Memo

To: Mayor and Town Board of Commissioners

From: Meredith Gruber, Planning Director

Date: September 1, 2022

Re: Agenda Item C.1. PR 20-06 – Point North Phases 11 - 13 Preliminary Subdivision Plat

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Application Request

The applicant, Ashton Raleigh Residential, LLC, proposes a Major Preliminary Subdivision Plat to subdivide 45.39 acres into 94 single-family detached residential lots and three (3) open space lots, and several new residential public streets. The proposed overall density of the residential lots is 2.26 dwelling units per acre, and it proposes to develop in three (3) Phases (referenced as Phases 11,12,13). The development proposes 16.99 acres, or approximately 40% of the site, as open space (14+ acres passive, 2+ acres active).

The site is located immediately north (or west) of the US 401 By-pass, and west (or south) of E. Young Street and is within the Town limits (Annexation occurred May 24, 2021). The property is currently undeveloped and partially wooded with a large clearing in the center, and it is contiguous to the Cedar Lakes and Village of Rolesville subdivisions, both of which are currently built out.

The property is zoned Residential and Planned Unit Development (R&PUD) District under the Unified Development Ordinance (UDO) and is subject to the prior entitlement and conditions of SUP 18-09, a Special Use Permit and Master Plan for the entire Point project that was approved by the Town Board of Commissioners on August 20, 2019. See details on this below in this Memo.

Background

Summary Information

Acreage:	45.39 acres
Current Zoning:	Residential and Planned Unit Development (R&PUD) zoning district per the Unified Development Ordinance (UDO).
Property Owner:	ASHTON RALEIGH RESIDENTIAL LLC – PIN 1768051864
Developer:	ASHTON RALEIGH RESIDENTIAL LLC / Bob Mishler
Project Contacts:	McAdams Co. – Mike Sanchez, PE

Residential Planned Unit Development Requirements (Unified Development Ordinance (UDO) Article 6.2)
The UDO specifies, "The R&PUD is intended to be primarily a pedestrian-oriented residential community that also contains a limited mix of retail, office and professional, civic and government uses. Residential offerings are to be varied and include both detached and attached dwellings."

The project is subject to a previously approved [by the Town Board] Special Use Permit that includes a PUD Master Plan and Conditions of Approval. The Applicant shall make presentations demonstrating compliance with the Findings of Fact at the evidentiary hearing before the Town Board.

Special Use Permit SUP 18-09 Conditions of Approval Compliance
The Special Use Permit approval by the Town Board included conditions specific to the portion of the project north of the US 401 By-pass; these included:

- Prior to any construction north of the 401 Bypass, a fifty foot (50') public street right of way from the existing end of Genovesa Drive, located in the Cedar Lakes subdivision, to the subject property shall be dedicated to the Town of Rolesville.
    - *This is completed/observed in the Preliminary Subdivision Plat. Construction Drawings that would follow Preliminary Plat must be consistent on this matter.*
- The property owner/developer shall provide a stub from the Genovesa Drive extension to the east to encourage future interconnection as shown in Overall PUD Master Plan at the time Genovesa is constructed.
    - *This is completed/observed in the Preliminary Subdivision Plat. Construction Drawings that would follow Preliminary Plat must be consistent on this matter.*
- The Preliminary Subdivision Plat for Phases 11 – 13 shall be reviewed under the Site Plan Review process found in Section 3.6 of the Town of Rolesville Unified Development Ordinance, and the submittal for the subdivision plat shall include an update to Traffic Impact Analysis related to the property north of the 401 Bypass only.
    - *The Town Board will conduct an evidentiary hearing on PR 20-06 on September 6, 2022.*
    - *See Attachment 4 to this Memo, an Addendum to the original TIA from Kimley-Horn.*
- No construction in the area north of the 401 Bypass shall occur until September 1, 2021.
    - *This 'no construction by' date has passed and thus been complied with*.

2002 Thoroughfare Plan and Traffic Impact Analysis (TIA)
The subject property borders but does not "front" (no access provided) the 401 Bypass. Physical access is available from Genovesa Drive, a 50' wide public right-of-way created via Book of Maps 2017/pages 681-683, Cedar Lakes Subdivision Phase 5C. As a Condition of the Town Board approval of SUP 18-09, the applicant's consultant, Kimley-Horn (who produced the original Traffic Impact Analysis circa June 2019) provided an update specific to Phases 11 – 13 – see Attachment 4. The Addendum states the following and does not recommend any off-site roadway improvements to accommodate site traffic:

- AM peak hour trips on Genovesa Drive – 72 (1 trip per 50 seconds between 7AM – 9AM)
- PM peak hour trips on Genovesa Drive – 96 (1 trip per 37 seconds between 4PM – 6PM)
- Average daily trips on Genovesa Drive – 972.

On behalf of the Town, consultant Ramey Kemp Associates reviewed this Addendum to the original TIA and concurs with the findings of the Kimley Horn addendum to the original TIA.

Technical Review Committee

The Technical Review Committee reviewed the application through four (4) submittals (between March 2020 and May 2022), and all the staff comments were resolved.

Staff recommends the Town Board hold an evidentiary hearing per UDO Section 2.1.2.b. and review, hear, consider, and approve, approve with conditions, or disapprove as appropriate PR 20-06.

Planning Board

The Planning Board recommended approval, with a 4 – 1 vote, at their July 25, 2022 meeting.

Findings of Fact

The following findings, based on evidence and testimony received at an evidentiary hearing in accordance with procedures specified in the Unified Development Ordinance (UDO), must be made by the Town Board in order to approve a preliminary subdivision plat:

A. That the proposed development and/or use will not materially endanger the public health or safety;
B. That the proposed development and/or use will not substantially injure the value of adjoining property;
C. That the proposed development and/or use will be in harmony with the scale, bulk, coverage, density, and character of the neighborhood in which it is located;
D. That the proposed development and/or use will generally conform with the Comprehensive plan and other official plans adopted by the Town;
E. That the proposed development and/or use is appropriately located with respect to transportation facilities, water and sewer supply, fire and police protection, and similar facilities;
F. That the proposed development and/or use will not cause undue traffic congestion or create a traffic hazard;
G. That the proposed development and use comply with all applicable requirements of this ordinance.

Potential Actions

- Approve the Preliminary Subdivision Plat and determine that the plat meets the requirements of the Town's Unified Development Ordinance.
- Approve the Preliminary Subdivision Plat with modifications in consideration of information presented at the evidentiary hearing.
- Deny the Preliminary Subdivision Plat based on information presented at the evidentiary hearing with the stated reason for denial.

Suggested Town Board Motion

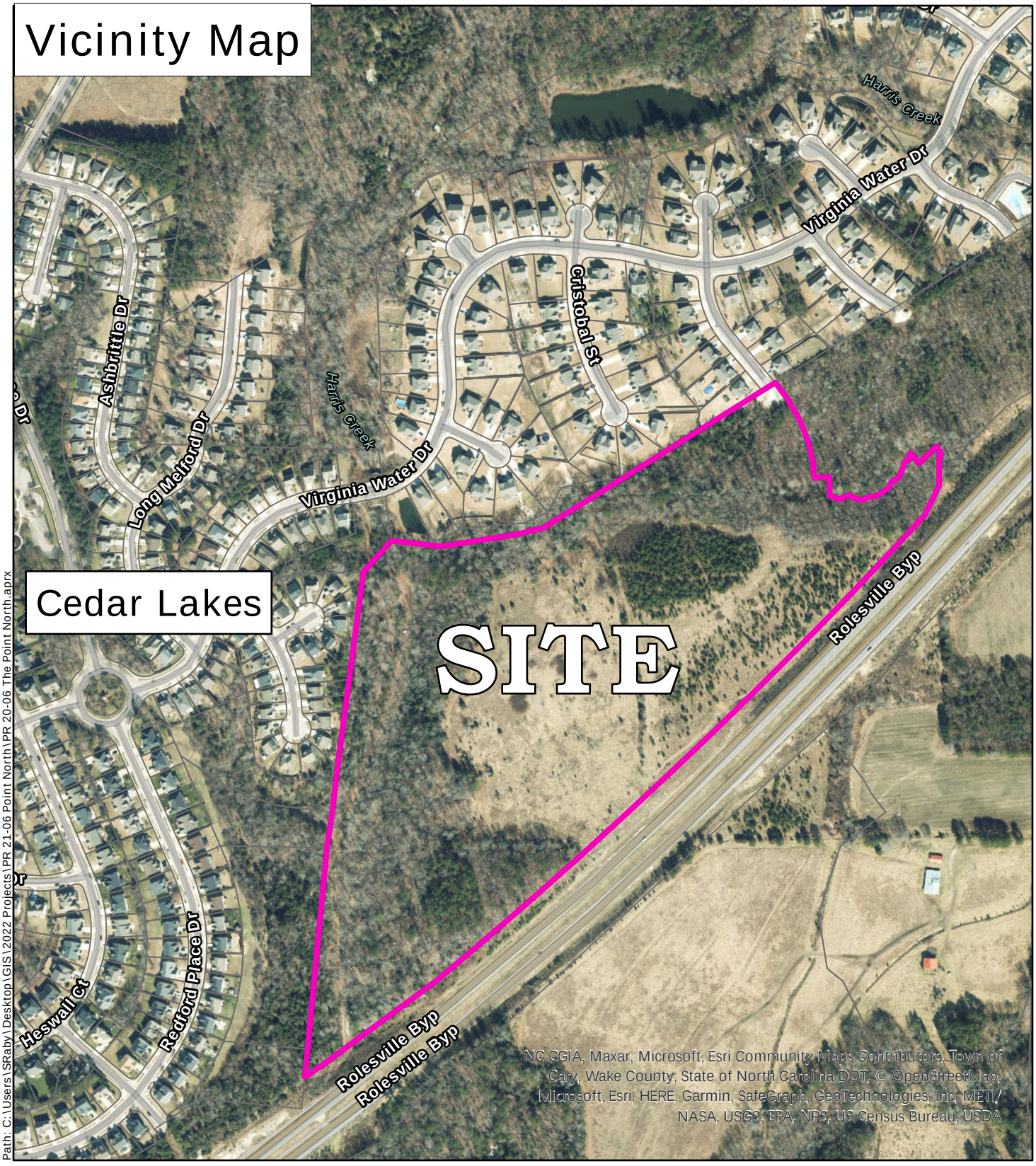
Motion to approve the preliminary subdivision plat for PR 20-06, Point North Phases 11 – 13, based on the evidence and testimony received at the hearing to determine the Findings of Fact.

Attachments

#	Type	Date
1	Vicinity Map	----
2	Application	04/01/2020
3	Proposed Preliminary Subdivision Plat	03/02/2022 revised
4	Traffic Impact Analysis (TIA) Memorandum	04/22/2022
5	Traffic Impact Analysis (TIA) Memorandum Review	06/28/2022

Case: PR 20-06 The Point North
Address: 0 Louisburg Road
PIN 1768051864
Date: 06.23.2022

Vicinity Map



0 0.05 0.1 0 0.2 Miles
Miles

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Path: C:\Users\SRaby\Desktop\GIS\2022 Projects\PR 21-06 Point North\PR 20-06 The Point North.aprx

Case No. PR 20-06

Date _Rvcd 7-11-22_

Development Plan Review Application

Project/Development Name The Point (The Point North)

Application Type
- ☐ Sketch Plan
- ☐ Construction Drawings
- ☑ Preliminary Plat
- ☐ Final Plat

Contact Information

Property Owner ASHTON RALEIGH RESIDENTIAL LLC

Address 900 Ridgefield Drive, Suite 335 City/State/Zip Raleigh, NC 27609

Phone (919) 232-3695 Email bob.mishler@ashtonwoods.com

Developer ASHTON RALEIGH RESIDENTIAL LLC

Contact Name Bob Mishler

Address 900 Ridgefield Drive, Suite 335 City/State/Zip Raleigh, NC 27609

Phone (919) 232-3695 Email bob.mishler@ashtonwoods.com

Design Engineering Company McAdams

Contact Name Mike Sanchez

Address 2905 Meridian Parkway City/State/Zip Durham, NC 27713

Phone 919-815-4368 Email sanchez@mcadamsco.com

Property Information

Wake County PIN(s) 1768051864 Address 0 Louisburg Road, Rolesville, NC 27571

Total Property Acreage 45.39 Total Phases 1

Total Lots 94 Average Lot Size 5,681 sf

Smallest Lot Size 4,856 sf Largest Lot Size 7,954 sf

I, as owner, developer, engineer, and/or agent, understand that I am responsible for all review fees due at the time of plan submittal. I understand that the Planning Department will not review my plans until I remit payment. I have read the Development Review Procedures, and I understand the review processes and requirements.

Signature Bob Mishler Date 07/11/2022

Land Entitlement Manager for Ashton Raleigh Residential, LLC

THE POINT - PHASES 11-13

EAST YOUNG STREET
ROLESVILLE, NORTH CAROLINA

PRELIMINARY PLAT PLANS

PROJECT NUMBER: AWH-20000
DATE: SEPTEMBER 11, 2020

PARCEL OWNER LIST		
PIN	OWNER	AREA
1768051864	ASHTON RALEIGH RESIDENTIAL LLC 4025 LAKE BOONE TRL STE 200 RALEIGH NC 27607-3087	45.39 AC.

DEVELOPER/OWNER

ASHTON RALEIGH RESIDENTIAL, LLC.
900 RIDGEFIELD DRIVE, SUITE 335
RALEIGH, NC 27609
919-232-3695

ATTN: BOB MISHLER

SURVEY BY:

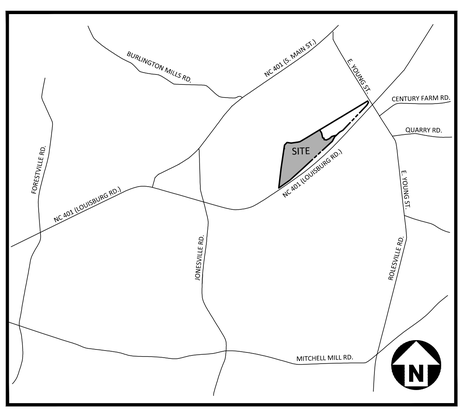
BATEMAN CIVIL SURVEY COMPANY
2424 RELIANCE AVENUE, APEX, NC 27539

TOPOGRAPHIC DECEMBER 22, 2019
ALTA SURVEY DECEMBER 12, 2019

STEVEN P CARSON, PLS
NC LICENSE # 4752
919-577-1081

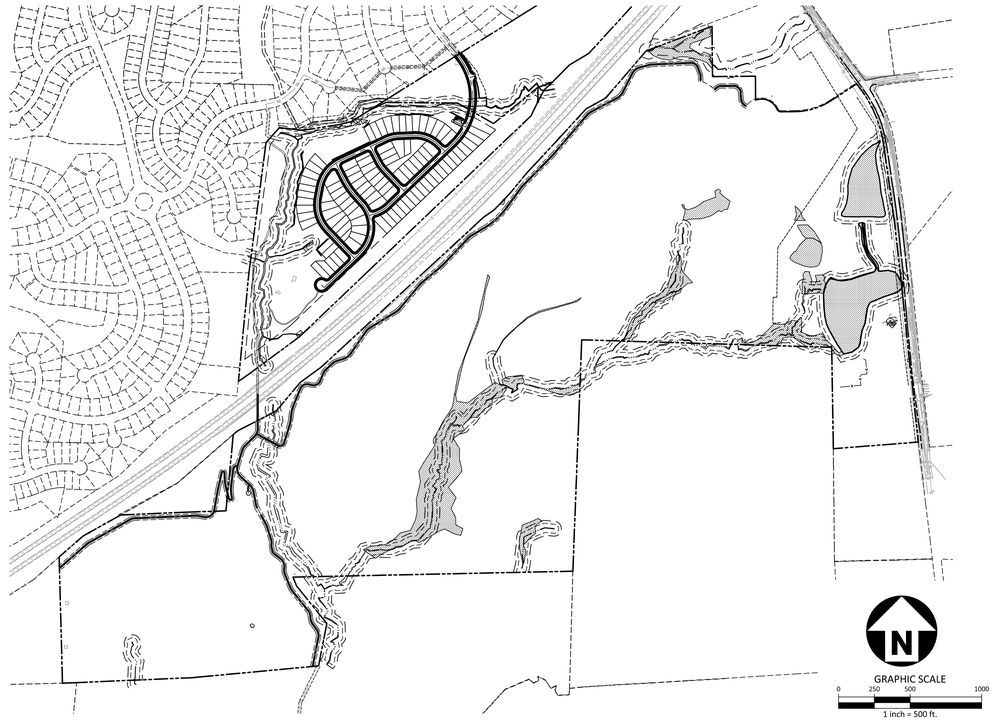
SURVEY NOTES

1. THE PROPERTY LIES IN ZONE "X" PER NATIONAL FLOOD INSURANCE PROGRAM RATE MAP 3720175800I & 3720176800I DATES 05/02/2006.
2. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES AND ALL BEARINGS ARE BASED ON OBSERVED GPS CONTROL. NAD 83 / NSRS 2011 / STATE PLANE COORDINATES.
3. SUBJECT PARCEL ZONED R & PUD PER WAKE COUNTY GIS.
4. SURVEY WAS PREPARED BY BATEMAN CIVIL SURVEY COMPANY UNDER THE SUPERVISION OF STEVEN P. CARSON, PLS. FIELD WORK WAS COMPLETED DEC 3 - 21, 2018.
5. AREAS COMPUTER BY COORDINATE METHOD.
6. SANITARY SEWER LINE EASEMENT WAS CREATED BASED ON CENTER LINES ON MANHOLES USING FIELD EVIDENCE.
7. NO CEMETERIES OBSERVED AS A RESULTS OF THE SURVEY.
8. BUILDING ARE AS SHOWN ON SURVEY.



VICINITY MAP

N.T.S.



SHEET INDEX

C0.00	PROJECT NOTES AND SITE DETAILS
C1.00	EXISTING CONDITIONS AND DEMOLITION PLAN
C2.00	OVERALL PRELIMINARY PLAT
C2.01	PRELIMINARY PLAT - AREA "A"
C2.02	PRELIMINARY PLAT - AREA "B"
C3.00	OVERALL GRADING AND STORM DRAINAGE PLAN
C3.01	GRADING AND STORM DRAINAGE PLAN - AREA "A"
C3.02	GRADING AND STORM DRAINAGE PLAN - AREA "B"
C4.00	OVERALL UTILITY PLAN
C4.01	UTILITY PLAN - AREA "A"
C4.02	UTILITY PLAN - AREA "B"
C8.00	SITE DETAILS
C8.01	SITE DETAILS
C8.02	STORM DRAINAGE DETAILS

15.4.5 - Streets

15.4.5.1
Type of Street Required All subdivision lots shall abut at least 20 feet on a public street. All public streets shall be dedicated to the Town of Rolesville, the State of North Carolina or the public as determined appropriate by the Board of Commissioners of the Town of Rolesville. All public streets shall be built to the standards of this ordinance and all other applicable standards of the Town of Rolesville and the North Carolina Department of Transportation. Public streets not dedicated to the Town which are eligible for acceptance into the State Highway System shall be constructed to the standards necessary to be put on the State Highway System or the standards in this ordinance, whichever is stricter, in regard to each particular item and shall be put on such system. Streets not dedicated to the Town which are not eligible to be put on the State Highway System because there are too few lots or residences shall, nevertheless, be dedicated to the public and shall be in accordance with the standards in this ordinance or the standards necessary to be put on the State Highway System, whichever is stricter in regard to each particular item, so as to be eligible to be put on the system at a later date. A written maintenance agreement with provisions for maintenance of the street until it is put on the State System shall be included with the final plat.

15.4.5.2
Subdivision Street Disclosure Statement All streets shown on the final plat shall be designated in accordance with G.S. § 136-102.6 and designation as public shall be conclusively presumed an offer of dedication to the public. Where streets are dedicated to the public but not accepted into a municipal or the State system, before lots are sold, a statement explaining the status of the street shall be included with the final plat.

McAdams
The John R. McAdams Company, Inc.
2905 Meridian Parkway
Durham, NC 27713

phone 919. 361. 5000
fax 919. 361. 2269
license number: C-0293, C-187

www.mcadamsco.com

CONTACT

MIKE SANCHEZ
sanchez@mcadamsco.com
PHONE: 919. 361. 5000

CLIENT

ASHTON RALEIGH RESIDENTIAL, LLC.
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RALEIGH, NC 27609
PHONE: 919. 232. 3695
CONTACT: BOB MISHLER

PROJECT DIRECTORY

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

W.T. O'Daniel
Jul 18 2022 11:51 AM

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REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PRELIMINARY PLAT PLANS:

THE POINT
PHASES 11-13
EAST YOUNG STREET
ROLESVILLE, NORTH CAROLINA
PROJECT NUMBER: AWH-20000

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawings\AWH20000-North-CS1.dwg, 7/18/2022 10:59:23 AM, Sherrill Williams

OPEN SPACE REQUIREMENTS

OPEN SPACE	AREA (AC) APPROXIMATE ACTIVE	PASSIVE	TOTAL	USE DESCRIPTION
OS-1	2.52	13.82	711,478 SF (16.33 AC)	OUTDOOR GRILLING, PLAYGROUND, DOG PARK, MAIL KIOSK, 6' WIDE PRIVATE GREENWAY, 10' WIDE PUBLIC GREENWAY
OS-2	0.0	0.2	8,906 SF (0.2 AC)	
OS-3	0.0	0.45	19,616 SF (0.45 AC)	
TOTAL	2.52	14.47	739,999 SF (16.99 AC)	NORTH OF 401 BYPASS

SETBACKS (NORTH OF 401 BYPASS)

R2 PUD	
FRONT	20 FT
SIDE	5 FT
AGGREGATE SIDE	10 FT
CORNER SIDE	10 FT
REAR	15 FT
MIN LOT WIDTH	45 FT
MIN LOT AREA	4,800 FT

PARKING (NORTH OF 401 BYPASS)

SINGLE FAMILY	
REQUIRED: (2 SPACES/UNIT)	2 x 94 UNITS = 188 SPACES
PROVIDED:	94 GARAGE SPACES 94 DRIVEWAY SPACES TOTAL PROVIDED: 188 SPACES

SITE AND OPEN SPACE AREAS

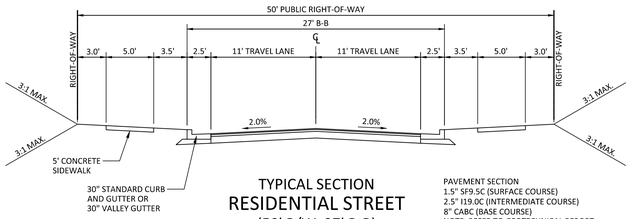
TOTAL SITE AREA	45.39 AC
RESIDENTIAL	45.39 AC
R2	94 SINGLE FAMILY DETACHED
TOTAL UNITS	94
OVERALL DENSITY	2.26 DU/AC
OPEN SPACE	
REQUIRED: SINGLE FAMILY 10% SFD AREA (41.65 AC)	4.165 AC REQUIRED
PROVIDED:	2.52 AC ACTIVE OPEN SPACE 14.47 AC PASSIVE OPEN SPACE 16.99 TOTAL OPEN SPACE PROVIDED

MAIL KIOSK CALCULATIONS

NUMBER OF MAIL BOXES(UNITS)	REQUIRED PARKING SPACES
52 OR LESS	2
53-78	3
79-104	4
105 OR MORE	4 PLUS 1 PER EACH ADDITIONAL 26 MAILBOXES

MAIL KIOSK AREA 5
MAIL KIOSK CALCULATION:
PHASES 11, 12, AND 13 (94 UNITS)
94 UNITS @ 16 UNITS/KIOSK (CBU) = 6 KIOSKS (CBUs)

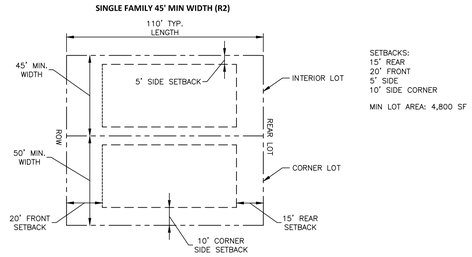
MAIL KIOSK PARKING: 94 UNITS
REQUIRED: 4 SPACES
PROVIDED: 4 SPACES (1 VAN ACCESSIBLE)



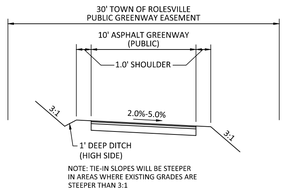
TYPICAL SECTION
RESIDENTIAL STREET
(50' R/W, 27' B-B)

PAVEMENT SECTION
1.5" SF9.5C (SURFACE COURSE)
2.5" I19.0C (INTERMEDIATE COURSE)
8" CABC (BASE COURSE)
NOTE: REFER TO GEOTECHNICAL REPORT FOR FINAL PAVEMENT DESIGN

SINGLE FAMILY 45' MIN WIDTH (R2)

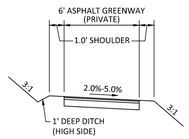


TYPICAL LOT DIMENSIONS
SCALE 1" = 40'



NOTE: TIE-IN SLOPES WILL BE STEEPER IN AREAS WHERE EXISTING GRADES ARE STEEPER THAN 3:1

TYPICAL SECTION
10' PUBLIC ASPHALT GREENWAY



NOTE: TIE-IN SLOPES WILL BE STEEPER IN AREAS WHERE EXISTING GRADES ARE STEEPER THAN 3:1

TYPICAL SECTION
6' PRIVATE ASPHALT GREENWAY

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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RALEIGH, NC 27609
PHONE: 919. 232. 3695

ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP,
WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

William T. O'Daniel
Jul 18 2022 11:51 AM

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REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-N1
CHECKED BY	.
DRAWN BY	.
SCALE	N.T.S.
DATE	09. 11. 2020

SHEET

PROJECT NOTES AND SITE DETAILS

C0.00

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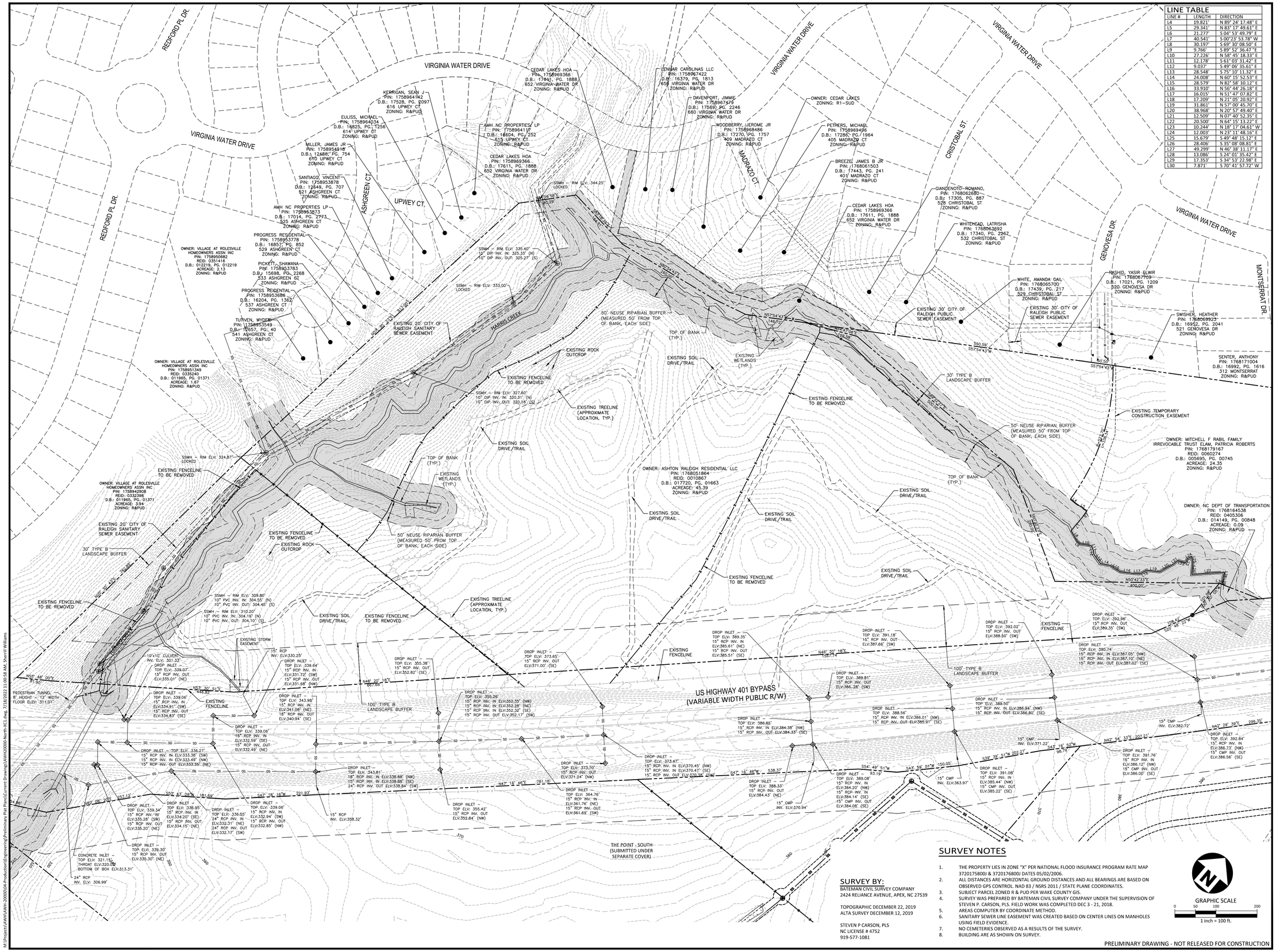
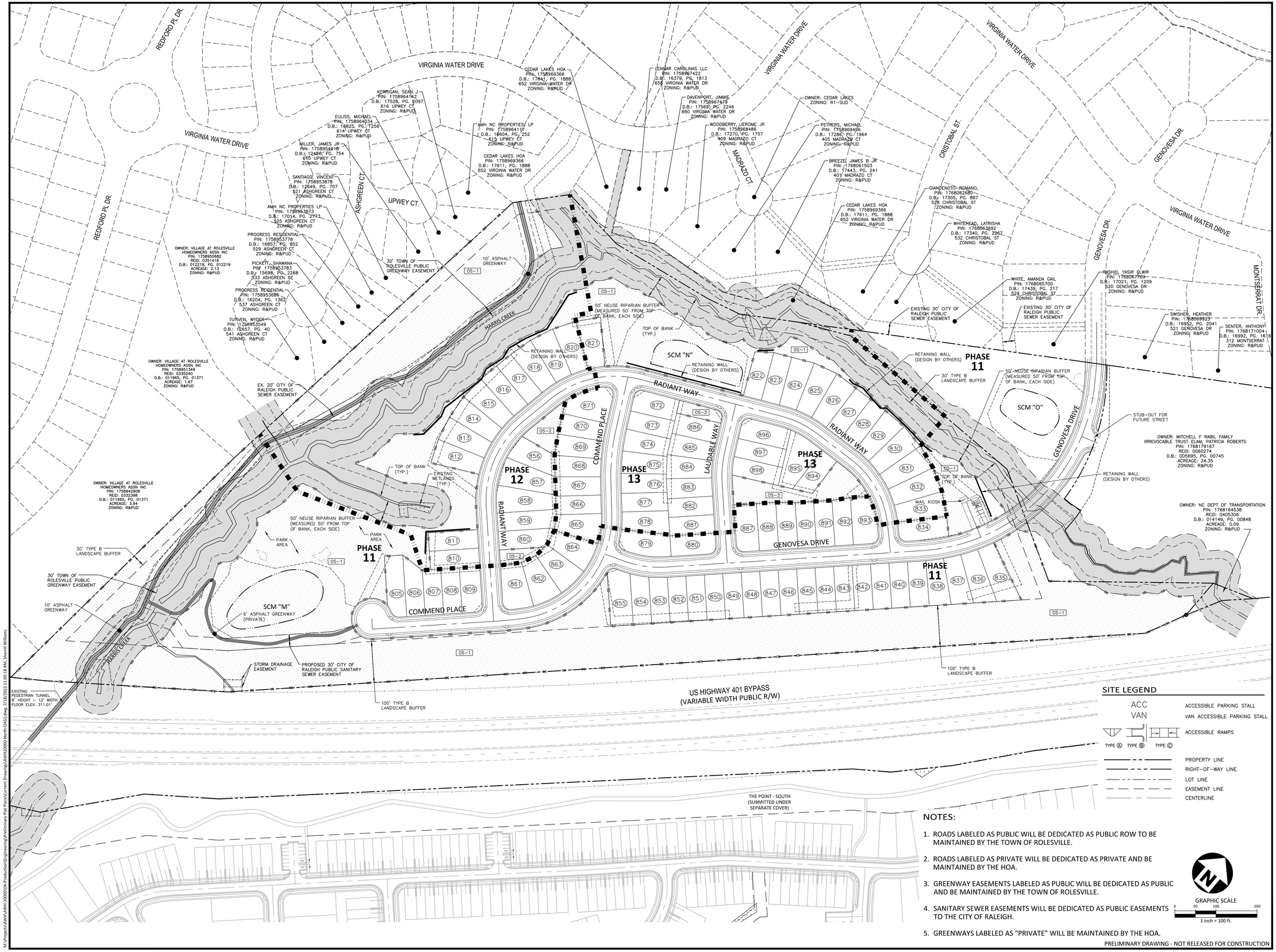

VIRGINIA WATER DRIVE
REDFORD PL DR.
UPWEY CT.
ASHGREEN CT.
CRISTOBAL ST.
MADRAZO CT.
GENOVESA DR.
MONTSERRAT DR.
HARRIS CREEK
US HIGHWAY 401 BYPASS
(VARIABLE WIDTH PUBLIC R/W)
THE POINT - SOUTH
(SUBMITTED UNDER
SEPARATE COVER)
KERRIGAN, SEAN J
PIN: 1758964142
D.B.: 17528, PG. 2097
616 UPWEY CT
ZONING: R&PUD
EULISS, MICHAEL
PIN: 1758964034
D.B.: 16825, PG. 1256
614 UPWEY CT
ZONING: R&PUD
MILLER, JAMES JR
PIN: 1758954918
D.B.: 12486, PG. 754
610 UPWEY CT
ZONING: R&PUD
SANTIAGO, VINCENT
PIN: 1758953878
D.B.: 12649, PG. 707
521 ASHGREEN CT
ZONING: R&PUD
AMH NC PROPERTIES LP
PIN: 1758953873
D.B.: 17014, PG. 2793
525 ASHGREEN CT
ZONING: R&PUD
PROGRESS RESIDENTIAL
PIN: 1758953778
D.B.: 16857, PG. 852
529 ASHGREEN CT
ZONING: R&PUD
PICKETT, SHAWANA
PIN: 1758953783
D.B.: 15698, PG. 2268
533 ASHGREEN CT
ZONING: R&PUD
PROGRESS RESIDENTIAL
PIN: 1758953686
D.B.: 16204, PG. 1362
537 ASHGREEN CT
ZONING: R&PUD
TUTIVEN, WYDER
PIN: 1758953549
D.B.: 17657, PG. 40
541 ASHGREEN CT
ZONING: R&PUD
OWNER: VILLAGE AT ROLESVILLE HOMEOWNERS ASSN INC
PIN: 1758950682
REID: 0351416
D.B.: 012219, PG. 012219
ACREAGE: 2.13
ZONING: R&PUD
OWNER: VILLAGE AT ROLESVILLE HOMEOWNERS ASSN INC
PIN: 1758951349
REID: 0335240
D.B.: 011965, PG. 01371
ACREAGE: 1.67
ZONING: R&PUD
OWNER: VILLAGE AT ROLESVILLE HOMEOWNERS ASSN INC
PIN: 1758943908
REID: 0333398
D.B.: 011965, PG. 01371
ACREAGE: 3.94
ZONING: R&PUD
CEDAR LAKES HOA
PIN: 1758969366
D.B.: 17641, PG. 1888
652 VIRGINIA WATER DR
ZONING: R&PUD
AMH NC PROPERTIES LP
PIN: 1758964117
D.B.: 16604, PG. 252
615 UPWEY CT
ZONING: R&PUD
CEDAR LAKES HOA
PIN: 1758969366
D.B.: 17611, PG. 1888
652 VIRGINIA WATER DR
ZONING: R&PUD
LENNAR CAROLINAS LLC
PIN: 1758967422
D.B.: 16379, PG. 1813
656 VIRGINIA WATER DR
ZONING: R&PUD
DAVENPORT, JIMMIE
PIN: 1758967479
D.B.: 17569, PG. 2246
660 VIRGINIA WATER DR
ZONING: R&PUD
WOODBERRY, JEROME JR
PIN: 1758968486
D.B.: 17270, PG. 1757
409 MADRAZO CT
ZONING: R&PUD
OWNER: CEDAR LAKES
ZONING: R1-SUD
PETHERS, MICHAEL
PIN: 1758969496
D.B.: 17286, PG. 1964
405 MADRAZO CT
ZONING: R&PUD
BREEZE, JAMES B JR
PIN: 1768061503
D.B.: 17443, PG. 241
401 MADRAZO CT
ZONING: R&PUD
CEDAR LAKES HOA
PIN: 1758969366
D.B.: 17611, PG. 1888
652 VIRGINIA WATER DR
ZONING: R&PUD
GIANDENOTO-ROMANO,
PIN: 1768062680
D.B.: 17305, PG. 887
528 CHRISTOBAL ST
ZONING: R&PUD
WHITEHEAD, LATRISHA
PIN: 1768063692
D.B.: 17340, PG. 2967
532 CHRISTOBAL ST
ZONING: R&PUD
WHITE, AMANDA GAIL
PIN: 1768065700
D.B.: 17439, PG. 217
529 CHRISTOBAL ST
ZONING: R&PUD
RASHID, YASIR ELWIR
PIN: 1768067709
D.B.: 17021, PG. 1209
520 GENOVESA DR
ZONING: R&PUD
SWISHER, HEATHER
PIN: 1768069923
D.B.: 16952, PG. 2041
521 GENOVESA DR
ZONING: R&PUD
SENTER, ANTHONY
PIN: 1768171004
D.B.: 16992, PG. 1616
312 MONTSERRAT
ZONING: R&PUD
OWNER: ASHTON RALEIGH RESIDENTIAL LLC
PIN: 1768051864
REID: 0010867
D.B.: 017720, PG. 01663
ACREAGE: 45.39
ZONING: R&PUD
OWNER: MITCHELL F RABIL FAMILY
IRREVOCABLE TRUST ELAM, PATRICIA ROBERTS
PIN: 1768179167
REID: 0060274
D.B.: 005695, PG. 00745
ACREAGE: 24.35
ZONING: R&PUD
OWNER: NC DEPT OF TRANSPORTATION
PIN: 1768164538
REID: 0405306
D.B.: 014149, PG. 00848
ACREAGE: 0.09
ZONING: R&PUD
EXISTING 20' CITY OF RALEIGH SANITARY SEWER EASEMENT
EXISTING 30' CITY OF RALEIGH PUBLIC SEWER EASEMENT
EXISTING TEMPORARY CONSTRUCTION EASEMENT
50' NEUSE RIPARIAN BUFFER (MEASURED 50' FROM TOP OF BANK, EACH SIDE)
30' TYPE B LANDSCAPE BUFFER
100' TYPE B LANDSCAPE BUFFER
EXISTING FENCELINE TO BE REMOVED
EXISTING ROCK OUTCROP
EXISTING TREELINE (APPROXIMATE LOCATION, TYP.)
EXISTING SOIL DRIVE/TRAIL
EXISTING WETLANDS (TYP.)
TOP OF BANK (TYP.)
EXISTING STORM EASEMENT
PEDESTRIAN TUNNEL
8' HEIGHT - 12' WIDTH
FLOOR ELEV: 311.01'
SSMH - RIM ELV: 344.25' LOCKED
SSMH - RIM ELV: 335.40'
10" DIP INV. IN: 325.33' (N)
10" DIP INV. OUT: 325.27' (S)
SSMH - RIM ELV: 333.00' LOCKED
SSMH - RIM ELV: 327.60'
10" DIP INV. IN: 320.31' (N)
10" DIP INV. OUT: 320.16' (S)
SSMH - RIM ELV: 324.87' LOCKED
SSMH - RIM ELV: 309.80'
10" PVC INV. IN: 304.55' (N)
10" PVC INV. OUT: 304.45' (S)
SSMH - RIM ELV: 310.20'
10" PVC INV. IN: 304.19' (N)
10" PVC INV. OUT: 304.10' (S)
10'x10' CULVERT
INV. ELV: 301.33'
CONCRETE INLET -
TOP ELV: 321.15'
THROAT ELV:320.78'
BOTTOM OF BOX ELV:313.31'
24" RCP
INV. ELV: 306.99'
15" RCP
INV. ELV:330.25'
15" RCP
INV. ELV:358.32'
DROP INLET - TOP ELV: 339.07' 15" RCP INV. OUT ELV:335.01' (NE)
DROP INLET - TOP ELV: 339.06' 15" RCP INV. IN ELV:332.59' (SE) 15" RCP INV. OUT ELV:332.49' (NE)
DROP INLET - TOP ELV: 339.64' 15" RCP INV. IN ELV:331.72' (SW) 15" RCP INV. OUT ELV:331.68' (NW)
DROP INLET - TOP ELV: 343.98' 15" RCP INV. IN ELV:341.08' (NE) 18" RCP INV. OUT ELV:340.94' (SE)
DROP INLET - TOP ELV: 339.06' 15" RCP INV. IN ELV:332.94' (SW) 15" RCP INV. OUT ELV:332.85' (NW)
DROP INLET - TOP ELV: 339.06' 15" RCP INV. IN ELV:334.91" (SW) 15" RCP INV. OUT ELV:334.83" (SE)
DROP INLET - TOP ELV: 336.27' 15" RCP INV. IN ELV:333.38" (SW) 15" RCP INV. IN ELV:333.49" (NW) 15" RCP INV. OUT ELV:333.35" (NE)
DROP INLET - TOP ELV: 339.34' 15" RCP INV. IN ELV:335.28" (SW) 15" RCP INV. OUT ELV:335.20" (NE)
DROP INLET - TOP ELV: 339.30' 15" RCP INV. OUT ELV:335.30" (NE)
DROP INLET - TOP ELV: 338.95' 15" RCP INV. IN ELV:334.20" (SE) 15" RCP INV. OUT ELV:334.15" (NE)
DROP INLET - TOP ELV: 336.65' 24" RCP INV. IN ELV:332.31" (NE) 24" RCP INV. OUT ELV:332.17" (SW)
DROP INLET - TOP ELV: 339.06' 15" RCP INV. IN ELV:332.94' (SW) 15" RCP INV. OUT ELV:332.85' (NW)
DROP INLET - TOP ELV: 343.81' 18" RCP INV. IN ELV:338.88' (NW) 15" RCP INV. IN ELV:338.88' (SE) 24" RCP INV. OUT ELV:338.84' (SW)
DROP INLET - TOP ELV: 373.70' 15" RCP INV. OUT ELV:371.24' (NW)
DROP INLET - TOP ELV: 364.76' 15" RCP INV. IN ELV:361.76' (NE) 15" RCP INV. OUT ELV:361.69' (SW)
DROP INLET - TOP ELV: 355.43' 15" RCP INV. OUT ELV:352.84' (NW)
DROP INLET - TOP ELV: 355.38' 15" RCP INV. OUT ELV:352.82' (SE)
DROP INLET - TOP ELV: 355.26' 15" RCP INV. IN ELV:352.55" (NW) 15" RCP INV. IN ELV:352.28" (NE) 15" RCP INV. IN ELV:352.32" (SE) 15" RCP INV. OUT ELV:352.17" (SW)
DROP INLET - TOP ELV: 373.65' 15" RCP INV. OUT ELV:371.00' (SE)
DROP INLET - TOP ELV: 373.47' 15" RCP INV. IN ELV:370.45' (NW) 15" RCP INV. IN ELV:370.47' (SE) 15" RCP INV. OUT ELV:370.34' (SW)
DROP INLET - TOP ELV: 386.85' 15" RCP INV. IN ELV:384.38" (NW) 15" RCP INV. OUT ELV:384.33" (SE)
DROP INLET - TOP ELV: 388.33' 15" RCP INV. OUT ELV:384.43" (NE)
DROP INLET - TOP ELV: 389.35' 15" RCP INV. IN ELV:385.61" (NE) 15" RCP INV. OUT ELV:385.51" (SE)
DROP INLET - TOP ELV: 389.81' 15" RCP INV. OUT ELV:386.24" (SW)
DROP INLET - TOP ELV: 388.56' 15" RCP INV. IN ELV:386.01" (NW) 15" RCP INV. OUT ELV:385.91" (SE)
DROP INLET - TOP ELV: 391.18' 15" RCP INV. OUT ELV:387.66" (SW)
DROP INLET - TOP ELV: 392.02' 15" RCP INV. OUT ELV:388.50" (SW)
DROP INLET - TOP ELV: 389.08' 15" RCP INV. IN ELV:384.20" (NW) 15" RCP INV. IN ELV:384.14" (SE) 15" CMP INV. OUT ELV:384.08" (SE)
DROP INLET - TOP ELV: 391.08' 15" RCP INV. IN ELV:385.44" (NW) 15" CMP INV. OUT ELV:385.22" (SE)
DROP INLET - TOP ELV: 389.50' 15" RCP INV. IN ELV:386.94" (NW) 15" RCP INV. OUT ELV:386.80" (SE)
DROP INLET - TOP ELV: 392.96' 15" RCP INV. OUT ELV:389.35" (SW)
DROP INLET - TOP ELV: 390.74' 15" RCP INV. IN ELV:387.05" (NW) 15" RCP INV. IN ELV:387.10" (NE) 15" RCP INV. OUT ELV:387.02" (SE)
DROP INLET - TOP ELV: 391.76' 15" RCP INV. IN ELV:386.12" (NW) 15" CMP INV. OUT ELV:386.00" (SE)
DROP INLET - TOP ELV: 392.84' 15" RCP INV. IN ELV:386.73" (NW) 15" CMP INV. OUT ELV:386.56" (SE)
15" CMP INV. ELV:371.22'
15" CMP INV. ELV:370.94'
15" CMP INV. ELV:363.97'
15" CMP INV. ELV:382.72'
EXISTING FENCELINE
N50° 48' 00"E 813.90'
N50° 48' 00"E 400.00'
N50°42'33"E 400.00'
N39° 30' 43"E 376.80'
N47° 16' 46"E 781.18'
N47° 20' 18"E 196.74'
N47° 20' 18"E 187.86'
N47° 16' 46"E 538.37'
N39° 10' 51"W 202.22'
N43° 16' 32"W 98.79'
N42° 54' 33"E 207.21'
N42° 29' 39"E 296.35'
S50° 43' 28"W 781.69'
S47° 16' 46"W 221.83'
S39° 10' 51"E 202.22'
S43° 59' 01"W 150.05'
S43° 59' 01"W 207.12'
S54° 49' 51"W 93.19'
S54° 49' 51"W 207.12'
S50°42'33"W 400.00'
S39°10'51"E 207.12'
S43°59'01"W 207.12'
S47°16'46"W 257.12'
S47°16'46"W 207.12'
S47°16'46"W 207.12'
S47°16'46"W 207



SITE LEGEND

- ACC / VAN — ACCESSIBLE PARKING STALL
- VAN ACCESSIBLE PARKING STALL
- ACCESSIBLE RAMPS (TYPE A, TYPE B, TYPE C)
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- LOT LINE
- EASEMENT LINE
- CENTERLINE

NOTES:

1. ROADS LABELED AS PUBLIC WILL BE DEDICATED AS PUBLIC ROW TO BE MAINTAINED BY THE TOWN OF ROLESVILLE.
2. ROADS LABELED AS PRIVATE WILL BE DEDICATED AS PRIVATE AND BE MAINTAINED BY THE HOA.
3. GREENWAY EASEMENTS LABELED AS PUBLIC WILL BE DEDICATED AS PUBLIC AND BE MAINTAINED BY THE TOWN OF ROLESVILLE.
4. SANITARY SEWER EASEMENTS WILL BE DEDICATED AS PUBLIC EASEMENTS TO THE CITY OF RALEIGH.
5. GREENWAYS LABELED AS "PRIVATE" WILL BE MAINTAINED BY THE HOA.

