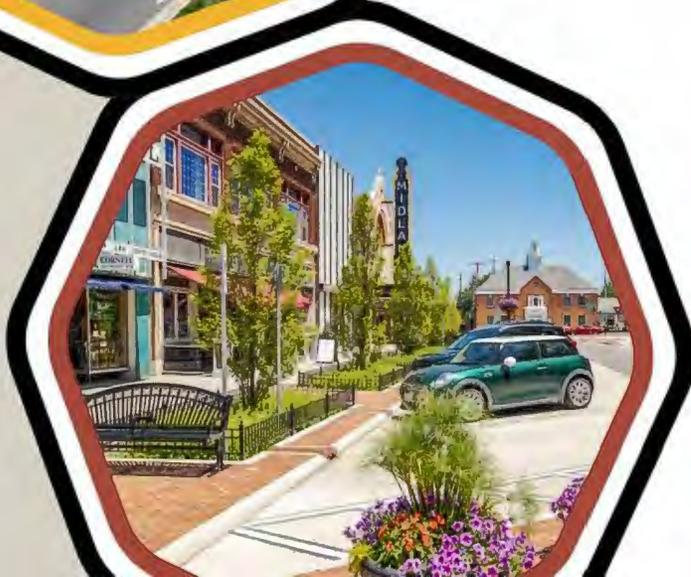
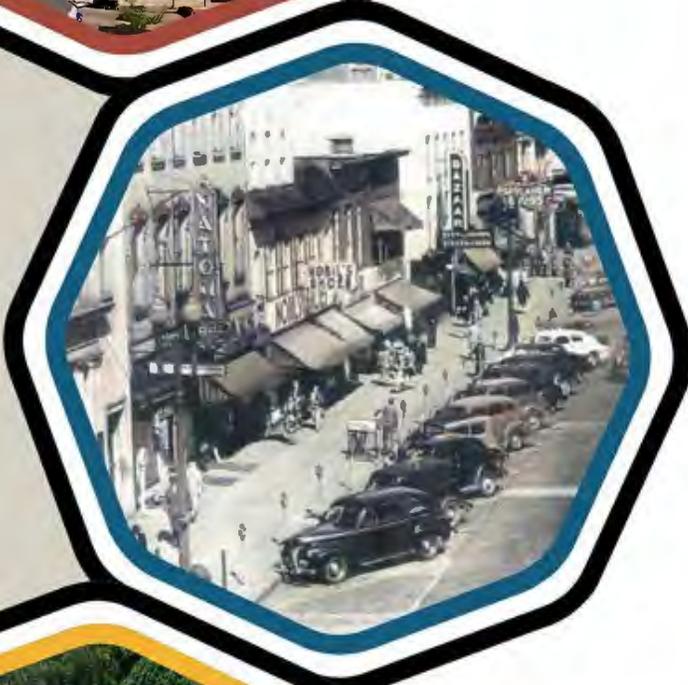


September 2024



Traffic Impact Study Requirements



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A. Introduction

This document establishes the requirements for traffic studies related to changes in land use and/or access which may impact public streets in the City of Newark. Questions related to these requirements should be directed to the City Engineer. Applicants should also review the *City of Newark Access Management Standards* and the *City of Newark Thoroughfare Plan* which should inform all traffic studies and development plans within the City.

1. Purpose

The following statements summarize the purpose of these regulations:

- Provide transparency, guidelines, and consistent expectations around traffic impact studies and turn lane analyses for site plan review requirements and development approval.
- Provide reliable and adequate access to property and internal site circulation.
- Manage and mitigate potential impacts to safety, congestion, and the multimodal network impacts by evaluating where an increase in vehicular trips will occur. This allows for accommodation of new development with additional access points and consideration of existing and expected future conditions, including growth in traffic volumes.
- Provide for safe ingress, egress, and internal site circulation.
- Establish common standards and expectations for traffic studies and how they fit within the development review process.
- Support current and future investment in the City of Newark while preserving quality of life and safety for residents and visitors.

2. City of Newark Responsibilities and Requirements

The City Engineer is Newark's lead staff member regarding traffic study requirements, long-range transportation planning issues, and traffic projection requirements. The City Engineer will have the primary responsibility regarding roadway design requirements, traffic engineering, operations, and safety.

