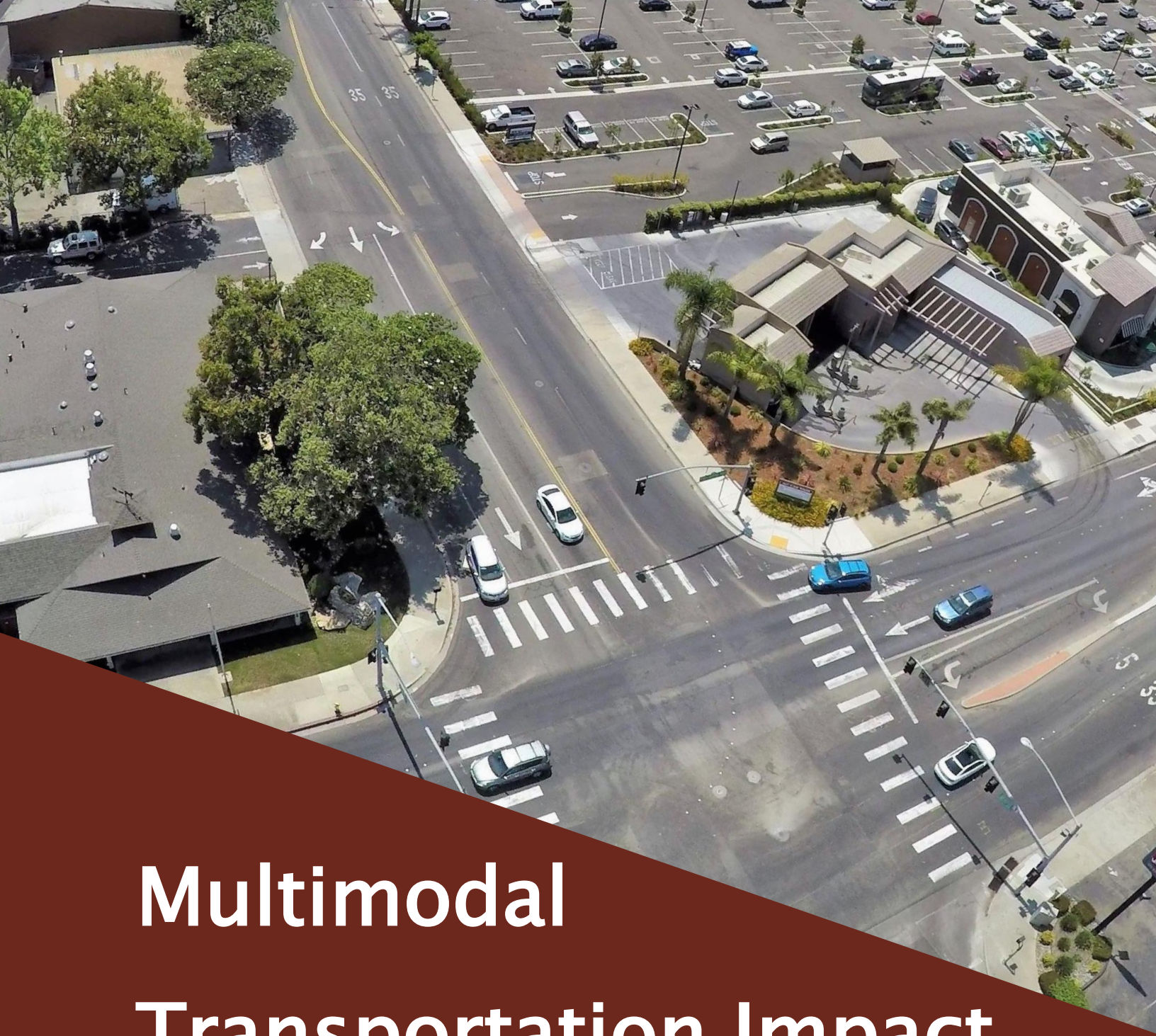


Multimodal Transportation Impact Study Guidelines

May 2021

CITY OF ARROYO GRANDE CALIFORNIA 1911

Table of Contents

Chapter 1: Introduction

The City of Arroyo Grande's General Plan Circulation Element establishes key transportation policies to accommodate growth and achieving a multimodal community with a system of complete streets. These Multimodal Transportation Impact Analysis Guidelines establish a consistent means for assessing potential multimodal transportation impacts of proposed projects such as development, land use & zoning designation changes, specific plans & amendments, general plan amendments, and transportation infrastructure modifications or expansions.