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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PHONE: 919. 232. 3695

ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP, WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

William T. O'Daniel
Jul 18 2022 11:52 AM

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REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
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3	07. 18. 2022	REVISED OWNER INFORMATION

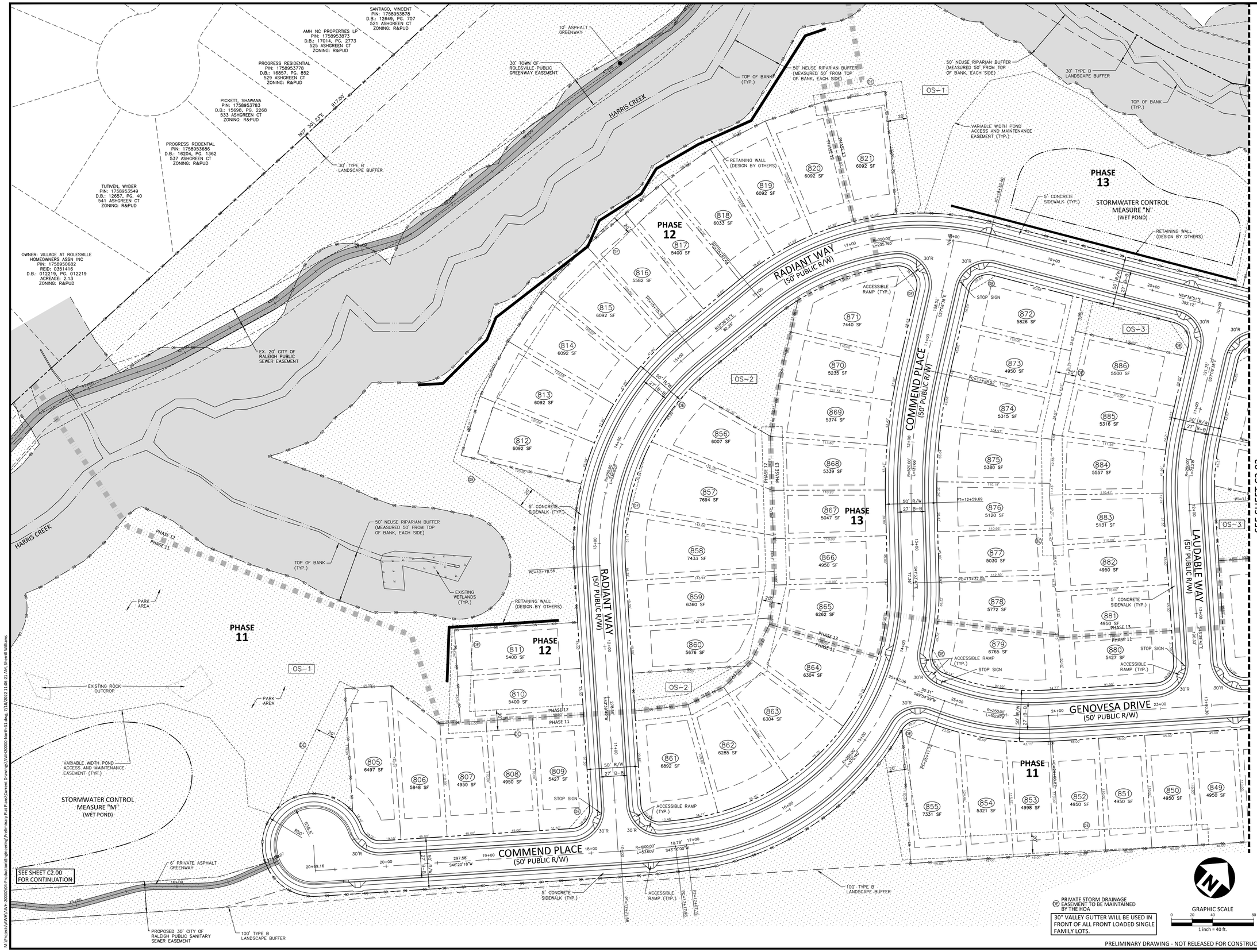
PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-OAS1
CHECKED BY	.
DRAWN BY	.
SCALE	1"=100'
DATE	09. 11. 2020

SHEET

OVERALL PRELIMINARY PLAT

C2.00



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DATE	09. 11. 2020

SHEET

PRELIMINARY PLAT AREA "A"

C2.01

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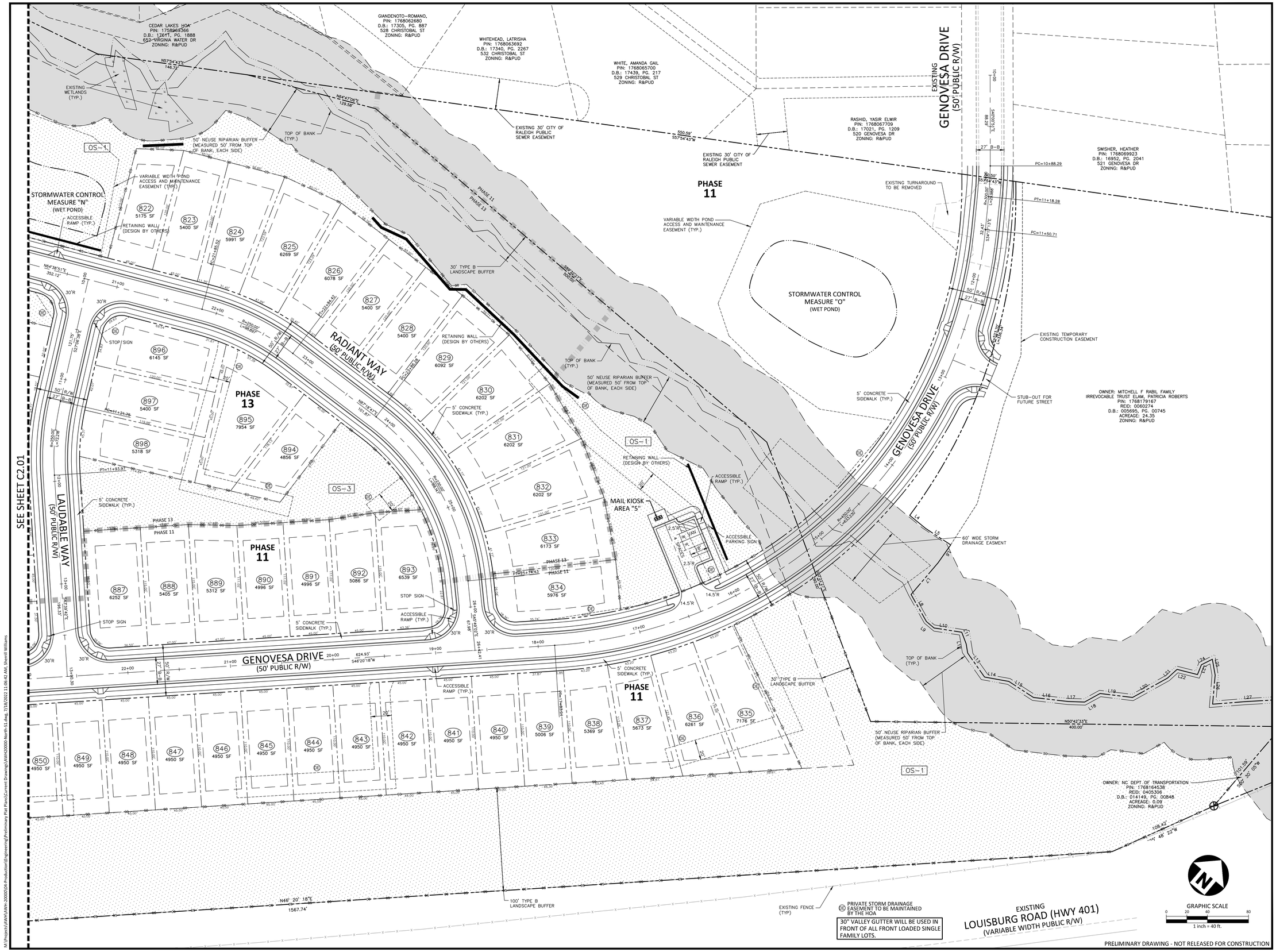

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DATE	09. 11. 2020

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PRELIMINARY PLAT AREA "B"

C2.02

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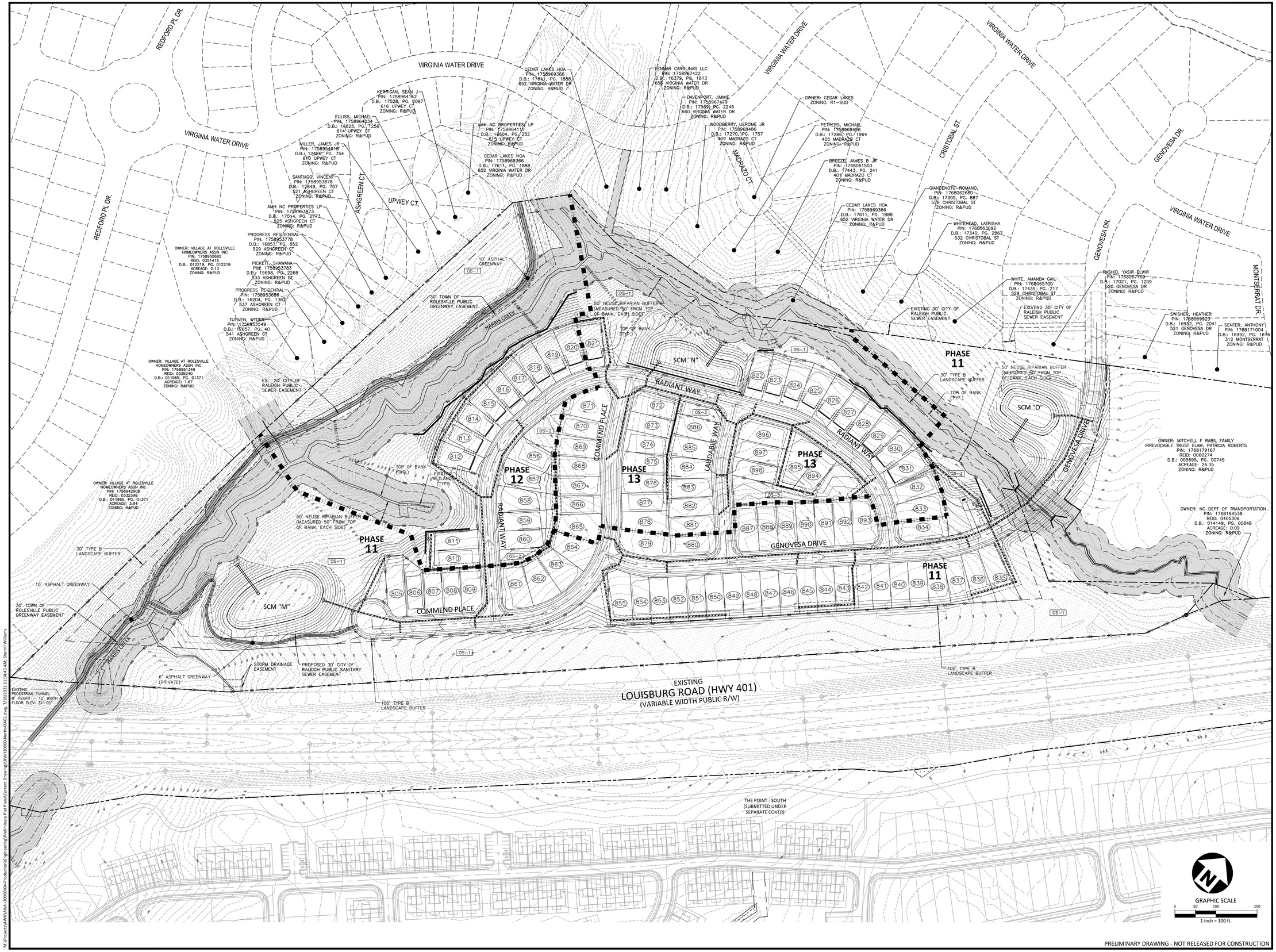

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DATE	09. 11. 2020

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OVERALL GRADING AND STORM DRAINAGE PLAN

C3.00

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WAKE COUNTY, NORTH CAROLINA

PR 20-06

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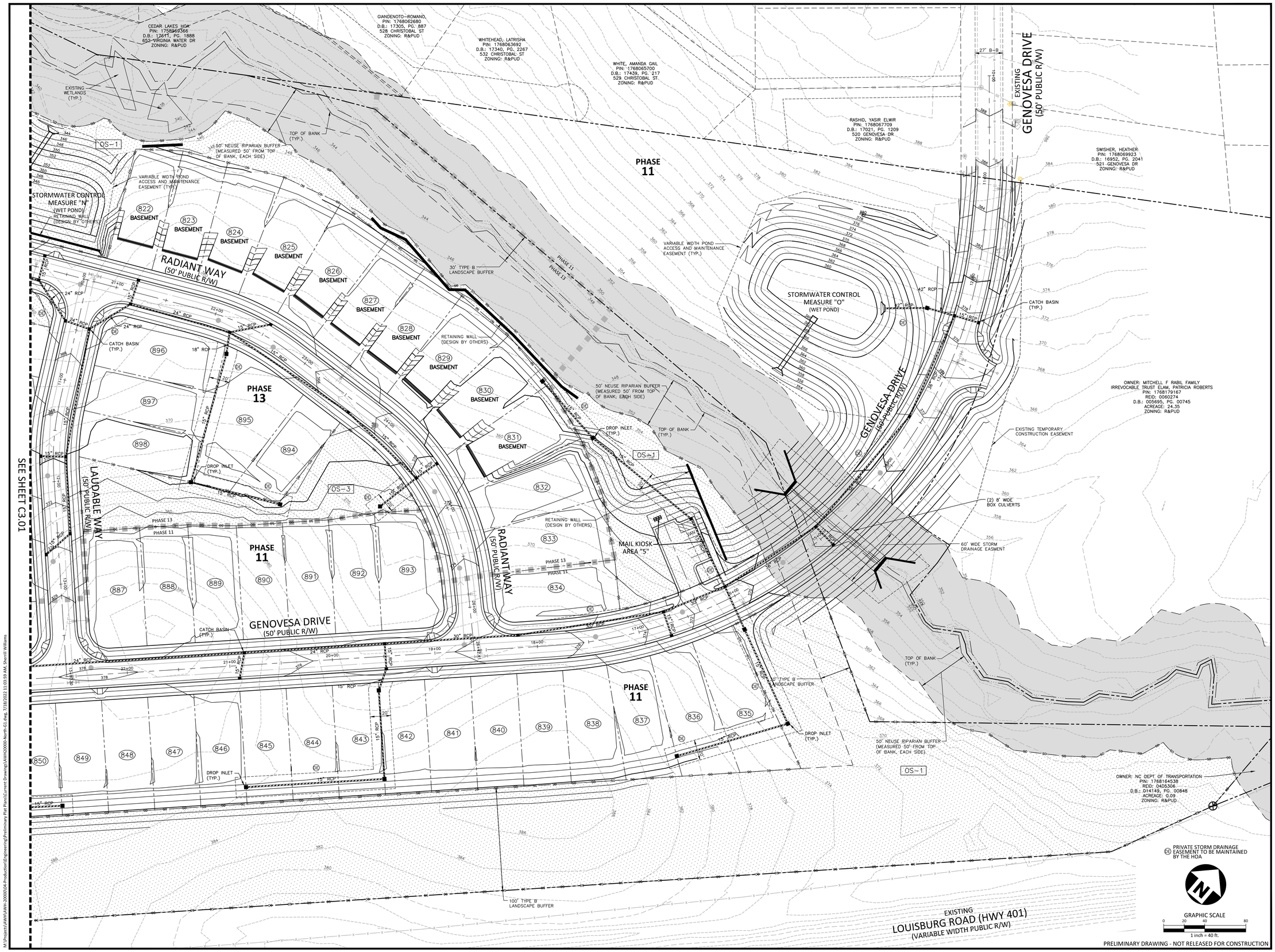
GRADING AND STORM DRAINAGE PLAN AREA "A"

C3.01



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GRADING AND STORM DRAINAGE PLAN AREA "B"

C3.02

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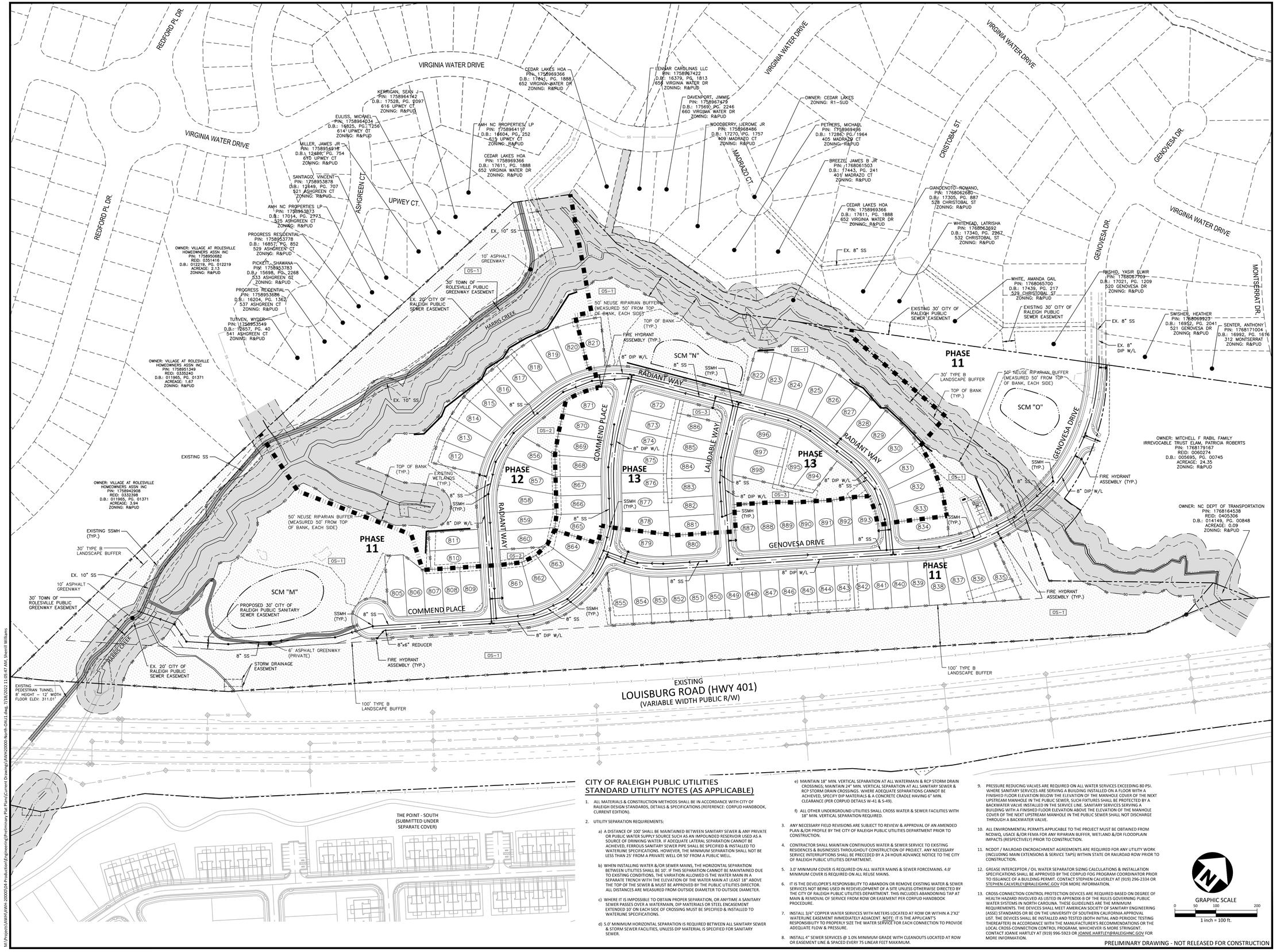

CITY OF RALEIGH PUBLIC UTILITIES STANDARD UTILITY NOTES (AS APPLICABLE)

1. ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CITY OF RALEIGH DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: CORPUD HANDBOOK, CURRENT EDITION).
2. UTILITY SEPARATION REQUIREMENTS:
   a) A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
   b) WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE PUBLIC UTILITIES DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER.
   c) WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
   d) 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
   e) MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 24" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATIONS CANNOT BE ACHIEVED, SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 6" MIN. CLEARANCE (PER CORPUD DETAILS W-41 & S-49).
   f) ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.
3. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTIONS SHALL BE PRECEDED BY A 24 HOUR ADVANCE NOTICE TO THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.
5. 3.0' MINIMUM COVER IS REQUIRED ON ALL WATER MAINS & SEWER FORCEMAINS. 4.0' MINIMUM COVER IS REQUIRED ON ALL REUSE MAINS.
6. IT IS THE DEVELOPER'S RESPONSIBILITY TO ABANDON OR REMOVE EXISTING WATER & SEWER SERVICES NOT BEING USED IN REDEVELOPMENT OF A SITE UNLESS OTHERWISE DIRECTED BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT. THIS INCLUDES ABANDONING TAP AT MAIN & REMOVAL OF SERVICE FROM ROW OR EASEMENT PER CORPUD HANDBOOK PROCEDURE.
7. INSTALL 3/4" COPPER WATER SERVICES WITH METERS LOCATED AT ROW OR WITHIN A 2'X2' WATERLINE EASEMENT IMMEDIATELY ADJACENT. NOTE: IT IS THE APPLICANT'S RESPONSIBILITY TO PROPERLY SIZE THE WATER SERVICE FOR EACH CONNECTION TO PROVIDE ADEQUATE FLOW & PRESSURE.
8. INSTALL 4" SEWER SERVICES @ 1.0% MINIMUM GRADE WITH CLEANOUTS LOCATED AT ROW OR EASEMENT LINE & SPACED EVERY 75 LINEAR FEET MAXIMUM.
9. PRESSURE REDUCING VALVES ARE REQUIRED ON ALL WATER SERVICES EXCEEDING 80 PSI. WHERE SANITARY SERVICES ARE SERVING A BUILDING INSTALLED ON A FLOOR WITH A FINISHED FLOOR ELEVATION BELOW THE ELEVATION OF THE MANHOLE COVER OF THE NEXT UPSTREAM MANHOLE IN THE PUBLIC SEWER, SUCH FIXTURES SHALL BE PROTECTED BY A BACKWATER VALVE INSTALLED IN THE SERVICE LINE. SANITARY SERVICES SERVING A BUILDING WITH A FINISHED FLOOR ELEVATION ABOVE THE ELEVATION OF THE MANHOLE COVER OF THE NEXT UPSTREAM MANHOLE IN THE PUBLIC SEWER SHALL NOT DISCHARGE THROUGH A BACKWATER VALVE.
10. ALL ENVIRONMENTAL PERMITS APPLICABLE TO THE PROJECT MUST BE OBTAINED FROM NCDWQ, USACE &/OR FEMA FOR ANY RIPARIAN BUFFER, WETLAND &/OR FLOODPLAIN IMPACTS (RESPECTIVELY) PRIOR TO CONSTRUCTION.
11. NCDOT / RAILROAD ENCROACHMENT AGREEMENTS ARE REQUIRED FOR ANY UTILITY WORK (INCLUDING MAIN EXTENSIONS & SERVICE TAPS) WITHIN STATE OR RAILROAD ROW PRIOR TO CONSTRUCTION.
12. GREASE INTERCEPTOR / OIL WATER SEPARATOR SIZING CALCULATIONS & INSTALLATION SPECIFICATIONS SHALL BE APPROVED BY THE CORPUD FOG PROGRAM COORDINATOR PRIOR TO ISSUANCE OF A BUILDING PERMIT. CONTACT STEPHEN CALVERLEY AT (919) 296-2334 OR STEPHEN.CALVERLEY@RALEIGHNC.GOV FOR MORE INFORMATION.
13. CROSS-CONNECTION CONTROL PROTECTION DEVICES ARE REQUIRED BASED ON DEGREE OF HEALTH HAZARD INVOLVED AS LISTED IN APPENDIX-B OF THE RULES GOVERNING PUBLIC WATER SYSTEMS IN NORTH CAROLINA. THESE GUIDELINES ARE THE MINIMUM REQUIREMENTS. THE DEVICES SHALL MEET AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) STANDARDS OR BE ON THE UNIVERSITY OF SOUTHERN CALIFORNIA APPROVAL LIST. THE DEVICES SHALL BE INSTALLED AND TESTED (BOTH INITIAL AND PERIODIC TESTING THEREAFTER) IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS OR THE LOCAL CROSS-CONNECTION CONTROL PROGRAM, WHICHEVER IS MORE STRINGENT. CONTACT JOANIE HARTLEY AT (919) 996-5923 OR JOANIE.HARTLEY@RALEIGHNC.GOV FOR MORE INFORMATION.

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

McADAMS
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900 RIDGEFIELD DRIVE, SUITE 335
RALEIGH, NC 27609
PHONE: 919. 232. 3695

ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP, WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

William T. O'Daniel
Jul 18 2022 11:54 AM
DocuSigned by:

REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-OAU1
CHECKED BY	.
DRAWN BY	.
SCALE	1"=100'
DATE	09. 11. 2020

SHEET

OVERALL UTILITY PLAN

C4.00

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawings\AWH20000-North-OAU1.dwg, 7/18/2022 11:05:37 AM, Sherrill Williams

SANTIAGO, VINCENT
PIN: 1758953878
D.B.: 12649, PG. 707
521 ASHGREEN CT
ZONING: R&PUD

AMH NC PROPERTIES LP
PIN: 1758953873
D.B.: 17014, PG. 2773
525 ASHGREEN CT
ZONING: R&PUD

PROGRESS RESIDENTIAL
PIN: 1758953778
D.B.: 16857, PG. 852
529 ASHGREEN CT
ZONING: R&PUD

PICKETT, SHAWANA
PIN: 1758953783
D.B.: 15698, PG. 2268
533 ASHGREEN CT
ZONING: R&PUD

PROGRESS REIDENTIAL
PIN: 1758953686
D.B.: 16204, PG. 1362
537 ASHGREEN CT
ZONING: R&PUD

TUTIVEN, WYDER
PIN: 1758953549
D.B.: 12657, PG. 40
541 ASHGREEN CT
ZONING: R&PUD

OWNER: VILLAGE AT ROLESVILLE HOMEOWNERS ASSN INC
PIN: 1758950682
REID: 0351416
D.B.: 012219, PG. 012219
ACREAGE: 2.13
ZONING: R&PUD

CEDAR LAKES HOA
PIN: 1758969366
D.B.: 17611, PG. 1888
652 VIRGINIA WATER DR
ZONING: R&PUD

10' ASPHALT GREENWAY

30' TOWN OF ROLESVILLE PUBLIC GREENWAY EASEMENT

30' TYPE B LANDSCAPE BUFFER

EX. 20' CITY OF RALEIGH PUBLIC SEWER EASEMENT

EXISTING SANITARY SEWER

HARRIS CREEK

TOP OF BANK (TYP.)

50' NEUSE RIPARIAN BUFFER (MEASURED 50' FROM TOP OF BANK, EACH SIDE)

VARIABLE WIDTH POND ACCESS AND MAINTENANCE EASEMENT (TYP.)

RETAINING WALL (DESIGN BY OTHERS)

STORMWATER CONTROL MEASURE "N" (WET POND)

STORMWATER CONTROL MEASURE "M" (WET POND)

PHASE 12

PHASE 13

PHASE 11

RADIANT WAY (50' PUBLIC R/W)

COMMEND PLACE (50' PUBLIC R/W)

LAUDABLE WAY (50' PUBLIC R/W)

GENOVESA DRIVE (50' PUBLIC R/W)

OS-1

OS-2

OS-3

FIRE HYDRANT ASSEMBLY (TYP.)

SSMH (TYP.)

W/L TEE (3) GV&B

8" DIP W/L

8" SS

6' PRIVATE ASPHALT GREENWAY

PARK AREA

EXISTING ROCK OUTCROP

EXISTING WETLANDS (TYP.)

100' TYPE B LANDSCAPE BUFFER

8" X 6" REDUCER

SANITARY SEWER OUTFALL TO EXISTING SANITARY SEWER (SEE SHEET C4.00 FOR CONTINUATION)

PROPOSED 30' CITY OF RALEIGH PUBLIC SANITARY SEWER EASEMENT

(DE) PRIVATE STORM DRAINAGE EASEMENT TO BE MAINTAINED BY THE HOA

SEE SHEET C4.02

GRAPHIC SCALE
0 20 40 80
1 inch = 40 ft.

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawings\AWH20000-North-U1.dwg, 7/18/2022 11:01:28 AM, Sherrill Williams

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ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP, WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

Todd O'Daniel
Jul 18 2022 11:54 AM

DocuSign

REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-U1
CHECKED BY	.
DRAWN BY	.
SCALE	1"=40'
DATE	09. 11. 2020

SHEET

UTILITY PLAN
AREA "A"
C4.01

SEE SHEET C4.01

CEDAR LAKES HOA
PIN: 1758969366
D.B.: 17611, PG. 1888
652 VIRGINIA WATER DR
ZONING: R&PUD

GIANDENOTO-ROMANO,
PIN: 1768062680
D.B.: 17305, PG. 887
528 CHRISTOBAL ST
ZONING: R&PUD

WHITEHEAD, LATRISHA
PIN: 1768063692
D.B.: 17340, PG. 2267
532 CHRISTOBAL ST
ZONING: R&PUD

WHITE, AMANDA GAIL
PIN: 1768065700
D.B.: 17439, PG. 217
529 CHRISTOBAL ST
ZONING: R&PUD

RASHID, YASIR ELWIR
PIN: 1768067709
D.B.: 17021, PG. 1209
520 GENOVESA DR
ZONING: R&PUD

SWISHER, HEATHER
PIN: 1768069923
D.B.: 16952, PG. 2041
521 GENOVESA DR
ZONING: R&PUD

OWNER: MITCHELL F RABIL FAMILY
IRREVOCABLE TRUST ELAM, PATRICIA ROBERTS
PIN: 1768179167
REID: 0060274
D.B.: 005695, PG. 00745
ACREAGE: 24.35
ZONING: R&PUD

OWNER: NC DEPT OF TRANSPORTATION
PIN: 1768164536
REID: 0405306
D.B.: 014149, PG. 00848
ACREAGE: 0.09
ZONING: R&PUD

EXISTING WETLANDS (TYP.)
50' NEUSE RIPARIAN BUFFER (MEASURED 50' FROM TOP OF BANK, EACH SIDE)
TOP OF BANK (TYP.)
VARIABLE WIDTH POND ACCESS AND MAINTENANCE EASEMENT (TYP.)
STORMWATER CONTROL MEASURE "N" (WET POND)
RETAINING WALL (DESIGN BY OTHERS)
30' TYPE B LANDSCAPE BUFFER
STORMWATER CONTROL MEASURE "O" (WET POND)
RETAINING WALL (DESIGN BY OTHERS)
MAIL KIOSK AREA "5"
VAN
100' TYPE B LANDSCAPE BUFFER
60' WIDE STORM DRAINAGE EASMENT
EXISTING TEMPORARY CONSTRUCTION EASEMENT
CONNECT TO EXISTING 8" DIP W/L
EX. CATCH BASINS
EX. FIRE HYDRANT ASSEMBLY
FIRE HYDRANT ASSEMBLY (TYP.)
BLOW-OFF ASSEMBLY
W/L TEE (3) GV&B
8" DIP W/L
SSMH (TYP.)
8" SS
EX. 8" SS
EX. 8" DIP W/L
OS-1
OS-3

PHASE 11
PHASE 13
PHASE 11-13

RADIANT WAY (50' PUBLIC R/W)
LAUDABLE WAY (50' PUBLIC R/W)
GENOVESA DRIVE (50' PUBLIC R/W)
EXISTING GENOVESA DRIVE (50' PUBLIC R/W)
EXISTING LOUISBURG ROAD (HWY 401) (VARIABLE WIDTH PUBLIC R/W)

822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850
887 888 889 890 891 892 893 894 895 896 897 898

(DE) PRIVATE STORM DRAINAGE EASEMENT TO BE MAINTAINED BY THE HOA

GRAPHIC SCALE
0 20 40 80
1 inch = 40 ft.

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawing\AWH20000-North-U1.dwg, 7/18/2022 11:02:00 AM, Sherrill Williams

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ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP,
WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

William T. O'Daniel (O'Daniel)
Jul 18 2022 11:55 AM

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REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
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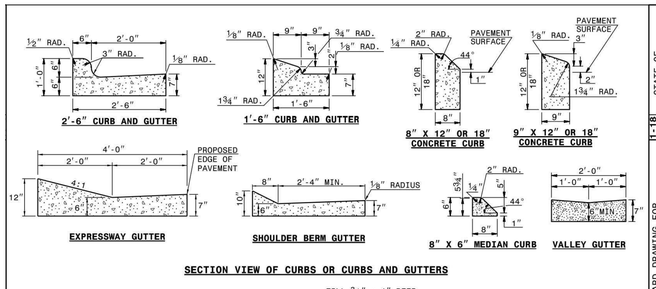
PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-U1
CHECKED BY	.
DRAWN BY	.
SCALE	1"=40'
DATE	09. 11. 2020

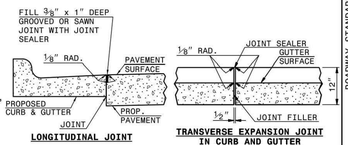
SHEET

UTILITY PLAN
AREA "B"

C4.02



GENERAL NOTES:
-PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
-JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
-CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
-FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
-SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.

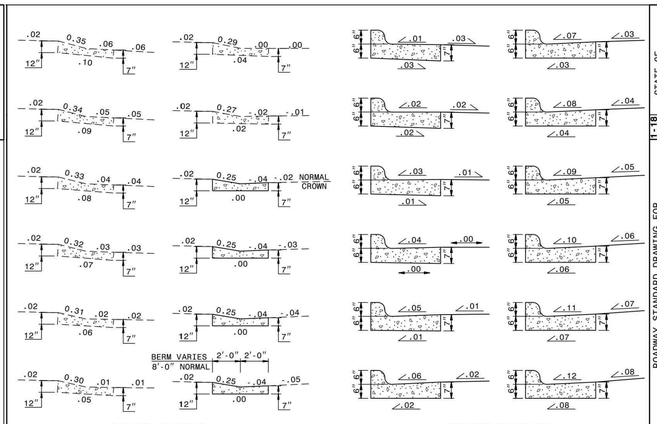


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER

SHEET 1 OF 3
846.01

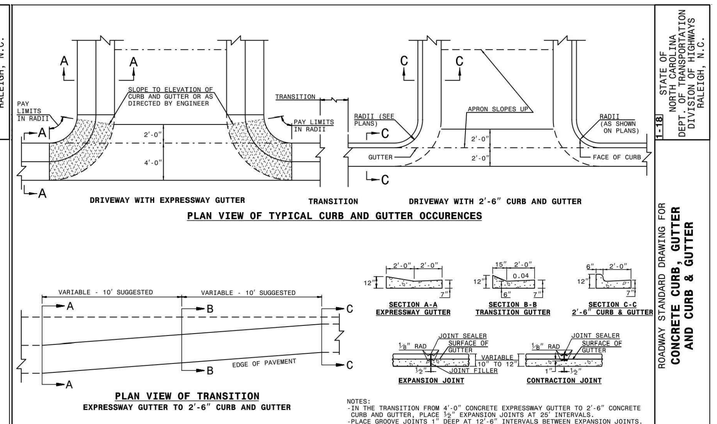


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER

SHEET 2 OF 3
846.01



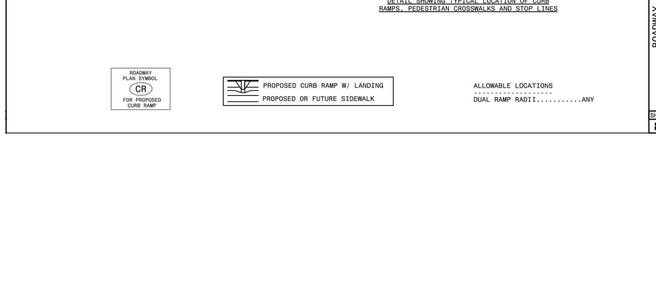
NOTES:
-IN THE TRANSITION FROM 4'-0" CONCRETE EXPRESSWAY GUTTER TO 2'-6" CONCRETE CURB AND GUTTER, PLACE ½" EXPANSION JOINTS AT 20' INTERVALS.
-PLACE GROOVE JOINTS 1" DEEP AT 12'-6" INTERVALS BETWEEN EXPANSION JOINTS.
-FILL AND SEAL THE TOP ½" OF THE EXPANSION JOINTS AND 1" OF CONTRACTION JOINTS WITH APPROVED JOINT SEALING COMPOUND.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER

SHEET 3 OF 3
846.01



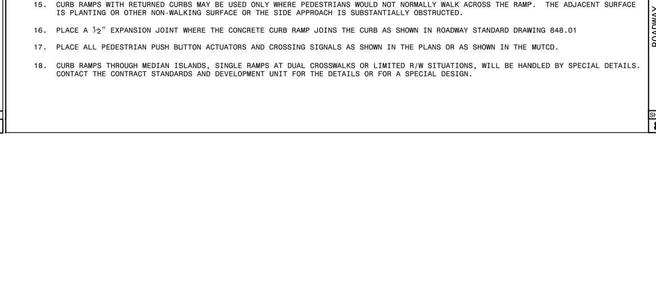
GENERAL NOTES:
★★NO CONSTRUCTION JOINT WILL BE PERMITTED IF FORMS ARE USED TO CAST DRIVEWAY. SLIP FORMING OF CURB AND GUTTER PERMITS THE USE OF CONSTRUCTION JOINT.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
DRIVEWAY TURNOUT
DROP CURB TYPE

SHEET 1 OF 2
848.03



DESIRABLE OR MAXIMUM DRIVEWAY GRADES				
BERM WIDTH	A		B	
	DIST.	GRADE	DIST.	GRADE
8' OR LESS	5'-0"	+2%*	2'-6"	+5%
8' OR LESS	2'-0"	+6%	5'-6"	+2%*
10'	4'-0"	+4%	5'-6"	+2%*
12' & OVER	4'-6"	+4%	7'-0"	+2%*

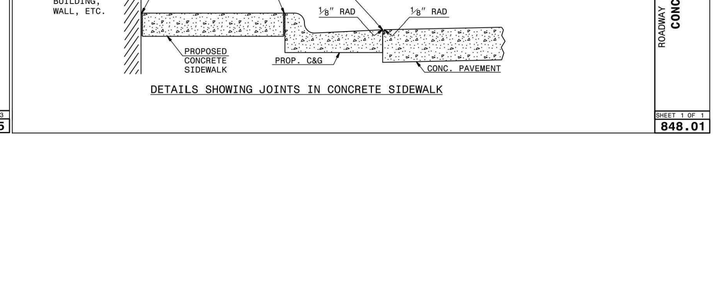
*SIDEWALK LOCATION (DO NOT PLACE SIDEWALK ON BERMS LESS THAN 6' WIDE.)

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
DRIVEWAY TURNOUT
DRIVEWAY GRADES

SHEET 2 OF 2
848.03



NOTES:
1. DETECTABLE WARNING DOMES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
2. DETECTABLE WARNING DOMES WILL CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

B	A	W=A+9"	X	B
5'	0.0'	5.8'	5.8'	5.0"
6'	0.0'	6.8'	6.8'	6.0"*
7'	0.0'	7.8'	7.3'	6.5"*
8'	0.0'	8.8'	7.3'	6.5"*
4'	3.0'	7.8'	7.8'	5.0'
5'	3.0'	8.8'	8.1'	5.0'
6'	3.0'	9.8'	8.1'	5.0'
3'	3.0'	9.3'	8.4'	5.1'
4'	4.0'	9.8'	8.4'	5.8'
5'	4.0'	10.3'	8.7'	5.4'
6'	5.0'	10.8'	8.9'	5.1'

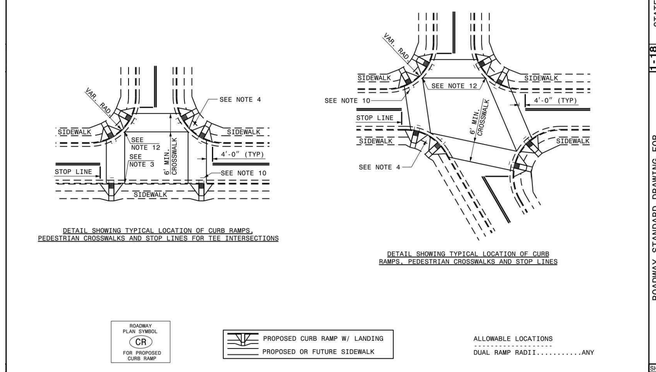
B = X-(A+9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
PROPOSED CURB AND GUTTER

SHEET 1 OF 3
848.05



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
PROPOSED CURB AND GUTTER

SHEET 2 OF 3
848.05

NOTES:

1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4'x4' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' BACK OF A PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT LANDINGS FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGHT THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5'X5' LANDING AT THE TOP OF A RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMPS
NOTES

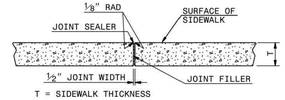
SHEET 3 OF 3
848.05

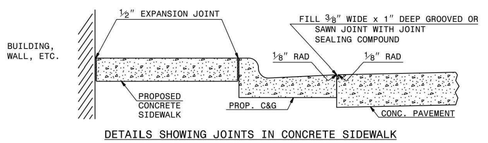
NOTES:

CONSTRUCT STANDARD SIDEWALK 5' WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

PLACE A GROOVE JOINT 1" DEEP WITH ⅛" RADII IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE ½" EXPANSION JOINT WILL BE REQUIRED AT 50' INTERVALS. A ½" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.

SEE STD. DWG. 848.05 FOR CURB RAMP LOCATION REQUIREMENTS AND CONSTRUCTION GUIDELINES.





STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE SIDEWALK

SHEET 1 OF 1
848.01

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ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP,
WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

William T. O'Daniel
Jul 18 2022 11:55 AM

DocuSign

REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-D1
CHECKED BY	.
DRAWN BY	.
SCALE	N/A
DATE	09. 11. 2020

SHEET

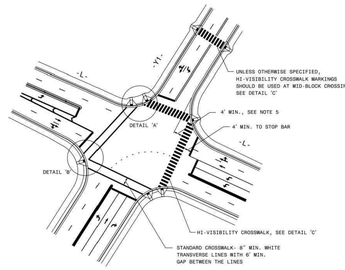
SITE DETAILS

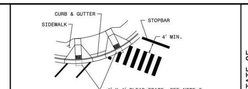
C8.00

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawings\AWH20000-North-D1.dwg, 7/18/2022 11:02:28 AM, Sherrill Williams

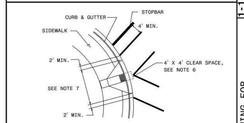
PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

CROSSWALK PLACEMENT GUIDANCE

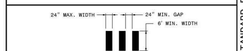




DETAIL 'A'- DUAL CURB RAMPS



DETAIL 'B'- SINGLE DIAGONAL CURB RAMP



DETAIL 'C'- HI-VISIBILITY CROSSWALK

GENERAL NOTES:

1- USE THE DETAILS ABOVE AND THE FOLLOWING NOTES FOR GUIDANCE IN PLACING CROSSWALK MARKINGS. REFER TO NCDOT ROADWAY STANDARD DRAWINGS, MUTCD AND ADA STANDARDS FOR ADDITIONAL GUIDANCE.

2- THE LOCATION AND TYPE OF CROSSWALK MARKINGS SHOWN ON THE ABOVE DETAILS ARE FOR REFERENCE ONLY. LOCATE CROSSWALK MARKINGS AS SHOWN ON THE PROJECT DETAIL SHEETS OR AS DIRECTED BY THE ENGINEER. THE CROSSWALK MARKING TYPE, STANDARD OR HI-VISIBILITY, SHALL BE INSTALLED AS SPECIFIED ON THE PROJECT DETAIL SHEETS OR AS DIRECTED BY THE ENGINEER.

3- THE STANDARD CROSSWALK IS TWO WHITE 8" MIN. TRANSVERSE LINES WITH A 6' MIN. GAP BETWEEN THE LINES. THE HI-VISIBILITY CROSSWALK IS WHITE 24" MAX. WIDE LONGITUDINAL LINES WITH 24" MIN. GAPS BETWEEN LINES, SEE DETAIL 'C'. HI-VISIBILITY CROSSWALKS SHOULD BE A MINIMUM OF 6' WIDE. CURB RAMPS SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS, EXCLUDING ANY FLARES.

4- STOP BARS SHOULD BE PLACED A 4' MIN. IN ADVANCE OF NEAREST CROSSWALK LINE.

5- SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL IS 4' MIN.

6- BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE OF 4' X 4' MIN. SHALL BE PROVIDED WITHIN THE MARKINGS.

7- SINGLE DIAGONAL CURB RAMPS WITH FLARED SIDES SHALL HAVE A SEGMENT OF CURB 2' MIN. LONG LOCATED ON EACH SIDE OF THE CURB RAMP AND WITHIN THE MARKED CROSSING, SEE DETAIL 'B'.

8- CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE TO THE LATEST NCDOT ROADWAY STANDARD DRAWINGS. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR DETAILS OR A SPECIAL DESIGN.

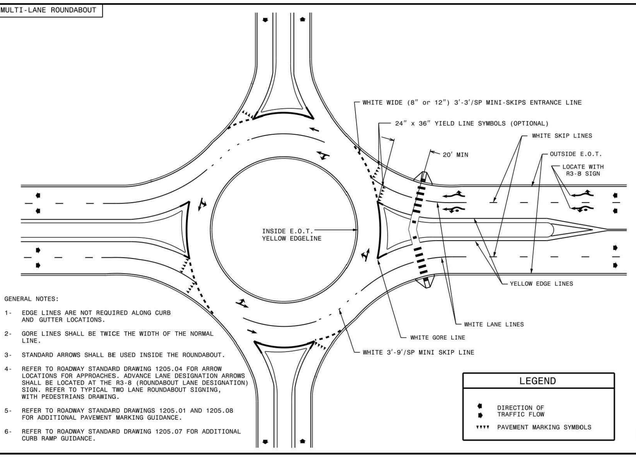
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
PAVEMENT MARKINGS
PEDESTRIAN CROSSWALKS

SHEET 1 OF 1
1205.07

MULTI-LANE ROUNDABOUT



GENERAL NOTES:

1- EDGE LINES ARE NOT REQUIRED ALONG CURB AND GUTTER LOCATIONS.

2- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

3- STANDARD ARROWS SHALL BE USED INSIDE THE ROUNDABOUT.

4- REFER TO ROADWAY STANDARD DRAWING 1205.04 FOR ARROW LOCATIONS FOR APPROACHES. ADVANCE LANE DESIGNATION ARROWS SHALL BE LOCATED AT THE R3-8 (ROUNDABOUT LANE DESIGNATION) SIGN. REFER TO TYPICAL TWO LANE ROUNDABOUT SIGNING, WITH PEDESTRIANS DRAWING.

5- REFER TO ROADWAY STANDARD DRAWINGS 1205.01 AND 1205.08 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

6- REFER TO ROADWAY STANDARD DRAWING 1205.07 FOR ADDITIONAL CURB RAMP GUIDANCE.

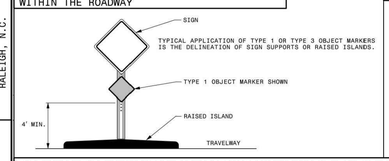
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

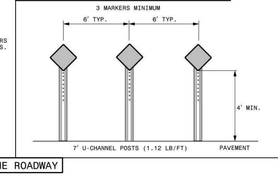
ROADWAY STANDARD DRAWING FOR
PAVEMENT MARKINGS
ROUNDABOUTS

SHEET 2 OF 2
1205.14

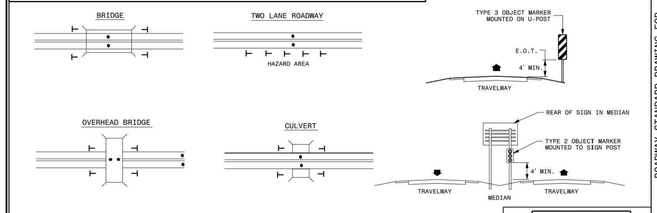
TYPE 1 OR TYPE 3 MARKERS FOR OBSTRUCTIONS WITHIN THE ROADWAY



TYPE 4 MARKERS FOR END OF ROADWAY



TYPE 2 OR TYPE 3 MARKERS FOR OBSTRUCTIONS ADJACENT TO THE ROADWAY



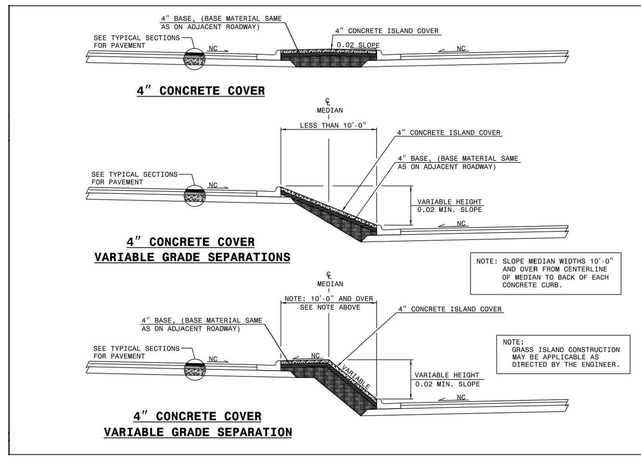
TYPICAL APPLICATIONS OF TYPE 2 OR TYPE 3 OBJECT MARKERS INCLUDES DELINEATION OF BRIDGE PIERS, ABUTMENTS, HANDRAILS, CULVERT HEADWALLS, NARROW SHOULDERS, DROP-OFFS, OR OTHER UNDESIRABLE CONDITIONS WHEN GUARDRAIL OR OTHER ROADSIDE PROTECTION IS NOT IN PLACE.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
OBJECT MARKERS
INSTALLATION

SHEET 1 OF 1
1264.02



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
MEDIAN CONSTRUCTION
WITH CURB AND GUTTER

SHEET 1 OF 1
852.10

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ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP,
WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

Todd O'Daniel
Jul 18 2022 11:55 AM

DocuSign

REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-D1
CHECKED BY	.
DRAWN BY	.
SCALE	N/A
DATE	09. 11. 2020

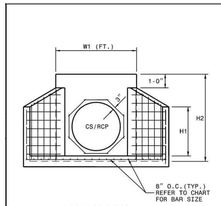
SHEET

SITE DETAILS

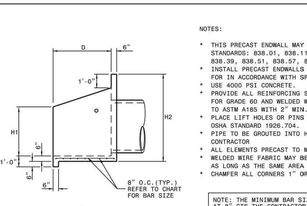
C8.01

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawings\AWH20000-North-D1.dwg, 7/18/2022 11:02:42 AM, Sherrill Williams

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION



ELEVATION

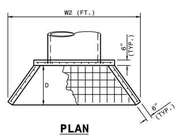


SIDE

NOTES:

* THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING STANDARDS: 838.01, 838.11, 838.21, 838.27, 838.33, 838.39, 838.51, 838.57, 838.63 AND 838.69.
* INSTALL PRECAST ENDWALLS WITH WINGS AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 838.
* USE 4000 PSI CONCRETE.
* PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185 WITH 2" MIN. CLEARANCE.
* PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
* PIPE TO BE GROUTED INTO HEADWALL AT JOB SITE BY CONTRACTOR
* ALL ELEMENTS PRECAST TO MEET ASTM C913.
* WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
* CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".

NOTE: THE MINIMUM BAR SIZE SHALL BE #5 BARS AT 8" CTS.THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.



PLAN

ENDWALL DIMENSIONS

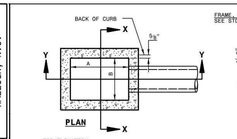
FT.	MINIMUM	MIN./MAX.	MIN./MAX.	MIN./MAX.	MIN./MAX.	MIN./MAX.
PIPE DIA.	BAR SIZE	H1(FT.)	H2(FT.)	D (FT.)	W1	W2
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.50	10.00/11.50
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/9.25	13.50/15.75
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/9.25	13.75/15.75
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/9.25	14.00/15.75
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/9.25	14.75/16.75

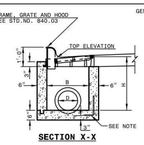
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

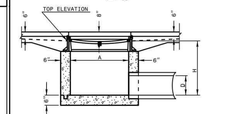
ROADWAY STANDARD DRAWING FOR
PRECAST CONCRETE ENDWALL
FOR SINGLE 12" THRU 72" PIPE - 90° SKEW

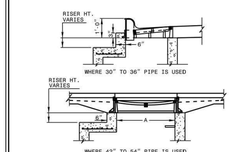
SHEET 1 OF 1
838.80



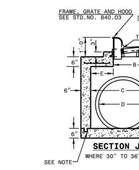


SECTION X-X



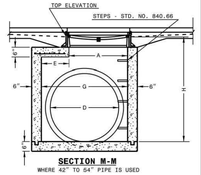


DETAIL SHOWING METHOD OF RISER CONSTRUCTION



SECTION J-J
WHERE 30" TO 36" PIPE IS USED

PLAN



SECTION M-M
WHERE 42" TO 54" PIPE IS USED

PLAN

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 3" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

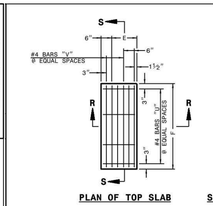
DRAWING NOT TO SCALE.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

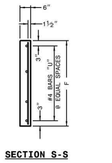
1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

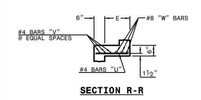
SHEET 1 OF 2
840.02



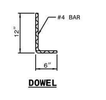
PLAN OF TOP SLAB



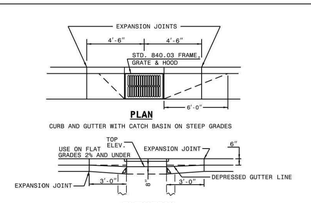
SECTION S-S



SECTION R-R

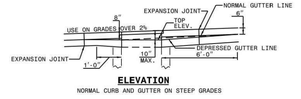


DOWEL



PLAN
CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES

ELEVATION
NORMAL CURB AND GUTTER ON LIGHT GRADES



ELEVATION
NORMAL CURB AND GUTTER ON STEEP GRADES

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

DIMENSIONS OF BOX AND PIPE						COVER DIMENSION		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
PIPE DIA.	SPAN A	WIDTH B	WIDTH C	SPAN G	MIN. HEIGHT H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH		BOTTOM SLAB	WALL PER FT. HT.	C.M.	R.C.
12"	3'-0"	2'-2"	---	---	2'-9"	---	---	---	---	---	---	---	---	---	0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			3'-0"										0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			3'-3"										0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"										0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-8"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.103	0.331	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.738	0.180	0.243
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-2"	4	2'-10"	3	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401

* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 2 OF 2
840.02

NOTE: USE TYPE "E", "F" AND "Q" GRATE UNLESS OTHERWISE NOTED.

SECTION - BB

SECTION - LL

SECTION - MM

SECTION - PP

SECTION - NN

SECTION - AA

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 1 OF 2
840.03

DETAIL SHOWING TYPES OF GRATES
USE ACCORDING TO WATER FLOW.

TYPE - E

TYPE - F

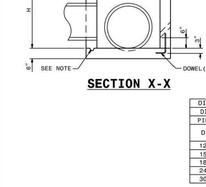
TYPE G

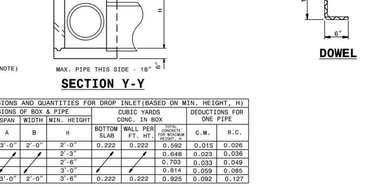
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 2 OF 2
840.03





PLAN OF GRATING
CAST IRON

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
DROP INLET FRAME AND GRATES
FOR USE WITH STD. DWG.S 840.14 AND 840.15

SHEET 1 OF 1
840.16

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR 2" KEYWAY OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
CONSTRUCT WITH PIPE CROWNS MATCHING.
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES NOT SHOWN.
INSTALL 2" WEEPHOLES AS DIRECTED BY THE ENGINEER.
INSTALL STONE DRAINS, OF A MINIMUM OF ½ CUBIC FOOT OF NO. 78M STONE IN A POROUS FABRIC BAG OR WRAP, AT EACH WEEP HOLE OR AS DIRECTED BY THE ENGINEER.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.

DIMENSIONS AND QUANTITIES FOR DROP INLET(BASED ON MIN. HEIGHT, H)

DIMENSIONS OF BOX & PIPE				CUBIC YARDS CONC. IN BOX			DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	MIN. HEIGHT	BOTTOM SLAB	WALL PER FT. HT.	TOTAL CONCRETE FOR BOTTOM SLAB & WALL	C.M.	R.C.
D	A	B	H					
12"	3'-0"	2'-0"	2'-0"	0.222	0.222	0.592	0.015	0.026
15"	″	″	2'-3"	″	″	0.648	0.023	0.036
18"	″	″	2'-6"	″	″	0.703	0.033	0.049
24"	″	″	3'-0"	″	″	0.814	0.059	0.085
30"	3'-0"	2'-0"	3'-6"	0.222	0.222	0.925	0.092	0.127

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE DROP INLET
12" THRU 30" PIPE

SHEET 1 OF 1
840.14

McADAMS
The John R. McAdams Company, Inc.
2905 Meridian Parkway
Durham, NC 27713

phone 919. 361. 5000
fax 919. 361. 2269
license number: C-0293, C-187

www.mcadamsco.com

CLIENT

ASHTON RALEIGH RESIDENTIAL, LLC.
900 RIDGEFIELD DRIVE, SUITE 335
RALEIGH, NC 27609
PHONE: 919. 232. 3695

ASHTON WOODS

THE POINT
PHASES 11-13
PRELIMINARY PLAT PLANS
EAST YOUNG STREET
TOWN OF ROLESVILLE, WAKE FOREST TOWNSHIP,
WAKE COUNTY, NORTH CAROLINA

PR 20-06

NORTH CAROLINA PROFESSIONAL SEAL 22630 ENGINEER WILLIAM T. O'DANIEL

William T. O'Daniel
Jul 18 2022 11:55 AM

DocuSign

REVISIONS

NO.	DATE	
1	12. 14. 2020	REV PER TOWN COMMENTS
2	03. 02. 2022	REV PER TOWN COMMENTS
3	07. 18. 2022	REVISED OWNER INFORMATION

PLAN INFORMATION

PROJECT NO.	AWH-20000
FILENAME	AWH20000-NORTH-D1
CHECKED BY	.
DRAWN BY	.
SCALE	N/A
DATE	09. 11. 2020

SHEET

STORM DRAINAGE DETAILS

C8.02

M:\Projects\AWH\AWH-20000\04-Production\Engineering\Preliminary Plat Plans\Current Drawings\AWH20000-North-D1.dwg, 7/18/2022 11:02:57 AM, Sherrill Williams

KIMLEY-HORN AND ASSOCIATES, INC
NC License #F-0102

MEMORANDUM

To:	Meredith Gruber, PLA, AICP, Town of Rolesville
From:	Travis Fluitt, P.E., Kimley-Horn and Associates, Inc.
Date:	April 22, 2022
Subject:	The Point North (Young Street PUD) – 2022 Traffic Impact Analysis Memorandum

DocuSigned by: SEAL 034394 ENGINEER TRAVIS FLUITT
E9D326BFBC3E429...
4/22/2022

As required by conditions in the approved special use permit, Kimley-Horn has prepared this memorandum to summarize updated analyses related to The Point North, which is the portion of the Young Street PUD development located north of the US 401 Bypass in Rolesville, North Carolina.

