

Ashville Residential Developments Traffic Impact Study

Prepared for: Maronda Homes Inc. of Ohio and D.R. Horton
March 28, 2022



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I. Purpose of Report & Study Objectives

The purpose of this traffic analysis and report is to document the potential traffic impacts of a proposed residential development located in Ashville, Ohio. This traffic impact study (TIS) is required by the Village of Ashville as part of the development approval process.

II. Proposed Development

A. Off-Site Developments

The study area includes the proposed site access points and the intersections of SR-752 and St. Paul Road with Ashville Pike. The surrounding area includes residential developments to the northeast and south, and undeveloped land in all other directions.

B. On-Site Development

Location

The site is located on both sides of Ashville Pike. The site is bounded by St. Paul Road to the north, railroad tracks to the west, Lockbourne Eastern Road to the east, and residential developments to the south. **Figure 1** shows the location of the proposed site in central Ohio and **Figure 2** shows the study area.

Figure 1 – Location in Central Ohio

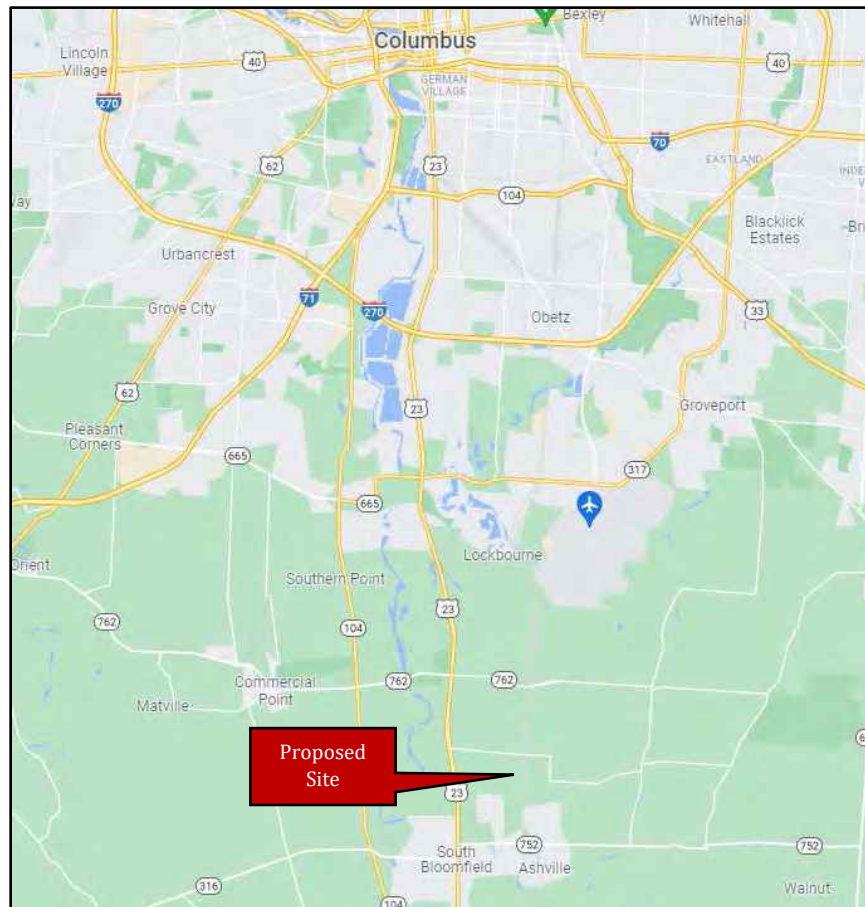
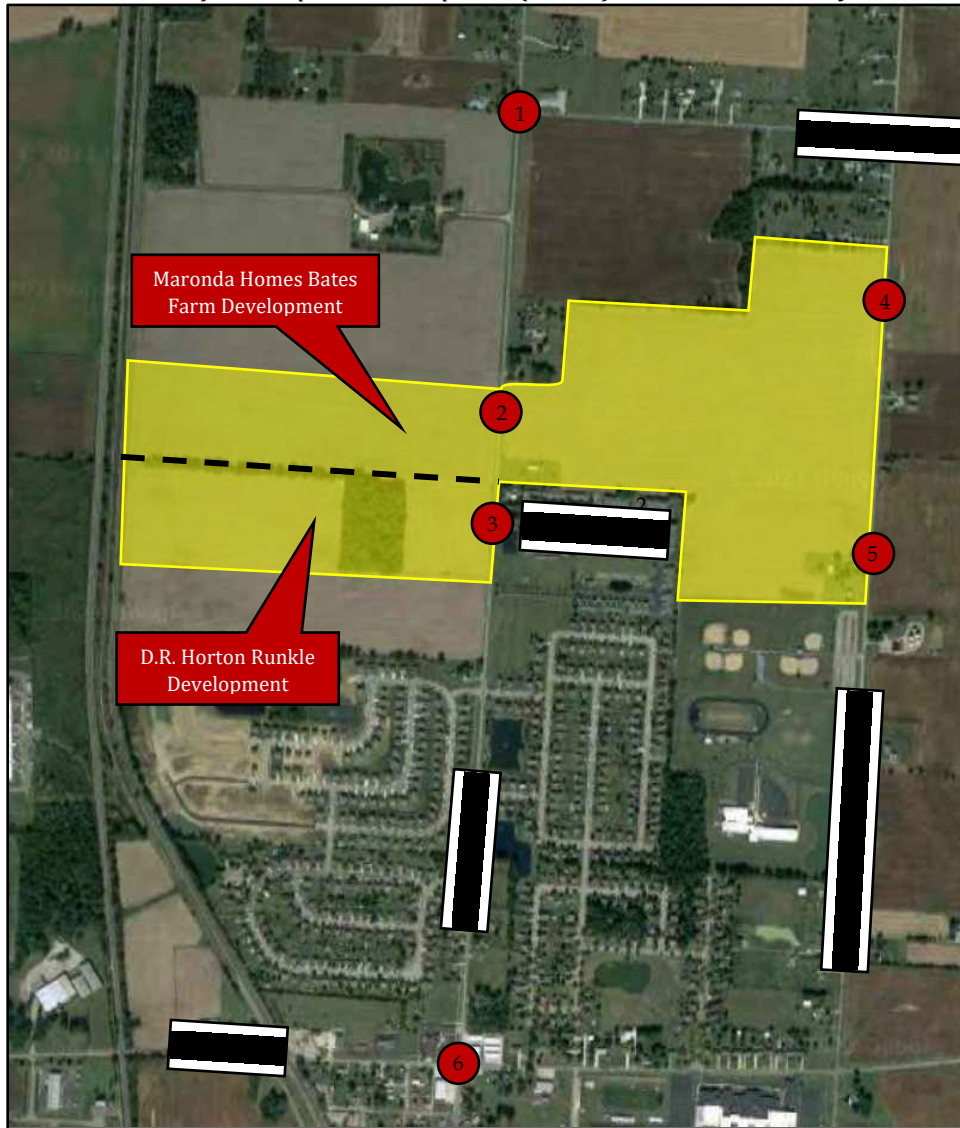


Figure 2 – Location of the Proposed Development (Yellow), Site Drive, and Study Intersections



Land Use & Intensity

The site is currently mostly undeveloped farmland with a few single-family homes. The site is comprised of two developments: the D.R. Horton Runkle development and the Maronda Homes Bates Farm development. The two developments are proposed to be developed into a total of 625 single-family units and 369 multi-family units. The Maronda Homes Bates Farm development is proposed to include four access points: two, aligned full access points on Ashville Pike, north of Long Street, a full access along Lockbourne Eastern Road to the single-family development, and an additional full access along Lockbourne Eastern Road for the planned 369-unit multifamily development. No cross access is proposed between the multifamily development and the single-family development that comprises the Maronda Homes Bates Farm development. The D.R. Horton Runkle development is proposed to have one full access across from Long Street (Lakes at Ashton Village Access). The two developments are proposed to have cross access on the west side of Ashville Pike to allow for shared use of the two site access intersections along Ashville Pike.

The site plan is provided in **Appendix A**.

III. Area Conditions

A. Area of Influence

The study intersections for the proposed development are listed below. Numbers correspond to **Figure 2**.

1. Ashville Pike & St. Paul Road (off-site intersection)
2. Ashville Pike & Site Drive 1/Site Drive 2
3. Ashville Pike & Long Street/Site Drive 3
4. Lockbourne Eastern Road & Site Drive 4
5. Lockbourne Eastern Road & Multifamily Site Drive 5
6. Ashville Pike & SR-752 (off-site intersection)

B. Jurisdictions

The proposed site is located in Ashville, Ohio. All intersections fall under Village of Ashville jurisdiction.

C. Traffic Volumes & Conditions

Peak hour count data was collected at the following intersections/segments with dates specified in parenthesis:

- SR-752 & St. Paul Road (September 30, 2021)
- SR-752 & Ashville Pike (September 30, 2021)
- Ashville Pike & Long Street (April 20, 2021)
- Lockbourne Eastern Road just north of Teays Valley East Middle School (February 16, 2022)

Count data can be found in **Appendix B**.

IV. Projected Traffic

A. Background Traffic

For analysis, the Opening Year of the development is 2022 and the Design, or Horizon Year, is 2032. A growth rate of 2% along Ashville Pike was obtained from ODOT's Transportation Information Mapping System (TIMS). This growth rate was applied to all count data to produce Background, or No Build, volumes for the Opening and Horizon Years.

B. Site Traffic

Trip Generation

Trips for the proposed development were generated using standard Institute of Transportation Engineers (ITE) practices and the Trip Generation Manual, 11th edition, data via the OTISS program¹. Land Use Code (LUC) 210 – *Single-Family Detached Housing* was used to generate trips for the proposed development. LUC 220 – *Multifamily Housing (Low*

¹ Online Traffic Impact Study Software developed by ITE and Transoft Solutions.

Rise) was used to generate trips for the multifamily development. **Table 1** shows the trip generation of the proposed developments. The full trip generation analysis can be found in **Appendix C**.

Table 1 – Proposed Site Trip Generation Summary

Land Use	Size	AM Peak		PM Peak	
		Entry	Exit	Entry	Exit
210 – Single-Family Detached Housing	625 Units	103	292	351	206
220 – Multifamily Housing (Low-Rise)	369 Units	33	104	113	66

Site traffic was distributed to/from the sites based on count data, knowledge of the surrounding area, and engineering judgement. Site traffic was added to the No Build traffic to produce Build traffic for the Opening and Horizon Years. The full volume calculations can be found in **Appendix D**.

V. Traffic Analysis

A. Turn Lane Warrant Analysis

Turn lane warrant analysis was conducted using standard ODOT turn lane warrant graphs for the stop-controlled study intersections. If a turn lane was warranted in any particular scenario, the length was calculated using methodologies in the ODOT Location and Design (L&D) Manual. Ashville Pike has a posted speed limit of 35 MPH at all study intersections except St. Paul Road, outside of the limits of Ashville where the speed limit is 55 MPH. Turn lane analysis for the southbound approach of the Ashville Pike & Site Drive 1/Site Drive 2 intersection was analyzed with a 55 MPH design speed. A design speed of 40 MPH was utilized for all turn lane length calculations with a 35 MPH posted speed limit. The two study intersections along Lockbourne Eastern Road utilized a 55 MPH design speed.

B. Signal Warrant Analysis

Signal warrant analysis was conducted at the Ashville Pike & Site Drive 1/Site Drive 2 intersection for the 2032 Build scenario. Peak hour, four-hour, and eight-hour warrants were evaluated per the Ohio Manual of Uniform Traffic Control Devices (OMUTCD).

C. Capacity Analysis

Highway Capacity Software (HCS) version 7.8.5 was used for capacity analysis. A minimum LOS of D for the overall intersection/approaches and for each individual movement during peak traffic hours was considered acceptable at the study intersections. If an intersection fell below these criteria, mitigation strategies were developed to bring each movement or intersection back to an acceptable LOS. A roundabout was also analyzed at Site Drive 1/Site Drive 2 as a possible intersection control.

D. Sight Distance

Sight distance triangle exhibits were developed for each proposed access point, except for the multifamily development access, based on criteria outlined in the ODOT L&D Manual. The exact location of the multifamily development access was not known at the time of this TIS. All exhibits were created with design speeds 5 MPH over the posted speed limits.

VI. Results

A. Turn Lane Warrant Analysis

Results of the turn lane warrant analysis show the following turn lanes meet warrants for the listed scenarios:

- Ashville Pike & Site Drive 1/Site Drive 2
 - 285' southbound left turn lane (all Build scenarios)
 - 285' southbound right turn lane (all Build scenarios)
- Ashville Pike & Long Street/Site Drive 3
 - 215' northbound left turn lane (all Build scenarios)
 - 125' southbound left turn lane (Horizon Year Build scenario)
- Ashville Pike & St. Paul Road
 - 315' southbound left turn lane (all scenarios)
 - 285' northbound right turn lane (all scenarios except Opening Year No Build)

All turn lane lengths are inclusive of a 50' diverging taper. The full turn lane warrant analysis and turn lane length analysis can be found in **Appendix E**.

B. Signal Warrant Analysis

Results of the signal warrant analysis at Ashville Pike & Site Drive 1/Site Drive 2 shows that a signal is not warranted at the intersection. The full signal warrant analysis can be found in **Appendix F**.

C. Capacity Analysis

Results of the capacity analysis for the study intersections can be seen in **Table 2**. Warranted turn lanes were included in the analysis. The full capacity analysis can be found in **Appendix G**.

Table 2 – Capacity Analysis Summary (LOS/delay)

Intersection (Control Type, Intersection # ²)	Approach / Movement	Opening Year (2022)				Horizon Year (2032)			
		AM No Build	AM Build	PM No Build	PM Build	AM No Build	AM Build	PM No Build	PM Build
Ashville Pike & St. Paul Road (Stop-Control, 1)	WB	B/12.0	C/15.1	B/14.5	C/19.6	B/13.4	C/16.9	C/17.4	D/25.4
	SB Left	A/8.1	A/8.6	A/7.8	A/8.2	A/8.3	A/8.9	A/7.9	A/8.4
Ashville Pike & Site Drive 1/ Site Drive 2 (Stop-Control, 2)	EB		C/17.4		C/23.2		C/20.3		D/28.4
	WB		C/15.2		C/18.1		C/17.2		C/21.2
	NB Left		A/7.7		A/8.7		A/7.8		A/9.0
	SB Left		A/8.2		A/8.0		A/8.4		A/8.0
Ashville Pike & Site Drive 1/ Site Drive 2 (Roundabout, 2)	EB		A/4.3		A/5.9		A/4.5		A/6.5
	WB		A/5.6		A/4.2		A/6.1		A/4.4
	NB		A/6.2		A/5.2		A/6.9		A/5.5
	SB		A/4.5		A/8.3		A/4.8		A/9.6
	Total		A/5.5		A/7.1		A/6.0		A/8.0
Ashville Pike & Long Street/ Site Drive 3 (Stop-Control, 3)	EB		B/14.5		C/18.0		C/16.2		C/20.9
	WB	B/11.1	B/12.5	B/11.9	C/18.2	B/11.8	B/13.6	B/12.8	C/20.8
	NB Left		A/7.9		A/8.6		A/8.0		A/8.9
	SB Left	A/7.9	A/8.0	A/7.7	A/7.8	A/8.1	A/8.2	A/7.7	A/7.9
Lockbourne Eastern Road & Site Drive 4 (Stop-Control, 4)	EB		B/10.2		A/9.8		B/10.5		A/10.0
	NB Left		A/7.5		A/7.6		A/7.5		A/7.6
	SB Left		A/7.6		A/7.4		A/7.7		A/7.4
Lockbourne Eastern Road & Multifamily Site Drive 5 (Stop-Control, 5)	EB		B/10.7		B/10.4		B/11.1		B/10.6
	NB Left		A/7.5		A/7.7		A/7.6		A/7.7
	SB Left		A/7.5		A/7.4		A/7.6		A/7.4
Ashville Pike & SR-752 (Signal, 6)	EB	C/25.3	C/25.1	C/26.0	C/26.8	C/25.2	C/25.0	C/27.2	C/32.8
	WB	C/25.4	C/25.8	C/26.5	C/28.0	C/25.2	C/25.6	C/28.3	C/32.4
	NB	C/24.1	C/24.4	C/23.5	C/24.6	C/25.5	C/25.8	C/24.3	C/24.9
	SB	C/21.5	C/23.4	C/25.6	C/30.4	C/22.8	C/24.7	C/28.8	C/35.0
	Total	C/24.0	C/24.5	C/25.5	C/27.8	C/24.6	C/25.2	C/27.4	C/31.9

As seen above in **Table 2**, all intersections operate with acceptable LOS in all scenarios.

D. Sight Distance

Sight distance exhibits for the proposed site drives can be seen in **Appendix H**. No sight distance issues were noted.

VII. Recommendations and Conclusions

No Build Improvements

No Build improvements are improvements that are needed for already existing traffic, prior to any traffic from the proposed development.

Based on the results of the turn lane warrant analysis, capacity analysis, and sight distance analysis, a 315' southbound left turn lane at Ashville Pike & St. Paul Road is warranted in all scenarios and is recommended to be implemented as a No Build improvement. Additionally, a 285' northbound right turn lane is recommended as a No Build improvement. While this warrant does not meet in the No Build condition on its own, the warrant does meet in the Build condition when additional through traffic is added to the intersection. As the driving factor for the warrant, the number of right turning vehicles, will not be affected by the proposed development, the turn lane is recommended to be installed as a No Build

² Intersection numbers correspond to Figure 2.

improvement as the warrant would be met eventually due to natural growth in the area and is not the result of additional turning vehicles generated by the proposed development.

Build Improvements

Build improvements refer to improvements that are the result of the added traffic by the proposed development.

The following improvements would be required as Build improvements. Both stop-control and roundabout control improvements are provided at the Ashville Pike & Site Drive 1/Site Drive 2 intersection should the Village consider a roundabout as regional improvement.

- Ashville Pike & Site Drive 1/Site Drive 2
 - Stop-Control
 - 285' southbound left turn lane
 - 285' southbound right turn lane
 - Roundabout Control
 - Single circulating lane with single-lane approaches
- Ashville Pike & Long Street/Site Drive 3
 - 215' northbound left turn lane
 - 125' southbound left turn lane

A conceptual exhibit of the recommended improvements can be found in **Appendix I**. In the stop-control scenario (no roundabout), a two-way left turn lane is shown between the Ashville Pike intersections with Site Drive 1/Site Drive 2 and Long Street/Site Drive 3 in lieu of dedicated left turn lanes due to the proximity of the intersections. No improvements are required or recommended for Site Drive 4 or the Multifamily Site Drive 5.

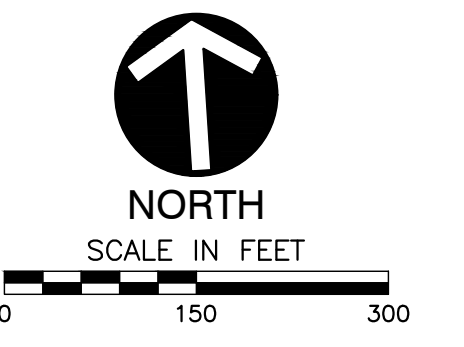
VIII. Appendices

- Appendix A – Site Plan
- Appendix B – Count Data
- Appendix C – Trip Generation
- Appendix D – Volume Calculations
- Appendix E – Turn Lane Warrant & Length Analysis
- Appendix F – Signal Warrant Analysis
- Appendix G – Capacity Analysis
- Appendix H – Sight Distance Analysis
- Appendix I – Improvements Exhibit

Appendix A

Site Plan

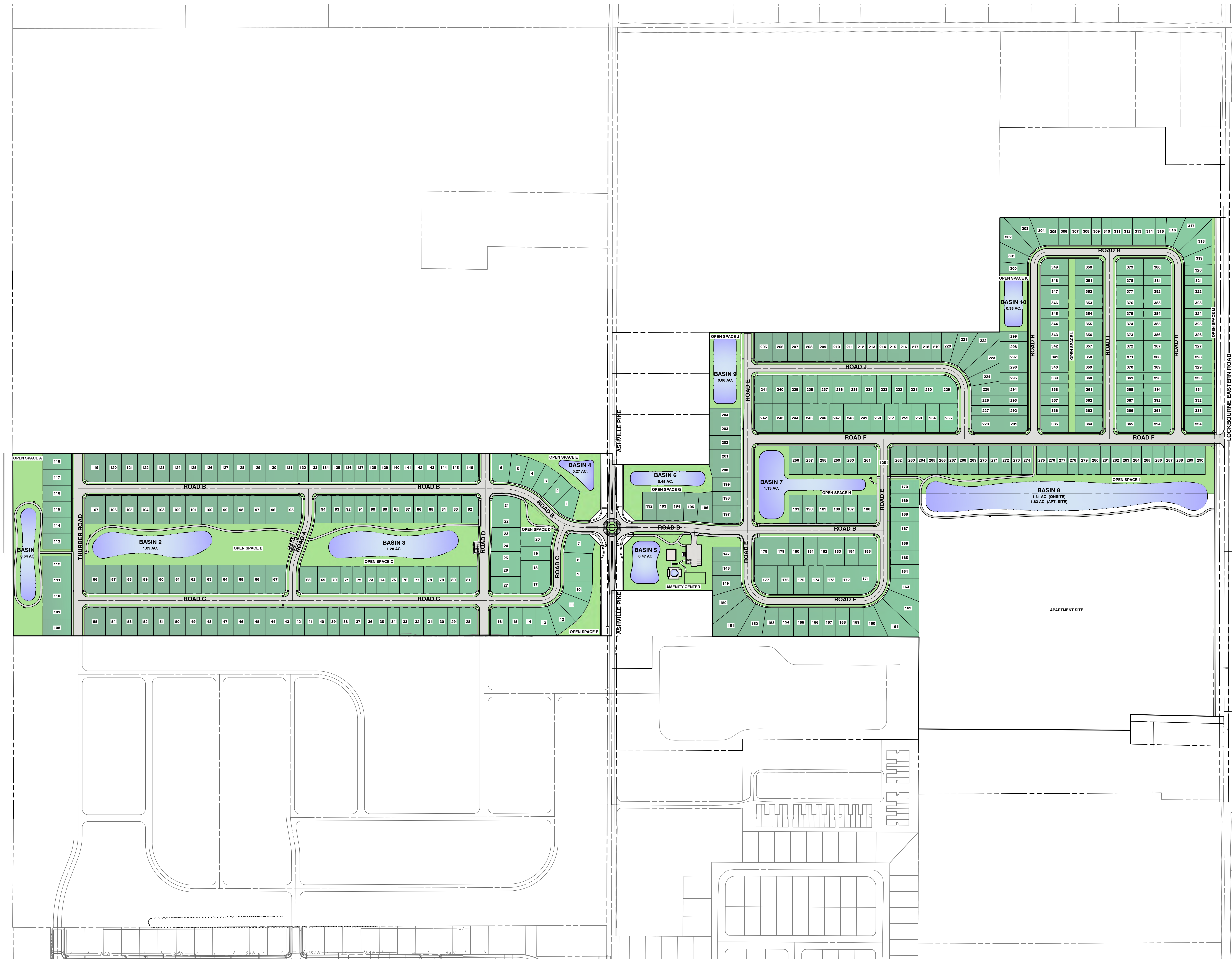




LEGEND

---	EXISTING SUBJECT PROPERTY LINE
---	EXISTING ADJACENT PROPERTY LINE
---	EXISTING RIGHT OF WAY
---	EXISTING CENTERLINE
---	EXISTING EDGE OF PAVEMENT
---	PROPOSED PROPERTY LINE
---	PROPOSED RIGHT OF WAY
---	PROPOSED CENTERLINE OF ROAD
---	PROPOSED PAVEMENT
---	PROPOSED WATER BODY

NO.	DATE	DESCRIPTION



C.E.C.
 Civil & Environmental Consultants, Inc.
 250 W. Old Wilson Bridge Road - Suite 250 - Worthington, OH 43088
 614-540-6683 668-596-8686
 www.ccec.com

MARONDA HOMES INC. OF OHIO
 BATES PROPERTY
 VILLAGE OF ASHVILLE
 PICKAWAY COUNTY, OHIO

OVERALL SITE PLAN

DATE:	JANUARY 2022	DRAWN BY:	JTH
PROJECT NO.:	11-157	CHECKED BY:	STL
PROJECT NAME:	BATES PROPERTY		
PROJECT LOCATION:	VILLAGE OF ASHVILLE		

ENGINEER / SURVEYOR

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
250 OLD WILSON BRIDGE ROAD, SUITE 250
WORTHINGTON, OH 43085
CONTACT: TIM VOLCHKO, P.E.
PHONE: (614) 540-6633

DEVELOPER

MARONDA HOMES INC. OF OHIO
3148 BROADWAY
GROVE CITY, OHIO 43123
CONTACT: JOHN KONOVODOFF
PHONE: (312) 505-4419
EMAIL: JKONOVODOFF@MARONDA.COM

PROJECT DESCRIPTION

PRELIMINARY PLAN FOR THE DEVELOPMENT OF BATES FARM SHOWING CONCEPTUAL LOT CONFIGURATION, BASIN LOCATIONS AND FOOTPRINTS, AMENITY CENTER AND PATHS.

REFERENCES

- EXISTING TOPOGRAPHIC INFORMATION IS BASED ON SURVEY PERFORMED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC IN OCTOBER 2021.
- EXISTING BASE MAP INFORMATION PER PICKAWAY COUNTY AUDITOR ACCESSED SEPTEMBER 2021.
- ALL INFORMATION SHOWN BY OTHERS IS FOR REFERENCE ONLY.

SITE STATISTICS		
	REQUIRED	PROVIDED
EXISTING SITE	-	146.04 AC.
PROPOSED ASHVILLE PIKE RIGHT-OF-WAY	-	1.55 AC.
LOCKBOURNE E. RIGHT-OF-WAY DROP	-	2.26 AC.
PROPOSED GROSS SITE AREA (TOTAL)	-	142.23 AC.
APARTMENT SITE GROSS SITE AREA	-	30.15 AC.
SINGLE FAMILY SITE GROSS SITE AREA	-	112.08 AC.
SINGLE FAMILY LOT ACREAGE	-	67.35 AC.
SINGLE FAMILY LOT DENSITY PER G.S.A.	-	3.51 UNITS/AC.
PROPOSED SINGLE FAMILY RIGHT-OF-WAY	-	22.51 AC.
AMENITY CENTER	-	3.86 AC.
OPEN SPACE ACRES*	16.73 AC. (15% OF TOTAL SINGLE FAMILY SITE AREA)	18.36 AC. (16.5%)
BASIN ACREAGE (SF)*	5.58 AC. (5% OF TOTAL SINGLE FAMILY SITE AREA)	7.07 AC.
BASIN ACREAGE (APT)	-	1.83 AC.
BASIN ACREAGE (TOT.)	-	8.90 AC.

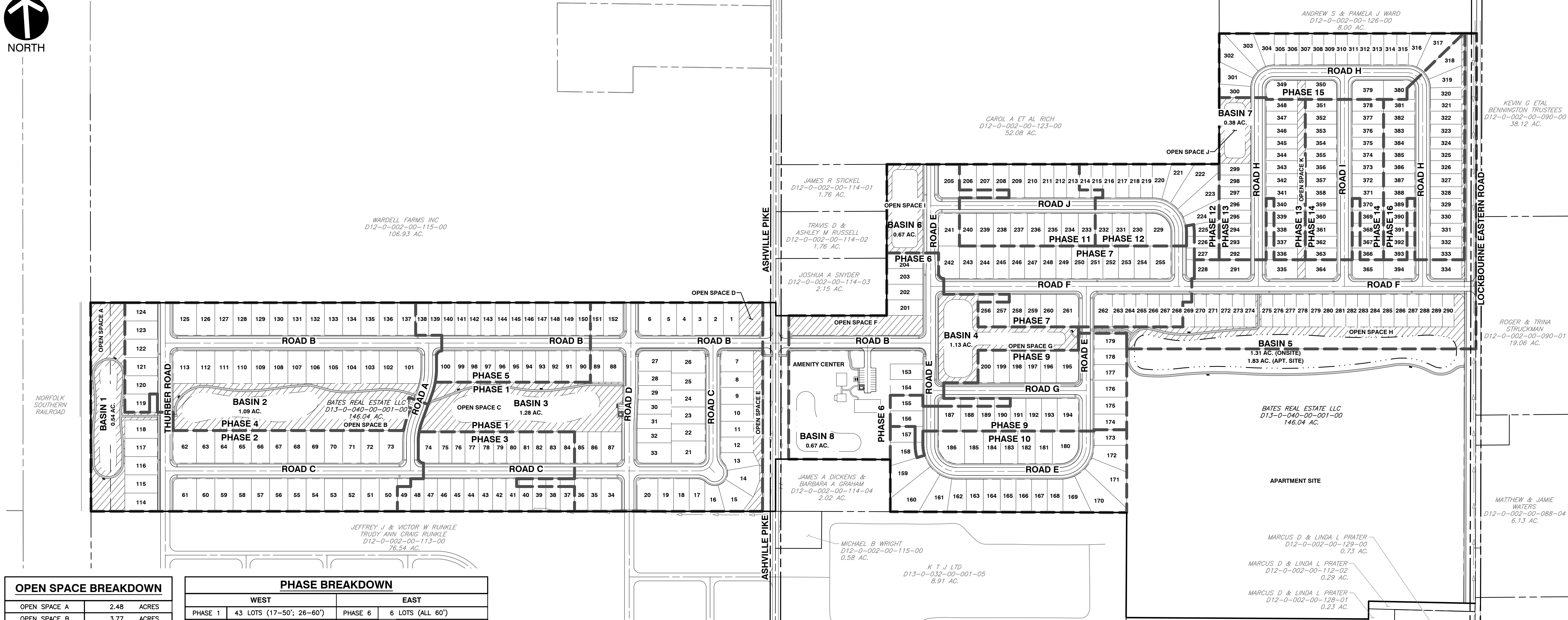
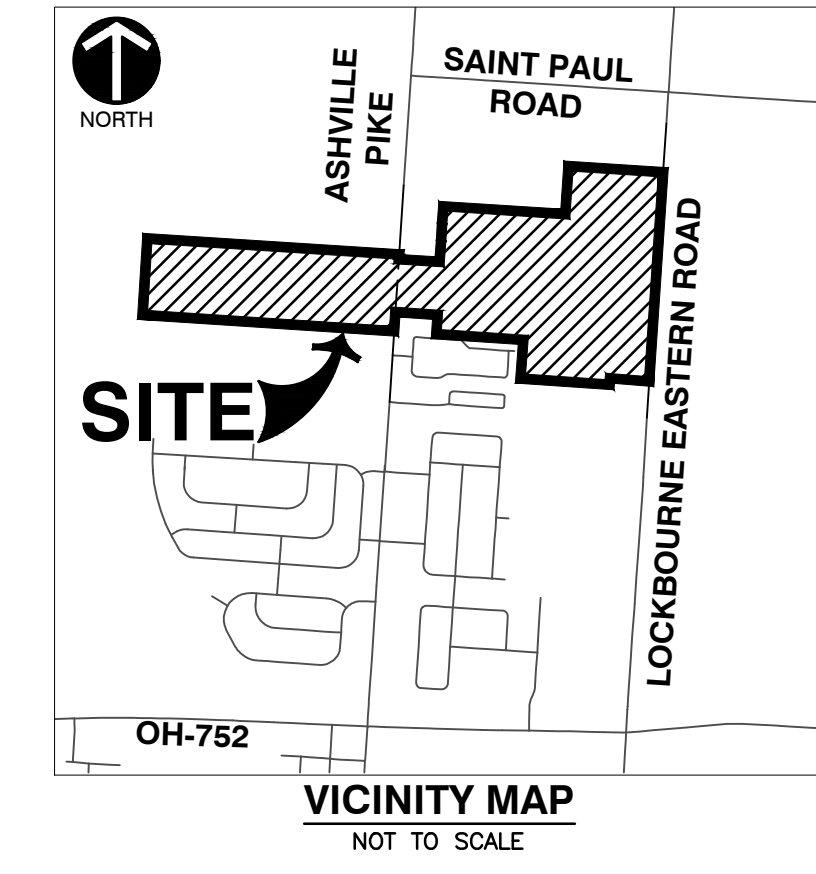
*SINGLE FAMILY BASIN ACREAGE IS INCLUDED IN OPEN SPACE ACREAGE

PRELIMINARY PLAN/PLAT

FOR BATES FARM

VILLAGE OF ASHVILLE, PICKAWAY COUNTY, OHIO

JANUARY 2022



OPEN SPACE BREAKDOWN

OPEN SPACE	ACRES
OPEN SPACE A	2.48
OPEN SPACE B	3.77
OPEN SPACE C	3.26
OPEN SPACE D	0.26
OPEN SPACE E	0.46
OPEN SPACE F	0.89
OPEN SPACE G	1.97
OPEN SPACE H	2.75
OPEN SPACE I	1.08
OPEN SPACE J	0.69
OPEN SPACE K	0.52
OPEN SPACE L	0.24
TOTAL	18.37

PHASE BREAKDOWN

	WEST	EAST	
PHASE 1	43 LOTS (17-50'; 26-60')	PHASE 6	6 LOTS (ALL 60')
PHASE 2	29 LOTS (ALL 70')	PHASE 7	29 LOTS (7-45'; 22-60')
PHASE 3	24 LOTS (ALL 50')	PHASE 8	29 LOTS (ALL 45')
PHASE 4	32 LOTS (ALL 70')	PHASE 9	22 LOTS (ALL 60')
PHASE 5	24 LOTS (ALL 50')	PHASE 10	24 LOTS (ALL 60')
		PHASE 11	16 LOTS (3-45'; 13-60')
		PHASE 12	18 LOTS (14-45'; 4-60')
		PHASE 13	21 LOTS (ALL 45')
		PHASE 14	26 LOTS (ALL 45')
		PHASE 15	22 LOTS (ALL 45')
		PHASE 16	29 LOTS (ALL 45')
TOTAL	152 LOTS (WEST)	TOTAL	242 LOTS (EAST)

DRAWING INDEX

NUMBER	DESC.	TITLE
1	C000	COVER SHEET
2	C001	TYPICAL SECTIONS
4	C200	SITE LAYOUT PLAN
3	C100	EXISTING CONDITIONS
5	C201	SITE LAYOUT PLAN
6	C500	UTILITY PLAN
7	C501	UTILITY PLAN



LOT LEGEND

LOT DIMENSIONS	PAD DIMENSIONS	SETBACKS			NUMBER OF LOTS
		FRONT	SIDE	REAR	
45'W X 120'L	30'W X 65'L	30'	5' MIN. 10' TOTAL	25'	151
50'W X 120'L	40'W X 65'L	30'	5' MIN. 10' TOTAL	25'	65
60'W X 125'L	40'W X 65'L	30'	7.5' MIN. 15' TOTAL	25'	117
70'W X 125'L	55'W X 65'L	30'	7.5' MIN. 15' TOTAL	25'	61
TOTAL NUMBER OF LOTS:					394

REVISION RECORD

NO.	DATE	DESCRIPTION

C&E
Civil & Environmental Consultants, Inc.
250 Old Wilson Bridge Road · Suite 250 · Worthington, OH 43085
614-540-6633 · 888-598-6808
www.cecinc.com

MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO

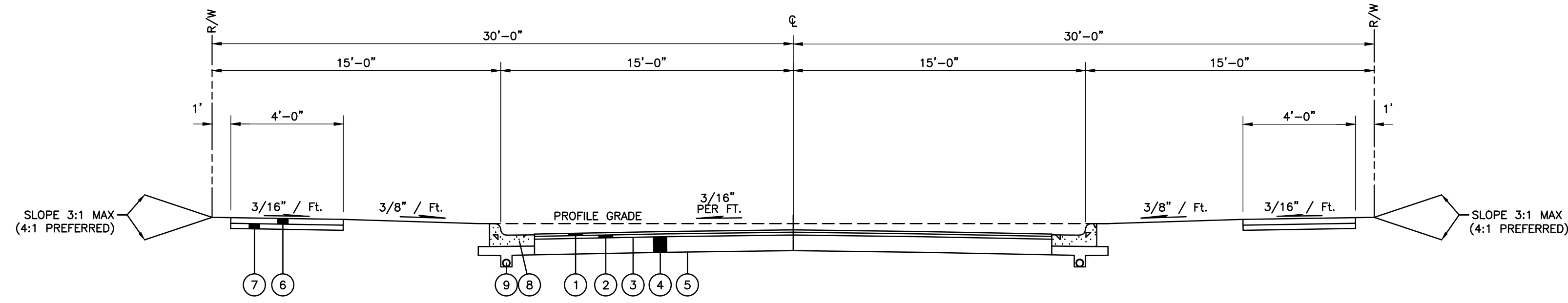
COVER SHEET

DATE: JANUARY 2022
DRAWN BY: JTH
DWG SCALE: 1"=200'
PROJECT NO: 314-502
APPROVED BY: JTV

DRAWING NO: **C000**
SHEET 1 OF 7



P:\310-000\314-502-C000\Draw\314-502-C000-Cover Sheet.dwg (1/21/2022 3:16 PM) - LP: 1/21/2022 3:16 PM

