

October 2022

VOLUME 3

TRANSPORTATION IMPACT STUDY

for

**PENNMARK
PROPERTY**

in

**Mount Joy Township
Lancaster County, Pennsylvania**

Prepared for:

Pennmark Management Company, Inc
1000 Germantown Pike, Suite A-2
Plymouth Meeting, PA 19462

Prepared by:

Grove Miller Engineering, Inc.
Gregory E. Creasy, P.E.
4800 Linglestown Road, Suite 307
Harrisburg, PA 17112
(717) 545-3636
www.grovemiller.com

APPENDIX M

TURN LANE ANALYSIS WORKSHEETS

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
 County: Lancaster County
 PennDOT Engineering District: 8

Analysis Date: 9/28/2022
 Conducted By: GEC
 Checked By:
 Agency/Company Name: GME

Intersection & Approach Description: Cloverleaf Road at Andrew Avenue/NORLANCO Drive - Northbound Left Turn

Analysis Period: 2033 Build
 Design Hour: AM Peak Hour
 Intersection Control: Signalized
 Posted Speed Limit (MPH): 40
 Type of Terrain: Rolling

Number of Approach Lanes: 1
 Undivided or Divided Highway: Undivided

Left or Right-Turn Lane Analysis?: Type of Analysis
Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	2	50.0%	4
	Through	-	900	10.0%	1035
	Right	Yes	7	29.0%	11
Opposing	Left	Yes	64	0.0%	64
	Through	-	729	9.0%	828
	Right	Yes	7	0.0%	7

Advancing Volume: 1050
 Opposing Volume: 899
 Left Turn Volume: 4

% Left Turns in Advancing Volume: 0.38%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: N/A
 Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 2
 Warrant Met?: No

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
 Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized
 Design Hour Volume of Turning Lane: 4
 Cycles Per Hour (Assumed): Known
 Cycles Per Hour (If Known): 51

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: N/A Feet
 Condition B: N/A Feet
 Condition C: N/A Feet
 Required Left Turn Lane Storage Length: N/A Feet

Additional Findings:
N/A

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
 County: Lancaster County
 PennDOT Engineering District: 8

Analysis Date: 9/28/2022
 Conducted By: GEC
 Checked By:
 Agency/Company Name: GME

Intersection & Approach Description: Cloverleaf Road at Andrew Avenue/NORLANCO Drive - Northbound Left Turn

Analysis Period: 2033 Build
 Design Hour: PM Peak Hour
 Intersection Control: Signalized
 Posted Speed Limit (MPH): 40
 Type of Terrain: Rolling

Number of Approach Lanes: 1
 Undivided or Divided Highway: Undivided

Left or Right-Turn Lane Analysis?: Type of Analysis
Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	17	0.0%	17
	Through	-	900	5.0%	968
	Right	Yes	5	0.0%	5
Opposing	Left	Yes	130	0.0%	130
	Through	-	1158	2.0%	1193
	Right	Yes	35	0.0%	35

Advancing Volume: 990
 Opposing Volume: 1358
 Left Turn Volume: 17

% Left Turns in Advancing Volume: 1.72%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: N/A
 Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 2
 Warrant Met?: Yes

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
 Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized
 Design Hour Volume of Turning Lane: 17
 Cycles Per Hour (Assumed): Known
 Cycles Per Hour (If Known): 60

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: N/A Feet
 Condition B: 75 Feet
 Condition C: 136 Feet
 Required Left Turn Lane Storage Length: 150 Feet

Additional Findings:
N/A

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: **Mt. Joy Twp.**
 County: **Lancaster County**
 PennDOT Engineering District: **8**

Analysis Date: **9/28/2022**
 Conducted By: **GEC**
 Checked By:
 Agency/Company Name: **GME**

Intersection & Approach Description: **Cloverleaf Road at Andrew Avenue/NORLANCO Drive - Northbound Left Turn**

Analysis Period: **2033 Build**
 Design Hour: **SAT Peak Hour**
 Intersection Control: **Signalized**
 Posted Speed Limit (MPH): **40**
 Type of Terrain: **Rolling**

Number of Approach Lanes: **1**
 Undivided or Divided Highway: **Undivided**

Left or Right-Turn Lane Analysis?: **Type of Analysis
Left Turn Lane**

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	16	0.0%	16
	Through	-	855	5.0%	920
	Right	Yes	7	0.0%	7
Opposing	Left	Yes	164	0.0%	164
	Through	-	904	2.0%	932
	Right	Yes	7	0.0%	7

Advancing Volume: **943**
 Opposing Volume: **1103**
 Left Turn Volume: **16**

% Left Turns in Advancing Volume: **1.70%**

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: **N/A**
 Right Turn Volume: **N/A**

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 2**
 Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**
 Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control: **Signalized**
 Design Hour Volume of Turning Lane: **16**
 Cycles Per Hour (Assumed): **Known**
 Cycles Per Hour (If Known): **60**

Average # of Vehicles/Cycle: **1.0**

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: **N/A** Feet
 Condition B: **75** Feet
 Condition C: **136** Feet
 Required Left Turn Lane Storage Length: **150** Feet

Additional Findings:
N/A

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
County: Lancaster County
PennDOT Engineering District: 8

Analysis Date: 9/28/2022
Conducted By: GEC
Checked By:
Agency/Company Name: GME

Intersection & Approach Description: Cloverleaf Road at Andrew Avenue/NORLANCO Drive - Southbound Left Turn

Analysis Period: 2033 Build
Design Hour: AM Peak Hour
Intersection Control: Signalized
Posted Speed Limit (MPH): 40
Type of Terrain: Rolling

Number of Approach Lanes: 1
Undivided or Divided Highway: Undivided

Type of Analysis: Left Turn Lane
Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	64	0.0%	64
	Through	-	729	9.0%	828
	Right	Yes	7	0.0%	7
Opposing	Left	Yes	2	50.0%	4
	Through	-	900	10.0%	1035
	Right	Yes	7	29.0%	11

Advancing Volume: 899
Opposing Volume: 1050
Left Turn Volume: 64

% Left Turns in Advancing Volume: 7.12%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: N/A
Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 2
Warrant Met?: Yes

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized
Design Hour Volume of Turning Lane: 64
Cycles Per Hour (Assumed): Known
Cycles Per Hour (If Known): 51

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: N/A Feet
Condition B: 75 Feet
Condition C: 136 Feet
Required Left Turn Lane Storage Length: 150 Feet

Additional Findings: N/A

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:
 County:
 PennDOT Engineering District:

Analysis Date:
 Conducted By:
 Checked By:
 Agency/Company Name:

Intersection & Approach Description:

Analysis Period:
 Design Hour:
 Intersection Control:
 Posted Speed Limit (MPH):
 Type of Terrain:

Number of Approach Lanes:
 Undivided or Divided Highway:

Left or Right-Turn Lane Analysis?: Type of Analysis

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	130	0.0%	130
	Through	-	1158	2.0%	1193
	Right	Yes	35	0.0%	35
Opposing	Left	Yes	17	0.0%	17
	Through	-	900	5.0%	968
	Right	Yes	5	0.0%	5

Advancing Volume:
 Opposing Volume:
 Left Turn Volume:

% Left Turns in Advancing Volume:

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume:
 Right Turn Volume:

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure:
 Warrant Met?:

Right Turn Lane Warrant Findings

Applicable Warrant Figure:
 Warrant Met?:

TURN LANE LENGTH CALCULATIONS

Intersection Control:
 Design Hour Volume of Turning Lane:
 Cycles Per Hour (Assumed):
 Cycles Per Hour (If Known):

Average # of Vehicles/Cycle:

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: Feet
 Condition B: Feet
 Condition C: Feet
 Required Left Turn Lane Storage Length: Feet

Additional Findings:

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
 County: Lancaster County
 PennDOT Engineering District: 8

Analysis Date: 9/28/2022
 Conducted By: GEC
 Checked By:
 Agency/Company Name: GME

Intersection & Approach Description: Cloverleaf Road at Andrew Avenue/NORLANCO Drive - Southbound Left Turn

Analysis Period: 2033 Build
 Design Hour: SAT Peak Hour
 Intersection Control: Signalized
 Posted Speed Limit (MPH): 40
 Type of Terrain: Rolling

Number of Approach Lanes: 1
 Undivided or Divided Highway: Undivided

Left or Right-Turn Lane Analysis?: Type of Analysis
Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	164	0.0%	164
	Through	-	904	2.0%	932
	Right	Yes	7	0.0%	7
Opposing	Left	Yes	16	0.0%	16
	Through	-	855	5.0%	920
	Right	Yes	7	0.0%	7

Advancing Volume: 1103
 Opposing Volume: 943
 Left Turn Volume: 164

% Left Turns in Advancing Volume: 14.87%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: N/A
 Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 2
 Warrant Met?: Yes

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
 Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized
 Design Hour Volume of Turning Lane: 164
 Cycles Per Hour (Assumed): Known
 Cycles Per Hour (If Known): 60

Average # of Vehicles/Cycle: 3.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: N/A Feet
 Condition B: 75 Feet
 Condition C: 211 Feet
 Required Left Turn Lane Storage Length: 225 Feet

Additional Findings:
N/A

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.	Analysis Date: 9/28/2022
County: Lancaster County	Conducted By: GEC
PennDOT Engineering District: 8	Checked By:
Agency/Company Name: GME	
Intersection & Approach Description: Cloverleaf Road at Schwanger Road - Southbound Right Turn	
Analysis Period: 2033 Build	Number of Approach Lanes: 1
Design Hour: AM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 40	
Type of Terrain: Rolling	
Left or Right-Turn Lane Analysis?: Right Turn Lane	

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A					
Opposing Volume: N/A					
Left Turn Volume: N/A					
% Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	11	0.0%	N/A
	Through	-	674	10.0%	776
	Right	-	195	5.0%	210
Advancing Volume: 986					
Right Turn Volume: 210					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 9
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	Average # of Vehicles/Cycle: 4.0					
Design Hour Volume of Turning Lane: 210						
Cycles Per Hour (Assumed): Known						
Cycles Per Hour (If Known): 51						
PennDOT Publication 46, Exhibit 11-6						
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B
Right Turn Lane Storage Length, Condition A:		N/A		Feet		
Condition B:		75		Feet		
Condition C:		236		Feet		
Required Right Turn Lane Storage Length:		250		Feet		
Additional Findings:		N/A				

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Schwanger Road - Southbound Right Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	51	0.0%	N/A
	Through	-	1169	2.0%	1205
	Right	-	455	1.0%	462
Advancing Volume: 1667 Right Turn Volume: 462					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 462 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 60	Average # of Vehicles/Cycle: 8.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: 75 Feet Condition C: 386 Feet Required Right Turn Lane Storage Length: 400 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Schwanger Road - Southbound Right Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	20	5.0%	N/A
	Through	-	923	1.0%	937
	Right	-	189	0.0%	189
Advancing Volume: 1126 Right Turn Volume: 189					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 189 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 60	Average # of Vehicles/Cycle: 3.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: 75 Feet Condition C: 211 Feet Required Right Turn Lane Storage Length: 225 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
County: Lancaster County
PennDOT Engineering District: 8

Analysis Date: 9/28/2022
Conducted By: GEC
Checked By:
Agency/Company Name: GME

Intersection & Approach Description: SR 0230 at Western Parcels Access - Westbound Right Turn

Analysis Period: 2033 Build
Design Hour: AM Peak Hour
Intersection Control: Unsignalized
Posted Speed Limit (MPH): 45
Type of Terrain: Level

Number of Approach Lanes: 1
Undivided or Divided Highway: Undivided

Left or Right-Turn Lane Analysis?: **Type of Analysis**
Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume: N/A
Opposing Volume: N/A
Left Turn Volume: N/A

% Left Turns in Advancing Volume: N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	528	7.0%	547
	Right	-	22	2.0%	23

Advancing Volume: 570
Right Turn Volume: 23

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 10**
Warrant Met?: **No**

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized
Design Hour Volume of Turning Lane: 23
Cycles Per Hour (Assumed): 60
Cycles Per Hour (If Known):

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

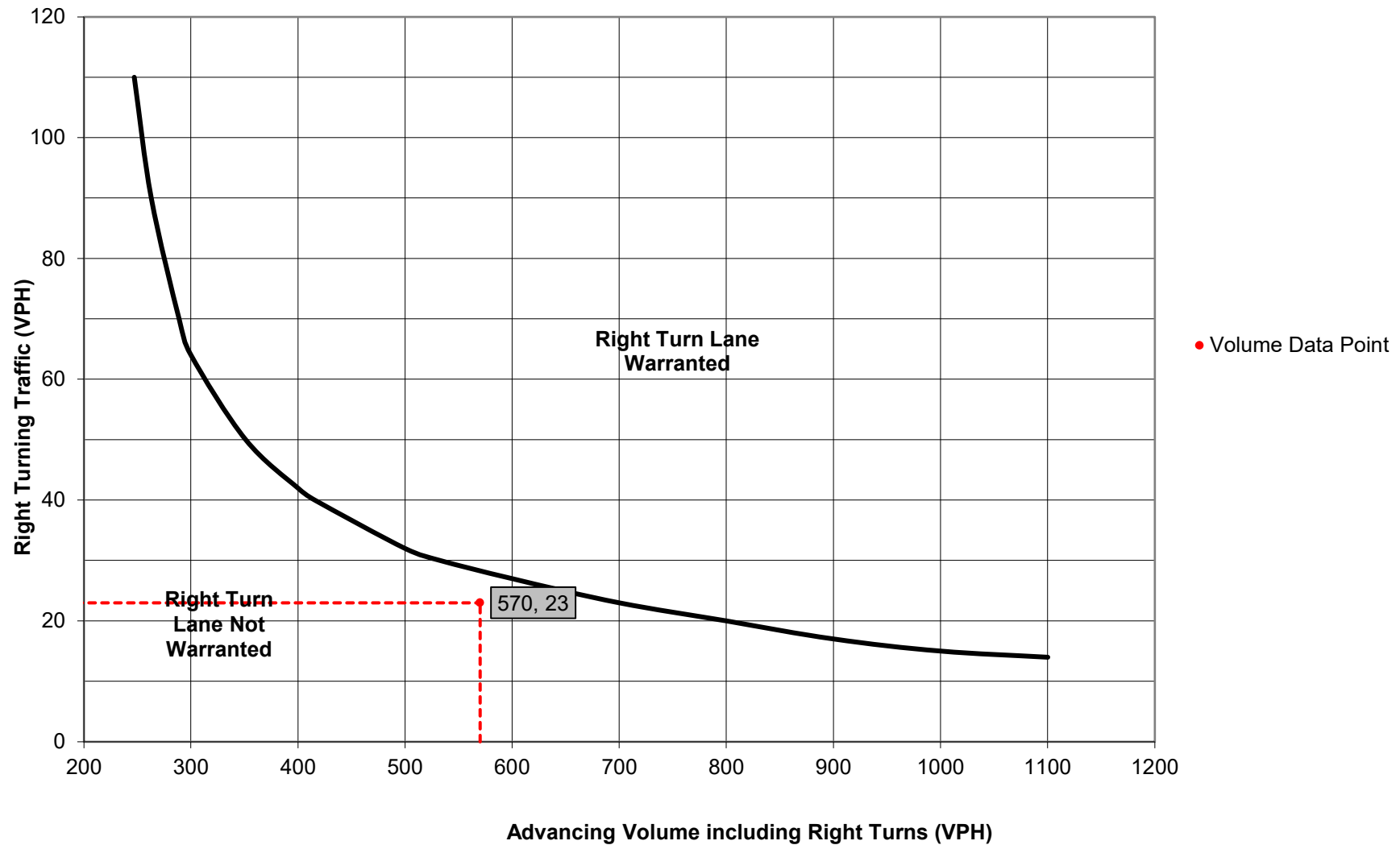
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: N/A Feet
Condition B: N/A Feet
Condition C: N/A Feet
Required Right Turn Lane Storage Length: N/A Feet

Additional Findings:
N/A

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at Western Parcels Access - Westbound Right Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 45 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A </div> <div> % Left Turns in Advancing Volume: N/A </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	881	5.0%	904
	Right	-	51	2.0%	52
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 956 Right Turn Volume: 52 </div> </div>					

TURN LANE WARRANT FINDINGS

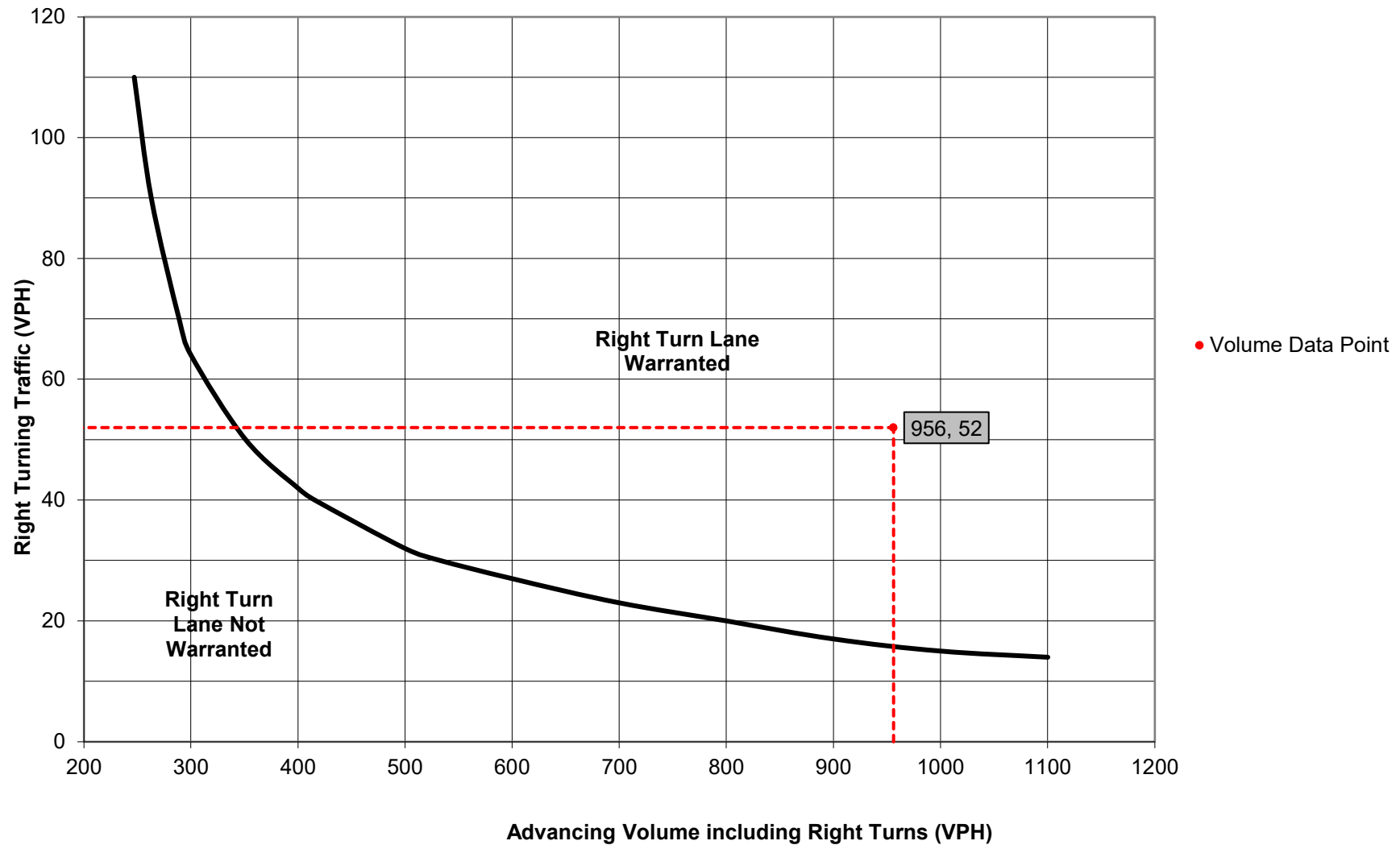
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 10 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 52 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 150 Feet Required Right Turn Lane Storage Length: 150 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at Western Parcels Access - Westbound Right Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 45 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	749	0.0%	749
	Right	-	70	2.0%	71
Advancing Volume: 820 Right Turn Volume: 71					

TURN LANE WARRANT FINDINGS

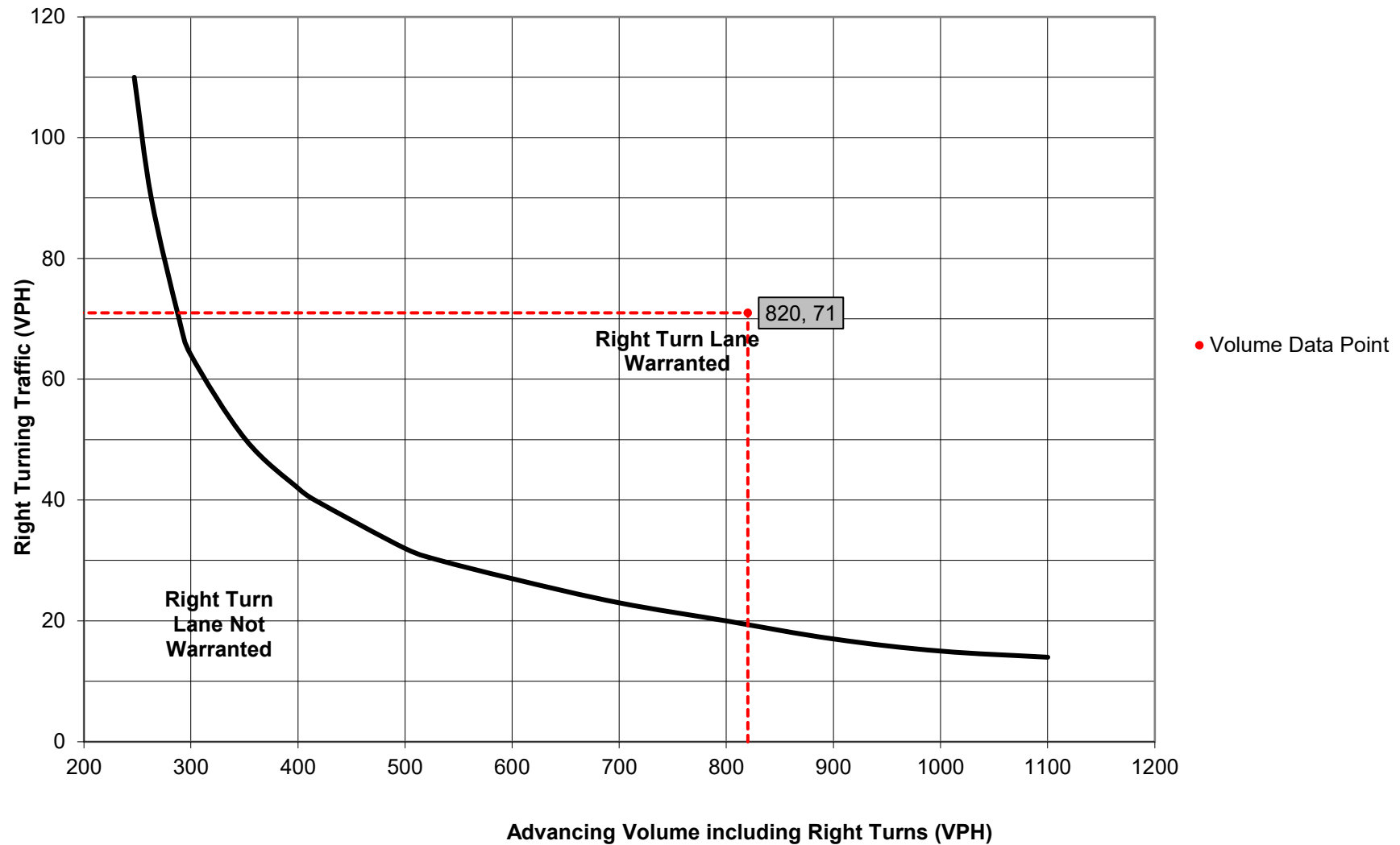
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 10 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 71 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 150 Feet Required Right Turn Lane Storage Length: 150 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:
 County:
 PennDOT Engineering District:

Analysis Date:
 Conducted By:
 Checked By:
 Agency/Company Name:

Intersection & Approach Description:

Analysis Period:
 Design Hour:
 Intersection Control:
 Posted Speed Limit (MPH):
 Type of Terrain:

Number of Approach Lanes:
 Undivided or Divided Highway:

Left or Right-Turn Lane Analysis?: Type of Analysis

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:
 Opposing Volume:
 Left Turn Volume:

% Left Turns in Advancing Volume:

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	530	5.0%	544
	Right	-	37	2.0%	38

Advancing Volume:
 Right Turn Volume:

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure:
 Warrant Met?:

Right Turn Lane Warrant Findings

Applicable Warrant Figure:
 Warrant Met?:

TURN LANE LENGTH CALCULATIONS

Intersection Control:
 Design Hour Volume of Turning Lane:
 Cycles Per Hour (Assumed):
 Cycles Per Hour (If Known):

Average # of Vehicles/Cycle:

PennDOT Publication 46, Exhibit 11-6

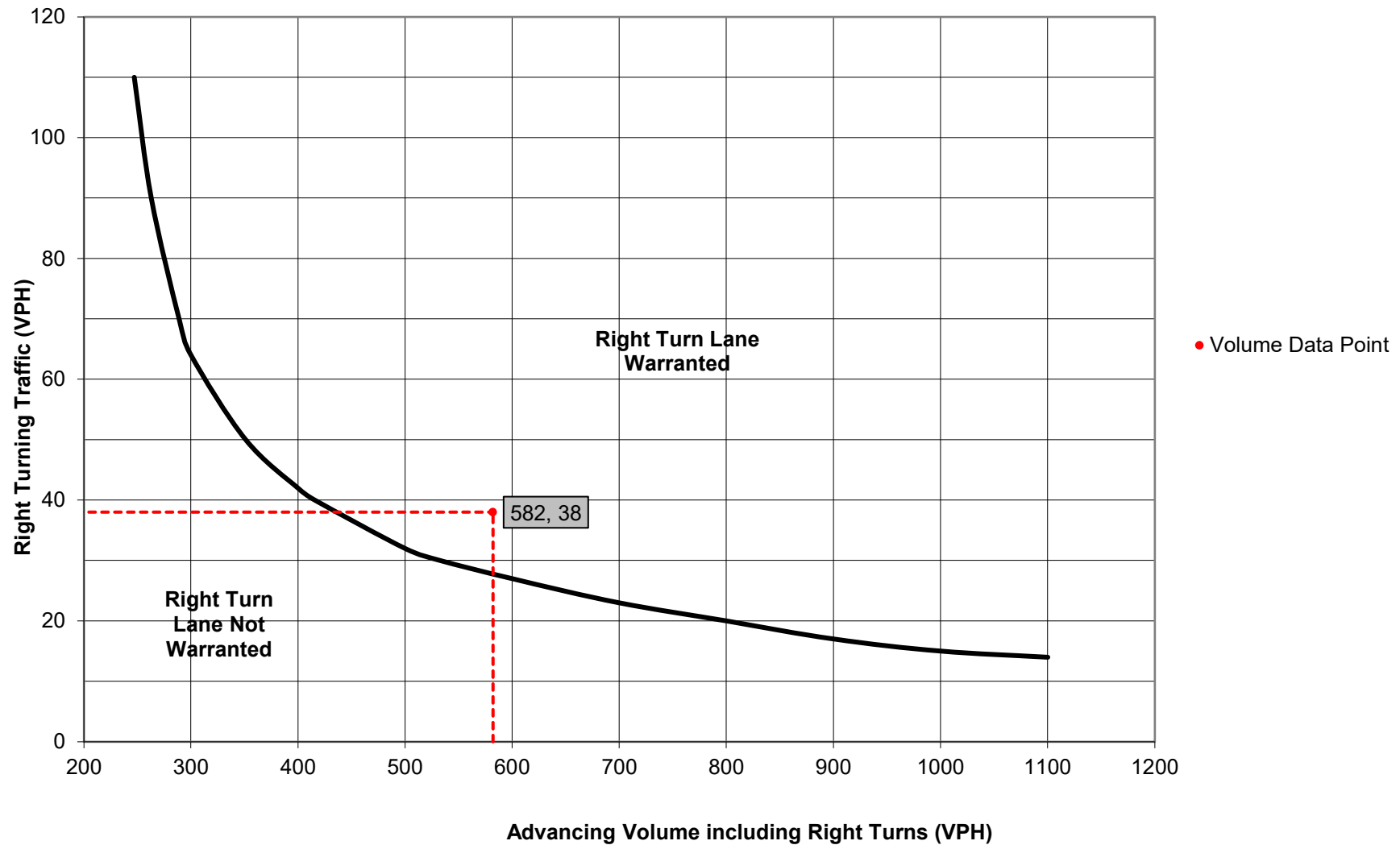
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: Feet
 Condition B: Feet
 Condition C: Feet
 Required Right Turn Lane Storage Length: Feet

Additional Findings:

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.	Analysis Date: 9/28/2022
County: Lancaster County	Conducted By: GEC
PennDOT Engineering District: 8	Checked By:
Agency/Company Name: GME	
Intersection & Approach Description: SR 0230 at Right-In Only Driveway - Westbound Right Turn	
Analysis Period: 2033 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Unsignalized	Type of Analysis
Posted Speed Limit (MPH): 45	
Type of Terrain: Level	
Left or Right-Turn Lane Analysis?: Right Turn Lane	

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume: N/A

Opposing Volume: N/A

Left Turn Volume: N/A

% Left Turns in Advancing Volume: N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	895	3.0%	909
	Right	-	35	2.0%	36

Advancing Volume: 945

Right Turn Volume: 36

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 10
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized	
Design Hour Volume of Turning Lane: 36	
Cycles Per Hour (Assumed): 60	
Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: N/A

Feet

Condition B: N/A

Feet

Condition C: 150

Feet

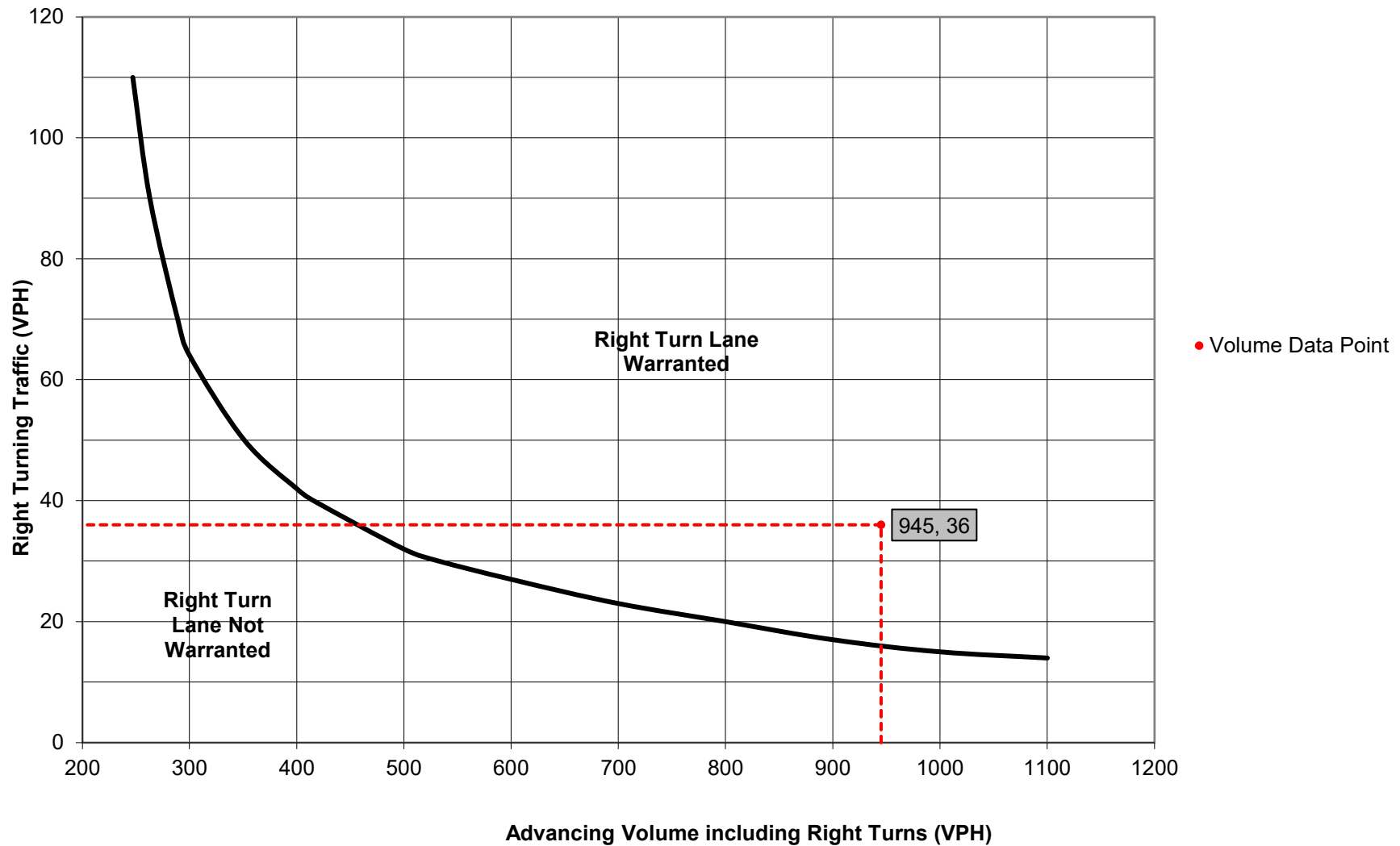
Required Right Turn Lane Storage Length: 150

Feet

Additional Findings: N/A

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at Right-In Only Driveway - Westbound Right Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 45 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A </div> <div> % Left Turns in Advancing Volume: N/A </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	917	1.0%	922
	Right	-	47	2.0%	48
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 970 Right Turn Volume: 48 </div> </div>					

TURN LANE WARRANT FINDINGS

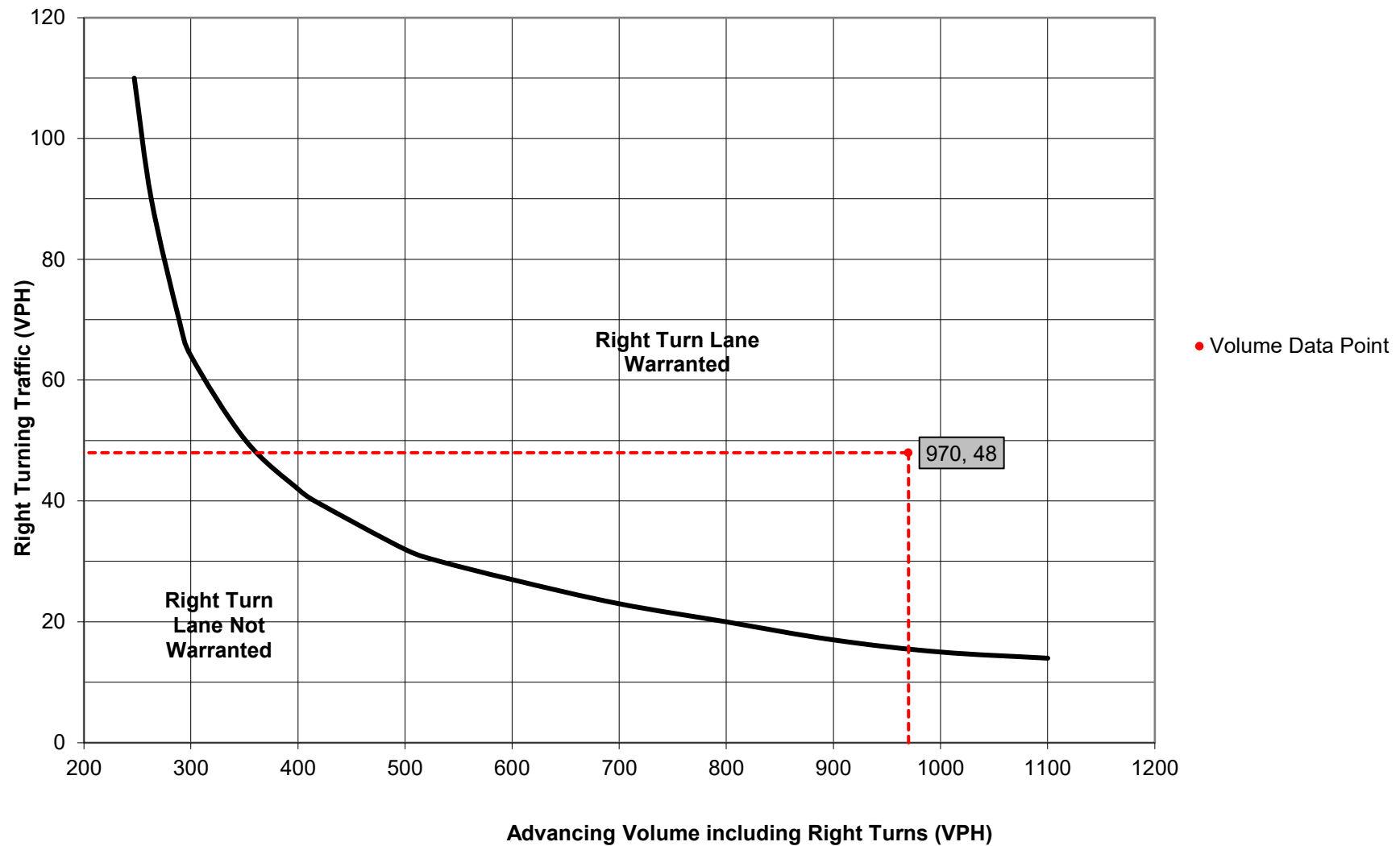
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 10 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 48 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 150 Feet Required Right Turn Lane Storage Length: 150 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Eastbound Left Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 45 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	101	2.0%	103
	Through	-	346	9.0%	362
	Right	No	0	0.0%	N/A
Opposing	Left	No	0	0.0%	N/A
	Through	-	436	5.0%	447
	Right	Yes	32	2.0%	33
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 465 Opposing Volume: 480 Left Turn Volume: 103 </div> <div> % Left Turns in Advancing Volume: 22.15% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 3 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 103 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 45	Average # of Vehicles/Cycle: 2.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: 125 Feet Condition C: 175 Feet Required Left Turn Lane Storage Length: 175 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.	Analysis Date: 9/28/2022
County: Lancaster County	Conducted By: GEC
PennDOT Engineering District: 8	Checked By:
Agency/Company Name: GME	
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Eastbound Left Turn	
Analysis Period: 2033 Build	Number of Approach Lanes: 1
Design Hour: PM Peak Hour	Undivided or Divided Highway: Undivided
Intersection Control: Signalized	Type of Analysis
Posted Speed Limit (MPH): 45	
Type of Terrain: Level	
Left or Right-Turn Lane Analysis?: Left Turn Lane	

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	239	2.0%	242
	Through	-	539	1.0%	542
	Right	No	0	0.0%	N/A
Opposing	Left	No	0	0.0%	N/A
	Through	-	527	3.0%	535
	Right	Yes	111	2.0%	113

Advancing Volume: 784

Opposing Volume: 648

Left Turn Volume: 242

% Left Turns in Advancing Volume: 30.87%

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: N/A

Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 3	Applicable Warrant Figure: N/A
Warrant Met?: Yes	Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized	
Design Hour Volume of Turning Lane: 242	
Cycles Per Hour (Assumed): Known	
Cycles Per Hour (If Known): 60	Average # of Vehicles/Cycle: 4.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	125	Feet
Condition C:	250	Feet
Required Left Turn Lane Storage Length:	250	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Eastbound Left Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 45 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	324	2.0%	328
	Through	-	440	1.0%	443
	Right	No	0	0.0%	N/A
Opposing	Left	No	0	0.0%	N/A
	Through	-	531	1.0%	534
	Right	Yes	153	2.0%	155
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 771 Opposing Volume: 689 Left Turn Volume: 328 </div> <div> % Left Turns in Advancing Volume: 42.54% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 3 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 328 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 48	Average # of Vehicles/Cycle: 7.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: 125 Feet Condition C: 350 Feet Required Left Turn Lane Storage Length: 350 Feet </div> <div> Additional Findings: <div style="border: 1px solid black; padding: 2px; text-align: center;">Consider Dual Left Turn Lanes and Operational Analyses</div> </div> </div>																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Southbound Left Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	50	2.0%	51
	Through	-	0	0.0%	0
	Right	Yes	131	2.0%	133
Opposing	Left	No	0	0.0%	N/A
	Through	-	1000	0.0%	1000
	Right	No	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 184 Opposing Volume: 1000 Left Turn Volume: 51 </div> <div> % Left Turns in Advancing Volume: 27.72% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 1 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 51 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 45	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: 75 Feet Condition B: N/A Feet Condition C: N/A Feet Required Left Turn Lane Storage Length: 75 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Southbound Left Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	164	2.0%	166
	Through	-	0	0.0%	0
	Right	Yes	403	2.0%	408
Opposing	Left	No	0	0.0%	N/A
	Through	-	600	0.0%	600
	Right	No	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 574 Opposing Volume: 600 Left Turn Volume: 166 </div> <div> % Left Turns in Advancing Volume: 28.92% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 1 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 166 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 60	Average # of Vehicles/Cycle: 3.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: 150 Feet Condition B: N/A Feet Condition C: N/A Feet Required Left Turn Lane Storage Length: 150 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Southbound Left Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	185	2.0%	187
	Through	-	0	0.0%	0
	Right	Yes	433	2.0%	438
Opposing	Left	No	0	0.0%	N/A
	Through	-	600	0.0%	600
	Right	No	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 625 Opposing Volume: 600 Left Turn Volume: 187 </div> <div> % Left Turns in Advancing Volume: 29.92% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 1 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 187 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 48	Average # of Vehicles/Cycle: 4.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: 175 Feet Condition B: N/A Feet Condition C: N/A Feet Required Left Turn Lane Storage Length: 175 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: SR 0230 at NORLANCO Drive - Westbound Right Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Signalized Posted Speed Limit (MPH): 45 Type of Terrain: Level	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	436	5.0%	447
	Right	-	32	2.0%	33
Advancing Volume: 480 Right Turn Volume: 33					

TURN LANE WARRANT FINDINGS

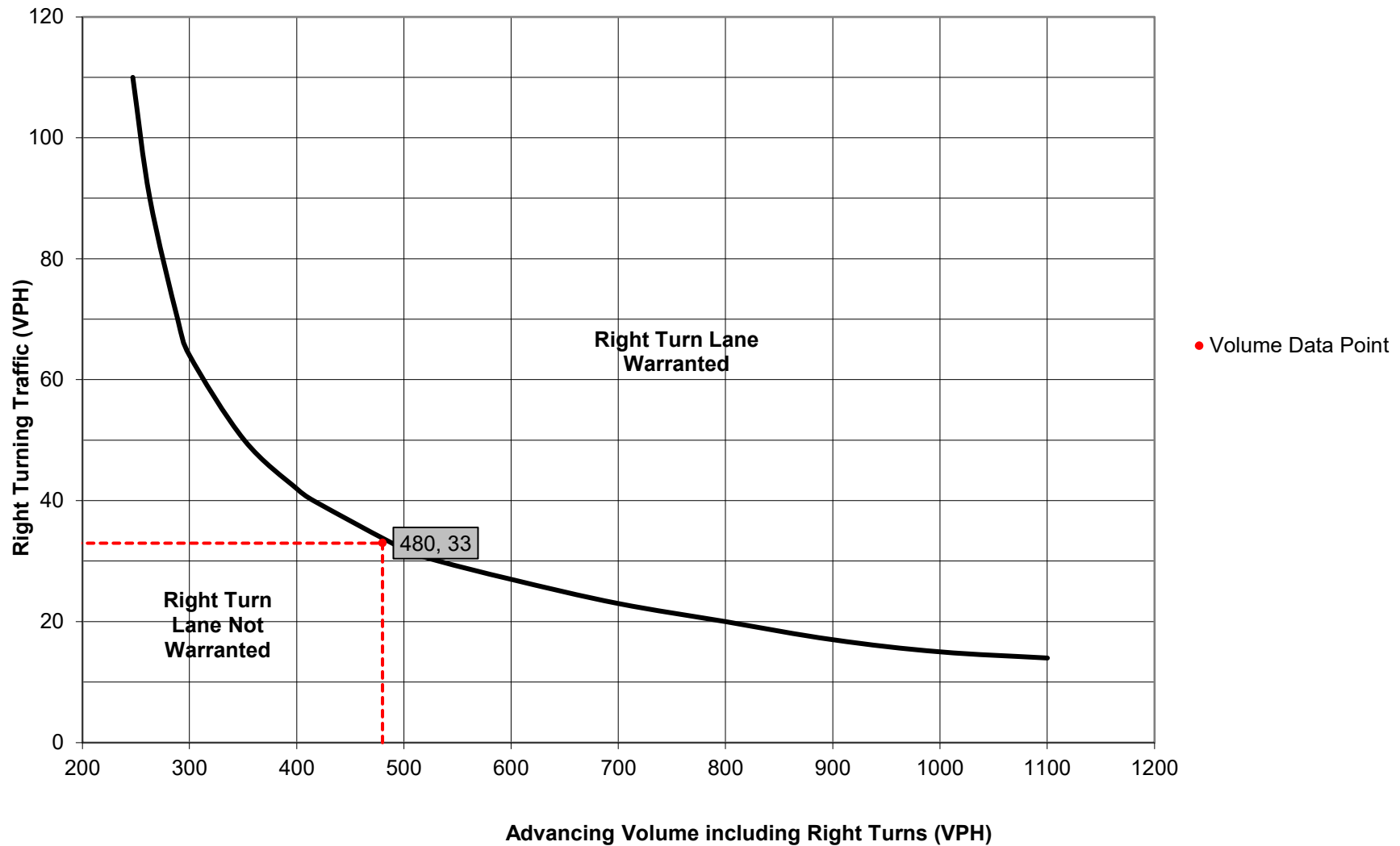
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 10 Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized Design Hour Volume of Turning Lane: 33 Cycles Per Hour (Assumed): Known Cycles Per Hour (If Known): 45	Average # of Vehicles/Cycle: N/A																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: N/A Feet Required Right Turn Lane Storage Length: N/A Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
 County: Lancaster County
 PennDOT Engineering District: 8

Analysis Date: 9/28/2022
 Conducted By: GEC
 Checked By:
 Agency/Company Name: GME

Intersection & Approach Description: SR 0230 at NORLANCO Drive - Westbound Right Turn

Analysis Period: 2033 Build
 Design Hour: PM Peak Hour
 Intersection Control: Signalized
 Posted Speed Limit (MPH): 45
 Type of Terrain: Level

Number of Approach Lanes: 1
 Undivided or Divided Highway: Undivided

Left or Right-Turn Lane Analysis?: Type of Analysis
Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume: N/A
 Opposing Volume: N/A
 Left Turn Volume: N/A

% Left Turns in Advancing Volume: N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	527	3.0%	535
	Right	-	111	2.0%	113

Advancing Volume: 648
 Right Turn Volume: 113

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
 Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 10
 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized
 Design Hour Volume of Turning Lane: 113
 Cycles Per Hour (Assumed): Known
 Cycles Per Hour (If Known): 60

Average # of Vehicles/Cycle: 2.0

PennDOT Publication 46, Exhibit 11-6

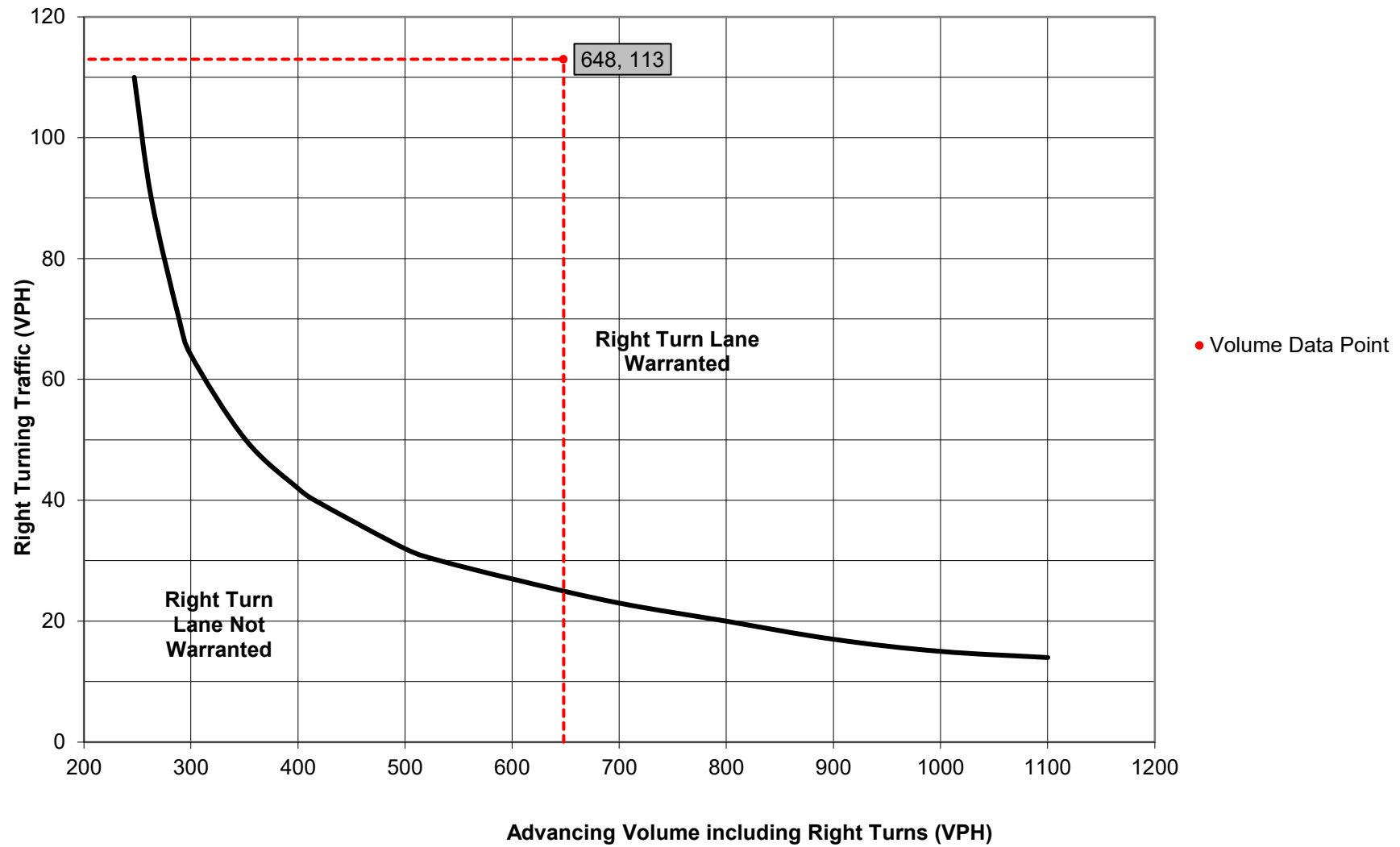
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: N/A Feet
 Condition B: 125 Feet
 Condition C: 175 Feet
 Required Right Turn Lane Storage Length: 175 Feet

Additional Findings:
N/A

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
 County: Lancaster County
 PennDOT Engineering District: 8

Analysis Date: 9/28/2022
 Conducted By: GEC
 Checked By:
 Agency/Company Name: GME

Intersection & Approach Description: SR 0230 at NORLANCO Drive - Westbound Right Turn

Analysis Period: 2033 Build
 Design Hour: SAT Peak Hour
 Intersection Control: Signalized
 Posted Speed Limit (MPH): 45
 Type of Terrain: Level

Number of Approach Lanes: 1
 Undivided or Divided Highway: Undivided

Left or Right-Turn Lane Analysis?: Type of Analysis
Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume: N/A
 Opposing Volume: N/A
 Left Turn Volume: N/A

% Left Turns in Advancing Volume: N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	531	1.0%	534
	Right	-	153	2.0%	155

Advancing Volume: 689
 Right Turn Volume: 155

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
 Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 10
 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Signalized
 Design Hour Volume of Turning Lane: 155
 Cycles Per Hour (Assumed): Known
 Cycles Per Hour (If Known): 48

Average # of Vehicles/Cycle: 3.0

PennDOT Publication 46, Exhibit 11-6

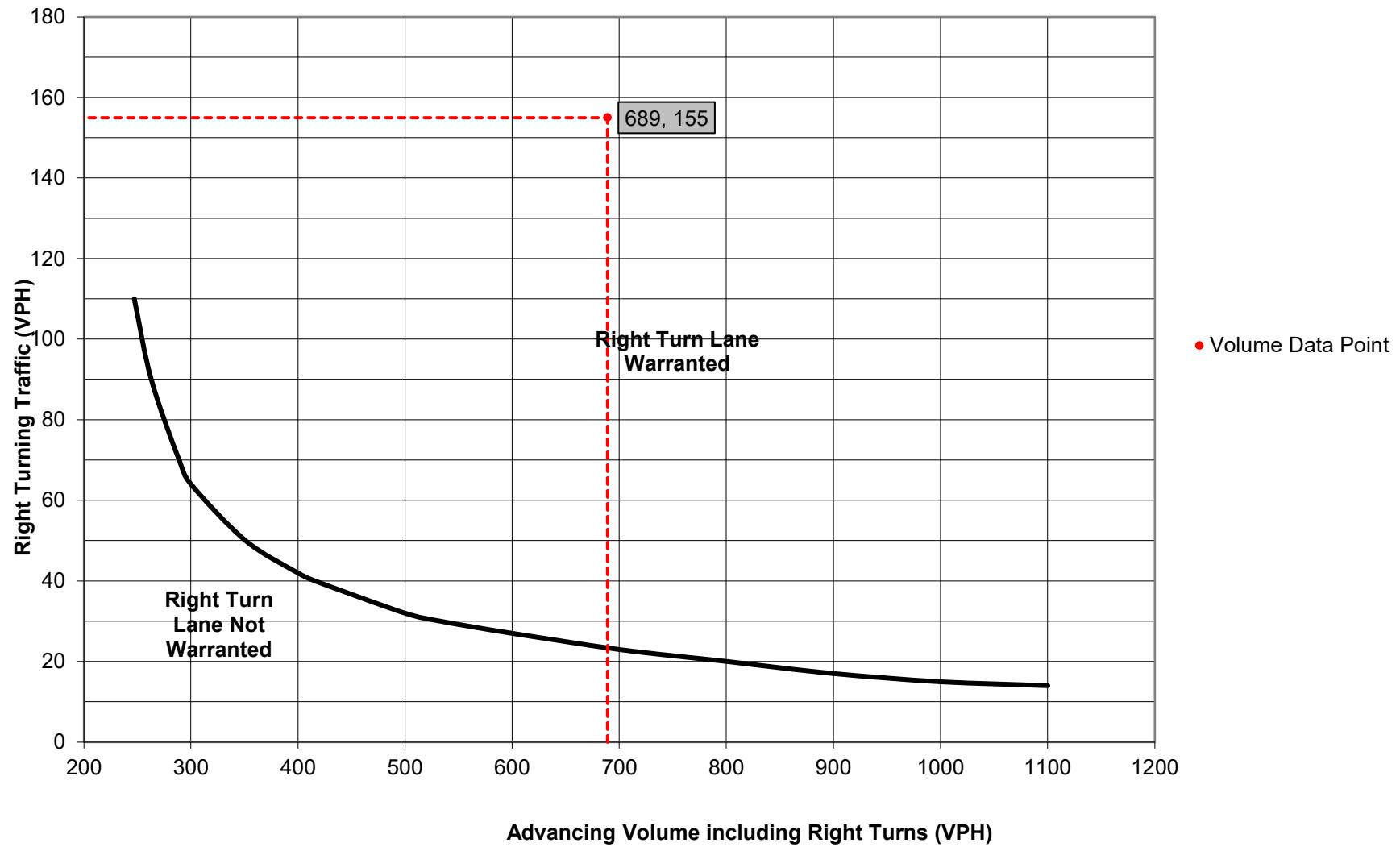
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: N/A Feet
 Condition B: 125 Feet
 Condition C: 225 Feet
 Required Right Turn Lane Storage Length: 225 Feet

Additional Findings:
N/A

Additional Comments / Justifications:

**Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Right-In Only Driveway - Northbound Right Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	864	9.0%	981
	Right	-	65	2.0%	67
Advancing Volume: 1048 Right Turn Volume: 67					

TURN LANE WARRANT FINDINGS

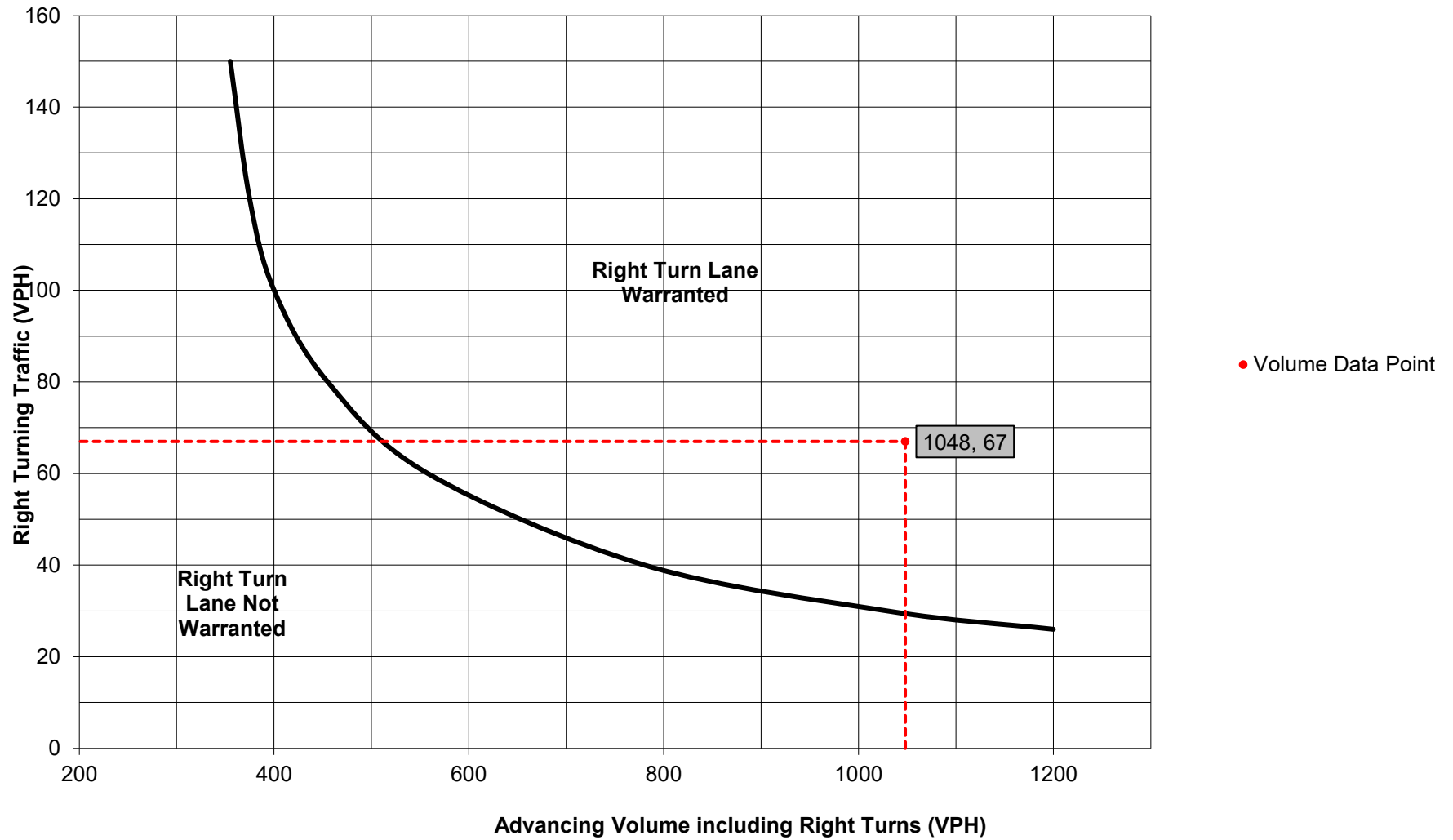
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 67 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 136 Feet Required Right Turn Lane Storage Length: 150 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Right-In Only Driveway - Northbound Right Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A </div> <div> % Left Turns in Advancing Volume: N/A </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	796	4.0%	844
	Right	-	37	2.0%	39
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 883 Right Turn Volume: 39 </div> </div>					

TURN LANE WARRANT FINDINGS

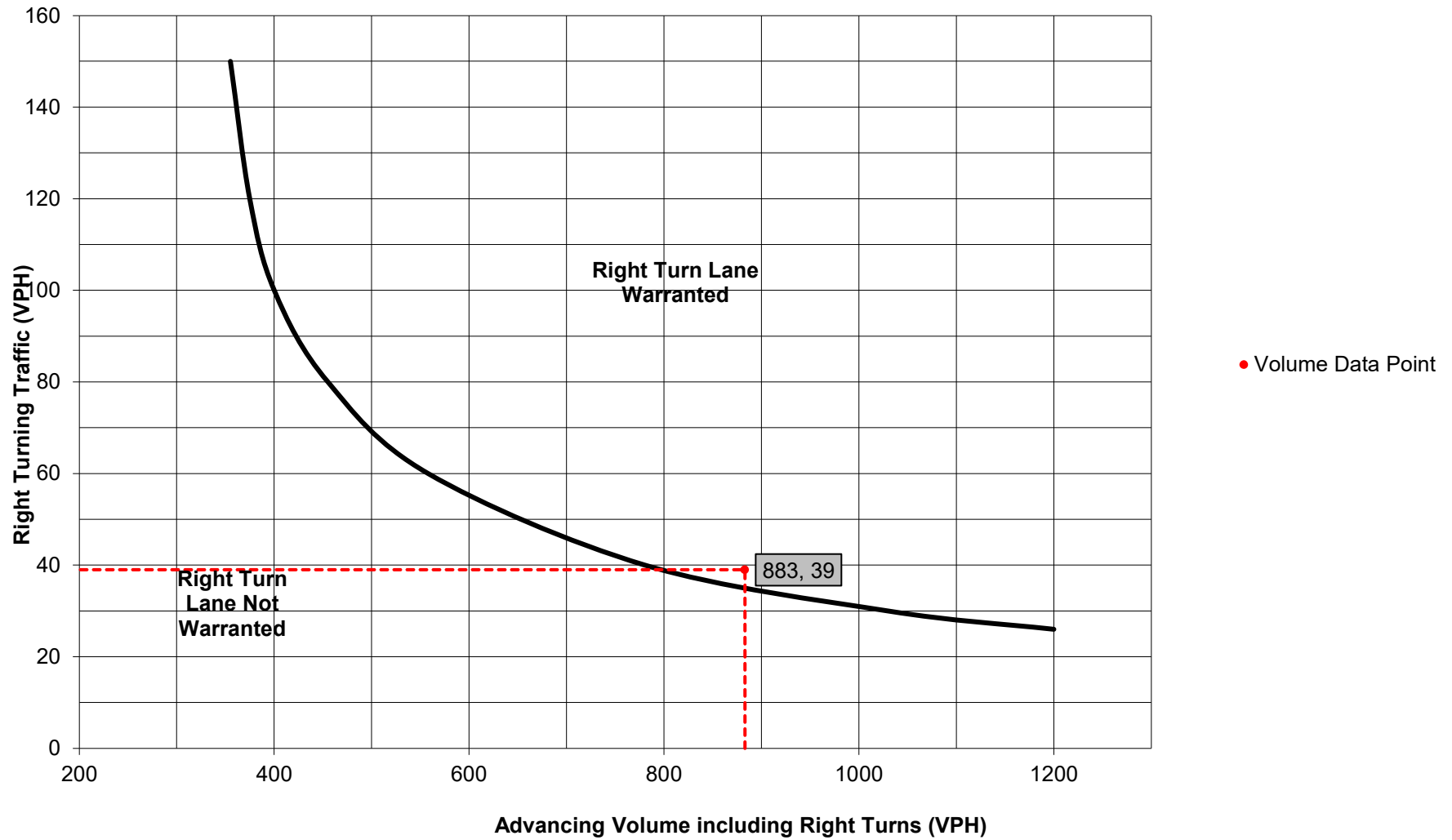
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 39 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 136 Feet Required Right Turn Lane Storage Length: 150 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Right-In Only Driveway - Northbound Right Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A					
% Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	680	2.0%	701
	Right	-	42	2.0%	44
Advancing Volume: 745 Right Turn Volume: 44					