As referenced in *Young Street PUD Revised TIA* (Kimley-Horn, June 2019), the Young Street PUD allows for up to 320 townhomes, 621 single-family homes (with approximately 96 of those located north of the US 401 Bypass), and 12.28 acres of commercial space. 319 townhomes south of the US 401 Bypass were previously approved under SP-20-04. As envisioned on the current site plan, the north portion of the site will include 96 single-family homes. The site location and proposed site plan are shown on **Figures 1** and **2**, respectively.

Town of Rolesville staff was consulted regarding the elements to be included in this study.

Existing Traffic

Weekday AM (7:00 to 9:00 AM) and PM (4:00 to 6:00 PM) peak hour turning movement counts were collected on March 24, 2022 at the following intersections when Wake County Public Schools were in session:

- Young Street at Virginia Water Drive
- Virginia Water Drive at Genovesa Drive
- Virginia Water Drive at Redford Place Drive
- S. Main Street (US 401 Business) at Rogers Road/Redford Place Drive

Turning movement counts were also collected at the intersection of S. Main Street (US 401 Business) at Burlington Mills Road for volume balancing purposes. **Figure 3** shows the existing roadway laneage at the study intersections, and the existing AM and PM peak hour turning movement volumes are shown on **Figures 4 and 5**, respectively.

Background Traffic

Historic Growth Traffic

A future study year of 2027 was used in this analysis to be consistent with the anticipated full build-out of the entire Young Street PUD site. An annual growth factor of 2.5% was applied to the existing traffic volumes up to the 2027 study year to account for ambient background traffic growth.

Approved Development Traffic

Based on discussions with Town staff, site traffic from three approved/pending developments also was included in the analysis as background traffic: the Kalas Falls development, the southern portion of The Point development, and the Wallbrook Development. For the purposes of this analysis, it was assumed that each of those developments would be built-out prior to the study year 2027.

Furthermore, to present a conservative analysis, site traffic from the Redford Place mixed-use and Jonesville Road Townhome developments was also included in this analysis as background traffic. These two developments were included as approved developments in the *Revised Wallbrook Development TIA* (Stantec, August 2020), and their site traffic volumes were obtained from that TIA and were not modified as part of this analysis.

Volume Diversions

This analysis assumed that traffic diversions will occur once the proposed extensions of Virginia Water Drive, Wall Creek Drive, and Bendemeer Lane have been completed as part of the Wallbrook Development.

At the intersection of S. Main Street (US 401) at Virginia Water Drive Extension (Wallbrook Access B)/Wallbrook Access K, this analysis assumed that 30% of traffic associated with the Carlton Pointe development would access S. Main Street (US 401 Business) via the Virginia Water Drive Extension. Furthermore, this analysis assumed that a portion of traffic to/from the Villages of Rolesville and Cedar Lakes developments would use the Virginia Water Drive Extension to access S. Main Street (US 401 Business) instead of Redford Place Drive. Note that, to provide a conservative analysis, traffic was added to the Virginia Water Drive extension but was not was removed from Redford Place Drive.

At the intersection of Virginia Water Drive at Redford Place Drive, existing + growth volumes were increased by 50% on the eastbound right-turn and northbound left-turn movements and by 25% on the eastbound left-turn, eastbound through, and westbound through movements to account for the Virginia Water Drive connection to S. Main Street (US 401 Business). To present at conservative analysis, no volume reduction was applied to any movement at any of the study intersections.

The diversion volumes are shown on the intersection spreadsheets attached to this memo.

Total Background Traffic

AM and PM peak hour background traffic volumes, which include historic growth and approved development traffic, are shown on **Figures 4 and 5**, respectively.

Trip Generation

The trip generation potential of the proposed development was determined using the traffic generation rates published in the *ITE Trip Generation Handbook* (Institute of Transportation Engineers, Eleventh Edition, 2021). The trip generation potential of the project is summarized in Table 1.

Table 1 ITE Traffic Generation (Vehicles)								
LUC	Land Use	Intensity		Daily	AM Peak Hour		PM Peak Hour	
					In	Out	In	Out
210	Single Family Detached Housing	96	d.u.	972	19	53	60	36

As shown in Table 1, the portion of the Point north of US 401 Bypass has the potential to generate approximately 972 daily trips, 72 AM peak hour trips, and 96 PM peak hour trips on a typical weekday.

Trip Distribution and Assignment

The proposed generated trips were assigned to the surrounding roadway network. The following distribution was used for new site trips for The Point North:

- 45% to/from the south on Young Street
- 20% to/from the north on Young Street
- 15% to/from the north on Rogers Road
- 10% to/from the southwest on S. Main Street (via Virginia Water Drive Extension)
- 5% to/from the northeast on S. Main Street (via Virginia Water Drive Extension)
- 5% to/from the Wallbrook Development

While multiple public road extensions are proposed as part of the Wallbrook Development project to disperse traffic, all site traffic for this project was assumed to be added to the S. Main Street – Virginia Water Drive Extension (Wallbrook Access B)/Wallbrook Access K intersection to be conservative.

The site traffic distribution and percent assignment for The Point North are shown on **Figure 6,** while **Figures 7** and **8** show the site traffic and projected (2027) build-out traffic volumes for the AM and PM peak hours, respectively.

Capacity and Queue Analysis

Capacity analyses were performed using Synchro Version 11 software. The LOS for the study intersections are summarized in Table 2. Existing peak hour factors (PHF) were used in each of the traffic conditions, while a PHF of 0.90 was used at new study intersections. Actual signal timings were used in the existing conditions, while signal timings were optimized in each of the future traffic conditions due to the anticipated roadway impacts associated with *NCDOT STIP Project U-6241*. Synchro LOS reports are attached.

Table 2 Level-of-Service Summary		
Condition	**AM Peak Hour LOS (Delay)**	**PM Peak Hour LOS (Delay)**
Young Street at Virginia Water Drive (Unsignalized)		
Existing (2022) Traffic	EB – B (12.7) NBL – A (8.3)	EB – B (12.2) NBL – A (8.0)
Background (2027) Traffic	EB – C (15.2) NBL – A (8.7)	EB – C (15.3) NBL – A (8.5)
Build-out (2027) Traffic	EB – C (18.5) NBL – A (8.8)	EB – C (16.9) NBL – A (8.6)
Virginia Water Drive at Genovesa Drive (Unsignalized)		
Existing (2022) Traffic	NB – A (9.7) SB – A (9.7) EBL – A (7.4) WBL – A (7.4)	NB – A (9.5) SB – B (10.4) EBL – A (7.4) WBL – A (7.4)
Background (2027) Traffic	NB – A (9.9) SB – A (9.9) EBL – A (7.5) WBL – A (7.4)	NB – A (9.7) SB – B (10.6) EBL – A (7.4) WBL – A (7.4)
Build-out (2027) Traffic	NB – B (10.4) SB – B (10.4) EBL – A (7.5) WBL – A (7.5)	NB – B (10.3) SB – B (11.8) EBL – A (7.4) WBL – A (7.5)
Virginia Water Drive at Redford Place Drive (Roundabout)		
Existing (2022) Traffic	A (3.3) *v/c Ratio* = 0.07	A (3.6) *v/c Ratio* = 0.13
Background (2027) Traffic	A (3.7) *v/c Ratio* = 0.11	A (4.1) *v/c Ratio* = 0.18
Build-out (2027) Traffic	A (3.8) *v/c Ratio* = 0.11	A (4.3) *v/c Ratio* = 0.19
S. Main Street (US 401 Business) at Rogers Road/Redford Place Drive (Signalized)		
Existing (2022) Traffic	C (20.5)	B (19.0)
Background (2027) Traffic – *with Committed Improvements by Others*	D (53.8)	C (32.3)
Build-out (2027) Traffic – *with Committed Improvements by Others*	D (53.9)	C (32.7)

Table 2 (cont.) Level-of-Service Summary		
Condition	**AM Peak Hour LOS (Delay)**	**PM Peak Hour LOS (Delay)**
S. Main Street (US 401 Business) at Wallbrook Access B (Virginia Water Drive Extension)/Wallbrook Access K (Signalized)		
Background (2027) Traffic – *with Committed Improvements by Others*	C (25.0)	D (37.0)
Build-out (2027) Traffic – *with Committed Improvements by Others*	C (25.3)	D (37.6)

Queues analyses were also performed along Virginia Water Drive using SimTraffic Version 11 software. Table 3 below summarizes the average and maximum queues observed in the simulations. SimTraffic queue reports are attached.

Table 3 SimTraffic Queue Summary		
Condition	**AM Peak Hour Avg/Max Queue (feet)**	**PM Peak Hour Avg/Max Queue (feet)**
Young Street at Virginia Water Drive (Unsignalized)		
Existing (2022) Traffic	EB - 31/72 NBL - 8/49	EB - 23/55 NBL - 9/38
Background (2027) Traffic	EB - 39/88 NBL - 10/38	EB - 27/97 NBL - 16/39
Build-out (2027) Traffic	EB - 46/97 NBL - 10/50	EB - 32/73 NBL - 22/62
Virginia Water Drive at Genovesa Drive (Unsignalized)		
Existing (2022) Traffic	NB - 11/32 SB - 9/31	NB - 13/74 SB - 19/83
Background (2027) Traffic	NB - 12/31 SB - 11/31	NB - 16/72 SB - 19/70
Build-out (2027) Traffic	NB - 24/61 SB - 11/36	NB - 32/71 SB - 22/74

Table 3 (cont.) SimTraffic Queue Summary		
Condition	**AM Peak Hour Avg/Max Queue (feet)**	**PM Peak Hour Avg/Max Queue (feet)**
Virginia Water Drive at Redford Place Drive (Roundabout)		
Existing (2022) Traffic	EB - 2/38 WB - 5/31 NB - 1/31 SB - 1/10	EB - 6/43 WB - 2/37 NB - 4/38 SB - 1/20
Background (2027) Traffic	EB - 1/21 WB - 6/46 NB - 7/46 SB - 2/22	EB - 12/45 WB - 4/31 NB - 10/39 SB - 13/71
Build-out (2027) Traffic	EB - 2/27 WB - 8/32 NB - 8/46 SB - 5/44	EB - 14/62 WB - 8/44 NB - 8/31 SB - 13/55

Committed Improvements (by Others)

The following improvements are committed to be performed by others and were assumed to be in place in each of the future traffic conditions:

S. Main Street (US 401 Bus.) at Rogers Road/Redford Place Drive (by NCDOT STIP Project U-6241)

- Restripe S. Main Street to a three-lane roadway with bike lanes
- Provide 125 feet of storage for the eastbound left-turn lane on S. Main Street
- Provide 225 feet of storage for the westbound left-turn lane on S. Main Street
- Modify the existing traffic signal to accommodate the new laneage

S. Main Street (US 401 Business) at Wallbrook Access B (Virginia Water Drive Extension)/Wallbrook Access K (by the Wallbrook Development)

- Construct eastbound left and right-turn lanes on S. Main Street with 140 of storage each
- Construct westbound left and right-turn lanes on S. Main Street with 350 feet of storage each
- Construct the northbound approach of Virginia Water Drive Extension (Wallbrook Access B) with a continuous left-turn lane and a shared through/right-turn lane with 100 feet of storage
- Construct the southbound approach of Wallbrook Access K with a continuous shared through/ right-turn lane and a left-turn lane with 225 feet of storage
- Install a traffic signal

Figure 9 shows the committed roadway laneage at the study intersections.

Summary and Recommendations

With the committed improvements in place, analyses indicate that all of the study intersections are expected to operate at an acceptable level-of-service in the study year 2027 with or without the project in place. Increases in delays and queues are expected to be minor with the addition of site traffic.

Furthermore, the site is projected to add only 72 trips (one vehicle every 50 seconds) to Genovesa Drive in the AM peak hour and only 96 trips (one vehicle every 37 seconds) during the PM peak hour on a typical weekday. Therefore, no roadway improvements are recommended to be performed to accommodate site traffic.

Should you have any questions or comments, please do not hesitate to contact me at (919) 653-2948 or travis.fluitt@kimley-horn.com.

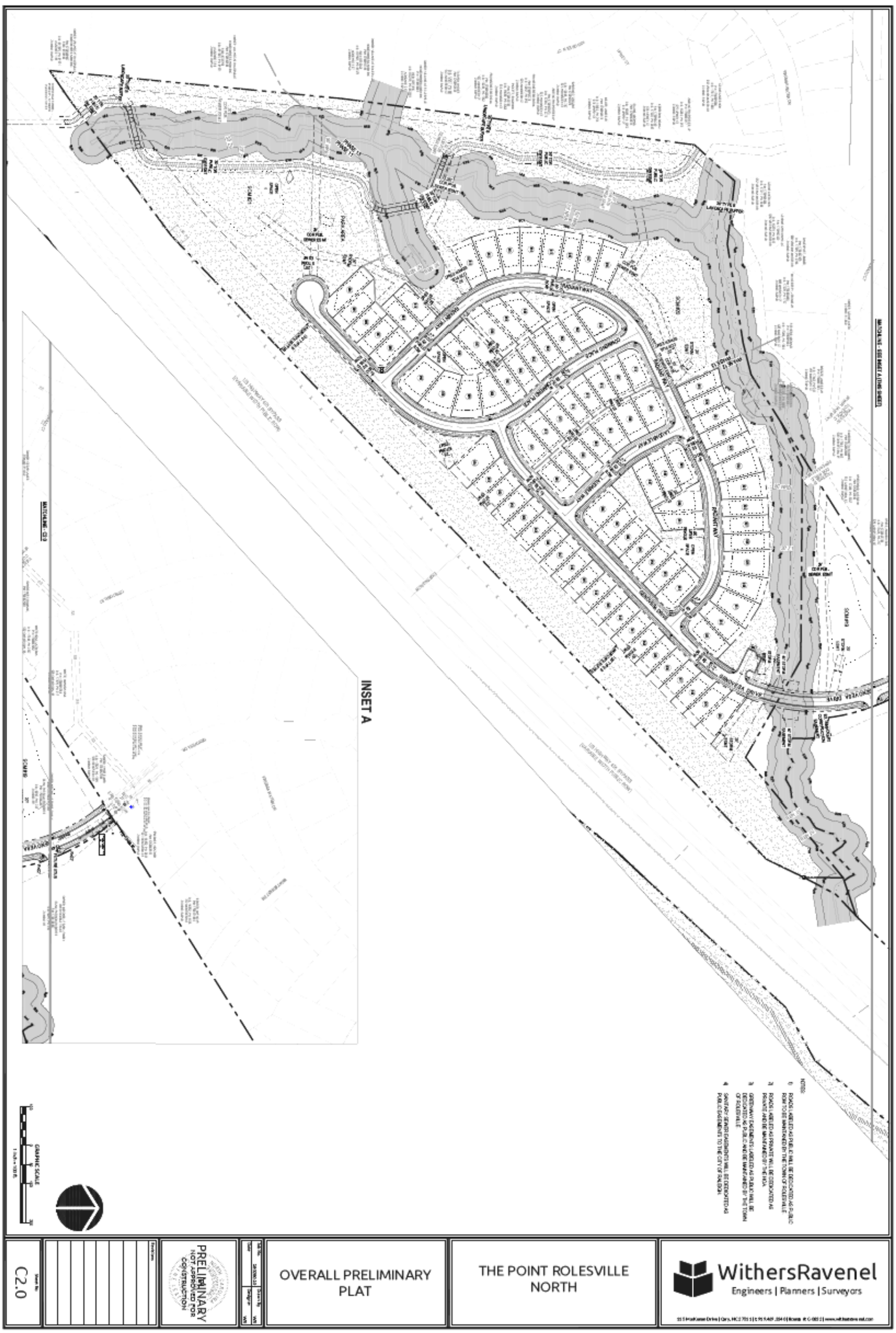
Appendix

Appendix A:

Figures 1-9

Kimley»Horn	THE POINT NORTH (YOUNG STREET PUD) ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	SITE LOCATION	FIGURE 1

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



Kimley»Horn

THE POINT NORTH
(YOUNG STREET PUD)
ROLESVILLE, NC
TRAFFIC IMPACT ANALYSIS

CONCEPTUAL SITE PLAN

FIGURE
2

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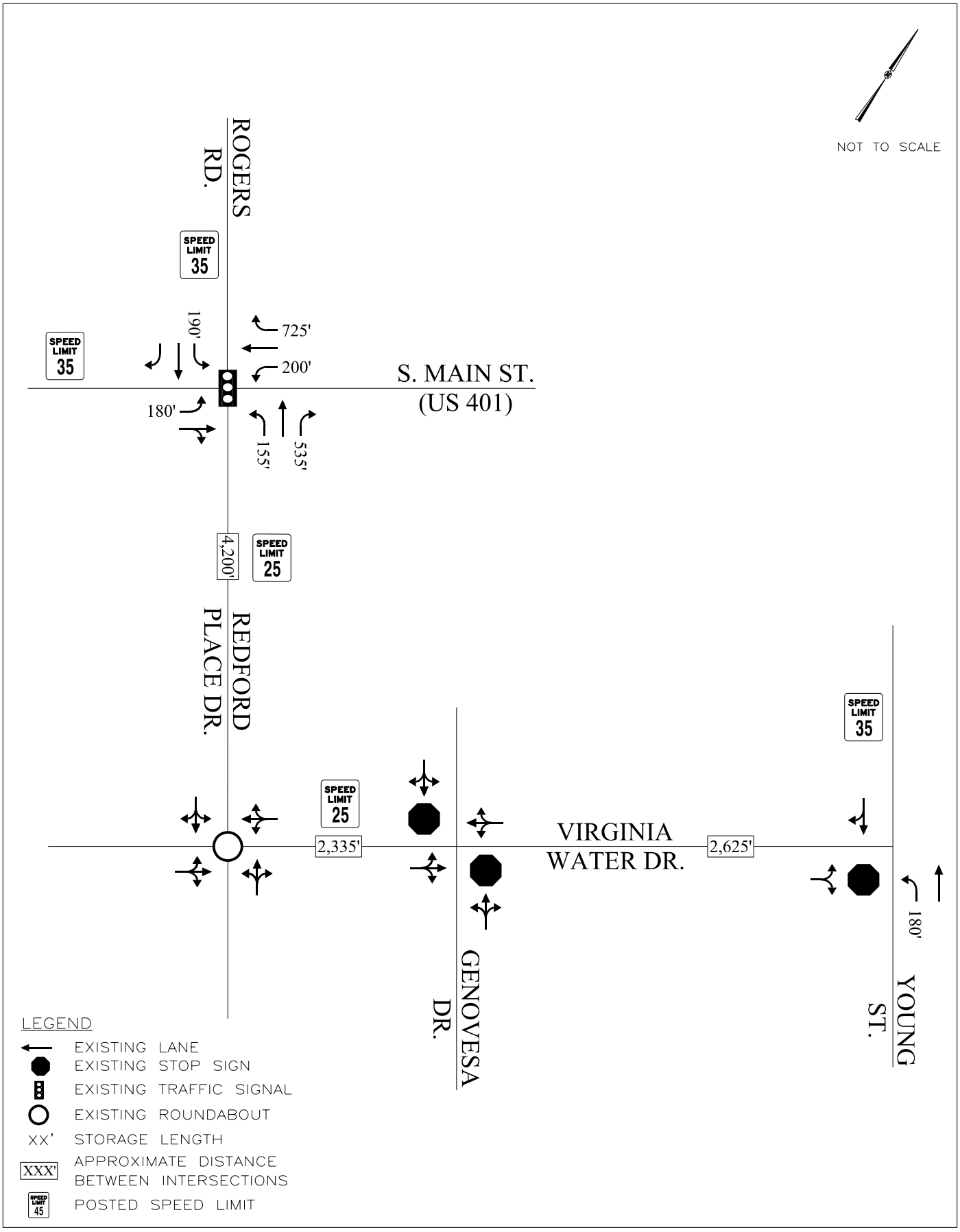

Kimley»Horn	THE POINT NORTH (YOUNG STREET PUD) ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	EXISTING ROADWAY LANEAGE	FIGURE 3

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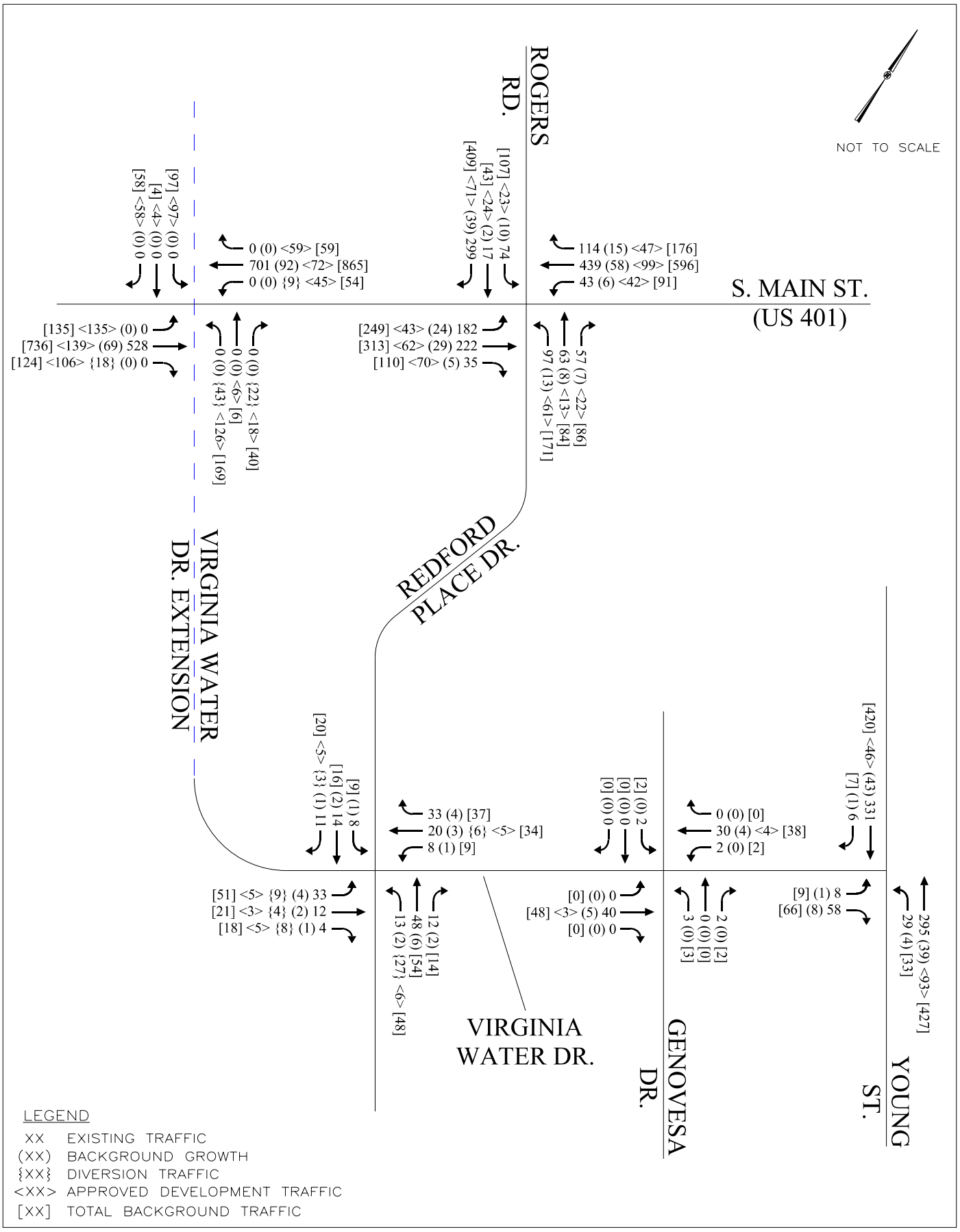

Kimley»Horn

THE POINT NORTH
(YOUNG STREET PUD)
ROLESVILLE, NC
TRAFFIC IMPACT ANALYSIS

EXISTING AND PROJECTED (2027)
BACKGROUND AM PEAK HOUR
TRAFFIC VOLUMES

FIGURE
4

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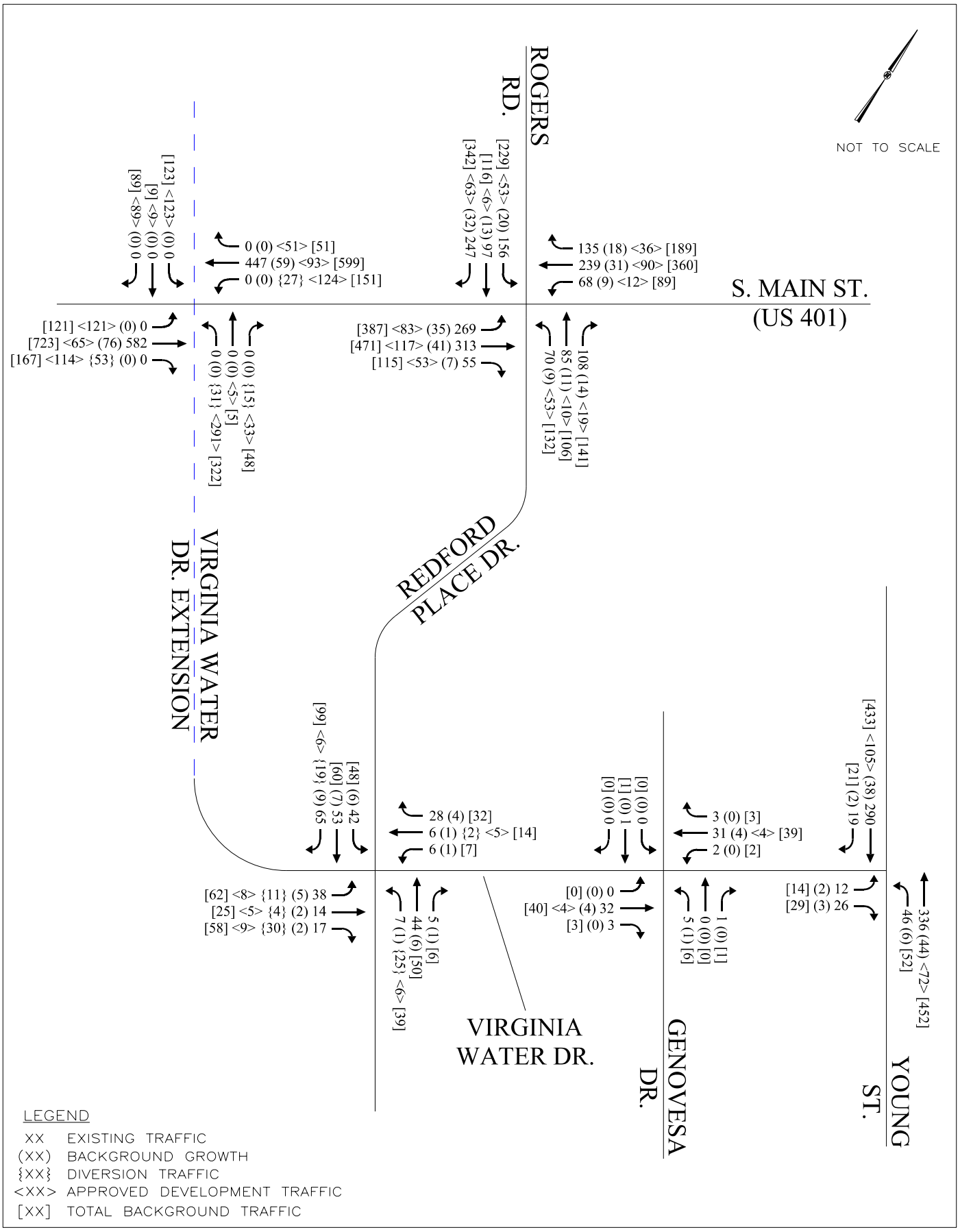

Kimley»Horn

THE POINT NORTH
(YOUNG STREET PUD)
ROLESVILLE, NC
TRAFFIC IMPACT ANALYSIS

EXISTING AND PROJECTED (2027)
BACKGROUND PM PEAK HOUR
TRAFFIC VOLUMES

FIGURE
5

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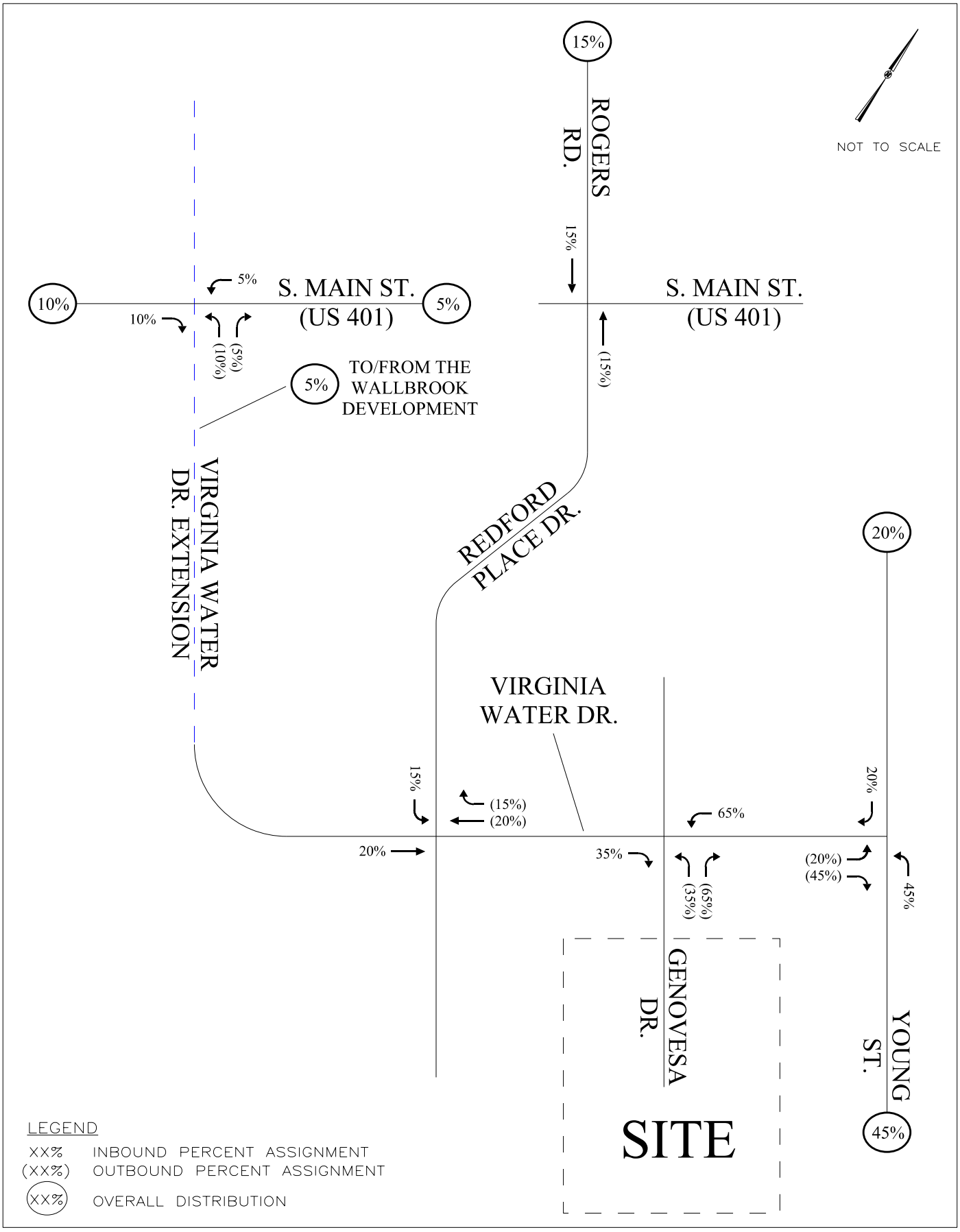

Kimley»Horn	THE POINT NORTH (YOUNG STREET PUD) ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	SITE TRAFFIC DISTRIBUTION AND PERCENT ASSIGNMENT	FIGURE 6

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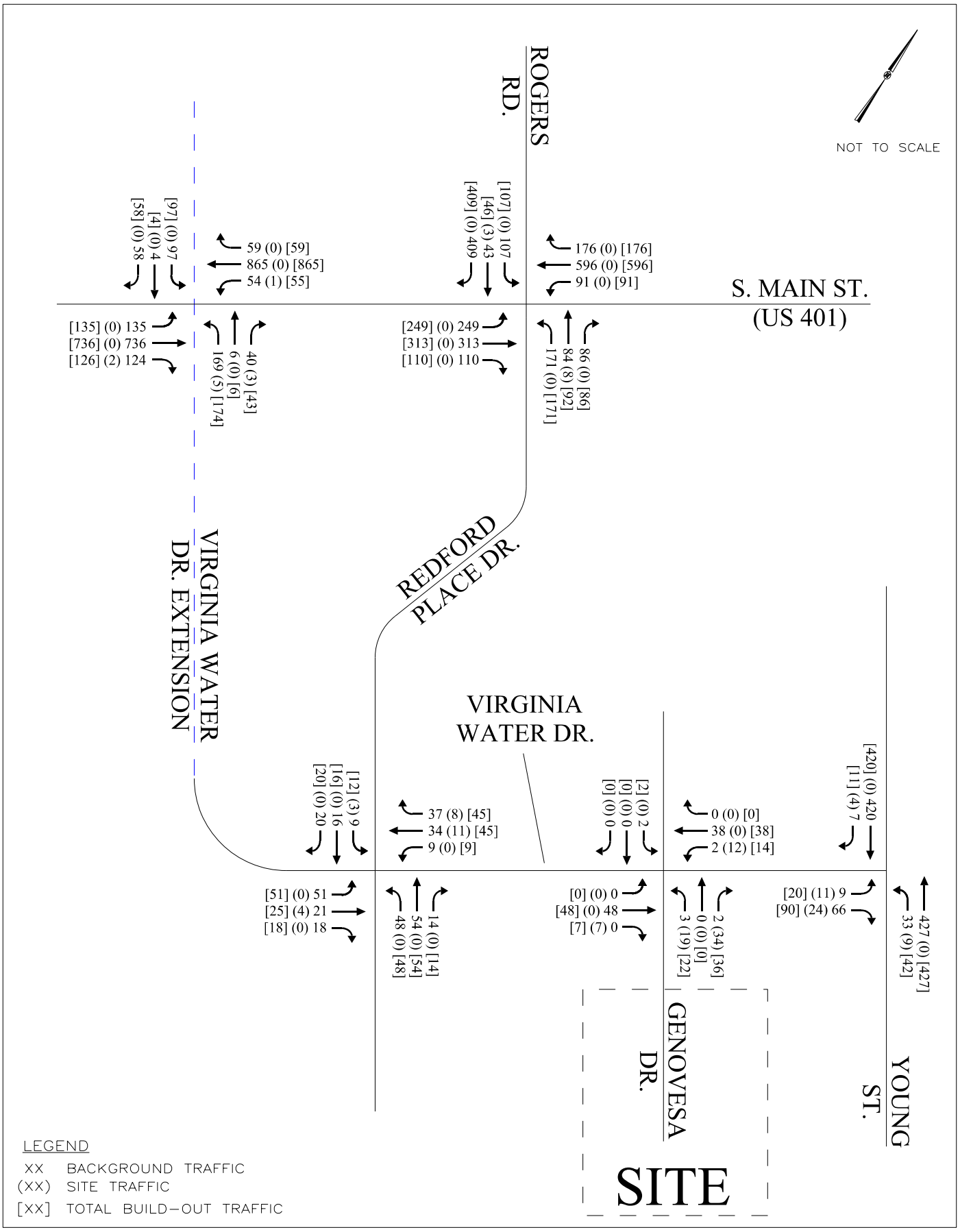
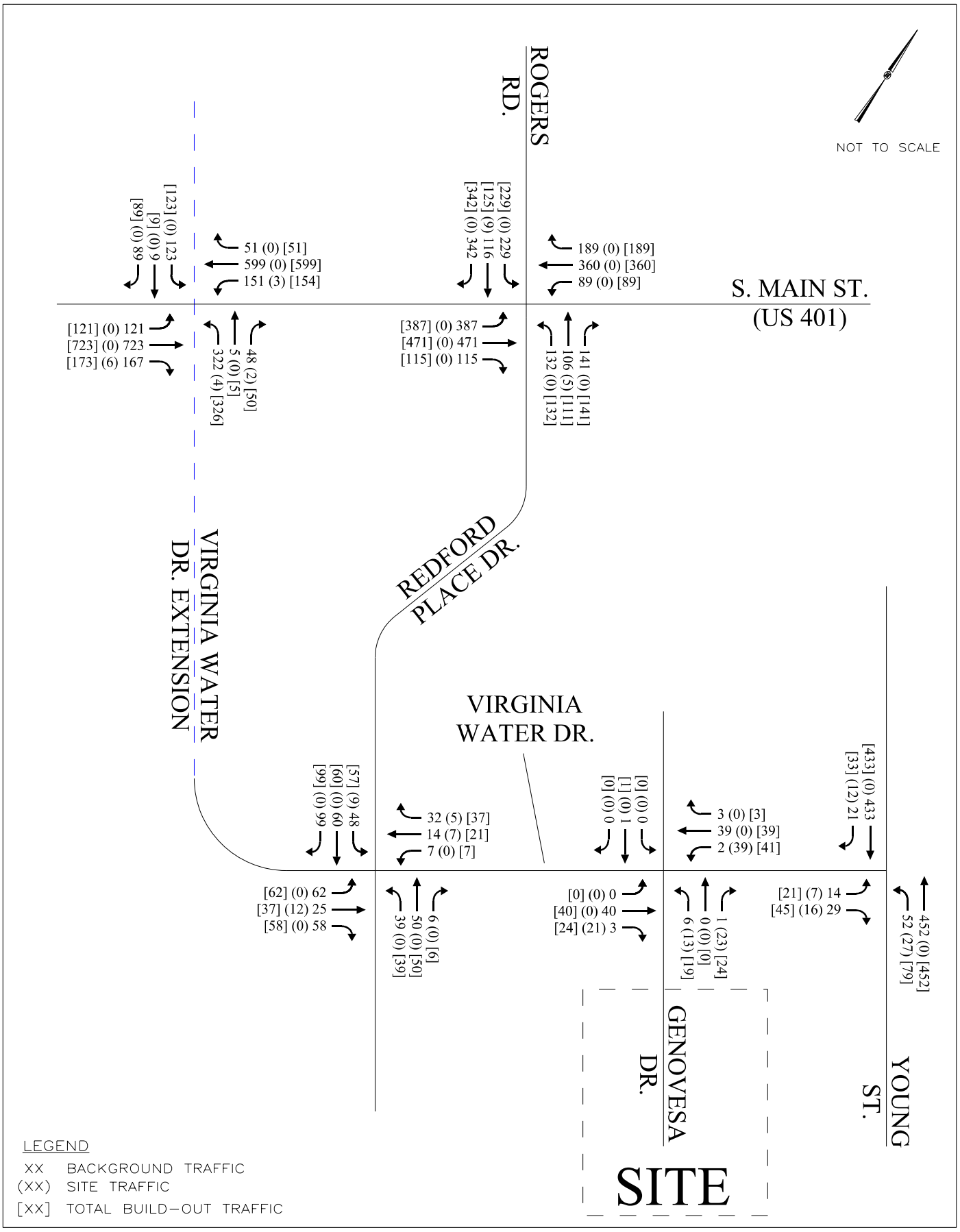


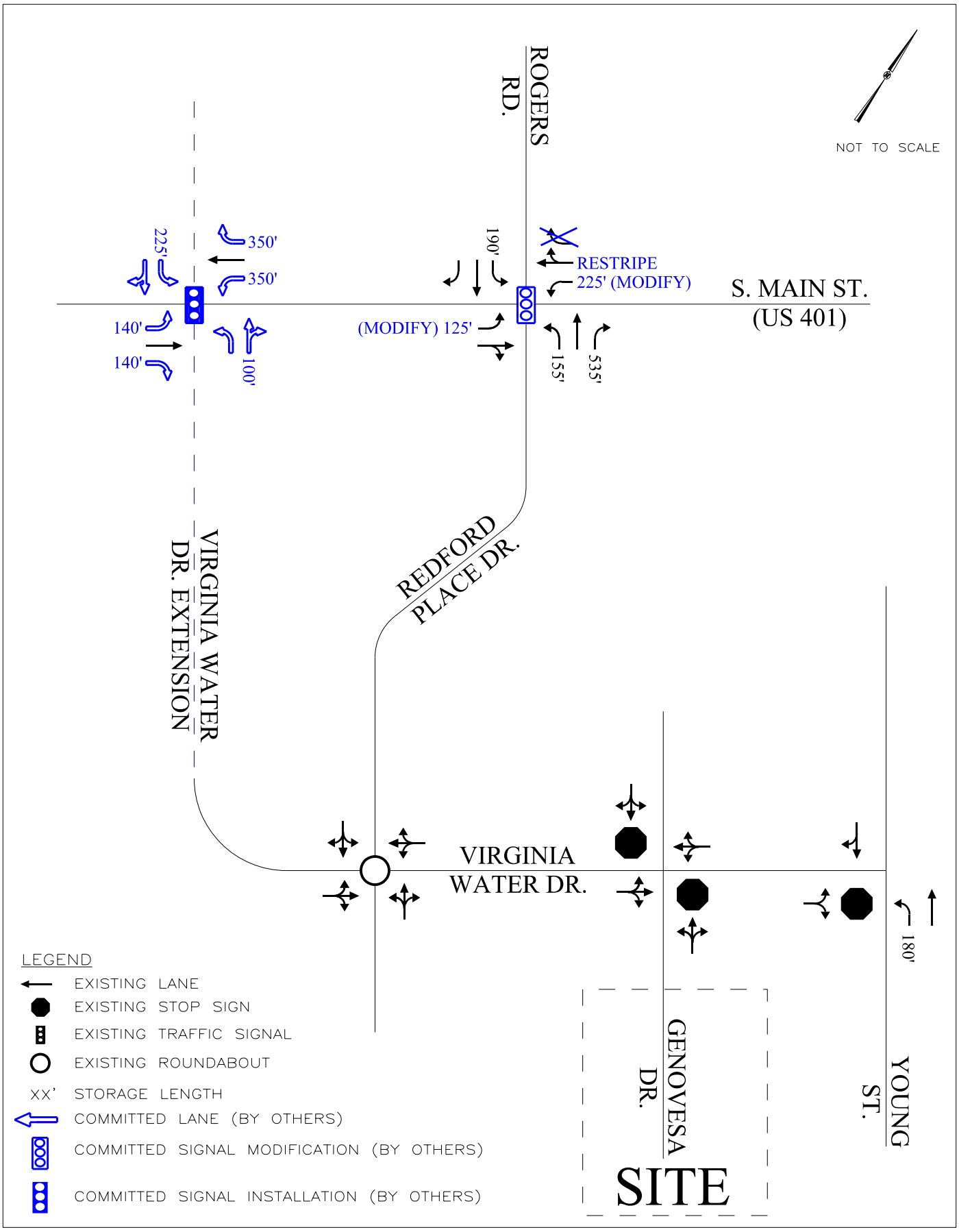
Kimley»Horn	THE POINT NORTH (YOUNG STREET PUD) ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	PROJECTED (2027) BUILD-OUT AM PEAK HOUR TRAFFIC VOLUMES	FIGURE 7

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



Kimley»Horn	THE POINT NORTH (YOUNG STREET PUD) ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	PROJECTED (2027) BUILD-OUT PM PEAK HOUR TRAFFIC VOLUMES	FIGURE 8

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



Kimley»Horn	THE POINT NORTH (YOUNG STREET PUD) ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	BUILD-OUT ROADWAY LANEAGE	FIGURE 9

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

Appendix B:
Study Assumptions Memorandum

Preliminary Analysis Assumptions
The Point North (Young Street PUD) – 2022 Traffic Impact Analysis
Rolesville, North Carolina

As required in the approved PUD, KHA will perform an analysis for the portion of The Point North located along Genovesa Drive between US 401 Bypass and Virginia Water Drive in Rolesville, North Carolina. As envisioned, this portion of development will include approximately 94 single-family homes and will be accessed via the extension of Genovesa Drive. The following assumptions will be used in this analysis based on a scoping call with Town of Rolesville staff on March 17, 2022:

Study Scenarios
The study scenarios will consist of:

- Existing (2022)
- Background (2027)
- Build-out (2027)

Study Intersections
The study area will consist of the following intersections:

- Young Street at Virginia Water Drive
- Virginia Water Drive at Genovesa Drive
- Virginia Water Drive at Redford Place Drive
- S Main Street (US 401) at Virginia Water Drive Extension (Wallbrook Access B) /Wallbrook Access K
- S Main Street (US 401) at Rogers Road/Redford Place Drive

Traffic Counts
Existing traffic counts will be collected in 15-minute intervals for the AM peak hour (6:00 to 9:00 AM) and PM peak hour (4:00 to 7:00 PM) at each of the existing study intersections.

Background Volume Development
Based on discussions with NCDOT and the Town of Rolesville, site traffic from the following approved developments will be included in the analysis as background traffic:

- The Point (South)
  - Will include site trips for the full build-out of the commercial and residential southern portion of the development as background traffic, not just portions that are currently approved
  - Site trips will be obtained from the *Young Street PUD Updated Traffic Impact Analysis – Northern Development* (Kimley-Horn, March 2020)
- Wallbrook Development
  - Multiuse project across multiple parcels along Virginia Water Drive Extension to Main Street
  - Will assume build-out of entire development, roadway extensions/realignments, and recommended improvements in each of the future traffic conditions
  - Site trips will be generated from the *Revised Wallbrook TIA* (Stantec, August 2020)
- Kalas Falls
  - 484 residential units northwest of Rolesville Road at Mitchell Mill Road
  - While the original *Kalas Property TIA* (Stantec, January 2016) assumed only 215 dwelling units, site traffic from the proposed 484 units will be generated and assigned to the network consistent with that study

As there are only a few dwelling units remaining in the Carlton Pointe development, that development will not be included specifically in the analysis.

While it is acknowledged that other projects in the area (Preserve at Moody Farm, the Tucker Williams Development, the Townes at Carlton Pointe, etc.) will add traffic to the study intersections, the impact of those projects is expected to be generally minimal and assumed to be accounted for in the annual growth rate described below.

Furthermore, as the study area Rolesville Crossing did not include any intersections north of the Rolesville Road – Fowler Road, that development will also be assumed to be accounted for in the annual growth rate described below and will not be specifically included.

In addition to approved development traffic, an annual growth rate of 2.5% will be applied to the existing traffic volumes up to the year 2027 to account for background traffic growth and other potential development in the area. No growth will be applied to volumes along Virginia Water Drive, Redford Place Drive, or Genovesa Drive as development along those roadways is either built-out or will be accounted for with approved development traffic volumes.

Background Volume Traffic Diversions

Consistent with the *Revised Wallbrook Development TIA*, it is assumed that traffic diversions will occur once the proposed extensions of Virginia Water Drive, Wall Creek Drive, and the Burlington Mills Road realignment/Bendemeer Lane Extension have been completed.

As it is assumed that the *Wallbrook Development TIA* accounted for traffic diversions, approved development traffic, and Wallbrook site traffic at that intersection, turns onto/off of Virginia Water Drive Extension (Wallbrook Access B)/Wallbrook Access K will be obtained from the Wallbrook TIA and used as background volumes, though through volumes along S. Main Street will be developed by applying the background growth rate discussed previously.

Site Traffic Distribution

The following distribution will be used for new site traffic:

- 45% to/from the south on Young Street
- 20% to/from the north on Young Street
- 15% to/from the north on Rogers Road
- 10% to/from the southwest on S. Main Street (via Virginia Water Drive Extension)
- 5% to/from the northeast on S. Main Street (via Virginia Water Drive Extension)
- 5% to/from the Wallbrook Development

Trip Generation

Trip generation for the site will be performed using the 11th Edition of the ITE Trip Generation Manual. Trip generation calculations are attached.

Other Study Assumptions

Existing peak hour factors (PHF's) will be used at existing intersections. Right-turns on Red (RTOR) and permitted+protected left-turn phasing will be permitted in the analysis where currently allowed.