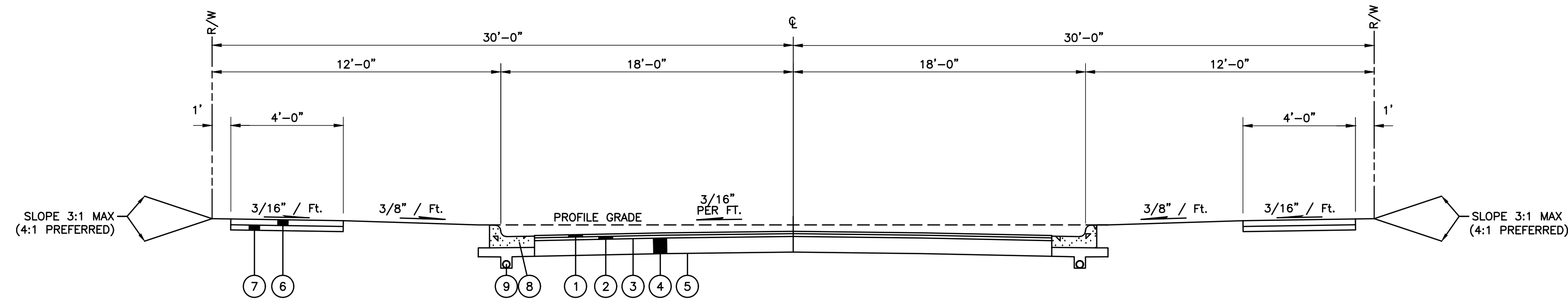


- ① ITEM 448 - 1 1/4" ASPHALT CONCRETE
- ② ITEM 448 - 2" ASPHALT CONCRETE
- ③ ITEM 408 - BITUMINOUS PRIME COAT (0.35 GAL. PER SY)
- ④ ITEM 304 - 10" AGGREGATE BASE
- ⑤ ITEM 204 - SUBGRADE COMPACTION
- ⑥ ITEM 608 - 4" CONCRETE WALK AS PER STD DWG 2300
- ⑦ ITEM 304 - 4" AGGREGATE BASE
- ⑧ ITEM 609 - CURB & GUTTER
- ⑨ ITEM 605 - 4" PIPE UNDERDRAIN

TYPICAL 30' SECTION (60' R/W)

NOT TO SCALE
ROAD A, ROAD C, ROAD E, ROAD G, ROAD H, ROAD I, ROAD J

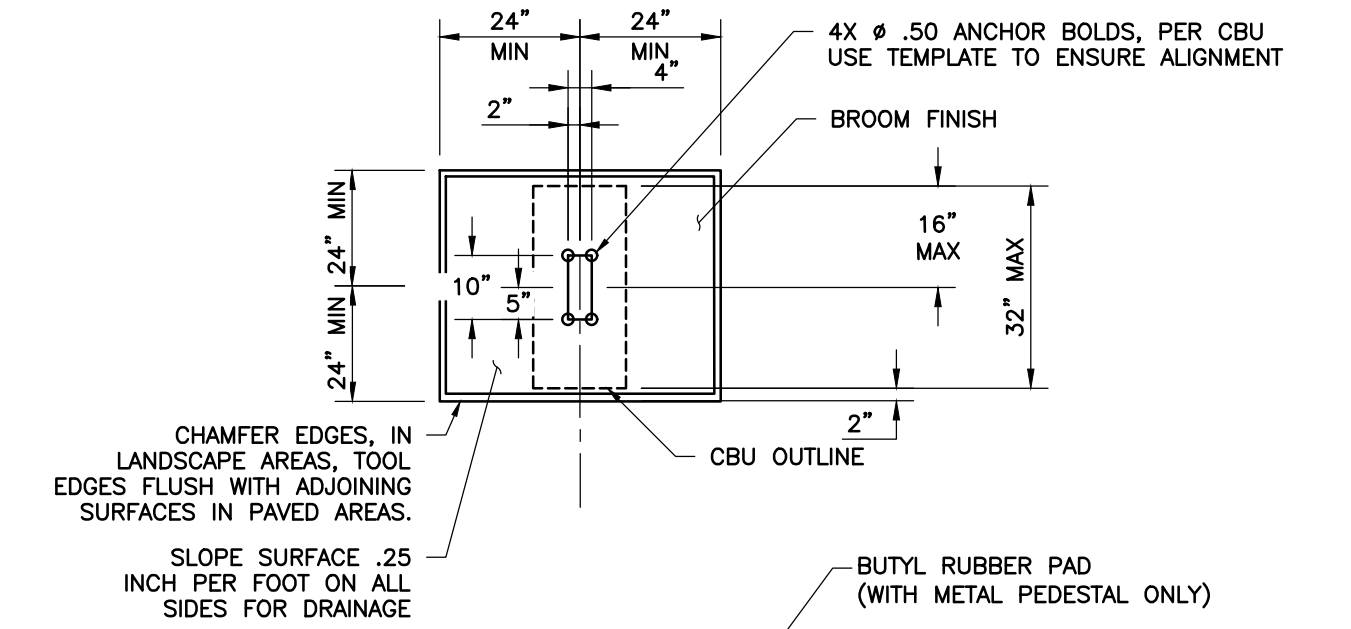
NOTE:
FINAL PAVEMENT DESIGN SHALL BE PER THE FINAL ENGINEERING PLANS. PAVEMENT THICKNESS SHOWN HERE IS BASED ON SIMILAR PROJECTS AND IS TO BE USED AS REFERENCE ONLY.



- ① ITEM 448 - 1 1/4" ASPHALT CONCRETE
- ② ITEM 448 - 2" ASPHALT CONCRETE
- ③ ITEM 408 - BITUMINOUS PRIME COAT (0.35 GAL. PER SY)
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- ⑤ ITEM 204 - SUBGRADE COMPACTION
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- ⑦ ITEM 304 - 4" AGGREGATE BASE
- ⑧ ITEM 609 - CURB & GUTTER
- ⑨ ITEM 605 - 4" PIPE UNDERDRAIN

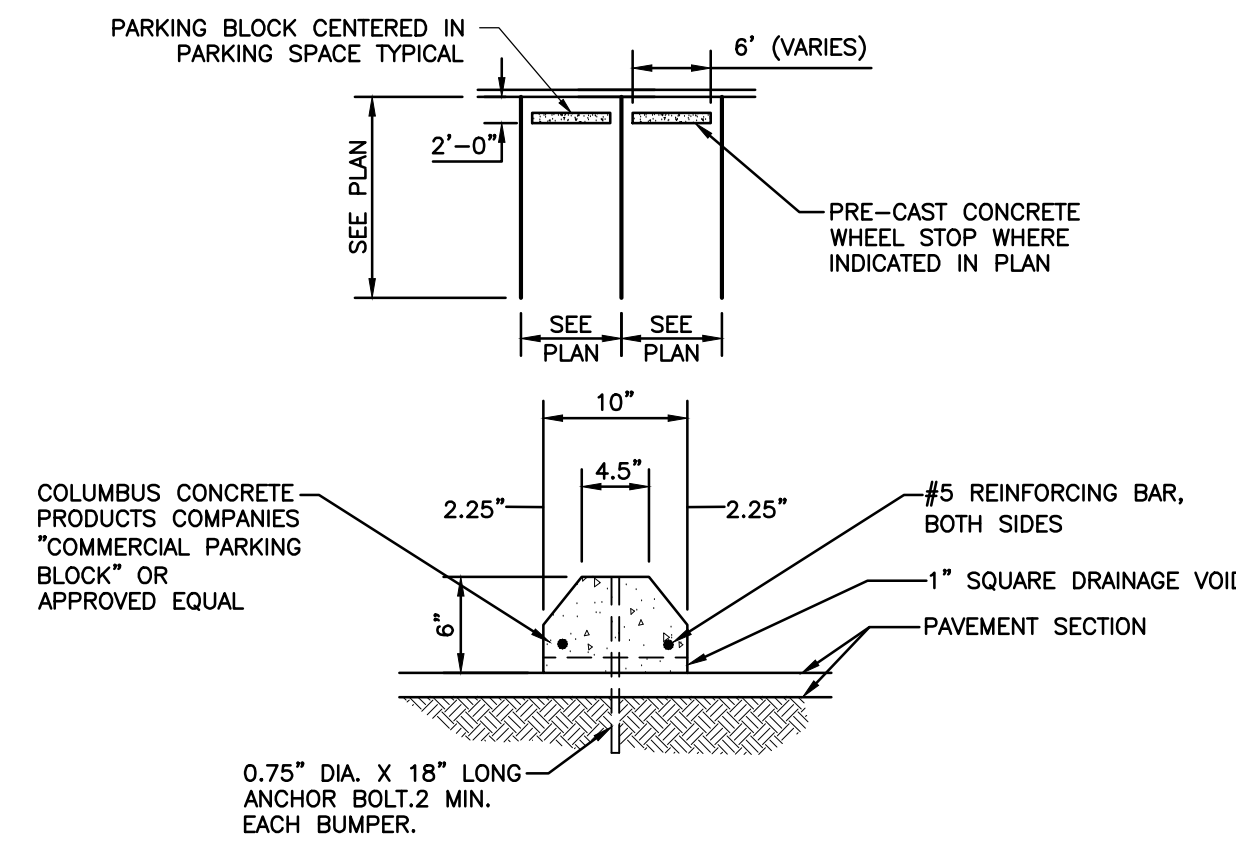
TYPICAL 36' SECTION (60' R/W)

NOT TO SCALE
THURBER ROAD, ROAD B, ROAD D, ROAD E, ROAD F



- CHAMFER EDGES, IN LANDSCAPE AREAS, TOOL EDGES FLUSH WITH ADJOINING SURFACES IN PAVED AREAS.
- SLOPE SURFACE .25 INCH PER FOOT ON ALL SIDES FOR DRAINAGE
- BUTYL RUBBER PAD (WITH METAL PEDESTAL ONLY)
- MATCH EXISTING GRADE IN PAVED AREAS
- SLOPE SURFACE .25 INCH PER FOOT ON ALL SIDES FOR DRAINAGE
- 4 RODS ON 14" CENTERS MAXIMUM, EACH WAY
- OPTIONAL COMPACT GRAVEL OR CRUSHED STONE (OMIT WHERE SOLID ROCK OCCURS)
- MAXIMUM FROST DEPTH
- FIRM UNDISTURBED SOIL OR WELL-COMPACTED FILL

- NOTES:
- CONCRETE SHALL HAVE COMPRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS, CONTAIN 4% MIN-6% MAX AIR ENTRAINMENT AND BE PLACED WITH A 3.50-4.50 SLUMP IN ACCORDANCE WITH ACI 301.
 - REINFORCING STEEL RODS SHALL CONFORM TO ASTM A615, GRADE 60.
 - ANCHOR BOLTS SHALL CONFORM TO ASTM A193, GRADE B8M, TYPE 315 STAINLESS STEEL.



PARKING BLOCK DETAIL

NOT TO SCALE

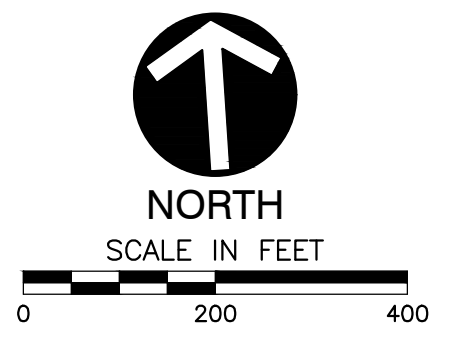
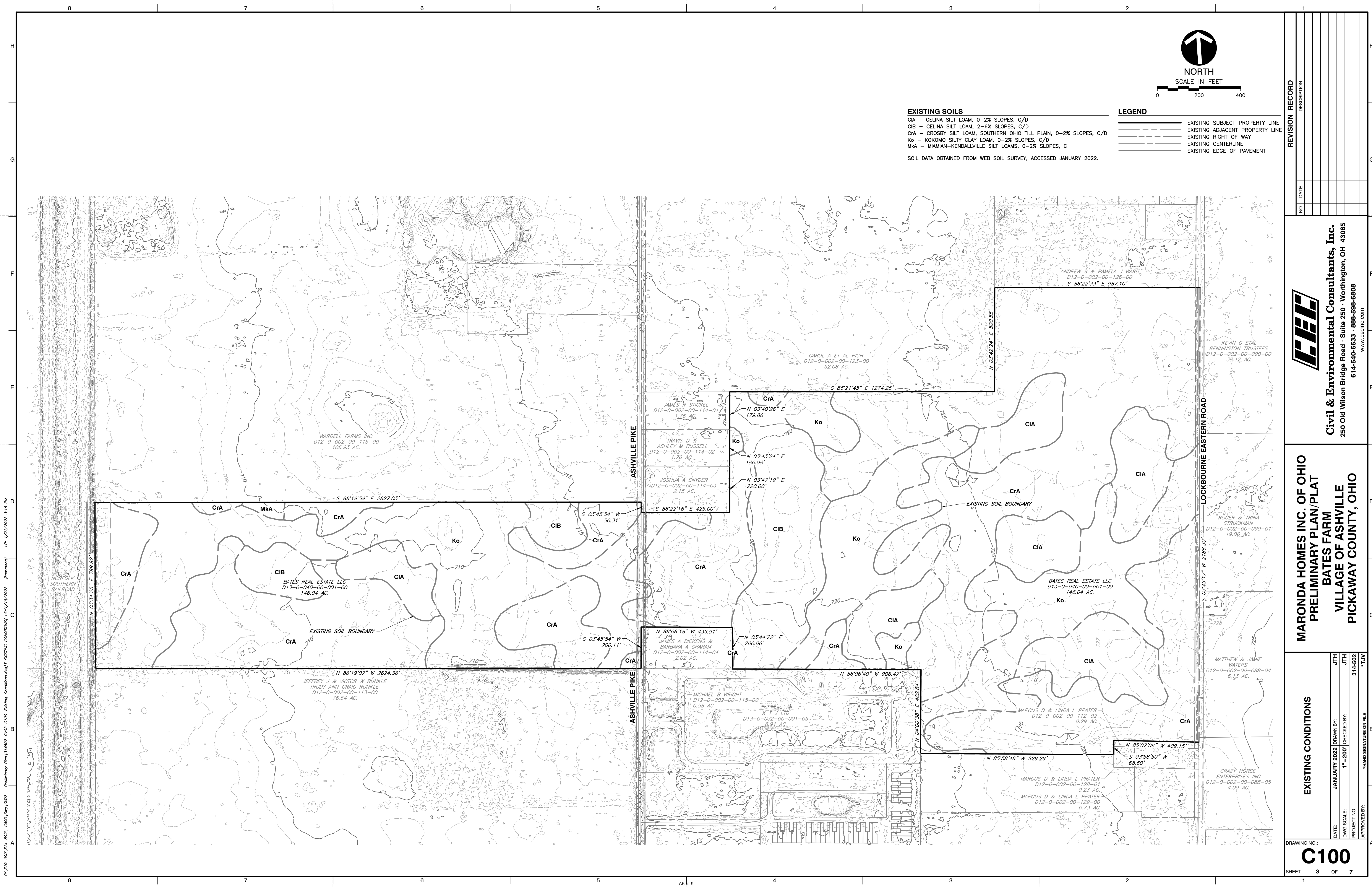
NO	DATE	DESCRIPTION

CEC
Civil & Environmental Consultants, Inc.
250 Old Wilson Bridge Road · Suite 250 · Worthington, OH 43085
614-540-6633 · 888-598-6808
www.cecinc.com

MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO

TYPICAL SECTIONS	
DATE: JANUARY 2022	DRAWN BY: JTH
DWG SCALE: AS NOTED	CHECKED BY: JTH
PROJECT NO: 314-502	APPROVED BY: *TJV

P:\310-000\314-502 - Preliminary Plan\314502-002-000-Cover Sheet, Typical Section, Site Layout.dwg [25/11/2022 - Hammond] - LP: 1/21/2022 3:16 PM



EXISTING SOILS
 CIA - CELINA SILT LOAM, 0-2% SLOPES, C/D
 CIB - CELINA SILT LOAM, 2-6% SLOPES, C/D
 CrA - CROSBY SILT LOAM, SOUTHERN OHIO TILL PLAIN, 0-2% SLOPES, C/D
 Ko - KOKOMO SILTY CLAY LOAM, 0-2% SLOPES, C/D
 MKA - MIAMIAN-KENDALLVILLE SILT LOAMS, 0-2% SLOPES, C

LEGEND
 ——— EXISTING SUBJECT PROPERTY LINE
 - - - - EXISTING ADJACENT PROPERTY LINE
 - - - - EXISTING RIGHT OF WAY
 - - - - EXISTING CENTERLINE
 - - - - EXISTING EDGE OF PAVEMENT

SOIL DATA OBTAINED FROM WEB SOIL SURVEY, ACCESSED JANUARY 2022.

P:\310-000\310-001-CADD\DWG\C100 - Preliminary Plan\310-002-C100-Existing Conditions.dwg (J:\hammond) - LP: 1/21/2022 3:16 PM

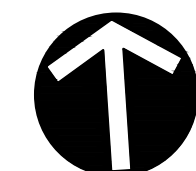
NO	DATE	DESCRIPTION

CEC
Civil & Environmental Consultants, Inc.
 250 Old Wilson Bridge Road · Suite 250 · Worthington, OH 43085
 614-540-6633 · 888-598-6808
 www.cecinc.com

MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO

EXISTING CONDITIONS

DATE:	JANUARY 2022	DRAWN BY:	JTH
DWG SCALE:	1"=200'	CHECKED BY:	JTH
PROJECT NO.:	314-502	APPROVED BY:	JTH
HAND SIGNATURE ON FILE			



NORTH
SCALE IN FEET
0 100 200

LEGEND

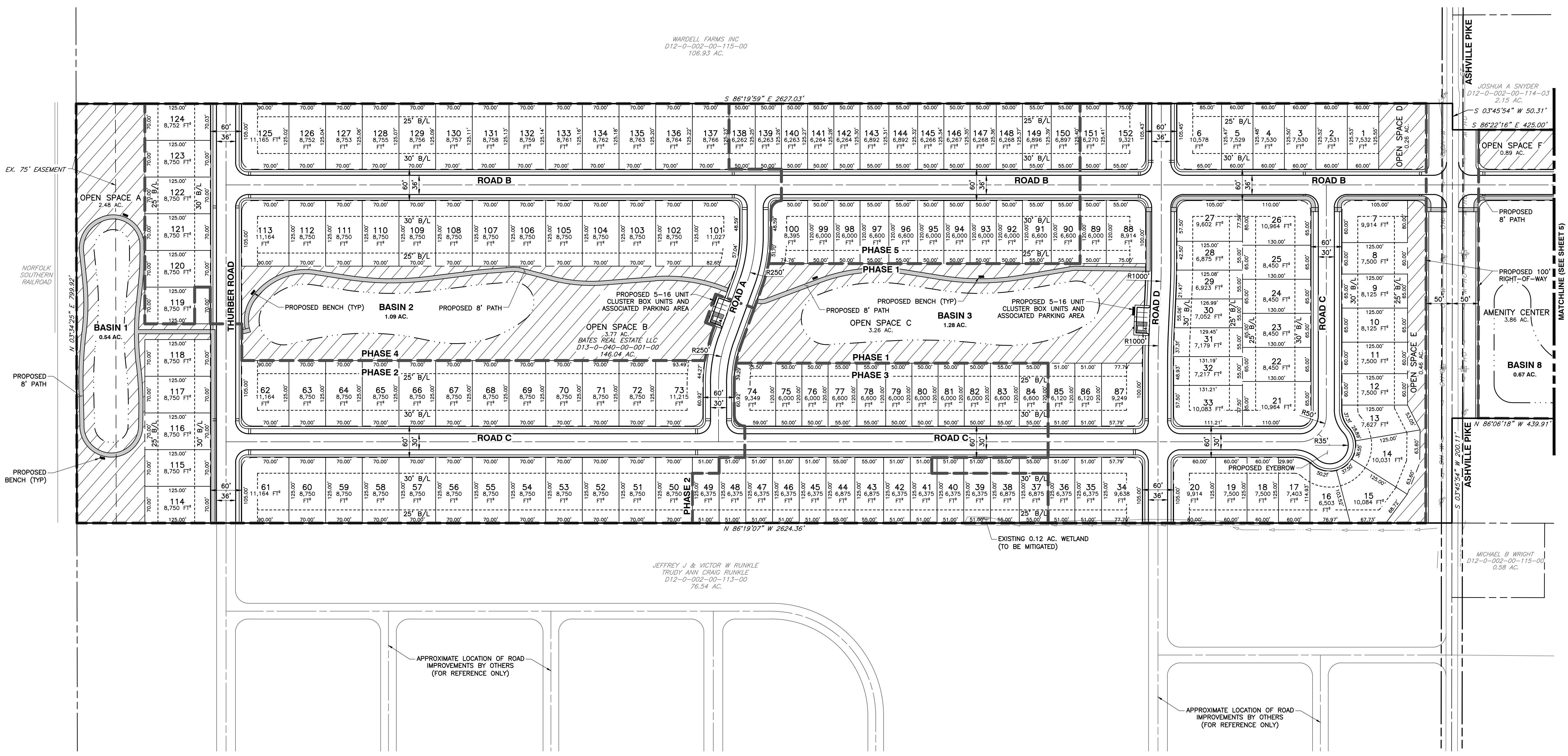
- EXISTING SUBJECT PROPERTY LINE
- EXISTING ADJACENT PROPERTY LINE
- EXISTING RIGHT OF WAY
- EXISTING CENTERLINE
- EXISTING EDGE OF PAVEMENT
- PROPOSED PROPERTY LINE
- PROPOSED RIGHT OF WAY
- PROPOSED CENTERLINE OF ROAD
- PROPOSED PAVEMENT
- PROPOSED WATER BODY

NOTES

1. EXISTING BASE MAP INFORMATION OBTAINED FROM PICKAWAY COUNTY AUDITORS ACCESSED SEPT. 2021.
2. EXISTING SUBJECT PROPERTY LINE PER BOUNDARY SURVEY COMPLETED BY CEC AUGUST 2021.
3. ROADWAYS NOTED "BY OTHERS" ARE FOR REFERENCE ONLY.
4. SEE SHEET 1 FOR LOT LEGEND, SITE STATISTICS AND OPEN SPACE BREAKDOWN.

NO	DATE	REVISION RECORD	DESCRIPTION

P:\310-000\314-502-CADD\DWG\C200 - Preliminary Plan\314502-002-CADD-Cover Sheet_Typical Section_Site Layout.dwg (1/21/2022 - Hammond) - LP: 1/21/2022 8:17 PM



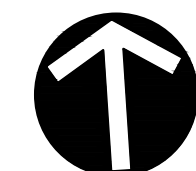
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614-540-6633 · 888-598-6808
www.cecinc.com

**MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO**

SITE LAYOUT PLAN

DATE: JANUARY 2022 DRAWN BY: JTH
 DWG SCALE: 1"=100' CHECKED BY: JTH
 PROJECT NO: 314-502
 APPROVED BY: [Signature] *LJV

MATCHLINE (SEE BELOW)



SCALE IN FEET
0 100 200

LEGEND

- EXISTING SUBJECT PROPERTY LINE
- EXISTING ADJACENT PROPERTY LINE
- EXISTING RIGHT OF WAY
- EXISTING CENTERLINE
- EXISTING EDGE OF PAVEMENT
- PROPOSED PROPERTY LINE
- PROPOSED RIGHT OF WAY
- PROPOSED CENTERLINE OF ROAD
- PROPOSED PAVEMENT
- PROPOSED WATER BODY

NOTES

1. EXISTING BASE MAP INFORMATION OBTAINED FROM PICKAWAY COUNTY AUDITORS ACCESSED SEPT. 2021.
2. EXISTING SUBJECT PROPERTY LINE PER BOUNDARY SURVEY COMPLETED BY CEC AUGUST 2021.
3. ROADWAYS NOTED "BY OTHERS" ARE FOR REFERENCE ONLY.
4. SEE SHEET 1 FOR LOT LEGEND, SITE STATISTICS AND OPEN SPACE BREAKDOWN.

NO	DATE	DESCRIPTION

CEC
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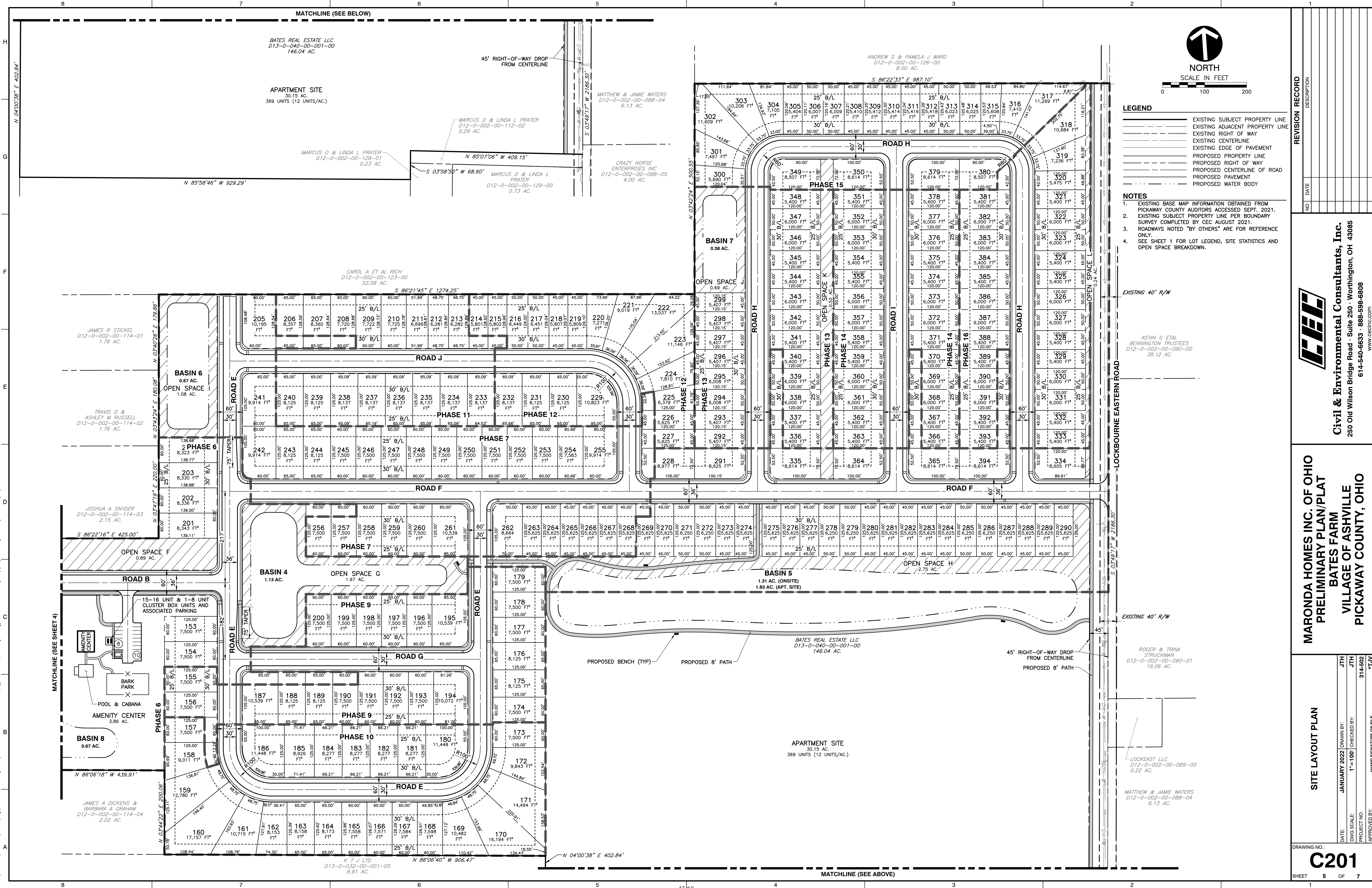
MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO

SITE LAYOUT PLAN

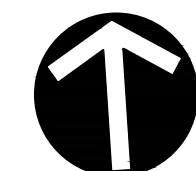
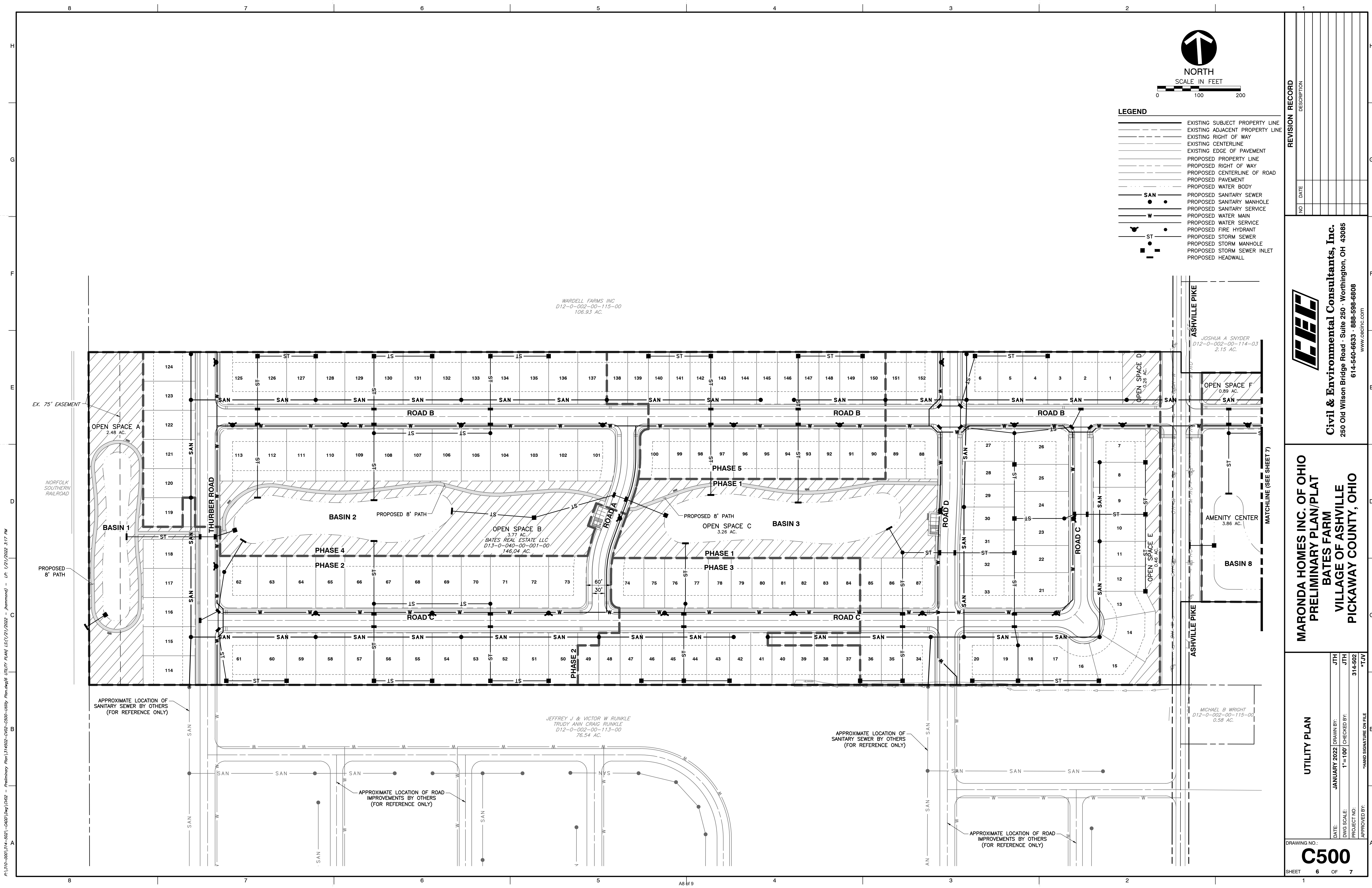
DRAWING NO.: **C201**

SHEET 5 OF 7

DATE: JANUARY 2022
 DWG SCALE: 1"=100'
 PROJECT NO: 314-502
 APPROVED BY: [Signature]



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NORTH

SCALE IN FEET



LEGEND

- EXISTING SUBJECT PROPERTY LINE
- - - EXISTING ADJACENT PROPERTY LINE
- - - EXISTING RIGHT OF WAY
- - - EXISTING CENTERLINE
- - - EXISTING EDGE OF PAVEMENT
- - - PROPOSED PROPERTY LINE
- - - PROPOSED RIGHT OF WAY
- - - PROPOSED CENTERLINE OF ROAD
- - - PROPOSED PAVEMENT
- - - PROPOSED WATER BODY
- SAN — PROPOSED SANITARY SEWER
- W — PROPOSED SANITARY MANHOLE
- ST — PROPOSED SANITARY SERVICE
- W — PROPOSED WATER MAIN
- W — PROPOSED WATER SERVICE
- W — PROPOSED FIRE HYDRANT
- ST — PROPOSED STORM SEWER
- ST — PROPOSED STORM MANHOLE
- ST — PROPOSED STORM SEWER INLET
- W — PROPOSED HEADWALL

NO.	DATE	DESCRIPTION

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MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO

UTILITY PLAN

DATE:	JANUARY 2022	DRAWN BY:	JTH
DWG SCALE:	1"=100'	CHECKED BY:	JTH
PROJECT NO.:	314-502	APPROVED BY:	JTH

DATE: 1/21/2022 3:17 PM
 P:\310-000\314-502\CADD\DWG\C500 - Preliminary Plan\314-502-C500-Utility Plan.dwg (6 Utility Plan) LS(1/21/2022 - Hammond) - LF: 1/21/2022 3:17 PM

WARDELL FARMS INC
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 106.93 AC.

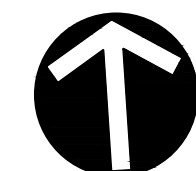
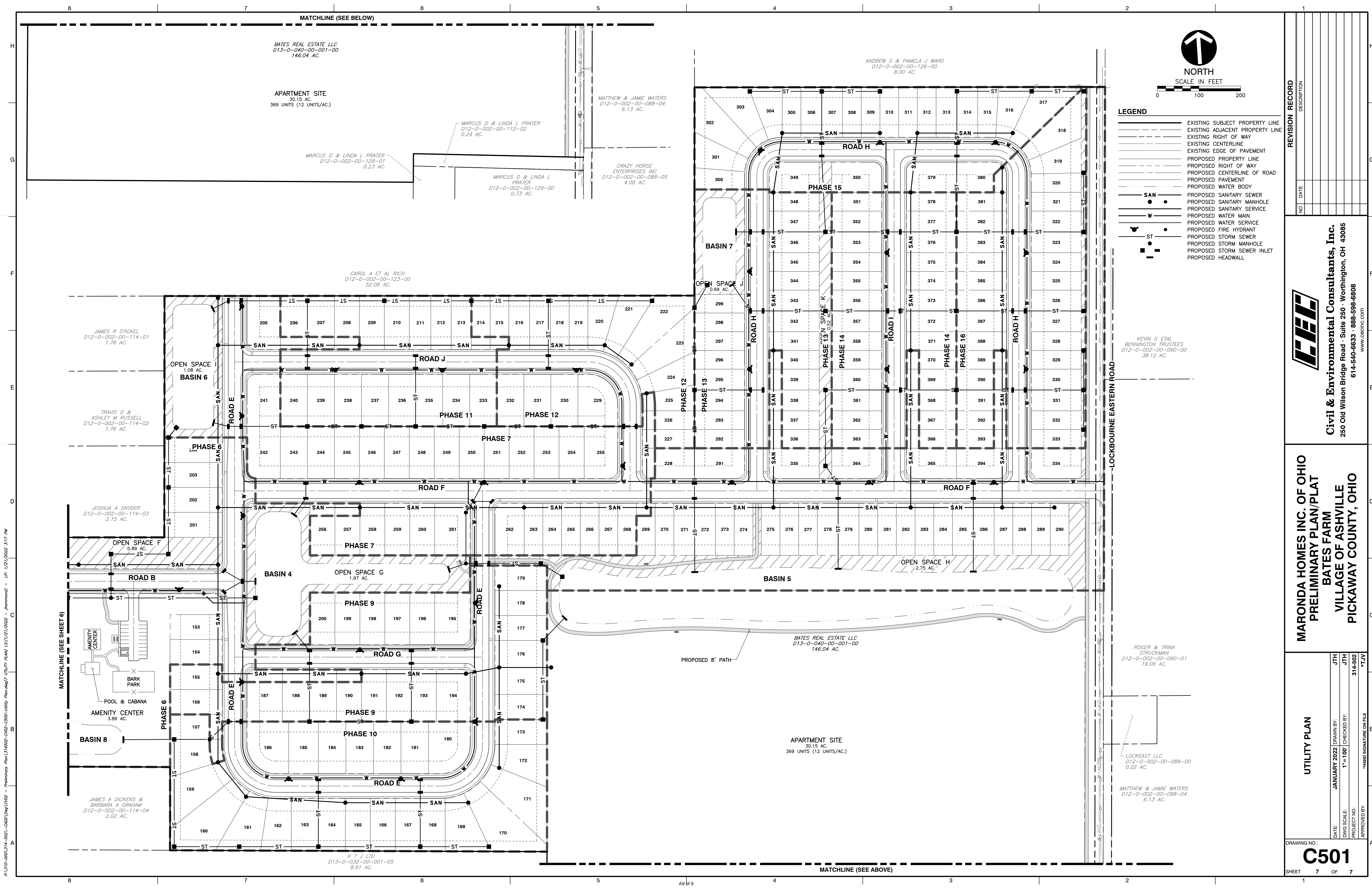
JOSHUA A SNYDER
 D12-0-002-00-114-03
 2.15 AC.