The City will:

- Determine whether a proposed development requires a Traffic Impact Study (TIS) or Turn Lane Analysis (TLA) in conjunction with a request for a development-related approval.
- Determine the study area and study intersections required.
- Meet with the study preparer to identify study issues, needs, assumptions, procedures, available sources of data, past and related studies, report requirements, and other topics relevant to the preparation of the traffic study.
- Provide the preparer with available data from agency files, including traffic counts, improvement plans, traffic signal information, transportation and comprehensive plan information, data on planned or approved developments within the study area, relevant ordinances, regulations, policies, and other information related to the proposed site.
- Review the study in a timely manner. The timeline for final approval will be contingent on the associated Planning Commission/City Council meetings.

3. Traffic Study Preparer Qualifications

The TIS or TLA shall be performed by an individual or entity demonstrating capability in transportation planning and traffic engineering. The TIS or TLA should be prepared directly, or under direct supervision of, a Professional Engineer registered in the State of Ohio. The registered Professional Engineer shall have experience in traffic engineering and shall sign and seal the report.

4. Process and Considerations

1. Prior to the first submittal, applicants shall coordinate with the City of Newark before finalizing and submitting a preliminary site plan for the City's review to ensure that project understanding, scope, and submittal expectations are mutually understood (see Section B.2).
 - a. The City will determine whether a TIS or TLA is required for the proposed site development (see Section B.1).
 - b. Applicants shall comply with the *City of Newark Access Management Standards* in addition to these *Traffic Impact Study Requirements*. Confirmation of proper access design should be confirmed during the pre-meeting and MOU process to ensure that efforts towards a TIS or TLA are based on correct placement of access and internal site design.
2. Submittals are required to meet standards set forth in their applicable sections. For TIS, see Section C. For TLA, see Section D. For questions or to schedule a pre-meeting with staff, contact the City of Newark Engineering and Zoning Department. For more information, visit newarkohio.gov/engineering-zoning or call 740-670-7727.
3. The application materials will be reviewed by the City for alignment with TLA or TIS requirements. Approval of studies and proposed mitigation measures or improvements is required before zoning or right-of-way permits may be obtained.

B. Pre-Study Determinations

1. Determine Type of Traffic Study

Traffic Impact Study (TIS)

A TIS is a type of assessment required for substantial development proposals as requested by the City Engineer. Typically, these include a change in use resulting in substantial change in trip generation and/or the number or type of access points.

Turn Lane Analysis (TLA)

A TLA is intended to be an abbreviated analysis for when impacts to traffic flow and safety are expected to be minimal, but additional turn lanes may be needed.

Traffic Queuing Study

If not given adequate on-site queue storage, traffic can back up onto adjacent streets impacting traffic flow and roadway safety. A queuing study estimates the length of a queue of vehicles based on vehicle arrival and departure rates for a given land use over its hours of operation. **All properties with on-site drive-thrus must provide the results of a queuing study** showing that the drive-thru queue will not impact adjacent street traffic during the properties peak hour of operation or the adjacent street’s peak hour. Traffic Queuing Studies should be completed following the approach outlined in Chapter 6 of the *ITE Manual of Transportation Engineering Studies, 2nd Edition*¹.

The need for a TIS or TLA will be determined by the City of Newark on a case-by-case basis. Table 1 provides guidance for the type of study required based on functional class.

Table 1: Traffic Study Requirements General Guidance under Typical Circumstances¹

	Trips added per hour during adjacent street peak hour ²	Required Study ³		
		None	TLA	TIS
Major Arterial, Minor Arterial, or Major Collector	Less than 90		•	
	Greater than 90			•
Minor Collector	Less than 10	•		
	10 – 90		•	
	Greater than 90			•
Local	Less than 20	•		
	20 – 90		•	
	Greater than 90			•

Beyond the above criteria, a TIS is typically required when development traffic is expected to impact the capacity or safety at an existing traffic signal/roundabout, or a new traffic signal/roundabout is proposed.

If deemed necessary by the City, an applicant may be required to submit a TIS or TLA for any proposed access or connection, change in land use type or density, or site circulation. Reasons could include, but are not limited to, addressing an identified safety problem, multimodal connectivity needs, and/or nearby congested locations.

The City also reserves the right to require a new TIS where development plans change significantly between the times that a rezoning, zoning variance, special permit, or Preliminary Plat approval is considered, and another is presented.