The Point North

Table 1 - Trip Generation

Land Use	Intensity	Daily	AM Peak Hour			PM Peak Hour		
		Total	Total	In	Out	Total	In	Out
210 Single Family Detached Housing	94 d.u.	954	70	18	52	94	59	35

Appendix C:
Turning Movement Count Data

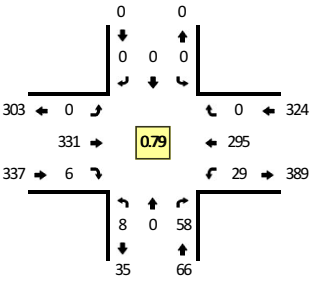
Type of peak hour being reported: Intersection Peak

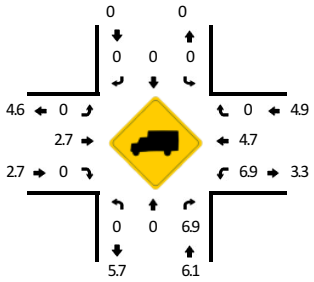
Method for determining peak hour: Total Entering Volume

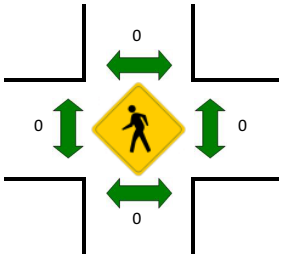
LOCATION: Virginia Water Dr -- E Young St
CITY/STATE: Rolesville, NC

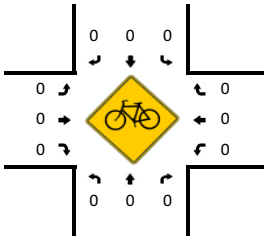
QC JOB #: 15748801
DATE: Thu, Mar 24 2022

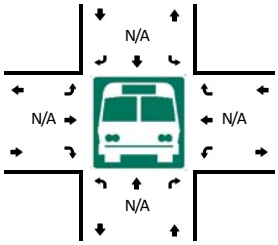
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

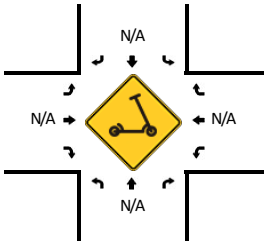












15-Min Count Period Beginning At	Virginia Water Dr (Northbound)				Virginia Water Dr (Southbound)				E Young St (Eastbound)				E Young St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	38	0	0	0	0	0	0	114	1	0	10	64	0	0	229	
7:15 AM	1	0	10	0	0	0	0	0	0	76	1	0	7	69	0	0	164	
7:30 AM	3	0	5	0	0	0	0	0	0	65	3	0	6	84	0	0	166	
7:45 AM	2	0	5	0	0	0	0	0	0	76	1	0	6	78	0	0	168	727
8:00 AM	4	0	6	0	0	0	0	0	0	65	2	0	6	57	0	0	140	638
8:15 AM	0	0	7	0	0	0	0	0	0	62	2	0	2	73	0	0	146	620
8:30 AM	2	0	9	0	0	0	0	0	0	53	1	0	3	51	0	0	119	573
8:45 AM	1	0	10	0	0	0	0	0	0	61	2	0	3	48	0	0	125	530

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	0	152	0	0	0	0	0	0	456	4	0	40	256	0	0	916
Heavy Trucks	0	0	12		0	0	0		0	20	0		4	16	0		52
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

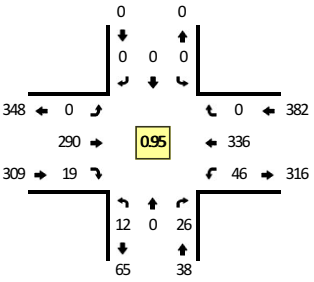
Type of peak hour being reported: Intersection Peak

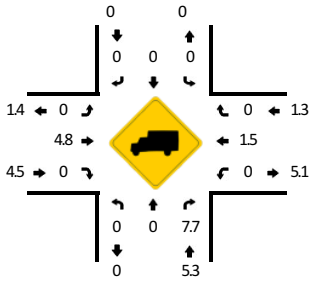
Method for determining peak hour: Total Entering Volume

LOCATION: Virginia Water Dr -- E Young St
CITY/STATE: Rolesville, NC

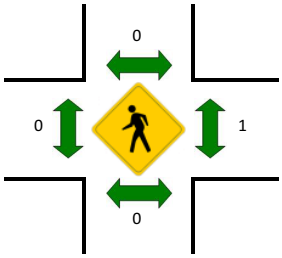
QC JOB #: 15748802
DATE: Thu, Mar 24 2022

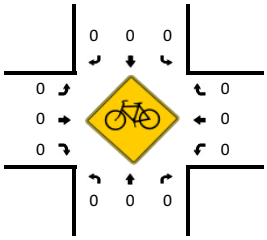
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

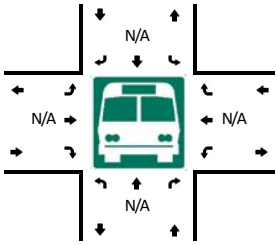


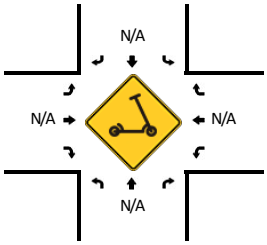


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Virginia Water Dr (Northbound)				Virginia Water Dr (Southbound)				E Young St (Eastbound)				E Young St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	0	6	0	0	0	0	0	0	78	2	0	7	72	0	0	170	
4:15 PM	2	0	8	0	0	0	0	0	0	81	3	0	9	66	0	0	169	
4:30 PM	4	0	6	0	0	0	0	0	0	64	3	0	12	80	0	0	169	
4:45 PM	1	0	9	0	0	0	0	0	0	83	5	0	7	77	0	0	182	690
5:00 PM	3	0	5	0	0	0	0	0	0	67	7	0	13	91	0	0	186	706
5:15 PM	4	0	6	0	0	0	0	0	0	76	4	0	14	88	0	0	192	729
5:30 PM	3	0	5	0	0	0	0	0	0	75	3	0	1	82	0	0	169	729
5:45 PM	3	0	5	0	0	0	0	0	0	58	7	0	5	77	0	0	155	702

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	0	24	0	0	0	0	0	0	304	16	0	56	352	0	0	768
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	12	0		24
Buses																	
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

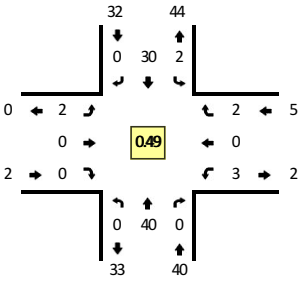
Type of peak hour being reported: Intersection Peak

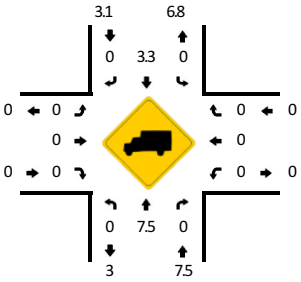
Method for determining peak hour: Total Entering Volume

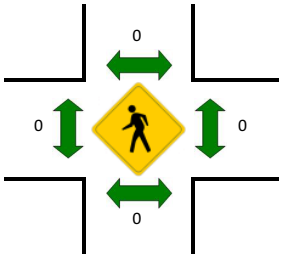
LOCATION: Virginia Water Dr -- Genovesa Dr
CITY/STATE: Rolesville, NC

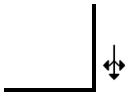
QC JOB #: 15748803
DATE: Thu, Mar 24 2022

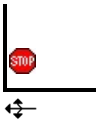
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

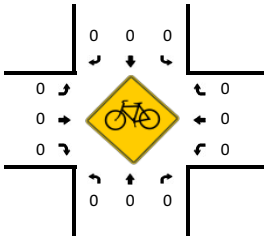


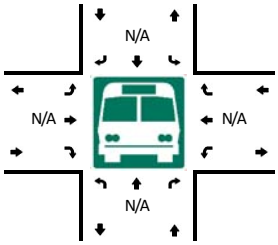


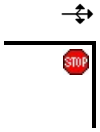


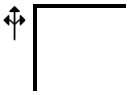


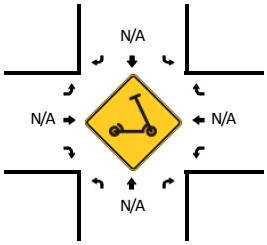












15-Min Count Period Beginning At	Virginia Water Dr (Northbound)				Virginia Water Dr (Southbound)				Genovesa Dr (Eastbound)				Genovesa Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	26	0	0	1	10	0	0	1	0	0	0	1	0	1	0	40	
7:15 AM	0	5	0	0	0	5	0	0	1	0	0	0	1	0	1	0	13	
7:30 AM	0	2	0	0	0	10	0	0	0	0	0	0	0	0	0	0	12	
7:45 AM	0	7	0	0	1	5	0	0	0	0	0	0	1	0	0	0	14	79
8:00 AM	0	4	1	0	0	4	0	0	1	0	0	0	1	0	0	0	11	50
8:15 AM	0	8	1	0	1	4	0	0	0	0	1	0	0	0	2	0	17	54
8:30 AM	1	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	7	49
8:45 AM	0	11	0	0	1	9	0	0	0	0	0	0	1	0	1	0	23	58

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	104	0	0	4	40	0	0	4	0	0	0	4	0	4	0	160
Heavy Trucks	0	8	0		0	0	0		0	0	0		0	0	0		8
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

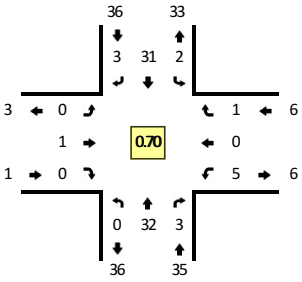
Type of peak hour being reported: Intersection Peak

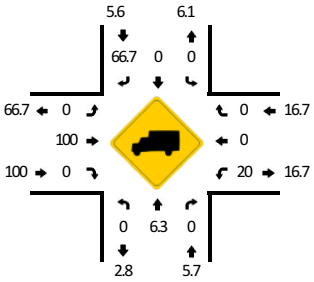
Method for determining peak hour: Total Entering Volume

LOCATION: Virginia Water Dr -- Genovesa Dr
CITY/STATE: Rolesville, NC

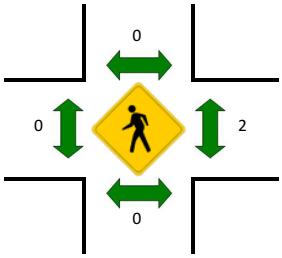
QC JOB #: 15748804
DATE: Thu, Mar 24 2022

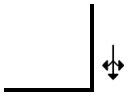
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

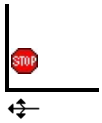


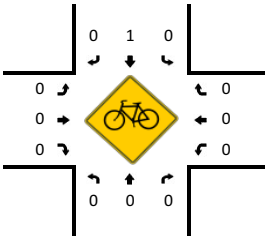


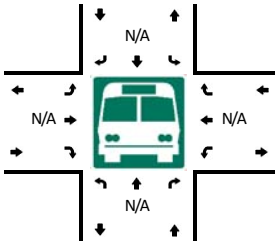
Quality Counts
DATA THAT DRIVES COMMUNITIES

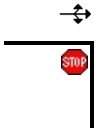


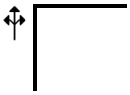


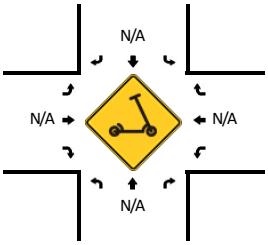












15-Min Count Period Beginning At	Virginia Water Dr (Northbound)				Virginia Water Dr (Southbound)				Genovesa Dr (Eastbound)				Genovesa Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	15	1	0	0	8	2	0	0	1	0	0	1	0	0	0	28	
4:15 PM	0	7	0	0	1	9	0	0	0	0	0	0	3	0	1	0	21	
4:30 PM	0	6	1	0	1	7	1	0	0	0	0	0	0	0	0	0	16	
4:45 PM	0	4	1	0	0	7	0	0	0	0	0	0	1	0	0	0	13	78
5:00 PM	1	11	1	0	0	9	1	0	0	0	1	0	0	0	1	0	25	75
5:15 PM	1	6	0	1	0	13	1	0	1	0	0	0	0	0	0	0	23	77
5:30 PM	0	3	0	0	1	4	0	0	1	0	0	0	0	0	0	0	9	70
5:45 PM	1	4	0	0	0	4	0	0	0	0	0	0	0	0	1	0	10	67

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	60	4	0	0	32	8	0	0	4	0	0	4	0	0	0	112
Heavy Trucks	0	0	0		0	0	8		0	4	0		4	0	0		16
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

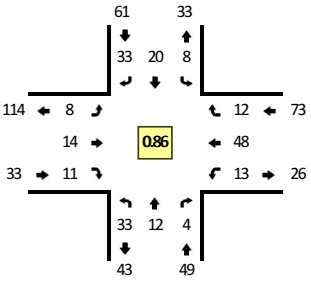
Type of peak hour being reported: Intersection Peak

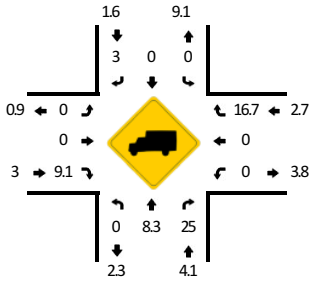
Method for determining peak hour: Total Entering Volume

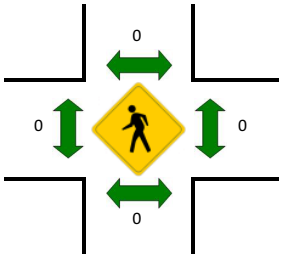
LOCATION: Virginia Water Dr -- Redford Pl Dr
CITY/STATE: Rolesville, NC

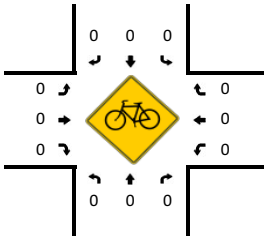
QC JOB #: 15748805
DATE: Thu, Mar 24 2022

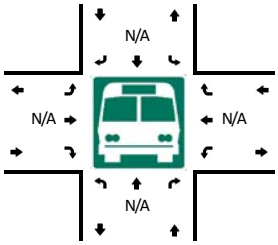
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

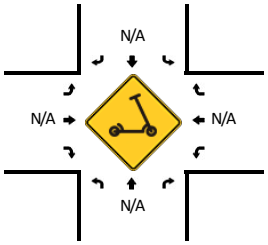












15-Min Count Period Beginning At	Virginia Water Dr (Northbound)				Virginia Water Dr (Southbound)				Redford Pl Dr (Eastbound)				Redford Pl Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	6	2	0	5	5	10	0	2	2	1	0	5	10	9	1	63	
7:15 AM	5	3	0	0	0	8	7	1	0	2	3	0	1	10	2	0	42	
7:30 AM	7	1	1	0	2	4	9	0	3	5	2	0	3	13	1	0	51	
7:45 AM	16	2	1	0	0	3	7	0	3	5	5	0	3	15	0	0	60	216
8:00 AM	15	1	1	0	0	2	4	0	6	5	11	0	3	6	0	0	54	207
8:15 AM	2	1	1	0	0	3	1	0	4	4	6	0	1	5	0	0	28	193
8:30 AM	11	0	1	0	1	0	10	0	2	4	5	0	3	8	1	0	46	188
8:45 AM	14	1	3	0	1	5	13	0	8	8	7	0	3	13	3	0	79	207

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	24	8	0	20	20	40	0	8	8	4	0	20	40	36	4	252
Heavy Trucks	0	4	4		0	0	0		0	0	0		0	0	4		12
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

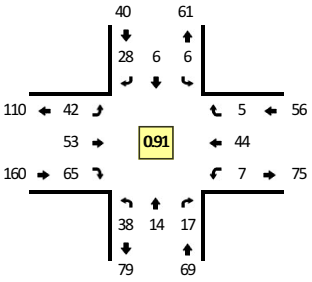
Type of peak hour being reported: Intersection Peak

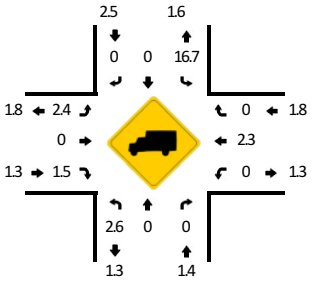
Method for determining peak hour: Total Entering Volume

LOCATION: Virginia Water Dr -- Redford Pl Dr
CITY/STATE: Rolesville, NC

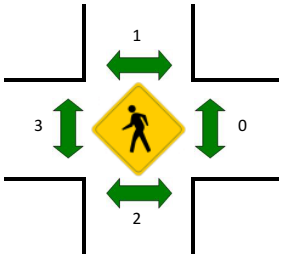
QC JOB #: 15748806
DATE: Thu, Mar 24 2022

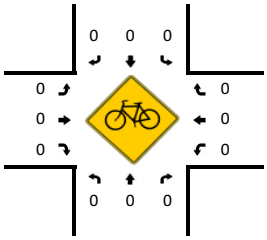
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

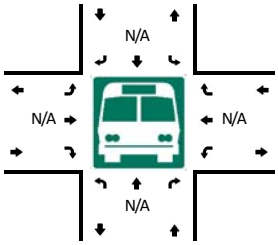


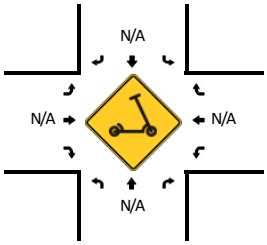


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Virginia Water Dr (Northbound)				Virginia Water Dr (Southbound)				Redford Pl Dr (Eastbound)				Redford Pl Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	13	3	5	0	0	3	11	0	13	13	18	0	3	6	1	0	89	
4:15 PM	10	3	3	0	1	2	7	0	7	3	8	0	1	7	2	0	54	
4:30 PM	9	3	4	0	2	2	1	0	3	7	13	0	1	6	2	0	53	
4:45 PM	11	2	7	0	3	1	6	0	2	16	14	0	0	11	2	0	75	271
5:00 PM	7	6	4	0	1	1	4	0	14	13	13	0	1	9	2	0	75	257
5:15 PM	7	0	8	0	4	4	11	1	7	9	20	0	2	14	2	0	89	292
5:30 PM	11	3	2	0	0	1	6	0	10	14	19	0	2	6	1	0	75	314
5:45 PM	12	5	3	1	0	0	7	0	10	17	13	1	2	15	0	0	86	325

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	0	32	0	16	16	44	4	28	36	80	0	8	56	8	0	356
Heavy Trucks	0	0	0		4	0	0		0	0	0		0	0	0		4
Buses																	
Pedestrians		8				0				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

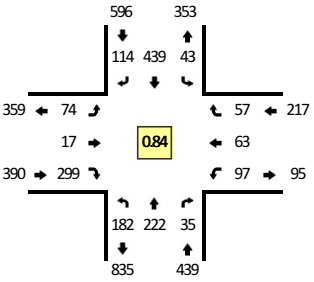
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

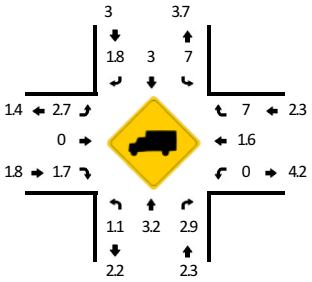
LOCATION: S Main St -- Rogers Rd/Redford Pl Dr
CITY/STATE: Rolesville, NC

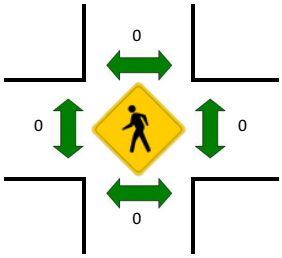
QC JOB #: 15748807
DATE: Thu, Mar 24 2022

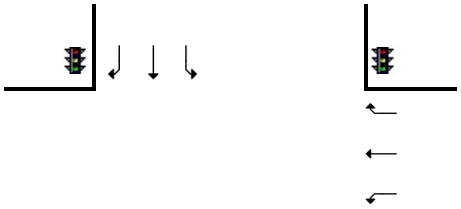
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

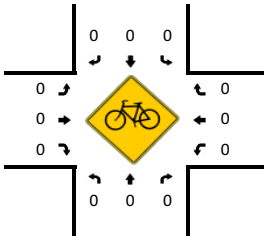


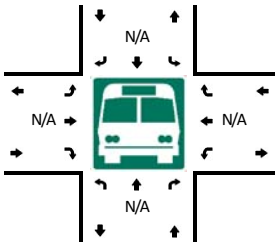
Quality Counts
DATA THAT DRIVES COMMUNITIES

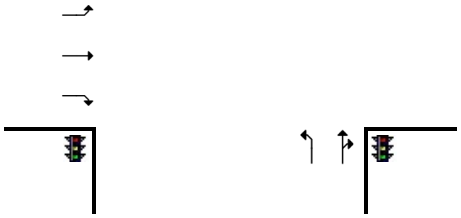


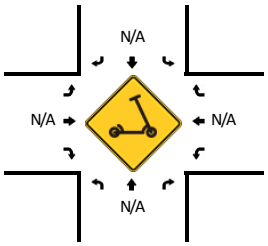












15-Min Count Period Beginning At	S Main St (Northbound)				S Main St (Southbound)				Rogers Rd/Redford Pl Dr (Eastbound)				Rogers Rd/Redford Pl Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	21	33	2	0	9	113	26	0	28	2	83	0	15	11	11	0	354	
7:15 AM	25	29	4	0	7	123	31	0	18	5	76	0	21	6	13	0	358	
7:30 AM	29	52	6	0	14	116	25	0	15	3	88	0	24	14	8	0	394	
7:45 AM	70	72	8	0	13	116	38	0	20	5	69	0	33	23	19	0	486	1592
8:00 AM	58	69	17	0	9	84	20	0	21	4	66	0	19	20	17	0	404	1642
8:15 AM	53	63	3	0	14	79	29	0	16	13	49	0	8	9	8	0	344	1628
8:30 AM	45	74	8	0	14	70	28	0	21	8	51	0	12	16	24	0	371	1605
8:45 AM	43	79	6	0	16	73	24	0	26	18	53	0	54	48	48	0	488	1607

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	280	288	32	0	52	464	152	0	80	20	276	0	132	92	76	0	1944
Heavy Trucks	0	4	0		4	12	0		4	0	12		0	0	8		44
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

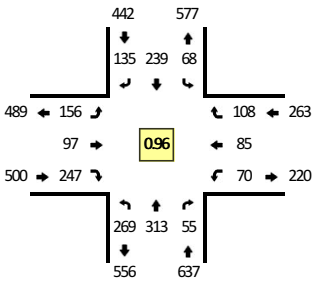
Type of peak hour being reported: Intersection Peak

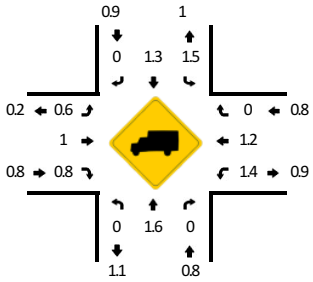
Method for determining peak hour: Total Entering Volume

LOCATION: S Main St -- Rogers Rd/Redford Pl Dr
CITY/STATE: Rolesville, NC

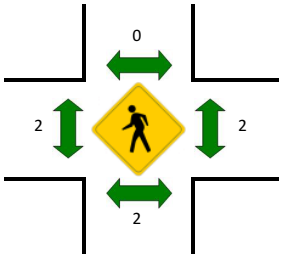
QC JOB #: 15748808
DATE: Thu, Mar 24 2022

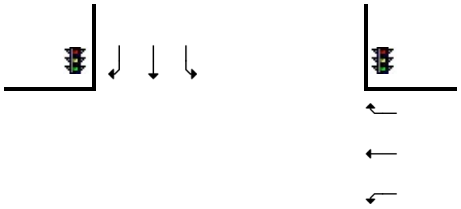
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

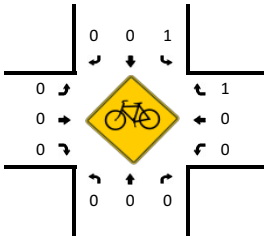


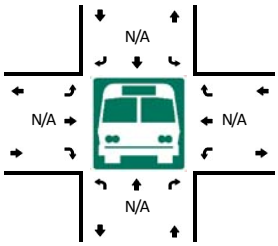


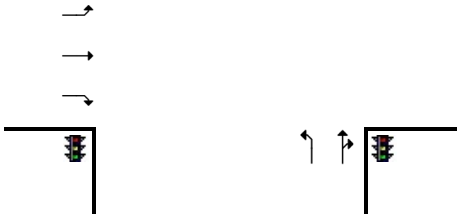
Quality Counts
DATA THAT DRIVES COMMUNITIES

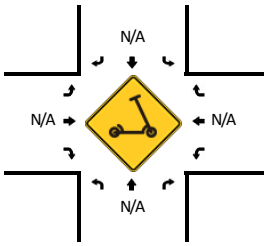












15-Min Count Period Beginning At	S Main St (Northbound)				S Main St (Southbound)				Rogers Rd/Redford Pl Dr (Eastbound)				Rogers Rd/Redford Pl Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	57	83	11	1	19	44	40	0	42	12	59	0	35	26	45	0	474	
4:15 PM	65	79	9	0	10	46	38	0	47	19	48	0	11	25	28	0	425	
4:30 PM	52	69	13	0	19	64	37	0	31	18	44	0	11	19	29	0	406	
4:45 PM	53	79	16	0	23	60	42	0	39	19	61	0	18	20	31	0	461	1766
5:00 PM	75	91	14	0	15	67	27	0	34	22	58	0	24	24	28	0	479	1771
5:15 PM	71	66	11	0	14	60	30	0	47	27	67	0	13	20	28	0	454	1800
5:30 PM	70	77	14	0	16	52	36	0	36	29	61	0	15	21	21	0	448	1842
5:45 PM	81	83	19	0	21	56	31	0	32	32	35	0	19	27	18	0	454	1835

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	300	364	56	0	60	268	108	0	136	88	232	0	96	96	112	0	1916
Heavy Trucks	0	4	0		0	8	0		0	4	0		4	0	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

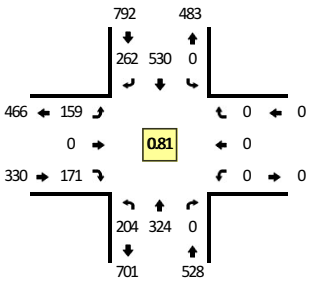
Type of peak hour being reported: Intersection Peak

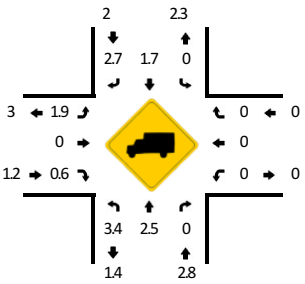
Method for determining peak hour: Total Entering Volume

LOCATION: S Main St -- Burlington Mills Rd
CITY/STATE: Rolesville, NC

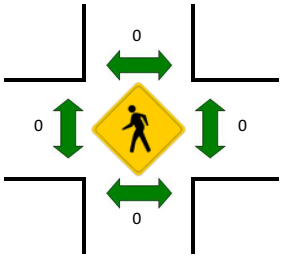
QC JOB #: 15748809
DATE: Thu, Mar 24 2022

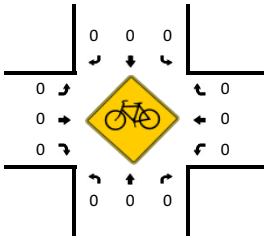
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

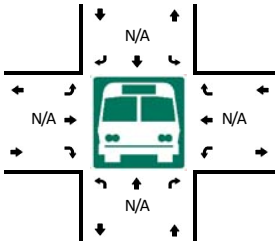


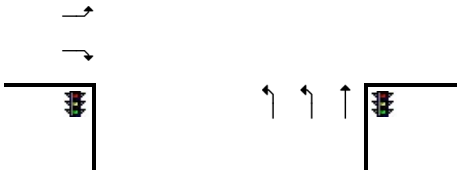


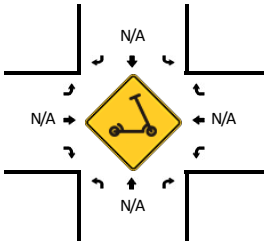
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	S Main St (Northbound)				S Main St (Southbound)				Burlington Mills Rd (Eastbound)				Burlington Mills Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	15	39	0	0	0	161	29	0	20	0	19	0	0	0	0	0	283	
7:15 AM	16	38	0	0	0	169	42	0	19	0	10	0	0	0	0	0	294	
7:30 AM	38	89	0	0	0	163	60	0	15	0	39	0	0	0	0	0	404	
7:45 AM	77	100	0	0	0	100	97	0	66	0	70	0	0	0	0	0	510	1491
8:00 AM	73	97	0	0	0	98	63	0	59	0	52	0	0	0	0	0	442	1650
8:15 AM	12	79	0	0	0	88	30	0	36	0	22	0	0	0	0	0	267	1623
8:30 AM	11	76	0	0	0	99	31	0	52	0	11	0	0	0	0	0	280	1499
8:45 AM	14	85	0	0	0	107	48	0	41	0	12	0	0	0	0	0	307	1296

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	308	400	0	0	0	400	388	0	264	0	280	0	0	0	0	0	2040
Heavy Trucks	16	4	0		0	8	16		4	0	0		0	0	0		48
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

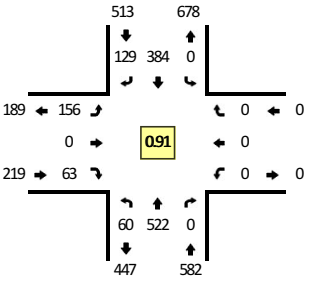
Type of peak hour being reported: Intersection Peak

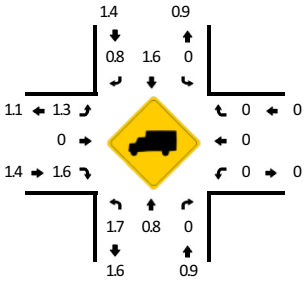
Method for determining peak hour: Total Entering Volume

LOCATION: S Main St -- Burlington Mills Rd
CITY/STATE: Rolesville, NC

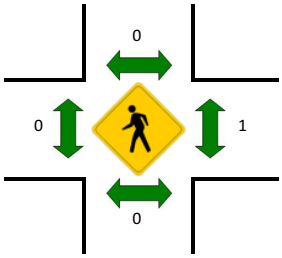
QC JOB #: 15748810
DATE: Thu, Mar 24 2022

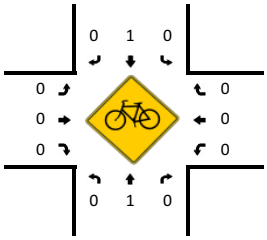
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

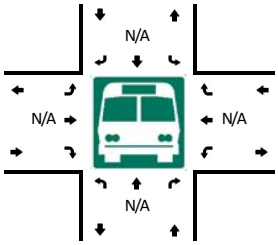


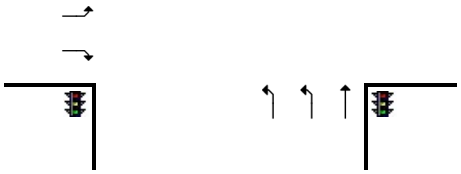


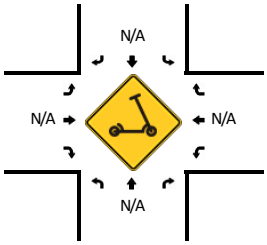
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	S Main St (Northbound)				S Main St (Southbound)				Burlington Mills Rd (Eastbound)				Burlington Mills Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	127	0	0	0	105	39	0	29	0	17	0	0	0	0	0	324	
4:15 PM	11	123	0	0	0	84	26	0	29	0	18	0	0	0	0	0	291	
4:30 PM	13	115	0	0	0	63	31	0	27	0	11	0	0	0	0	0	260	
4:45 PM	21	115	0	0	0	86	39	0	50	0	16	0	0	0	0	0	327	1202
5:00 PM	20	137	0	0	0	107	38	0	42	0	17	0	0	0	0	0	361	1239
5:15 PM	13	132	0	0	0	94	26	0	25	0	13	0	0	0	0	0	303	1251
5:30 PM	6	138	0	0	0	97	26	0	39	0	17	0	0	0	0	0	323	1314
5:45 PM	10	118	0	0	0	64	28	0	29	0	18	0	0	0	0	0	267	1254

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	80	548	0	0	0	428	152	0	168	0	68	0	0	0	0	0	1444
Heavy Trucks	0	0	0		0	4	4		0	0	4		0	0	0		12
Buses																	
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	4	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 3/30/2022 8:51 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix D:
Approved Development Data

Kalas Falls

Table 1 - Trip Generation

Land Use	Intensity	Daily	AM Peak Hour			PM Peak Hour		
		Total	Total	In	Out	Total	In	Out
210 Single Family Detached Housing	484 d.u.	4,306	313	81	232	438	276	162

INTERSECTION ANALYSIS SHEET

			AM In	AM Out	PM In	PM Out
Project:	**Kalas Falls**	**North Side Net New Trips:**	81	232	276	162
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**Approved Development Data**					
N/S Street:	**Young Street**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**Virginia Water Drive**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

	Virginia Water Drive						Young Street			Young Street		
	Eastbound			**Westbound**			**Northbound**			**Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	8	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	23	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**23**	**0**	**0**	**8**	**0**

PM PEAK HOUR
PM PHF =

	Virginia Water Drive						Young Street			Young Street		
	Eastbound			**Westbound**			**Northbound**			**Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10.00%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	28	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	10.00%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	16	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**28**	**0**

Overall Percent Impact 24.9%

INTERSECTION ANALYSIS SHEET

			AM In	AM Out	PM In	PM Out
Project:	**Kalas Falls**	**North Side Net New Trips:**	81	232	276	162
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**Approved Development Data**					
N/S Street:	**Genovesa Drive**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**Virginia Water Drive**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Genovesa Drive **Northbound**			Genovesa Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PM PEAK HOUR
PM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Genovesa Drive **Northbound**			Genovesa Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Overall Percent Impact 0.0%

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INTERSECTION ANALYSIS SHEET

			AM In	AM Out	PM In	PM Out
Project:	**Kalas Falls**	**North Side Net New Trips:**	81	232	276	162
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**Approved Development Data**					
N/S Street:	**Redford Place Drive**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**Virginia Water Drive**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Redford Place Drive **Northbound**			Redford Place Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PM PEAK HOUR
PM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Redford Place Drive **Northbound**			Redford Place Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Overall Percent Impact 0.0%

INTERSECTION ANALYSIS SHEET

			AM In	AM Out	PM In	PM Out
Project:	**Kalas Falls**	**North Side Net New Trips:**	81	232	276	162
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**Approved Development Data**					
N/S Street:	**Rogers Road/Redford Place Drive**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**S. Main Street (US 401)**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Redford Place Drive **Northbound**			Rogers Road **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	4	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	12	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**4**	**0**	**0**

PM PEAK HOUR
PM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Redford Place Drive **Northbound**			Rogers Road **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	5.00%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	14	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	5.00%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	8	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**14**	**0**	**0**

Overall Percent Impact 14.2%

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INTERSECTION ANALYSIS SHEET

			AM In	AM Out	PM In	PM Out
Project:	**Kalas Falls**	**North Side Net New Trips:**	81	232	276	162
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**Approved Development Data**					
N/S Street:	**Wallbrook Acces B (Virginia Water Ext)/Access K**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**S. Main Street (US 401)**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Wallbrook Access B (Vir. Water Ext) **Northbound**			Wallbrook Access K **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

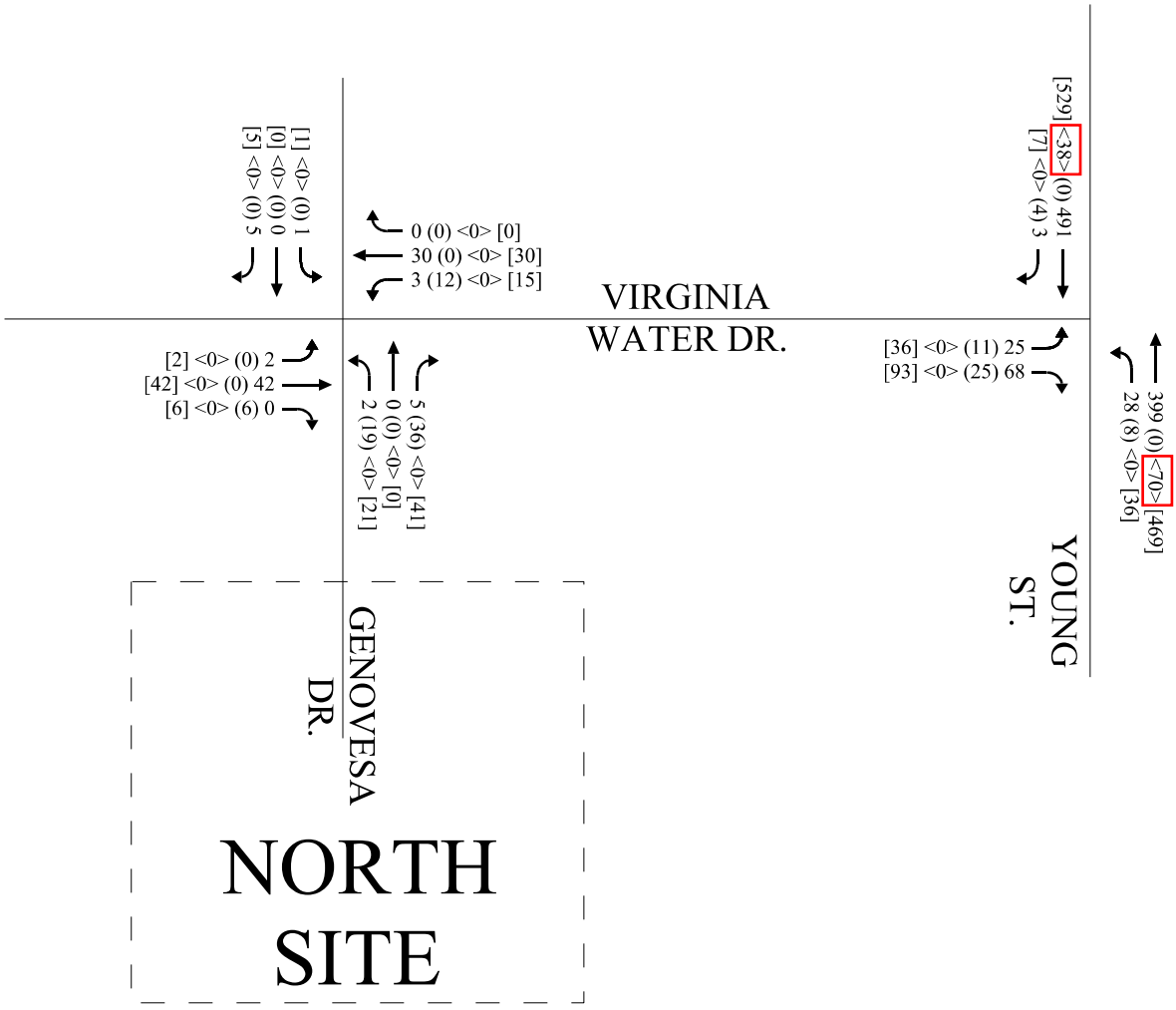
PM PEAK HOUR
PM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Wallbrook Access B (Vir. Water Ext) **Northbound**			Wallbrook Access K **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Overall Percent Impact 0.0%

Previous Point North Update
(Kimley-Horn, March 2020)

NOT TO SCALE



LEGEND

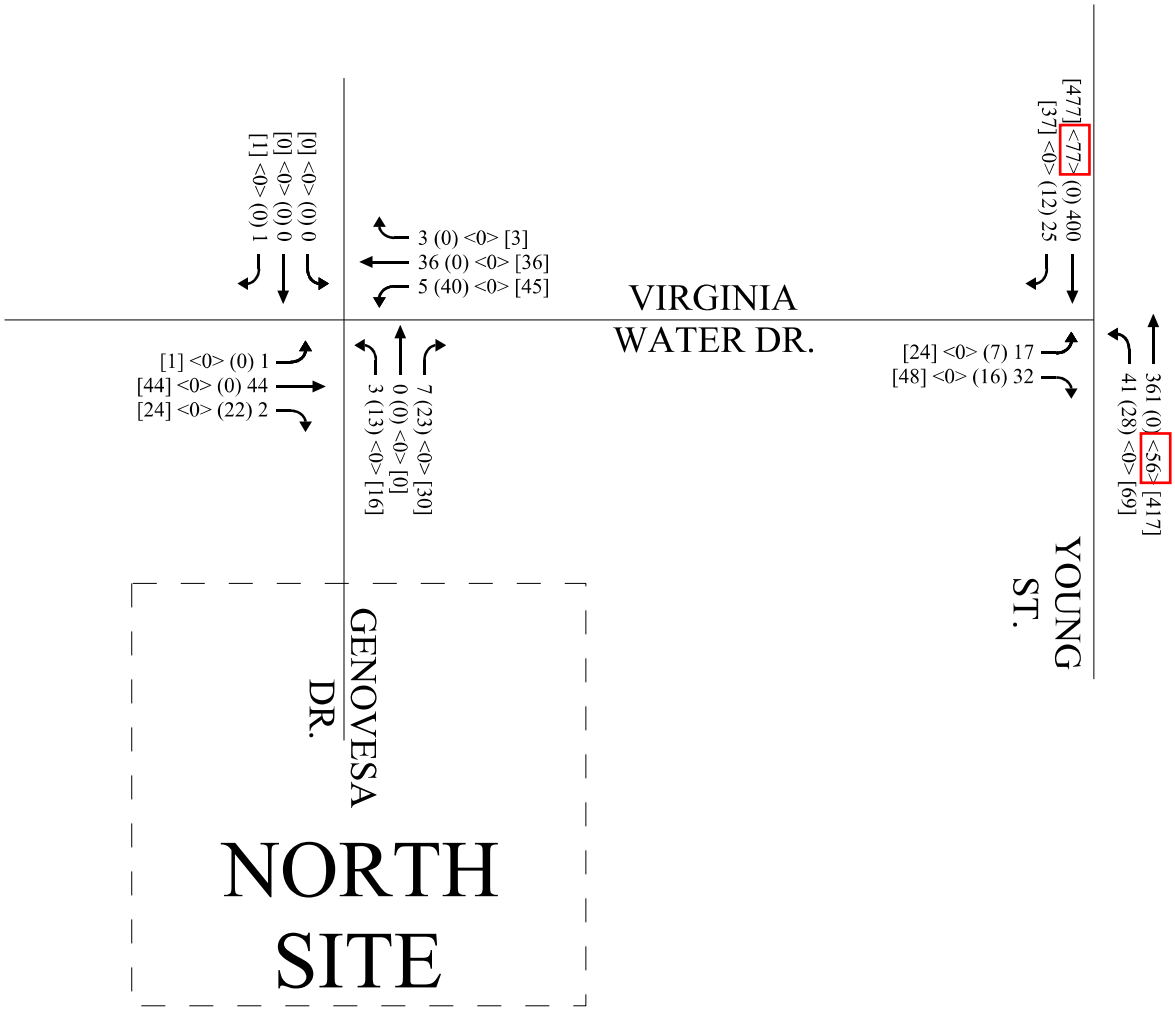
XX BACKGROUND TRAFFIC
(XX) SITE TRAFFIC – NORTH SIDE
<XX> SITE TRAFFIC – SOUTH SIDE
[XX] TOTAL BUILD–OUT TRAFFIC

Kimley»Horn	YOUNG STREET PUD ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	PROJECTED (2027) BUILD–OUT AM PEAK HOUR TRAFFIC VOLUMES – FULL BUILD–OUT	FIGURE 7

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY–HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY–HORN AND ASSOCIATES, INC.

Previous Point North Update
(Kimley-Horn, March 2020)

NOT TO SCALE



LEGEND

XX BACKGROUND TRAFFIC
(XX) SITE TRAFFIC – NORTH SIDE
<XX> SITE TRAFFIC – SOUTH SIDE
[XX] TOTAL BUILD–OUT TRAFFIC

Kimley»Horn	YOUNG STREET PUD ROLESVILLE, NC TRAFFIC IMPACT ANALYSIS	PROJECTED (2027) BUILD–OUT PM PEAK HOUR TRAFFIC VOLUMES – FULL BUILD–OUT	FIGURE 8

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY–HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY–HORN AND ASSOCIATES, INC.

Revised Wallbrook Development Traffic Impact Analysis

August 11, 2020

Prepared for:

Crosland Southeast
4700 Six Forks Rd #150
Raleigh, NC 27609

Prepared by:

Stantec Consulting Services Inc.
801 Jones Franklin Road, Suite 300
Raleigh, NC

File: 171002232

Figure 1: Site Location and Study Area Map

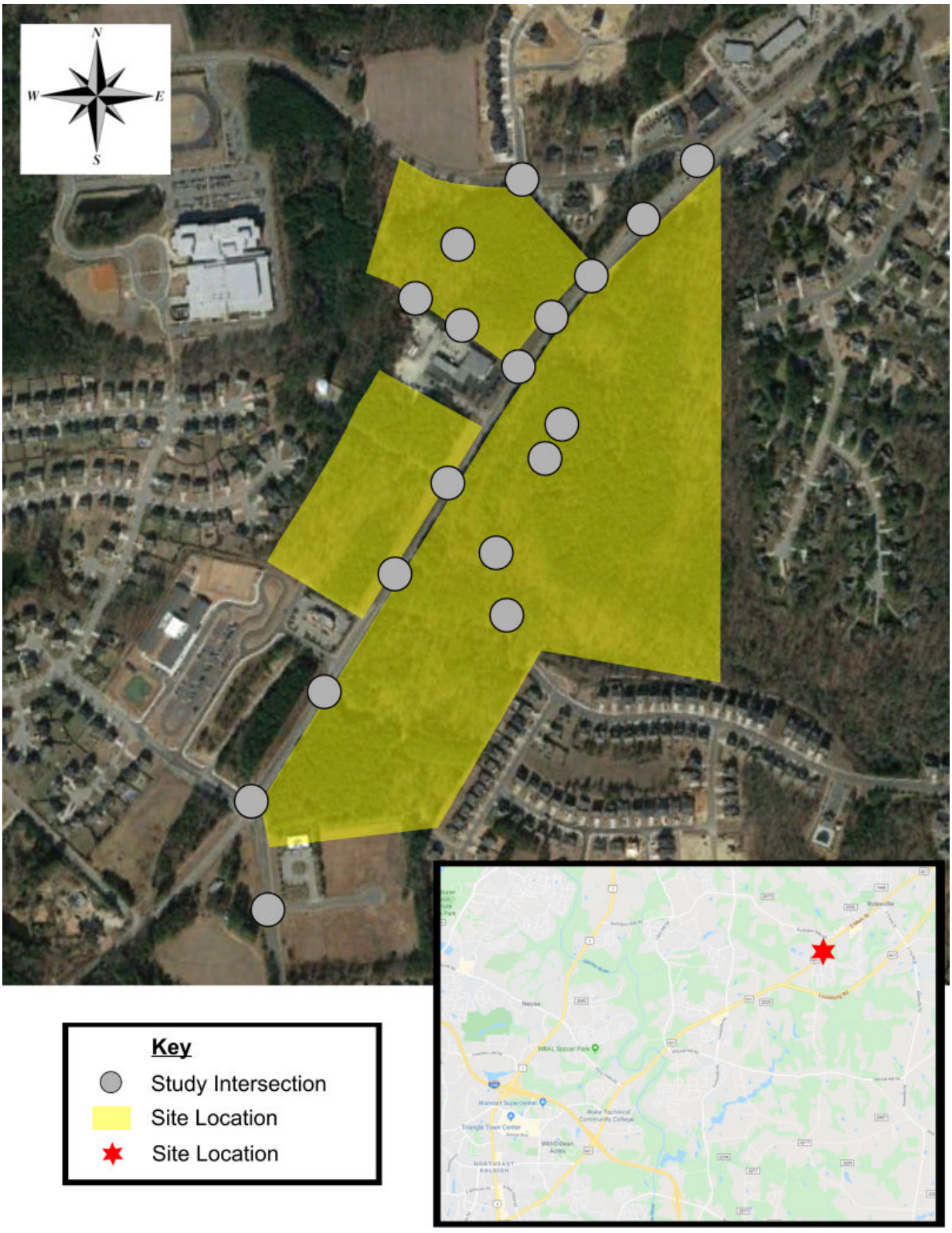
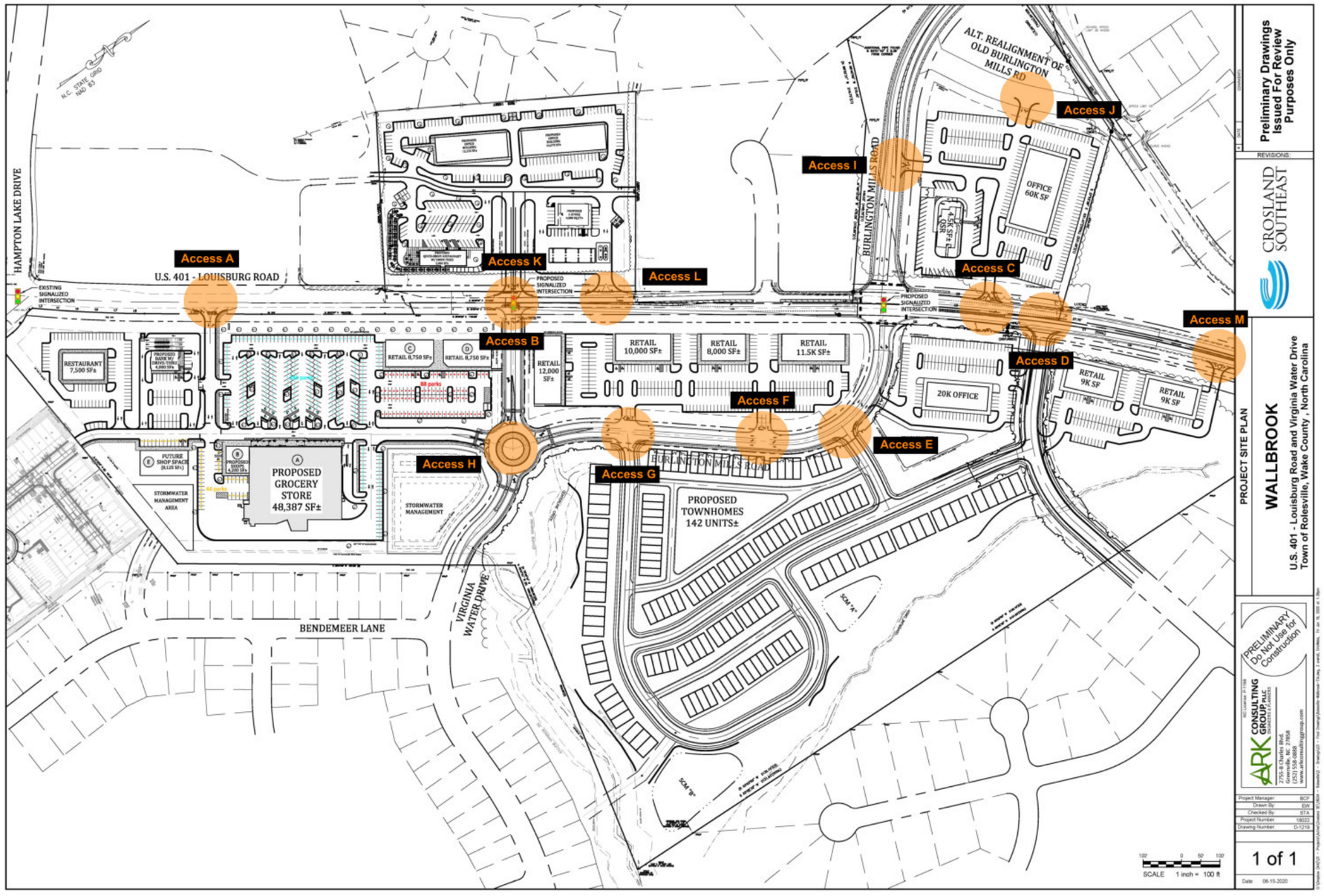


Figure 2: Proposed Site Plan



3.1 NORTH SITE

The North site of the development is expected to consist of 60,000 square feet of medical-dental office space, 8,000 square feet of retail, and 6,000 square feet of a fast-food restaurant. Table 2 shows the number of anticipated trips that will be generated by the North site of the proposed development (Daily, AM Peak, and PM Peak entering and exiting).

Table 2: North Site ITE Trip Generation

North Site Trip Generation (N1, N2, N3)													
Land Use	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**			
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	
Medical-Dental Office Bldg.	720	60	1,000 GFA	2,088	1,044	1,044	167	130	37	208	58	150	
Fast-Food Rest. w/ Drive-Thru	934	4.5	1,000 GFA	2,120	1,060	1,060	181	92	89	147	76	71	
				4,208	2,104	2,104	348	222	126	355	134	221	
Internal Capture	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**			
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	
Medical-Dental Office Bldg.	720	60	1,000 GFA				-39	-18	-21	-2	-2		
Fast-Food Rest. w/ Drive-Thru	934	4.5	1,000 GFA				-39	-21	-18	-2		-2	
Pass-Bys	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**			
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	
Fast-Food Rest. w/ Drive-Thru	934	4.5	1,000 GFA				-70	-35	-35	-72	-38	-34	
Adjusted Trip Generation	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**			
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	
Medical-Dental Office Bldg.	720	60	1,000 GFA	2,088	1,044	1,044	128	112	16	206	56	150	
Fast-Food Rest. w/ Drive-Thru	934	4.5	1,000 GFA	2,120	1,060	1,060	72	36	36	73	38	35	
Total Trips Generated				4,208	2,104	2,104	200	148	52	279	94	185	

3.2 SOUTH SITE

The South site of the development is expected to consist of a 71,400 square feet of retail space, a 50,000 square foot grocery store, a 4,000 square foot bank, and a 7,500 square foot restaurant. Table 3 shows the number of anticipated trips that will be generated by the South site of the proposed development (Daily, AM Peak, and PM Peak entering and exiting).

Table 3: South Site ITE Trip Generation

South Site Trip Generation (S1, S2, S3)												
Land Use	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Shopping Center	820	71.4	1,000 GLA	4,780	2,390	2,390	187	116	71	423	203	220
Supermarket	850	50	1,000 GFA	5,340	2,670	2,670	191	115	76	462	236	226
Drive-In Bank	912	4	1,000 GFA	400	200	200	38	22	16	82	41	41
High-Turnover (Sit-Down) Rest.	932	7.5	1,000 GFA	840	420	420	105	60	45	131	68	63
				11,360	5,680	5,680	521	313	208	1,098	548	550
Internal Capture	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Shopping Center	820	71.4	1,000 GLA					-12	-3	-9	-22	-12
Supermarket	850	50	1,000 GFA					-13	-3	-10	-23	-13
High-Turnover (Sit-Down) Rest.	932	7.5	1,000 GFA					-25	-19	-6	-46	-20
Pass-Bys	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Shopping Center	820	71.4	1,000 GLA							-136	-65	-71
Supermarket	850	50	1,000 GFA							-158	-80	-78
Drive-In Bank	912	4	1,000 GFA				-11	-6	-5	-28	-14	-14
High-Turnover (Sit-Down) Rest.	932	7.5	1,000 GFA							-37	-21	-16
Adjusted Trip Generation	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Shopping Center	820	71.4	1,000 GLA	4,780	2,390	2,390	175	113	62	265	126	139
Supermarket	850	50	1,000 GFA	5,340	2,670	2,670	178	112	66	281	143	138
Drive-In Bank	912	4	1,000 GFA	400	200	200	27	16	11	54	27	27
High-Turnover (Sit-Down) Rest.	932	7.5	1,000 GFA	840	420	420	80	41	39	48	27	21
			Total Trips Generated	11,360	5,680	5,680	460	282	178	648	323	325

3.3 EAST SITE

The East site of the development is expected to consist of 170 townhomes, 20,000 square feet of office space, and 18,000 square feet of retail space. Table 4 shows the number of anticipated trips that will be generated by the East site of the proposed development (Daily, AM Peak, and PM Peak entering and exiting).

