

# **TRANSPORTATION TECHNICAL DESIGN STANDARDS**

The Town of



Public Works & Engineering Services

16801 Westgrove Road  
Addison, TX 75001

Revised January 2022

## TABLE OF CONTENTS

|  |    |
|--|----|
| <b>I. GENERAL</b> .....                                  | 3  |
| A. MASTER TRANSPORTATION PLAN .....                      | 3  |
| B. GEOMETRIC ROADWAY DESIGN.....                         | 3  |
| <b>II. DRIVEWAYS</b> .....                               | 4  |
| A. DRIVEWAY CLASSIFICATION .....                         | 4  |
| B. ACCESS CONTROL POLICY.....                            | 4  |
| C. HORIZONTAL DRIVEWAY GEOMETRY.....                     | 4  |
| D. VERTICAL DRIVEWAY GEOMETRY .....                      | 9  |
| E. CHANNELIZATION ISLANDS & MEDIAN DIVIDERS .....        | 9  |
| <b>III. TURN &amp; DECELERATION LANES</b> .....          | 12 |
| A. RIGHT TURN LANES.....                                 | 12 |
| B. LEFT TURN LANES .....                                 | 13 |
| <b>IV. MEDIAN OPENINGS</b> .....                         | 13 |
| A. LOCATION & SPACING.....                               | 13 |
| B. DESIGN .....  | 16 |
| <b>V. TRAFFIC SIGNALS</b> .....                          | 16 |
| A. GENERAL.....  | 16 |
| B. SIGNAL PHASING.....                                   | 16 |
| C. DESIGN REQUIREMENTS .....                             | 16 |
| D. EQUIPMENT REQUIREMENTS .....                          | 17 |
| <b>VI. LANE CLOSURES AND TRAFFIC CONTROL</b> .....       | 17 |
| <b>VII. TRAFFIC IMPACT ANALYSIS AND MITIGATION</b> ..... | 17 |
| A. GENERAL.....  | 17 |
| B. APPLICABILITY OF TIA REQUIREMENTS .....               | 19 |
| C. TIA PREPARATION AND REVIEW .....                      | 20 |
| D. TIA STANDARDS .....                                   | 20 |
| E. TIA METHODOLOGY.....                                  | 21 |
| F. TIA REPORT FORMAT .....                               | 22 |
| G. TRAFFIC IMPACT MITIGATION .....                       | 23 |
| H. ADMINISTRATION OF THE TIA.....                        | 24 |
| <b>VIII. OTHER TRANSPORTATION ITEMS</b> .....            | 24 |
| <b>IX. DEVIATION FROM STANDARDS</b> .....                | 24 |
| <b>APPENDIX A - REFERENCES</b> .....                     | 26 |

THIS DOCUMENT PROVIDES GUIDANCE to developers, engineers, and contractors desiring to install additions to the Town of Addison public pavement infrastructure. The criteria laid out herein are the set minimum standards, more stringent criteria may be required at the direction of the Public Works & Engineering Services.

**I. GENERAL**

**A. MASTER TRANSPORTATION PLAN**

1. Reference the latest revision of the Town of Addison Master Transportation Plan for the following design information:
  - a) Street classifications
  - b) Typical and alternative roadway cross-sections, public Right-of-Way widths, and corridor concepts
  - c) Future vehicular & pedestrian connectivity routes
  - d) Future transit projects
  - e) Recommended infrastructure improvements/enhancements

**B. GEOMETRIC ROADWAY DESIGN**

1. Unless otherwise specified in these design standards, reference the latest edition of the *AASHTO Policy on Geometric Design of Highways and Streets* for the following design information:
2. Horizontal and vertical geometric roadway design for Local, Collector, and Arterial streets
3. Minimum longitudinal street slope is 0.5% to ensure drainage.
4. Maximum longitudinal street slopes are shown in Table I.1

| <b>TABLE I.1<br/>NORMAL MAXIMUM LONGITUDINAL STREET GRADES</b> |                  |
|--|------------------|
| <b>Functional Classification</b>                               | <b>MAX GRADE</b> |
| Local (Residential)  | 10%              |
| All Collectors   | 8%               |
| All Arterials  | 6%               |

5. Intersection design
6. Minimum curb radius at street intersections shall be forty feet (40'), or as otherwise specified by the Director of Public Works & Engineering Services.
7. Sight distances and visibility triangles
  - a) Visibility triangles should be maintained at all intersections to ensure proper sight distance for all cases. This includes street-to-street intersections and driveway-to-street intersections.
  - b) Obstructions greater than two feet in height are prohibited within visibility triangles, except for traffic control signs and signals, street signs, fire hydrants, utility poles, or other devices authorized by the Town Council.
8. All plans shall be prepared by a Professional Civil Engineer licensed in the State of Texas.
9. Approved permits from agencies/municipalities other than the Town must be submitted to the town prior to construction plan approval.