¹ (ITE) Manual of Transportation Engineering Studies, 2nd Edition: <https://www.ite.org/technical-resources/topics/traffic-engineering/>

2. Pre-Meeting and Memorandum of Understanding (MOU)

Prior to commencing the traffic study, the preparer shall schedule a meeting with the City of Newark to establish the parameters of the study. Other participants in the pre-meeting may include representatives from the County or Township, Ohio Department of Transportation (ODOT), or the Licking County Area Transportation Study (LCATS) as deemed appropriate by the City of Newark. This pre-meeting will identify and agree upon study assumptions and requirements prior to the preparation of the study such as:

- Type of study
- Study area and study intersections
- Opening year and design year for the study
- Intermediate years if development is to be built in phases
- Traffic count requirements
- Background traffic assumptions and growth factors
- Trip Generation land use categories and equations to be used
- Trip Distribution methods and percentages
- Capacity Analysis methodology
- Access locations and allowable movements
- Anticipated mitigation methods
 - Traffic signal, turn lanes, roundabouts, sidewalks, bikeway connections, etc.
- Additional analyses required;
 - Sight distance, crashes, signal system timing, etc.
- Miscellaneous topics such as:
 - Applicable planning documents
 - Other traffic studies (prior or ongoing) in the vicinity
 - Committed and planned City capital improvements and construction schedule
 - Submittal date and review schedule
 - Review distribution List

All assumptions regarding the study agreed upon in this meeting shall be summarized in an MOU that is completed by the preparer and submitted for approval to the City. The City will give comments, if necessary, and final approval of the MOU before the preparer begins the analytical portion of the traffic study.

C. Traffic Impact Study (TIS) Requirements

1. Description of Site, Site Context, and Study Area

The study area, at a minimum, should encompass all site access points (existing and proposed), adjacent roadways, and other intersection(s) impacted by traffic to the proposed development site. Below is guidance for establishing the study area and determining the existing land use and roadway conditions:

- Site drawings and/or renderings accompanied by a narrative describing the characteristics, description of the land use(s), construction timeline/phasing, and expected users.
- Illustrations and description of the adjacent roadway system (i.e., speed limits, lane usage, traffic control methods) and how the proposed site will connect to the road network. This description should also include expected development in the vicinity that could influence future traffic conditions, special site features, and a description of any roadway improvements.
- Definition of the study area accompanied with a map highlighting arterials/collectors and major intersections. The study area will extend to at least the first signalized intersection adjacent to all access points to the development. Larger developments with greater than 150 trips occurring during the adjacent streets' peak hour should consider extending the study area to consider additional intersections. The City of Newark reserves the right to expand the minimum study area based on local or site-specific issues or development size.
- The City of Newark reserves the right to request additional data collection including, but not limited to, roadway safety history, transit connectivity assessment, and bike/pedestrian connectivity assessment.

2. Opening Year and Design Year

Opening Year is defined as the year the site is expected to be open with all proposed roadway improvements. Design Year is established in Table 2. Opening Year and Design Year shall be decided at the pre-meeting and be clearly stated in the MOU.

Table 2: Design Year Determination

Peak Hour Vehicle Trip Ends of the Proposed Development	TIS Design Year
Up to 299	Opening Year Plus 10 Years
300 or Greater	Opening Year Plus 10 Years and Opening Year Plus 20 Years

3. Analysis Time Periods

All analyses shall, at a minimum, examine the AM and PM weekday peak traffic hours of the adjacent roadway. However, there are cases where the weekday or weekend midday peak hours, and/or school or other site-specific peak hours may be required. Examples of such may include, but are not limited to, shopping centers, discount stores, schools, churches, recreational facilities, and special events. The peak hours to be analyzed shall be decided at the pre-meeting and be clearly stated in the MOU.

4. Traffic Counts

Traffic counts shall be performed using manual or automated collection devices that have been documented to produce accurate results. These traffic counts will become the basis for the existing traffic conditions. The following are requirements for traffic counts used for a TIS:

- All traffic counts must be taken on an average day (no holidays, inclement weather, detours, special events, etc.) when nearby schools are in full session, unless otherwise directed by the City.
- Intersection turning movement counts will be performed at all study intersections that currently serve traffic for the hours agreed to by the City of Newark. Typical traffic count time and duration requirements are:
 - Weekday morning peak period (2 hours)
 - Weekday evening peak period (2 hours)
- Intersection turning movement counts should include separate accounting for heavy vehicles (B&C classifications as defined by ODOT). Cyclist and pedestrian movement volumes should also be collected in built-up areas, or if specifically requested by the City.

a. Exceptions and Additional Considerations

- If traffic within the study area is significantly influenced by a school, additional peak periods coinciding with the school peak hours may also be required.
- If the location is in an area that is primarily commercial, recreational, or of another use that generates significant Saturday traffic, Saturday peak period (2 hours typical) traffic volumes may also be required.
- If the site involves a church or is located near a large church, Sunday peak period (2 hours typical) may also be required.