TURN LANE WARRANT FINDINGS

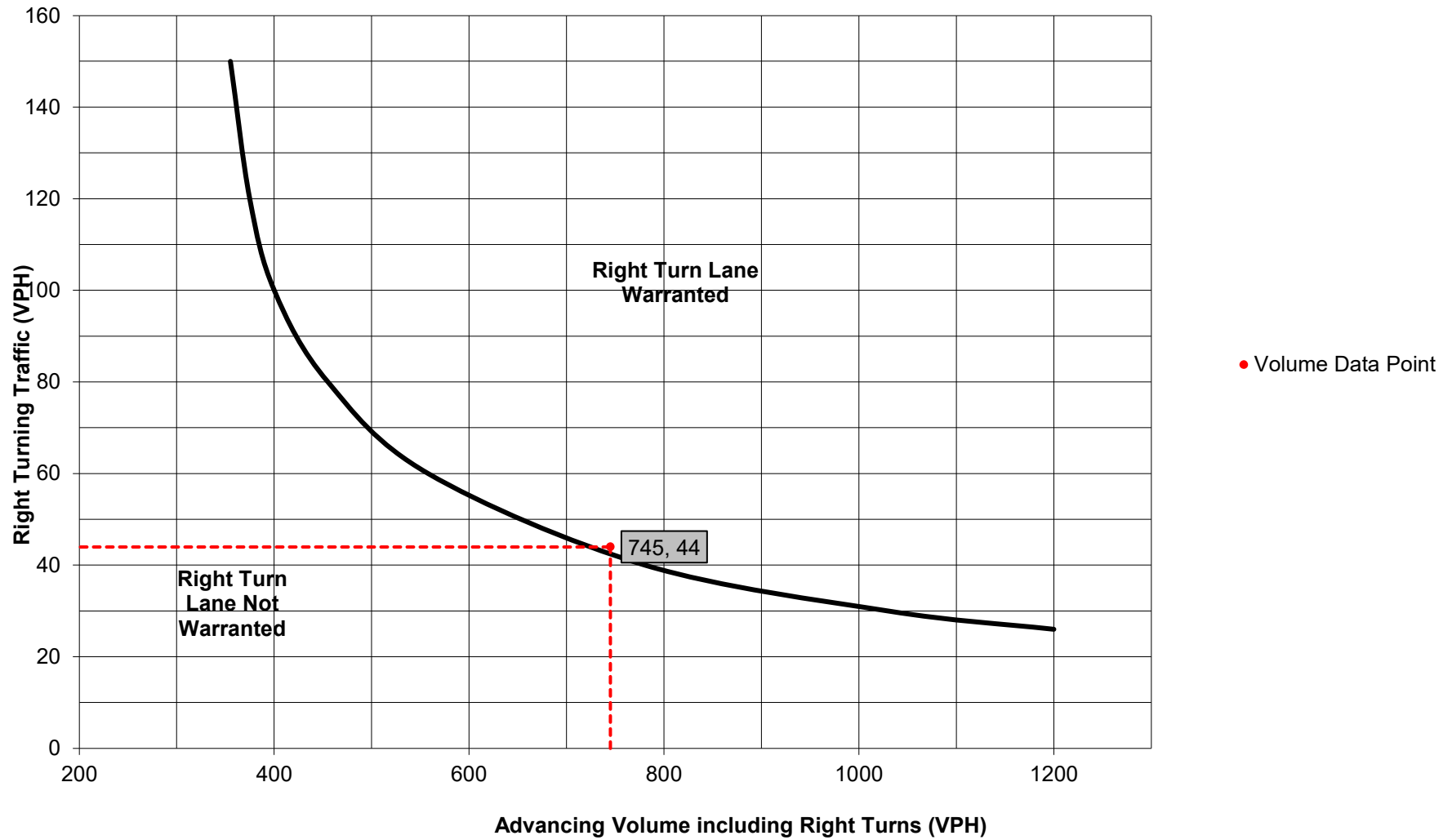
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 44 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 136 Feet Required Right Turn Lane Storage Length: 150 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Northbound Left Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	10	2.0%	11
	Through	-	841	9.0%	955
	Right	Yes	13	2.0%	14
Opposing	Left	Yes	126	2.0%	130
	Through	-	551	10.0%	634
	Right	Yes	41	0.0%	41
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 980 Opposing Volume: 805 Left Turn Volume: 11 </div> <div> % Left Turns in Advancing Volume: 1.12% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

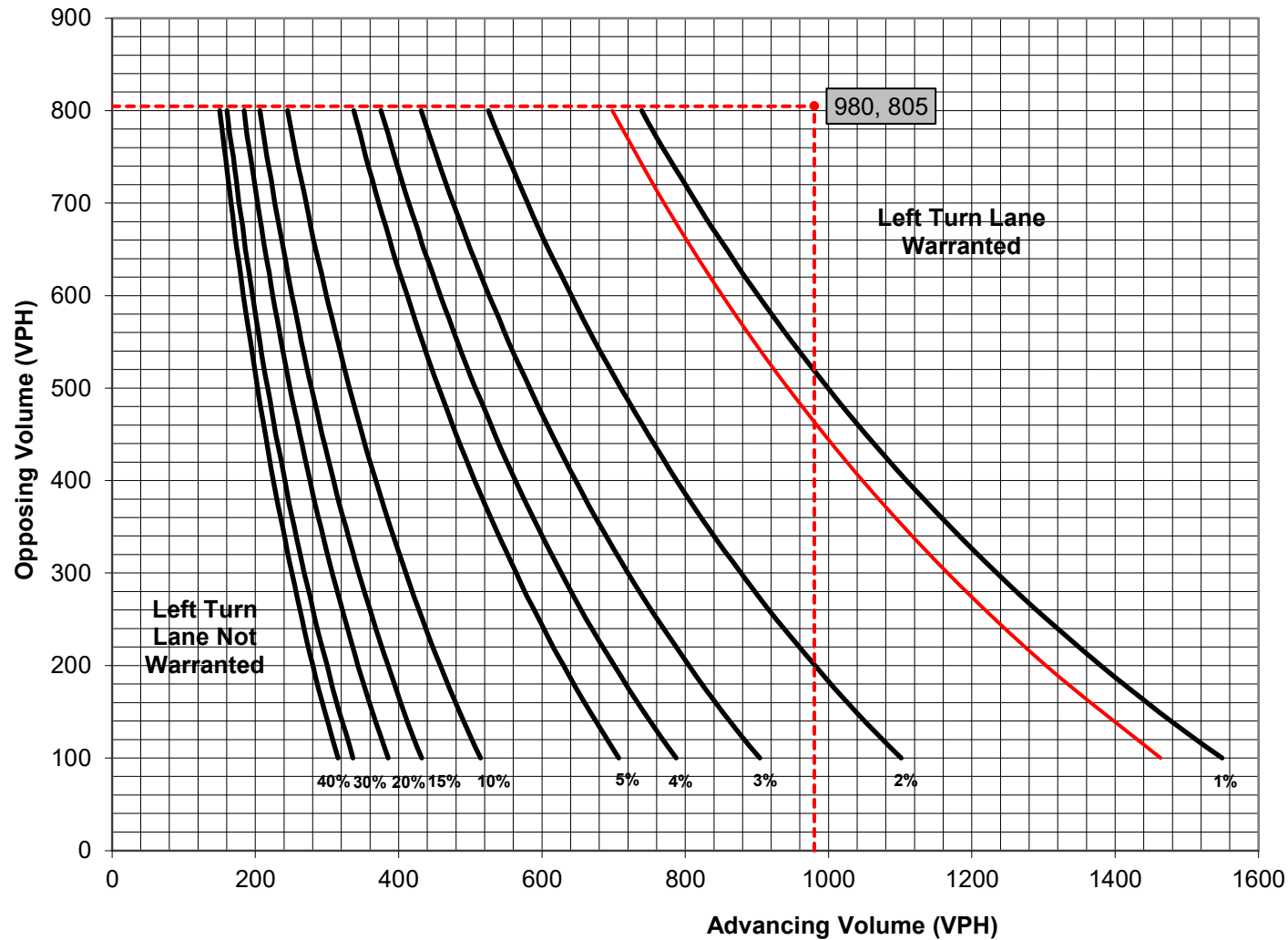
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 2 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 11 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: 75 Feet Condition C: N/A Feet Required Left Turn Lane Storage Length: 75 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Figure 2. Warrant for left turn lanes on two-lane highways
(40 mph speed, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Northbound Left Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	34	2.0%	36	Advancing Volume: 843 Opposing Volume: 1236 Left Turn Volume: 36
	Through	-	688	4.0%	730	
	Right	Yes	74	2.0%	77	
Opposing	Left	Yes	276	2.0%	285	% Left Turns in Advancing Volume: 4.27%
	Through	-	826	3.0%	864	
	Right	Yes	87	0.0%	87	
Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	No	0	0.0%	N/A	Advancing Volume: N/A Right Turn Volume: N/A
	Through	-	0	0.0%	N/A	
	Right	-	0	0.0%	N/A	

TURN LANE WARRANT FINDINGS

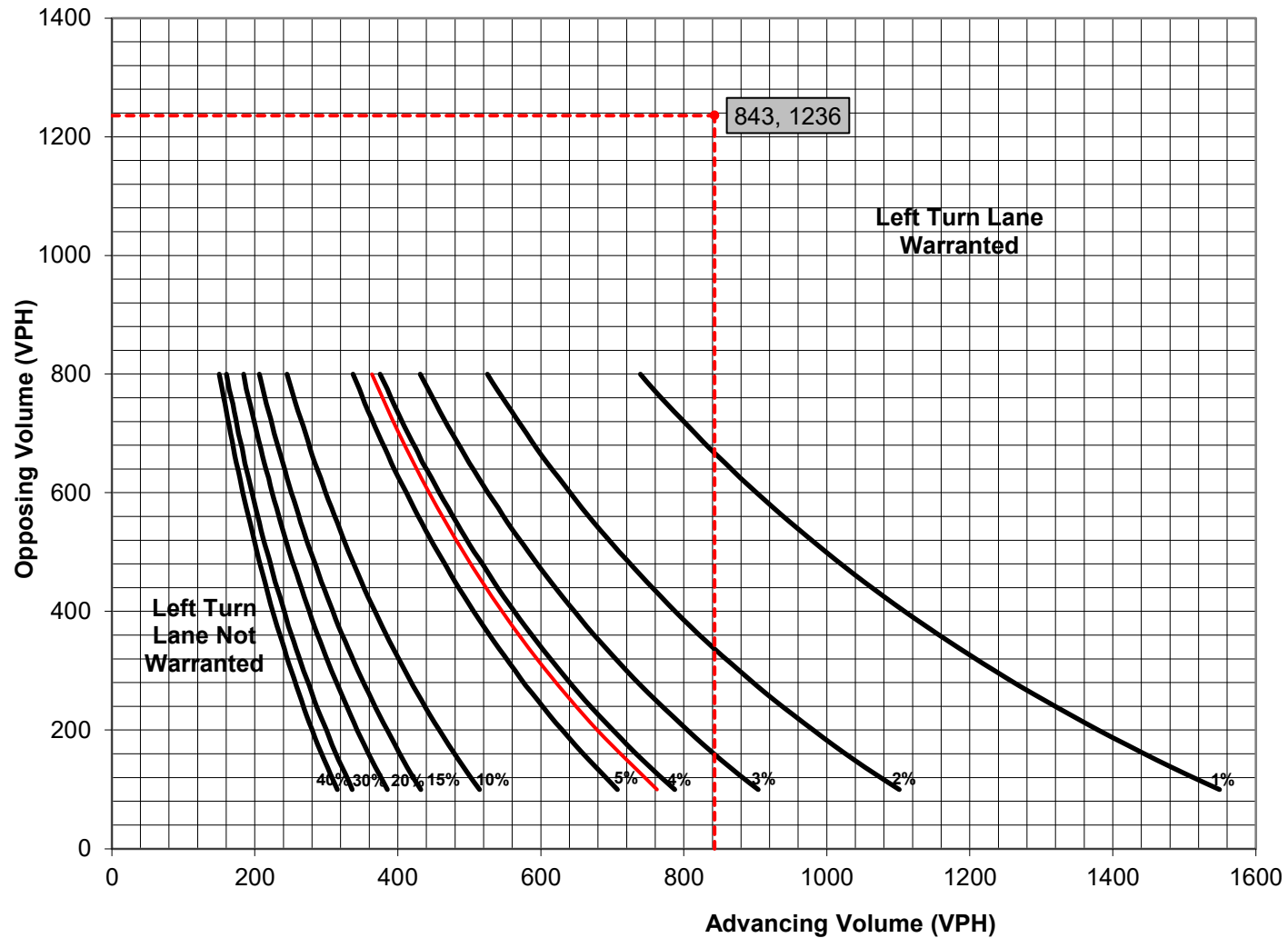
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 2 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 36 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0					
PennDOT Publication 46, Exhibit 11-6						
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B
Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: 75 Feet Condition C: N/A Feet Required Left Turn Lane Storage Length: 75 Feet	Additional Findings: <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>					

Additional Comments / Justifications:

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
County: Lancaster County
PennDOT Engineering District: 8

Analysis Date: 9/28/2022
Conducted By: GEC
Checked By:
Agency/Company Name: GME

Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Northbound Left Turn

Analysis Period: 2033 Build
Design Hour: SAT Peak Hour
Intersection Control: Unsignalized
Posted Speed Limit (MPH): 40
Type of Terrain: Rolling

Number of Approach Lanes: 1
Undivided or Divided Highway: Undivided

Type of Analysis: Left Turn Lane
Left or Right-Turn Lane Analysis?:

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	44	2.0%	46
	Through	-	494	4.0%	524
	Right	Yes	84	2.0%	87
Opposing	Left	Yes	355	2.0%	366
	Through	-	419	3.0%	438
	Right	Yes	113	2.0%	117

Advancing Volume: 657
Opposing Volume: 921
Left Turn Volume: 46

% Left Turns in Advancing Volume: 7.00%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume: N/A
Right Turn Volume: N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 2
Warrant Met?: Yes

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized
Design Hour Volume of Turning Lane: 46
Cycles Per Hour (Assumed): 60
Cycles Per Hour (If Known):

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

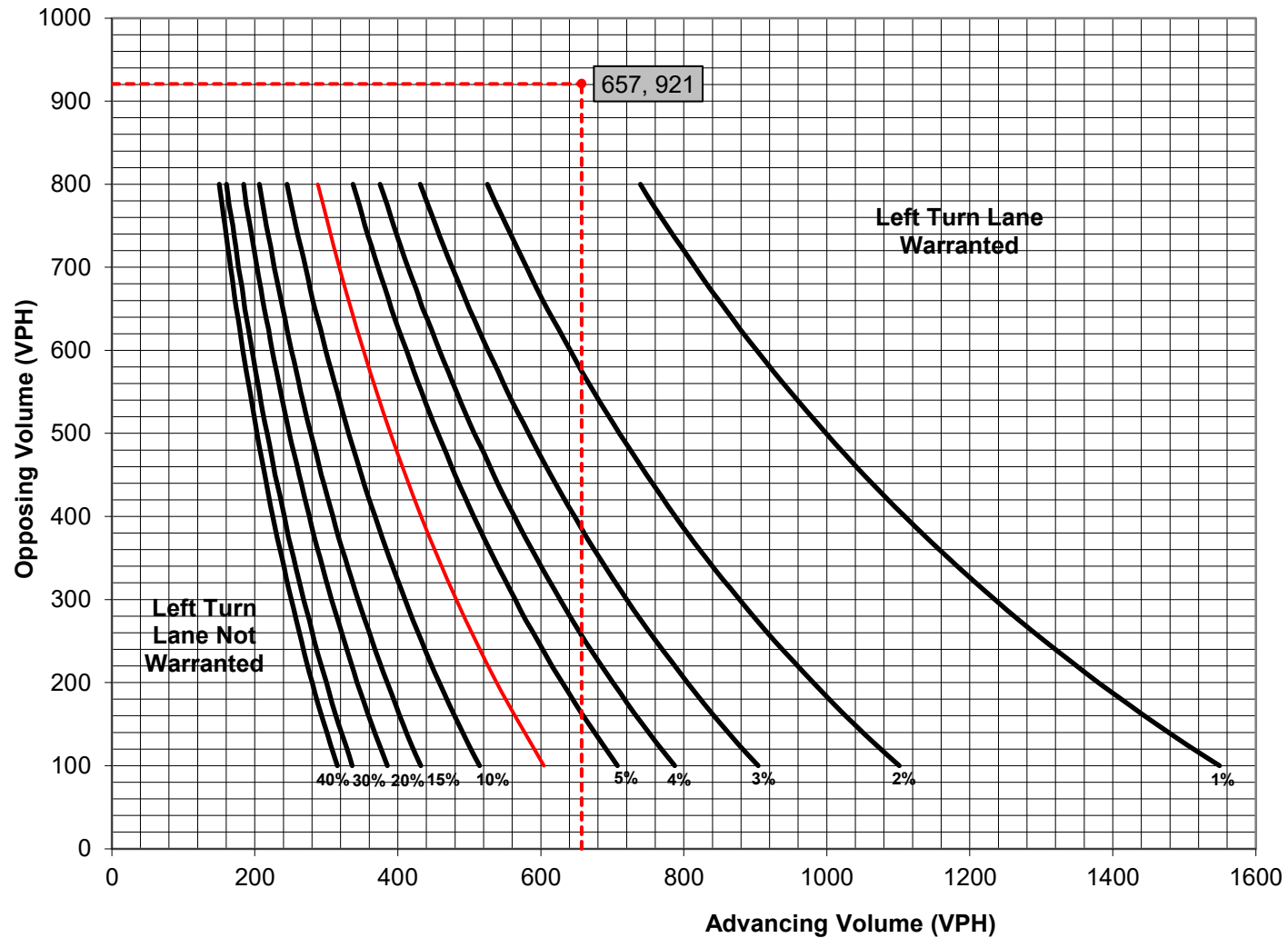
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A: N/A Feet
Condition B: 75 Feet
Condition C: N/A Feet
Required Left Turn Lane Storage Length: 75 Feet

Additional Findings:
N/A

Additional Comments / Justifications:

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Northbound Right Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	841	9.0%	955
	Right	-	13	2.0%	14
Advancing Volume: 969 Right Turn Volume: 14					

TURN LANE WARRANT FINDINGS

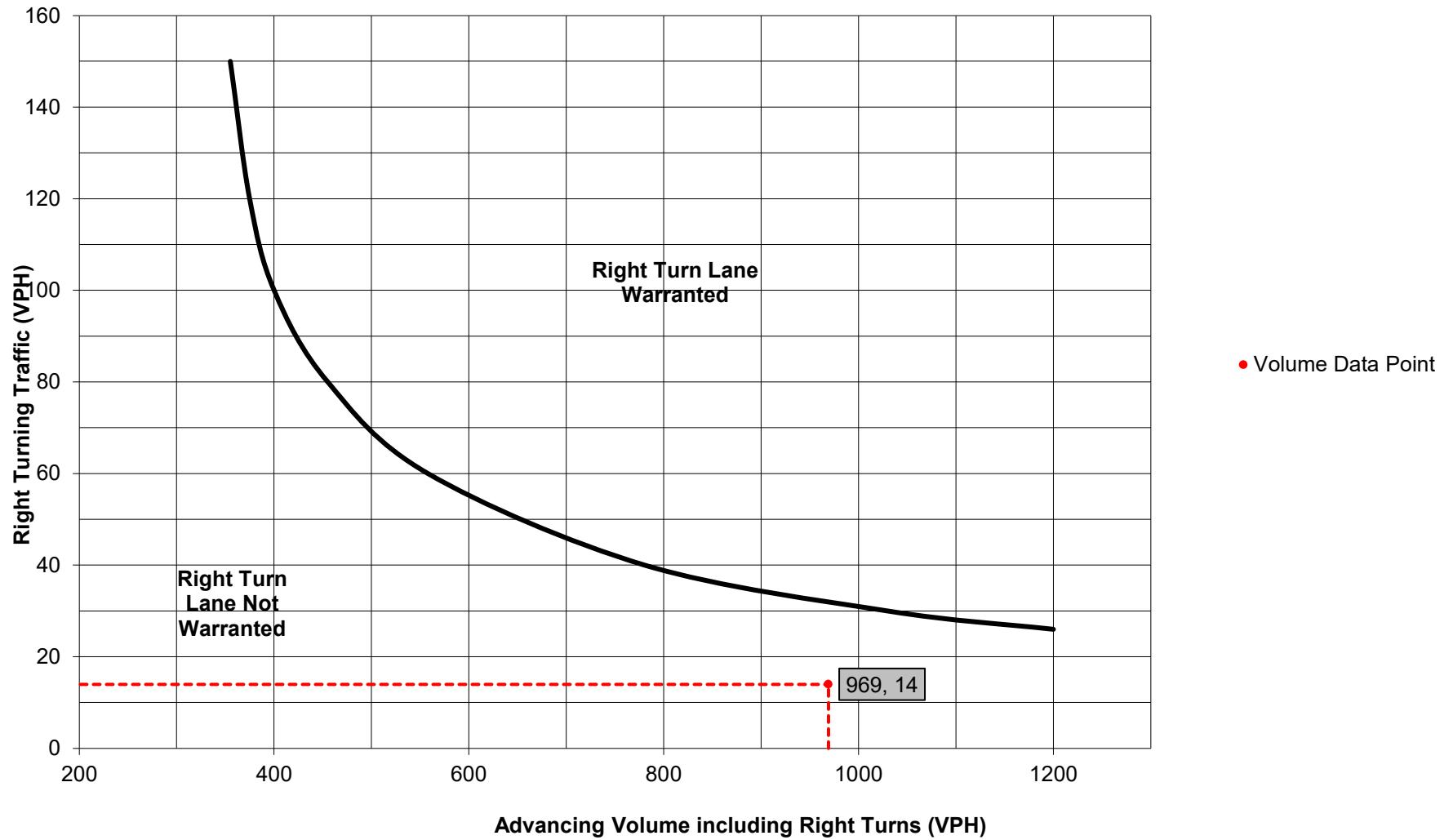
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 14 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: N/A																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: N/A Feet Required Right Turn Lane Storage Length: N/A Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Northbound Right Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	688	4.0%	730
	Right	-	74	2.0%	77
Advancing Volume: 807 Right Turn Volume: 77					

TURN LANE WARRANT FINDINGS

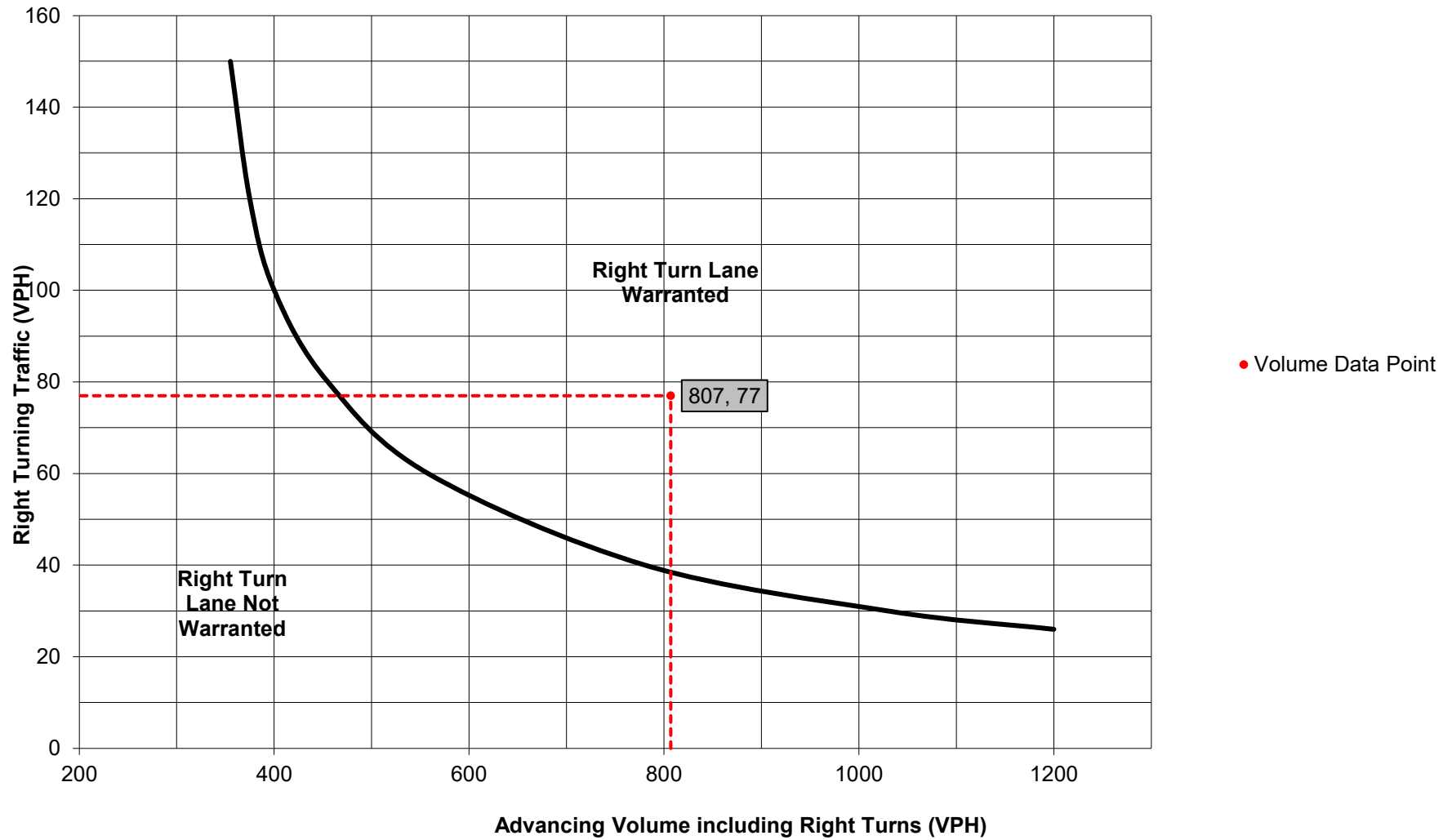
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 77 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 136 Feet Required Right Turn Lane Storage Length: 150 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Northbound Right Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	494	2.0%	509
	Right	-	84	2.0%	87
Advancing Volume: 596 Right Turn Volume: 87					

TURN LANE WARRANT FINDINGS

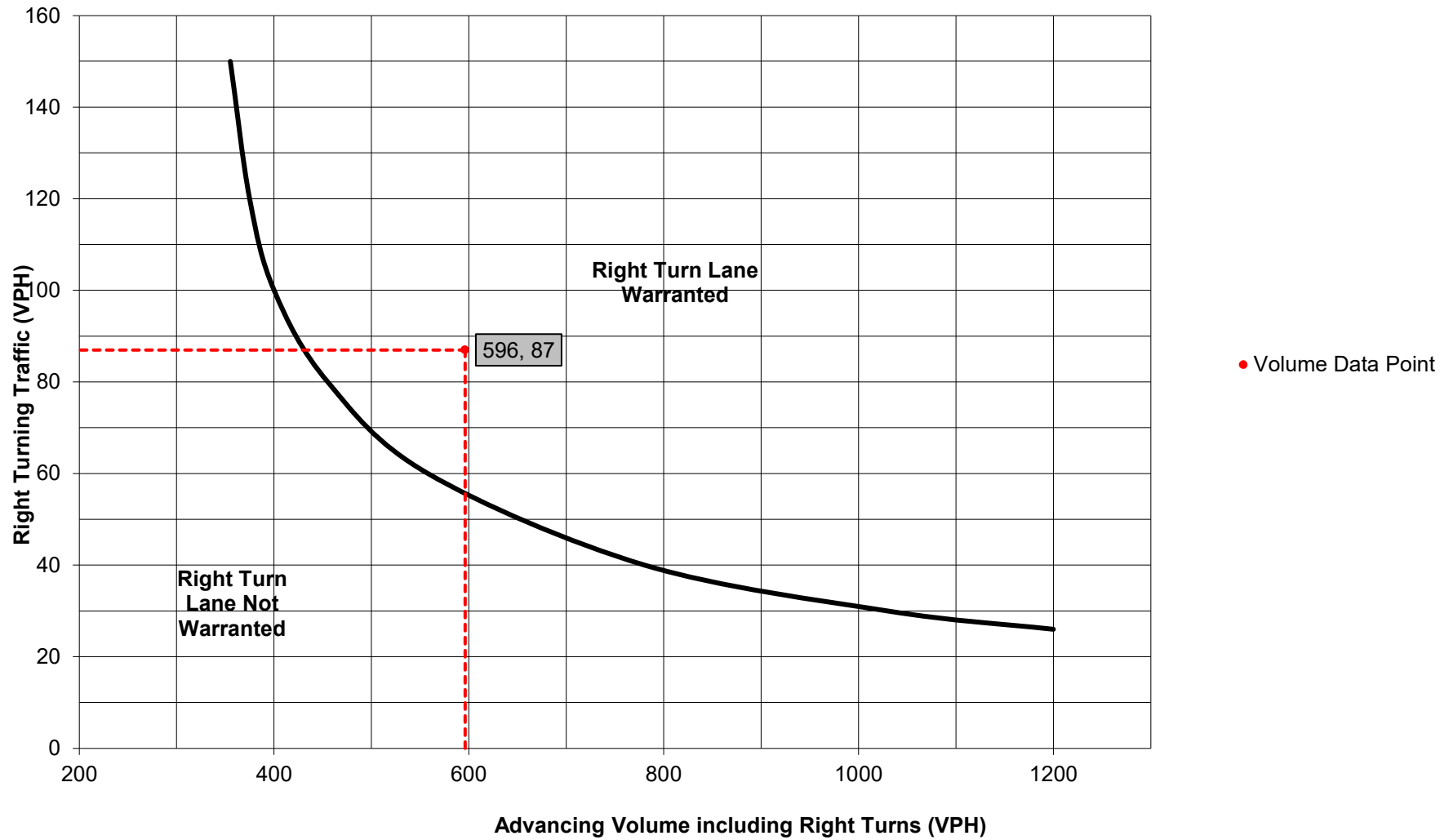
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 87 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 1.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 136 Feet Required Right Turn Lane Storage Length: 150 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Southbound Left Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	126	2.0%	130
	Through	-	551	10.0%	634
	Right	Yes	41	2.0%	43
Opposing	Left	Yes	10	2.0%	11
	Through	-	841	9.0%	955
	Right	Yes	13	0.0%	13
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 807 Opposing Volume: 979 Left Turn Volume: 130 </div> <div> % Left Turns in Advancing Volume: 16.11% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

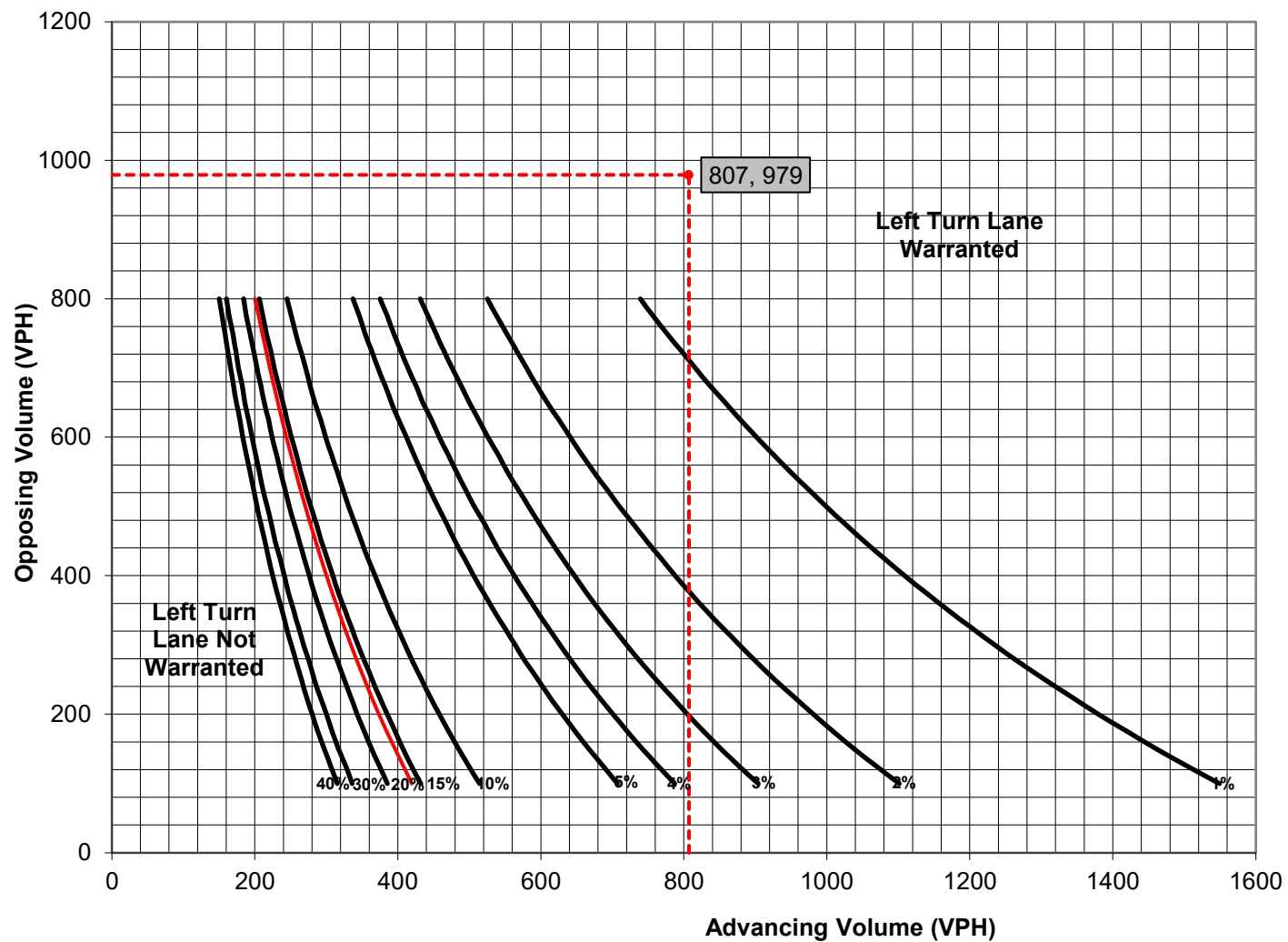
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 2 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 130 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 2.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 161 Feet Required Left Turn Lane Storage Length: 175 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Figure 2. Warrant for left turn lanes on two-lane highways
(40 mph speed, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Southbound Left Turn	
Analysis Period: 2033 Build Design Hour: PM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided Type of Analysis: Type of Analysis Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	276	2.0%	285	Advancing Volume: 1239 Opposing Volume: 843 Left Turn Volume: 285
	Through	-	826	3.0%	864	
	Right	Yes	87	2.0%	90	
Opposing	Left	Yes	34	2.0%	36	% Left Turns in Advancing Volume: 23.00%
	Through	-	688	4.0%	730	
	Right	Yes	74	2.0%	77	
Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	No	0	0.0%	N/A	Advancing Volume: N/A Right Turn Volume: N/A
	Through	-	0	0.0%	N/A	
	Right	-	0	0.0%	N/A	

TURN LANE WARRANT FINDINGS

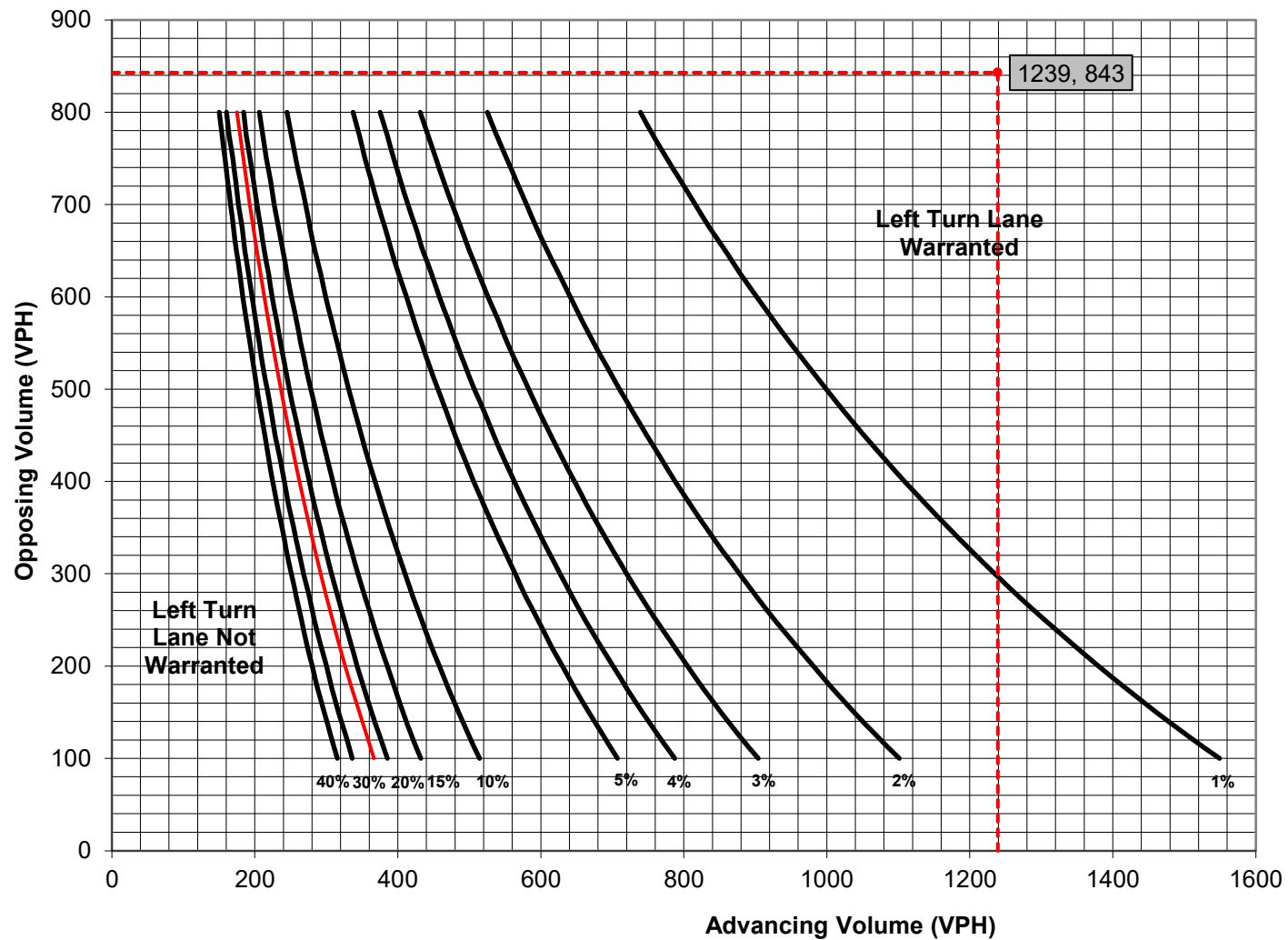
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 2 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 285 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 5.0																																	
PennDOT Publication 46, Exhibit 11-6																																		
<table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="4">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2">40-45</th> <th>50-60</th> </tr> <tr> <th colspan="5">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th></th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> </tr> </table>		Type of Traffic Control	Speed (MPH)				25-35		40-45		50-60	Turn Demand Volume						High	Low	High	Low		Signalized	A	A	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C
Type of Traffic Control	Speed (MPH)																																	
	25-35		40-45		50-60																													
	Turn Demand Volume																																	
	High	Low	High	Low																														
Signalized	A	A	B or C	B or C	B or C																													
Unsignalized	A	A	C	B	B or C																													
Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 261 Feet Required Left Turn Lane Storage Length: 275 Feet	Additional Findings: N/A																																	

Additional Comments / Justifications:

Figure 2. Warrant for left turn lanes on two-lane highways
(40 mph speed, unsignalized and signalized intersections)
 (L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Southbound Left Turn	
Analysis Period: 203e Build Design Hour: SAT Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	355	2.0%	366
	Through	-	419	3.0%	438
	Right	Yes	113	2.0%	117
Opposing	Left	Yes	44	2.0%	46
	Through	-	494	4.0%	524
	Right	Yes	84	2.0%	87
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 921 Opposing Volume: 657 Left Turn Volume: 366 </div> <div> % Left Turns in Advancing Volume: 39.74% </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	-	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Right Turn Volume: N/A </div> </div>					

TURN LANE WARRANT FINDINGS

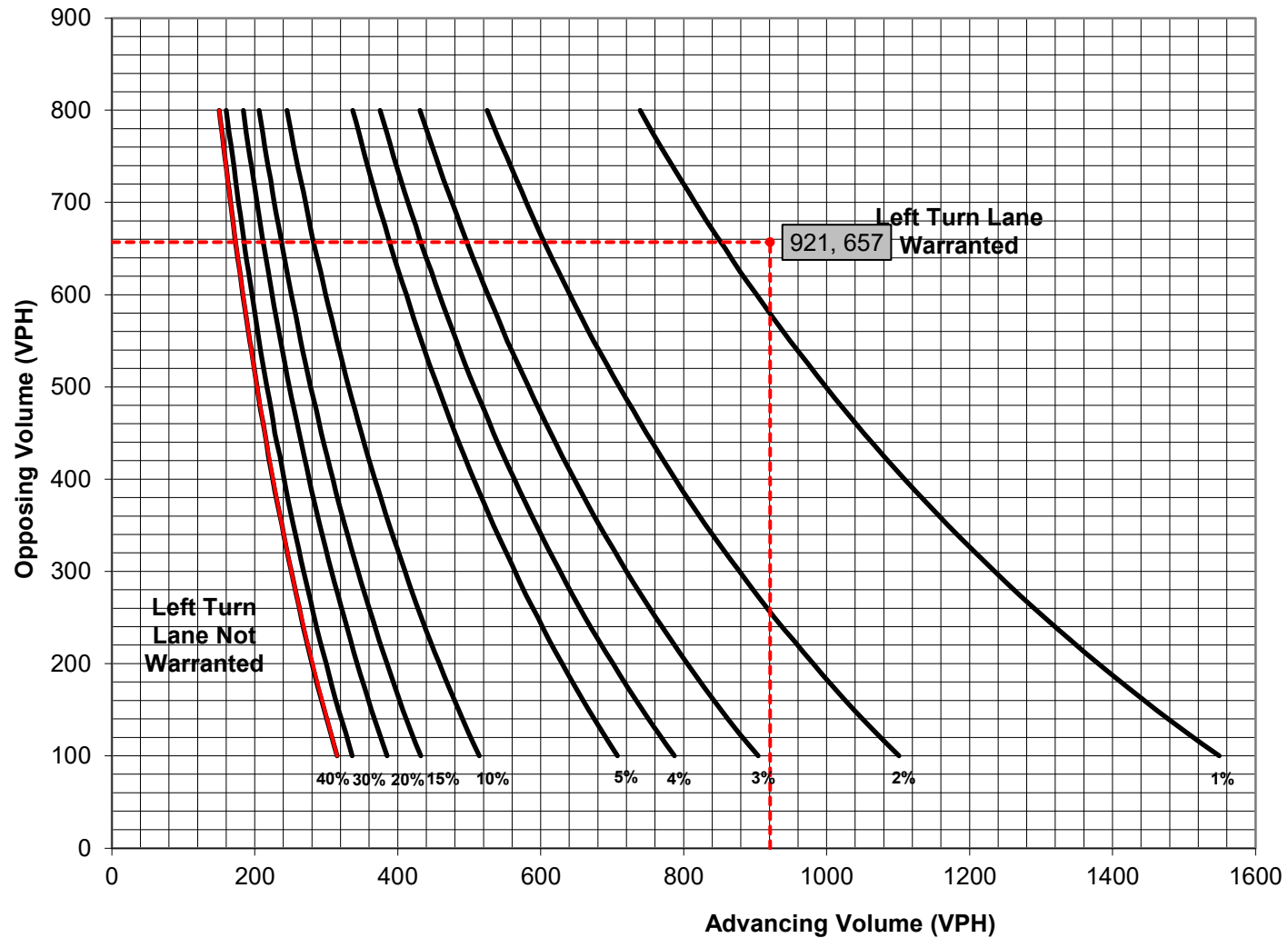
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: Figure 2 Warrant Met?: Yes	Applicable Warrant Figure: N/A Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 366 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 6.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Left Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 311 Feet Required Left Turn Lane Storage Length: 325 Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

Figure 2. Warrant for left turn lanes on two-lane highways
(40 mph speed, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Southbound Right Turn	
Analysis Period: 2033 Build Design Hour: AM Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A </div> <div> % Left Turns in Advancing Volume: N/A </div> </div>					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	551	10.0%	634
	Right	-	41	2.0%	43
<div style="display: flex; justify-content: space-between;"> <div> Advancing Volume: 677 Right Turn Volume: 43 </div> </div>					

TURN LANE WARRANT FINDINGS

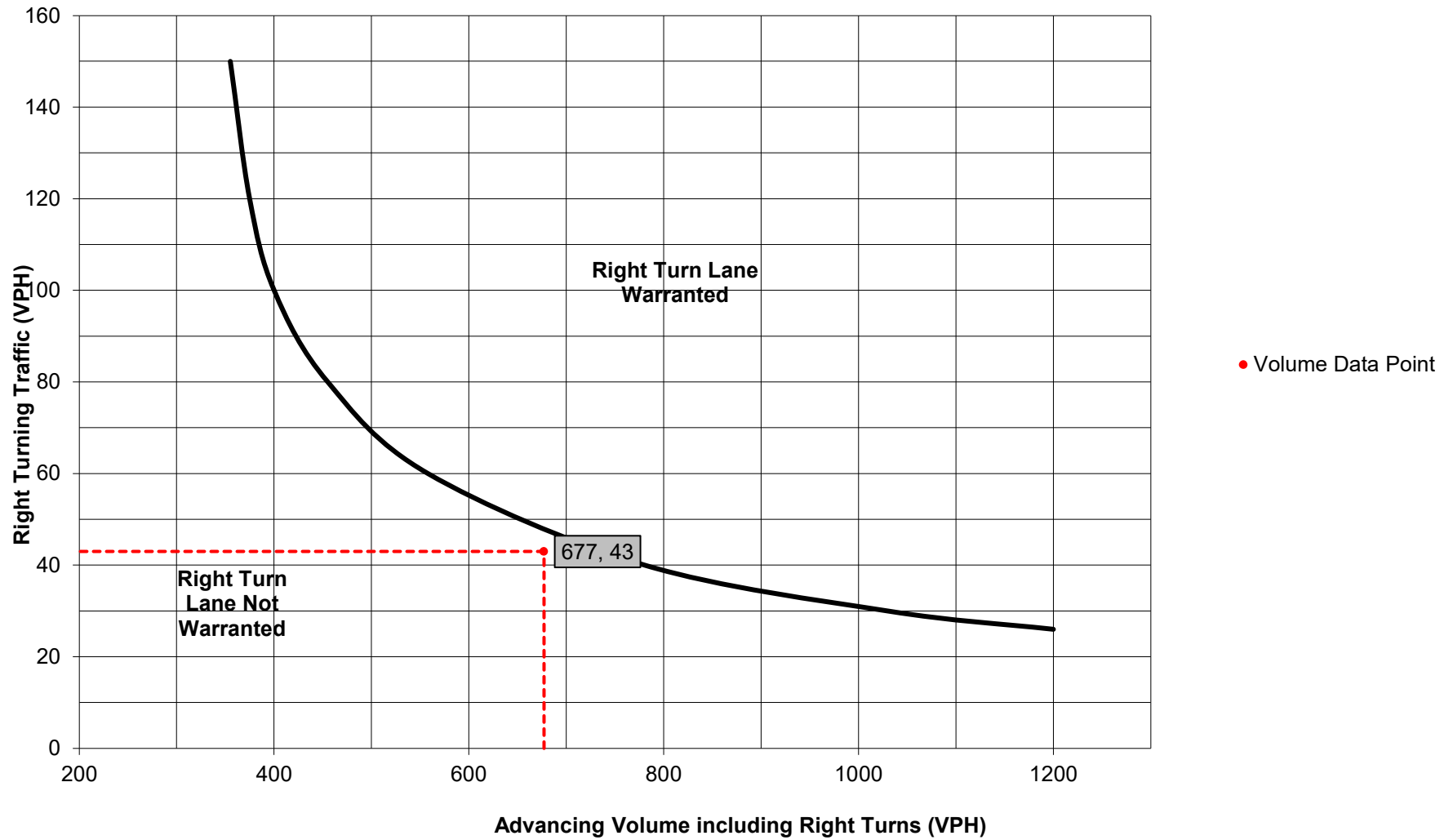
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 43 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: N/A																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
<div style="display: flex; justify-content: space-between;"> <div> Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: N/A Feet Required Right Turn Lane Storage Length: N/A Feet </div> <div> Additional Findings: N/A </div> </div>																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp.
County: Lancaster County
PennDOT Engineering District: 8

Analysis Date: 9/28/2022
Conducted By: GEC
Checked By:
Agency/Company Name: GME

Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Southbound Right Turn

Analysis Period: 2033 Build
Design Hour: PM Peak Hour
Intersection Control: Unsignalized
Posted Speed Limit (MPH): 40
Type of Terrain: Rolling

Number of Approach Lanes: 1
Undivided or Divided Highway: Undivided

Type of Analysis: Right Turn Lane
Left or Right-Turn Lane Analysis?:

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume: N/A
Opposing Volume: N/A
Left Turn Volume: N/A

% Left Turns in Advancing Volume: N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	826	3.0%	864
	Right	-	87	2.0%	90

Advancing Volume: 954
Right Turn Volume: 90

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A
Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9
Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized
Design Hour Volume of Turning Lane: 90
Cycles Per Hour (Assumed): 60
Cycles Per Hour (If Known):

Average # of Vehicles/Cycle: 2.0

PennDOT Publication 46, Exhibit 11-6

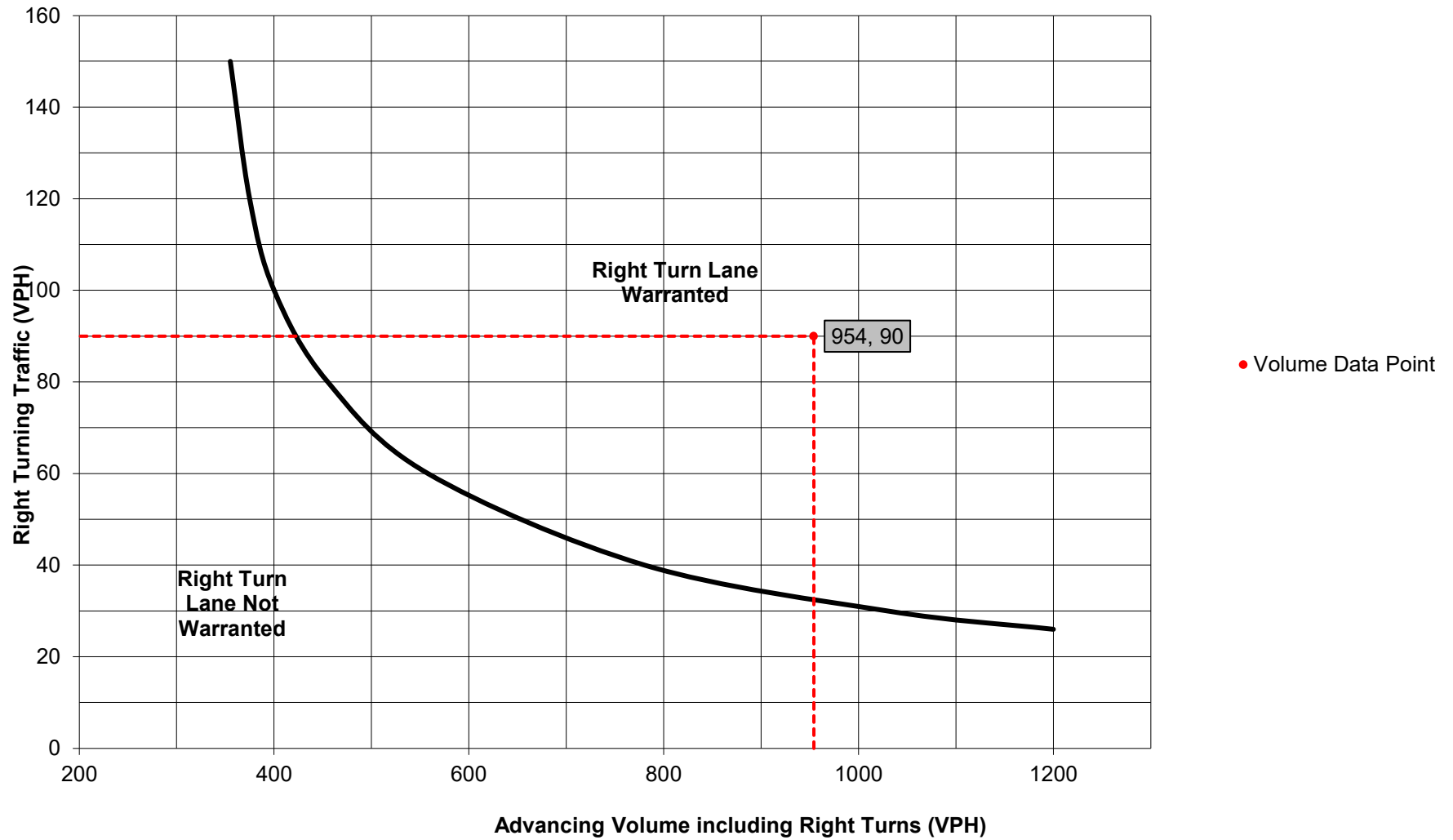
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: N/A Feet
Condition B: N/A Feet
Condition C: 161 Feet
Required Right Turn Lane Storage Length: 175 Feet

Additional Findings: N/A

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Mt. Joy Twp. County: Lancaster County PennDOT Engineering District: 8	Analysis Date: 9/28/2022 Conducted By: GEC Checked By: Agency/Company Name: GME
Intersection & Approach Description: Cloverleaf Road at Eastern Parcels Access - Southbound Right Turn	
Analysis Period: 2033 Build Design Hour: SAT Peak Hour Intersection Control: Unsignalized Posted Speed Limit (MPH): 40 Type of Terrain: Rolling	Number of Approach Lanes: 1 Undivided or Divided Highway: Undivided <div style="border: 1px solid black; padding: 2px; display: inline-block; color: red; font-weight: bold;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A % Left Turns in Advancing Volume: N/A					
Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	419	3.0%	438
	Right	-	113	2.0%	117
Advancing Volume: 555 Right Turn Volume: 117					

TURN LANE WARRANT FINDINGS

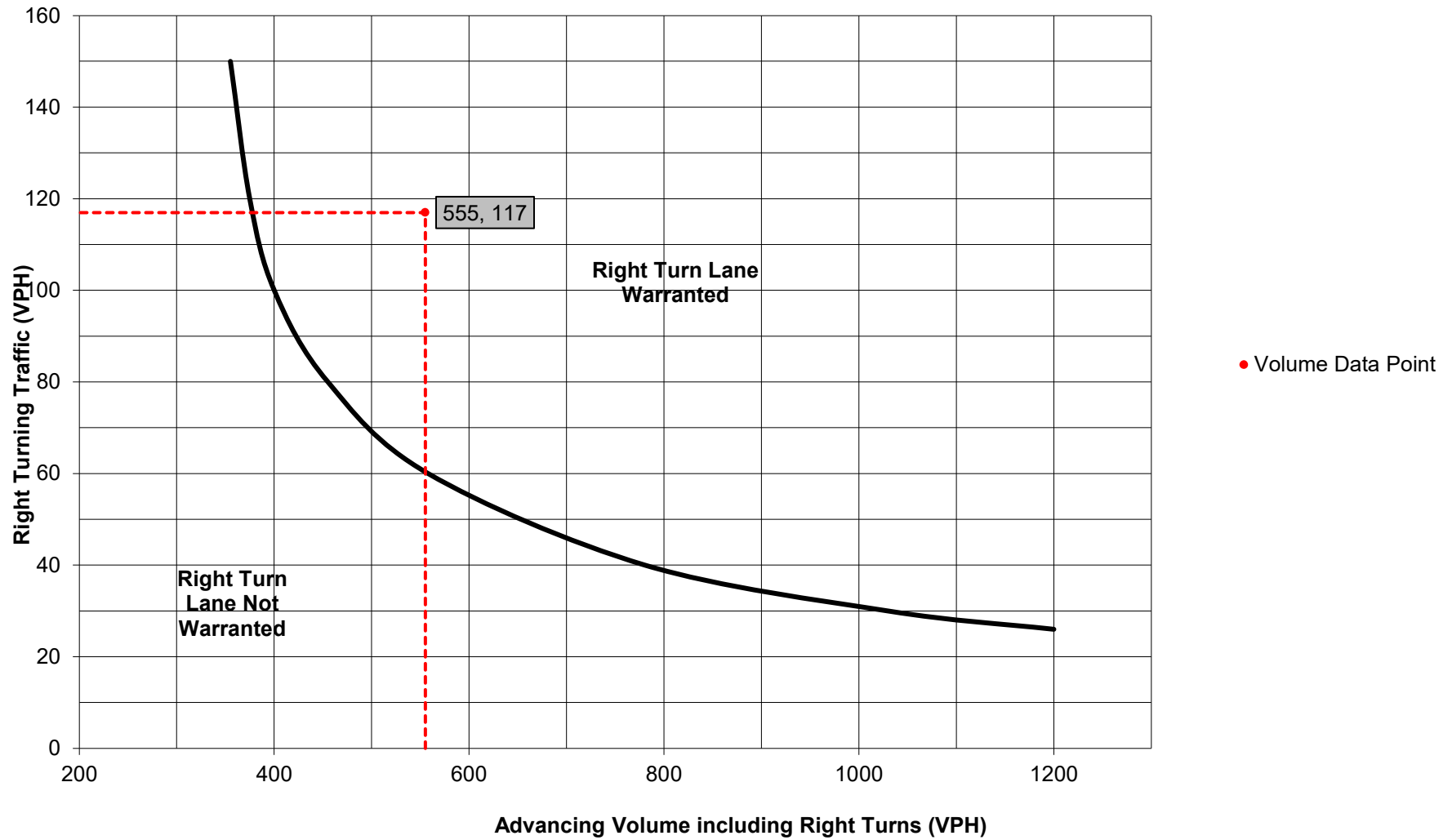
Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A Warrant Met?: N/A	Applicable Warrant Figure: Figure 9 Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 117 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 	Average # of Vehicles/Cycle: 2.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2" rowspan="2">40-45</th> <th colspan="2" rowspan="2">50-60</th> </tr> <tr> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
	25-35		40-45		50-60																																				
	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: N/A Feet Condition B: N/A Feet Condition C: 161 Feet Required Right Turn Lane Storage Length: 175 Feet																																									
Additional Findings: N/A																																									

Additional Comments / Justifications:

**Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)**



APPENDIX N

SIGHT DISTANCE ANALYSIS WORKSHEETS

DRIVEWAY SIGHT DISTANCE MEASUREMENTS

(FOR LOCAL ROADS, USE PENNDOT PUB 70)

APPLICANT Pennmark APPLICATION NO. _____

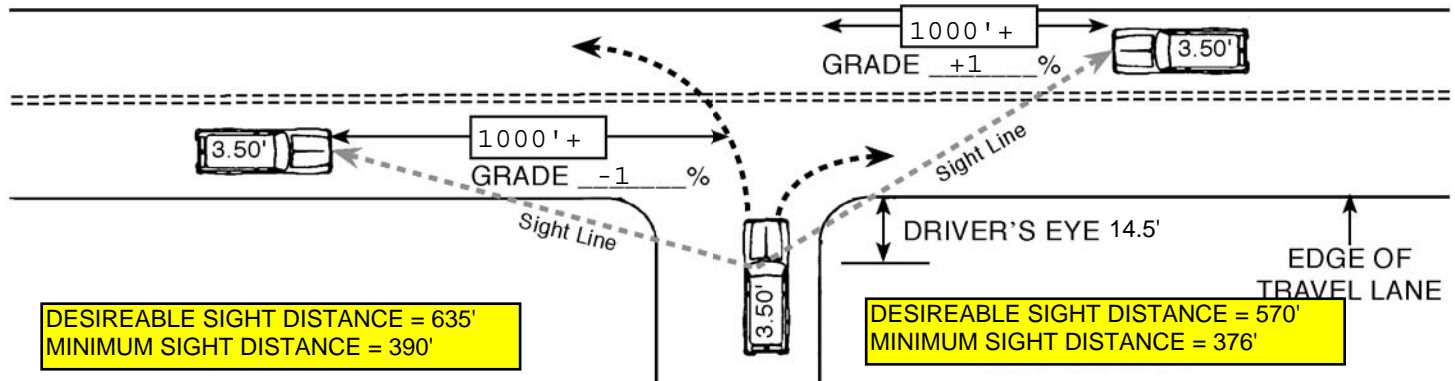
S.R. 0230 SEG. 0150 OFFSET 1308 LEGAL SPEED LIMIT 45 MPH

MEASURED BY Grove Miller Engineering, Inc. DATE 03/22/2022

FOR DEPARTMENT USE ONLY: Safe-Running Speed _____ 85th Percentile Speed _____

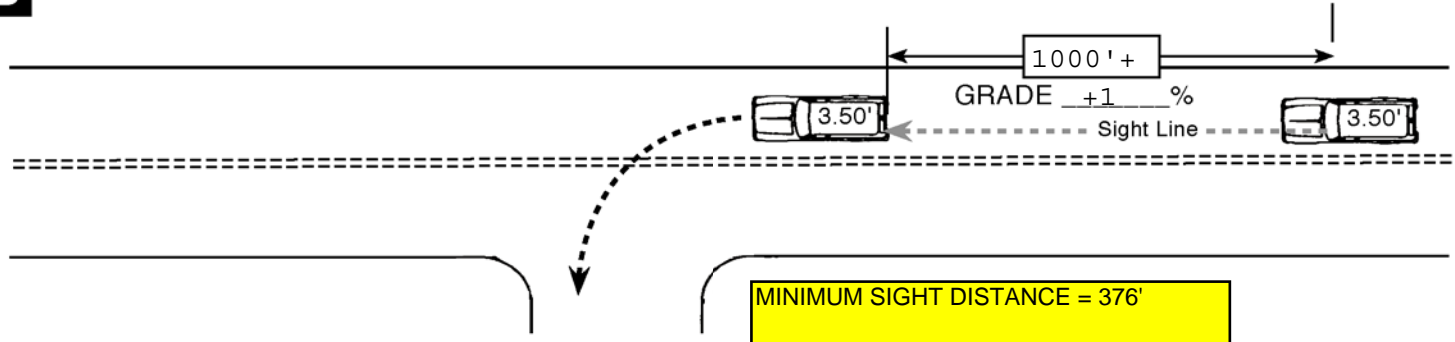
SR 0230 & NORLANCO DRIVE EXTENSION

A



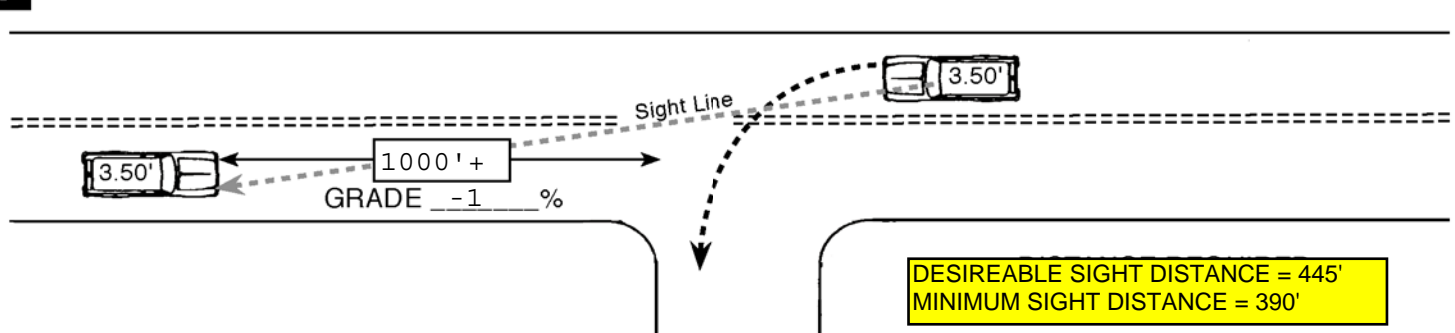
THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER AT A DRIVEWAY LOCATION CAN CONTINUOUSLY SEE ANOTHER VEHICLE APPROACHING ON THE ROADWAY.

B



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER ON THE ROADWAY CAN CONTINUOUSLY SEE THE REAR OF A VEHICLE WHICH IS LOCATED IN THE DRIVER'S TRAVEL LANE AND WHICH IS POSITIONED TO MAKE A LEFT TURN INTO A DRIVEWAY.

C



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER OF A VEHICLE INTENDING TO MAKE A LEFT TURN INTO A DRIVEWAY CAN CONTINUOUSLY SEE A VEHICLE APPROACHING FROM THE OPPOSITE DIRECTION.