Table 4: East Site ITE Trip Generation

East Site Trip Generation (E1, E2, R1)												
Land Use	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Multifamily Housing (Mid-Rise)	221	170	Units	926	463	463	58	15	43	74	45	29
General Office Building	710	20	1,000 GFA	222	111	111	40	35	5	87	16	71
Shopping Center	820	18	1,000 GLA	1874	937	937	161	100	61	153	73	80
				3,022	1,511	1,511	259	150	109	314	134	180
Internal Capture	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Multifamily Housing (Mid-Rise)	221	170	Units				-1		-1	-3	-1	-2
General Office Building	710	20	1,000 GFA				-3	-2	-1	-3	-2	-1
Shopping Center	820	18	1,000 GLA				-4	-2	-2	-6	-2	-4
Pass-Bys	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Shopping Center	820	18	1,000 GLA							-50	-24	-26
Adjusted Trip Generation	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Multifamily Housing (Mid-Rise)	221	170	Units	926	463	463	57	15	42	71	44	27
General Office Building	710	20	1,000 GFA	222	111	111	37	33	4	84	14	70
Shopping Center	820	18	1,000 GLA	1,874	937	937	157	98	59	97	47	50
Total Trips Generated				3,022	1,511	1,511	251	146	105	252	105	147

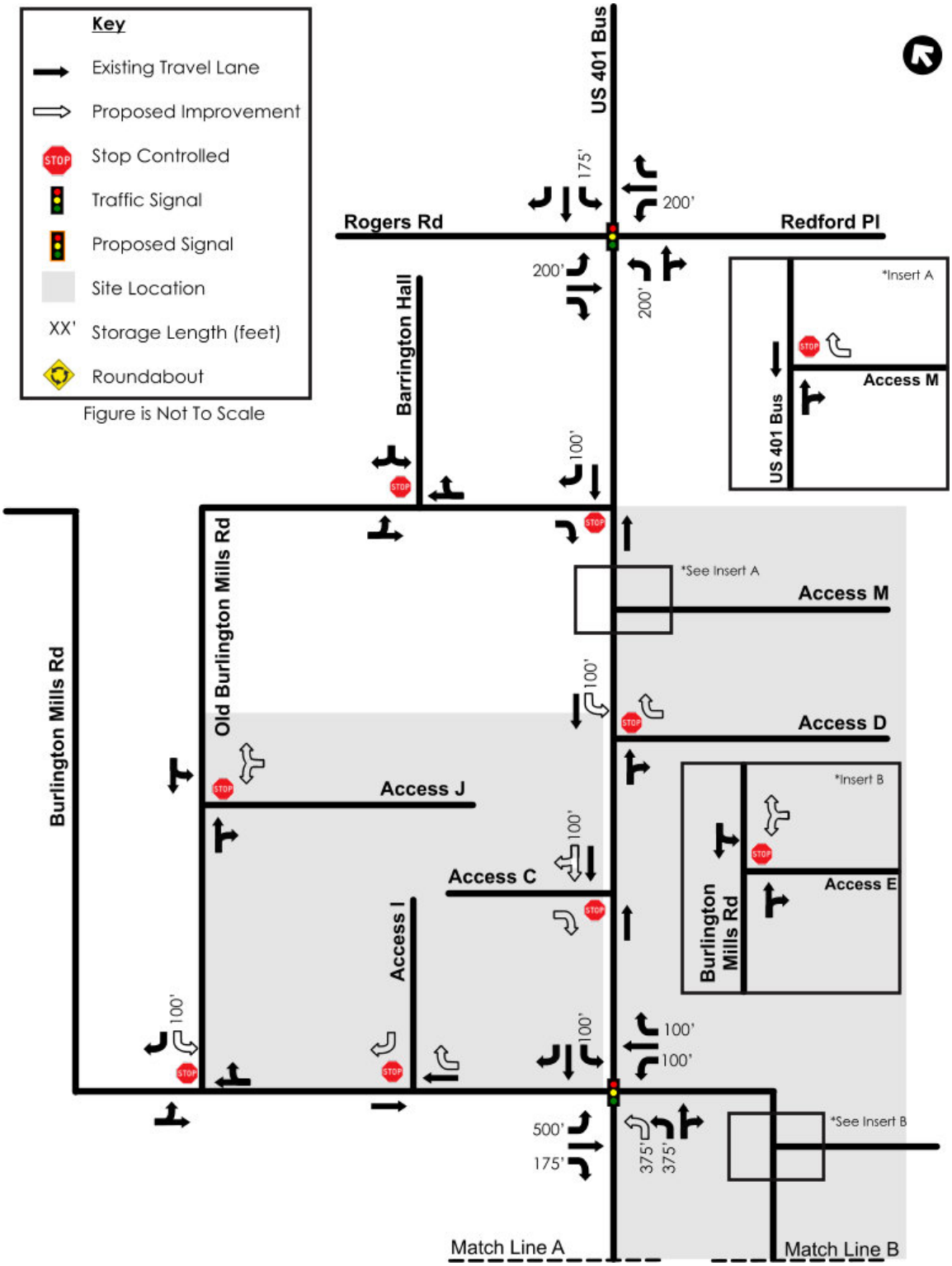
3.4 WEST SITE

The West site of the development is expected to consist of 27,000 square feet of office space, and a 5,000 square foot fast-food restaurant. Table 5 shows the number of anticipated trips that will be generated by the West site of the proposed development (Daily, AM Peak, and PM Peak entering and exiting).

Table 5: West Site ITE Trip Generation

West Site Trip Generation (W1)												
Land Use	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
General Office Building	710	27	1,000 GFA	298	149	149	52	46	6	95	17	78
Fast-Food Rest. w/ Drive-Thru	934	5	1,000 GFA	2356	1178	1178	201	102	99	163	85	78
Gas./Serv. Station w/ Conv. Market	945	16	Fuel Pos.	3286	1643	1643	200	102	98	224	114	110
				5940	2970	2970	453	250	203	482	216	266
Internal Capture	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
General Office Building	710	27	1,000 GFA				-9	-6	-3	-2	-2	
Fast-Food Rest. w/ Drive-Thru	934	5	1,000 GFA				-10	-4	-6	-3		-3
Pass-Bys	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Fast-Food Rest. w/ Drive-Thru	934	5	1,000 GFA				-94	-48	-46	-80	-42	-38
Gas./Serv. Station w/ Conv. Market	945	16	Fuel Pos.				-124	-63	-61	-126	-64	-62
Adjusted Trip Generation	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
General Office Building	710	27	1,000 GFA	298	149	149	43	40	3	93	15	78
Fast-Food Rest. w/ Drive-Thru	934	5	1,000 GFA	2,356	1,178	1,178	97	50	47	80	43	37
Gas./Serv. Station w/ Conv. Market	945	16	Fuel Pos.	3,286	1,643	1,643	76	39	37	98	50	48
Total Trips Generated				5,940	2,970	2,970	216	129	87	271	108	163

Figure 8: Build Recommended Lane Configurations



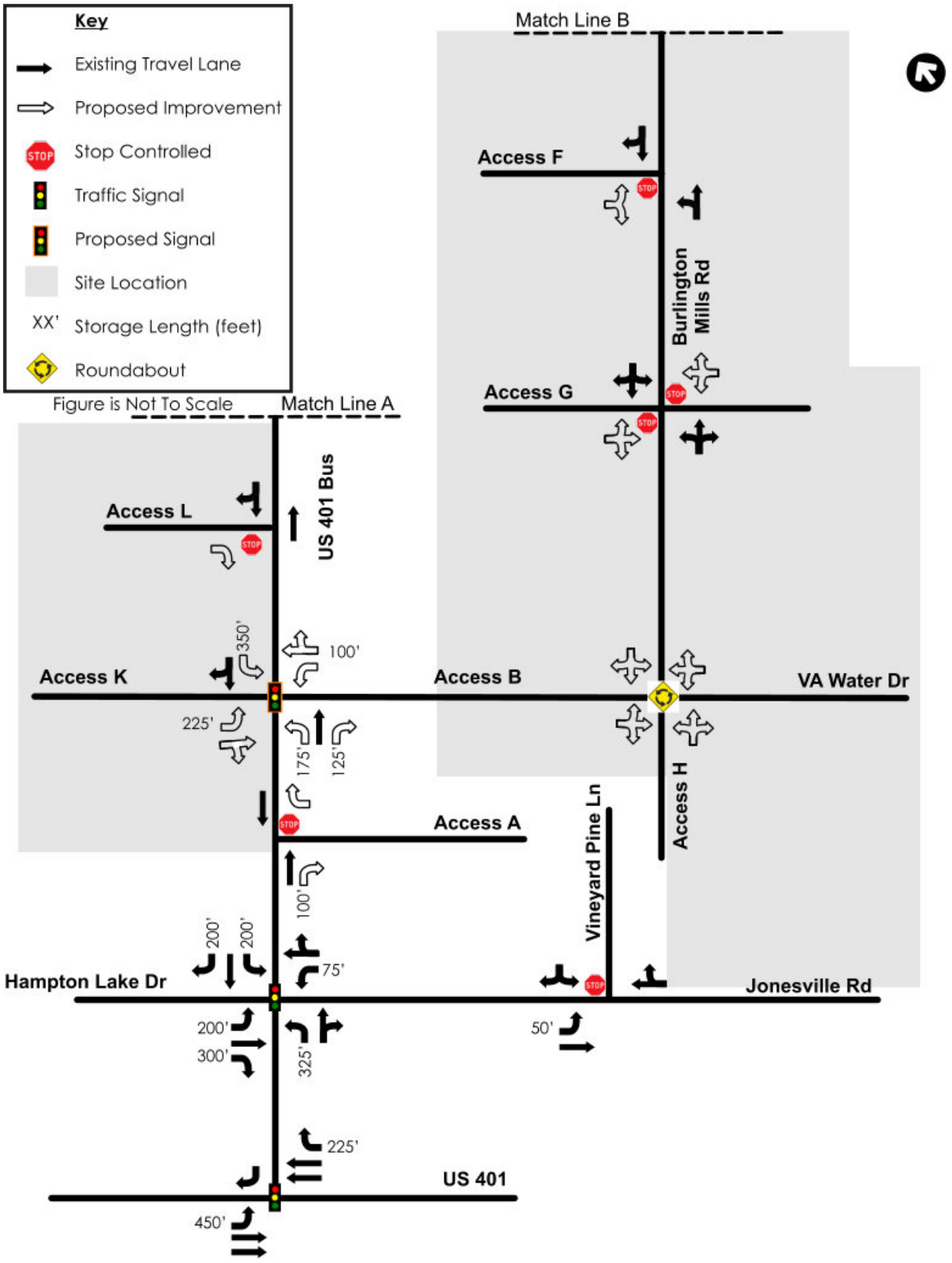

Key
Existing Travel Lane
Proposed Improvement
Stop Controlled
Traffic Signal
Proposed Signal
Site Location
XX' Storage Length (feet)
Roundabout
Figure is Not To Scale
Match Line A
Match Line B
Access F
Access G
Burlington Mills Rd
Access L
US 401 Bus
Access K
Access B
VA Water Dr
Access A
Access H
Vineyard Pine Ln
Hampton Lake Dr
Jonesville Rd
US 401
350'
100'
225'
175'
125'
100'
200'
200'
75'
200'
300'
325'
50'
225'
450'

Figure 9: Approved Development Trips

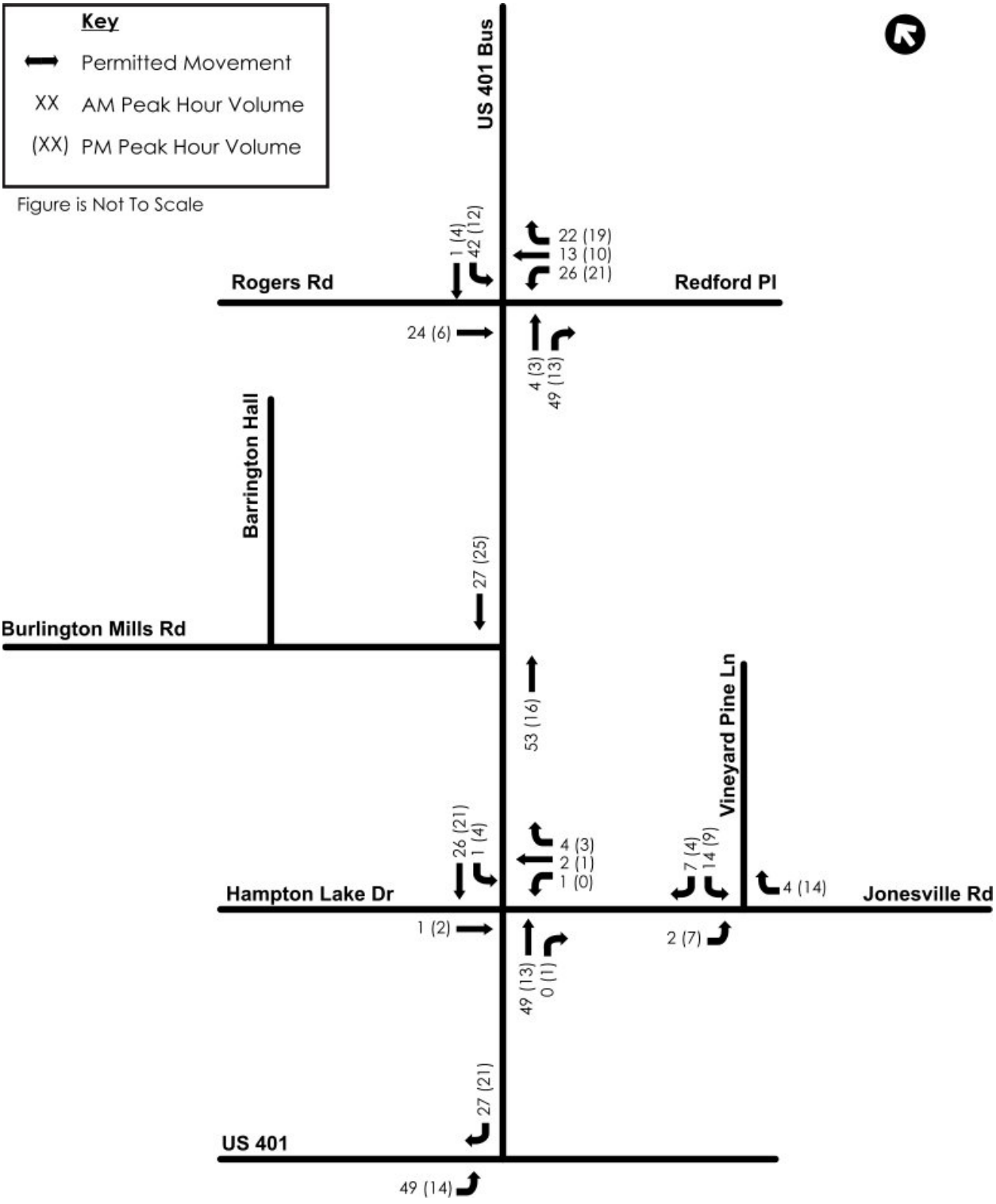
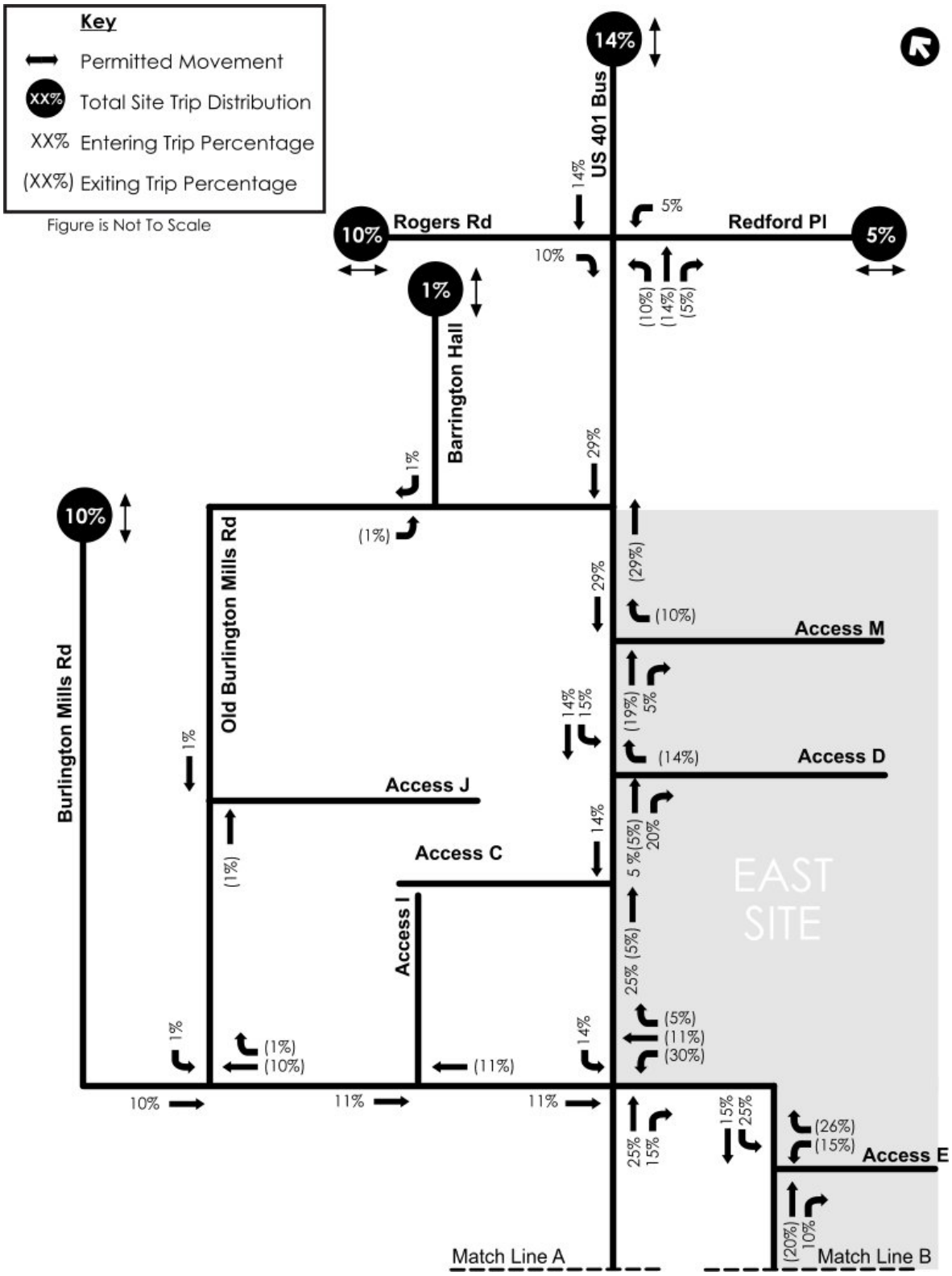


Figure 10: East Trip Distribution



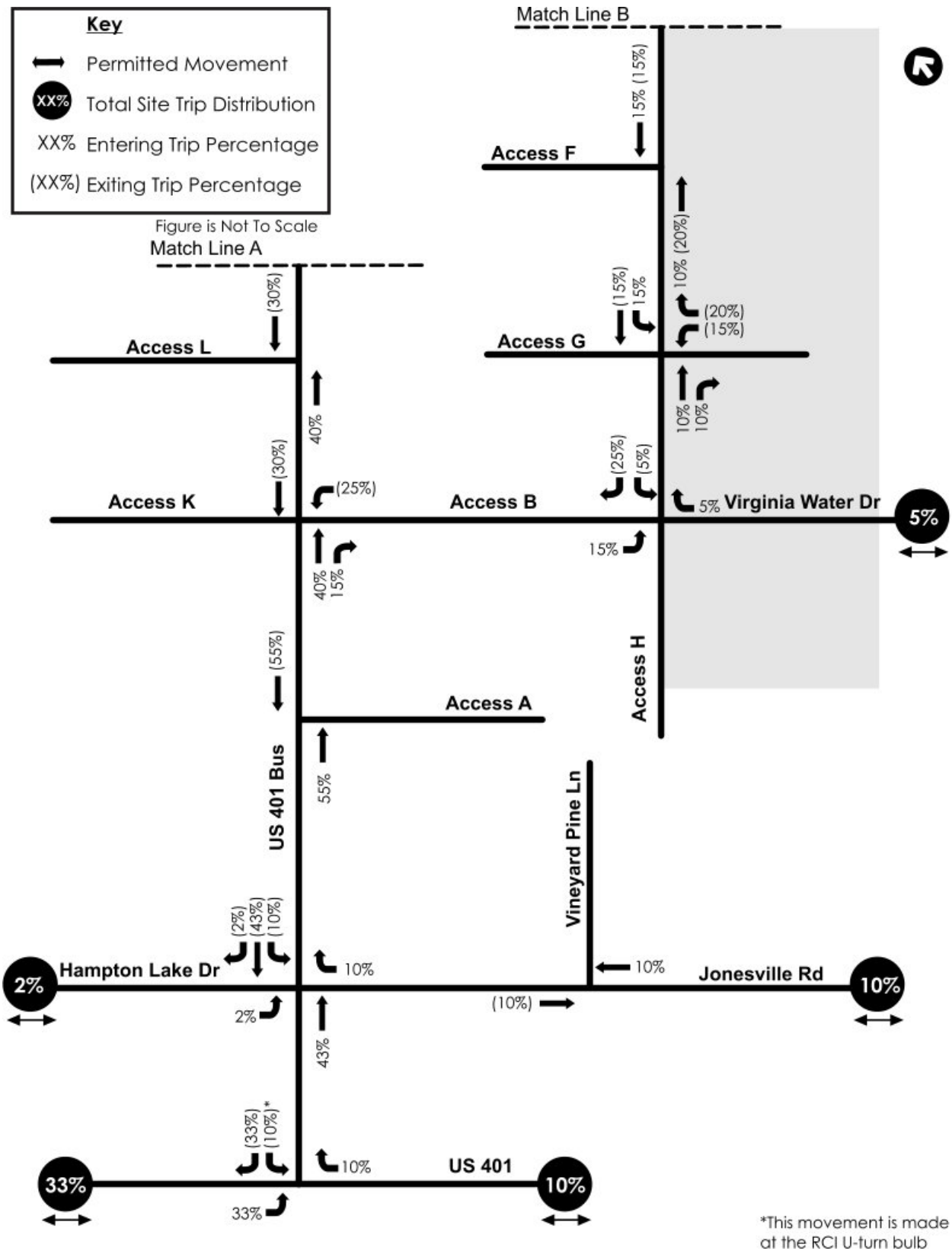
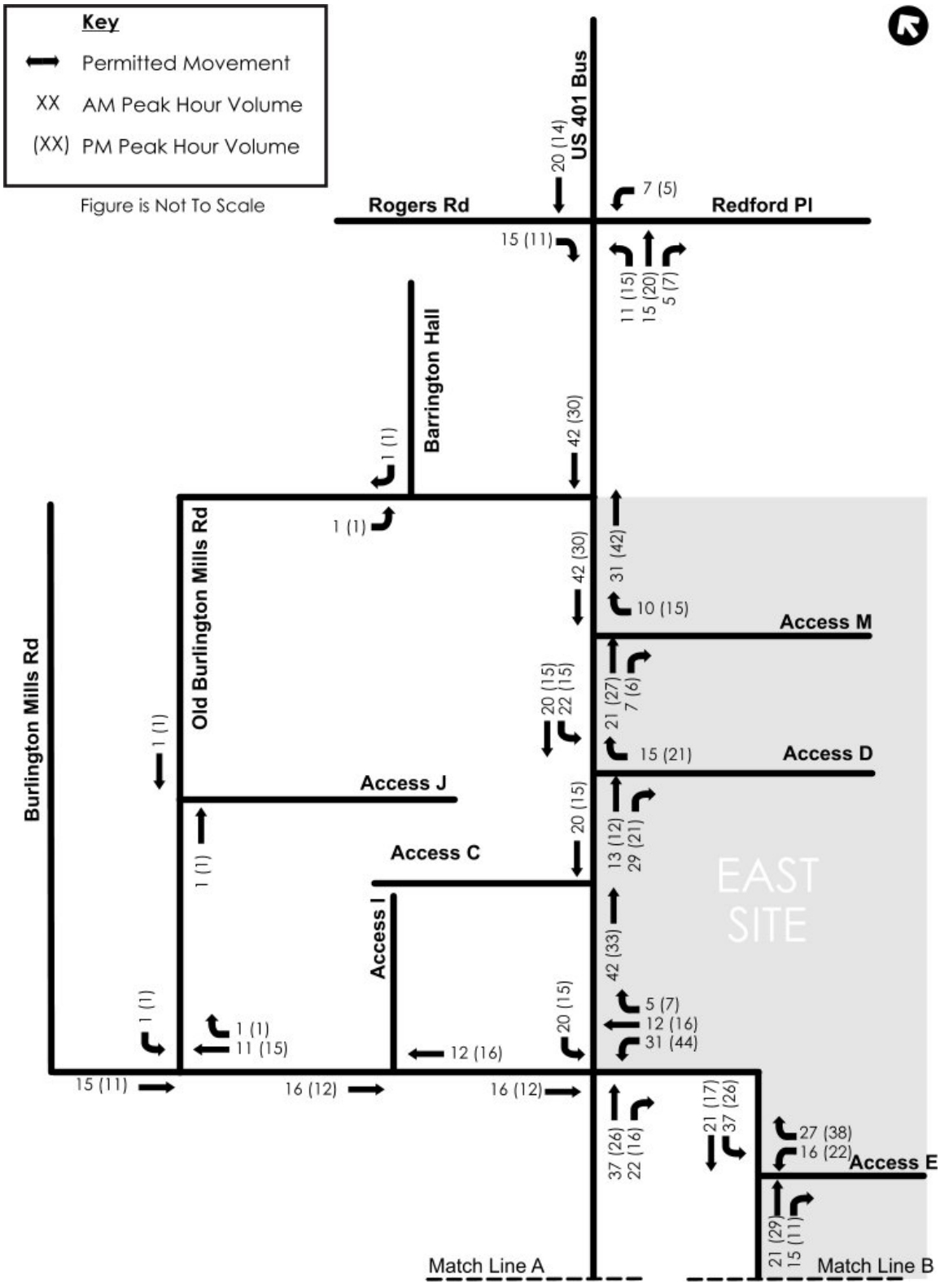

Key
Permitted Movement
XX% Total Site Trip Distribution
XX% Entering Trip Percentage
(XX%) Exiting Trip Percentage
Figure is Not To Scale
Match Line A
Match Line B
Access L
Access K
Access F
Access G
Access B
Access A
Access H
US 401 Bus
Vineyard Pine Ln
Hampton Lake Dr
Jonesville Rd
US 401
Virginia Water Dr
2%
10%
33%
5%
(30%)
40%
(25%)
(55%)
55%
15% (15%)
10% (20%)
(20%)
(15%)
15%
(5%)
10%
(2%)
(43%)
(33%)
(10%)*
*This movement is made at the RCI U-turn bulb

Figure 11: East Site Trip Assignment



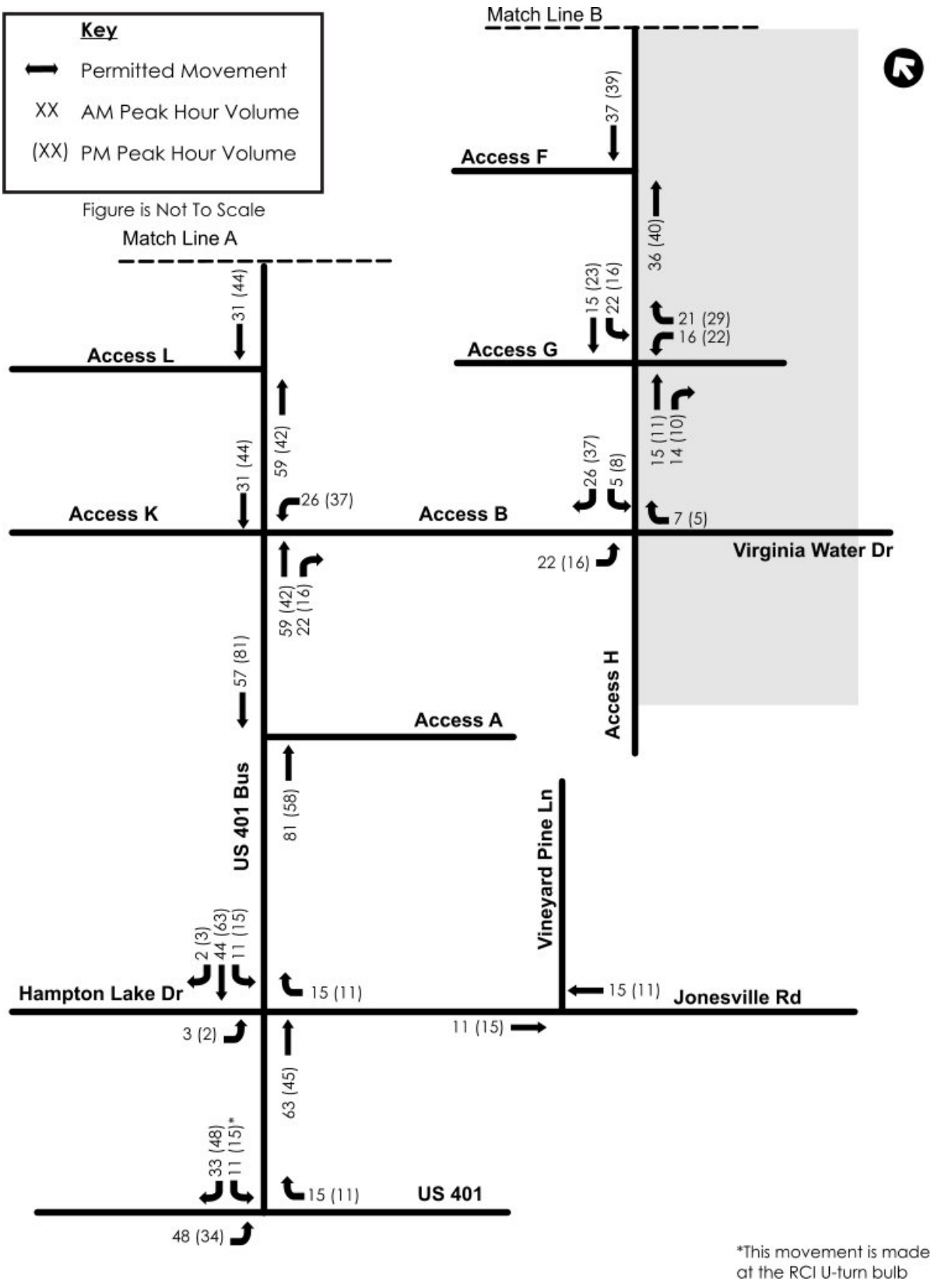
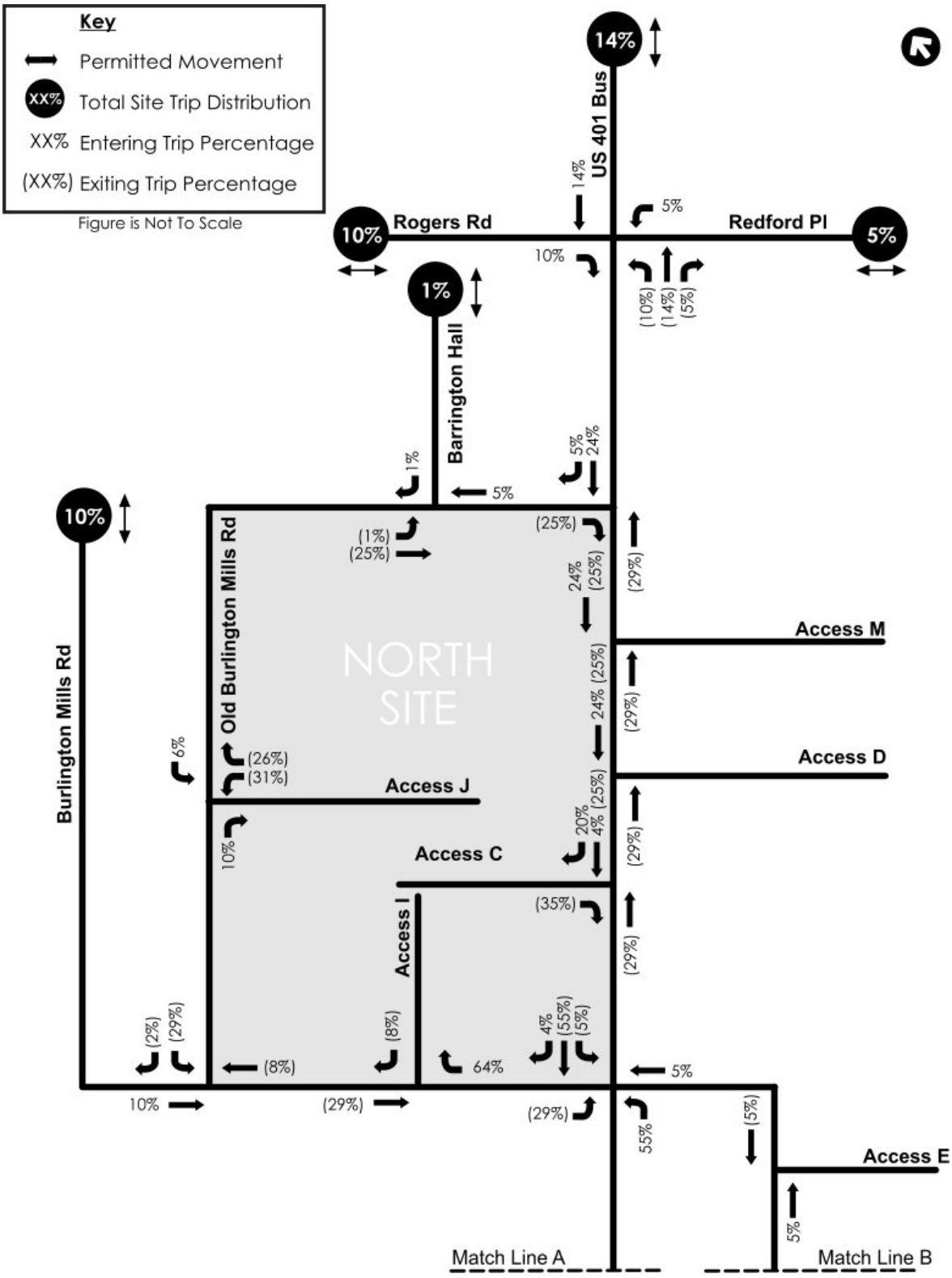

Key
Permitted Movement
XX AM Peak Hour Volume
(XX) PM Peak Hour Volume
Figure is Not To Scale
Match Line A
Match Line B
Access L
Access K
Access F
Access G
Access B
Access A
Access H
Virginia Water Dr
US 401 Bus
Vineyard Pine Ln
Hampton Lake Dr
Jonesville Rd
US 401
31 (44)
59 (42)
26 (37)
57 (81)
81 (58)
2 (3)
44 (63)
11 (15)
15 (11)
3 (2)
63 (45)
33 (48)
11 (15)*
48 (34)
37 (39)
36 (40)
15 (23)
22 (16)
21 (29)
16 (22)
26 (37)
5 (8)
15 (11)
14 (10)
7 (5)
22 (16)
59 (42)
22 (16)
15 (11)
11 (15)
*This movement is made at the RCI U-turn bulb

Figure 12: North Site Trip Distribution



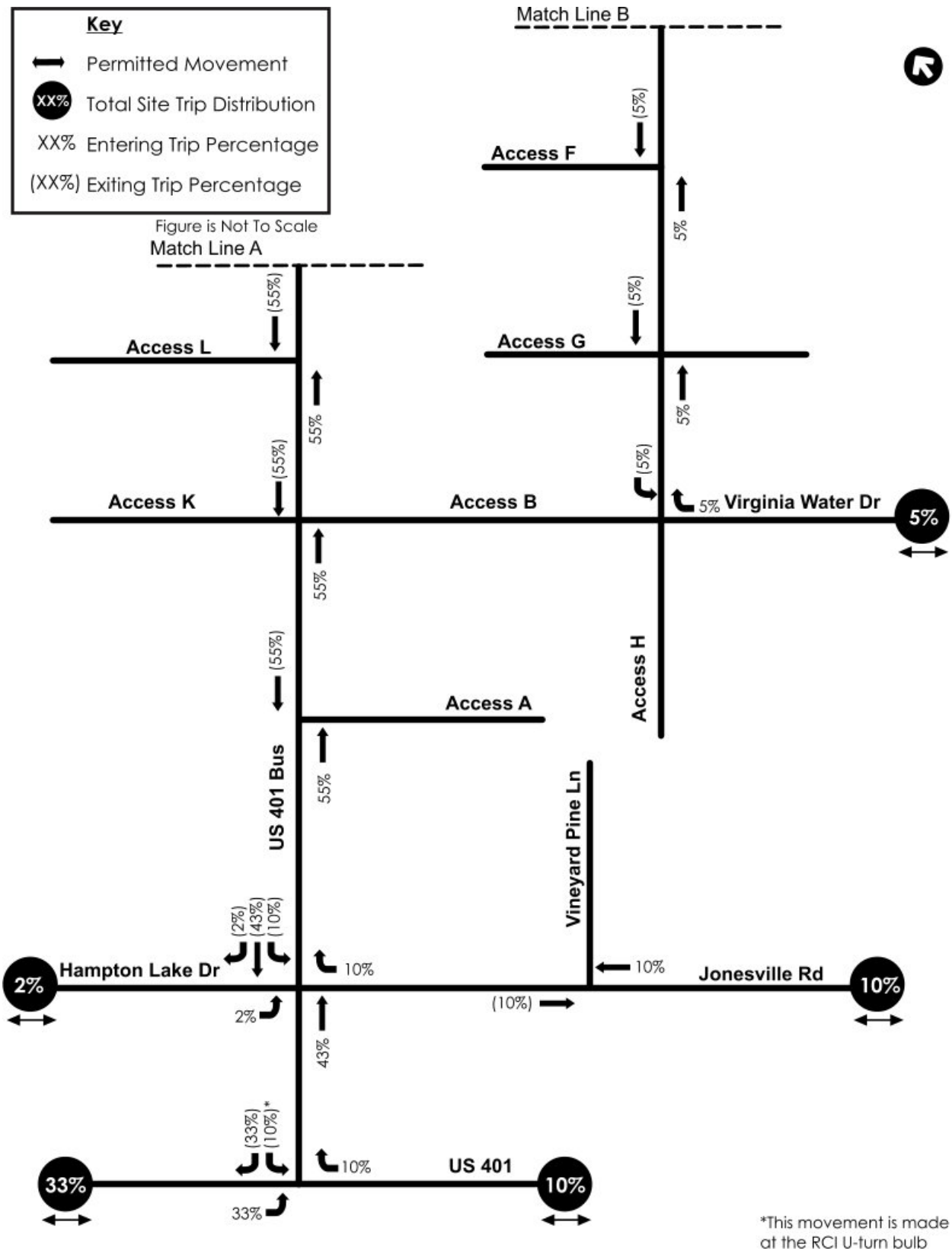
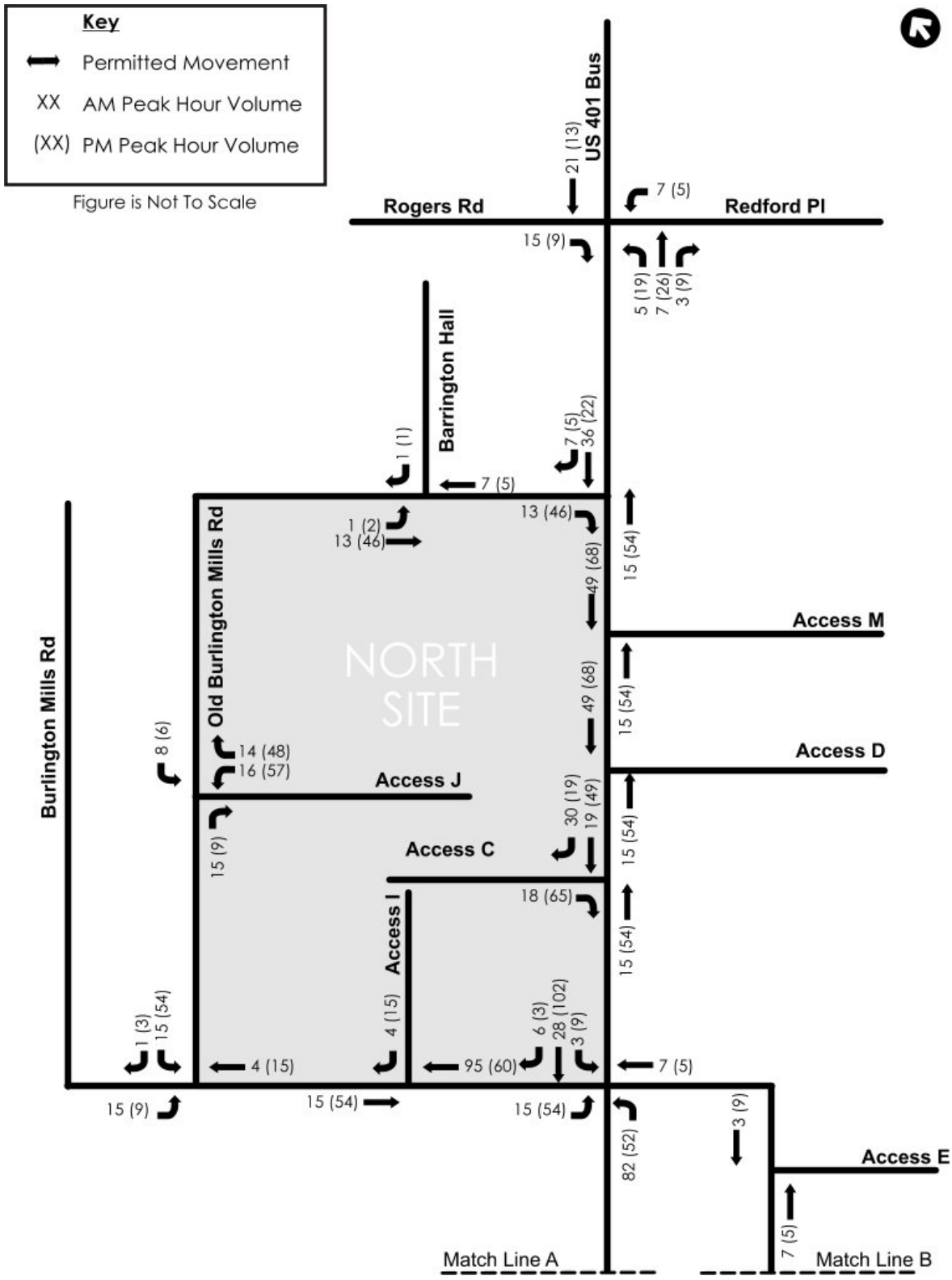

Key
Permitted Movement
XX% Total Site Trip Distribution
XX% Entering Trip Percentage
(XX%) Exiting Trip Percentage
Figure is Not To Scale
Match Line A
Match Line B
Access L
Access K
Access B
Access F
Access G
Access H
Access A
US 401 Bus
Vineyard Pine Ln
Hampton Lake Dr
Jonesville Rd
US 401
Virginia Water Dr
2%
10%
33%
5%
*This movement is made at the RCI U-turn bulb

Figure 13: North Site Trip Assignment



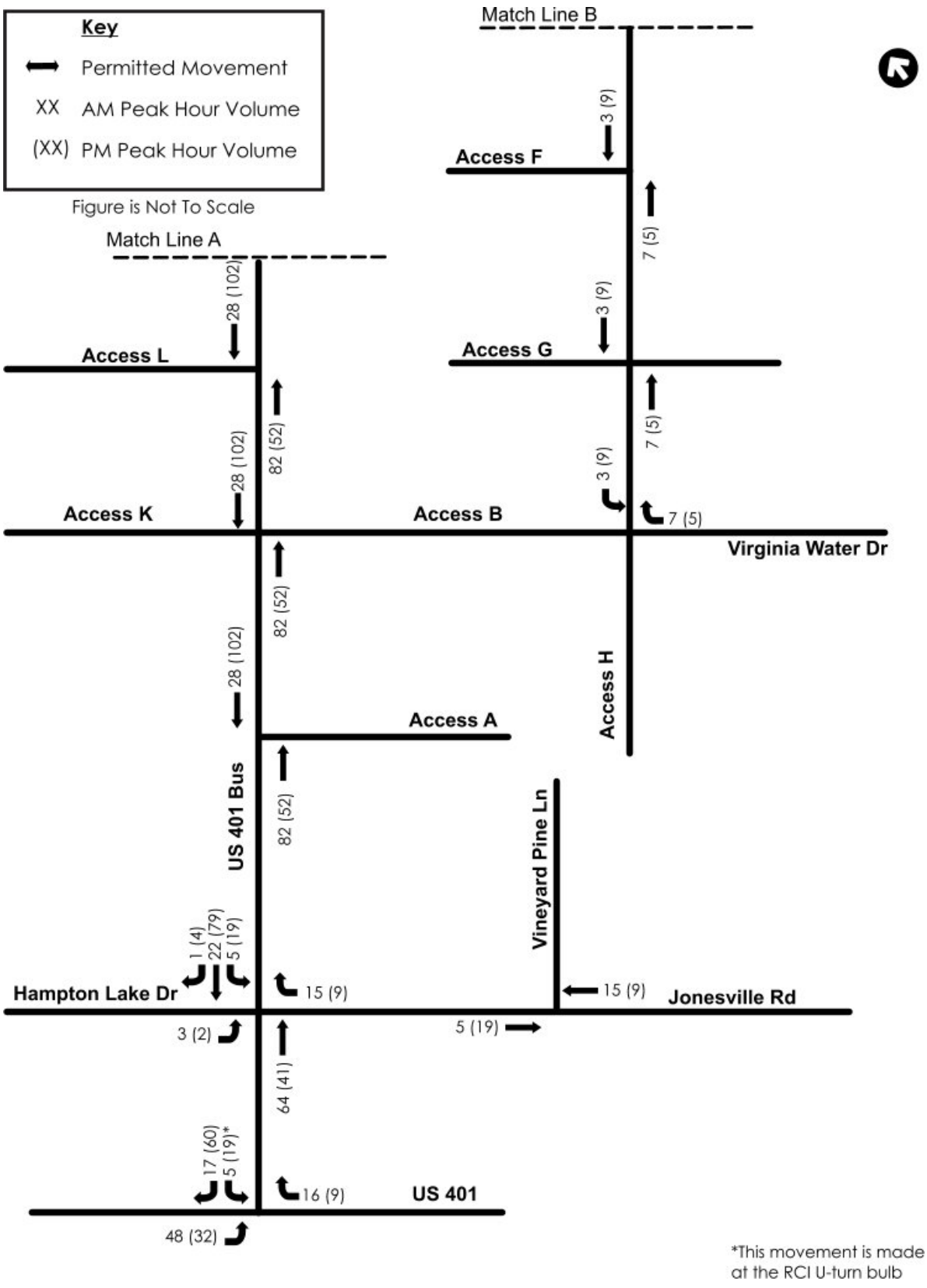
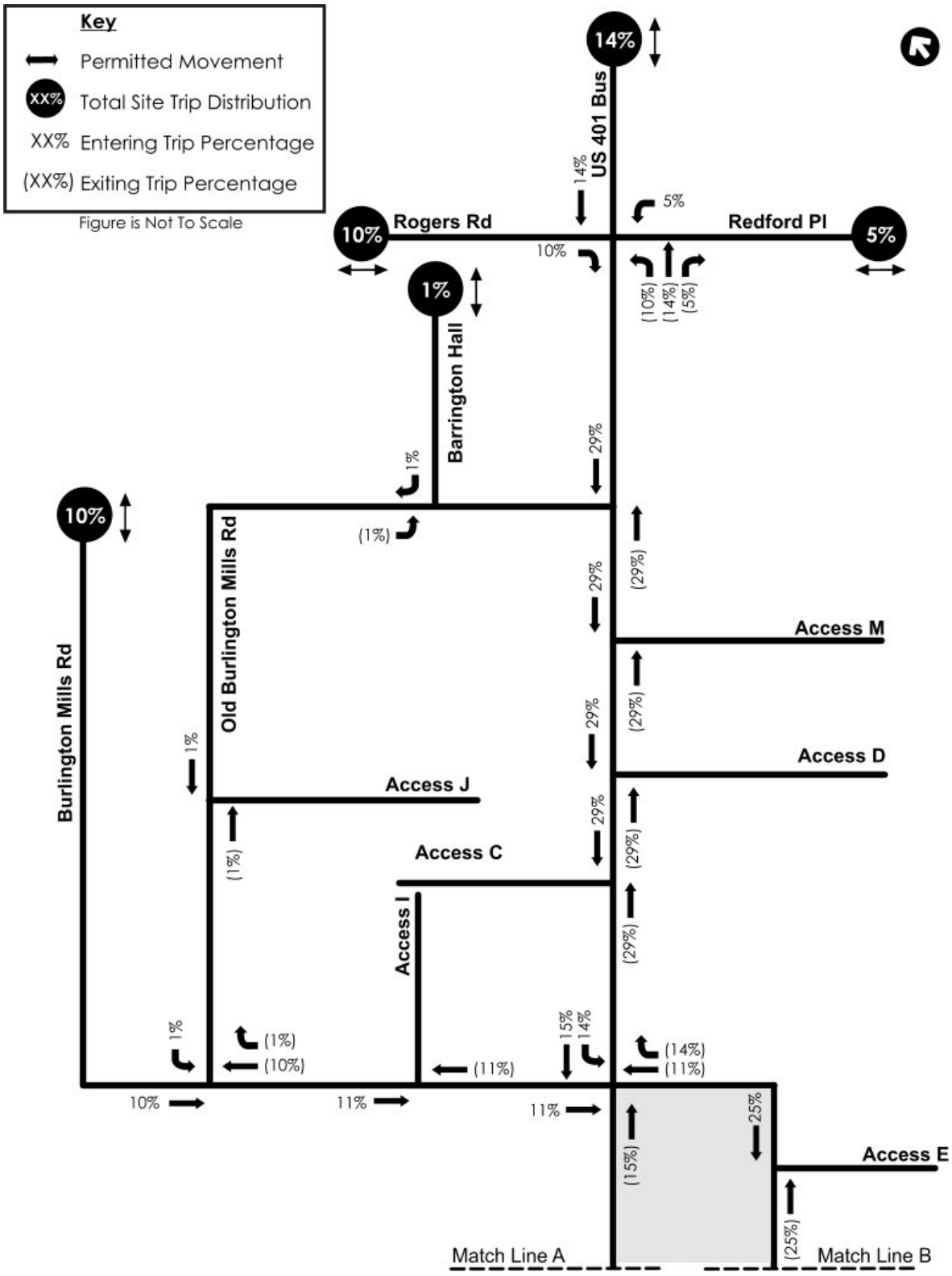

Key
Permitted Movement
XX AM Peak Hour Volume
(XX) PM Peak Hour Volume
Figure is Not To Scale
Match Line A
Match Line B
Access L
Access K
Access F
Access G
Access B
Access A
Access H
Virginia Water Dr
US 401 Bus
Vineyard Pine Ln
Hampton Lake Dr
Jonesville Rd
US 401
28 (102)
82 (52)
3 (9)
7 (5)
1 (4)
22 (79)
5 (19)
15 (9)
3 (2)
5 (19)
64 (41)
17 (60)
5 (19)*
16 (9)
48 (32)
*This movement is made at the RCI U-turn bulb

Figure 14: South Site Trip Distribution



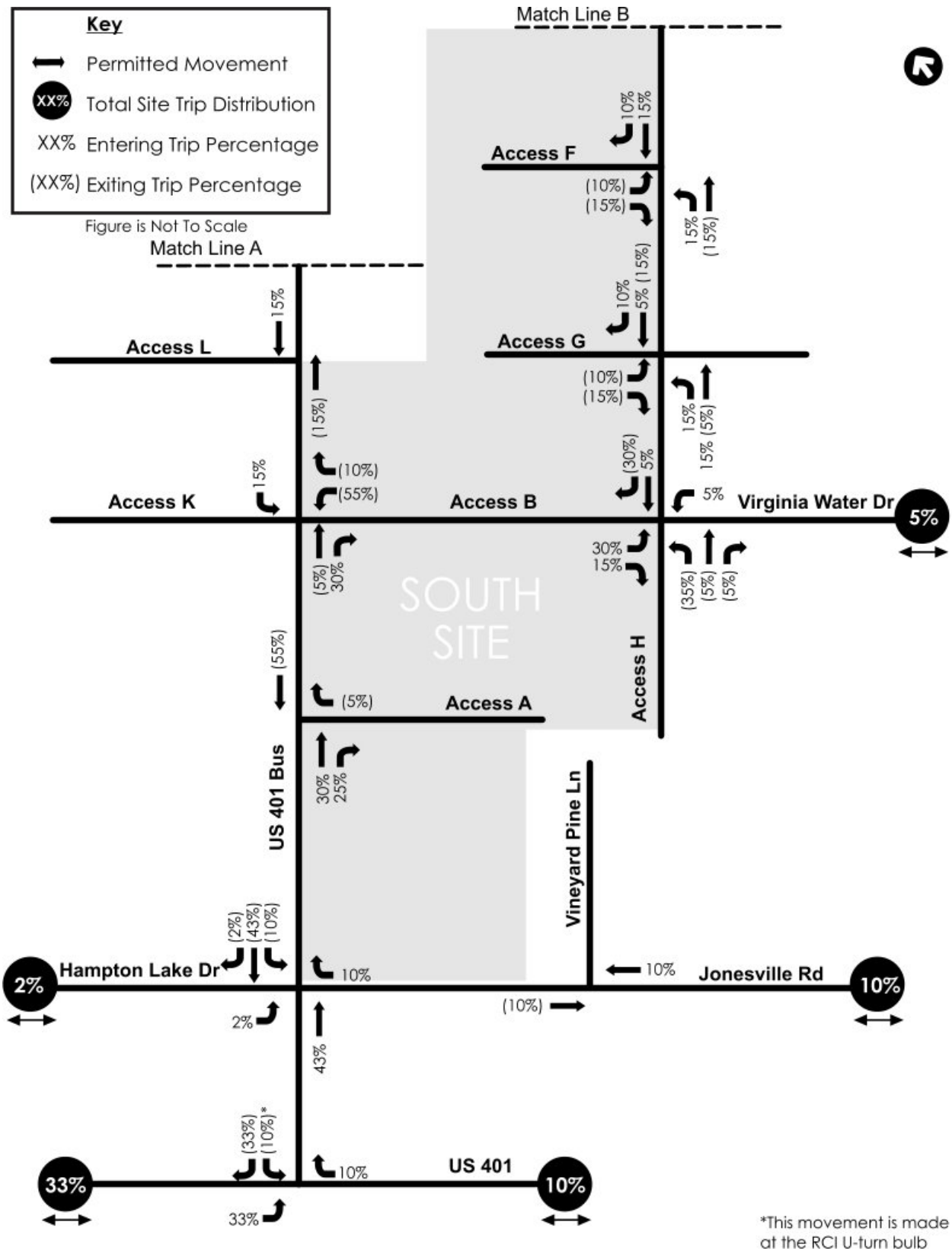
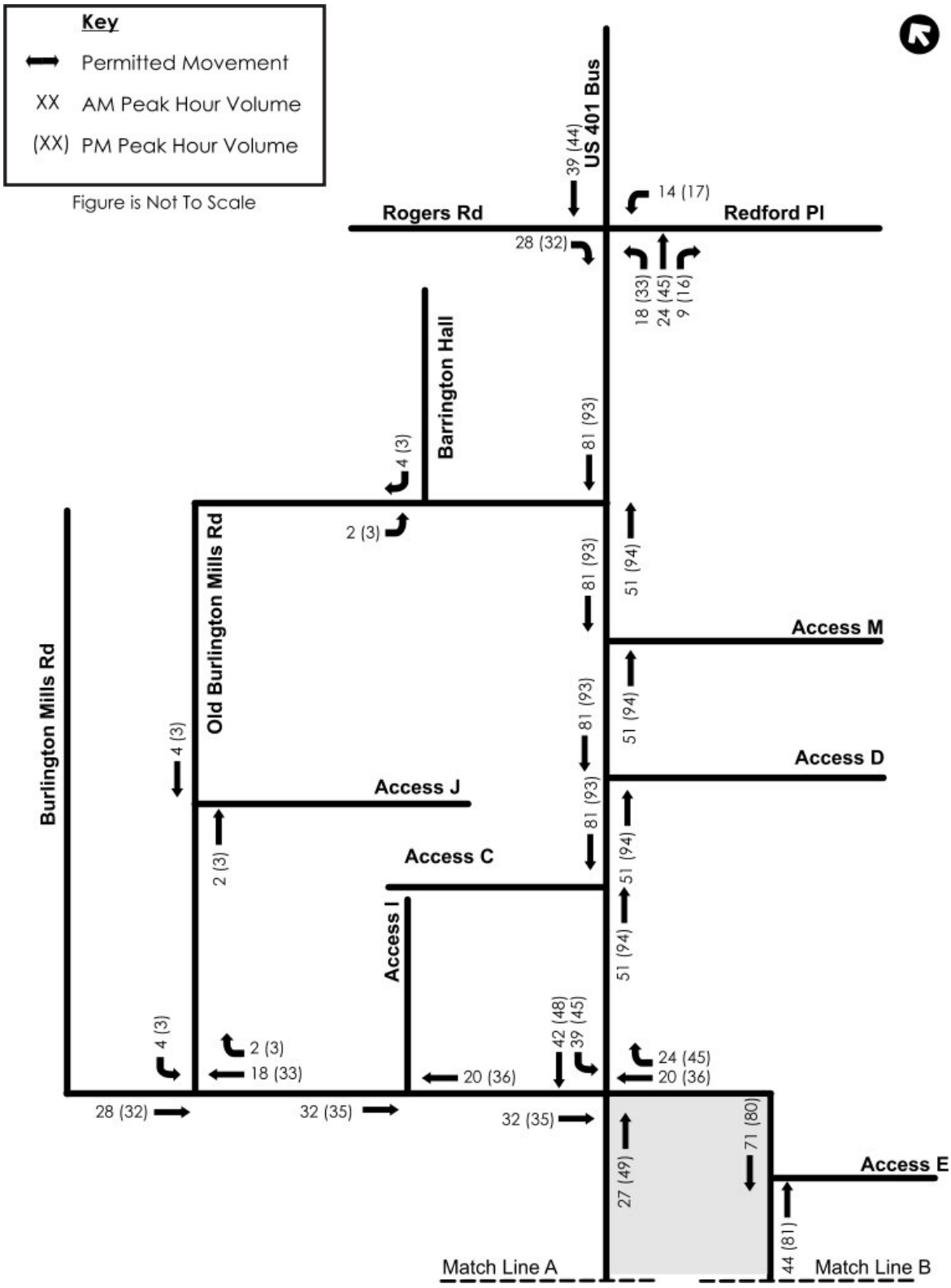