OPEN SPACE B
 3.77 AC.
 BATES REAL ESTATE LLC
 D13-0-040-00-001-00
 146.04 AC.

JEFFREY J & VICTOR W RUNKLE
 TRUDY ANN CRAIG RUNKLE
 D12-0-002-00-113-00
 76.54 AC.

MICHAEL B WRIGHT
 D12-0-002-00-115-00
 0.58 AC.

P:\310-000\314-502\CADD\DWG\C500 - Preliminary Plan\314-502-C500-Utility Plan.dwg (6 Utility Plan) LS(1/21/2022 - Hammond) - LF: 1/21/2022 3:17 PM



NORTH
SCALE IN FEET
0 100 200

LEGEND

	EXISTING SUBJECT PROPERTY LINE
	EXISTING ADJACENT PROPERTY LINE
	EXISTING RIGHT OF WAY
	EXISTING CENTERLINE
	EXISTING EDGE OF PAVEMENT
	PROPOSED PROPERTY LINE
	PROPOSED RIGHT OF WAY
	PROPOSED CENTERLINE OF ROAD
	PROPOSED PAVEMENT
	PROPOSED WATER BODY
	PROPOSED SANITARY SEWER
	PROPOSED SANITARY MANHOLE
	PROPOSED SANITARY SERVICE
	PROPOSED WATER MAIN
	PROPOSED WATER SERVICE
	PROPOSED FIRE HYDRANT
	PROPOSED STORM SEWER
	PROPOSED STORM MANHOLE
	PROPOSED STORM SEWER INLET
	PROPOSED HEADWALL

REVISION RECORD

NO.	DATE	DESCRIPTION

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MARONDA HOMES INC. OF OHIO
PRELIMINARY PLAN/PLAT
BATES FARM
VILLAGE OF ASHVILLE
PICKAWAY COUNTY, OHIO

UTILITY PLAN

DATE:	JANUARY 2022	DRAWN BY:	JTH
DWG SCALE:	1" = 100'	CHECKED BY:	JTH
PROJECT NO.:	314-502	APPROVED BY:	*TJV
*HAND SIGNATURE ON FILE			

DRAWING NO.: **C501**
SHEET 7 OF 7

P:\310-000\314-502-CAD\DWG\C502 - Preliminary Plan\314502-002-C502-Utility Plan.dwg (7 Utility Plan) LS(1/21/2022 - Hammond) - LF: 1/21/2022 3:17 PM

Appendix B

Count Data



Ashville Pike & St. Paul Road - TMC

Thu Sep 30, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881160, Location: 39.742179, -82.951237

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	Saint Paul Road Westbound				Ashville Pike Northbound				Ashville Pike Southbound				Int
	L	R	U	App	T	R	U	App	L	T	U	App	
2021-09-30 7:00AM	6	12	0	18	73	21	1	95	16	34	0	50	163
7:15AM	12	20	0	32	80	16	0	96	11	68	1	80	208
7:30AM	3	23	0	26	73	8	0	81	5	21	0	26	133
7:45AM	6	8	0	14	55	2	0	57	1	12	0	13	84
Hourly Total	27	63	0	90	281	47	1	329	33	135	1	169	588
8:00AM	0	6	0	6	49	4	0	53	2	22	0	24	83
8:15AM	4	3	0	7	40	6	0	46	2	32	0	34	87
8:30AM	4	2	0	6	47	3	0	50	4	29	0	33	89
8:45AM	4	6	0	10	25	5	0	30	2	17	0	19	59
Hourly Total	12	17	0	29	161	18	0	179	10	100	0	110	318
4:00PM	6	10	0	16	33	3	0	36	7	89	0	96	148
4:15PM	5	5	0	10	37	5	0	42	20	89	0	109	161
4:30PM	2	3	0	5	37	7	1	45	19	88	0	107	157
4:45PM	6	5	0	11	34	5	0	39	16	105	0	121	171
Hourly Total	19	23	0	42	141	20	1	162	62	371	0	433	637
5:00PM	7	4	0	11	40	2	0	42	17	102	0	119	172
5:15PM	8	2	0	10	40	7	0	47	14	116	0	130	187
5:30PM	10	8	0	18	42	7	0	49	21	94	0	115	182
5:45PM	2	5	0	7	38	5	0	43	21	73	0	94	144
Hourly Total	27	19	0	46	160	21	0	181	73	385	0	458	685
Total	85	122	0	207	743	106	2	851	178	991	1	1170	2228
% Approach	41.1%	58.9%	0%	-	87.3%	12.5%	0.2%	-	15.2%	84.7%	0.1%	-	-
% Total	3.8%	5.5%	0%	9.3%	33.3%	4.8%	0.1%	38.2%	8.0%	44.5%	0%	52.5%	-
Lights	77	115	0	192	722	101	2	825	172	955	1	1128	2145
% Lights	90.6%	94.3%	0%	92.8%	97.2%	95.3%	100%	96.9%	96.6%	96.4%	100%	96.4%	96.3%
Articulated Trucks	1	2	0	3	11	0	0	11	2	11	0	13	27
% Articulated Trucks	1.2%	1.6%	0%	1.4%	1.5%	0%	0%	1.3%	1.1%	1.1%	0%	1.1%	1.2%
Buses and Single-Unit Trucks	7	5	0	12	10	5	0	15	4	25	0	29	56
% Buses and Single-Unit Trucks	8.2%	4.1%	0%	5.8%	1.3%	4.7%	0%	1.8%	2.2%	2.5%	0%	2.5%	2.5%

*L: Left, R: Right, T: Thru, U: U-Turn

Ashville Pike & St. Paul Road - TMC

Thu Sep 30, 2021

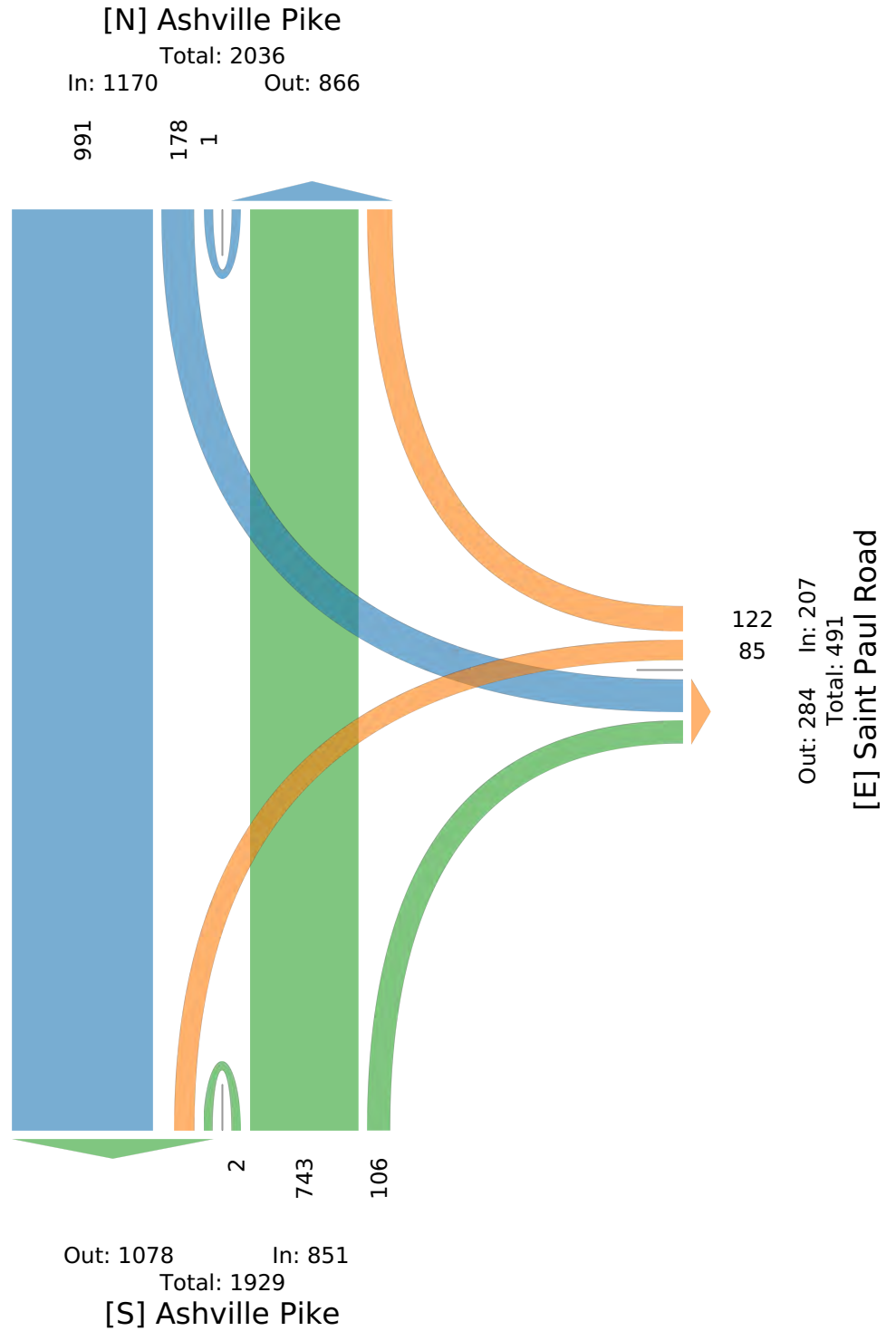
Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881160, Location: 39.742179, -82.951237

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



Ashville Pike & St. Paul Road - TMC

Thu Sep 30, 2021

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881160, Location: 39.742179, -82.951237

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	Saint Paul Road Westbound				Ashville Pike Northbound				Ashville Pike Southbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2021-09-30 7:00AM	6	12	0	18	73	21	1	95	16	34	0	50	163
7:15AM	12	20	0	32	80	16	0	96	11	68	1	80	208
7:30AM	3	23	0	26	73	8	0	81	5	21	0	26	133
7:45AM	6	8	0	14	55	2	0	57	1	12	0	13	84
Total	27	63	0	90	281	47	1	329	33	135	1	169	588
% Approach	30.0%	70.0%	0%	-	85.4%	14.3%	0.3%	-	19.5%	79.9%	0.6%	-	-
% Total	4.6%	10.7%	0%	15.3%	47.8%	8.0%	0.2%	56.0%	5.6%	23.0%	0.2%	28.7%	-
PHF	0.563	0.685	-	0.703	0.878	0.560	0.250	0.857	0.516	0.496	0.250	0.528	0.707
Lights	22	60	0	82	275	46	1	322	32	130	1	163	567
% Lights	81.5%	95.2%	0%	91.1%	97.9%	97.9%	100%	97.9%	97.0%	96.3%	100%	96.4%	96.4%
Articulated Trucks	1	0	0	1	3	0	0	3	0	0	0	0	4
% Articulated Trucks	3.7%	0%	0%	1.1%	1.1%	0%	0%	0.9%	0%	0%	0%	0%	0.7%
Buses and Single-Unit Trucks	4	3	0	7	3	1	0	4	1	5	0	6	17
% Buses and Single-Unit Trucks	14.8%	4.8%	0%	7.8%	1.1%	2.1%	0%	1.2%	3.0%	3.7%	0%	3.6%	2.9%

* L: Left, R: Right, T: Thru, U: U-Turn

Ashville Pike & St. Paul Road - TMC

Thu Sep 30, 2021

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881160, Location: 39.742179, -82.951237

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

[N] Ashville Pike

Total: 514

In: 169

Out: 345

135

33

1



63
27

Out: 80 In: 90
Total: 170

[E] Saint Paul Road

Out: 163

In: 329

Total: 492

[S] Ashville Pike

Ashville Pike & St. Paul Road - TMC

Thu Sep 30, 2021

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881160, Location: 39.742179, -82.951237

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	Saint Paul Road Westbound				Ashville Pike Northbound				Ashville Pike Southbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2021-09-30 4:45PM	6	5	0	11	34	5	0	39	16	105	0	121	171
5:00PM	7	4	0	11	40	2	0	42	17	102	0	119	172
5:15PM	8	2	0	10	40	7	0	47	14	116	0	130	187
5:30PM	10	8	0	18	42	7	0	49	21	94	0	115	182
Total	31	19	0	50	156	21	0	177	68	417	0	485	712
% Approach	62.0%	38.0%	0%	-	88.1%	11.9%	0%	-	14.0%	86.0%	0%	-	-
% Total	4.4%	2.7%	0%	7.0%	21.9%	2.9%	0%	24.9%	9.6%	58.6%	0%	68.1%	-
PHF	0.775	0.594	-	0.694	0.929	0.750	-	0.903	0.810	0.899	-	0.933	0.952
Lights	30	18	0	48	152	21	0	173	67	409	0	476	697
% Lights	96.8%	94.7%	0%	96.0%	97.4%	100%	0%	97.7%	98.5%	98.1%	0%	98.1%	97.9%
Articulated Trucks	0	1	0	1	3	0	0	3	0	5	0	5	9
% Articulated Trucks	0%	5.3%	0%	2.0%	1.9%	0%	0%	1.7%	0%	1.2%	0%	1.0%	1.3%
Buses and Single-Unit Trucks	1	0	0	1	1	0	0	1	1	3	0	4	6
% Buses and Single-Unit Trucks	3.2%	0%	0%	2.0%	0.6%	0%	0%	0.6%	1.5%	0.7%	0%	0.8%	0.8%

* L: Left, R: Right, T: Thru, U: U-Turn

Ashville Pike & St. Paul Road - TMC

Thu Sep 30, 2021

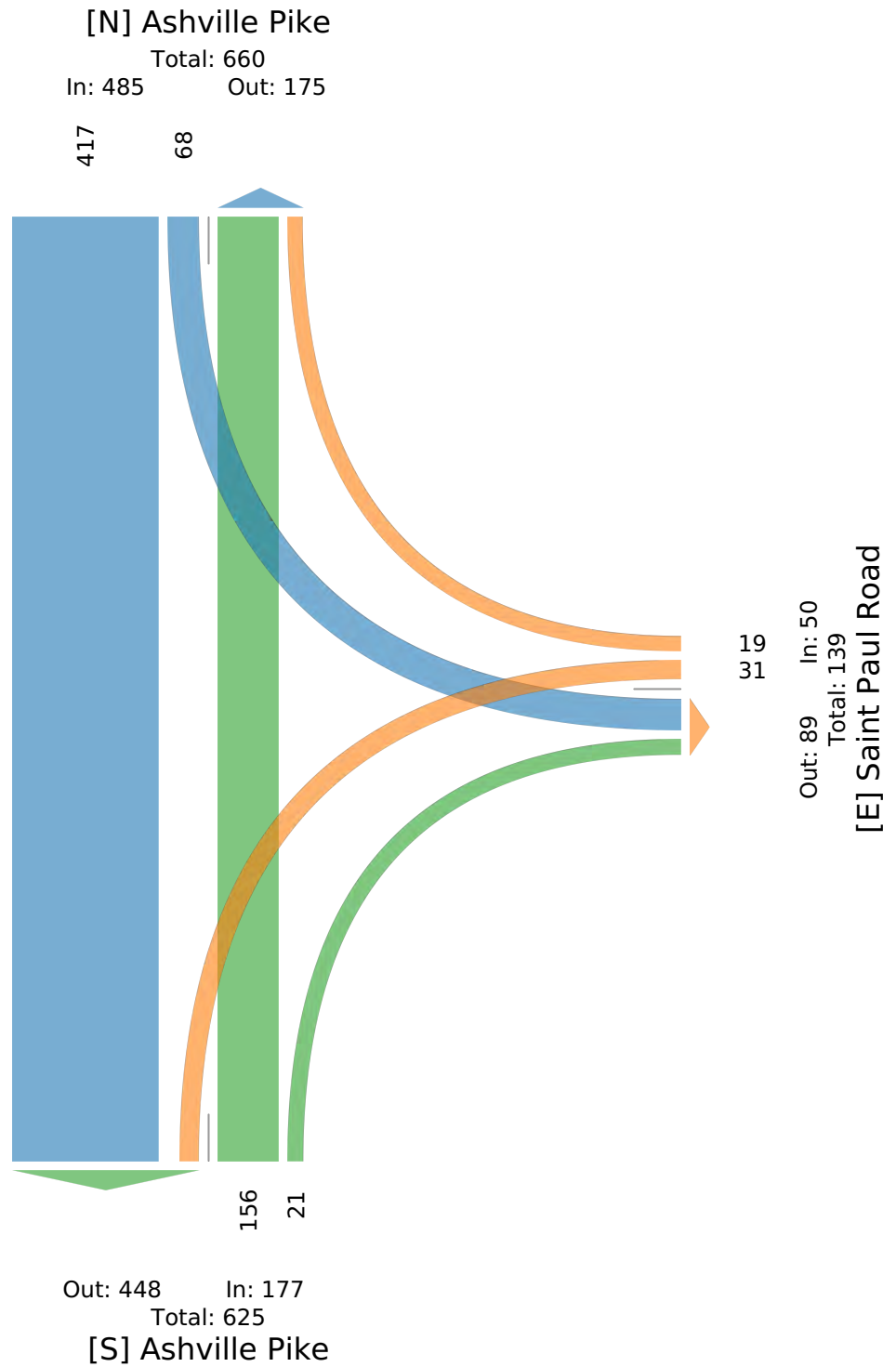
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881160, Location: 39.742179, -82.951237

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



Ashville Pike and Long Street - TMC

Tue Apr 20, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 830100, Location: 39.734115, -82.951975

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction Time	Long Street Westbound				Ashville Pike Northbound				Ashville Pike Southbound				Int
	L	R	U	App	T	R	U	App	L	T	U	App	
2021-04-20 7:00AM	3	18	0	21	82	3	0	85	0	48	0	48	154
7:15AM	4	6	0	10	93	1	0	94	0	75	0	75	179
7:30AM	4	8	0	12	78	2	0	80	2	39	0	41	133
7:45AM	2	5	0	7	32	1	0	33	3	20	0	23	63
Hourly Total	13	37	0	50	285	7	0	292	5	182	0	187	529
8:00AM	2	8	0	10	40	0	0	40	1	24	0	25	75
8:15AM	5	1	0	6	24	2	0	26	1	22	0	23	55
8:30AM	4	1	0	5	32	1	0	33	2	26	0	28	66
8:45AM	3	1	0	4	43	3	0	46	2	16	0	18	68
Hourly Total	14	11	0	25	139	6	0	145	6	88	0	94	264
4:00PM	4	2	0	6	27	7	0	34	5	85	0	90	130
4:15PM	7	2	0	9	42	6	0	48	14	82	0	96	153
4:30PM	2	3	0	5	31	4	0	35	3	89	0	92	132
4:45PM	6	3	0	9	32	2	0	34	7	90	0	97	140
Hourly Total	19	10	0	29	132	19	0	151	29	346	0	375	555
5:00PM	1	1	0	2	41	8	0	49	4	85	0	89	140
5:15PM	2	3	0	5	41	2	0	43	6	91	0	97	145
5:30PM	4	2	0	6	41	5	0	46	7	83	0	90	142
5:45PM	2	1	0	3	40	6	0	46	8	73	0	81	130
Hourly Total	9	7	0	16	163	21	0	184	25	332	0	357	557
Total	55	65	0	120	719	53	0	772	65	948	0	1013	1905
% Approach	45.8%	54.2%	0%	-	93.1%	6.9%	0%	-	6.4%	93.6%	0%	-	-
% Total	2.9%	3.4%	0%	6.3%	37.7%	2.8%	0%	40.5%	3.4%	49.8%	0%	53.2%	-
Lights	54	64	0	118	704	51	0	755	65	925	0	990	1863
% Lights	98.2%	98.5%	0%	98.3%	97.9%	96.2%	0%	97.8%	100%	97.6%	0%	97.7%	97.8%
Articulated Trucks	0	0	0	0	3	0	0	3	0	0	0	0	3
% Articulated Trucks	0%	0%	0%	0%	0.4%	0%	0%	0.4%	0%	0%	0%	0%	0.2%
Buses and Single-Unit Trucks	1	1	0	2	12	2	0	14	0	23	0	23	39
% Buses and Single-Unit Trucks	1.8%	1.5%	0%	1.7%	1.7%	3.8%	0%	1.8%	0%	2.4%	0%	2.3%	2.0%

*L: Left, R: Right, T: Thru, U: U-Turn

Ashville Pike and Long Street - TMC

Tue Apr 20, 2021

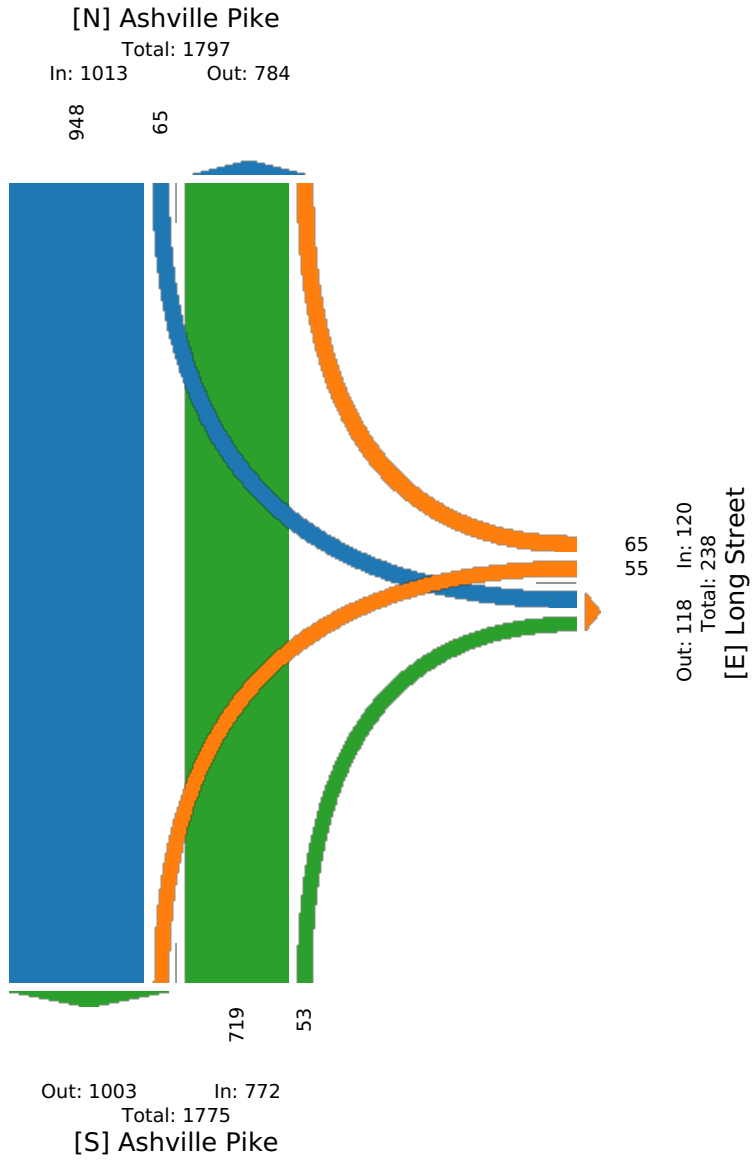
Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 830100, Location: 39.734115, -82.951975

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



Ashville Pike and Long Street - TMC

Tue Apr 20, 2021

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 830100, Location: 39.734115, -82.951975

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	Long Street Westbound				Ashville Pike Northbound				Ashville Pike Southbound				Int
	L	R	U	App	T	R	U	App	L	T	U	App	
Time													
2021-04-20 7:00AM	3	18	0	21	82	3	0	85	0	48	0	48	154
7:15AM	4	6	0	10	93	1	0	94	0	75	0	75	179
7:30AM	4	8	0	12	78	2	0	80	2	39	0	41	133
7:45AM	2	5	0	7	32	1	0	33	3	20	0	23	63
Total	13	37	0	50	285	7	0	292	5	182	0	187	529
% Approach	26.0%	74.0%	0%	-	97.6%	2.4%	0%	-	2.7%	97.3%	0%	-	-
% Total	2.5%	7.0%	0%	9.5%	53.9%	1.3%	0%	55.2%	0.9%	34.4%	0%	35.3%	-
PHF	0.813	0.514	-	0.595	0.766	0.583	-	0.777	0.417	0.607	-	0.623	0.739
Lights	13	36	0	49	282	6	0	288	5	176	0	181	518
% Lights	100%	97.3%	0%	98.0%	98.9%	85.7%	0%	98.6%	100%	96.7%	0%	96.8%	97.9%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Buses and Single-Unit Trucks	0	1	0	1	3	1	0	4	0	6	0	6	11
% Buses and Single-Unit Trucks	0%	2.7%	0%	2.0%	1.1%	14.3%	0%	1.4%	0%	3.3%	0%	3.2%	2.1%

*L: Left, R: Right, T: Thru, U: U-Turn

Ashville Pike and Long Street - TMC

Tue Apr 20, 2021

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

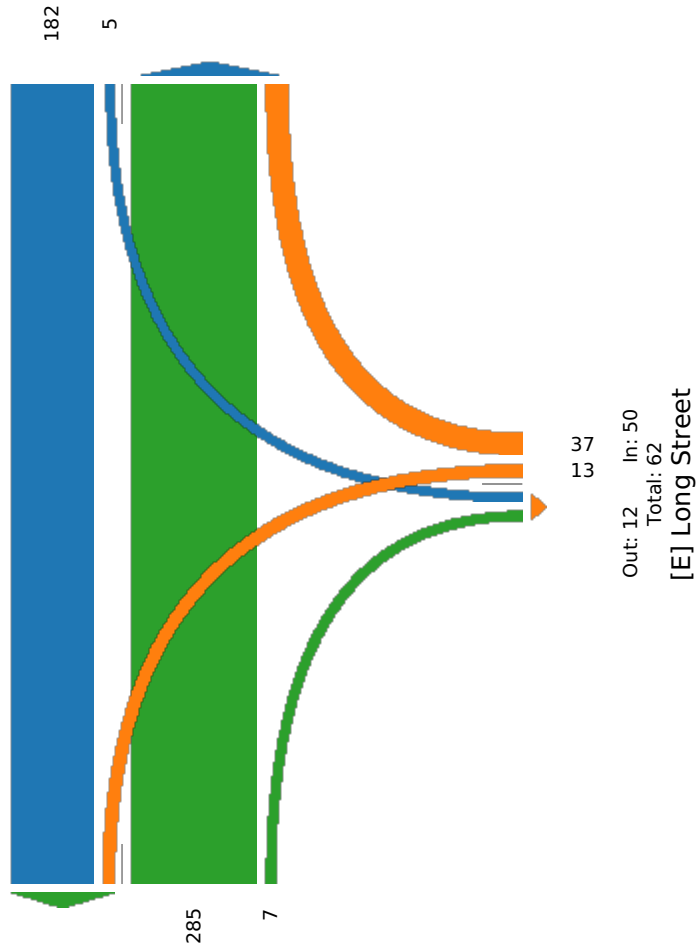
ID: 830100, Location: 39.734115, -82.951975

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

[N] Ashville Pike

Total: 509

In: 187 Out: 322



Out: 195 In: 292

Total: 487

[S] Ashville Pike

Out: 12 In: 50
Total: 62

[E] Long Street

Ashville Pike and Long Street - TMC

Tue Apr 20, 2021

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 830100, Location: 39.734115, -82.951975

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	Long Street Westbound				Ashville Pike Northbound				Ashville Pike Southbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2021-04-20 4:45PM	6	3	0	9	32	2	0	34	7	90	0	97	140
5:00PM	1	1	0	2	41	8	0	49	4	85	0	89	140
5:15PM	2	3	0	5	41	2	0	43	6	91	0	97	145
5:30PM	4	2	0	6	41	5	0	46	7	83	0	90	142
Total	13	9	0	22	155	17	0	172	24	349	0	373	567
% Approach	59.1%	40.9%	0%	-	90.1%	9.9%	0%	-	6.4%	93.6%	0%	-	-
% Total	2.3%	1.6%	0%	3.9%	27.3%	3.0%	0%	30.3%	4.2%	61.6%	0%	65.8%	-
PHF	0.542	0.750	-	0.611	0.945	0.531	-	0.878	0.857	0.959	-	0.961	0.978
Lights	13	9	0	22	151	17	0	168	24	344	0	368	558
% Lights	100%	100%	0%	100%	97.4%	100%	0%	97.7%	100%	98.6%	0%	98.7%	98.4%
Articulated Trucks	0	0	0	0	2	0	0	2	0	0	0	0	2
% Articulated Trucks	0%	0%	0%	0%	1.3%	0%	0%	1.2%	0%	0%	0%	0%	0.4%
Buses and Single-Unit Trucks	0	0	0	0	2	0	0	2	0	5	0	5	7
% Buses and Single-Unit Trucks	0%	0%	0%	0%	1.3%	0%	0%	1.2%	0%	1.4%	0%	1.3%	1.2%

*L: Left, R: Right, T: Thru, U: U-Turn

Ashville Pike and Long Street - TMC

Tue Apr 20, 2021

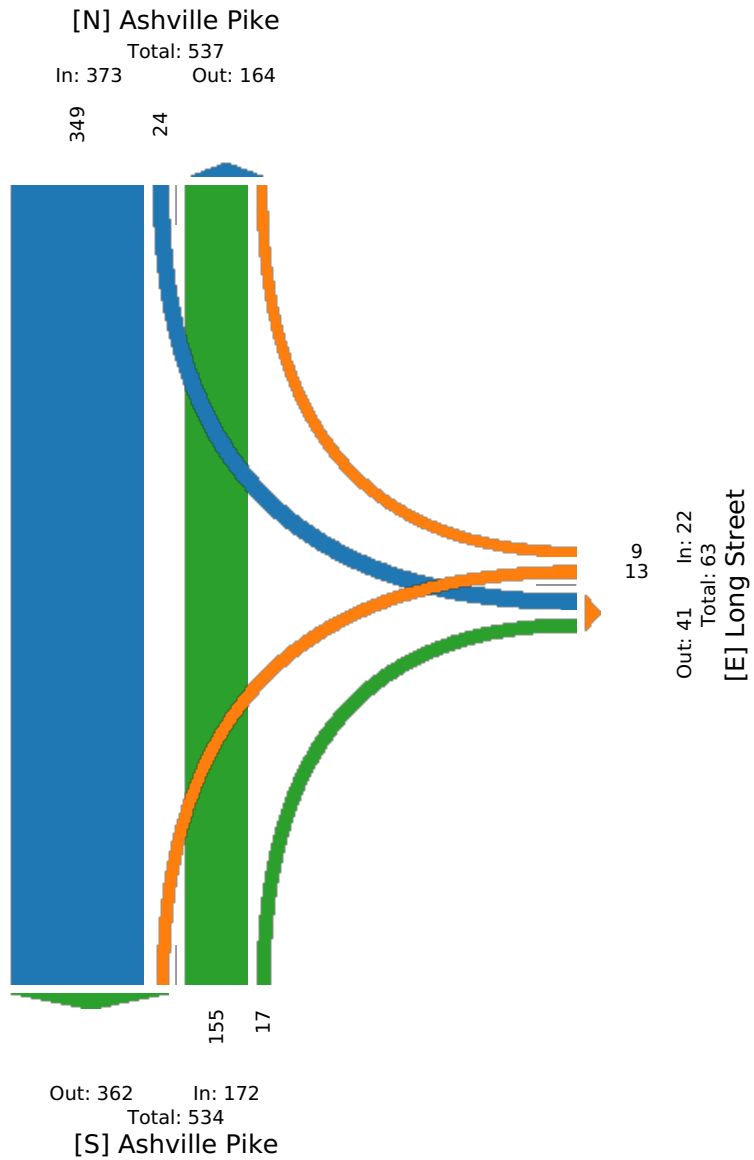
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 830100, Location: 39.734115, -82.951975

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



SR-752 & Ashville Pike - TMC

Thu Sep 30, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881161, Location: 39.723492, -82.95282

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	SR-752 Eastbound					SR-752 Westbound					Ashville Pike Northbound					Ashville Pike Southbound					Int
	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	
2021-09-30 7:00AM	8	53	3	1	65	7	15	12	0	34	4	26	21	2	53	32	15	16	1	64	216
7:15AM	11	74	3	0	88	8	33	17	0	58	8	34	20	0	62	70	19	11	0	100	308
7:30AM	9	24	4	0	37	10	29	26	0	65	7	27	14	0	48	15	6	12	0	33	183
7:45AM	12	16	2	1	31	3	20	8	0	31	1	25	1	0	27	7	12	15	0	34	123
Hourly Total	40	167	12	2	221	28	97	63	0	188	20	112	56	2	190	124	52	54	1	231	830
8:00AM	12	19	6	0	37	10	27	8	0	45	2	16	5	0	23	5	11	14	0	30	135
8:15AM	13	25	8	0	46	6	13	11	0	30	1	17	4	0	22	18	16	19	0	53	151
8:30AM	11	20	9	1	41	6	15	11	0	32	7	16	6	0	29	13	34	13	0	60	162
8:45AM	10	17	9	0	36	4	19	19	0	42	10	24	1	0	35	11	30	12	0	53	166
Hourly Total	46	81	32	1	160	26	74	49	0	149	20	73	16	0	109	47	91	58	0	196	614
4:00PM	26	28	10	0	64	28	23	19	0	70	20	30	7	0	57	16	58	14	0	88	279
4:15PM	21	33	8	0	62	10	23	15	0	48	11	29	11	0	51	11	49	31	1	92	253
4:30PM	20	30	15	1	66	14	19	15	0	48	10	33	6	0	49	17	45	27	0	89	252
4:45PM	23	26	10	0	59	20	17	13	0	50	7	37	16	1	61	27	47	33	0	107	277
Hourly Total	90	117	43	1	251	72	82	62	0	216	48	129	40	1	218	71	199	105	1	376	1061
5:00PM	24	31	17	2	74	17	40	22	0	79	13	40	13	0	66	23	44	24	0	91	310
5:15PM	20	26	16	0	62	18	30	28	0	76	7	32	12	0	51	25	54	28	1	108	297
5:30PM	25	47	17	1	90	26	35	16	0	77	15	28	19	0	62	31	57	22	0	110	339
5:45PM	13	35	10	1	59	25	26	21	0	72	8	38	17	0	63	16	59	17	0	92	286
Hourly Total	82	139	60	4	285	86	131	87	0	304	43	138	61	0	242	95	214	91	1	401	1232
Total	258	504	147	8	917	212	384	261	0	857	131	452	173	3	759	337	556	308	3	1204	3737
% Approach	28.1%	55.0%	16.0%	0.9%	-	24.7%	44.8%	30.5%	0%	-	17.3%	59.6%	22.8%	0.4%	-	28.0%	46.2%	25.6%	0.2%	-	-
% Total	6.9%	13.5%	3.9%	0.2%	24.5%	5.7%	10.3%	7.0%	0%	22.9%	3.5%	12.1%	4.6%	0.1%	20.3%	9.0%	14.9%	8.2%	0.1%	32.2%	-
Lights	251	474	145	8	878	209	357	254	0	820	128	443	171	3	745	321	543	295	2	1161	3604
% Lights	97.3%	94.0%	98.6%	100%	95.7%	98.6%	93.0%	97.3%	0%	95.7%	97.7%	98.0%	98.8%	100%	98.2%	95.3%	97.7%	95.8%	66.7%	96.4%	96.4%
Articulated Trucks	3	8	0	0	11	2	5	0	0	7	1	2	1	0	4	2	3	5	0	10	32
% Articulated Trucks	1.2%	1.6%	0%	0%	1.2%	0.9%	1.3%	0%	0%	0.8%	0.8%	0.4%	0.6%	0%	0.5%	0.6%	0.5%	1.6%	0%	0.8%	0.9%
Buses and Single-Unit Trucks	4	22	2	0	28	1	22	7	0	30	2	7	1	0	10	14	10	8	1	33	101
% Buses and Single-Unit Trucks	1.6%	4.4%	1.4%	0%	3.1%	0.5%	5.7%	2.7%	0%	3.5%	1.5%	1.5%	0.6%	0%	1.3%	4.2%	1.8%	2.6%	33.3%	2.7%	2.7%