These guidelines establish standards for technical studies consistent with the latest applicable planning and engineering methodologies, standards, and analysis procedures. These guidelines will also establish protocol for pre-approval of project-specific technical assumptions in a Memorandum of Assumptions (MOA) with the intent of streamlining applicant-side workflow by avoiding duplicative work between draft and final multimodal transportation impact study submissions. The goal of these guidelines and procedures is for resulting multimodal traffic impact studies to provide comprehensive, clear, and consistent analyses for all projects within the City. Development applications will not be deemed complete until a final approved multimodal transportation impact study is received by the City.

These guidelines have been prepared in conformance with Senate Bill 743 (SB 743), whereas Level of Service (LOS) as a function of automobile delay is no longer considered a significant impact and Vehicle Miles of Travel (VMT) is now established as the measure of assessing transportation impact under the California Environmental Quality Act (CEQA). SB 743 however does not preclude local agencies from retaining LOS as local policy outside of CEQA. To this end the City of Arroyo Grande has adopted local General Plan policies for motor vehicle LOS, bicycle level of traffic stress, pedestrian connectivity, transit proximity, and neighborhood volume thresholds. Although these measures are not subject to CEQA or considered measures of impacts under SB 743, they are policy measures that should be studied for general plan consistency and compliance.

The following provides the framework of a Multimodal Transportation Impact Study document, including the Table of Contents, and outlines within each section the requested information that needs to be provided for an informative multimodal transportation analysis and disclosure of transportation impacts.

Chapter 2: Transportation Impact Analysis Requirements

Transportation impact studies may be required by the City to adequately assess impacts or policy inconsistencies of a development proposal, changes in land use designations through a zoning or General Plan amendment, or modification or expansion of transportation infrastructure. The CEQA Transportation Impact Analysis section of a Transportation Impact Analysis Report (TIAR) will typically be incorporated into the "Circulation" section of an Environmental Impact Report (EIR). The Local Transportation Policy Analysis section of a TIAR is considered as local policy review apart and not subject to CEQA pursuant to Senate Bill (SB) 743. Local Transportation Policy Analysis is used to inform the City if and how a project is inconsistent with adopted Transportation Policy; the City may adopt conditions of approval to offset policy inconsistencies through its legislative authority. If an EIR is not required, a stand-alone TIAR may still be required by the City. The final decision on the type and scope of a TIAR will be determined by the City.

Due to potential conflicts, applicants (excluding public agencies) are not permitted to commission and direct the preparation of a TIAR. Funding for TIAR's are the applicant's responsibility, however the studies shall be prepared independent of the applicant. Applicants shall deposit the necessary funding and fees for the City to commission & direct the preparation of TIAR's. A certified professional Transportation Planner, or registered professional Traffic or Civil Engineer must prepare all TIAR studies with adequate experience in Transportation Planning & Engineering.

Impact Analysis Requirement Triggers

A complete TIAR study will typically be required for a project when the projected trip generation during any peak hour is equal to or greater than 20 trips. This criterion specifically applies to Local Transportation Policy Analysis and does not preclude the need to evaluate transportation impacts under CEQA pursuant to SB 743, which have different screening criteria as described in Chapter 3. The amount of traffic generated by the project shall be calculated using the methodology and guidelines of the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. The table below provides examples of development types that would typically generate 20 peak hour trips and require a TIAR.

Table 2-1: Example 20+ Peak Hour Trip Development Scenarios

1. 20 Single Family Units	2. 35 Multi-Family Units
3. 33 Room Hotel	4. 2,560 Sq. Ft. Restaurant
5. 5,240 Sq. Ft. Retail	6. 17,240 Sq. Ft. Office
7. 28,570 Sq. Ft. Industrial	

Sources:
1. Institute of Transportation Engineers' *Trip Generation Manual*, 10th Edition, 2017.

The City reserves its authority to require a TIAR for projects with a peak hour trip generation of less than 20 trips typically because of, but not limited to, safety and/or access concerns, community circulation concerns to the project, or when existing service levels on area streets are at or approaching unacceptable levels.

Memorandum of Assumptions

Upon determining that a TIAR is required, a project applicant must submit a project description including access points, land use types, and land use quantities that will be the foundation of the study. If the project description is later changed, any progress maybe invalidated, and the study would have to start over based on the new project description. Before technical analysis may commence an MOA must be submitted to the City for approval. The MOA shall include basic study parameters and assumptions, including the scope of the TIAR study area, proposed analysis scenarios, proposed data collection efforts, proposed project trip generation, proposed project trip distribution and assignment, and technical analysis parameters and methodologies. The MOA shall also include a summary of existing transportation conditions, and proposed methodology for developing future volumes in the Short-Term Conditions (if necessary) and Cumulative Conditions analyses.

