



TMS Engineers, Inc



TRAFFIC IMPACT STUDY

Proposed Day Care Hudson, Ohio

January 7, 2026

Prepared for:
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Suite #125
Englewood, Colorado 80112

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Executive Summary

This Traffic Impact Study (TIS) has been prepared at the request of Crosslands Development Company, LLC for a proposed child care facility in Hudson, Summit County, Ohio. The site's access driveway is located on the west side of Terex Road south of W. Streetsboro Street (SR 303) The project site location is shown in **Figure 1.1, Appendix A.**

The development is expected to consist of the following:

- Day Care Center (173 Students)

The construction of the child care facility is scheduled to be completed in 2027.

The site will be served by a single access driveway. This access driveway is located on the west side of Terex Road approximately 150 feet south of the W. Streetsboro Street (SR 303) and Terex Road intersection. This access driveway is proposed as full access with one egress lane and one ingress lane.

The weekday AM peak hour of traffic was determined to be 7:30 AM to 8:30 AM. The weekday PM peak hour of traffic was found to be 4:45 PM to 5:45 PM.

The child care facility is expected to generate the following hourly traffic volumes during the peak periods as shown in the table below:

| TRIP GENERATION | | | WEEKDAY TRIP ENDS | | | |
|--------------------------------|---------------------|--------------|---------------------------|----|---------------------------|----|
| ITE CODE | DESCRIPTION | SIZE | AM PEAK HOUR (ENTER/EXIT) | | PM PEAK HOUR (ENTER/EXIT) | |
| 565 | Child Care Facility | 173 Students | 64 | 57 | 55 | 62 |
| PASS-BY TRIPS (AM=N/A, PM=44%) | | | 0 | 0 | 27 | 27 |
| TOTAL NON-PASS-BY TRIPS | | | 64 | 57 | 28 | 35 |
| | | | 121 | | 63 | |
| TOTAL NON-PASS-BY TRIPS | | | 0 | | 54 | |
| TOTAL TRIPS | | | 121 | | 117 | |

The ODOT **State Highway Access Management Manual** ⁽⁷⁾ requires that ten year design hour traffic volumes be analyzed for a proposed development when the number of generated trips is below 500 in the peak hour and twenty year design hour traffic volumes when the number of generated trips is greater than 500 in the peak hour.

The proposed development is expected to generate a total of 121 driveway trips in the AM peak hour and a total of 117 driveway trips in the PM peak hour. Therefore, the year 2037 will be analyzed for the ten year design hour conditions from the opening year of the daycare

Recommended Improvements to Serve Future Conditions without the Development

The following improvements were recommended to accommodate the forecasted 2027 and 2037 No-Build conditions at the study area intersection.

W. Streetsboro Street (SR 303) & Terex Road

- Extend the northbound left turn lane to a length of 550 feet.

Recommended Improvements to Mitigate the Traffic Associated with the Development

No improvements were recommended to accommodate the forecasted 2027 and 2037 Build conditions at the study area intersection.

Development Access Recommendations

The following lane use and traffic control is recommended at the site access locations under the forecasted Build conditions:

Terex Road & Access Driveway

- Place a stop sign on the west approach.
- Provide one egress lane and one ingress lane on the west approach.

The recommended lane use and traffic control for the study area to accommodate expected Build traffic volumes can be seen in **Figure 4.1, Appendix A**.

Chapter 1

Introduction

1.1 Purpose of Report

This Traffic Impact Study (TIS) has been prepared at the request of Crosslands Development Company, LLC for a proposed child care facility in Hudson, Summit County, Ohio. The site's access driveway is located on the west side of Terex Road south of W. Streetsboro Street (SR 303) The project site location is shown in **Figure 1.1, Appendix A.**

The development is expected to consist of the following:

- Day Care Center (173 Students)

The construction of the child care facility is scheduled to be completed in 2027.

The site will be served by a single access driveway. This access driveway is located on the west side of Terex Road approximately 150 feet south of the W. Streetsboro Street (SR 303) and Terex Road intersection. This access driveway is proposed as full access with one egress lane and one ingress lane. The day care center site plan is shown in **Figure 1.2, Appendix A.**

1.2 Study Objectives

This study is structured for the following purposes;

- to adequately assess the traffic impacts associated with the proposed development, and identify the level of off-site access and traffic,
- to provide a comprehensive study which evaluates and documents the traffic impacts and off-site improvements, where warranted,
- and to provide a technically sound basis to identify mitigation requirements to off-site traffic impacts.

This study documents the methodologies, findings and conclusions of the analysis, including the basis for all assumptions, traffic parameters utilized and conclusions reached.

The development of future traffic volumes will be based on the forecasting guidelines and methodology found in the Ohio Department of Transportation's **Ohio Traffic Forecasting Manual, Volume 1** ⁽⁴⁾ & **Volume 2** ⁽⁵⁾.

The traffic impacts will be determined by comparing the existing intersection levels-of-service, delay or density, volume to capacity ratio and queue storage ratio before the construction of the proposed development to the anticipated measures after the development is completed. Traffic analyses for the study area and access intersections will be calculated using the computerized version of the Transportation Research Board's **Highway Capacity Manual 7TH Edition** ⁽¹⁾, (**HCS2026, Release 8.5**). Data inputs for the HCS software program will be based on the guidance found in the Ohio Department of Transportation's **Analysis & Traffic Simulation Manual (OATS)** ⁽⁶⁾.

The justification for any changes in the intersections will be determined by comparing data collected of the existing traffic conditions to the criteria established by the **Ohio Manual of Uniform Traffic Control Devices** ⁽²⁾ and professional engineering judgment from an on-site field review.

Intersection geometric design guidelines will be based in the information and procedures found in the Ohio Department of Transportation's **Location & Design Manual, Volume 1** ⁽³⁾.

1.3 Intersection Capacity & Levels-of-Service

Intersection capacity analyses will be performed at the study area intersections using the procedures outlined in the computerized version of the Transportation Research Board's **Highway Capacity Manual** ⁽¹⁾. Section 3.1 of the Ohio Department of Transportation's **OATS Manual** ⁽⁶⁾ provides the following description of the **HCM** ⁽¹⁾:

"The Highway Capacity Manual (HCM) is the most widely used document in the transportation industry that contains a set of methodologies and application procedures for evaluating the capacity and quality of service of various transportation facilities. It is a tool for analyzing existing facilities and for the planning and design of future systems. HCM is built from more than 60 years of research work and represents a body of expert transportation consensus."

The capacity analysis procedures provide a calculated "average vehicle delay", which is based on traffic volumes, number of lanes, type of traffic control, channelization, grade, and percentage of large vehicles in the traffic stream at each intersection. The average delay calculated at an intersection is then assigned a "grade" or level of service (LOS) ranging from LOS A, the best, to LOS F, the worst based upon driver expectation. The intersection LOS "grades" as defined by the Transportation Research Board are as follows:

Table 1.1 Intersection Levels-of-Service

| LOS | UNSIGNALIZED AVERAGE DELAY PER VEHICLE (seconds/vehicle) | SIGNALIZED AVERAGE DELAY PER VEHICLE (seconds/vehicle) |
|-----|--|--|
| A | ≤ 10.0 | ≤ 10.0 |
| B | 10.1 to 15.0 | 10.1 to 20.0 |
| C | 15.1 to 25.0 | 20.1 to 35.0 |
| D | 25.1 to 35.0 | 35.1 to 55.0 |
| E | 35.1 to 50.0 | 55.1 to 80.0 |
| F | > 50 | > 80 |

Intersection capacity analyses will be performed in order to estimate the maximum amount of traffic that can be accommodated by the intersection while maintaining recommended operational qualities. No-Build and Build peak hour traffic volumes will be analyzed to determine the level-of-service (LOS) at the study area intersections.

Section 5.9 of the Ohio Department of Transportation’s **OATS Manual** ⁽⁶⁾ provides additional intersection operational goals for volume-to-capacity ratio and queue storage ratio. The following table from Section 5.9 details the operation goals for intersection analyses (All-Way Stop Control, Two-Way Stop Control, Signalized, & Roundabout).

Table 1.2 Intersection Operational Goals

| RESULT INSIDE AN MPO OUTSIDE AN MPO | |
|-------------------------------------|--|
| Intersection LOS | D or BETTER C or BETTER |
| Approach LOS | E or BETTER |
| Control LOS | E or BETTER |
| v/c | All movements < 1.0 (<= 0.93 preferred) |
| QSR | All movements <1.0 from HCS analysis, TransModeler may be needed to determine if queuing impacts upstream intersections. |

v/c = Volume to Capacity Ratio
QSR = Queue Storage Ratio

It will be determined from the capacity analysis if there are any intersections, approaches or movements that fail to meet the minimum LOS requirements and the v/c, and/or QSR exceed the operational goals shown in Table 1.2.

All intersections will be analyzed using the computerized version of the Transportation Research Board’s **Highway Capacity Manual 7TH Edition** ⁽¹⁾, (**HCS2026, Release 8.5**). The capacity analyses for signalized intersections will be based on the process detailed in Section 6.2.2.1 of the ODOT **OATS Manual** ⁽⁶⁾. The optimization of any traffic signal timings will be based on the delay minimization function with the objective of Balanced Delay.

It should be noted that any values for queue length, shown in the HCS analysis summary sheets that are displayed in red, indicate that the movement is expected to experience a “spillback” condition where the queue may exceed the existing length of the turn lane and extend into the adjacent through lane. These instances, if they occur, will be investigated for mitigation.

1.4 Intersection Turn Lanes

Turn Lane Warrants

The ODOT **Location and Design Manual, Volume 1** ⁽³⁾ and the **State Highway Access Management Manual** ⁽⁷⁾ describes the need for auxiliary turn lanes at unsignalized intersections. *Section 401.6.3* of the ODOT **Location and Design Manual** ⁽⁴⁾ states that:

“To determine the number and use of left (right) turn lanes, intersection capacity analysis procedures of the current edition of the Highway Capacity Manual should be used. For unsignalized intersections, left (right) turn lanes may also be needed if they meet warrants provided in Figures 401-5(6)a, b, c and d. The warrants apply only to the free-flow approach of the unsignalized intersection.”

The Auxiliary Lane Graphs found in *Section 401-6* of the **Location and Design Manual, Volume 1** ⁽⁴⁾ are used for this determination. This applies to the free-flow approaches at unsignalized intersections.

Section 401-6 of the **Location and Design Manual, Volume 1** ⁽⁴⁾ specifies the current edition of the **Highway Capacity Manual** ⁽¹⁾ should be used for signalized intersections.

It is the intent of this report to evaluate the need for exclusive deceleration and turn lanes at the proposed access driveway on Terex Road.

Turn Lane Length

Existing turn lanes found to be deficient per the QSR results from the capacity analysis and any recommended turn lanes will be analyzed to determine the necessary storage length in accordance with the procedure found in the Ohio Department of Transportation’s **Location and Design Manual, Volume 1** ⁽³⁾, *Section 401*. The ODOT criteria and procedures are furnished in **Appendix B**.

Guidance regarding maximum and minimum turn lane lengths can be found in *section 401.6* of the **ODOT Location and Design Manual** ⁽⁴⁾.

Design Speed

The procedure for determining the necessary turn lane storage length found in the Ohio Department of Transportation's **Location and Design Manual, Volume 1** ⁽³⁾, *Section 401*, is in part based on the design speed of the roadway.

The AASHTO publication, **A Policy on Geometric Design of Highway Streets (Green Book)** ⁽¹¹⁾, defines design speed as a selected speed used to determine the various geometric design features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use and the functional classification of highway.

The ODOT **Location and Design Manual, Volume 1** ⁽³⁾ provides guidance for determining the design speed of a roadway. *Section 104.2* of the ODOT **Location and Design Manual** ⁽³⁾ states that:

"The design speed should be at least the legal speed for facilities with a legal speed of 35 mph or less. For facilities with a legal speed of 40 or 45 mph the design speed shall either match the legal speed, or be 5 mph greater than the legal speed, depending on the context of the area. For facilities with a legal speed 50 mph or greater, the design speed shall be 5 mph greater than the legal speed."

1.5 References

The following list of references will be utilized for this report and the analysis contained within it:

1. *Highway Capacity Manual*, 7th Edition. Transportation Research Board of the National Academies, Washington, D.C.
2. *Ohio Manual of Uniform Traffic Control Devices for Streets and Highways*, 2012 Edition. Ohio Department of Transportation, Office of Traffic Engineering, Columbus, Ohio.
3. *Location and Design Manual*, Volume 1, Roadway Design. Ohio Department of Transportation, Office of Roadway Engineering, Columbus, Ohio.
4. *Ohio Traffic Forecasting Manual*, Volume 1, Traffic Forecasting Background. Ohio Department of Transportation, Office of Statewide Planning & Research, Columbus, Ohio.
5. *Ohio Traffic Forecasting Manual*, Volume 2, Traffic Forecasting Methodologies. Ohio Department of Transportation, Office of Statewide Planning & Research, Columbus, Ohio.
6. *ODOT Analysis and Traffic Simulation Manual (OATS)*, Ohio Department of Transportation, Office of Roadway Engineering, Columbus, Ohio.
7. *State Highway Access Management Manual*, Ohio Department of Transportation, Office of Roadway Engineering, Columbus, Ohio.
8. *Trip Generation Manual*, 11th Edition, September 2021, Institute of Transportation Engineers, (ITE), Washington, D.C.
9. *Trip Generation Handbook*, 3rd Edition, September 2017, Institute of Transportation Engineers, (ITE), Washington, D.C.
10. *Traffic Engineering Manual*, October 23, 2002 Edition (Revised January 15, 2021), Ohio Department of Transportation, Office of Roadway Engineering, Columbus, Ohio.
11. *Highway Functional Classification Concepts, Criteria and Procedures*, 2013 Edition, Federal Highway Administration.

Chapter 2

Area Conditions

2.1 Transportation Network Study Area

The study area for the project includes the previously discussed site access location and the following intersection:

1. W. Streetsboro Street (SR 303) & Terex Road

The intersection will be enumerated and referred to as listed above throughout this report and analysis contained within it.

An aerial view of the of the study area can be seen in **Figure 2.1 Appendix A**.

The following section details the lane use and traffic control for the intersections under study for this report.

1. W. Streetsboro Street (SR 303) & Terex Road**Hudson Crossing Parkway North Approach**

- 1 Exclusive Left Turn Lane
- 1 Exclusive Through Lane
- 1 Exclusive Right Turn Lane

Terex Road South Approach

- 1 Exclusive Left Turn Lane
- 1 Shared Through/Right Turn Lane

W. Streetsboro Street East Approach

- 1 Exclusive Left Turn Lane
- 1 Exclusive Through Lane
- 1 Shared Through/ Right Turn Lane

W. Streetsboro Street West Approach

- 1 Exclusive Left Turn Lane
- 1 Exclusive Through Lane
- 1 Exclusive Right Turn Lane

The intersection is controlled by a traffic signal. The signal operates with seven (7) “phases” which assigns the right-of-way to specific movements and displays yellow and all-red clearances. The first two phases are the eastbound and westbound left turn movements with the left turns made during a green arrow indication (protected movement). The next two phases are all eastbound and westbound movements where the left turn movements are made during a green ball indication when there is a gap in the opposing through traffic movements (permissive movement). The next phase is the northbound left turn and through movements with the left turns made during a green arrow indication (protected movement). The last two phases are all northbound and southbound movements where the left turn movements are made during a green ball indication when there is a gap in the opposing through traffic movements (permissive movement). The phasing also includes two right turn overlaps allowing for southbound right turns during the eastbound left turn phase and eastbound right turns during the northbound left turn phase.

Roadway & Intersection Characteristics

The following table details the primary characteristics of the study area roadways:

Table 2.1 Roadway Characteristics

| INTERSECTION | | APPROACH | LANE USE | | SPEED LIMIT | TRAFFIC CONTROL |
|--------------|----------------------|----------|-----------------|---------------|-------------|---------------------------|
| # | ROADWAYS | | THROUGH LANE(S) | TURN LANES(S) | | |
| 1 | Hudson Crossing Pkwy | North | 1 | 1 RT, 1 LT | 25 | Traffic Signal Controlled |
| | Terex Rd. | South | 1* | 1 LT | 45 | |
| | SR 303 | East | 2* | 1 LT | 45 | |
| | SR 303 | West | 1 | 1 RT, 1 LT | 45 | |

*Shared Through/Turn Lane(s)

Figure 2.2, Appendix A shows the lane use and traffic control conditions based upon our field investigation in the study area. These will be considered the existing base conditions for this report.

2.2 Functional Classification

The Ohio Department of Transportation functionally classifies roadways to help define a roadway's characteristics as well as identify roadways that are eligible for federal funds. Functional classification is the grouping of roads, streets, and highways in a hierarchy based on the type of highway service they provide. Generally, streets and highways perform two types of service. They provide either traffic mobility or land access and can be ranked in terms of the proportion of service they provide.

The functional classification as determined by ODOT will be used in this report to apply growth and design hour factors to the study area roadways for use in forecasting the future traffic volumes in the study area. These factors are determined using data, guidelines, and methodology supplied by ODOT. The methods and the corresponding data are based on the roadways assigned functional classification. The ODOT methods for forecasting future traffic volumes are a recognized traffic engineering standard in the State of Ohio.

Roadways that are not listed as having a functional classification can be assigned into one of two categories. The first category is a local roadway and the second category is that of an access drive.

The roadway functional classifications are assigned either an urban or rural designation.

The ODOT the urban/rural designation and functional classification of the roadways in the study area can currently be found using the ODOT Transportation Information Mapping System (TIMS). TIMS is ODOT's web-mapping portal where information about Ohio's transportation system can be found. TIMS can currently be found at the following web address:

<https://gis.dot.state.oh.us/tims/>

The urban and rural designation for the study area roadways can be found under the Boundaries tab and the selection of the "Census Urban Areas" layer.

The roadway functional classification can be found under the Roadway Information tab and the selection of the "Functional Classification" layer.

The following table lists the study area roadways that have an assigned functional classification as determined by ODOT and local government entities.

Table 2.2 Functional Classification

| INTERSECTION | | AREA | FC# | CLASSIFICATION |
|--------------|--------------------------------|-------|-----|----------------|
| # | ROADWAYS | | | |
| 1 | W. Streetsboro Street (SR 303) | Urban | 4 | Minor Arterial |
| | Terex Road | | 4 | Minor Arterial |
| | Hudson Crossing Parkway | | 7 | Local Roadway |

Figure 2.3, Appendix A illustrates the section of the functional classification map for the study area. The map was created using the ODOT Transportation Information Mapping System (TIMS) web-mapping portal.

2.3 Traffic

Weekday Peak Hours

A weekday nine hour turning movement count was performed at the following location on Tuesday November 20, 2025.

1. W. Streetsboro Street (SR 303) & Terex Road

The 2025 weekday traffic count was conducted in fifteen (15) minute intervals between the hours of 7 AM - 10 AM, 11 AM - 2 PM, and 3 PM - 6 PM, then hourly totals were calculated. Average daily traffic was calculated for the roadways using expansion factors to account for daily and seasonal variations according to the recommendations and latest data from the Ohio Department of Transportation. Copies of the intersection turn movement counts are included in **Appendix C**.

The peak hours for the study area were determined based on the AM and PM hour experiencing the highest total volumes. The weekday AM peak hour of traffic was determined to be 7:30 AM to 8:30 AM. The weekday PM peak hour of traffic was found to be 4:45 PM to 5:45 PM. The peak hours are shown in the turn movement counts in **Appendix C**. These periods will be used to forecast expected and future traffic volumes since they reflect the period of the highest volume of vehicular traffic flow for the study area roadways.

Chapter 3

Projected Traffic Conditions

3.1 Site Traffic

Trip Generation

Calculating future total driveway trips requires an estimate of the traffic generated by the proposed development. The most widely accepted method of determining the amount of traffic that the proposed development will generate is to compare the proposed land use with existing facilities of the same use. The Institute of Transportation Engineers (ITE) has prepared a manual titled “**Trip Generation Manual**” ⁽⁸⁾, which is a compilation of similar traffic generation studies to aide in making such a comparison. The most recent update of this manual is the 12TH edition and was utilized for this study.

The Institute of Transportation Engineers (ITE) provides a web-based application (**ITETripGen**) that will be used to calculate the expected future driveway trips using the data from the **Trip Generation Manual** ⁽⁵⁾. The **ITETripGen** web-based app can be accessed through a subscription at the following address:

<https://itetripgen.org/>

An independent variable is used in trip generation calculations, which consists of a physical, measurable and predictable characteristic that describes the study site. This has a direct relationship to the variation in the number of trips generated by the land use. For example, with day care centers, the number of students is the independent variable.

The development is expected to consist of the following:

- Day Care Center (173 Students)

The following table details the development land use from the site plan (**Figure 1.2, Appendix A**) and the corresponding ITE land use that will be used to forecast the site generated traffic volumes for the Build conditions:

Table 3.1 ITE Land Use Code

| SITE PLAN DESCRIPTION | SIZE | ITE CODE | ITE DESCRIPTION |
|-----------------------|--------------|----------|-------------------|
| Child Care Facility | 173 Students | 565 | Child Care Center |

Vehicle Trip Types

Site generated driveway trips can be separated into two major categories: Non-pass-by trips and pass-by trips. Non-pass-by trips can be further subdivided into primary trips and diverted trips. Pass-by and diverted trips may be part of multiple-stop chain of trips. Retail and service land use categories sometimes generated a different mixture of traffic than land uses such a residential homes and office facilities, which add all of the “new” traffic to the adjacent roadway system.

A ***pass-by-trip*** is made as an intermediate stop on the way from an origin to a primary trip destination. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator (i.e. motorists who are already on the road and drop off their kids on their way to work from home)

A ***non-pass-by trip*** is simply any trip generated by a site that is not a pass-by trip. Non-pass-by trips can be further subdivided into primary trips and diverted trips.

- A ***diverted trip*** is attracted from the traffic volume on roadways within the vicinity of the generator but without direct access to the site. A diverted trip requires a diversion from a roadway not adjacent to the site to another roadway to gain direct access to the site (i.e motorists who are on the interstate and exit to get something to eat and then re-enter the interstate). Non-pass-by trips are sometimes used when diverted trips are not calculated separately from primary trips in the analysis process.
- A ***primary trip*** is made for the specific purpose of visiting the generator. The stop at the generator is the primary reason for the trip.

The site generated traffic for the proposed development will be categorized as non-pass-by trips and pass-by trips for the purpose of this report and all analysis contained within.

Pass-by Trips

The technical appendices in the ITE **Trip Generation Manual** ⁽⁸⁾ provides access to pass-by trip rates (previously **Trip Generation Handbook** ⁽⁹⁾) for various land uses. The appendices can be accessed by subscription either through the **ITETripGen** web-based app or through the trip generation resource page on the ITE website at the following address:

<https://www.ite.org/technical-resources/topics/trip-and-parking-generation>

The ITE **Trip Generation Manual** ⁽⁸⁾ does not provide AM peak hour pass-by data for land use #565, therefore, only PM peak hour pass-by rates will be used in this report. A copy of the ITE **Trip Generation Manual** ⁽⁸⁾ pass-by rate tables used in this report are provided in **Appendix D**.

The following tables details the PM peak hour pass-by rates that will be used in the forecasting of the expected site generated traffic volumes:

Table 3.2 PM Peak Hour Pass By Rates

| ITE LAND USE DESCRIPTION | ITE CODE | PEAK HOUR | PASS-BY RATE |
|--------------------------|----------|-----------|--------------|
| | | | AVERAGE |
| Child Care Center | 565 | PM | 44% |

Trip Generation Summary

Trip generation calculations for the development were performed utilizing data contained in the **Trip Generation Manual**⁽⁸⁾ and the methods outlined in the **Trip Generation Handbook**⁽⁹⁾. The following table details the expected generated weekday peak hour traffic volumes for the child care facility. A copy of the trip generation worksheet can be found in **Appendix D**.

Table 3.3 Trip Generation Summary

| TRIP GENERATION | | | WEEKDAY TRIP ENDS | | | |
|--------------------------------|-------------------|--------------|---------------------------|----|---------------------------|----|
| ITE CODE | DESCRIPTION | SIZE | AM PEAK HOUR (ENTER/EXIT) | | PM PEAK HOUR (ENTER/EXIT) | |
| 565 | Child Care Center | 173 Students | 64 | 57 | 55 | 62 |
| PASS-BY TRIPS (AM=N/A, PM=44%) | | | 0 | 0 | 27 | 27 |
| TOTAL NON-PASS-BY TRIPS | | | 64 | 57 | 28 | 35 |
| | | | 121 | | 63 | |
| TOTAL NON-PASS-BY TRIPS | | | 0 | | 54 | |
| TOTAL TRIPS | | | 121 | | 117 | |

A requirement from the ODOT **State Highway Access Management Manual**⁽⁷⁾ indicates that ten year design hour traffic volumes be analyzed for a proposed development when the number of generated trips is below 500 in the peak hour and twenty year design hour traffic volumes when the number of generated trips is greater than 500 in the peak hour.

The proposed development is expected to generate a total of 121 driveway trips in the AM peak hour and a total of 117 driveway trips in the PM peak hour. Therefore, the year 2037 will be analyzed for the ten year design hour conditions from the opening year of the development.

Distribution of Weekday Site Generated Trips

The directional distribution for the site generated trips is a function of the prevailing operating conditions on the existing roadways. The distribution pattern that was assumed is shown in the tables that follow and is based upon the existing traffic volumes entering and exiting the study area at the study area intersection during the AM and PM peak hours shown in **Figure 2.4, Appendix A**.

The following tables detail the distribution of the non-pass-by site generated trips for the proposed development under the opening and design year conditions.

Table 3.4 AM Non-Pass-by Trip Origins and Destinations

| ORIGIN/ DESTINATION | ROUTE | FROM (ENTER) | % TOTAL | TRIPS* | TO (EXIT) | % TOTAL | TRIPS* |
|------------------------|-----------|-----------------|-------------|-----------|--------------|-------------|-----------|
| East | SR 303 | 461 | 28.4% | 18 | 565 | 38.7% | 22 |
| West | SR 303 | 871 | 53.8% | 34 | 678 | 46.3% | 26 |
| South | Terex Rd. | 289 | 17.8% | 12 | 220 | 15.0% | 9 |
| TOTALS | | 1621 | 100% | 64 | 1463 | 100% | 57 |

*Rounded

Table 3.5 PM Non-Pass-by Trip Origins and Destinations

| ORIGIN/ DESTINATION | ROUTE | FROM (ENTER) | % TOTAL | TRIPS* | TO (EXIT) | % TOTAL | TRIPS* |
|------------------------|-----------|-----------------|-------------|-----------|--------------|-------------|-----------|
| East | SR 303 | 585 | 30.0% | 8 | 641 | 30.9% | 11 |
| West | SR 303 | 1055 | 54.0% | 15 | 912 | 44.0% | 15 |
| South | Terex Rd. | 312 | 16.0% | 5 | 520 | 25.1% | 9 |
| TOTALS | | 1952 | 100% | 28 | 2073 | 100% | 35 |

*Rounded

The following table details the distribution of the pass-by site generated trips for the proposed development under the opening and design year conditions.

Table 3.6 PM Pass-by Trip Origins and Destinations

| ORIGIN/ DESTINATION | ROUTE | FROM (ENTER) | % TOTAL | TRIPS* | TO (EXIT) | % TOTAL | TRIPS* |
|------------------------|-----------|-----------------|-------------|-----------|--------------|-------------|-----------|
| East | SR 303 | 912 | 32.6% | 9 | 1055 | 37.7% | 10 |
| West | SR 303 | 1055 | 37.7% | 10 | 912 | 32.6% | 9 |
| North | Terex Rd. | 520 | 18.5% | 5 | 312 | 11.1% | 3 |
| South | Terex Rd. | 312 | 11.1% | 3 | 520 | 18.5% | 5 |
| TOTALS | | 2799 | 100% | 27 | 2799 | 100% | 27 |

*Rounded

Directional Distribution of Site Generated Non-Pass-by Trips

The directional distribution for the AM and PM peak hour non-pass-by site generated trips is shown graphically in **Figure 3.1, Appendix A**.

Directional Distribution of Site Generated Pass-by Trips

The directional distribution for the PM peak hour pass-by site generated trips is shown graphically in **Figure 3.2, Appendix A**.

Assignment of Non-Pass-by Site Generated Trips

The PM peak hour site generated non-pass-by trips were assigned to the study intersections based upon the distribution pattern shown in **Figure 3.1, Appendix A**. The assignment of the estimated site generated non-pass-by trips for the proposed development under opening and design year conditions is shown graphically in **Figure 3.3, Appendix A**.

Assignment of Pass-by Site Generated Trips

The AM and PM peak hour site generated pass-by trips were assigned to the study intersections based upon the distribution pattern shown in **Figure 3.2, Appendix A**. The assignment of the estimated site generated pass-by trips for the proposed development under opening and design year conditions is shown graphically in **Figure 3.4, Appendix A**.

Total Site Generated Trips

The assignments of the site generated non-pass-by trips in **Figure 3.3, Appendix A** and the site generated pass-by trips in **Figure 3.4, Appendix A** were added together to arrive at the total site generated traffic shown in **Figure 3.5, Appendix A**.

3.2 Non-Site Traffic

Background Traffic Growth

Design of new roadways or improvements to existing roadways should not usually be based on current traffic volumes alone, but should consider future traffic volumes expected to make use of the facilities. Roadways should be designed to accommodate the traffic volume that is likely to occur within the design life of the facility. In a practical sense, this design volume should be a value that can be estimated with reasonable accuracy. It is believed that the maximum design period is in the range of 15 to 24 years. Traffic cannot usually be forecasted accurately beyond this period on a specific facility because of probable changes in the general regional economy, population, and land development along the roadway.

