuing Penalty (veh)			1			0	0

Intersection: 2: Jacob Holm Way/Bob Lewis Ballpark & Walk Off Way/Private Driveway

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	148	64	89	36
Average Queue (ft)	78	21	52	18
95th Queue (ft)	127	54	80	44
Link Distance (ft)	974	360	479	432
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Enka Heritage & US 19/23

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	254	232	227	82	75	35	248
Average Queue (ft)	162	125	118	7	5	4	124
95th Queue (ft)	227	206	187	42	36	20	212
Link Distance (ft)	1036	1036		1001	1001	398	398
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			800				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 4: Walk Off Way & Enka Heritage

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	64	30	86
Average Queue (ft)	6	3	51
95th Queue (ft)	43	17	79
Link Distance (ft)			569
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200	200	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1

Intersection: 1: Private Driveway/Jacob Holm Way & NC 112

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	T	R	LTR	L	R
Maximum Queue (ft)	181	133	110	192	75	105	113
Average Queue (ft)	70	46	42	98	19	40	39
95th Queue (ft)	133	104	88	167	52	85	86
Link Distance (ft)		964	995		379		803
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	225			250		100	
Storage Blk Time (%)	0			0		1	0
Queuing Penalty (veh)	0			0		1	0

Intersection: 2: Jacob Holm Way/Bob Lewis Ballpark & Walk Off Way/Private Driveway

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	155	50	109	44
Average Queue (ft)	79	18	59	19
95th Queue (ft)	121	46	90	45
Link Distance (ft)	974	360	479	432
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Enka Heritage & US 19/23

Movement	EB	EB	WB	WB	WB	NB	NB	NB	B7
Directions Served	T	TR	L	T	T	L	L	R	T
Maximum Queue (ft)	1083	1087	891	1013	952	66	90	413	25
Average Queue (ft)	1030	1029	664	502	415	16	38	226	1
95th Queue (ft)	1200	1205	1037	1232	1132	49	75	359	22
Link Distance (ft)	1036	1036		1001	1001		398	398	334
Upstream Blk Time (%)	50	50		23	2			1	
Queuing Penalty (veh)	0	0		0	0			2	
Storage Bay Dist (ft)			800			300			
Storage Blk Time (%)			33	4					
Queuing Penalty (veh)			134	15					

Intersection: 4: Walk Off Way & Enka Heritage

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	22	168	68	90
Average Queue (ft)	1	57	22	52
95th Queue (ft)	9	138	53	79
Link Distance (ft)	502			569
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		200	200	
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Network Summary

Network wide Queuing Penalty: 152

Intersection: 1: Private Driveway/Jacob Holm Way & NC 112

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	T	R	LTR	L	R
Maximum Queue (ft)	82	98	313	216	64	101	119
Average Queue (ft)	24	28	142	67	16	46	31
95th Queue (ft)	57	71	262	145	47	86	79
Link Distance (ft)		964	995		379		803
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	225			250		100	
Storage Blk Time (%)			1			1	1
Queuing Penalty (veh)			3			0	0

Intersection: 2: Jacob Holm Way/Bob Lewis Ballpark & Walk Off Way/Private Driveway

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	132	48	100	39
Average Queue (ft)	78	18	57	16
95th Queue (ft)	120	45	88	41
Link Distance (ft)	974	360	479	432
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Enka Heritage & US 19/23

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	TR	L	T	T	L	L	R
Maximum Queue (ft)	410	369	310	133	132	55	72	322
Average Queue (ft)	251	213	167	52	46	12	32	178
95th Queue (ft)	353	317	269	121	113	43	63	311
Link Distance (ft)	1036	1036		1001	1001		398	398
Upstream Blk Time (%)								1
Queuing Penalty (veh)								1
Storage Bay Dist (ft)			800			300		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 4: Walk Off Way & Enka Heritage

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	23	142	61	123
Average Queue (ft)	1	44	19	59
95th Queue (ft)	12	109	50	94
Link Distance (ft)	502			569
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		200	200	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 5

INTERSECTIONS	Lane	Storage	Taper	AM Peak Hour			PM Peak Hour		
				No-Build	Build	Comparison	No-Build	Build	Comparison
NC 112 and Jacob Holm Way/Private Driveway	EBL	225	100	148	181	33	67	82	15
	EBT			106	133	27	86	98	12
	WBT			95	110	15	489	507	18
	WBR	250	100	224	219	-5	124	216	92
	NBLTR			58	75	17	52	64	12
	SBL	100	100	88	105	17	107	101	-6
	SBR			117	113	-4	69	119	50
Jacob Holm Way/Bob Lewis Ballpark and Walk Off Way/Private Driveway	EBLTR			136	155	19	148	132	-16
	WBLTR			56	50	-6	64	48	-16
	NBLTR			98	109	11	89	100	11
	SBLTR			40	44	4	36	39	3
US 19/23 and Enka Heritage	EBT			1,237	1,331	94	530	638	108
	EBTR			1,237	1,331	94	530	638	108
	WBL	800	100	440	891	451	258	321	63
	WBT			72	1,013	941	191	191	0
	WBT			72	952	880	191	191	0
	NBL	300	100	7	66	59	6	55	49
	NBL			35	90	55	35	75	40
	NBR			396	438	42	248	322	74
Enka Heritage and Walk Off Way	EBTR			0	22	22	0	23	23
	WBL	200	100	79	168	89	64	142	78
	WBT			0	0	0	0	0	0
	NBL	200	100	35	68	33	30	61	31
	NBR			95	90	-5	86	123	37

Legend:	
	Revised lane configuration and/or new lane due to construction of proposed site accesses
	95th percentile Synchro queue > Maximum SimTraffic queue
	> 50 Foot queue increase from 'No-Build' to 'Build' Conditions