Following submittal, the City will review the MOA and submit comments to the applicant, indicating approval of or rejection of submitted content. The consultant will then have an opportunity to modify assumptions and methodologies prior to proceeding with the Technical Analysis and submitting a Draft TIAR. The MOA process provides the consultant pre-approval of many technical assumptions prior to completing a Draft TIAR and provides the City a chance to review important assumptions that will be used in the forthcoming Draft TIAR.

Study Area

The scope of a TIAR study should be determined by which intersections or roadway segments may be impacted by project-generated traffic. As a general guideline, any roadway segment or intersection through which the project will generate twenty (20) or more peak hour trips will be included in the analysis. In addition, all project access points shall be included in the study. Additional facilities may be studied based on circumstances unique to the site. Consultants should consult and advise the City early regarding any additional study locations based on local or site-specific issues.

Traffic Data Collection

At minimum, AM and PM weekday peak hour conditions must be analyzed at all study intersections and average daily traffic conditions must be analyzed at all study roadway segment locations. In some cases, the City may also require midday peaks, school-related afternoon peak periods, as well as weekend peak hour, and/or daily conditions. New traffic data must be collected at all study intersections during these peak hour and daily time frames, unless recent traffic data from within two (2) years of initiating the TIAR is available. The City Community Development Department may allow the use of older traffic data if the applicant can quantitatively demonstrate that traffic conditions have either not significantly changed since the date the older counts were collected or that the older counts can be manually adjusted to reflect current year conditions.

New AM and PM peak hour traffic counts must be collected on a typical weekday (on a Tuesday, Wednesday, or Thursday of a week without holidays, large special events, or disruptive construction

activity) between 7:00 – 9:00 AM and between 4:00 – 6:00 PM respectively. If a school-related peak hour is required, verify the drop-off and pick-up period with the school schedule and collect accordingly. If a weekend peak hour analysis is required, weekend traffic data should be collected between 11:00 AM – 1:00 PM. A peak hour is defined as the highest continuous hour of traffic, as measured in 15-minute increments, of a two-hour data collection sample. Roadway geometrics should be collected at the time of traffic data collection or via aerial photography, as built plans, and site visits.

Trip Generation

A summary table listing each type of land use, corresponding size, the average trip generation rates used (total daily traffic, AM and PM weekday peak hours, and weekend peak hour if needed), and the resulting total trips generated must be provided for the proposed project. A similar trip generation table must be provided for the approved/pending projects (provided by the City Community Development Department) that were determined necessary for the Short-Term Conditions analysis scenario. Trip generation rates must be calculated using the latest edition of the ITE Trip Generation Manual. At the City's discretion, the applicant may alternatively use driveway count data from similar existing uses to develop trip generation rates if no published rates are available for the proposed use. Pass-by, link-diverted, and internal capture may be considered subject to City approval.

Trip Distribution & Assignment

The estimated percentage distribution of the proposed project's generated trips, to destinations both within and outside the City, must be clearly stated in the report. The San Luis Obispo Council of Governments (SLOCOG) Regional Travel Demand Model should be used to develop trip distribution, although market studies, employee address lists, driveway counts at adjacent uses, or other information concerning origin of trip attractions to the proposed development, may be used to generate or refine trip distribution projections. At the City's discretion, the City's local travel demand model may be utilized, if it is updated to current conditions and made available to the public. A map showing the percentage of the proposed project's generated daily traffic through vicinity roadways must also be provided. The distribution estimates shall be reviewed and approved by the City Community Development Department.

The directions of approach and departure of the proposed project's generated trips, via the area's street system through project driveways and all study intersections, must be presented in the report. The technical analysis steps, basic methods, and assumptions used in this work must be clearly stated and approved by the City. The assumed trip distribution and assignment must represent the most logically travelled route for drivers accessing the proposed project. These routes should be developed using the SLOCOG Regional Travel Demand Model and refined by observation of travel patterns to and from existing land uses in the study area.

Chapter 3: CEQA Transportation Impact Analysis

Vehicle Miles Traveled (VMT)

For purposes of transportation analysis, VMT refers to the amount and distance of automobile travel attributable to a project. Baseline VMT is established as the Countywide average including incorporated cities as calculated by the SLOCOG Regional Travel Demand Model (regional average).

The baseline VMT per Capita is 20.2, and baseline VMT per Employee is 14.0.

Baseline VMT metrics may be updated periodically, at the City's discretion, for a variety of reasons, such as to maintain an accurate reflection of existing land use or travel conditions, to coincide with changes to VMT analysis best practices, and to reflect updates to the SLOCOG Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS) and/or regional model. Project applicants may also elect to calculate the baseline VMT metric utilizing a different methodology or data source, upon demonstrating a need to update the values presented in this document due to changes in existing land use or travel conditions, and upon providing substantial evidence that the baseline VMT calculation follows guidance from OPR and is defensible under CEQA, including accounting for full trip lengths, not restricted to jurisdictional boundaries, and accounting for vehicle trips to and from the County.