The ODOT **State Highway Access Management Manual** ⁽⁷⁾ requires that a ten year design hour traffic volumes be analyzed for a proposed development when the number of generated trips is less than 500 in the peak hour.

The year 2027 (Opening Year) and 2037 (Design Year) will be analyzed for the proposed development. Therefore, it is necessary to estimate historical growth rates in order to establish the future traffic on the study area roadways due to non-site related conditions.

Hudson Crossing Parkway is classified as urban local roadways and an access drive. The Ohio Department of Transportation, in their document **ODOT Highway Functional Classification System Concepts, Procedures and Instructions** ⁽¹¹⁾, has identified the following characteristics for local roadways and access drives:

- Provide direct access to adjacent land
- Provide access to higher systems
- Carry no through traffic movement
- Constitute the mileage not classified as part of the Arterial and Collector systems

Therefore it is anticipated that existing traffic on this roadway will not increase in future years.

TFMS is a front-end software application for reporting simplified traffic forecasts. TFMS generates design designations using a Microsoft Access database file which was created by adding functionality to the ODOT Modeling & Forecasting (M&F) congestion management forecasting tool and thus is consistent with Ohio's Congestion Management and Ohio's statewide Travel Demand Forecasting (TDF) model. The database is updated annually.

The TFMS segment runs provides twenty year Average Daily Traffic (ADT) forecast data for the following vehicle/truck classifications as defined by ODOT in *Section 102* of the **Location & Design Manual, Volume 1** ⁽³⁾.

- **P - Passenger Cars** - including station wagons, mini-vans, sport utility vehicles and motorcycles.
- **A - Commercial** - including motorized recreational vehicles, school buses, and light delivery trucks such as panel trucks and pick-up trucks which do not use dual tires.
- **B - Commercial** - including tractors, trucks with semi-trailers and truck-trailer combinations.
- **C - Commercial** - including buses or dual tired trucks having either single or tandem rear axles.

TFMS segment runs were performed for W. Streetsboro Street from Chittenden Road to Boston Mills Road and on Terex Road from W. Streetsboro Street to Barlow Road. Copies of the TFMS segment runs can be seen in **Appendix E**.

This report will use a positive growth rate of 0.30% in order to provide a conservative forecast. A copy of the ODOT historical traffic data analysis and the growth rate calculations can be seen in **Appendix E**.

The growth rate and factors for study area can be seen in the following table:

Table 3.7 - Growth Rate & Factors

| GROWTH RATE (Annual Growth)* | 2027 GROWTH FACTOR* | 2037 GROWTH FACTOR* |
|---------------------------------|---------------------|---------------------|
| 0.30% | 1.006 | 1.036 |

* Rounded

Roadways like W. Streetsboro Street (SR 303) and Terex Road carry a significant amount of through traffic due to their functional characteristics. This through traffic component generally increases as regional growth occurs. Therefore, it is anticipated that existing traffic on these roadway will increase in future years.

Design Hour Traffic

The traffic patterns on any roadway typically show considerable variation in the traffic volumes experienced during the various hours of the day and in the hourly volumes experienced throughout the year. A key decision in the design process involves determining which of these hourly traffic volumes should be used as the basis for the design.

It would be wasteful to predicate a design on the maximum peak hour traffic that occurs during the year and the use of the average hourly traffic would result in an inadequate design. The hourly traffic volumes used in a design should not be exceeded very often or by very much. However, the hourly traffic volumes should not be so high that traffic would rarely be sufficient to make full use of the designed facility.

Normal design policy in the State of Ohio is based upon a review of curves that depict the variation in hourly traffic volumes during the year. The Ohio Department of Transportation recommends using the 30TH highest hour as a design control for urban streets. There is typically very little difference between the volumes in this range. The Ohio Department of Transportation provides factors or a methodology to determine factors that are applied to counted daily traffic volumes to determine appropriate design hour traffic volumes.

All analyses will examine the design hour volume for the adjacent roadway and peak hour traffic volume of the proposed development following guidelines set forth in the ODOT **State Highway Access Management Manual** ⁽⁷⁾. The **Ohio Traffic Forecasting Manual** ^(4&5) will be used to determine peak hour factors for the study area roadways.

The design hour volumes are determined by multiplying the AM and PM peak hour volumes by the appropriate factors from the ODOT Peak Hour to Design Hour Factor Report based on the functional classification of the roadway, the day of the week and the month that the traffic data was collected. A copy of the ODOT's Peak Hour to Design Hour Factor Report can be seen in **Appendix F**.

The following table details the peak hour to design hour factors for the study area roadways.

Table 3.8 - Peak Hour to Design Hour Factors

| INTERSECTION | | MONTH | DAY | URBAN CLASSIFICATION | DHV FACTOR* |
|--------------|-----------------------------|----------|----------|----------------------|-------------|
| # | ROADWAYS | | | | |
| 1 | W. Streetsboro St. (SR 303) | November | Thursday | Minor Arterial | 1.15 |
| | Terex Rd. | | | Minor Arterial | 1.15 |
| | Hudson Crossing Pkwy. | | | Local Roadway | 1.15 |

* Rounded

The design hour factors detailed in *Table 3.8* will be used in the forthcoming intersection capacity calculations in *Chapter 4* of this report.

Peak Hour Factors

The intersection peak hour factor (PHF) is used to convert the hourly traffic volume into the flow rate that represents the busiest 15 minutes of the peak hour. The PHF is the sum of the traffic entering the intersection during the peak hour divided by four times the highest 15 minute volume during the peak hour. A PHF of 1 indicates that the traffic volume in each 15 minute volume is the same and therefore traffic flow is consistent throughout the hour. A lower PHF indicates a more variable traffic flow and that traffic volume has a spike during the peak 15 minute interval. PHF’s under 0.80 occur in locations with highly peaked demand, such as at schools and factories during shift changes.

The ODOT **Analysis and Traffic Simulation Manual, (OATS)**⁽⁶⁾ provides guidance to use the existing year PHF for all intersections from traffic counts collected for the project. The PHF is calculated for the intersection as a whole and not individual approaches or movements. A minimum of 0.80 for the PHF is required to be utilized unless justified by highly peaked demands such as for schools and factories noted above. If project specific counts are not available, a default value of 0.92 is to be utilized.

It is assumed for this report that the PHF for the design year analysis are the same as the calculated PHF from the collected existing year traffic counts. The intersection PHF’s are included in **Appendix C**.

The following table shows the PHF’s calculated for the study area intersection during the AM and PM peak hours:

Table 3.9 - Intersection Peak Hour Factors

| # | INTERSECTION(S) | AM PHF | PM PHF |
|---|---|--------|--------|
| 1 | W. Streetsboro Street (SR 303) & Terex Road | 0.97 | 0.90 |

The peak hour factors detailed in *Table 3.9* will be used in the forthcoming intersection capacity calculations in *Chapter 4* of this report.

3.3 Future Traffic

No-Build Conditions

The previously discussed peak hour to design hour factors and growth factors for each movement were applied to the traffic volumes shown in **Figure 2.4, Appendix A** in order to estimate the future traffic considering non-project traffic conditions. This condition will be referred to as the “**No-Build**” scenario as it will reference the calculated future study area volumes **without** the development.

Printouts of our Excel spreadsheet detailing the use of the design hour factors, growth rates and the resulting expected 2027 and 2037 No-Build traffic volumes can be found in **Appendix G**.

The estimated 2027 and 2037 No-Build traffic volumes for the study area are shown graphically in **Figures 3.6 and 3.7, Appendix A**. This traffic is the expected traffic if the proposed development **IS NOT** constructed, the “**No-Build**” condition.

The No-Build traffic volumes have been rounded to the nearest 10 to adhere to preferred ODOT practices.

Build Conditions

The sum of the 2027 No-Build volumes, shown in **Figure 3.6, Appendix A**, were added to the total site generated traffic (**Figure 3.5, Appendix A**) to equal the future Build peak hour volumes in order to estimate the future opening year traffic considering project traffic conditions. The estimated 2027 Build traffic volumes for the study area are shown graphically in **Figure 3.8, Appendix A** for the proposed development.

The sum of the 2037 No-Build volumes, shown in **Figure 3.7, Appendix A**, were added to the total site generated traffic (**Figure 3.5, Appendix A**) to equal the future Build peak hour volumes in order to estimate the future design year traffic considering project traffic conditions. The estimated 2037 Build traffic volumes for the study area are shown graphically in **Figure 3.9, Appendix A** for the proposed development.

These traffic volumes are the expected volumes if the proposed development **IS** constructed, or the “**Build**” condition.

Chapter 4

Traffic Analysis

4.1 Capacity & LOS at Study Area Intersections

2027 Traffic Analysis - No-Build & Build Conditions

Traffic analyses were performed for the projected 2027 conditions under the No-Build and Build scenarios so:

1. any existing roadway/intersection deficiencies can be identified in the No-Build scenario which would not be attributable to the development, and;
2. a comparison can be made to determine the changes in the traffic operations which may be attributed to the development.

The existing traffic signal timing was used for the W. Streetsboro Street (SR 303) and Terex Road intersection and can be found in **Appendix H**.

The traffic volumes used in the 2027 No-Build analyses can be seen in **Figure 3.6, Appendix A**. Copies of the capacity worksheets for the 2027 No-Build analyses are included in **Appendix I**.

The traffic volumes used in the 2027 Build analyses can be seen in **Figure 3.8, Appendix A**. Copies of the capacity worksheets for the 2027 Build analyses are included in **Appendix J**.

1. W. Streetsboro Street (SR 303) & Terex Road

The peak hour traffic analysis results of the 2027 No-Build versus Build conditions for the signalized intersection of W. Streetsboro Street (SR 303) and Terex Road are shown in the following tables:

**Table 4.1 - 2027 AM Peak Hour Traffic Analysis Comparison
(W. Streetsboro Street (SR 303) & Terex Road)**

| Int # 1 W. Streetsboro St. (SR 303) & Terex Rd. | 2027 AM (Signal, 100s) No-Build | | | | | Int # 1 W. Streetsboro St. (SR 303) & Terex Rd. | 2027 AM (Signal, 100s) Build | | | | |
|--|------------------------------------|-----------------|-------|------|-----------------------|--|---------------------------------|-----------------|-------|------|-----------------------|
| | LOS | Delay (sec/veh) | v/c | QSR | 95th %tile Queue (ft) | | LOS | Delay (sec/veh) | v/c | QSR | 95th %tile Queue (ft) |
| EBL | B | 10.3 | 0.306 | 0.21 | 68 | EBL | B | 11.6 | 0.313 | 0.23 | 76 |
| EBT | B | 18.5 | 0.627 | 0.38 | 376 | EBT | C | 21.7 | 0.668 | 0.41 | 411 |
| EBR | A | 6.7 | 0.236 | 0.25 | 82 | EBR | A | 8.0 | 0.279 | 0.33 | 107 |
| EB Approach | B | 14.4 | - | - | - | EB Approach | B | 16.6 | - | - | - |
| WBL | B | 14.0 | 0.031 | 0.03 | 5 | WBL | B | 14.7 | 0.089 | 0.09 | 14 |
| WBT | B | 15.7 | 0.300 | 0.17 | 166 | WBT | B | 16.5 | 0.308 | 0.17 | 172 |
| WBR | B | 15.7 | 0.301 | 0.16 | 156 | WBR | B | 16.5 | 0.309 | 0.17 | 162 |
| WB Approach | B | 15.7 | - | - | - | WB Approach | B | 16.4 | - | - | - |
| NBL | D | 38.7 | 0.688 | 1.14 | 273 | NBL | D | 39.0 | 0.716 | 1.23 | 296 |
| NBT | C | 27.4 | 0.136 | 0.05 | 50 | NBT | C | 26.9 | 0.180 | 0.07 | 67 |
| NB Approach | D | 36.7 | - | - | - | NB Approach | D | 36.4 | - | - | - |
| SBL | D | 41.5 | 0.065 | 0.05 | 14 | SBL | D | 41.3 | 0.065 | 0.05 | 14 |
| SBT | D | 41.5 | 0.086 | 0.01 | 14 | SBT | D | 41.2 | 0.083 | 0.01 | 14 |
| SBR | D | 35.8 | 0.116 | 0.09 | 26 | SBR | D | 35.5 | 0.115 | 0.09 | 26 |
| SB Approach | D | 38.6 | - | - | - | SB Approach | D | 38.4 | - | - | - |
| Intersection | B | 19.2 | - | - | - | Intersection | C | 20.8 | - | - | - |

It was determined that conditions at the intersection of W. Streetsboro Street (SR 303) and Terex Road during the AM peak hour will operate with level-of-service D or better under the forecasted 2027 No-Build and Build conditions.

The AM peak hour comparison table indicates that the movement and approach LOS remain unchanged from the No-Build to the Build condition with the following exceptions:

- The eastbound through movement degrades from LOS B to LOS C.
- The intersection LOS degrades from a LOS B to a LOS C.

**Table 4.2 - 2027 PM Peak Hour Traffic Analysis Comparison
(W. Streetsboro Street (SR 303) & Terex Road)**

| Int # 1 | 2027 PM (Signal, 120s) No-Build | | | | | Int # 1 | 2027 PM (Signal, 120s) Build | | | | |
|---------------------|---|-------------|-----------------|------|-----|---------------------|---------------------------------|---|-------|-----------------|-----|
| | W. Streetsboro St. (SR 303) & Terex Rd. | LOS | Delay (sec/veh) | v/c | QSR | | 95th %tile Queue (ft) | W. Streetsboro St. (SR 303) & Terex Rd. | LOS | Delay (sec/veh) | v/c |
| EBL | B | 13.7 | 0.053 | 0.04 | 12 | EBL | B | 16.5 | 0.058 | 0.04 | 14 |
| EBT | C | 32.5 | 0.815 | 0.66 | 661 | EBT | D | 41.9 | 0.882 | 0.74 | 737 |
| EBR | B | 11.9 | 0.528 | 0.88 | 287 | EBR | B | 12.7 | 0.557 | 0.95 | 310 |
| EB Approach | C | 23.6 | - | - | - | EB Approach | C | 28.9 | - | - | - |
| WBL | C | 20.3 | 0.255 | 0.25 | 36 | WBL | C | 24.5 | 0.388 | 0.37 | 53 |
| WBT | B | 17.4 | 0.353 | 0.24 | 237 | WBT | C | 20.7 | 0.378 | 0.26 | 256 |
| WBR | B | 17.4 | 0.353 | 0.24 | 231 | WBR | C | 20.7 | 0.378 | 0.25 | 249 |
| WB Approach | B | 17.7 | - | - | - | WB Approach | C | 21.1 | - | - | - |
| NBL | D | 48.1 | 0.792 | 1.70 | 408 | NBL | D | 39.8 | 0.732 | 1.67 | 401 |
| NBT | C | 29.5 | 0.089 | 0.04 | 42 | NBT | C | 26.4 | 0.120 | 0.06 | 60 |
| NB Approach | D | 46.1 | - | - | - | NB Approach | D | 37.8 | - | - | - |
| SBL | D | 49.0 | 0.057 | 0.05 | 14 | SBL | D | 48.9 | 0.057 | 0.05 | 14 |
| SBT | D | 49.6 | 0.180 | 0.04 | 44 | SBT | D | 49.5 | 0.178 | 0.04 | 43 |
| SBR | D | 50.8 | 0.651 | 0.59 | 181 | SBR | D | 50.7 | 0.647 | 0.59 | 181 |
| SB Approach | D | 50.5 | - | - | - | SB Approach | D | 50.4 | - | - | - |
| Intersection | C | 27.1 | - | - | - | Intersection | C | 29.6 | - | - | - |

It was determined that conditions at the intersection of W. Streetsboro Street (SR 303) and Terex Road during the PM peak hour will operate with level-of-service D or better under the forecasted 2027 No-Build and Build conditions.

The PM peak hour comparison table indicates that the movement, approach, and intersection LOS remain unchanged from the No-Build to the Build condition with the following exceptions:

- The eastbound through movement degrade from a LOS C to a LOS D.

The 2027 AM and PM peak hour comparison tables for the intersection of W. Streetsboro Street (SR 303) and Terex Road shown previously, indicate that the levels-of-service are within the acceptable range shown in **Table 1.2, Page 4** as stated in the ODOT **OATS Manual**.

A QSR greater than 1.0 indicates the storage length of the lane may not be adequate for the forecasted conditions. The QSR for the following movements is greater than 1.0 in the No-Build and Build conditions:

- The northbound left turn movement during the AM and PM peak hour.

The turn lane lengths needed to provide an adequate the queue storage ratio will be calculated in a later section of this report.

2037 Traffic Analysis - No-Build & Build Conditions

Traffic analyses were performed for the projected 2037 conditions under the No-Build and Build scenarios so:

1. any existing roadway/intersection deficiencies can be identified in the No-Build scenario which would not be attributable to the development, and;
2. a comparison can be made to determine the changes in the traffic operations which may be attributed to the development.

The existing traffic signal timing was used for the W. Streetsboro Street (SR 303) and Terex Road intersection and can be found in **Appendix H**.

The traffic volumes used in the 2037 No-Build analyses can be seen in **Figure 3.7, Appendix A**. Copies of the capacity worksheets for the 2037 No-Build analyses are included in **Appendix K**.

The traffic volumes used in the 2037 Build analyses can be seen in **Figure 3.9, Appendix A**. Copies of the capacity worksheets for the 2037 Build analyses are included in **Appendix L**.

1. W. Streetsboro Street (SR 303) & Terex Road

The peak hour traffic analysis results of the 2037 No-Build versus Build conditions for the signalized intersection of W. Streetsboro Street (SR 303) and Terex Road are shown in the following tables:

**Table 4.3 - 2037 AM Peak Hour Traffic Analysis Comparison
(W. Streetsboro Street (SR 303) & Terex Road)**

| Int # 1 W. Streetsboro St. (SR 303) & Terex Rd. | 2037 AM (Signal, 100s) No-Build | | | | | Int # 1 W. Streetsboro St. (SR 303) & Terex Rd. | 2037 AM (Signal, 100s) Build | | | | |
|--|------------------------------------|-----------------|-------|------|-----------------------|--|---------------------------------|-----------------|-------|------|-----------------------|
| | LOS | Delay (sec/veh) | v/c | QSR | 95th %tile Queue (ft) | | LOS | Delay (sec/veh) | v/c | QSR | 95th %tile Queue (ft) |
| EBL | B | 10.4 | 0.309 | 0.21 | 68 | EBL | B | 13.6 | 0.338 | 0.26 | 84 |
| EBT | B | 19.0 | 0.648 | 0.39 | 393 | EBT | C | 26.7 | 0.742 | 0.47 | 471 |
| EBR | A | 6.8 | 0.246 | 0.26 | 85 | EBR | A | 8.1 | 0.290 | 0.34 | 112 |
| EB Approach | B | 14.7 | - | - | - | EB Approach | B | 19.8 | - | - | - |
| WBL | B | 14.2 | 0.033 | 0.03 | 5 | WBL | B | 17.5 | 0.108 | 0.10 | 15 |
| WBT | B | 15.8 | 0.306 | 0.17 | 170 | WBT | B | 19.3 | 0.341 | 0.19 | 193 |
| WBR | B | 15.8 | 0.307 | 0.17 | 160 | WBR | B | 19.3 | 0.343 | 0.19 | 182 |
| WB Approach | B | 15.8 | - | - | - | WB Approach | B | 19.2 | - | - | - |
| NBL | D | 38.7 | 0.688 | 1.14 | 273 | NBL | C | 32.4 | 0.625 | 1.13 | 271 |
| NBT | C | 27.4 | 0.136 | 0.05 | 50 | NBT | C | 24.2 | 0.160 | 0.06 | 63 |
| NB Approach | D | 36.7 | - | - | - | NB Approach | C | 30.6 | - | - | - |
| SBL | D | 41.5 | 0.065 | 0.05 | 14 | SBL | D | 41.3 | 0.065 | 0.05 | 14 |
| SBT | D | 41.5 | 0.086 | 0.01 | 14 | SBT | D | 41.2 | 0.083 | 0.01 | 14 |
| SBR | D | 35.8 | 0.116 | 0.09 | 26 | SBR | D | 35.3 | 0.113 | 0.09 | 26 |
| SB Approach | D | 38.6 | - | - | - | SB Approach | D | 38.3 | - | - | - |
| Intersection | B | 19.3 | - | - | - | Intersection | C | 22.1 | - | - | - |

It was determined that conditions at the intersection of W. Streetsboro Street (SR 303) and Terex Road during the AM peak hour will operate with level-of-service D or better under the forecasted 2037 No-Build and Build conditions.

The AM peak hour comparison table indicates that the movement and approach LOS remain unchanged or better from the No-Build to the Build condition with the following exceptions:

- The eastbound through movement degrades from LOS B to LOS C.
- The intersection LOS degrades from a LOS B to a LOS C.

**Table 4.4 - 2037 PM Peak Hour Traffic Analysis Comparison
(W. Streetsboro Street (SR 303) & Terex Road)**

| Int # 1 W. Streetsboro St. (SR 303) & Terex Rd. | 2037 PM (Signal, 120s) No-Build | | | | | Int # 1 W. Streetsboro St. (SR 303) & Terex Rd. | 2037 PM (Signal, 120s) Build | | | | |
|---|------------------------------------|--------------------|-------|------|--------------------------|---|---------------------------------|--------------------|-------|------|--------------------------|
| | LOS | Delay (sec/veh) | v/c | QSR | 95th %tile Queue (ft) | | LOS | Delay (sec/veh) | v/c | QSR | 95th %tile Queue (ft) |
| EBL | B | 13.8 | 0.054 | 0.04 | 12 | EBL | B | 17.1 | 0.060 | 0.04 | 14 |
| EBT | C | 34.1 | 0.838 | 0.70 | 695 | EBT | D | 48.1 | 0.925 | 0.81 | 806 |
| EBR | B | 12.1 | 0.539 | 0.91 | 294 | EBR | B | 12.9 | 0.568 | 0.98 | 318 |
| EB Approach | C | 24.7 | - | - | - | EB Approach | C | 32.5 | - | - | - |
| WBL | C | 21.2 | 0.269 | 0.25 | 36 | WBL | C | 26.5 | 0.434 | 0.38 | 54 |
| WBT | B | 17.6 | 0.364 | 0.24 | 244 | WBT | C | 21.6 | 0.397 | 0.27 | 268 |
| WBR | B | 17.6 | 0.364 | 0.24 | 238 | WBR | C | 21.6 | 0.397 | 0.27 | 261 |
| WB Approach | B | 17.9 | - | - | - | WB Approach | C | 22.1 | - | - | - |
| NBL | D | 50.4 | 0.816 | 1.86 | 446 | NBL | D | 39.2 | 0.733 | 1.70 | 407 |
| NBT | C | 29.5 | 0.089 | 0.04 | 42 | NBT | C | 25.7 | 0.118 | 0.06 | 59 |
| NB Approach | D | 48.2 | - | - | - | NB Approach | D | 37.2 | - | - | - |
| SBL | D | 49.0 | 0.057 | 0.05 | 14 | SBL | D | 48.9 | 0.057 | 0.05 | 14 |
| SBT | D | 49.6 | 0.180 | 0.04 | 44 | SBT | D | 49.5 | 0.178 | 0.04 | 43 |
| SBR | D | 50.8 | 0.651 | 0.59 | 181 | SBR | D | 50.7 | 0.647 | 0.59 | 181 |
| SB Approach | D | 50.5 | - | - | - | SB Approach | D | 50.4 | - | - | - |
| Intersection | C | 28.0 | - | - | - | Intersection | C | 31.6 | - | - | - |

It was determined that conditions at the intersection of W. Streetsboro Street (SR 303) and Terex Road during the PM peak hour will operate with level-of-service D or better under the forecasted 2037 No-Build and Build conditions.

The PM peak hour comparison table indicates that the movement, approach, and intersection LOS remain unchanged from the No-Build to the Build condition with the following exceptions:

- The eastbound through movement degrade from a LOS C to a LOS D.
- The westbound through, right turn movement and approach degrade from a LOS B to a LOS C.

The 2037 AM and PM peak hour comparison tables for the intersection of W. Streetsboro Street (SR 303) and Terex Road shown previously, indicate that the levels-of-service are within the acceptable range shown in **Table 1.2, Page 4** as stated in the ODOT **OATS Manual**.

A QSR greater than 1.0 indicates the storage length of the lane may not be adequate for the forecasted conditions. The QSR for the following movements is greater than 1.0 in the No-Build and Build conditions:

- The southbound left turn movement during the AM and PM peak hour.

The turn lane lengths needed to provide an adequate the queue storage ratio will be calculated in a later section of this report.

4.2 Capacity & LOS at Development Access Intersection

Capacity analyses were performed for the site access driveway. It was assumed that the access driveway approach would be controlled by a stop sign. The procedures outlined in the computerized version of the Transportation Research Board’s **Highway Capacity Manual 7TH Edition** ⁽¹⁾, (**HCS2026, Release 8.5**) were utilized to determine the expected capacities.

2027 Build Conditions - Capacity Analysis

Analyses were performed for the projected 2027 conditions under the Build scenario to determine the future levels-of-service at the site access driveway on Terex Road. The traffic volumes used in this analysis can be seen in **Figure 3.8, Appendix A**. Copies of the capacity worksheets are included in **Appendix M**. The results of the Build analyses are shown in the following table:

**Table 4.5 - 2027 Peak Hour Traffic Analysis Results
(Terex Road & Access Driveway)**

| Access | | 2027 Build AM Peak | | | One-Way Stop | | Access | | 2027 Build PM Peak | | | One-Way Stop | |
|-----------------------|--|--------------------|-----------------|------|-------------------------|-----------------------|--------|-----|--------------------|------|-------------------------|--------------|--|
| Terex Rd. & Access DW | | LOS | Delay (sec/veh) | v/c | 95th %tile Queue (Feet) | Terex Rd. & Access DW | | LOS | Delay (sec/veh) | v/c | 95th %tile Queue (Feet) | | |
| EBT | | B | 12.9 | 0.12 | 10.2 | EBT | | C | 16.5 | 0.18 | 15.4 | | |
| EB Approach | | B | 12.9 | - | - | EB Approach | | C | 16.5 | - | - | | |
| NBL | | A | 8.0 | 0.01 | 0.0 | NBL | | A | 9.1 | 0.01 | 0.0 | | |
| NB Approach | | A | 0.3 | - | - | NB Approach | | A | 0.2 | - | - | | |

The capacity of the approaches and critical movements at the intersection of Terex Road and Access Driveway were found to be at a level-of-service C or better in the AM and PM peak hours under the 2027 Build conditions.

2037 Build Conditions - Capacity Analysis

Analyses were performed for the projected 2037 conditions under the Build scenario to determine the future levels-of-service at the site access driveway on Terex Road. The traffic volumes used in this analysis can be seen in **Figure 3.9, Appendix A**. Copies of the capacity worksheets are included in **Appendix N**. The results of the Build analyses are shown in the following table:

**Table 4.6 - 2037 Peak Hour Traffic Analysis Results
(Terex Road & Access Driveway)**

| Access | | 2037 Build AM Peak | | | One-Way Stop | | Access | | 2037 Build PM Peak | | | One-Way Stop | |
|-----------------------|--|--------------------|-----------------|------|-------------------------|-----------------------|--------|-----|--------------------|------|-------------------------|--------------|--|
| Terex Rd. & Access DW | | LOS | Delay (sec/veh) | v/c | 95th %tile Queue (Feet) | Terex Rd. & Access DW | | LOS | Delay (sec/veh) | v/c | 95th %tile Queue (Feet) | | |
| EBT | | B | 13.0 | 0.12 | 10.2 | EBT | | C | 16.8 | 0.18 | 17.9 | | |
| EB Approach | | B | 13.0 | - | - | EB Approach | | C | 16.8 | - | - | | |
| NBL | | A | 8.0 | 0.01 | 0.0 | NBL | | A | 9.1 | 0.01 | 0.0 | | |
| NB Approach | | A | 0.3 | - | - | NB Approach | | A | 0.2 | - | - | | |

The capacity of the approaches and critical movements at the intersection of Terex Road and Access Driveway were found to be at a level-of-service C or better in the AM and PM peak hours under the 2037 Build conditions.

4.3 Auxiliary Turning Lane Warrant Analysis at Access Intersections

It is the intent of this section of the report to evaluate the need for exclusive deceleration and turning lanes at the proposed access driveway on Terex Road. The turn lane warrants will be evaluated based on the following conditions:

- Terex Road
 - Four-lane roadway
 - Speed Limit = 45 miles per hour

The following table shows the results of the analysis of the need for exclusive left and right turn lanes at the proposed access driveway on Terex Road under the forecasted Build conditions. Copies of the ODOT turn lane warrant graphs can be seen in **Appendix O**.

Table 4.7 Access Turn Lane Warrants

| LOCATION | TURN LANE | CONDITIONS | | | |
|------------------------------|--------------------|-------------------|----|------------------|----|
| | | 2027 Opening Year | | 2037 Design Year | |
| | | AM | PM | AM | PM |
| Terex Road & Access Driveway | NB Left Turn Lane | NO | NO | NO | NO |
| | SB Right Turn Lane | NO | NO | NO | NO |

The results of the turn lane analyses indicate that exclusive left and right turns lanes on Terex Road and Access Driveway **ARE NOT** justified under the expected 2027 and 2037 Build conditions.