*L: Left, R: Right, T: Thru, U: U-Turn

SR-752 & Ashville Pike - TMC

Thu Sep 30, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881161, Location: 39.723492, -82.95282

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

[N] Ashville Pike

Total: 2178

In: 1204

Out: 974

308

556

337

3

[W] SR-752

Total: 1748

In: 917

Out: 831

8
258
504
147

261
384
212

Out: 1014

In: 857

Total: 1871

[E] SR-752

3

131

452

173

Out: 918

In: 759

Total: 1677

[S] Ashville Pike

SR-752 & Ashville Pike - TMC

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

Thu Sep 30, 2021

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881161, Location: 39.723492, -82.95282

Leg Direction	SR-752 Eastbound					SR-752 Westbound					Ashville Pike Northbound					Ashville Pike Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2021-09-30 7:00AM	8	53	3	1	65	7	15	12	0	34	4	26	21	2	53	32	15	16	1	64	216
7:15AM	11	74	3	0	88	8	33	17	0	58	8	34	20	0	62	70	19	11	0	100	308
7:30AM	9	24	4	0	37	10	29	26	0	65	7	27	14	0	48	15	6	12	0	33	183
7:45AM	12	16	2	1	31	3	20	8	0	31	1	25	1	0	27	7	12	15	0	34	123
Total	40	167	12	2	221	28	97	63	0	188	20	112	56	2	190	124	52	54	1	231	830
% Approach	18.1%	75.6%	5.4%	0.9%	-	14.9%	51.6%	33.5%	0%	-	10.5%	58.9%	29.5%	1.1%	-	53.7%	22.5%	23.4%	0.4%	-	-
% Total	4.8%	20.1%	1.4%	0.2%	26.6%	3.4%	11.7%	7.6%	0%	22.7%	2.4%	13.5%	6.7%	0.2%	22.9%	14.9%	6.3%	6.5%	0.1%	27.8%	-
PHF	0.833	0.564	0.750	0.500	0.628	0.700	0.735	0.606	-	0.723	0.625	0.824	0.667	0.250	0.766	0.443	0.684	0.844	0.250	0.578	0.674
Lights	39	156	11	2	208	28	90	61	0	179	19	111	55	2	187	123	50	51	0	224	798
% Lights	97.5%	93.4%	91.7%	100%	94.1%	100%	92.8%	96.8%	0%	95.2%	95.0%	99.1%	98.2%	100%	98.4%	99.2%	96.2%	94.4%	0%	97.0%	96.1%
Articulated Trucks	0	1	0	0	1	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	3
% Articulated Trucks	0%	0.6%	0%	0%	0.5%	0%	0%	0%	0%	0%	5.0%	0%	1.8%	0%	1.1%	0%	0%	0%	0%	0%	0.4%
Buses and Single-Unit Trucks	1	10	1	0	12	0	7	2	0	9	0	1	0	0	1	1	2	3	1	7	29
% Buses and Single-Unit Trucks	2.5%	6.0%	8.3%	0%	5.4%	0%	7.2%	3.2%	0%	4.8%	0%	0.9%	0%	0%	0.5%	0.8%	3.8%	5.6%	100%	3.0%	3.5%

*L: Left, R: Right, T: Thru, U: U-Turn

SR-752 & Ashville Pike - TMC

Thu Sep 30, 2021

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881161, Location: 39.723492, -82.95282

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

[N] Ashville Pike

Total: 447

In: 231

Out: 216

54 52 124 1

[W] SR-752

Total: 394

Out: 173

In: 221

2 40 167 12

63 97 28

Out: 347

In: 188

Total: 535

[E] SR-752

Out: 94 In: 190

Total: 284

[S] Ashville Pike

2 20 112 56

SR-752 & Ashville Pike - TMC

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US

Thu Sep 30, 2021

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881161, Location: 39.723492, -82.95282

Leg Direction	SR-752 Eastbound					SR-752 Westbound					Ashville Pike Northbound					Ashville Pike Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2021-09-30 5:00PM	24	31	17	2	74	17	40	22	0	79	13	40	13	0	66	23	44	24	0	91	310
5:15PM	20	26	16	0	62	18	30	28	0	76	7	32	12	0	51	25	54	28	1	108	297
5:30PM	25	47	17	1	90	26	35	16	0	77	15	28	19	0	62	31	57	22	0	110	339
5:45PM	13	35	10	1	59	25	26	21	0	72	8	38	17	0	63	16	59	17	0	92	286
Total	82	139	60	4	285	86	131	87	0	304	43	138	61	0	242	95	214	91	1	401	1232
% Approach	28.8%	48.8%	21.1%	1.4%	-	28.3%	43.1%	28.6%	0%	-	17.8%	57.0%	25.2%	0%	-	23.7%	53.4%	22.7%	0.2%	-	-
% Total	6.7%	11.3%	4.9%	0.3%	23.1%	7.0%	10.6%	7.1%	0%	24.7%	3.5%	11.2%	5.0%	0%	19.6%	7.7%	17.4%	7.4%	0.1%	32.5%	-
PHF	0.820	0.739	0.882	0.500	0.792	0.827	0.819	0.777	-	0.962	0.717	0.863	0.803	-	0.917	0.766	0.907	0.813	0.250	0.911	0.909
Lights	80	137	59	4	280	85	129	86	0	300	43	135	61	0	239	92	214	88	1	395	1214
% Lights	97.6%	98.6%	98.3%	100%	98.2%	98.8%	98.5%	98.9%	0%	98.7%	100%	97.8%	100%	0%	98.8%	96.8%	100%	96.7%	100%	98.5%	98.5%
Articulated Trucks	2	2	0	0	4	0	1	0	0	1	0	1	0	0	1	2	0	3	0	5	11
% Articulated Trucks	2.4%	1.4%	0%	0%	1.4%	0%	0.8%	0%	0%	0.3%	0%	0.7%	0%	0%	0.4%	2.1%	0%	3.3%	0%	1.2%	0.9%
Buses and Single-Unit Trucks	0	0	1	0	1	1	1	1	0	3	0	2	0	0	2	1	0	0	0	1	7
% Buses and Single-Unit Trucks	0%	0%	1.7%	0%	0.4%	1.2%	0.8%	1.1%	0%	1.0%	0%	1.4%	0%	0%	0.8%	1.1%	0%	0%	0%	0.2%	0.6%

* L: Left, R: Right, T: Thru, U: U-Turn

SR-752 & Ashville Pike - TMC

Thu Sep 30, 2021

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 881161, Location: 39.723492, -82.95282

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

[N] Ashville Pike

Total: 709

In: 401

Out: 308

91

214

95

1

[W] SR-752

Total: 554

In: 285

Out: 269

4

82

139

60

87

131

86

Out: 295

In: 304

Total: 599

[E] SR-752

Out: 360

In: 242

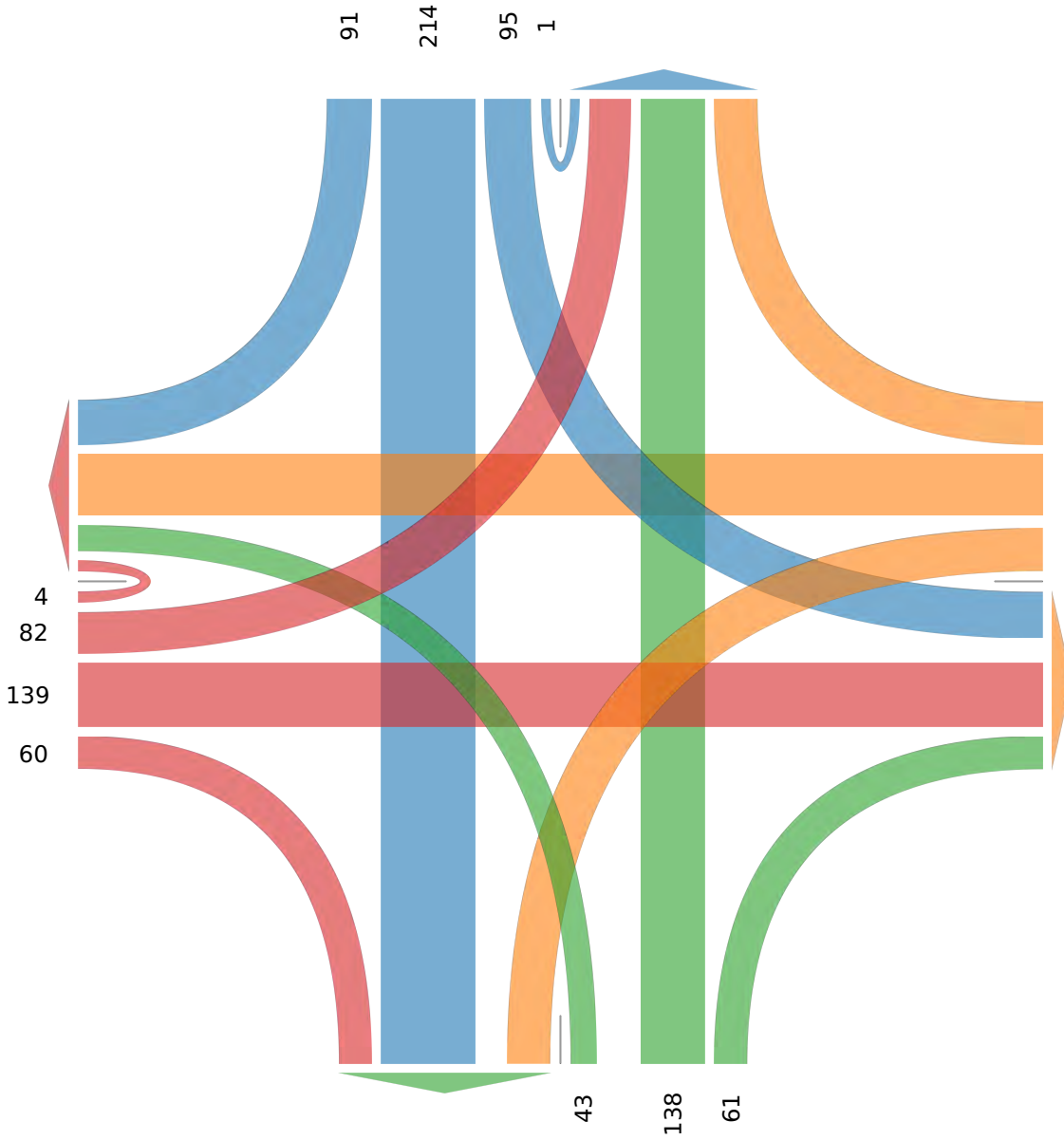
Total: 602

[S] Ashville Pike

43

138

61



Lockbourne-Eastern Road Segment - ATR

Tue Feb 15, 2022

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Channels

ID: 922827, Location: 39.731942, -82.942602

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	South Northbound		North Southbound		Int
	T	App	T	App	
Time					
2022-02-15 7:00AM	24	24	35	35	59
7:15AM	63	63	57	57	120
7:30AM	42	42	5	5	47
7:45AM	8	8	3	3	11
Hourly Total	137	137	100	100	237
8:00AM	11	11	5	5	16
8:15AM	6	6	7	7	13
8:30AM	5	5	12	12	17
8:45AM	8	8	7	7	15
Hourly Total	30	30	31	31	61
4:00PM	7	7	15	15	22
4:15PM	12	12	11	11	23
4:30PM	10	10	25	25	35
4:45PM	12	12	20	20	32
Hourly Total	41	41	71	71	112
5:00PM	10	10	13	13	23
5:15PM	8	8	21	21	29
5:30PM	14	14	22	22	36
5:45PM	5	5	18	18	23
Hourly Total	37	37	74	74	111
Total	245	245	276	276	521
% Approach	100%	-	100%	-	-
% Total	47.0%	47.0%	53.0%	53.0%	-
Lights	242	242	267	267	509
% Lights	98.8%	98.8%	96.7%	96.7%	97.7%
Articulated Trucks	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%
Buses and Single-Unit Trucks	3	3	9	9	12
% Buses and Single-Unit Trucks	1.2%	1.2%	3.3%	3.3%	2.3%

*T: Thru

Lockbourne-Eastern Road Segment - ATR

Tue Feb 15, 2022

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Channels

ID: 922827, Location: 39.731942, -82.942602

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



Lockbourne-Eastern Road Segment - ATR

Tue Feb 15, 2022

AM Peak (7 AM - 8 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Channels

ID: 922827, Location: 39.731942, -82.942602

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	South Northbound		North Southbound		Int
	T	App	T	App	
Time					
2022-02-15 7:00AM	24	24	35	35	59
7:15AM	63	63	57	57	120
7:30AM	42	42	5	5	47
7:45AM	8	8	3	3	11
Total	137	137	100	100	237
% Approach	100%	-	100%	-	-
% Total	57.8%	57.8%	42.2%	42.2%	-
PHF	0.544	0.544	0.439	0.439	0.494
Lights	136	136	96	96	232
% Lights	99.3%	99.3%	96.0%	96.0%	97.9%
Articulated Trucks	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%
Buses and Single-Unit Trucks	1	1	4	4	5
% Buses and Single-Unit Trucks	0.7%	0.7%	4.0%	4.0%	2.1%

*T: Thru

Lockbourne-Eastern Road Segment - ATR

Tue Feb 15, 2022

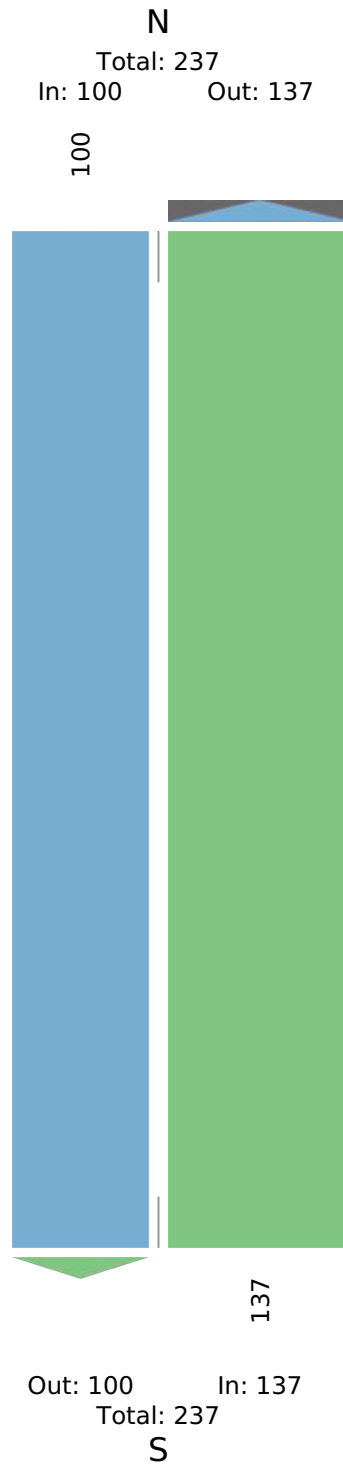
AM Peak (7 AM - 8 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Channels

ID: 922827, Location: 39.731942, -82.942602

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



Lockbourne-Eastern Road Segment - ATR

Tue Feb 15, 2022

PM Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Channels

ID: 922827, Location: 39.731942, -82.942602

Provided by: Carpenter Marty (CM) Transportation Inc.

6612 Singletree Drive, Columbus, OH, 43229, US

Leg Direction	South Northbound		North Southbound		
Time	T	App	T	App	Int
2022-02-15 4:45PM	12	12	20	20	32
5:00PM	10	10	13	13	23
5:15PM	8	8	21	21	29
5:30PM	14	14	22	22	36
Total	44	44	76	76	120
% Approach	100%	-	100%	-	-
% Total	36.7%	36.7%	63.3%	63.3%	-
PHF	0.786	0.786	0.864	0.864	0.833
Lights	44	44	76	76	120
% Lights	100%	100%	100%	100%	100%
Articulated Trucks	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%
Buses and Single-Unit Trucks	0	0	0	0	0
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%

*T: Thru

Lockbourne-Eastern Road Segment - ATR

Tue Feb 15, 2022

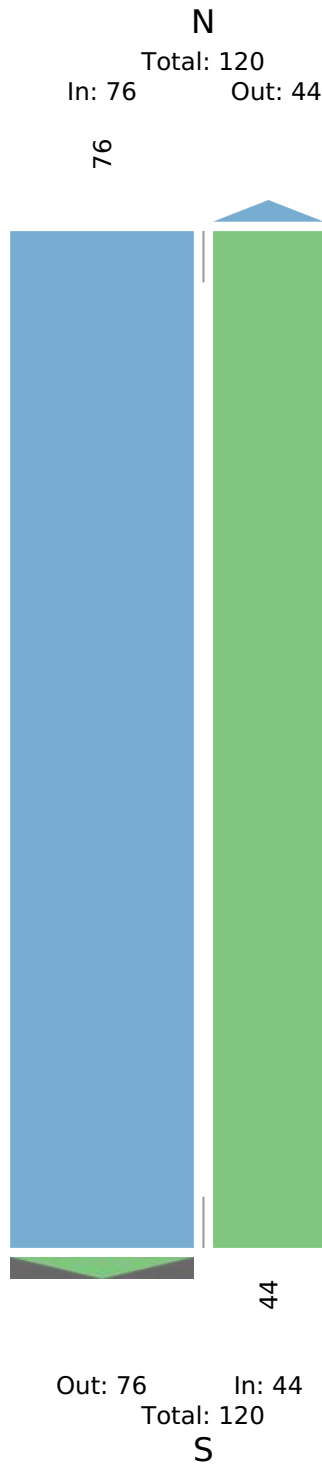
PM Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Channels

ID: 922827, Location: 39.731942, -82.942602

Provided by: Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive, Columbus, OH, 43229, US



Appendix C

Trip Generation



Scenario - 1

Scenario Name: AM Peak

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
210 - Single-Family Detached Housing	General	Dwelling Units	625	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	103	292	395
Data Source: Trip Generation Manual, 11th Ed	Urban/Suburban				$\ln(T) = 0.91\ln(X) + 0.12$	26%	74%	
220 - Multifamily Housing (Low-Rise) - Not Close	General	Dwelling Units	369	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN)	33	104	137
Data Source: Trip Generation Manual, 11th Ed	Urban/Suburban				$T = 0.31(X) + 22.85$	24%	76%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
210 - Single-Family Detached Housing	100	100	1	1	26	74
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	100	100	1	1	24	76

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing	103	292	0	0	103	292
	395		0		395	
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	33	104	0	0	33	104
	137		0		137	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
210 - Single-Family Detached Housing	103	292	395
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	33	104	137

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	136	396	532
External Vehicle Trips	136	396	532
New Vehicle Trips	136	396	532

Scenario - 2

Scenario Name: PM Peak

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
210 - Single-Family Detached Housing	General	Dwelling Units	625	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	351	206	557
Data Source: Trip Generation Manual, 11th Ed	Urban/Suburban				$\ln(T) = 0.94\ln(X) + 0.27$	63%	37%	
220 - Multifamily Housing (Low-Rise) - Not Close	General	Dwelling Units	369	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN)	113	66	179
Data Source: Trip Generation Manual, 11th Ed	Urban/Suburban				$T = 0.43(X) + 20.55$	63%	37%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
210 - Single-Family Detached Housing	100	100	1	1	63	37
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	100	100	1	1	63	37

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing	351	206	0	0	351	206
	557		0		557	
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	113	66	0	0	113	66
	179		0		179	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
210 - Single-Family Detached Housing	351	206	557
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	113	66	179

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	464	272	736
External Vehicle Trips	464	272	736
New Vehicle Trips	464	272	736

Scenario - 3

Scenario Name: Weekday
 Dev. phase: 1
 Analyst Note:

User Group:
 No. of Years to Project 0
 Traffic :

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
210 - Single-Family Detached Housing	General Urban/Suburban	Dwelling Units	625	Weekday	Best Fit (LOG)	2723	2723	5446
Data Source: Trip Generation Manual, 11th Ed					$\ln(T) = 0.92\ln(X) + 2.68$	50%	50%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
210 - Single-Family Detached Housing	100	100	1	1	50	50

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing	2723	2723	0	0	2723	2723
	5446		0		5446	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
210 - Single-Family Detached Housing	2723	2723	5446

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	2723	2723	5446
External Vehicle Trips	2723	2723	5446
New Vehicle Trips	2723	2723	5446

Appendix D

Volume Calculations

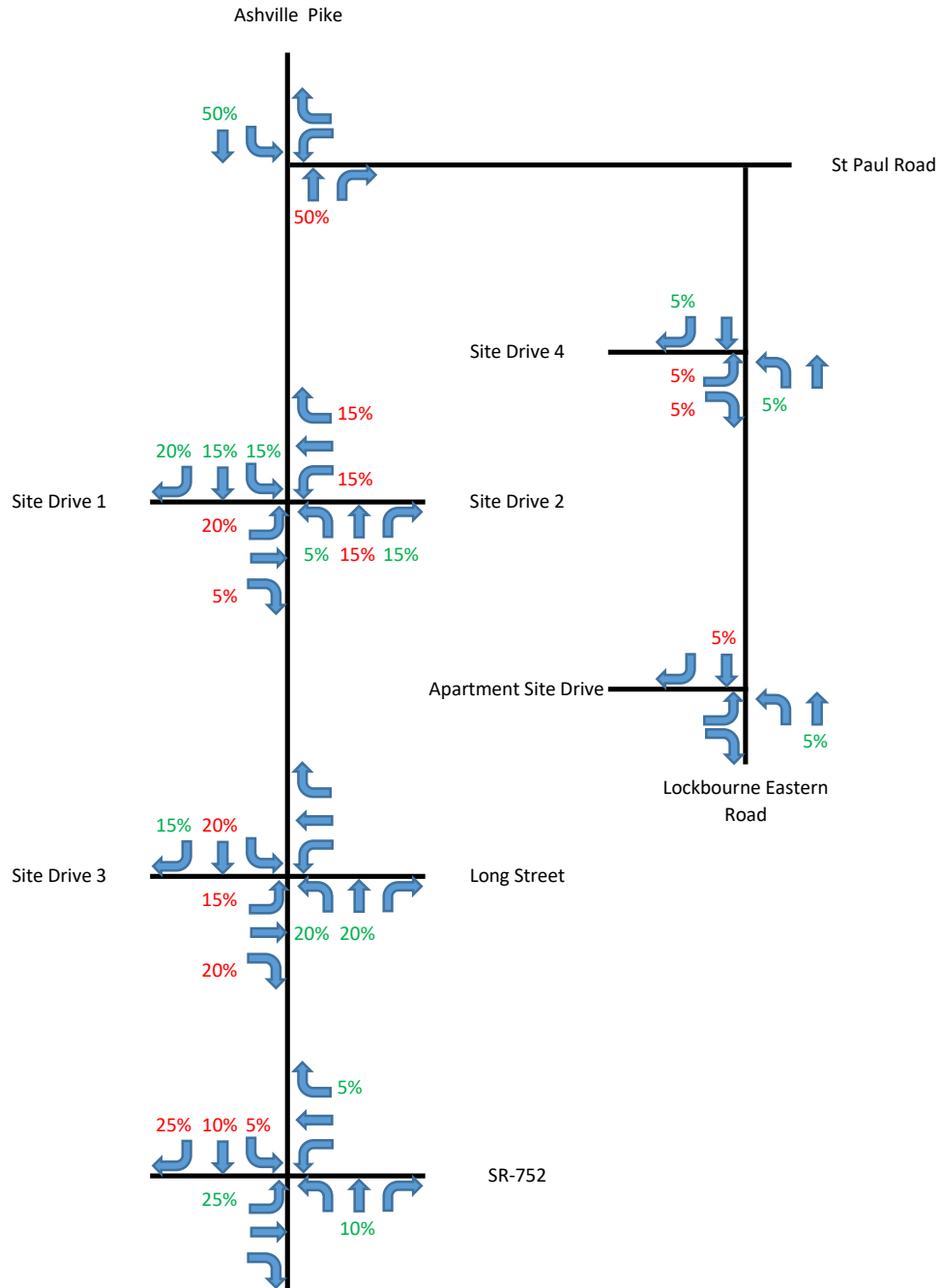


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
		Site Distribution	

^
N

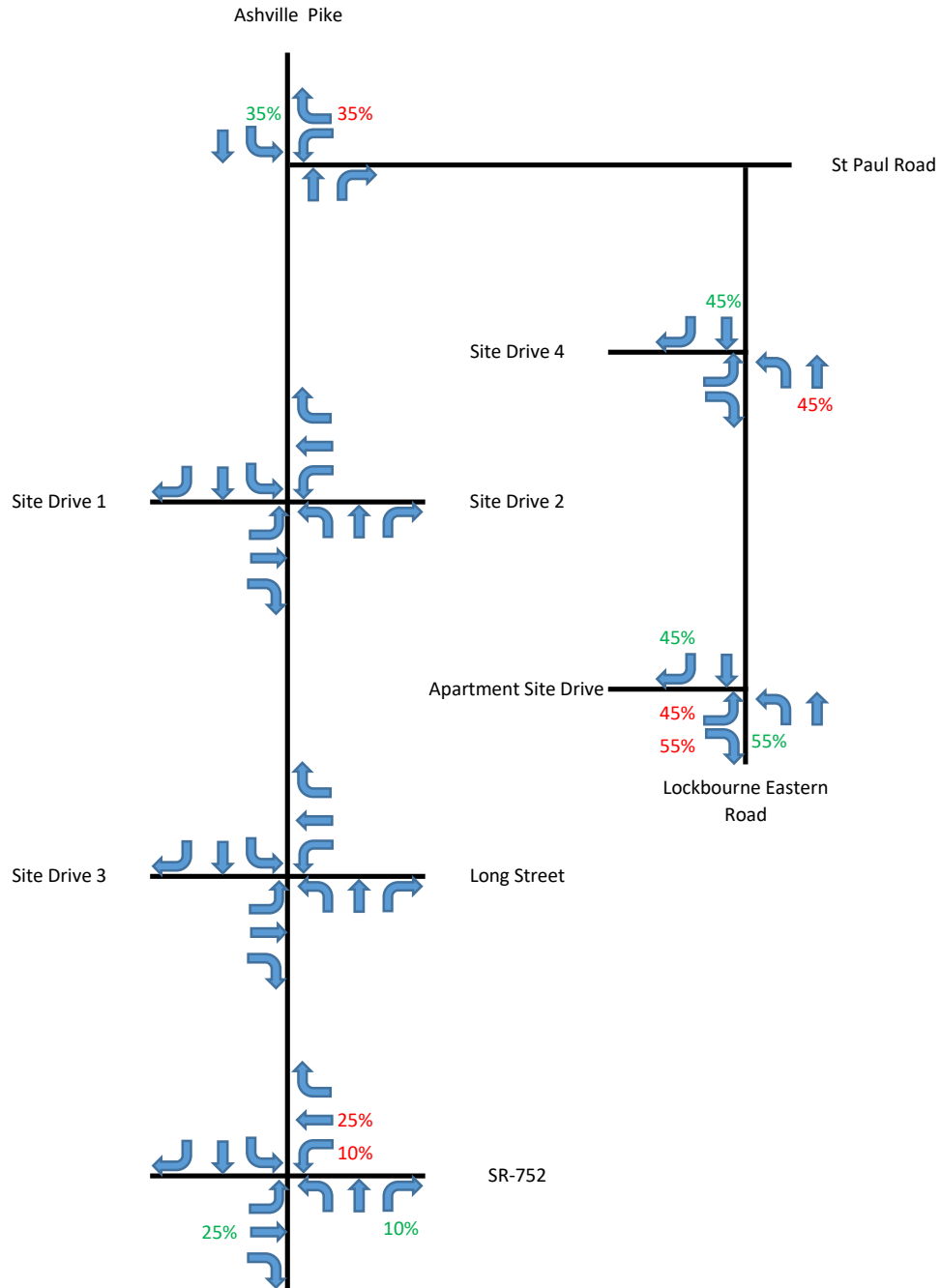


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
		Apartment Distribution	

^
N

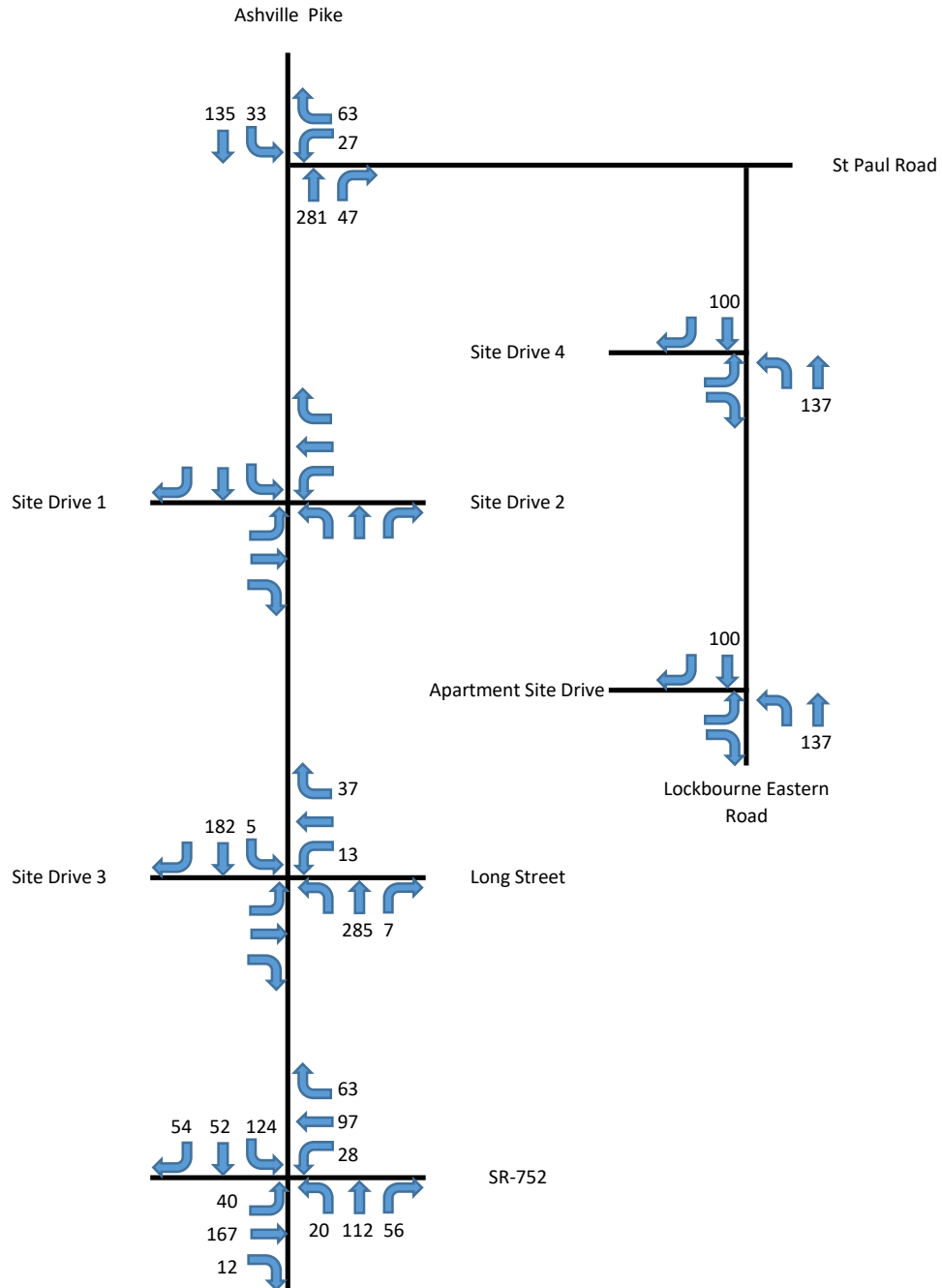


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2021	AM	Count	

^
N



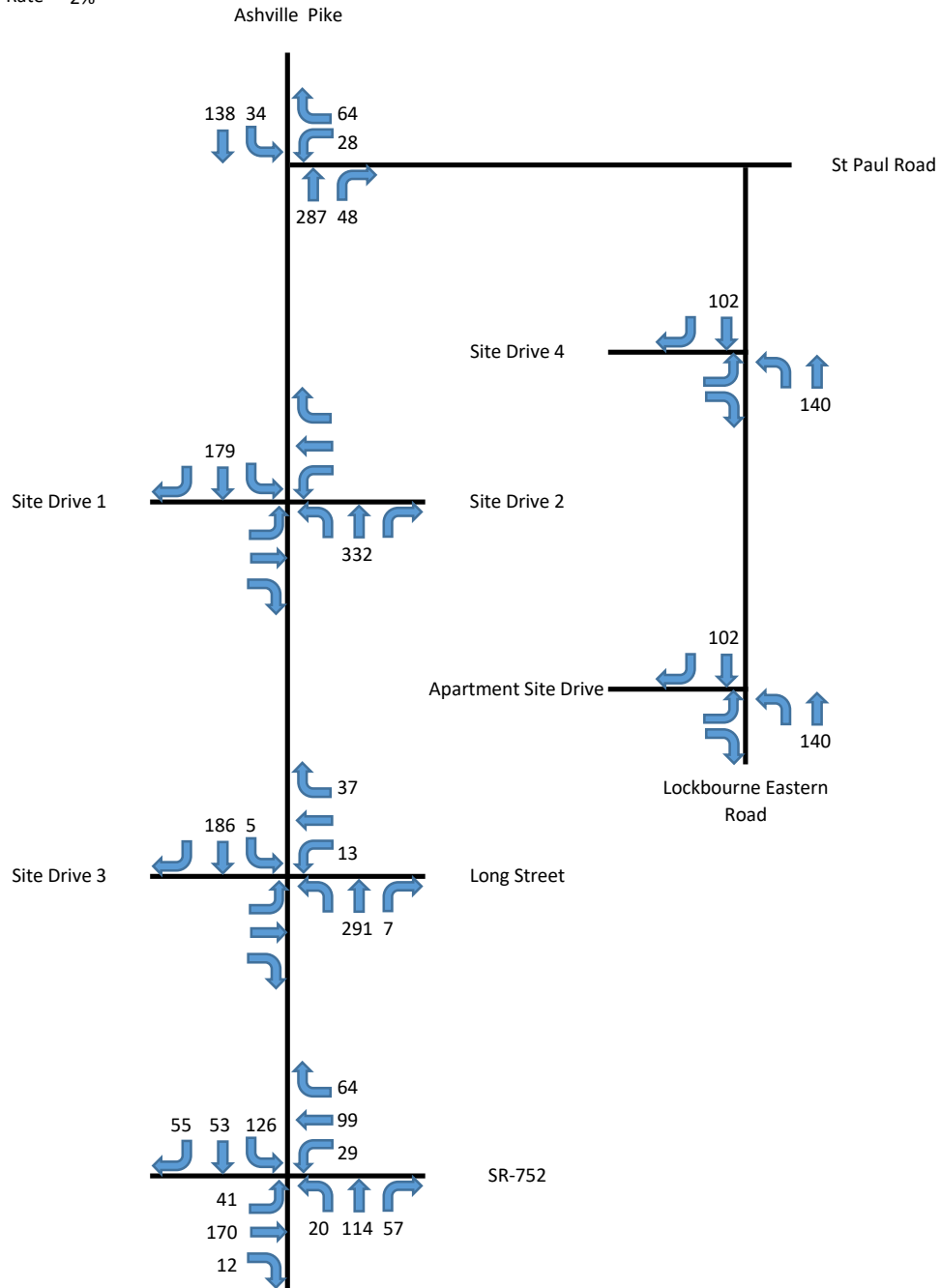
Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2022	AM	No Build	A1