The VMT threshold for residential and non-residential land use projects shall comply with the 15% below baseline thresholds as set in this document, and the VMT threshold for retail, industrial, or other projects shall comply with the zero-net increase in total regional VMT threshold as set in this document.

Projects Assumed to be Less Than Significant.

The California Office of Planning & Research Technical Advisory has established the following thresholds under which development projects are presumed to have less than significant impacts on vehicle miles traveled. Projects that meet any of these criteria are assumed to have a less than significant impact and do not require CEQA review as it relates to transportation.

A) Project is consistent with the Sustainable Communities Strategy (SCS) or General Plan and generates fewer than 110 daily trips based on the most current edition of the Institute of Traffic Engineer's Trip Generation Manual.

B) Projects that are within ½ mile of a transit stop at the intersection of two transit routes with 15 minute or less headways. Unless the project:

   a. Has a floor to area ratio (FAR) of less than 0.75, or

   b. Includes more parking than required under the City's zoning code, or

   c. Is inconsistent with the region's Sustainable Communities Strategy, City Zoning Code, or City Land Use Policies (i.e. General Plan or Specific Plan), or

   d. Replaces affordable housing with a smaller number of moderate- or high-income residential units.

C) Project is Locally-serving retail defined as retail project within an urban environment of less than 50,000 square feet. However, retail projects of less than 50,000 square feet may still be regionally serving (i.e., auto dealerships & specialty retailers), therefore each project should be considered on a case-by-case basis by City staff to determine if they are likely to attract regional trips. The City should consider project-specific information such as market surveys or economic impact analysis that may more accurately determine market geography.

D) Transportation projects that are expected to reduce or have no impact on VMT will not require a quantitative VMT analysis. These projects include, but are not limited to, road diets (traffic lane reductions/narrowing), roundabouts, roadway rehabilitation and maintenance, safety improvements that do not substantially increase auto capacity, installation or reconfiguration of lanes not for through traffic (addition of left/right turn lanes, etc.), timing of traffic signals, removal of on-street parking, addition or enhancement of pedestrian, bicycle and transit facilities and services.

Residential Based Land Use

Project VMT per capita shall be calculated by performing a run of the SLOCOG Regional Travel Demand Model and comparing the total regional residential VMT with and without project to determine total project VMT. Total project VMT then shall be divided by the proposed dwelling units multiplied by the City's average persons per household from the US Census (2.54 Average Persons Per Household).

$$\text{VMT per Capita} = \frac{\text{Total Regional VMT for Home Based Trips}}{(\text{Proposed Dwelling Units}) \; x \; (\text{Avg. Persons per Household})}$$

Significance Criteria: Project VMT per capita exceeds (17.2) 15% below the existing regional average VMT per capita.

Employment Based Land Use

Project VMT per capita shall be calculated by performing a run of the SLOCOG Regional Travel Demand Model and comparing the total regional work VMT with and without project to determine total project VMT. Total project VMT then shall be divided by the proposed square feet divided by the average square feet per worker.

$$\text{VMT per Employee} = \frac{\text{Total Regional VMT for Home Based Work Trips}}{(\text{Proposed Office Sq. Ft.}) \; / \; (\text{Avg. Sq. Ft. per Worker})}$$

Significance Criteria: Project VMT per employee exceeds (11.9) 15% below the existing regional average VMT per employee.

For purposes of calculating work square footage to employee ratios on a project-by-project basis, the American Community Survey and employment density shown in Table 3-1 below should be considered. The City retains discretion for determining the appropriate ratio assumptions for each project application.

Table 3-1: Example Employment Density

Derivation of Square Feet per Employee Based on:
--MEDIAN EMPLOYEES PER ACRE
--MEDIAN FAR
FIVE COUNTY REGION Net/Gross Adjustment Factor: 0.75

Land Use Category	# of Records	FAR	Employees/ Acre	Building Efficiency	Square Feet/ Employee
Regional Retail	27	0.59	14.99	0.80	1,023
Other Retail/Svc.	1013	0.28	13.49	0.85	585
Low-Rise Office	349	0.36	22.91	0.90	466
High-Rise Office	46	1.19	116.32	0.90	300
Hotel/Motel	16	0.61	11.04	N/A	1,804
R & D/Flex Space	70	0.31	18.13	0.95	527
Light Manufacturing	1047	0.35	11.63	0.95	924
Heavy Manufacuring	0	--	17.05	N/A	--
Warehouse	121	0.42	10.63	0.95	1,225
Government Offices	32	0.37	16.23	0.90	672

Source: Employment Density Report Table 1A, Southern California Association of Governments (SCAG), 2001.