4.4 Turn Lane Length Analysis

Analyses were performed to determine the necessary turn lane storage length in order to reduce the queue storage ratio to a value less than one and to accommodate the recommended northbound left turn lane at the intersection of W. Streetsboro Street and Terex Road during the 2027 and 2037 No-Build and Build conditions under traffic signal control.

The turn lane calculations will be based on the following conditions:

- Signalized (120 second cycle length PM)
- 45 MPH Design Speed
- Condition B or C

The following table details the results of the turn lane length analyses based upon the highest anticipated turn volumes at the intersection under the expected 2037 Build conditions.

**Table 4.8 Turn Lane Length Calculation
(W. Streetsboro Street (SR 303) & Terex Road)**

| Movement Direction | DHV | No. of Lanes | Cycles / Hour | Average Veh/ Cycle/ Lane | Design Speed (mph) | Figure 401-10 Queue Length (ft) | Fig. 401-9 /401-10 Condition | | Turn Lane Length (ft) |
|--------------------|-----|--------------|---------------|--------------------------|--------------------|---------------------------------|------------------------------|-----|-----------------------|
| | | | | | | | B | C | |
| NB LT | 364 | 1 | 30 | 12.13 | 45 | 475 | 125 | 550 | 550 |
| NB T/RT | 61 | 1 | 30 | 2.03 | 45 | 150 | 125 | 225 | |

4.5 Improvements to Accommodate Study Area Traffic

Recommended Improvements to Serve Future Conditions without the Development

The following improvements were recommended to accommodate the forecasted 2027 and 2037 No-Build conditions at the study area intersection.

W. Streetsboro Street (SR 303) & Terex Road

- Extend the northbound left turn lane to a length of 550 feet.

Recommended Improvements to Mitigate the Traffic Associated with the Development

No improvements were recommended to accommodate the forecasted 2027 and 2037 Build conditions at the study area intersection.

Development Access Recommendations

The following lane use and traffic control is recommended at the site access locations under the forecasted Build conditions:

Terex Road & Access Driveway

- Place a stop sign on the west approach.
- Provide one egress lane and one ingress lane on the west approach.

The recommended lane use and traffic control for the study area to accommodate expected Build traffic volumes can be seen in **Figure 4.1, Appendix A**.

Chapter 5

Conclusions

Based on the results of the analyses, we offer the following conclusions and recommendations:

- 5.1 This Traffic Impact Study (TIS) has been prepared at the request of Crosslands Development Company, LLC for a proposed child care facility in Hudson, Summit County, Ohio. The site's access driveway is located on the west side of Terex Road south of W. Streetsboro Street (SR 303) The project site location is shown in **Figure 1.1, Appendix A.**
- 5.2 The development is expected to consist of the following:
 - Day Care Center (173 Students)
- 5.3 The construction of the development is scheduled to be completed in 2027.
- 5.4 The site will be served by a single access driveway. This access driveway is located on the west side of Terex Road approximately 150 feet south of the W. Streetsboro Street (SR 303) and Terex Road intersection. This access driveway is proposed as full access with one egress lane and one ingress lane.
- 5.5 The weekday AM peak hour of traffic was determined to be 7:30 AM to 8:30 AM. The weekday PM peak hour of traffic was found to be 4:45 PM to 5:45 PM.

5.6 The child care facility is expected to generate the following hourly traffic volumes during the peak periods as shown in the table below:

| TRIP GENERATION | | | WEEKDAY TRIP ENDS | | | |
|--------------------------------|-------------------|--------------|---------------------------|----|---------------------------|----|
| ITE CODE | DESCRIPTION | SIZE | AM PEAK HOUR (ENTER/EXIT) | | PM PEAK HOUR (ENTER/EXIT) | |
| 565 | Child Care Center | 173 Students | 64 | 57 | 55 | 62 |
| PASS-BY TRIPS (AM=N/A, PM=44%) | | | 0 | 0 | 27 | 27 |
| TOTAL NON-PASS-BY TRIPS | | | 64 | 57 | 28 | 35 |
| | | | 121 | | 63 | |
| TOTAL NON-PASS-BY TRIPS | | | 0 | | 54 | |
| TOTAL TRIPS | | | 121 | | 117 | |

5.7 The ODOT **State Highway Access Management Manual**⁽⁷⁾ requires that a ten year design hour traffic volumes be analyzed for a proposed development when the number of generated trips is below 500 in the peak hour. The proposed development is expected to generate a total of 121 driveway trips in the AM peak hour and a total of 117 driveway trips in the PM peak hour. Therefore, the year 2037 will be analyzed for the ten year design hour conditions from the opening year of the development.

5.8 The following improvements were recommended to accommodate the forecasted 2027 and 2037 No-Build conditions at the study area intersection.

W. Streetsboro Street (SR 303) & Terex Road

- Extend the northbound left turn lane to a length of 550 feet.

5.9 No improvements were recommended to accommodate the forecasted 2027 and 2037 Build conditions at the study area intersection.

5.10 The following lane use and traffic control is recommended at the site access locations under the forecasted Build conditions:

Terex Road & Access Driveway

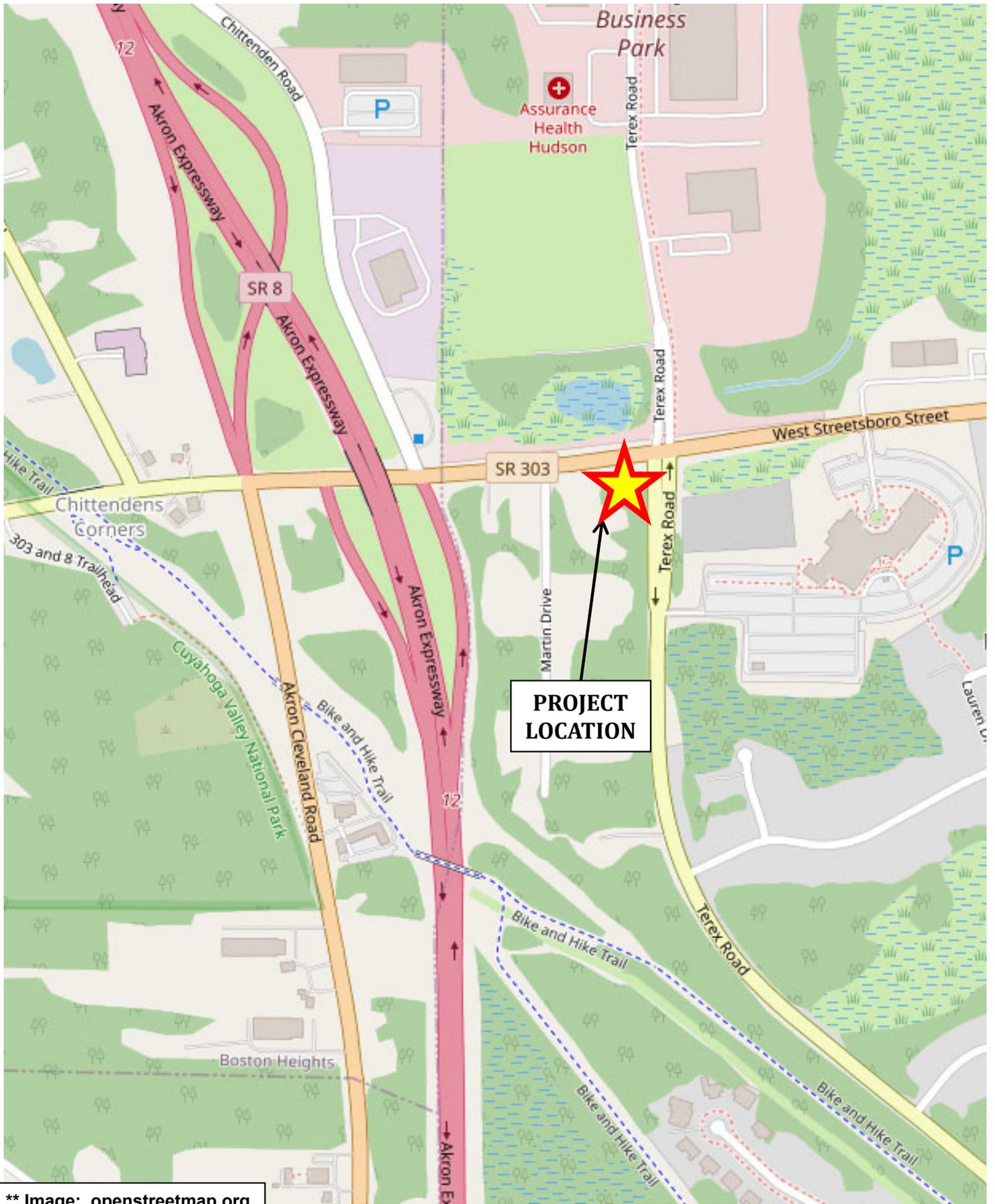
- Place a stop sign on the west approach.
- Provide one egress lane and one ingress lane on the west approach.

5.11 The recommended lane use and traffic control for the study area to accommodate expected Build traffic volumes can be seen in **Figure 4.1, Appendix A**.

5.12 It can be seen that the development traffic can be accommodated without adversely impacting the area roadway network based upon the results of the analysis in this study and the corresponding recommendations.

Appendix A

Figures

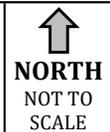


** Image: openstreetmap.org

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 Hudson, Ohio
 Traffic Impact Study**

Location Map



**Figure 1.1
 Appendix A**



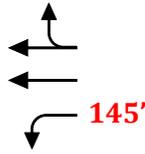
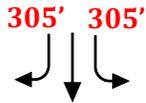
W. Streetsboro Street (SR 303)

Hudson Crossing Parkway

Terex Road

Hudson Crossing

Parkway



W. Streetsboro

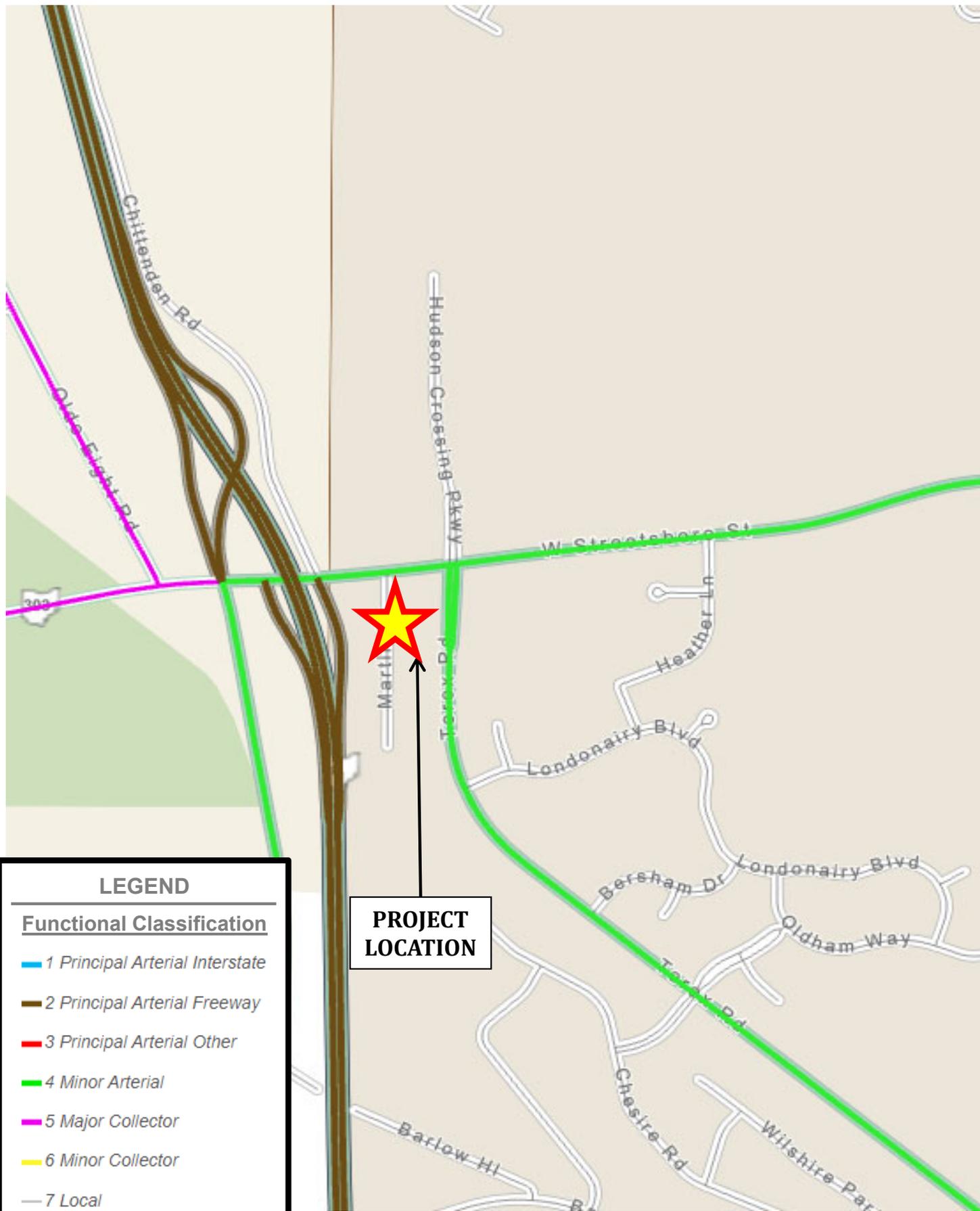
Street (SR 303)



Terex
Road

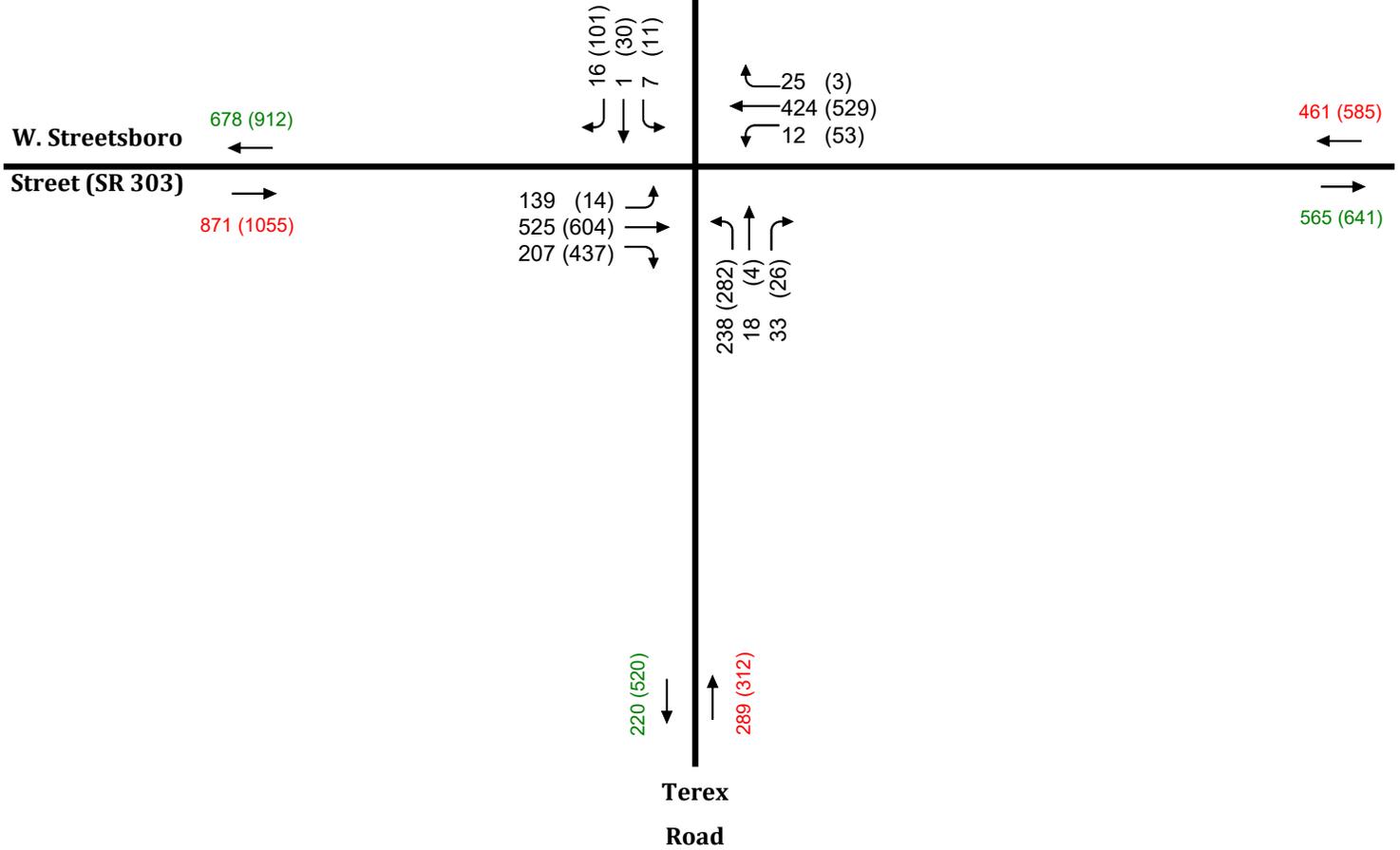
LEGEND

- Existing Lane Use
- Existing Roadway
- 🚦 Existing Traffic Signal
- XXX' Turn Lane Storage Length



Hudson Crossing

Parkway



LEGEND

- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic
- Existing Roadway

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)

28% (30%)

54% (54%)

46% (44%)
39% (31%)

82% (84%)

85% (75%)
15% (25%)

18% (16%)

Terex
Road

Proposed
Day Care

LEGEND

XX AM Peak Hour Distribution

(XX) PM Peak Hour Distribution

— Existing Roadway

- - Proposed Driveway

RED = Entering Volumes

GREEN = Exiting Volumes

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Site Generated
Non-Pass-By
Traffic Distribution

↑
NORTH
NOT TO
SCALE

Figure 3.1
Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)

Proposed
Day Care

Terex
Road

(-33%)
(33%)

(-38%)
(38%)

(33%)
(38%)

(89%)
(-18%)

(82%)
(18%)

(11%)
(-11%)

LEGEND

(XX) PM Peak Hour Distribution

— Existing Roadway

- - - Proposed Driveway

RED = Entering Volumes

GREEN = Exiting Volumes

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Site Generated
Pass-By
Traffic Distribution

↑
NORTH
NOT TO
SCALE

Figure 3.2
Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)



**Proposed
Day Care**

34 (15)

18 (8)

26 (15)
22 (11)

52 (23)

48 (26)
9 (9)

12 (5)

Terex
Road

**NEW GENERATED
TRAFFIC**

| | AM | PM |
|--------------------|------------|-----------|
| TOTAL TRIPS | 121 | 63 |
| ENTER | 64 | 28 |
| EXIT | 57 | 35 |

LEGEND

- XX AM Peak Hour Trips
- (XX) PM Peak Hour Trips
- Existing Roadway
- - - Proposed Driveway
- RED = Entering Volumes
- GREEN = Exiting Volumes

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)

**Proposed
Day Care**

Terex
Road

(-10)
(10)

(-9)
(9)

(9)
(10)

(24)
(-5)

(22)
(5)

(3)
(3)

**NEW GENERATED
TRAFFIC**

| | PM |
|--------------------|-----------|
| TOTAL TRIPS | 54 |
| ENTER | 27 |
| EXIT | 27 |

LEGEND

- (XX) PM Peak Hour Trips
- Existing Roadway
- - - Proposed Driveway
- RED = Entering Volumes**
- GREEN = Exiting Volumes**

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Site Generated
Pass-By
Traffic Assignment

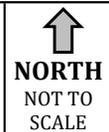


Figure 3.4

Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)



Proposed
Day Care

Terex
Road

0 (-10)
34 (25)

0 (-9)
18 (17)

26 (24)
22 (21)

52 (47)
0 (-5)

48 (48)
9 (14)

12 (8)
0 (-3)

NEW GENERATED
TRAFFIC

| | AM | PM |
|-------------|-----|-----|
| TOTAL TRIPS | 121 | 117 |
| ENTER | 64 | 55 |
| EXIT | 57 | 62 |

LEGEND

- XX AM Peak Hour Trips
- (XX) PM Peak Hour Trips
- Existing Roadway
- - - Proposed Driveway
- RED = Entering Volumes
- GREEN = Exiting Volumes

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Total
Site Generated
Traffic Assignment

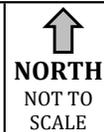


Figure 3.5

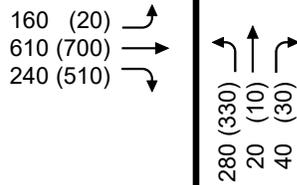
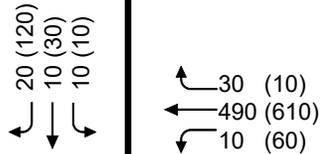
Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)



Terex
Road

LEGEND

XX AM Peak Hour Traffic

(XX) PM Peak Hour Traffic

— Existing Roadway

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2027 No-Build
Peak Hour
Traffic Volumes

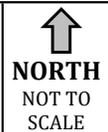


Figure 3.6

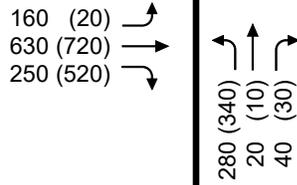
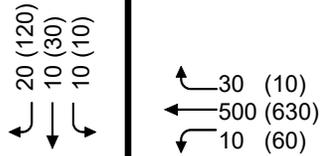
Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)



Terex
Road

LEGEND

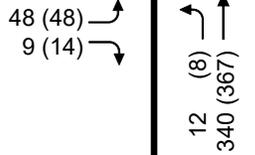
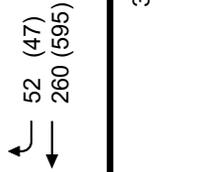
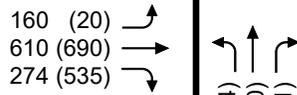
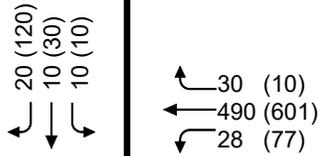
- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic
- Existing Roadway

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)



Terex Road

Proposed Day Care

LEGEND

- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic
- Existing Roadway
- - - Proposed Driveway

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2027 Build
Peak Hour
Traffic Volumes

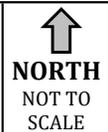


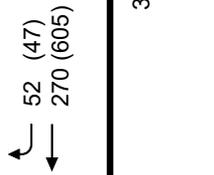
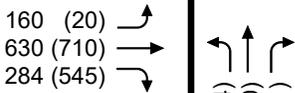
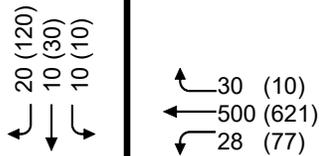
Figure 3.8
Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)



Terex Road

Proposed Day Care

LEGEND

- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic
- Existing Roadway
- - - Proposed Driveway

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2037 Build
Peak Hour
Traffic Volumes

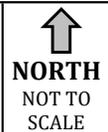


Figure 3.9
Appendix A

Hudson Crossing

Parkway

W. Streetsboro

Street (SR 303)

550'

Proposed
Day Care

Terex
Road

LEGEND

- Existing Lane Use
- Proposed Lane Use
- Existing Roadway
- - - Proposed Driveway
- ABC No-Build Improvement
- ABC Build Improvement
- STOP Proposed Stop Sign
- Existing Traffic Signal
- XXX' Turn Lane Storage Length

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Lane Use and
Traffic Control
Considerations

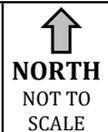


Figure 4.1

Appendix A

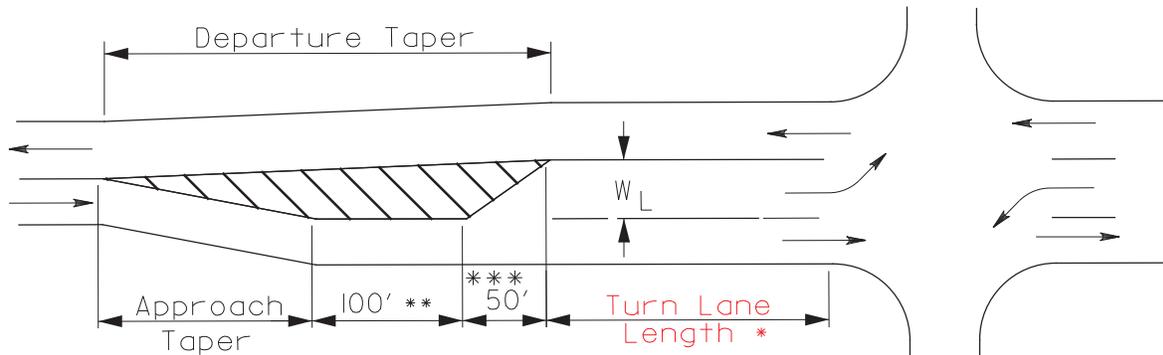
Appendix B

ODOT Turn Lane Design Criteria

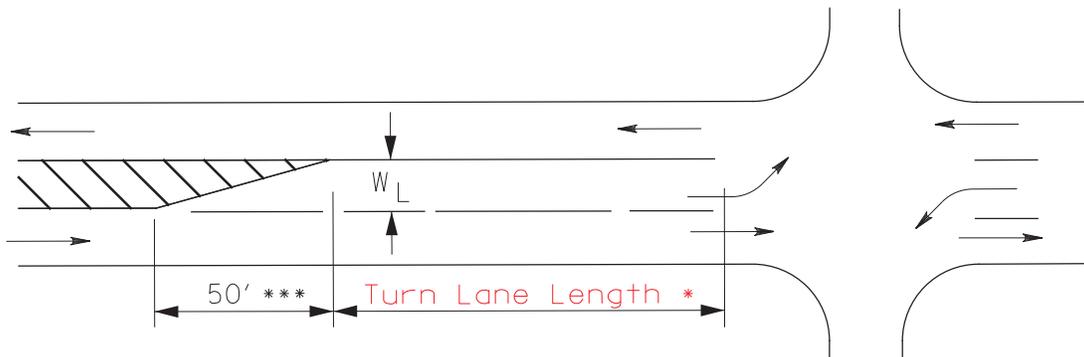
TURNING LANE DESIGN

401-7

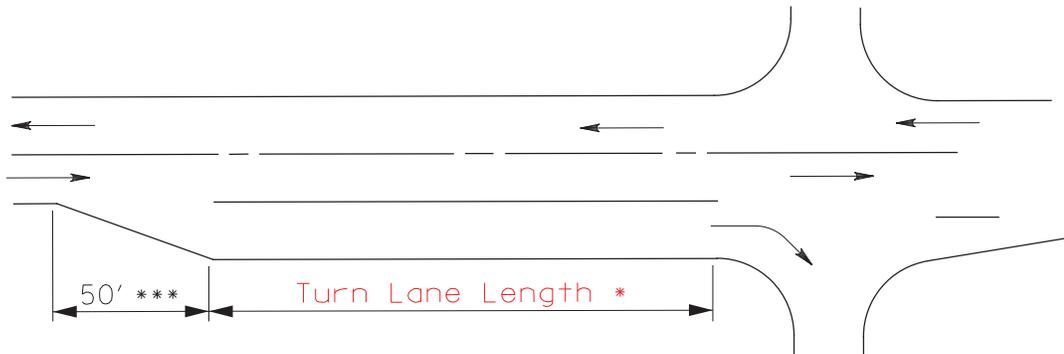
REFERENCE SECTIONS
401.6.1, 401.6.3



LEFT TURN LANE - NO MEDIAN OR MEDIAN WIDTH $< W_L$



LEFT TURN LANE - MEDIAN WIDTH $\geq W_L$



RIGHT TURN LANE

- * Turn Lane Length = Queue + Deceleration
See Figures 401-9 and 401-10 to compute turn lane length.
 - ** May be reduced or eliminated in urban areas if intersection spacing or storage is constraining
 - *** Diverging taper
- W_L = Turn Lane Width

BASIS FOR COMPUTING LENGTH OF TURN LANES

401-9

REFERENCE SECTIONS
401.6.1 & 401.6.3

| Type of Traffic Control | Design Speed | | |
|--------------------------------------|--------------------|--------|----------------|
| | 30-35 | 40-65 | |
| | Turn Demand Volume | | |
| | All | Low* | High |
| Signalized | A | B ** C | B ** C |
| Unsignalized Stopped Crossroad | A | A | A |
| Unsignalized Through Road | A | B | B ** B or C |

* Low is considered 10% or less of approach traffic volume

** Whichever is greater

| | |
|--|-------------------|
| CONDITION A | QUEUE ONLY |
| Length = Queue Length (Figure 401-10) | |

| | |
|--------------|-------------------------------------|
| CONDITION B | HIGH SPEED DECELERATION ONLY |
| Design Speed | Length (feet) |
| 40 | 75 |
| 45 | 125 |
| 50 | 175 |
| 55 | 250 |
| 60 | 300 |
| 65 | 375 |

| | |
|--------------|--|
| CONDITION C | MODERATE SPEED DECELERATION AND QUEUE |
| Design Speed | Length (feet) |
| 40 | 75 + Queue Length (Figure 401-10) |
| 45 | 75 " |
| 50 | 100 " |
| 55 | 125 " |
| 60 | 150 " |
| 65 | 175 " |