^
N

Growth Rate 2%

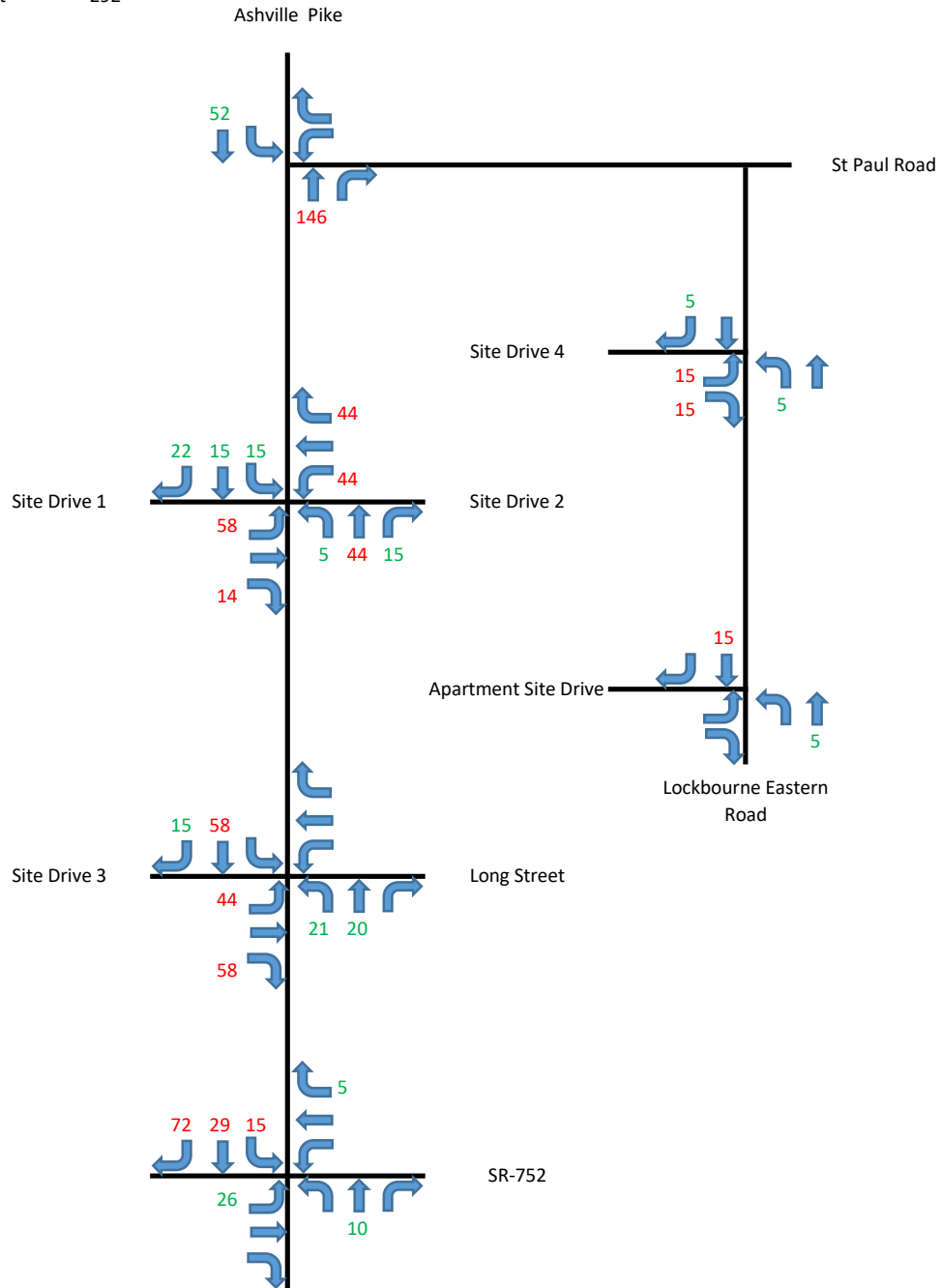


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
	AM	Site Non-Pass-By Traffic	B1

^
N
Enter 103
Exit 292

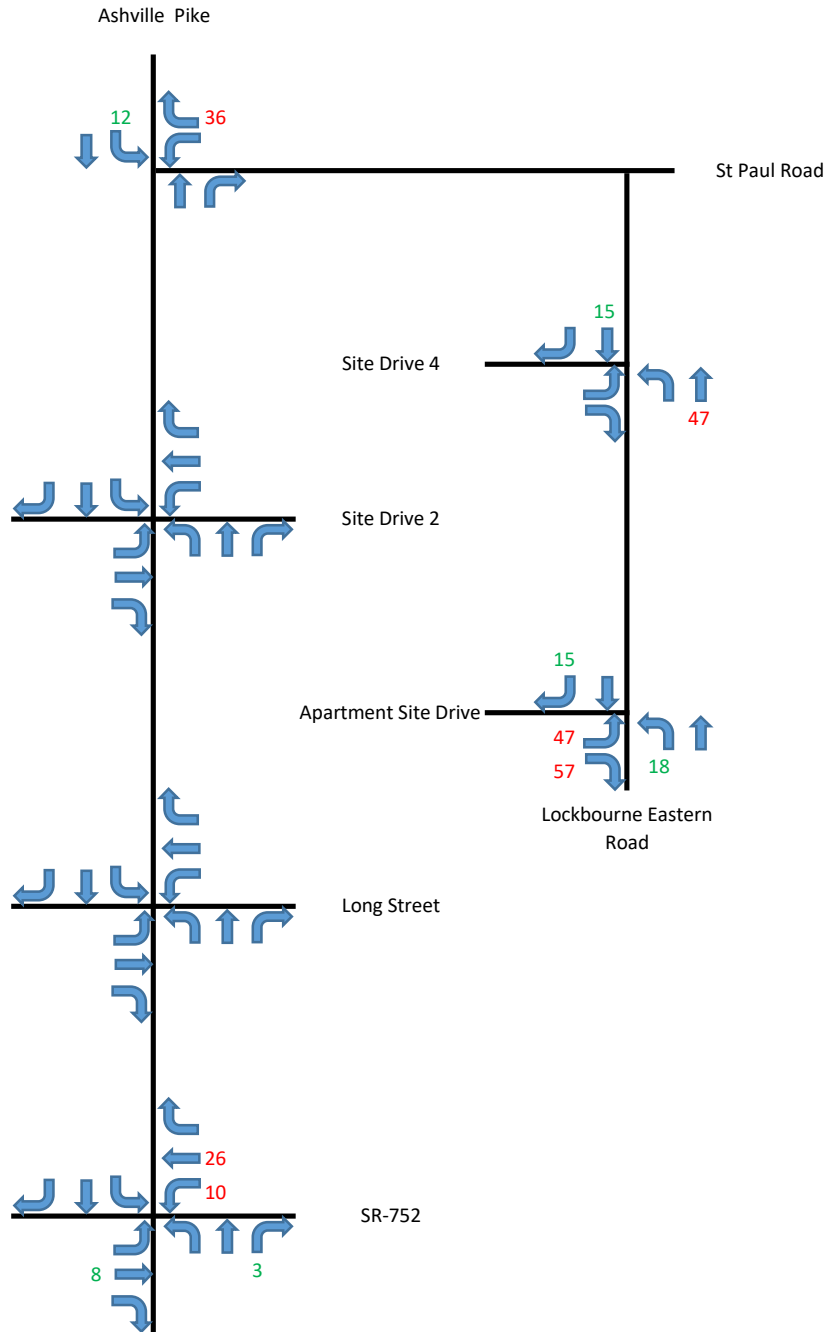


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
	AM	Apartment Site Non-Pass-By Traffic	C1

^
N
Enter 33
Exit 104

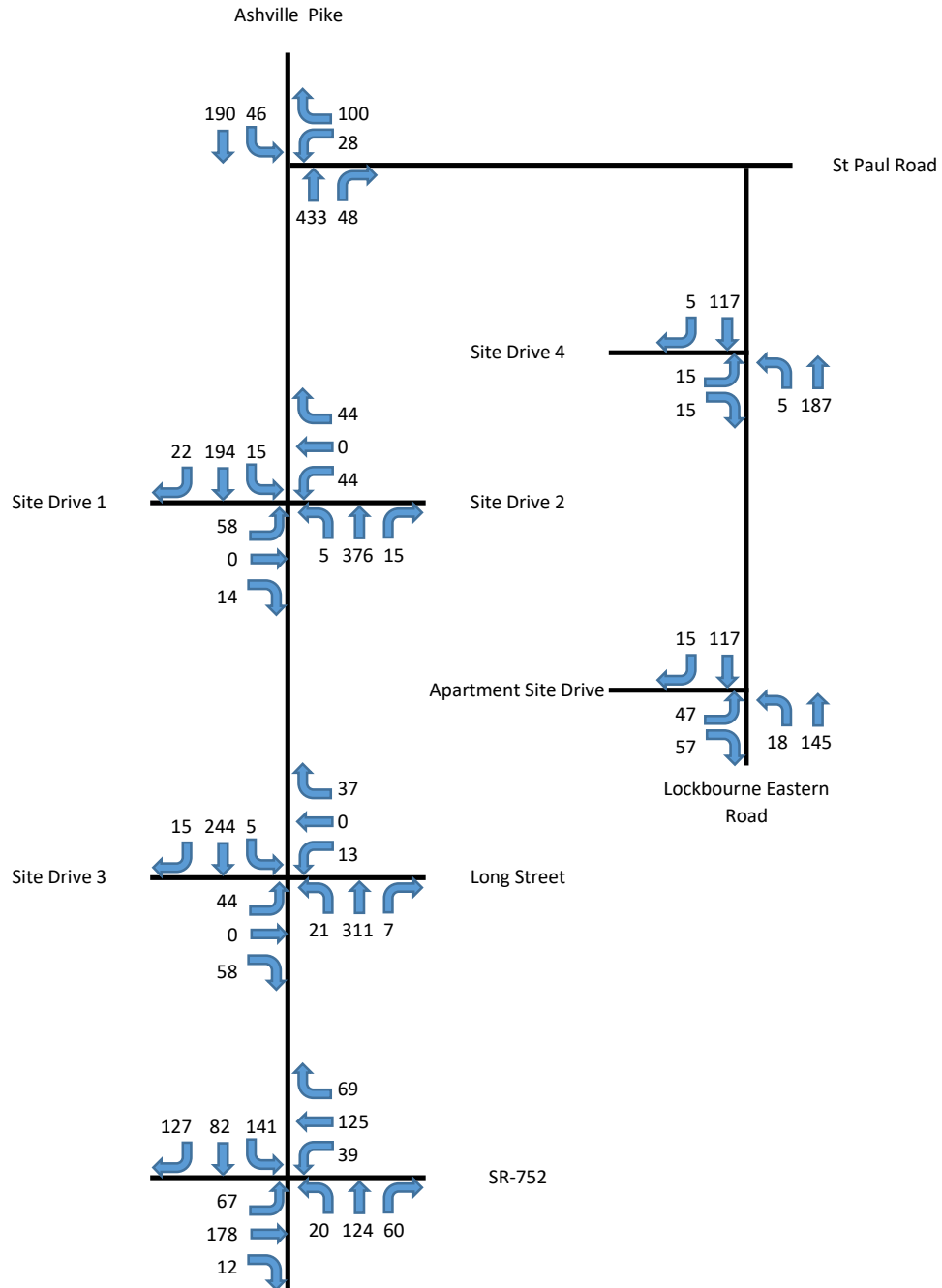


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2022	AM	Build	D1 = A1 + B1 + C1

^
N



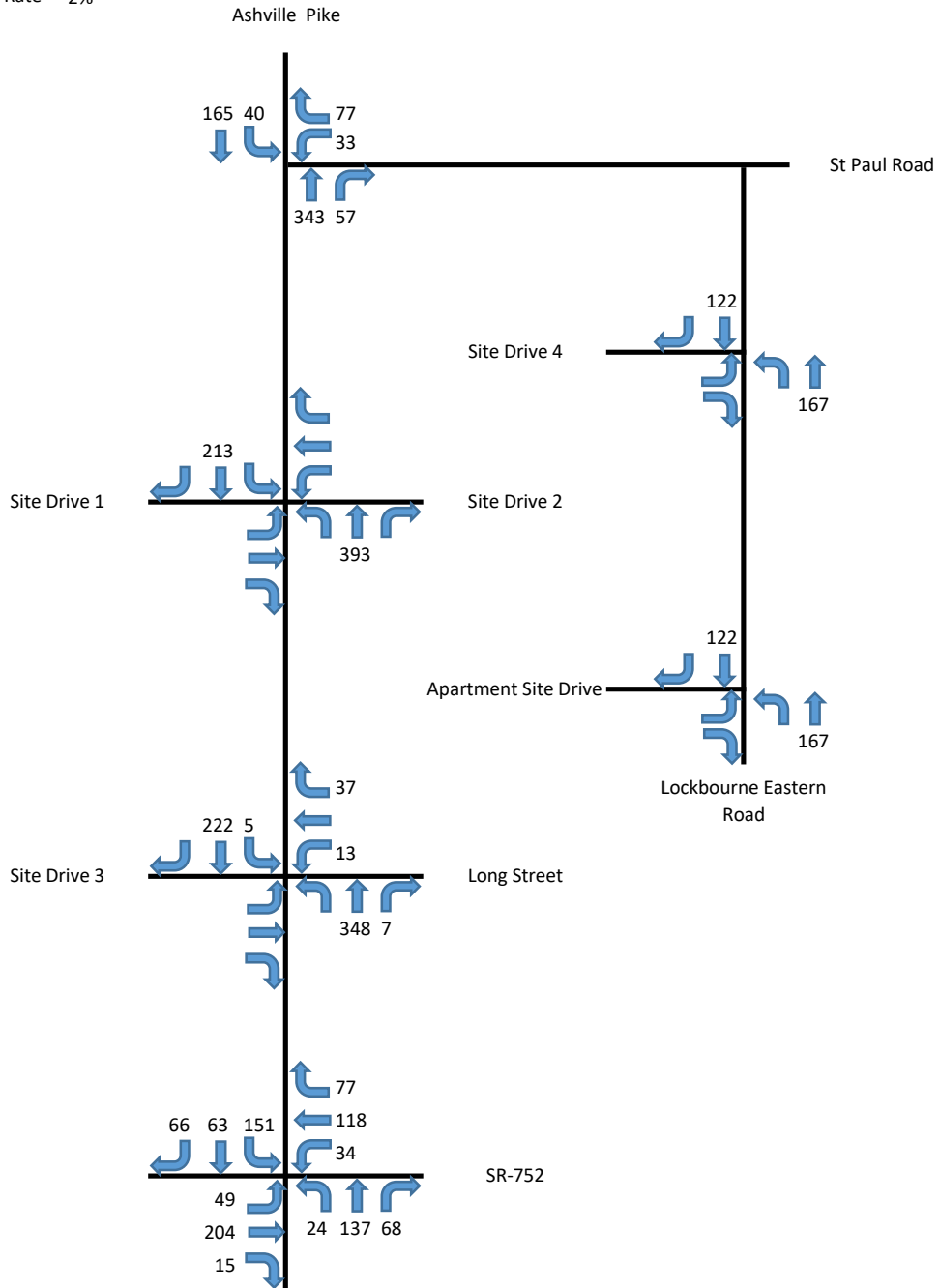
Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2032	AM	No Build	E1

^
N

Growth Rate 2%

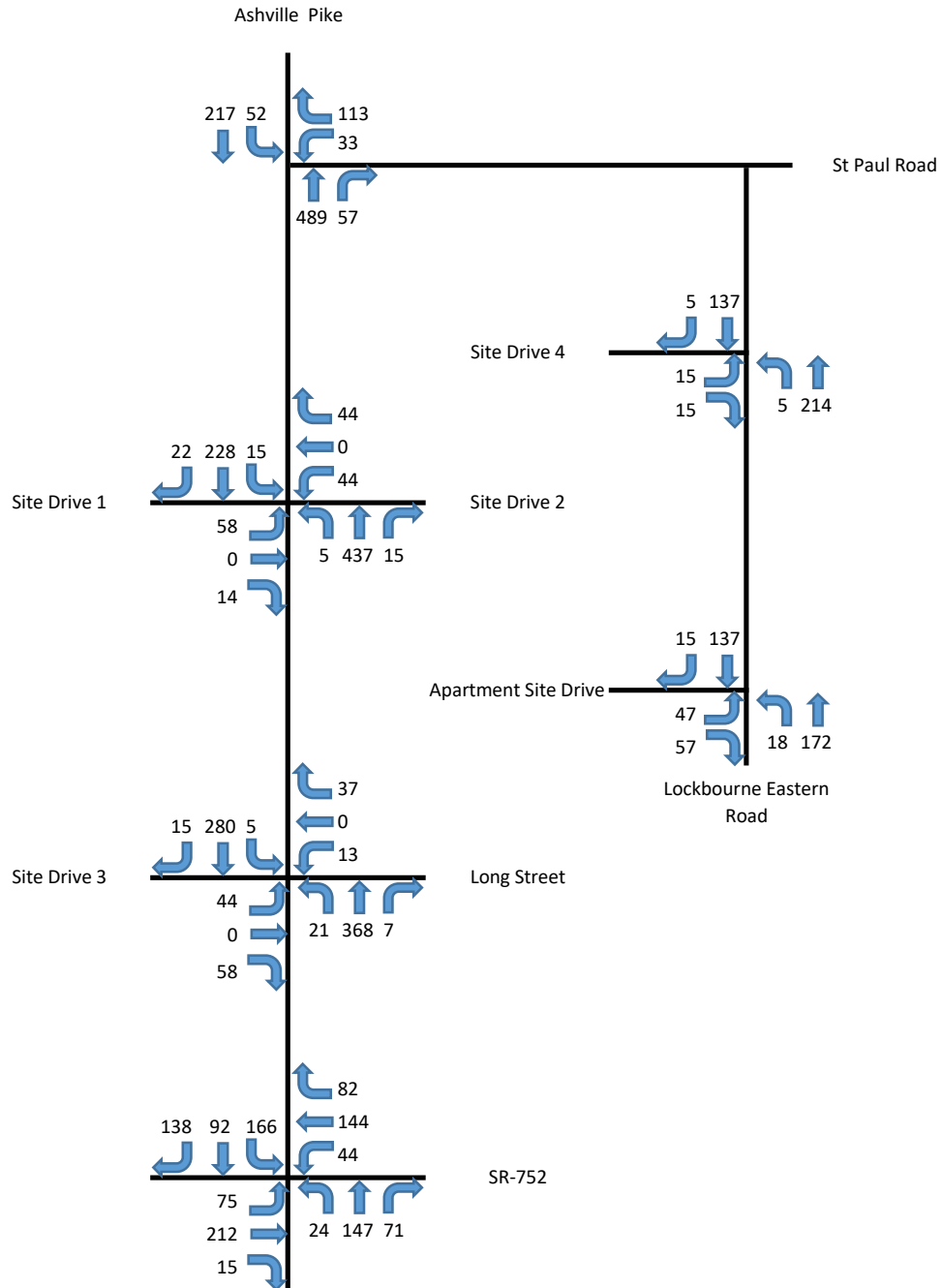


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2032	AM	Build	F1 = B1 + C1 + E1

^
N

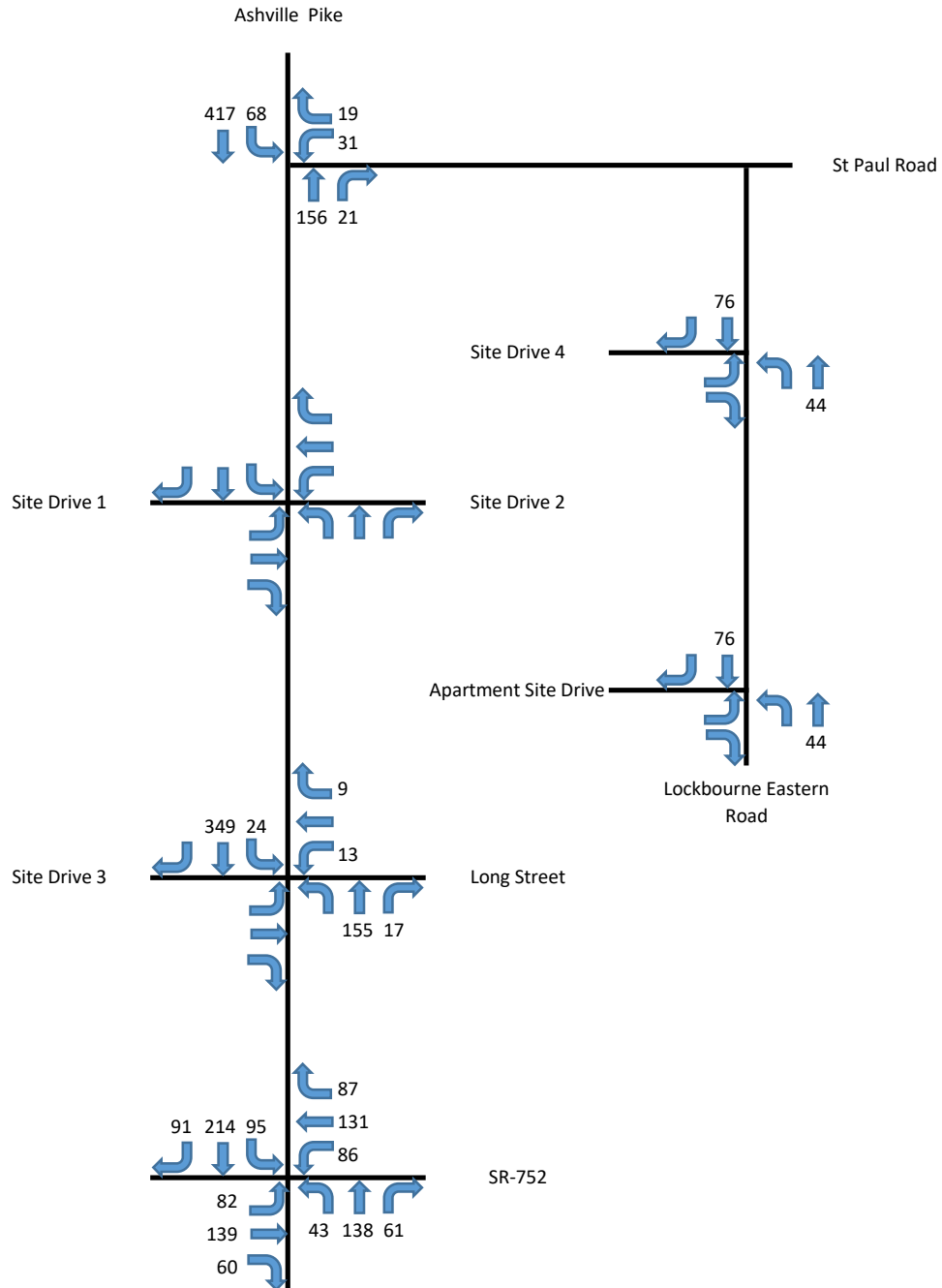


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2021	PM	Count	

^
N



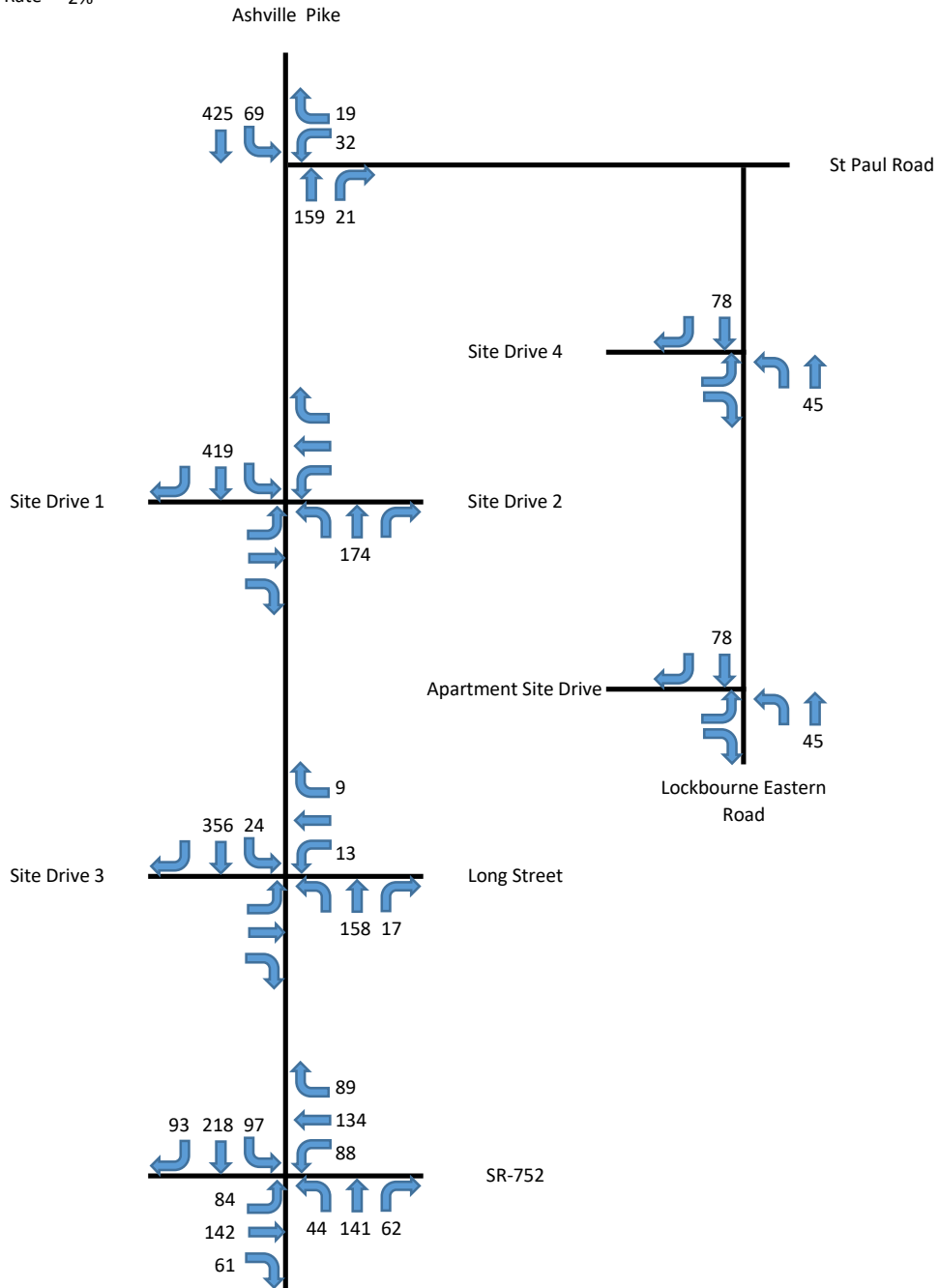
Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2022	PM	No Build	A2

^
N

Growth Rate 2%

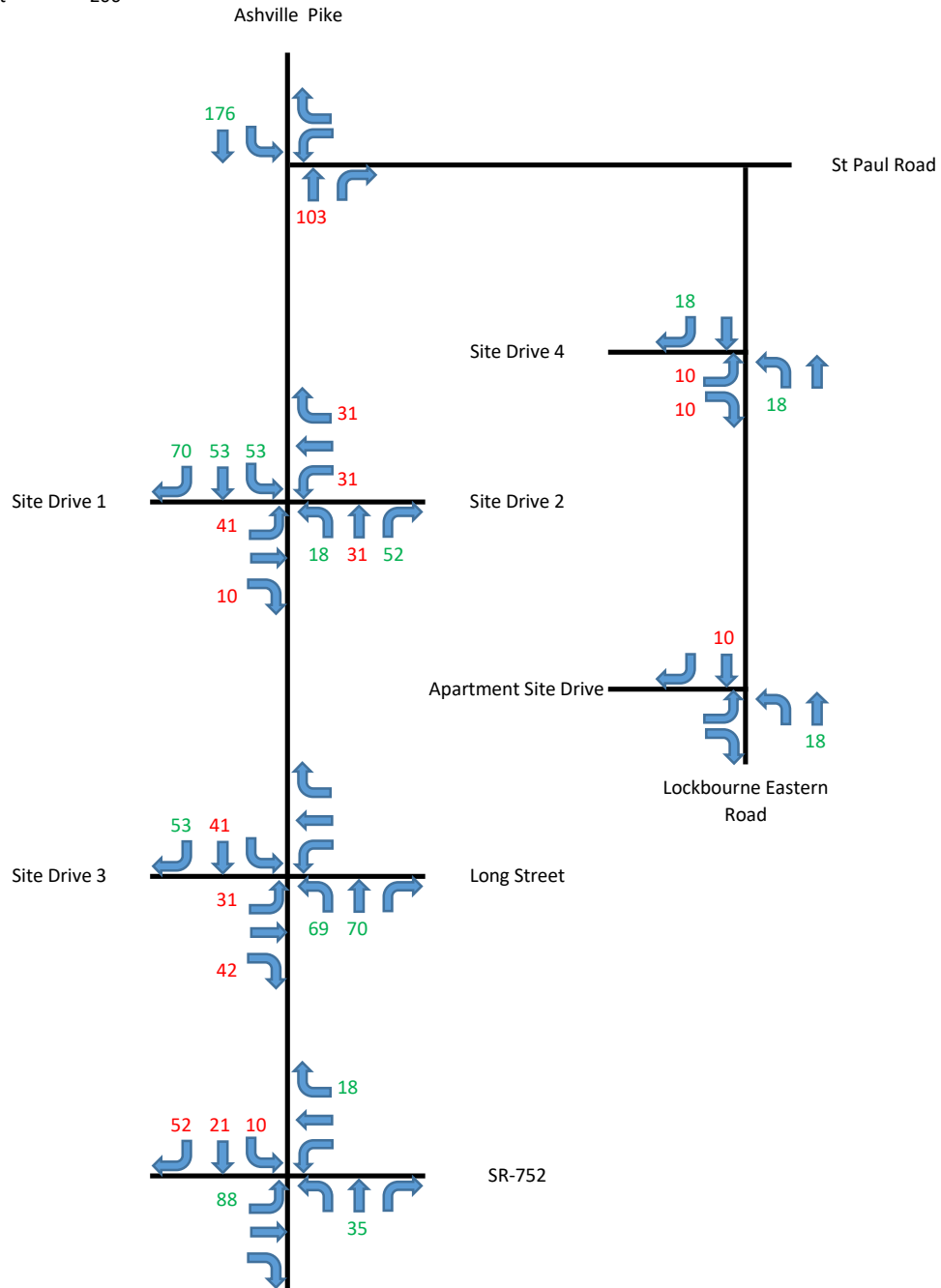


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
	PM	Site Non-Pass-By Traffic	B2

^
N
Enter 351
Exit 206

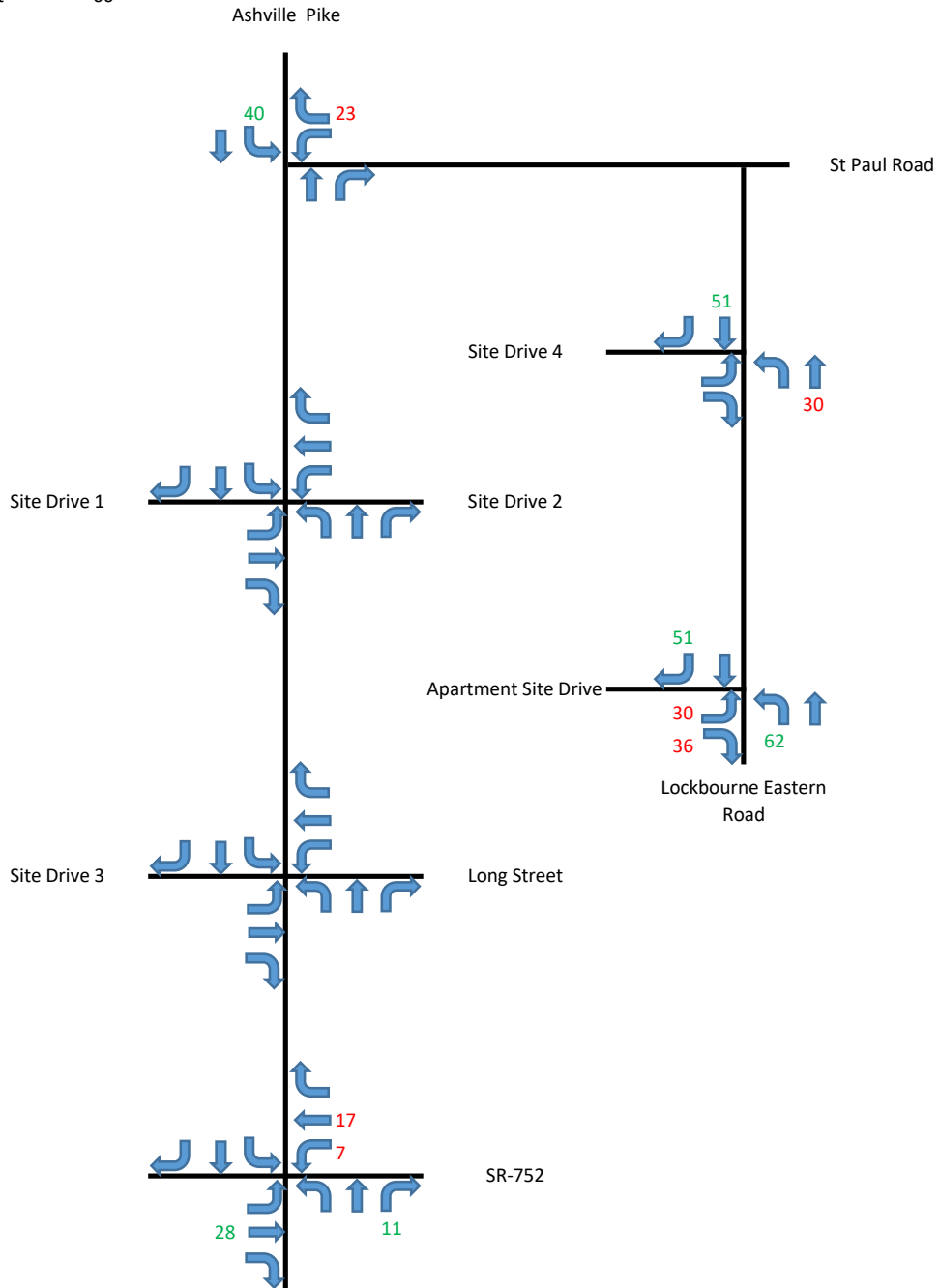


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
	PM	Apartment Site Non-Pass-By Traffic	C2

^
N
Enter 113
Exit 66

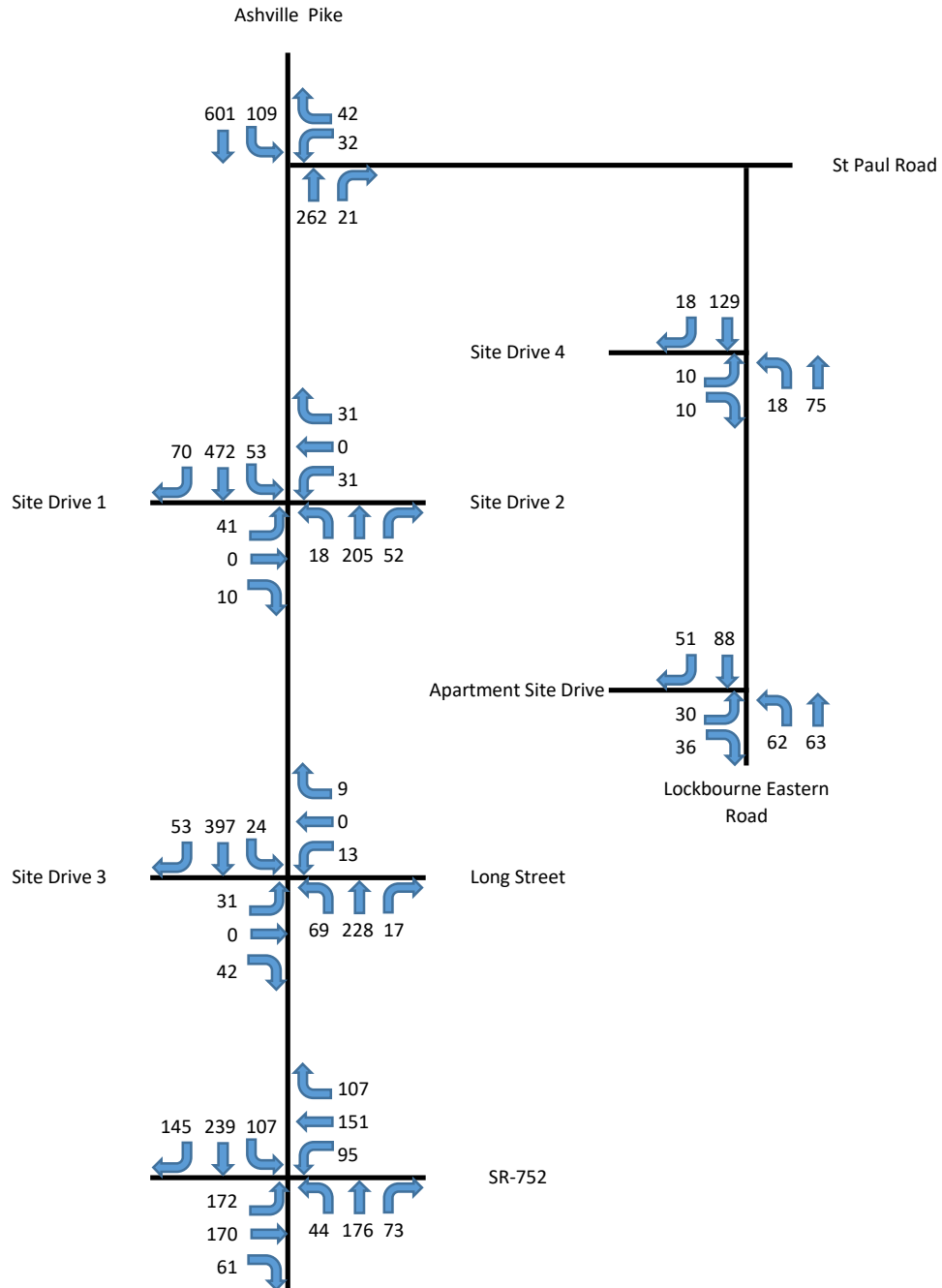


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2022	PM	Build	D2 = A2 + B2 + C2