Retail, Industrial, & Other

Project VMT per capita shall be calculated by performing a run of the SLOCOG Regional Travel Demand Model and comparing the total regional VMT with and without project to determined total project VMT.

Significance Criteria: Project VMT results in a total net increase of the regional VMT.

Transportation Projects

For transportation projects that increase auto capacity, such as the addition of through lanes on existing or new highways, which would likely lead to a measurable and substantial increase in VMT, quantitative analysis is required to calculate the amount of additional vehicle travel anticipated. For transportation projects that have already been evaluated for VMT at a programmatic level, such as within a General Plan or Specific Plan, the City may tier from that analysis. For transportation projects located within the City that are anticipated to increase vehicle travel, the VMT threshold of significance shall be evaluated and determined on a case-by-case basis, while ensuring that the analysis addresses:

A) Direct, indirect and cumulative effects of the transportation project, including potential for induced demand (CEQA Guidelines §15064(d) and (h));

B) Near-term and long-term effects of the transportation project (CEQA Guidelines §§15063(a)(1), 15126. 2(a));

C) The transportation project's consistency with state greenhouse gas reduction goals (Pub. Res. Code §21099);

D) The impact of the transportation project on the development of multimodal transportation networks (Pub. Res. Code §21099); and

E) The impact of the transportation project on the development of a diversity of land uses (Pub. Res. Code §21099).

Mixed-Use Projects

Each proposed use will be analyzed separately and compared to the corresponding threshold. Alternatively, the City may consider only the project's dominant use where doing so will not underestimate potential transportation impacts resulting from the project. In the analysis of each use, a project should take credit for internal capture.

Safety

Intersections

For each of the study intersections an assessment of geometric and operational conditions, turn pocket queues, and review of the City's Local Roadway Safety Plan shall be conducted.

Significance Criteria:

A) Introduction of geometric or operational elements which are inconsistent with adopted local and state design standards & policies.

B) Project traffic exceeds intersection turn pocket storage length(s) or exacerbates already exceeded turn pocket storage lengths.

C) Project traffic added to intersections identified in the City's adopted Local Roadway Safety Plan and found to potentially exacerbate the identified collision pattern.

Segments

For each of the study segments and project frontages an assessment of geometry, access, and review of the City's Local Roadway Safety Plan shall be conducted.

Significance Criteria:

A) Introduction of geometric or operational elements which are inconsistent with adopted local and state design standards & policies.

B) Project access points on collectors and arterials are within the functional area of adjacent signalized intersections.

C) Project traffic added to intersections identified in the City's adopted Local Roadway Safety Plan and found to potentially exacerbate the identified collision pattern.

Safety Mitigation Measures

- Geometric or Operational Modifications
- Extension of turn pockets
- Modification of Access Points and/or Turning Movement Restrictions
- Implementation of Local Roadway Safety Plan (LRSP) recommendations

Induced Travel

Significance Criteria: Project introduces roadway improvements which in and of themselves increase net vehicle trip frequency and distance, improved travel time allows driving to substitute for non-travel activities, excluding travel shifted from other times and routes.

Induced Travel Mitigation Measures

Project Infrastructure Modification

Chapter 4: Local Transportation Policy Analysis

Transportation Analysis Scenarios

Typically, TIAR studies will require the analysis of three (3) conditions, with and without the proposed Project. These conditions are: Existing Conditions, Short-Term Conditions, and Cumulative Conditions. At the discretion of the City Community Development Department, fewer conditions may be allowed. Additional scenarios may be required based on project characteristics, such as Project phasing, at the discretion of the City.

Within each of the conditions, both AM and PM weekday peak hours must be analyzed at all study intersections and average daily traffic conditions must be analyzed at all study roadway segments, noon peak hour may also be required by the City when volumes are greater than AM or PM peaks. The City Community Development Department may also require weekend peak hour and/or daily analysis if the project is expected to generate significant weekend traffic. The following scenarios will typically be required for analysis:

- Existing Conditions
- Existing Plus Project Conditions
- Short-Term with No Project Conditions
- Short-Term with Project Conditions
- Cumulative with No Project Conditions
- Cumulative with Project Conditions

Technical Analysis Parameters

The following section outlines the methodology and analysis parameters TIAR studies must use to quantify traffic operations at study locations. This section also describes multi-modal analysis methodologies TIAR studies must follow when quantifying non-vehicular mode service levels.