For explanation, see Turn Lane Design Example

QUEUE LENGTH AT INTERSECTIONS

401-10

REFERENCE SECTIONS
401.6.1 & 401.6.3

| *Average # of Vehicles/Cycle | Queue Length (feet) |
|------------------------------|---------------------|
| 1 | 50 |
| 2 | 100 |
| 3 | 150 |
| 4 | 175 |
| 5 | 200 |
| 6 | 250 |
| 7 | 275 |
| 8 | 325 |
| 9 | 350 |
| 10 | 375 |
| 11 | 400 |
| 12 | 450 |
| 13 | 475 |
| 14 | 500 |
| 15 | 525 |
| 16 | 550 |
| 17 | 600 |
| 18 | 625 |
| 19 | 650 |
| 20 | 675 |
| 21 | 725 |
| 22 | 750 |
| 23 | 775 |
| 24 | 800 |
| 25 | 825 |
| 26 | 875 |
| 27 | 900 |
| 28 | 925 |
| 29 | 950 |
| 30 | 975 |

| *Average # of Vehicles/Cycle | Queue Length (feet) |
|------------------------------|---------------------|
| 31 | 1025 |
| 32 | 1050 |
| 33 | 1075 |
| 34 | 1100 |
| 35 | 1125 |
| 36 | 1150 |
| 37 | 1175 |
| 38 | 1200 |
| 39 | 1225 |
| 40 | 1250 |
| 41 | 1300 |
| 42 | 1325 |
| 43 | 1350 |
| 44 | 1375 |
| 45 | 1400 |
| 46 | 1450 |
| 47 | 1475 |
| 48 | 1500 |
| 49 | 1525 |
| 50 | 1550 |
| 51 | 1600 |
| 52 | 1625 |
| 53 | 1650 |
| 54 | 1675 |
| 55 | 1700 |
| 56 | 1750 |
| 57 | 1775 |
| 58 | 1800 |
| 59 | 1825 |
| 60 | 1850 |

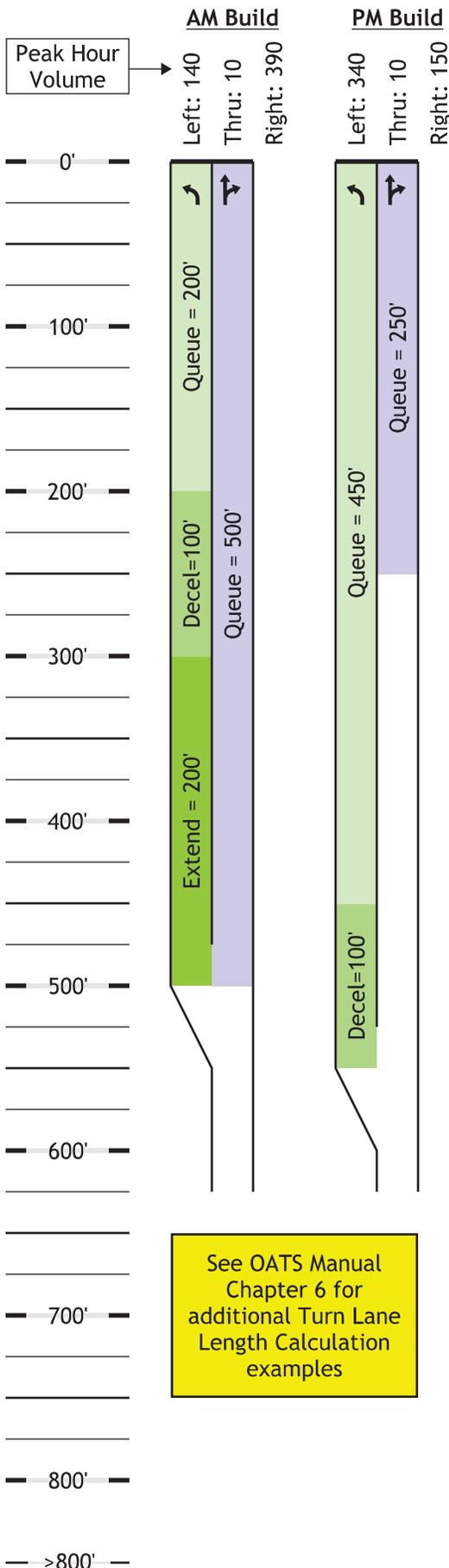
NOTE: ADDITIONAL TURN LANE STORAGE MAY BE REQUIRED WHEN THE AVERAGE VEHICLES PER CYCLE ≥ 10 AND THE HEAVY VEHICLES ARE $\geq 10\%$.

$$* \text{ AVERAGE VEHICLES PER CYCLE} = \frac{\text{DHV (TURNING LANE)}}{\text{CYCLES/HOUR}}$$

IF CYCLES ARE UNKNOWN ASSUME:

- UNIGNALIZED OR 2 PHASE = 60 CYCLES/HOUR
- 3 PHASE = 40 CYCLES/HOUR
- 4 PHASE = 30 CYCLES/HOUR

Required Turn Lane Length Example Using Figures 401-9 and 401-10



Traffic Control: Signalized  Design Speed: 50 mph
 Cycle Length(s) = 120s (AM/PM)

Determine Required Turn Lane Length (Queue + Deceleration)
 The required turn lane length is being calculated at a signalized intersection with a design speed of 50 mph; therefore, the storage will be based on Figure 401-9 Condition B or Condition C, whichever is greater.

Calculate Required Turn Lane Length for AM Peak Hour

- 1) Condition B = High speed deceleration only = 175 feet
- 2) Condition C = Queue Length (see calculations below) + Moderate Speed Deceleration = 200 feet + 100 feet = 300 feet.
- 3) Determine the left turn queue. Calculate the average number of vehicles per cycle for the turn lane. Round the answer up to the next whole number and determine the queue length per Figure 401-10. This length is shown in figure to the left in green. $[(140 \text{ veh/hr}) \cdot (120 \text{ s/cyc})] / 3600 \text{ s/hr} = 4.7 \text{ veh/cyc} > 5 \text{ veh/cyc} > \underline{200 \text{ feet}}$.
- 4) Determine thru/adjacent lane queue. Calculate the average number of vehicles per cycle for the thru/adjacent lane. Round the answer up to the next whole number and determine the queue length per Figure 401-10. This length is shown in figure to the left in blue. $[(400 \text{ veh/hr}) \cdot (120 \text{ s/cyc})] / 3600 \text{ s/hr} = 13.3 \text{ veh/cyc} > 14 \text{ veh/cyc} > \underline{500 \text{ feet}}$.
- 5) Compare the calculated lengths from Step 3 and Step 4. For this example the thru/adjacent lane queue (500 feet) is longer than the required left turn storage (300 feet); therefore, the left turn lane must be extended an additional 200 feet so left turning vehicles can enter the turn lane without being blocked by the thru/adjacent lane.
- 6) The required turn lane length of the left turn lane for the AM peak hour is **500 feet**.

Calculate Required Turn Lane Length for PM Peak Hour

- 1) Condition B = High speed deceleration only = 175 feet
- 2) Required turn lane storage for Condition C = Queue Length (see calculations below) + Moderate Speed Deceleration = 450 feet + 100 feet = 550 feet.
- 3) Determine the left turn queue. Calculate the average number of vehicles per cycle for the turn lane. Round the answer up to the next whole number and determine the queue length per Figure 401-10. This length is shown in figure to the left in green. $[(340 \text{ veh/hr}) \cdot (120 \text{ s/cyc})] / 3600 \text{ s/hr} = 11.3 \text{ veh/cyc} > 12 \text{ veh/cyc} > \underline{450 \text{ feet}}$.
- 4) Determine thru/adjacent lane queue. Calculate the average number of vehicles per cycle for the thru/adjacent lane. Round the answer up to the next whole number and determine the queue length per Figure 401-10. This length is shown in figure to the left in blue. $[(160 \text{ veh/hr}) \cdot (120 \text{ s/cyc})] / 3600 \text{ s/hr} = 5.3 \text{ veh/cyc} > 6 \text{ veh/cyc} > \underline{250 \text{ feet}}$.
- 5) Compare the calculated lengths from Step 3 and Step 4. For this example the thru/adjacent lane queue (250 feet) is shorter than the required left turn storage (550 feet); therefore, the left turn lane does not need to be extended so left turning vehicles can enter the turn lane without being blocked by the thru/adjacent lane.
- 6) The required turn lane length of the left turn lane for the PM peak hour is **550 feet**.

Determine Required Storage of Turn Lane

- 1) Per the AM and PM peak hour calculations the required turn lane length for the left turn lane is 500 feet and 550 feet, respectively.
- 2) The required turn lane length for the left turn lane is **550 feet**.
- 3) See PM Build figure to the left for the Final Design.

Appendix C

Traffic Count Data

VEHICULAR TRAFFIC COUNT SUMMARY

Municipality: Hudson **At Intersection of:** West Streetsboro Street (SR 302) and Dix Road / Hudson Crossing Parkway
Date: 11/20/2025 **Day:** Thu. **Comments:** _____ **Project:** 25-142 **W. Streetsboro St & Terex Rd**
Weather: Clear **Recorder(s):** KPB **Date entry by:** JUD **Date entered:** Nov. 21, 2025 **Nov. 21, 2025**

| TIME BEGINS | Hudson Crossing Pkwy. FROM NORTH | | | | Terex Rd. FROM SOUTH | | | | W. Streetsboro St. (SR 303) FROM EAST | | | | W. Streetsboro St. (SR 303) FROM WEST | | | | TOTAL EAST WEST | | TOTAL ALL DIREC. | PEAK HOUR FACTOR | | | |
|---------------|----------------------------------|------------|------------|------------|----------------------|-------------|------------|-------------|---------------------------------------|-------------|-------------|-------------|---------------------------------------|-------------|-------------|-------------|-----------------|-------------|------------------|------------------|-------------|-------------|------|
| | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Bus | Trk | | North | South | East | West |
| 06:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 07:00 | 10 | 4 | 16 | 30 | 11 | 449 | 20 | 480 | 18 | 5 | | | 109 | 439 | 176 | 724 | 39 | 6 | 0.833 | 0.888 | 0.845 | 0.745 | |
| 08:00 | 12 | 2 | 13 | 27 | 13 | 400 | 30 | 443 | 23 | 4 | | | 101 | 496 | 206 | 803 | 41 | 5 | 0.614 | 0.821 | 0.908 | 0.908 | |
| 09:00 | 5 | 7 | 32 | 44 | 22 | 310 | 15 | 347 | 28 | 1 | | | 48 | 394 | 188 | 630 | 47 | 1 | 0.786 | 0.623 | 0.741 | 0.820 | |
| 10:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 11:00 | 13 | 7 | 34 | 54 | 21 | 335 | 10 | 366 | 35 | 2 | | | 28 | 370 | 135 | 533 | 33 | 1 | 0.750 | 0.840 | 0.847 | 0.877 | |
| 12:00 | 12 | 13 | 52 | 77 | 33 | 362 | 26 | 421 | 25 | 0 | | | 44 | 404 | 138 | 586 | 38 | 1 | 0.602 | 0.746 | 0.849 | 0.877 | |
| 1:00 | 8 | 6 | 20 | 34 | 33 | 409 | 15 | 457 | 32 | 0 | | | 23 | 375 | 136 | 534 | 23 | 5 | 0.567 | 0.771 | 0.936 | 0.967 | |
| 2:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 3:00 | 6 | 7 | 79 | 92 | 38 | 477 | 4 | 519 | 18 | 6 | | | 13 | 491 | 267 | 771 | 24 | 5 | 0.852 | 0.837 | 0.763 | 0.853 | |
| 4:00 | 6 | 14 | 59 | 79 | 48 | 538 | 5 | 591 | 12 | 5 | | | 26 | 532 | 283 | 841 | 14 | 5 | 0.637 | 0.801 | 0.935 | 0.883 | |
| 5:00 | 16 | 30 | 100 | 146 | 47 | 483 | 2 | 532 | 13 | 0 | | | 12 | 570 | 462 | 1044 | 15 | 0 | 0.500 | 0.740 | 0.831 | 0.879 | |
| 6:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 7:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 8:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 9:00 | | | | | | | | | | | | | | | | | | | | | | | |
| TOTALS | 88 | 90 | 405 | 583 | 266 | 3763 | 127 | 4156 | 204 | 23 | 1991 | 6466 | 404 | 4071 | 1991 | 6466 | 274 | 29 | 1.41 | 1.48 | 1.48 | 1.48 | |
| ADT | 124 | 127 | 573 | 825 | 394 | 5576 | 188 | 6158 | 5.5% | 5.5% | 2950 | 9581 | 509 | 6032 | 2950 | 9581 | 4.7% | 4.7% | 1.41 | 1.48 | 1.48 | 1.48 | |

| | | | |
|--|--|--|--|
| N Log Hourly Factor: 1.52 S Log Hourly Factor: 1.59 N Log Monthly Factor: 0.93 S Log Monthly Factor: 0.93 | E Log Hourly Factor: 1.59 W Log Hourly Factor: 1.59 E Log Monthly Factor: 0.93 W Log Monthly Factor: 0.93 | N Log Combined Factor: 1.41 S Log Combined Factor: 1.48 | E Log Combined Factor: 1.41 W Log Combined Factor: 1.48 |
|--|--|--|--|

TMS ENGINEERS, INC.
 2112 Case Parkway South #7
 Twinsburg, Ohio 44087
 (330) 686-6402 FAX: (330) 686-6417

Figure #: _____
 Page #: _____

TMS Engineers, Inc.

2112 Case Parkway South #7
Twinsburg, Ohio, 44087

File Name : 1. Terex Rd and W Streetsboro St 11-20-2025 KB
 Site Code : 00000000
 Start Date : 11/20/2025
 Page No : 2

Groups Printed- Cars - Trucks - Busses

| Start Time | HUDSON CROSSING PARKWAY From North | | | | | | WEST STREETSBORO STREET (SR 303) From East | | | | | | TEREX ROAD From South | | | | | | WEST STREETSBORO STREET (SR 303) From West | | | | | |
|------------|---------------------------------------|------|------|------|------------|--|--|------|------|------|------------|--|--------------------------|------|------|------|------------|--|--|------|------|------|------------|--|
| | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| 10:30 AM | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| 10:45 AM | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Total | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| 11:00 AM | 6 | 2 | 2 | 0 | 10 | | 2 | 68 | 6 | 0 | 76 | | 2 | 0 | 37 | 0 | 39 | | 27 | 74 | 5 | 0 | 106 | |
| 11:15 AM | 9 | 1 | 5 | 0 | 15 | | 1 | 81 | 6 | 0 | 88 | | 10 | 2 | 46 | 0 | 58 | | 41 | 99 | 12 | 0 | 152 | |
| 11:30 AM | 6 | 2 | 3 | 0 | 11 | | 3 | 104 | 1 | 0 | 108 | | 6 | 1 | 57 | 0 | 64 | | 32 | 95 | 3 | 0 | 130 | |
| 11:45 AM | 13 | 2 | 3 | 0 | 18 | | 4 | 82 | 8 | 0 | 94 | | 12 | 1 | 41 | 0 | 54 | | 35 | 102 | 8 | 0 | 145 | |
| Total | 34 | 7 | 13 | 0 | 54 | | 10 | 335 | 21 | 0 | 366 | | 30 | 4 | 181 | 0 | 215 | | 135 | 370 | 28 | 0 | 533 | |
| 12:00 PM | 21 | 5 | 6 | 0 | 32 | | 5 | 92 | 3 | 0 | 100 | | 6 | 2 | 39 | 0 | 47 | | 30 | 101 | 10 | 0 | 141 | |
| 12:15 PM | 19 | 2 | 2 | 0 | 23 | | 5 | 93 | 9 | 0 | 107 | | 14 | 5 | 42 | 0 | 61 | | 33 | 119 | 15 | 0 | 167 | |
| 12:30 PM | 4 | 5 | 0 | 0 | 9 | | 5 | 78 | 7 | 0 | 90 | | 11 | 0 | 35 | 0 | 46 | | 46 | 97 | 5 | 1 | 149 | |
| 12:45 PM | 8 | 1 | 4 | 0 | 13 | | 11 | 99 | 14 | 0 | 124 | | 5 | 0 | 23 | 0 | 28 | | 29 | 87 | 14 | 0 | 130 | |
| Total | 52 | 13 | 12 | 0 | 77 | | 26 | 362 | 33 | 0 | 421 | | 36 | 7 | 139 | 0 | 182 | | 138 | 404 | 44 | 1 | 587 | |
| 01:00 PM | 5 | 1 | 2 | 0 | 8 | | 6 | 102 | 7 | 0 | 115 | | 6 | 3 | 32 | 0 | 41 | | 38 | 82 | 5 | 0 | 125 | |
| 01:15 PM | 7 | 3 | 5 | 0 | 15 | | 5 | 100 | 6 | 0 | 111 | | 6 | 3 | 24 | 0 | 33 | | 30 | 102 | 6 | 0 | 138 | |
| 01:30 PM | 5 | 1 | 0 | 0 | 6 | | 2 | 98 | 9 | 0 | 109 | | 3 | 0 | 23 | 0 | 26 | | 30 | 98 | 7 | 0 | 135 | |
| 01:45 PM | 3 | 1 | 1 | 0 | 5 | | 2 | 109 | 11 | 0 | 122 | | 4 | 2 | 42 | 0 | 48 | | 38 | 93 | 5 | 1 | 137 | |
| Total | 20 | 6 | 8 | 0 | 34 | | 15 | 409 | 33 | 0 | 457 | | 19 | 8 | 121 | 0 | 148 | | 136 | 375 | 23 | 1 | 535 | |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| 02:15 PM | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |

TMS Engineers, Inc.

2112 Case Parkway South #7
Twinsburg, Ohio, 44087

File Name : 1. Terex Rd and W Streetsboro St 11-20-2025 KB

Site Code : 00000000

Start Date : 11/20/2025

Page No : 3

Groups Printed- Cars - Trucks - Buses

| Start Time | HUDSON CROSSING PARKWAY From North | | | | | | WEST STREETSBORO STREET (SR 303) From East | | | | | | TEREX ROAD From South | | | | | | WEST STREETSBORO STREET (SR 303) From West | | | | | | |
|-------------|---------------------------------------|------|------|------|------------|-----|--|------|------|------|------------|-----|--------------------------|------|------|------|------------|-----|--|------|------|------|------------|-----|---|
| | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 02:30 PM | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 PM | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 PM | 14 | 6 | 1 | 0 | 21 | | 4 | 107 | 8 | 0 | 119 | | 12 | 0 | 63 | 0 | 75 | | 48 | 78 | 4 | 0 | 130 | | |
| 03:15 PM | 19 | 0 | 1 | 0 | 20 | | 0 | 95 | 9 | 1 | 105 | | 6 | 1 | 49 | 0 | 56 | | 66 | 140 | 0 | 0 | 206 | | |
| 03:30 PM | 22 | 0 | 2 | 0 | 24 | | 0 | 155 | 15 | 0 | 170 | | 9 | 0 | 61 | 0 | 70 | | 78 | 127 | 4 | 0 | 209 | | |
| 03:45 PM | 24 | 1 | 2 | 0 | 27 | | 0 | 120 | 6 | 0 | 126 | | 7 | 1 | 42 | 0 | 50 | | 75 | 146 | 5 | 1 | 227 | | |
| Total | 79 | 7 | 6 | 0 | 92 | | 4 | 477 | 38 | 1 | 520 | | 34 | 2 | 215 | 0 | 251 | | 267 | 491 | 13 | 1 | 772 | | |
| 04:00 PM | 17 | 9 | 5 | 0 | 31 | | 3 | 133 | 16 | 0 | 152 | | 4 | 0 | 67 | 0 | 71 | | 67 | 110 | 12 | 0 | 189 | | |
| 04:15 PM | 13 | 2 | 0 | 0 | 15 | | 0 | 149 | 9 | 0 | 158 | | 5 | 4 | 56 | 0 | 65 | | 64 | 122 | 7 | 0 | 193 | | |
| 04:30 PM | 18 | 0 | 1 | 0 | 19 | | 1 | 118 | 10 | 0 | 129 | | 9 | 1 | 83 | 0 | 93 | | 72 | 147 | 2 | 0 | 221 | | |
| 04:45 PM | 11 | 3 | 0 | 0 | 14 | | 1 | 138 | 13 | 1 | 153 | | 5 | 1 | 63 | 1 | 70 | | 80 | 153 | 5 | 1 | 239 | | |
| Total | 59 | 14 | 6 | 0 | 79 | | 5 | 538 | 48 | 1 | 592 | | 23 | 6 | 269 | 1 | 299 | | 283 | 532 | 26 | 1 | 842 | | |
| 05:00 PM | 51 | 16 | 6 | 0 | 73 | | 2 | 145 | 13 | 0 | 160 | | 7 | 1 | 91 | 0 | 99 | | 110 | 139 | 2 | 0 | 251 | | |
| 05:15 PM | 16 | 8 | 3 | 0 | 27 | | 0 | 129 | 10 | 0 | 139 | | 4 | 1 | 69 | 0 | 74 | | 127 | 167 | 3 | 0 | 297 | | |
| 05:30 PM | 23 | 3 | 2 | 1 | 29 | | 0 | 117 | 17 | 0 | 134 | | 10 | 1 | 59 | 0 | 70 | | 120 | 145 | 4 | 0 | 269 | | |
| 05:45 PM | 10 | 3 | 5 | 0 | 18 | | 0 | 92 | 7 | 0 | 99 | | 7 | 0 | 43 | 0 | 50 | | 105 | 119 | 3 | 0 | 227 | | |
| Total | 100 | 30 | 16 | 1 | 147 | | 2 | 483 | 47 | 0 | 532 | | 28 | 3 | 262 | 0 | 293 | | 462 | 570 | 12 | 0 | 1044 | | |
| Grand Total | 405 | 90 | 88 | 3 | 586 | | 127 | 3763 | 266 | 2 | 4158 | | 262 | 72 | 1790 | 1 | 2125 | | 1991 | 4071 | 404 | 6 | 6472 | | |
| Approach % | 69.1 | 15.4 | 15 | 0.5 | | 3.1 | 90.5 | 6.4 | 0 | | 12.3 | 3.4 | 84.2 | 0 | | 30.8 | 62.9 | 6.2 | 0.1 | | 30.8 | 62.9 | 6.2 | 0.1 | |
| Total % | 3 | 0.7 | 0.7 | 0 | 4.4 | | 1 | 28.2 | 2 | 0 | 31.2 | | 2 | 0.5 | 13.4 | 0 | 15.9 | | 14.9 | 30.5 | 3 | 0 | 48.5 | | |
| Cars | 367 | 83 | 68 | 3 | 521 | | 105 | 3583 | 241 | 2 | 3931 | | 249 | 64 | 1705 | 1 | 2019 | | 1898 | 3892 | 373 | 5 | 6168 | | |
| % Cars | 90.6 | 92.2 | 77.3 | 100 | 88.9 | | 82.7 | 95.2 | 90.6 | 100 | 94.5 | | 95 | 88.9 | 95.3 | 100 | 95 | | 95.3 | 95.6 | 92.3 | 83.3 | 95.3 | | |
| Trucks | 38 | 7 | 20 | 0 | 65 | | 22 | 163 | 19 | 0 | 204 | | 11 | 8 | 79 | 0 | 98 | | 85 | 158 | 31 | 1 | 275 | | |

TMS Engineers, Inc.

2112 Case Parkway South #7
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| | 9.4 | 7.8 | 22.7 | 0 | 11.1 | 17.3 | 4.3 | 7.1 | 0 | 4.9 | 4.2 | 11.1 | 4.4 | 0 | 4.6 | 4.3 | 3.9 | 7.7 | 16.7 | 4.2 | 4.8 | |
|----------|-----|-----|------|---|------|------|-----|-----|---|-----|-----|------|-----|---|-----|-----|-----|-----|------|-----|-----|-----|
| % Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 6 | 0 | 23 | 2 | 0 | 6 | 0 | 8 | 8 | 21 | 0 | 0 | 0 | 29 | 60 |
| % Busses | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2.3 | 0 | 0.6 | 0.8 | 0 | 0.3 | 0 | 0.4 | 0.4 | 0.5 | 0 | 0 | 0 | 0.4 | 0.4 |

| | HUDSON CROSSING PARKWAY From North | | | | | | WEST STREETSBORO STREET (SR) 303) From East | | | | | | TEREX ROAD From South | | | | | | WEST STREETSBORO STREET (SR) 303) From West | | | | | | |
|--|---------------------------------------|------|------|------|------------|------|---|------|------|------|------------|------|--------------------------|------|------|------|------------|------|---|------|------|------|------------|------------|--|
| | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | | Right | Thru | Left | Peds | App. Total | Int. Total | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07:30 AM | 5 | 0 | 3 | 0 | 8 | 7 | 119 | 2 | 0 | 128 | 14 | 5 | 61 | 0 | 80 | 44 | 124 | 30 | 0 | 198 | | | | 414 | |
| 07:45 AM | 4 | 1 | 0 | 0 | 5 | 5 | 109 | 2 | 0 | 116 | 5 | 3 | 52 | 0 | 60 | 63 | 143 | 37 | 0 | 243 | | | | 424 | |
| 08:00 AM | 3 | 0 | 2 | 0 | 5 | 5 | 105 | 6 | 0 | 116 | 7 | 5 | 69 | 0 | 81 | 54 | 116 | 39 | 0 | 209 | | | | 411 | |
| 08:15 AM | 4 | 0 | 2 | 0 | 6 | 8 | 91 | 2 | 0 | 101 | 7 | 5 | 56 | 0 | 68 | 46 | 142 | 33 | 0 | 221 | | | | 396 | |
| Total Volume | 16 | 1 | 7 | 0 | 24 | 25 | 424 | 12 | 0 | 461 | 33 | 18 | 238 | 0 | 289 | 207 | 525 | 139 | 0 | 871 | | | | 1645 | |
| % App. Total | 66.7 | 4.2 | 29.2 | 0 | | 5.4 | 92 | 2.6 | 0 | | 11.4 | 6.2 | 82.4 | 0 | | 23.8 | 60.3 | 16 | 0 | | | | | | |
| PHF | .800 | .250 | .583 | .000 | .750 | .781 | .891 | .500 | .000 | .900 | .589 | .900 | .862 | .000 | .892 | .821 | .918 | .891 | .000 | .896 | | | | .970 | |
| Cats | 13 | 1 | 0 | 0 | 14 | 17 | 408 | 9 | 0 | 434 | 33 | 16 | 231 | 0 | 280 | 197 | 491 | 136 | 0 | 824 | | | | 1552 | |
| % Cats | 81.3 | 100 | 0 | 0 | 58.3 | 68.0 | 96.2 | 75.0 | 0 | 94.1 | 100 | 88.9 | 97.1 | 0 | 96.9 | 95.2 | 93.5 | 97.8 | 0 | 94.6 | | | | 94.3 | |
| Trucks | 3 | 0 | 7 | 0 | 10 | 8 | 11 | 0 | 0 | 19 | 0 | 2 | 6 | 0 | 8 | 10 | 32 | 3 | 0 | 45 | | | | 82 | |
| % Trucks | 18.8 | 0 | 100 | 0 | 41.7 | 32.0 | 2.6 | 0 | 0 | 4.1 | 0 | 11.1 | 2.5 | 0 | 2.8 | 4.8 | 6.1 | 2.2 | 0 | 5.2 | | | | 5.0 | |
| Busses | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 3 | 0 | 8 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | | | | 11 | |
| % Busses | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 | 25.0 | 0 | 1.7 | 0 | 0 | 0.4 | 0 | 0.3 | 0 | 0.4 | 0 | 0 | 0.2 | | | | 0.7 | |

Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 04:45 PM

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|------|
| 04:45 PM | 11 | 3 | 0 | 0 | 14 | 1 | 138 | 13 | 1 | 153 | 5 | 1 | 63 | 1 | 70 | 80 | 153 | 5 | 1 | 239 | | | | 476 |
| 05:00 PM | 51 | 16 | 6 | 0 | 73 | 2 | 145 | 13 | 0 | 160 | 7 | 1 | 91 | 0 | 99 | 110 | 139 | 2 | 0 | 251 | | | | 583 |
| 05:15 PM | 16 | 8 | 3 | 0 | 27 | 0 | 129 | 10 | 0 | 139 | 4 | 1 | 69 | 0 | 74 | 127 | 167 | 3 | 0 | 297 | | | | 537 |
| 05:30 PM | 23 | 3 | 2 | 1 | 29 | 0 | 117 | 17 | 0 | 134 | 10 | 1 | 59 | 0 | 70 | 120 | 145 | 4 | 0 | 269 | | | | 502 |
| Total Volume | 101 | 30 | 11 | 1 | 143 | 3 | 529 | 53 | 1 | 586 | 26 | 4 | 282 | 1 | 313 | 437 | 604 | 14 | 1 | 1056 | | | | 2098 |
| % App. Total | 70.6 | 21 | 7.7 | 0.7 | | 0.5 | 90.3 | 9 | 0.2 | | 8.3 | 1.3 | 90.1 | 0.3 | | 41.4 | 57.2 | 1.3 | 0.1 | | | | | |
| PHF | .495 | .469 | .458 | .250 | .490 | .375 | .912 | .779 | .250 | .916 | .650 | 1.00 | .775 | .250 | .790 | .860 | .904 | .700 | .250 | .889 | | | | .900 |
| Cats | 97 | 28 | 11 | 1 | 137 | 3 | 515 | 51 | 1 | 570 | 26 | 3 | 272 | 1 | 302 | 433 | 598 | 9 | 1 | 1041 | | | | 2050 |
| % Cats | 96.0 | 93.3 | 100 | 100 | 95.8 | 100 | 97.4 | 96.2 | 100 | 97.3 | 100 | 75.0 | 96.5 | 100 | 96.5 | 99.1 | 99.0 | 64.3 | 100 | 98.6 | | | | 97.7 |
| Trucks | 4 | 2 | 0 | 0 | 6 | 0 | 14 | 2 | 0 | 16 | 0 | 1 | 10 | 0 | 11 | 4 | 6 | 5 | 0 | 15 | | | | 48 |
| % Trucks | 4.0 | 6.7 | 0 | 0 | 4.2 | 0 | 2.6 | 3.8 | 0 | 2.7 | 0 | 25.0 | 3.5 | 0 | 3.5 | 0.9 | 1.0 | 35.7 | 0 | 1.4 | | | | 2.3 |
| Busses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 |
| % Busses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 |