Norlanco Drive Extended Access onto SR 0230 looking left



Norlanco Drive Extended Access onto SR 0230 looking right



Norlanco Drive Extended Access onto SR 0230 looking across SR 0230



Looking at Norlanco Drive Extended Access onto SR 0230 from opposite



Turning left into Norlanco Drive Extended Access onto SR 230 – looking ahead



Turning left into Norlanco Drive Extended Access onto SR 230 – looking back

DRIVEWAY SIGHT DISTANCE MEASUREMENTS

(FOR LOCAL ROADS, USE PENNDOT PUB 70)

APPLICANT Pennmark APPLICATION NO. _____

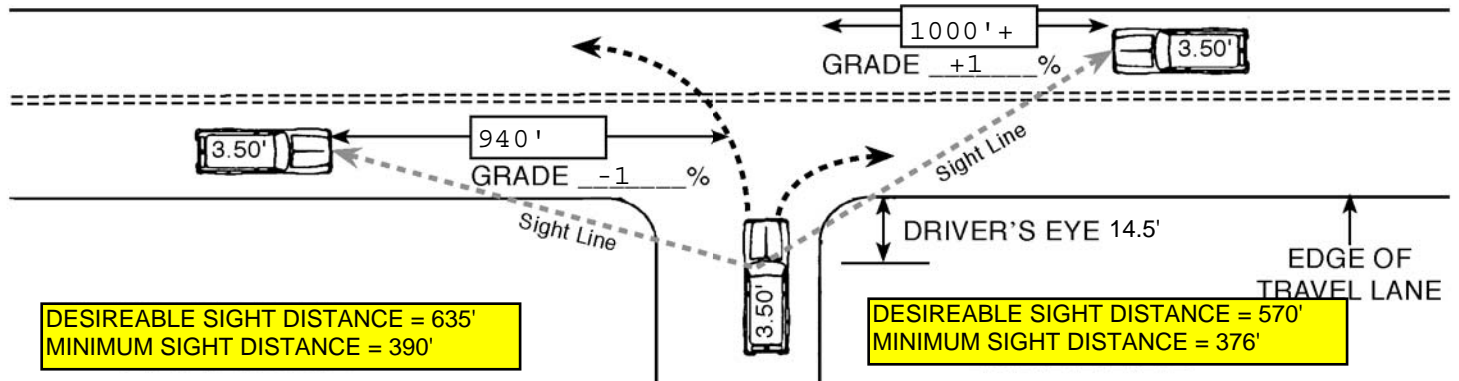
S.R. 0230 SEG. 0140 OFFSET 1280 LEGAL SPEED LIMIT 45 MPH

MEASURED BY Grove Miller Engineering, Inc. DATE 03/22/2022

FOR DEPARTMENT USE ONLY: Safe-Running Speed _____ 85th Percentile Speed _____

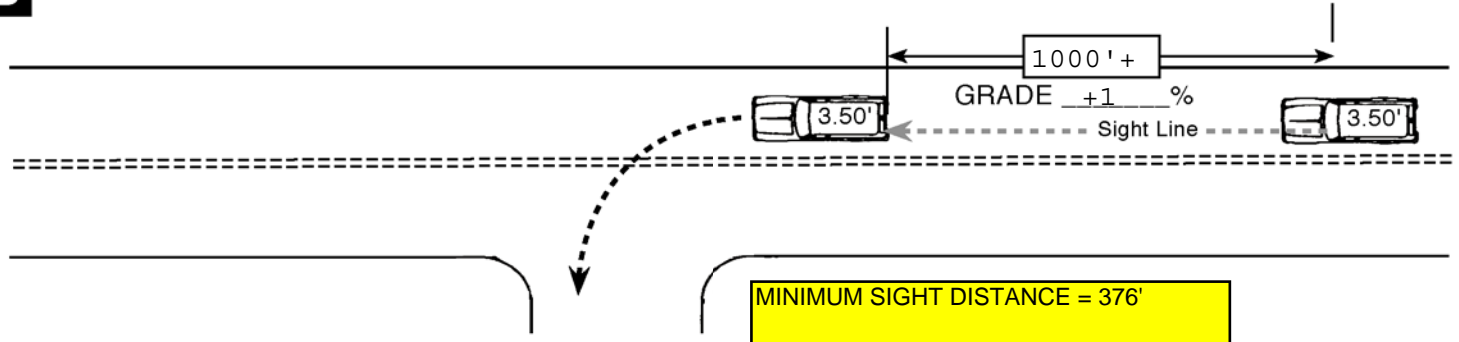
SR 0230 & WEST PARCELS ACCESS

A



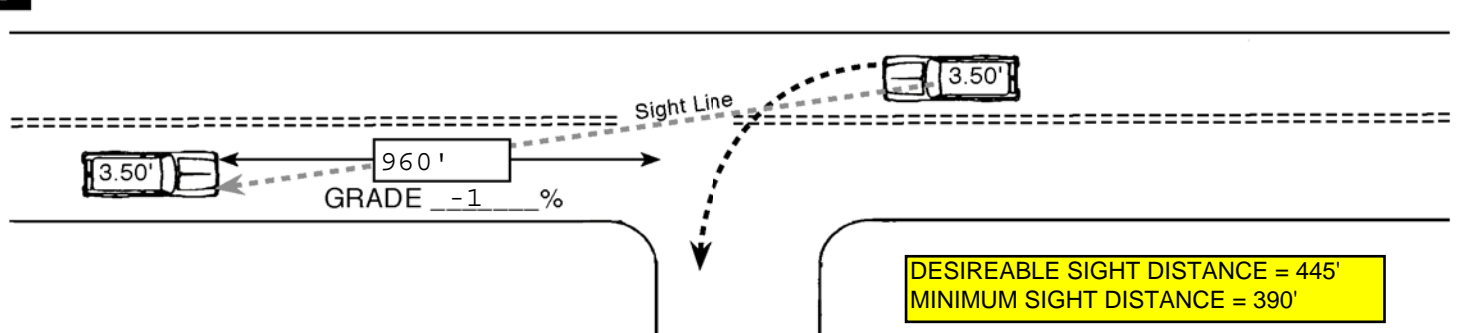
THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER AT A DRIVEWAY LOCATION CAN CONTINUOUSLY SEE ANOTHER VEHICLE APPROACHING ON THE ROADWAY.

B



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER ON THE ROADWAY CAN CONTINUOUSLY SEE THE REAR OF A VEHICLE WHICH IS LOCATED IN THE DRIVER'S TRAVEL LANE AND WHICH IS POSITIONED TO MAKE A LEFT TURN INTO A DRIVEWAY.

C



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER OF A VEHICLE INTENDING TO MAKE A LEFT TURN INTO A DRIVEWAY CAN CONTINUOUSLY SEE A VEHICLE APPROACHING FROM THE OPPOSITE DIRECTION.



Western Parcels Access onto SR 0230 looking left



Western Parcels Access onto SR 0230 looking right



Western Parcels Access onto SR 0230 looking across SR 0230



Looking at Western Parcels Access onto SR 0230 from opposite



Turning left into Western Parcels Access onto SR 230 – looking ahead



Turning left into Western Parcels Access onto SR 230 – looking back

DRIVEWAY SIGHT DISTANCE MEASUREMENTS

(FOR LOCAL ROADS, USE PENNDOT PUB 70)

APPLICANT Pennmark APPLICATION NO. _____

S.R. 0010 SEG. 0140 OFFSET 0690 LEGAL SPEED LIMIT 40 MPH

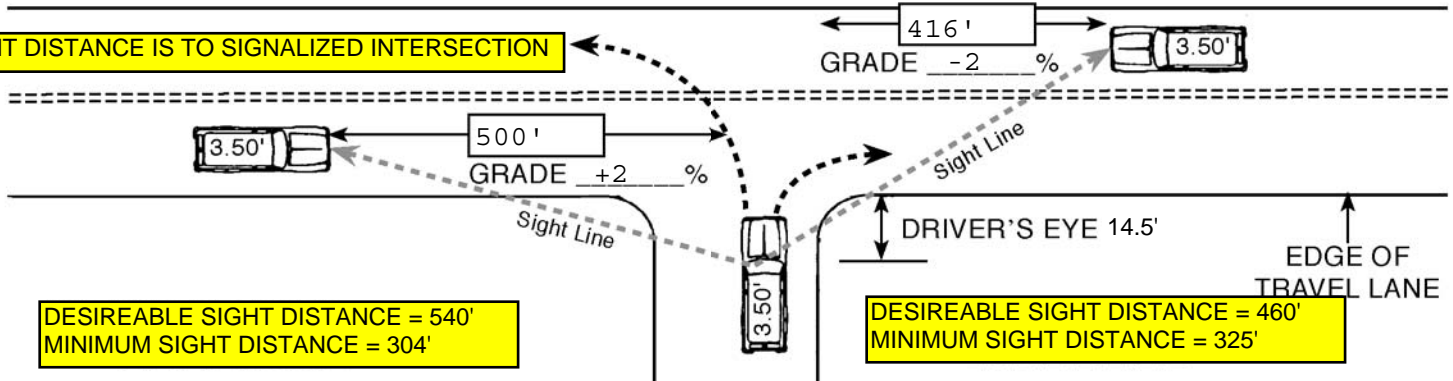
MEASURED BY D. C. Gohn Associates, Inc. DATE 04/14/2022

FOR DEPARTMENT USE ONLY: Safe-Running Speed _____ 85th Percentile Speed _____

SR 4025 & EASTERN PARCELS ACCESS

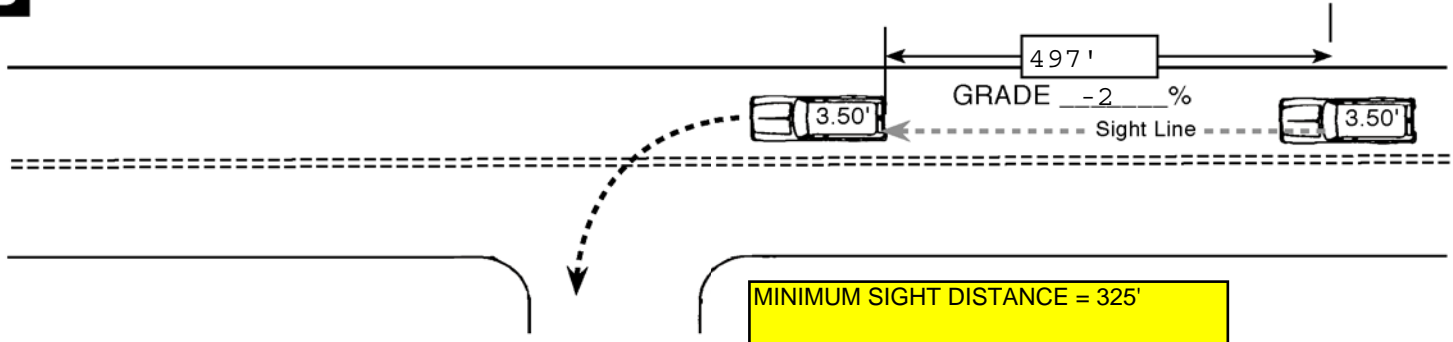
A

SIGHT DISTANCE IS TO SIGNALIZED INTERSECTION



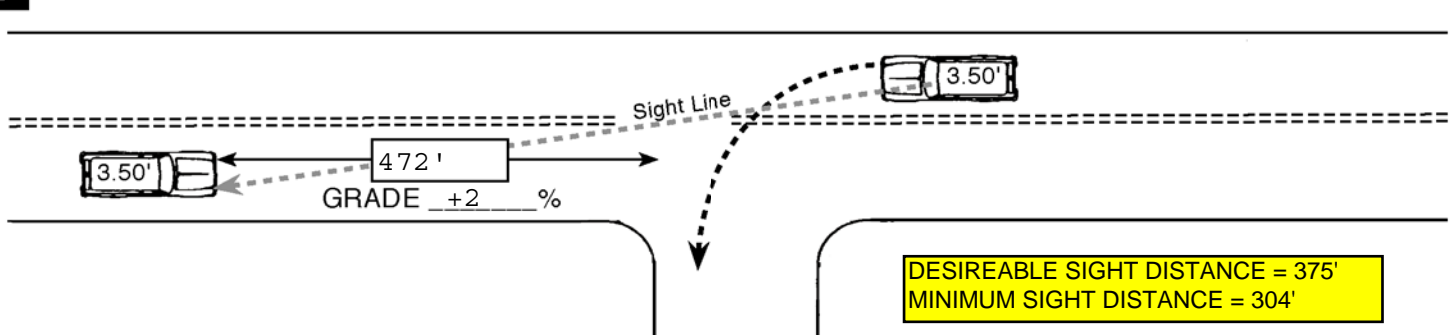
THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER AT A DRIVEWAY LOCATION CAN CONTINUOUSLY SEE ANOTHER VEHICLE APPROACHING ON THE ROADWAY.

B



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER ON THE ROADWAY CAN CONTINUOUSLY SEE THE REAR OF A VEHICLE WHICH IS LOCATED IN THE DRIVER'S TRAVEL LANE AND WHICH IS POSITIONED TO MAKE A LEFT TURN INTO A DRIVEWAY.

C



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER OF A VEHICLE INTENDING TO MAKE A LEFT TURN INTO A DRIVEWAY CAN CONTINUOUSLY SEE A VEHICLE APPROACHING FROM THE OPPOSITE DIRECTION.



Eastern Parcels Access onto Cloverleaf Road looking left



Eastern Parcels Access onto Cloverleaf Road looking right



Eastern Parcels Access onto Cloverleaf Road looking across Cloverleaf Road



Looking at Eastern Parcels Access onto Cloverleaf Road from opposite



Turning left into Eastern Parcels Access onto Cloverleaf Road – looking ahead



Turning left into Eastern Parcels Access onto Cloverleaf Road – looking back

DRIVEWAY SIGHT DISTANCE MEASUREMENTS

(FOR LOCAL ROADS, USE PENNDOT PUB 70)

APPLICANT Pennmark APPLICATION NO. _____

S.R. 0010 SEG. 0140 OFFSET 0690 LEGAL SPEED LIMIT 40 MPH

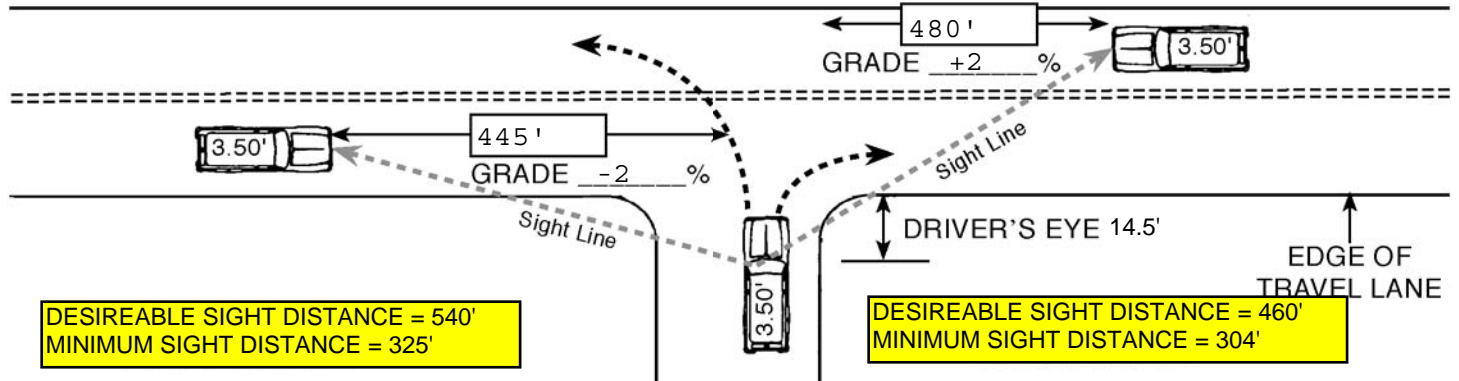
MEASURED BY D. C. Gohn Associates, Inc. DATE 04/14/2022

FOR DEPARTMENT USE ONLY: Safe-Running Speed _____ 85th Percentile Speed _____

SR 4025 & WESTERN PARCELS ACCESS

A

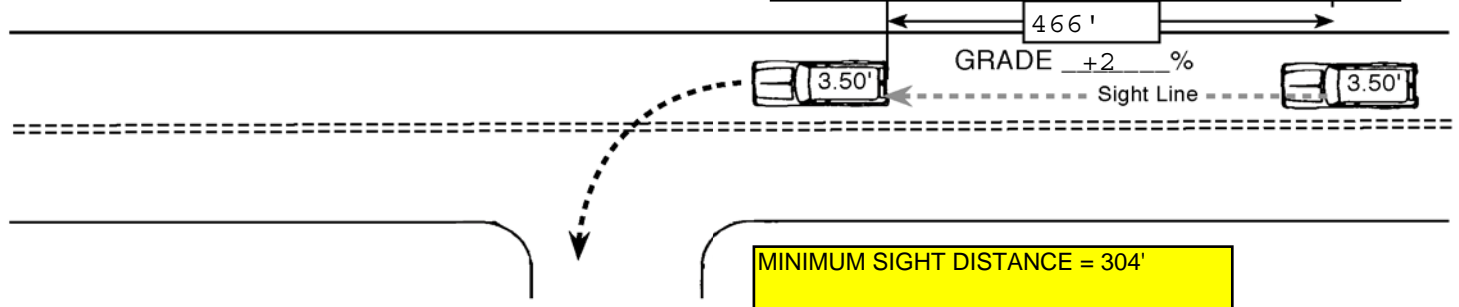
SIGHT DISTANCE IS TO SIGNALIZED INTERSECTION



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER AT A DRIVEWAY LOCATION CAN CONTINUOUSLY SEE ANOTHER VEHICLE APPROACHING ON THE ROADWAY.

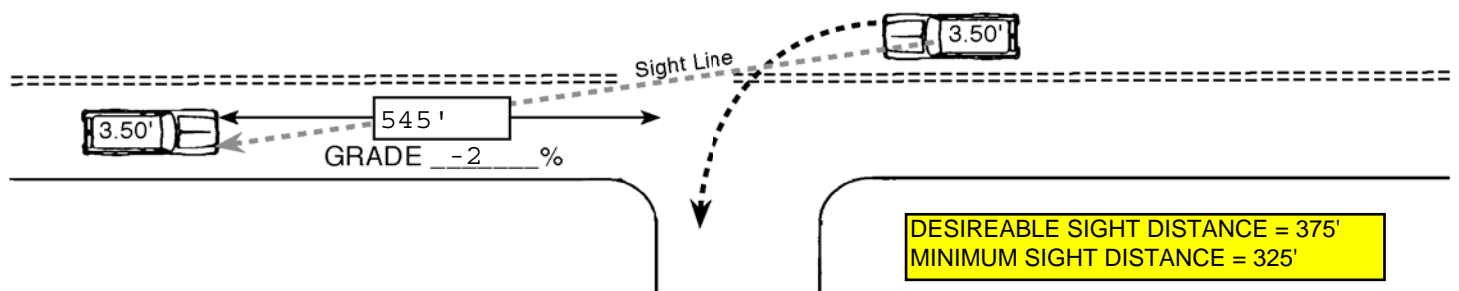
B

SIGHT DISTANCE IS TO SIGNALIZED INTERSECTION



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER ON THE ROADWAY CAN CONTINUOUSLY SEE THE REAR OF A VEHICLE WHICH IS LOCATED IN THE DRIVER'S TRAVEL LANE AND WHICH IS POSITIONED TO MAKE A LEFT TURN INTO A DRIVEWAY.

C



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER OF A VEHICLE INTENDING TO MAKE A LEFT TURN INTO A DRIVEWAY CAN CONTINUOUSLY SEE A VEHICLE APPROACHING FROM THE OPPOSITE DIRECTION.



Western Parcels Access onto Cloverleaf Road looking left



Western Parcels Access onto Cloverleaf Road looking right



Western Parcels Access onto Cloverleaf Road looking across Cloverleaf Road



Looking at Western Parcels Access onto Cloverleaf Road from opposite



Turning left into Western Parcels Access onto Cloverleaf Road – looking ahead



Turning left into Western Parcels Access onto Cloverleaf Road – looking back

DRIVEWAY SIGHT DISTANCE MEASUREMENTS

(FOR LOCAL ROADS, USE PENNDOT PUB 70)

APPLICANT Pennmark APPLICATION NO. _____

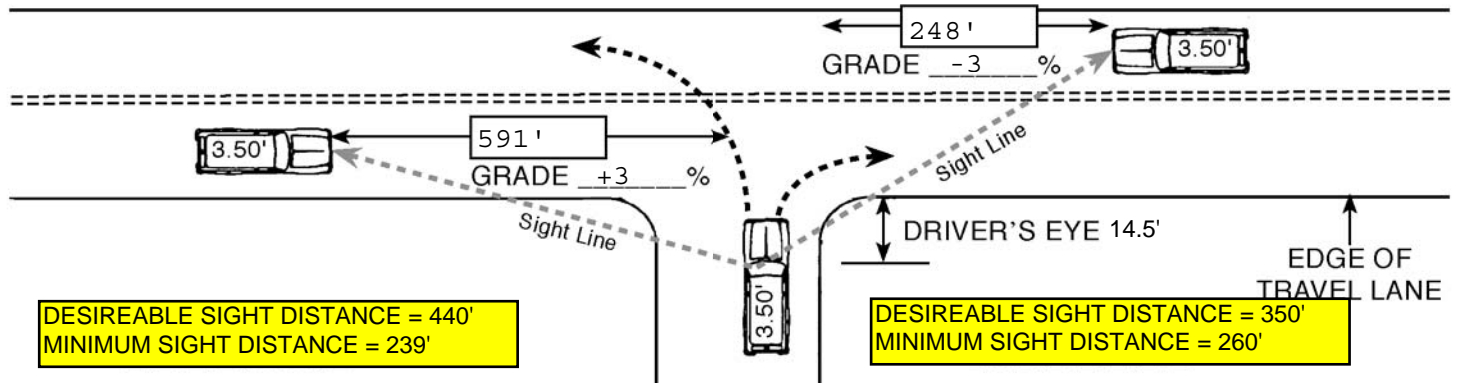
S.R. _____ SEG. _____ OFFSET _____ LEGAL SPEED LIMIT 35 MPH

MEASURED BY D. C. Gohn Associates, Inc. DATE 04/14/2022

FOR DEPARTMENT USE ONLY: Safe-Running Speed _____ 85th Percentile Speed _____

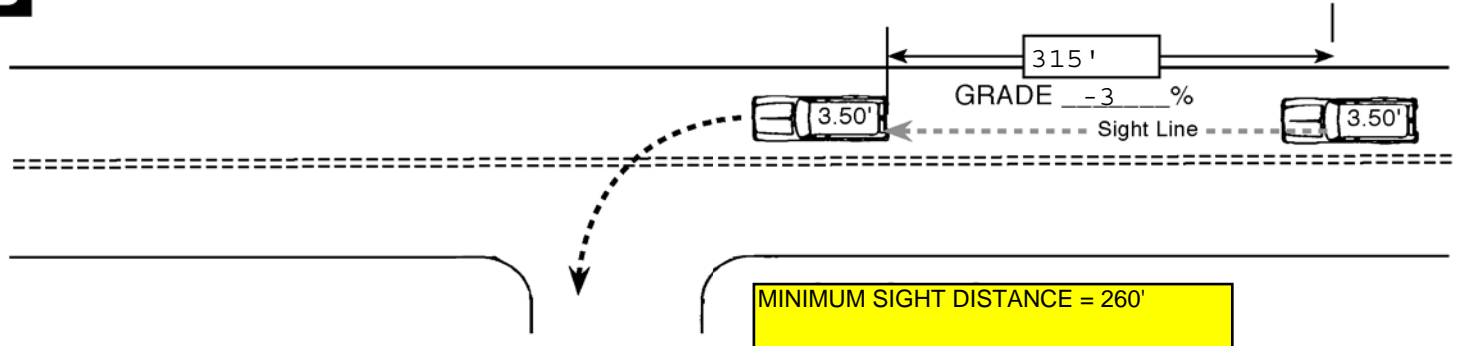
RIDGE RUN ROAD & SITE ACCESS

A



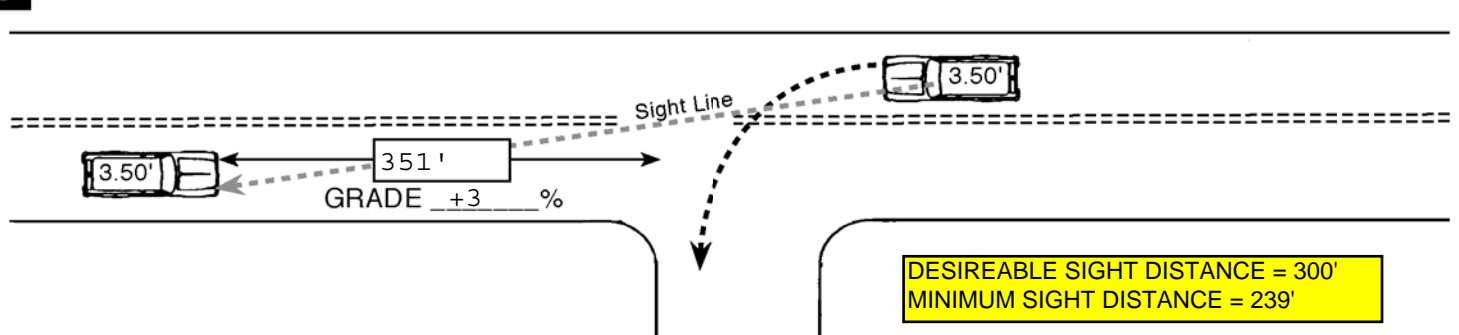
THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER AT A DRIVEWAY LOCATION CAN CONTINUOUSLY SEE ANOTHER VEHICLE APPROACHING ON THE ROADWAY.

B



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER ON THE ROADWAY CAN CONTINUOUSLY SEE THE REAR OF A VEHICLE WHICH IS LOCATED IN THE DRIVER'S TRAVEL LANE AND WHICH IS POSITIONED TO MAKE A LEFT TURN INTO A DRIVEWAY.

C



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER OF A VEHICLE INTENDING TO MAKE A LEFT TURN INTO A DRIVEWAY CAN CONTINUOUSLY SEE A VEHICLE APPROACHING FROM THE OPPOSITE DIRECTION.

APPENDIX O

TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

STUDY AND ANALYSIS INFORMATION

Municipality: Mt Joy Township
 County: Cumberland County
 PennDOT Engineering District: 8

Analysis Date: 9/28/2022
 Conducted By: GEC
 Agency/Company Name: GME

Analysis Information

Data Collection Date: 2024 Build
 Day of the Week: Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number: SR 0230
 Major Street Approach #1 Direction: E-Bound
 Major Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 1 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 45 MPH

Minor Street Information

Minor Street Name and Route Number: Norlanco Drive Ext
 Minor Street Approach #1 Direction: S-Bound
 Minor Street Approach #2 Direction: N/A

Number of Lanes for Moving Traffic on Each Minor Street Approach: 1 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	No	N/A
Warrant 2, Four-Hour Vehicular Volume	No	N/A
Warrant 3, Peak Hour	Yes	Yes
Warrant 4, Pedestrian Volume	No	N/A
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	No	N/A
Warrant 8, Roadway Network	No	N/A
Warrant 9, Intersection Near a Grade Crossing	No	N/A
Warrant PA-1, ADT Volume Warrant	No	N/A
Warrant PA-2, Midblock and Trail Crossings	No	N/A

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?

Yes

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*

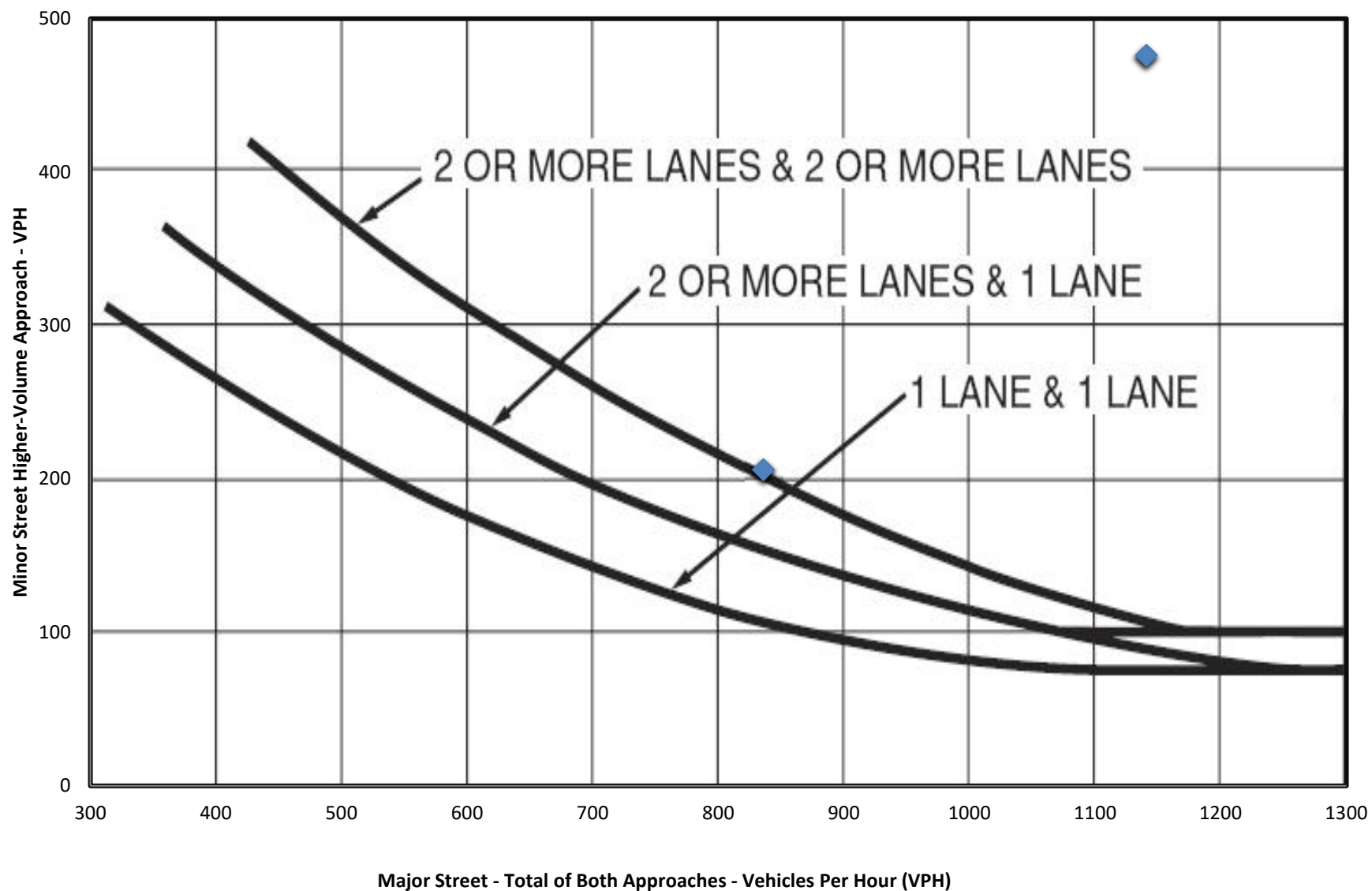
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	Yes
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	Yes
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	Yes

**If applicable, attach all supporting calculations and documentation.*

Total Number of Unique Hours Met On Figure 4C-4
2

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	836	206	Met
6:30 AM	836	206	Met
6:45 AM	836	206	Met
7:00 AM	836	206	Met
7:15 AM	0	0	
7:30 AM	0	0	
7:45 AM	0	0	
8:00 AM	0	0	
8:15 AM	0	0	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
8:30 AM	0	0	
8:45 AM	0	0	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	1141	476	Met
3:30 PM	1141	476	Met
3:45 PM	1141	476	Met
4:00 PM	1141	476	Met
4:15 PM	0	0	
4:30 PM	0	0	
4:45 PM	0	0	
5:00 PM	0	0	
5:15 PM	0	0	
5:30 PM	0	0	
5:45 PM	0	0	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

APPENDIX P

CORRESPONDENCE

February 24, 2016



Capital Improvements Plan

Mount Joy Township, Lancaster County PA

Prepared by Justin S. Evans, AICP, Community Development Director

159 Merts Drive—Elizabethtown, PA 17022

T: 717.367.8917 E: justin@mtjoytwp.org



Introduction

Mount Joy Township and its Traffic Impact Fee Advisory Committee updated the Land Use Assumptions Report and Roadway Sufficiency Analysis Report in order to revise the traffic impact fee in compliance with the requirements of the Municipal Planning Code (MPC). These updates to the original 2004 reports are intended to evaluate a reasonable land use build-out scenario and associated traffic projections for a ten-year planning horizon. Revisions to the Capital Improvements Plan (CIP) take into account the recommendations of the Roadway Sufficiency Analysis, improvements made since 2004, and additional considerations that were incorporated into the March 2013 Official Map. All transportation improvements included in the CIP are contained in the Transportation Service Area (TSA) shown in Figure 1.

Transportation improvements contained in the CIP are intended to maintain the Township's preferred level of service (LOS), which is LOS D. Each improvement considers actions necessary to maintain a LOS D in existing and base conditions that do not account for new development as identified in the Land Use Assumptions Report, which cannot be funded by traffic impact fees. Improvements to address the projected traffic conditions resulting from new development are eligible to be funded by the fees. The Roadway Sufficiency Analysis sets forth the basis to differentiate between eligible and ineligible improvements.

The remainder of this report addresses the necessary components of a CIP as set forth in §504-A(e)(i) of the MPC:

- (i) A description of the existing highways, roads and streets within the transportation service area and the road improvements required to update, improve, expand or replace such highways, roads and streets in order to meet the preferred level of service and usage and stricter safety, efficiency, environmental or regulatory standards ***not attributable to new development***. [emphasis added]
- (ii) A plan specifying the road improvements within the transportation service area ***attributable to forecasted pass-through traffic*** so as to maintain the preferred level of service after existing deficiencies identified by the roadway sufficiency analysis have been remedied. [emphasis added]
- (iii) A plan specifying the road improvements or portions thereof within the transportation service area ***attributable to the projected future development***, consistent with the adopted land use assumptions, in order to maintain the preferred level of service after accommodation for pass-through traffic and after existing deficiencies identified in the roadway sufficiency analysis have been remedied. [emphasis added]
- (iv) The projected costs of the road improvements to be included in the transportation capital improvements plan, calculating separately for each project by the following categories:
 - (A) The costs or portion thereof associated with correcting existing deficiencies as specified in subparagraph (i).
 - (B) The costs or portions thereof attributable to providing road improvements to accommodate forecasted pass-through trips as specified in subparagraph (ii).
 - (C) The costs of providing necessary road improvements or portions thereof attributable to projected future development as specified in subparagraph (iii); provided that no more than 50% of the cost of the improvements to any highway, road or street which qualifies as a State Highway or portion of the rural State Highway System as provided in section 102 of the act of June 1, 1945 (P.L. 1242, No. 428), known as the "State Highway Law" may be included.
- (v) A projected timetable and proposed budget for constructing each road improvement contained in the plan.



- (vi) The proposed source of funding for each capital improvement included in the road plan. This shall include anticipated revenue from the Federal Government, State government, municipality, impact fees and any other source. The estimated revenue for each capital improvement in the plan which is to be provided by impact fees shall be identified separately for each project.

Improvements

Figure 2 lists the costs for the improvements recommended in the Roadway Sufficiency Analysis in order to mitigate 2014 Existing, 2024 Base, and 2024 Projected Conditions deficiencies, respectively. The improvements contained in Figure 2 have been specified to meet LOS D for the TSA as set forth in the MPC.

The approval of the CIP by the Board of Supervisors in no way obligates the Township to complete all of the roadway improvements it contains. The improvements contained in the initial CIP may change over time due to changes in the land use assumptions. Furthermore, the improvements may not be completed due to lack of available funding from state and federal programs and/or lack of revenue generated by the collection of impact fees. Note that improvements to state or federal-aid highways must be approved by PENNDOT and in some cases the Federal Highway Administration before the project can be completed. Improvements may vary based on these necessary approvals.

Although some improvements designated in the CIP may not be implemented due to the reasons listed above, they cannot be excluded per the MPC. The identification of improvements must be objective based on the results of the required background analyses (i.e., the Land Use Assumptions Report and the Roadway Sufficiency Analysis) rather than being subjectively determined. These improvements are necessary to improve roadway capacity in the TSA to LOS D and are not comprehensive of all needed capacity improvements within Mount Joy Township.

There may be other improvements identified by the Township as higher priorities such as safety, reconstruction of existing roads, widening of shoulders, public transportation, and bicycle and pedestrian facilities. Although these types of improvements may be higher priorities of the Township and/or PennDOT, they cannot be funded by impact fees. Therefore, safety and maintenance improvements must be implemented through other mechanisms.

Cost Estimates

Cost estimates were assessed for the engineering/design, right-of-way acquisition, and construction aspects of each improvement in the CIP. A 10% contingency was added to each of the estimates to account for unexpected costs associated with each project. These estimates are included in Figure 2 for the 2014 Existing, 2024 Base and 2024 Projected Conditions improvements located in the TSA.

Two improvement scenarios were explored in the 2004 CIP: “Existing Transportation Network” and “Existing Transportation Network with Merts Drive Extension”. The latter scenario factored in new roadway construction that would alleviate current and anticipated traffic volumes on Cloverleaf Road. Critical strides have been made since that time to relocate the eastbound Route 283 off-ramp and extend Merts Drive (to be renamed North Conifer Drive) between the new off-ramp and Cloverleaf Road.

This Roadway Sufficiency Analysis updates the 2004 scenarios noted above. As regional planning has matured and private development has progressed in the Township, the scenarios have evolved to incorporate a broader focus and are now called “With New Roads” and “Without New Roads”. The primary objectives of the With New Roads



option are to “reduce motorists’ dependency on Cloverleaf Road...[and] create a more direct route between Route 743 and the residential areas to the southeast.” The CIP is designed around the decision to implement this scenario, which is generally consistent with the approach used in the 2004 plan. The majority of the programmed transportation improvements involve intersections, but the following roadway projects key to the “With New Roads” scenario are also included:

- ▲ Construct new eastbound off-ramp for the Route 283/Cloverleaf Road interchange [“B” on Figure 1]
- ▲ Extend Eagle Parkway from the Campus Road/Schwanger Road intersection to Route 230 [“F” on Figure 1]
- ▲ Construct North Conifer Drive between relocated eastbound Route 283/Cloverleaf Road off-ramp and Cloverleaf Road [“L” on Figure 1]
- ▲ Extend Buckingham Boulevard between Route 241 and Old Hershey Road [“T” on Figure 1]
- ▲ Widen Route 230 for additional through lane(s) generally between Anchor Road and Cloverleaf Road to achieve LOS D [included in #8, #9, #10, #11, & #12 on Figure 1]

Cost Estimate Summary

- ▲ Costs of 2014 Existing Condition improvements total: \$681,340
- ▲ Costs of 2024 Base Condition improvements total: \$0
- ▲ Costs of 2024 Projected Condition improvements total: \$23,983,947
 - ▼ \$8,868,266 to be funded by impact fees (37.0% of total)
 - ▼ \$15,115,681 to be funded by other sources (63.0% of total)

TOTAL OF ALL IMPROVEMENTS = \$24,665,287

Funding Sources and Implementation Schedule

The MPC stipulates that a CIP must identify funding sources for each improvement, and provide a timetable for when it will be completed. In addition to impact fees, federal, state, and Township funds are considered as viable funding sources for the capital improvements. Recognizing that nearly all of the improvements involve state roads, the CIP pays adheres to MPC §504-A(e)(1)(iv)(C) which limits 50% of the total costs of the 2024 Projected Conditions improvements in the traffic impact fee equation.

As shown in Figure 3, the CIP assumed that the funding for 2014 Existing and 2024 Base Conditions improvements would be the responsibility of the Township. If additional sources of funding become available for these improvements, the CIP can be amended to reflect these changes as often as once per year. For Projected Conditions improvements involving only Township roads, it is assumed that 100% of the costs can be funded with traffic impact fees. Where Projected Conditions improvements involve a state road(s), no more than 50% of the cost can be funded by impact fees. The remaining 50% needs to be funded by another source(s).

Many factors contribute to the prioritization of the roadway improvements, some of which are beyond control of the Township. The most influential factors are summarized to include:



- ▲ **Ease of Implementation** – since the Township will be required to return impact fees designated for a particular improvement if construction is not started within three years of its scheduled date in the CIP, then “low hanging fruit” projects will generally be prioritized higher.
- ▲ **Availability of Future Funds** – a lack of sufficient funding can significantly delay a project or group of projects and impact implementation of the plan.
- ▲ **Likelihood of Land Development** – the potential for development on a large parcel may have a significant impact on the transportation network. However, if it is not likely to be developed later into the ten-year planning horizon, then the improvements associated with development of the site should be prioritized lower. On the other hand, improvements associated with or proximate to a development that is expected to be constructed in the next several years should warrant higher priority.
- ▲ **Physical Constraints** – Improvements that may be hampered by environmental or right-of-way constraints should be given a higher priority. Because extensive review, permitting, and/or land acquisition may be necessary, the design stage for such projects should begin early in order keep such projects on track.

Since all but one of the study area intersections programmed with improvements to accommodate the 2024 Projected Condition include at least one state highway (#21 – Schwanger Road/Campus Road and Eagle Parkway), state and federal funding will play a crucial role. Acquiring federal and state funding can take significant amounts of time to obtain, so it is recommended that the Township take steps to secure these funds immediately. As these dollars become available for a given project, the implementation schedule can be reassessed and the CIP revised accordingly.

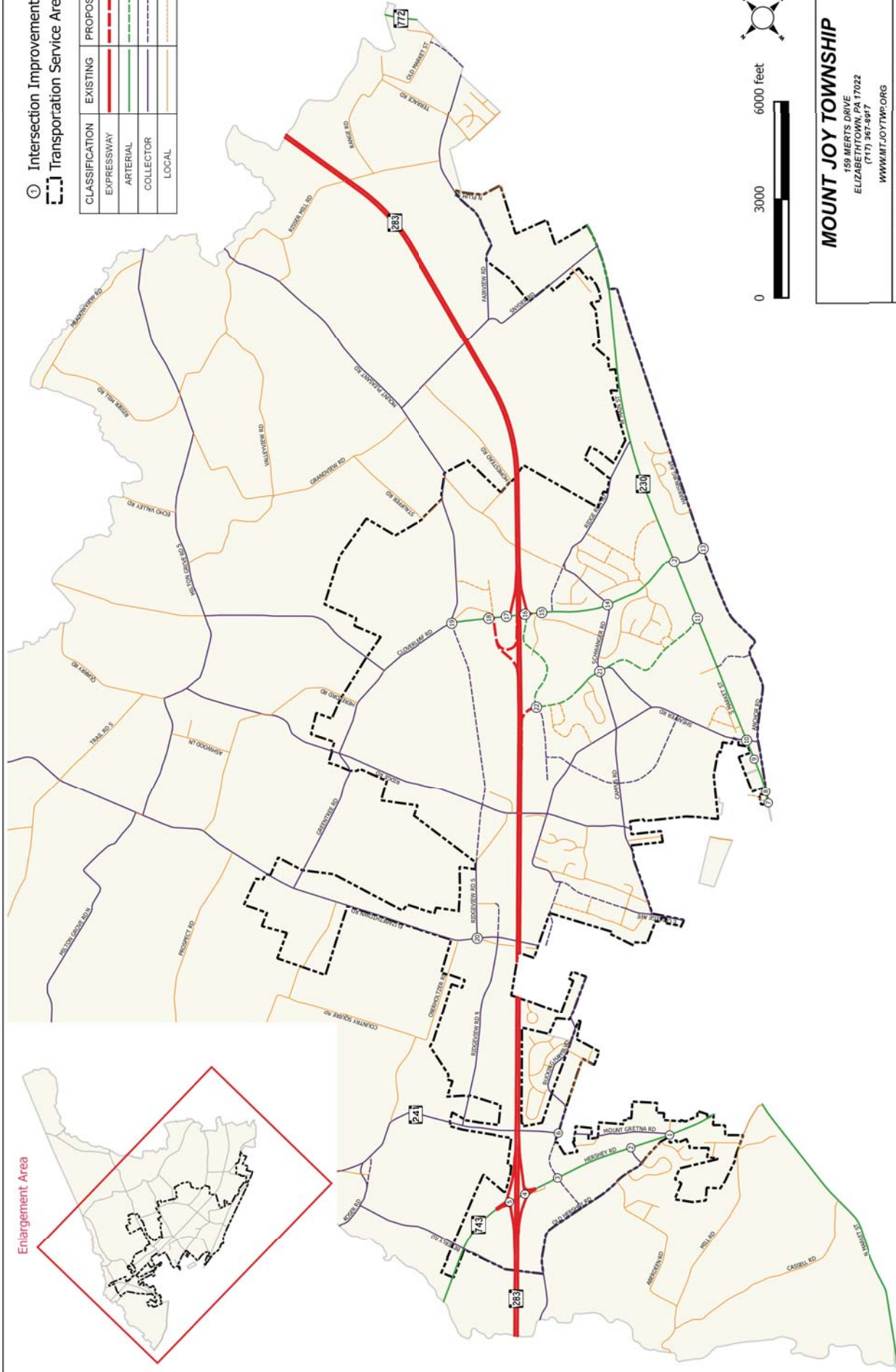
One project in particular, #18 – Cloverleaf Road and Steelway Drive/PA 283 WB Ramps, is expected to rely heavily on federal and state funding to bring to fruition. The construction of two new ramps for the Cloverleaf Road interchange and other associated improvements is estimated to cost \$10,946,864 and would require the complete replacement of the PA 283 bridge decks (which are not included in the cost estimate for improvement #18). Due to the magnitude of this project and the challenge of securing the additional funds, a lower proportion of impact fee money is programmed into the improvement funding schedule for #18 in Figure 3. An 80/20 split between federal/state transportation dollars and impact fees deviates from the standard 50/50 split because of these differentiating circumstances. This atypical arrangement is proposed as part of the balancing act between funding the Capital Improvements Plan and the risk of overburdening the impact fee payers.

Because of the uncertainty created by the above factors, Figure 3 in the original CIP assumed a start date of 2004 for obtaining funding on all projects. Completion dates of 2011 were assumed for engineering, 2012 for right-of-way acquisition, and 2013 for construction. As part of this update, actual timelines for projects that are in the process or realistically programmed are provided. All other improvements that have not been initiated will have a similar logic applied to them as in the 2004 CIP. A start date of 2014 for obtaining funding will be used, as will 2022 for engineering, 2023 for right-of-way acquisition, and 2023 for construction. The Township is not restricted from beginning projects before the scheduled time, yet will be penalized if construction of a certain project is commenced more than three years later than the scheduled construction date. Therefore, this plan allows the greatest flexibility and can be revised as often as once a year with more accurate timelines as circumstances become clearer.

Enlargement Area

- ① Intersection Improvement
Transportation Service Area

CLASSIFICATION	EXISTING	PROPOSED
EXPRESSWAY		
ARTERIAL		
COLLECTOR		
LOCAL		



MOUNT JOY TOWNSHIP

159 MERTS DRIVE
ELIZABETHTOWN, PA 17022
(717) 367-8917

WWW.MTJOYTWP.ORG

CAPITAL IMPROVEMENTS PLAN - FIGURE 1

TRANSPORTATION IMPROVEMENTS - DECEMBER 2015

FIGURE 2: COST ESTIMATE OF IMPROVEMENTS

Map #	Location	Existing Improvements		Base Improvements		Projected Improvements	
		Description	Price	Description	Price	Description	Price
1	Route 743, Holly Street and Route 241	Modify traffic signal timings	\$6,000			Construct dual-lane roundabout	\$663,730
						ROW Acquisition	\$73,350
						Utility Relocation	\$84,505
						Inspection/Legal/Mobilization (18.5%)	\$122,790
						Survey and Engineering (15%)	\$99,560
		Contingency (10%)	\$600			Contingency (10%)	\$104,393
		TOTAL	\$6,600			TOTAL	\$1,148,328
2	Route 743 and Veterans Drive					Signalize intersection	\$133,000
						Utility Relocation	\$10,000
						Inspection/Legal/Mobilization (18.5%)	\$24,605
						Survey and Engineering (15%)	\$19,950
						Contingency (10%)	\$18,756
		TOTAL				TOTAL	\$206,311
3	Route 743 and Buckingham Boulevard					Signalize intersection	\$160,000
						Construct WB right turn lane	\$57,839
						Construct 2nd NB thru lane	\$356,500
						Construct SB left turn lane	\$136,230
						ROW Acquisition	\$13,776
						Utility Relocation	\$40,000
						Inspection/Legal/Mobilization (18.5%)	\$131,455
						Survey and Engineering (15%)	\$106,585
						Contingency (10%)	\$100,239
		TOTAL				TOTAL	\$1,102,624
4	Route 743 and PA 283 EB Ramps	Signalize intersection	\$160,000			Add SB left turn phase	\$10,000
		Utility Relocation	\$10,000				
		Inspection/Legal/Mobilization (18.5%)	\$29,600				
		Survey and Engineering (15%)	\$24,000				
		Contingency (10%)	\$22,360				
		TOTAL	\$245,960			TOTAL	\$11,000
5	Route 743 and PA 283 WB Ramps					Modify traffic signal timings	\$6,000
						Contingency (10%)	\$600
						TOTAL	\$6,600
						Construct EB & WB left turn lanes	\$249,012
						Implement all-way stop control	\$1,000
6	Route 241 and Buckingham Boulevard					ROW Acquisition	\$5,740
						Utility Relocation	\$10,000
						Inspection/Legal/Mobilization (18.5%)	\$46,252
						Survey and Engineering (15%)	\$37,502
						Contingency (10%)	\$34,951
		TOTAL				TOTAL	\$384,457
7	Route 230 and Carey Lane					Convert WB right to shared thru/rt	\$18,910
						Construct 2nd WB receiving lane	\$119,295
						Inspection/Legal/Mobilization (18.5%)	\$25,568
						Survey and Engineering (15%)	\$20,731
						Contingency (10%)	\$18,450
		TOTAL				TOTAL	\$202,954
8	Route 230 and Anchor Road					Construct 2nd WB thru lane	\$741,520
						Utility Relocation	\$40,000
						Inspection/Legal/Mobilization (18.5%)	\$137,181
						Survey and Engineering (15%)	\$111,228
						Contingency (10%)	\$102,993
		TOTAL				TOTAL	\$1,132,922

FIGURE 2: COST ESTIMATE OF IMPROVEMENTS

Map #	Location	Existing Improvements		Base Improvements		Projected Improvements	
		Description	Price	Description	Price	Description	Price
9	Route 230 and Market Street Square					Convert WB right to shared thru/rt Construct 2nd WB receiving lane <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$18,910 \$119,295 \$25,568 \$20,731 \$18,450 \$202,954
10	Route 230 and Scheaffer Road					Modify traffic signal timings Construct 2nd WB thru lane Utility Relocation <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$6,000 \$741,520 \$100,000 \$138,291 \$112,128 \$109,794 \$1,207,733
11	Route 230 and Eagle Parkway					Signalize intersection Construct 2nd WB thru lane Construct SB left & right turn lanes ROW Acquisition Utility Relocation <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$120,000 \$741,520 \$194,069 \$2,296 \$70,000 \$195,284 \$158,338 \$148,151 \$1,629,658
12	Route 230 and Cloverleaf Road/Colebrook Road					Modify traffic signal timings Add WB left turn phase Construct 2nd EB/WB thru lane Construct NB right turn lane ROW Acquisition Utility Relocation <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$6,000 \$10,000 \$1,251,620 \$157,389 \$22,960 \$130,000 \$263,627 \$213,751 \$205,535 \$2,260,882
13	Colebrook Road and Harrisburg Avenue					Signalize intersection Synchronize with Cloverleaf signals Construct NB & SB left turn lanes ROW Acquisition Utility Relocation <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$160,000 \$10,000 \$249,012 \$170,000 \$40,000 \$77,517 \$62,852 \$76,938 \$846,319
14	Cloverleaf Road and Schwanger Road	Modify traffic signal timings <i>Contingency (10%)</i>	\$6,000 \$600				
15	Cloverleaf Road and Merts Drive	Signalize intersection Utility Relocation <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$6,600 \$120,000 \$10,000 \$22,200 \$18,000 \$17,020			Remove traffic signal Close intersection <i>Inspection/Legal/Mobilization (18.5%)</i> <i>Survey and Engineering (15%)</i> <i>Contingency (10%)</i>	\$0 \$1,000 \$9,575 \$1,956 \$1,586 \$1,412 \$15,529

FIGURE 2: COST ESTIMATE OF IMPROVEMENTS

Map #	Location	Existing Improvements		Base Improvements		Projected Improvements	
		Description	Price	Description	Price	Description	Price
16	Cloverleaf Road and PA 283 EB Ramps	Signalize Intersection	\$160,000			Reconstruct EB ramp as N. Conifer	\$122,295
						Provide EB left, thru & right lanes	\$186,165
						Construct NB left & right turn lanes	\$194,069
						Construct SB right turn lane	\$57,839
		Inspection/Legal/Mobilization (18.5%)	\$29,600			Inspection/Legal/Mobilization (18.5%)	\$103,668
		Survey and Engineering (15%)	\$24,000			Survey and Engineering (15%)	\$84,055
		Contingency (10%)	\$21,360			Contingency (10%)	\$74,809
		TOTAL	\$234,960			TOTAL	\$822,900
17	Cloverleaf Road and PA 283 WB Ramps					Remove traffic signal	\$1,000
						Convert off-ramp to right turn only	\$2,300
		Inspection/Legal/Mobilization (18.5%)				Inspection/Legal/Mobilization (18.5%)	\$611
		Survey and Engineering (15%)				Survey and Engineering (15%)	\$495
		Contingency (10%)				Contingency (10%)	\$441
		TOTAL				TOTAL	\$4,846
18	Cloverleaf Road and Steelway Drive/PA 283 WB Ramps					Signalize intersection	\$160,000
						Construct NB & SB left turn lanes	\$260,736
						Construct WB cloverleaf on & offramps	\$6,091,050
						ROW Acquisition	\$1,218,460
		Utility Relocation	\$40,000			Utility Relocation	\$40,000
		Inspection/Legal/Mobilization (18.5%)	\$1,204,680			Inspection/Legal/Mobilization (18.5%)	\$1,204,680
		Survey and Engineering (15%)	\$976,768			Survey and Engineering (15%)	\$976,768
		Contingency (10%)	\$995,169			Contingency (10%)	\$995,169
		TOTAL				TOTAL	\$10,946,864
19	Cloverleaf Road and Mt. Pleasant Road					Construct EB right turn lane	\$46,406
						ROW Acquisition	\$8,610
						Utility Relocation	\$10,000
						Inspection/Legal/Mobilization (18.5%)	\$8,585
		Survey and Engineering (15%)	\$6,961			Survey and Engineering (15%)	\$6,961
		Contingency (10%)	\$8,056			Contingency (10%)	\$8,056
		TOTAL				TOTAL	\$88,618
20	Elizabethtown Road and Ridgeview Road South					Construct EB right turn lane	\$46,406
						ROW Acquisition	\$8,610
						Utility Relocation	\$10,000
						Inspection/Legal/Mobilization (18.5%)	\$8,585
		Survey and Engineering (15%)	\$6,961			Survey and Engineering (15%)	\$6,961
		Contingency (10%)	\$8,056			Contingency (10%)	\$8,056
		TOTAL				TOTAL	\$88,618
21	Schwanger Road/Campus Road and Eagle Parkway					Signalize intersection	\$160,000
						Restripe for NB & EB left turn lanes	\$550
						Construct SB right turn lane	\$57,839
						Inspection/Legal/Mobilization (18.5%)	\$40,402
		Survey and Engineering (15%)	\$29,155			Survey and Engineering (15%)	\$29,155
		Contingency (10%)	\$29,155			Contingency (10%)	\$29,155
		TOTAL				TOTAL	\$320,704
22	Conifer Drive, Eagle Parkway and PA 283 EB Off-ramp					Signalize intersection	\$160,000
						Construct EB right turn lane	\$57,839
						Construct WB left turn lane	\$136,230
						Construct NB channelized right turn	\$57,839
		Construct SB left & right turn lanes	\$194,069			Construct SB left & right turn lanes	\$194,069
		Provide WB & NB left turn lanes	\$272,460			Provide WB & NB left turn lanes	\$272,460
		ROW Acquisition	\$57,400			ROW Acquisition	\$57,400
		Inspection/Legal/Mobilization (18.5%)	\$162,511			Inspection/Legal/Mobilization (18.5%)	\$162,511
		Survey and Engineering (15%)	\$131,766			Survey and Engineering (15%)	\$131,766
		Contingency (10%)	\$123,011			Contingency (10%)	\$123,011
		TOTAL				TOTAL	\$1,353,125

FIGURE 3: IMPROVEMENT FUNDING

Costs Attributable to:						
Map #	Location	Road ID #	Proposed Improvement(s)	Existing	New	Project Schedule
				Deficiencies	Base Conditions Development	
1	Route 743, Holly Street and Route 241	SR 0743 T-610 SR 0241	Modify traffic signal timings Construct dual-lane roundabout			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
				\$6,600	\$1,148,328	\$0 FUNDING \$0 ENGINEERING \$6,600 RIGHT-OF-WAY \$574,164 CONSTRUCTION \$574,164 \$1,154,928
2	Route 743 and Veterans Drive	SR 0743 T-301	Signalize intersection			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
						\$0 FUNDING \$0 ENGINEERING \$103,155 RIGHT-OF-WAY \$103,155 CONSTRUCTION \$0 \$206,311
3	Route 743 and Buckingham Boulevard	SR 0743 T-333	Signalize intersection Construct WB right turn lane Construct 2nd NB thru lane Construct SB left turn lane			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
						\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$551,312 CONSTRUCTION \$551,312 \$1,102,624
4	Route 743 and PA 283 EB Ramps	SR 0743 SR 0283	Signalize intersection Add SB left turn phase			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
				\$245,960	\$11,000	\$0 FUNDING \$0 ENGINEERING \$245,960 RIGHT-OF-WAY \$5,500 CONSTRUCTION \$5,500 \$256,960
5	Route 743 and PA 283 WB Ramps	SR 0743 SR 0283	Modify traffic signal timings			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
						\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$3,300 CONSTRUCTION \$3,300 \$6,600
6	Route 241 and Buckingham Boulevard	SR 0214 T-333	Construct EB & WB left turn lanes Implement all-way stop control (western part of intersection in Elizabethtown Borough)			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
						\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$192,228 CONSTRUCTION \$192,228 \$384,457
7	Route 230 and Carey Lane	SR 0230	Convert WB right to shared thru/rt Construct 2nd WB receiving lane			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
						\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$101,477 CONSTRUCTION \$101,477 \$202,954

FIGURE 3: IMPROVEMENT FUNDING

Costs Attributable to:						
Map #	Location	Road ID #	Proposed Improvement(s)	Existing	New	Project Schedule
				Deficiencies	Base Conditions Development	
8	Route 230 and Anchor Road	SR 0230 SR 4018	Construct 2nd WB thru lane			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$1,132,922	\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$566,461 CONSTRUCTION \$566,461 \$1,132,922
						2014 2022 n/a 2023
9	Route 230 and Market Street Square	SR 0230	Convert WB right to shared thru/rt Construct 2nd WB receiving lane			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$202,954	\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$101,477 CONSTRUCTION \$101,477 \$202,954
						2014 2022 n/a 2023
10	Route 230 and Scheaffer Road	SR 0230 T-888	Modify traffic signal timings Construct 2nd WB thru lane			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$202,954	\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$603,867 CONSTRUCTION \$603,867 \$1,207,733
						2014 2022 n/a 2023
11	Route 230 and Eagle Parkway	SR 0230	Signalize intersection Construct 2nd WB thru lane Construct SB left & right turn lanes			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$1,207,733	\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$814,829 CONSTRUCTION \$814,829 \$1,629,658
						2014 2021 2021 2022
12	Route 230 and Cloverleaf Road/ Colebrook Road	SR 0230 SR 4025	Modify traffic signal timings Add WB left turn phase Construct 2nd EB/WB thru lane Construct NB right turn lane Underground gasoline storage tank/Structure demolition			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$1,629,658	\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$1,130,441 CONSTRUCTION \$1,130,441 \$2,260,882
						2014 2022 2023 2023
13	Colebrook Road and Harrisburg Avenue	SR 4025 SR 4018	Signalize intersection Synchronize with Cloverleaf signals Construct NB & SB left turn lanes (southern part of intersection is in West Donegal Township)			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$846,319	\$0 FUNDING \$0 ENGINEERING \$0 RIGHT-OF-WAY \$423,160 CONSTRUCTION \$423,160 \$846,319
						2014 2022 2023 2023
14	Cloverleaf Road and Schwanger Road	SR 4025 T-843	Modify traffic signal timings			FEDERAL PENNDOT MUNICIPALITY IMPACT FEES OTHER TOTAL
					\$6,600	\$0 FUNDING \$0 ENGINEERING \$6,600 RIGHT-OF-WAY \$0 CONSTRUCTION \$0 \$6,600
						2014 2022 n/a 2023

FIGURE 3: IMPROVEMENT FUNDING

Costs Attributable to:									
Map #	Location	Road ID #	Proposed Improvement(s)	Existing		New		Total Costs	Proposed Funding
				Deficiencies	Base Conditions	Development	Project Schedule		
22	Conifer Drive, Eagle Parkway and PA 283 EB Off-ramp	SR 0283	Signalize intersection						FEDERAL
			Construct EB right turn lane						PENNDOT
			Construct WB left turn lane						MUNICIPALITY
			Construct NB channelized right turn						IMPACT FEES
			Construct SB left & right turn lanes						OTHER
			Provide WB & NB left turn lanes			\$1,353,125		\$1,353,125	TOTAL
				Existing	Base Conditions	Development			
				Deficiencies					
				\$681,340	\$0	\$23,983,947			
				Total Costs		\$24,665,287			
				TOTALS:					

GENERAL NOTES:

ALL ARTERIALS ARE CONTROLLED ACCESS IN ACCORDANCE WITH ARTERIAL STREET DESIGN CRITERIA WITHIN CHAPTER 119, SUBDIVISION AND LAND DEVELOPMENT, AND PENNDOT DESIGN MANUAL 2.

PROVIDE LEFT TURN LANES ON ALL APPROACHES OF SIGNALIZED INTERSECTIONS UNLESS OTHERWISE NOTED.

PROVIDE A MINIMUM 50' RIGHT-OF-WAY FOR LOCAL ROADS. 60' FOR COLLECTOR ROADS AND ARTERIALS UNLESS NOTED OTHERWISE

PROVIDE SLOPE EASEMENT BEYOND RIGHT-OF-WAY FOR REHABILITATION OF ALL EXISTING ROADS WHEN VERTICAL GEOMETRY ADJUSTMENT IS REQUIRED TO PROVIDE SAFE SHORT STOPPING DISTANCE IN ACCORDANCE WITH PENNSYLVANIA DESIGN MANUAL 2.

RIGHT-OF-WAY REQUIREMENTS AT INTERSECTIONS MAY BE GREATER THAN THOSE REQUIRED FOR CORRIDORS TO PROVIDE NECESSARY TURNING LANES.

NAMES FOR PROPOSED ROADS ARE SUBJECT TO CHANGE AND MUST BE APPROVED BY LANCASTER COUNTYWIDE COMMUNICATIONS.

TOWNSHIP CERTIFICATION
THIS MAP IS CERTIFIED AS THE ORIGINAL OFFICIAL MAP OF MOUNT JOY TOWNSHIP AS
ADOPTED BY THE MOUNT JOY TOWNSHIP BOARD OF SUPERVISORS, LANCASTER.

Doreen P. Wilson
CHAIRMAN MOUNT JOY TOWNSHIP BOARD OF SUPERVISORS

Patricia J. Barlow
SECRETARY MOUNT JOY TOWNSHIP

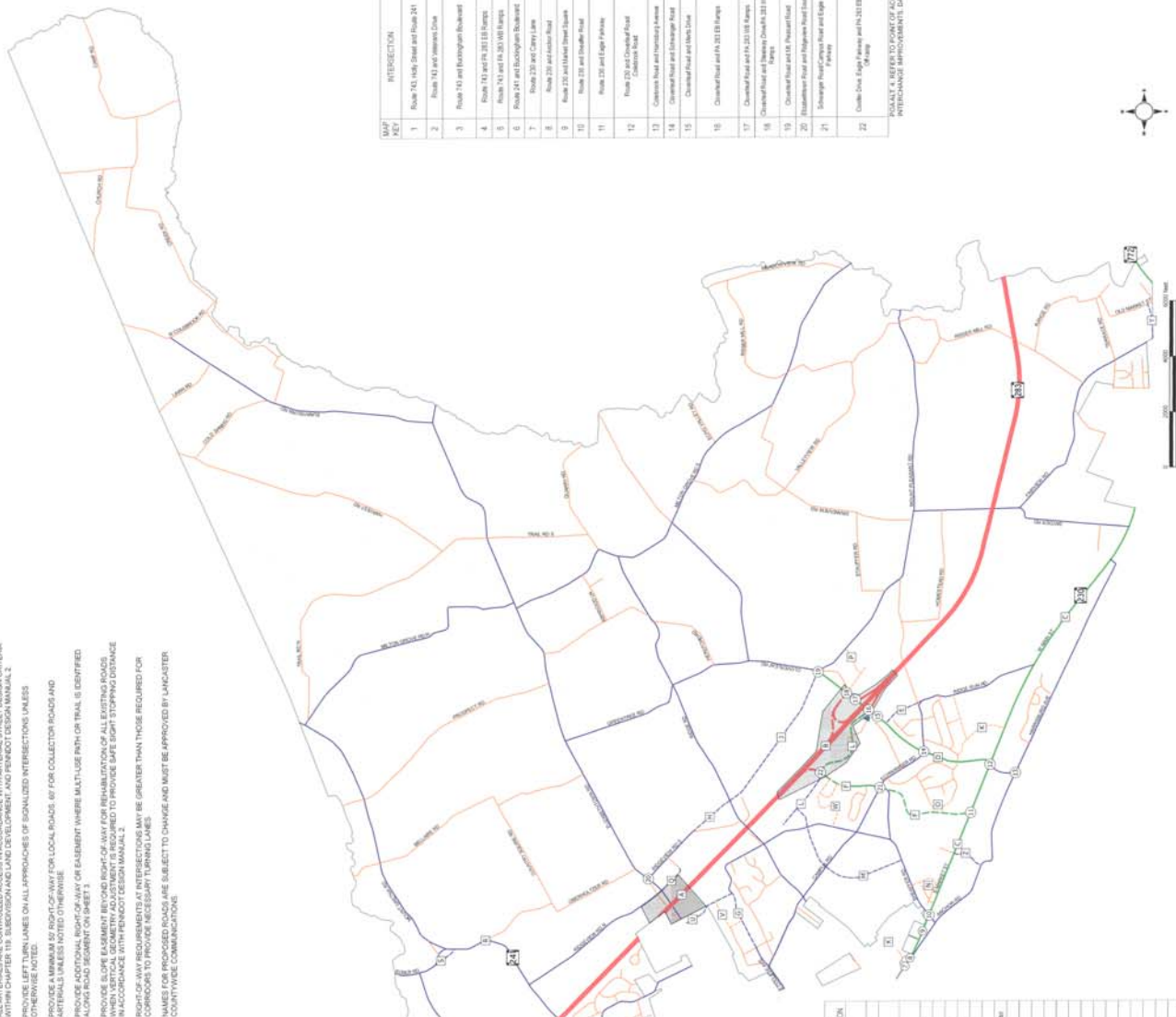


LEGEND

CLASSIFICATION	EXISTING	PROPOSED
EXTERIOR INTERSECTION		
INTERSECTION		
ROADWAY IMPROVEMENT		
PARK-AND-RIDE LOT LOCATION		

100' (30.48m)

INTERCHANGE IMPROVEMENT
① INTERSECTION IMPROVEMENT
② ROADWAY IMPROVEMENT
▲ PARK-AND-RIDE LOT LOCATION



WSP KEY	INTERSECTION	INTERSECTION IMPROVEMENTS	AGE OF DATA	ADDITIONAL REQUIREMENTS	ADDITIONAL REQUIREMENTS
1	Route 141, 145th Street and Route 241	Signalize intersection	Route 142, 10/4	Signalize intersection	Signalize intersection
2	Route 142 and 150th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
3	Route 142 and 160th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
4	Route 141 and 161st Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
5	Route 141 and 162nd Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
6	Route 141 and 163rd Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
7	Route 141 and 164th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
8	Route 141 and 165th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
9	Route 141 and 166th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
10	Route 141 and 167th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
11	Route 141 and 168th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
12	Route 141 and 169th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
13	Route 141 and 170th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
14	Route 141 and 171st Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
15	Route 141 and 172nd Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
16	Route 141 and 173rd Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
17	Route 141 and 174th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
18	Route 141 and 175th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
19	Route 141 and 176th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
20	Route 141 and 177th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
21	Route 141 and 178th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection
22	Route 141 and 179th Street	Signalize intersection	Route 141, 10/4	Signalize intersection	Signalize intersection

POAALY 4. REFER TO POINT OF ACCESS STUDY FOR ROUTE 285/CLOVERLEAF ROAD INTERCHANGE IMPROVEMENTS, DATED OCTOBER 31, 2006.