Key
Permitted Movement
XX% Total Site Trip Distribution
XX% Entering Trip Percentage
(XX%) Exiting Trip Percentage
Figure is Not To Scale
Match Line A
Match Line B
Access F
Access G
Access L
Access K
Access B
Access A
Access H
SOUTH SITE
US 401 Bus
Vineyard Pine Ln
Virginia Water Dr
Hampton Lake Dr
Jonesville Rd
US 401
5%
2%
10%
33%
10%
*This movement is made at the RCI U-turn bulb

Figure 155: South Site Trip Assignment



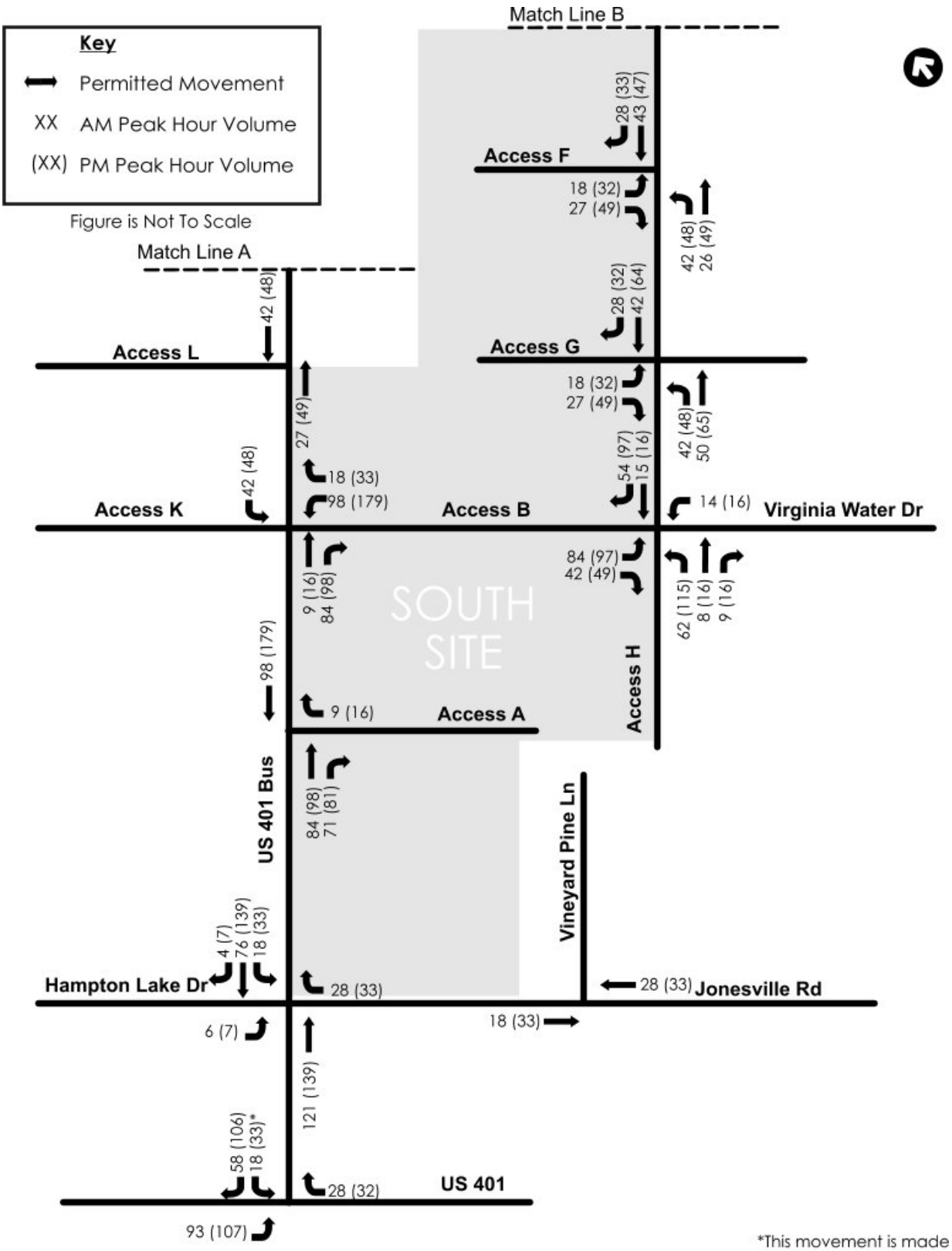
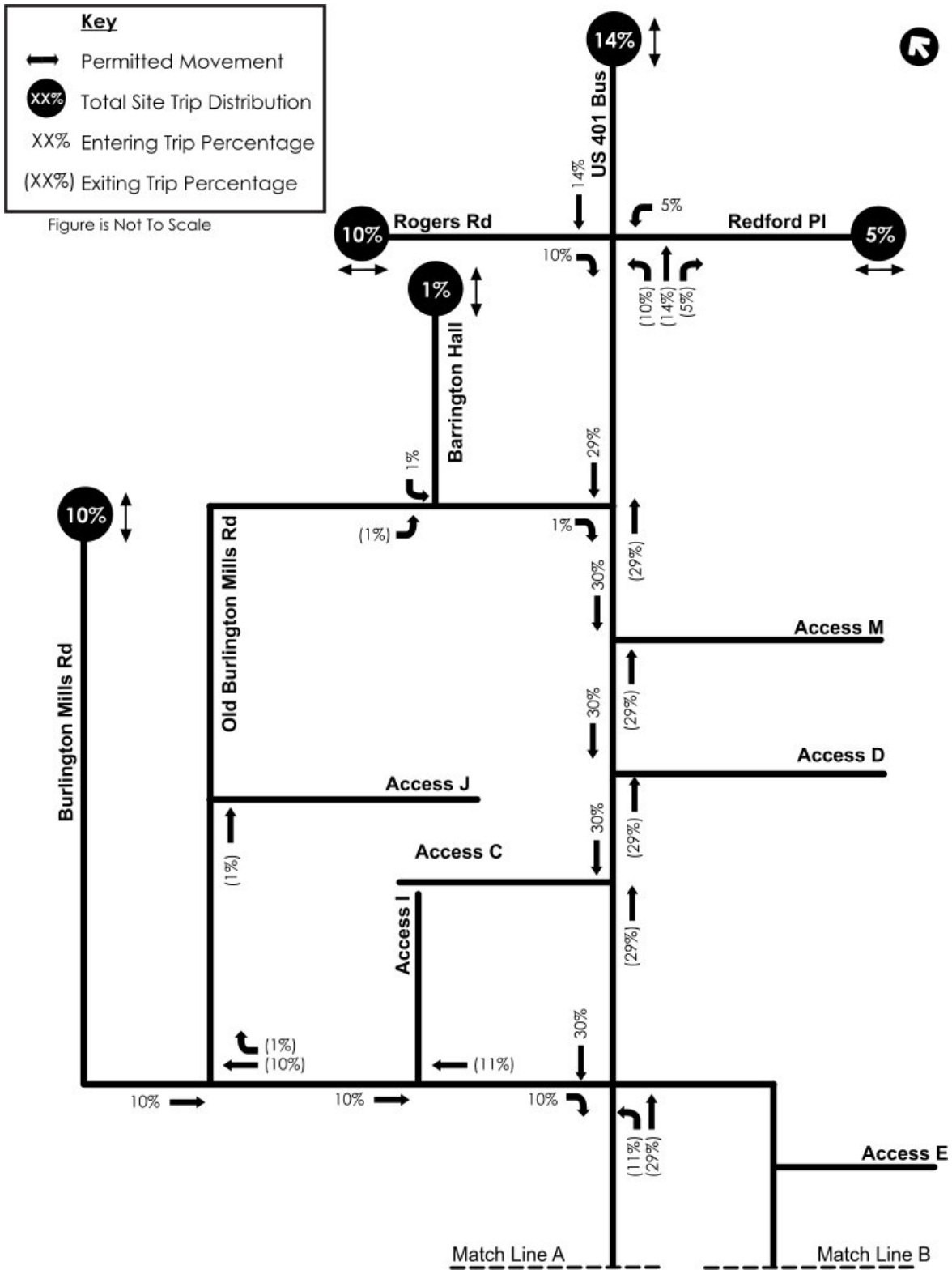

Key
Permitted Movement
XX AM Peak Hour Volume
(XX) PM Peak Hour Volume
Figure is Not To Scale
Match Line A
Match Line B
Access L
Access K
Access F
Access G
Access B
Access A
Access H
Virginia Water Dr
US 401 Bus
Vineyard Pine Ln
Hampton Lake Dr
Jonesville Rd
US 401
SOUTH SITE
42 (48)
27 (49)
18 (33)
98 (179)
9 (16)
84 (98)
71 (81)
4 (7)
76 (139)
18 (33)
6 (7)
121 (139)
58 (106)
18 (33)*
93 (107)
28 (33)
43 (47)
18 (32)
27 (49)
42 (48)
26 (49)
28 (32)
42 (64)
54 (97)
15 (16)
50 (65)
14 (16)
84 (97)
42 (49)
62 (115)
8 (16)
9 (16)
28 (32)
*This movement is made at the RCI U-turn bulb

Figure 16: West Site Trip Distribution



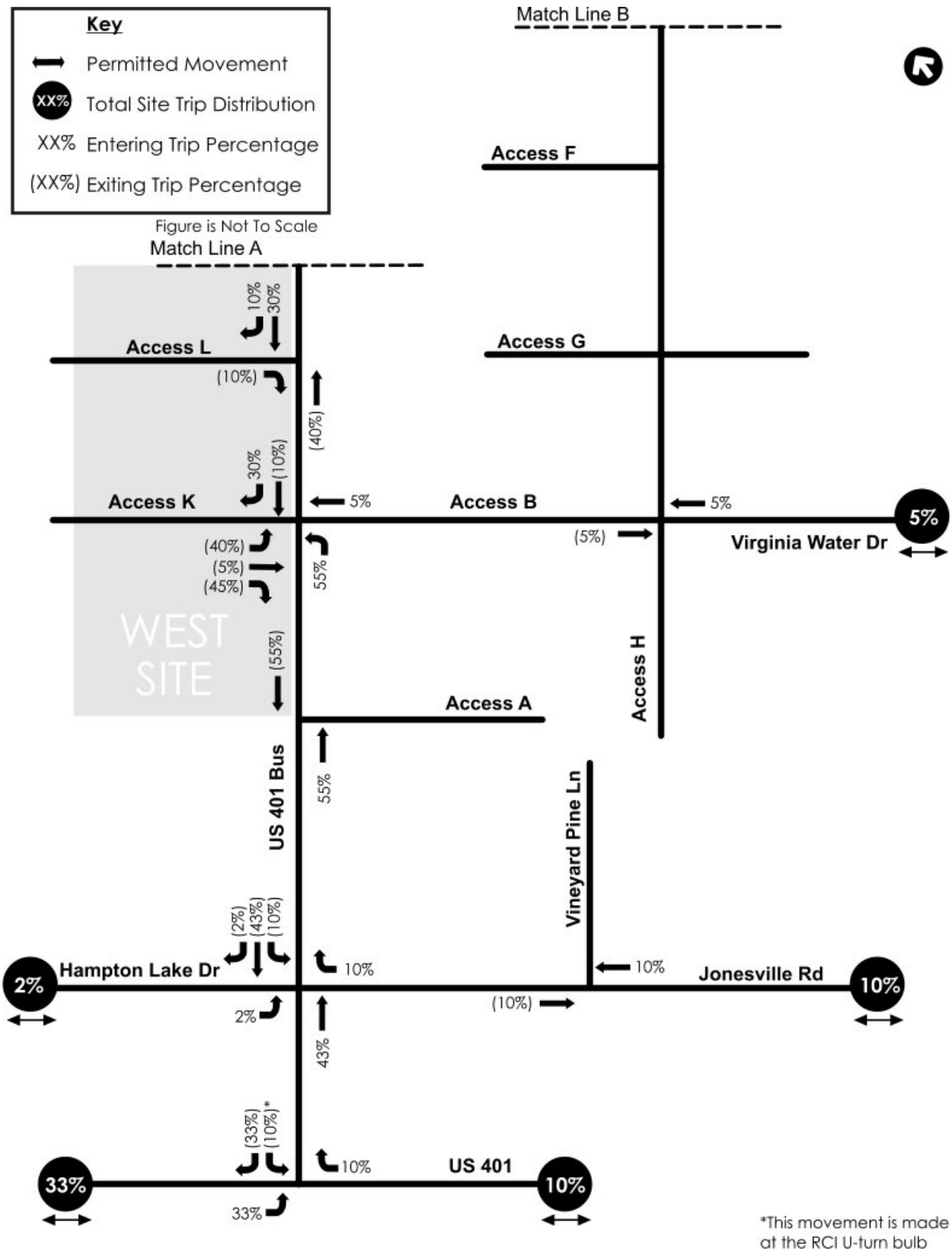
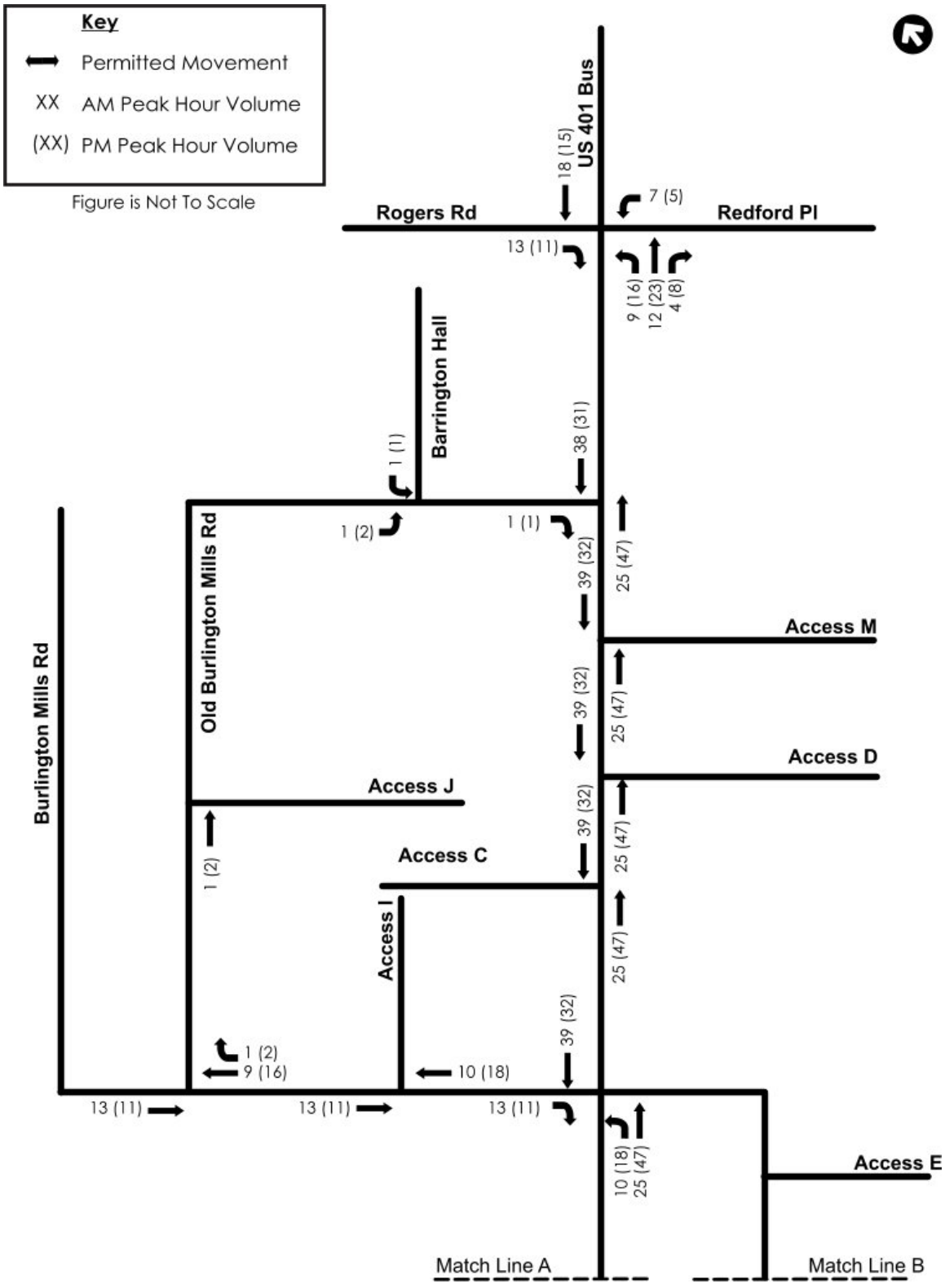

Key
Permitted Movement
XX% Total Site Trip Distribution
XX% Entering Trip Percentage
(XX%) Exiting Trip Percentage
Figure is Not To Scale
Match Line A
Match Line B
Access F
Access G
Access L
Access K
Access B
Access A
Access H
US 401 Bus
Vineyard Pine Ln
Virginia Water Dr
Hampton Lake Dr
Jonesville Rd
US 401
WEST SITE
10%
30%
(10%)
(40%)
5%
55%
(5%)
(45%)
(55%)
(2%)
(43%)
2%
43%
(33%)
(10%)*
33%
*This movement is made at the RCI U-turn bulb

Figure 17: West Site Trip Assignment



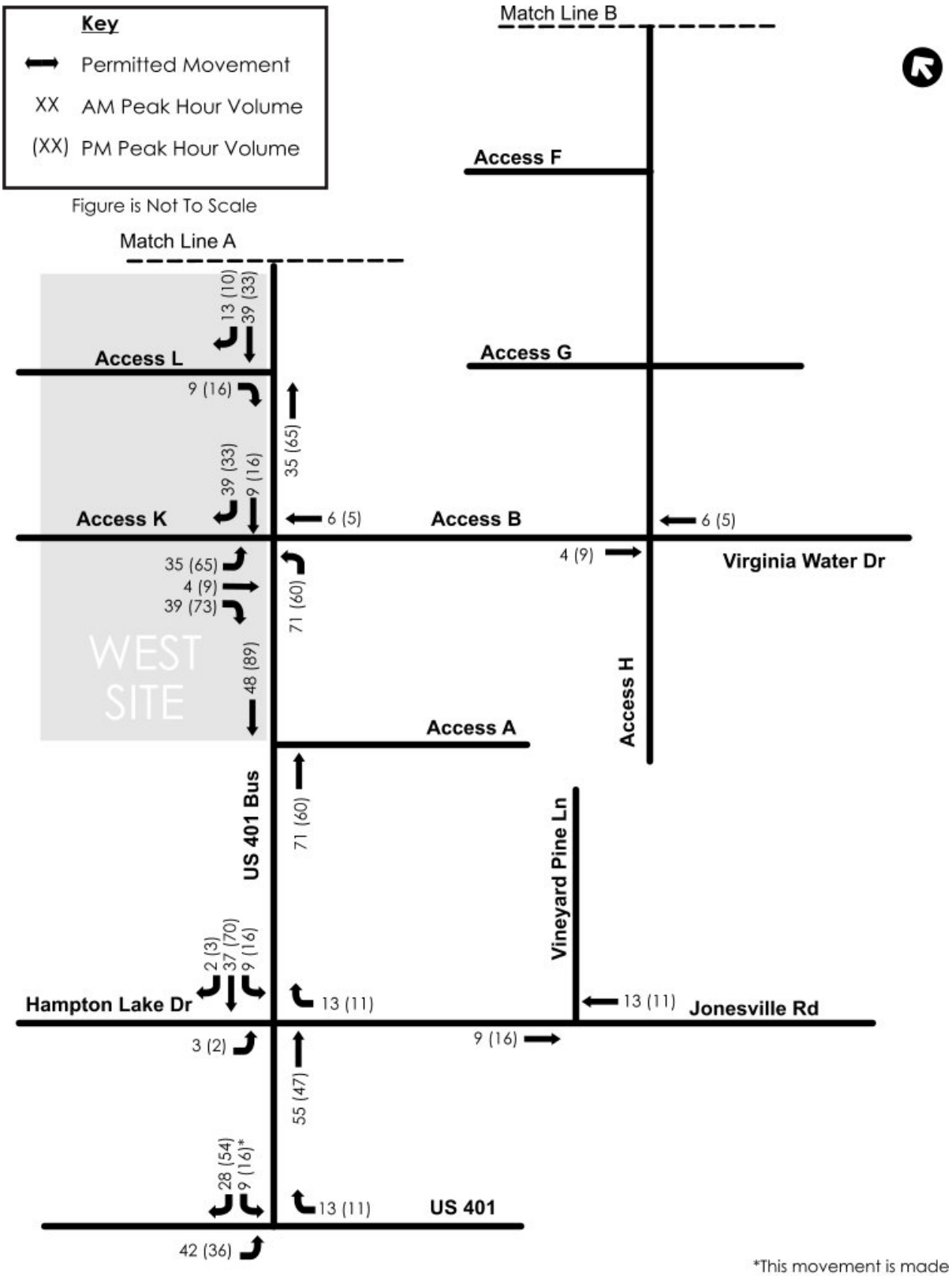
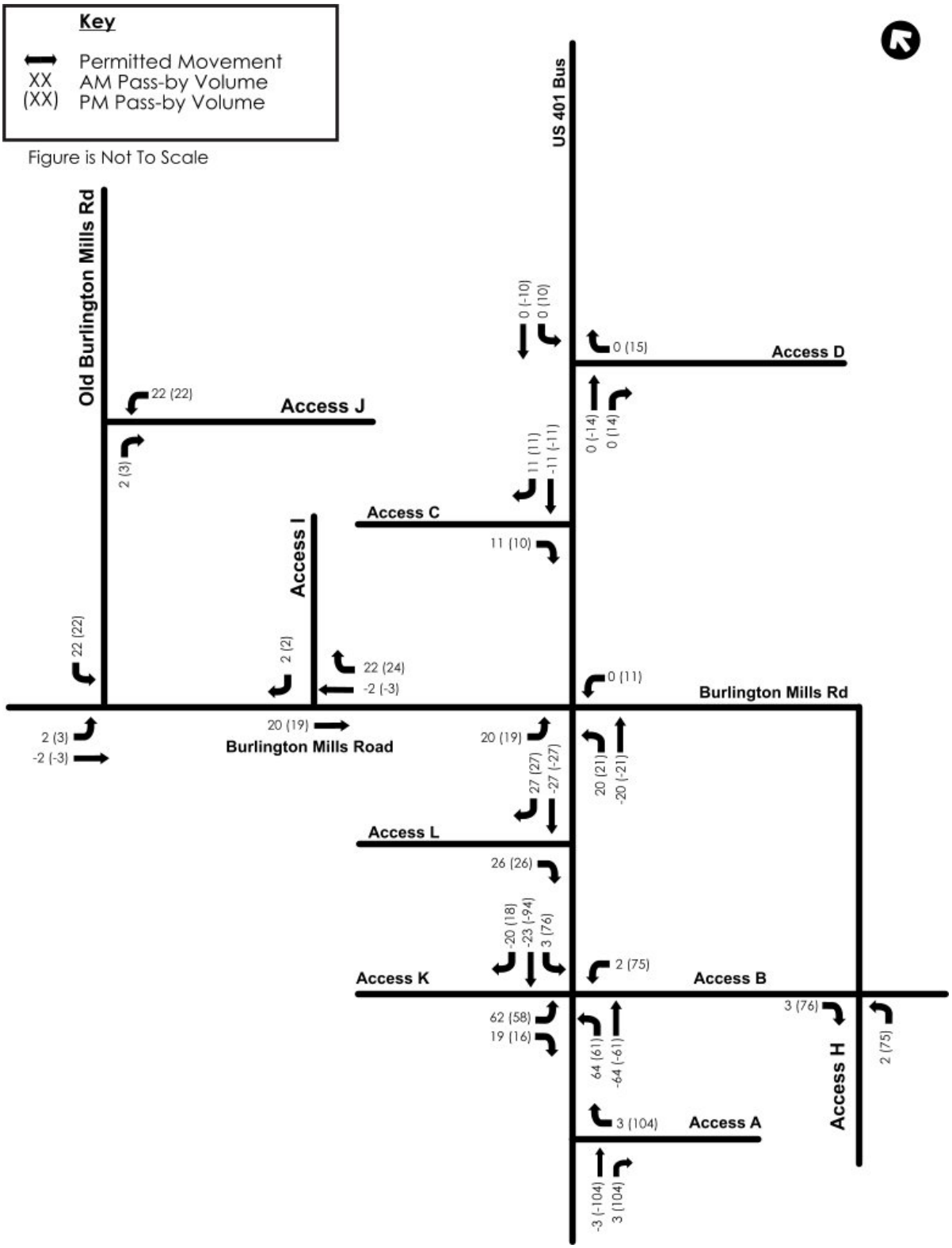

Key
Permitted Movement
XX AM Peak Hour Volume
(XX) PM Peak Hour Volume
Figure is Not To Scale
Match Line A
Match Line B
Access L
Access K
Access F
Access G
Access B
Access A
Access H
Virginia Water Dr
Jonesville Rd
Hampton Lake Dr
US 401 Bus
Vineyard Pine Ln
US 401
WEST SITE
13 (10)
39 (33)
9 (16)
35 (65)
39 (33)
9 (16)
6 (5)
6 (5)
4 (9)
35 (65)
4 (9)
39 (73)
71 (60)
48 (89)
71 (60)
2 (3)
37 (70)
9 (16)
13 (11)
13 (11)
9 (16)
3 (2)
55 (47)
28 (54)
9 (16)*
13 (11)
42 (36)
*This movement is made at the RCI U-turn bulb

Figure 168: Pass-By Trips



INTERSECTION ANALYSIS SHEET

Project:	**Wallbrook**
Location:	**Rolesville, NC**
Scenario:	**Approved Development Data**
N/S Street:	**Young Street**
E/W Street:	**Virginia Water Drive**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	0	0	0	0
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF =

	Virginia Water Drive						Young Street			Young Street		
	Eastbound			**Westbound**			**Northbound**			**Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
South Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
East Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
West Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PM PEAK HOUR
PM PHF =

	Virginia Water Drive						Young Street			Young Street		
	Eastbound			**Westbound**			**Northbound**			**Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
South Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
East Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
West Site Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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INTERSECTION ANALYSIS SHEET

Project:	**Wallbrook**
Location:	**Rolesville, NC**
Scenario:	**Approved Development Data**
N/S Street:	**Genovesa Drive**
E/W Street:	**Virginia Water Drive**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	0	0	0	0
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Genovesa Drive **Northbound**			Genovesa Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	0	0	0	1	0	0	0	0	0	0	0
South Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
East Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
West Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**0**	**3**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PM PEAK HOUR
PM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Genovesa Drive **Northbound**			Genovesa Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
South Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
East Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
West Site Traffic	0	1	0	0	1	0	0	0	0	0	0	0
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**0**	**4**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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INTERSECTION ANALYSIS SHEET

Project:	**Wallbrook**
Location:	**Rolesville, NC**
Scenario:	**Approved Development Data**
N/S Street:	**Redford Place Drive**
E/W Street:	**Virginia Water Drive**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	0	0	0	0
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Redford Place Drive **Northbound**			Redford Place Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	1	0	1	0	1	0	1	0	0	0	0	1
South Site Traffic	2	1	2	0	2	0	3	0	0	0	0	2
East Site Traffic	1	1	1	0	1	0	1	0	0	0	0	1
West Site Traffic	1	1	1	0	1	0	1	0	0	0	0	1
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**5**	**3**	**5**	**0**	**5**	**0**	**6**	**0**	**0**	**0**	**0**	**5**

PM PEAK HOUR
PM PHF =

	Virginia Water Drive **Eastbound**			Virginia Water Drive **Westbound**			Redford Place Drive **Northbound**			Redford Place Drive **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	2	1	2	0	1	0	1	0	0	0	0	1
South Site Traffic	3	2	3	0	2	0	3	0	0	0	0	3
East Site Traffic	1	1	2	0	1	0	1	0	0	0	0	1
West Site Traffic	2	1	2	0	1	0	1	0	0	0	0	1
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**8**	**5**	**9**	**0**	**5**	**0**	**6**	**0**	**0**	**0**	**0**	**6**

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INTERSECTION ANALYSIS SHEET

			AM In	AM Out	PM In	PM Out
Project:	**Wallbrook**	**North Side Net New Trips:**	0	0	0	0
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**Approved Development Data**					
N/S Street:	**Rogers Road/Redford Place Drive**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**S. Main Street (US 401)**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Redford Place Drive **Northbound**			Rogers Road **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	5	7	3	0	21	0	7	0	0	0	0	15
South Site Traffic	18	24	9	0	39	0	14	0	0	0	0	28
East Site Traffic	11	15	5	0	20	0	7	0	0	0	0	15
West Site Traffic	9	12	4	0	18	0	7	0	0	0	0	13
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**43**	**58**	**21**	**0**	**98**	**0**	**35**	**0**	**0**	**0**	**0**	**71**

PM PEAK HOUR
PM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Redford Place Drive **Northbound**			Rogers Road **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	19	26	9	0	13	0	5	0	0	0	0	9
South Site Traffic	33	45	16	0	44	0	17	0	0	0	0	32
East Site Traffic	15	20	7	0	14	0	5	0	0	0	0	11
West Site Traffic	16	23	8	0	15	0	5	0	0	0	0	11
Pass-by Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	**83**	**114**	**40**	**0**	**86**	**0**	**32**	**0**	**0**	**0**	**0**	**63**

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INTERSECTION ANALYSIS SHEET

Project:	**Wallbrook**
Location:	**Rolesville, NC**
Scenario:	**Approved Development Data**
N/S Street:	**Wallbrook Access B (Virginia Water Ext)/Access K**
E/W Street:	**S. Main Street (US 401)**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	0	0	0	0
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Wallbrook Access B (Vir. Water Ext) **Northbound**			Wallbrook Access K **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	82	0	0	28	0	0	0	0	0	0	0
South Site Traffic	0	9	84	42	0	0	98	0	18	0	0	0
East Site Traffic	0	59	22	0	31	0	26	0	0	0	0	0
West Site Traffic	71	0	0	0	9	39	0	6	0	35	4	39
Pass-by Traffic	64	-64	0	3	-23	20	2	0	0	62	0	19
Total Project Traffic	**135**	**86**	**106**	**45**	**45**	**59**	**126**	**6**	**18**	**97**	**4**	**58**

PM PEAK HOUR
PM PHF =

	S. Main Street (US 401) **Eastbound**			S. Main Street (US 401) **Westbound**			Wallbrook Access B (Vir. Water Ext) **Northbound**			Wallbrook Access K **Southbound**		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	52	0	0	102	0	0	0	0	0	0	0
South Site Traffic	0	16	98	48	0	0	179	0	33	0	0	0
East Site Traffic	0	42	16	0	44	0	37	0	0	0	0	0
West Site Traffic	60	0	0	0	16	33	0	5	0	65	9	73
Pass-by Traffic	61	-61	0	76	-94	18	75	0	0	58	0	16
Total Project Traffic	**121**	**49**	**114**	**124**	**68**	**51**	**291**	**5**	**33**	**123**	**9**	**89**

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INTERSECTION ANALYSIS SHEET

Project:	**Wallbrook**
Location:	**Rolesville, NC**
Scenario:	**Approved Development Data**
N/S Street:	**Virginia Water Dr Extension/Access B**
E/W Street:	**Access H/Virginia Water Dr Extension**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	0	0	0	0
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF =

	Access H			Virginia Water Dr Extension			Virginia Water Dr Extension			Access B		
		Eastbound			**Westbound**			**Northbound**			**Southbound**	
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	0	0	3	0	0	0	0	7	0	0	0
South Site Traffic	62	8	9	0	15	54	14	0	0	84	0	42
East Site Traffic	0	0	0	5	0	26	0	0	7	22	0	0
West Site Traffic	0	0	0	0	0	0	0	6	0	0	4	0
Pass-by Traffic	2	0	0	0	0	0	0	0	0	0	0	3
Total Project Traffic	**64**	**8**	**9**	**8**	**15**	**80**	**14**	**6**	**14**	**106**	**4**	**45**

PM PEAK HOUR
PM PHF =

	Access H			Virginia Water Dr Extension			Virginia Water Dr Extension			Access B		
		Eastbound			**Westbound**			**Northbound**			**Southbound**	
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Project Traffic												
North Site Traffic	0	0	0	9	0	0	0	0	5	0	0	0
South Site Traffic	115	16	16	0	16	97	16	0	0	97	0	49
East Site Traffic	0	0	0	8	0	37	0	0	5	16	0	0
West Site Traffic	0	0	0	0	0	0	0	5	0	0	9	0
Pass-by Traffic	75	0	0	0	0	0	0	0	0	0	0	76
Total Project Traffic	**190**	**16**	**16**	**17**	**16**	**134**	**16**	**5**	**10**	**113**	**9**	**125**

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Appendix E:
Trip Generation

The Point North

Table 1 - Trip Generation

Land Use	Intensity	Daily	AM Peak Hour			PM Peak Hour		
		Total	Total	In	Out	Total	In	Out
210 Single Family Detached Housing	96 d.u.	972	72	19	53	96	60	36

Appendix F:
Volume Development Worksheets

INTERSECTION ANALYSIS SHEET

Project:	**The Point North**
Location:	**Rolesville, NC**
Scenario:	**2022 North Side Update**
Ct. Date	**3/24/2022**
N/S Street:	**Young Street**
E/W Street:	**Virginia Water Drive**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	19	53	60	36
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF = 0.79

Description	Virginia Water Drive Eastbound			Westbound			Young Street Northbound			Young Street Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	8	0	58	0	0	0	29	295	0	0	331	6
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	8	0	58	0	0	0	29	295	0	0	331	6
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	1	0	8	0	0	0	4	39	0	0	43	1
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	23	0	0	8	0
Wallbrook Development	0	0	0	0	0	0	0	0	0	0	0	0
The Point (South)	0	0	0	0	0	0	0	70	0	0	38	0
Total Committed Traffic	0	0	0	0	0	0	0	93	0	0	46	0
2027 Background Traffic	9	0	66	0	0	0	33	427	0	0	420	7
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	20%
Inbound Project Traffic	0	0	0	0	0	0	9	0	0	0	0	4
Percent Assignment Outbound	20%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	11	0	24	0	0	0	0	0	0	0	0	0
Total Traffic - North Side	11	0	24	0	0	0	9	0	0	0	0	4
2027 Buildout Total	20	0	90	0	0	0	42	427	0	0	420	11
Percent Impact (Approach)		31.8%			-			1.9%			0.9%	

Overall Percent Impact 4.8%

PM PEAK HOUR
PM PHF = 0.95

Description	Virginia Water Drive Eastbound			Westbound			Young Street Northbound			Young Street Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	12	0	26	0	0	0	46	336	0	0	290	19
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2020 Existing Traffic	12	0	26	0	0	0	46	336	0	0	290	19
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	2	0	3	0	0	0	6	44	0	0	38	2
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	16	0	0	28	0
Wallbrook Development	0	0	0	0	0	0	0	0	0	0	0	0
The Point (South)	0	0	0	0	0	0	0	56	0	0	77	0
Total Committed Traffic	0	0	0	0	0	0	0	72	0	0	105	0
2027 Background Traffic	14	0	29	0	0	0	52	452	0	0	433	21
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	45.00%	0%	0%	0%	0%	20.00%
Inbound Project Traffic	0	0	0	0	0	0	27	0	0	0	0	12
Percent Assignment Outbound	20.00%	0%	45.00%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	7	0	16	0	0	0	0	0	0	0	0	0
Total Traffic - North Side	7	0	16	0	0	0	27	0	0	0	0	12
2027 Buildout Total	21	0	45	0	0	0	79	452	0	0	433	33
Percent Impact (Approach)		34.8%			-			5.1%			2.6%	

Overall Percent Impact 5.8%

INTERSECTION ANALYSIS SHEET

Project:	**The Point North**
Location:	**Rolesville, NC**
Scenario:	**2022 North Side Update**
Ct. Date	**3/24/2022**
N/S Street:	**Genovesa Drive**
E/W Street:	**Virginia Water Drive**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	19	53	60	36
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF = 0.49

Description	Virginia Water Drive Eastbound			Virginia Water Drive Westbound			Genovesa Drive Northbound			Genovesa Drive Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	0	40	0	2	30	0	3	0	2	2	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	0	40	0	2	30	0	3	0	2	2	0	0
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	0	5	0	0	4	0	0	0	0	0	0	0
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	0	0	0	0	0
Wallbrook Development	0	3	0	0	4	0	0	0	0	0	0	0
The Point (South)	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	0	3	0	0	4	0	0	0	0	0	0	0
2027 Background Traffic	0	48	0	2	38	0	3	0	2	2	0	0
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	35%	65%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	7	12	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	35%	0%	65%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	19	0	34	0	0	0
Total Traffic - North Side	0	0	7	12	0	0	19	0	34	0	0	0
2027 Buildout Total	0	48	7	14	38	0	22	0	36	2	0	0
Percent Impact (Approach)		12.7%			23.1%			91.4%			0.0%	

Overall Percent Impact 43.1%

PM PEAK HOUR
PM PHF = 0.70

Description	Virginia Water Drive Eastbound			Virginia Water Drive Westbound			Genovesa Drive Northbound			Genovesa Drive Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	0	32	3	2	31	3	5	0	1	0	1	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	0	32	3	2	31	3	5	0	1	0	1	0
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	0	4	0	0	4	0	1	0	0	0	0	0
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	0	0	0	0	0
Wallbrook Development	0	4	0	0	4	0	0	0	0	0	0	0
The Point (South)	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	0	4	0	0	4	0	0	0	0	0	0	0
2027 Background Traffic	0	40	3	2	39	3	6	0	1	0	1	0
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	35.00%	65.00%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	21	39	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	35.00%	0%	65.00%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	13	0	23	0	0	0
Total Traffic - North Side	0	0	21	39	0	0	13	0	23	0	0	0
2027 Buildout Total	0	40	24	41	39	3	19	0	24	0	1	0
Percent Impact (Approach)		32.8%			47.0%			83.7%			0.0%	

Overall Percent Impact 50.3%

INTERSECTION ANALYSIS SHEET

Project:	**The Point North**
Location:	**Rolesville, NC**
Scenario:	**2022 North Side Update**
Ct. Date	**3/24/2022**
N/S Street:	**Redford Place Drive**
E/W Street:	**Virginia Water Drive**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	19	53	60	36
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF = 0.86

Description	Virginia Water Drive Eastbound			Virginia Water Drive Westbound			Redford Place Drive Northbound			Redford Place Drive Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	33	12	4	8	20	33	13	48	12	8	14	11
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	33	12	4	8	20	33	13	48	12	8	14	11
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	4	2	1	1	3	4	2	6	2	1	2	1
Virginia Water Dr. Extension Diversion	9	4	8	0	6	0	27	0	0	0	0	3
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	0	0	0	0	0
Wallbrook Development	5	3	5	0	5	0	6	0	0	0	0	5
The Point (South)	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	5	3	5	0	5	0	6	0	0	0	0	5
2027 Background Traffic	51	21	18	9	34	37	48	54	14	9	16	20
Project Traffic - North Side												
Percent Assignment Inbound	0%	20%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%
Inbound Project Traffic	0	4	0	0	0	0	0	0	0	3	0	0
Percent Assignment Outbound	0%	0%	0%	0%	20%	15%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	11	8	0	0	0	0	0	0
Total Traffic - North Side	0	4	0	0	11	8	0	0	0	3	0	0
2027 Buildout Total	51	25	18	9	45	45	48	54	14	12	16	20
Percent Impact (Approach)		4.3%			19.2%			0.0%			6.3%	

Overall Percent Impact 7.3%

PM PEAK HOUR
PM PHF = 0.91

Description	Virginia Water Drive Eastbound			Virginia Water Drive Westbound			Redford Place Drive Northbound			Redford Place Drive Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	38	14	17	6	6	28	7	44	5	42	53	65
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	38	14	17	6	6	28	7	44	5	42	53	65
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	5	2	2	1	1	4	1	6	1	6	7	9
Virginia Water Dr. Extension Diversion	11	4	30	0	2	0	25	0	0	0	0	19
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	0	0	0	0	0
Wallbrook Development	8	5	9	0	5	0	6	0	0	0	0	6
The Point (South)	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	8	5	9	0	5	0	6	0	0	0	0	6
2027 Background Traffic	62	25	58	7	14	32	39	50	6	48	60	99
Project Traffic - North Side												
Percent Assignment Inbound	0%	20.00%	0%	0%	0%	0%	0%	0%	0%	15.00%	0%	0%
Inbound Project Traffic	0	12	0	0	0	0	0	0	0	9	0	0
Percent Assignment Outbound	0%	0%	0%	0%	20.00%	15.00%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	7	5	0	0	0	0	0	0
Total Traffic - North Side	0	12	0	0	7	5	0	0	0	9	0	0
2027 Buildout Total	62	37	58	7	21	37	39	50	6	57	60	99
Percent Impact (Approach)		7.6%			18.5%			0.0%			4.2%	

Overall Percent Impact 6.2%

INTERSECTION ANALYSIS SHEET

Project:	**The Point North**
Location:	**Rolesville, NC**
Scenario:	**2022 North Side Update**
Ct. Date	**3/24/2022**
N/S Street:	**Rogers Road/Redford Place Drive**
E/W Street:	**S. Main Street (US 401)**

	AM In	AM Out	PM In	PM Out
North Side Net New Trips:	19	53	60	36
North Side Pass-By Trips:	0	0	0	0

Annual Growth Rate:	2.5%	**Existing Year:**	2022
Growth Factor:	0.131408	**Buildout Year:**	2027

AM PEAK HOUR
AM PHF = 0.84

Description	S. Main Street (US 401) Eastbound			S. Main Street (US 401) Westbound			Redford Place Drive Northbound			Rogers Road Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	182	222	35	43	439	114	97	63	57	74	17	299
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	182	222	35	43	439	114	97	63	57	74	17	299
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	24	29	5	6	58	15	13	8	7	10	2	39
Committed Projects												
Kalas Falls	0	0	0	0	0	12	0	0	0	4	0	0
Wallbrook Development	43	58	21	0	98	0	35	0	0	0	0	71
Jonesville TH + Redford Mixed Use	0	4	49	42	1	0	26	13	22	0	24	0
The Point (South)	0	0	0	0	0	35	0	0	0	19	0	0
Total Committed Traffic	43	62	70	42	99	47	61	13	22	23	24	71
2027 Background Traffic	249	313	110	91	596	176	171	84	86	107	43	409
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	3	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	8	0	0	0	0
Total Traffic - North Side	0	0	0	0	0	0	0	8	0	0	3	0
2027 Buildout Total	249	313	110	91	596	176	171	92	86	107	46	409
Percent Impact (Approach)		0.0%			0.0%			2.3%			0.5%	

Overall Percent Impact 0.4%

PM PEAK HOUR
PM PHF = 0.96

Description	S. Main Street (US 401) Eastbound			S. Main Street (US 401) Westbound			Redford Place Drive Northbound			Rogers Road Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	269	313	55	68	239	135	70	85	108	156	97	247
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2022 Existing Traffic	269	313	55	68	239	135	70	85	108	156	97	247
Growth Factor (0.025 per year)	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
2027 Background Growth	35	41	7	9	31	18	9	11	14	20	13	32
Committed Projects												
Kalas Falls	0	0	0	0	0	8	0	0	0	14	0	0
Wallbrook Development	83	114	40	0	86	0	32	0	0	0	0	63
Jonesville TH + Redford Mixed Use	0	3	13	12	4	0	21	10	19	0	6	0
The Point (South)	0	0	0	0	0	28	0	0	0	39	0	0
Total Committed Traffic	83	117	53	12	90	36	53	10	19	53	6	63
2027 Background Traffic	387	471	115	89	360	189	132	106	141	229	116	342
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15.00%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	0	0	0	9	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	15.00%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	5	0	0	0	0
Total Traffic - North Side	0	0	0	0	0	0	0	5	0	0	9	0
2027 Buildout Total	387	471	115	89	360	189	132	111	141	229	125	342
Percent Impact (Approach)		0.0%			0.0%			1.3%			1.3%	

Overall Percent Impact 0.5%

INTERSECTION ANALYSIS SHEET

		AM In	AM Out	PM In	PM Out
Project:	**The Point North**	**North Side Net New Trips:**	19	53	60	36
Location:	**Rolesville, NC**	**North Side Pass-By Trips:**	0	0	0	0
Scenario:	**2022 North Side Update**					
Ct. Date	**Balanced with Burlington Mills/Wallbrook Projections**					
N/S Street:	**Wallbrook Access B (Virginia Water Ext)/Access K**	**Annual Growth Rate:**	2.5%	**Existing Year:**	2022	
E/W Street:	**S. Main Street (US 401)**	**Growth Factor:**	0.131408	**Buildout Year:**	2027	

AM PEAK HOUR
AM PHF =

Description	S. Main Street (US 401) Eastbound			S. Main Street (US 401) Westbound			Wallbrook Access B (Vir. Water Ext) Northbound			Wallbrook Access K Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	528	0	0	701	0	0	0	0	0	0	0
2022 Existing Traffic	0	528	0	0	701	0	0	0	0	0	0	0
Growth Factor (0.025 per year)	0.000	0.131	0.000	0.000	0.131	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2027 Background Growth	0	69	0	0	92	0	0	0	0	0	0	0
Virginia Water Dr. Extension Diversion	0	0	18	9	0	0	43	0	22	0	0	0
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	0	0	0	0	0
Wallbrook Development	135	86	106	45	45	59	126	6	18	97	4	58
Jonesville TH + Redford Mixed Use	0	53	0	0	27	0	0	0	0	0	0	0
The Point (South)	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	135	139	106	45	72	59	126	6	18	97	4	58
2027 Background Traffic	135	736	124	54	865	59	169	6	40	97	4	58
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	10%	5%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	2	1	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	10%	0%	5%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	5	0	3	0	0	0
Total Traffic - North Side	0	0	2	1	0	0	5	0	3	0	0	0
2027 Buildout Total	135	736	126	55	865	59	174	6	43	97	4	58
Percent Impact (Approach)		0.2%			0.1%			3.6%			0.0%	

Overall Percent Impact 0.5%

PM PEAK HOUR
PM PHF =

Description	S. Main Street (US 401) Eastbound			S. Main Street (US 401) Westbound			Wallbrook Access B (Vir. Water Ext) Northbound			Wallbrook Access K Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2022 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	582	0	0	447	0	0	0	0	0	0	0
2022 Existing Traffic	0	582	0	0	447	0	0	0	0	0	0	0
Growth Factor (0.025 per year)	0.000	0.131	0.000	0.000	0.131	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2027 Background Growth	0	76	0	0	59	0	0	0	0	0	0	0
Virginia Water Dr. Extension Diversion	0	0	53	27	0	0	31	0	15	0	0	0
Committed Projects												
Kalas Falls	0	0	0	0	0	0	0	0	0	0	0	0
Wallbrook Development	121	49	114	124	68	51	291	5	33	123	9	89
Jonesville TH + Redford Mixed Use	0	16	0	0	25	0	0	0	0	0	0	0
The Point (South)	0	0	0	0	0	0	0	0	0	0	0	0
Total Committed Traffic	121	65	114	124	93	51	291	5	33	123	9	89
2027 Background Traffic	121	723	167	151	599	51	322	5	48	123	9	89
Project Traffic - North Side												
Percent Assignment Inbound	0%	0%	10.00%	5.00%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	6	3	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	10.00%	0%	5.00%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	4	0	2	0	0	0
Total Traffic - North Side	0	0	6	3	0	0	4	0	2	0	0	0
2027 Buildout Total	121	723	173	154	599	51	326	5	50	123	9	89
Percent Impact (Approach)		0.6%			0.4%			1.6%			0.0%	

Overall Percent Impact 0.6%

Appendix G:

Synchro & SIDRA LOS Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	58	29	295	331	6
Future Volume (vph)	8	58	29	295	331	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Satd. Flow (prot)	1570	0	1719	1810	1839	0
Flt Permitted	0.994		0.950			
Satd. Flow (perm)	1570	0	1719	1810	1839	0
Link Speed (mph)	25			35	35	
Link Distance (ft)	2379			874	955	
Travel Time (s)	64.9			17.0	18.6	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	6%	6%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	37	373	427	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	58	29	295	331	6
Future Vol, veh/h	8	58	29	295	331	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	6	6	5	5	3	3
Mvmt Flow	10	73	37	373	419	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	870	423	427	0	-	0
Stage 1	423	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.15	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.245	-	-	-
Pot Cap-1 Maneuver	317	622	1116	-	-	-
Stage 1	652	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	307	622	1116	-	-	-
Mov Cap-2 Maneuver	307	-	-	-	-	-
Stage 1	630	-	-	-	-	-
Stage 2	636	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1116	-	553	-	-
HCM Lane V/C Ratio	0.033	-	0.151	-	-
HCM Control Delay (s)	8.3	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	40	4	4	30	4	4	4	4	4	4	4
Future Volume (vph)	4	40	4	4	30	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1733	0	0	1810	0	0	1750	0	0	1750	0
Flt Permitted		0.996			0.995			0.984			0.984	
Satd. Flow (perm)	0	1733	0	0	1810	0	0	1750	0	0	1750	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		676			2379			631			224	
Travel Time (s)		18.4			64.9			17.2			6.1	
Peak Hour Factor	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	77	0	0	24	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	40	4	4	30	4	4	4	4	4	4	4
Future Vol, veh/h	4	40	4	4	30	4	4	4	4	4	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	49	49	49	49	49	49	49	49	49	49	49	49
Heavy Vehicles, %	8	8	8	3	3	3	2	2	2	2	2	2
Mvmt Flow	8	82	8	8	61	8	8	8	8	8	8	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	69	0	0	90	0	0	191	187	86	191	187	65
Stage 1	-	-	-	-	-	-	102	102	-	81	81	-
Stage 2	-	-	-	-	-	-	89	85	-	110	106	-
Critical Hdwy	4.18	-	-	4.13	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.272	-	-	2.227	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1495	-	-	1499	-	-	769	708	973	769	708	999
Stage 1	-	-	-	-	-	-	904	811	-	927	828	-
Stage 2	-	-	-	-	-	-	918	824	-	895	807	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1495	-	-	1499	-	-	749	700	973	749	700	999
Mov Cap-2 Maneuver	-	-	-	-	-	-	749	700	-	749	700	-
Stage 1	-	-	-	-	-	-	899	806	-	921	823	-
Stage 2	-	-	-	-	-	-	896	819	-	873	802	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.8	9.7	9.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	791	1495	-	-	1499	-	-	797
HCM Lane V/C Ratio	0.031	0.005	-	-	0.005	-	-	0.031
HCM Control Delay (s)	9.7	7.4	0	-	7.4	0	-	9.7
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