Appendix D

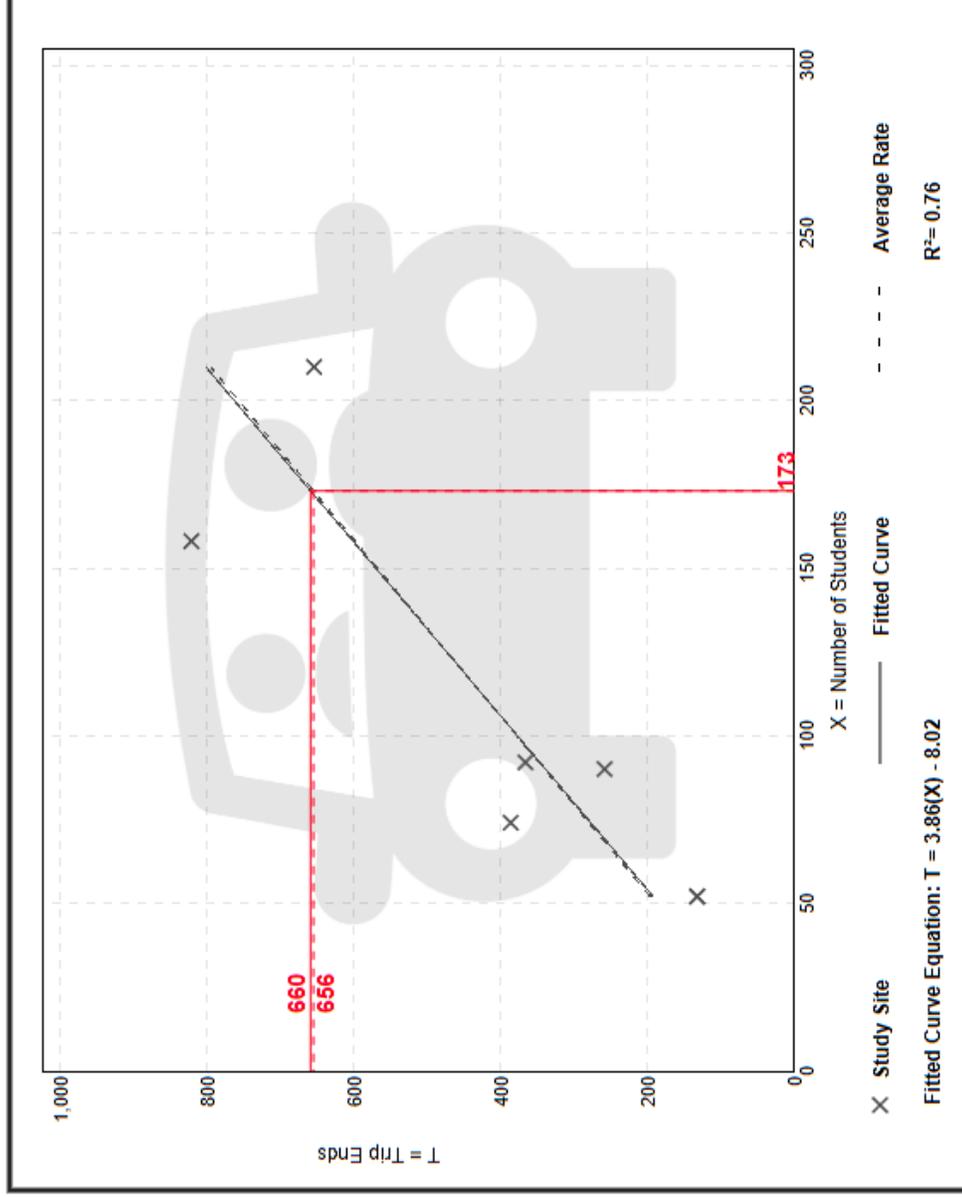
Trip Generation Calculations

Day Care Center – ITE CODE #565
Size: 173 Students

WEEKDAY
Weekday

| <u>DATA STATISTICS</u> | |
|----------------------------------|--|
| Land Use: | Day Care Center (565) Click for Description and Data Plots |
| Independent Variable: | Students |
| Time Period: | Weekday |
| Setting/Location: | General Urban/Suburban |
| Trip Type: | Vehicle |
| Number of Studies: | 7 |
| Avg. Num. of Students: | 104 |
| Average Rate: | 3.79 |
| Range of Rates: | 2.56 - 5.23 |
| Standard Deviation: | 1.13 |
| Fitted Curve Equation: | $T = 3.86(X) - 8.02$ |
| R²: | 0.76 |
| Directional Distribution: | 50% entering, 50% exiting |
| Calculated Trip Ends: | Average Rate: 656 (Total), 328 (Entry), 328 (Exit) Fitted Curve: 660 (Total), 330 (Entry), 330 (Exit) |

Data Plot and Equation



Trip Gen Manual, 12th Edition

• Institute of Transportation Engineers

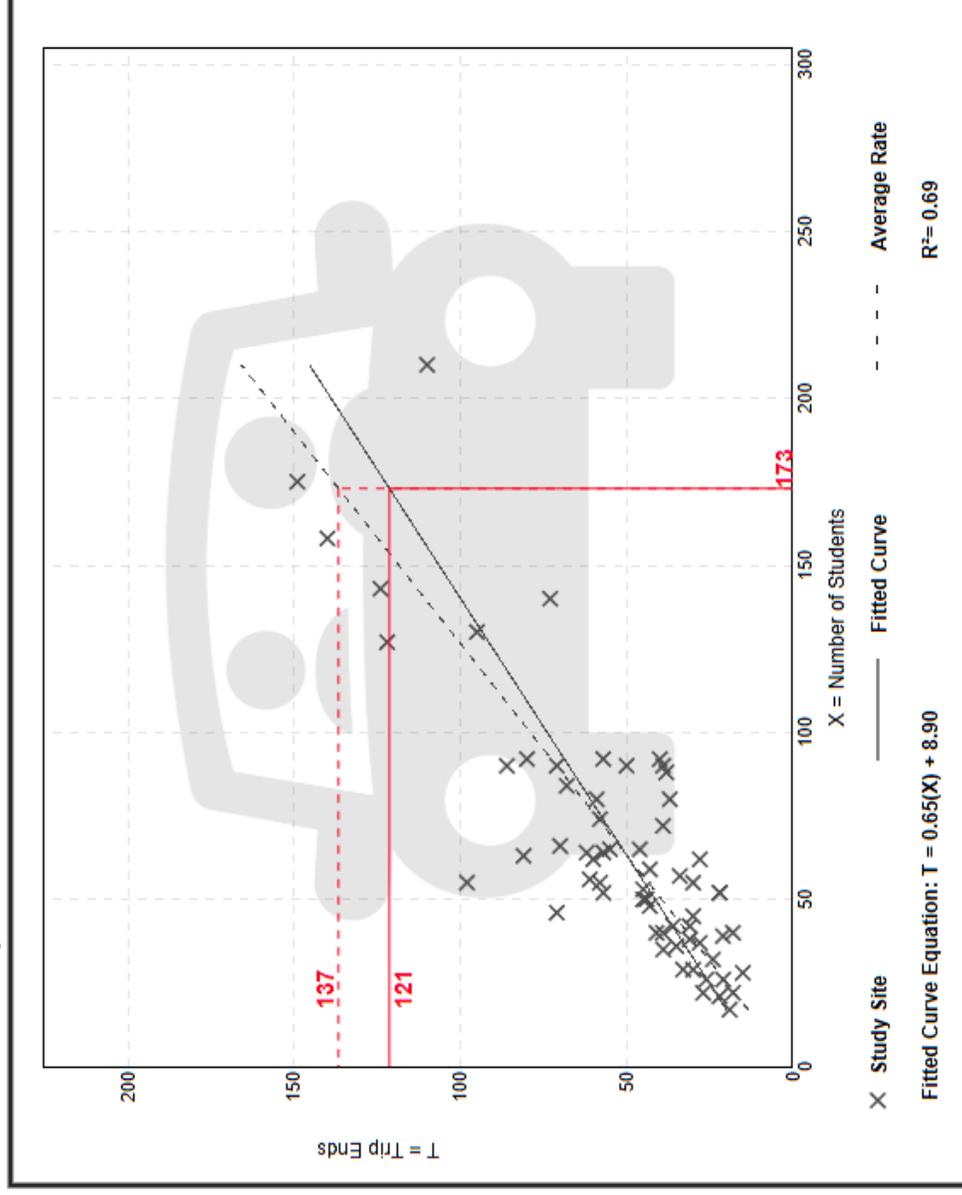
Date: 01/02/2025

Day Care Center – ITE CODE #565
Size: 173 Students

WEEKDAY
Peak Hour of Adjacent Street Traffic: 7-9 AM

| DATA STATISTICS | |
|---------------------------|--|
| Land Use: | Day Care Center (565) Click for Description and Data Plots |
| Independent Variable: | Students |
| Time Period: | Weekday |
| | Peak Hour of Adjacent Street Traffic |
| | One Hour Between 7 and 9 a.m. |
| Setting/Location: | General Urban/Suburban |
| Trip Type: | Vehicle |
| Number of Studies: | 63 |
| Avg. Num. of Students: | 66 |
| Average Rate: | 0.79 |
| Range of Rates: | 0.42 - 1.78 |
| Standard Deviation: | 0.26 |
| Fitted Curve Equation: | $T = 0.65(X) + 8.90$ |
| R ² : | 0.69 |
| Directional Distribution: | 53% entering, 47% exiting |
| Calculated Trip Ends: | Average Rate: 137 (Total), 72 (Entry), 65 (Exit) |
| | Fitted Curve: 121 (Total), 64 (Entry), 57 (Exit) |

Data Plot and Equation



Trip Gen Manual, 12th Edition

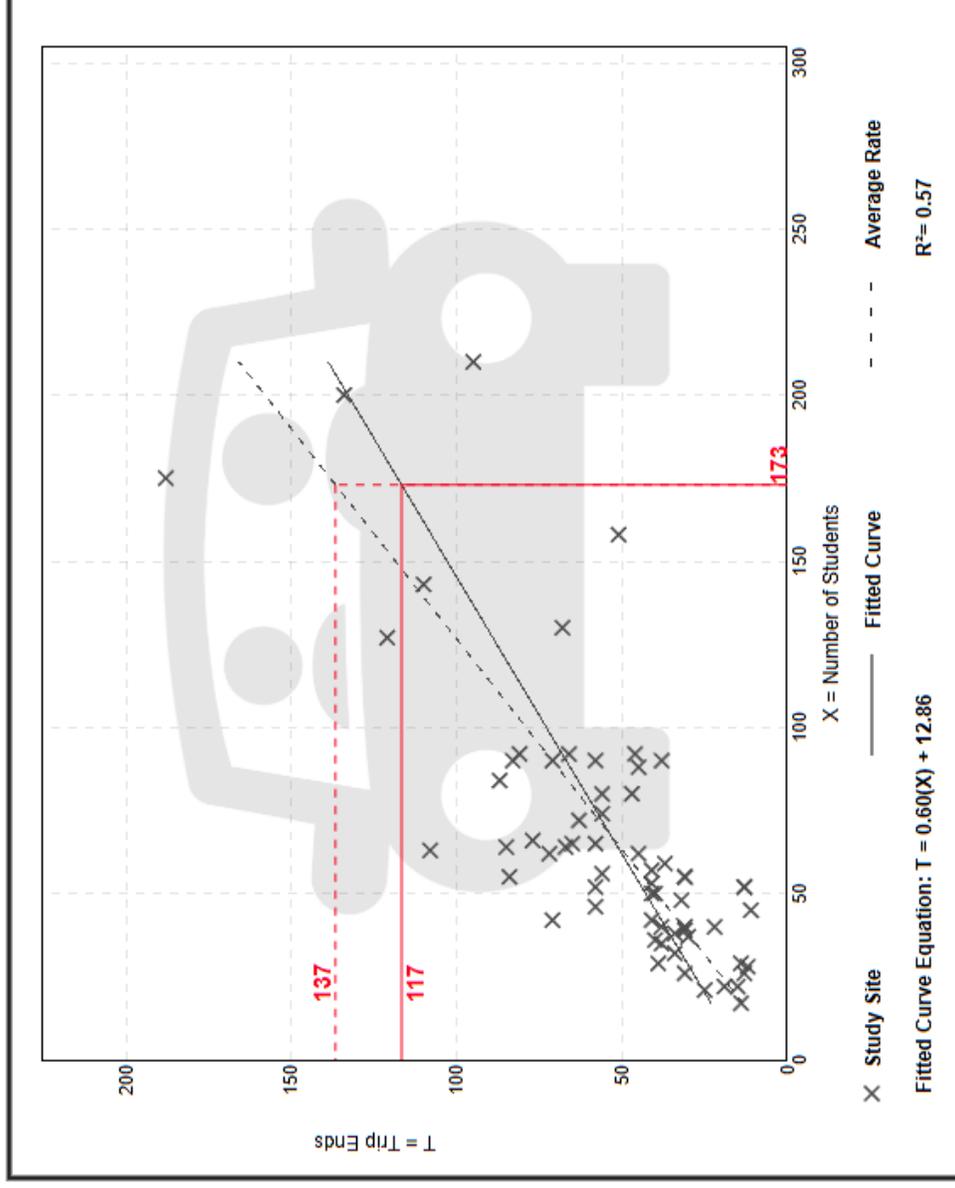
• Institute of Transportation Engineers

Day Care Center – ITE CODE #565
Size: 173 Students

WEEKDAY
Peak Hour of Adjacent Street Traffic: 4-6 PM

| <u>DATA STATISTICS</u> | |
|----------------------------------|--|
| Land Use: | Day Care Center (565) Click for Description and Data Plots |
| Independent Variable: | Students |
| Time Period: | Weekday |
| Setting/Location: | Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m. |
| General Urban/Suburban | |
| Trip Type: | Vehicle |
| Number of Studies: | 63 |
| Avg. Num. of Students: | 67 |
| Average Rate: | 0.79 |
| Range of Rates: | 0.24 - 1.71 |
| Standard Deviation: | 0.31 |
| Fitted Curve Equation: | $T = 0.60(X) + 12.86$ |
| R²: | 0.57 |
| Directional Distribution: | 47% entering, 53% exiting |
| Calculated Trip Ends: | Average Rate: 137 (Total), 64 (Entry), 73 (Exit) Fitted Curve: 117 (Total), 55 (Entry), 62 (Exit) |

Data Plot and Equation



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Appendix E

ODOT Historical Data & Calculations



TFMS - Segment Forecast Report

| | | | | |
|--------------|-----------------------|-----------------------|----------------|---------------|
| Username | Email | Script Import Date | Script Version | Model Version |
| Kyle.Coville | kyle@tmsengineers.com | 5/15/2025 10:30:27 AM | Initial | 2025.1900 |

Forecast Summary

| | | | |
|------------|--------------|--------------|-------------|
| Project ID | Project Name | Opening Year | Design Year |
| 25142 | 25-142 | 2027 | 2037 |

Project Description

Day Care Center

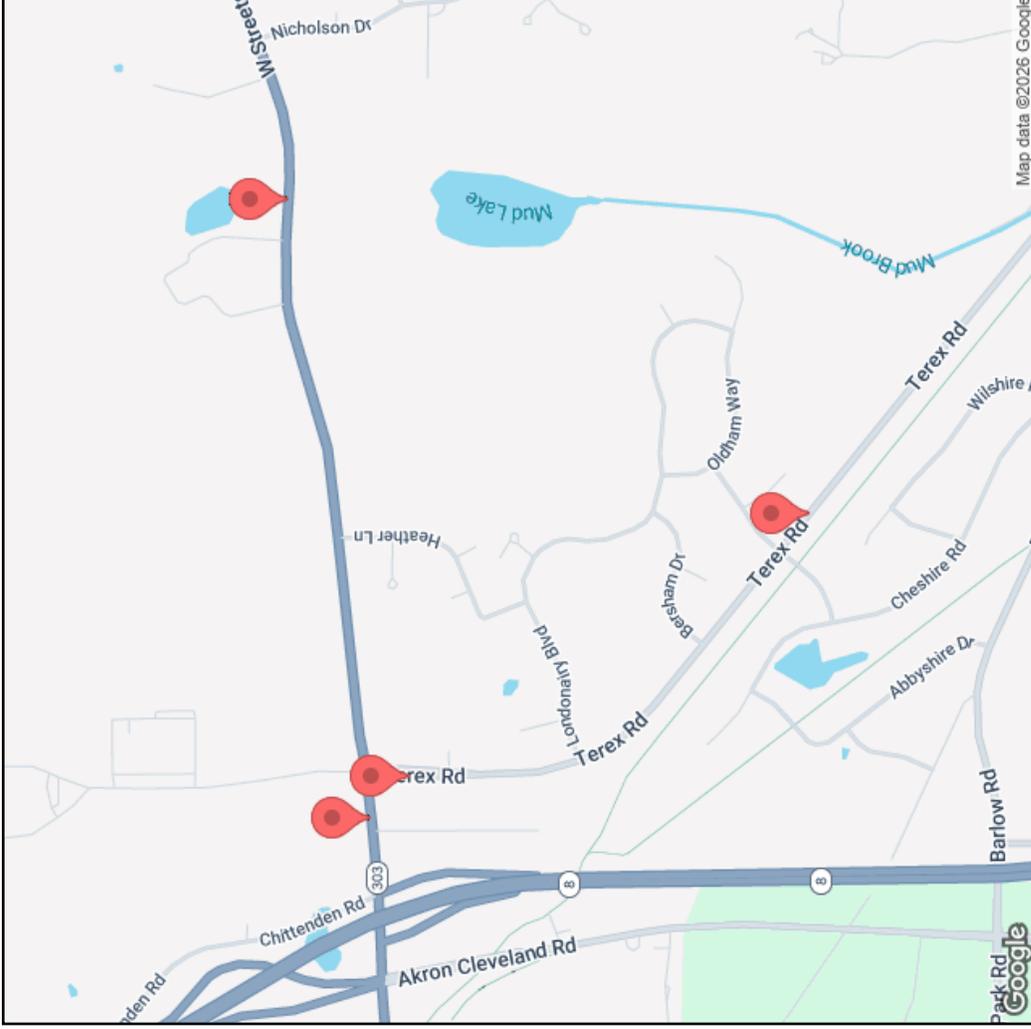
*Users of this data need to be aware that there are limitations to the forecasts generated by this product that make it suitable only for roadway design projects which are low risk.

Segment Information

| Segment ID | LRS ID | BMP | EMP | Length | Latitude | Longitude |
|------------|----------------|--------|--------|--------|-------------------|------------------|
| 2251453 | SSUMSR00303**C | 10.530 | 10.714 | 0.184 | -81.4877844134668 | 41.2325638505045 |
| 2251454 | SSUMSR00303**C | 10.714 | 12.273 | 1.559 | -81.4712912711514 | 41.2342098620994 |
| 2300309 | MSUMMR05646**C | 0.000 | 0.120 | 0.120 | -81.4866487633107 | 41.2318038807016 |
| 2300311 | MSUMMR05646**C | 0.120 | 1.419 | 1.299 | -81.4796716623658 | 41.2238108749304 |

Forecast Information

| Segment ID | 2027 AADT | 2037 AADT | DHV-30 | K% | D% | T24% | TD% |
|------------|-----------|-----------|--------|------|------|------|-----|
| 2251453 | 13,000 | 13,500 | 1,600 | 11.9 | 52.1 | 3 | 3 |
| 2251454 | 13,000 | 13,500 | 1,600 | 11.9 | 52.1 | 3 | 3 |
| 2300309 | 6,800 | 6,800 | 1,100 | 16.2 | 62.3 | 4 | 1 |
| 2300311 | 6,800 | 6,800 | 1,100 | 16.2 | 62.3 | 4 | 1 |



Definitions:

- o AADT – Annual Average Daily Traffic
- o DHV30 – Design Hour Volume for 30th highest hour of the year
- o DHV30 – K * AADT
- o K % – Design Hour Factor
- o D % – Peak Direction Factor
- o T24 % – Percent Daily Trucks
- o TD % – Percent Design Hour Trucks

| | | | |
|---------------------|----------------|--------|--------|
| Forecast Segment ID | Route | BMP | EMP |
| 2251453 | SSUMSR00303**C | 10.530 | 10.714 |

Forecast

| Year | K% | T24 % (Existing) | PA AADT | PA Method | PA Growth Rate % | PA Calculated Rate % |
|--------|--------|------------------|---------|-----------|------------------|----------------------|
| 2050 | ◆ 11.9 | 3 | 13,000 | Average | 0.300 | 0.300 |
| AADT | D% | TD % (Existing) | BC AADT | BC Method | BC Growth Rate % | BC Calculated Rate % |
| 13,500 | ◆ 52.1 | 3 | 500 | Model | 1.100 | 1.100 |

◆ K/D factors from TCDS were used.

Regression

| Method Number | PA AADT | BC AADT | AADT |
|---------------|---------|---------|--------|
| 2 | 14,288 | 183 | 14,471 |

95% Confidence Min/Max

| PA Min | PA Max | BC Min | BC Max | Year |
|--------|--------|--------|--------|------|
| 3812 | 18046 | -2229 | 2357 | 2050 |

| Method Number | PA Growth % | BC Growth % | PA Drop Count | BC Drop Count | PA AADT | BC AADT | PA Adjustment | BC Adjustment |
|---------------|-------------|-------------|---------------|---------------|---------|---------|---------------|---------------|
| 1 | -0.66 | -1.18 | 0 | 0 | 9,978 | 330 | 10,389 | 272 |
| 2 | 0.54 | -2.06 | 1 | 4 | 14,458 | 150 | 14,288 | 183 |
| 3 | 0.54 | -0.27 | 0 | 0 | 14,458 | 437 | 14,288 | 365 |
| 4 | 0.55 | 0.00 | 4 | 4 | 14,395 | 387 | 14,323 | 393 |
| 5 | 0.54 | -3.41 | 0 | 0 | 14,478 | 83 | 14,306 | 45 |
| 6 | 0.71 | 0.16 | 4 | 4 | 14,947 | 405 | 14,836 | 409 |

Adjustment Info

| ID | Adjustment Methods Name | Model vs Count AADT | Adjusted AADT | Model vs Count BC | Adjusted BC | PA Growth Rate % | BC Growth Rate % |
|----|-------------------------|---------------------|---------------|-------------------|-------------|------------------|------------------|
| 1 | DIF | -16,036 | 13,145 | -1,023 | 673 | -0.02 | 2.74 |
| 2 | RAT | 0.45 | 13,025 | 0.28 | 471 | 0.01 | 0.76 |
| 3 | MRAT | 1.01 | 13,026 | 1.20 | 504 | 0.00 | 1.09 |
| 4 | RAF | | 13,085 | | 589 | -0.01 | 1.92 |

| Adjust Method AADT | Adjust Method BC | Selected PA Growth Rate % | Selected BC Growth Rate % |
|--------------------|------------------|---------------------------|---------------------------|
| | Model Ratio | 0.000 | 1.100 |

Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total Max Volume |
|---------------|---------------|---------------|---------------|------------------|------------------|
| 12472 | 12554 | 471 | 673 | 12943 | 13227 |

Process Flag: Adjusted model to counts with process per ODOT 255 spreadsheet

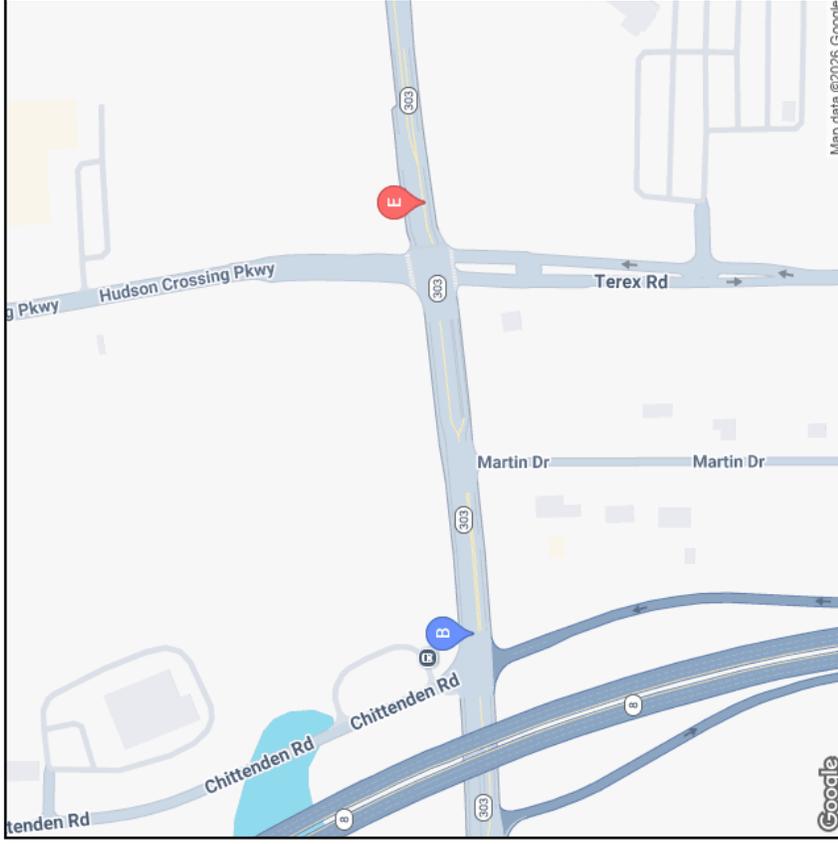
Comment:

No Comment

Historical Count

| Year | All | Cars | Trucks |
|--------|--------|--------|--------|
| 2010 | 15,270 | 14,720 | 550 |
| 2013 | 12,360 | 11,968 | 391 |
| 2015 | 12,180 | 11,794 | 385 |
| 2018 | 13,531 | 12,726 | 805 |
| 2021 | 12,927 | 12,547 | 380 |
| * 2024 | 12,928 | 12,535 | 393 |

* Pivot Point



| Segment ID | LRS ID | BMP | EMP | Length | Yr 2027 AADT | Yr 2037 AADT | DHV30 | K % | D % | T24 % | TD % |
|------------|----------------|--------|--------|--------|--------------|--------------|-------|------|------|-------|------|
| 2251453 | SSUMSR00303**C | 10.530 | 10.714 | 0.184 | 13,000 | 13,500 | 1600 | 11.9 | 52.1 | 3 | 3 |

| | | | |
|---------------------|----------------|--------|--------|
| Forecast Segment ID | Route | BMP | EMP |
| 2251454 | SSUMSR00303**C | 10.714 | 12.273 |

Forecast

| Year | K% | T24 % (Existing) | PA AADT | PA Method | PA Growth Rate % | PA Calculated Rate % |
|--------|--------|------------------|---------|-----------|------------------|----------------------|
| 2050 | ◆ 11.9 | 3 | 13,000 | Average | 0.300 | 0.300 |
| AADT | D% | TD % (Existing) | BC AADT | BC Method | BC Growth Rate % | BC Calculated Rate % |
| 13,400 | ◆ 52.1 | 3 | 400 | Model | 0.100 | 0.100 |

◆ K/D factors from TCDS were used.