^
N



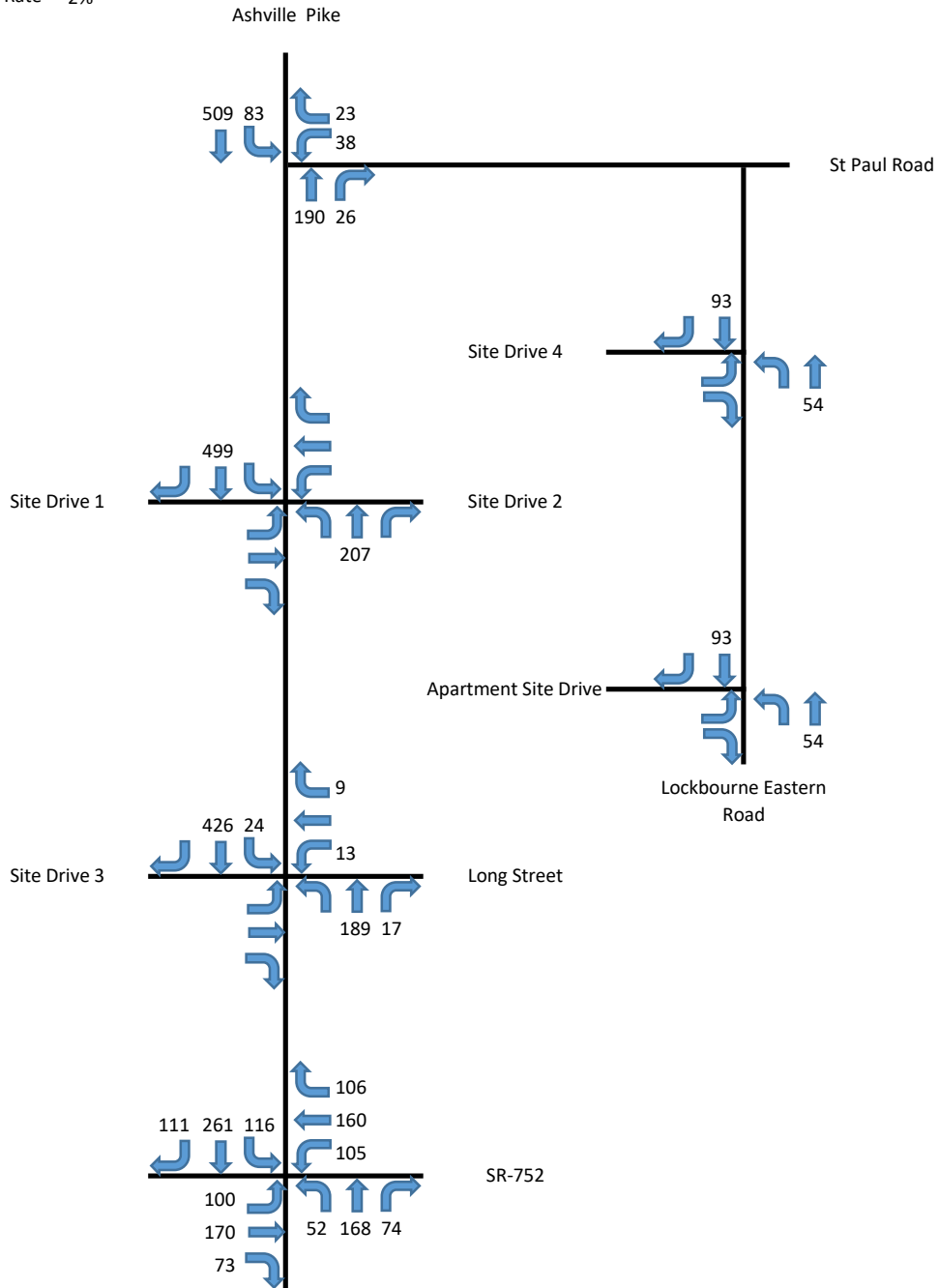
Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2032	PM	No Build	E2

^
N

Growth Rate 2%

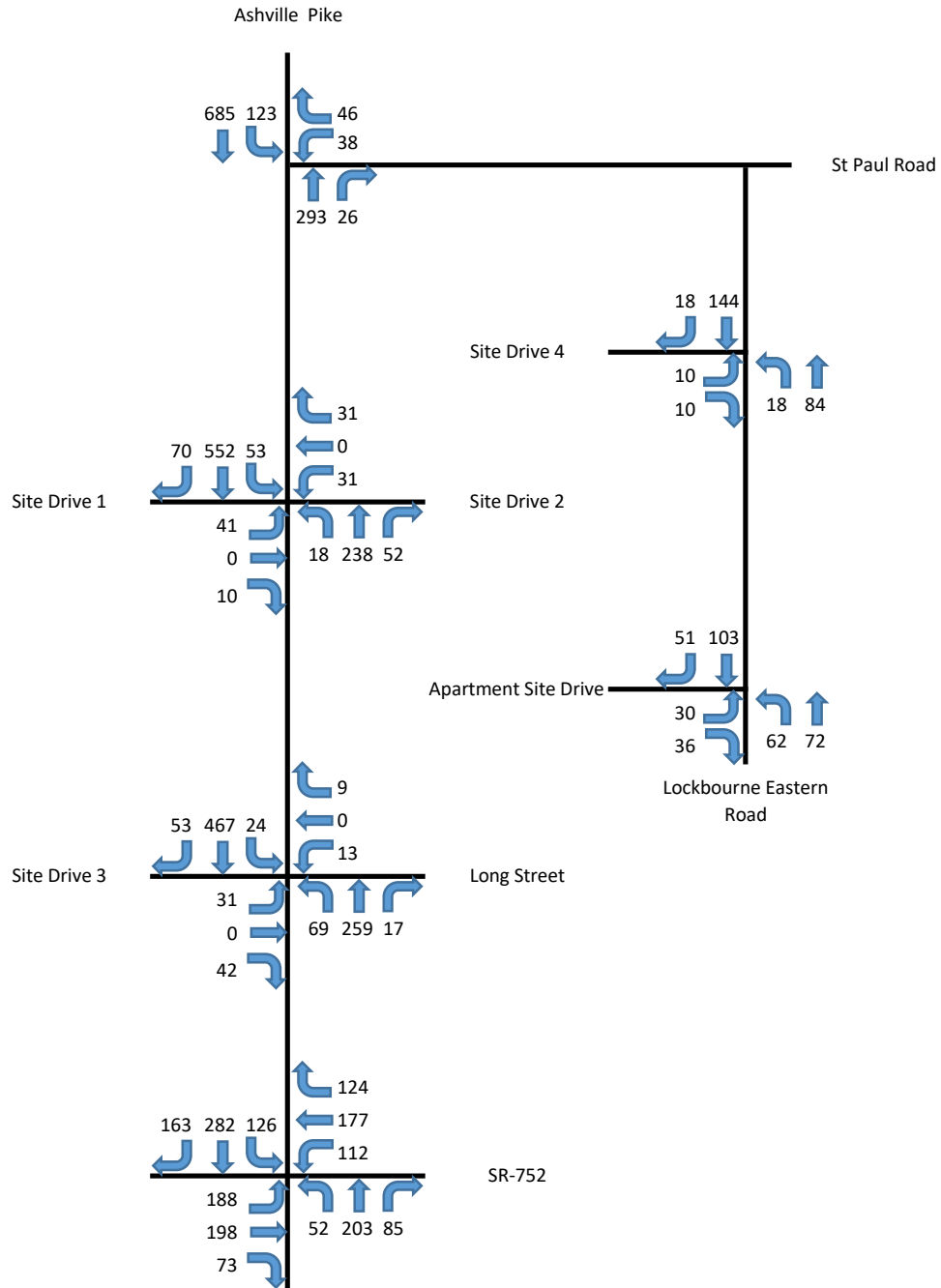


Ashville Residential TIS
Traffic Volume Calculations



Year	Period	Scenario	Plate
2032	PM	Build	F2 = B2 + C2 + D2

^
N

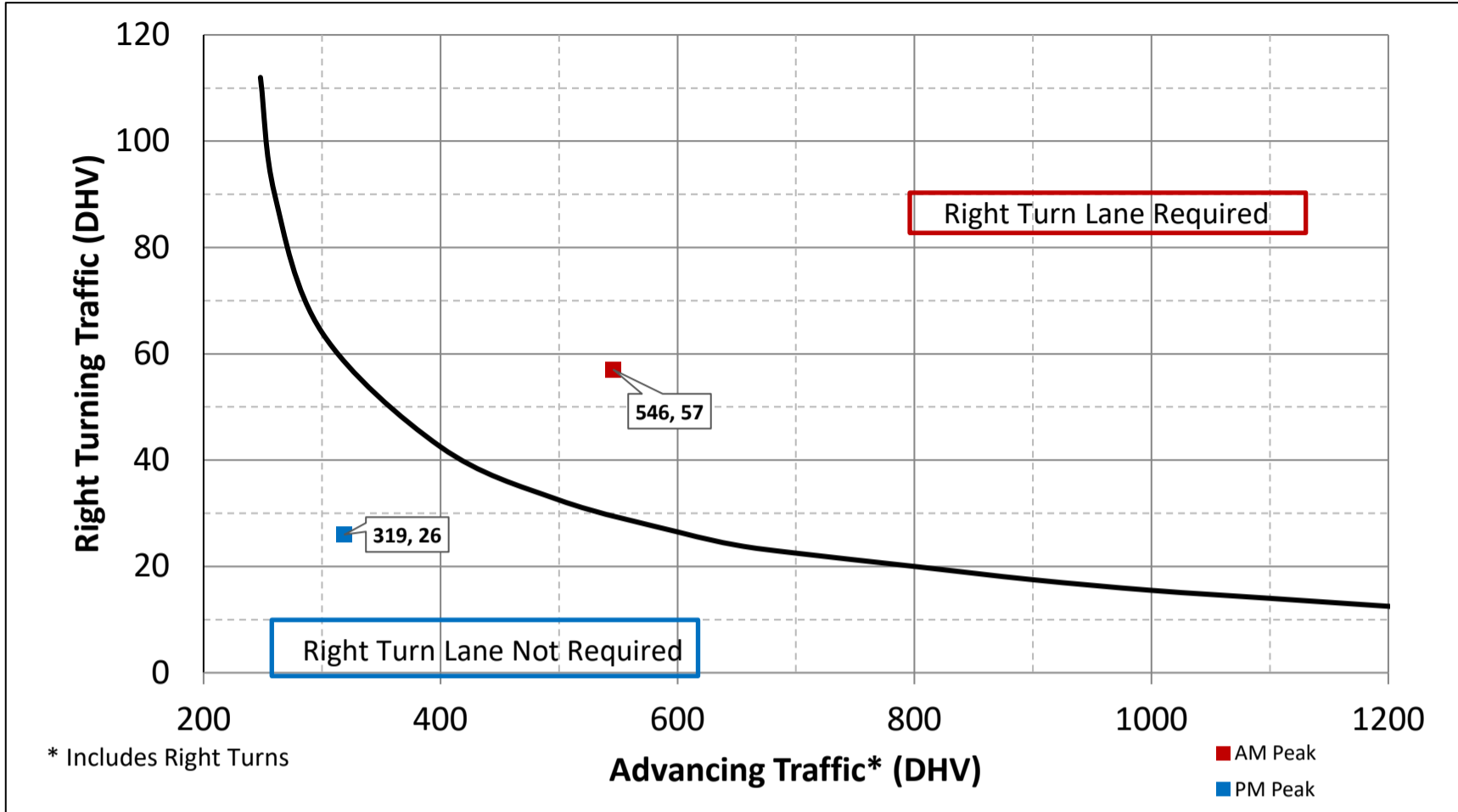


Appendix E

Turn Lane Warrant and Length Analysis



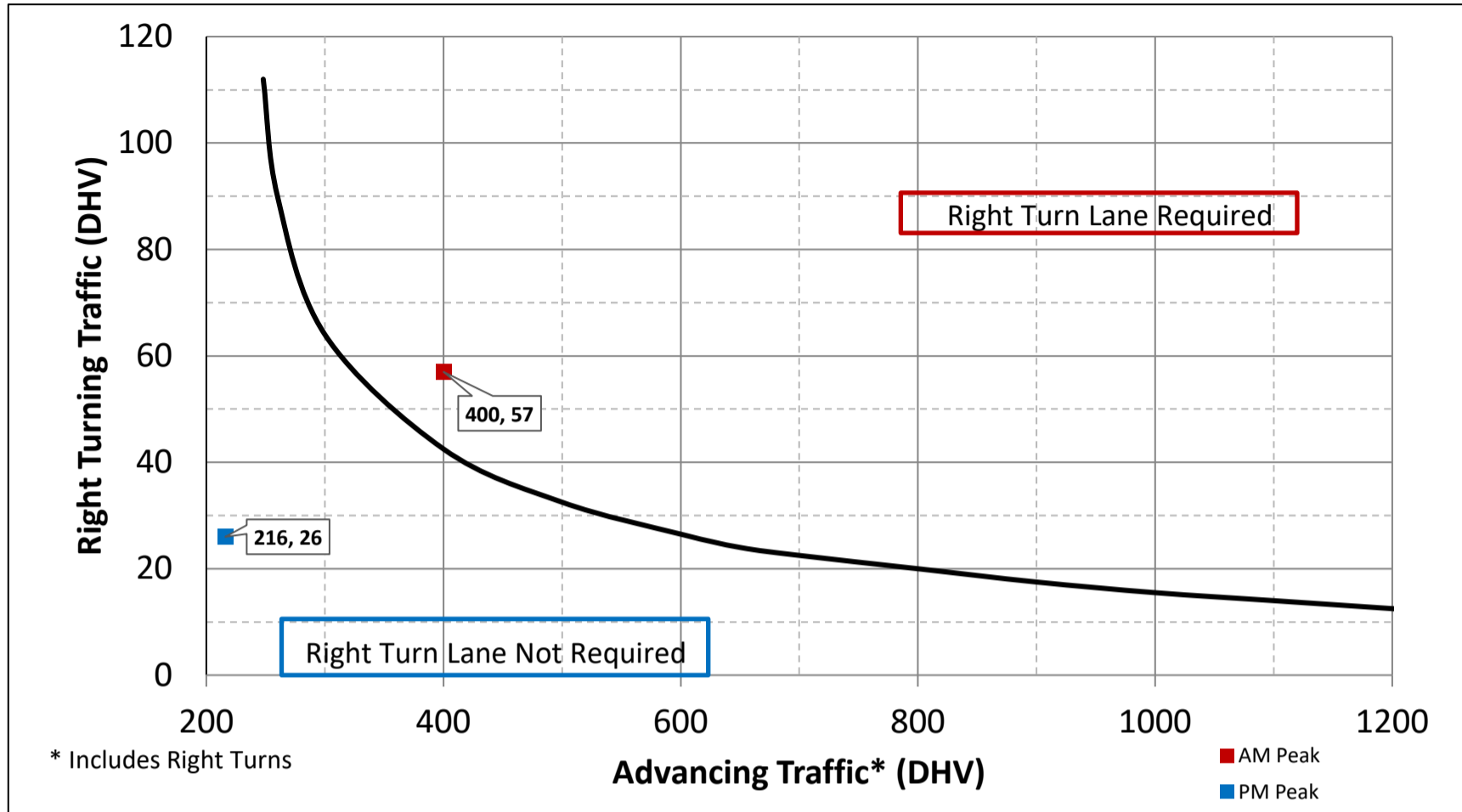
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	57	VPH	
	Advancing Traffic	546	VPH	
	Right Turn Percentage	10%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
	PM Peak	Design Speed	55	mph
Traffic Control		Unsignalized		
Cycle Length		Unsignalized		
Cycles Per Hour		60	Assume 60	
Turn Lane Volume		26	VPH	
Advancing Traffic		319	VPH	
Right Turn Percentage		8%		
Location Type		Through Road		
Condition		B		
Vehicles/Cycle		1		
Turn Lane Length		285		* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met		Yes	See Above	

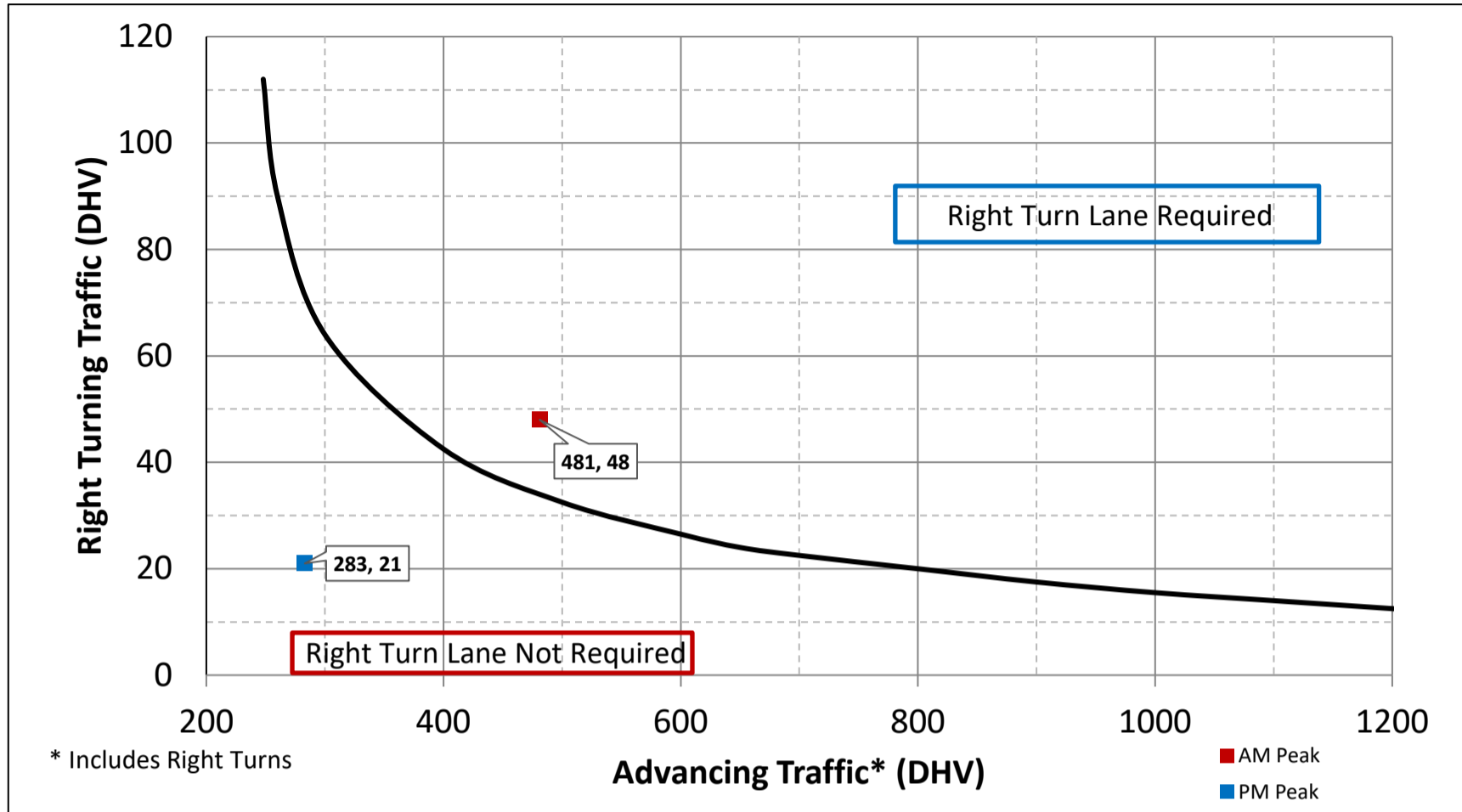
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	57	VPH	
	Advancing Traffic	400	VPH	
	Right Turn Percentage	14%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	26	VPH	
	Advancing Traffic	216	VPH	
	Right Turn Percentage	12%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met		Yes	See Above	

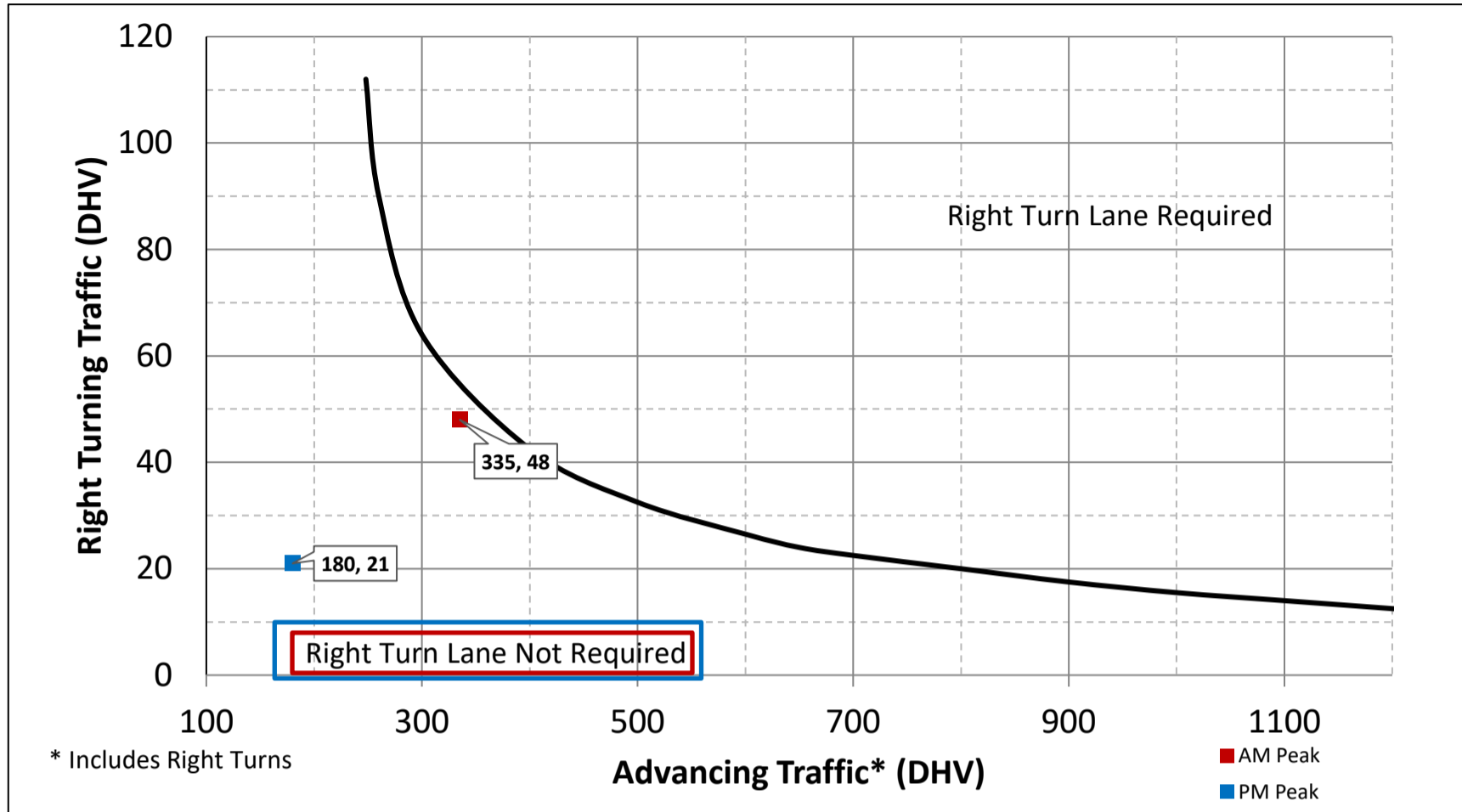
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	48	VPH	
	Advancing Traffic	481	VPH	
	Right Turn Percentage	10%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	21	VPH	
	Advancing Traffic	283	VPH	
	Right Turn Percentage	7%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met		Yes	See Above	

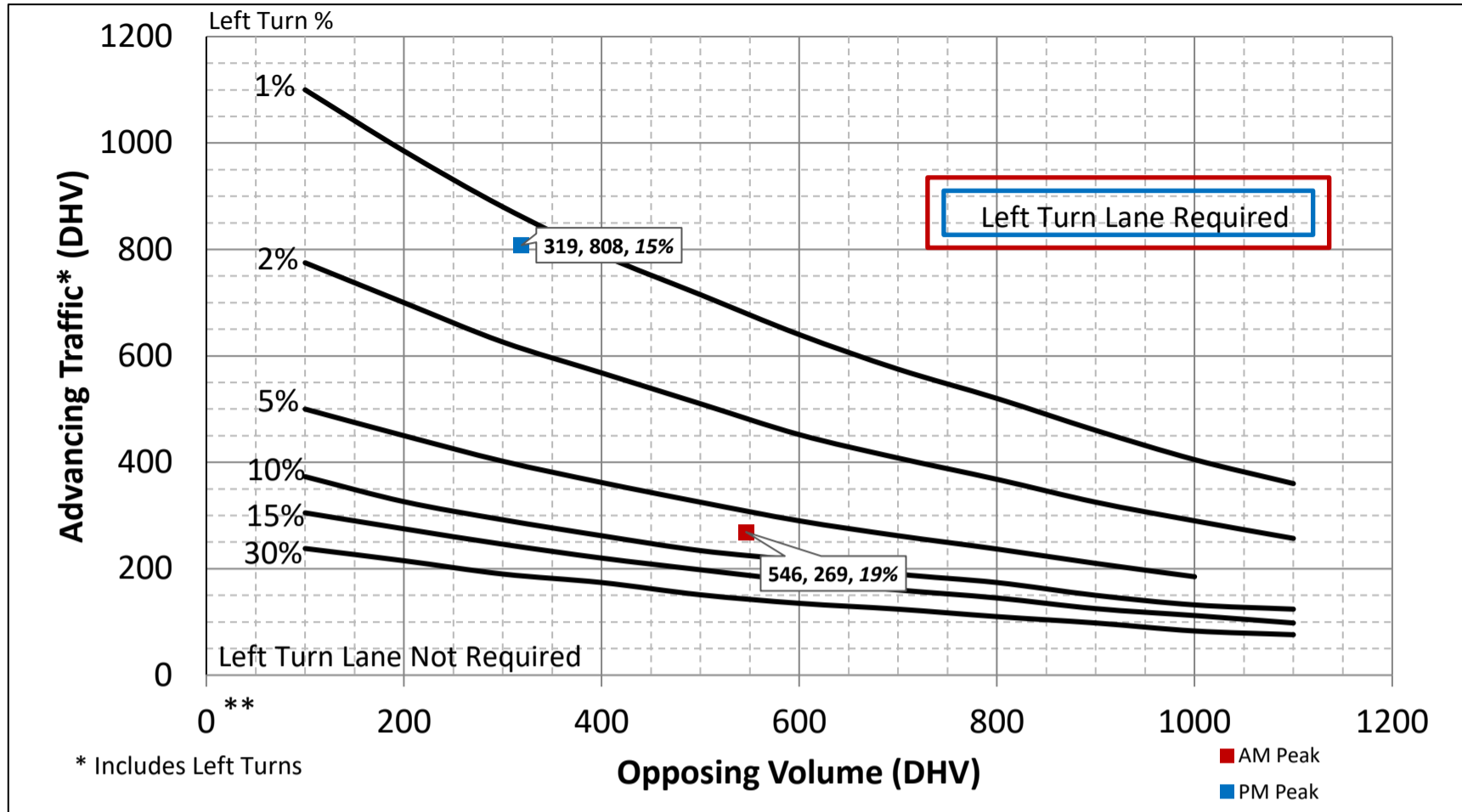
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	48	VPH	
	Advancing Traffic	335	VPH	
	Right Turn Percentage	14%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	21	VPH	
	Advancing Traffic	180	VPH	
	Right Turn Percentage	12%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met	No	No Right Turn Lane Required		

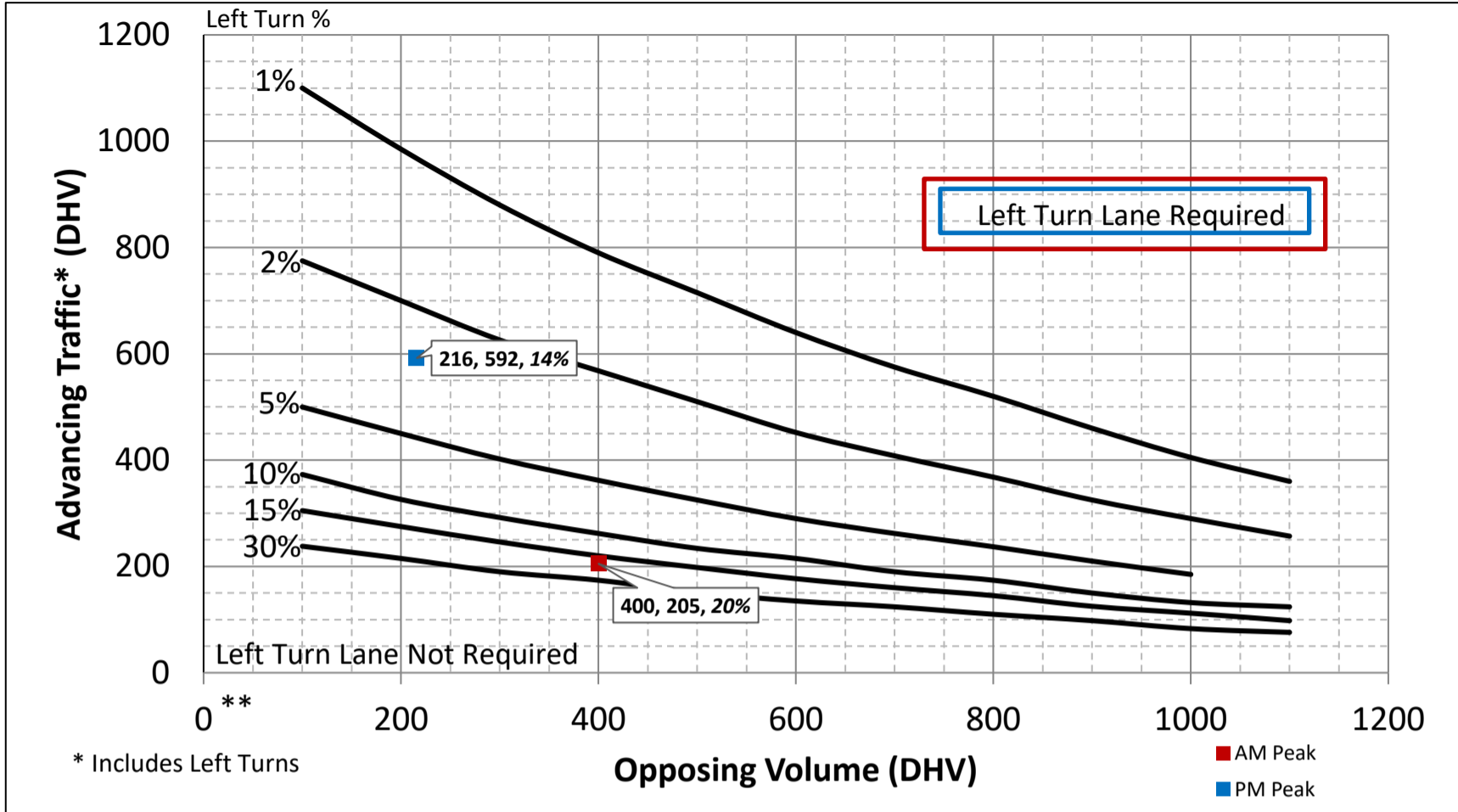
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	52		VPH
	Advancing Traffic	269		VPH
	Opposing Volume	546		VPH
	Left Turn Percentage	19%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right		285
	Offset Width	12		
	Approach Taper	660		
PM Peak	Design Speed	55		mph
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	123		VPH
	Advancing Traffic	808		VPH
	Opposing Volume	319		VPH
	Left Turn Percentage	15%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	3		
	Turn Lane Length	See Column to Right		315
	Offset Width	12		
	Approach Taper	660		
				* Turn Lane Length includes 50 ft diverging taper
Is Left Turn Warrant Met		Yes		See Above

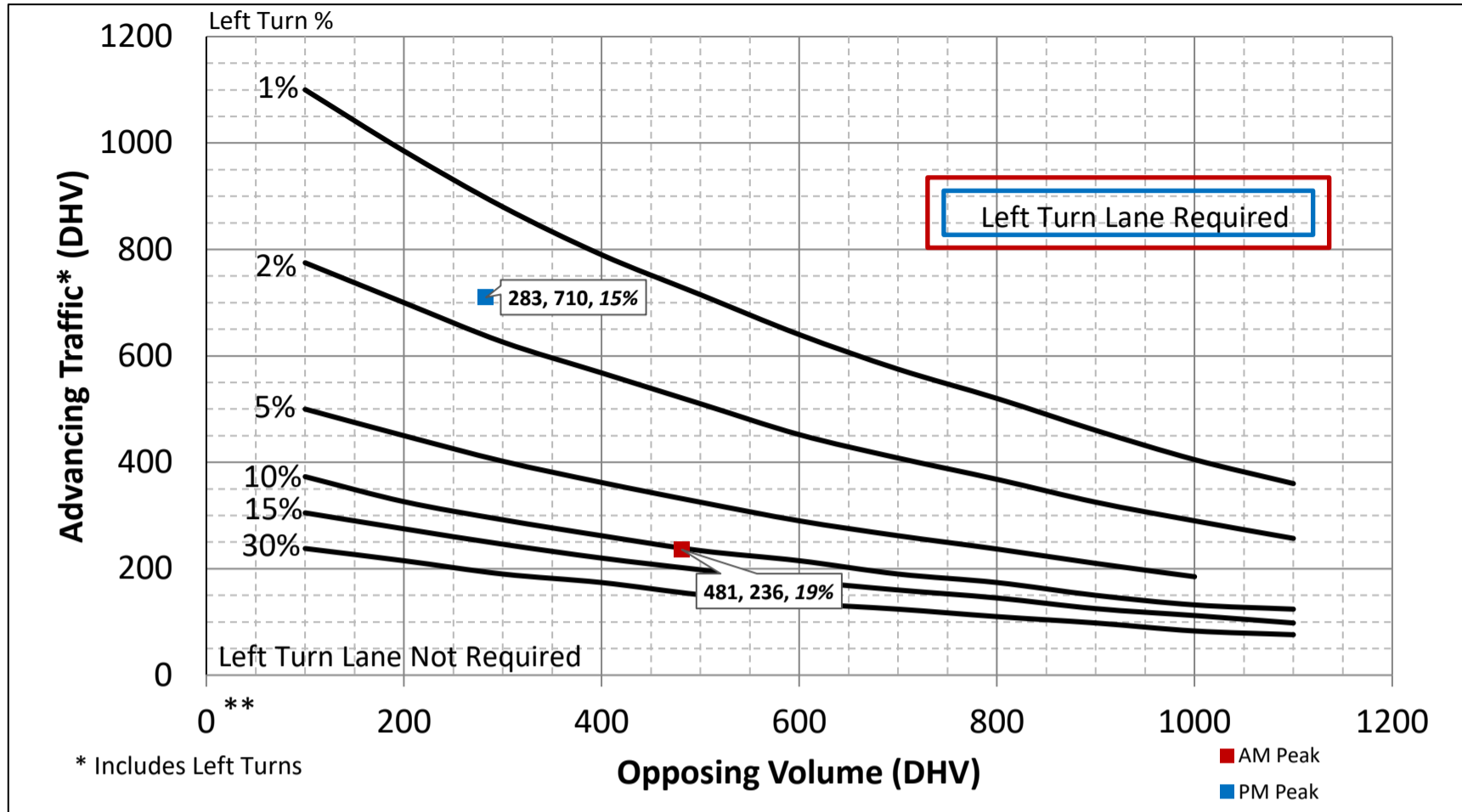
2-Lane Highway Left Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	<i>Assume 60</i>	
	Turn Lane Volume	40	VPH	
	Advancing Traffic	205	VPH	
	Opposing Volume	400	VPH	
	Left Turn Percentage	20%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	
	Offset Width	12		
	Approach Taper	660		
	<i>* Turn Lane Length includes 50 ft diverging taper</i>			
PM Peak	Design Speed	55		
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	<i>Assume 60</i>	
	Turn Lane Volume	83	VPH	
	Advancing Traffic	592	VPH	
	Opposing Volume	216	VPH	
	Left Turn Percentage	14%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	2		
	Turn Lane Length	See Column to Right	285	
	Offset Width	12		
	Approach Taper	660		
<i>* Turn Lane Length includes 50 ft diverging taper</i>				
Is Left Turn Warrant Met		Yes	See Above	