5. Background Traffic Growth

An appropriate background growth rate shall be applied to existing traffic volumes on study area roadways to estimate future traffic volumes on the roadways without the proposed development (“no-build” traffic volumes). The applicant shall request this growth rate from LCATS.

Traffic from other planned developments in the general area of the study, which are expected to add more traffic than addressed by the background growth rate, should be included in the background growth projections.

6. Trip Generation

Trip generation of the proposed development shall be forecasted for the AM and PM peak hour of adjacent street traffic and for the average day (if applicable). The forecasts shall be based on the data and procedures outlined in the most recent edition of the *ITE Trip Generation Manual* (TGM), including those relating to pass-by, internal, and diverted trips.

Alternatively, if approved by the City, a rate developed from a published or unpublished trip generation study for a comparable development may be used if deemed more appropriate for a particular development, or if the rates are not available in the TGM. Methods for trip generation shall be decided at the pre-meeting and be clearly stated in the MOU.

7. Trip Distributions and Assignment

The projected generated traffic shall be distributed for inbound and outbound movements onto the existing road network to forecast turning movements at site access points and nearby intersections, based on available traffic data and knowledge of local traffic patterns.

Forecasted turning movements shall be illustrated in the report. A description of the procedures for determining the distribution should also be included.

Pre-approval is recommended for assumptions on trip generation land use categories, trip distribution percentages, pass-by trip percentages, and internal trip capture rates prior to completing the final TIS analysis and report.

8. Analyzed Build Conditions

The TIS will examine the No-Build and Build conditions to evaluate traffic impacts associated with the proposed development. No-Build and Build conditions shall be evaluated for Opening Year and Design Year traffic volumes. These conditions are defined as follows:

a. No-Build (NB)

This includes the analysis of existing roadway geometry (number of lanes, speed limits, etc.) and existing traffic control (i.e., signalized, roundabout, unsignalized) using the background traffic excluding proposed site traffic. For isolated intersections, the No-Build signalized Level of Service (LOS) should be based on optimized traffic signal timings for an equal comparison with build scenarios. Signals in a coordinated system should also be optimized but use the existing cycle length and mainline through traffic should maintain, at worse, LOS D for comparison purposes.

b. Build (B)

This includes analysis of the proposed roadway geometry (number of lanes, speed limits, etc.) and proposed traffic control (i.e. signalized, unsignalized) using the background traffic plus site generated traffic.

For **all proposed access points or access modifications**, the proposed geometry must provide an overall intersection level of service (LOS) of "D" or better for the opening and design year analysis, with no single movement being worse than LOS E, nor having a volume to capacity ratio of more than 0.90 for all proposed access points or access modifications in the build condition, unless otherwise stipulated by the City Engineer.

Choice of appropriate LOS for design should also include consideration of a variety of other factors. These factors include the desires of motorists, community goals, adjacent land use type and development intensity, environmental factors, and aesthetic and historic values. The MOU should establish a threshold for desired LOS at key intersections within the study area.

At **adjacent, off-site, intersections and access points**, the LOS calculated for each intersection approach in the opening and design year Build condition shall be the same or better than achieved in the No-Build condition, with no individual movement being worsened by more than one LOS grade. For example, a left turn movement may not be degraded from a "C" to an "E." If these LOS criteria are not met, the study should clearly identify the improvements that would be necessary to achieve these thresholds. For conditions where LOS is already E or F, coordination with the City is required to determine an acceptable level of impact.