Regression

| Method Number | PA AADT | BC AADT | AADT |
|---------------|---------|---------|--------|
| 2 | 14,288 | 183 | 14,471 |

95% Confidence Min/Max

| PA Min | PA Max | BC Min | BC Max | Year |
|--------|--------|--------|--------|------|
| 3812 | 18046 | -2229 | 2357 | 2050 |

| Method Number | PA Growth % | BC Growth % | PA Drop Count | BC Drop Count | PA AADT | BC AADT | PA Adjustment | BC Adjustment |
|---------------|-------------|-------------|---------------|---------------|---------|---------|---------------|---------------|
| 1 | -0.66 | -1.18 | 0 | 0 | 9,978 | 330 | 10,389 | 272 |
| 2 | 0.54 | -2.06 | 1 | 4 | 14,458 | 150 | 14,288 | 183 |
| 3 | 0.54 | -0.27 | 0 | 0 | 14,458 | 437 | 14,288 | 365 |
| 4 | 0.55 | 0.00 | 4 | 4 | 14,395 | 387 | 14,323 | 393 |
| 5 | 0.54 | -3.41 | 0 | 0 | 14,478 | 83 | 14,306 | 45 |
| 6 | 0.71 | 0.16 | 4 | 4 | 14,947 | 405 | 14,836 | 409 |

Adjustment Info

| ID | Adjustment Methods Name | Model vs Count AADT | Adjusted AADT | Model vs Count BC | Adjusted BC | PA Growth Rate % | BC Growth Rate % |
|----|-------------------------|---------------------|---------------|-------------------|-------------|------------------|------------------|
| 1 | DIF | 2,241 | 12,819 | -512 | 418 | -0.04 | 0.24 |
| 2 | RAT | 1.21 | 12,796 | 0.43 | 404 | -0.04 | 0.11 |
| 3 | MRAT | 0.99 | 12,796 | 1.03 | 404 | -0.04 | 0.11 |
| 4 | RAF | | 12,807 | | 411 | -0.04 | 0.18 |

| Adjust Method AADT | Adjust Method BC | Selected PA Growth Rate % | Selected BC Growth Rate % |
|--------------------|------------------|---------------------------|---------------------------|
| Average | Model Ratio | 0.000 | 0.100 |

Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total Max Volume |
|---------------|---------------|---------------|---------------|------------------|------------------|
| 12392 | 12403 | 404 | 418 | 12796 | 12821 |

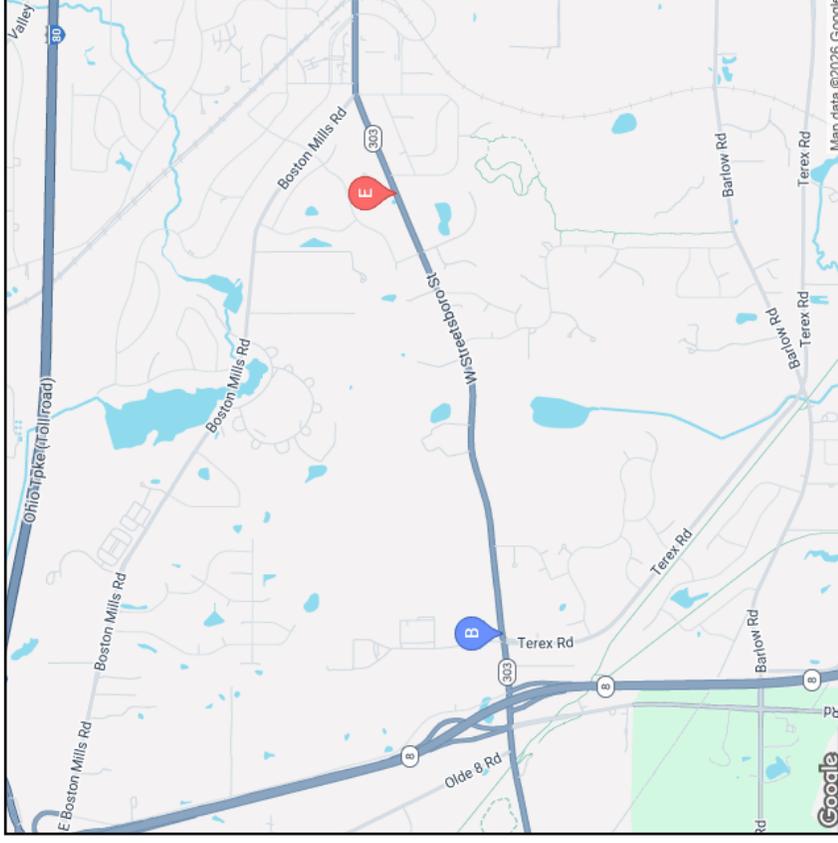
Process Flag: Adjusted model to counts with process per ODOT 255 spreadsheet

Comment: No Comment

Historical Count

| Year | All | Cars | Trucks |
|--------|--------|--------|--------|
| 2010 | 15,270 | 14,720 | 550 |
| 2013 | 12,360 | 11,968 | 391 |
| 2015 | 12,180 | 11,794 | 385 |
| 2018 | 13,531 | 12,726 | 805 |
| 2021 | 12,927 | 12,547 | 380 |
| * 2024 | 12,928 | 12,535 | 393 |

* Pivot Point



| Segment ID | LRS ID | BMP | EMP | Length | Yr 2027 AADT | Yr 2037 AADT | DHV30 | K % | D % | T24 % | TD % |
|------------|----------------|--------|--------|--------|--------------|--------------|-------|------|------|-------|------|
| 2251454 | SSUMSR00303**C | 10.714 | 12.273 | 1.559 | 13,000 | 13,500 | 1600 | 11.9 | 52.1 | 3 | 3 |

| | | | |
|---------------------|----------------|-------|-------|
| Forecast Segment ID | Route | BMP | EMP |
| 2300309 | MSUMMR05646**C | 0.000 | 0.120 |

Forecast

| Year | K% | T24 % (Existing) | PA AADT | PA Method | PA Growth Rate % | PA Calculated Rate % |
|-------|--------|------------------|---------|-----------|------------------|----------------------|
| 2050 | ◆ 16.2 | 4 | 6,600 | Average | ● -0.800 | 0.000 |
| AADT | D% | TD % (Existing) | BC AADT | BC Method | BC Growth Rate % | BC Calculated Rate % |
| 6,840 | ◆ 62.3 | 1 | 240 | Average | ● -1.100 | 0.000 |

● Warning: The growth rate was negative and was capped.

◆ K/D factors from TCDS were used.

Regression

| Method Number | PA AADT | BC AADT | AADT |
|---------------|---------|---------|-------|
| 2 | 4,382 | | 4,382 |

95% Confidence Min/Max

| PA Min | PA Max | BC Min | BC Max | Year |
|--------|--------|--------|--------|------|
| -2130 | 8961 | -221 | 827 | 2050 |

| Method Number | PA Growth % | BC Growth % | PA Drop Count | BC Drop Count | PA AADT | BC AADT | PA Adjustment | BC Adjustment |
|---------------|-------------|-------------|---------------|---------------|---------|---------|---------------|---------------|
| 1 | -1.15 | 0.95 | 0 | 0 | 4,666 | 303 | 4,602 | 303 |
| 2 | -1.28 | -999999.00 | 4 | 0 | 4,223 | | 4,382 | |
| 3 | -1.40 | -999999.00 | 0 | 0 | 4,159 | | 4,170 | |
| 4 | -1.37 | -999999.00 | 4 | 0 | 4,048 | | 4,231 | |
| 5 | -1.82 | -999999.00 | 0 | 0 | 3,372 | | 3,459 | |
| 6 | -1.34 | -999999.00 | 4 | 0 | 4,087 | | 4,267 | |

Adjustment Info

| ID | Adjustment Methods Name | Model vs Count AADT | Adjusted AADT | Model vs Count BC | Adjusted BC | PA Growth Rate % | BC Growth Rate % |
|----|-------------------------|---------------------|---------------|-------------------|-------------|------------------|------------------|
| 1 | DIF | -14,156 | 4,994 | -341 | 437 | -1.17 | 3.07 |
| 2 | RAT | 0.32 | 6,215 | 0.42 | 324 | -0.39 | 1.28 |
| 3 | MRAT | 0.91 | 6,215 | 1.33 | 352 | -0.41 | 1.73 |
| 4 | RAF | | 5,605 | | 395 | -0.79 | 2.41 |

| Adjust Method AADT | Adjust Method BC | Selected PA Growth Rate % | Selected BC Growth Rate % |
|--------------------|------------------|---------------------------|---------------------------|
| Ratio | Model Ratio | -0.400 | 1.700 |

Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total Max Volume |
|---------------|---------------|---------------|---------------|------------------|------------------|
| 4557 | 5891 | 324 | 437 | 4881 | 6328 |

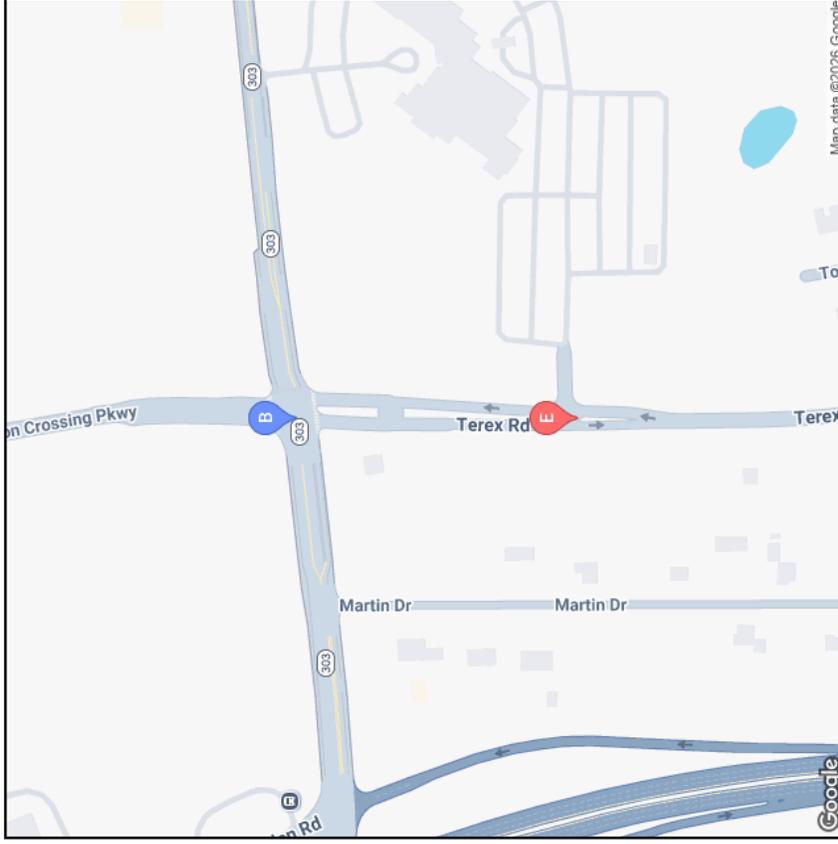
Process Flag: Adjusted model to counts with process per ODOT 255 spreadsheet

Comment: No Comment

Historical Count

| Year | All | Cars | Trucks |
|--------|-------|-------|--------|
| 2006 | 7,870 | 7,870 | |
| 2013 | 7,369 | 7,369 | |
| 2015 | 7,262 | 7,262 | |
| 2018 | 7,841 | 7,841 | |
| 2021 | 6,609 | 6,373 | 236 |
| * 2024 | 6,802 | 6,559 | 243 |

* Pivot Point



| Segment ID | LRS ID | BMP | EMP | Length | Yr 2027 AADT | Yr 2037 AADT | DHV30 | K % | D % | T24 % | TD % |
|------------|--------------------|-------|-------|--------|--------------|--------------|-------|------|------|-------|------|
| 2300309 | MSUMMR05646** C | 0.000 | 0.120 | 0.120 | 6,800 | 6,800 | 1100 | 16.2 | 62.3 | 4 | 1 |

| | | | |
|---------------------|----------------|-------|-------|
| Forecast Segment ID | Route | BMP | EMP |
| 2300311 | MSUMMR05646**C | 0.120 | 1.419 |

Forecast

| Year | K% | T24 % (Existing) | PA AADT | PA Method | PA Growth Rate % | PA Calculated Rate % |
|-------|--------|------------------|---------|-----------|------------------|----------------------|
| 2050 | ◆ 16.2 | 4 | 6,600 | Average | ● -0.900 | 0.000 |
| AADT | D% | TD % (Existing) | BC AADT | BC Method | BC Growth Rate % | BC Calculated Rate % |
| 6,840 | ◆ 62.3 | 1 | 240 | Average | ● -1.000 | 0.000 |

● Warning: The growth rate was negative and was capped.

◆ K/D factors from TCDS were used.

Regression

| Method Number | PA AADT | BC AADT | AADT |
|---------------|---------|---------|-------|
| 2 | 4,382 | | 4,382 |

95% Confidence Min/Max

| PA Min | PA Max | BC Min | BC Max | Year |
|--------|--------|--------|--------|------|
| -2130 | 8961 | -221 | 827 | 2050 |

| Method Number | PA Growth % | BC Growth % | PA Drop Count | BC Drop Count | PA AADT | BC AADT | PA Adjustment | BC Adjustment |
|---------------|-------------|-------------|---------------|---------------|---------|---------|---------------|---------------|
| 1 | -1.15 | 0.95 | 0 | 0 | 4,666 | 303 | 4,602 | 303 |
| 2 | -1.28 | -999999.00 | 4 | 0 | 4,223 | | 4,382 | |
| 3 | -1.40 | -999999.00 | 0 | 0 | 4,159 | | 4,170 | |
| 4 | -1.37 | -999999.00 | 4 | 0 | 4,048 | | 4,231 | |
| 5 | -1.82 | -999999.00 | 0 | 0 | 3,372 | | 3,459 | |
| 6 | -1.34 | -999999.00 | 4 | 0 | 4,087 | | 4,267 | |

Adjustment Info

| ID | Adjustment Methods Name | Model vs Count AADT | Adjusted AADT | Model vs Count BC | Adjusted BC | PA Growth Rate % | BC Growth Rate % |
|----|-------------------------|---------------------|---------------|-------------------|-------------|------------------|------------------|
| 1 | DIF | -6,669 | 4,969 | -363 | 444 | -1.19 | 3.18 |
| 2 | RAT | 0.50 | 5,876 | 0.40 | 324 | -0.59 | 1.28 |
| 3 | MRAT | 0.86 | 5,876 | 1.33 | 354 | -0.61 | 1.76 |
| 4 | RAF | | 5,423 | | 399 | -0.90 | 2.47 |

| Adjust Method AADT | Adjust Method BC | Selected PA Growth Rate % | Selected BC Growth Rate % |
|--------------------|------------------|---------------------------|---------------------------|
| Ratio | Model Ratio | -0.600 | 1.800 |

Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total Max Volume |
|---------------|---------------|---------------|---------------|------------------|------------------|
| 4525 | 5552 | 324 | 444 | 4849 | 5996 |

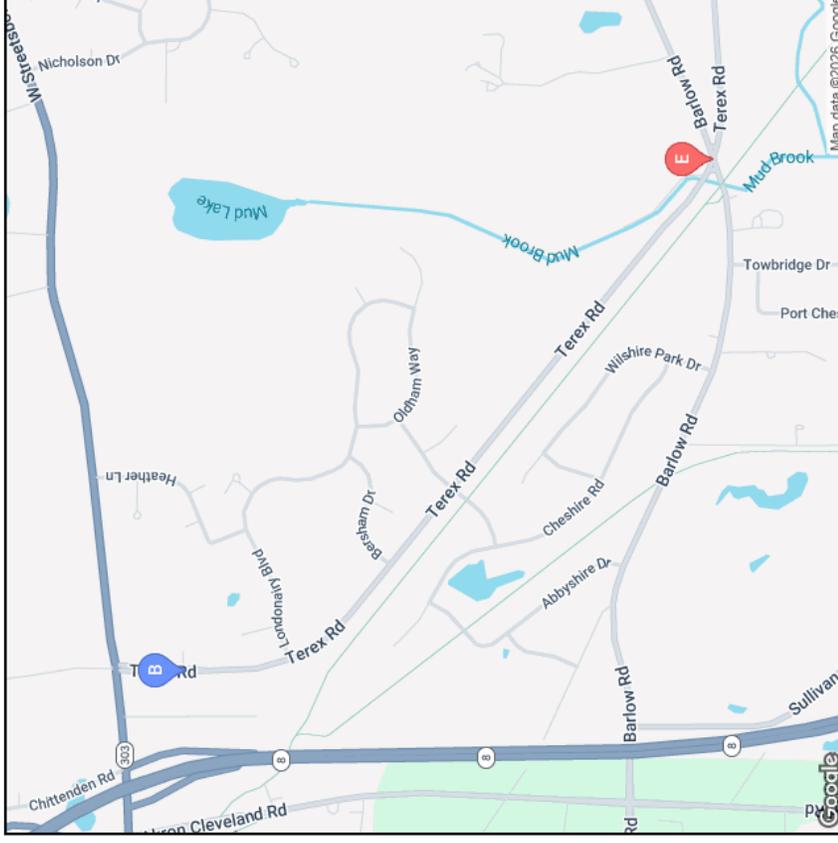
Process Flag: Adjusted model to counts with process per ODOT 255 spreadsheet

Comment: No Comment

Historical Count

| Year | All | Cars | Trucks |
|--------|-------|-------|--------|
| 2006 | 7,870 | 7,870 | |
| 2013 | 7,369 | 7,369 | |
| 2015 | 7,262 | 7,262 | |
| 2018 | 7,841 | 7,841 | |
| 2021 | 6,609 | 6,373 | 236 |
| * 2024 | 6,802 | 6,559 | 243 |

* Pivot Point



| Segment ID | LRS ID | BMP | EMP | Length | Yr 2027 AADT | Yr 2037 AADT | DHV30 | K % | D % | T24 % | TD % |
|------------|--------------------|-------|-------|--------|--------------|--------------|-------|------|------|-------|------|
| 2300311 | MSUMMR05646** C | 0.120 | 1.419 | 1.299 | 6,800 | 6,800 | 1100 | 16.2 | 62.3 | 4 | 1 |

Appendix F

ODOT Peak Hour to Design Hour Charts

PEAK HOUR to DESIGN HOUR FACTORS
FUNCTIONAL CLASSIFICATION = 03, 04, 05u
(Urban Principal Arterial, Urban Minor Arterial, & Urban Minor Collector)

| Day Month | | Monthly Average by Day-of-Week | | | | | | | |
|--------------|----|--------------------------------|------|------|------|------|------|------|------|
| | | WEEKDAY MON-THUR | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| January | 1 | 1.25 | 1.81 | 1.27 | 1.25 | 1.25 | 1.23 | 1.18 | 1.61 |
| February | 2 | 1.23 | 1.78 | 1.26 | 1.23 | 1.23 | 1.19 | 1.17 | 1.58 |
| March | 3 | 1.18 | 1.63 | 1.20 | 1.18 | 1.17 | 1.17 | 1.12 | 1.47 |
| April | 4 | 1.13 | 1.57 | 1.15 | 1.14 | 1.12 | 1.11 | 1.08 | 1.42 |
| May | 5 | 1.10 | 1.47 | 1.12 | 1.10 | 1.10 | 1.07 | 1.06 | 1.35 |
| June | 6 | 1.14 | 1.51 | 1.16 | 1.14 | 1.14 | 1.11 | 1.10 | 1.40 |
| July | 7 | 1.14 | 1.54 | 1.16 | 1.14 | 1.13 | 1.14 | 1.11 | 1.45 |
| August | 8 | 1.12 | 1.49 | 1.14 | 1.14 | 1.12 | 1.10 | 1.06 | 1.41 |
| September | 9 | 1.12 | 1.53 | 1.15 | 1.13 | 1.13 | 1.09 | 1.05 | 1.42 |
| October | 10 | 1.12 | 1.54 | 1.15 | 1.12 | 1.11 | 1.10 | 1.05 | 1.42 |
| November | 11 | 1.16 | 1.63 | 1.17 | 1.15 | 1.15 | 1.15 | 1.08 | 1.52 |
| December | 12 | 1.16 | 1.61 | 1.18 | 1.16 | 1.16 | 1.13 | 1.10 | 1.50 |

peak hour volume * factor = design hour volume

source: year 2018, 2019, & 2021 Automatic Traffic Recorders (ATR) Data

ATR Stations:

2018: 15 Stations

2019: 21 Stations

2021: 22 Stations

Ohio Department of Transportation

Modeling & Forecasting Section

Nov-22

NOTE: These are NOT seasonal adjustment factors!!!

NOTE: Factors shown rounded to 2 decimal places. Unrounded value will be used in calculations.

Note: Insufficient data exists to produce factors for functional classes 06 and 07 Urban.

Appendix G

Background Traffic Volume Forecast Calculations

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

W. Streetsboro St & Terex Rd 112025

| | Hudson Crossing Pkwy. | | | | | | | | | | | | Terex Rd. | | | | | | W. Streetsboro St. (SR 303) | | | | | | W. Streetsboro St. (SR 303) | | | | | | TOTAL | |
|--------------|-----------------------|--------|--------|--------|-----|--------|------------|--------|-------|-------|-----|-----|-------------|------|-------|-----------|------|------|-----------------------------|-------|------|------|-------|-------|-----------------------------|------------|-----|-----|-----|--|-------|--|
| | FROM NORTH | | | | | | FROM SOUTH | | | | | | TOTAL NORTH | | | FROM EAST | | | FROM WEST | | | EAST | | WEST | | ALL DIREC. | | | | | | |
| | Left | Thru | Right | Total | Trk | Bus | Left | Thru | Right | Total | Trk | Bus | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Trk | | Bus | Trk | Bus | | | |
| 2025 | Raw | 7 | 1 | 16 | 24 | 238 | 18 | 33 | 289 | 313 | 12 | 424 | 25 | 461 | 139 | 525 | 207 | 871 | 1332 | 1645 | | | | | | | | | | | | |
| DIV | Feeder | 1,1492 | 1,1492 | 1,1492 | | 1,1492 | 1,1492 | 1,1492 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2025 | No Build | 8 | 1 | 18 | 27 | 274 | 21 | 38 | 333 | 360 | 14 | 487 | 29 | 530 | 160 | 603 | 238 | 1001 | 1531 | 1991 | | | | | | | | | | | | |
| Growth | Feeder | 0.0000 | 0.0000 | 0.0000 | | 0.0030 | 0.0000 | 0.0030 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2027 | Adj +Growth+DIV | 8 | 1 | 18 | 27 | 275 | 21 | 38 | 334 | 361 | 14 | 490 | 29 | 533 | 160 | 607 | 239 | 1006 | 1539 | 1900 | | | | | | | | | | | | |
| Opening Year | Round | 10 | 10 | 20 | 40 | 280 | 20 | 40 | 340 | 380 | 10 | 490 | 30 | 550 | 160 | 610 | 240 | 1010 | 1540 | 1920 | | | | | | | | | | | | |
| 2037 | Adj +Growth+DIV | 8 | 1 | 18 | 27 | 283 | 21 | 39 | 343 | 370 | 14 | 505 | 29 | 548 | 160 | 625 | 246 | 1031 | 1579 | 1949 | | | | | | | | | | | | |
| Design Year | Round | 10 | 10 | 20 | 40 | 280 | 20 | 40 | 340 | 380 | 10 | 500 | 30 | 540 | 160 | 630 | 250 | 1040 | 1580 | 1960 | | | | | | | | | | | | |
| 2025 | Raw | 11 | 30 | 101 | 142 | 282 | 4 | 26 | 312 | 454 | 53 | 529 | 3 | 585 | 14 | 604 | 437 | 1055 | 1640 | 2094 | | | | | | | | | | | | |
| DIV | Feeder | 1,1492 | 1,1492 | 1,1492 | | 1,1492 | 1,1492 | 1,1492 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2025 | No Build | 13 | 34 | 116 | 163 | 324 | 5 | 30 | 359 | 522 | 61 | 608 | 3 | 672 | 16 | 694 | 502 | 1212 | 1884 | 2406 | | | | | | | | | | | | |
| Growth | Feeder | 0.0000 | 0.0000 | 0.0000 | | 0.0030 | 0.0000 | 0.0030 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2027 | Adj +Growth+DIV | 13 | 34 | 116 | 163 | 326 | 5 | 30 | 361 | 524 | 61 | 612 | 3 | 676 | 16 | 698 | 505 | 1219 | 1895 | 2419 | | | | | | | | | | | | |
| Opening Year | Round | 10 | 30 | 120 | 160 | 330 | 10 | 30 | 370 | 530 | 60 | 610 | 10 | 680 | 20 | 700 | 510 | 1230 | 1910 | 2440 | | | | | | | | | | | | |
| 2037 | Adj +Growth+DIV | 13 | 34 | 116 | 163 | 336 | 5 | 31 | 372 | 535 | 63 | 630 | 3 | 696 | 16 | 719 | 520 | 1255 | 1951 | 2486 | | | | | | | | | | | | |
| Design Year | Round | 10 | 30 | 120 | 160 | 340 | 10 | 30 | 380 | 540 | 60 | 630 | 10 | 700 | 20 | 720 | 520 | 1260 | 1960 | 2500 | | | | | | | | | | | | |

AM PEAK

PM PEAK

Appendix H

Existing Traffic Signal Timing - SR 303 & Terex Road

| | | | | |
|--------|--------|----------|--------------------------|----------|
| OWN BY | DATE | APPVD BY | CITY & LOCATION | PAGE NO. |
| JL | 6/3/20 | DB | Hudson RT 303 + Terex | |

TIMING PLAN # _____ BRAND ECON MMU _____
 CONTROLLER TIMING MODEL ASC 2100 TS1 TS2 _____

| DESCRIPTION | RANGE | EBLT | WBLT | NBLT | SB | WBLT | EB | NB | |
|------------------|--------|------|------|------|-----|------|-----|-----|----|
| VAL | RANGE | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 |
| GREEN | 0-255 | 5 | 40 | 5 | 5 | 5 | 40 | 5 | |
| VEHICLE EXT | 0-25.5 | 2 | 5 | 3 | 2 | 2.5 | 5.0 | 3 | |
| | 0-25.5 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | |
| | 0-25.5 | 1.7 | 1.8 | 1.6 | 1.6 | 1.7 | 1.8 | 1.6 | |
| 1 | 0-255 | 15 | 60 | 18 | 15 | 15 | 60 | 49 | |
| 2 | 0-255 | 15 | 60 | 10 | 25 | 15 | 60 | 49 | |
| WALK | 0-255 | | | | | | | | |
| | 0-255 | | 5 | | | | 5 | 15 | |
| | 7-255 | | 25 | | 7 | | 25 | 15 | |
| ALL | 0 OR 1 | 1 | 1 | | | | 1 | | |
| ALL | 0 OR 1 | | 1 | | | | 1 | | |
| ALL | 0 OR 1 | | 1 | | | | 1 | | |
| | 0 OR 1 | | | | | | | | |
| | 0 OR 1 | | | | | | | | |
| WALK | 0 OR 1 | | | | | | | | |
| MIT | 0 OR 1 | | | | | | | | |
| IT | 0 OR 1 | | | | | | | | |
| CALL | 0 OR 1 | | | | | | | | |
| E DENSITY ACTIVE | 0 OR 1 | | | | | | | | |
| TIAL | 0-12.7 | | | | | | | | |
| | 0-127 | | | | | | | | |
| | 0-127 | | | | | | | | |
| ON | 0-127 | | | | | | | | |
| | 0-12.7 | | | | | | | | |

SPECIAL FEATURES

OPERATES IN FREE MODE N
 ARROW BACK-UP PROTECTION Y
 DENSITY ACTIVE N
 SE(S) AFTER U.C.F. 2-6
 TART PHASE(S) 2-6

FLASH OR MAX II TIMES NONE
 FLASH OR MAX II DAYS NONE
 FLASH COLORS _____
 PHASE 01 _____

CHANNEL 9 YELLOW
 326
 323
 HH
 A655
 TYP

SOUND PATTERN 4
 COMPLETE LENGTH..... 100% C/D/S..... 704
 PHASE 1} 12% 33 53% 33 11% 40 24%
 PHASE 5} 12% 33 53% 33 10% 40 24%
 PHASE 9} 10% 10 11% 11 12% 12 0%
 VEH PERMISSIVE..... [1] 10% [2] 0%
 VEH 1 PERMISSIVE..... [1] 10% [2] 0%
 VEH 2 PERMISSIVE..... [1] 10% [2] 0%
 VEH 3 PERMISSIVE..... [1] 10% [2] 0%
 VEH 4 PERMISSIVE..... [1] 10% [2] 0%
 VEH 5 PERMISSIVE..... [1] 10% [2] 0%
 VEH 6 PERMISSIVE..... [1] 10% [2] 0%
 VEH 7 PERMISSIVE..... [1] 10% [2] 0%
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 VEH 62 PERMISSIVE..... [1] 10% [2] 0%
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 VEH 97 PERMISSIVE..... [1] 10% [2] 0%
 VEH 98 PERMISSIVE..... [1] 10% [2] 0%
 VEH 99 PERMISSIVE..... [1] 10% [2] 0%
 VEH 100 PERMISSIVE..... [1] 10% [2] 0%

F1 MAIN MENU
 F3 SUB MENU
 F5 DISPLAY ADJUST
 F7 STATUS DISPLAY

ECONOLITE
 CONTROL PRODUCTS, INC.