MOVEMENT SUMMARY

Site: 3 [Existing AM (Site Folder: Young Street PUD - North Side Update)]

Virginia Water Drive at Redford Place Drive
Site Category: Existing AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Redford Place Drive														
3	L2	13	3.0	15	3.0	0.068	3.4	LOS A	0.3	7.4	0.18	0.07	0.18	37.4
8	T1	48	3.0	56	3.0	0.068	3.4	LOS A	0.3	7.4	0.18	0.07	0.18	36.8
18	R2	12	3.0	14	3.0	0.068	3.4	LOS A	0.3	7.4	0.18	0.07	0.18	35.4
Approach		73	3.0	85	3.0	0.068	3.4	LOS A	0.3	7.4	0.18	0.07	0.18	36.7
East: Virginia Water Drive														
1	L2	8	2.0	9	2.0	0.059	3.5	LOS A	0.3	6.4	0.25	0.12	0.25	37.5
6	T1	20	2.0	23	2.0	0.059	3.5	LOS A	0.3	6.4	0.25	0.12	0.25	36.9
16	R2	33	2.0	38	2.0	0.059	3.5	LOS A	0.3	6.4	0.25	0.12	0.25	35.4
Approach		61	2.0	71	2.0	0.059	3.5	LOS A	0.3	6.4	0.25	0.12	0.25	36.2
North: Redford Place Drive														
7	L2	8	3.0	9	3.0	0.030	3.1	LOS A	0.1	3.2	0.15	0.05	0.15	37.3
4	T1	14	3.0	16	3.0	0.030	3.1	LOS A	0.1	3.2	0.15	0.05	0.15	36.7
14	R2	11	3.0	13	3.0	0.030	3.1	LOS A	0.1	3.2	0.15	0.05	0.15	35.3
Approach		33	3.0	38	3.0	0.030	3.1	LOS A	0.1	3.2	0.15	0.05	0.15	36.4
West: Virginia Water Drive														
5	L2	33	4.0	38	4.0	0.045	3.2	LOS A	0.2	4.8	0.13	0.04	0.13	35.5
2	T1	12	4.0	14	4.0	0.045	3.2	LOS A	0.2	4.8	0.13	0.04	0.13	35.1
12	R2	4	4.0	5	4.0	0.045	3.2	LOS A	0.2	4.8	0.13	0.04	0.13	33.8
Approach		49	4.0	57	4.0	0.045	3.2	LOS A	0.2	4.8	0.13	0.04	0.13	35.3
All Vehicles		216	2.9	251	2.9	0.068	3.3	LOS A	0.3	7.4	0.18	0.07	0.18	36.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: K:\RAL_TPTO_Traffic\015956012 Young Street PUD\2_2022-NorthSideUpdate\T4 - Analysis\Sidra\Virginia Water at Redford Place.sip9

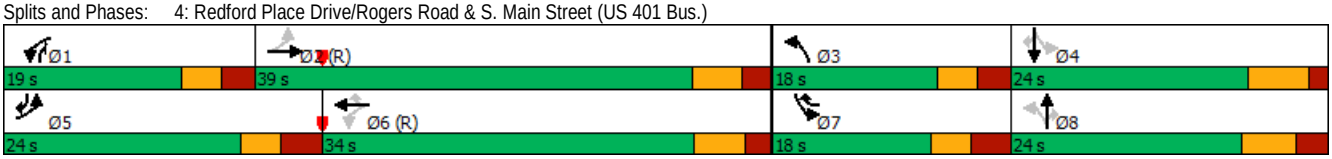
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	222	35	43	439	114	97	63	57	74	17	299
Future Volume (vph)	182	222	35	43	439	114	97	63	57	74	17	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			2%			0%	
Storage Length (ft)	180		0	200		725	155		535	190		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	70			100			50			75		
Satd. Flow (prot)	1770	1824	0	1752	1845	1568	1752	1844	1567	1770	1863	1583
Flt Permitted	0.244			0.574			0.404			0.708		
Satd. Flow (perm)	455	1824	0	1059	1845	1568	745	1844	1567	1319	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				136			100			232
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		1049			1274			972			1193	
Travel Time (s)		20.4			24.8			26.5			23.2	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	306	0	51	523	136	115	75	68	88	20	356
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes						Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	60	76		60	76	0	60	60	60	60	60	60
Trailing Detector (ft)	0	70		0	70	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	70		0	70	0	0	0	0	0	0	0
Detector 1 Size(ft)	60	6		60	6	20	60	60	60	60	60	60
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	15.0	0.0		15.0	0.0	0.0	15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	36.0		13.0	28.0	14.0	13.0	26.0	13.0	14.0	24.0	14.0
Total Split (s)	24.0	39.0		19.0	34.0	18.0	18.0	24.0	19.0	18.0	24.0	24.0
Total Split (%)	24.0%	39.0%		19.0%	34.0%	18.0%	18.0%	24.0%	19.0%	18.0%	24.0%	24.0%
Yellow Time (s)	3.0	3.8		3.0	3.8	3.0	3.0	4.1	3.0	3.0	4.5	3.0
All-Red Time (s)	3.1	2.3		2.6	2.1	3.1	2.6	2.5	2.6	3.1	1.6	3.1
Lost Time Adjust (s)	-1.1	-1.1		-0.6	-0.9	-1.1	-0.6	-1.6	-0.6	-1.1	-1.1	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	65.2	55.3		54.8	46.9	62.8	22.5	11.2	21.4	16.1	10.1	20.9
Actuated g/C Ratio	0.65	0.55		0.55	0.47	0.63	0.22	0.11	0.21	0.16	0.10	0.21
v/c Ratio	0.46	0.30		0.08	0.60	0.13	0.34	0.36	0.16	0.34	0.11	0.69
Control Delay	11.5	15.6		9.7	27.5	2.6	30.9	45.4	3.2	35.2	40.5	17.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	15.6		9.7	27.5	2.6	30.9	45.4	3.2	35.2	40.5	17.9
LOS	B	B		A	C	A	C	D	A	D	D	B
Approach Delay		13.9			21.5			27.8			22.2	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	54	109		12	253	0	57	45	0	53	12	77

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	93	176		28	#455	25	89	80	12	71	31	102
Internal Link Dist (ft)		969			1194			892			1113	
Turn Bay Length (ft)	180			200		725	155		535	190		
Base Capacity (vph)	554	1012		740	865	1065	358	350	503	299	353	592
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.30		0.07	0.60	0.13	0.32	0.21	0.14	0.29	0.06	0.60

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 20.5 Intersection LOS: C
Intersection Capacity Utilization 60.0% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	26	46	336	290	19
Future Volume (vph)	12	26	46	336	290	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Satd. Flow (prot)	1619	0	1770	1863	1795	0
Flt Permitted	0.984		0.950			
Satd. Flow (perm)	1619	0	1770	1863	1795	0
Link Speed (mph)	25			35	35	
Link Distance (ft)	2379			874	955	
Travel Time (s)	64.9			17.0	18.6	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	48	354	325	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	26	46	336	290	19
Future Vol, veh/h	12	26	46	336	290	19
Conflicting Peds, #/hr	0	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	5	2	2	5	5
Mvmt Flow	13	27	48	354	305	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	765	316	325	0	-	0
Stage 1	315	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.218	-	-	-
Pot Cap-1 Maneuver	367	718	1235	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	353	717	1235	-	-	-
Mov Cap-2 Maneuver	353	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	636	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1235	-	541	-	-
HCM Lane V/C Ratio	0.039	-	0.074	-	-
HCM Control Delay (s)	8	-	12.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	32	4	4	31	4	5	4	4	4	4	4
Future Volume (vph)	4	32	4	4	31	4	5	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1759	0	0	1759	0	0	1526	0	0	893	0
Flt Permitted		0.995			0.995			0.982			0.984	
Satd. Flow (perm)	0	1759	0	0	1759	0	0	1526	0	0	893	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		676			2379			631			224	
Travel Time (s)		18.4			64.9			17.2			6.1	
Confl. Peds. (#/hr)			2	2								
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	17%	17%	17%	100%	100%	100%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	58	0	0	56	0	0	19	0	0	18	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 14.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	32	4	4	31	4	5	4	4	4	4	4
Future Vol, veh/h	4	32	4	4	31	4	5	4	4	4	4	4
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	6	6	6	6	6	6	17	17	17	100	100	100
Mvmt Flow	6	46	6	6	44	6	7	6	6	6	6	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	50	0	0	54	0	0	128	125	51	126	125	47
Stage 1	-	-	-	-	-	-	63	63	-	59	59	-
Stage 2	-	-	-	-	-	-	65	62	-	67	66	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.27	6.67	6.37	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	7.1	6.5	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.653	4.153	3.453	4.4	4.9	4.2
Pot Cap-1 Maneuver	1531	-	-	1526	-	-	812	738	976	665	616	802
Stage 1	-	-	-	-	-	-	912	814	-	755	687	-
Stage 2	-	-	-	-	-	-	909	815	-	747	682	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1531	-	-	1523	-	-	794	731	974	653	610	802
Mov Cap-2 Maneuver	-	-	-	-	-	-	794	731	-	653	610	-
Stage 1	-	-	-	-	-	-	907	809	-	752	684	-
Stage 2	-	-	-	-	-	-	891	812	-	734	678	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.8	9.5	10.4
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	819	1531	-	-	1523	-	-	679
HCM Lane V/C Ratio	0.023	0.004	-	-	0.004	-	-	0.025
HCM Control Delay (s)	9.5	7.4	0	-	7.4	0	-	10.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

MOVEMENT SUMMARY

Site: 3 [Existing PM (Site Folder: Young Street PUD - North Side Update)]

Virginia Water Drive at Redford Place Drive
Site Category: Existing PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Redford Place Drive														
3	L2	7	2.0	8	2.0	0.051	3.4	LOS A	0.2	5.5	0.24	0.11	0.24	37.7
8	T1	44	2.0	48	2.0	0.051	3.4	LOS A	0.2	5.5	0.24	0.11	0.24	37.1
18	R2	5	2.0	5	2.0	0.051	3.4	LOS A	0.2	5.5	0.24	0.11	0.24	35.6
Approach		56	2.0	62	2.0	0.051	3.4	LOS A	0.2	5.5	0.24	0.11	0.24	37.0
East: Virginia Water Drive														
1	L2	6	3.0	7	3.0	0.036	3.3	LOS A	0.2	3.9	0.23	0.10	0.23	37.5
6	T1	6	3.0	7	3.0	0.036	3.3	LOS A	0.2	3.9	0.23	0.10	0.23	36.9
16	R2	28	3.0	31	3.0	0.036	3.3	LOS A	0.2	3.9	0.23	0.10	0.23	35.4
Approach		40	3.0	44	3.0	0.036	3.3	LOS A	0.2	3.9	0.23	0.10	0.23	35.9
North: Redford Place Drive														
7	L2	42	2.0	46	2.0	0.133	3.8	LOS A	0.6	15.9	0.10	0.03	0.10	36.8
4	T1	53	2.0	58	2.0	0.133	3.8	LOS A	0.6	15.9	0.10	0.03	0.10	36.2
14	R2	65	2.0	71	2.0	0.133	3.8	LOS A	0.6	15.9	0.10	0.03	0.10	34.8
Approach		160	2.0	176	2.0	0.133	3.8	LOS A	0.6	15.9	0.10	0.03	0.10	35.8
West: Virginia Water Drive														
5	L2	38	2.0	42	2.0	0.063	3.5	LOS A	0.3	6.8	0.25	0.12	0.25	35.8
2	T1	14	2.0	15	2.0	0.063	3.5	LOS A	0.3	6.8	0.25	0.12	0.25	35.3
12	R2	17	2.0	19	2.0	0.063	3.5	LOS A	0.3	6.8	0.25	0.12	0.25	34.0
Approach		69	2.0	76	2.0	0.063	3.5	LOS A	0.3	6.8	0.25	0.12	0.25	35.3
All Vehicles		325	2.1	357	2.1	0.133	3.6	LOS A	0.6	15.9	0.17	0.07	0.17	35.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: K:\RAL_TPTO_Traffic\015956012 Young Street PUD\2_2022-NorthSideUpdate\T4 - Analysis\Sidra\Virginia Water at Redford Place.sip9

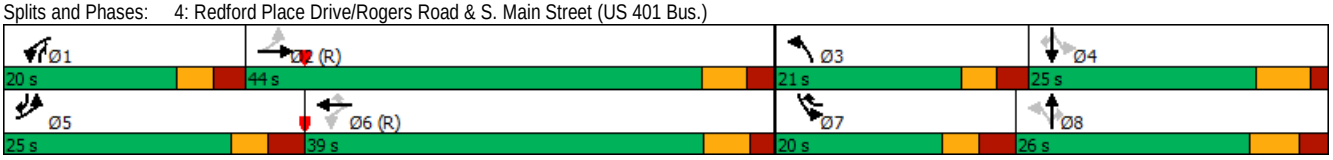
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	313	55	69	239	135	70	85	108	156	97	247
Future Volume (vph)	269	313	55	69	239	135	70	85	108	156	97	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			2%			0%	
Storage Length (ft)	180		0	200		725	155		535	190		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	70			100			50			75		
Satd. Flow (prot)	1770	1815	0	1770	1863	1583	1752	1844	1567	1770	1863	1583
Flt Permitted	0.501			0.505			0.692			0.473		
Satd. Flow (perm)	932	1815	0	939	1863	1560	1269	1844	1567	881	1863	1542
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				141			113			257
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		1049			1274			972			1193	
Travel Time (s)		20.4			24.8			26.5			23.2	
Confl. Peds. (#/hr)	2		2	2		2	2					2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	280	383	0	72	249	141	73	89	113	163	101	257
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes						Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	60	76		60	76	0	60	60	60	60	60	60
Trailing Detector (ft)	0	70		0	70	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	70		0	70	0	0	0	0	0	0	0
Detector 1 Size(ft)	60	6		60	6	20	60	60	60	60	60	60
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	15.0	0.0		15.0	0.0	0.0	15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5
Permitted Phases	2			6		6	8		8	4		4
Detector Phase	5	2		1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	36.0		13.0	28.0	14.0	13.0	26.0	13.0	14.0	24.0	14.0
Total Split (s)	25.0	44.0		20.0	39.0	20.0	21.0	26.0	20.0	20.0	25.0	25.0
Total Split (%)	22.7%	40.0%		18.2%	35.5%	18.2%	19.1%	23.6%	18.2%	18.2%	22.7%	22.7%
Yellow Time (s)	3.0	3.8		3.0	3.8	3.0	3.0	4.1	3.0	3.0	4.5	3.0
All-Red Time (s)	3.1	2.3		2.6	2.1	3.1	2.6	2.5	2.6	3.1	1.6	3.1
Lost Time Adjust (s)	-1.1	-1.1		-0.6	-0.9	-1.1	-0.6	-1.6	-0.6	-1.1	-1.1	-1.1
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	70.8	58.4		60.1	51.8	65.6	20.3	12.3	22.9	27.7	16.2	31.1
Actuated g/C Ratio	0.64	0.53		0.55	0.47	0.60	0.18	0.11	0.21	0.25	0.15	0.28
v/c Ratio	0.39	0.40		0.13	0.28	0.14	0.26	0.43	0.27	0.49	0.37	0.41
Control Delay	11.2	18.6		10.5	22.4	2.5	31.3	51.4	7.5	36.5	45.4	4.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	18.6		10.5	22.4	2.5	31.3	51.4	7.5	36.5	45.4	4.8
LOS	B	B		B	C	A	C	D	A	D	D	A
Approach Delay		15.5			14.5			28.0			22.6	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	84	161		19	111	0	38	60	0	90	64	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	142	266		42	204	30	70	107	42	140	115	48
Internal Link Dist (ft)		969			1194			892			1113	
Turn Bay Length (ft)	180			200		725	155		535	190		
Base Capacity (vph)	761	967		681	877	1005	377	352	504	350	338	690
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.40		0.11	0.28	0.14	0.19	0.25	0.22	0.47	0.30	0.37

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 19.0 Intersection LOS: B
Intersection Capacity Utilization 61.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	66	33	427	420	7
Future Volume (vph)	9	66	33	427	420	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Satd. Flow (prot)	1570	0	1719	1810	1841	0
Flt Permitted	0.994		0.950			
Satd. Flow (perm)	1570	0	1719	1810	1841	0
Link Speed (mph)	25			35	35	
Link Distance (ft)	2379			874	955	
Travel Time (s)	64.9			17.0	18.6	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	6%	6%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	95	0	42	541	541	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	66	33	427	420	7
Future Vol, veh/h	9	66	33	427	420	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	6	6	5	5	3	3
Mvmt Flow	11	84	42	541	532	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1162	537	541	0	-	0
Stage 1	537	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.15	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.245	-	-	-
Pot Cap-1 Maneuver	212	536	1013	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	203	536	1013	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	526	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1013	-	448	-	-
HCM Lane V/C Ratio	0.041	-	0.212	-	-
HCM Control Delay (s)	8.7	-	15.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	48	4	4	38	4	4	4	4	4	4	4
Future Volume (vph)	4	48	4	4	38	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1738	0	0	1817	0	0	1750	0	0	1750	0
Flt Permitted		0.997			0.996			0.984			0.984	
Satd. Flow (perm)	0	1738	0	0	1817	0	0	1750	0	0	1750	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		676			2379			631			224	
Travel Time (s)		18.4			64.9			17.2			6.1	
Peak Hour Factor	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	114	0	0	94	0	0	24	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	48	4	4	38	4	4	4	4	4	4	4
Future Vol, veh/h	4	48	4	4	38	4	4	4	4	4	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	49	49	49	49	49	49	49	49	49	49	49	49
Heavy Vehicles, %	8	8	8	3	3	3	2	2	2	2	2	2
Mvmt Flow	8	98	8	8	78	8	8	8	8	8	8	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	106	0	0	224	220	102	224	220	82
Stage 1	-	-	-	-	-	-	118	118	-	98	98	-
Stage 2	-	-	-	-	-	-	106	102	-	126	122	-
Critical Hdwy	4.18	-	-	4.13	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.272	-	-	2.227	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1473	-	-	1479	-	-	732	678	953	732	678	978
Stage 1	-	-	-	-	-	-	887	798	-	908	814	-
Stage 2	-	-	-	-	-	-	900	811	-	878	795	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1473	-	-	1479	-	-	712	670	953	712	670	978
Mov Cap-2 Maneuver	-	-	-	-	-	-	712	670	-	712	670	-
Stage 1	-	-	-	-	-	-	882	793	-	903	809	-
Stage 2	-	-	-	-	-	-	878	806	-	856	790	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	9.9	9.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	760	1473	-	-	1479	-	-	765
HCM Lane V/C Ratio	0.032	0.006	-	-	0.006	-	-	0.032
HCM Control Delay (s)	9.9	7.5	0	-	7.4	0	-	9.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

MOVEMENT SUMMARY

Site: 3 [Background AM (Site Folder: Young Street PUD - North Side Update)]

Virginia Water Drive at Redford Place Drive
Site Category: Background AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Redford Place Drive														
3	L2	48	3.0	56	3.0	0.111	3.9	LOS A	0.5	12.7	0.24	0.11	0.24	36.1
8	T1	54	3.0	63	3.0	0.111	3.9	LOS A	0.5	12.7	0.24	0.11	0.24	35.6
18	R2	14	3.0	16	3.0	0.111	3.9	LOS A	0.5	12.7	0.24	0.11	0.24	34.3
Approach		116	3.0	135	3.0	0.111	3.9	LOS A	0.5	12.7	0.24	0.11	0.24	35.7
East: Virginia Water Drive														
1	L2	9	2.0	10	2.0	0.083	3.9	LOS A	0.4	9.0	0.33	0.19	0.33	37.3
6	T1	34	2.0	40	2.0	0.083	3.9	LOS A	0.4	9.0	0.33	0.19	0.33	36.8
16	R2	37	2.0	43	2.0	0.083	3.9	LOS A	0.4	9.0	0.33	0.19	0.33	35.3
Approach		80	2.0	93	2.0	0.083	3.9	LOS A	0.4	9.0	0.33	0.19	0.33	36.1
North: Redford Place Drive														
7	L2	9	3.0	10	3.0	0.044	3.4	LOS A	0.2	4.7	0.24	0.11	0.24	37.2
4	T1	16	3.0	19	3.0	0.044	3.4	LOS A	0.2	4.7	0.24	0.11	0.24	36.7
14	R2	20	3.0	23	3.0	0.044	3.4	LOS A	0.2	4.7	0.24	0.11	0.24	35.2
Approach		45	3.0	52	3.0	0.044	3.4	LOS A	0.2	4.7	0.24	0.11	0.24	36.1
West: Virginia Water Drive														
5	L2	51	4.0	59	4.0	0.082	3.5	LOS A	0.4	9.2	0.14	0.05	0.14	35.7
2	T1	21	4.0	24	4.0	0.082	3.5	LOS A	0.4	9.2	0.14	0.05	0.14	35.3
12	R2	18	4.0	21	4.0	0.082	3.5	LOS A	0.4	9.2	0.14	0.05	0.14	33.9
Approach		90	4.0	105	4.0	0.082	3.5	LOS A	0.4	9.2	0.14	0.05	0.14	35.3
All Vehicles		331	3.0	385	3.0	0.111	3.7	LOS A	0.5	12.7	0.23	0.11	0.23	35.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: K:\RAL_TPTO_Traffic\015956012 Young Street PUD\2_2022-NorthSideUpdate\T4 - Analysis\Sidra\Virginia Water at Redford Place.sip9

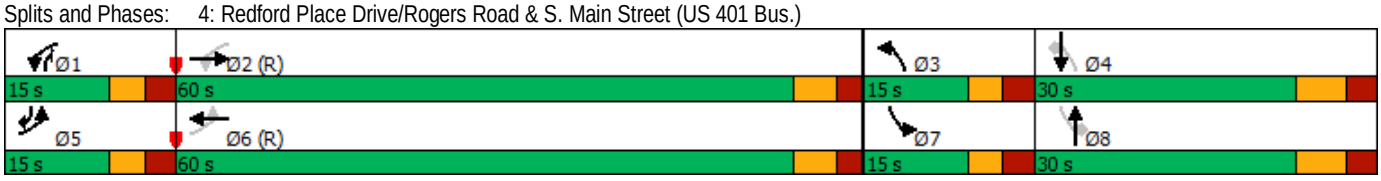
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	249	313	110	91	596	176	171	84	86	107	43	409
Future Volume (vph)	249	313	110	91	596	176	171	84	86	107	43	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			2%			0%	
Storage Length (ft)	125		0	225		0	155		535	190		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			100			50			75		
Satd. Flow (prot)	1770	1790	0	1752	1782	0	1752	1844	1567	1770	1863	1583
Flt Permitted	0.075			0.367			0.724			0.630		
Satd. Flow (perm)	140	1790	0	677	1782	0	1335	1844	1567	1174	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			16				102			174
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		1049			1274			972			1193	
Travel Time (s)		20.4			24.8			26.5			23.2	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	296	504	0	108	920	0	204	100	102	127	51	487
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	60	76		60	76		60	60	60	60	60	60
Trailing Detector (ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Position(ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Size(ft)	60	6		60	6		60	60	60	60	60	60
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	15.0	0.0		15.0	0.0		15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases	6			2			4		8	8		4
Detector Phase	5	2		1	6		3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	38.0		14.0	33.0		14.0	31.0	14.0	14.0	28.0	14.0
Total Split (s)	15.0	60.0		15.0	60.0		15.0	30.0	15.0	15.0	30.0	15.0
Total Split (%)	12.5%	50.0%		12.5%	50.0%		12.5%	25.0%	12.5%	12.5%	25.0%	12.5%
Maximum Green (s)	9.2	53.9		9.2	53.9		9.1	22.7	9.2	9.2	22.7	9.2
Yellow Time (s)	3.0	3.8		3.0	3.8		3.0	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	2.8	2.3		2.8	2.3		2.9	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	-0.8	-1.1		-0.8	-1.1		-0.9	-2.3	-0.8	-0.8	-2.3	-0.8
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	2.0	2.0	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.0			18.0			15.0			12.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	77.1	68.6		77.1	55.0		23.9	13.3	26.8	22.9	13.3	37.5
Actuated g/C Ratio	0.64	0.57		0.64	0.46		0.20	0.11	0.22	0.19	0.11	0.31
v/c Ratio	0.76	0.49		0.21	1.12		0.66	0.49	0.24	0.47	0.25	0.79
Control Delay	44.9	17.5		8.2	99.2		51.7	57.6	7.9	43.4	50.4	33.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	17.5		8.2	99.2		51.7	57.6	7.9	43.4	50.4	33.7
LOS	D	B		A	F		D	E	A	D	D	C
Approach Delay		27.6			89.7			42.2			36.8	
Approach LOS		C			F			D			D	
Queue Length 50th (ft)	163	210		26	~813		138	74	0	82	37	222
Queue Length 95th (ft)	#302	308		48	#948		188	117	35	122	69	314
Internal Link Dist (ft)		969			1194			892			1113	
Turn Bay Length (ft)	125			225			155		535	190		
Base Capacity (vph)	389	1031		533	825		309	384	448	277	388	614
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.49		0.20	1.12		0.66	0.26	0.23	0.46	0.13	0.79

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 53.8 Intersection LOS: D
Intersection Capacity Utilization 89.4% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)



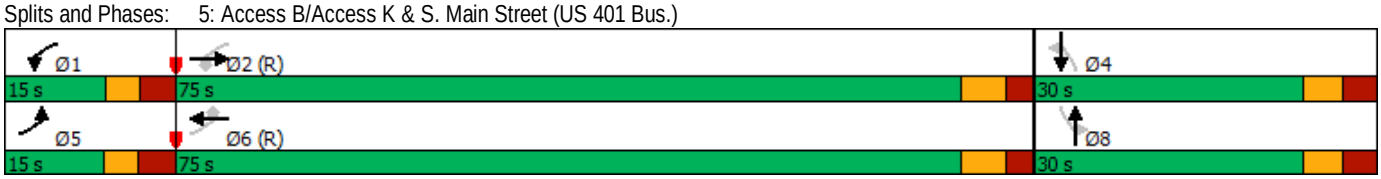
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	736	124	54	865	59	169	6	40	97	4	58
Future Volume (vph)	135	736	124	54	865	59	169	6	40	97	4	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-1%			3%			-5%	
Storage Length (ft)	140		140	350		350	0		100	225		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	150			100			25			100		
Satd. Flow (prot)	1770	1863	1583	1778	1872	1591	1743	1598	0	1814	1640	0
Flt Permitted	0.111			0.211			0.713			0.724		
Satd. Flow (perm)	207	1863	1583	395	1872	1591	1308	1598	0	1382	1640	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		44			64	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1083			1033			782			499	
Travel Time (s)		21.1			20.1			21.3			13.6	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	818	138	60	961	66	188	51	0	108	68	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	0.99	0.99	0.99	1.02	1.02	1.02	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	0	1	1	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	40	76	0	40	76	0	40	40		40	40	
Trailing Detector (ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Position(ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	15.0	0.0	0.0	15.0	0.0	0.0	3.0	10.0		3.0	10.0	
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	D.Pm	NA		D.Pm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6		2	2		6	4			8		
Detector Phase	5	2	2	1	6	6	4	8		8	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	26.0	26.0	14.0	28.0	28.0	30.0	29.0		29.0	30.0	
Total Split (s)	15.0	75.0	75.0	15.0	75.0	75.0	30.0	30.0		30.0	30.0	
Total Split (%)	12.5%	62.5%	62.5%	12.5%	62.5%	62.5%	25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	8.7	68.5	68.5	8.8	68.5	68.5	23.4	23.4		23.4	23.4	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9	3.9	3.5	3.5		3.5	3.5	
All-Red Time (s)	3.3	2.6	2.6	3.2	2.6	2.6	3.1	3.1		3.1	3.1	
Lost Time Adjust (s)	-1.3	-1.5	-1.5	-1.2	-1.5	-1.5	-1.6	-1.6		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	2.0	2.0		2.0	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		12.0	12.0		14.0	14.0	16.0	15.0		15.0	16.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	83.4	77.9	77.9	84.4	74.1	74.1	21.6	21.6		21.6	21.6	
Actuated g/C Ratio	0.70	0.65	0.65	0.70	0.62	0.62	0.18	0.18		0.18	0.18	
v/c Ratio	0.57	0.68	0.13	0.16	0.83	0.06	0.80	0.16		0.44	0.20	
Control Delay	17.2	18.6	4.3	6.1	27.2	1.2	71.2	15.0		48.6	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.2	18.6	4.3	6.1	27.2	1.2	71.2	15.0		48.6	12.0	
LOS	B	B	A	A	C	A	E	B		D	B	
Approach Delay		16.6			24.4			59.2			34.4	
Approach LOS		B			C			E			C	
Queue Length 50th (ft)	31	410	14	12	582	0	138	4		74	3	
Queue Length 95th (ft)	79	591	42	25	#919	11	#233	39		130	41	
Internal Link Dist (ft)		1003			953			702			419	
Turn Bay Length (ft)	140		140	350		350				225		
Base Capacity (vph)	275	1208	1058	397	1155	1016	272	367		287	392	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.55	0.68	0.13	0.15	0.83	0.06	0.69	0.14		0.38	0.17	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 25.0 Intersection LOS: C
Intersection Capacity Utilization 81.5% 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: 5: Access B/Access K & S. Main Street (US 401 Bus.)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	29	52	452	433	21
Future Volume (vph)	14	29	52	452	433	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Satd. Flow (prot)	1619	0	1770	1863	1799	0
Flt Permitted	0.984		0.950			
Satd. Flow (perm)	1619	0	1770	1863	1799	0
Link Speed (mph)	25			35	35	
Link Distance (ft)	2379			874	955	
Travel Time (s)	64.9			17.0	18.6	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	55	476	478	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	29	52	452	433	21
Future Vol, veh/h	14	29	52	452	433	21
Conflicting Peds, #/hr	0	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	5	2	2	5	5
Mvmt Flow	15	31	55	476	456	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1053	468	478	0	-	0
Stage 1	467	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.218	-	-	-
Pot Cap-1 Maneuver	247	589	1084	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	234	588	1084	-	-	-
Mov Cap-2 Maneuver	234	-	-	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1084	-	394	-	-
HCM Lane V/C Ratio	0.05	-	0.115	-	-
HCM Control Delay (s)	8.5	-	15.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	40	4	4	39	4	6	4	4	4	4	4
Future Volume (vph)	4	40	4	4	39	4	6	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1764	0	0	1764	0	0	1528	0	0	893	0
Flt Permitted		0.996			0.996			0.979			0.984	
Satd. Flow (perm)	0	1764	0	0	1764	0	0	1528	0	0	893	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		676			2379			631			224	
Travel Time (s)		18.4			64.9			17.2			6.1	
Confl. Peds. (#/hr)			2	2								
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	17%	17%	17%	100%	100%	100%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	68	0	0	21	0	0	18	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	14.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	40	4	4	39	4	6	4	4	4	4	4
Future Vol, veh/h	4	40	4	4	39	4	6	4	4	4	4	4
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	6	6	6	6	6	6	17	17	17	100	100	100
Mvmt Flow	6	57	6	6	56	6	9	6	6	6	6	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	62	0	0	65	0	0	151	148	62	149	148	59
Stage 1	-	-	-	-	-	-	74	74	-	71	71	-
Stage 2	-	-	-	-	-	-	77	74	-	78	77	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.27	6.67	6.37	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	7.1	6.5	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.653	4.153	3.453	4.4	4.9	4.2
Pot Cap-1 Maneuver	1516	-	-	1512	-	-	784	717	962	640	596	788
Stage 1	-	-	-	-	-	-	899	805	-	743	678	-
Stage 2	-	-	-	-	-	-	896	805	-	735	673	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1516	-	-	1509	-	-	767	710	960	628	590	788
Mov Cap-2 Maneuver	-	-	-	-	-	-	767	710	-	628	590	-
Stage 1	-	-	-	-	-	-	894	800	-	740	675	-
Stage 2	-	-	-	-	-	-	878	802	-	723	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.6	9.7	10.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	794	1516	-	-	1509	-	-	658
HCM Lane V/C Ratio	0.025	0.004	-	-	0.004	-	-	0.026
HCM Control Delay (s)	9.7	7.4	0	-	7.4	0	-	10.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

MOVEMENT SUMMARY

Site: 3 [Background PM (Site Folder: Young Street PUD - North Side Update)]

Virginia Water Drive at Redford Place Drive
Site Category: Background PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Redford Place Drive														
3	L2	39	2.0	43	2.0	0.090	3.9	LOS A	0.4	10.0	0.30	0.16	0.30	36.2
8	T1	50	2.0	55	2.0	0.090	3.9	LOS A	0.4	10.0	0.30	0.16	0.30	35.7
18	R2	6	2.0	7	2.0	0.090	3.9	LOS A	0.4	10.0	0.30	0.16	0.30	34.3
Approach		95	2.0	104	2.0	0.090	3.9	LOS A	0.4	10.0	0.30	0.16	0.30	35.8
East: Virginia Water Drive														
1	L2	7	3.0	8	3.0	0.052	3.6	LOS A	0.2	5.5	0.31	0.17	0.31	37.3
6	T1	14	3.0	15	3.0	0.052	3.6	LOS A	0.2	5.5	0.31	0.17	0.31	36.8
16	R2	32	3.0	35	3.0	0.052	3.6	LOS A	0.2	5.5	0.31	0.17	0.31	35.3
Approach		53	3.0	58	3.0	0.052	3.6	LOS A	0.2	5.5	0.31	0.17	0.31	36.0
North: Redford Place Drive														
7	L2	48	2.0	53	2.0	0.180	4.4	LOS A	0.9	22.3	0.21	0.09	0.21	36.5
4	T1	60	2.0	66	2.0	0.180	4.4	LOS A	0.9	22.3	0.21	0.09	0.21	36.0
14	R2	99	2.0	109	2.0	0.180	4.4	LOS A	0.9	22.3	0.21	0.09	0.21	34.6
Approach		207	2.0	227	2.0	0.180	4.4	LOS A	0.9	22.3	0.21	0.09	0.21	35.4
West: Virginia Water Drive														
5	L2	62	2.0	68	2.0	0.134	4.2	LOS A	0.6	15.6	0.29	0.15	0.29	35.9
2	T1	25	2.0	27	2.0	0.134	4.2	LOS A	0.6	15.6	0.29	0.15	0.29	35.4
12	R2	58	2.0	64	2.0	0.134	4.2	LOS A	0.6	15.6	0.29	0.15	0.29	34.0
Approach		145	2.0	159	2.0	0.134	4.2	LOS A	0.6	15.6	0.29	0.15	0.29	35.1
All Vehicles		500	2.1	549	2.1	0.180	4.1	LOS A	0.9	22.3	0.26	0.13	0.26	35.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: K:\RAL_TPTO_Traffic\015956012 Young Street PUD\2_2022-NorthSideUpdate\T4 - Analysis\Sidra\Virginia Water at Redford Place.sip9

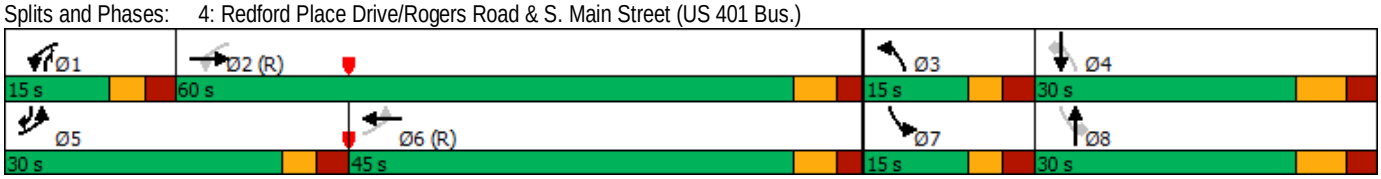
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	387	471	115	89	360	189	132	106	141	229	116	342
Future Volume (vph)	387	471	115	89	360	189	132	106	141	229	116	342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			2%			0%	
Storage Length (ft)	125		0	225		0	155		535	190		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			100			50			75		
Satd. Flow (prot)	1770	1800	0	1770	1757	0	1752	1844	1567	1770	1863	1583
Flt Permitted	0.166			0.291			0.547			0.586		
Satd. Flow (perm)	309	1800	0	542	1757	0	1004	1844	1567	1092	1863	1542
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			24				147			287
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		1049			1274			972			1193	
Travel Time (s)		20.4			24.8			26.5			23.2	
Confl. Peds. (#/hr)	2		2	2		2	2					2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	403	611	0	93	572	0	138	110	147	239	121	356
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	60	76		60	76		60	60	60	60	60	60
Trailing Detector (ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Position(ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Size(ft)	60	6		60	6		60	60	60	60	60	60
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	15.0	0.0		15.0	0.0		15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases	6			2			4		8	8		4
Detector Phase	5	2		1	6		3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	38.0		14.0	33.0		14.0	31.0	14.0	14.0	28.0	14.0
Total Split (s)	30.0	60.0		15.0	45.0		15.0	30.0	15.0	15.0	30.0	30.0
Total Split (%)	25.0%	50.0%		12.5%	37.5%		12.5%	25.0%	12.5%	12.5%	25.0%	25.0%
Yellow Time (s)	3.0	3.8		3.0	3.8		3.0	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	2.8	2.3		2.8	2.3		2.9	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	-0.8	-1.1		-0.8	-1.1		-0.9	-2.3	-0.8	-0.8	-2.3	-0.8
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Act Effct Green (s)	75.6	67.3		75.6	46.6		24.4	14.4	27.7	24.4	14.7	43.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.63	0.56		0.63	0.39		0.20	0.12	0.23	0.20	0.12	0.36
v/c Ratio	0.74	0.60		0.22	0.82		0.52	0.50	0.31	0.86	0.53	0.47
Control Delay	28.9	21.0		8.9	44.4		44.1	56.4	7.1	69.2	57.3	6.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	21.0		8.9	44.4		44.1	56.4	7.1	69.2	57.3	6.9
LOS	C	C		A	D		D	E	A	E	E	A
Approach Delay		24.2			39.5			33.8			36.2	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)	178	290		23	388		88	81	0	162	90	32
Queue Length 95th (ft)	311	466		48	#646		139	134	49	#248	146	92
Internal Link Dist (ft)		969			1194			892			1113	
Turn Bay Length (ft)	125			225			155		535	190		
Base Capacity (vph)	554	1015		451	696		269	384	495	278	388	759
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.60		0.21	0.82		0.51	0.29	0.30	0.86	0.31	0.47

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 32.3 Intersection LOS: C
Intersection Capacity Utilization 83.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)



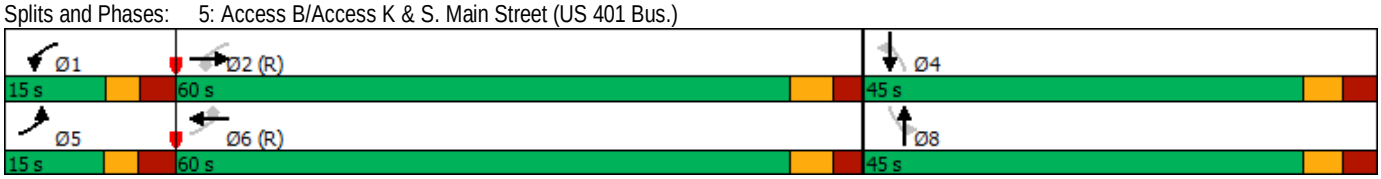
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	723	167	151	599	51	322	5	48	123	9	89
Future Volume (vph)	121	723	167	151	599	51	322	5	48	123	9	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-1%			3%			-5%	
Storage Length (ft)	140		140	350		350	0		100	225		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	150			100			25			100		
Satd. Flow (prot)	1770	1863	1583	1778	1872	1591	1743	1587	0	1814	1650	0
Flt Permitted	0.190			0.077			0.681			0.719		
Satd. Flow (perm)	354	1863	1583	144	1872	1591	1250	1587	0	1373	1650	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		53			99	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1083			1033			782			499	
Travel Time (s)		21.1			20.1			21.3			13.6	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	803	186	168	666	57	358	59	0	137	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	0.99	0.99	0.99	1.02	1.02	1.02	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	0	1	1	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	40	76	0	40	76	0	40	40		40	40	
Trailing Detector (ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Position(ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	15.0	0.0	0.0	15.0	0.0	0.0	3.0	10.0		3.0	10.0	
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	D.Pm	NA		D.Pm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6		2	2		6	4			8		
Detector Phase	5	2	2	1	6	6	4	8		8	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	26.0	26.0	14.0	28.0	28.0	30.0	29.0		29.0	30.0	
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	45.0	45.0		45.0	45.0	
Total Split (%)	12.5%	50.0%	50.0%	12.5%	50.0%	50.0%	37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9	3.9	3.5	3.5		3.5	3.5	
All-Red Time (s)	3.3	2.6	2.6	3.2	2.6	2.6	3.1	3.1		3.1	3.1	
Lost Time Adjust (s)	-1.3	-1.5	-1.5	-1.2	-1.5	-1.5	-1.6	-1.6		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	67.6	57.7	57.7	67.6	58.3	58.3	37.4	37.4		37.4	37.4	
Actuated g/C Ratio	0.56	0.48	0.48	0.56	0.49	0.49	0.31	0.31		0.31	0.31	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.43	0.90	0.23	0.78	0.73	0.07	0.92	0.11		0.32	0.19	
Control Delay	15.5	43.8	10.6	48.0	31.6	1.4	69.4	9.2		33.1	7.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.5	43.8	10.6	48.0	31.6	1.4	69.4	9.2		33.1	7.5	
LOS	B	D	B	D	C	A	E	A		C	A	
Approach Delay		34.9			32.8			60.9			21.8	
Approach LOS		C			C			E			C	
Queue Length 50th (ft)	44	579	42	73	422	0	258	3		78	5	
Queue Length 95th (ft)	74	#846	89	#188	584	10	#430	33		133	46	
Internal Link Dist (ft)		1003			953			702			419	
Turn Bay Length (ft)	140		140	350		350				225		
Base Capacity (vph)	319	895	807	220	909	818	416	564		457	616	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.42	0.90	0.23	0.76	0.73	0.07	0.86	0.10		0.30	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 15 (13%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Access B/Access K & S. Main Street (US 401 Bus.)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	90	42	427	420	11
Future Volume (vph)	20	90	42	427	420	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Satd. Flow (prot)	1579	0	1719	1810	1839	0
Flt Permitted	0.991		0.950			
Satd. Flow (perm)	1579	0	1719	1810	1839	0
Link Speed (mph)	25			35	35	
Link Distance (ft)	2379			874	955	
Travel Time (s)	64.9			17.0	18.6	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles (%)	6%	6%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	139	0	53	541	546	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	90	42	427	420	11
Future Vol, veh/h	20	90	42	427	420	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	6	6	5	5	3	3
Mvmt Flow	25	114	53	541	532	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1186	539	546	0	-	0
Stage 1	539	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.15	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.245	-	-	-
Pot Cap-1 Maneuver	205	535	1008	-	-	-
Stage 1	577	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	194	535	1008	-	-	-
Mov Cap-2 Maneuver	194	-	-	-	-	-
Stage 1	546	-	-	-	-	-
Stage 2	514	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1008	-	405	-	-
HCM Lane V/C Ratio	0.053	-	0.344	-	-
HCM Control Delay (s)	8.8	-	18.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.5	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	48	7	14	38	4	22	4	36	4	4	4
Future Volume (vph)	4	48	7	14	38	4	22	4	36	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1726	0	0	1806	0	0	1687	0	0	1750	0
Flt Permitted		0.997			0.988			0.982			0.984	
Satd. Flow (perm)	0	1726	0	0	1806	0	0	1687	0	0	1750	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		676			2379			631			224	
Travel Time (s)		18.4			64.9			17.2			6.1	
Peak Hour Factor	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	120	0	0	115	0	0	126	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	48	7	14	38	4	22	4	36	4	4	4
Future Vol, veh/h	4	48	7	14	38	4	22	4	36	4	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	49	49	49	49	49	49	49	49	49	49	49	49
Heavy Vehicles, %	8	8	8	3	3	3	2	2	2	2	2	2
Mvmt Flow	8	98	14	29	78	8	45	8	73	8	8	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	112	0	0	269	265	105	302	268	82
Stage 1	-	-	-	-	-	-	121	121	-	140	140	-
Stage 2	-	-	-	-	-	-	148	144	-	162	128	-
Critical Hdwy	4.18	-	-	4.13	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.272	-	-	2.227	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1473	-	-	1471	-	-	684	640	949	650	638	978
Stage 1	-	-	-	-	-	-	883	796	-	863	781	-
Stage 2	-	-	-	-	-	-	855	778	-	840	790	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1473	-	-	1471	-	-	658	623	949	582	621	978
Mov Cap-2 Maneuver	-	-	-	-	-	-	658	623	-	582	621	-
Stage 1	-	-	-	-	-	-	878	791	-	858	765	-
Stage 2	-	-	-	-	-	-	821	762	-	762	785	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.9	10.4	10.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	797	1473	-	-	1471	-	-	689
HCM Lane V/C Ratio	0.159	0.006	-	-	0.019	-	-	0.036
HCM Control Delay (s)	10.4	7.5	0	-	7.5	0	-	10.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	0.1

MOVEMENT SUMMARY

Site: 3 [Build AM (Site Folder: Young Street PUD - North Side Update)]

Virginia Water Drive at Redford Place Drive
Site Category: Build AM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Redford Place Drive														
3	L2	48	3.0	56	3.0	0.112	3.9	LOS A	0.5	12.8	0.25	0.12	0.25	36.1
8	T1	54	3.0	63	3.0	0.112	3.9	LOS A	0.5	12.8	0.25	0.12	0.25	35.6
18	R2	14	3.0	16	3.0	0.112	3.9	LOS A	0.5	12.8	0.25	0.12	0.25	34.3
Approach		116	3.0	135	3.0	0.112	3.9	LOS A	0.5	12.8	0.25	0.12	0.25	35.7
East: Virginia Water Drive														
1	L2	9	2.0	10	2.0	0.103	4.1	LOS A	0.4	11.4	0.33	0.20	0.33	37.3
6	T1	45	2.0	52	2.0	0.103	4.1	LOS A	0.4	11.4	0.33	0.20	0.33	36.7
16	R2	45	2.0	52	2.0	0.103	4.1	LOS A	0.4	11.4	0.33	0.20	0.33	35.3
Approach		99	2.0	115	2.0	0.103	4.1	LOS A	0.4	11.4	0.33	0.20	0.33	36.1
North: Redford Place Drive														
7	L2	12	3.0	14	3.0	0.047	3.4	LOS A	0.2	5.0	0.25	0.12	0.25	37.0
4	T1	16	3.0	19	3.0	0.047	3.4	LOS A	0.2	5.0	0.25	0.12	0.25	36.5
14	R2	20	3.0	23	3.0	0.047	3.4	LOS A	0.2	5.0	0.25	0.12	0.25	35.0
Approach		48	3.0	56	3.0	0.047	3.4	LOS A	0.2	5.0	0.25	0.12	0.25	36.0
West: Virginia Water Drive														
5	L2	51	4.0	59	4.0	0.086	3.5	LOS A	0.4	9.7	0.15	0.05	0.15	35.8
2	T1	25	4.0	29	4.0	0.086	3.5	LOS A	0.4	9.7	0.15	0.05	0.15	35.3
12	R2	18	4.0	21	4.0	0.086	3.5	LOS A	0.4	9.7	0.15	0.05	0.15	34.0
Approach		94	4.0	109	4.0	0.086	3.5	LOS A	0.4	9.7	0.15	0.05	0.15	35.3
All Vehicles		357	3.0	415	3.0	0.112	3.8	LOS A	0.5	12.8	0.25	0.12	0.25	35.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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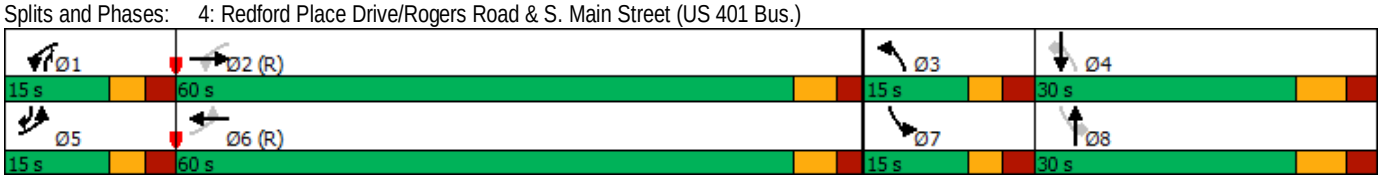
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	249	313	110	91	596	176	171	92	86	107	46	409
Future Volume (vph)	249	313	110	91	596	176	171	92	86	107	46	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			2%			0%	
Storage Length (ft)	125		0	225		0	155		535	190		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			100			50			75		
Satd. Flow (prot)	1770	1790	0	1752	1782	0	1752	1844	1567	1770	1863	1583
Flt Permitted	0.075			0.364			0.721			0.597		
Satd. Flow (perm)	140	1790	0	671	1782	0	1330	1844	1567	1112	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			16				102			174
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		1049			1274			972			1193	
Travel Time (s)		20.4			24.8			26.5			23.2	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	296	504	0	108	920	0	204	110	102	127	55	487
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	60	76		60	76		60	60	60	60	60	60
Trailing Detector (ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Position(ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Size(ft)	60	6		60	6		60	60	60	60	60	60
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	15.0	0.0		15.0	0.0		15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases	6			2			4		8	8		4
Detector Phase	5	2		1	6		3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	38.0		14.0	33.0		14.0	31.0	14.0	14.0	28.0	14.0
Total Split (s)	15.0	60.0		15.0	60.0		15.0	30.0	15.0	15.0	30.0	15.0
Total Split (%)	12.5%	50.0%		12.5%	50.0%		12.5%	25.0%	12.5%	12.5%	25.0%	12.5%
Yellow Time (s)	3.0	3.8		3.0	3.8		3.0	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	2.8	2.3		2.8	2.3		2.9	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	-0.8	-1.1		-0.8	-1.1		-0.9	-2.3	-0.8	-0.8	-2.3	-0.8
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Act Effct Green (s)	76.5	68.0		76.5	55.0		24.5	13.9	27.4	23.5	13.9	37.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.64	0.57		0.64	0.46		0.20	0.12	0.23	0.20	0.12	0.31
v/c Ratio	0.78	0.49		0.21	1.12		0.65	0.52	0.23	0.47	0.26	0.79
Control Delay	46.6	17.9		8.5	99.2		50.4	57.9	7.8	42.9	49.9	33.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	17.9		8.5	99.2		50.4	57.9	7.8	42.9	49.9	33.7
LOS	D	B		A	F		D	E	A	D	D	C
Approach Delay		28.5			89.7			41.9			36.8	
Approach LOS		C			F			D			D	
Queue Length 50th (ft)	165	213		26	~813		137	81	0	81	39	222
Queue Length 95th (ft)	#313	315		49	#948		186	125	35	120	72	314
Internal Link Dist (ft)		969			1194			892			1113	
Turn Bay Length (ft)	125			225			155		535	190		
Base Capacity (vph)	381	1023		527	825		315	384	455	275	388	614
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.49		0.20	1.12		0.65	0.29	0.22	0.46	0.14	0.79

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 53.9 Intersection LOS: D
Intersection Capacity Utilization 89.4% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)