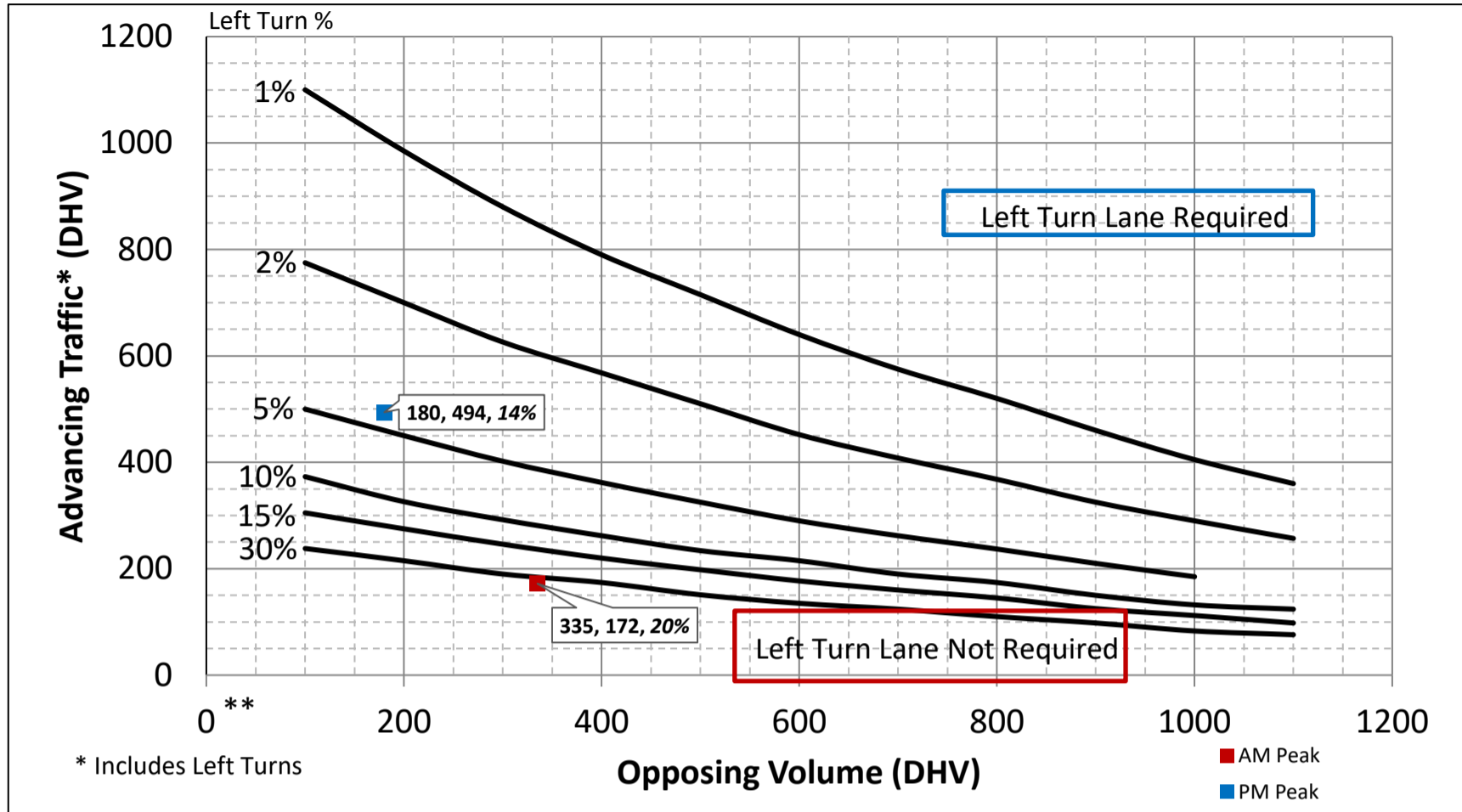
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	46		VPH
	Advancing Traffic	236		VPH
	Opposing Volume	481		VPH
	Left Turn Percentage	19%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right		285
	Offset Width	12		
	Approach Taper	660		
PM Peak	Design Speed	55		mph
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	109		VPH
	Advancing Traffic	710		VPH
	Opposing Volume	283		VPH
	Left Turn Percentage	15%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	2		
	Turn Lane Length	See Column to Right		285
	Offset Width	12		
	Approach Taper	660		
				* Turn Lane Length includes 50 ft diverging taper
Is Left Turn Warrant Met		Yes		See Above

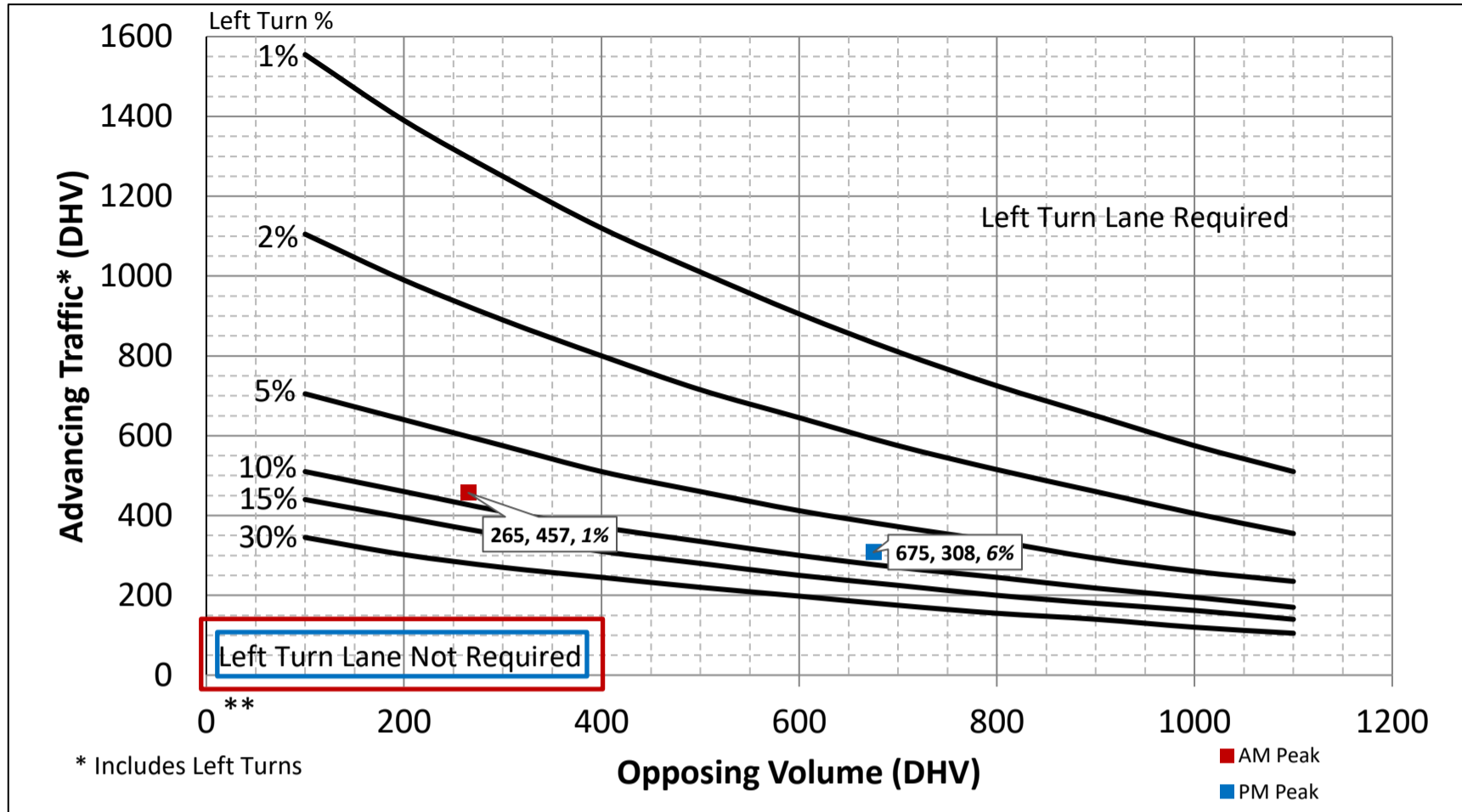
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	34		VPH
	Advancing Traffic	172		VPH
	Opposing Volume	335		VPH
	Left Turn Percentage	20%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right		285
	Offset Width	12		
	Approach Taper	660		
PM Peak	Design Speed	55		mph
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	69		VPH
	Advancing Traffic	494		VPH
	Opposing Volume	180		VPH
	Left Turn Percentage	14%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	2		
	Turn Lane Length	See Column to Right		285
	Offset Width	12		
	Approach Taper	660		
				* Turn Lane Length includes 50 ft diverging taper
Is Left Turn Warrant Met		Yes	See Above	

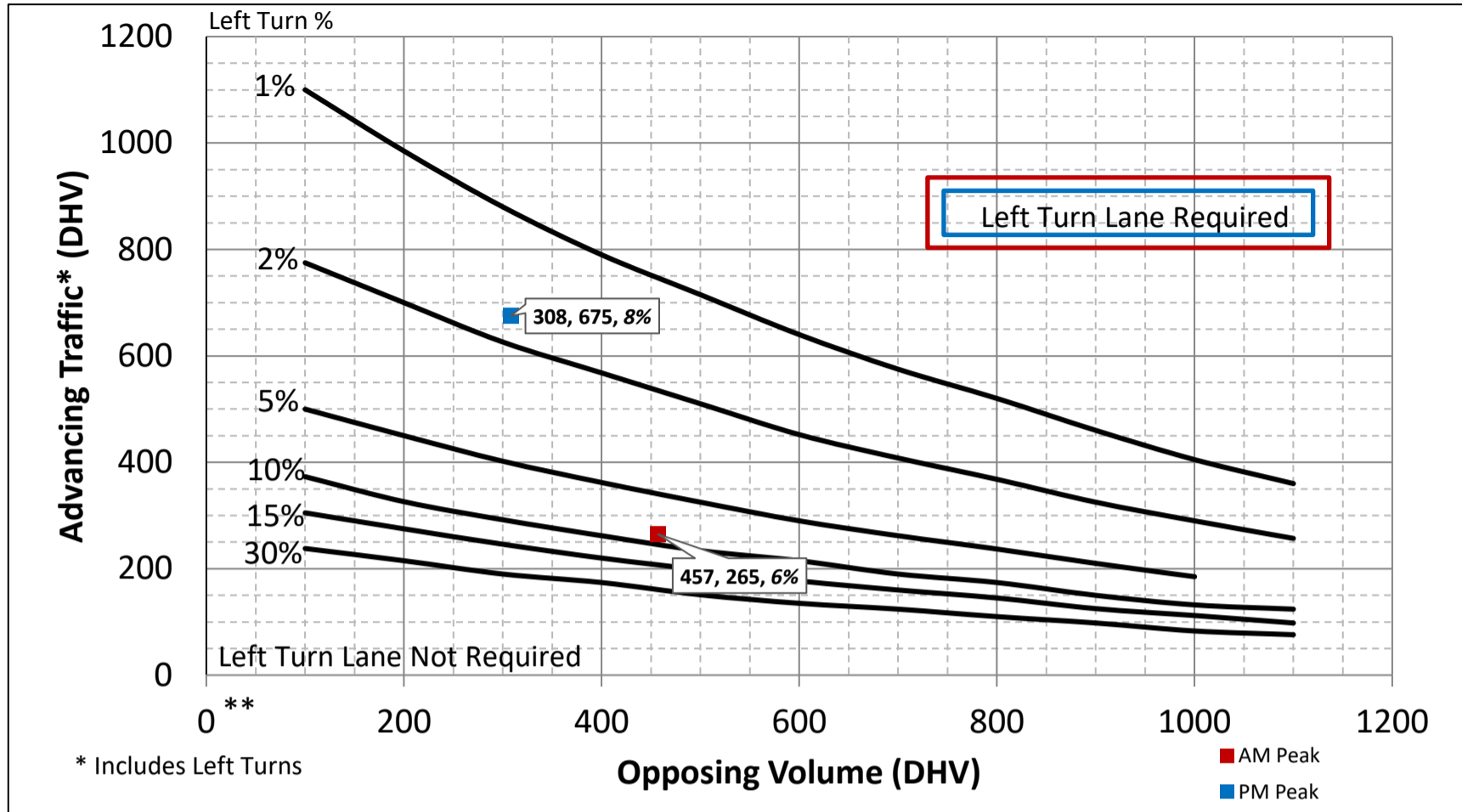
2-Lane Highway Left Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	40	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	5		VPH
	Advancing Traffic	457		VPH
	Opposing Volume	265		VPH
	Left Turn Percentage	1%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12		
	Approach Taper	320		
	PM Peak	Design Speed	40	
Traffic Control		Unsignalized		
Cycle Length		Unsignalized		
Cycles Per Hour		60		Assume 60
Turn Lane Volume		18		VPH
Advancing Traffic		308		VPH
Opposing Volume		675		VPH
Left Turn Percentage		6%		
Location Type		Through Road		
Condition		B		
Vehicles/Cycle		1		
Turn Lane Length		125		* Turn Lane Length includes 50 ft diverging taper
Offset Width		12		
Approach Taper		320		
Is Left Turn Warrant Met		No	No Left Turn Lane Required	

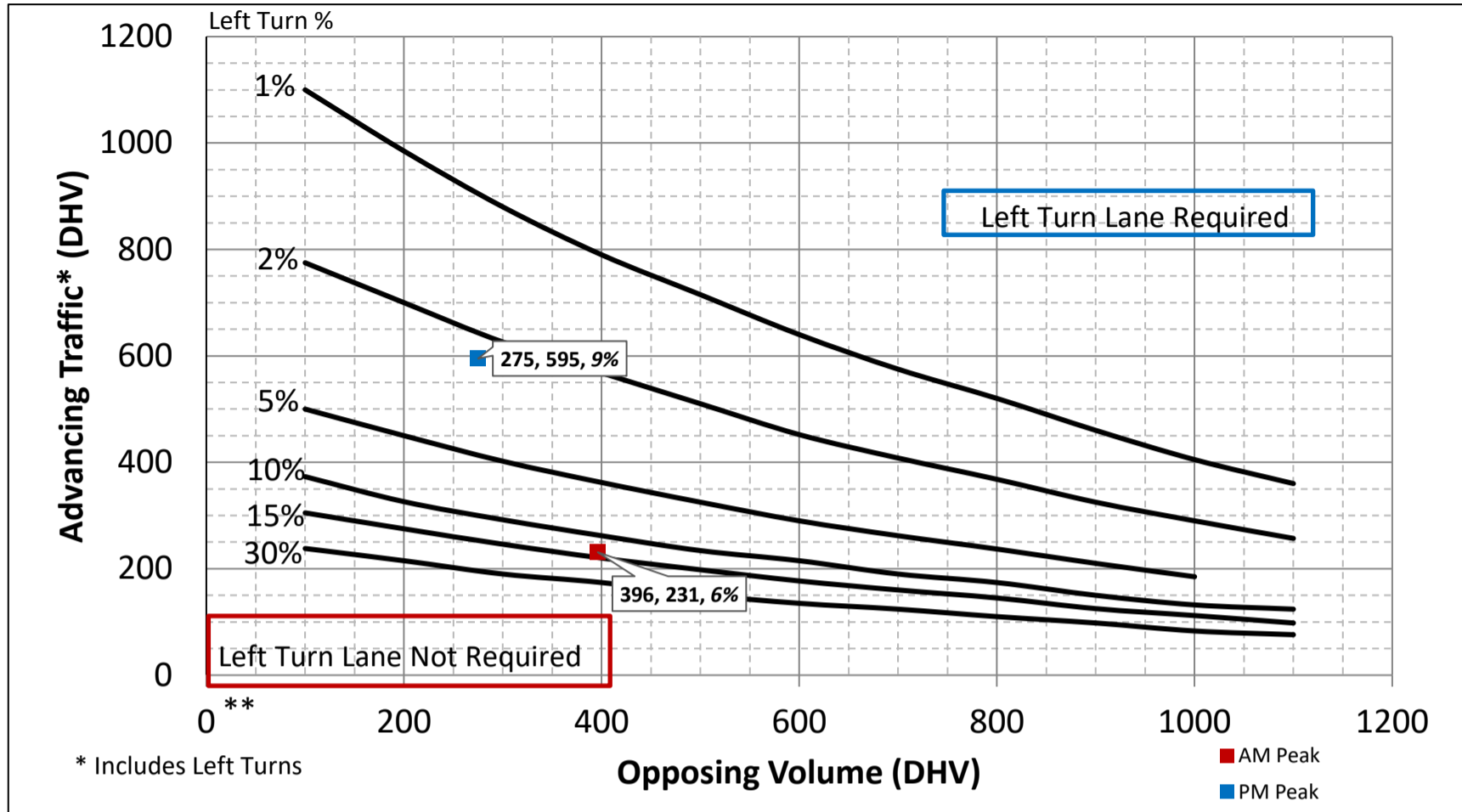
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	15		VPH
	Advancing Traffic	265		VPH
	Opposing Volume	457		VPH
	Left Turn Percentage	6%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12		
	Approach Taper	660		
	PM Peak	Design Speed	55	
Traffic Control		Unsignalized		
Cycle Length		Unsignalized		
Cycles Per Hour		60		Assume 60
Turn Lane Volume		53		VPH
Advancing Traffic		675		VPH
Opposing Volume		308		VPH
Left Turn Percentage		8%		
Location Type		Through Road		
Condition		B		
Vehicles/Cycle		1		
Turn Lane Length		285		* Turn Lane Length includes 50 ft diverging taper
Offset Width		12		
Approach Taper		660		
Is Left Turn Warrant Met		Yes		See Above

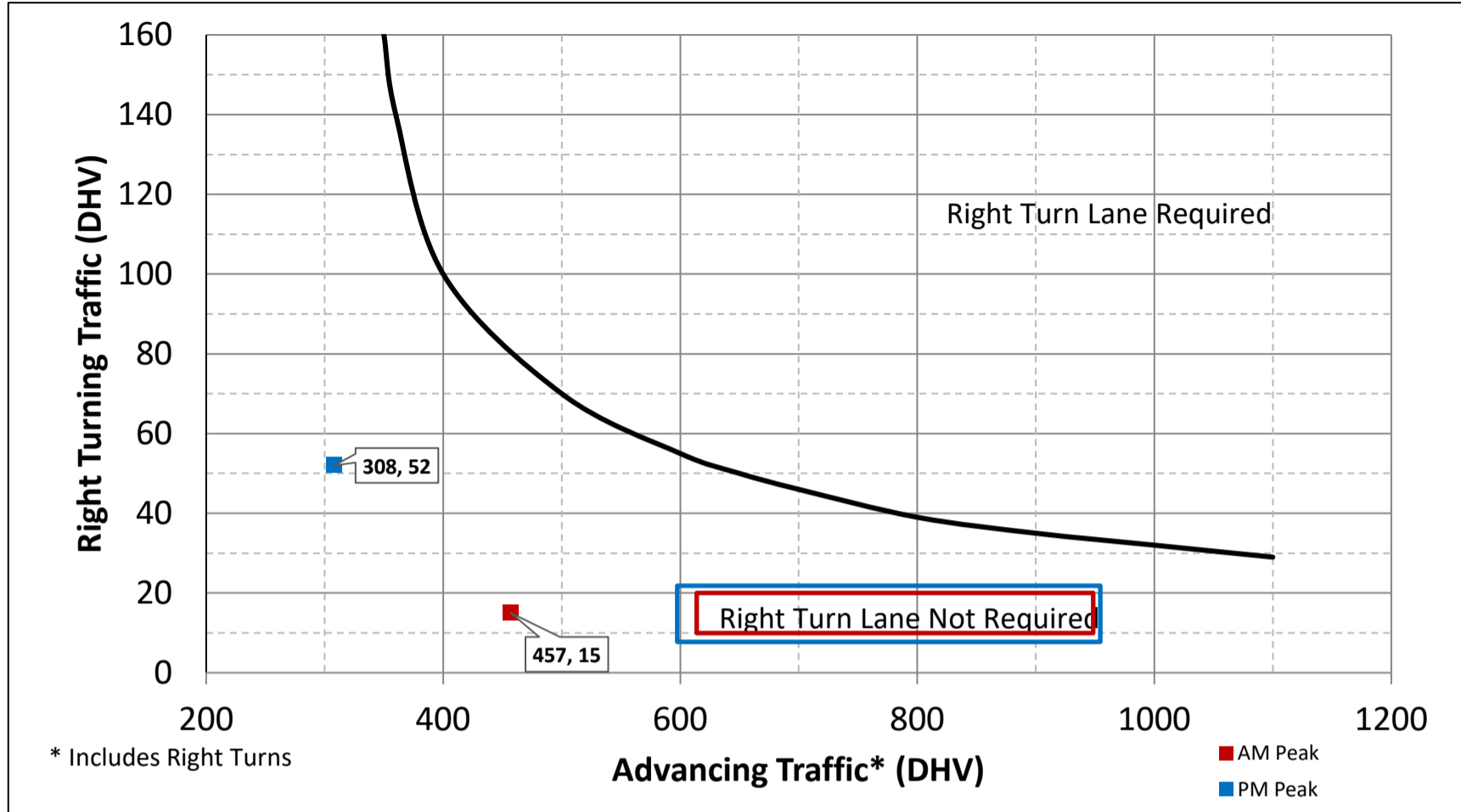
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	<i>Assume 60</i>	
	Turn Lane Volume	15	VPH	
	Advancing Traffic	231	VPH	
	Opposing Volume	396	VPH	
	Left Turn Percentage	6%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		
	Offset Width	12		
	Approach Taper	660		
	* Turn Lane Length includes 50 ft diverging taper			
PM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	<i>Assume 60</i>	
	Turn Lane Volume	53	VPH	
	Advancing Traffic	595	VPH	
	Opposing Volume	275	VPH	
	Left Turn Percentage	9%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		
	Offset Width	12		
	Approach Taper	660		
	* Turn Lane Length includes 50 ft diverging taper			
Is Left Turn Warrant Met		Yes	See Above	

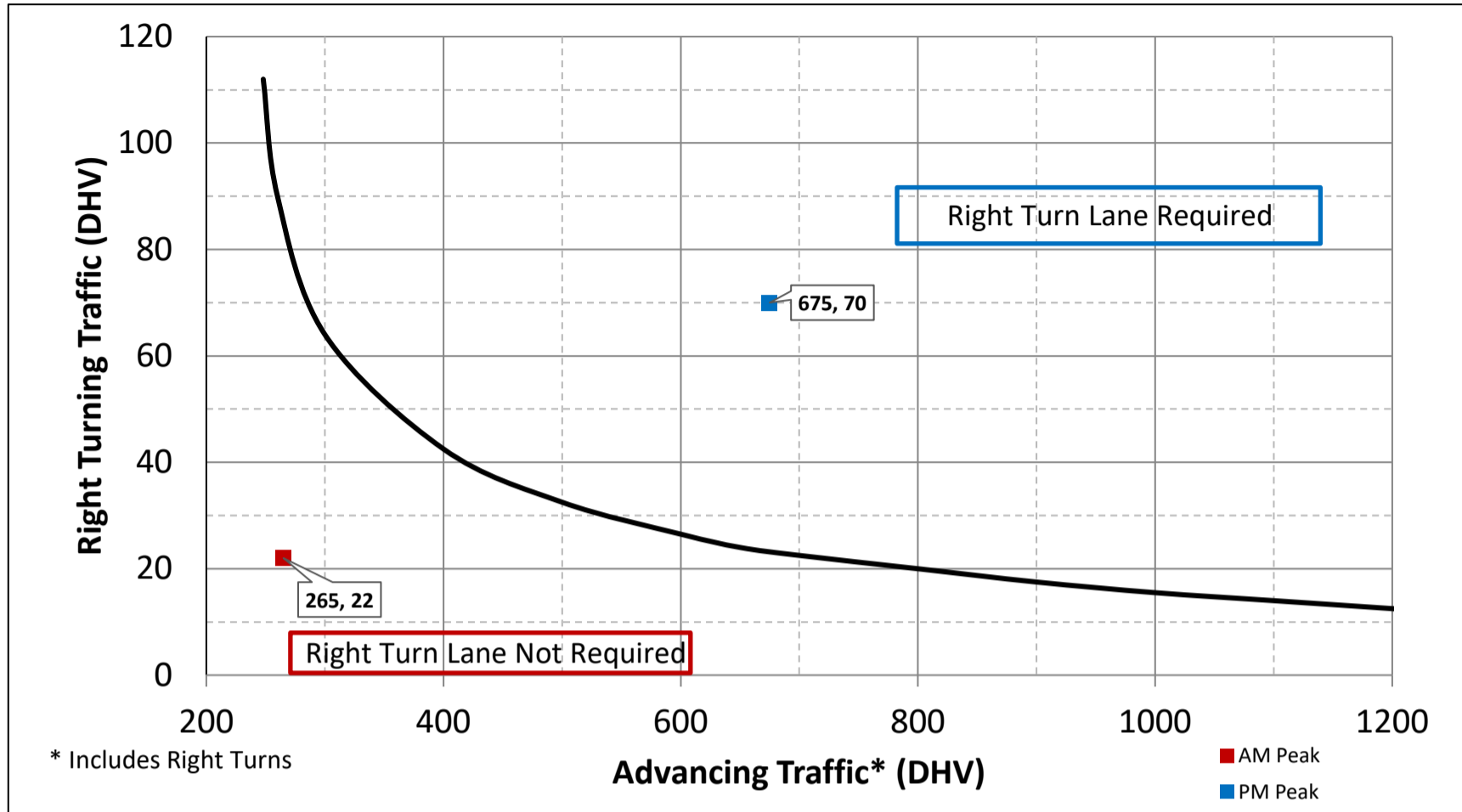
2-Lane Highway Right Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	40	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	15	VPH	
	Advancing Traffic	457	VPH	
	Right Turn Percentage	3%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	40	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	52	VPH	
	Advancing Traffic	308	VPH	
	Right Turn Percentage	17%		
	Location Type	Through Road		
	Condition	C		
	Vehicles/Cycle	1		
	Turn Lane Length	165		* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met		No	No Right Turn Lane Required	* Turn Lane Length includes 50 ft diverging taper

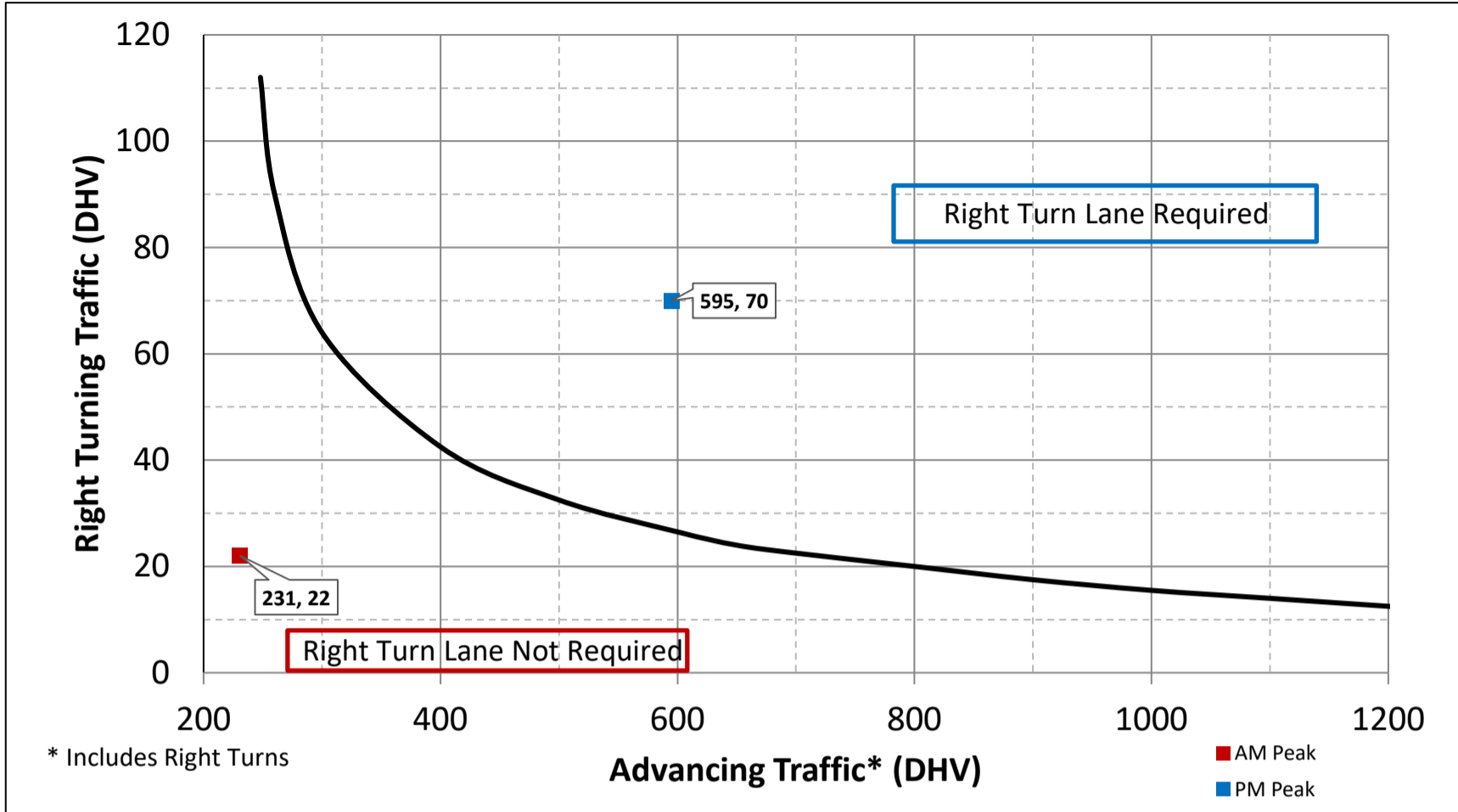
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	22	VPH	
	Advancing Traffic	265	VPH	
	Right Turn Percentage	8%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	70	VPH	
	Advancing Traffic	675	VPH	
	Right Turn Percentage	10%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	2		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met		Yes	See Above	

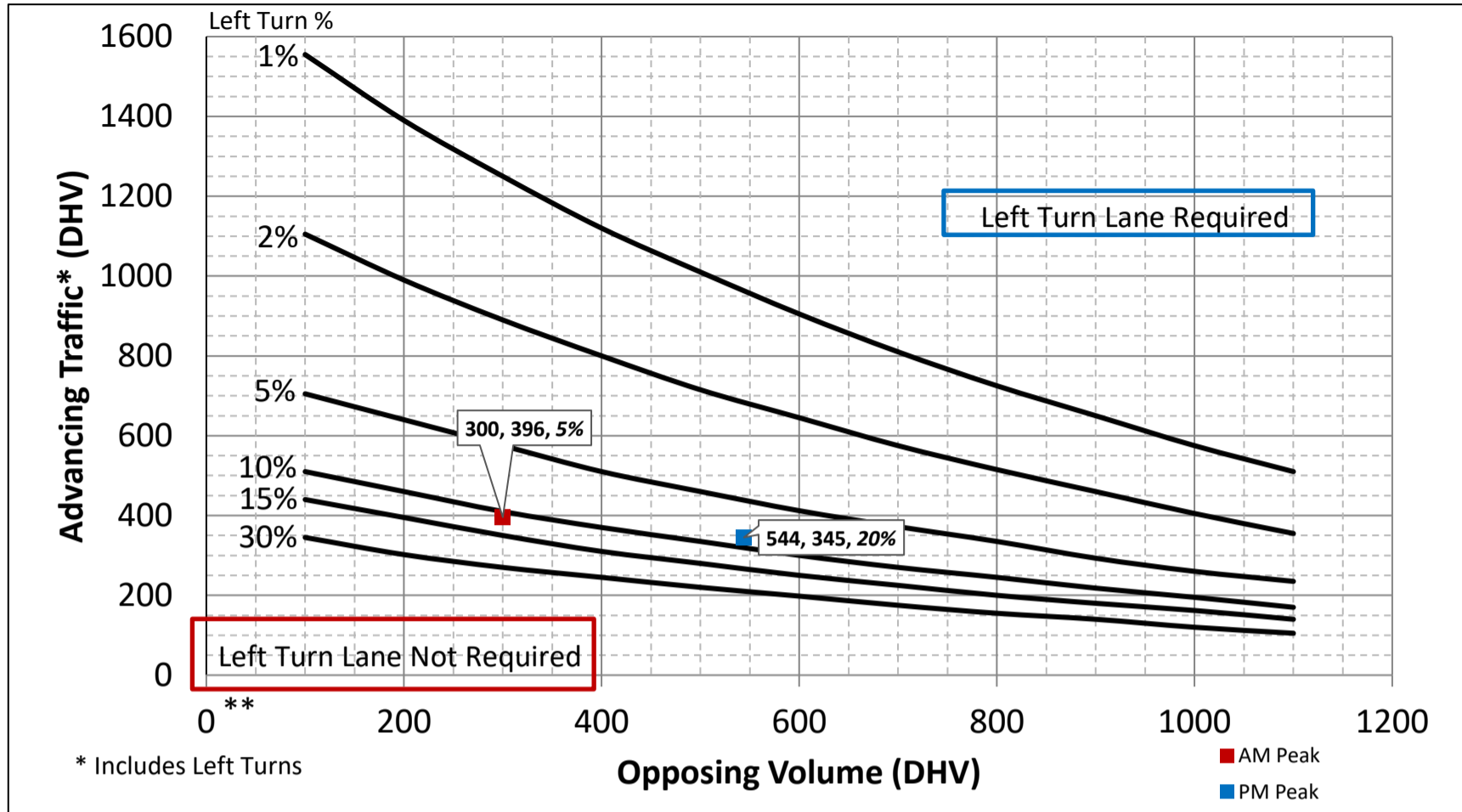
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	22	VPH	
	Advancing Traffic	231	VPH	
	Right Turn Percentage	10%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	70	VPH	
	Advancing Traffic	595	VPH	
	Right Turn Percentage	12%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	2		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met	Yes	See Above		

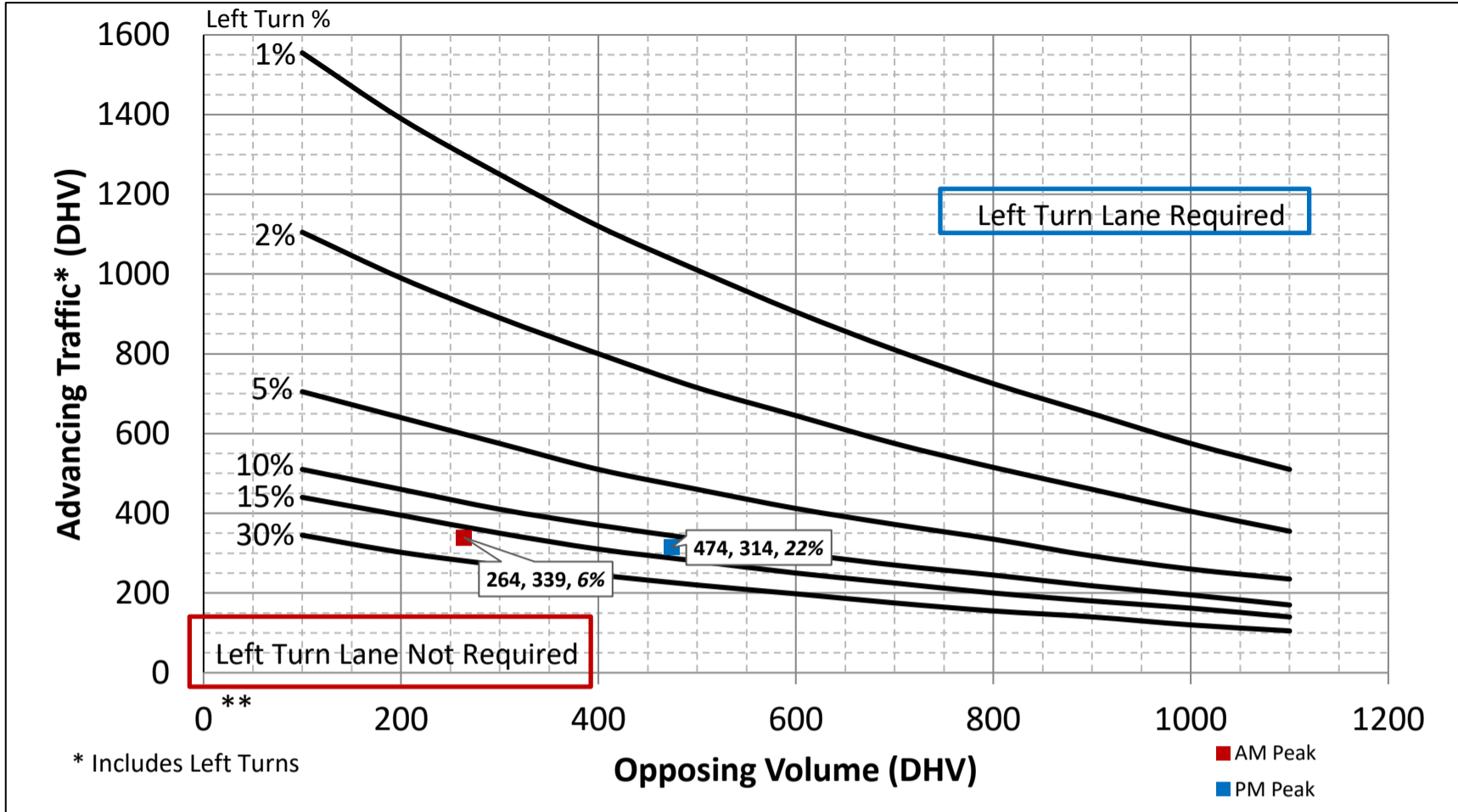
2-Lane Highway Left Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	40	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	21		VPH
	Advancing Traffic	396		VPH
	Opposing Volume	300		VPH
	Left Turn Percentage	5%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12		
	Approach Taper	320		
			Design Speed	40
PM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	69		VPH
	Advancing Traffic	345		VPH
	Opposing Volume	544		VPH
	Left Turn Percentage	20%		
	Location Type	Through Road		
	Condition	C		
	Vehicles/Cycle	2		
	Turn Lane Length	215		* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12		
	Approach Taper	320		
	Is Left Turn Warrant Met		Yes	See Above