DSF

PORT 1
 PORT 3

2505

F1

MAIN MENU

F3

SUB MENU

F5

DISPLAY ADJUST

F7

STATUS DISPLAY

The LCD display shows a menu with the following text and data:

- CODE PATTERN 7
- LENGTH 120%
- LETTERS: 13 14% 23 69% 73 16% 43 22%
- PHASE 53 29% 163 53% 113 0% 83 0%
- EMISSIVE [1] 10% [2] 0%
- RESERVE PATTERNING [1] 10% [2] 0%
- EXTENSION [1] 0% [2] 0%
- ADDITIONAL PARAMETERS

 **ECONOLITE**
CONTROL PRODUCTS, INC.

PORT 1

PORT 3

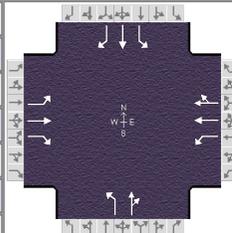


Appendix I

No-Build Capacity Analysis Worksheets - 2027

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|---|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.97 | | |
| Urban Street | SR 303 | Analysis Year | 2027 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2027 AM Peak NB SR 303 & Terex Rd..xus | | | | |
| Project Description | No-Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---------------------|-----|-----|-----|----|-----|----|-----|----|----|----|----|----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 160 | 610 | 240 | 10 | 490 | 30 | 280 | 20 | 40 | 10 | 10 | 20 |

| Signal Information | | | | | | | | | | | | | |
|--------------------|-------|-----------------|-----|--------|-----|-----|------|------|-----|-----|--|--|--|
| Cycle, s | 100.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 1.7 | 5.2 | 49.7 | 12.8 | 9.4 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| | | | | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

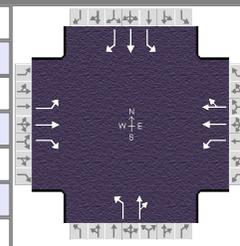
| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|--|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 12.2 | 60.3 | 7.0 | 55.1 | 18.0 | 32.6 | | 14.6 |
| Change Period, (Y+R _c), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g _s), s | 6.3 | | 2.3 | | 14.8 | 4.8 | | 3.6 |
| Green Extension Time (g _e), s | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | | 0.1 |
| Phase Call Probability | 0.99 | | 0.25 | | 1.00 | 1.00 | | 0.94 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 165 | 629 | 247 | 10 | 270 | 266 | 289 | 62 | | 10 | 10 | 21 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1739 | 1826 | 1547 | 1725 | 1811 | 1774 | 1767 | 1657 | | 916 | 1278 | 1083 |
| Queue Service Time (g _s), s | 4.3 | 23.7 | 6.1 | 0.3 | 8.8 | 8.9 | 12.8 | 2.8 | | 1.0 | 0.7 | 1.6 |
| Cycle Queue Clearance Time (g _c), s | 4.3 | 23.7 | 6.1 | 0.3 | 8.8 | 8.9 | 12.8 | 2.8 | | 1.0 | 0.7 | 1.6 |
| Green Ratio (g/C) | 0.59 | 0.55 | 0.68 | 0.51 | 0.50 | 0.50 | 0.24 | 0.27 | | 0.09 | 0.09 | 0.16 |
| Capacity (c), veh/h | 539 | 1003 | 1048 | 328 | 901 | 882 | 419 | 454 | | 158 | 120 | 177 |
| Volume-to-Capacity Ratio (X) | 0.306 | 0.627 | 0.236 | 0.031 | 0.300 | 0.301 | 0.688 | 0.136 | | 0.065 | 0.086 | 0.116 |
| Back of Queue (Q), ft/ln (95 th percentile) | 68 | 376 | 82 | 5 | 166 | 156 | 273 | 50 | | 14 | 14 | 26 |
| Back of Queue (Q), veh/ln (95 th percentile) | 2.6 | 14.5 | 3.1 | 0.2 | 6.3 | 6.2 | 10.7 | 1.9 | | 0.4 | 0.4 | 0.8 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.21 | 0.38 | 0.25 | 0.03 | 0.17 | 0.16 | 1.14 | 0.05 | | 0.05 | 0.01 | 0.09 |
| Uniform Delay (d ₁), s/veh | 10.2 | 15.5 | 6.2 | 14.0 | 14.8 | 14.9 | 34.7 | 27.4 | | 41.5 | 41.3 | 35.7 |
| Incremental Delay (d ₂), s/veh | 0.1 | 3.0 | 0.5 | 0.0 | 0.9 | 0.9 | 3.9 | 0.1 | | 0.1 | 0.1 | 0.1 |
| Initial Queue Delay (d ₃), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 10.3 | 18.5 | 6.7 | 14.0 | 15.7 | 15.7 | 38.7 | 27.4 | | 41.5 | 41.5 | 35.8 |
| Level of Service (LOS) | B | B | A | B | B | B | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 14.4 | | B | 15.7 | | B | 36.7 | | D | 38.6 | | D |
| Intersection Delay, s/veh / LOS | 19.2 | | | | | | B | | | | | |

| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|---|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.90 | | |
| Urban Street | SR 303 | Analysis Year | 2027 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2027 PM Peak NB SR 303 & Terex Rd..xus | | | | |
| Project Description | No-Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---------------------|----|-----|-----|----|-----|----|-----|----|----|----|----|-----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 20 | 700 | 510 | 60 | 610 | 10 | 330 | 10 | 30 | 10 | 30 | 120 |

| Signal Information | | | | | | | | | | | | | |
|--------------------|-------|-----------------|-----|--------|-----|-----|------|------|------|-----|--|--|--|
| Cycle, s | 120.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 3.7 | 2.6 | 60.8 | 19.8 | 12.1 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| | | | | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|--|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 9.0 | 66.2 | 11.5 | 68.8 | 25.0 | 42.3 | | 17.3 |
| Change Period, (Y+R _c), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g _s), s | 2.7 | | 4.1 | | 21.8 | 4.3 | | 11.7 |
| Green Extension Time (g _e), s | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | | 0.3 |
| Phase Call Probability | 0.52 | | 0.89 | | 1.00 | 1.00 | | 1.00 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 22 | 778 | 567 | 67 | 345 | 344 | 367 | 44 | | 11 | 33 | 133 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1795 | 1885 | 1598 | 1767 | 1856 | 1845 | 1753 | 1622 | | 1340 | 1841 | 1560 |
| Queue Service Time (g _s), s | 0.7 | 41.6 | 21.7 | 2.1 | 13.0 | 13.0 | 19.8 | 2.3 | | 0.9 | 2.0 | 9.7 |
| Cycle Queue Clearance Time (g _c), s | 0.7 | 41.6 | 21.7 | 2.1 | 13.0 | 13.0 | 19.8 | 2.3 | | 0.9 | 2.0 | 9.7 |
| Green Ratio (g/C) | 0.54 | 0.51 | 0.67 | 0.56 | 0.53 | 0.53 | 0.28 | 0.31 | | 0.10 | 0.10 | 0.13 |
| Capacity (c), veh/h | 421 | 955 | 1073 | 262 | 980 | 974 | 463 | 501 | | 195 | 185 | 205 |
| Volume-to-Capacity Ratio (X) | 0.053 | 0.815 | 0.528 | 0.255 | 0.353 | 0.353 | 0.792 | 0.089 | | 0.057 | 0.180 | 0.651 |
| Back of Queue (Q), ft/ln (95 th percentile) | 12 | 661 | 287 | 36 | 237 | 231 | 408 | 42 | | 14 | 44 | 181 |
| Back of Queue (Q), veh/ln (95 th percentile) | 0.5 | 26.2 | 11.4 | 1.4 | 9.3 | 9.2 | 15.8 | 1.6 | | 0.6 | 1.7 | 7.0 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.04 | 0.66 | 0.88 | 0.25 | 0.24 | 0.24 | 1.70 | 0.04 | | 0.05 | 0.04 | 0.59 |
| Uniform Delay (d ₁), s/veh | 13.7 | 24.9 | 10.0 | 20.1 | 16.4 | 16.4 | 39.7 | 29.5 | | 48.9 | 49.4 | 49.5 |
| Incremental Delay (d ₂), s/veh | 0.0 | 7.6 | 1.9 | 0.2 | 1.0 | 1.0 | 8.4 | 0.0 | | 0.0 | 0.2 | 1.3 |
| Initial Queue Delay (d ₃), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 13.7 | 32.5 | 11.9 | 20.3 | 17.4 | 17.4 | 48.1 | 29.5 | | 49.0 | 49.6 | 50.8 |
| Level of Service (LOS) | B | C | B | C | B | B | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 23.6 | | C | 17.7 | | B | 46.1 | | D | 50.5 | | D |
| Intersection Delay, s/veh / LOS | 27.1 | | | | | | C | | | | | |

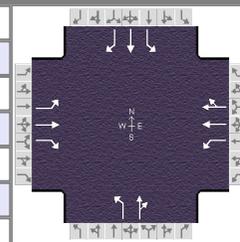
| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

Appendix J

Build Capacity Analysis Worksheets - 2027

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|--|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.97 | | |
| Urban Street | SR 303 | Analysis Year | 2027 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2027 AM Peak SR 303 & Terex Rd..xus | | | | |
| Project Description | Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---------------------|-----|-----|-----|----|-----|----|-----|----|----|----|----|----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 160 | 610 | 274 | 28 | 490 | 30 | 306 | 20 | 62 | 10 | 10 | 20 |

| Signal Information | | | | | | | | | | | | | |
|--------------------|-------|-----------------|-----|-----|-----|------|------|-----|-----|--|--|--|--|
| Cycle, s | 100.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | | | | | | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | | | | | | | | | | |
| | | Green | | 3.9 | 3.1 | 48.5 | 13.8 | 9.7 | 0.0 | | | | |
| | | Yellow | | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | | |
| | | Red | | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | | |

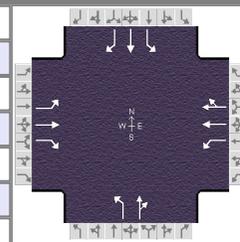
| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|--|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 12.2 | 56.9 | 9.2 | 53.9 | 19.0 | 33.9 | | 14.9 |
| Change Period, (Y+R _c), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g _s), s | 6.7 | | 2.8 | | 15.8 | 5.9 | | 3.6 |
| Green Extension Time (g _e), s | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | | 0.1 |
| Phase Call Probability | 0.99 | | 0.55 | | 1.00 | 1.00 | | 0.97 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.01 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 165 | 629 | 282 | 29 | 270 | 266 | 315 | 85 | | 10 | 10 | 21 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1739 | 1826 | 1547 | 1725 | 1811 | 1774 | 1767 | 1633 | | 897 | 1278 | 1083 |
| Queue Service Time (g _s), s | 4.7 | 25.5 | 7.7 | 0.8 | 9.0 | 9.1 | 13.8 | 3.9 | | 1.0 | 0.7 | 1.6 |
| Cycle Queue Clearance Time (g _c), s | 4.7 | 25.5 | 7.7 | 0.8 | 9.0 | 9.1 | 13.8 | 3.9 | | 1.0 | 0.7 | 1.6 |
| Green Ratio (g/C) | 0.55 | 0.52 | 0.65 | 0.52 | 0.48 | 0.48 | 0.25 | 0.29 | | 0.10 | 0.10 | 0.17 |
| Capacity (c), veh/h | 526 | 941 | 1011 | 324 | 878 | 860 | 441 | 469 | | 159 | 124 | 180 |
| Volume-to-Capacity Ratio (X) | 0.313 | 0.668 | 0.279 | 0.089 | 0.308 | 0.309 | 0.716 | 0.180 | | 0.065 | 0.083 | 0.115 |
| Back of Queue (Q), ft/ln (95 th percentile) | 76 | 411 | 107 | 14 | 172 | 162 | 296 | 67 | | 14 | 14 | 26 |
| Back of Queue (Q), veh/ln (95 th percentile) | 2.9 | 15.8 | 4.1 | 0.5 | 6.5 | 6.5 | 11.5 | 2.6 | | 0.4 | 0.4 | 0.8 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.23 | 0.41 | 0.33 | 0.09 | 0.17 | 0.17 | 1.23 | 0.07 | | 0.05 | 0.01 | 0.09 |
| Uniform Delay (d ₁), s/veh | 11.5 | 17.9 | 7.3 | 14.6 | 15.6 | 15.6 | 34.3 | 26.8 | | 41.2 | 41.1 | 35.4 |
| Incremental Delay (d ₂), s/veh | 0.1 | 3.8 | 0.7 | 0.0 | 0.9 | 0.9 | 4.7 | 0.1 | | 0.1 | 0.1 | 0.1 |
| Initial Queue Delay (d ₃), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 11.6 | 21.7 | 8.0 | 14.7 | 16.5 | 16.5 | 39.0 | 26.9 | | 41.3 | 41.2 | 35.5 |
| Level of Service (LOS) | B | C | A | B | B | B | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 16.6 | | B | 16.4 | | B | 36.4 | | D | 38.4 | | D |
| Intersection Delay, s/veh / LOS | 20.8 | | | | | | C | | | | | |

| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|--|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.90 | | |
| Urban Street | SR 303 | Analysis Year | 2027 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2027 PM Peak SR 303 & Terex Rd..xus | | | | |
| Project Description | Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---------------------|----|-----|-----|----|-----|----|-----|----|----|----|----|-----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 20 | 690 | 535 | 77 | 601 | 10 | 354 | 10 | 51 | 10 | 30 | 120 |

| Signal Information | | | | Signal Phases | | | | | | | | | |
|--------------------|-------|-----------------|-----|---------------|-----|-----|------|------|------|-----|--|--|--|
| Cycle, s | 120.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | Green | 3.7 | 2.9 | 55.3 | 24.8 | 12.2 | 0.0 | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|--|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 9.0 | 60.7 | 11.9 | 63.6 | 30.0 | 47.4 | | 17.4 |
| Change Period, (Y+R _c), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g _s), s | 2.8 | | 5.0 | | 25.4 | 5.4 | | 11.7 |
| Green Extension Time (g _e), s | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | | 0.5 |
| Phase Call Probability | 0.52 | | 0.94 | | 1.00 | 1.00 | | 1.00 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 22 | 767 | 594 | 86 | 340 | 339 | 393 | 68 | | 11 | 33 | 133 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1795 | 1885 | 1598 | 1767 | 1856 | 1845 | 1753 | 1600 | | 1312 | 1841 | 1560 |
| Queue Service Time (g _s), s | 0.8 | 44.3 | 23.6 | 3.0 | 13.9 | 13.9 | 23.4 | 3.4 | | 0.9 | 2.0 | 9.7 |
| Cycle Queue Clearance Time (g _c), s | 0.8 | 44.3 | 23.6 | 3.0 | 13.9 | 13.9 | 23.4 | 3.4 | | 0.9 | 2.0 | 9.7 |
| Green Ratio (g/C) | 0.49 | 0.46 | 0.67 | 0.52 | 0.49 | 0.49 | 0.32 | 0.35 | | 0.10 | 0.10 | 0.13 |
| Capacity (c), veh/h | 386 | 869 | 1067 | 221 | 901 | 895 | 537 | 562 | | 193 | 187 | 206 |
| Volume-to-Capacity Ratio (X) | 0.058 | 0.882 | 0.557 | 0.388 | 0.378 | 0.378 | 0.732 | 0.120 | | 0.057 | 0.178 | 0.647 |
| Back of Queue (Q), ft/ln (95 th percentile) | 14 | 737 | 310 | 53 | 256 | 249 | 401 | 60 | | 14 | 43 | 181 |
| Back of Queue (Q), veh/ln (95 th percentile) | 0.5 | 29.2 | 12.3 | 2.1 | 10.0 | 9.9 | 15.5 | 2.3 | | 0.6 | 1.7 | 7.0 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.04 | 0.74 | 0.95 | 0.37 | 0.26 | 0.25 | 1.67 | 0.06 | | 0.05 | 0.04 | 0.59 |
| Uniform Delay (d ₁), s/veh | 16.4 | 29.4 | 10.6 | 24.1 | 19.5 | 19.5 | 35.3 | 26.3 | | 48.8 | 49.3 | 49.4 |
| Incremental Delay (d ₂), s/veh | 0.0 | 12.5 | 2.1 | 0.4 | 1.2 | 1.2 | 4.5 | 0.0 | | 0.0 | 0.2 | 1.3 |
| Initial Queue Delay (d ₃), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 16.5 | 41.9 | 12.7 | 24.5 | 20.7 | 20.7 | 39.8 | 26.4 | | 48.9 | 49.5 | 50.7 |
| Level of Service (LOS) | B | D | B | C | C | C | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 28.9 | | C | 21.1 | | C | 37.8 | | D | 50.4 | | D |
| Intersection Delay, s/veh / LOS | 29.6 | | | | | | C | | | | | |

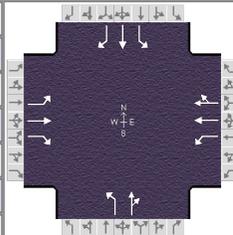
| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

Appendix K

No-Build Capacity Analysis Worksheets - 2037

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|---|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.97 | | |
| Urban Street | SR 303 | Analysis Year | 2037 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2037 AM Peak NB SR 303 & Terex Rd..xus | | | | |
| Project Description | No-Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|-----------------------|-----|-----|-----|----|-----|----|-----|----|----|----|----|----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 160 | 630 | 250 | 10 | 500 | 30 | 280 | 20 | 40 | 10 | 10 | 20 |

| Signal Information | | | | Signal Phases | | | | | | | | | |
|--------------------|-------|-----------------|-----|---------------|-----|-----|------|------|-----|-----|--|--|--|
| Cycle, s | 100.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | Green | 1.7 | 5.2 | 49.7 | 12.8 | 9.4 | 0.0 | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

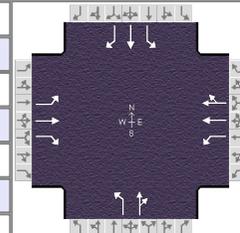
| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-----------------------------------|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 12.2 | 60.3 | 7.0 | 55.1 | 18.0 | 32.6 | | 14.6 |
| Change Period, ($Y+R_c$), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g_s), s | 6.3 | | 2.3 | | 14.8 | 4.8 | | 3.6 |
| Green Extension Time (g_e), s | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | | 0.1 |
| Phase Call Probability | 0.99 | | 0.25 | | 1.00 | 1.00 | | 0.94 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 165 | 649 | 258 | 10 | 275 | 271 | 289 | 62 | | 10 | 10 | 21 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1739 | 1826 | 1547 | 1725 | 1811 | 1775 | 1767 | 1657 | | 916 | 1278 | 1083 |
| Queue Service Time (g_s), s | 4.3 | 24.9 | 6.5 | 0.3 | 9.0 | 9.1 | 12.8 | 2.8 | | 1.0 | 0.7 | 1.6 |
| Cycle Queue Clearance Time (g_c), s | 4.3 | 24.9 | 6.5 | 0.3 | 9.0 | 9.1 | 12.8 | 2.8 | | 1.0 | 0.7 | 1.6 |
| Green Ratio (g/C) | 0.59 | 0.55 | 0.68 | 0.51 | 0.50 | 0.50 | 0.24 | 0.27 | | 0.09 | 0.09 | 0.16 |
| Capacity (c), veh/h | 534 | 1003 | 1048 | 314 | 901 | 883 | 419 | 454 | | 158 | 120 | 177 |
| Volume-to-Capacity Ratio (X) | 0.309 | 0.648 | 0.246 | 0.033 | 0.306 | 0.307 | 0.688 | 0.136 | | 0.065 | 0.086 | 0.116 |
| Back of Queue (Q), ft/ln (95 th percentile) | 68 | 393 | 85 | 5 | 170 | 160 | 273 | 50 | | 14 | 14 | 26 |
| Back of Queue (Q), veh/ln (95 th percentile) | 2.6 | 15.1 | 3.3 | 0.2 | 6.5 | 6.4 | 10.7 | 1.9 | | 0.4 | 0.4 | 0.8 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.21 | 0.39 | 0.26 | 0.03 | 0.17 | 0.17 | 1.14 | 0.05 | | 0.05 | 0.01 | 0.09 |
| Uniform Delay (d_1), s/veh | 10.2 | 15.8 | 6.2 | 14.2 | 14.9 | 14.9 | 34.7 | 27.4 | | 41.5 | 41.3 | 35.7 |
| Incremental Delay (d_2), s/veh | 0.1 | 3.2 | 0.6 | 0.0 | 0.9 | 0.9 | 3.9 | 0.1 | | 0.1 | 0.1 | 0.1 |
| Initial Queue Delay (d_3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 10.4 | 19.0 | 6.8 | 14.2 | 15.8 | 15.8 | 38.7 | 27.4 | | 41.5 | 41.5 | 35.8 |
| Level of Service (LOS) | B | B | A | B | B | B | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 14.7 | | B | 15.8 | | B | 36.7 | | D | 38.6 | | D |
| Intersection Delay, s/veh / LOS | 19.3 | | | | | | B | | | | | |

| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|---|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.90 | | |
| Urban Street | SR 303 | Analysis Year | 2037 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2037 PM Peak NB SR 303 & Terex Rd..xus | | | | |
| Project Description | No-Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|-----------------------|----|-----|-----|----|-----|----|-----|----|----|----|----|-----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 20 | 720 | 520 | 60 | 630 | 10 | 340 | 10 | 30 | 10 | 30 | 120 |

| Signal Information | | | | | | | | | | | | | |
|--------------------|-------|-----------------|-----|--------|-----|-----|------|------|------|-----|--|--|--|
| Cycle, s | 120.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 3.7 | 2.6 | 60.8 | 19.8 | 12.1 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| | | | | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|-----------------------------------|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 9.0 | 66.2 | 11.5 | 68.8 | 25.0 | 42.3 | | 17.3 |
| Change Period, ($Y+R_c$), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g_s), s | 2.7 | | 4.1 | | 21.8 | 4.3 | | 11.7 |
| Green Extension Time (g_e), s | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | | 0.3 |
| Phase Call Probability | 0.52 | | 0.89 | | 1.00 | 1.00 | | 1.00 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 22 | 800 | 578 | 67 | 356 | 355 | 378 | 44 | | 11 | 33 | 133 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1795 | 1885 | 1598 | 1767 | 1856 | 1845 | 1753 | 1622 | | 1340 | 1841 | 1560 |
| Queue Service Time (g_s), s | 0.7 | 43.7 | 22.3 | 2.1 | 13.5 | 13.5 | 19.8 | 2.3 | | 0.9 | 2.0 | 9.7 |
| Cycle Queue Clearance Time (g_c), s | 0.7 | 43.7 | 22.3 | 2.1 | 13.5 | 13.5 | 19.8 | 2.3 | | 0.9 | 2.0 | 9.7 |
| Green Ratio (g/C) | 0.54 | 0.51 | 0.67 | 0.56 | 0.53 | 0.53 | 0.28 | 0.31 | | 0.10 | 0.10 | 0.13 |
| Capacity (c), veh/h | 412 | 955 | 1073 | 248 | 980 | 974 | 463 | 501 | | 195 | 185 | 205 |
| Volume-to-Capacity Ratio (X) | 0.054 | 0.838 | 0.539 | 0.269 | 0.364 | 0.364 | 0.816 | 0.089 | | 0.057 | 0.180 | 0.651 |
| Back of Queue (Q), ft/ln (95 th percentile) | 12 | 695 | 294 | 36 | 244 | 238 | 446 | 42 | | 14 | 44 | 181 |
| Back of Queue (Q), veh/ln (95 th percentile) | 0.5 | 27.6 | 11.7 | 1.4 | 9.6 | 9.5 | 17.3 | 1.6 | | 0.6 | 1.7 | 7.0 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.04 | 0.70 | 0.91 | 0.25 | 0.24 | 0.24 | 1.86 | 0.04 | | 0.05 | 0.04 | 0.59 |
| Uniform Delay (d_1), s/veh | 13.7 | 25.4 | 10.1 | 21.0 | 16.6 | 16.6 | 40.2 | 29.5 | | 48.9 | 49.4 | 49.5 |
| Incremental Delay (d_2), s/veh | 0.0 | 8.7 | 1.9 | 0.2 | 1.0 | 1.1 | 10.1 | 0.0 | | 0.0 | 0.2 | 1.3 |
| Initial Queue Delay (d_3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 13.8 | 34.1 | 12.1 | 21.2 | 17.6 | 17.6 | 50.4 | 29.5 | | 49.0 | 49.6 | 50.8 |
| Level of Service (LOS) | B | C | B | C | B | B | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 24.7 | | C | 17.9 | | B | 48.2 | | D | 50.5 | | D |
| Intersection Delay, s/veh / LOS | 28.0 | | | | | | C | | | | | |

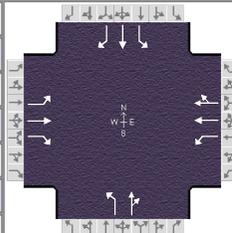
| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

Appendix L

Build Capacity Analysis Worksheets - 2037

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|-------------|--|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.97 | | |
| Urban Street | SR 303 | Analysis Year | 2037 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | | File Name | 1. 2037 AM Peak SR 303 & Terex Rd..xus | | | |
| Project Description | Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---------------------|-----|-----|-----|----|-----|----|-----|----|----|----|----|----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 160 | 630 | 284 | 28 | 500 | 30 | 306 | 20 | 62 | 10 | 10 | 20 |

| Signal Information | | | | Signal Phases | | | | | | | | | |
|--------------------|-------|-----------------|-----|---------------|-----|-----|------|------|-----|-----|--|--|--|
| Cycle, s | 100.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | Green | 3.9 | 3.4 | 44.5 | 17.4 | 9.7 | 0.0 | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

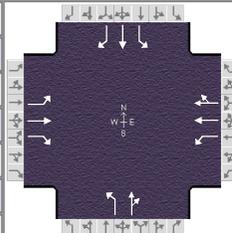
| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|--|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 12.5 | 53.3 | 9.2 | 49.9 | 22.6 | 37.5 | | 14.9 |
| Change Period, (Y+R _c), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g _s), s | 7.0 | | 2.9 | | 17.4 | 5.7 | | 3.6 |
| Green Extension Time (g _e), s | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | | 0.1 |
| Phase Call Probability | 0.99 | | 0.55 | | 1.00 | 1.00 | | 0.97 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.01 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 165 | 649 | 293 | 29 | 275 | 271 | 315 | 85 | | 10 | 10 | 21 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1739 | 1826 | 1547 | 1725 | 1811 | 1775 | 1767 | 1633 | | 897 | 1278 | 1083 |
| Queue Service Time (g _s), s | 5.0 | 28.8 | 8.1 | 0.9 | 9.9 | 10.0 | 15.4 | 3.7 | | 1.0 | 0.7 | 1.6 |
| Cycle Queue Clearance Time (g _c), s | 5.0 | 28.8 | 8.1 | 0.9 | 9.9 | 10.0 | 15.4 | 3.7 | | 1.0 | 0.7 | 1.6 |
| Green Ratio (g/C) | 0.52 | 0.48 | 0.65 | 0.48 | 0.45 | 0.45 | 0.29 | 0.32 | | 0.10 | 0.10 | 0.17 |
| Capacity (c), veh/h | 488 | 875 | 1011 | 268 | 807 | 791 | 505 | 528 | | 159 | 124 | 183 |
| Volume-to-Capacity Ratio (X) | 0.338 | 0.742 | 0.290 | 0.108 | 0.341 | 0.343 | 0.625 | 0.160 | | 0.065 | 0.083 | 0.113 |
| Back of Queue (Q), ft/ln (95 th percentile) | 84 | 471 | 112 | 15 | 193 | 182 | 271 | 63 | | 14 | 14 | 26 |
| Back of Queue (Q), veh/ln (95 th percentile) | 3.2 | 18.1 | 4.3 | 0.6 | 7.4 | 7.3 | 10.6 | 2.5 | | 0.4 | 0.4 | 0.8 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.26 | 0.47 | 0.34 | 0.10 | 0.19 | 0.19 | 1.13 | 0.06 | | 0.05 | 0.01 | 0.09 |
| Uniform Delay (d ₁), s/veh | 13.4 | 21.1 | 7.4 | 17.4 | 18.1 | 18.1 | 30.6 | 24.1 | | 41.2 | 41.1 | 35.2 |
| Incremental Delay (d ₂), s/veh | 0.2 | 5.7 | 0.7 | 0.1 | 1.2 | 1.2 | 1.7 | 0.1 | | 0.1 | 0.1 | 0.1 |
| Initial Queue Delay (d ₃), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 13.6 | 26.7 | 8.1 | 17.5 | 19.3 | 19.3 | 32.4 | 24.2 | | 41.3 | 41.2 | 35.3 |
| Level of Service (LOS) | B | C | A | B | B | B | C | C | | D | D | D |
| Approach Delay, s/veh / LOS | 19.8 | | B | 19.2 | | B | 30.6 | | C | 38.3 | | D |
| Intersection Delay, s/veh / LOS | 22.1 | | | | | | C | | | | | |

| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | | | |
|---------------------|---------------------|---------------|--|--------------------------|----------|--|--|
| Agency | TMS Engineers, Inc. | | | Duration, h | 0.250 | | |
| Analyst | KMC | Analysis Date | Jan 5, 2026 | Area Type | Other | | |
| Jurisdiction | Hudson | Time Period | AM Peak | PHF | 0.90 | | |
| Urban Street | SR 303 | Analysis Year | 2037 | Analysis Period | 1 > 7:00 | | |
| Intersection | SR 303 & Terex Road | File Name | 1. 2037 PM Peak SR 303 & Terex Rd..xus | | | | |
| Project Description | Build | | | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---------------------|----|-----|-----|----|-----|----|-----|----|----|----|----|-----|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Demand (v), veh/h | 20 | 710 | 545 | 77 | 621 | 10 | 364 | 10 | 51 | 10 | 30 | 120 |

| Signal Information | | | | Signal Phases | | | | | | | | | |
|--------------------|-------|-----------------|-----|---------------|-----|-----|------|------|------|-----|--|--|--|
| Cycle, s | 120.0 | Reference Phase | 2 | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | Green | 3.7 | 2.9 | 54.3 | 25.8 | 12.2 | 0.0 | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Yellow | 3.6 | 0.0 | 3.6 | 3.6 | 3.6 | 0.0 | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Red | 1.7 | 0.0 | 1.8 | 1.6 | 1.6 | 0.0 | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|--|------|------|------|------|------|------|-----|------|
| Assigned Phase | 1 | 6 | 5 | 2 | 3 | 8 | | 4 |
| Case Number | 1.1 | 3.0 | 1.1 | 4.0 | 1.0 | 4.0 | | 5.3 |
| Phase Duration, s | 9.0 | 59.7 | 11.9 | 62.6 | 31.0 | 48.4 | | 17.4 |
| Change Period, (Y+R _c), s | 5.3 | 5.4 | 5.3 | 5.4 | 5.2 | 5.2 | | 5.2 |
| Max Allow Headway (MAH), s | 3.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.4 | | 3.4 |
| Queue Clearance Time (g _s), s | 2.8 | | 5.0 | | 26.0 | 5.4 | | 11.7 |
| Green Extension Time (g _e), s | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | | 0.5 |
| Phase Call Probability | 0.52 | | 0.94 | | 1.00 | 1.00 | | 1.00 |
| Max Out Probability | 0.00 | | 0.00 | | 1.00 | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|----|-------|-------|-------|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Approach Movement | | | | | | | | | | | | |
| Assigned Movement | 1 | 6 | 16 | 5 | 2 | 12 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate (v), veh/h | 22 | 789 | 606 | 86 | 351 | 350 | 404 | 68 | | 11 | 33 | 133 |
| Adjusted Saturation Flow Rate (s), veh/h/ln | 1795 | 1885 | 1598 | 1767 | 1856 | 1845 | 1753 | 1600 | | 1312 | 1841 | 1560 |
| Queue Service Time (g _s), s | 0.8 | 47.3 | 24.3 | 3.0 | 14.7 | 14.7 | 24.0 | 3.4 | | 0.9 | 2.0 | 9.7 |
| Cycle Queue Clearance Time (g _c), s | 0.8 | 47.3 | 24.3 | 3.0 | 14.7 | 14.7 | 24.0 | 3.4 | | 0.9 | 2.0 | 9.7 |
| Green Ratio (g/C) | 0.48 | 0.45 | 0.67 | 0.51 | 0.48 | 0.48 | 0.33 | 0.36 | | 0.10 | 0.10 | 0.13 |
| Capacity (c), veh/h | 369 | 853 | 1067 | 197 | 885 | 880 | 552 | 576 | | 193 | 187 | 206 |
| Volume-to-Capacity Ratio (X) | 0.060 | 0.925 | 0.568 | 0.434 | 0.397 | 0.397 | 0.733 | 0.118 | | 0.057 | 0.178 | 0.647 |
| Back of Queue (Q), ft/ln (95 th percentile) | 14 | 806 | 318 | 54 | 268 | 261 | 407 | 59 | | 14 | 43 | 181 |
| Back of Queue (Q), veh/ln (95 th percentile) | 0.6 | 32.0 | 12.6 | 2.1 | 10.5 | 10.4 | 15.8 | 2.3 | | 0.6 | 1.7 | 7.0 |
| Queue Storage Ratio (RQ) (95 th percentile) | 0.04 | 0.81 | 0.98 | 0.38 | 0.27 | 0.27 | 1.70 | 0.06 | | 0.05 | 0.04 | 0.59 |
| Uniform Delay (d ₁), s/veh | 17.0 | 30.9 | 10.7 | 25.9 | 20.2 | 20.2 | 34.8 | 25.7 | | 48.8 | 49.3 | 49.4 |
| Incremental Delay (d ₂), s/veh | 0.0 | 17.2 | 2.2 | 0.6 | 1.3 | 1.3 | 4.4 | 0.0 | | 0.0 | 0.2 | 1.3 |
| Initial Queue Delay (d ₃), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Control Delay (d), s/veh | 17.1 | 48.1 | 12.9 | 26.5 | 21.6 | 21.6 | 39.2 | 25.7 | | 48.9 | 49.5 | 50.7 |
| Level of Service (LOS) | B | D | B | C | C | C | D | C | | D | D | D |
| Approach Delay, s/veh / LOS | 32.5 | | C | 22.1 | | C | 37.2 | | D | 50.4 | | D |
| Intersection Delay, s/veh / LOS | 31.6 | | | | | | C | | | | | |

| Multimodal Results | EB | WB | NB | SB |
|----------------------------|----|----|----|----|
| Pedestrian LOS Score / LOS | | | | |
| Bicycle LOS Score / LOS | | | | |