Intersections

Motor Vehicle Level of Service

Intersection traffic operations are quantified through a determination of "Level of Service" (LOS). Intersection LOS must be calculated for all intersection control types using the methods documented in the latest edition of the Transportation Research Board Publication *Highway Capacity Manual* (HCM). The current edition of the HCM is the Sixth Edition, *A Guide for Multimodal Mobility Analysis*, 2016 (if intersection configuration is not supported by HCM 6, HCM 2000 methodologies may be used). Intersection LOS provides a graduated description of traffic operating conditions, whereby a letter grade A through F is assigned to an intersection representing progressively worsening traffic conditions based

on delay calculations. For signalized intersections, roundabouts, and All-Way-Stop-Controlled (AWSC) intersections, intersection delays and LOS are average values for all intersection movements. For Two-Way Stop-Controlled (TWSC) intersections, intersection delays and LOS are representative of the worst-case intersection approach. The delay-based LOS criteria for different types of intersection control are outlined in Table 4-1.

Table 4-1: Level of Service (LOS) Criteria for Intersections

Level of Service	Roundabout Delay	Signal Delay	All-Way Stop Delay
A	≤ 10.0	≤ 10.0	≤ 10.0
B	>10 and ≤ 15.0	>10 and ≤ 20.0	>10 and ≤ 15.0
C	>15 and ≤ 25.0	>20 and ≤ 35.0	>15 and ≤ 25.0
D	>25 and ≤ 35.0	>35 and ≤ 55.0	>25 and ≤ 35.0
E	>35 and ≤ 50.0	>55 and ≤ 80.0	>35 and ≤ 50.0
F	> 50.0	> 80.0	> 50.0

Inconsistency Criteria: Project causes intersection Level of Service to exceed or exacerbates already exceeded intersection Level of Service below D.

Motor Vehicle Intersection Level of Service Conditions of Approval

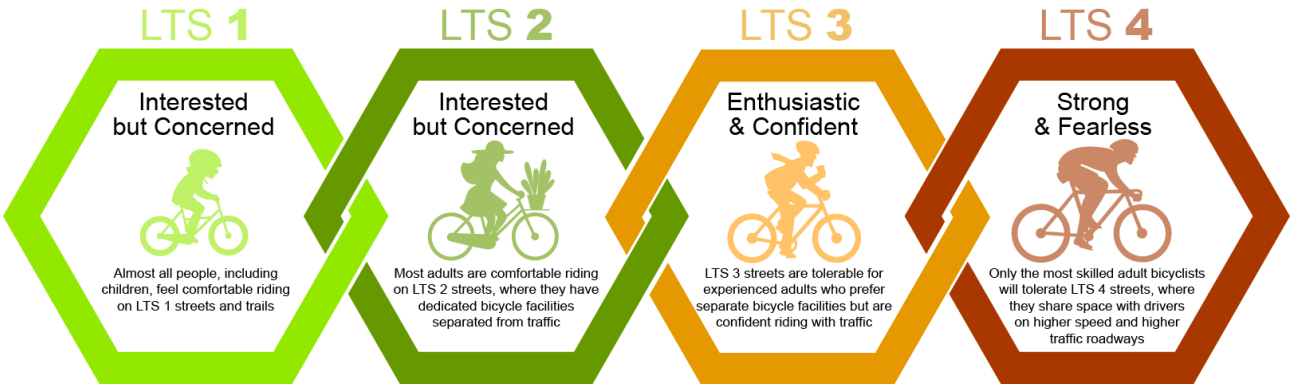
- Intersection Improvements
- Improvements to adjacent Bicycle & Pedestrian facilities
- Improvement in Transit service

Bicycle Level of Traffic Stress

Intersection bicycle operations are quantified through a determination of "Level of Traffic Stress" (LTS). Intersection LTS must be calculated for all intersection control types using the methods documented in the paper, *Low Stress Bicycling and Network Connectivity*, Mineta Transportation Institute, Report 11-19, May 2012. Bicycle LTS quantifies the stress level of a given roadway segment by considering a variety of criteria, including street width (number of lanes), speed limit or prevailing speed, presence and width of bike lanes, and the presence and width of parking lanes. Bicycle LTS is a suitability rating system of the safety, comfort, and convenience of transportation facilities from the perspective of the user. Moreover, the methodology allows planning practitioners to assess gaps in connectivity that may discourage active users from traversing roadways.