## II. DRIVEWAYS

### A. DRIVEWAY CLASSIFICATION

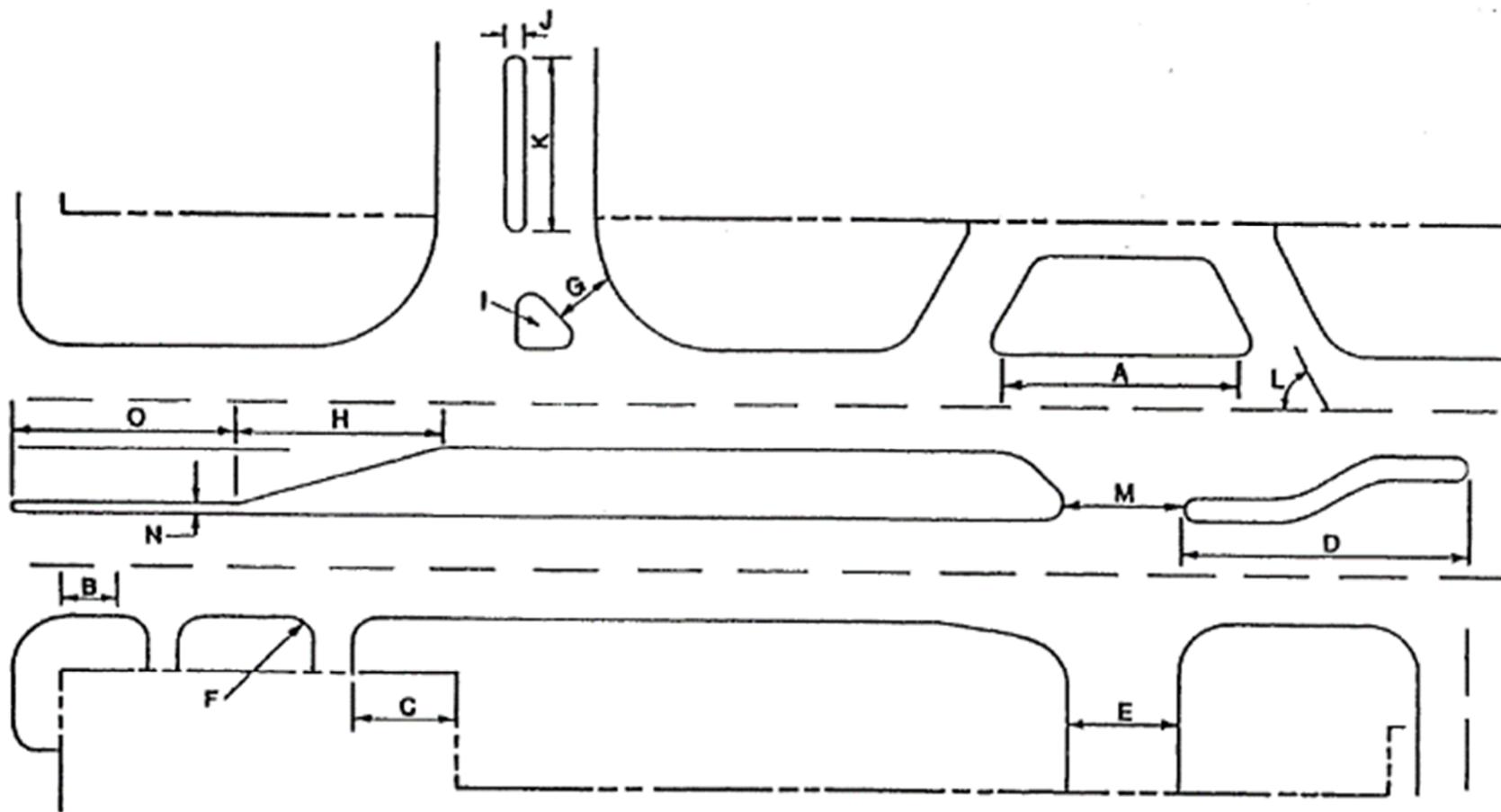
1. Classification is by land use of the property and the intensity of that use.
  - a) Residential : all single-family land uses, including duplexes, townhouses, and small multi-family complexes of up to eight units.
  - b) Commercial drives serve all retail, office, and other land uses commonly referred to as commercial. Driveways serving multi-family complexes of more than eight units should conform to commercial rather than residential driveway standards.
  - c) Industrial driveways serve truck traffic, and should be used at manufacturing and truck access points of high volume commercial land uses (i.e., shopping malls).