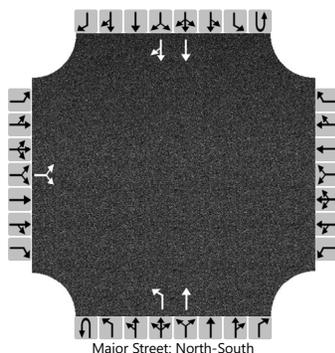
Appendix M

Access Capacity Analysis Worksheets - 2027

HCS Two-Way Stop-Control Report

| General Information | | | | Site Information | | | |
|--------------------------|---------------------|--|--|----------------------------|------------------------------|--|--|
| Analyst | KMC | | | Intersection | Terex Road & Access Driveway | | |
| Agency/Co. | TMS Engineers, Inc. | | | Jurisdiction | Hudson | | |
| Date Performed | 1/5/2026 | | | East/West Street | Access Driveway | | |
| Analysis Year | 2027 | | | North/South Street | Terex Road | | |
| Time Analyzed | AM Peak | | | Peak Hour Factor | 0.92 | | |
| Intersection Orientation | North-South | | | Analysis Time Period (hrs) | 0.25 | | |
| Project Description | Build | | | | | | |

Lanes



Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|----------------------------|-----------|----|----|----|-----------|---|---|---|------------|----|-----|---|------------|---|-----|----|
| | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Movement | | | | | | | | | | | | | | | | |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | T | TR |
| Volume (veh/h) | | 48 | | 9 | | | | | 0 | 12 | 340 | | | | 260 | 52 |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | 3 | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | 0 | | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type Storage | | | | | Left Only | | | | | | | | 1 | | | |

Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|------------------------------|--|------|--|------|--|--|--|--|--|------|--|--|--|--|--|--|
| Base Critical Headway (sec) | | 7.5 | | 6.9 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.86 | | 6.96 | | | | | | 4.16 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | 2.23 | | | | | | |

Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|------|--|------|--|--|--|--|--|-----|------|--|--|--|--|--|--|
| Flow Rate, v (veh/h) | | | 62 | | | | | | | 13 | | | | | | |
| Capacity, c (veh/h) | | | 516 | | | | | | | 1210 | | | | | | |
| v/c Ratio | | | 0.12 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, Q ₉₅ (veh) | | | 0.4 | | | | | | | 0.0 | | | | | | |
| 95% Queue Length, Q ₉₅ (ft) | | | 10.2 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 12.9 | | | | | | | 8.0 | | | | | | |
| Level of Service (LOS) | | | B | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | 12.9 | | | | | | | | 0.3 | | | | | | | |
| Approach LOS | B | | | | | | | | A | | | | | | | |

HCS Two-Way Stop-Control Report

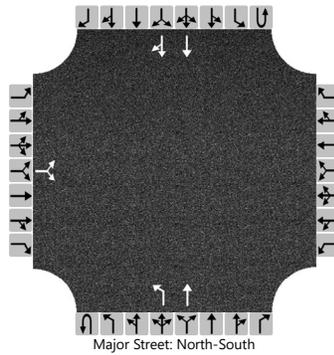
General Information

| | |
|--------------------------|---------------------|
| Analyst | KMC |
| Agency/Co. | TMS Engineers, Inc. |
| Date Performed | 1/5/2026 |
| Analysis Year | 2027 |
| Time Analyzed | PM Peak |
| Intersection Orientation | North-South |
| Project Description | Build |

Site Information

| | |
|----------------------------|------------------------------|
| Intersection | Terex Road & Access Driveway |
| Jurisdiction | Hudson |
| East/West Street | Access Driveway |
| North/South Street | Terex Road |
| Peak Hour Factor | 0.92 |
| Analysis Time Period (hrs) | 0.25 |

Lanes



Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
|----------------------------|-----------|----|----|----|-----------|---|---|---|------------|---|-----|---|------------|---|---|-----|----|---|
| | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R | | |
| Movement | | | | | | | | | | | | | | | | | | |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 1 | 0 | | 0 | 0 | 2 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | T | TR | | |
| Volume (veh/h) | | 48 | | 14 | | | | | 0 | 8 | 367 | | | | | 595 | 47 | |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | 3 | 3 | | | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | | | |
| Percent Grade (%) | 0 | | | | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | | | |
| Median Type Storage | Left Only | | | | | | | | 1 | | | | | | | | | |

Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|------------------------------|--|------|--|------|--|--|--|--|--|--|------|--|--|--|--|--|
| Base Critical Headway (sec) | | 7.5 | | 6.9 | | | | | | | 4.1 | | | | | |
| Critical Headway (sec) | | 6.86 | | 6.96 | | | | | | | 4.16 | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | | 2.2 | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | | 2.23 | | | | | |

Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|------|--|------|--|--|--|--|--|-----|------|--|--|--|--|--|--|
| Flow Rate, v (veh/h) | | | 67 | | | | | | | 9 | | | | | | |
| Capacity, c (veh/h) | | | 379 | | | | | | | 888 | | | | | | |
| v/c Ratio | | | 0.18 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, Q ₉₅ (veh) | | | 0.6 | | | | | | | 0.0 | | | | | | |
| 95% Queue Length, Q ₉₅ (ft) | | | 15.4 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 16.5 | | | | | | | 9.1 | | | | | | |
| Level of Service (LOS) | | | C | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | 16.5 | | | | | | | | 0.2 | | | | | | | |
| Approach LOS | C | | | | | | | | A | | | | | | | |

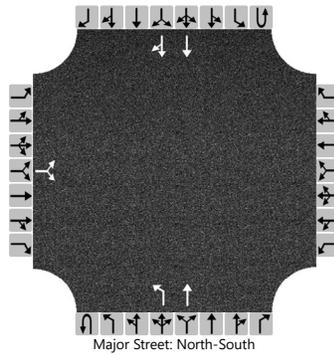
Appendix N

Access Capacity Analysis Worksheets - 2037

HCS Two-Way Stop-Control Report

| General Information | | | | Site Information | | | |
|--------------------------|---------------------|----------------------------|------------------------------|------------------|--|--|--|
| Analyst | KMC | Intersection | Terex Road & Access Driveway | | | | |
| Agency/Co. | TMS Engineers, Inc. | Jurisdiction | Hudson | | | | |
| Date Performed | 1/5/2026 | East/West Street | Access Driveway | | | | |
| Analysis Year | 2037 | North/South Street | Terex Road | | | | |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.92 | | | | |
| Intersection Orientation | North-South | Analysis Time Period (hrs) | 0.25 | | | | |
| Project Description | Build | | | | | | |

Lanes



Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | | |
|----------------------------|-----------|----|----|----|-----------|---|---|---|------------|----|-----|---|------------|---|---|-----|----|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R | | |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 1 | 0 | | 0 | 0 | 2 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | T | TR | | |
| Volume (veh/h) | | 48 | | 9 | | | | | 0 | 12 | 340 | | | | | 270 | 52 | |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | 3 | 3 | | | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | | | |
| Median Type Storage | | | | | Left Only | | | | | | | | 1 | | | | | |

Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|------------------------------|--|------|--|------|--|--|--|--|--|------|--|--|--|--|--|--|
| Base Critical Headway (sec) | | 7.5 | | 6.9 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.86 | | 6.96 | | | | | | 4.16 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | 2.23 | | | | | | |

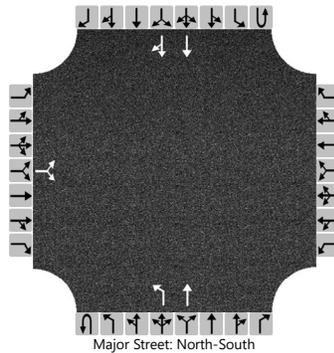
Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | | |
|---|--|------|------|--|--|--|--|--|--|------|--|--|--|--|--|--|--|
| Flow Rate, v (veh/h) | | | 62 | | | | | | | 13 | | | | | | | |
| Capacity, c (veh/h) | | | 511 | | | | | | | 1198 | | | | | | | |
| v/c Ratio | | | 0.12 | | | | | | | 0.01 | | | | | | | |
| 95% Queue Length, Q ₉₅ (veh) | | | 0.4 | | | | | | | 0.0 | | | | | | | |
| 95% Queue Length, Q ₉₅ (ft) | | | 10.2 | | | | | | | 0.0 | | | | | | | |
| Control Delay (s/veh) | | | 13.0 | | | | | | | 8.0 | | | | | | | |
| Level of Service (LOS) | | | B | | | | | | | A | | | | | | | |
| Approach Delay (s/veh) | | 13.0 | | | | | | | | 0.3 | | | | | | | |
| Approach LOS | | B | | | | | | | | A | | | | | | | |

HCS Two-Way Stop-Control Report

| General Information | | | | Site Information | | | |
|--------------------------|---------------------|--|--|----------------------------|------------------------------|--|--|
| Analyst | KMC | | | Intersection | Terex Road & Access Driveway | | |
| Agency/Co. | TMS Engineers, Inc. | | | Jurisdiction | Hudson | | |
| Date Performed | 1/5/2026 | | | East/West Street | Access Driveway | | |
| Analysis Year | 2037 | | | North/South Street | Terex Road | | |
| Time Analyzed | PM Peak | | | Peak Hour Factor | 0.92 | | |
| Intersection Orientation | North-South | | | Analysis Time Period (hrs) | 0.25 | | |
| Project Description | Build | | | | | | |

Lanes



Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|----------------------------|-----------|----|----|----|-----------|---|---|---|------------|---|-----|---|------------|---|-----|----|
| | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | T | TR |
| Volume (veh/h) | | 48 | | 14 | | | | | 0 | 8 | 377 | | | | 605 | 47 |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | 3 | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type Storage | | | | | Left Only | | | | | | | | 1 | | | |

Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|------------------------------|--|------|--|------|--|--|--|--|--|------|--|--|--|--|--|--|
| Base Critical Headway (sec) | | 7.5 | | 6.9 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.86 | | 6.96 | | | | | | 4.16 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | 2.23 | | | | | | |

Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|--|------|------|--|--|--|--|--|--|------|--|--|--|--|--|--|
| Flow Rate, v (veh/h) | | | 67 | | | | | | | 9 | | | | | | |
| Capacity, c (veh/h) | | | 373 | | | | | | | 879 | | | | | | |
| v/c Ratio | | | 0.18 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, Q ₉₅ (veh) | | | 0.7 | | | | | | | 0.0 | | | | | | |
| 95% Queue Length, Q ₉₅ (ft) | | | 17.9 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 16.8 | | | | | | | 9.1 | | | | | | |
| Level of Service (LOS) | | | C | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | 16.8 | | | | | | | | 0.2 | | | | | | |
| Approach LOS | | C | | | | | | | | A | | | | | | |

Appendix O

Access Intersection Turn Lane Warrants

AUXILLIARY TURN LANE WARRANTS

PROJECT INFORMATION

| | | | | | | | | | |
|--|--------------------------------------|--|------------|------|------------|-------|-----------|----------|------|
| 1. Client | Crosslands Development Company, LLC. | | | | | | | | |
| 2. Job Number | 25-142 | | | | | | | | |
| 3. Jurisdiction | Hudson | | | | | | | | |
| 4. Name of roadway where turn lanes are to be analyzed | Terex Road & West Access DW | | | | | | | | |
| 5. Roadway speed limit | 45 | | | | | | | | |
| 6. Number of Lanes | 4 | | | | | | | | |
| 7. Analysis Condition (Year / Build) | 2027 Build | | | | | | | | |
| 8. Direction of Roadway | NB/SB | | | | | | | | |
| 9. Direction of Side Street Approach | EB | | | | | | | | |
| 10. Is the Roadway Divided or Undivided | Divided | | | | | | | | |
| 11. Enter Volume Data for Intersection | | | | | | | | | |
| | | | SOUTHBOUND | | | | | | |
| - Right Turn | | | Right | Thru | Advancing | | | | |
| | AM | | 52 | 260 | 312 | | | | |
| | PM | | 47 | 595 | 642 | | | | |
| | | | NORTHBOUND | | SOUTHBOUND | | | | |
| - Left Turn | | | Left | Thru | Thru | Right | Advancing | Opposing | LT% |
| | AM | | 12 | 340 | 260 | 52 | 352 | 312 | 3.4% |
| | PM | | 8 | 367 | 595 | 47 | 375 | 642 | 2.1% |

Notes:

1. Analyst to fill in all blue areas.
2. Green areas are calculated for the analyst

4-LANE LEFT TURN LANE WARRANT

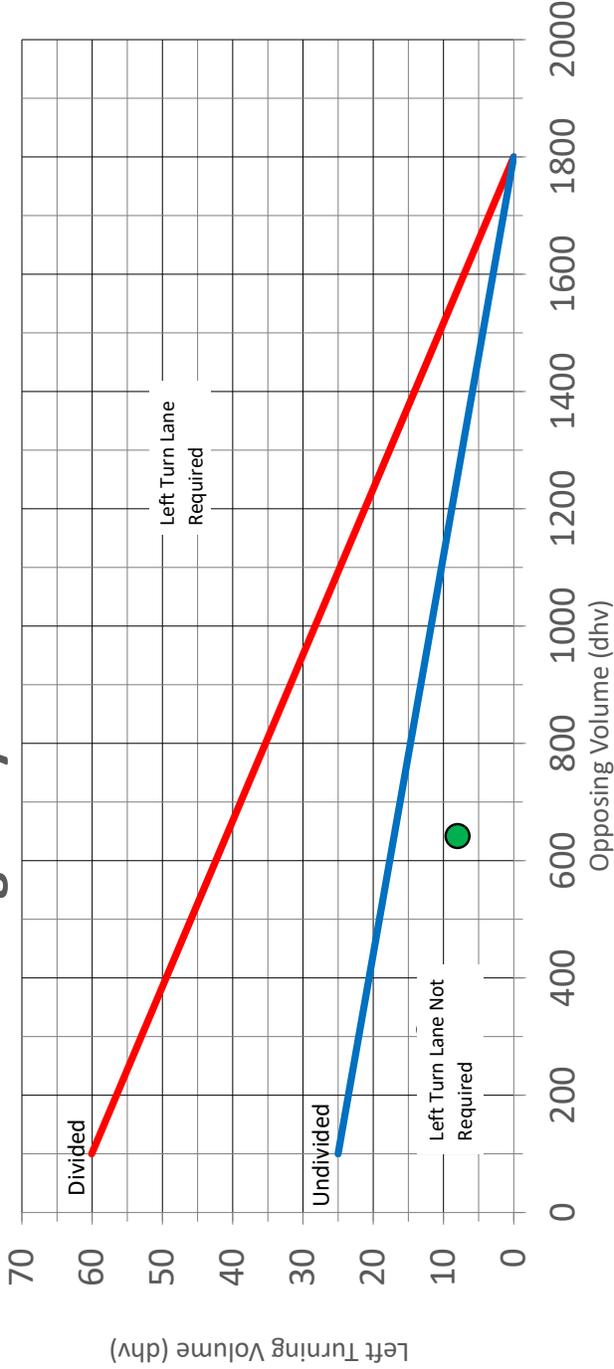
401-5cM

REFERENCE SECTION
401.6.1

Terex Road & West Access DW

2027 Build WARRANT IS NOT MET

4 Lane Highway Left Turn Lane Warrant



| TIME | NORTHBOUND | | SOUTHBOUND | | OPPOSING | WARRANT? |
|------|------------|------|------------|------|----------|----------|
| | LEFT | THRU | THRU | LEFT | | |
| ● AM | 12 | 260 | 595 | 52 | 312 | NO |
| ● PM | 8 | 595 | 595 | 47 | 642 | NO |

4-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6dM

REFERENCE SECTION
401.6.3

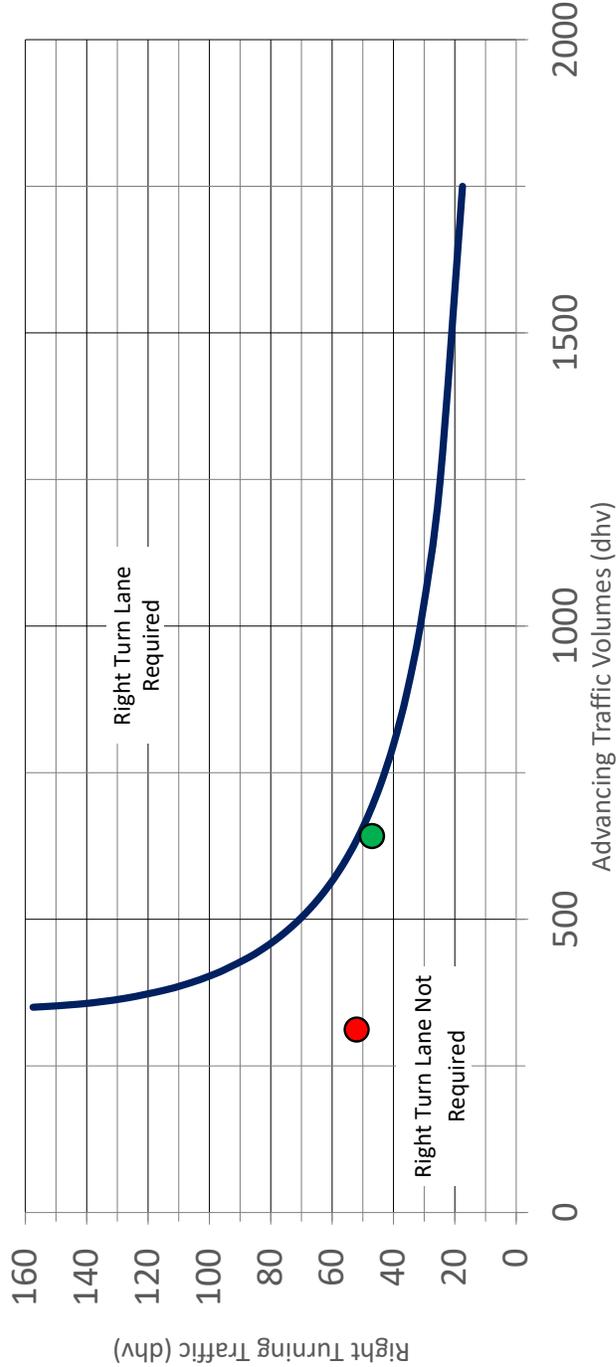
Terex Road & West Access DW

2027 Build

WARRANT IS NOT MET

4 Lane Highway Right Turn Lane Warrant

(>40 mph or 70 kph Posted Speed)



| TIME | SOUTHBOUND | | | WARRANT? |
|------|------------|-------|-----------|----------|
| | THRU | RIGHT | ADVANCING | |
| AM | 260 | 52 | 312 | NO |
| PM | 595 | 47 | 642 | NO |

AUXILLIARY TURN LANE WARRANTS

PROJECT INFORMATION

| | | | | | | | | | |
|--|--------------------------------------|--|------------|------|------------|-------|-----------|----------|------|
| 1. Client | Crosslands Development Company, LLC. | | | | | | | | |
| 2. Job Number | 25-142 | | | | | | | | |
| 3. Jurisdiction | Hudson | | | | | | | | |
| 4. Name of roadway where turn lanes are to be analyzed | Terex Road & West Access DW | | | | | | | | |
| 5. Roadway speed limit | 45 | | | | | | | | |
| 6. Number of Lanes | 4 | | | | | | | | |
| 7. Analysis Condition (Year / Build) | 2037 Build | | | | | | | | |
| 8. Direction of Roadway | NB/SB | | | | | | | | |
| 9. Direction of Side Street Approach | EB | | | | | | | | |
| 10. Is the Roadway Divided or Undivided | Divided | | | | | | | | |
| 11. Enter Volume Data for Intersection | | | | | | | | | |
| | | | SOUTHBOUND | | | | | | |
| - Right Turn | | | Right | Thru | Advancing | | | | |
| | AM | | 52 | 270 | 322 | | | | |
| | PM | | 47 | 605 | 652 | | | | |
| | | | NORTHBOUND | | SOUTHBOUND | | | | |
| - Left Turn | | | Left | Thru | Thru | Right | Advancing | Opposing | LT% |
| | AM | | 12 | 340 | 270 | 52 | 352 | 322 | 3.4% |
| | PM | | 8 | 377 | 605 | 47 | 385 | 652 | 2.1% |

Notes:

1. Analyst to fill in all blue areas.
2. Green areas are calculated for the analyst

4-LANE LEFT TURN LANE WARRANT

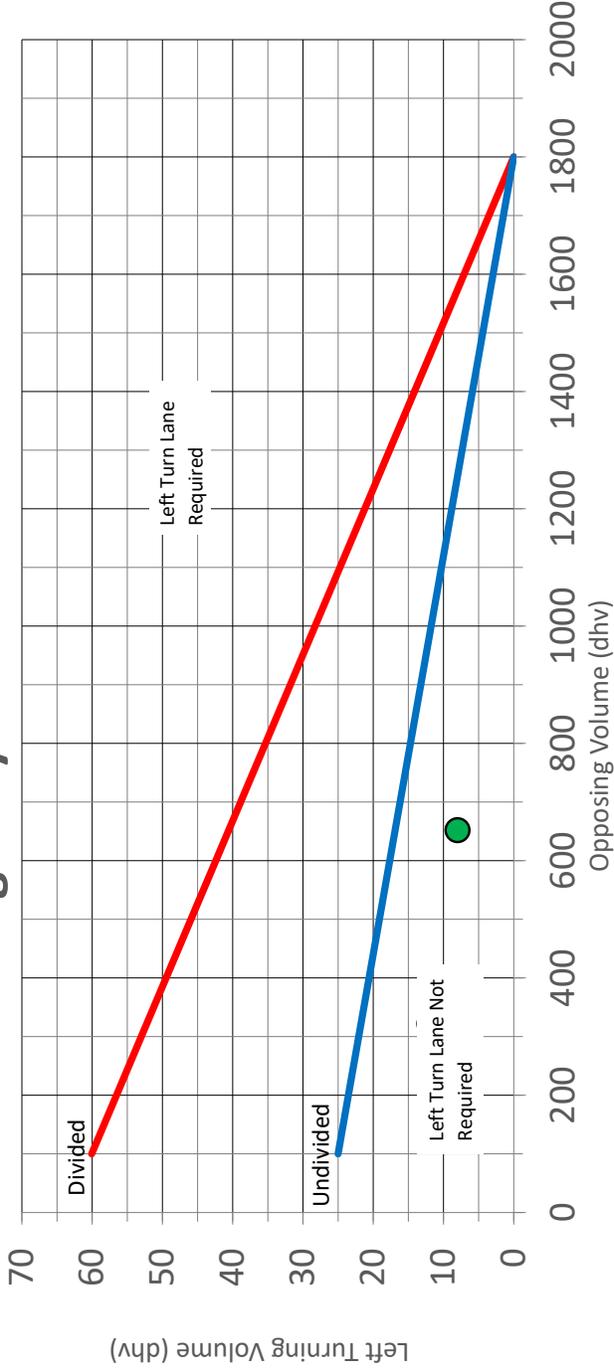
401-5cM

REFERENCE SECTION
401.6.1

Terex Road & West Access DW

2037 Build WARRANT IS NOT MET

4 Lane Highway Left Turn Lane Warrant



| TIME | NORTHBOUND | | SOUTHBOUND | | OPPOSING | WARRANT? |
|------|------------|------|------------|------|----------|----------|
| | LEFT | THRU | THRU | LEFT | | |
| AM | 12 | 270 | 605 | 52 | 322 | NO |
| PM | 8 | 605 | 47 | 47 | 652 | NO |

4-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6dM

REFERENCE SECTION
401.6.3

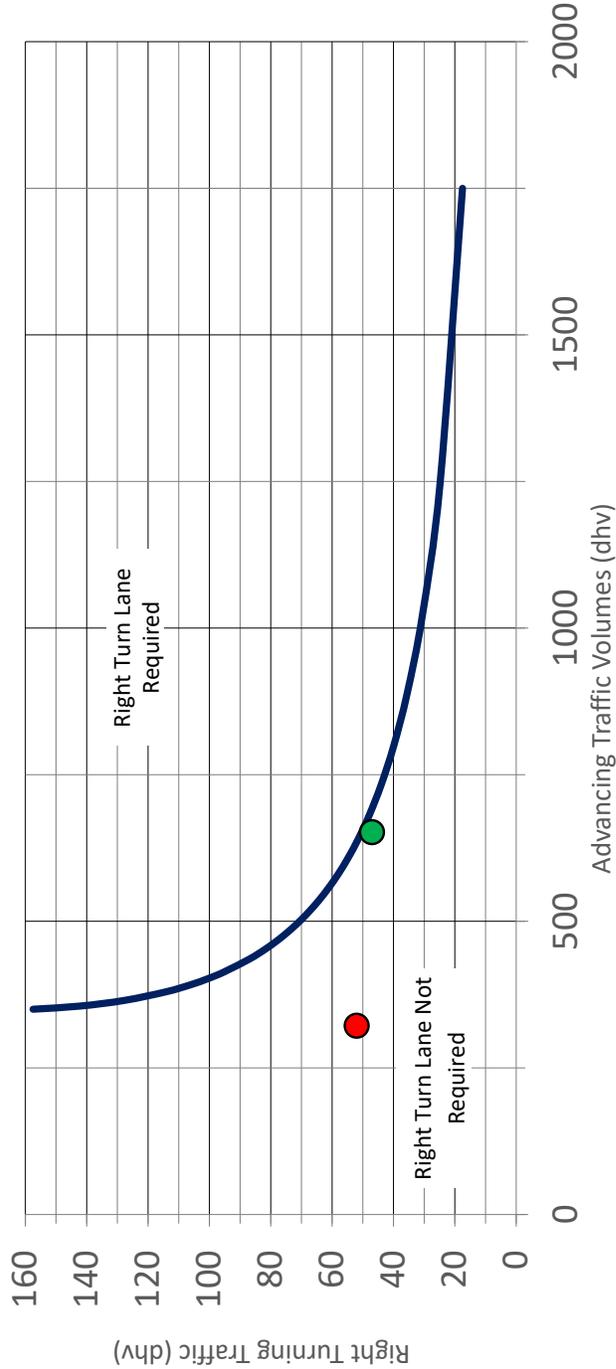
Terex Road & West Access DW

2037 Build

WARRANT IS NOT MET

4 Lane Highway Right Turn Lane Warrant

(>40 mph or 70 kph Posted Speed)



| TIME | SOUTHBOUND | | | WARRANT? |
|------|------------|-------|-----------|----------|
| | THRU | RIGHT | ADVANCING | |
| AM | 270 | 52 | 322 | NO |
| PM | 605 | 47 | 652 | NO |