Bicycle LTS scores roadway facilities into one of four classifications or ratings for measuring the effects of traffic-based stress on bicycle riders, with 1 being the lowest stress or most comfortable, and 4 being the highest stress or least comfortable. Generally, LTS score of 1 indicates the facility provides a traffic stress

tolerable by most children and less experienced riders, such as multi-use paths that are separated from motorized traffic. An LTS score of 4 indicates a stress level tolerable by only the most experienced cyclists who are comfortable with high-volume and high-speed, mixed traffic environments. The Figure below presents the four scoring classifications, subsequent tables show the criteria associated with determining the LTS score.



The Bicycle LTS methodology is comprised of three scoring categories: roadway segments, intersection approaches where right turn lanes exist, and unsignalized intersection crossings. The Bicycle LTS scoring criteria for intersection approaches where right turn lanes exist, and for unsignalized intersection crossings are provided below.

Table 4-2 LTS Criteria for Intersection Approaches with Right Turn Lanes

Right-turn Lane Configuration	Right-turn lane length (ft)	Bike Lane Approach Alignment[2]	Vehicle Turning Speed (mph)[3]	LTS Score
With Pocket Bike Lane				
Single	≤ 150	Straight	≤ 15	LTS 2
Single	>150	Straight	≤ 20	LTS 3
Single	Any	Left	≤ 15	LTS 3
Single[1] or Dual Exclusive/ Shared	Any	Any	Any	LTS 4
Without a Pocket Bike Lane				
Single	≤ 75		≤ 15	(no effect on LTS)
Single	75-150		≤ 15	LTS 3
Otherwise				LTS 4

1 Any other single right turn lane configuration not shown above.

2 The right turn criteria are based on whether the bike lane stays straight or shifts to the left.

3 This is vehicle speed at the corner, not the speed crossing the bike lane. Corner radius can also be used as a proxy for turning speeds.

4 There is no effect on LTS if the bikeway is physically separated from traffic, as on a shared-use path.

Table 4-3 LTS Criteria for Unsignalized Crossings Without a Median Refuge

Speed Limit of Street Being Crossed	Width of Street Being Crossed		
	Up to 3 lanes	4-5 lanes	6+ lanes
Up to 25 mph	LTS 1	LTS 2	LTS 4
30 mph	LTS 1	LTS 2	LTS 4
35 mph	LTS 2	LTS 3	LTS 4
40+	LTS 3	LTS 4	LTS 4

[1] Refuge should be at least 10 feet to accommodate a wide range of bicyclists (i.e. bicycle with a trailer) for LTS 1, otherwise LTS=2 for refuges 6 to <10 feet.

Table 4-4 LTS Criteria for Unsignalized Crossings With a Median Refuge

Speed Limit of Street Being Crossed	Width of Street Being Crossed		
	Up to 2 lanes	4-5 lanes	6+ lanes
Up to 25 mph	LTS 1	LTS 1	LTS 2
30 mph	LTS 1	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 4
40+	LTS 3	LTS 4	LTS 4

[1] Refuge should be at least 10 feet to accommodate a wide range of bicyclists (i.e. bicycle with a trailer) for LTS 1, otherwise LTS=2 for refuges 6 to <10 feet.

Inconsistency Criteria: Project causes bicycle level of traffic stress to exceed or exacerbates approaches or crossings that already exceed LTS 3 at intersections with Class II or Class III facilities.

Bicycle Intersection Level of Traffic Stress Conditions of Approval

- Project Land use Modifications
- Improvements to Bicycle Facilities

Segments

Motor Vehicle Level of Service

Roadway segment traffic operations are quantified through a determination of LOS based on Average Daily Traffic (ADT). The volume-based LOS criteria for different types of roadways are outlined in Table 4-5.

Table 4-5 Level of Service (LOS) Criteria for Roadways

Volume-to-Capacity Ratio (V/C)	<0.6	0.6-0.7	0.7-0.8	0.8-0.9	0.9-1.0
Roadway Segment Type	Max. Average Daily Traffic (ADT) For Given Service Level				
	LOS "A"	LOS "B"	LOS "C"	LOS "D"	LOS "E"
Six Lane Freeway	42,000	64,800	92,400	111,600	120,000
Four Lane Freeway	28,000	43,200	61,600	74,400	80,000
Four Lane Highway	4,800	9,600	15,800	27,000	45,800
Two Lane Highway	2,400	4,800	7,900	13,500	22,900
Four Lane (With Turning Lane) Arterial	22,000	25,000	29,000	33,000	36,000
Four Lane (No Turning Lane) Arterial	18,000	21,000	24,000	27,000	30,000
Two Lane (With Turning Lane) Arterial	11,000	12,500	14,500	16,500	18,000
Two Lane (No Turning Lane) Arterial	9,000	10,500	12,000	13,500	15,000
Four Lane Collector	12,000	15,000	18,000	21,000	24,000
Two Lane Collector	6,000	7,500	9,000	10,500	12,000

Note: All volumes are approximate and assume ideal roadway characteristics. Actual threshold volumes for each Level of Service listed above may vary depending on a variety of factors including (but not limited to) roadway curvature and grade, intersection or interchange spacing, driveway spacing, percentage of trucks and other heavy vehicles, travel lane widths, signal timing characteristics, on-street parking, volume of cross traffic and pedestrians, etc.