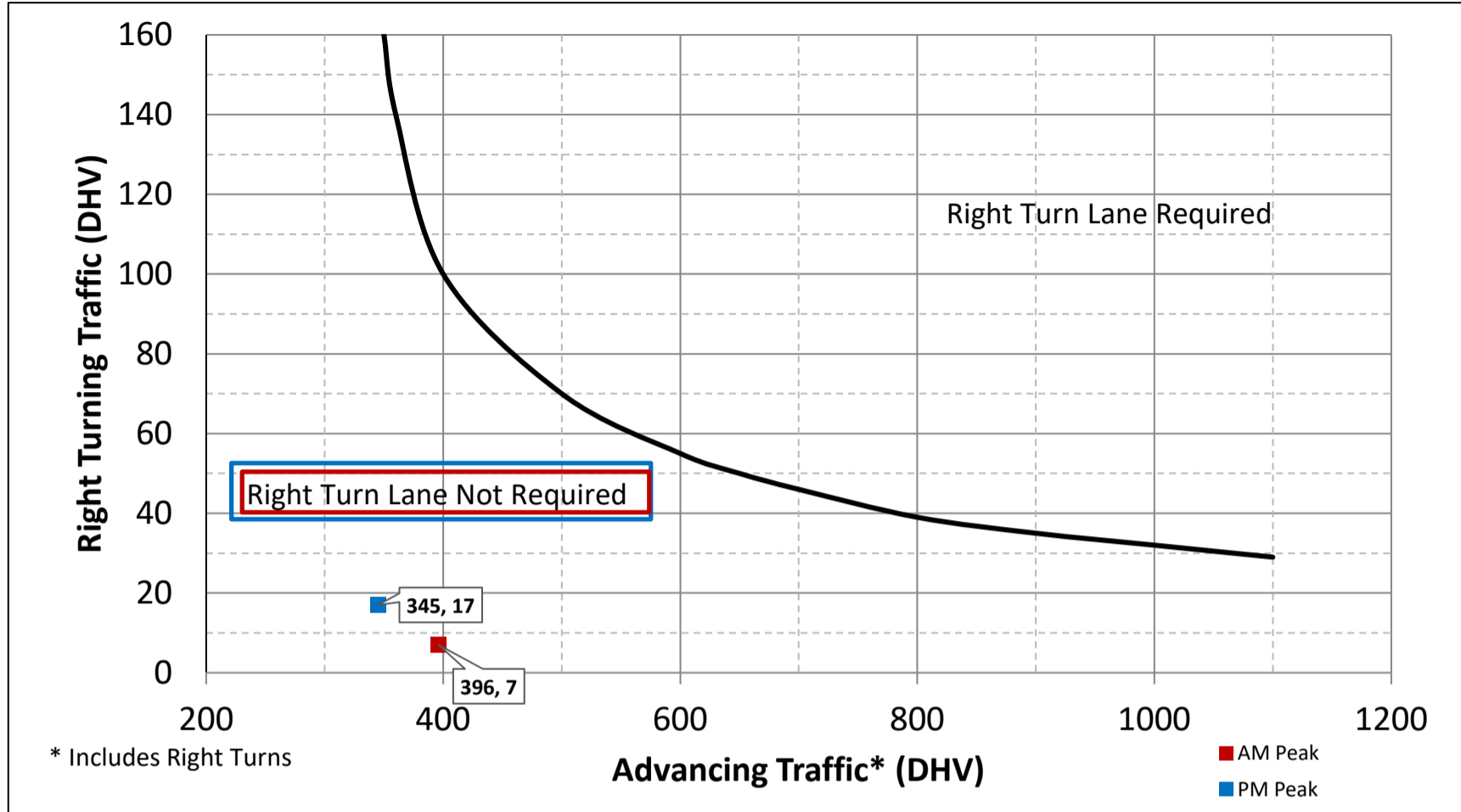
2-Lane Highway Left Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	40	mph
	Traffic Control	Unsignalized	
	Cycle Length	Unsignalized	
	Cycles Per Hour	60	Assume 60
	Turn Lane Volume	21	VPH
	Advancing Traffic	339	VPH
	Opposing Volume	264	VPH
	Left Turn Percentage	6%	
	Location Type	Through Road	
	Condition	B	
	Vehicles/Cycle	1	
	Turn Lane Length	125	* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12	
	Approach Taper	320	
PM Peak	Design Speed	40	mph
	Traffic Control	Unsignalized	
	Cycle Length	Unsignalized	
	Cycles Per Hour	60	Assume 60
	Turn Lane Volume	69	VPH
	Advancing Traffic	314	VPH
	Opposing Volume	474	VPH
	Left Turn Percentage	22%	
	Location Type	Through Road	
	Condition	C	
	Vehicles/Cycle	2	
	Turn Lane Length	215	* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12	
	Approach Taper	320	
Is Left Turn Warrant Met		Yes	See Above

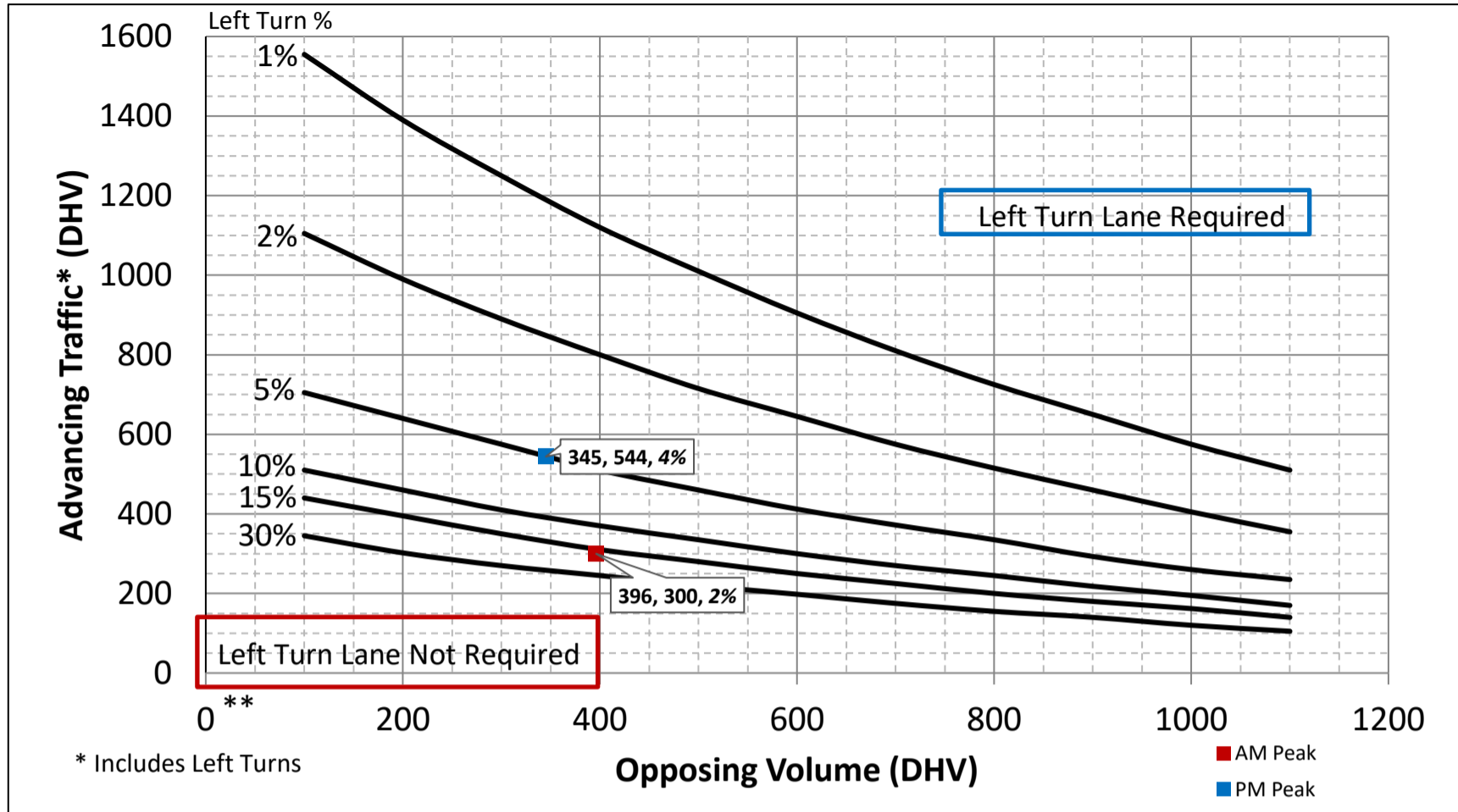
2-Lane Highway Right Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	40	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	7	VPH	
	Advancing Traffic	396	VPH	
	Right Turn Percentage	2%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	40	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	17	VPH	
	Advancing Traffic	345	VPH	
	Right Turn Percentage	5%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met	No	No Right Turn Lane Required		

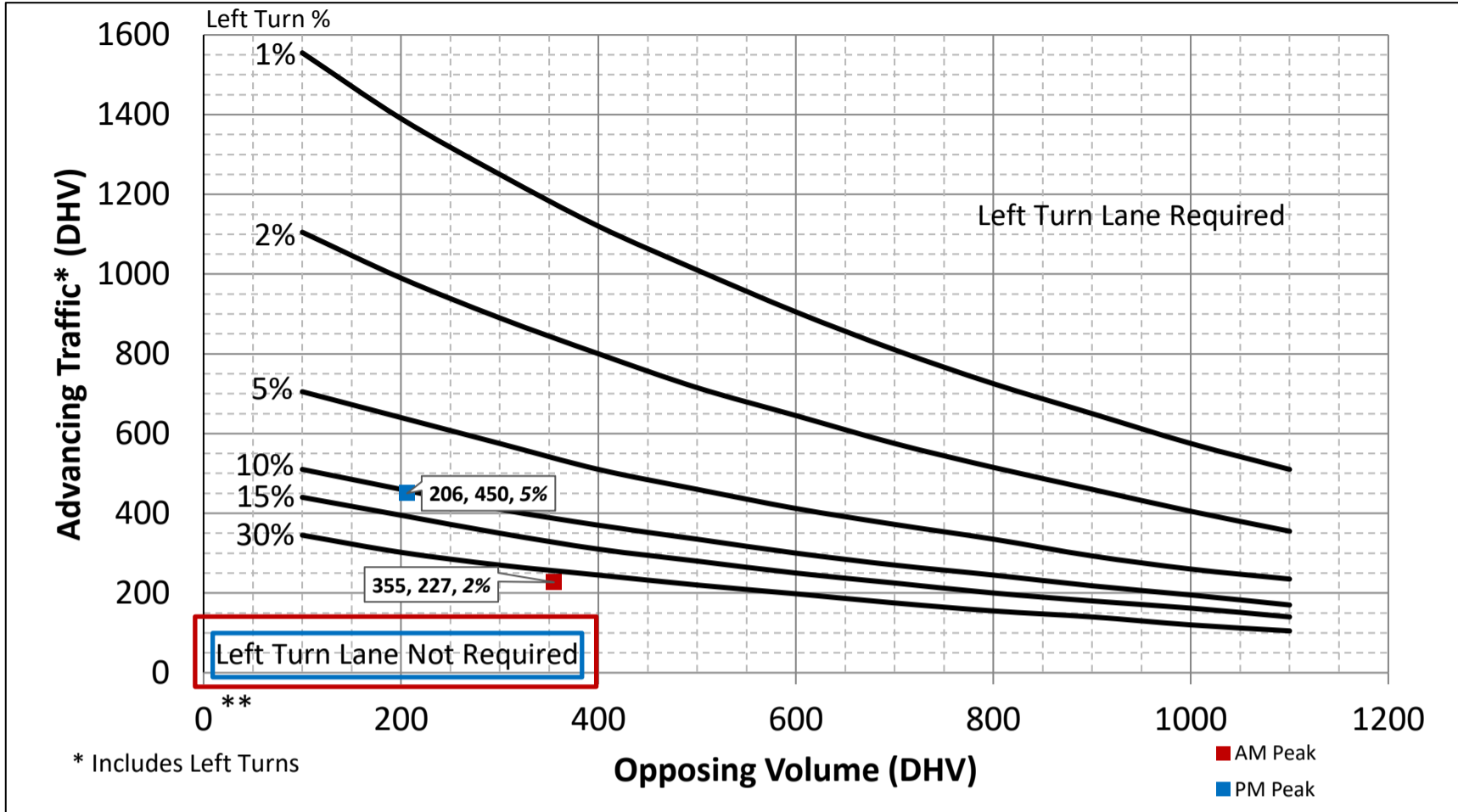
2-Lane Highway Left Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	40	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	<i>Assume 60</i>	
	Turn Lane Volume	5	VPH	
	Advancing Traffic	300	VPH	
	Opposing Volume	396	VPH	
	Left Turn Percentage	2%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125	* Turn Lane Length includes 50 ft diverging taper	
	Offset Width	12		
	Approach Taper	320		
			Design Speed	40
PM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	<i>Assume 60</i>	
	Turn Lane Volume	24	VPH	
	Advancing Traffic	544	VPH	
	Opposing Volume	345	VPH	
	Left Turn Percentage	4%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125	* Turn Lane Length includes 50 ft diverging taper	
	Offset Width	12		
	Approach Taper	320		
	Is Left Turn Warrant Met		Yes	See Above

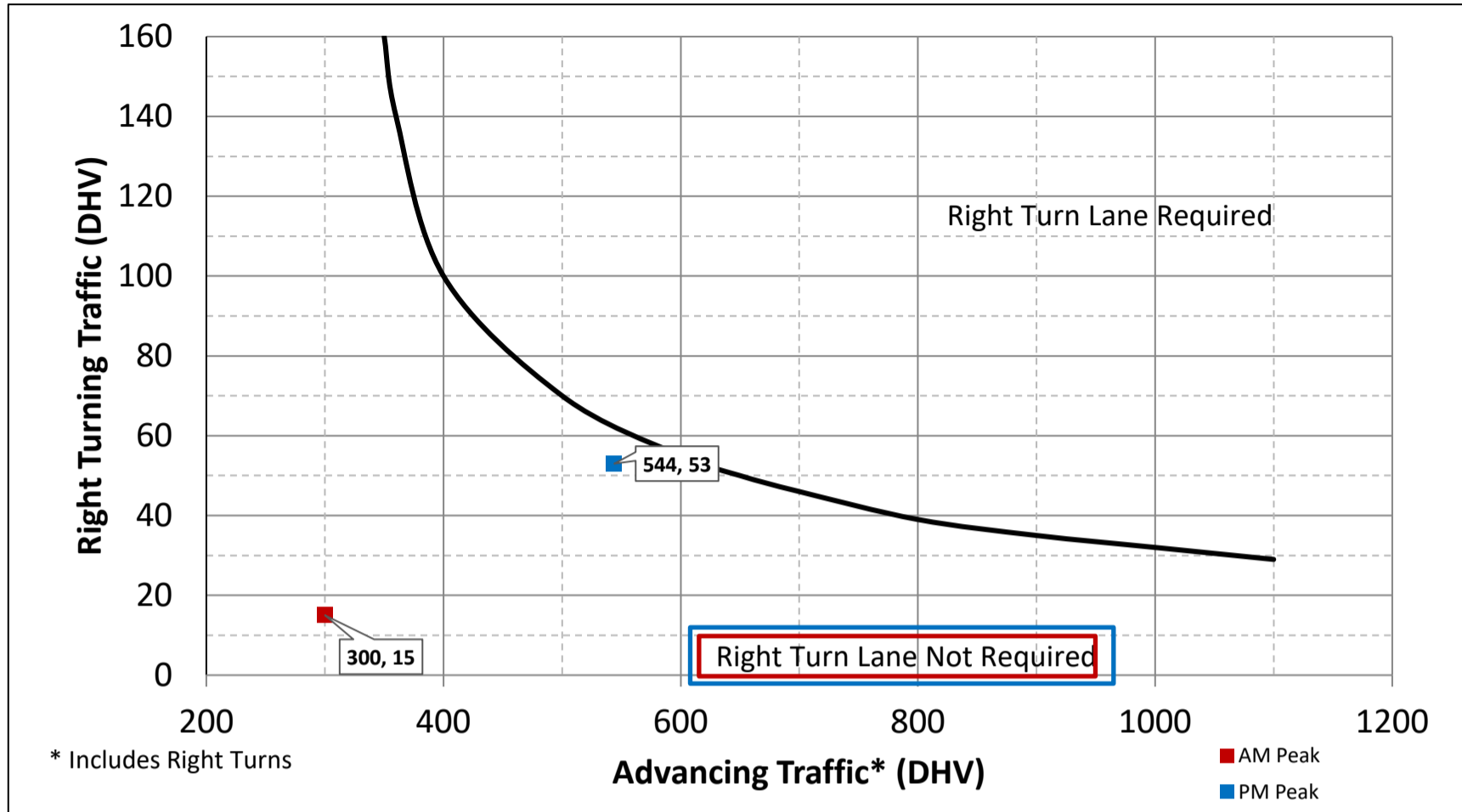
2-Lane Highway Left Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	40	mph
	Traffic Control	Unsignalized	
	Cycle Length	Unsignalized	
	Cycles Per Hour	60	Assume 60
	Turn Lane Volume	5	VPH
	Advancing Traffic	227	VPH
	Opposing Volume	355	VPH
	Left Turn Percentage	2%	
	Location Type	Through Road	
	Condition	B	
	Vehicles/Cycle	1	
	Turn Lane Length	125	* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12	
	Approach Taper	320	
PM Peak	Design Speed	40	mph
	Traffic Control	Unsignalized	
	Cycle Length	Unsignalized	
	Cycles Per Hour	60	Assume 60
	Turn Lane Volume	24	VPH
	Advancing Traffic	450	VPH
	Opposing Volume	206	VPH
	Left Turn Percentage	5%	
	Location Type	Through Road	
	Condition	B	
	Vehicles/Cycle	1	
	Turn Lane Length	125	* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12	
	Approach Taper	320	
Is Left Turn Warrant Met	No	No Left Turn Lane Required	

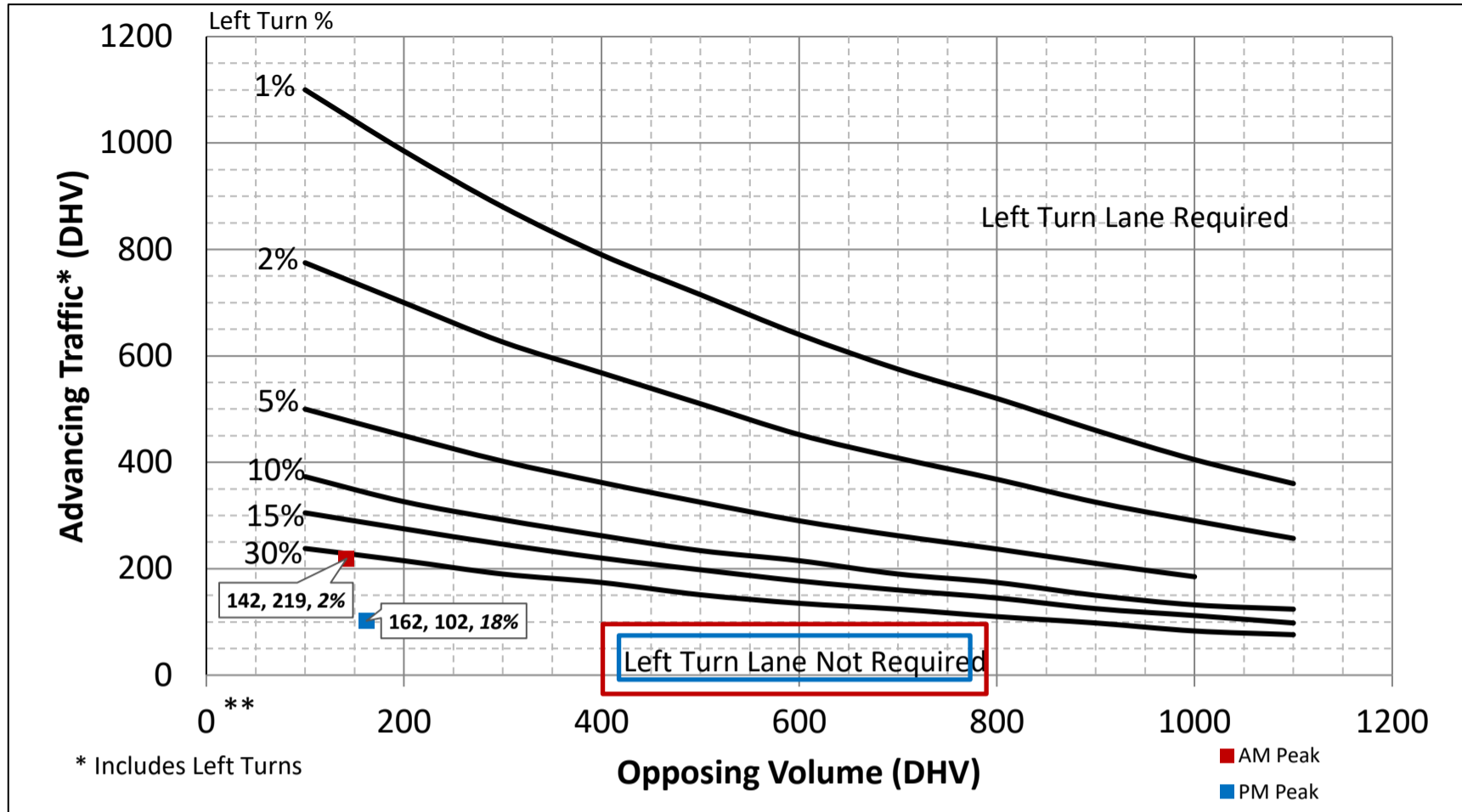
2-Lane Highway Right Turn Lane Warrant
(= < 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	40	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	15	VPH	
	Advancing Traffic	300	VPH	
	Right Turn Percentage	5%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	40	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	53	VPH	
	Advancing Traffic	544	VPH	
	Right Turn Percentage	10%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	125		* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met	No	No Right Turn Lane Required		

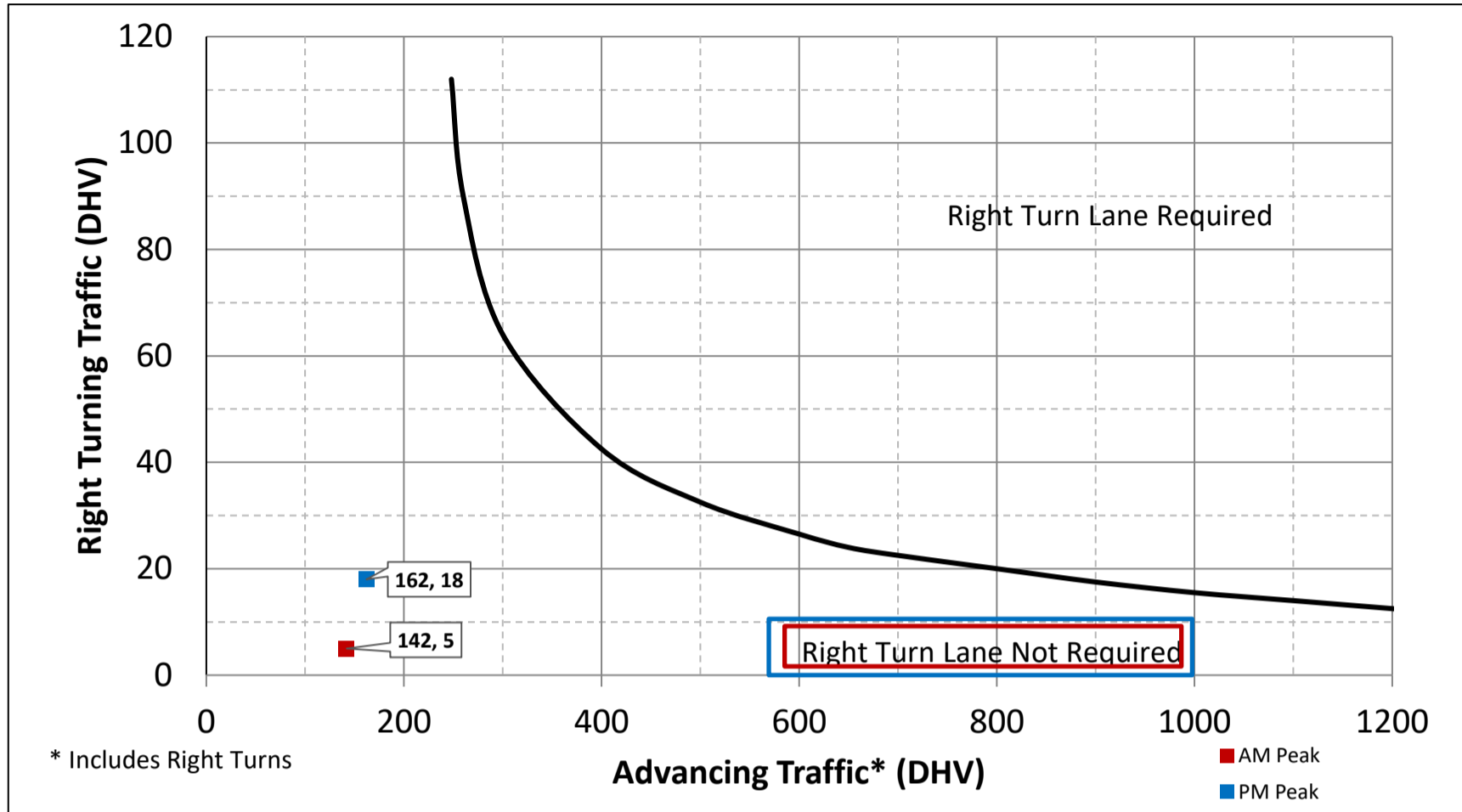
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		<i>Assume 60</i>
	Turn Lane Volume	5		VPH
	Advancing Traffic	219		VPH
	Opposing Volume	142		VPH
	Left Turn Percentage	2%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12		
	Approach Taper	660		
	PM Peak	Design Speed	55	
Traffic Control		Unsignalized		
Cycle Length		Unsignalized		
Cycles Per Hour		60		<i>Assume 60</i>
Turn Lane Volume		18		VPH
Advancing Traffic		102		VPH
Opposing Volume		162		VPH
Left Turn Percentage		18%		
Location Type		Through Road		
Condition		B or C		
Vehicles/Cycle		1		
Turn Lane Length		See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Offset Width		12		
Approach Taper		660		
Is Left Turn Warrant Met		No	No Left Turn Lane Required	

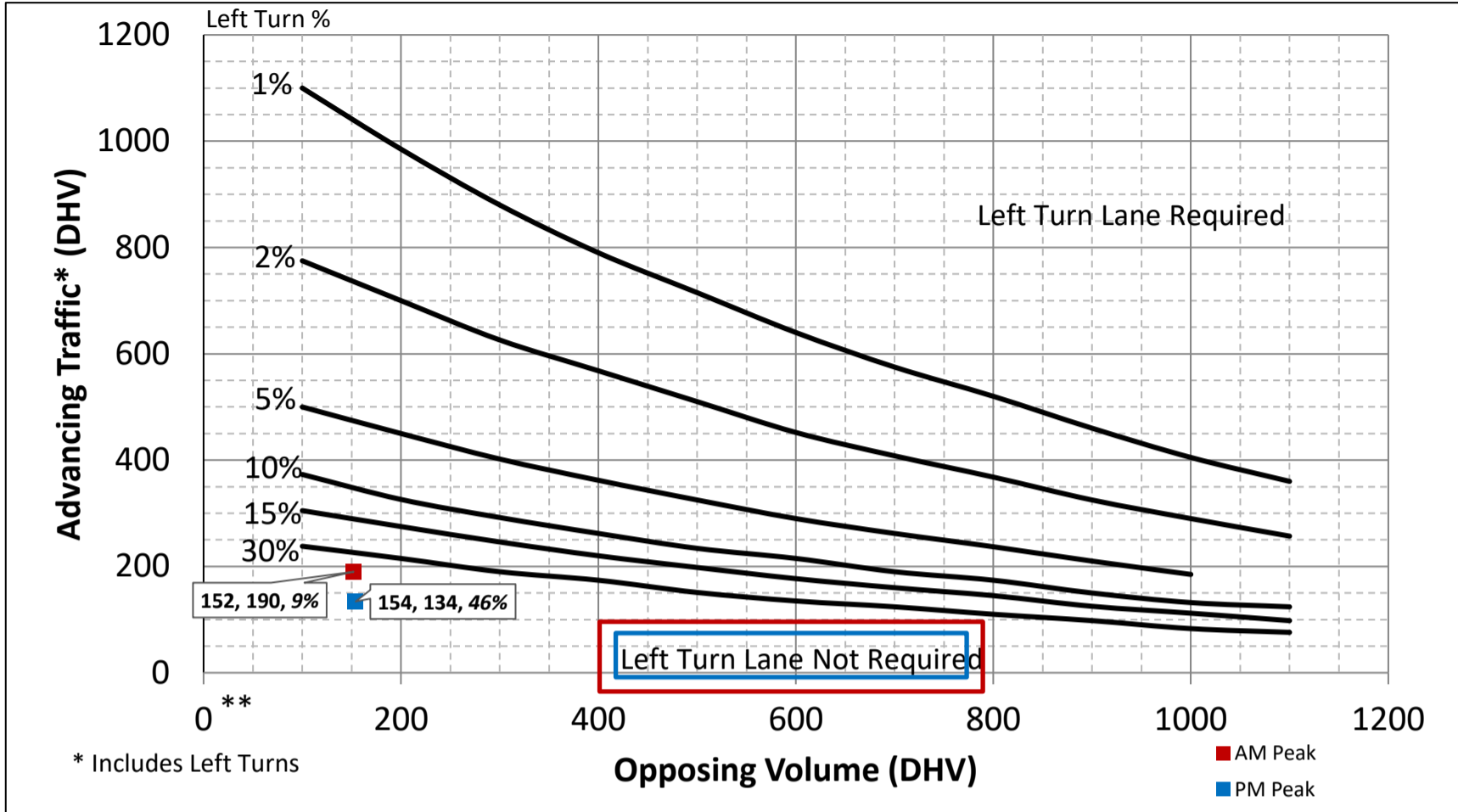
2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	5	VPH	
	Advancing Traffic	142	VPH	
	Right Turn Percentage	4%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	18	VPH	
	Advancing Traffic	162	VPH	
	Right Turn Percentage	11%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met	No	No Right Turn Lane Required		

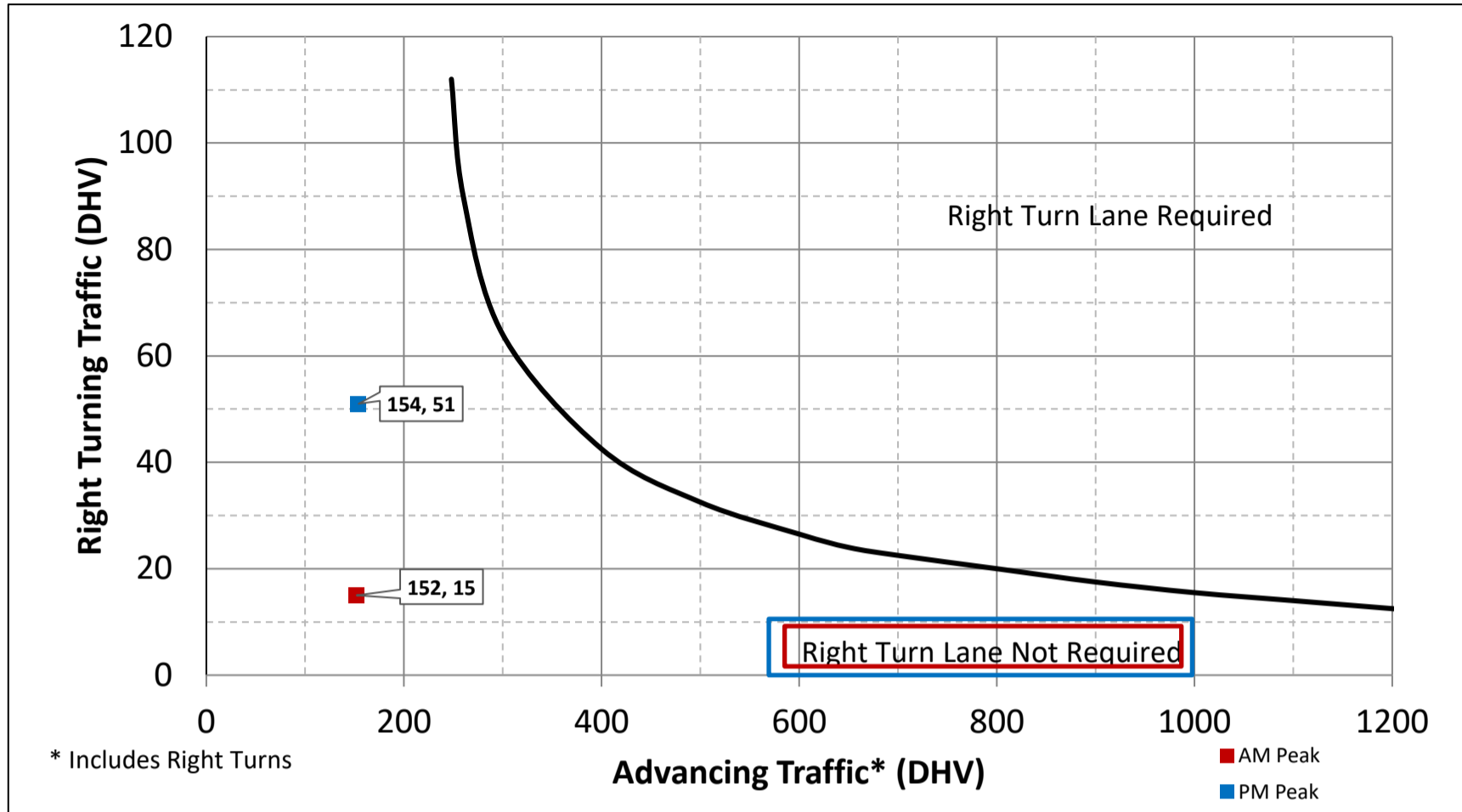
2-Lane Highway Left Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

		Design Speed	55	mph
AM Peak	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60		Assume 60
	Turn Lane Volume	18		VPH
	Advancing Traffic	190		VPH
	Opposing Volume	152		VPH
	Left Turn Percentage	9%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
	Offset Width	12		
	Approach Taper	660		
	PM Peak	Design Speed	55	
Traffic Control		Unsignalized		
Cycle Length		Unsignalized		
Cycles Per Hour		60		Assume 60
Turn Lane Volume		62		VPH
Advancing Traffic		134		VPH
Opposing Volume		154		VPH
Left Turn Percentage		46%		
Location Type		Through Road		
Condition		B or C		
Vehicles/Cycle		2		
Turn Lane Length		See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Offset Width		12		
Approach Taper		660		
Is Left Turn Warrant Met		No	No Left Turn Lane Required	

2-Lane Highway Right Turn Lane Warrant
(> 40 mph or 70 kph Posted Speed)



Turn Lane Length Calculations

AM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	15	VPH	
	Advancing Traffic	152	VPH	
	Right Turn Percentage	10%		
	Location Type	Through Road		
	Condition	B		
	Vehicles/Cycle	1		
	Turn Lane Length	285		* Turn Lane Length includes 50 ft diverging taper
PM Peak	Design Speed	55	mph	
	Traffic Control	Unsignalized		
	Cycle Length	Unsignalized		
	Cycles Per Hour	60	Assume 60	
	Turn Lane Volume	51	VPH	
	Advancing Traffic	154	VPH	
	Right Turn Percentage	33%		
	Location Type	Through Road		
	Condition	B or C		
	Vehicles/Cycle	1		
	Turn Lane Length	See Column to Right	285	* Turn Lane Length includes 50 ft diverging taper
Is Right Turn Warrant Met	No	No Right Turn Lane Required		