[illegible]

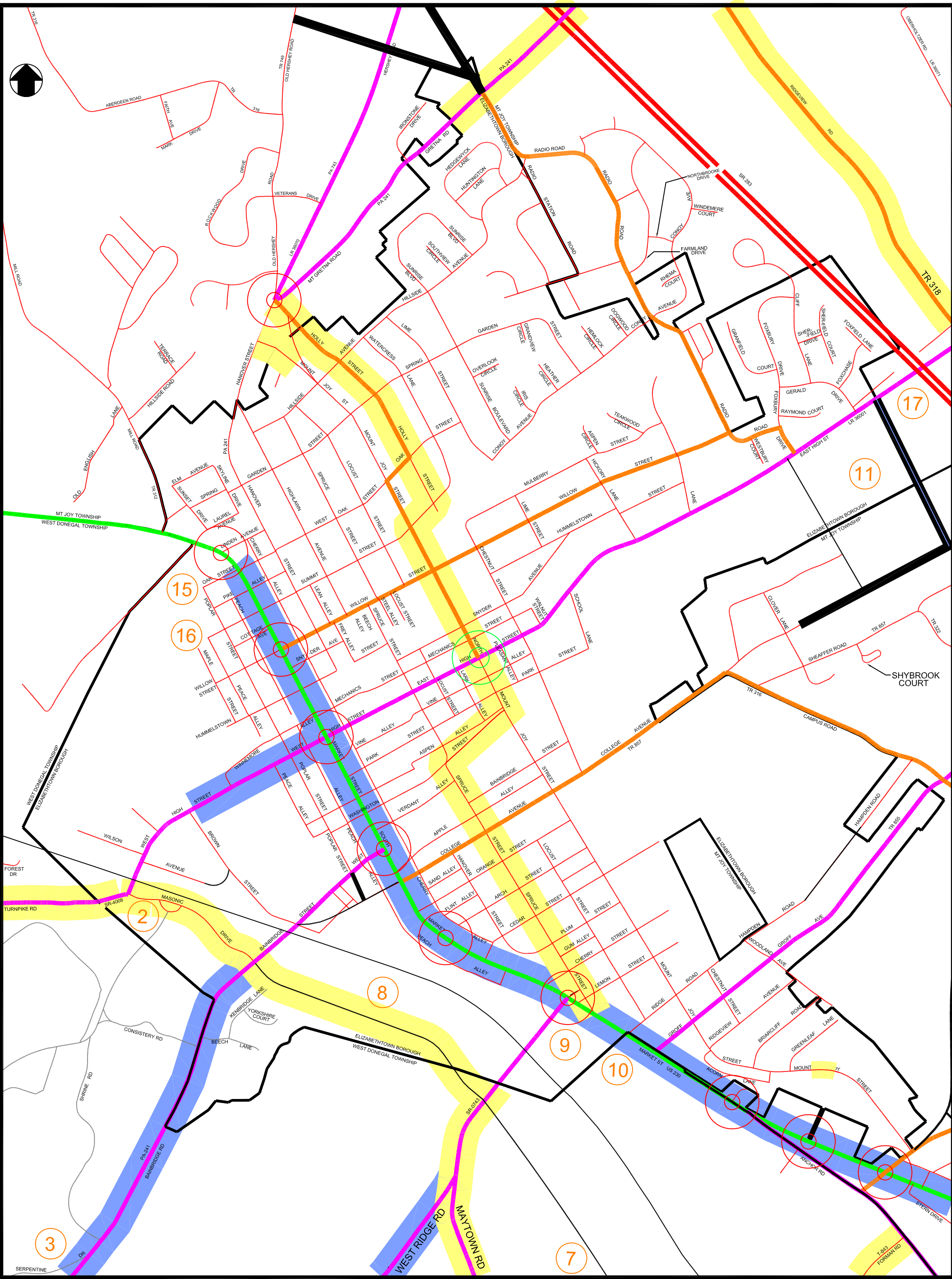
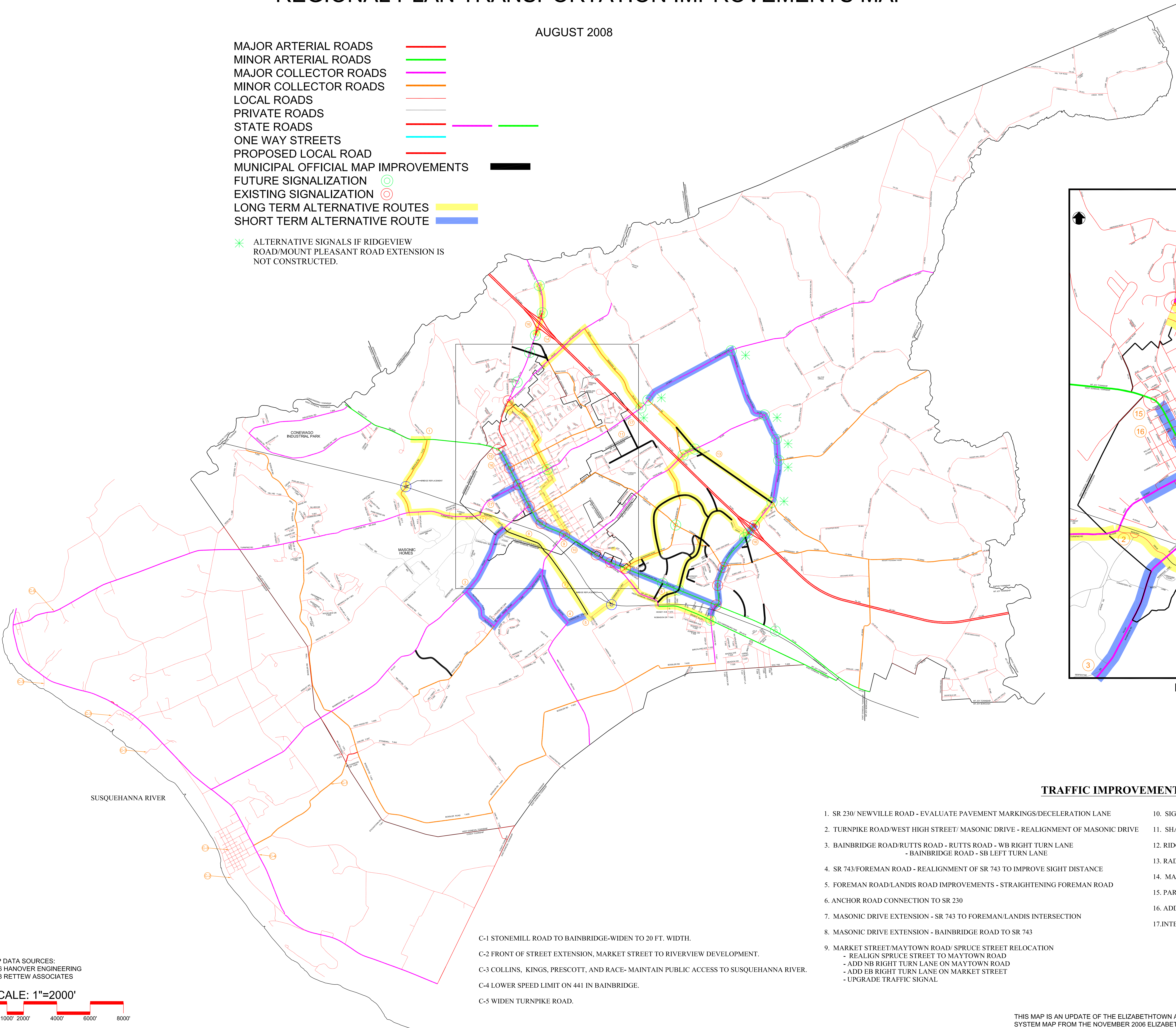
MOUNT JOY TOWNSHIP
159 WERTS DRIVE
ELIZABETHTOWN, PA 17022
(717) 367-8917

OFFICIAL MAP - SHEET 2

REGIONAL PLAN TRANSPORTATION IMPROVEMENTS MAP

AUGUST 2008

- MAJOR ARTERIAL ROADS
 - MINOR ARTERIAL ROADS
 - MAJOR COLLECTOR ROADS
 - MINOR COLLECTOR ROADS
 - LOCAL ROADS
 - PRIVATE ROADS
 - STATE ROADS
 - ONE WAY STREETS
 - PROPOSED LOCAL ROAD
 - MUNICIPAL OFFICIAL MAP IMPROVEMENTS
 - FUTURE SIGNALIZATION
 - EXISTING SIGNALIZATION
 - LONG TERM ALTERNATIVE ROUTES
 - SHORT TERM ALTERNATIVE ROUTE
- * ALTERNATIVE SIGNALS IF RIDGEVIEW ROAD/MOUNT PLEASANT ROAD EXTENSION IS NOT CONSTRUCTED.



ELIZABETHTOWN BOROUGH
SCALE: 1"=1000'

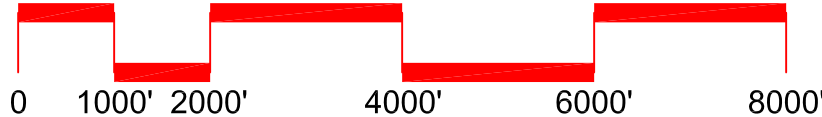
TRAFFIC IMPROVEMENTS

1. SR 230/ NEWVILLE ROAD - EVALUATE PAVEMENT MARKINGS/DECELERATION LANE
2. TURNPIKE ROAD/WEST HIGH STREET/ MASONIC DRIVE - REALIGNMENT OF MASONIC DRIVE
3. BAINBRIDGE ROAD/RUTTS ROAD - RUTTS ROAD - WB RIGHT TURN LANE - BAINBRIDGE ROAD - SB LEFT TURN LANE
4. SR 743/FOREMAN ROAD - REALIGNMENT OF SR 743 TO IMPROVE SIGHT DISTANCE
5. FOREMAN ROAD/LANDIS ROAD IMPROVEMENTS - STRAIGHTENING FOREMAN ROAD
6. ANCHOR ROAD CONNECTION TO SR 230
7. MASONIC DRIVE EXTENSION - SR 743 TO FOREMAN/LANDIS INTERSECTION
8. MASONIC DRIVE EXTENSION - BAINBRIDGE ROAD TO SR 743
9. MARKET STREET/MAYTOWN ROAD/ SPRUCE STREET RELOCATION
 - REALIGN SPRUCE STREET TO MAYTOWN ROAD
 - ADD NB RIGHT TURN LANE ON MAYTOWN ROAD
 - ADD EB RIGHT TURN LANE ON MARKET STREET
 - UPGRADE TRAFFIC SIGNAL
10. SIGHT DISTANCE IMPROVEMENTS ON MARKET STREET- GROFF TO RIDGE ROAD
11. SHAEFFER ROAD CONNECTION TO EAST HIGH STREET
12. RIDGEVIEW ROAD/MT PLEASANT ROAD
13. RADIO ROAD EXTENSION TO SR 743
14. MARKET STREET TRAFFIC SIGNAL COORDINATION UPGRADE
15. PARK AND RIDE FACILITIES AT SR 283 INTERCHANGES
16. ADD BUS STOP AT AMTRAK TRAIN STATION
- 17.INTERCHANGE CONSTRUCTION-SR 283/HIGH STREET.

- C-1 STONEMILL ROAD TO BAINBRIDGE-WIDEN TO 20 FT. WIDTH.
- C-2 FRONT OF STREET EXTENSION, MARKET STREET TO RIVERVIEW DEVELOPMENT.
- C-3 COLLINS, KINGS, PRESCOTT, AND RACE- MAINTAIN PUBLIC ACCESS TO SUSQUEHANNA RIVER.
- C-4 LOWER SPEED LIMIT ON 441 IN BAINBRIDGE.
- C-5 WIDEN TURNPIKE ROAD.

MAP DATA SOURCES:
2006 HANOVER ENGINEERING
2008 RETTEW ASSOCIATES

SCALE: 1"=2000'



H:\07\07-01449-002\INCOMING\MARKUP-CHANGES-8-04-08\REGIONAL TRANSPORTATION MAP FROM HANOVER2.DWG

THIS MAP IS AN UPDATE OF THE ELIZABETHTOWN AREA REGIONAL TRANSPORTATION SYSTEM MAP FROM THE NOVEMBER 2006 ELIZABETHTOWN AREA REGIONAL TRANSPORTATION STUDY PREPARED BY HANOVER ENGINEERING.

RETTEW
We answer to you.

Greg Creasy

From: ePermitting Help <penndotepermittinghelp@pa.gov>
Sent: Wednesday, April 27, 2022 11:40 AM
To: sichelstiel@pennmarkproperties.com; gcreasy@grovemiller.com; ekinard@pa.gov; mmalik@state.pa.us; ralandar@pa.gov; dnoles@state.pa.us; RA-pdDist80Signals@pa.gov; rbini@co.lancaster.pa.us; justin@mtjoytwp.org; patricia@mtjoytwp.org; sgault@pa.gov
Cc: RA-PDESPROD@pa.gov
Subject: :: Scoping Meeting Application - Returned - Application Number is : S0820210107 (Sent on: 04/27/2022 11:40:15 AM)

PennDOT has completed its review of the TIS Determination and Scoping Meeting Application.

Please address the following comments below, and resubmit the application to PennDOT for review.

PennDOT Review Comments :

1. The District Traffic Unit has reviewed the submitted Cycle 3 TIS scope application and has found it to be conditionally acceptable. Please proceed with the TIS submission pending the applicant's revision to the proposed accesses as noted in the attached comments. Comments, to be addressed in the TIS submission, have been uploaded in the attachment section. The revised trip distribution may be submitted via email for the Traffic Unit's review/approval prior to the TIS submission.

[Click here to access the Scoping Application](#)

PENNDOT EPERMIT - PLEASE DO NOT REPLY TO THIS EMAIL

Scope Application Cycle 4 Comment Sheet

COUNTY:	Lancaster	MUNICIPALITY:	Mount Joy Township
JOB NAME:	Pennmark Property	PREPARED BY:	Grove Miller Engineering, Inc.
APPLICANT:	Pennmark Management Company Inc	REVIEW BY:	PennDOT/McM

Please incorporate these comments into the TIS submission and the revised trip distribution, which the trip distribution may be submitted via email to the Traffic Unit for review/approval prior to the TIS submission:

Scope Application Comments:

1. As previously noted, the proposed access to S.R. 0230 between Cloverleaf Road and the proposed signalized full movement access must be eliminated or further restricted to RI only. The application currently notes two options for consideration, but a RIRO only access is not an option and therefore the trip distribution and the TIS should be prepared without this access or with a single access further restricted to RI only.
2. Documentation of the revised scope acceptance from Mount Joy Township as well as the MPO, as necessary, for the scope should be provided. Include documentation of correspondence within the study.
3. Provide additional information regarding the trip distribution percentages shown for roadways not considered in the retail gravity model, such as Maytown Road (SR 0743), the PA-283 ramps, Groff Avenue, Harrisburg Avenue, and Schwanger Road.
4. Clarify which intersection counts are being utilized in the analysis of existing traffic patterns as shown on the trip distribution methodology documentation figure. Additionally, clarify the source of the volumes used for pass-by trip distribution along Cloverleaf Road as they do not seem consistent with the count data.
5. Provide trip distribution percentages for each site driveway, and to clarify the trip distribution must be provided consistent with the final driveway configuration proposed (i.e., RI only or eliminated secondary access to SR 0230).

REVISED TRANSPORTATION IMPACT STUDY (TIS) SCOPING MEETING APPLICATION

Project Name: Pennmark Property

Applicant: Pennmark Management Company, Inc.

Applicant's Traffic Engineer: Grove Miller Engineering, Inc.

Applicant's Primary Contact: Gregory E. Creasy, P.E.

Note: Revisions in italics font.

(1) LOCATION OF PROPOSED DEVELOPMENT:

PennDOT Engineering District: 8-0

County: Lancaster

Municipality: Mount Joy Township

State Route(s) (SR): SR 0230, Seg/Off: 0140/0670 to Seg/Off: 0140/1350

State Route(s) (SR): SR 0230, Seg/Off: 0150/0000 to Seg/Off: 0160/0660

State Route(s) (SR): SR 4025, Seg/Off: 0020/0000 to Seg/Off: 0020/0760

(2) DESCRIPTION OF PROPOSED DEVELOPMENT:

Proposed Site Access Locations: The proposed development is very large with over 3,000 feet of frontage along SR 0230 and frontage on both sides of SR 4025 for over 500 feet. Currently proposed access locations are as follows:

Pennmark Site West of SR 4025 (630 ft. of frontage on SR 0230)

- 1) Full access onto SR 0230 on east boundary for Connector Road to SR 4025
- 2) Full access onto SR 4025 for Connector Road from SR 0230 *aligned opposite the access for the parcels East of Cloverleaf Road.*

Pennmark Site East of SR 4025 (2,400 ft. of frontage on SR 0230)

- 1) Signalized access onto SR 0230, 1,330 feet east of Cloverleaf Road, for Norlanco Drive extension
- 2) Right-in only driveway onto SR 4025 on north side of convenience store parcel

- 3) Driveway onto SR 4025, 550 feet north of SR 0230 aligned opposite the Connector Road for the parcels west of Cloverleaf Road.
- 4) Full access onto Ridge Run Road at east end of site
- 5) *Two (2) options are being considered for a restricted access driveway onto SR 0230 proposed between Cloverleaf Road and Norlanco Drive extension (only one option will be proposed in the TIS):*

Option A: Right-in only driveway located on the east side of the convenience store lot. This driveway would be located approximately 425 feet from the stop bar at the signalized intersection of SR 0230/Cloverleaf Road. A sketch plan for this option is provided in the attachments.

Option B: Right-in/right-out only driveway located midway between Cloverleaf Road and Norlanco Drive extension. This driveway would be located approximately 625 feet from the stop bar at the signalized intersection of SR 0230/Cloverleaf Road. A sketch plan for this option is provided in the attachments. The evaluation of this access location will include queuing from the adjacent traffic signal at SR 0230/Cloverleaf Road, sight distance, signage and design to prevent illegal movements, and safety.

Access Location/Alignment Notes:

- 1) The developer is working with adjacent property owners to attempt to provide an aligned, four-way intersection from the proposed driveways onto SR 4025 from the east and west sides of the Pennmark Development.
- 2) The developer is working with the church located on the west side of SR 4025 just north of the development parcels to provide access to the church from the Bypass Road rather than SR 4025.

Proposed Land Uses: The development will consist of a variety of land uses. The current proposed breakdown is as follows:

Pennmark Site West of SR 4025

- 1) 23,000 square-foot fitness center

- 2) 70,570 square feet of general retail space
- 3) 4,000 square-foot drive-in bank w/ 3 drive-thru lanes

Pennmark Site East of SR 4025

- 1) 5,600 square-foot super convenience store
- 2) 21,900 square-foot supermarket
- 3) 144,600 square feet of general retail space
- 4) 39,000 square feet of office space
- 5) 10,000 square-foot pharmacy
- 6) 4,000 square-foot medical office/urgent care
- 7) 170 apartments

It is anticipated that the development will be constructed in phases. The TIS will be constructed such that a phased development and improvement plan will be provided. The development phases are presented in Section 3.

Community Linkages: The development plan shows extension of Norlanco Drive thru the site to the south to connection to SR 0230 at a proposed signalized intersection. It is assumed that this connection will happen during Phase 1 of the proposed development. The extension of Norlanco Drive is shown on the Mount Joy Township Official Map.

A second Connector Road is also proposed thru the development site located west of SR 4025. The Connector Road will also intersect SR 0230 approximately 950 feet west of Cloverleaf Road. It is assumed that this connection will happen during Phase 3 of the proposed development.

(3) DEVELOPMENT SCHEDULE AND STAGING:

Anticipated Phasing Schedule:

Phase 1:	2024
Phase 2:	2026
Phase 3:	2028

Proposed Development Schedule/Staging Description:

Phase 1

5,600 square-foot super convenience store
4,000 square-foot medical office/urgent care
94,000 square feet of general retail space
39,000 square feet of office space
21,900 square-foot supermarket
10,000 square-foot pharmacy

Phase 2

50,600 additional square feet of general retail space
170 units of apartments

Phase 3 (west side of Cloverleaf Road)

23,000 square-foot fitness center
70,570 square feet of general retail space
4,000 square-foot drive-in bank w/ 3 drive-thru lanes

(4) TRIP GENERATION:

Trip Generation Method:

 X ITE Trip Generation Manual 11th Edition

Trip generation calculations are summarized in the following table. Trip generation calculation worksheets for each Phase are attached for reference.

For the Convenience Store land use, trip generation calculations were performed using the number of vehicle fueling positions category with the building square footage as the secondary variable, and then with the building square footage category with the number of fueling positions as the secondary variable to determine the most conservative estimates. The most conservative estimate was used in the trip generation projections.

For the Drive-In Bank land use, trip generation calculations were performed using the building square footage and the number of drive-thru lanes to determine the most conservative estimates. The most conservative estimate was used in the trip generation projections.

It is noted that the Saturday peak hour trip generation calculations for the Pharmacy and Multi-Family Housing land uses were taken from the 10th Edition of the Trip Generation Manual due to the lack of sufficient data points in the 11th Edition.

For Land Use 821, the “Supermarket - No” subcategory was used because trip generation calculations for the small Supermarket were performed separately.

Proposed Land Use and Trip Generation Summary - Phase 1

Land Use (Code)	Size	Daily Trips	Peak Hour Trips					
			AM Enter	AM Exit	PM Enter	PM Exit	SAT Enter	SAT Exit
Office (710)	39,000 sq ft	511	65	9	13	63	11	10
Internal Trips	–	238	12	8	8	15	4	5
New External Trips	–	273	53	1	5	48	7	5
Medical Office (720)	4,000 sq ft	64	10	3	4	9	7	5
Internal Trips	–	29	2	3	2	2	3	3
New External Trips	–	35	8	0	2	7	4	2
Retail (821)	94,000 sq ft	6,347	101	62	239	249	328	302
Internal Trips	–	852	10	10	47	31	34	37
External Trips	–	5,495	91	52	192	218	294	265
Pass-By Trips	–	–	0	0	77	87	91	82
New Trips	–	–	91	52	115	131	203	183
Supermarket (850)	21,900 sq ft	2,366	37	26	113	113	148	149
Internal Trips	–	314	4	4	23	14	15	18
External Trips	–	2,052	33	22	90	99	133	131
Pass-By Trips	–	–	0	0	22	24	25	25
New Trips	–	–	33	22	68	75	108	106
Conv. Store (945)	5,600 sq ft	4,149	189	190	161	162	175	182
Internal Trips	–	1,338	22	24	50	71	62	54
External Trips	–	2,811	167	166	111	91	113	128
Pass-By Trips	–	–	127	126	83	68	73	83
New Trips	–	–	40	40	28	23	40	45
Pharmacy (881)	10,000 sq ft	1,123	19	18	51	52	43	45
Internal Trips	–	144	2	3	10	7	4	6
External Trips	–	979	17	15	41	45	39	39
Pass-By Trips	–	–	0	0	20	22	0	0
New Trips	–	–	17	15	21	23	39	39
Total Site Trips		14,560	421	308	581	648	712	693
Total External Trips		11,645	369	256	441	508	590	570
Total Pass-By Trips		–	127	126	202	201	189	190
Total New Trips		–	242	130	239	307	401	380

Proposed Land Use and Trip Generation Summary - Phase 2

Land Use (Code)	Size	Daily Trips	Peak Hour Trips					
			AM Enter	AM Exit	PM Enter	PM Exit	SAT Enter	SAT Exit
Office (710)	39,000 sq ft	511	65	9	13	63	11	10
Internal Trips	–	255	13	8	8	16	5	5
New External Trips	–	256	52	1	5	47	6	5
Medical Office (720)	4,000 sq ft	64	10	3	4	9	7	5
Internal Trips	–	31	2	3	3	2	4	3
New External Trips	–	33	8	0	1	7	3	2
Retail (821)	144,600 sq ft	9,763	155	95	367	383	467	432
Internal Trips	–	1,248	15	14	66	55	50	61
External Trips	–	8,515	140	81	301	328	417	371
Pass-By Trips	–	–	0	0	120	131	129	115
New Trips	–	–	140	81	181	197	288	256
Supermarket (850)	21,900 sq ft	2,366	37	26	113	113	148	149
Internal Trips	–	303	4	4	20	17	15	21
External Trips	–	2,063	33	22	93	96	133	128
Pass-By Trips	–	–	0	0	22	23	25	24
New Trips	–	–	33	22	71	73	108	104
Conv. Store (945)	5,600 sq ft	4,149	189	190	161	162	175	182
Internal Trips	–	1,629	38	29	57	80	86	62
External Trips	–	2,520	151	161	104	82	89	120
Pass-By Trips	–	–	115	122	78	61	58	78
New Trips	–	–	36	39	26	21	31	42
Pharmacy (881)	10,000 sq ft	1,123	19	18	51	52	43	45
Internal Trips	–	135	2	3	9	7	5	6
External Trips	–	988	17	15	42	45	38	39
Pass-By Trips	–	–	0	0	21	22	0	0
New Trips	–	–	17	15	21	23	38	39
Apartments (220)	170 units	1,165	18	58	59	35	75	75
Internal Trips	–	464	1	14	37	23	26	34
New External Trips	–	701	17	44	22	12	49	41
Total Site Trips		19,141	493	399	768	817	926	898
Total External Trips		15,076	418	324	568	617	735	706
Total Pass-By Trips		–	115	122	241	237	212	217
Total New Trips		–	303	202	327	380	523	489

Proposed Land Use and Trip Generation Summary - Phase 3

Land Use (Code)	Size	Daily Trips	Peak Hour Trips					
			AM Enter	AM Exit	PM Enter	PM Exit	SAT Enter	SAT Exit
Fitness (492)	23,000 sq ft	940*	15	15	54	40	36	37
Retail (821)	70,570 sq ft	4,765	76	46	179	187	233	215
Pass-By Trips	—	—	0	0	72	75	72	67
New Trips	—	—	76	46	107	112	161	148
Drive-In Bank (912)	4,000 sq ft	401	23	17	42	42	54	51
Pass-By Trips	—	—	7	5	15	15	21	19
New Trips	—	—	16	12	27	27	33	32
Total Pass-by	—	—	7	5	87	90	93	86
Total New	—	6,106	107	73	188	179	230	217

* - ADT calculated assuming PM peak hour trips equate to 10 percent of ADT.

(5) ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:

(a) Estimated Daily Trip Generation of Proposed Development at Full Build Out:

East Development (Phases 1 & 2): 15,076 external site trips.

West Development (Phase 3): 6,106 external site trips.

(b) Driveway Classification Based on Trip Generation and One Access Point:

The TIS will include ADT calculations and PennDOT classifications for each of the proposed driveways.

(6) TRANSPORTATION IMPACT STUDY REQUIREMENT:

☐ No

☒ Yes

☒ 3,000 or more vehicle trips/day generated

☒ 100 or more new vehicle trips entering or 100 or more new vehicle trips exiting the proposed development

☐ Other considerations as described below:

(7) TRAFFIC IMPACT ASSESSMENT REQUIREMENT:

☒ No
☐ Yes

NOTE: If A TIS is required, the following sections of the check list will be discussed at the TIS Scoping Meeting. Preliminary information may be added prior to meeting.

(8) TIS STUDY AREA:

Roadway and Study Intersections: It is proposed that the TIS will include analyses of the following intersections:

- SR 0230 (S. Market Street) and SR 4025 (Cloverleaf Road/Colebrook Road)
- SR 0230 and Scheaffer Road
- SR 0230 and Ridge Run Road
- SR 4025 and SR 4018 (Harrisburg Avenue)
- SR 4025 and Andrew Avenue/Norlanco Drive
- SR 4025 and Schwanger Road
- SR 4025 and PA Route 283 Eastbound Ramps
- SR 4025 and PA Route 283 Westbound Ramps
- All site access locations
- SR 0230 and Market Street Square Driveway/Hess Driveway
- SR 0230 and Giant Plaza Driveway
- SR 0230 and Groff Avenue
- SR 0230 and SR 0743 (Maytown Road)
- SR 4025 and Merts Drive

Land Use Context: The development site is located in an area defined by PennDOT as an Urban Area. When the existing land use of the proposed development site and the land uses of the properties immediately surrounding the site are considered, the area can be defined as a Suburban Corridor. SR 0230 and SR 4025 can be considered Regional Arterials based upon criteria in Publication 10X (Design Manual Part 1X).

Known Congestion Areas: None

Known Safety Concerns: None

Known Environmental Constraints: None

Pedestrian/Bicycle Review: The TIS will include a discussion of existing and/or proposed pedestrian facilities (i.e. sidewalks, intersection treatments, and off-road paths/trails). The TIS will include a discussion of existing and/or proposed bicycle facilities (i.e. on-street bike lanes, paved shoulders, and off-road paths/trails). The TIS will state that if pedestrian accommodations are needed, they will be constructed to be ADA compliant as required and approved by the Department in the HOP process.

Transit Review: The TIS will include a discussion of existing transit facilities that could be affected by the proposed project (i.e. bus routes within 0.25 miles, and rail centers within 0.5 miles of the development).

(9) STUDY AREA TYPE:

☒ Urban
☐ Rural

(10) TIS ANALYSIS PERIOD AND TIMES:

Traffic analyses will be conducted at the study area intersections during weekday AM, weekday PM, and Saturday midday peak hour traffic periods. The analyses will be performed for the following years:

Existing (2022)
Phase 1 Opening Year (2024)
Phase 1 Horizon Year (2029)
Phase 2 Opening Year (2026)
Phase 2 Horizon Year (2031)
Phase 3 Opening Year (2028)
Phase 3 Horizon Year (2033)

The TIS will include With Development Future Year analyses for the Opening and Horizon Years for two (2) scenarios (no improvements and with improvements, if required) in accordance with Step 9 of PennDOT's Policies and Procedures for Transportation Impact Studies Related to Highway Occupancy Permits.

(11) TRAFFIC ADJUSTMENT FACTORS:

(a) Seasonal Adjustment: None taken.

(b) Annual Base Traffic Growth: 0.67 %/Year Source: PennDOT

(c) Pass-By Trips: LU 821 Shopping Plaza 40,000-150,000 sq. ft. - 40% PM, 31% SAT; Super Convenience Store - 76% AM, 75% PM, 65% SAT (assume 10% less than PM); Pharmacy w/ Drive-Thru - 49% PM; Supermarket - 24% PM, 19% SAT; and Drive-In Bank - 29% AM, 35% PM, 38% SAT. See trip generation table, trip distribution figures, and trip generation calculation documentation.

(d) Captured Trips for Multi-Use Sites: Internal capture trips were calculated using the ITE/NCHRP 684 Internal Trip Capture Estimation Tool Spreadsheet. For Saturday and weekday ADT internal trip calculations, the average of the AM and PM peak hour internal capture trip rates were used. Copies of the spreadsheets are attached. The internal capture trips were split between each of the land uses within the grouped categories based upon the percentage of trips for each land use within the group (e.g., if pharmacy had 10 trips of 100 total retail group category trips, then 10 percent of internal trips were assigned to the pharmacy).

(e) Modal Split Reduction: None taken

(f) Other Reductions: None taken

(12) OTHER ADJACENT PROJECTS WITH IN THE STUDY AREA TO BE ADDED TO BASE TRAFFIC:

The Township has provided information regarding six (6) other development projects in the area. The developments are: Featherton 5, 1376 Campus Road, 1925 Sheaffer Road, Westbrooke IV, Raffensperger, and Westmount. Traffic for the developments will be included in the TIS where appropriate (TIS submitted to the Township prior to the TIS submission for this development).

(13) TRIP DISTRIBUTION AND ASSIGNMENT:

Trip distribution calculations and trip assignments will be provided after the trip generation methodology is approved by PennDOT/Township during the TIS Scoping Process and before the formal TIS is submitted. The proposed trip assignments will be based on a gravity model.

(14) APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

<u>Location</u>	<u>Period</u>	<u>Type</u>
Study Intersections	6:00 - 9:00 AM (Weekday)	TMC
	3:00 - 6:00 PM (Weekday)	
	11:00 AM - 2:00 PM (Saturday)	
SR 0230	24-Hour ADT	ATR
SR 4025	24-Hour ADT	ATR

(15) CAPACITY/LOS ANALYSIS:

<u>Location</u>	<u>Period</u>	<u>Type</u>
All	AM, PM, SAT	HCM 6 th , Synchro 10

(16) ROADWAY IMPROVEMENTS/MODIFICATIONS PLANNED BY OTHERS TO BE INCLUDED:

No planned roadway improvement projects were identified during the Scoping Meeting.

(17) OTHER NEEDED ANALYSES:

(a) Sight Distance Analyses: Sight distance evaluations will be performed at the site driveway (using Chapter 441 criteria) and local road extension locations (using intersection sight distance criteria from the AASHTO Greenbook). It is understood that sight distances less than Safe Sight Distance will only be accepted if it is not possible to achieve Safe Sight Distance anywhere along the property frontage.

(b) Signal Warrant Analyses: Traffic signal warrant analyses will be conducted at intersections that require mitigation. The analyses will evaluate all applicable signal warrants in the MUTCD and the additional PennDOT warrants.

(c) Required Signal Phasing/Timing Modifications: Signal timing and phasing at existing and proposed signalized intersections in the study area will be evaluated as necessary.

(d) Traffic Signal Corridor/Network Analyses: Traffic signal corridor and interconnect timings at existing and proposed signalized intersections in the study area will be evaluated as necessary.

(e) Turning Lane Analyses: Analyses of the need for turning lanes and turning lane lengths will be conducted at the site access locations. The analyses will be in accordance with Section 11.16 and 11.17 of PennDOT Publication 46.

(f) Turning Lane Lengths: Analyses of the need for turning lanes and turning lane lengths will be conducted at the site access locations. The analyses will be in accordance with Section 11.16 and 11.17 of PennDOT Publication 46. Queue analyses will also be evaluated when determining the appropriate turning lane lengths.

(g) Left Turn Signal Phasing Analyses: Left turn signal phasing at existing and proposed signalized intersections in the study area will be evaluated as necessary.

(h) Queue Analyses: Queue analyses will be completed for all movements at all study area intersections. The analyses will be based on the 95th percentile queue results from the HCM 6 methodology (unsignalized and signalized intersections) and Synchro analyses (signalized intersections). If necessary, the 50th percentile queue results will

be provided for critical movements that require additional study beyond the 95th percentile queues. Queue lengths will also be reviewed when determining turning lane lengths. For through movements, the distance to the next major intersection as the available stacking distance. Mitigation measures will be proposed if queues that are shorter than the available stacking distance in the baseline condition grow to lengths that are longer than the available stacking distance in the with development scenario. Mitigation measures will also be proposed if queues that are longer than the available stacking distance in the baseline condition are increased from the baseline to the with development scenarios.

(i) Gap Studies: As applicable. If the unsignalized capacity analysis shows that a movement is projected to operate at an unacceptable LOS, a gap study will be required to identify if a sufficient number of gaps exist.

(j) Crash Analyses: Traffic crash data and analyses for the study area intersections and key corridors will be provided for the most recent five years, summarizing any trends in the crash data. Mitigation options will be provided if crash trends are present at an intersection or along a corridor. It is noted that the crash history information provided by PennDOT is confidential under 75 PA Code Section 3754. This material is only provided to official agencies that have responsibility in the highway transportation system, and can only be used by those agencies for traffic safety-related planning or research. Publication, reproduction, release or discussion of these materials, as well as the use of or reliance upon these materials for any purpose other than stated above, is expressly prohibited without the specific written consent of PennDOT. Copies of the crash data reports and analyses will be provided under separate cover from the TIS.

(k) Weaving Analyses: NA

(l) Other Included Information: It is noted that an ICE form will be required for this project.

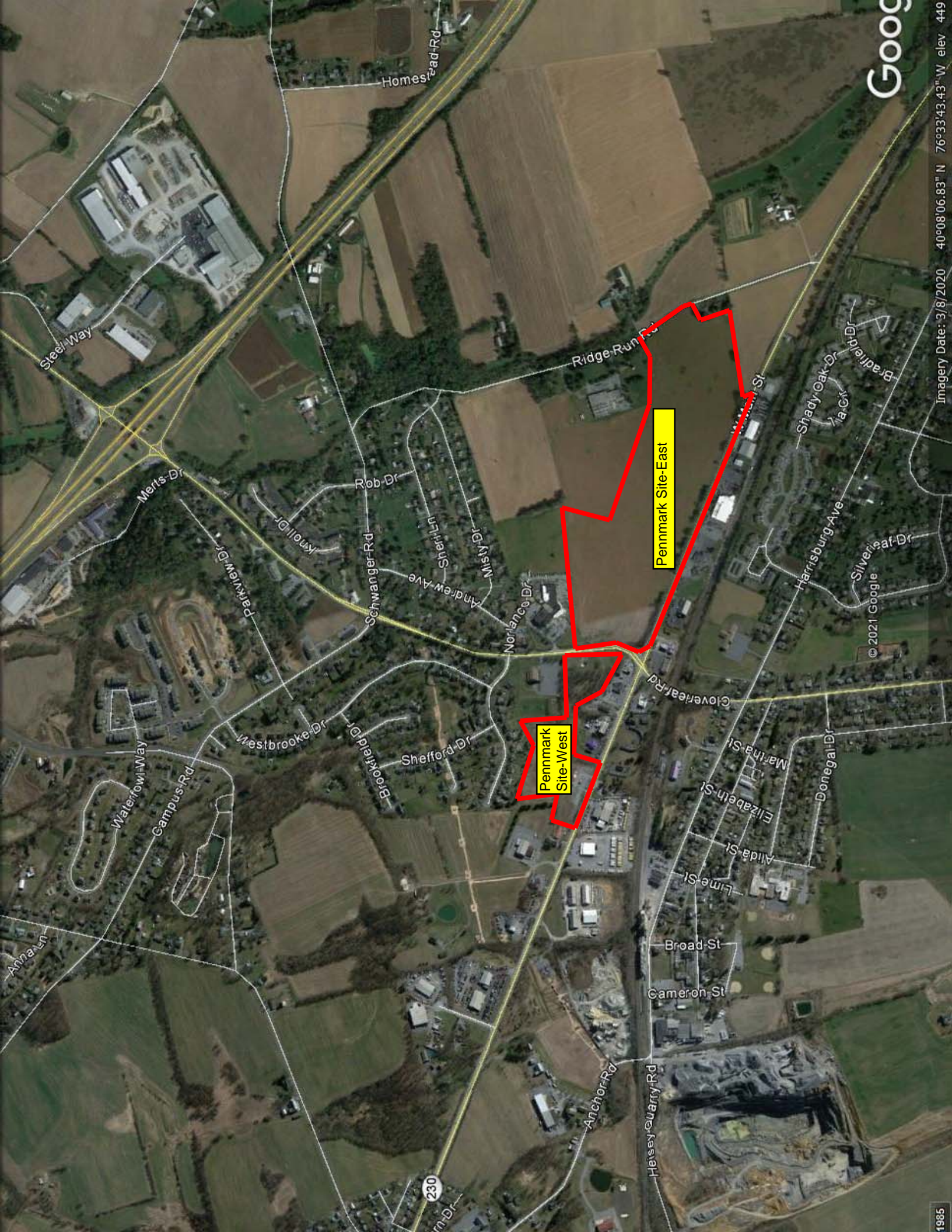
(18) ADDITIONAL COMMENTS OR RECOMMENDATIONS RELATED TO THE SCOPE OF THE TIS:

During the signal design process, PennDOT will require a new TE-672 (Pedestrian Needs Accommodation at Intersection Checklist) for the intersection of Cloverleaf Road (SR 4025) and S. Market Street (SR 0230). The pedestrian crossings will be reviewed based upon the new land uses to determine appropriate pedestrian access.

Attachments

GEC/me

G:\804_01\Revised TIS Scoping April 2022\Revised TIS SOW.wpd



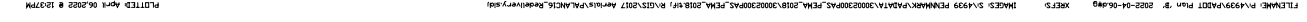
Lot/Building Number	Size	Use
Phase 1 - Between Cloverleaf Road and Norlanco Drive		
C-1	21,900 sq. ft.	Aldi
C-2	37,000 sq. ft.	Retail
C-3	39,000 sq. ft. x 2 floors	1 st Floor - Retail 2 nd Floor - Office
C-4	5,600 sq. ft.	Wawa
C-5	4,000 sq. ft.	Urgent Care
C-6	9,000 sq. ft.	Retail
C-7	9,000 sq. ft.	Retail
C-8	10,000 sq. ft.	Pharmacy
Phase 2 - East of Norlanco Drive		
C-9	4,200 sq. ft.	Retail
C-10	8,200 sq. ft.	Retail
C-11	4,500 sq. ft.	Retail
C-12	4,500 sq. ft.	Retail
C-13	4,500 sq. ft.	Retail
C-14	12,000 sq. ft.	Retail
C-15	4,500 sq. ft.	Retail
C-16	8,200 sq. ft.	Retail
Residential	170 units	Apartments
Phase 3 - West of Cloverleaf Road		
W-1	23,000 sq. ft.	Fitness Center
W-2	23,000 sq. ft.	Retail
W-3	5,500 sq. ft.	Retail
W-4	8,320 sq. ft.	Retail
W-5	3,990 sq. ft.	Bank
W-6	33,750 sq. ft.	Retail

SITE PLAN FOR PARCELS EAST OF CLOVERLEAF ROAD

OPTION A: RESTRICTED MOVEMENT DRIVEWAY ADJACENT TO CONVENIENCE STORE

SITE PLAN FOR PARCELS EAST OF CLOVERLEAF ROAD

OPTION B: RESTRICTED MOVEMENT DRIVEWAY MIDWAY BETWEEN CLOVERLEAF ROAD AND NORLANCO DRIVE EXTENSION



SITE PLAN FOR PARCELS WEST OF CLOVERLEAF ROAD

Westside

BYPASS ROAD

CLOVERLEAF ROAD

STORMWATER BASIN

W-1
23,000 SF

W-2
23,000 SF

W-6
33,750 SF

STORMWATER BASIN

W-3
6,500 SF

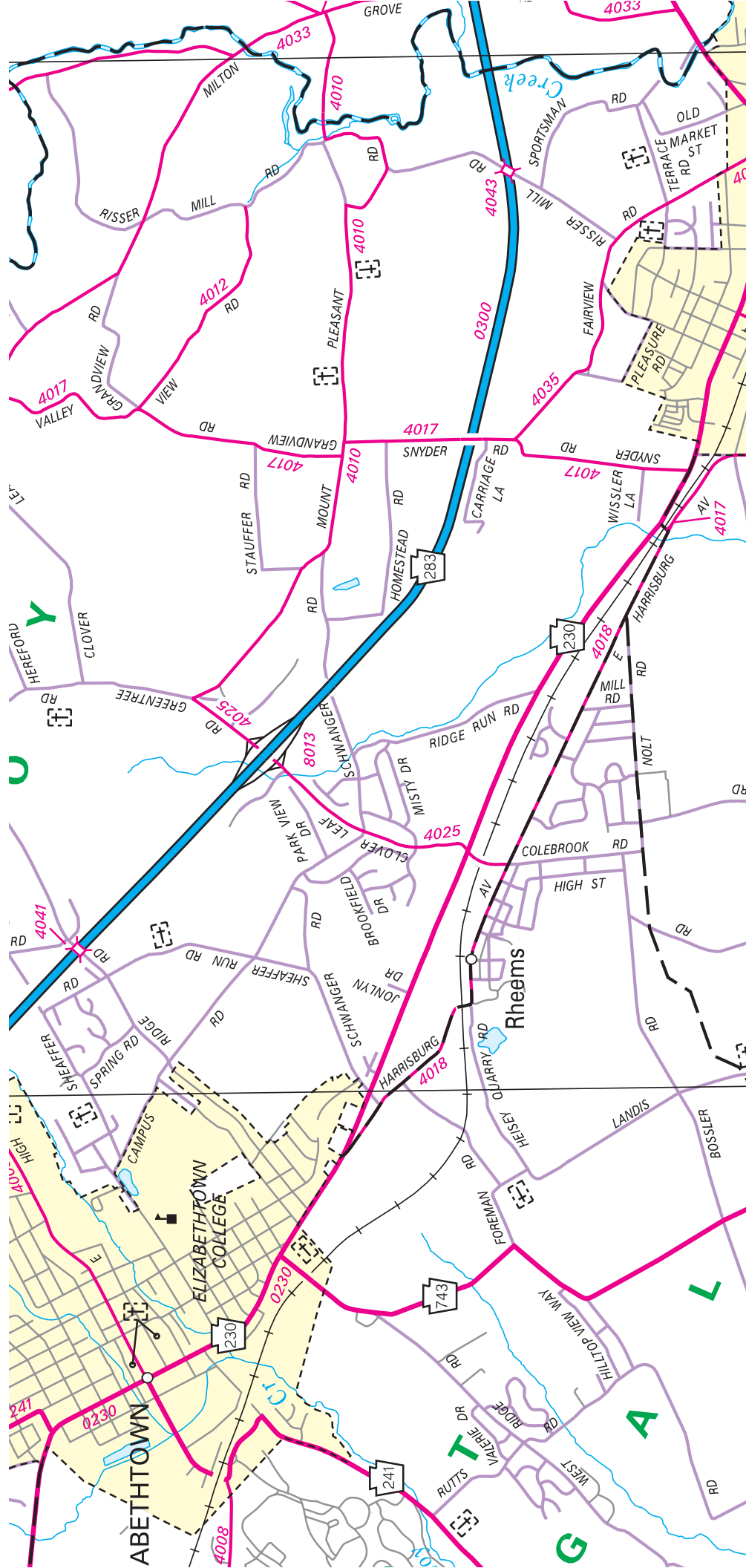
W-4
8,320 SF

W-5
3,990 SF



EXISTING
TRAFFIC
LIGHT





EXTRACT DATE: 12/19/2018 ROADWAY MANAGEMENT SYSTEM PAGE NUMBER: 94
PRINT DATE: 12/26/2018 SLD COUNTY/SR - ANNUAL PRINT COUNTY: LANCASTER
DIR: B DIST: 08-7 SR: 230
LEFT MUN: MOUNT JOY TOWNSHIP T RIGHT MUN: MOUNT JOY TOWNSHIP T
TOTAL LEN: 12.109 MI.
024486 FT 1 0 00129 0 01 0241+68
NC MAIN STREET
0140/0000 LENGTH(AH 2226 BK 3649)

JONLYN DR (T837)	0130/2424	0130/0368	STERN DR (TWP)
LARKSPUR LN (TWP)	0130/0475	020837 FT	SHEAFFER RD (T843)
1 0 00129 0 01 0205+19 020837 FT	0130/0000	0130/0000	LENGTH(AH 3649 BK 1734)
SHEAFFER RD (T843)			UNKNOWN RD (TWP)
UNKNOWN RD (TWP)	0120/1125	0120/1125	BMSSEN 36/0230/0120/0542
		0120/0552	1 0 00129 0 01 0192+10
			TR CONDY CRK
		0120/0542	BMSBG 36/0230/0120/0542
		0120/0326	ANCHOR RD
		0120/0282	(SR4018 SEG 0010/0000)
			MOUNT JOY TOWNSHIP
			WEST DONEGAL T
			TO 4018/0010 SH
		0120/0013	(CONN)
		019103 FT	1 0 00129 0 01 0188+00
		0120/0000	LENGTH(AH 1734 BK 1555)
UNKNOWN RD (BORO)	0110/1438	0110/1438	UNKNOWN RD (BORO)
GROFF AV (BORO)	0110/0387	017548 FT	1 0 00129 0 01 0175+02
RIDGE RD (BORO)	017548 FT		NC MARKET ST
MOUNT JOY TOWNSHIP			WEST DONEGAL
ELIZABETH TOWN B			ELIZABETH TOWN B
SPRUCE ST	0110/0000	0110/0000	LENGTH(AH 1555 BK 0811)

EXTRACT DATE: 12/19/2018 ROADWAY MANAGEMENT SYSTEM PAGE NUMBER: 95
PRINT DATE: 12/26/2018 SLD COUNTY/SR - ANNUAL PRINT COUNTY: LANCASTER

DIR: B TOTAL LEN: 12.109 MI. DIST: 08-7 SR: 230
LEFT MUN: MOUNT JOY TOWNSHIP T RIGHT MUN: MOUNT JOY TOWNSHIP T

0190/0286 HARRISBURG AV
0190/0026 (SR4017 SEG 0060/2562)
035074 FT BMSBN 36/0230/0190/0000
1 0 00129 0 01 0350+99
DNEGAL CK
BMSBG 36/0230/0190/0000
0190/0000 LENGTH(AH 1656 BK 2157)

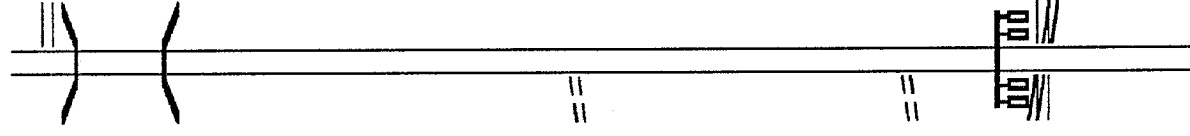
032917 FT 1 0 00129 0 01 0329+27
0180/0000 LENGTH(AH 2157 BK 2228)

030689 FT
0170/0000 LENGTH(AH 2228 BK 2085)

028604 FT 1 0 00129 0 01 0286+14
NC HARRISBURG PK
0160/0000 LENGTH(AH 2085 BK 1892)

CLOVER LEAF RD
(SR4025 SEG 0020/0000)

026712 FT COLEBROOK RD
0150/0000 (SR4025 SEG 0020/0000)
LENGTH(AH 1892 BK 2226)



035074 FT

032917 FT

1 0 00129 0 01 0306+99 030689 FT
RIDGE RUN RD
(T316) 0170/0000

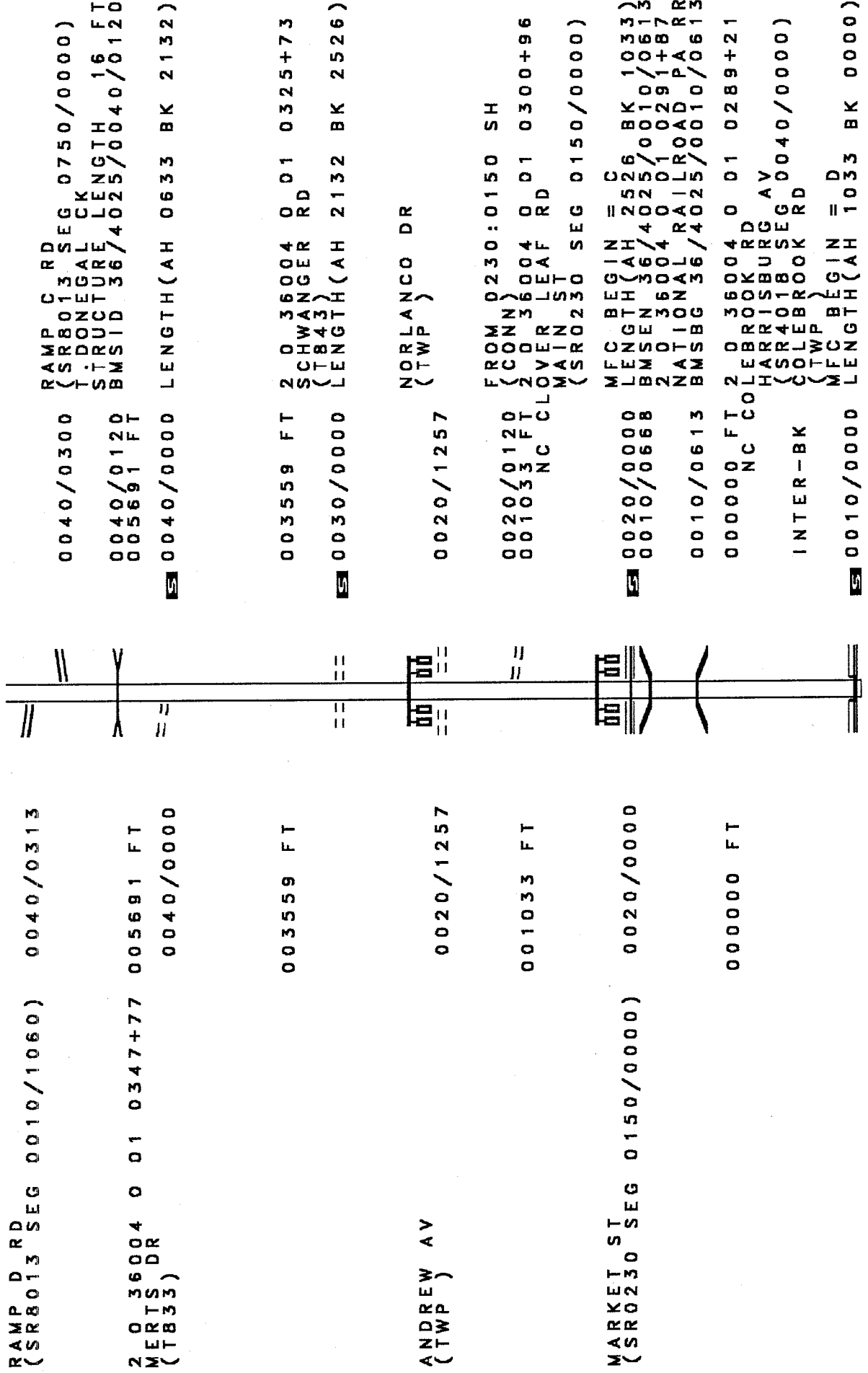
028604 FT

TO 4025/0020 SH
(CONN) 0150/0201

1 0 00129 0 01 0267+22 026712 FT
CLOVERLEAF RD
(SR4025 SEG 0020/0000) 0150/0000

[illegible]

EXTRACT DATE: 12/19/2018 ROADWAY MANAGEMENT SYSTEM PAGE NUMBER: 730
PRINT DATE: 12/26/2018 SLD COUNTY/SR - ANNUAL PRINT COUNTY: LANCASTER
DIR: B DIST: 08-7 SR: 4025
LEFT MUN: MOUNT JOY TOWNSHIP T RIGHT MUN: MOUNT JOY TOWNSHIP T



EXTRACT DATE: 12/19/2018
PRINT DATE: 12/26/2018

ROADWAY MANAGEMENT SYSTEM
SLD COUNTY/SR - ANNUAL PRINT

PAGE NUMBER: 731
COUNTY: LANCASTER

DIR: B MOUNT JOY TOWNSHIP T 2.910 MI.

DIST: 08-7 SR: 4025
RIGHT MUN: MOUNT JOY TOWNSHIP T

008326 FT

008326 FT 0 0 0000 0 00 0000+00
CLOVER LEAF RD
(T334)

INTER-BK

008326	FT	01022/0000
008326	FT	008326
008326	FT	7100/0000
008326	FT	008326
008326	FT	7090/0000
008326	FT	008326
008326	FT	7080/0000
008326	FT	008326
008326	FT	7070/0000
008326	FT	008326
008326	FT	7060/0000
008326	FT	INTER-AHD

PENNDOT STOCKPILE #16
(GOVT)
RAMP A RD
(SR8013 SEG 0250/0000) 0050/0676
0050/0270

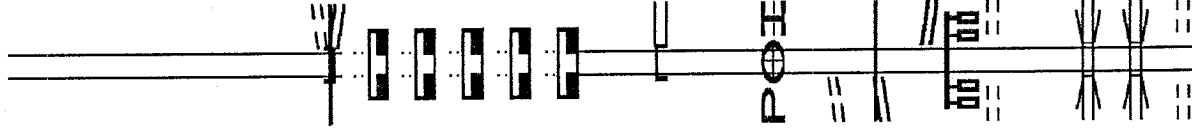
TO 8013/0250 SH
(CONN) 0050/0209
006324 FT

FROM 8013/0010 SH
(CONN) 0040/0360

(APRA) GREINER IND
(STEELWAY RD
(TWP)

```
0050/0270 MFC BEGIN = D
0050/0245 RAMP BB RD
          {SR8013 SEG 0500/0897)
          FROM 8013/0500 SH
          {CONN}
```

006324	FT	2 0	36004	0	01	0355+78
0050/0000		OP ID	PA 283	WB		
0040/0548		LENGTH	(AH 2002	EB	0991/0000	
0040/0360		OP ID	PA 283	EB	0090/0000	
		TO 8013	/0750	SH		
		(CONN)				



Growth Factors for August 2021 to July 2022				
County	Urban Interstate	Rural Interstate	Urban Non-Interstate	Rural Non-Interstate
ADAMS	*	*	0.57	0.61
ALLEGHENY	1.03	*	0.00	0.45
ARMSTRONG	0.85	*	0.00	0.38
BEAVER	0.70	2.05	0.00	0.31
BEDFORD	*	2.20	0.00	0.40
BERKS	1.39	2.52	0.39	0.59
BLAIR	0.91	2.34	0.00	0.41
BRADFORD	1.11	*	0.00	0.49
BUCKS	1.40	2.64	0.29	0.59
BUTLER	1.70	2.87	0.36	0.72
CAMBRIA	0.40	*	0.00	0.20
CAMERON	*	*	*	0.12
CARBON	1.46	2.67	0.33	0.61
CENTRE	1.84	2.74	0.80	0.75
CHESTER	1.83	2.92	0.61	0.78
CLARION	0.83	2.23	0.00	0.38
CLEARFIELD	0.66	1.94	0.00	0.32
CLINTON	1.14	2.36	0.07	0.49
COLUMBIA	1.14	2.31	0.12	0.49
CRAWFORD	0.79	2.11	0.00	0.37
CUMBERLAND	1.69	2.79	0.67	0.70
DAUPHIN	1.59	*	0.42	0.67
DELAWARE	1.32	*	0.00	*
ELK	*	*	0.00	0.31
ERIE	1.01	2.31	0.00	0.44
FAYETTE	0.91	*	0.00	0.41
FOREST	*	*	*	0.96
FRANKLIN	1.76	2.80	0.79	0.73
FULTON	*	2.32	*	0.50
GREENE	0.77	2.28	0.00	0.36
HUNTINGDON	*	2.49	0.00	0.50
INDIANA	0.98	*	0.00	0.44
JEFFERSON	*	2.31	0.02	0.47
JUNIATA	*	*	*	0.54
LACKAWANNA	1.04	2.37	0.00	0.46
LANCASTER	1.72	2.84	0.67	0.71
LAWRENCE	0.74	2.18	0.00	0.34
LEBANON	*	2.54	0.55	0.63
LEHIGH	1.79	3.09	0.59	0.75
LUZERNE	1.09	2.41	0.00	0.48
LYCOMING	1.05	2.37	0.00	0.46
MCKEAN	0.64	*	0.00	0.30
MERCER	0.96	2.52	0.00	0.44
MIFFLIN	1.22	*	0.00	0.52
MONROE	1.81	2.87	0.84	0.76
MONTGOMERY	1.34	*	0.33	0.57
MONTOUR	1.34	2.67	0.01	0.58
NORTHAMPTON	1.84	3.15	0.52	0.79
NORTHUMBERLAND	1.04	2.28	0.00	0.44
PERRY	*	*	0.30	0.55
PHILADELPHIA	1.23	*	0.12	*
PIKE	1.77	2.72	0.91	0.74
POTTER	*	*	*	0.36
SCHUYLKILL	1.04	2.44	0.00	0.46
SNYDER	1.27	*	0.27	0.54
SOMERSET	0.66	2.06	0.00	0.35
SULLIVAN	*	*	*	0.38
SUSQUEHANNA	1.14	2.43	0.00	0.48
TIOGA	*	*	*	0.43
UNION	1.59	2.67	0.50	0.64
VENANGO	*	1.91	0.00	0.28
WARREN	*	*	0.00	0.36
WASHINGTON	1.27	2.73	0.00	0.56
WAYNE	*	2.53	0.37	0.59
WESTMORELAND	0.95	2.19	0.00	0.41
WYOMING	*	*	0.06	0.44
YORK	1.62	2.88	0.54	0.70

* = Functional Class Doesn't Exist in County

Questions? Please contact Andrew O'Neill at the Bureau of Planning and Research, 717-346-3250 or andoneill@pa.gov

NOTE: The projected growth factors are derived using historical VMT (Vehicle Miles Traveled) data (1994 to 2020), as well as Woods and Poole demographic and economic data. The factors should be compounded when calculating future values. The factors should not be used to project traffic beyond a 20-year period. Please be aware that these factors are estimates, and unforeseen events (opening of shopping centers, fast food franchises, gas stations, etc) could cause growth to change over time.

RURAL

to

Rural Places

Suburban Neighborhood

Suburban Corridor

Suburban Center



Figure 5.1 Roads in Context



URBAN

**Town/Village
Neighborhood**



Town Center



Urban Core



REGIONAL

**Regional
Arterial**



**Community
Arterial**



**Community
Collector**




**Neighborhood
Collector**

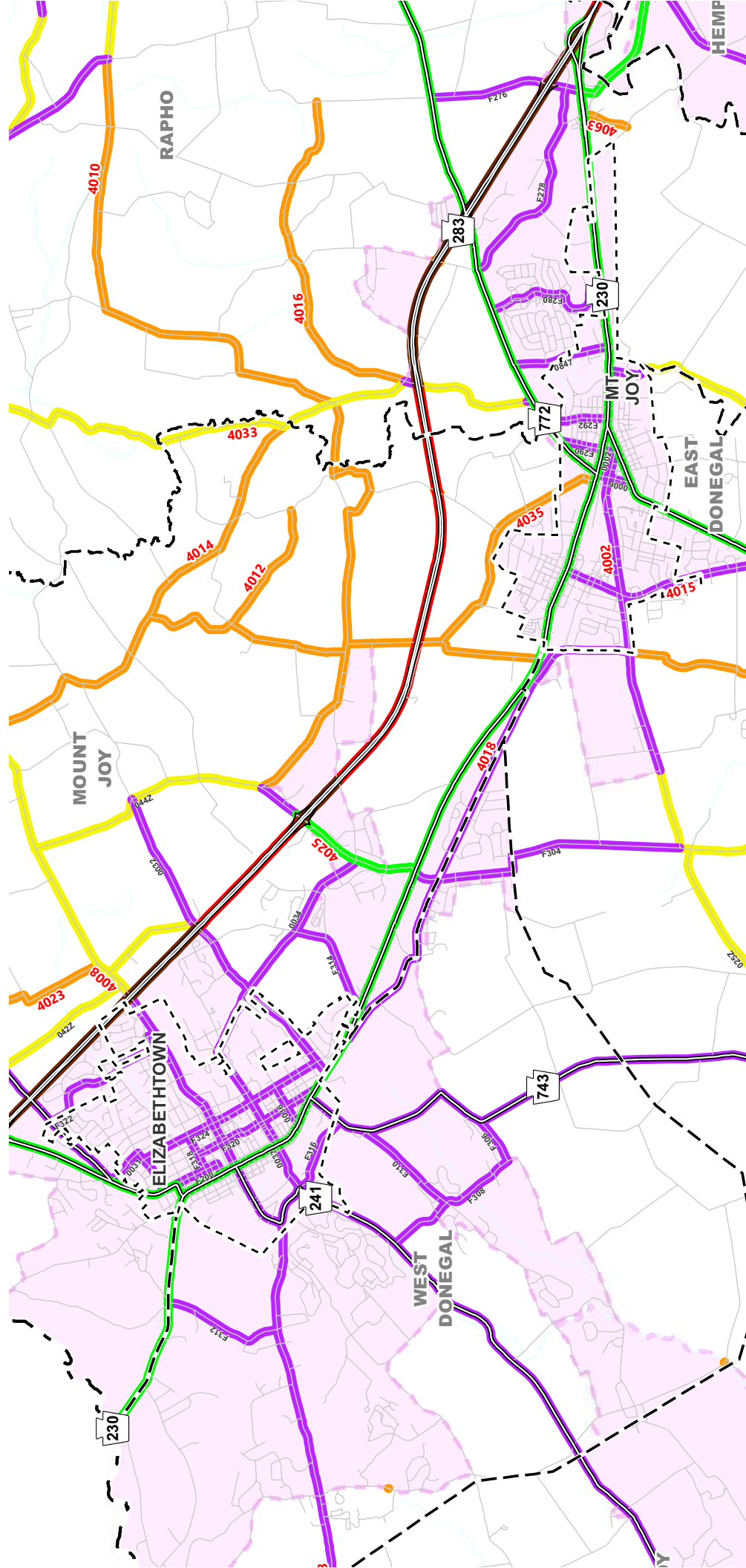


**Local Road/
Street**

to














LOCAL

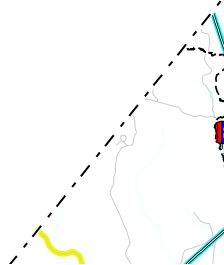
 The photos enclosed in a yellow box indicate the Town Center and Core City streets that also operate as a local or regional Main Street.