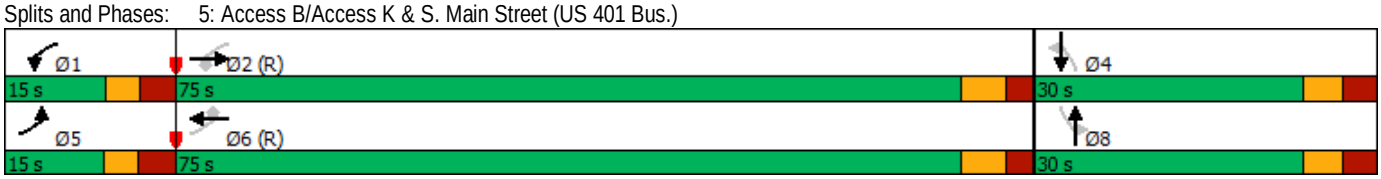
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	736	126	55	865	59	174	6	43	97	4	58
Future Volume (vph)	135	736	126	55	865	59	174	6	43	97	4	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-1%			3%			-5%	
Storage Length (ft)	140		140	350		350	0		100	225		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	150			100			25			100		
Satd. Flow (prot)	1770	1863	1583	1778	1872	1591	1743	1594	0	1814	1640	0
Flt Permitted	0.109			0.210			0.713			0.721		
Satd. Flow (perm)	203	1863	1583	393	1872	1591	1308	1594	0	1377	1640	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		48			64	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1083			1033			782			499	
Travel Time (s)		21.1			20.1			21.3			13.6	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	818	140	61	961	66	193	55	0	108	68	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	0.99	0.99	0.99	1.02	1.02	1.02	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	0	1	1	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	40	76	0	40	76	0	40	40		40	40	
Trailing Detector (ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Position(ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	15.0	0.0	0.0	15.0	0.0	0.0	3.0	10.0		3.0	10.0	
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	D.Pm	NA		D.Pm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6		2	2		6	4			8		
Detector Phase	5	2	2	1	6	6	4	8		8	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	26.0	26.0	14.0	28.0	28.0	30.0	29.0		29.0	30.0	
Total Split (s)	15.0	75.0	75.0	15.0	75.0	75.0	30.0	30.0		30.0	30.0	
Total Split (%)	12.5%	62.5%	62.5%	12.5%	62.5%	62.5%	25.0%	25.0%		25.0%	25.0%	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9	3.9	3.5	3.5		3.5	3.5	
All-Red Time (s)	3.3	2.6	2.6	3.2	2.6	2.6	3.1	3.1		3.1	3.1	
Lost Time Adjust (s)	-1.3	-1.5	-1.5	-1.2	-1.5	-1.5	-1.6	-1.6		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	83.1	77.6	77.6	84.1	73.8	73.8	21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.69	0.65	0.65	0.70	0.62	0.62	0.18	0.18		0.18	0.18	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.57	0.68	0.13	0.16	0.83	0.07	0.81	0.17		0.43	0.19	
Control Delay	17.8	18.8	4.4	6.2	27.6	1.2	72.0	14.4		48.2	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.8	18.8	4.4	6.2	27.6	1.2	72.0	14.4		48.2	12.0	
LOS	B	B	A	A	C	A	E	B		D	B	
Approach Delay		16.8			24.8			59.2			34.2	
Approach LOS		B			C			E			C	
Queue Length 50th (ft)	32	417	15	12	590	0	142	4		73	3	
Queue Length 95th (ft)	81	591	42	26	#919	11	#241	40		130	41	
Internal Link Dist (ft)		1003			953			702			419	
Turn Bay Length (ft)	140		140	350		350				225		
Base Capacity (vph)	272	1204	1054	395	1151	1012	272	370		286	392	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.55	0.68	0.13	0.15	0.83	0.07	0.71	0.15		0.38	0.17	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 25.3 Intersection LOS: C
Intersection Capacity Utilization 81.8% 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: 5: Access B/Access K & S. Main Street (US 401 Bus.)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	45	79	452	433	33
Future Volume (vph)	21	45	79	452	433	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		100			
Satd. Flow (prot)	1617	0	1770	1863	1791	0
Flt Permitted	0.984		0.950			
Satd. Flow (perm)	1617	0	1770	1863	1791	0
Link Speed (mph)	25			35	35	
Link Distance (ft)	2379			874	955	
Travel Time (s)	64.9			17.0	18.6	
Confl. Peds. (#/hr)		1				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	0	83	476	491	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.5%		ICU Level of Service A	
Analysis Period (min) 15			

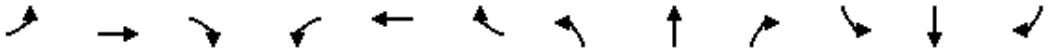
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	45	79	452	433	33
Future Vol, veh/h	21	45	79	452	433	33
Conflicting Peds, #/hr	0	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	5	2	2	5	5
Mvmt Flow	22	47	83	476	456	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1116	475	491	0	-	0
Stage 1	474	-	-	-	-	-
Stage 2	642	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.12	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.218	-	-	-
Pot Cap-1 Maneuver	227	584	1072	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	518	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	210	583	1072	-	-	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	518	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	1.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1072	-	372	-	-
HCM Lane V/C Ratio	0.078	-	0.187	-	-
HCM Control Delay (s)	8.6	-	16.9	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.7	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	40	24	41	39	4	19	4	24	4	4	4
Future Volume (vph)	4	40	24	41	39	4	19	4	24	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1703	0	0	1737	0	0	1482	0	0	893	0
Flt Permitted		0.997			0.976			0.980			0.984	
Satd. Flow (perm)	0	1703	0	0	1737	0	0	1482	0	0	893	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		676			2379			631			224	
Travel Time (s)		18.4			64.9			17.2			6.1	
Confl. Peds. (#/hr)			2	2								
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	17%	17%	17%	100%	100%	100%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	97	0	0	121	0	0	67	0	0	18	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	40	24	41	39	4	19	4	24	4	4	4
Future Vol, veh/h	4	40	24	41	39	4	19	4	24	4	4	4
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	70	70	70	70	70	70	70	70	70
Heavy Vehicles, %	6	6	6	6	6	6	17	17	17	100	100	100
Mvmt Flow	6	57	34	59	56	6	27	6	34	6	6	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	62	0	0	93	0	0	271	268	76	283	282	59
Stage 1	-	-	-	-	-	-	88	88	-	177	177	-
Stage 2	-	-	-	-	-	-	183	180	-	106	105	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.27	6.67	6.37	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	7.1	6.5	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.653	4.153	3.453	4.4	4.9	4.2
Pot Cap-1 Maneuver	1516	-	-	1477	-	-	652	613	945	512	492	788
Stage 1	-	-	-	-	-	-	884	794	-	642	601	-
Stage 2	-	-	-	-	-	-	785	723	-	708	652	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1516	-	-	1474	-	-	618	584	943	473	469	788
Mov Cap-2 Maneuver	-	-	-	-	-	-	618	584	-	473	469	-
Stage 1	-	-	-	-	-	-	879	789	-	639	576	-
Stage 2	-	-	-	-	-	-	740	693	-	675	648	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	3.7	10.3	11.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	746	1516	-	-	1474	-	-	544
HCM Lane V/C Ratio	0.09	0.004	-	-	0.04	-	-	0.032
HCM Control Delay (s)	10.3	7.4	0	-	7.5	0	-	11.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1

MOVEMENT SUMMARY

Site: 3 [Build PM (Site Folder: Young Street PUD - North Side Update)]

Virginia Water Drive at Redford Place Drive
Site Category: Build PM
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Redford Place Drive														
3	L2	39	2.0	43	2.0	0.092	4.0	LOS A	0.4	10.2	0.32	0.19	0.32	36.2
8	T1	50	2.0	55	2.0	0.092	4.0	LOS A	0.4	10.2	0.32	0.19	0.32	35.6
18	R2	6	2.0	7	2.0	0.092	4.0	LOS A	0.4	10.2	0.32	0.19	0.32	34.3
Approach		95	2.0	104	2.0	0.092	4.0	LOS A	0.4	10.2	0.32	0.19	0.32	35.8
East: Virginia Water Drive														
1	L2	7	3.0	8	3.0	0.063	3.7	LOS A	0.3	6.8	0.31	0.17	0.31	37.4
6	T1	21	3.0	23	3.0	0.063	3.7	LOS A	0.3	6.8	0.31	0.17	0.31	36.8
16	R2	37	3.0	41	3.0	0.063	3.7	LOS A	0.3	6.8	0.31	0.17	0.31	35.4
Approach		65	3.0	71	3.0	0.063	3.7	LOS A	0.3	6.8	0.31	0.17	0.31	36.0
North: Redford Place Drive														
7	L2	57	2.0	63	2.0	0.189	4.5	LOS A	0.9	23.7	0.23	0.10	0.23	36.4
4	T1	60	2.0	66	2.0	0.189	4.5	LOS A	0.9	23.7	0.23	0.10	0.23	35.8
14	R2	99	2.0	109	2.0	0.189	4.5	LOS A	0.9	23.7	0.23	0.10	0.23	34.4
Approach		216	2.0	237	2.0	0.189	4.5	LOS A	0.9	23.7	0.23	0.10	0.23	35.3
West: Virginia Water Drive														
5	L2	62	2.0	68	2.0	0.147	4.3	LOS A	0.7	17.2	0.30	0.17	0.30	36.0
2	T1	37	2.0	41	2.0	0.147	4.3	LOS A	0.7	17.2	0.30	0.17	0.30	35.4
12	R2	58	2.0	64	2.0	0.147	4.3	LOS A	0.7	17.2	0.30	0.17	0.30	34.1
Approach		157	2.0	173	2.0	0.147	4.3	LOS A	0.7	17.2	0.30	0.17	0.30	35.1
All Vehicles		533	2.1	586	2.1	0.189	4.3	LOS A	0.9	23.7	0.28	0.14	0.28	35.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: K:\RAL_TPTO_Traffic\015956012 Young Street PUD\2_2022-NorthSideUpdate\T4 - Analysis\Sidra\Virginia Water at Redford Place.sip9

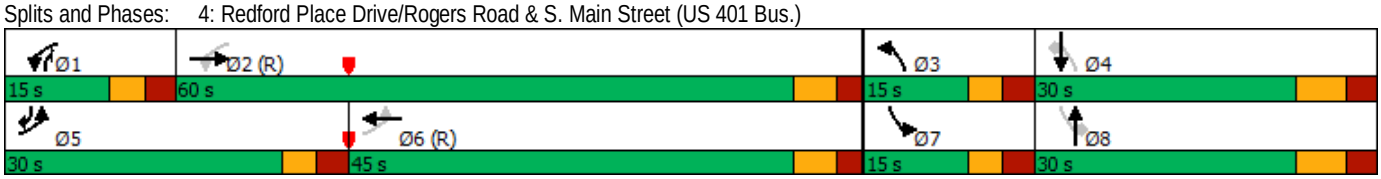
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	387	471	115	89	360	189	132	111	141	229	125	342
Future Volume (vph)	387	471	115	89	360	189	132	111	141	229	125	342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			2%			0%	
Storage Length (ft)	125		0	225		0	155		535	190		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			100			50			75		
Satd. Flow (prot)	1770	1800	0	1770	1757	0	1752	1844	1567	1770	1863	1583
Flt Permitted	0.164			0.288			0.520			0.568		
Satd. Flow (perm)	305	1800	0	536	1757	0	954	1844	1567	1058	1863	1542
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			24				147			284
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		1049			1274			972			1193	
Travel Time (s)		20.4			24.8			26.5			23.2	
Confl. Peds. (#/hr)	2		2	2		2	2					2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	403	611	0	93	572	0	138	116	147	239	130	356
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	60	76		60	76		60	60	60	60	60	60
Trailing Detector (ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Position(ft)	0	70		0	70		0	0	0	0	0	0
Detector 1 Size(ft)	60	6		60	6		60	60	60	60	60	60
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	15.0	0.0		15.0	0.0		15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases	6			2			4		8	8		4
Detector Phase	5	2		1	6		3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	38.0		14.0	33.0		14.0	31.0	14.0	14.0	28.0	14.0
Total Split (s)	30.0	60.0		15.0	45.0		15.0	30.0	15.0	15.0	30.0	30.0
Total Split (%)	25.0%	50.0%		12.5%	37.5%		12.5%	25.0%	12.5%	12.5%	25.0%	25.0%
Yellow Time (s)	3.0	3.8		3.0	3.8		3.0	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	2.8	2.3		2.8	2.3		2.9	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	-0.8	-1.1		-0.8	-1.1		-0.9	-2.3	-0.8	-0.8	-2.3	-0.8
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Act Effct Green (s)	75.1	66.8		75.1	46.4		24.9	14.9	28.2	24.9	15.2	43.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.63	0.56		0.63	0.39		0.21	0.12	0.24	0.21	0.13	0.37
v/c Ratio	0.74	0.61		0.22	0.82		0.53	0.51	0.31	0.86	0.55	0.47
Control Delay	29.9	21.5		9.2	44.8		43.8	56.1	7.0	68.7	57.5	7.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	21.5		9.2	44.8		43.8	56.1	7.0	68.7	57.5	7.0
LOS	C	C		A	D		D	E	A	E	E	A
Approach Delay		24.8			39.8			33.9			36.4	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)	181	293		23	391		87	85	0	161	96	33
Queue Length 95th (ft)	317	473		48	#646		138	140	48	#245	154	94
Internal Link Dist (ft)		969			1194			892			1113	
Turn Bay Length (ft)	125			225			155		535	190		
Base Capacity (vph)	548	1008		445	694		266	384	501	278	388	759
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.61		0.21	0.82		0.52	0.30	0.29	0.86	0.34	0.47

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 32.7 Intersection LOS: C
Intersection Capacity Utilization 87.2% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)



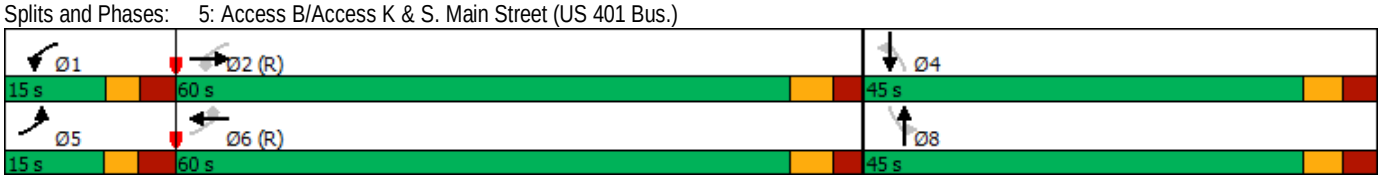
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	723	176	154	599	51	326	5	50	123	9	89
Future Volume (vph)	121	723	176	154	599	51	326	5	50	123	9	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-1%			3%			-5%	
Storage Length (ft)	140		140	350		350	0		100	225		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	150			100			25			100		
Satd. Flow (prot)	1770	1863	1583	1778	1872	1591	1743	1587	0	1814	1650	0
Flt Permitted	0.189			0.074			0.681			0.717		
Satd. Flow (perm)	352	1863	1583	139	1872	1591	1250	1587	0	1369	1650	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		56			99	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1083			1033			782			499	
Travel Time (s)		21.1			20.1			21.3			13.6	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	803	196	171	666	57	362	62	0	137	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	0.99	0.99	0.99	1.02	1.02	1.02	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	0	1	1	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	40	76	0	40	76	0	40	40		40	40	
Trailing Detector (ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Position(ft)	0	70	0	0	70	0	0	0		0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	15.0	0.0	0.0	15.0	0.0	0.0	3.0	10.0		3.0	10.0	
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	D.Pm	NA		D.Pm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6		2	2		6	4			8		
Detector Phase	5	2	2	1	6	6	4	8		8	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	26.0	26.0	14.0	28.0	28.0	30.0	29.0		29.0	30.0	
Total Split (s)	15.0	60.0	60.0	15.0	60.0	60.0	45.0	45.0		45.0	45.0	
Total Split (%)	12.5%	50.0%	50.0%	12.5%	50.0%	50.0%	37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9	3.9	3.5	3.5		3.5	3.5	
All-Red Time (s)	3.3	2.6	2.6	3.2	2.6	2.6	3.1	3.1		3.1	3.1	
Lost Time Adjust (s)	-1.3	-1.5	-1.5	-1.2	-1.5	-1.5	-1.6	-1.6		-1.6	-1.6	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	67.4	57.3	57.3	67.4	58.0	58.0	37.6	37.6		37.6	37.6	
Actuated g/C Ratio	0.56	0.48	0.48	0.56	0.48	0.48	0.31	0.31		0.31	0.31	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.44	0.90	0.24	0.80	0.74	0.07	0.93	0.12		0.32	0.19	
Control Delay	15.6	44.7	11.2	51.5	31.8	1.4	70.0	9.0		33.0	7.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.6	44.7	11.2	51.5	31.8	1.4	70.0	9.0		33.0	7.5	
LOS	B	D	B	D	C	A	E	A		C	A	
Approach Delay		35.4			33.7			61.1			21.7	
Approach LOS		D			C			E			C	
Queue Length 50th (ft)	44	579	47	78	422	0	262	3		78	5	
Queue Length 95th (ft)	74	#846	96	#197	584	10	#438	34		133	46	
Internal Link Dist (ft)		1003			953			702			419	
Turn Bay Length (ft)	140		140	350		350				225		
Base Capacity (vph)	317	889	803	218	905	815	416	566		456	616	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.42	0.90	0.24	0.78	0.74	0.07	0.87	0.11		0.30	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 37.6 Intersection LOS: D
Intersection Capacity Utilization 83.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Access B/Access K & S. Main Street (US 401 Bus.)



Intersection: 1: Young Street & Virginia Water Drive

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	72	49
Average Queue (ft)	31	8
95th Queue (ft)	64	32
Link Distance (ft)	2312	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		180
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Genovesa Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	8	10	32	31
Average Queue (ft)	0	0	11	9
95th Queue (ft)	5	6	36	31
Link Distance (ft)	642	2312	605	190
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Redford Place Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	38	31	31	10
Average Queue (ft)	2	5	1	1
95th Queue (ft)	15	23	10	10
Link Distance (ft)	1366	966	804	1191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	143	123	50	304	59	180	161	63	155	62	198
Average Queue (ft)	56	44	16	142	21	74	58	27	60	16	86
95th Queue (ft)	102	103	41	269	51	138	121	56	118	46	159
Link Distance (ft)		1004		1223			938			1142	1142
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	180		200		725	155		535	190		
Storage Blk Time (%)	0			3		1	0		0		
Queuing Penalty (veh)	0			5		1	0		0		

Network Summary

Network wide Queuing Penalty: 7

Intersection: 1: Young Street & Virginia Water Drive

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	55	38
Average Queue (ft)	23	9
95th Queue (ft)	50	33
Link Distance (ft)	2312	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		180
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Genovesa Drive & Virginia Water Drive

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	16	74	83
Average Queue (ft)	1	13	19
95th Queue (ft)	9	48	65
Link Distance (ft)	642	605	190
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Redford Place Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	43	37	38	20
Average Queue (ft)	6	2	4	1
95th Queue (ft)	30	14	23	10
Link Distance (ft)	1366	966	804	1191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	169	219	78	220	73	120	153	110	226	198	144
Average Queue (ft)	77	91	31	97	26	56	72	45	109	65	58
95th Queue (ft)	141	183	64	183	61	106	126	85	183	133	109
Link Distance (ft)		1004		1223			938			1142	1142
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	180		200		725	155		535	190		
Storage Blk Time (%)	0	1		1		0	0		2		
Queuing Penalty (veh)	1	2		1		0	1		2		

Network Summary

Network wide Queuing Penalty: 6

Intersection: 1: Young Street & Virginia Water Drive

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	88	38
Average Queue (ft)	39	10
95th Queue (ft)	67	33
Link Distance (ft)	2312	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		180
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Genovesa Drive & Virginia Water Drive

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	9	31	31
Average Queue (ft)	0	12	11
95th Queue (ft)	5	36	35
Link Distance (ft)	2312	605	190
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Redford Place Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	21	46	46	22
Average Queue (ft)	1	6	7	2
95th Queue (ft)	12	28	33	16
Link Distance (ft)	1366	966	804	1191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	224	481	325	1276	204	586	422	167	105	369
Average Queue (ft)	123	143	143	993	159	244	115	75	38	183
95th Queue (ft)	223	316	374	1617	238	644	440	146	83	317
Link Distance (ft)		1004		1224		938			1154	1154
Upstream Blk Time (%)				42						
Queuing Penalty (veh)				0						
Storage Bay Dist (ft)	125		225		155		535	190		
Storage Blk Time (%)	18	7		49	41	1		0		
Queuing Penalty (veh)	80	18		45	69	3		0		

Intersection: 5: Access B/Access K & S. Main Street (US 401 Bus.)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	164	414	140	211	529	58	282	198	135	94
Average Queue (ft)	72	162	28	39	266	13	130	35	61	33
95th Queue (ft)	134	311	98	120	472	41	240	107	115	65
Link Distance (ft)		1048			997		736			453
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140		140	350		350		100	225	
Storage Blk Time (%)	1	8			3		25	0		
Queuing Penalty (veh)	8	20			4		12	0		

Network Summary

Network wide Queuing Penalty: 260

Intersection: 1: Young Street & Virginia Water Drive

Movement	EB	NB	NB
Directions Served	LR	L	T
Maximum Queue (ft)	97	39	10
Average Queue (ft)	27	16	0
95th Queue (ft)	61	41	5
Link Distance (ft)	2312		850
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		180	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Genovesa Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	19	10	72	70
Average Queue (ft)	1	1	16	19
95th Queue (ft)	10	8	51	63
Link Distance (ft)	642	2312	605	190
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Redford Place Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	45	31	39	71
Average Queue (ft)	12	4	10	13
95th Queue (ft)	38	21	34	49
Link Distance (ft)	1366	966	804	1191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	225	918	325	994	179	188	126	265	839	252
Average Queue (ft)	185	326	118	447	91	77	50	217	356	103
95th Queue (ft)	275	669	327	858	156	140	91	315	901	195
Link Distance (ft)		1004		1224		938			1154	1154
Upstream Blk Time (%)		0							0	
Queuing Penalty (veh)		0							0	
Storage Bay Dist (ft)	125		225		155		535	190		
Storage Blk Time (%)	25	15		39	1	0		49	2	
Queuing Penalty (veh)	148	58		35	3	1		57	4	

Intersection: 5: Access B/Access K & S. Main Street (US 401 Bus.)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	289	941	290	368	515	183	508	200	145	123
Average Queue (ft)	93	419	131	94	256	17	239	69	74	42
95th Queue (ft)	237	766	334	206	418	98	431	200	131	91
Link Distance (ft)		1048			997		736			453
Upstream Blk Time (%)		1								
Queuing Penalty (veh)		0								
Storage Bay Dist (ft)	140		140	350		350		100	225	
Storage Blk Time (%)	1	33			3		48	0		
Queuing Penalty (veh)	7	95			7		26	0		

Network Summary

Network wide Queuing Penalty: 440

Intersection: 1: Young Street & Virginia Water Drive

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	97	50
Average Queue (ft)	46	10
95th Queue (ft)	80	36
Link Distance (ft)	2312	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		180
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Genovesa Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	15	38	61	36
Average Queue (ft)	1	1	24	11
95th Queue (ft)	8	13	55	35
Link Distance (ft)	642	2312	605	190
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Redford Place Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	27	32	46	44
Average Queue (ft)	2	8	8	5
95th Queue (ft)	15	29	31	25
Link Distance (ft)	1366	966	804	1191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	225	521	325	1266	204	518	243	162	175	418
Average Queue (ft)	134	160	189	987	154	200	81	73	43	213
95th Queue (ft)	234	351	431	1546	232	544	329	152	107	392
Link Distance (ft)		1004		1224		938			1154	1154
Upstream Blk Time (%)				31						
Queuing Penalty (veh)				0						
Storage Bay Dist (ft)	125		225		155		535	190		
Storage Blk Time (%)	19	8		51	36	3		1	0	
Queuing Penalty (veh)	84	20		47	64	7		0	0	

Intersection: 5: Access B/Access K & S. Main Street (US 401 Bus.)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	289	370	211	323	675	192	265	198	186	135
Average Queue (ft)	84	177	32	41	285	29	126	33	77	36
95th Queue (ft)	184	320	128	150	525	163	231	107	149	84
Link Distance (ft)		1048			997		736			453
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140		140	350		350		100	225	
Storage Blk Time (%)	3	10			4		23	0	0	0
Queuing Penalty (veh)	25	27			5		11	0	0	0

Network Summary

Network wide Queuing Penalty: 290

Intersection: 1: Young Street & Virginia Water Drive

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	73	62	10
Average Queue (ft)	32	22	0
95th Queue (ft)	58	54	6
Link Distance (ft)	2312		923
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		180	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Genovesa Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	19	30	71	74
Average Queue (ft)	1	2	32	22
95th Queue (ft)	10	14	63	67
Link Distance (ft)	642	2312	605	190
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Redford Place Drive & Virginia Water Drive

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	44	31	55
Average Queue (ft)	14	8	8	13
95th Queue (ft)	44	31	30	44
Link Distance (ft)	1366	966	804	1191
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Redford Place Drive/Rogers Road & S. Main Street (US 401 Bus.)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	225	758	324	702	179	183	111	265	844	552
Average Queue (ft)	165	274	108	422	94	90	51	228	442	147
95th Queue (ft)	265	573	305	714	162	153	87	317	996	483
Link Distance (ft)		1004		1224		938			1154	1154
Upstream Blk Time (%)									2	1
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)	125		225		155		535	190		
Storage Blk Time (%)	23	16		38	2	1		63	0	
Queuing Penalty (veh)	132	61		34	4	3		79	0	

Intersection: 5: Access B/Access K & S. Main Street (US 401 Bus.)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	290	917	290	287	484	173	506	200	161	143
Average Queue (ft)	105	404	125	92	251	19	258	69	72	44
95th Queue (ft)	271	729	327	201	422	98	434	200	132	95
Link Distance (ft)		1048			997		736			453
Upstream Blk Time (%)		0								
Queuing Penalty (veh)		0								
Storage Bay Dist (ft)	140		140	350		350		100	225	
Storage Blk Time (%)	0	32			3		57	0		
Queuing Penalty (veh)	2	95			6		32	0		

Network Summary

Network wide Queuing Penalty: 446

Appendix H:
Signal Plan and Timing Data

Intersection: S. Main St @ Redford Place Dr/Rogers Rd Collected by: TF

Signal Inventory #: 05-2229 Date: 4/20/22

AM Peak Hour

Coordinated: (Y) / N
Plan #: 2-1
Duration: 6:45 - 9:15 AM
Cycle Length: 100
Offset: 5
Phase Seq. Page: 1
Laging Phases: —
Timing Page: 1

Phase	1	2	3	4	5	6	7	8
Splits/Max	19	39	18	24	24	34	18	24
Min. Green	7	10	7	7	7	10	7	7
Yellow	3.0	3.8	3.0	4.5	3.0	3.8	3.0	4.1
Red	2.6	2.3	2.6	1.6	3.1	2.1	3.1	2.5
Veh. Ext.	3	5	3	3	3	5	3	3
Walk		4		4		4		4
Ped. Clear		25		13		18		15
Time B4 Reduce								
Time 2 Reduce								
Min. Gap								
Seconds/Actuation								

PM Peak Hour

Coordinated: (Y) / N
Plan #: 3-1
Duration: 3:45-6:15PM
Cycle Length: 110
Offset: 46
Phase Seq. Page: 1
Laging Phases: —
Timing Page: 1

Phase	1	2	3	4	5	6	7	8
Splits/Max	20	44	21	25	25	39	20	26
Min. Green								
Yellow								
Red								
Veh. Ext.								
Walk								
Ped. Clear								
Time B4 Reduce								
Time 2 Reduce								
Min. Gap								
Seconds/Actuation								

Notes:

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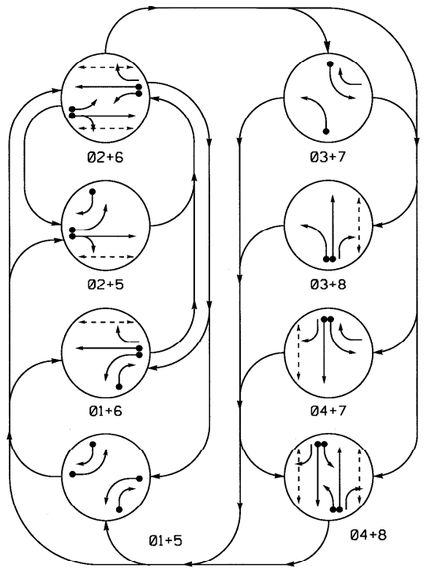
PROJECT REFERENCE NO.	SHEET NO.
05-2229	Sig. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

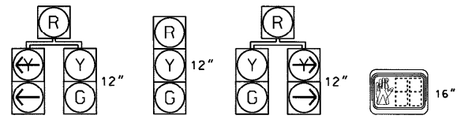
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
21	R→	R	→G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
41	R	R	R	R	R→	R	→G	G	R
42	R→	R	R→	R	R	R	G	G	R
61	R←	G←	R	G	R	R	R	R	Y
62	R	G	R	G	R←	R	R←	R	Y
81	R	R	R	R	R←	G←	R	G	R
82	R→	R→	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



21, 41, 61, 81 — 22 — 42, 62, 82 — P21, P22, P41, P42, P61, P62, P81, P82

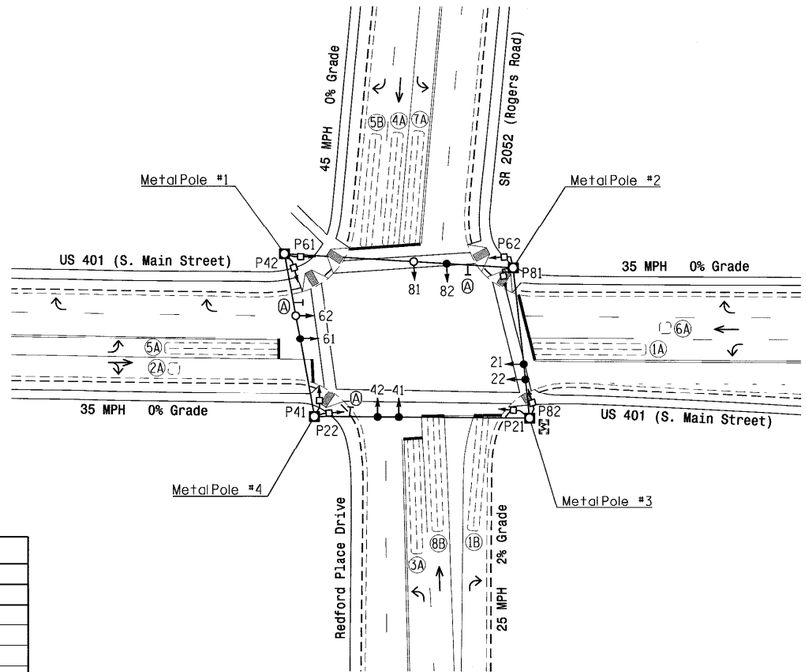
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	-
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A	6X6	70	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	15	-	Y
					8	Y	Y	-	-	3	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
5B	6X60	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	70	EXIST	-	6	Y	Y	-	-	-	-	-
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	15	-	-
					4	Y	Y	-	-	3	-	-
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	-

8 Phase Fully Actuated (Louisburg Rd. CLS #3)

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. Omit phase 3 during phase 4 on.
4. Omit phase 7 during phase 8 on.
5. Enable Backup Protect for phase 2 and 6 to allow the controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through an all red display.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Closed loop system data: Master Asset #: 10520. Controller Asset #: 2229.



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	→
[M]	Master Controller & Cabinet	[M]
○	Metal Strain Pole	○
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	1.0	3.0	1.0	1.0	1.0	3.0	1.0	1.0
Max Green 1 *	15	60	15	25	15	60	15	25
Yellow Clearance	3.0	3.8	3.0	4.5	3.0	3.8	3.0	4.1
Red Clearance	2.6	2.3	2.6	1.6	3.1	2.1	3.1	2.5
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0	2.0	2.0
Walk 1 *	-	4	-	4	-	4	-	4
Don't Walk 1	-	25	-	13	-	18	-	15
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	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.

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy, Garner, NC 27529

US 401 (S. Main Street)
at
SR 2052 (Rogers Road)/
Redford Place Drive

Division 5 Wake County Rolesville

PLAN DATE: December 2013 REVIEWED BY:
PREPARED BY: N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZEMBA
SIGNATURE 1/13/14 DATE
SIG. INVENTORY NO. 05-2229

13-JAN-2014 12:11
S:\mTS&SM\ITS Signals\Signal Design Section\Central Region\Div 5\05-2229\05229_sig_dsn_20140113.dgn
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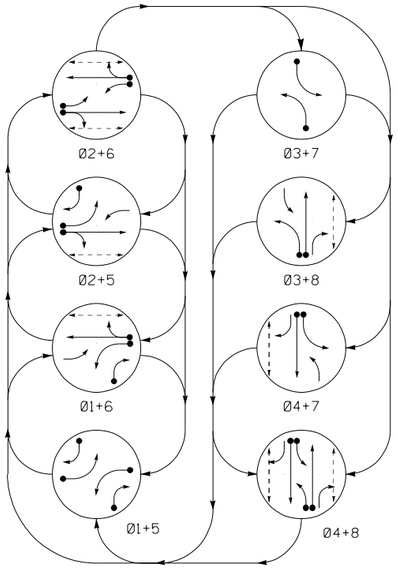
PROJECT REFERENCE NO.	SHEET NO.
U-6241	SIG 5.0

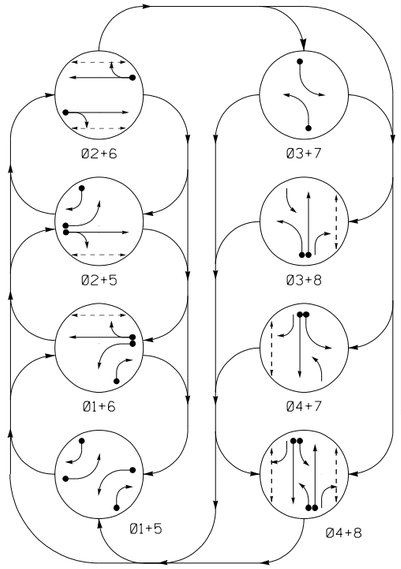
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	F Y	F Y	R	R	R	R	Y
21,22	R	R	G	G	R	R	R	R	Y
31	R	R	R	R	←	←	F Y	F Y	R
41	R	R	R	R	R	R	G	G	R
42	R/←	R	R/←	R	R	R	G	G	R
51	←	F Y	←	F Y	R	R	R	R	Y
61,62	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	F Y	←	F Y	R
81	R	R	R	R	R	G	R	G	R
82	R/←	R/←	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←	←	R	R	R	R	R	R	Y
21,22	R	R	G	G	R	R	R	R	Y
31	R	R	R	R	←	←	F Y	F Y	R
41	R	R	R	R	R	R	G	G	R
42	R/←	R	R/←	R	R	R	G	G	R
51	←	R	←	R	R	R	R	R	Y
61,62	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	F Y	←	F Y	R
81	R	R	R	R	R	G	R	G	R
82	R/←	R/←	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

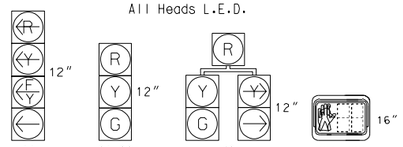
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	Yes	-	15*	-	N	-	X
					6▪	Yes	-	-	-	N	-	X
1B	6X40	0	2-4-2	-	1	Yes	-	15	-	N	-	X
2A	6X6	70	4	X	2	Yes	-	-	-	N	-	X
3A	6X40	0	2-4-2	-	3	Yes	-	15	-	N	-	X
					8	Yes	-	3	-	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	15*	-	N	-	X
					2▪	Yes	-	-	-	N	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	70	3	X	6	Yes	-	-	-	N	-	X
7A	6X60	0	2-4-2	-	7	Yes	-	15	-	N	-	X
					4	Yes	-	3	-	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	N	-	X

*Reduce Delay to 3 seconds during Alternate Phasing operation.
▪Disable phase call for loop during Alternate Phasing operation.

SIGNAL FACE I.D.

All Heads L.E.D.



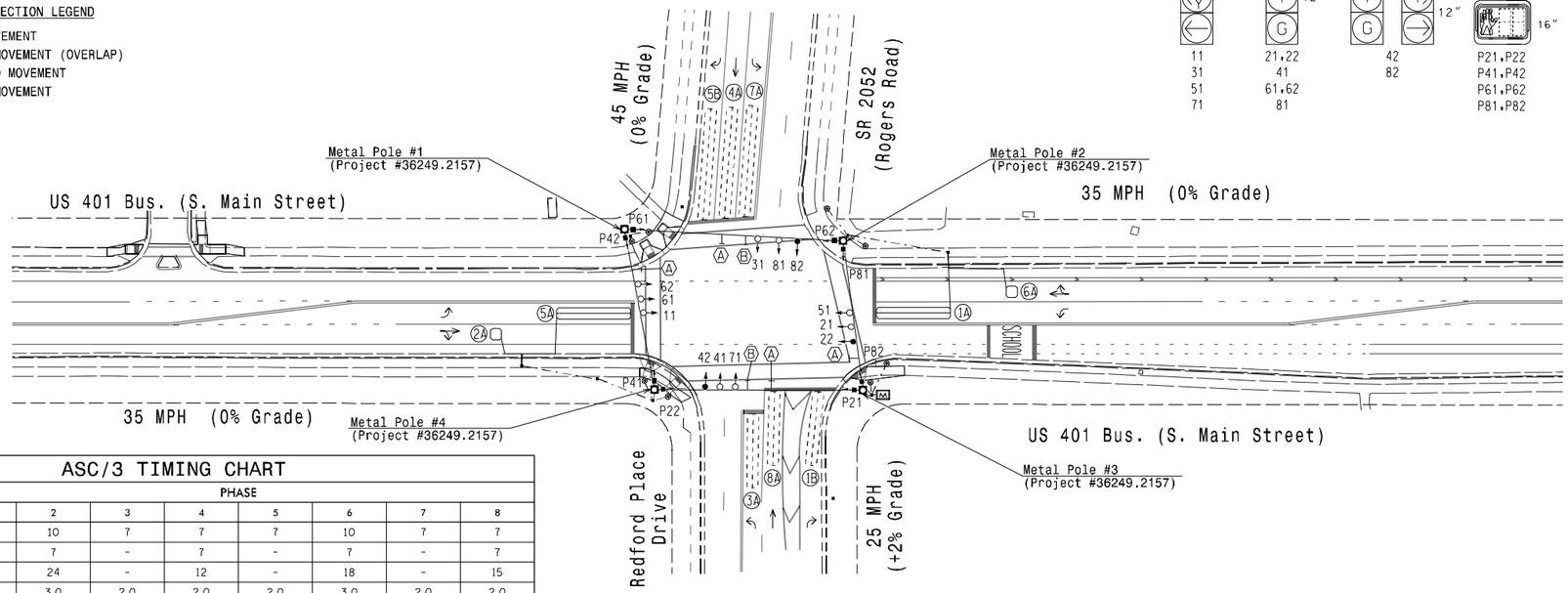
8 Phase
Fully Actuated
US 401 Business (Louisburg Rd)(CLS - System 3)
Signal System #D05-20_Rolesville

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 22, 42 and 82.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. The Division Traffic Engineer will determine the hours of use for each phasing plan.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Install new cabinet on the existing cabinet foundation.
14. Closed Loop System Data:
    Controller Asset #: 2229,
    Master Asset#: 10520.

PHASING DIAGRAM DETECTION LEGEND

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



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	▭
Ⓜ	Master Controller & Cabinet	Ⓜ
□	Junction Box	■
— — —	2-in Underground Conduit	— — —
N/A	Right of Way	— — —
→	Directional Arrow	→
◯	Metal Strain Pole	◘
⊛	Type I Pushbutton Post	⊛
N/A	Curb Ramp	♿
Ⓐ	Street Name Sign (D3-1) By Others	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Walk *	-	7	-	7	-	7	-	7
Ped Clear	-	24	-	12	-	18	-	15
Veh. Extension *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max 1 *	15	60	15	25	15	60	15	25
Yellow	3.0	3.8	3.0	4.5	3.0	3.8	3.0	4.5
Red Clear	2.8	2.3	2.9	2.8	2.8	2.3	2.8	2.8
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

* 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.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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License No. F-0672

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE 0 40 1" = 40'

US 401 Bus. (S. Main Street)
at
SR 2052 (Rogers Road)/
Redford Place Drive

Division 5 Wake County Rolesville

PLAN DATE:	January 2022	REVIEWED BY:	E D Harris
PREPARED BY:	D A Waller	REVIEWED BY:	R M Muncey

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042678 DERRICK A. WALLER

DocuSigned by: Derrick Waller 1/6/2022
SIGNATURE DATE

SIG. INVENTORY NO. 05-2229

$$$$$$$$SYSDATE$$$$$$
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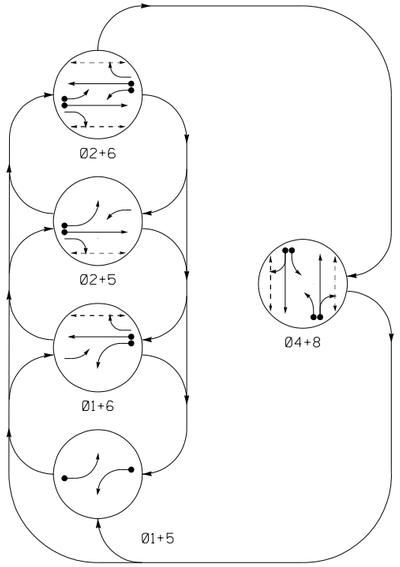
PROJECT REFERENCE NO.	SHEET NO.
U-6241	SIG 3.0

DEFAULT PHASING DIAGRAM



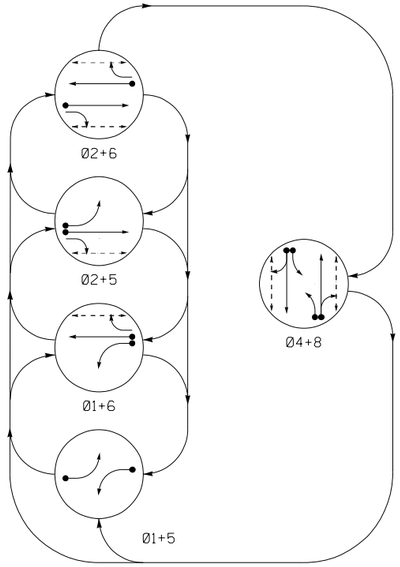
PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	04+08	FLASH
11	←	←	F Y	F Y	R	Y
21,22	R	R	G	G	R	Y
41	R	R	R	R	F Y	R
42,43	R	R	R	R	G	R
51	←	F Y	←	F Y	R	Y
61,62	R	G	R	G	R	Y
81	R	R	R	R	F Y	R
82,83	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	04+08	FLASH
11	←	←	R	R	R	Y
21,22	R	R	G	G	R	Y
41	R	R	R	R	F Y	R
42,43	R	R	R	R	G	R
51	←	R	←	R	R	Y
61,62	R	G	R	G	R	Y
81	R	R	R	R	F Y	R
82,83	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

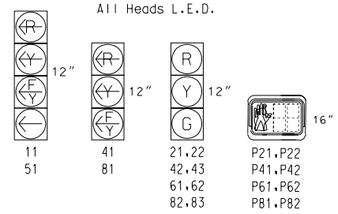
ASC/3 DETECTOR INSTALLATION CHART

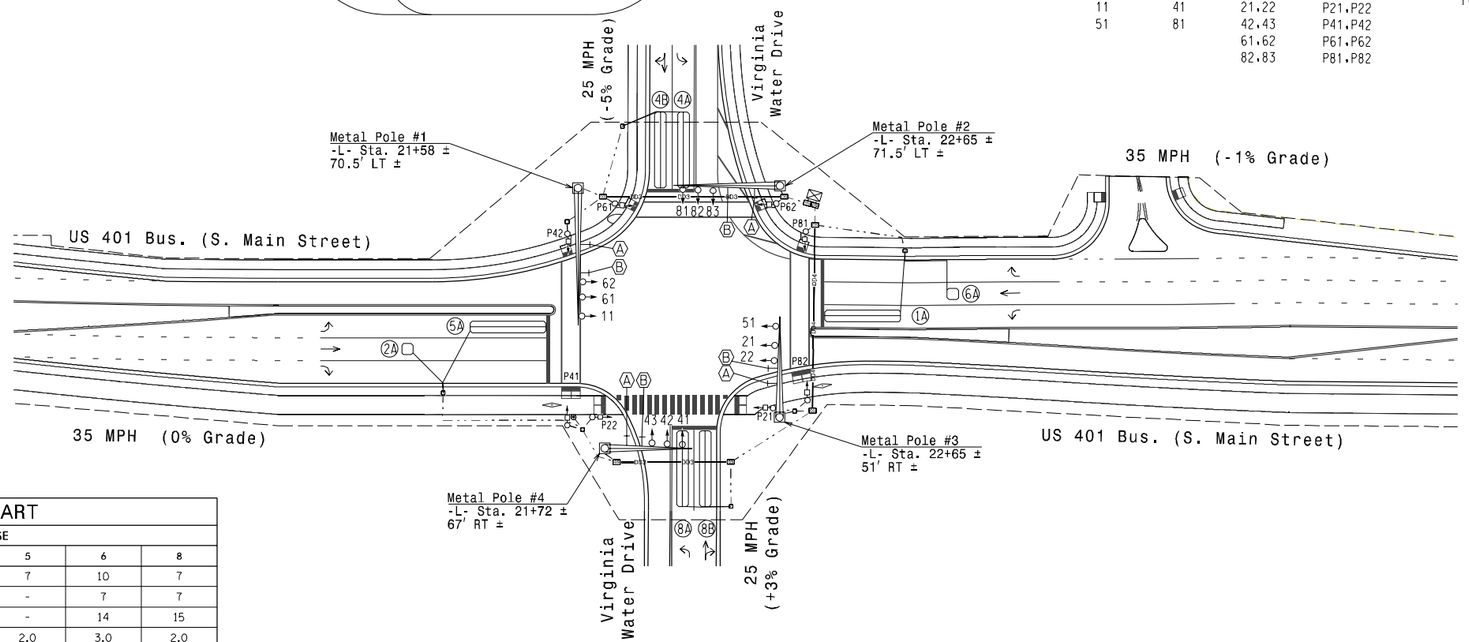
DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	Yes	-	15*	-	N	-	X
					6#	Yes	-	-	-	N	-	X
2A	6X6	70	4	X	2	Yes	-	-	-	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	3	-	N	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	10	-	N	-	X
5A	6X40	0	2-4-2	X	5	Yes	-	15*	-	N	-	X
					2#	Yes	-	-	-	N	-	X
6A	6X6	70	3	X	6	Yes	-	-	-	N	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	3	-	N	-	X
8B	6X40	0	2-4-2	X	8	Yes	-	10	-	N	-	X

*Disable Delay during Alternate Phasing operation.
#Disable phase call for loop during Alternate Phasing operation.

SIGNAL FACE I.D.

All Heads L.E.D.





ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	10	7	7	10	7
Walk *	-	7	7	-	7	7
Ped Clear	-	12	16	-	14	15
Veh. Extension *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	15	45	25	15	45	25
Yellow	3.0	3.9	3.5	3.0	3.9	3.5
Red Clear	3.2	2.6	3.1	3.3	2.6	3.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* 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.

5 Phase
Fully Actuated
US 401 Business (Louisburg Rd) (CLS - System 3)
Signal System #D05-20_Rolesville

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Closed Loop System Data:
Controller Asset #: 1787.
Master Asset #: 10520.

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	◘
— DD —	Directional Drill	N/A
◎	Metal Pole with Mastarm	◘
⬡	Type II Signal Pedestal	⬢
OS	Oversized Junction Box	■
N/A	Curb Ramp	◢
Ⓐ	Street Name Sign (D3-1) By Others	Ⓐ
Ⓑ	"TURNING VEHICLES YIELD TO PEDS" Sign (R10-15R)	Ⓑ

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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www.stantec.com
License No. F-0672

Prepared for the Offices of:
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE 0 40 1" = 40'

US 401 Bus. (S. Main Street) at Virginia Water Drive

Division 5 Wake County Rolesville

PLAN DATE: DECEMBER 2021 REVIEWED BY: E D Harris
PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL SEAL 43239 ENGINEER REGINA M. MUNCEY

DocuSigned by: Regina M. Muncey 12/16/2021
SIGNATURE DATE

SIG. INVENTORY NO. 05-1787

$$$$$$SYSDATE$$$$$$
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User:rmuncey

RAMEY KEMP ASSOCIATES
Moving forward.

T 919 872 5115
5808 Faringdon Place
Raleigh, NC 27609

June 28, 2022

TO: Meredith Gruber, PLA, AICP
Planning Director – Town of Rolesville
E: meredith.gruber@rolesville.nc.gov

FROM: Craig J. Hyman, P.E.
Ramey Kemp Associates
E: chyman@rameykemp.com

SUBJECT: **The Point North (Young Street PUD) - TIA Review Comments**

Ms. Gruber:

Ramey Kemp Associates (RKA) has reviewed the subject TIA and issues the following comments.

Study Summary

The proposed site, The Point North, is the portion of the Young Street PUD development located north of the US 401 Bypass in Rolesville, North Carolina. The Point North development is proposed to be residential and consist of 96 single-family homes. The development is expected to be built in a single phase by the year 2027, which aligns with the planned buildout year of the original Young Street PUD development TIA. Access is proposed via extension of Genovesa Drive.

The Point North development is anticipated to generate approximately 972 daily trips during a typical weekday at full buildout – with 72 trips occurring during the morning (AM) peak hour and 96 trips occurring during the afternoon (PM) peak hour. Analysis was performed for three scenarios: 2022 Existing, 2027 Background, and 2027 Build-out Conditions. Analysis results indicate that the levels-of-service from the 2027 Background scenario remain relatively the same under the 2027 Build-out scenarios with some minor increases in delay.

At the time the subject TIA was prepared and submitted, NCDOT Project U-6241 (considered in the analysis of future traffic conditions) was funded for construction. This project will improve S. Main Street (US 401 Business) by restriping the roadway to a three-lane section with bike lanes, as well as install an exclusive eastbound and westbound left-turn lane on S. Main Street. It is expected that this project will also involve traffic signal upgrades to accommodate for the change in lane configurations – which is an assumption for future traffic conditions within the TIA. Volume diversions were considered for the proposed extensions of Virginia Waters Drive, Wall Creek Drive, and Bendemeer Lane that are expected to be completed as part of the Wallbrook Development. These diversion assumptions applied additional traffic at study intersections without applying a reduction to other study intersections in order to provide for a conservative analysis.

The TIA provided by Kimley Horn for the subject development recommended no improvements due to the acceptable levels-of-service and minor increases in delays and queues expected under 2027 Build-out conditions with the background improvements assumed in the study. **Based on the review of The Point North TIA, no additional improvements within the study area are required to accommodate site traffic associated with the subject development.**

The following comments relate to deviations from various NCDOT and/or Town analysis guidelines. However, these variations have either been approved by NCDOT or are not anticipated to significantly impact the analysis results. A revised TIA based on these comments is <u>not</u> requested.

<u>TIA Report</u>

1. The Study Assumptions Memorandum (Appendix B) states that the approved 2.5% growth rate would not be applied to volumes along Virginia Water Drive, Redford Place Drive, or Genovesa Drive as development along these roadways is either built-out or will be accounted for with approved development traffic volumes. The TIA shows that 2.5% growth in background traffic volumes outside of approved development traffic volumes was accounted for in the analysis. While this differs from what is stated in Appendix B, this provides for a conservative analysis and is not expected to significantly impact the analysis results.

2. An annual growth rate of 2.5% was applied to the 2022 existing peak hour traffic volumes to develop the 2027 future traffic volumes. In addition to the background traffic projections, five (5) adjacent developments were considered in the analysis of future traffic conditions:
   - Kalas Falls
   - The Point (southern portion)
   - Wallbrook
   - Redford Place Mixed-Use
   - Jonesville Road Townhomes

   The Redford Place Mixed-Use and Jonesville Road Townhomes developments were not included in the Study Assumptions Memorandum (Appendix B); however, the inclusion of these developments is addressed in the TIA and appears reasonable. This is consistent with the approved methodology from the NCDOT TIA Scoping Checklist.

3. Trip generation results presented in the TIA, assuming 96 single-family homes, are correct.

4. There is conflicting information regarding the number of single-family homes proposed at full buildout when comparing the site plan, TIA report, and the Study Assumptions Memorandum (Appendix B). The Study Assumptions Memorandum and site plan indicate 94 single-family homes, while the TIA report and capacity analysis results for the subject development are based on 96 single-family homes. Though these densities differ, the density analyzed in the TIA report is higher and therefore provides a more conservative analysis if the desired density is actually 94 homes. <u>The developer / TIA consultant should coordinate with NCDOT and Town staff to confirm the number of single-family homes proposed at full buildout.</u>

5. The trip distribution is reasonable and consistent with similar developments in the area.

6. ***Figures 7 & 8: Projected (2027) Build-Out Peak Hour Traffic Volumes*** – There are minor imbalances (loss or gain of one trip in both the AM and PM peak hours) in site trips between study intersections. The entering and exiting trips during both peak hours from the site do equal the proposed trip generation potential at full buildout, as shown in Table 1. These imbalances are not expected to significantly impact the analysis results.

7. The traffic count times for AM and PM peaks are not consistent between the TIA Memo (pg. 1) and the Study Assumptions Memorandum (Appendix B). The TIA memo suggests counts to be performed from 7AM to 9AM and 4PM to 6PM, whereas Appendix B states 6AM to 9AM and 4PM to 7PM. The 7AM to 9AM and 4PM to 6PM time frames provided adequate data for this analysis.

Synchro Analysis

1. NCDOT Congestion Management Guidelines indicate that Right-Turn-On-Red (RTOR) operations should not be used for future or existing traffic analysis to be conservative with the intersection performance. However, RTOR is being shown where currently allowed at the approaches of the signalized intersections as stated in the Study Assumptions Memorandum (Appendix B). This is consistent with the approved scope / methodology from Appendix B and appears reasonable given the use provides for a consistent comparison of operations between analysis scenarios.

2. NCDOT Congestion Management Guidelines indicate that all link termini should be modeled with a length of 1,000 feet or more. A number of links within the Synchro models are less than 1,000 feet; however, based on the low expected traffic volumes along these links, is not anticipated to significantly impact the analysis results.

3. NCDOT Congestion Management Guidelines indicate the default values for peak hour factor (PHF) should be 0.90 for future conditions. The 2027 Build-out AM and PM uses the peak hour factor from the existing conditions. As stated in the Study Assumptions Memorandum (Appendix B), the use of existing peak hour factors will be used for existing intersections. The use of the existing PHF is not anticipated to significantly impact the analysis results.

4. NCDOT Congestion Management Guidelines indicate the default value for future left turn-lane phasing should be "protected." As stated in the Study Assumptions Memorandum (Appendix B), the use of permitted + protected phasing will be used where it is currently allowed. The use permitted or permitted + protected turns is not anticipated to significantly impact the analysis results.

General

1. The development is generally consistent with the Town of Rolesville long-range plans. The Rolesville Moves Community Transportation Plan (2021) does not include any recommendations for pedestrians and bicyclists on Genovesa Drive or Virginia Water Drive.