Inconsistency Criteria: Project degrades segment Level of Service or exacerbates already degraded segment level below LOS D.

Motor Vehicle Roadway Segment LOS Conditions of Approval

- Roadway Segment widening, channelization or other capacity or safety enhancing improvements
- Improvements to adjacent Bicycle & Pedestrian facilities
- Improvement in Transit service

Pedestrians

Network Connectivity

Inconsistency Criteria: Project lacks connectivity to the existing pedestrian network beyond the project frontage.

Sidewalk Buffer

Inconsistency Criteria: Project introduces un-buffered sidewalk on roadways with speed limits above 35 mph.

Pedestrian Conditions of Approval

- Project Land use Modifications
- Improvements to Bicycle Facilities

Bicycles

Network Connectivity

Inconsistency Criteria: Project which fronts a planned bicycle network; omits planned network frontage improvements, lacks connectivity to the planned bicycle network, or obstructs implementation of the planned network.

Bicycle Level of Traffic Stress

The Bicycle LTS scoring criteria for roadway segments with bike lanes and for mixed traffic (no bike lanes) are provided below.

Table 4-6 LTS Criteria for Bike Lanes

Lane Factor	LTS Score			
	LTS 1	LTS 2	LTS 3	LTS 4
Alongside a Parking Lane				
Street width (through lanes per direction)	1	(no effect)	2 or more	(no effect)
Sum of bike lane and parking lane width (includes marked buffer and paved gutter)	15 ft. or more	14 or 14.5 ft.[2]	13.5 ft. or less	(no effect)
Speed limit or prevailing speed	25 mph or less	30 mph	35 mph	40 mph or more
Bike lane blockage (typically applies in commercial areas)	rare	(no effect)	frequent	(no effect)
Not Alongside a Parking Lane				
Street width (through lanes per direction)	1	2, if directions are separated by a raised median	more than 2, or 2 without a separating median	(no effect)
Bike Lane Width (includes marked buffer and paved gutter)	6 ft. or more	5.5 ft. or less	(no effect)	(no effect)
Speed limit or prevailing speed	30 mph or less	(no effect)	35 mph	40 mph or more
Bike lane blockage (typically applies in commercial areas)	rare	(no effect)	frequent	(no effect)

Note: [1] (no effect) = factor does not trigger an increase to this level of traffic stress.

[2] If speed limit < 25 mph or Class = residential, then any width is acceptable for LTS 2.

Table 4-7 LTS Criteria for Mixed Traffic

	Street Width		
Speed Limit	2-3 lanes	4-5 lanes	6+ lanes
Up to 25 mph	LTS 1 or 2[1]	LTS 3	LTS 4
30 mph	LTS 2 or 3[1]	LTS 4	LTS 4
35+ mph	LTS 4	LTS 4	LTS 4

[1]Use lower value for streets without marked centerlines or classified as residential and with fewer than 3 lanes; use higher value otherwise.

Inconsistency Criteria: Project causes bicycle level of traffic stress to exceed or exacerbates segments that already exceed LTS 3 on Class II or Class III routes.

Bicycle Roadway Segment Level of Traffic Stress Conditions of Approval

- Project Land use Modifications
- Improvements to Bicycle Facilities on Roadway Segments, including buffering, bike lane widening, sharrows and other bicycle safety enhancements.

Transit

Inconsistency Criteria:

- Project Frontage or Frontages(s) to the Public Right of Way are more than ¼ mi along ADA accessible pedestrian routes.
- Project lacks connectivity to the existing pedestrian network beyond the project frontage.

Transit Conditions of Approval

- Project Land use Modifications
- Improvements to Transit Stop Locations

Neighborhood Traffic

Inconsistency Criteria:

- Project traffic causes local residential streets to exceed or exacerbates streets that already exceed 1,500 ADT.
- Project traffic causes collector residential streets to exceed or exacerbates streets that already exceed 3,000 ADT.

Neighborhood Traffic Conditions of Approval

- Project Land use Modifications
- Project Site Plan Redesign to redistribute neighborhood traffic to below local residential and/or collector roadway criteria.
- Introduce traffic calming measures as secondary options, to redistribute neighborhood traffic.