Legend

-  STATE
-  COUNTY
-  CITY or BORO
-  TOWNSHIP
-  INTERSTATE HIGHWAYS
-  OTHER FREEWAYS AND EXPRESSWAYS
-  OTHER PRINCIPAL ARTERIAL HIGHWAYS
-  MINOR ARTERIALS
-  MAJOR COLLECTOR
-  MINOR COLLECTOR
-  LOCAL ROADS
-  2010 SMALL URBAN BOUNDARY
-  2010 LARGE URBAN BOUNDARY



Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

821

Shopping Plaza (40 - 150k)

General Urban/Suburban

Weekday PM Peak Period

15

40%

Pass-By Characteristics for Individual Sites

GLA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak	
					Primary (%)	Diverted (%)	Total (%)	Hour Volume	Source
45	Florida	1992	844	56	24	20	44	—	30
50	Florida	1992	555	41	41	18	59	—	30
52	Florida	1995	665	42	33	25	58	—	30
53	Florida	1993	162	59	—	—	41	—	30
57.23	Kentucky	1993	247	31	53	16	69	2659	34
60	Florida	1995	1583	40	38	22	60	—	30
69.4	Kentucky	1993	109	25	42	33	75	1559	34
77	Florida	1992	365	46	—	—	54	—	30
78	Florida	1991	702	55	23	22	45	—	30
82	Florida	1992	336	34	—	—	66	—	30
92.857	Kentucky	1993	133	22	50	28	78	3555	34
100.888	Kentucky	1993	281	28	50	22	72	2111	34
121.54	Kentucky	1993	210	53	30	17	47	2636	34
144	New Jersey	1990	176	32	44	24	68	—	24
146.8	Kentucky	1993	—	36	39	25	64	—	34

Vehicle Pass-By Rates by Land Use

Source: ITE Trip Generation Manual, 11th Edition

[illegible]

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	850										
Land Use	Supermarket										
Setting	General Urban/Suburban										
Time Period	Weekday PM Peak Period										
# Data Sites	43										
Average Pass-By Rate	24%										
Pass-By Characteristics for Individual Sites											
GFA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips		Adj Street Daily		Source		
					Primary (%)	Diverted (%)	Total (%)	Volume			
15.16	Florida	1993	161	23	51	26	77	—	33		
31	Nebraska	1990	—	19	36	45	81	48700	31		
31	Nebraska	1990	—	28	40	32	72	23500	31		
31	Florida	1993	440	35	—	—	65	—	30		
34	Nebraska	1990	—	44	29	27	56	15200	31		
50	Kansas	1998	33	9	70	21	91	—	31		
55	Nebraska	1990	—	27	35	38	73	27200	31		
65	Nebraska	1990	—	25	25	50	75	44700	31		
66	Nebraska	1990	—	23	30	47	77	63000	31		
66	Oregon	2010	382	18	47	35	82	—	27		
67	Washington	2010	—	25	40	35	75	—	27		
70	Nebraska	1990	—	26	30	44	74	34300	31		
71.717	Oregon	2001	—	31	51	18	69	—	18		
72	Oregon	2001	827	31	51	18	69	—	18		
74.63	Oregon	2001	—	33	40	27	67	—	18		
75	Oregon	2001	786	33	40	27	67	—	18		
79	Washington	2001	884	34	39	27	66	—	18		
79	Oregon	2001	637	13	52	35	87	—	18		
79	California	2002	547	15	64	21	85	—	18		
79	California	2002	798	20	58	22	80	—	18		

79.097	California	2002	—	15	64	21	85	—	18
79.097	Oregon	2001	—	13	52	35	87	—	18
79.324	California	2002	—	20	58	22	80	—	18
79.336	Washington	2001	—	34	39	27	66	—	18
79.771	Nevada	2002	—	38	44	18	62	—	18
80	Nevada	2002	478	38	44	18	62	—	18
80	California	2002	617	12	68	20	88	—	18
80	California	2002	538	25	52	23	75	—	18
80.147	California	2002	—	12	68	20	88	—	18
80.147	California	2002	—	25	52	23	75	—	18
81	New York	1997	—	31	46	23	69	—	26
87.4	New York	1997	—	32	55	13	68	—	26
88	California	2010	497	15	49	36	85	—	27
89.8	New York	1997	—	38	47	15	62	—	26
93	Washington	2010	440	21	41	38	79	—	27
94	Oregon	2002	536	7	45	48	93	—	27
95	California	2010	—	16	56	28	84	—	27
96	California	2010	—	19	48	33	81	—	27
96	California	2010	—	15	64	21	85	—	27
99	California	2010	—	17	54	29	83	—	27
104	California	2010	—	18	55	27	82	—	27
105.3	New York	1997	—	33	48	19	67	—	26
123.5	New York	1997	—	26	44	30	74	—	26

Vehicle Pass-By Rates by Land Use

Source: ITE Trip Generation Manual, 11th Edition

[illegible]

Vehicle Pass-By Rates by Land Use

Source: ITE Trip Generation Manual, 11th Edition

881

Pharmacy/Drugstore with Drive-Through Window

General Urban/Suburban

Weekday PM Peak Period

3

49%

Pass-By Characteristics for Individual Sites

GFA (000)

State or Province

Survey	Year
--------	------

Interviews

Pass-By Trip (%)

	Non-Pass-By Trips	
	Primary (%)	Diverted (%)

Total (%)

Adj Street Peak
Hour Volume

Source

9.6

Florida

1995

370

47

40	13
----	----

53

1

30

16

Florida

1995

385

41

50	9
----	---

59

1

30

16

Florida

1995

522

58

25	17
----	----

42

1

30

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	912
Land Use	Drive-In Bank
Setting	General Urban/Suburban
Time Period	Weekday AM Peak Period
# Data Sites	8
Average Pass-By Rate	29%

Pass-By Characteristics for Individual Sites

GFA (000)		State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak		Source
						Primary (%)	Diverted (%)	Total (%)	Hour Volume		
3.8		Pennsylvania	2005	11	27	—	—	73	—	—	19
3.8		Pennsylvania	2005	9	24	—	—	76	—	—	19
3.8		Pennsylvania	2005	22	34	—	—	66	—	—	19
3.8		Pennsylvania	2005	30	27	—	—	73	—	—	19
3.8		Pennsylvania	2005	34	40	—	—	60	—	—	19
3.8		Pennsylvania	2005	7	27	—	—	73	—	—	19
3.8		Pennsylvania	2005	15	16	—	—	84	—	—	19
3.8		Pennsylvania	2005	27	36	—	—	64	—	—	19

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	912									
Land Use	Drive-In Bank									
Setting	General Urban/Suburban									
Time Period	Weekday PM Peak Period									
# Data Sites	19									
Average Pass-By Rate	35%									
Pass-By Characteristics for Individual Sites										
GFA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips		Adj Street Peak		Source	
					Primary (%)	Diverted (%)	Total (%)	Hour Volume		
	2.7	Washington	2007	—	26	66	8	74	—	11
	2.8	Washington	2007	—	21	55	24	79	—	11
	3.3	Kentucky	1993	—	48	22	30	52	2570	34
	3.4	Kentucky	1993	—	64	22	14	36	2266	34
	3.4	Kentucky	1993	75	57	11	32	43	1955	34
	3.5	Kentucky	1993	53	47	32	21	53	2785	2
	3.6	Washington	2007	—	42	50	8	58	—	11
	3.6	Washington	2007	—	29	—	—	71	—	11
	3.8	Pennsylvania	2005	56	43	—	—	57	—	19
	3.8	Pennsylvania	2005	38	41	—	—	59	—	19
	3.8	Pennsylvania	2005	14	24	—	—	76	—	19
	3.8	Pennsylvania	2005	63	29	—	—	71	—	19
3.8	Pennsylvania	2005	70	29	—	—	71	—	19	
3.8	Pennsylvania	2005	29	27	—	—	73	—	19	
3.8	Pennsylvania	2005	41	25	—	—	75	—	19	
3.8	Pennsylvania	2005	37	31	—	—	69	—	19	
3.8	Pennsylvania	2005	19	29	—	—	71	—	19	
3.8	Pennsylvania	2005	34	21	—	—	79	—	19	
3.8	Pennsylvania	2005	36	29	—	—	71	—	19	

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	912								
Land Use	Drive-In Bank								
Setting	General Urban/Suburban								
Time Period	Saturday Midday								
# Data Sites	5								
Average Pass-By Rate	38%								
Pass-By Characteristics for Individual Sites									
GFA (000)	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips		Adj Street Peak		
					Primary (%)	Diverted (%)	Total (%)	Hour Volume	
	Pennsylvania	2005	63	33	—	—	67	—	
	Pennsylvania	2005	103	77	—	—	23	—	
	Pennsylvania	2005	34	37	—	—	63	—	
	Pennsylvania	2005	53	33	—	—	67	—	
	Pennsylvania	2005	25	12	—	—	88	—	

Vehicle Pass-By Rates by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	945										
Land Use	Convenience Store/Gas Station										
Setting	General Urban/Suburban										
Time Period	Weekday AM Peak Period										
# Data Sites	16 Sites with between 2 and 8 VFP					28 Sites with between 9 and 20 VFP					
Average Pass-By Rate	60% for Sites with between 2 and 8 VFP					76% for Sites with between 9 and 20 VFP					
	Pass-By Characteristics for Individual Sites										
							Non-Pass-By Trips			Adj Street Peak	
GFA (000)	VFP	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Primary (%)	Diverted (%)	Total (%)	Hour Volume	Source	
2	8	Maryland	1992	46	87	13	0	13	2235	25	
2.1	6	Maryland	1992	26	58	23	19	42	2080	25	
2.1	6	Maryland	1992	26	58	23	19	42	2080	25	
2.2	8	Maryland	1992	31	47	34	19	53	1785	25	
2.2	< 8	Indiana	1993	79	56	6	38	44	635	2	
2.2	8	Maryland	1992	35	78	9	13	22	7080	25	
2.3	6	Maryland	1992	37	32	41	27	68	2080	25	
2.3	< 8	Kentucky	1993	58	64	5	31	36	1255	2	
2.3	6	Maryland	1992	37	32	41	27	68	2080	25	
2.4	< 8	Kentucky	1993	—	48	17	35	52	1210	2	
2.6	< 8	Kentucky	1993	—	72	15	13	28	940	2	
2.8	< 8	Kentucky	1993	—	54	11	35	46	1240	2	
3	< 8	Indiana	1993	62	74	10	16	26	790	2	
3.6	< 8	Kentucky	1993	49	67	4	29	33	1985	2	
3.7	< 8	Kentucky	1993	49	66	16	18	34	990	2	
4.694	12	Maryland	2000	—	72	—	—	28	2440	30	
4.694	12	Maryland	2000	—	78	—	—	22	1561	30	
4.694	12	Maryland	2000	—	79	—	—	21	2764	30	
4.848	12	Virginia	2000	—	55	—	—	45	1398	30	
5.06	12	Pennsylvania	2000	—	84	—	—	16	3219	30	
5.242	12	Virginia	2000	—	74	—	—	26	1160	30	
5.242	12	Virginia	2000	—	71	—	—	29	548	30	
5.488	12	Delaware	2000	—	80	—	—	20	—	30	
5.5	12	Pennsylvania	2000	—	85	—	—	15	2975	30	
4.2	< 8	Kentucky	1993	47	62	19	19	38	1705	2	
4.694	16	Maryland	2000	—	90	—	—	10	2278	30	
4.694	16	Delaware	2000	—	74	—	—	26	2185	30	
4.694	16	Delaware	2000	—	58	—	—	42	962	30	
4.694	16	Delaware	2000	—	84	—	—	16	2956	30	
4.694	16	New Jersey	2000	—	79	—	—	21	1859	30	
4.694	20	Delaware	2000	—	84	—	—	16	3864	30	
4.848	16	Virginia	2000	—	68	—	—	32	2106	30	
4.848	16	Virginia	2000	—	85	—	—	15	2676	30	
4.848	16	Virginia	2000	—	75	—	—	25	3244	30	
4.848	16	Virginia	2000	—	71	—	—	29	1663	30	
4.993	16	Pennsylvania	2000	—	75	—	—	25	1991	30	
5.094	16	New Jersey	2000	—	86	—	—	14	1260	30	
5.5	16	Pennsylvania	2000	—	82	—	—	18	1570	30	
5.543	16	Pennsylvania	2000	—	84	—	—	16	1933	30	
5.565	16	Pennsylvania	2000	—	77	—	—	23	2262	30	
5.565	16	Pennsylvania	2000	—	68	—	—	32	2854	30	
5.565	16	New Jersey	2000	—	58	—	—	42	1253	30	
5.565	16	New Jersey	2000	—	79	—	—	21	1928	30	
5.565	16	New Jersey	2000	---	84	---	---	16	1953	30	

Vehicle Pass-By Rates by Land Use										
Source: ITE Trip Generation Manual , 11th Edition										
Land Use Code	945									
Land Use	Convenience Store/Gas Station									
Setting	General Urban/Suburban									
Time Period	Weekday PM Peak Period									
# Data Sites	12 Sites with between 2 and 8 VFP					28 Sites with between 9 and 20 VFP				
Average Pass-By Rate	56% for Sites with between 2 and 8 VFP					75% for Sites with between 9 and 20 VFP				
	Pass-By Characteristics for Individual Sites									
GFA (000)	VFP	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak	
						Primary (%)	Diverted (%)	Total (%)	Hour Volume	Source
2.1	8	Maryland	1992	31	52	13	35	48	1785	25
2.1	6	Maryland	1992	30	53	20	27	47	1060	25
2.2	< 8	Indiana	1993	115	48	16	36	52	820	2
2.3	< 8	Kentucky	1993	67	57	16	27	43	1954	2
2.3	6	Maryland	1992	55	40	11	49	60	2760	25
2.4	< 8	Kentucky	1993	—	58	13	29	42	2655	2
2.6	< 8	Kentucky	1993	68	67	15	18	33	950	2
2.8	< 8	Kentucky	1993	—	62	11	27	38	2875	2
3	< 8	Indiana	1993	80	65	15	20	35	1165	2
3.6	< 8	Kentucky	1993	60	56	17	27	44	2505	2
3.7	< 8	Kentucky	1993	70	61	16	23	39	2175	2
4.2	< 8	Kentucky	1993	61	58	26	16	42	2300	2
4.694	12	Maryland	2000	—	78	—	—	22	3549	30
4.694	12	Maryland	2000	—	67	—	—	33	2272	30
4.694	12	Maryland	2000	—	66	—	—	34	3514	30
4.848	12	Virginia	2000	—	71	—	—	29	2350	30
5.06	12	Pennsylvania	2000	—	91	—	—	9	4181	30
5.242	12	Virginia	2000	—	70	—	—	30	2445	30
5.242	12	Virginia	2000	—	56	—	—	44	950	30
5.488	12	Delaware	2000	—	73	—	—	27	—	30
5.5	12	Pennsylvania	2000	—	84	—	—	16	4025	30
4.694	16	Maryland	2000	—	89	—	—	11	2755	30
4.694	16	Delaware	2000	—	73	—	—	27	1858	30
4.694	16	Delaware	2000	—	59	—	—	41	1344	30
4.694	16	Delaware	2000	—	72	—	—	28	3434	30
4.694	16	New Jersey	2000	—	81	—	—	19	1734	30
4.694	20	Delaware	2000	—	76	—	—	24	1616	30
4.848	16	Virginia	2000	—	67	—	—	33	2.954	30
4.848	16	Virginia	2000	—	78	—	—	22	3086	30
4.848	16	Virginia	2000	—	83	—	—	17	4143	30
4.848	16	Virginia	2000	—	73	—	—	27	2534	30
4.993	16	Pennsylvania	2000	—	72	—	—	28	2917	30
5.094	16	New Jersey	2000	—	86	—	—	14	1730	30
5.5	16	Pennsylvania	2000	—	90	—	—	10	2616	30
5.543	16	Pennsylvania	2000	—	87	—	—	13	2363	30
5.565	16	Pennsylvania	2000	—	81	—	—	19	2770	30
5.565	16	Pennsylvania	2000	—	76	—	—	24	3362	30
5.565	16	New Jersey	2000	—	61	—	—	39	1713	30
5.565	16	New Jersey	2000	—	86	—	—	14	1721	30
5.565	16	New Jersey	2000	---	81	---	---	19	2227	30

TRIP GENERATION WORKSHEETS

PHASE 1

General Office Building (710)

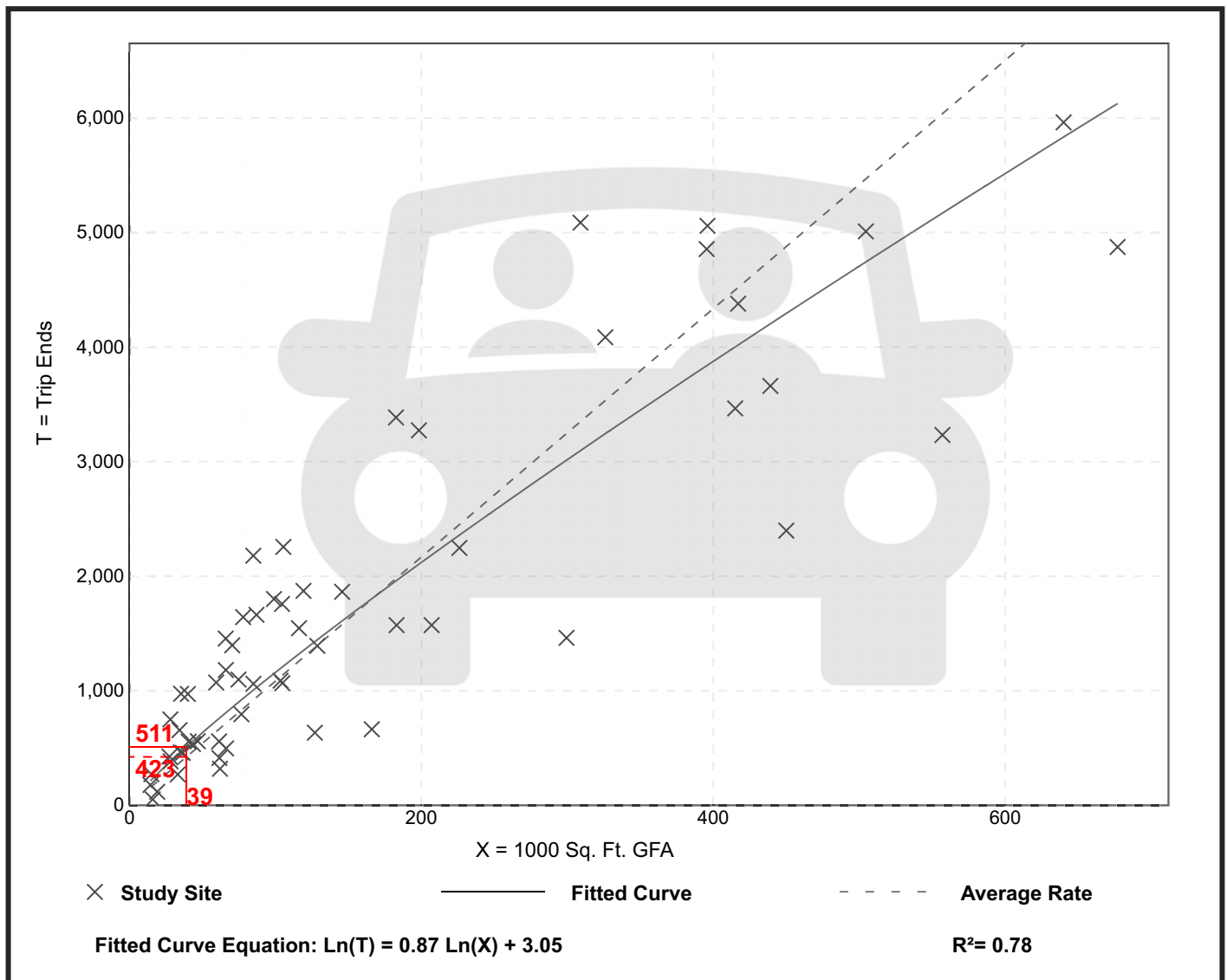
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 59
Avg. 1000 Sq. Ft. GFA: 163
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.84	3.27 - 27.56	4.76

Data Plot and Equation



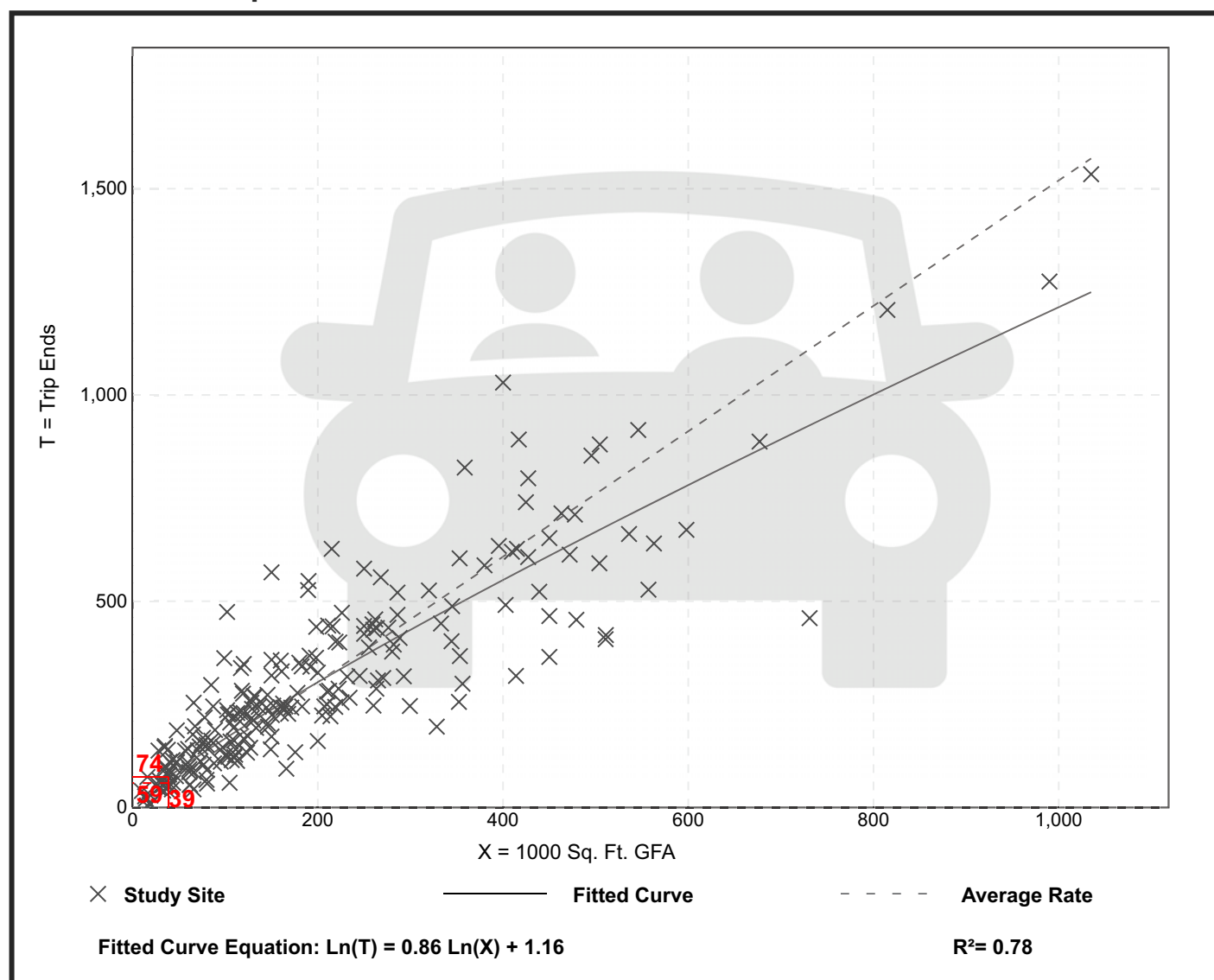
General Office Building (710)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 221
 Avg. 1000 Sq. Ft. GFA: 201
 Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.52	0.32 - 4.93	0.58

Data Plot and Equation



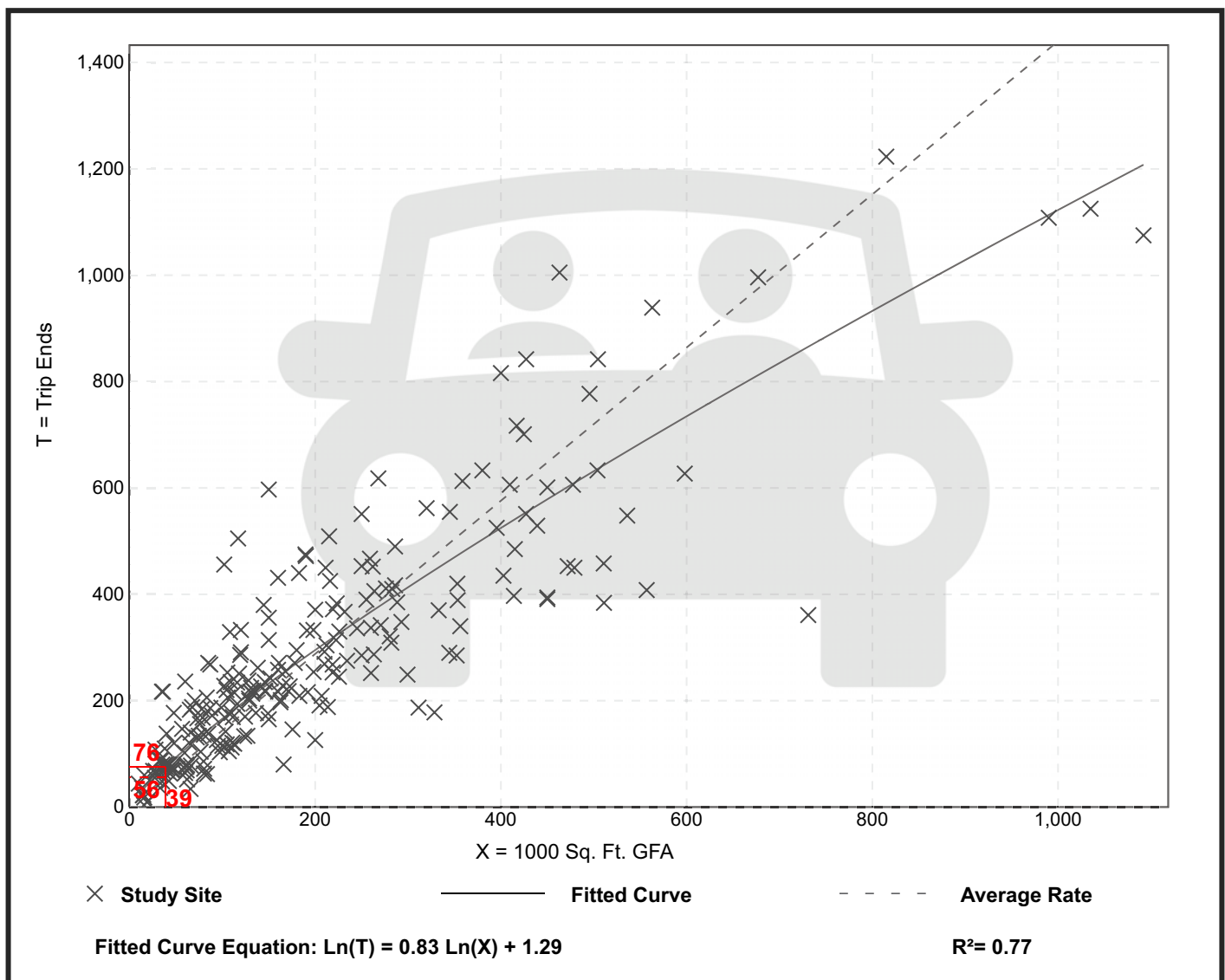
General Office Building (710)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 232
 Avg. 1000 Sq. Ft. GFA: 199
 Directional Distribution: 17% entering, 83% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.44	0.26 - 6.20	0.60

Data Plot and Equation



General Office Building (710)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

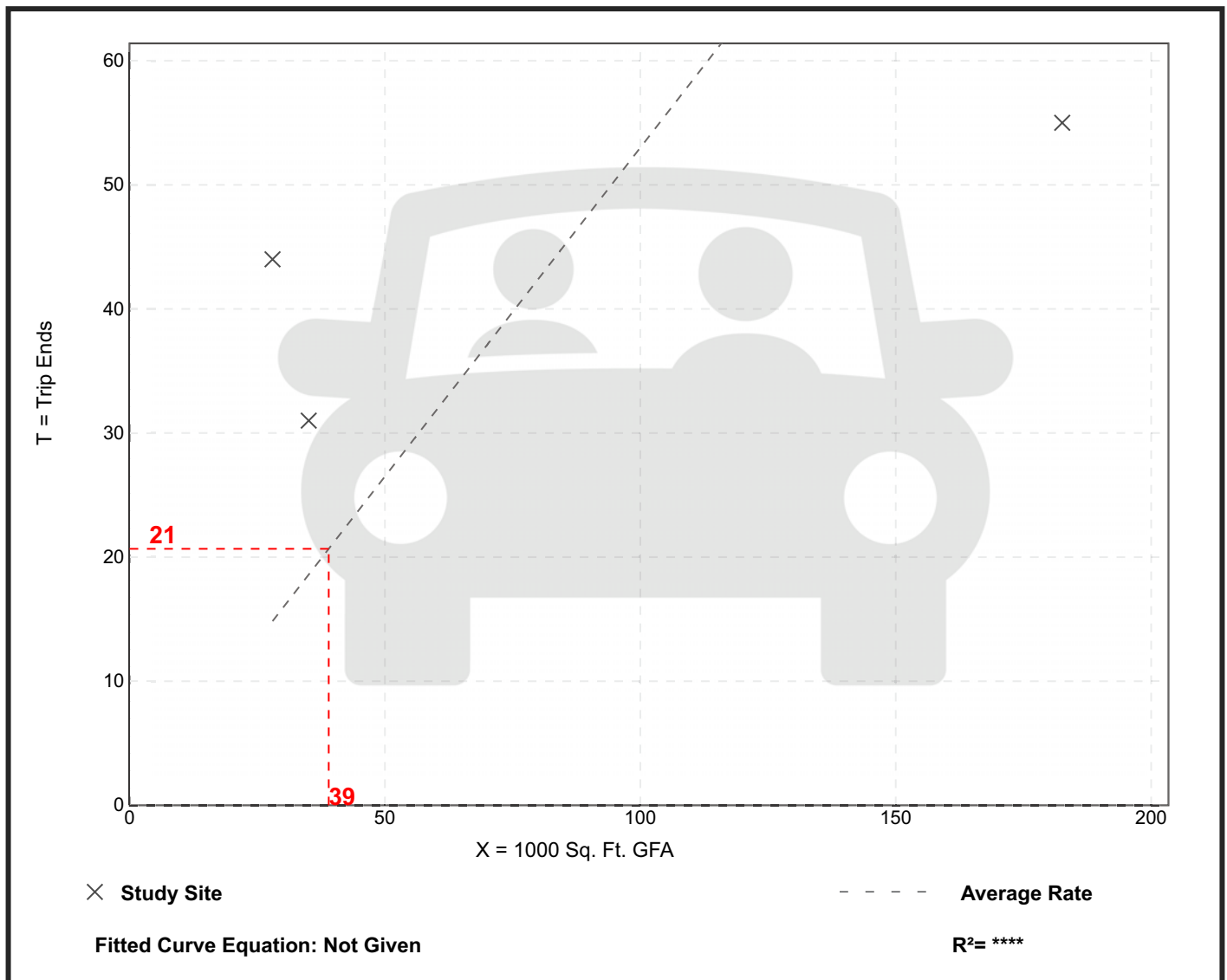
Setting/Location: General Urban/Suburban
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 82
Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.53	0.30 - 1.57	0.52

Data Plot and Equation

Caution – Small Sample Size



Medical-Dental Office Building - Stand-Alone (720)

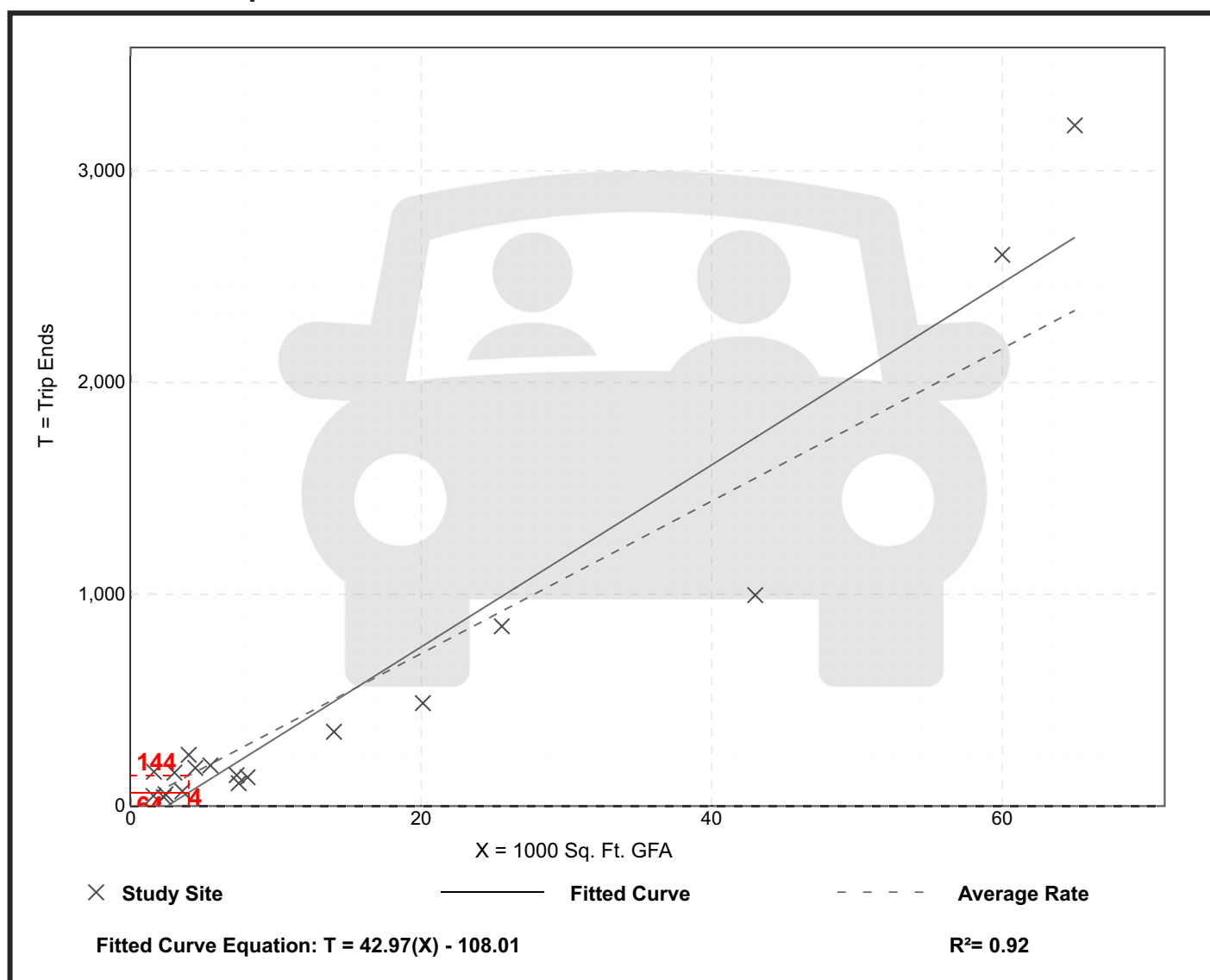
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 18
Avg. 1000 Sq. Ft. GFA: 15
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
36.00	14.52 - 100.75	13.38

Data Plot and Equation



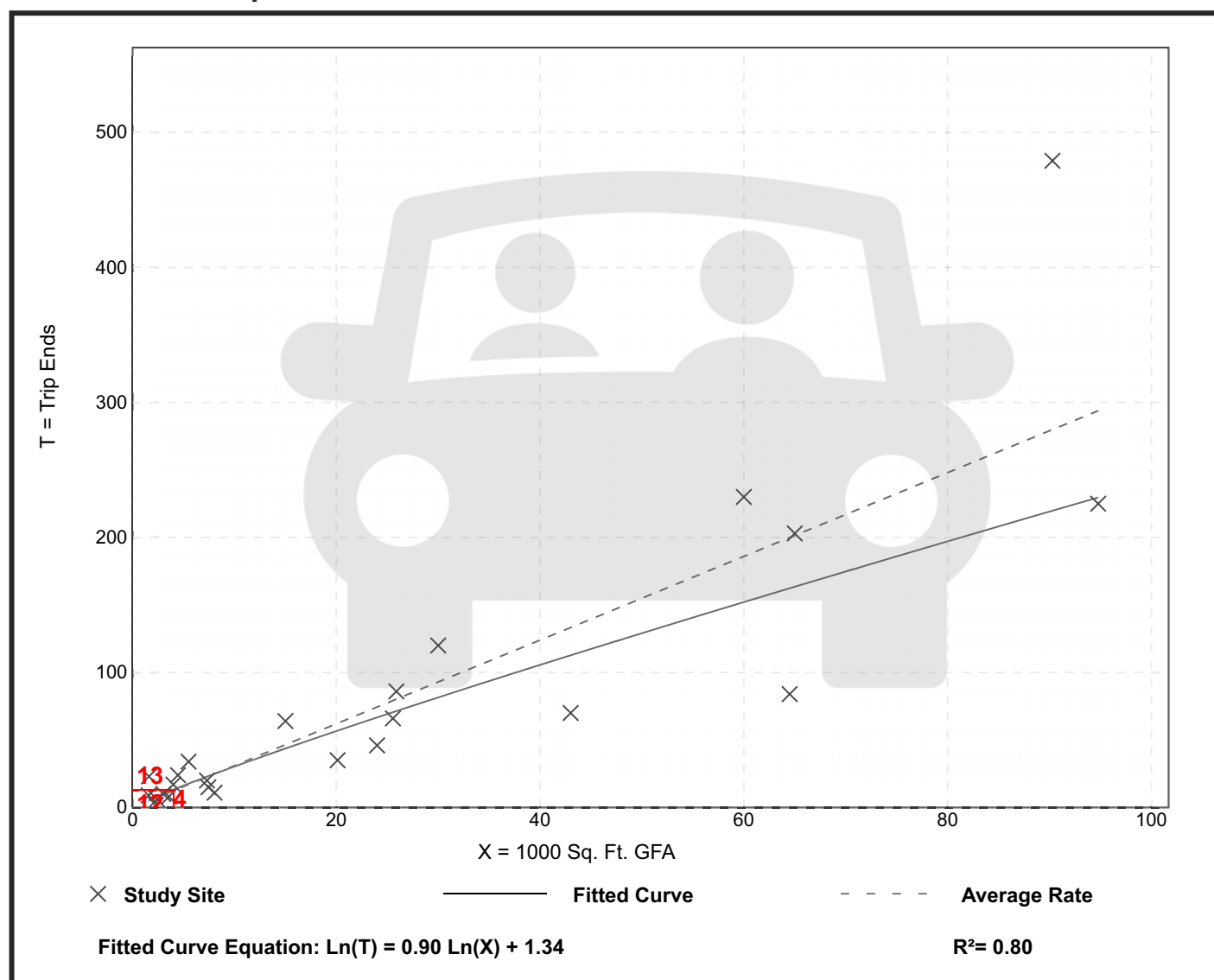
Medical-Dental Office Building - Stand-Alone (720)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 24
 Avg. 1000 Sq. Ft. GFA: 25
 Directional Distribution: 79% entering, 21% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.10	0.87 - 14.30	1.49

Data Plot and Equation



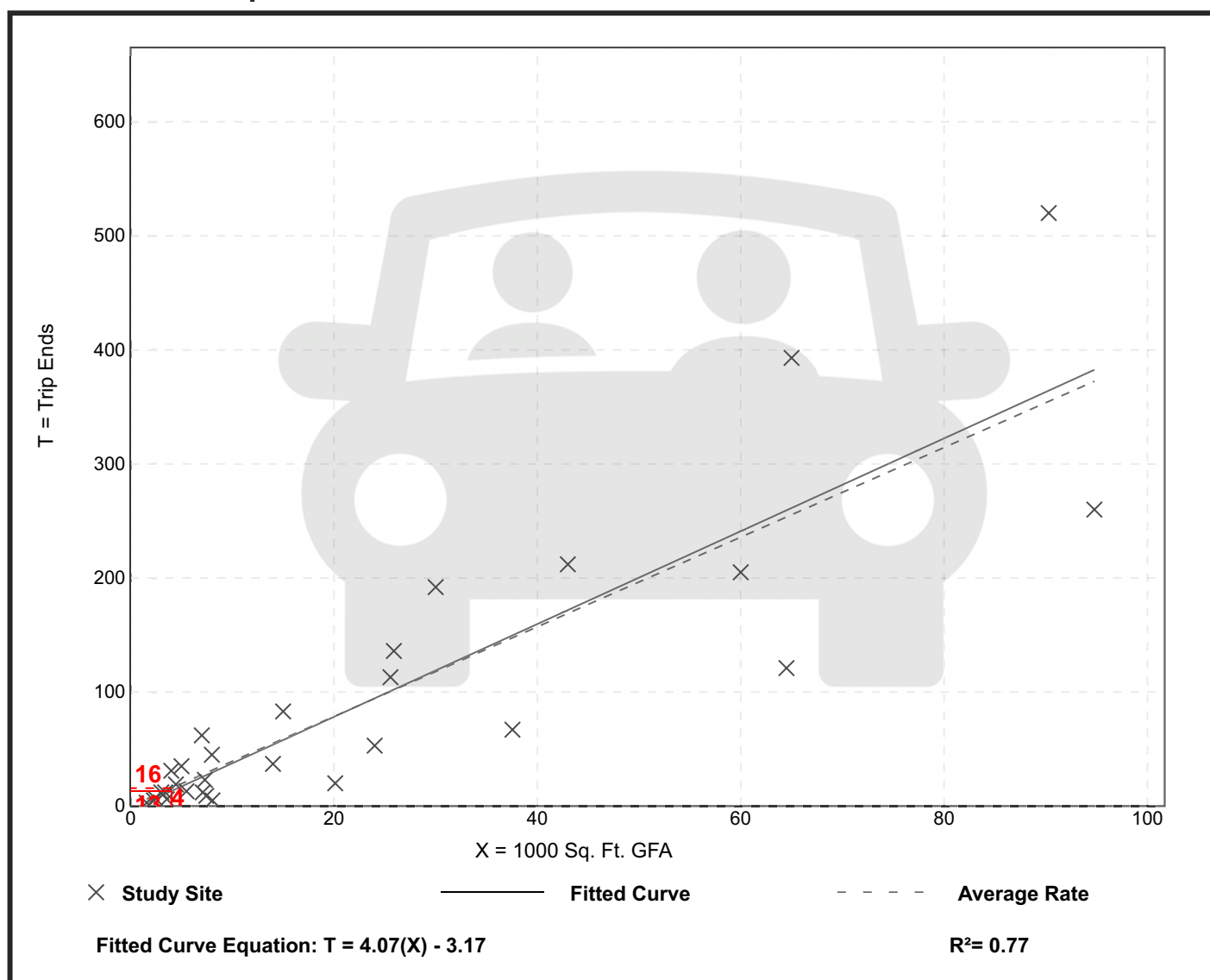
Medical-Dental Office Building - Stand-Alone (720)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 30
 Avg. 1000 Sq. Ft. GFA: 23
 Directional Distribution: 30% entering, 70% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.93	0.62 - 8.86	1.86

Data Plot and Equation



Medical-Dental Office Building (720)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

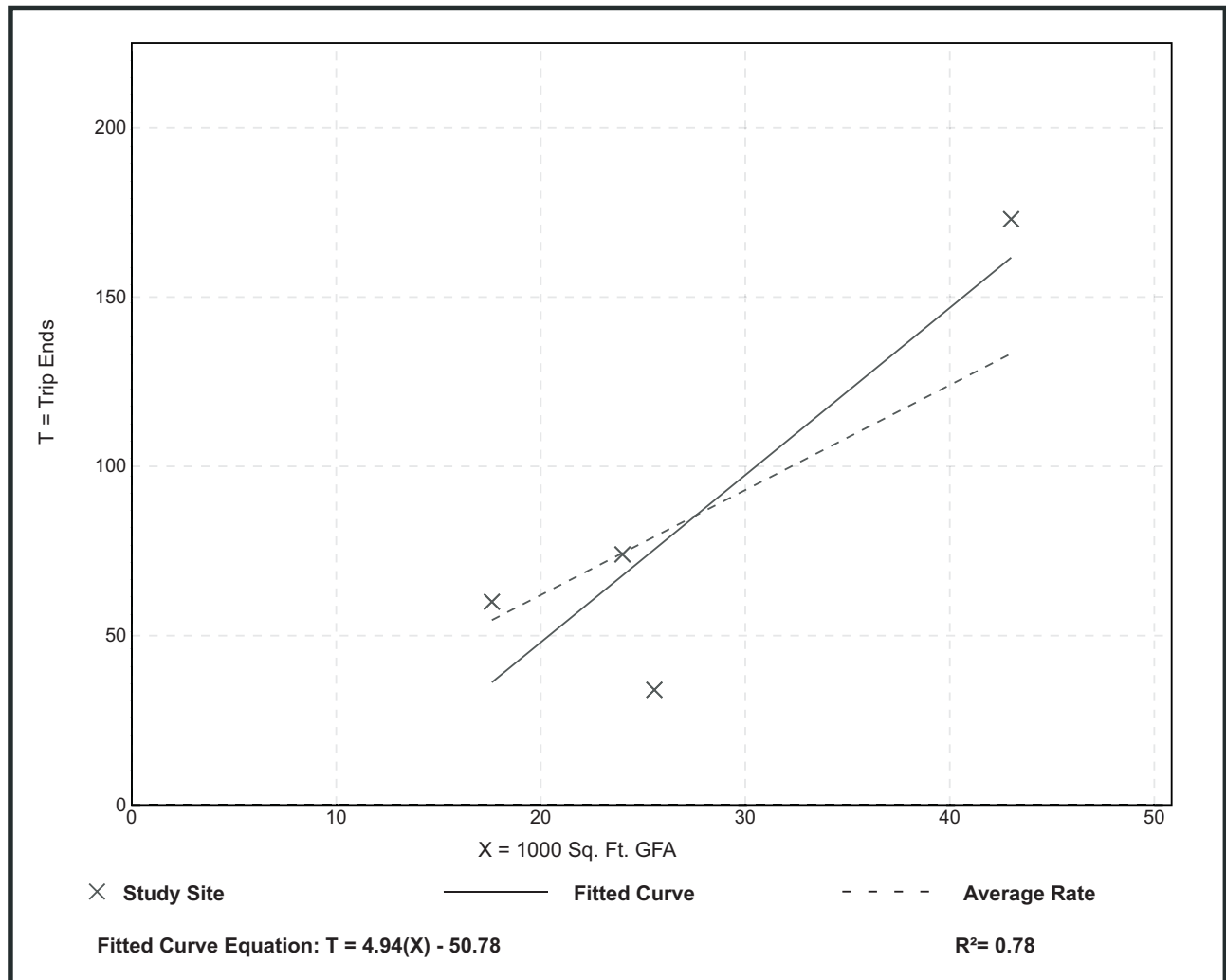
Setting/Location: General Urban/Suburban
Number of Studies: 4
1000 Sq. Ft. GFA: 28
Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.10	1.33 - 4.02	1.20

Data Plot and Equation

Caution – Small Sample Size



Shopping Plaza (40-150k) - Supermarket - No (821)

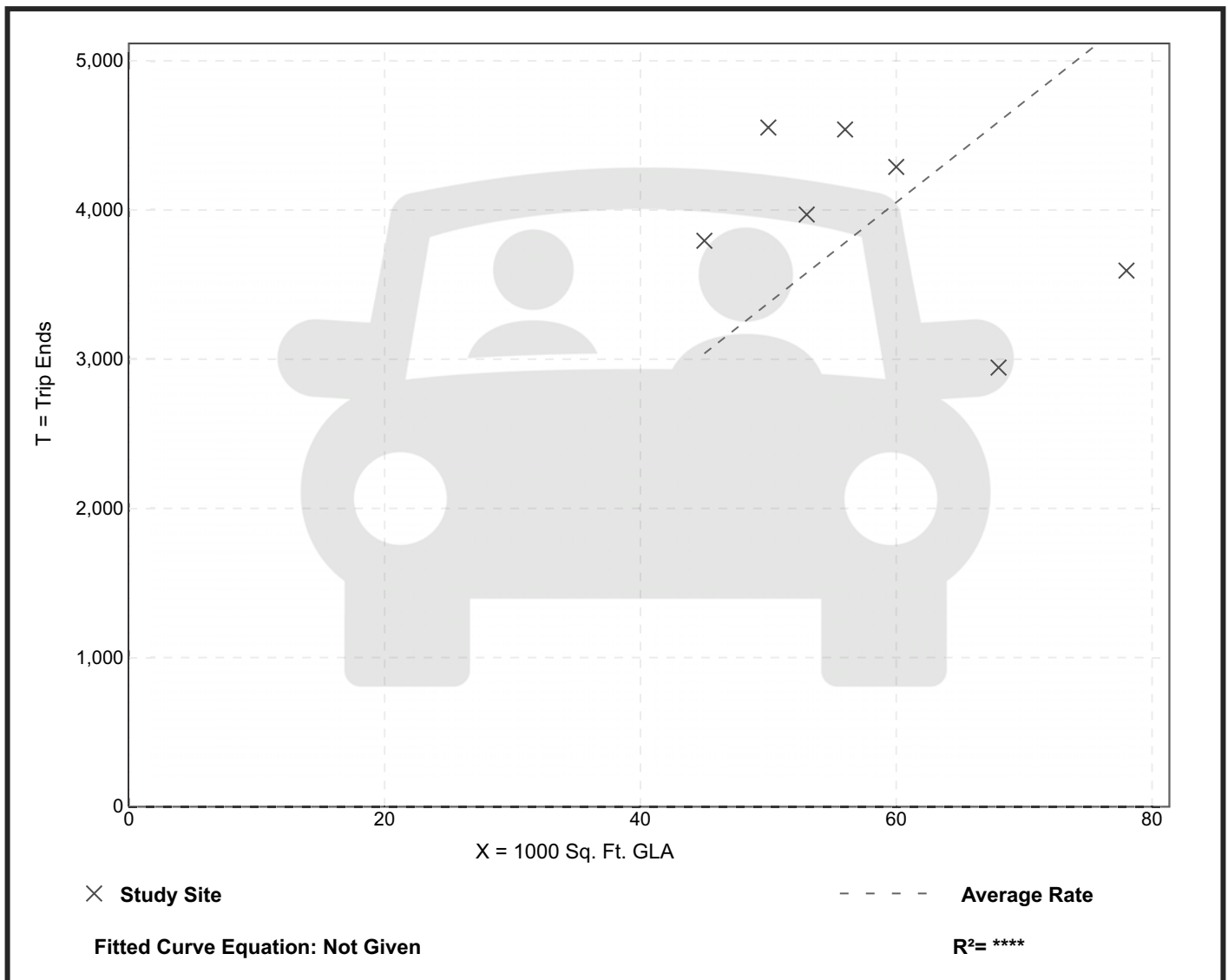
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 7
Avg. 1000 Sq. Ft. GLA: 59
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
67.52	43.29 - 91.06	19.25

Data Plot and Equation



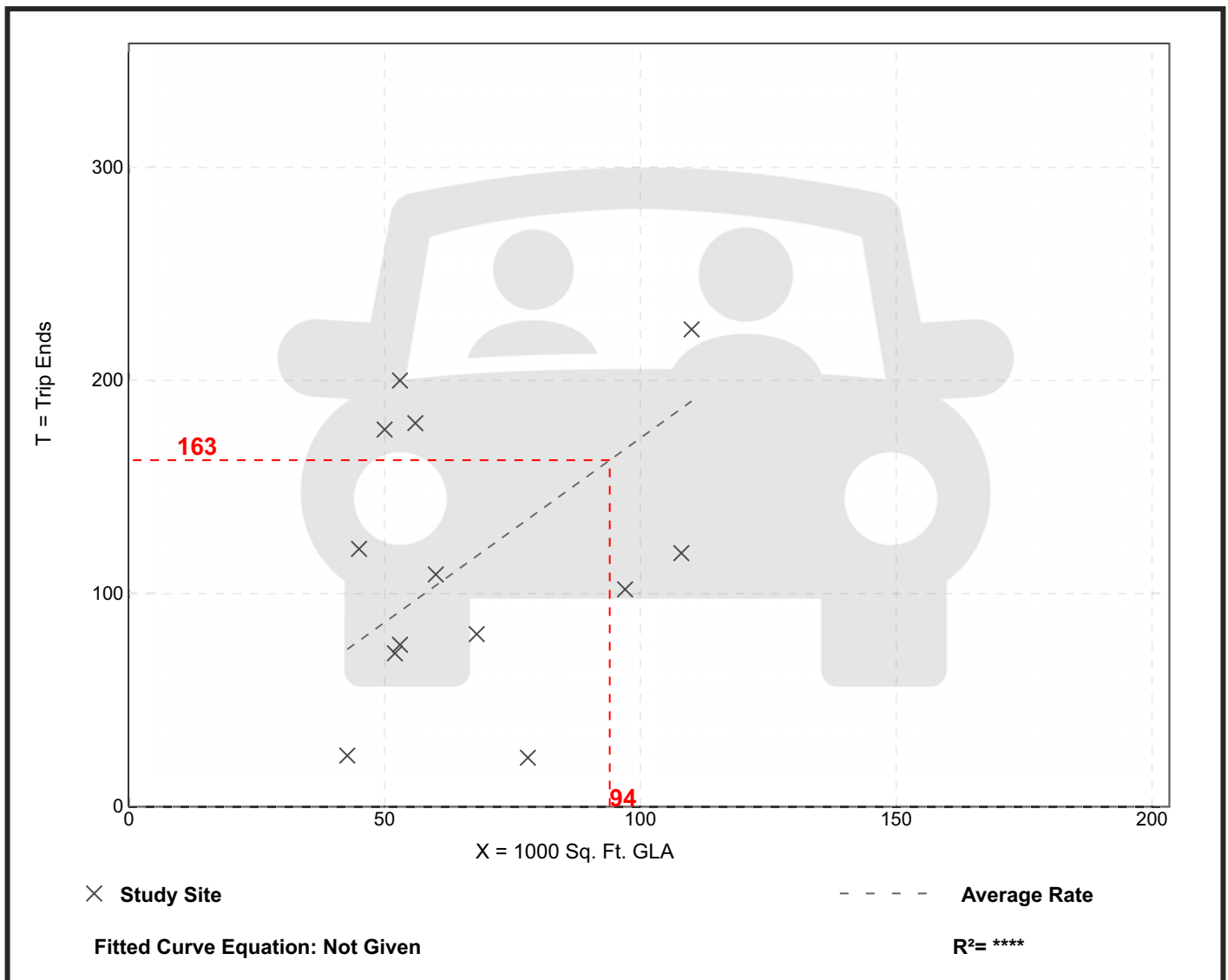
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 13
 Avg. 1000 Sq. Ft. GLA: 67
 Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
1.73	0.29 - 3.77	1.06

Data Plot and Equation



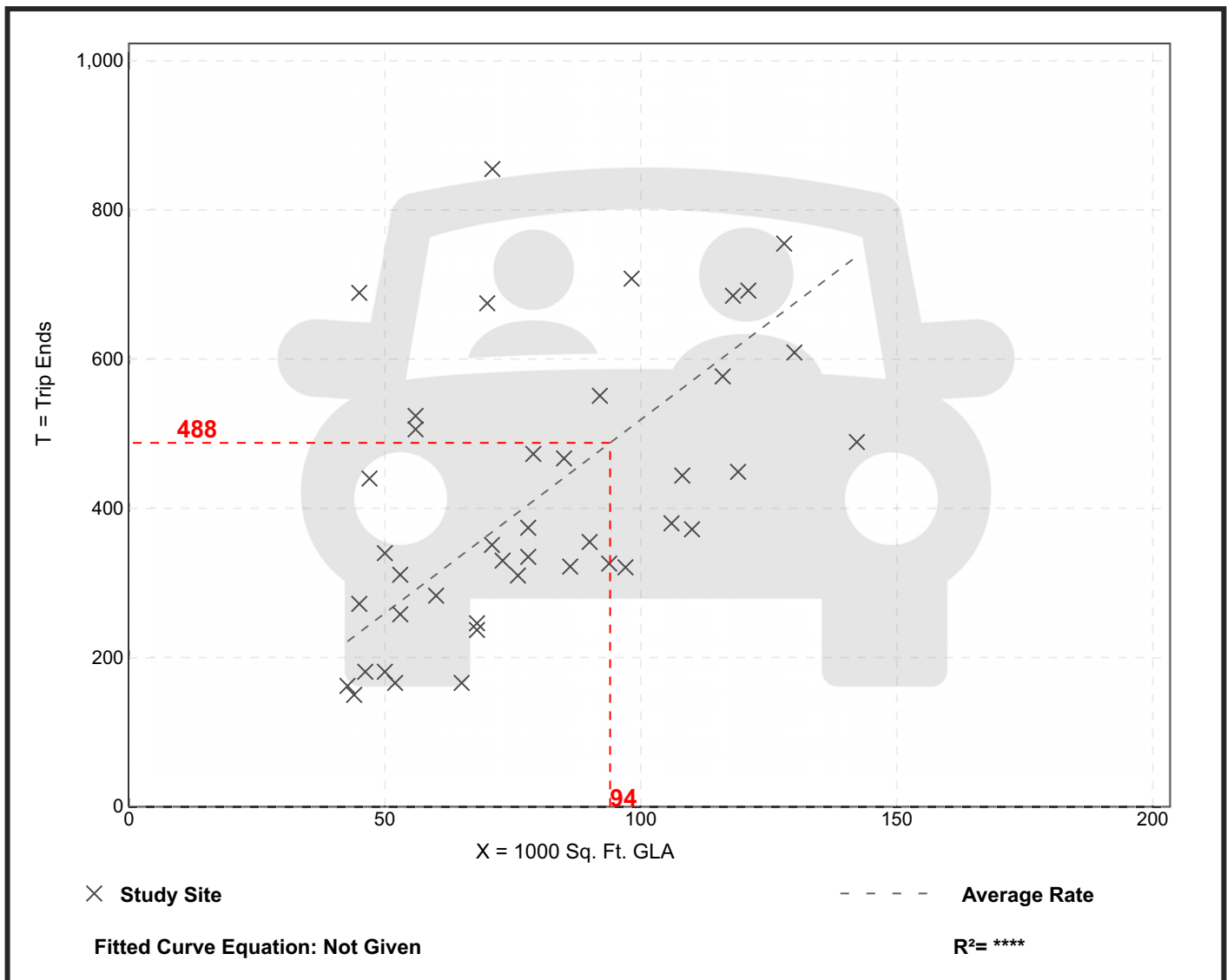
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 42
 Avg. 1000 Sq. Ft. GLA: 79
 Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
5.19	2.55 - 15.31	2.28

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - No (821)

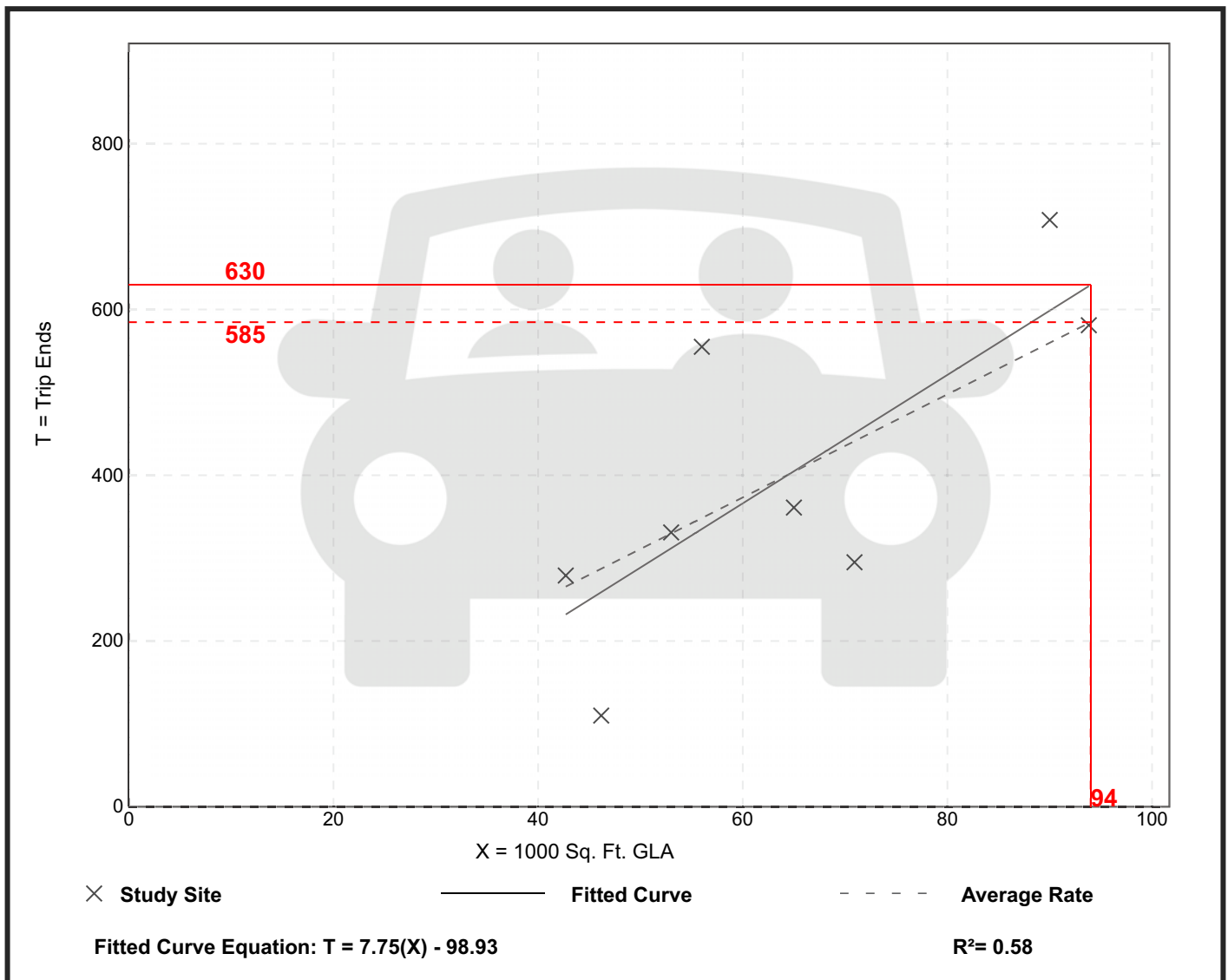
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GLA: 65
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.22	2.38 - 9.91	2.11

Data Plot and Equation



Supermarket (850)

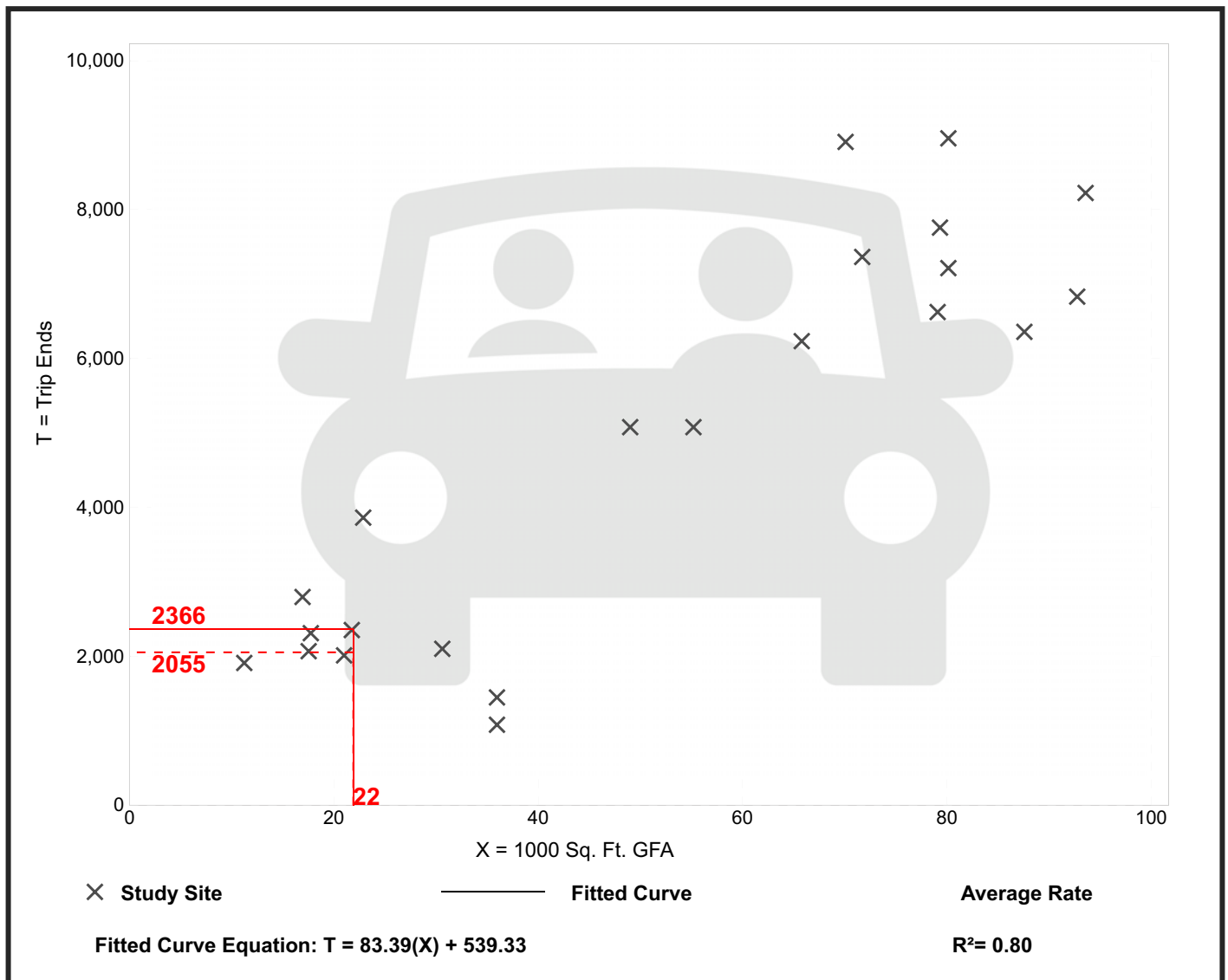
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. 1000 Sq. Ft. GFA: 52
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
93.84	30.09 - 170.24	27.05