### B. ACCESS CONTROL POLICY

1. Driveway access control is a critical issue which enhances traffic safety and preserves maximum available capacity on roadways. Since a large percentage of the thoroughfares in the Town of Addison carry high volumes of traffic, and there is limited opportunity for additional roadway capacity increase, access control is of particular importance to achieve maximum effectiveness of the existing roadway system.
2. To reduce the number of driveways, The Town requires cross-connection between adjacent commercial and/or industrial lots and encourages developers/property owners to seek joint access with adjacent property owners.
3. Property access shall be limited to one driveway onto a public street, either contained wholly within the property frontage or as part of a joint access with an adjacent property. With the approval of the Director of Public Works & Engineering Services, additional points of access may be granted if a professionally competent traffic analysis shows that more than one access point is needed to properly and safely serve the property.
4. Corner lots shall have their driveway access on the minor street.
5. If adequate driveway spacing can be maintained, driveways shall, where feasible:
  - a) On non-divided roadways, align with existing/proposed driveways across the street to minimize points of conflict during turning movements.
  - b) On divided roadways, align with existing/proposed median breaks, or be designed as "right in, right out" driveways only.
6. Driveways are not permitted to exit into right turn lanes.
7. For single-family, duplex, and townhouse residential land uses, lots should be platted so that direct access to arterial streets is not provided.

### C. HORIZONTAL DRIVEWAY GEOMETRY

1. Figure II.1 shows driveway design elements
2. Driveway spacing
  - a) Driveways should be spaced at sufficient distances to ensure that conflicting movements at adjacent driveways do not overlap".
  - b) Adjacent driveways should be spaced as far apart as access and on-site circulation needs will permit.



**A - DRIVEWAY SPACING**  
**B - CORNER CLEARANCE**  
**C - PROPERTY CLEARANCE**  
**D - MEDIAN OPENING SPACING**  
**E - DRIVEWAY WIDTH**  
**F - CURB RETURN RADIUS**  
**G - TURNING ROADWAY WIDTH**  
**H - TAPER LENGTH**

**I - ISLAND SIZE**  
**J - ELONGATED ISLAND WIDTH**  
**K - ELONGATED ISLAND LENGTH**  
**L - DRIVEWAY ANGLE**  
**M - MEDIAN OPENING LENGTH**  
**N - NARROWED MEDIAN END WIDTH**  
**O - LEFT TURN STORAGE AREA**

**Figure II.1 - Driveway Horizontal Design Elements**

- c) Driveway spacing is measured from the PT of the driveway radii. See Distance 'A' on Figure II.1.
- d) Table II.1 shows the minimum safe driveway spacing standards for various roadway functional classifications. This spacing should be maintained to ensure safe stopping distances. The recommended local residential street driveway spacing is based on a ten foot (10') minimum curb return at back-to-back driveways

| <b>TABLE II.1<br/>MINIMUM DRIVEWAY SPACING – TWO-WAY DRIVEWAYS</b> |                        |
|--|------------------------|
| <b>Functional Classification</b>                                   | <b>Minimum Spacing</b> |
| Arterial (Principal)   | 200                    |
| Arterial (Minor)   | 200                    |
| Collector (Non-Residential)  | 150                    |
| Collector (Residential)  | 20                     |
| Local (Residential)  | 20                     |

3. Corner Clearance

- a) Corner clearance is measured from the ultimate near cross street curb to the near driveway curb (see Distance "B" on Figure II.1).
- b) The minimum corner clearances for arterials, collectors, and local streets are displayed in Table II.2. If the property line is less than the minimum distance from the corner to meet these requirements, the driveway must be located within ten feet of the property line away from the corner.