9. Performance Measures

The performance measures in Table 3 will be calculated for all intersections and roadway segments within the study area defined in the MOU. All performance measures will be calculated using the procedures outlined in the most recent edition of the *Highway Capacity Manual* (HCM), published by the Transportation Research Board. The *Highway Capacity Software* (HCS) or other approved software that utilizes the HCM methodology may be used. Additional arterial and/or system-wide analyses may utilize Synchro/SimTraffic software for system-level comparisons. Complex traffic operations (i.e., weaves, large roundabouts, closely spaced intersections, etc.) might require the use of other methods/software. The software used shall be discussed at the pre-meeting and be clearly stated in the MOU. See Table 3 for performance measures that shall be calculated for the Build and No-Build conditions in opening year and design year:

Table 3: Performance Measures

Performance Measure	Description	Completed For
Peak Hour Traffic	Volume of vehicles and heavy vehicles during the AM and PM peak hours	<ul style="list-style-type: none"> All study area road segments
Intersection Turning Movement Counts	Number of vehicles making each possible turning movement during the AM and PM peak hours	<ul style="list-style-type: none"> All study area intersections All driveways entering and leaving the proposed development
95% Traffic Queue Length	<p>95% Queue lengths shall be calculated (<i>HCS</i> or other approved software), tabulated, and compared to available storage lengths</p> <p>Queuing storage deficiencies and improvements needed to correct these deficiencies shall be identified.</p>	<ul style="list-style-type: none"> All study area intersections All driveways entering and leaving the proposed development
Intersection Level of Service (LOS)	A measure of vehicle delay at intersections and along segments. Build intersection analysis should meet LOS D and no individual movement worse than LOS E during peak hours, unless otherwise stipulated by the City Engineer.	<ul style="list-style-type: none"> All study area intersections

This list may be modified during the development of the MOU to include performance measures outside Table 3. Tradeoffs may be considered when establishing goals for LOS. These may include, but are not limited to, the following:

- Impact on roadway safety (i.e., projected crash rate changes and impacts to sight distance)
- Impact on adjacent transit (i.e., access to transit stops and system performance)
- Impact on multimodal connectivity (i.e., impact on pedestrian crossings and bicycle lanes at intersections)
- Tolerance for decreased LOS at peak times

10. Mitigation Methods

The study shall describe improvements necessary to meet operational performance criteria as described in the build condition, and/or any traffic safety or bicycle/pedestrian improvements or operational changes needed to address identified problems and issues. Mitigation measures may include, but are not limited to, the following:

- Roadway widening
- Roundabouts
- Turn lanes
- Deceleration/acceleration tapers/lanes
- New signalization, changes to signalization
- Access management
- Reduction in the proposed intensity of development

a. Turn Lanes and Storage Lanes

Left turn lane warrants at all existing and proposed unsignalized intersection approaches will be determined using design year peak hour turning movement volumes. Design year turning movement volumes are to be calculated using peak hour traffic counts, background growth (rate to be agreed to with the City), and additional traffic generated from development (based on the TMD).

Left turn lanes will be required for driveways on Major and Minor Arterials and driveways on Moderate to High Volume driveways on Major Collector. The cost of constructing required turn lanes is the responsibility of the applicant. Storage lane length must provide adequate traffic queuing storage based on the ODOT Location & Design Manual, Vol. 4² and State Highway Access Management Manual (SHAMM)³ unless directed otherwise by the City.

Right-of-way limitations and existing conditions may make turn lane construction impractical. The City Engineer has the discretion to deem turn lanes unnecessary based on site-specific conditions.

b. Signalized Intersections and Spacing Requirements

The decision to install and the design of any traffic signal must comply with the *Ohio Manual of Uniform Traffic Control Devices (OMUTCD) Part 4*⁴, and must be approved by the City Engineer or their designee. Under no circumstance will a traffic signal be installed that does not meet one or more of the warrants defined in the OMUTCD. However, as stated in the OMUTCD, meeting one of the warrants does not necessitate the installation of a traffic signal. The proliferation of traffic signals is detrimental to traffic flow and often traffic safety. Signals should only be installed when a signal is deemed the best option on a roadway for long-term access and safety. Meeting the eight-hour volume warrant (Warrant 1) will generally be required for the consideration of a traffic signal. Other warrants will only be considered in unique circumstances.

Roundabouts should be considered as an alternative to traffic signals and will generally only be considered necessary at a location where a traffic signal is also warranted. However, other needs and conditions could lead to the approval of a roundabout (i.e., safety, access management, right-of-way constraints). Coordinate with the City Engineer on the appropriate treatment and planned capital improvements adjacent to the proposed development site.

See the *City of Newark Access Management Requirements* document for further requirements and information regarding traffic signal and roundabout installation and spacing.