Data Plot and Equation



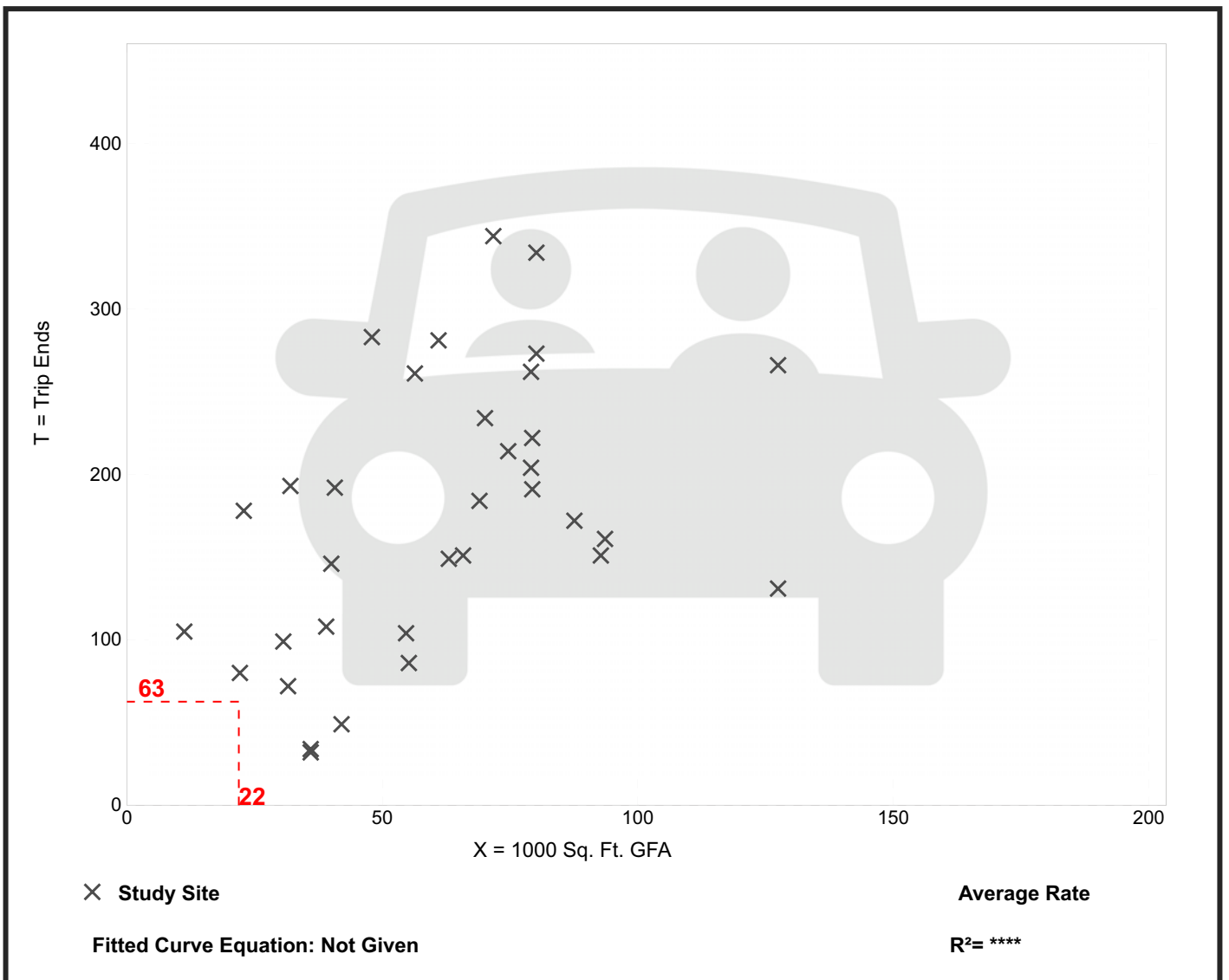
Supermarket (850)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 34
Avg. 1000 Sq. Ft. GFA: 61
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.86	0.89 - 9.35	1.45

Data Plot and Equation



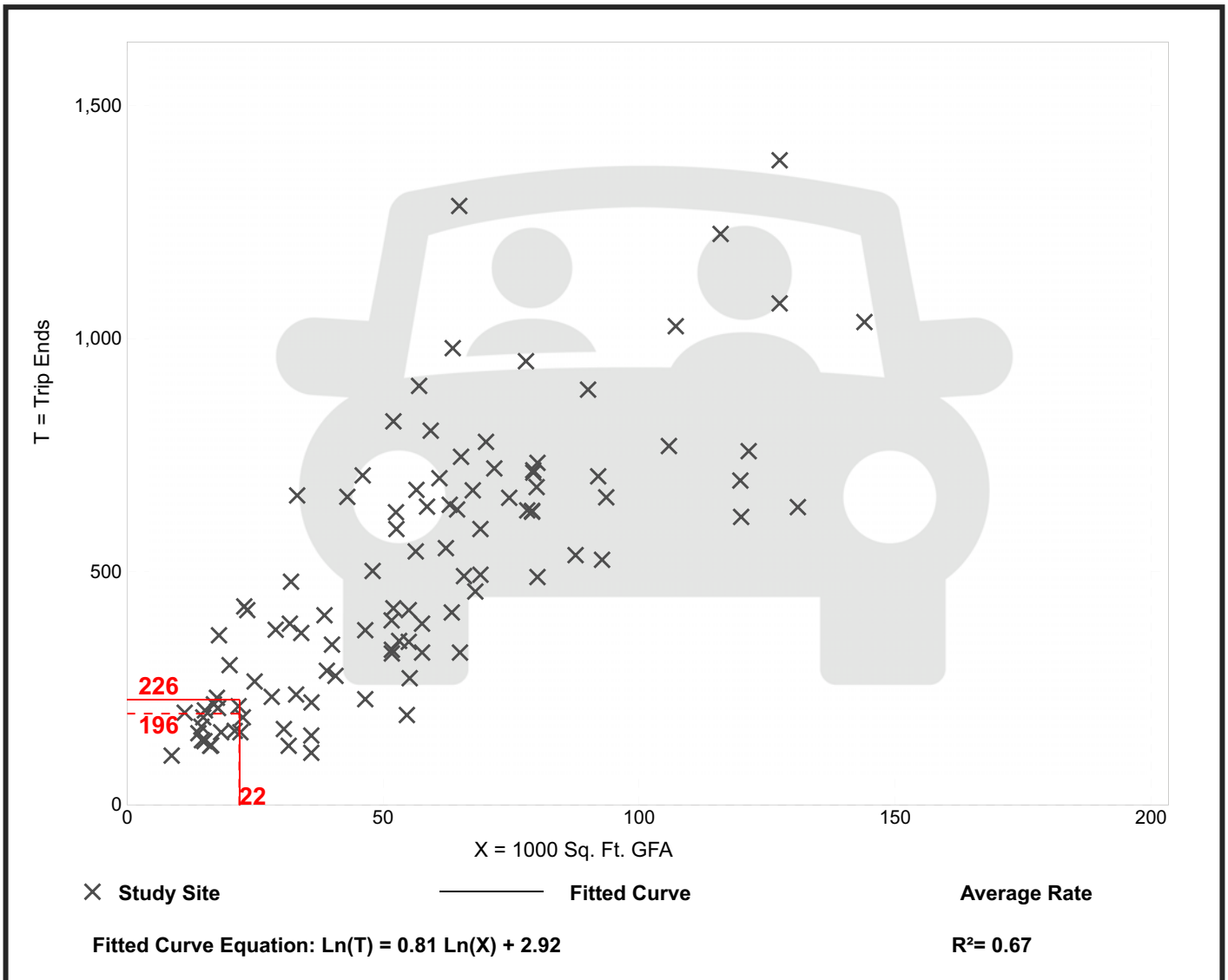
Supermarket (850)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 104
 Avg. 1000 Sq. Ft. GFA: 55
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
8.95	3.11 - 20.30	3.32

Data Plot and Equation



Supermarket (850)

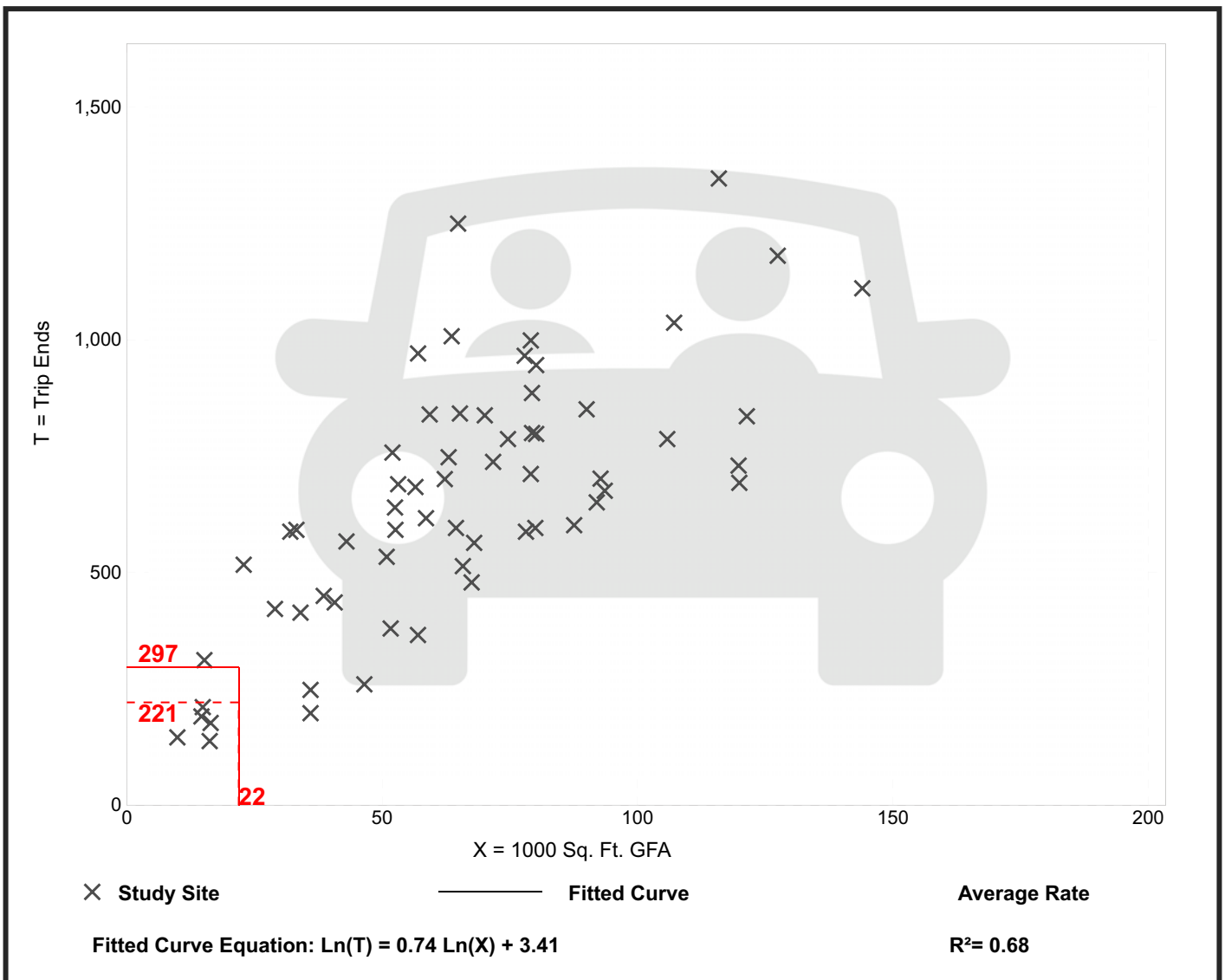
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 62
Avg. 1000 Sq. Ft. GFA: 65
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.10	5.51 - 22.61	3.30

Data Plot and Equation



Pharmacy/Drugstore with Drive-Through Window (881)

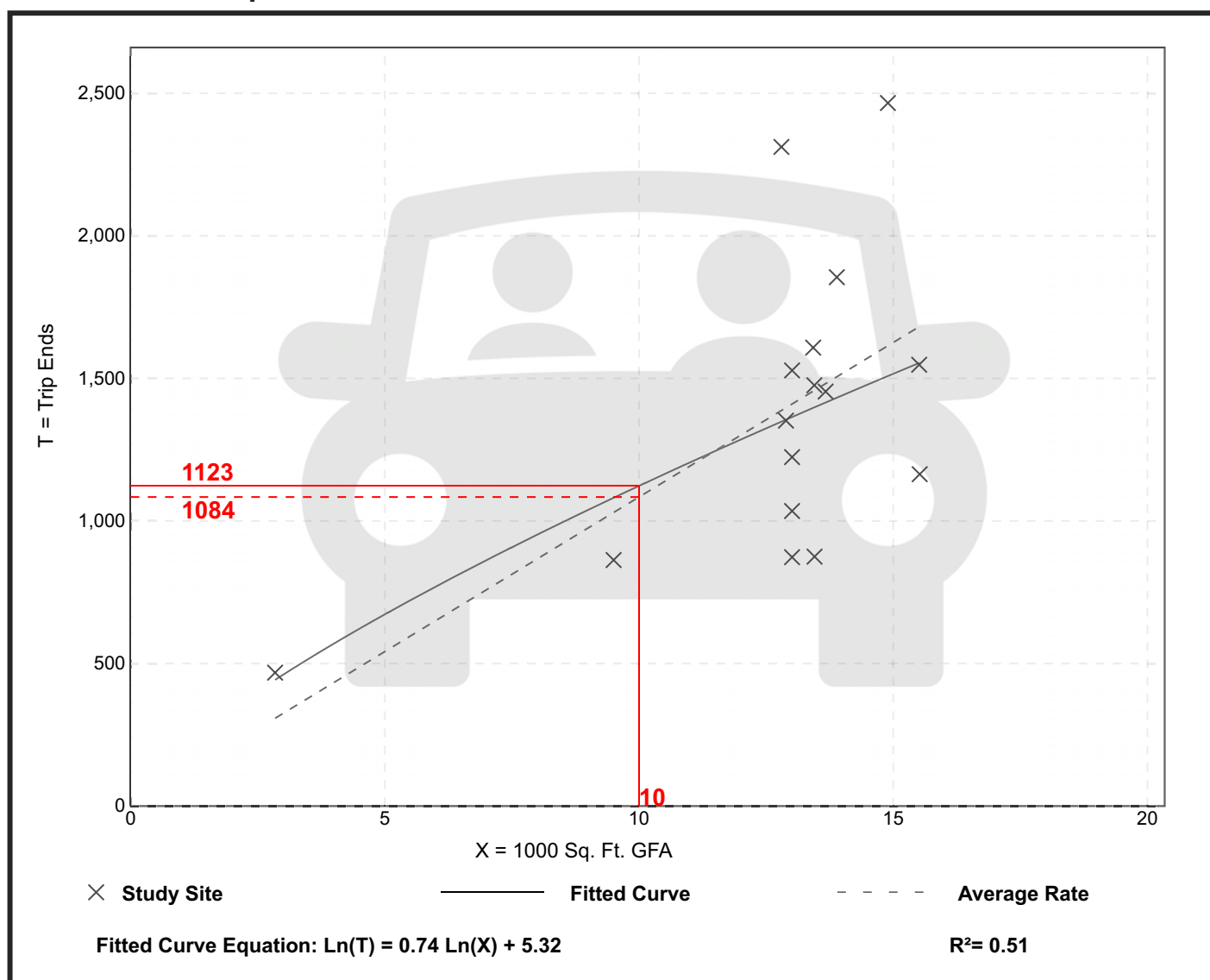
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 16
Avg. 1000 Sq. Ft. GFA: 13
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
108.40	65.05 - 180.63	33.82

Data Plot and Equation



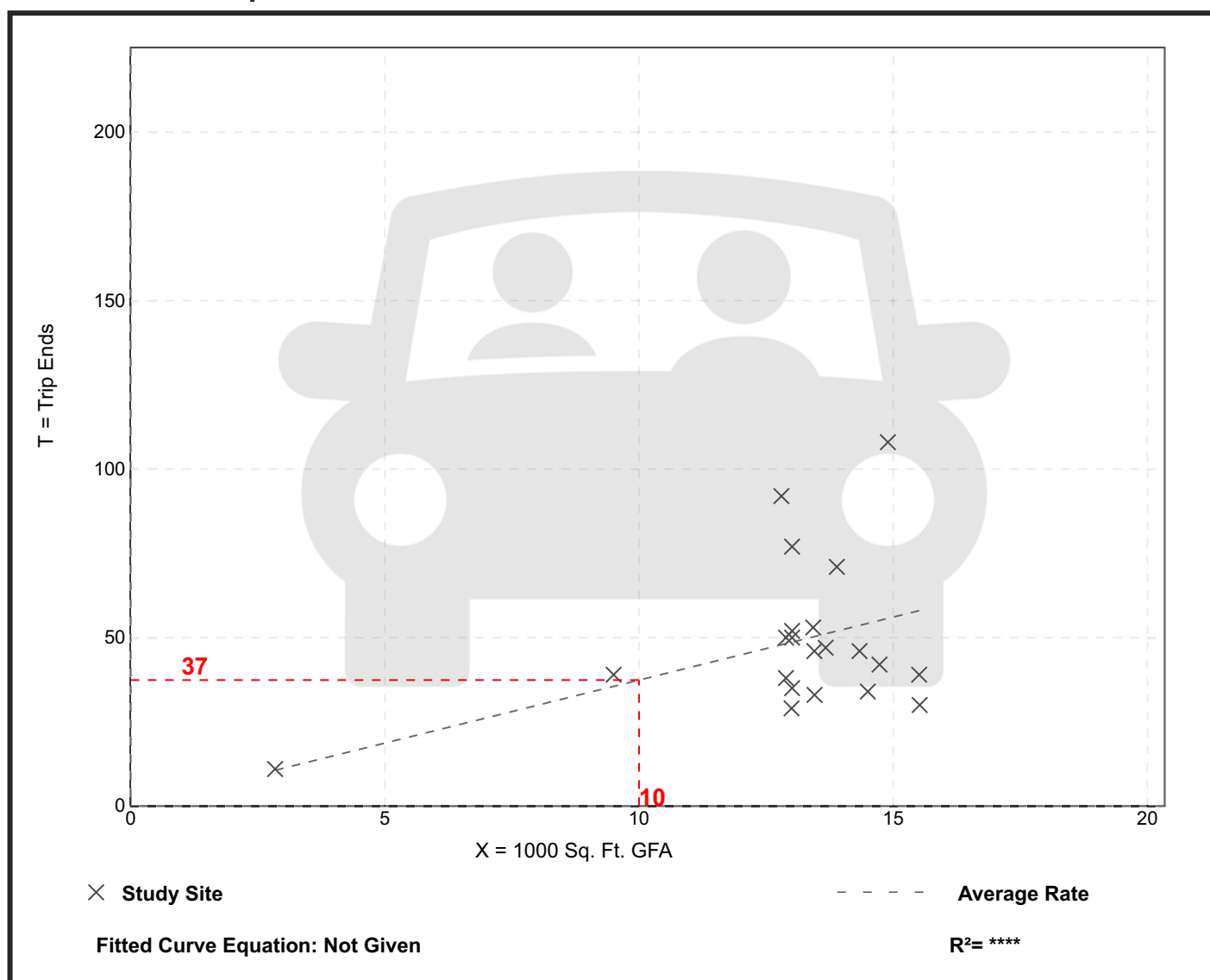
Pharmacy/Drugstore with Drive-Through Window (881)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 21
 Avg. 1000 Sq. Ft. GFA: 13
 Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.74	1.93 - 7.25	1.55

Data Plot and Equation



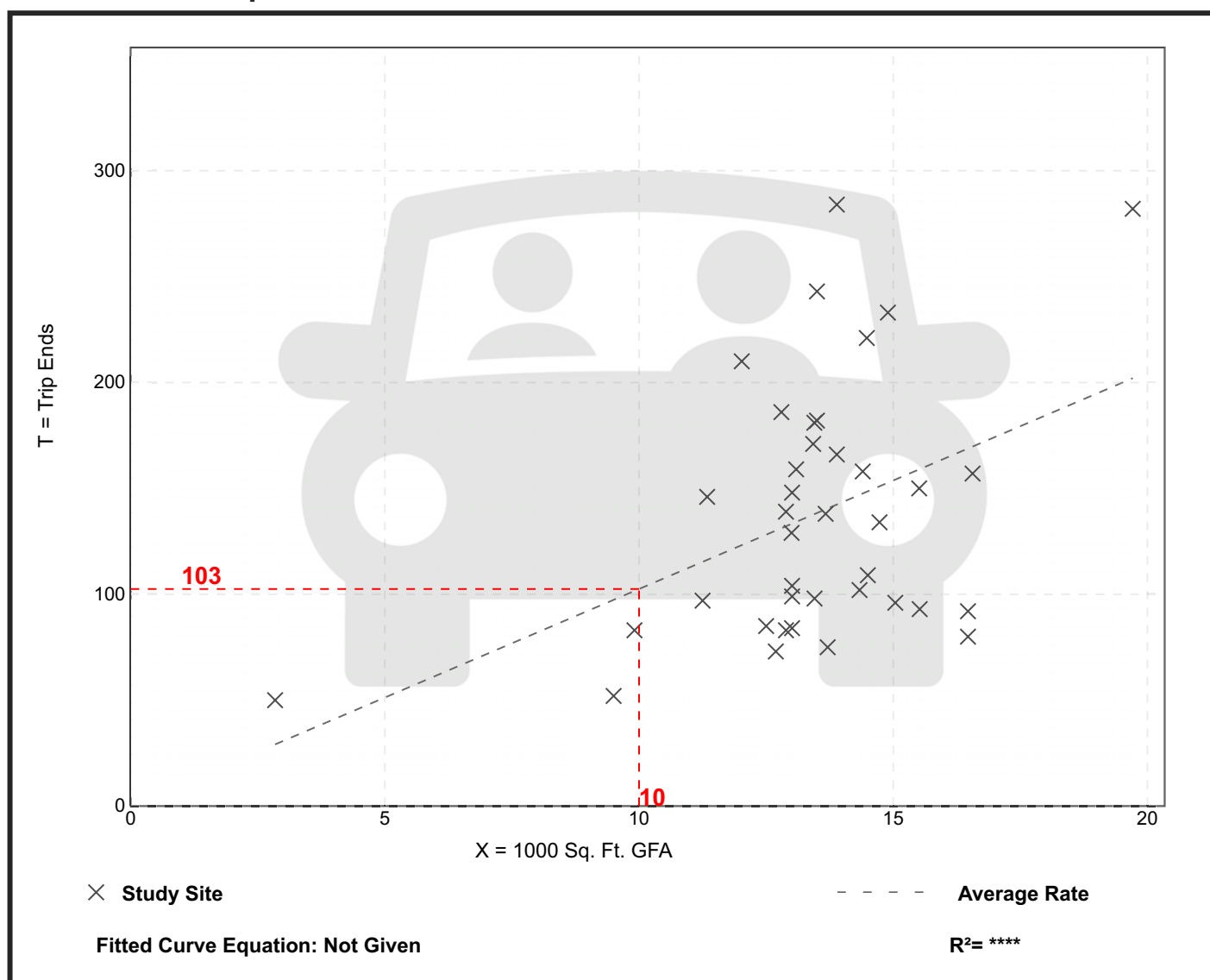
Pharmacy/Drugstore with Drive-Through Window (881)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 39
 Avg. 1000 Sq. Ft. GFA: 13
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.25	4.86 - 20.45	4.01

Data Plot and Equation



Pharmacy/Drugstore with Drive-Through Window (881)

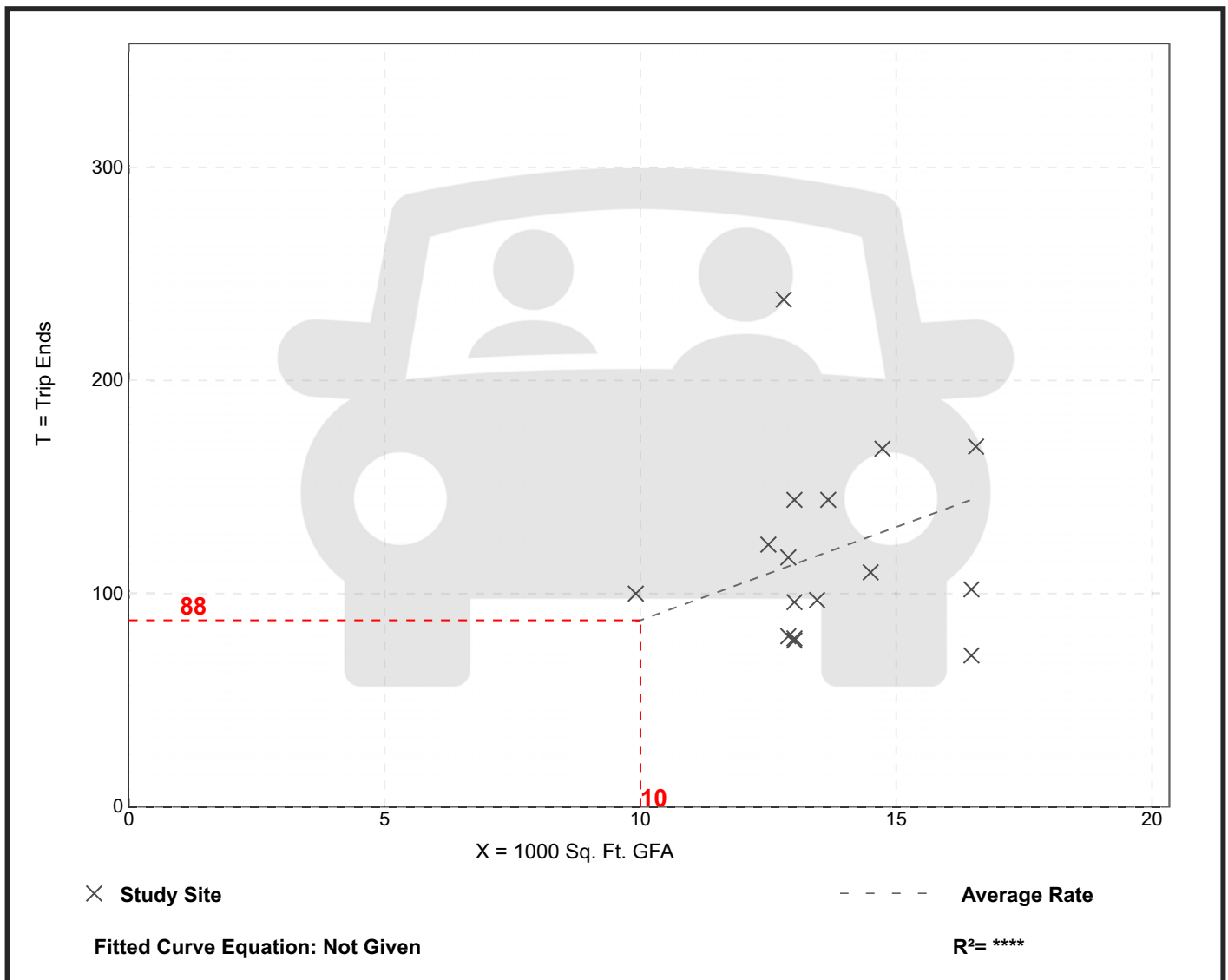
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 16
Avg. 1000 Sq. Ft. GFA: 14
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
8.75	4.31 - 18.59	3.36

Data Plot and Equation



Convenience Store/Gas Station - GFA (5.5-10k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday

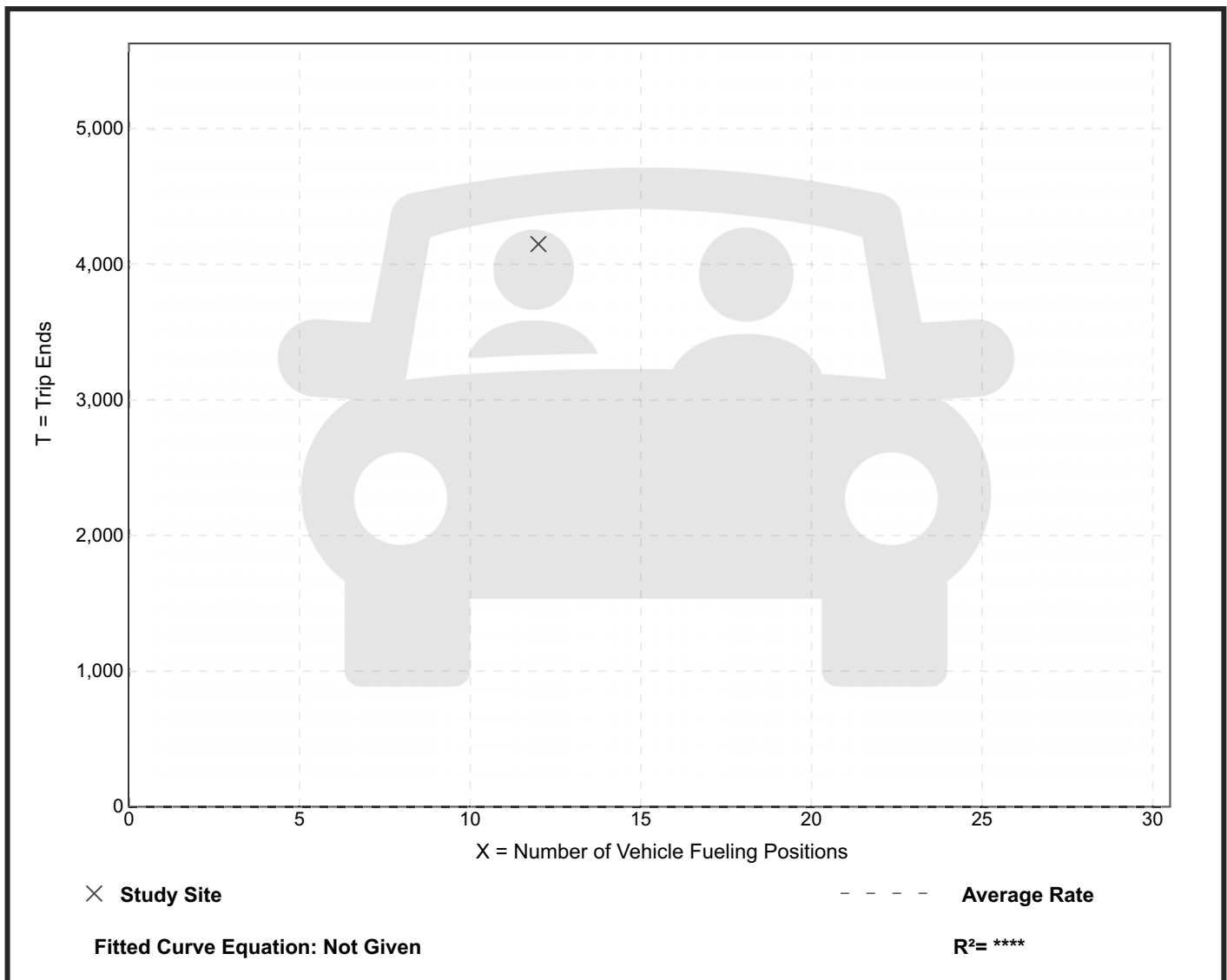
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Vehicle Fueling Positions: 12
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
345.75	345.75 - 345.75	*

Data Plot and Equation

Caution – Small Sample Size



Convenience Store/Gas Station - VFP (9-15) (945)

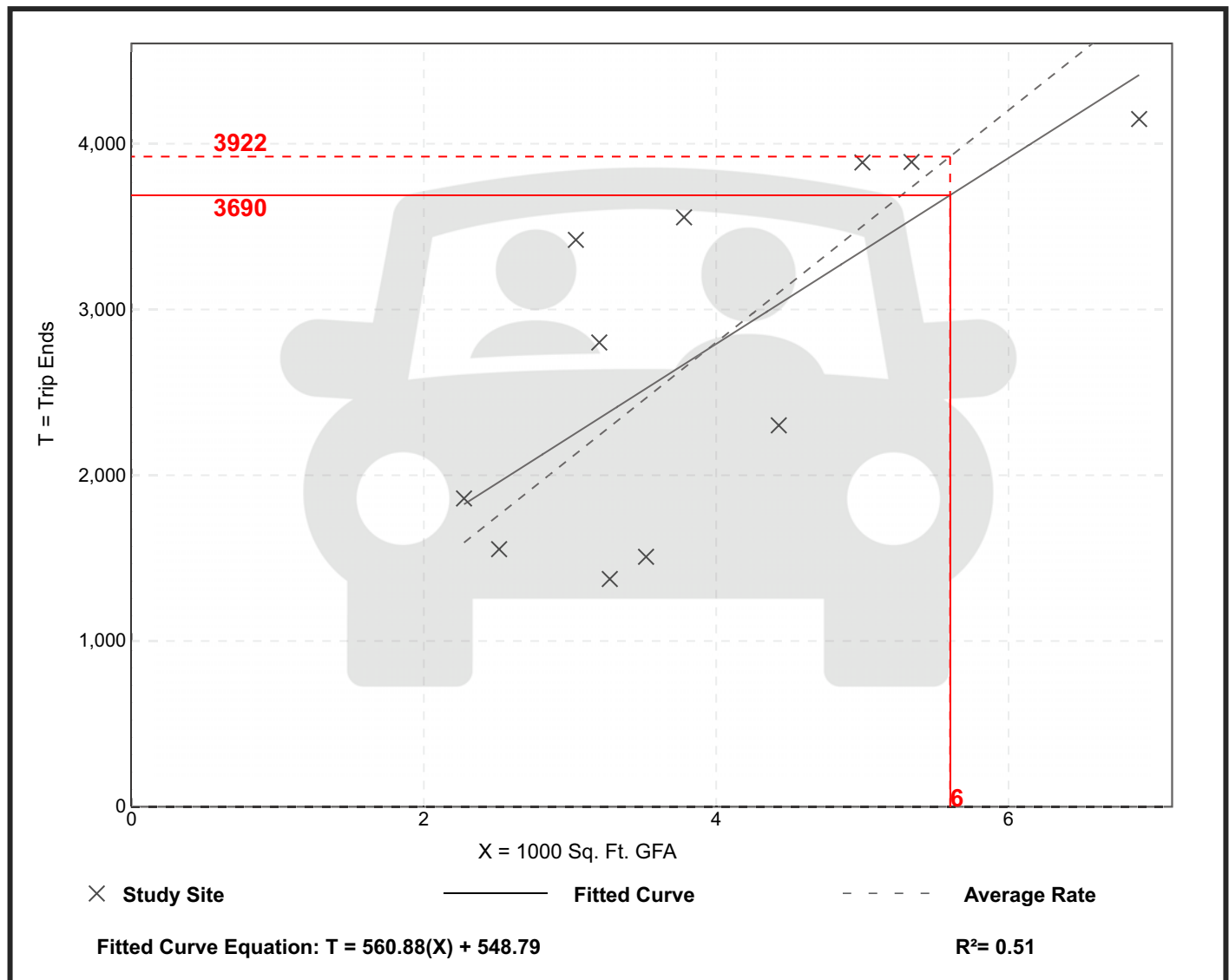
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 11
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
700.43	419.93 - 1125.00	206.44

Data Plot and Equation



Convenience Store/Gas Station - GFA (5.5-10k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 29

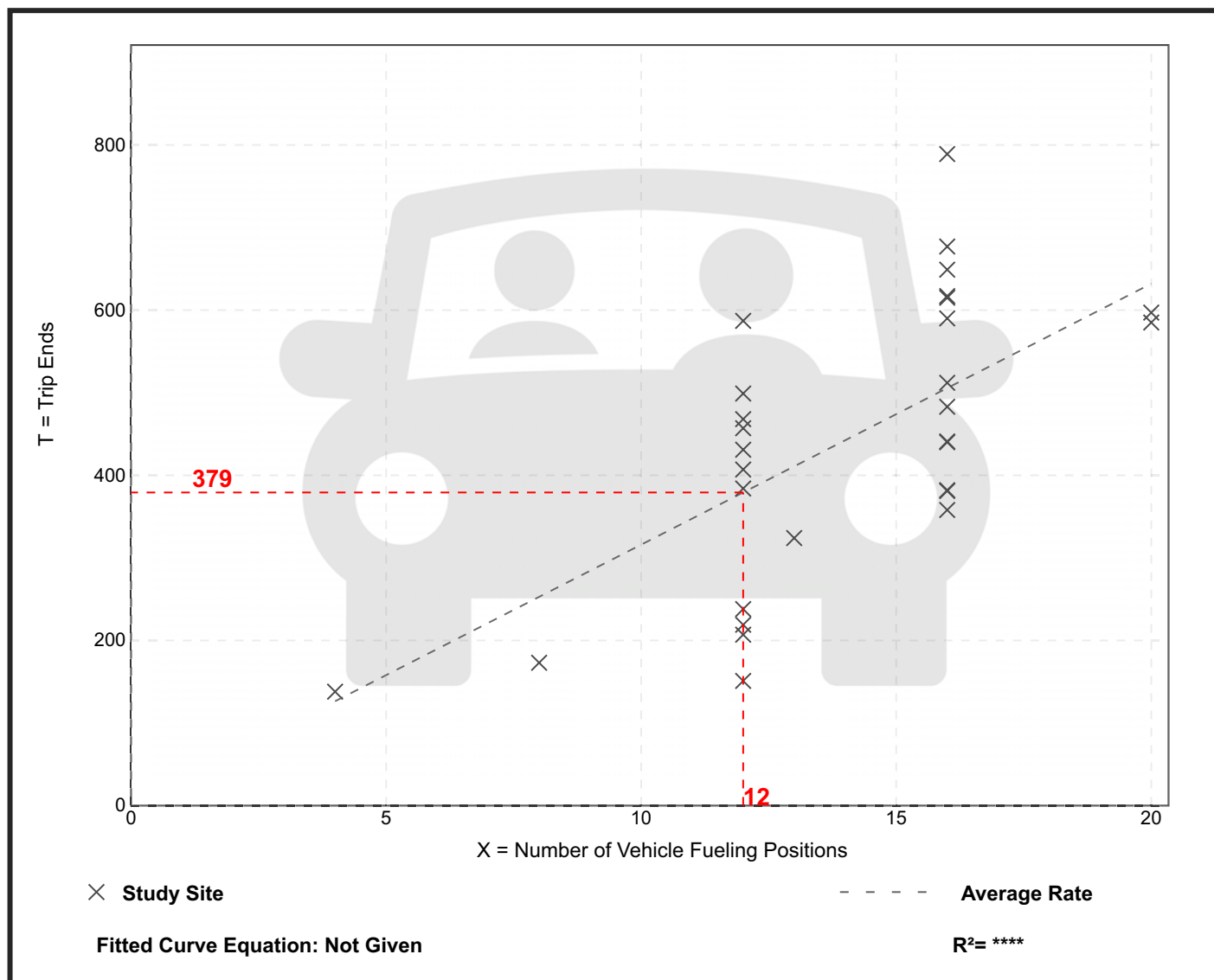
Avg. Num. of Vehicle Fueling Positions: 14

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
31.60	12.58 - 49.31	9.10

Data Plot and Equation



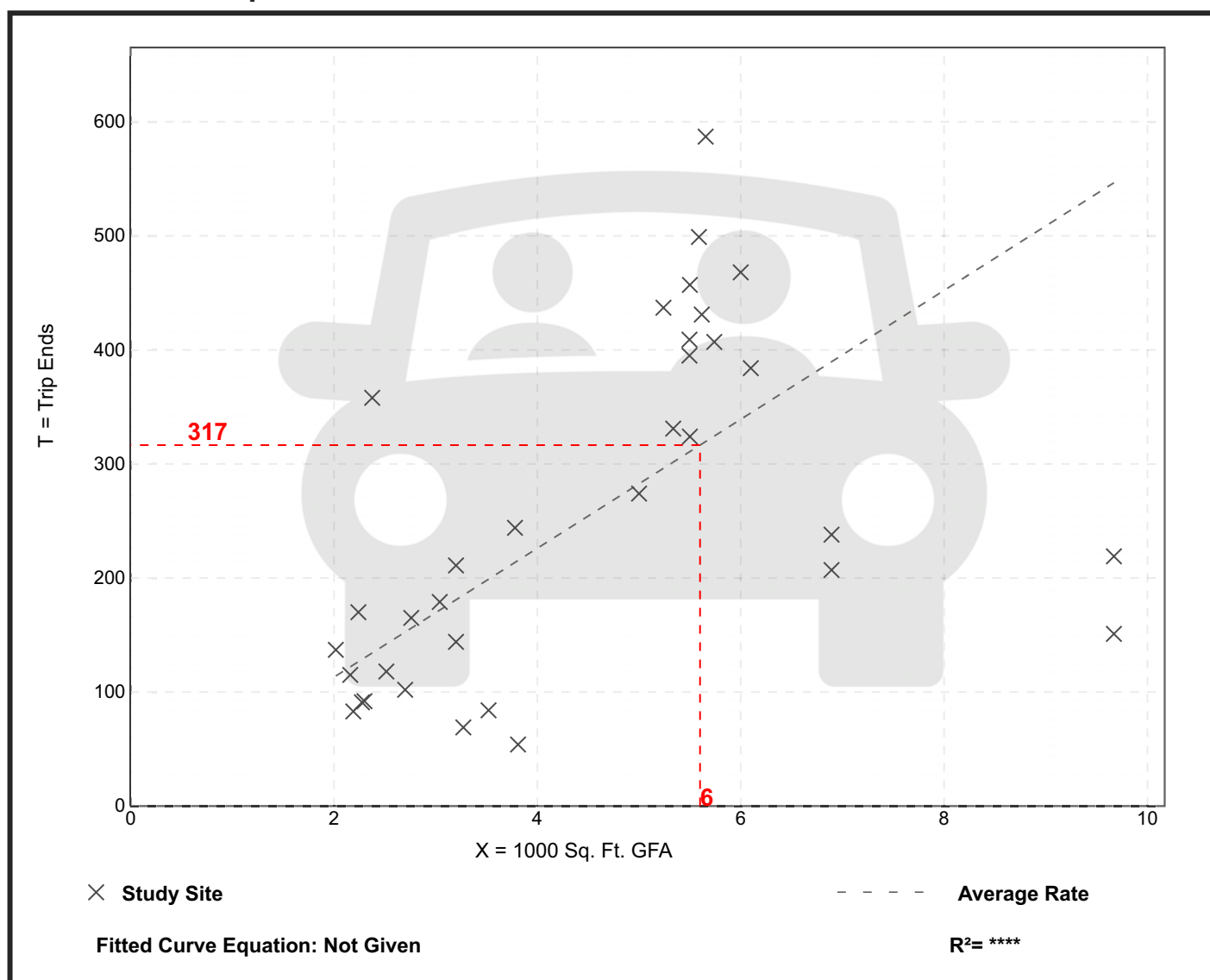
Convenience Store/Gas Station - VFP (9-15) (945)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 34
 Avg. 1000 Sq. Ft. GFA: 4
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
56.52	14.17 - 150.67	27.56

Data Plot and Equation



Convenience Store/Gas Station - GFA (5.5-10k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 29

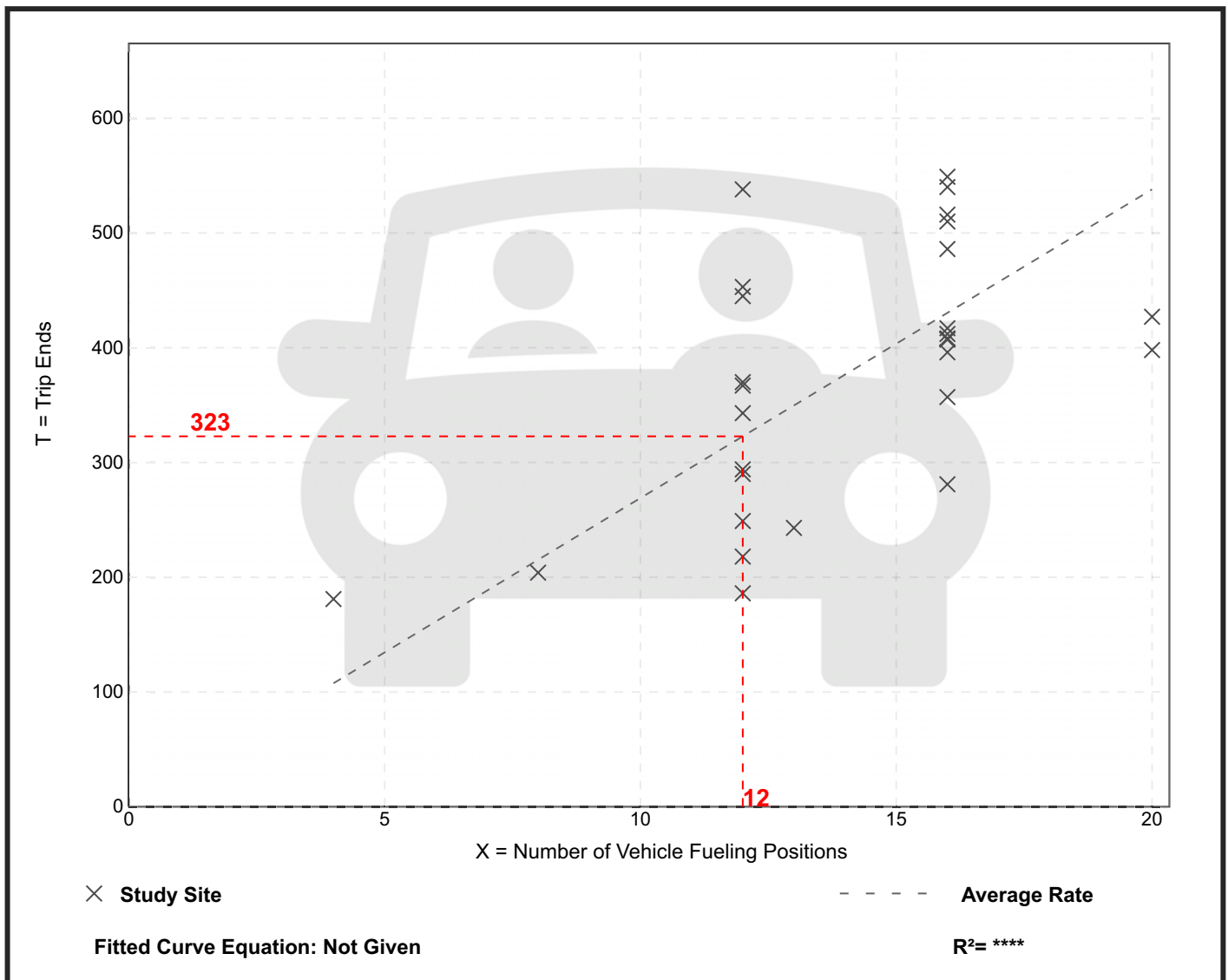
Avg. Num. of Vehicle Fueling Positions: 14

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
26.90	15.50 - 45.25	6.87

Data Plot and Equation



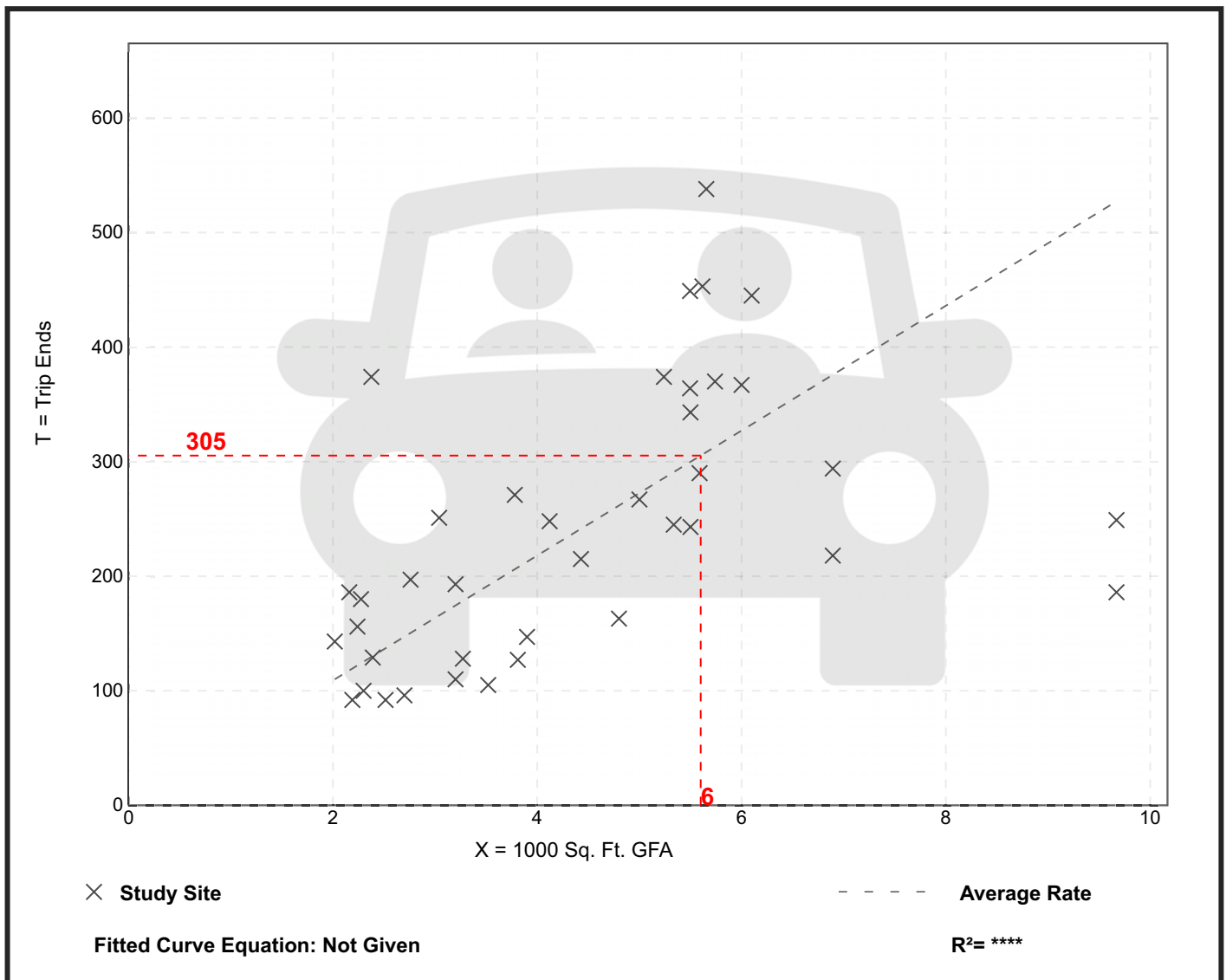
Convenience Store/Gas Station - VFP (9-15) (945)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 39
 Avg. 1000 Sq. Ft. GFA: 4
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
54.52	19.23 - 157.41	23.69

Data Plot and Equation



Convenience Store/Gas Station - GFA (5.5-10k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Saturday, Peak Hour of Generator

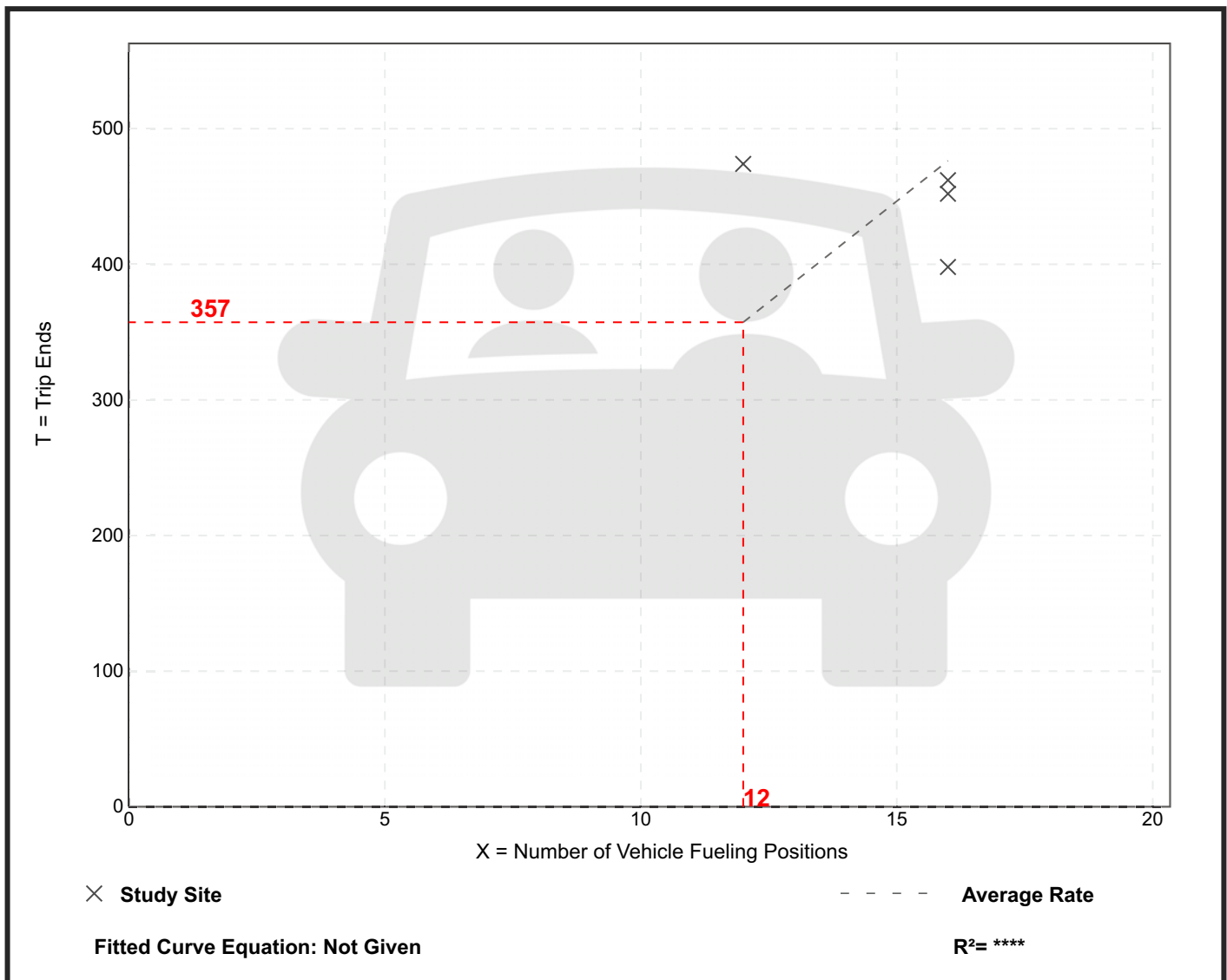
Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Vehicle Fueling Positions: 15
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
29.77	24.88 - 39.50	5.91

Data Plot and Equation

Caution – Small Sample Size



Convenience Store/Gas Station - VFP (9-15) (945)

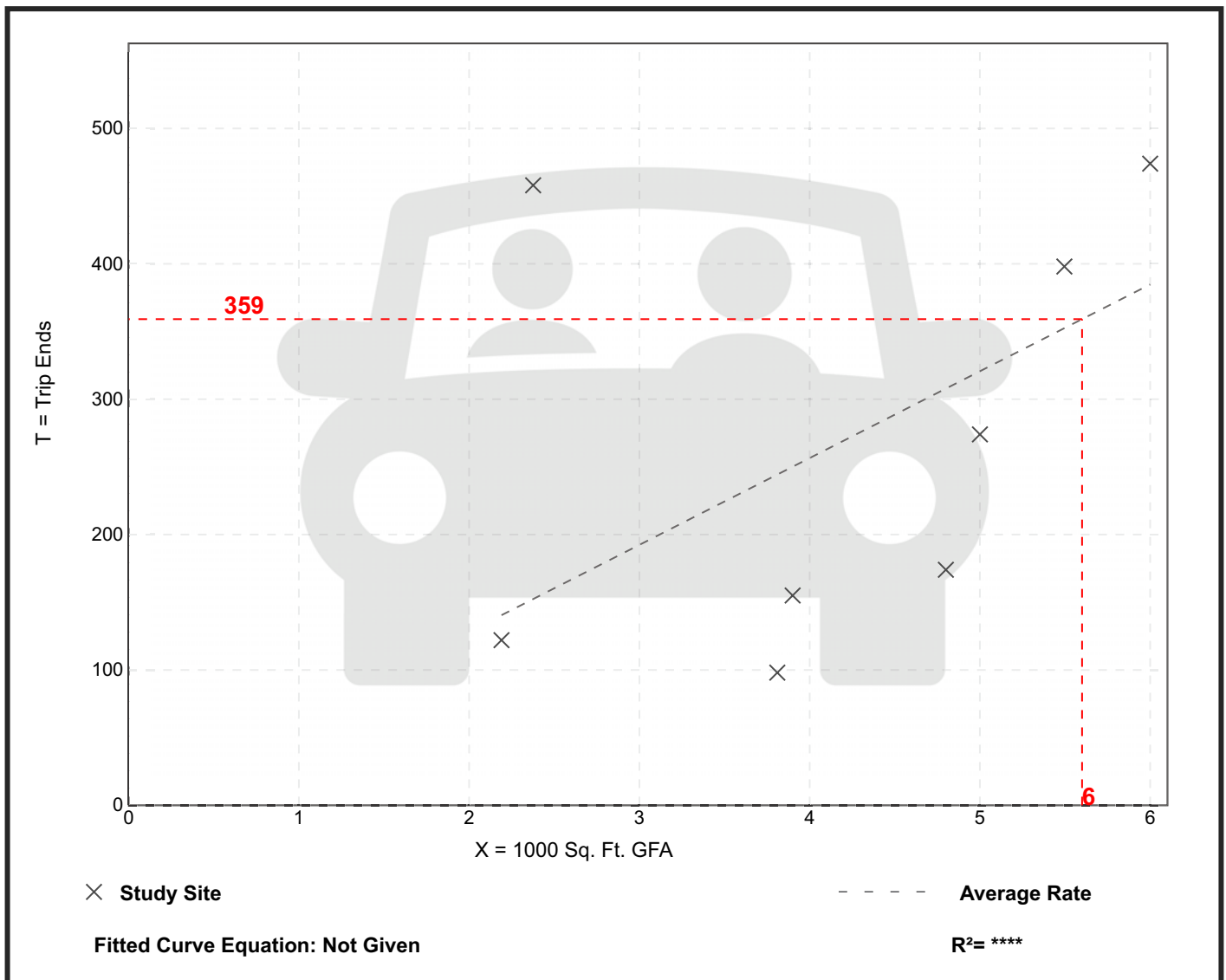
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
64.13	25.72 - 192.76	42.59

Data Plot and Equation



NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 1			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	ADT (AM)			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	575	287	288
Retail	821/850/881	94/21.9/10	ksf	9,836	4,918	4,918
Restaurant	945	5.6	ksf	4,149	2,075	2,074
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
				14,560	7,280	7,280

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		81	181	0	0	0
Retail	11		639	0	0	0
Restaurant	40	290		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	14,560	7,280	7,280
Internal Capture Percentage	17%	17%	17%
External Vehicle-Trips ⁵	12,076	6,038	6,038
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	18%	91%
Retail	8%	13%
Restaurant	40%	16%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	ADT (AM)

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	287	287	1.00	288	288
Retail	1.00	4918	4918	1.00	4918	4918
Restaurant	1.00	2075	2075	1.00	2074	2074
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		81	181	0	3	0
Retail	1426		639	0	689	0
Restaurant	643	290		0	83	62
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1574	477	0	0	0
Retail	11		1038	0	0	0
Restaurant	40	393		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	9	836	415	0		0
Hotel	9	197	125	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	51	236	287	236	0	0
Retail	371	4547	4918	4547	0	0
Restaurant	820	1255	2075	1255	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	262	26	288	26	0	0
Retail	650	4268	4918	4268	0	0
Restaurant	330	1744	2074	1744	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 1			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	ADT (PM)			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	575	287	288
Retail	821/850/881	94/21.9/10	ksf	9,836	4,918	4,918
Restaurant	945	5.6	ksf	4,149	2,075	2,074
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
				14,560	7,280	7,280

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		58	12	0	0	0
Retail	89		602	0	0	0
Restaurant	62	850		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	14,560	7,280	7,280
Internal Capture Percentage	23%	23%	23%
External Vehicle-Trips ⁵	11,214	5,607	5,607
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	53%	24%
Retail	18%	14%
Restaurant	30%	44%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	ADT (PM)

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	287	287	1.00	288	288
Retail	1.00	4918	4918	1.00	4918	4918
Restaurant	1.00	2075	2075	1.00	2074	2074
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		58	12	0	6	0
Retail	98		1426	197	1279	246
Restaurant	62	850		166	373	145
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		393	42	0	0	0
Retail	89		602	0	0	0
Restaurant	86	2459		0	0	0
Cinema/Entertainment	17	197	62		0	0
Residential	164	492	291	0		0
Hotel	0	98	104	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	151	136	287	136	0	0
Retail	908	4010	4918	4010	0	0
Restaurant	614	1461	2075	1461	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	70	218	288	218	0	0
Retail	691	4227	4918	4227	0	0
Restaurant	912	1162	2074	1162	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 1			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	AM PEAK HOUR			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	87	75	12
Retail	821/850/881	94/21.9/10	ksf	263	157	106
Restaurant	945	5.6	ksf	379	189	190
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
				729	421	308

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	8	0	0	0
Retail	3		14	0	0	0
Restaurant	11	13		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	729	421	308
Internal Capture Percentage	14%	12%	17%
External Vehicle-Trips ⁵	625	369	256
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	19%	92%
Retail	10%	16%
Restaurant	12%	13%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	AM PEAK HOUR

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	75	75	1.00	12	12
Retail	1.00	157	157	1.00	106	106
Restaurant	1.00	189	189	1.00	190	190
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	8	0	0	0
Retail	31		14	0	15	0
Restaurant	59	27		0	8	6
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		50	43	0	0	0
Retail	3		95	0	0	0
Restaurant	11	13		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	27	38	0		0
Hotel	2	6	11	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	14	61	75	61	0	0
Retail	16	141	157	141	0	0
Restaurant	22	167	189	167	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	11	1	12	1	0	0
Retail	17	89	106	89	0	0
Restaurant	24	166	190	166	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 1			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	PM PEAK HOUR			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	89	17	72
Retail	821/850/881	94/21.9/10	ksf	817	403	414
Restaurant	945	5.6	ksf	323	161	162
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
				1,229	581	648

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	3	0	0	0
Retail	5		47	0	0	0
Restaurant	5	66		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,229	581	648
Internal Capture Percentage	23%	24%	22%
External Vehicle-Trips ⁵	949	441	508
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	59%	24%
Retail	20%	13%
Restaurant	31%	44%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	PM PEAK HOUR

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	17	17	1.00	72	72
Retail	1.00	403	403	1.00	414	414
Restaurant	1.00	161	161	1.00	162	162
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	3	0	1	0
Retail	8		120	17	108	21
Restaurant	5	66		13	29	11
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		32	3	0	0	0
Retail	5		47	0	0	0
Restaurant	5	202		0	0	0
Cinema/Entertainment	1	16	5		0	0
Residential	10	40	23	0		0
Hotel	0	8	8	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	10	7	17	7	0	0
Retail	80	323	403	323	0	0
Restaurant	50	111	161	111	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	17	55	72	55	0	0
Retail	52	362	414	362	0	0
Restaurant	71	91	162	91	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 1			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	SAT (AM)			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	33	18	15
Retail	821/850/881	94/21.9/10	ksf	1,015	519	496
Restaurant	945	5.6	ksf	357	175	182
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
				1,405	712	693

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	9	0	0	0
Retail	1		64	0	0	0
Restaurant	3	25		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,405	712	693
Internal Capture Percentage	15%	15%	15%
External Vehicle-Trips ⁵	1,193	606	587
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	22%	87%
Retail	6%	13%
Restaurant	42%	15%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	SAT (AM)

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	18	18	1.00	15	15
Retail	1.00	519	519	1.00	496	496
Restaurant	1.00	175	175	1.00	182	182
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	9	0	0	0
Retail	144		64	0	69	0
Restaurant	56	25		0	7	5
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		166	40	0	0	0
Retail	1		88	0	0	0
Restaurant	3	42		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	88	35	0		0
Hotel	1	21	11	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	4	14	18	14	0	0
Retail	29	490	519	490	0	0
Restaurant	73	102	175	102	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	13	2	15	2	0	0
Retail	65	431	496	431	0	0
Restaurant	28	154	182	154	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 1			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	SAT (PM)			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	33	18	15
Retail	821/850/881	94/21.9/10	ksf	1,015	519	496
Restaurant	945	5.6	ksf	357	175	182
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
				1,405	712	693

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	0	0
Retail	6		51	0	0	0
Restaurant	5	75		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,405	712	693
Internal Capture Percentage	20%	20%	20%
External Vehicle-Trips ⁵	1,123	571	552
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	61%	27%
Retail	15%	11%
Restaurant	30%	44%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	SAT (PM)

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	18	18	1.00	15	15
Retail	1.00	519	519	1.00	496	496
Restaurant	1.00	175	175	1.00	182	182
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	0	0
Retail	10		144	20	129	25
Restaurant	5	75		15	33	13
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		42	4	0	0	0
Retail	6		51	0	0	0
Restaurant	5	260		0	0	0
Cinema/Entertainment	1	21	5		0	0
Residential	10	52	25	0		0
Hotel	0	10	9	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	11	7	18	7	0	0
Retail	78	441	519	441	0	0
Restaurant	52	123	175	123	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	4	11	15	11	0	0
Retail	57	439	496	439	0	0
Restaurant	80	102	182	102	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

TRIP GENERATION WORKSHEETS

PHASE 2

Multifamily Housing (Low-Rise)

Not Close to Rail Transit (220)

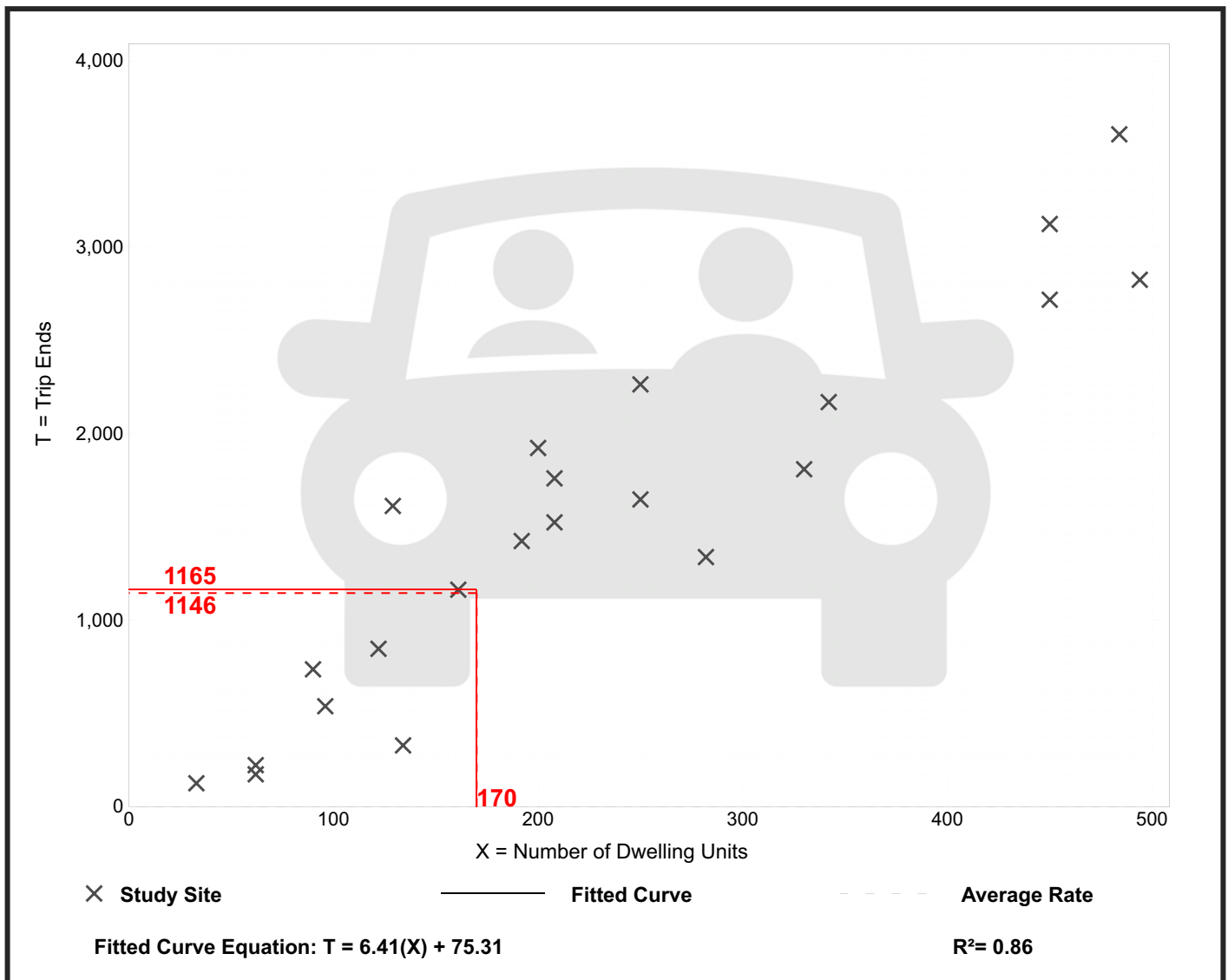
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. Num. of Dwelling Units: 229
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Multifamily Housing (Low-Rise)

Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 49

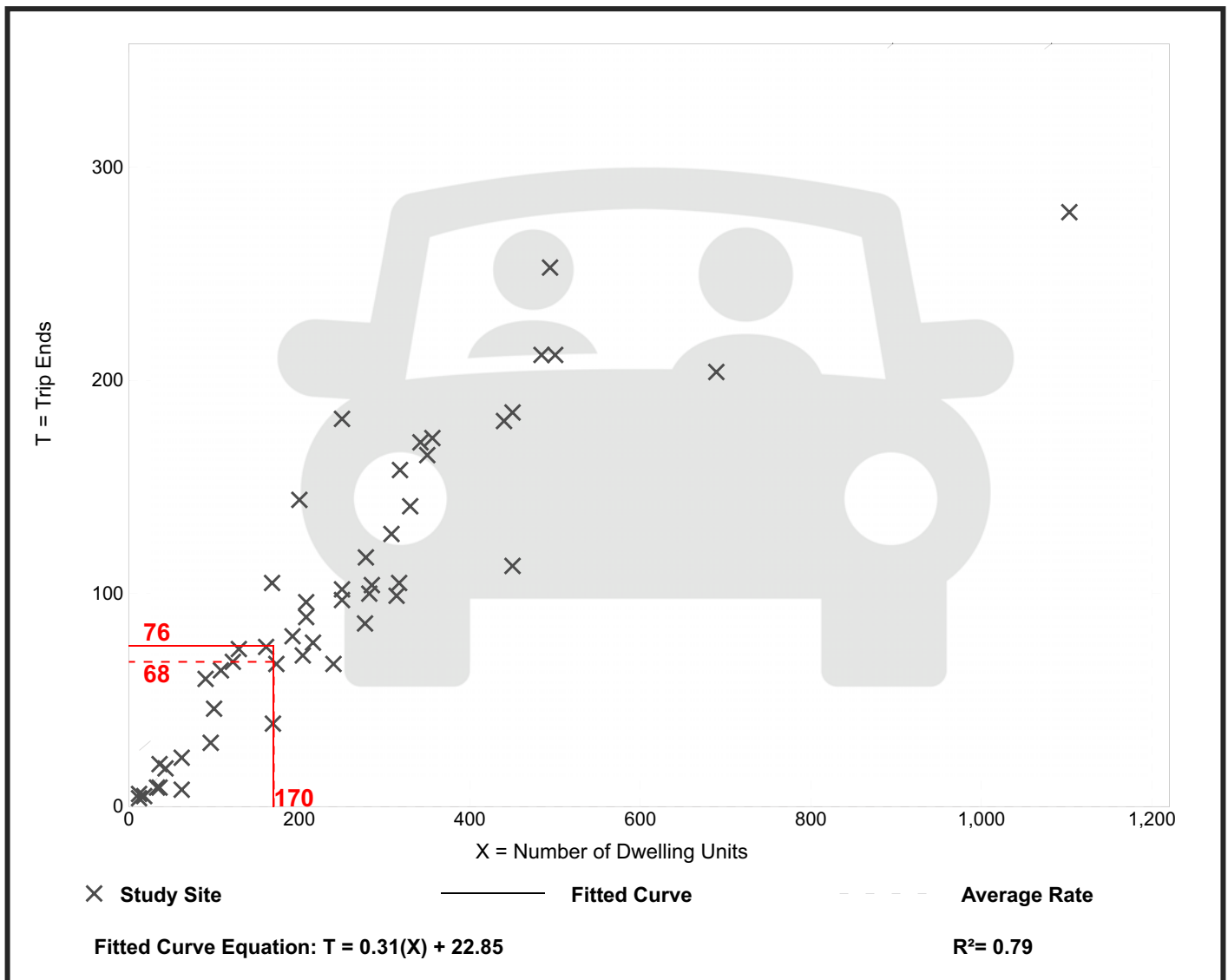
Avg. Num. of Dwelling Units: 249

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise)

Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 59

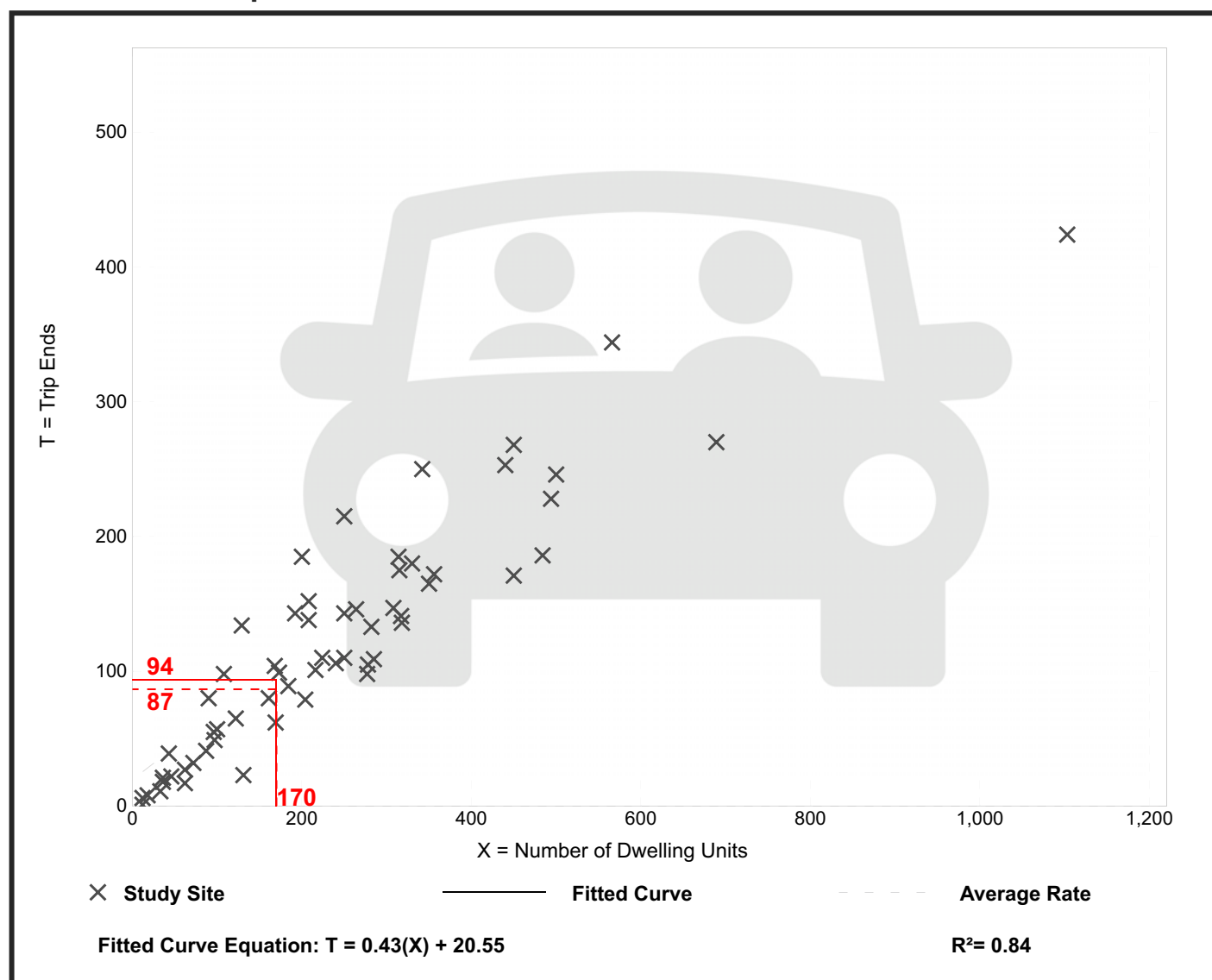
Avg. Num. of Dwelling Units: 241

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Multifamily Housing (Low-Rise) (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Saturday, Peak Hour of Generator

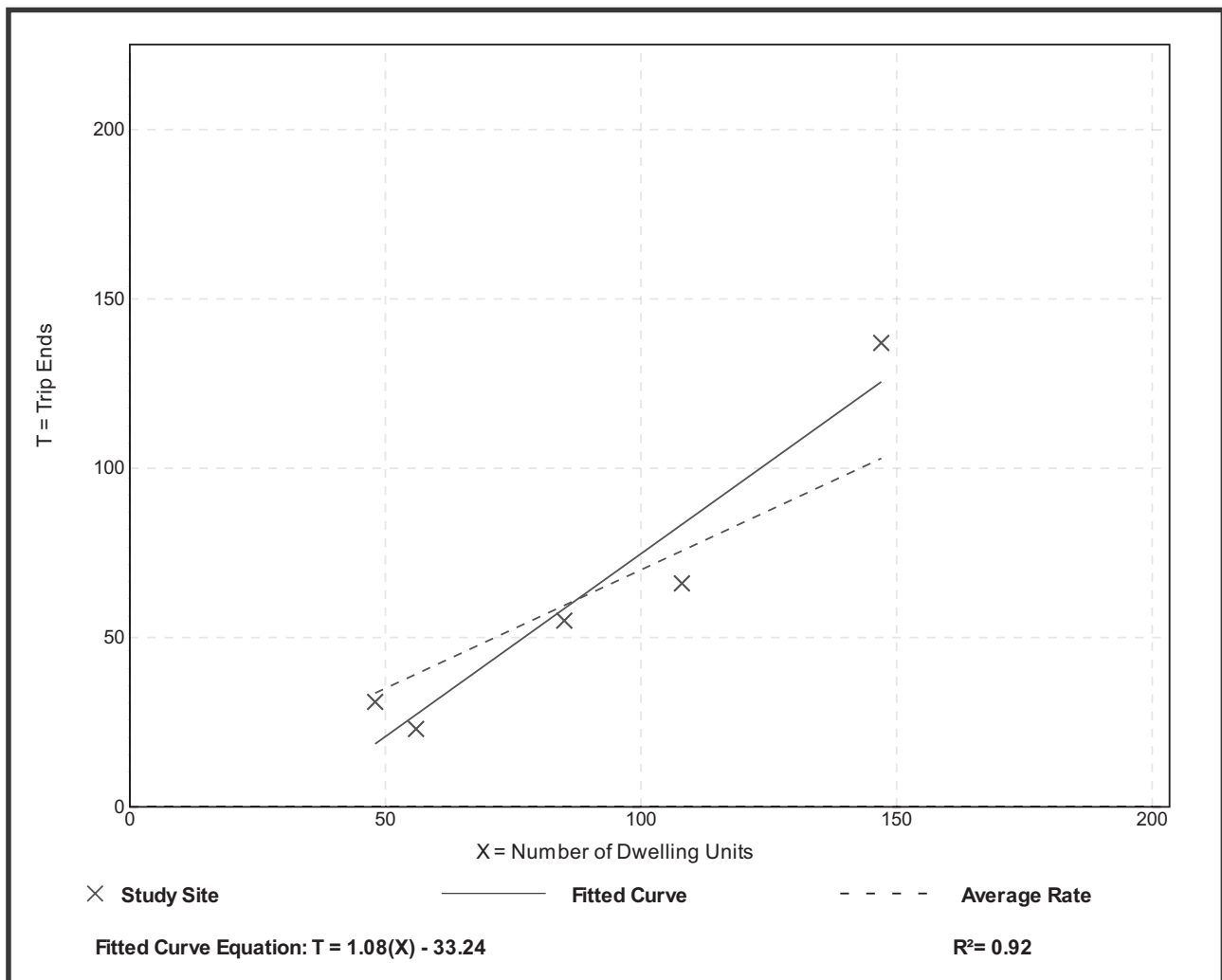
Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Dwelling Units: 89
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.41 - 0.93	0.20

Data Plot and Equation

Caution – Small Sample Size



Shopping Plaza (40-150k) - Supermarket - No (821)

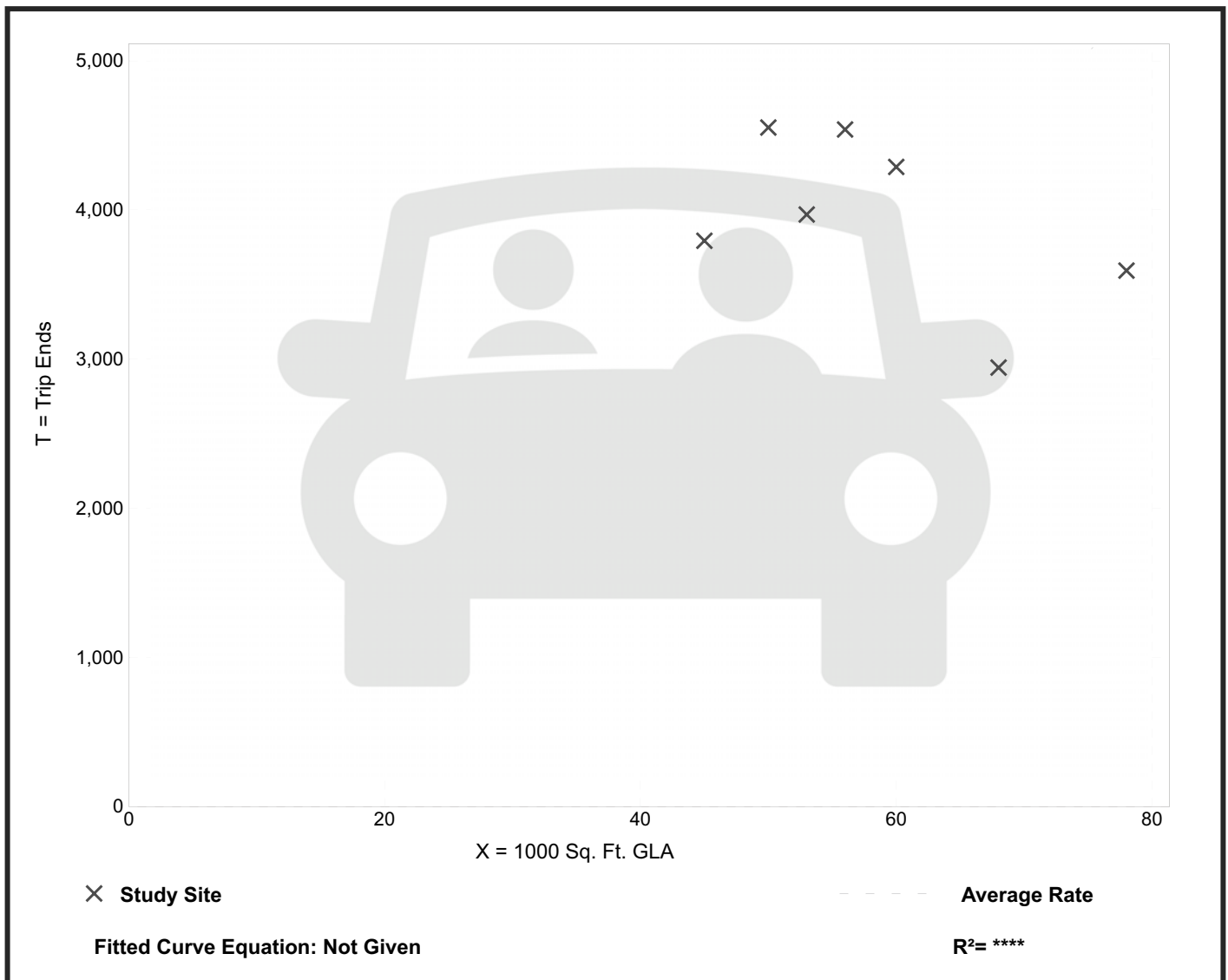
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 7
Avg. 1000 Sq. Ft. GLA: 59
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
67.52	43.29 - 91.06	19.25

Data Plot and Equation



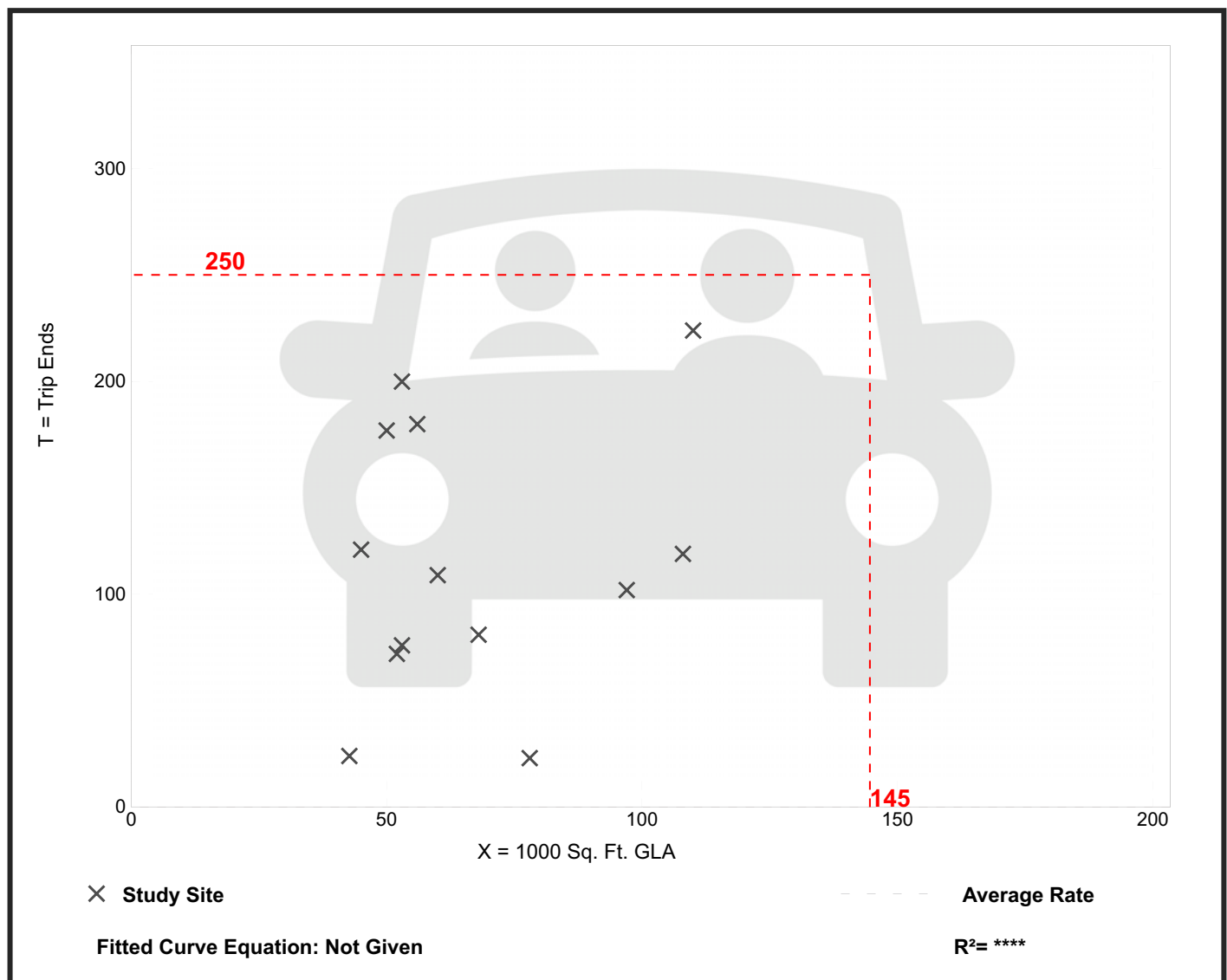
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 13
 Avg. 1000 Sq. Ft. GLA: 67
 Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
1.73	0.29 - 3.77	1.06

Data Plot and Equation



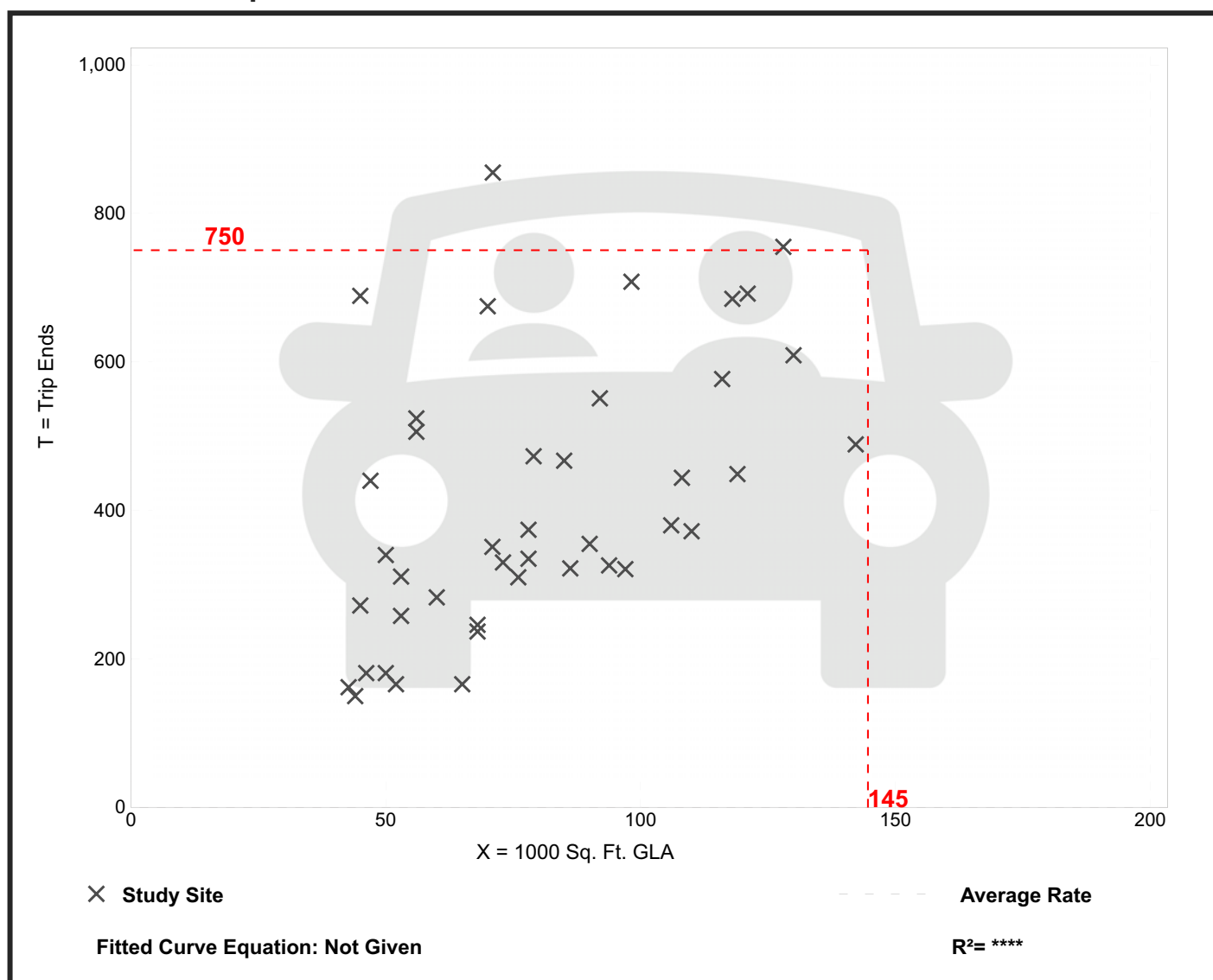
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 42
 Avg. 1000 Sq. Ft. GLA: 79
 Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
5.19	2.55 - 15.31	2.28

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - No (821)

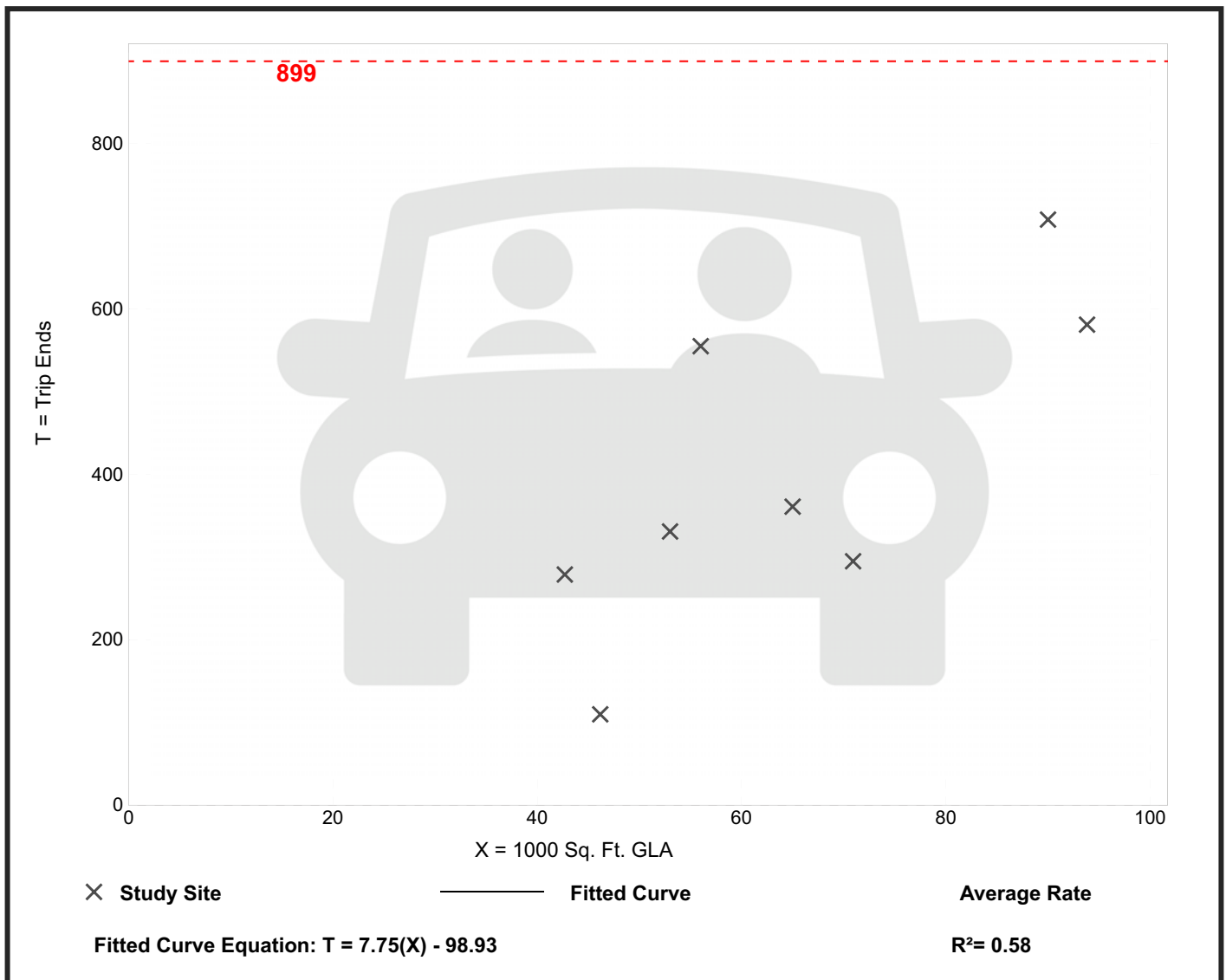
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GLA: 65
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.22	2.38 - 9.91	2.11

Data Plot and Equation



NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 2			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	ADT (AM)			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	575	287	288
Retail	821/850/881	144.6/21.9/10	ksf	13,252	6,626	6,626
Restaurant	945	5.6	ksf	4,149	2,075	2,074
Cinema/Entertainment				0		
Residential	220	170	units	1,165	583	582
Hotel				0		
All Other Land Uses ²				0		
				19,141	9,571	9,570

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		81	181	0	0	0
Retail	11		861	0	12	0
Restaurant	40	290		0	29	0
Cinema/Entertainment	0	0	0		0	0
Residential	9	6	116	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	19,141	9,571	9,570
Internal Capture Percentage	17%	17%	17%
External Vehicle-Trips ⁵	15,869	7,935	7,934
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	21%	91%
Retail	6%	13%
Restaurant	56%	17%
Cinema/Entertainment	N/A	N/A
Residential	7%	23%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	ADT (AM)

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	287	287	1.00	288	288
Retail	1.00	6626	6626	1.00	6626	6626
Restaurant	1.00	2075	2075	1.00	2074	2074
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	583	583	1.00	582	582
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		81	181	0	3	0
Retail	1922		861	0	928	0
Restaurant	643	290		0	83	62
Cinema/Entertainment	0	0	0		0	0
Residential	12	6	116	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2120	477	0	0	0
Retail	11		1038	0	12	0
Restaurant	40	530		0	29	0
Cinema/Entertainment	0	0	0		0	0
Residential	9	1126	415	0		0
Hotel	9	265	125	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	60	227	287	227	0	0
Retail	377	6249	6626	6249	0	0
Restaurant	1158	917	2075	917	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	41	542	583	542	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	262	26	288	26	0	0
Retail	884	5742	6626	5742	0	0
Restaurant	359	1715	2074	1715	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	131	451	582	451	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 2			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	ADT (PM)			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	575	287	288
Retail	821/850/881	144.6/21.9/10	ksf	13,252	6,626	6,626
Restaurant	945	5.6	ksf	4,149	2,075	2,074
Cinema/Entertainment				0		
Residential	220	170	units	1,165	583	582
Hotel				0		
All Other Land Uses ²				0		
				19,141	9,571	9,570

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		58	12	0	6	0
Retail	89		602	0	268	0
Restaurant	62	850		0	93	0
Cinema/Entertainment	0	0	0		0	0
Residential	23	244	122	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	19,141	9,571	9,570
Internal Capture Percentage	25%	25%	25%
External Vehicle-Trips ⁵	14,283	7,142	7,141
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	61%	26%
Retail	17%	14%
Restaurant	35%	48%
Cinema/Entertainment	N/A	N/A
Residential	63%	67%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	ADT (PM)

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	287	287	1.00	288	288
Retail	1.00	6626	6626	1.00	6626	6626
Restaurant	1.00	2075	2075	1.00	2074	2074
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	583	583	1.00	582	582
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		58	12	0	6	0
Retail	133		1922	265	1723	331
Restaurant	62	850		166	373	145
Cinema/Entertainment	0	0	0		0	0
Residential	23	244	122	0		17
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		530	42	0	23	0
Retail	89		602	0	268	0
Restaurant	86	3313		0	93	0
Cinema/Entertainment	17	265	62		23	0
Residential	164	663	291	0		0
Hotel	0	133	104	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	174	113	287	113	0	0
Retail	1152	5474	6626	5474	0	0
Restaurant	736	1339	2075	1339	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	367	216	583	216	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	76	212	288	212	0	0
Retail	959	5667	6626	5667	0	0
Restaurant	1005	1069	2074	1069	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	389	193	582	193	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 2			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	AM PEAK HOUR			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	87	75	12
Retail	821/850/881	144.6/21.9/10	ksf	350	211	139
Restaurant	945	5.6	ksf	379	189	190
Cinema/Entertainment				0		
Residential	220	170	units	76	18	58
Hotel				0		
All Other Land Uses ²				0		
				892	493	399

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	8	0	0	0
Retail	3		18	0	0	0
Restaurant	11	17		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	12	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	892	493	399
Internal Capture Percentage	17%	15%	19%
External Vehicle-Trips ⁵	742	418	324
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	20%	92%
Retail	10%	15%
Restaurant	20%	15%
Cinema/Entertainment	N/A	N/A
Residential	6%	24%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	AM PEAK HOUR

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	75	75	1.00	12	12
Retail	1.00	211	211	1.00	139	139
Restaurant	1.00	189	189	1.00	190	190
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	18	18	1.00	58	58
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	8	0	0	0
Retail	40		18	0	19	0
Restaurant	59	27		0	8	6
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	12	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		68	43	0	0	0
Retail	3		95	0	0	0
Restaurant	11	17		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	36	38	0		0
Hotel	2	8	11	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	15	60	75	60	0	0
Retail	21	190	211	190	0	0
Restaurant	38	151	189	151	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	17	18	17	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	11	1	12	1	0	0
Retail	21	118	139	118	0	0
Restaurant	29	161	190	161	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	14	44	58	44	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 2			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	PM PEAK HOUR			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	89	17	72
Retail	821/850/881	144.6/21.9/10	ksf	1,079	531	548
Restaurant	945	5.6	ksf	323	161	162
Cinema/Entertainment				0		
Residential	220	170	units	94	59	35
Hotel				0		
All Other Land Uses ²				0		
				1,585	768	817

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	3	0	1	0
Retail	5		47	0	27	0
Restaurant	5	66		0	9	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	15	7	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,585	768	817
Internal Capture Percentage	25%	26%	24%
External Vehicle-Trips ⁵	1,185	568	617
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	65%	25%
Retail	18%	14%
Restaurant	35%	49%
Cinema/Entertainment	N/A	N/A
Residential	63%	66%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	PM PEAK HOUR

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	17	17	1.00	72	72
Retail	1.00	531	531	1.00	548	548
Restaurant	1.00	161	161	1.00	162	162
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	59	59	1.00	35	35
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	3	0	1	0
Retail	11		159	22	142	27
Restaurant	5	66		13	29	11
Cinema/Entertainment	0	0	0		0	0
Residential	1	15	7	0		1
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		42	3	0	2	0
Retail	5		47	0	27	0
Restaurant	5	266		0	9	0
Cinema/Entertainment	1	21	5		2	0
Residential	10	53	23	0		0
Hotel	0	11	8	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	11	6	17	6	0	0
Retail	95	436	531	436	0	0
Restaurant	57	104	161	104	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	37	22	59	22	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	18	54	72	54	0	0
Retail	79	469	548	469	0	0
Restaurant	80	82	162	82	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	23	12	35	12	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 2			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	SAT (AM)			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	33	18	15
Retail	821/850/881	144.6/21.9/10	ksf	1,284	658	626
Restaurant	945	5.6	ksf	357	175	182
Cinema/Entertainment				0		
Residential	220	170	untis	150	75	75
Hotel				0		
All Other Land Uses ²				0		
				1,824	926	898

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	9	0	0	0
Retail	1		81	0	2	0
Restaurant	3	25		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	15	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,824	926	898
Internal Capture Percentage	16%	16%	16%
External Vehicle-Trips ⁵	1,532	780	752
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	28%	87%
Retail	5%	13%
Restaurant	60%	18%
Cinema/Entertainment	N/A	N/A
Residential	8%	23%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	SAT (AM)

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	18	18	1.00	15	15
Retail	1.00	658	658	1.00	626	626
Restaurant	1.00	175	175	1.00	182	182
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	75	75	1.00	75	75
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	9	0	0	0
Retail	182		81	0	88	0
Restaurant	56	25		0	7	5
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	15	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		211	40	0	0	0
Retail	1		88	0	2	0
Restaurant	3	53		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	112	35	0		0
Hotel	1	26	11	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	5	13	18	13	0	0
Retail	30	628	658	628	0	0
Restaurant	105	70	175	70	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	6	69	75	69	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	13	2	15	2	0	0
Retail	84	542	626	542	0	0
Restaurant	32	150	182	150	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	17	58	75	58	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Pennmark Property			Organization:	Grove Miller Engineering, Inc.
Project Location:	Mt. Joy Township, Lancaster County			Performed By:	GEC
Scenario Description:	Phase 2			Date:	1/20/2022
Analysis Year:				Checked By:	
Analysis Period:	SAT (PM)			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	710/720	43	ksf	33	18	15
Retail	821/850/881	144.6/21.9/10	ksf	1,284	658	626
Restaurant	945	5.6	ksf	357	175	182
Cinema/Entertainment				0		
Residential	220	170	units	150	75	75
Hotel				0		
All Other Land Uses ²				0		
				1,824	926	898

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	0	0
Retail	6		51	0	35	0
Restaurant	5	75		0	12	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	32	16	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,824	926	898
Internal Capture Percentage	26%	26%	27%
External Vehicle-Trips ⁵	1,346	687	659
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	78%	27%
Retail	17%	15%
Restaurant	39%	51%
Cinema/Entertainment	N/A	N/A
Residential	63%	68%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Pennmark Property
Analysis Period:	SAT (PM)

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	18	18	1.00	15	15
Retail	1.00	658	658	1.00	626	626
Restaurant	1.00	175	175	1.00	182	182
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	75	75	1.00	75	75
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	0	0
Retail	13		182	25	163	31
Restaurant	5	75		15	33	13
Cinema/Entertainment	0	0	0		0	0
Residential	3	32	16	0		2
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		53	4	0	3	0
Retail	6		51	0	35	0
Restaurant	5	329		0	12	0
Cinema/Entertainment	1	26	5		3	0
Residential	10	66	25	0		0
Hotel	0	13	9	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	14	4	18	4	0	0
Retail	110	548	658	548	0	0
Restaurant	68	107	175	107	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	47	28	75	28	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	4	11	15	11	0	0
Retail	92	534	626	534	0	0
Restaurant	92	90	182	90	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	51	24	75	24	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

TRIP GENERATION WORKSHEETS

PHASE 3

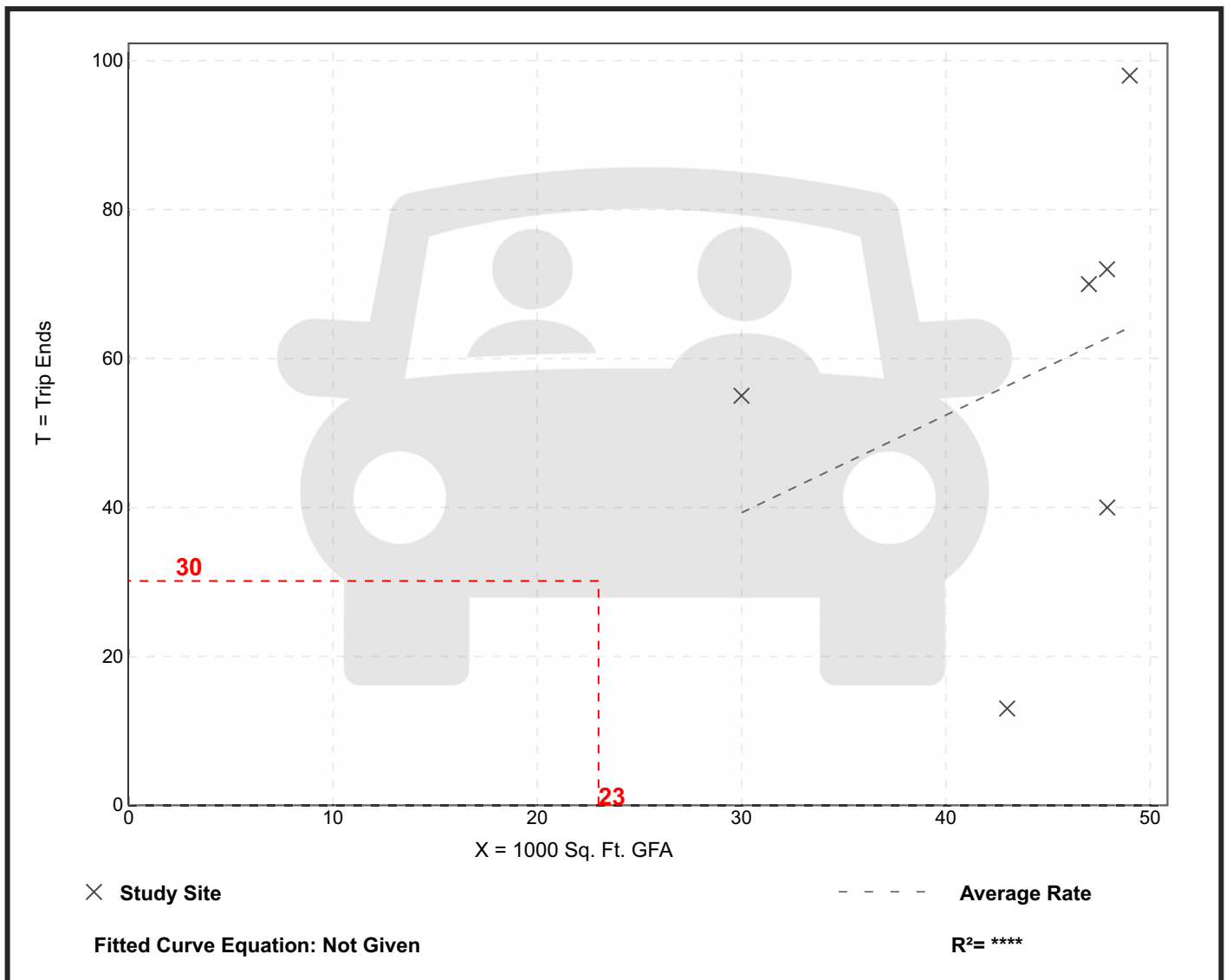
Health/Fitness Club (492)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 6
 Avg. 1000 Sq. Ft. GFA: 44
 Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.31	0.30 - 2.00	0.64

Data Plot and Equation



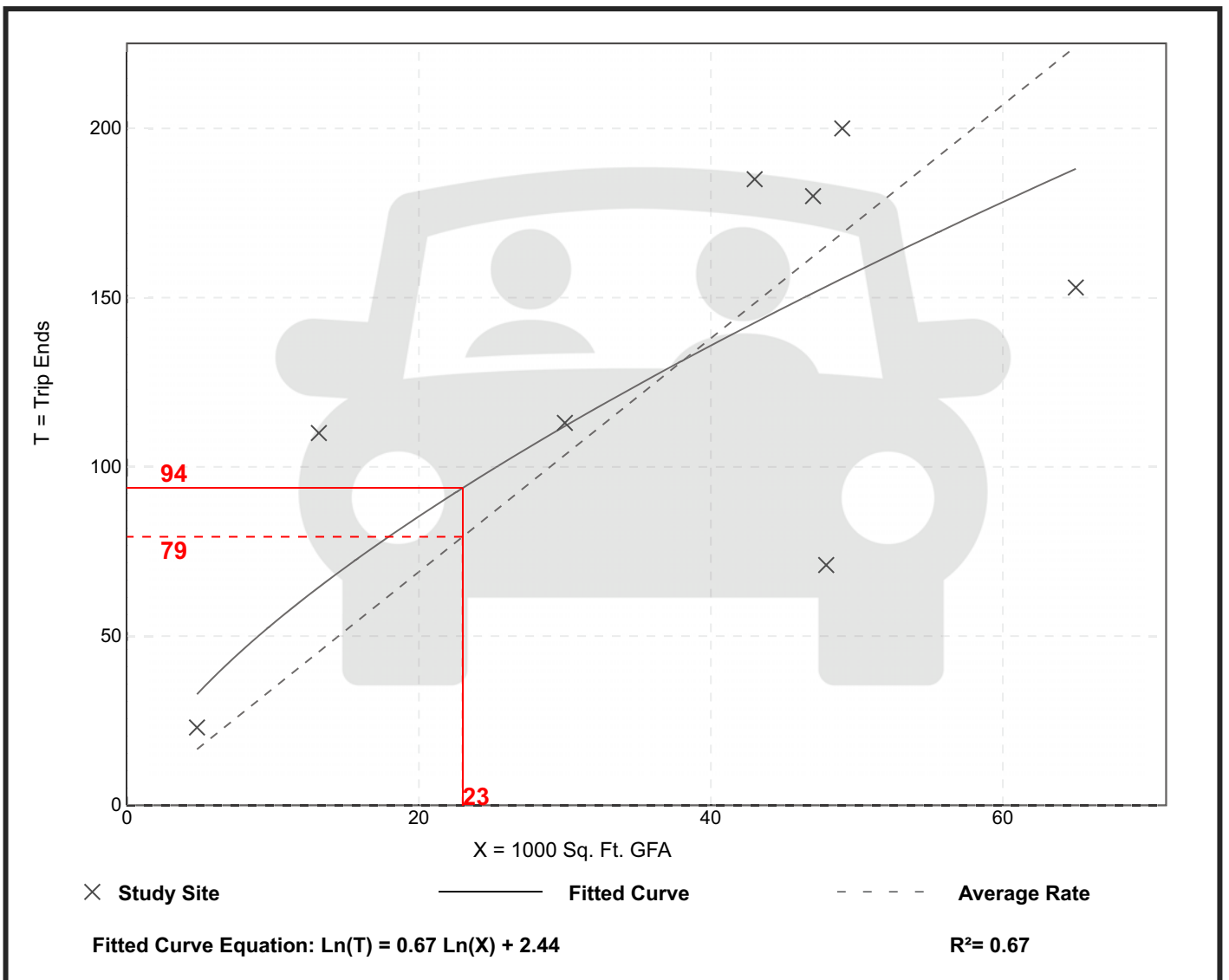
Health/Fitness Club (492)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 8
 Avg. 1000 Sq. Ft. GFA: 37
 Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.45	1.48 - 8.37	1.57

Data Plot and Equation



Health/Fitness Club (492)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

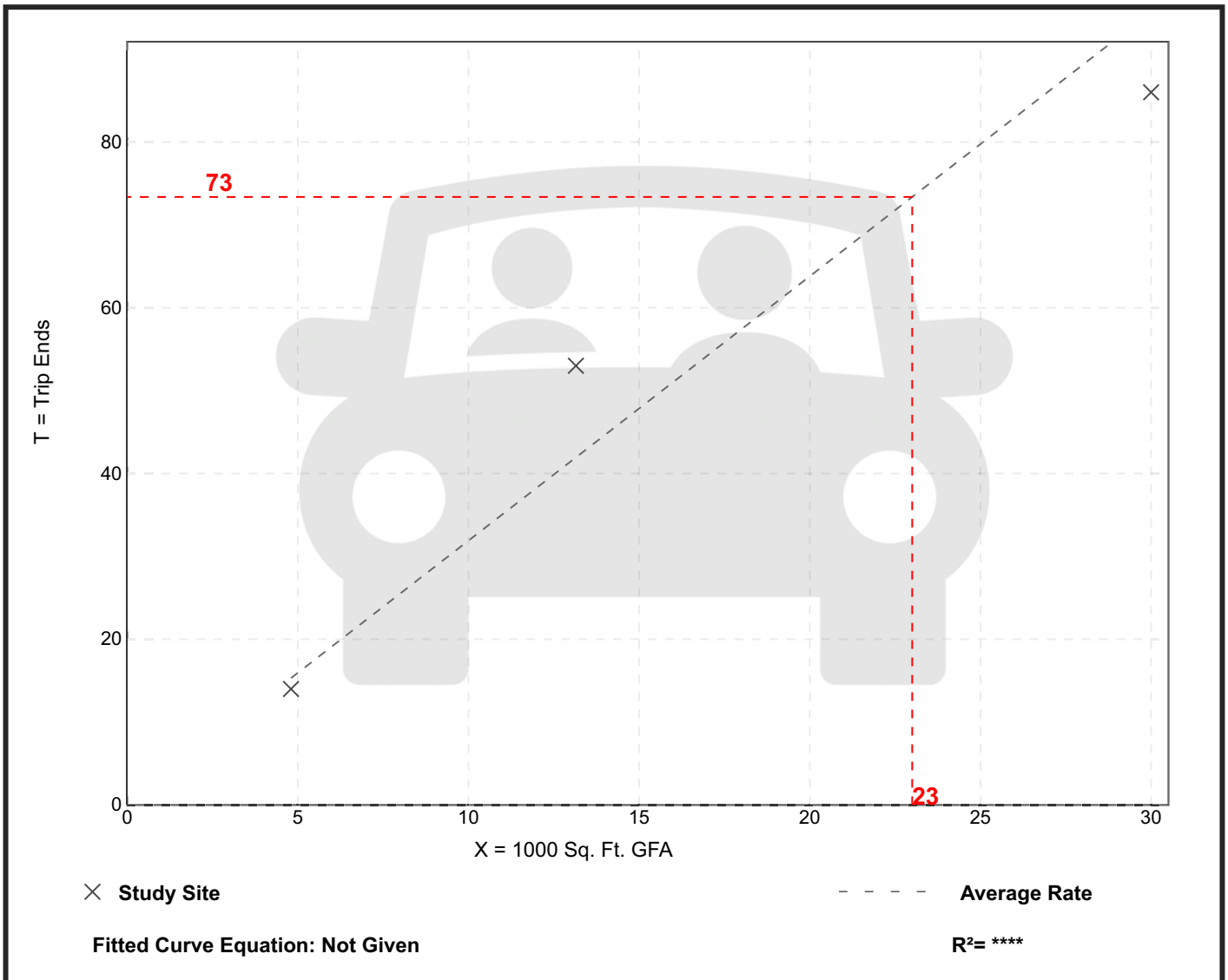
Setting/Location: General Urban/Suburban
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 16
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.19	2.87 - 4.03	0.63

Data Plot and Equation

Caution – Small Sample Size



Shopping Plaza (40-150k) - Supermarket - No (821)

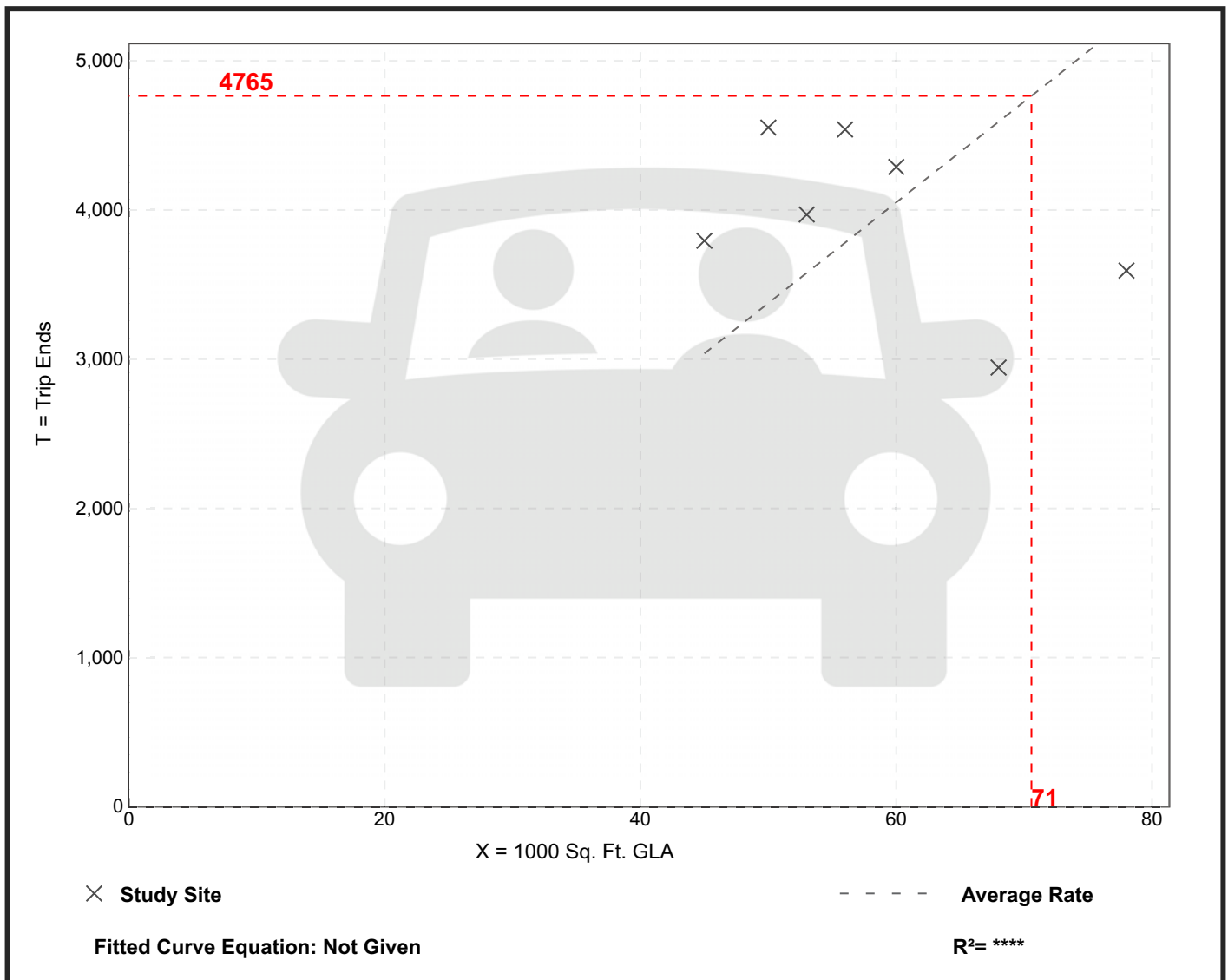
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 7
Avg. 1000 Sq. Ft. GLA: 59
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
67.52	43.29 - 91.06	19.25

Data Plot and Equation



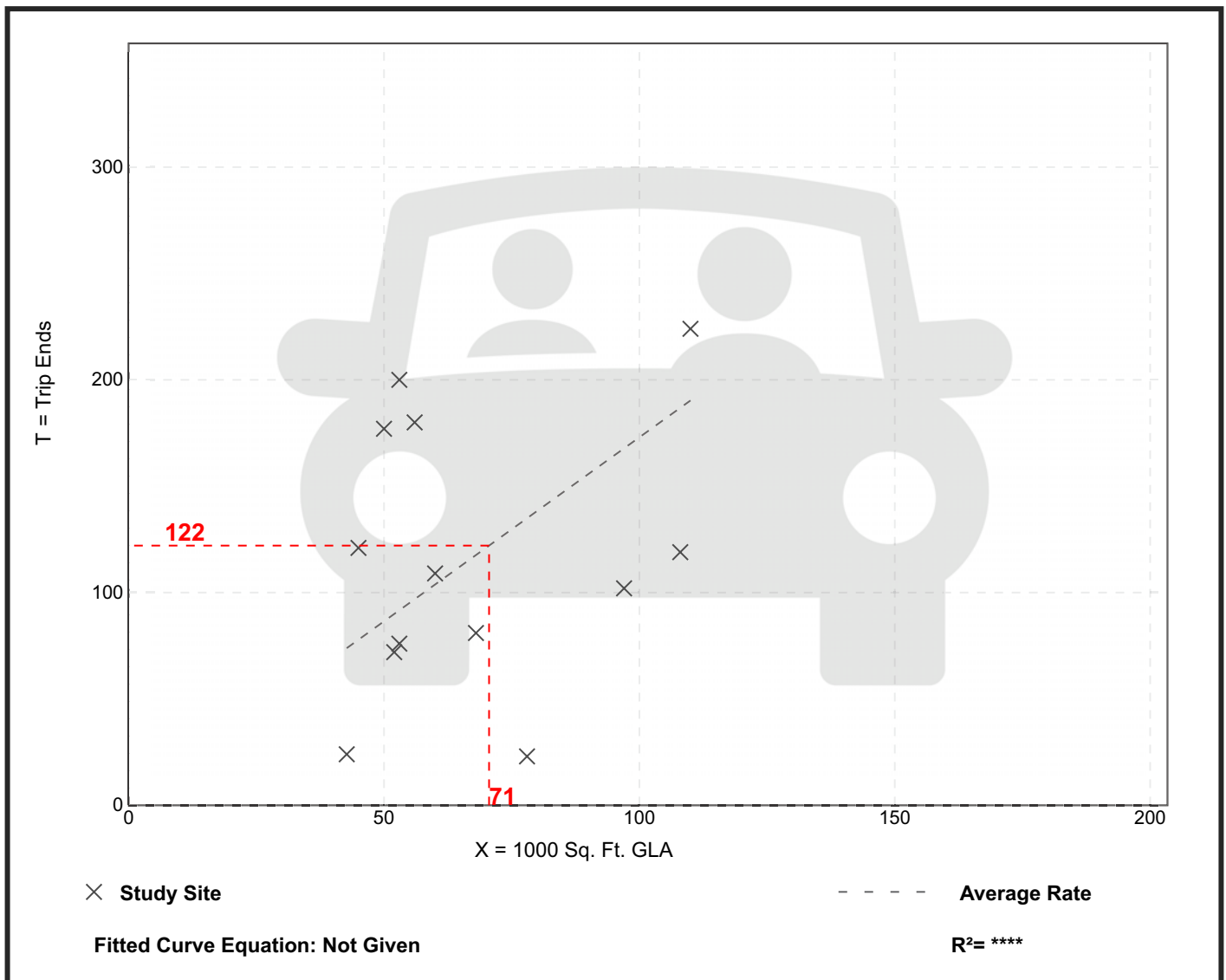
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 13
 Avg. 1000 Sq. Ft. GLA: 67
 Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
1.73	0.29 - 3.77	1.06

Data Plot and Equation



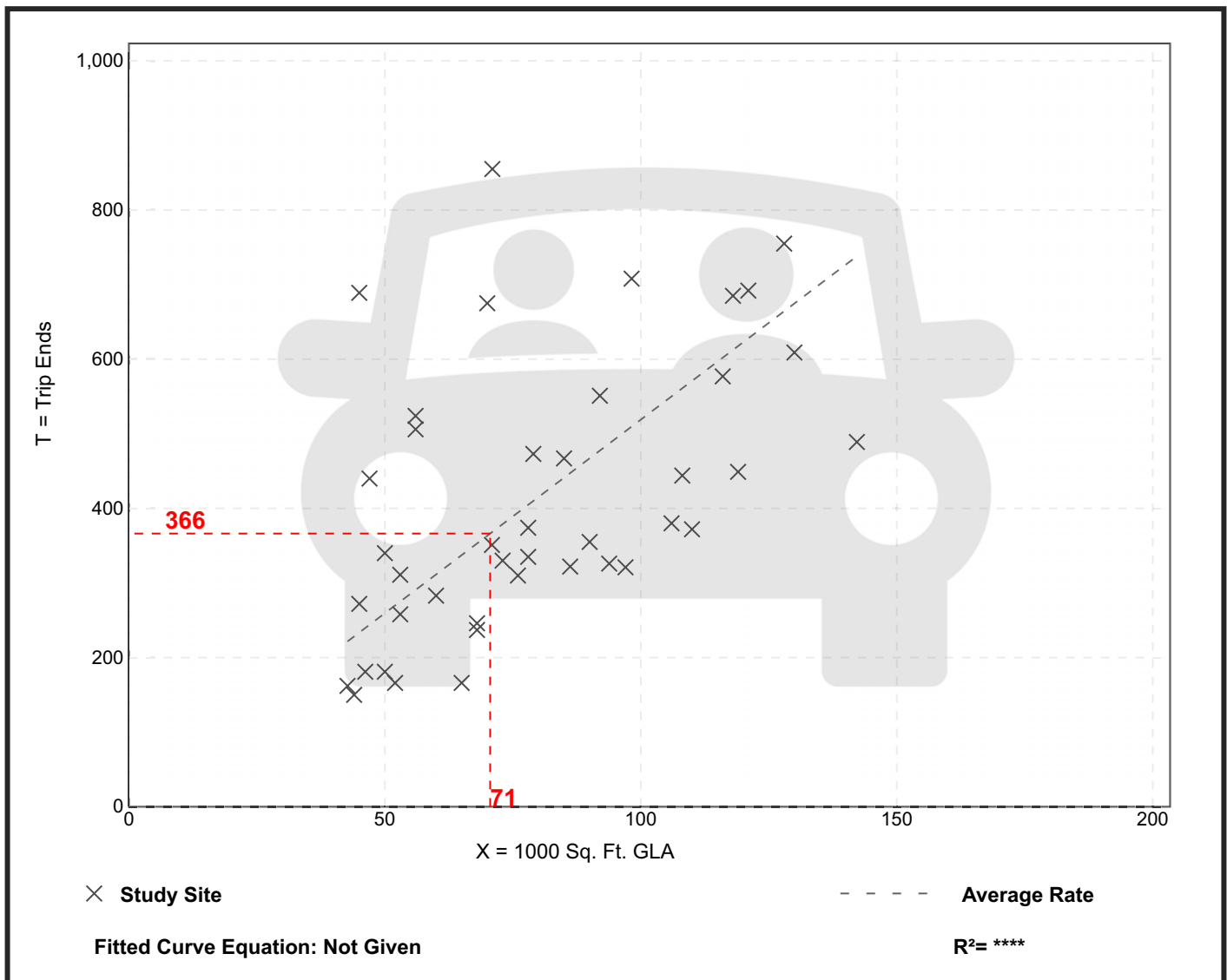
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 42
 Avg. 1000 Sq. Ft. GLA: 79
 Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
5.19	2.55 - 15.31	2.28

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - No (821)

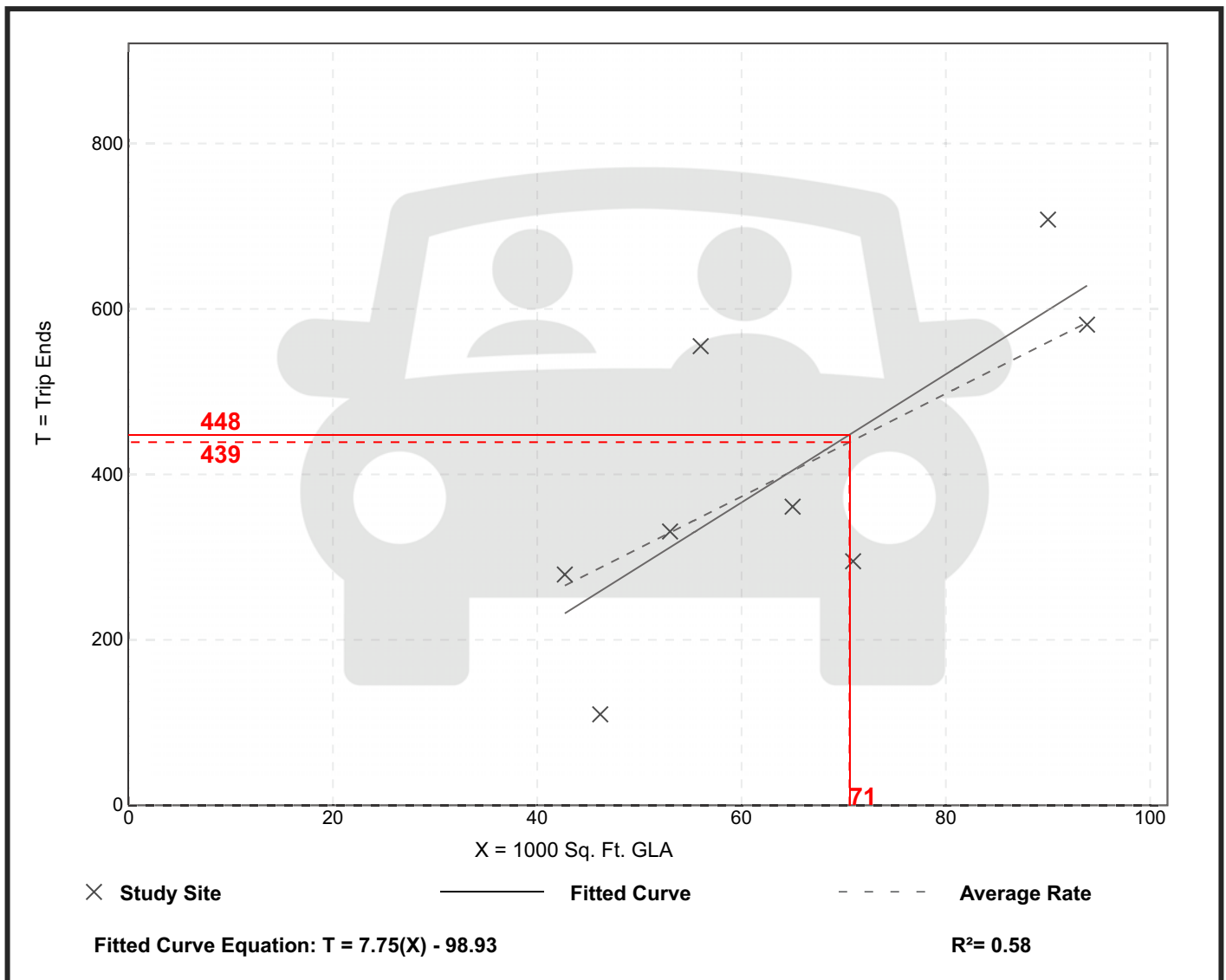
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GLA: 65
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.22	2.38 - 9.91	2.11