² (ODOT) Location & Design Manual (L&D):

<https://www.transportation.ohio.gov/working/engineering/roadway/manuals-standards/location-design-vol-1/>

³ (ODOT) State Highway Access Management Manual (SHAMM):

<https://www.transportation.ohio.gov/working/publications/shamm>

⁴ (ODOT) *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)*:

<https://www.dot.state.oh.us/roadway/omutcd/Pages/default.aspx>

11. TIS Final Report Contents

Each TIS shall have the following:

- Cover
 - Name and location of development
 - Applicant name
 - Preparer name
 - Report date
- Title Page
 - All information on Cover
 - Applicant street address and contact information
 - Preparer street address and contact information
 - Preparer engineering registration seal and signature
- Table of Contents
- List of Exhibits and Tables
- Executive Summary
- Summary of Revisions (for revised reports)
- Body of Report
 - Proposed Project
 - Study Area Conditions/Descriptions
 - Location map
 - Site plan depicting area roadways and identifying geometric/physical concerns relating to area, site, and specific access points
 - Existing roadway and traffic control features (number of lanes, lane widths, traffic signals, signs, etc.)
- Analysis of Existing Conditions
 - Existing traffic volumes map
- Traffic Forecasts – Opening Year, Intermediate Year(s), and Design Year
 - Site generated trip summary and volumes table
 - Proposed traffic volume maps (including other site traffic if applicable)
- Traffic Analyses Discussion
 - Traffic Analysis (including existing/projected LOS table and future conditions diagram)
 - Signal Warrant Analysis (if applicable)
 - Turn Lane Warrant Analysis (if applicable)
 - Sight Distance (if applicable)
 - Crash Analysis (if applicable)
- Conclusions –
 - Summary of traffic impacts
 - Necessary mitigation measures to meet City requirements
- Appendix (Appendices may be provided as a separate, companion document)
 - Site Plan
 - Traffic Counts
 - Traffic Capacity Analyses
 - Signal Warrant Charts (if applicable)
 - Turn Lane Warrant Charts/Graphs (if applicable)
 - Sight Distance Figure(s) (if applicable)
 - Crash Reports (if applicable)

The City of Newark reserves the right to request additional documents as required, including the software files used for the Capacity Analyses.

12. Submittal Requirements

Submittal requirements shall be discussed during the pre-meeting. This includes the required medium, number of copies, etc. Required submittal items shall be clearly stated in the MOU.

D. Turn Lane Analysis (TLA) Requirements

A TLA is intended to be an abbreviated analysis for when impacts to traffic flow and safety are expected to be minimal, but additional turn lanes may be needed. The study area for a TLA will only include proposed or existing access points that serve the proposed development or redevelopment. Turn lane analysis for a TLA will be based on 10-year design hour volumes calculated using peak hour traffic counts, plus background growth (rate to be agreed to with the City), plus additional traffic generated from development/redevelopment (based on the TDM). All new turn lanes must provide adequate traffic queuing storage based on the L&D, Vol. 1⁵ and the SHAMM⁶ unless directed otherwise by the City.

Left turn lanes will be required for driveways on Major and Minor Arterials and driveways on Moderate to High Volume driveways on Major Collector. Lower volume driveways may be exempt, provided they do not meet turn lane warrant criteria. Turn lane warrants must be prepared using Design Year traffic. The cost of constructing required turn lanes is the responsibility of the applicant. Any exemption requests must be coordinated through the City.

The TLA shall be documented in a brief memorandum with diagrams showing traffic volumes and describing the results of the analysis. Traffic counts and turn lane warrant charts should be included as attachments. Bicycle and pedestrian needs for the site and impacts to these modes should also be reviewed and discussed in the memorandum. The TLA report will have the following structure. All sections will follow the same stipulations as outlined in Section C, TIS Requirements.

- Cover
 - Name and location of development
 - Applicant name
 - Preparer name
 - Report date
- Title Page
 - All information on Cover
 - Applicant street address and contact information
 - Preparer street address and contact information
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 - Site plan depicting area roadways and identifying geometric/physical concerns relating to area, site, and specific access points
 - Existing roadway and traffic control features (number of lanes, lane widths, traffic signals, signs, etc.)
- Traffic Analyses Discussion
 - Signal Warrant Analysis
 - Turn Lane Warrant Analysis
 - Sight Distance
- Conclusions –
 - Summary of traffic impacts
 - Necessary mitigation measures to meet City requirements

⁵ <https://www.transportation.ohio.gov/working/engineering/roadway/manuals-standards/location-design-vol-1/>

⁶ <https://www.transportation.ohio.gov/working/publications/shamm>