Data Plot and Equation



Drive-in Bank (912)

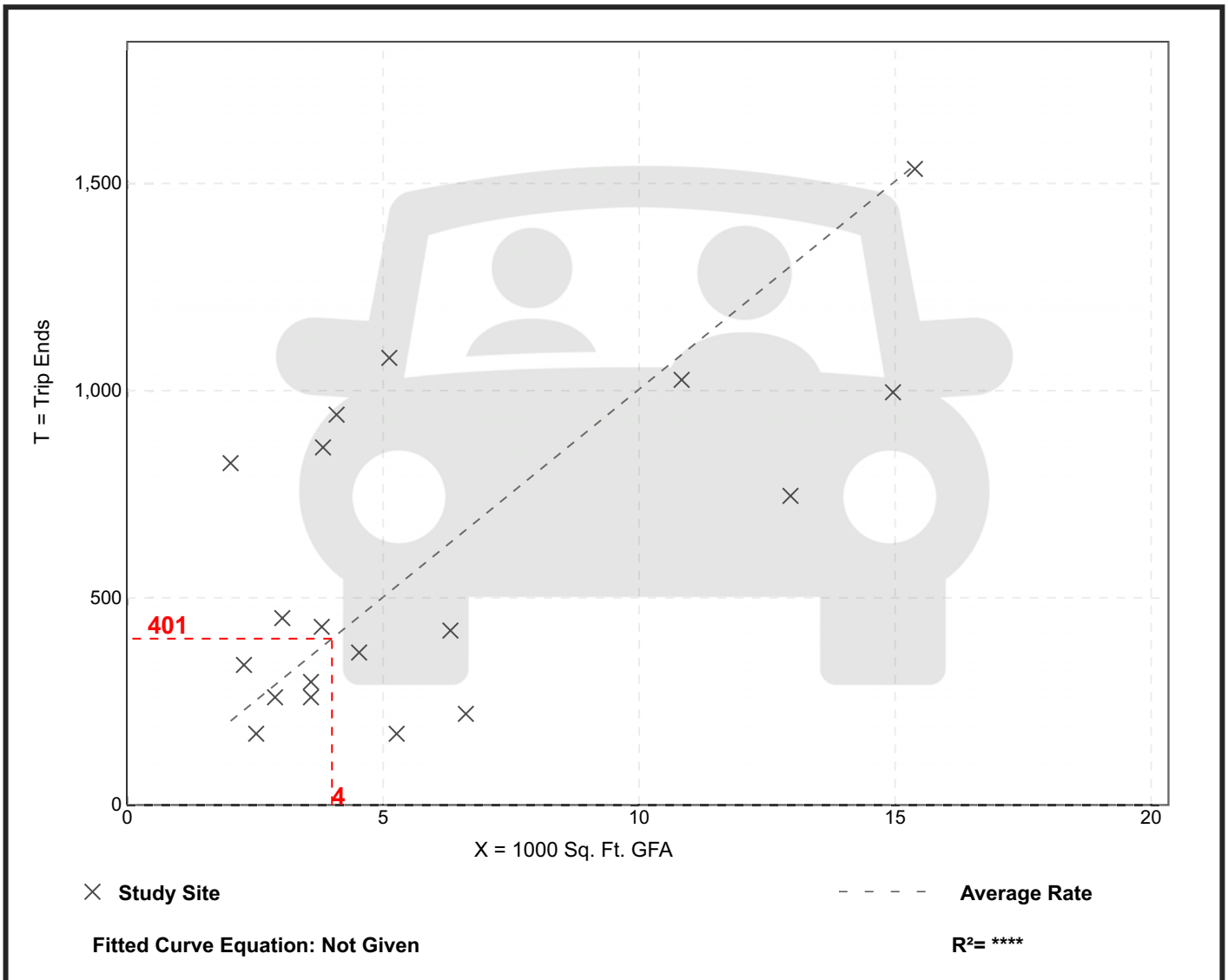
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 19
Avg. 1000 Sq. Ft. GFA: 6
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
100.35	32.67 - 408.42	68.62

Data Plot and Equation



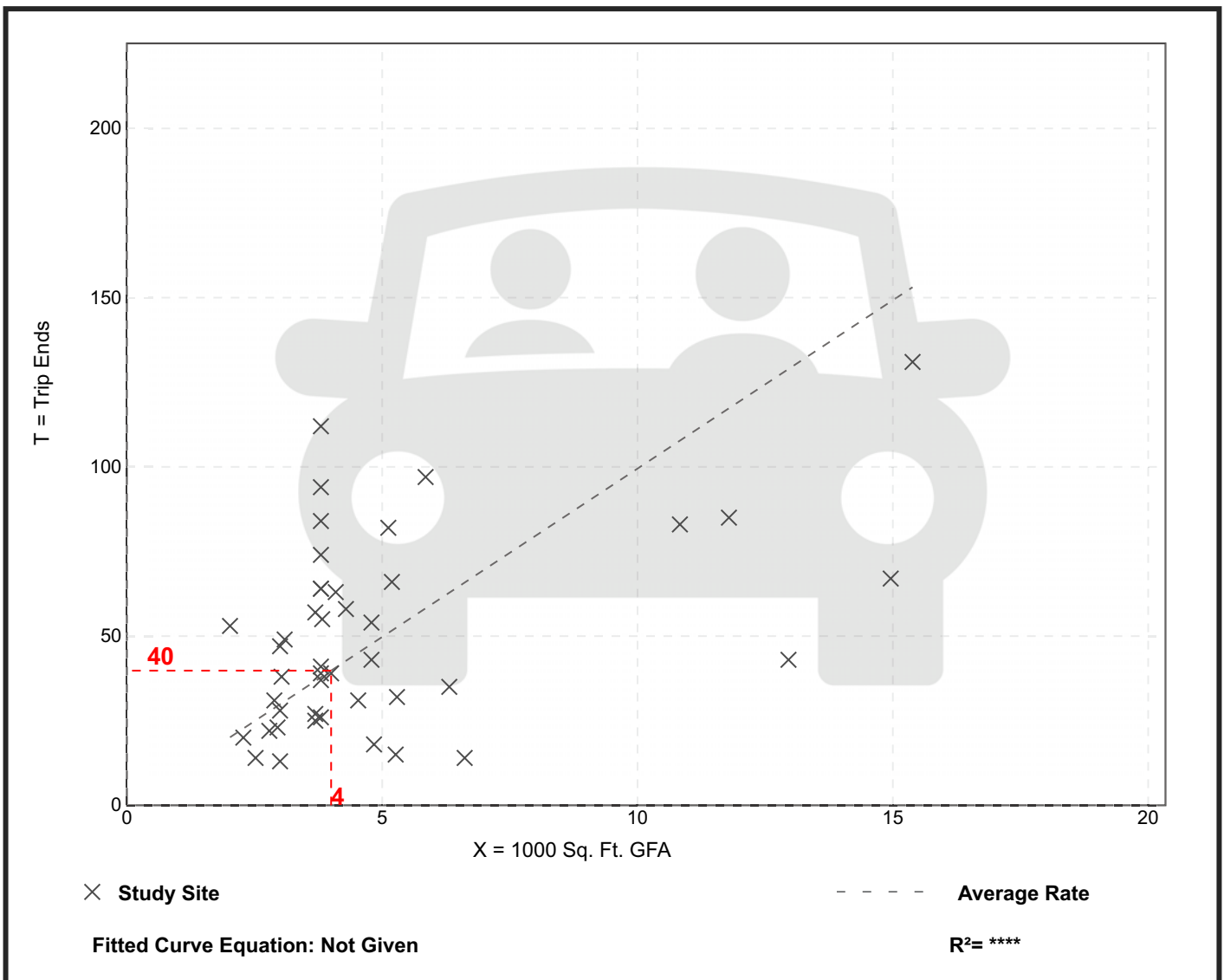
Drive-in Bank (912)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 44
 Avg. 1000 Sq. Ft. GFA: 5
 Directional Distribution: 58% entering, 42% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.95	2.12 - 29.47	6.00

Data Plot and Equation



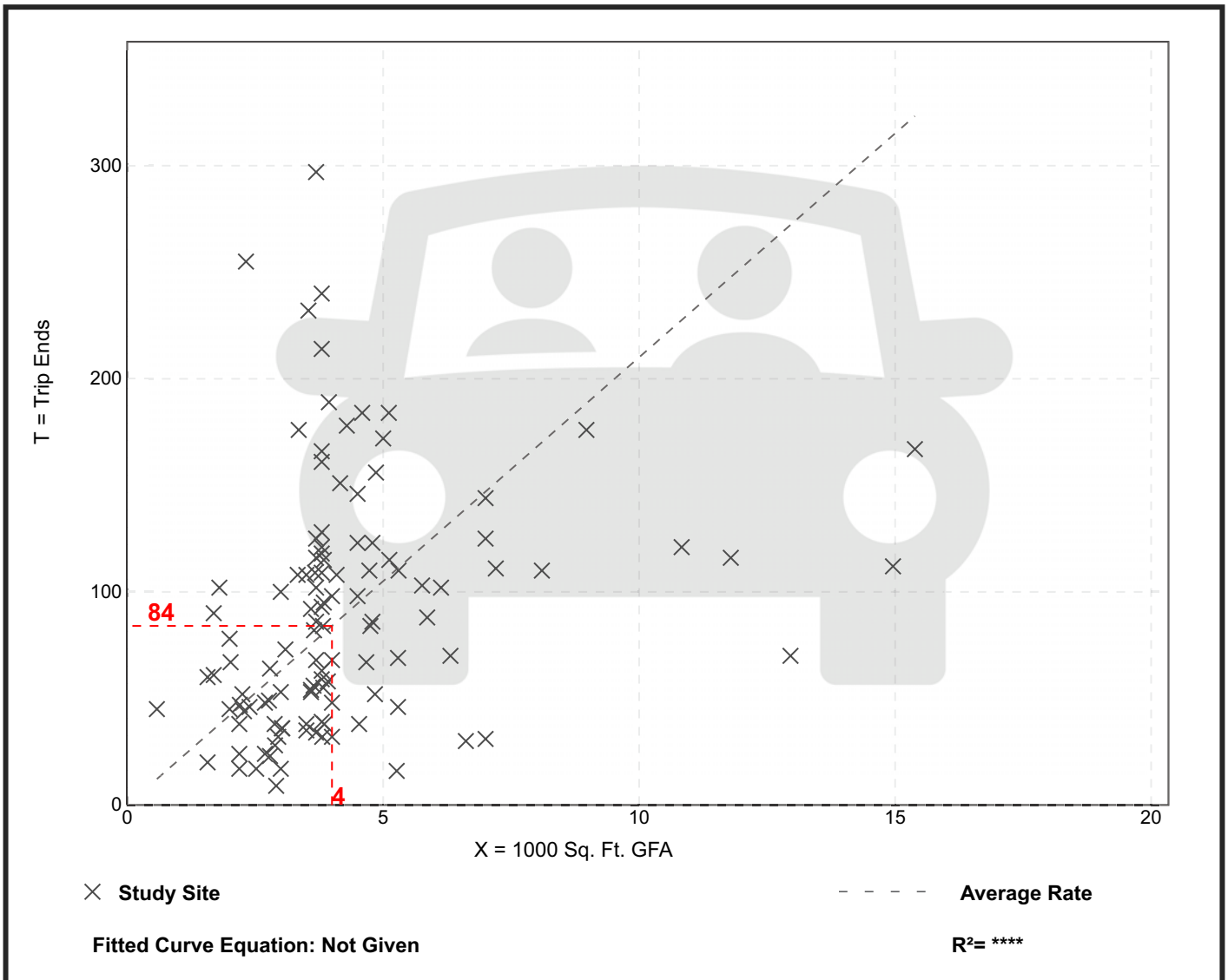
Drive-in Bank (912)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 114
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
21.01	3.04 - 109.91	15.13

Data Plot and Equation



Drive-in Bank (912)

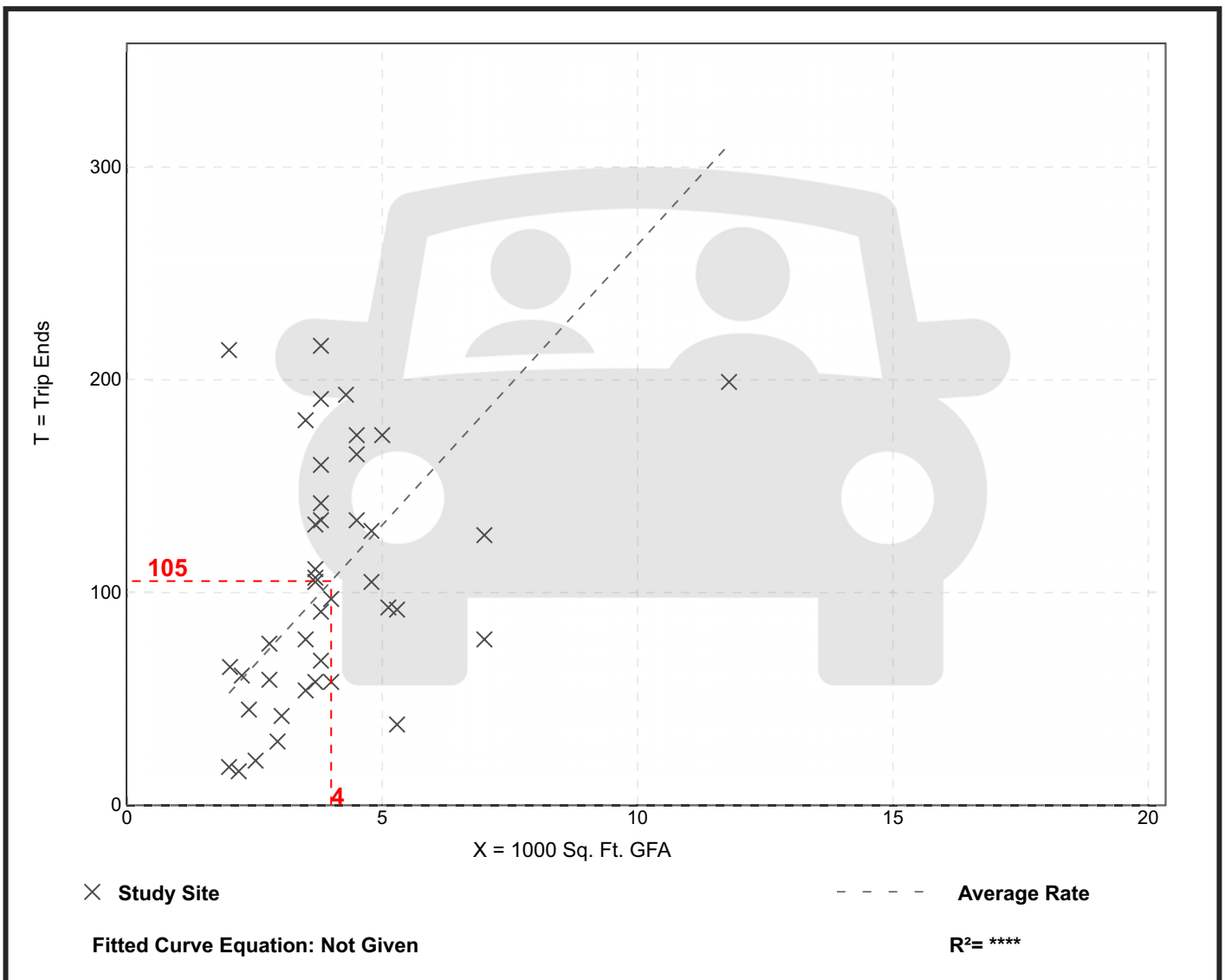
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 41
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
26.35	7.18 - 107.00	15.32

Data Plot and Equation



Drive-in Bank (912)

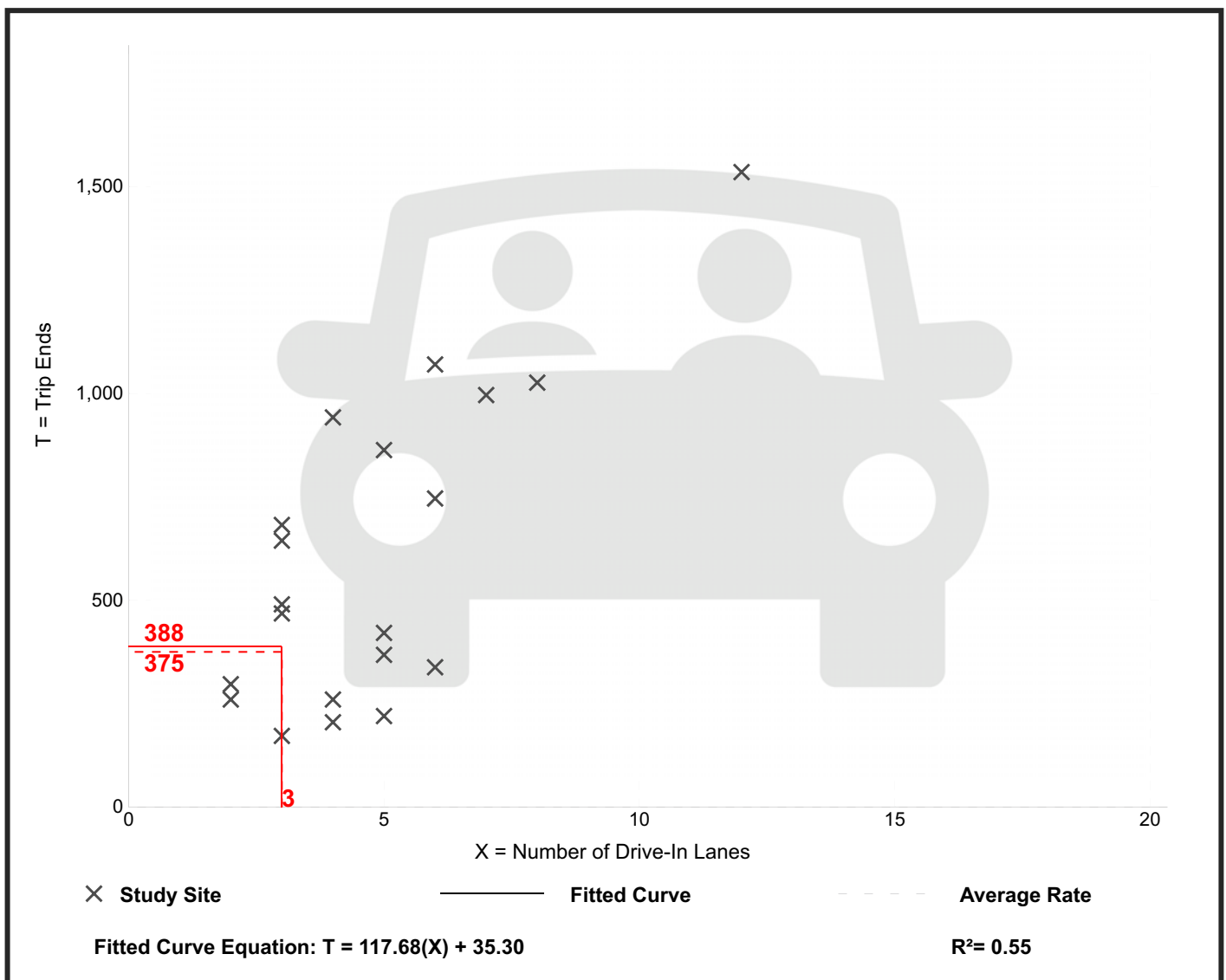
Vehicle Trip Ends vs: Drive-In Lanes
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 20
Avg. Num. of Drive-In Lanes: 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Drive-In Lane

Average Rate	Range of Rates	Standard Deviation
125.03	44.00 - 235.50	55.01

Data Plot and Equation



Drive-in Bank (912)

Vehicle Trip Ends vs: Drive-In Lanes

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 36

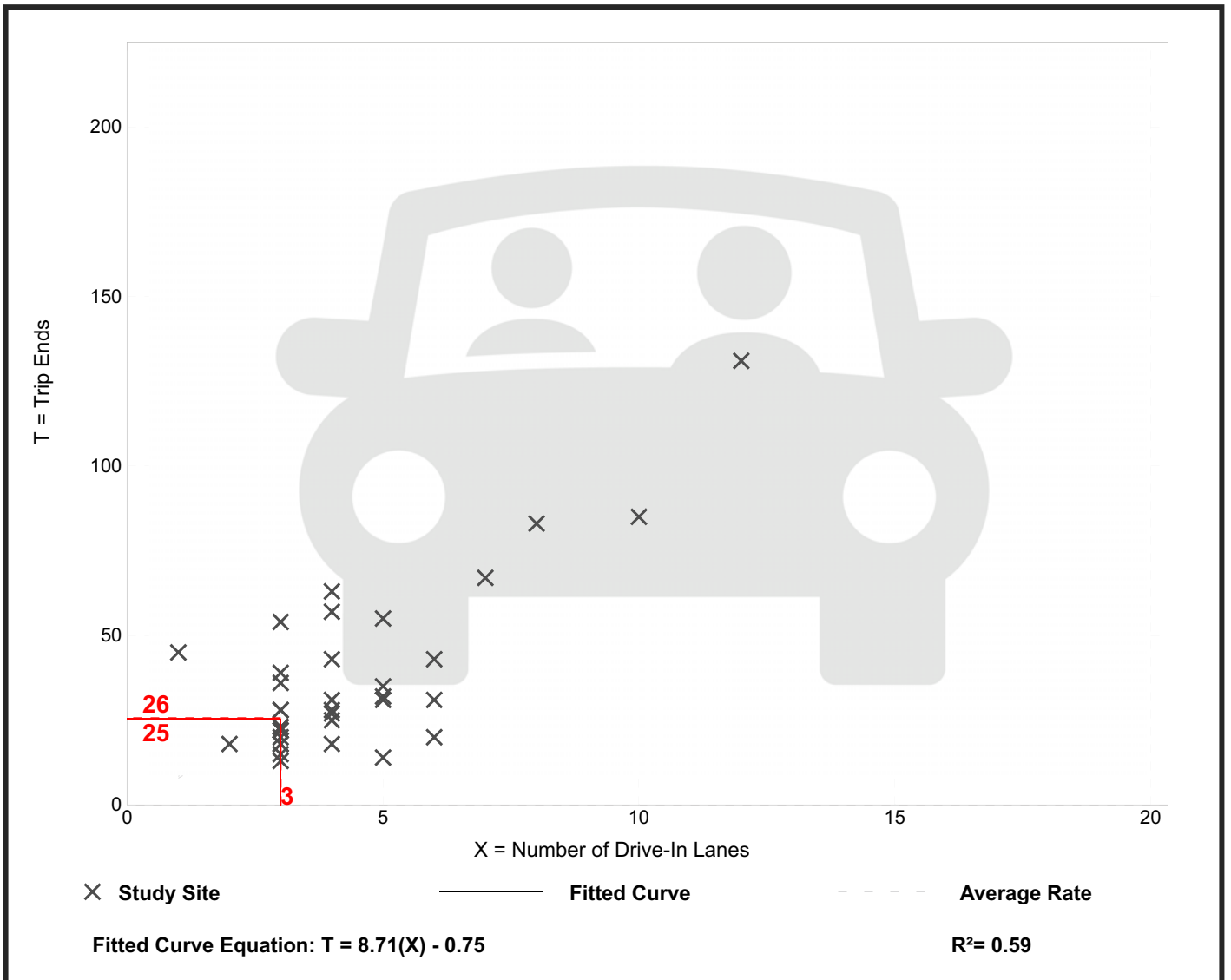
Avg. Num. of Drive-In Lanes: 4

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Drive-In Lane

Average Rate	Range of Rates	Standard Deviation
8.54	2.80 - 45.00	4.37

Data Plot and Equation



Drive-in Bank (912)

Vehicle Trip Ends vs: Drive-In Lanes

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 109

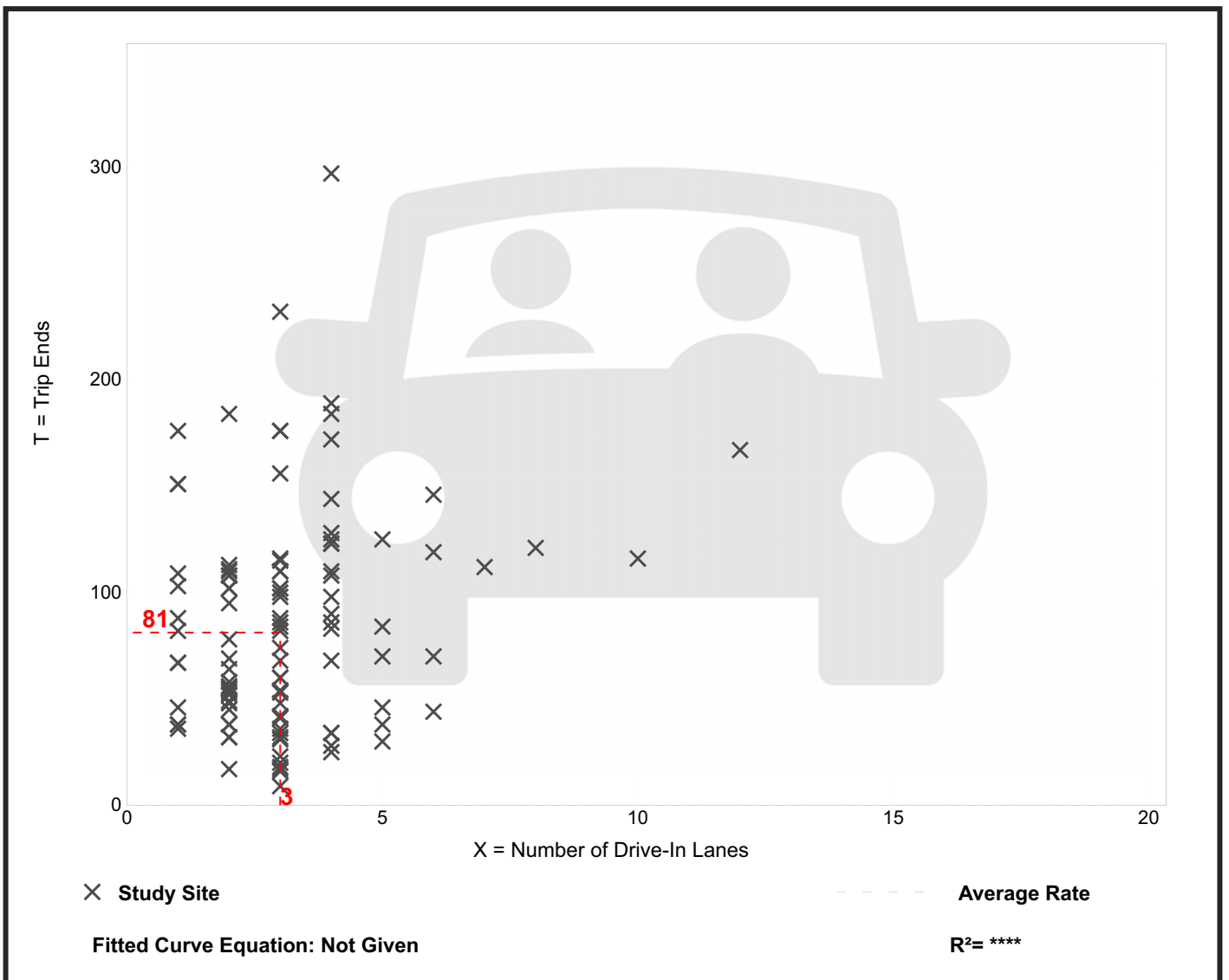
Avg. Num. of Drive-In Lanes: 3

Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per Drive-In Lane

Average Rate	Range of Rates	Standard Deviation
27.07	3.00 - 176.00	22.13

Data Plot and Equation



Drive-in Bank (912)

Vehicle Trip Ends vs: Drive-In Lanes

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 31

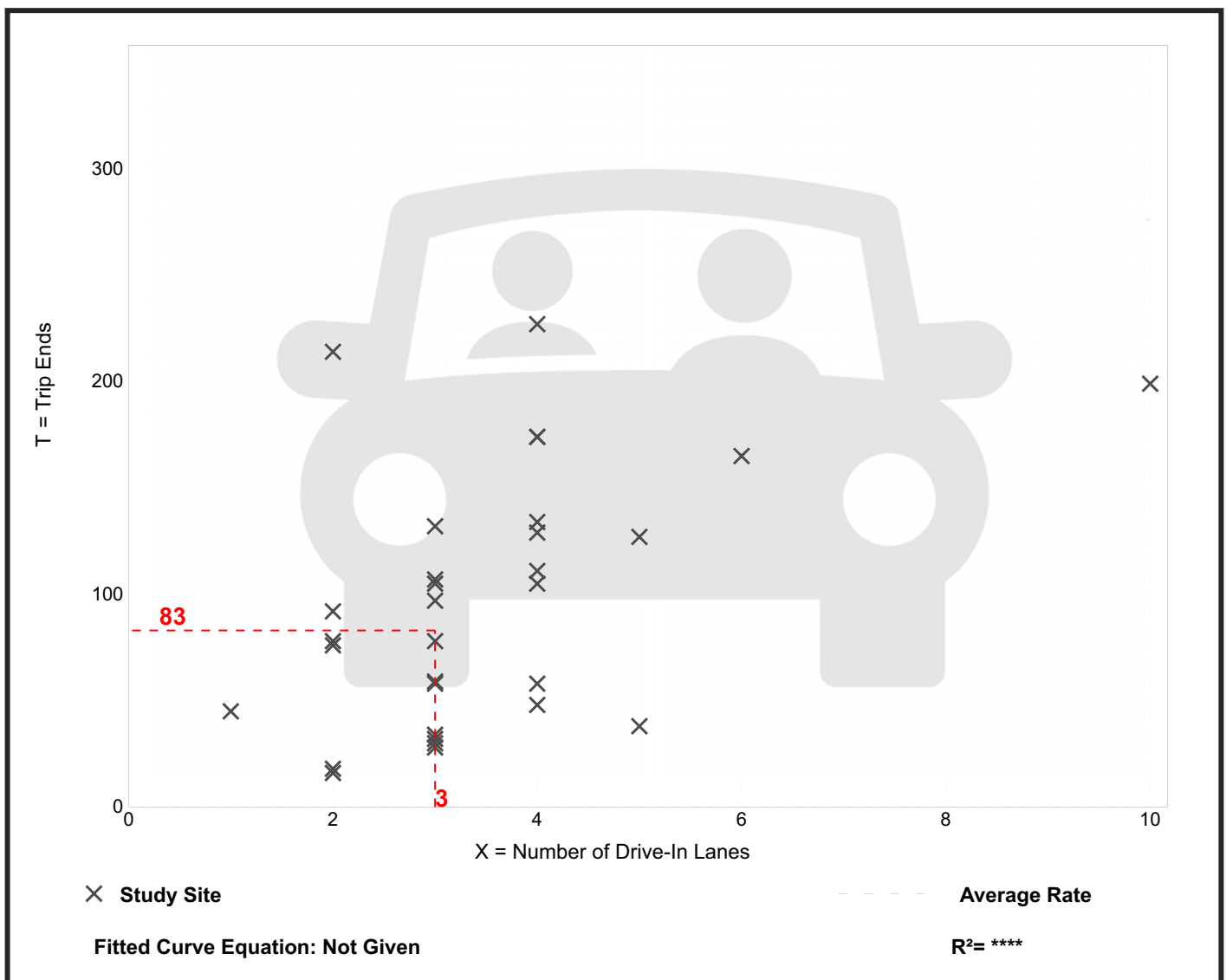
Avg. Num. of Drive-In Lanes: 3

Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per Drive-In Lane

Average Rate	Range of Rates	Standard Deviation
27.67	7.60 - 107.00	17.13

Data Plot and Equation





GREGORY E. CREASY, P.E., Principal Traffic Engineer
JAY E. STATES, P.E., Principal Traffic Engineer

4800 Linglestown Road, Suite 307
Harrisburg, PA 17112
Telephone: (717) 545-3636
www.grovemiller.com

April 7, 2022

Mr. Eric W. Kinard
Signal and Congestion Management Supervisor
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103-1699

Re: TIS Scoping Application Comment Response (Scoping #0820210107)
Pennmark Property
Mount Joy Township, Lancaster County

Dear Mr. Kinard:

We have received the Department's comments on the TIS Scoping Application for the referenced development. We are providing this letter and Revised TIS Scoping Application to respond to the comments.

Our responses to the comments, provided point-by-point, are as follows.

Transportation Impact Study/Transportation Impact Assessment

Comment 1: As previously noted, the number of proposed accesses appears excessive and undesirable from an access management perspective. Per Ch. 441.7(c), access to a property which abuts two or more intersecting streets or highways may be restricted to only the roadway which can more safely accommodate its traffic. In addition, per Ch. 441.7(e), not more than two driveways will be permitted for a non-residential development, and if the property frontage exceeds 600 feet, the permit may authorize an additional driveway. The number of accesses should be reduced, further restricted (right-in only) or clear justification provided.

Comment 2: As previously noted, all restricted movement driveways, if permitted, must be designed and signed appropriately to minimize restricted movements from utilizing the access. Consideration to restrict turning movements should be analyzed based on, but not limited to, the site design, the adjacent street lane configurations, traffic volumes, traffic speeds, type of highway being accessed, and alternative access points. Queuing from the adjacent traffic signal and sight distance should also be considered. As currently illustrated on the site plan, the proposed access to S.R. 0230 to the west of Cloverleaf Road that is not a part of the Connector Road must be eliminated, and the RIRO only access to S.R. 0230 near the proposed convenience store must be eliminated or further restricted to RI only. Also, for the proposed full movement access north of the RI only access

to the proposed convenience store to remain, opposing alignment with the proposed Connector Road is required, otherwise this access should be eliminated. In addition, any proposed access may be required to further restrict movements depending on the capacity and safety analyses results in the TIS. The District requires these access revisions be documented in the revised Scope Application before proceeding with the TIS.

Response 1/2: The Proposed Site Access Locations portion in Section 2 of the TIS Scoping Application has been revised to reflect the current access proposals.

Comment 3: *Documentation of the revised scope acceptance from Mount Joy Township as well as the MPO, as necessary, for the scope should be provided. Include documentation of correspondence within the study.*

Response 3: The documentation will be provided in the TIS as requested.

We respectfully request the Department's approval of the Revised TIS Scoping Application. Please call our office if you have any questions or need additional information.

Sincerely,



Gregory E. Creasy, P.E.
Senior Traffic Engineer

Attachment

GEC/me
G:\804_01\corres\penndot_scope_comment_response 2.wpd

Scope Application Cycle 3 Comment Sheet

COUNTY:	Lancaster	MUNICIPALITY:	Mount Joy Township
JOB NAME:	Pennmark Property	PREPARED BY:	Grove Miller Engineering, Inc.
APPLICANT:	Pennmark Management Company Inc	REVIEW BY:	PennDOT/McM

Please incorporate these comments into the revised Scope Application and resubmit:

Scope Application Comments:

(1) LOCATION OF PROPOSED DEVELOPMENT:

(2) DESCRIPTION OF PROPOSED DEVELOPMENT:

1. As previously noted, the number of proposed accesses appears excessive and undesirable from an access management perspective. Per Ch. 441.7(c), access to a property which abuts two or more intersecting streets or highways may be restricted to only the roadway which can more safely accommodate its traffic. In addition, per Ch. 441.7(e), not more than two driveways will be permitted for a non-residential development, and if the property frontage exceeds 600 feet, the permit *may* authorize an additional driveway. The number of accesses should be reduced, further restricted (right-in only) or clear justification provided.
2. As previously noted, all restricted movement driveways, if permitted, must be designed and signed appropriately to minimize restricted movements from utilizing the access. Consideration to restrict turning movements should be analyzed based on, but not limited to, the site design, the adjacent street lane configurations, traffic volumes, traffic speeds, type of highway being accessed, and alternative access points. Queuing from the adjacent traffic signal and sight distance should also be considered. As currently illustrated on the site plan, the **proposed access to S.R. 0230 to the west of Cloverleaf Road that is not a part of the Connector Road must be eliminated**, and the **RIRO only access to S.R. 0230 near the proposed convenience store must be eliminated or further restricted to RI only**. Also, for the proposed full movement access north of the RI only access to the proposed convenience store to remain, **opposing alignment with the proposed Connector Road is required, otherwise this access should be eliminated**. In addition, any proposed access may be required to further restrict movements depending on the capacity and safety analyses results in the TIS. **The District requires these access revisions be documented in the revised Scope Application before proceeding with the TIS.**

(3) DEVELOPMENT SCHEDULE AND STAGING: No comment.

(4) TRIP GENERATION: No comment.

(5) TRANSPORTATION IMPACT STUDY REQUIRED? No comment.

(6) TRAFFIC IMPACT ASSESSMENT REQUIRED? No comment.

(7) TIS STUDY AREA: No comment.

(8) STUDY AREA TYPE: No comment.

(9) TIS ANALYSIS PERIODS AND TIMES: No comment.

(10) TRAFFIC ADJUSTMENT FACTORS: No comment.

(11) OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:

3. Documentation of the revised scope acceptance from Mount Joy Township as well as the MPO, as necessary, for the scope should be provided. Include documentation of correspondence within the study.

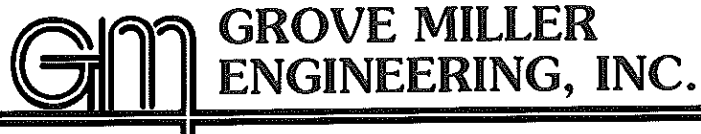
(12) TRIP DISTRIBUTION AND ASSIGNMENT: No comment.

(13) APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES: No comment.

(14) CAPACITY/LOS ANALYSIS: No comment.

(15) ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED: No comment.

(16) OTHER NEEDED ANALYSES: No comment.



GREGORY E. CREASY, P.E., Principal Traffic Engineer
JAY E. STATES, P.E., Principal Traffic Engineer

4800 Linglestown Road, Suite 307
Harrisburg, PA 17112
Telephone: (717) 545-3636
www.grovemiller.com

February 22, 2022

Mr. Eric W. Kinard
Signal and Congestion Management Supervisor
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103-1699

Re: TIS Scoping Application Comment Response (Scoping #0820210107)
Pennmark Property
Mount Joy Township, Lancaster County

Dear Mr. Kinard:

We have received the Department's comments on the TIS Scoping Application for the referenced development. We are providing this letter and Revised TIS Scoping Application to respond to the comments.

Our responses to the comments, provided point-by-point, are as follows.

Transportation Impact Study/Transportation Impact Assessment

Comment: Please verify the Average Daily Trips for consistency with the trip generation tables.

Response: The ADTs provided in the Location Information section of the EPS Scoping Application have been revised to reflect the total external trip volumes. Specific ADT information for each driveway will be presented in the TIS once the traffic counts and trip distributions have been performed.

Comment: Eliminate any reference to the distance to the proposed signalized access for the Pennmark Site West of S.R. 4025, which is no longer being considered for signalization.

Response: Reference to the signalized access for the portion of the site west of SR 4025 has been removed from the Scoping Application.

Comment: As previously noted, the number of proposed accesses appears excessive and undesirable from an access management perspective. Per Ch. 441.7(c), access to a property which abuts two or more intersecting streets or highways may be restricted to only the roadway which can more safely accommodate its traffic. In addition, per Ch. 441.7(e), not more than two driveways will be permitted for a

non-residential development, and if the property frontage exceeds 600 feet, the permit may authorize an additional driveway. The number of accesses should be reduced, further restricted (right-in only) or clear justification provided.

Response: The Department's comment/concerns are noted. The number of proposed driveways, location of proposed driveways, and permitted movements for proposed driveways will be evaluated during the preparation of the TIS based upon capacity analyses, queue evaluations, and sight distance evaluations. The site plan will also continue to develop as discussions with potential tenants and neighboring property owners proceed.

Comment: *As previously noted, all restricted movement driveways, if permitted, must be designed and signed appropriately to minimize restricted movements from utilizing the access. Consideration to restrict turning movements should be analyzed based on, but not limited to, the site design, the adjacent street lane configurations, traffic volumes, traffic speeds, type of highway being accessed, and alternative access points. Queuing from the adjacent traffic signal and sight distance should also be considered. As currently illustrated on the site plan, the proposed access to S.R. 0230 to the west of Cloverleaf Road that is not a part of the Connector Road should be eliminated, and the RIRO only access to S.R. 0230 near the proposed convenience store should be eliminated or further restricted. Also, for the proposed full movement access north of the RI only access to the proposed convenience store to remain, opposing alignment with the proposed Connector Road is required, otherwise this access should be eliminated. Any proposed access may be required to further restrict movements depending on the capacity and safety analyses results in the TIS.*

Response: The Department's comment/concerns are noted. The number of proposed driveways, location of proposed driveways, and permitted movements for proposed driveways will be evaluated during the preparation of the TIS based upon capacity analyses, queue evaluations, and sight distance evaluations. The site plan will also continue to develop as discussions with potential tenants and neighboring property owners proceed.

Comment: *As previously noted, the study should identify the driveway classification for each driveway serving the proposed development. If the design standards for the driveway classification cannot be met, provide an engineering justification explaining why and verify that driveway configurations won't unreasonably impact the state roads. Per PennDOT Pub. 282, at least 50 feet of throat length should be provided for non-minimum use driveways. For medium volume driveways, a median of sufficient length to accommodate the 95th percentile queue length must be provided, desirably 120'. For high volume driveways, a 150' median must be provided. Internal site driveways should not be located within these areas.*

Response: As indicated in the TIS Scoping Application, the TIS will include ADT calculations and PennDOT classification information for each of the proposed driveways. The throat length and median length requirements are understood.

Comment: Please verify the Saturday trip generation calculations for the proposed apartments, LU 220 (Multifamily Housing – Low Rise), they appear inconsistent with ITE's Trip Generation Manual (10th Edition) and ITE's Trip Generation Manual (11th Edition).

Response: The 11th Edition of the Trip Generation Manual only provides one (1) data point for the Saturday peak hour generation for the subject land use, so the 10th Edition of the Trip Generation Manual was used to generation trips for the Saturday peak hour. There are five (5) data points in the 10th Edition and the equation has a r-squared value of 0.92. The equation provided a more conservative trip generation estimate than the rate. The equation is $T=1.08(X) - 33.24$. The 170 apartment units proposed in Phase 2 of the project would equate to 150 trips. Neither the 11th Edition nor the 10th Edition provides directional distribution information for the Saturday peak hour, so a 50/50 split was assumed for entering and exiting trips.

Comment: For LU 821 (Shopping Plaza (40-150k)), clearly indicate which land use subcategory was used to estimate trip generation.

Response: The discussion in the Trip Generation section of the TIS Scoping Application has been revised to reflect that for Land Use 821, the "Supermarket - No" subcategory was used because trip generation calculations for the small Supermarket were performed separately.

Comment: Documentation of the revised scope acceptance from Mount Joy Township as well as the MPO, as necessary, for the scope should be provided. Include documentation of correspondence within the study.

Response: The requested documentation will be included in the Correspondence appendix of the TIS.

Comment: As previously noted, at the intersection of Cloverleaf Road (SR 4025) and S. Market Street (SR 0230), please note that we will require a new TE-672, Pedestrian Needs Accommodation at Intersection Checklist. With this type of land use change the crossings are to be reviewed as part of the signal design. An existing TE-672 is not a guarantee that the crossings will continue to be restricted. Please add this to the additional comments section of the scope application.

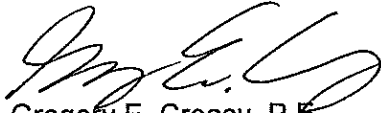
Response: The requested text has been added to the TIS Scoping Application.

Comment: If the unsignalized capacity analyses shows that a movement is projected to operate at an unacceptable level of service, a gap study will be required to identify if a sufficient number of gaps exist. Therefore, please revise the gap studies from "NA" to "as applicable", unless all proposed unsignalized accesses will be restricted to right-in only.

Response: The TIS Scoping Application has been revised as requested.

We respectfully request the Department's approval of the Revised TIS Scoping Application.
Please call our office if you have any questions or need additional information.

Sincerely,



Gregory E. Creasy, P.E.
Senior Traffic Engineer

Attachment

GEC/me
G:\804_01\corres\penndot_scope_comment_response.wpd

Scope Application Cycle 2 Comment Sheet

COUNTY:	Lancaster	MUNICIPALITY:	Mount Joy Township
JOB NAME:	Pennmark Property	PREPARED BY:	Grove Miller Engineering, Inc.
APPLICANT:	Pennmark Management Company Inc	REVIEW BY:	PennDOT/McM

Please incorporate these comments into the revised Scope Application and resubmit:

Scope Application Comments:

(1) LOCATION OF PROPOSED DEVELOPMENT:

1. Please verify the Average Daily Trips for consistency with the trip generation tables.

(2) DESCRIPTION OF PROPOSED DEVELOPMENT:

2. Eliminate any reference to the distance to the proposed signalized access for the Pennmark Site West of S.R. 4025, which is no longer being considered for signalization.
3. As previously noted, the number of proposed accesses appears excessive and undesirable from an access management perspective. Per Ch. 441.7(c), access to a property which abuts two or more intersecting streets or highways may be restricted to only the roadway which can more safely accommodate its traffic. In addition, per Ch. 441.7(e), not more than two driveways will be permitted for a non-residential development, and if the property frontage exceeds 600 feet, the permit *may* authorize an additional driveway. The number of accesses should be reduced, further restricted (right-in only) or clear justification provided.
4. As previously noted, all restricted movement driveways, if permitted, must be designed and signed appropriately to minimize restricted movements from utilizing the access. Consideration to restrict turning movements should be analyzed based on, but not limited to, the site design, the adjacent street lane configurations, traffic volumes, traffic speeds, type of highway being accessed, and alternative access points. Queuing from the adjacent traffic signal and sight distance should also be considered. As currently illustrated on the site plan, the proposed access to S.R. 0230 to the west of Cloverleaf Road that is not a part of the Connector Road should be eliminated, and the RIRO only access to S.R. 0230 near the proposed convenience store should be eliminated or further restricted. Also, for the proposed full movement access north of the RI only access to the proposed convenience store to remain, opposing alignment with the proposed Connector Road is required, otherwise this access should be eliminated. Any proposed access may be required to further restrict movements depending on the capacity and safety analyses results in the TIS.
5. As previously noted, the study should identify the driveway classification for each driveway serving the proposed development. If the design standards for the driveway classification cannot be met, provide an engineering justification explaining why and verify that driveway configurations won't unreasonably impact the state roads. Per PennDOT Pub. 282, at least 50 feet of throat length should be provided for non-minimum use driveways. For medium volume driveways, a median of sufficient length to accommodate the 95th percentile queue length must be provided, desirably 120'. For high volume driveways, a 150' median must be provided. Internal site driveways should not be located within these areas.

(3) DEVELOPMENT SCHEDULE AND STAGING: No comment.

(4) TRIP GENERATION:

6. Please verify the Saturday trip generation calculations for the proposed apartments, LU 220 (Multifamily Housing – Low Rise), they appear inconsistent with ITE's Trip Generation Manual (10th Edition) and ITE's Trip Generation Manual (11th Edition).
7. For LU 821 (Shopping Plaza (40-150k)), clearly indicate which land use subcategory was used to estimate trip generation.

(5) TRANSPORTATION IMPACT STUDY REQUIRED? No comment.

- (6) **TRAFFIC IMPACT ASSESSMENT REQUIRED?** No comment.
- (7) **TIS STUDY AREA:** No comment.
- (8) **STUDY AREA TYPE:** No comment.
- (9) **TIS ANALYSIS PERIODS AND TIMES:** No comment.
- (10) **TRAFFIC ADJUSTMENT FACTORS:** No comment.
- (11) **OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:**
 - 8. Documentation of the revised scope acceptance from Mount Joy Township as well as the MPO, as necessary, for the scope should be provided. Include documentation of correspondence within the study.
- (12) **TRIP DISTRIBUTION AND ASSIGNMENT:** No comment.
- (13) **APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:** No comment.
- (14) **CAPACITY/LOS ANALYSIS:** No comment.
- (15) **ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:**
- (16) **OTHER NEEDED ANALYSES:**
 - 9. As previously noted, at the intersection of Cloverleaf Road (SR 4025) and S. Market Street (SR 0230), please note that we will require a new TE-672, Pedestrian Needs Accommodation at Intersection Checklist. With this type of land use change the crossings are to be reviewed as part of the signal design. An existing TE-672 is not a guarantee that the crossings will continue to be restricted. Please add this to the additional comments section of the scope application.
 - 10. If the unsignalized capacity analyses shows that a movement is projected to operate at an unacceptable level of service, a gap study will be required to identify if a sufficient number of gaps exist. Therefore, please revise the gap studies from “NA” to “as applicable”, unless all proposed unsignalized accesses will be restricted to right-in only.



GROVE MILLER ENGINEERING, INC.

GREGORY E. CREASY, P.E., Principal Traffic Engineer
JAY E. STATES, P.E., Principal Traffic Engineer

4800 Linglestown Road, Suite 307
Harrisburg, PA 17112
Telephone: (717) 545-3636
www.grovemiller.com

MEETING MINUTES

TO: Bob Sichelstiel, Pennmark Management Company, Inc.
Chris Cafiero, Pennmark Management Company, Inc.
Mike Brubaker, Pennmark Management Company, Inc.
Eric Kinard, PennDOT
Dean Noles, PennDOT
Mazhar Malik, PennDOT
Bill Warden, PennDOT
Justin Evans, Mount Joy Township Manager
Ben Craddock, P.E., Lancaster Civil Engineering, Township Engineer
Chris Lincoln, TPD, Township Traffic Engineer
Lauri Ahlskog, AICP, Lancaster County Planning Commission

FROM: Gregory E. Creasy, P.E.

DATE: November 9, 2021 - Final Version December 1, 2021

RE: Pennmark Property
Transportation Impact Study Scoping Meeting Minutes
Mount Joy Township, Lancaster County

A virtual meeting was held with the development team, PennDOT 8-0 District Office, Mt. Joy Township staff, and Lancaster County Planning Commission staff on Tuesday, September 7, 2021 to discuss the TIS Scoping Meeting Application submission and PennDOT review comments.

Bob Sichelstiel and Chris Cafiero provided an introduction to the meeting discussing the proposed development site and the history of the project.

PennDOT provided review comments on the scope application. Copies of the comments are attached for reference.

The discussion of the comments is summarized as follows:

- Significant discussion was held regarding the proposed access points for the development. PennDOT indicated that they would not permit all the access locations shown on the sketch plan submitted with the TIS Scoping Meeting Application. The development team will further refine/ revise the development plan and present an updated access plan with the Revised TIS Scoping Application.

- PennDOT indicated that the proposed signalized intersection of SR 0230/Bypass Road will not be signalized due to the proposed future traffic signal at the intersection of SR 0230/Eagle Parkway just to the west. Bob Sichelstiel and Chris Cafiero indicated that they have tried to work with the neighboring property to gain access to Eagle Parkway, but have not had any success. PennDOT asked for documentation of the discussions. Access to the Pennmark parcels west of Cloverleaf Road will be reevaluated.
- Discussion was held regarding the possibility of a common entrance point on Cloverleaf Road for the proposed development, Norlanco Medical/Penn Medicine (neighbor) and Allegiance Church (neighbor). Pennmark agreed to start the discussions to develop a possible shared access location.
- The trip generation calculations will be reviewed and revised as necessary. Additional documentation and discussion will be provided regarding pass-by trips and internal capture trip calculations as requested in the comments.
- All parties discussed and agreed that while PA Route 283 and its exit and entrance ramps may need improvements, it is beyond any one project, developer, or agency to solve.
- The additional intersections listed on the PennDOT comment letter were discussed. It was agreed that the intersections of SR 0230/Snyder Road and SR 0230 Angle Street/Union School Road would not be part of the study area.
- Since traffic counts will be conducted after September 7, 2021, a COVID factor will not be necessary.
- There are other residential developments in the area to be included in the background traffic volumes. Greg Creasy asked if the Township could provide trip generation, trip distribution, and location information for those developments.
- No major planned roadway improvement projects were identified.

These are the final meeting minutes incorporating all municipal and PennDOT comments.

GEC/me
FILE: G:\804_01\corres\final scoping_meeting_minutes.wpd

Greg Creasy

From: Benjamin Craddock <bencraddock@lancastercivil.com>
Sent: Friday, November 19, 2021 11:07 AM
To: Greg Creasy
Cc: Justin Evans; Christopher C. Lincoln
Subject: Fwd: TIS Scoping Meeting Minutes - Pennmark Property - Mount Joy Township, Lancaster County

Greg,

Per the discussion during the scoping application meeting, Mount Joy Township does not object to excluding the Snyder Road and Angle/Union School Road intersections from the study (i.e. we are fine with those intersections not being included).

Thanks,
Ben

[Benjamin S. Craddock, PE, President](#)
[Lancaster Civil Engineering Co. | 717-799-8599](#)

----- Forwarded message -----

From: **Noles, Dean T** <dnoles@pa.gov>
Date: Wed, Nov 17, 2021 at 1:27 PM
Subject: RE: TIS Scoping Meeting Minutes - Pennmark Property - Mount Joy Township, Lancaster County
To: Greg Creasy <gcreasy@grovemiller.com>, Bob Sichelstiel <Bob@pennmarkproperties.com>, Chris Cafiero <Chris@pennmarkproperties.com>, Kinard, Eric W <ekinard@pa.gov>, Malik, Mazhar <MMALIK@pa.gov>, Warden, William J <wilwarden@pa.gov>, justin@mtjoytp.org <justin@mtjoytp.org>, Benjamin Craddock <bencraddock@lancastercivil.com>, clincoln@trafficpd.com <clincoln@trafficpd.com>, Ahlskog, Lauri <AhlskogL@co.lancaster.pa.us>

Greg,

The Traffic Unit has reviewed the draft meeting minutes, for the subject project, and have the following comment:

As per our discussion during the scoping application meeting, the Department asked that you get input from the municipalities to determine adding these study intersections to the study:

S Market St (SR 230) & Snyder Rd

S Market St (SR 230) & Angle/Union School Rd

S Market St (SR 230) & Groff Ave

Greg Creasy

From: Benjamin Craddock <bencraddock@lancastercivil.com>
Sent: Monday, November 15, 2021 11:37 AM
To: Greg Creasy
Cc: Bob Sichelstiel; Chris Cafiero; Kinard, Eric W; Noles, Dean T; Malik, Mazhar; Warden, William J; Justin Evans; Christopher C. Lincoln; Ahlskog, Lauri; Rebecca Denlinger; Pam Roberts; Jeff Kinsey
Subject: Re: TIS Scoping Meeting Minutes - Pennmark Property - Mount Joy Township, Lancaster County

To all:

On behalf of both Mount Joy Township and Elizabethtown Borough, we believe there would be value in studying the intersections of SR 230 with Groff Avenue and Maytown Road, as originally intended.

The additional traffic generated by the PennMark Property is expected to be significant, and there are several other large developments occurring near these intersections, so understanding and properly accounting for any decrease in the level of service is something that both the Borough and the Township would support.

Thanks,
Ben

[Benjamin S. Craddock, PE, President](#)
[Lancaster Civil Engineering Co. | 717-799-8599](#)

On Wed, Nov 10, 2021 at 10:44 AM Greg Creasy <gcreasy@grovemiller.com> wrote:

All,

Attached are meeting minutes from the TIS Scoping Application Meeting held in September. Please review and let me know if you have any questions or comments.

Thank you.

Gregory E. Creasy, P.E.

President

Senior Traffic Engineer

Grove Miller Engineering, Inc.

4800 Linglestown Road, Suite 307

Draft Scope Application Comment Sheet

COUNTY:	Lancaster	MUNICIPALITY:	Mount Joy Township
JOB NAME:	Pennmark Property	PREPARED BY:	Grove Miller Engineering, Inc.
APPLICANT:	Pennmark Management Company Inc	REVIEW BY:	PennDOT/McM

Please incorporate these comments into the revised Scope Application and resubmit:

Scope Application Comments:

(1) LOCATION OF PROPOSED DEVELOPMENT:

1. Please verify the Average Daily Trips throughout considering the trip generation comments below.

(2) DESCRIPTION OF PROPOSED DEVELOPMENT:

2. Please provide a separate site plan PDF that more clearly exhibits the labeled proposed square footage and parcel designations. Clearly illustrate an access connection to the Alliance Church property, if feasible, and if the connector road is to remain.
3. Please verify that the size and type of all land uses is consistent throughout the scoping application and revise for consistency. There appears to be some minor inconsistencies in size/type and/or omission of land uses.
4. The number of proposed accesses appears excessive and undesirable from an access management perspective. Per Ch. 441.7(c), access to a property which abuts two or more intersecting streets or highways may be restricted to only the roadway which can more safely accommodate its traffic. In addition, per Ch. 441.7(e), not more than two driveways will be permitted for a non-residential development, and if the property frontage exceeds 600 feet, the permit *may* authorize an additional driveway. Furthermore, some of the accesses do not appear to meet the requirements identified in the Access Management Manual, including influence distance, corner clearance, and access spacing guidelines. The number of accesses should be reduced or clear justification provided.
5. All restricted movement driveways, if permitted, must be designed and signed appropriately to minimize restricted movements from utilizing the access. Also, for the proposed accesses to remain, alignment with existing opposing accesses must be considered. Consideration to restrict turning movements should be analyzed based on, but not limited to, the site design, the adjacent street lane configurations, traffic volumes, traffic speeds, type of highway being accessed, and alternative access points. Queuing from the adjacent traffic signal and sight distance should also be considered.
6. An access covenant will be required for all lots with frontage along the State Route, as all lots must provide access to the site internal roadways and not directly to the State Route.
7. The study should identify the driveway classification for each driveway serving the proposed development. If the design standards for the driveway classification cannot be met, provide an engineering justification explaining why and verify that driveway configurations won't unreasonably impact the state roads. Per PennDOT Pub. 282, at least 50 feet of throat length should be provided for non-minimum use driveways. For medium volume driveways, a median of sufficient length to accommodate the 95th percentile queue length must be provided, desirably 120'. For high volume driveways, a 150' median must be provided. Internal site driveways should not be located within these areas.
8. Please reference any proposed pedestrian accommodations in the community linkages.

(3) DEVELOPMENT SCHEDULE AND STAGING: No comment.

(4) TRIP GENERATION:

9. Please verify the trip generation calculations, as it appears that some are inconsistent with ITE's Trip Generation Manual (10th Edition). For example, in some cases there are no pass-by trips noted, but the external trips differ from the new trips, which should not be the case. Also, the Apartments (LU 220) Saturday peak hour trips do not appear to be consistent with ITE.

10. For LU 912 (Drive-in Bank), the trip generation should be estimated based on the square footage and number of drive-in lanes, and the more conservative trip generation estimate applied.
11. Per Pub. 282 when completing studies for convenience markets with gasoline pumps, the peak hour trip generation should be evaluated for all applicable variables in the ITE Trip Generation Manual and the more conservative trip generation applied. Please clearly indicate the various trip generation items in the scoping application table as based on fueling positions, square footage or the multiple variable methodology, as applicable. Clearly indicate which trip generation results are proposed for use in the TIS.
12. Based on the ITE Trip Generation Handbook flowchart, the weighted average rate for the daily trips should be considered since the R^2 value is not $\geq 75\%$ and this would be more conservative equating to a slightly higher trip generation than based on the fitted curve equation.
12. Please clarify your methodology for splitting the internal trips to each of the land uses within the grouped categories of land uses (retail/services/residential).

(5) TRANSPORTATION IMPACT STUDY REQUIRED? No comment.

(6) TRAFFIC IMPACT ASSESSMENT REQUIRED? No comment.

(7) TIS STUDY AREA:

12. The study area should be expanded in accordance with ITE's *Transportation Impact Analyses for Site Development* Table 2-3. As a development with more than 500 peak-hour trips, all signalized intersections and freeway ramps within 2 miles of a property line and all major unsignalized access within a mile of a property line of the site should be considered, such as:

- S. Market Street (S.R. 0230) and Market Street Square (Weis)/Hess Driveway (signalized)
- S. Market Street (S.R. 0230) and Giant Plaza (signalized)
- S. Market Street (S.R. 0230) and Groff Avenue
- S. Market Street (S.R. 0230) and Maytown Road (S.R. 0743) (signalized)
- S. Market Street (S.R. 0230) and Harrisburg Avenue (S.R. 4017)
- S. Market Street (S.R. 0230) and Angle Street/Union School Road (S.R. 4015) (signalized)
- Cloverleaf Road (S.R. 4025) and Merts Drive

(8) STUDY AREA TYPE: No comment.

(9) TIS ANALYSIS PERIODS AND TIMES: No comment.

(10) TRAFFIC ADJUSTMENT FACTORS:

13. The background growth rate factors were recently updated by PennDOT for August 2021 to July 2022, and should be applied for all new traffic studies.
14. The pass-by reductions should only be applied where available in ITE's *Trip Generation Handbook*. Provide justification for the use of pass-by trip rates not found in the ITE *Trip Generation Handbook*, 3rd Edition. Using another peak hour pass-by rate or pass-by rates for a different Land Use Code is not always realistic depending on the land use. Review the pass-by trip rates and either provide additional justification or revise the rates as necessary. For example, supermarket pass-by trips typically should not be assumed for Saturday midday based on PM peak pass by rate available since most Saturday supermarket trips are destination trips not pass by.

(11) OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:

15. Review documentation and acceptance from Mount Joy Township as well as the MPO, as necessary, for the scope should be provided. Additional municipalities may require input due to the size of the development and if the study area is expanded into their jurisdiction. Confirm with the municipality(ies) if there are adjacent developments within the study area that should be added to the base traffic (i.e., Westbrooke expansion, etc.). Include documentation of correspondence within the study.

(12) TRIP DISTRIBUTION AND ASSIGNMENT:

16. Considering the size of the development and various land uses, a gravity model must be completed for distribution and assignment of the development traffic. Provide trip distribution and assignment information including calculations and backup data to support the trip distribution percentages. A review of the backup data and methodologies will be required prior to the Department accepting the trip distribution. Consider submitting this for approval prior to submitting the TIS.
17. Since there are multiple driveways serving the site, the driveway assignment methodology should be clearly explained and consider travel time, most logical path, and location of development features such as parking, etc. Details on the site circulation must be provided.

(13) APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

18. The applicant's engineer has proposed COVID-19 adjustments to the traffic volumes by a comparison to TIRe data, with which we generally concur. The engineer should prepare a data collection plan to supplement the scoping application to identify how traffic volumes will be collected and details on the proposed adjustments.

(14) CAPACITY/LOS ANALYSIS: No comment.

(15) ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:

19. Per PennDOT One Map, study area roadways are scheduled to be resurfaced in 2022-2023, and therefore, coordination may be necessary if improvements are recommended to be installed by the developer along the site frontage in that timeframe.

(16) OTHER NEEDED ANALYSES:

20. All site accesses intended to become local roads must be evaluated by the applicant's engineer for the intersection sight distance criteria included in the AASHTO Green Book.
21. Please note that an Intersection Control Evaluation (ICE) may be required for this project, since this project appears to include proposed medium and/or high-volume accesses, a proposed 4th leg to an existing intersection, and/or change in traffic control or lane configurations at an existing intersection. Refer to Appendix AI of Publication 10X (DM-1X) for guidance on when an ICE is required. This will be further considered with the additional information to be provided in the TIS and/or HOP submission.
22. To clarify, provide traffic crash data and analyses for the study area intersections and key corridors for the most recent five years, summarizing any trends in the crash data. Include mitigation options if crash trends are present at an intersection or along a corridor. The applicant should also contact the municipality for input regarding non-reportable crashes. Note that the crash history provided by the Department is confidential under 75 PA Code Section 3754. This material is only provided to official agencies that have responsibility in the highway transportation system and can only be used by those agencies for traffic safety-related planning or research. Publication, reproduction, release or discussion of these materials, as well as the use of or reliance upon these materials for any purpose other than stated above, is expressly prohibited without the specific written consent of the Pennsylvania Department of Transportation. Do not include copies of crash data in the TIS. Provide copies of the crash data reports and analysis in a separately bound appendix, under separate cover.
23. In accordance with PennDOT Pub. 46, the ideal spacing for traffic signals is at least one half-mile apart (2,640 feet). A minimum spacing of one-quarter mile should always be maintained. When the spacing between signal falls below one-quarter mile (1,320 feet), the traffic flow along the route may be disrupted.
24. At the intersection of Cloverleaf Road (SR 4025) and S. Market Street (SR 0230), please note that we will require a new TE-672, Pedestrian Needs Accommodation at Intersection Checklist. With this type of land use change the crossings are to be reviewed as part of the signal design. An existing TE-672 is not a guarantee that the crossings will continue to be restricted.

Greg Creasy

From: Bob Sichelstiel <Bob@pennmarkproperties.com>
Sent: Monday, August 23, 2021 5:39 PM
To: Greg Creasy
Cc: Chris Cafiero
Subject: FW: PennDOT TIS Scoping Meeting

Greg,

Here was the email from the township.



From: Benjamin Craddock <bencraddock@lanastercivil.com>
Sent: Saturday, August 21, 2021 10:28 AM
To: Bob Sichelstiel <Bob@pennmarkproperties.com>
Cc: Justin Evans <Justin@mtjoytp.org>; Christopher C. Lincoln <clincoln@trafficpd.com>
Subject: Re: PennDOT TIS Scoping Meeting

Hi Bob,

At this time, I don't believe Chris or I have any engineering issues with the info that was provided...

Ben

[Benjamin S. Craddock, PE, President](#)
[Lancaster Civil Engineering Co. | 717-799-8599](#)

On Wed, Aug 18, 2021 at 12:42 PM Bob Sichelstiel <Bob@pennmarkproperties.com> wrote:

Hi Ben,

We were hoping to discuss the scoping application ahead of time. If the township had any issues with the intersections, trip generations or trip distributions, we would rather know ahead of time if possible.