| <b>TABLE II.2<br/>CORNER CLEARANCE</b>  |                            |                        |
|---|----------------------------|------------------------|
| <b>Functional Classification</b>        | <b>Intersecting With</b>   | <b>Clearance.(ft.)</b> |
| Arterial<br>(Principal & minor)         | Arterial, Collector, Local | 200, 125, 50           |
| Collector<br>(Residential & commercial) | All                        | 50                     |
| Local                                   | All                        | 50                     |

4. Property Clearance

- a) Property clearance is measured from the property line of a parcel and the edge of the nearest driveway (see Distance "C" on Figure II.1).
- b) The minimum property clearances for specific roadway functional classifications are displayed in Table II.3.. Should a property not have sufficient frontage to provide this distance, joint access with an adjacent property should be considered.

| <b>TABLE II.3<br/>PROPERTY CLEARANCE REQUIREMENTS</b> |                       |
|---|-----------------------|
| <b>Functional Classification</b>                      | <b>CLEARANCE (ft)</b> |
| Arterial (Principal and minor)                        | 100                   |
| Commercial/industrial Collector                       | 75                    |
| Residential Collector                                 | 10                    |
| Local Residential                                     | 10                    |

5. Throat Length & Storage

a) The required length of throat for storage will depend on these factors:

(1) Parking facility egress control, if any (egress control should be considered as a site design prerogative of the developer and normally does not impact street operations), and

(2) The gap availability on the street being entered. Gap availability, if not considered in establishing driveway throat length, can result in the request for police traffic control or unwarranted signalization. Police control should not be permitted as a solution to inadequate throat length.

b) Egress driveway lanes should be designed to accommodate outbound traffic during the most demanding peak hour condition. Differing land uses will have differing peak parking movement distributions. These distributions affect the rate at which vehicles exit the parking locations and therefore directly affect the length of storage required to hold the vehicles until they receive an acceptable gap to enter the roadway. Table II.4 presents the required storage for exiting driveway lanes as a function of land use and parking spaces.

| <b>TABLE II.4<br/>ON-SITE DRIVEWAY VEHICLE STORAGE LENGTHS</b> |  |                           |               |                   |
|--|--|---------------------------|---------------|-------------------|
| <b>PARKING SPACES/<br/>OUTBOUND<br/>DRIVEWAY LANE</b>          | <b>STORAGE REQUIRED (ft)<sup>1</sup></b> |                           |               |                   |
|  | <b>MF<br/>Residential</b>                | <b>Retail<sup>2</sup></b> | <b>Office</b> | <b>Industrial</b> |
| 0 - 200  | 25                                       | 25                        | 25            | 50                |
| 200 – 400  | 25                                       | 50                        | 100           | 150               |
| 400 – 600  | 50                                       | 150                       | 200           | More lanes        |
| > 600  | 100                                      | 200                       | More lanes    | More lanes        |

<sup>1</sup> Measured from property line.

<sup>2</sup> More than 700 spaces/lane will require additional outbound driveway lanes.

6. Number of driveway lanes and direction of travel

a) If a traffic analysis shows that more than one ingress lane is required, it may be desirable to provide an additional ingress lane, thereby widening the effective width of the throat to facilitate simultaneous left and right turn ingress movements. Should a high volume driveway have two left turn ingress lanes, the receiving length at the drive entrance must be a minimum of thirty feet.

- b) If a traffic analysis shows that more than one egress lane is required, the driveway should be designed to meet the needs of the site.
  - c) If a traffic analysis shows that a pair of one-way driveways better serve the needs of the site, and the property frontage exceeds two hundred feet (200') in length, one-way driveways may be considered.
7. Driveway width & radii
- a) The width of the street right-of-way should not be a limiting factor in selecting the appropriate curb return radii. Curb returns should extend into private property if necessary.
    - (1) Driveways off of arterial roadways shall have a minimum forty foot (40') radius, or as otherwise specified by the Public Works & Engineering Services.
    - (2) Driveways serving fire lanes shall meet curb radius requirements as specified in the Town Fire Lane Ordinance.
  - b) If a commercial development is serviced by moderate truck traffic (i.e., delivery trucks), it may be desirable to provide one well-designed "industrial" driveway for these vehicles and prohibit their use of the other "commercial" driveways within the development.
  - c) At high volume industrial driveways, the use of compound curves in the curb returns is recommended by *AASHTO*.
  - d) The use of a narrow driveway width in combination with a short curb return radius should be avoided and may only be used with the approval of the Director of Public Works & Engineering Services. If the width must be reduced, the curb return radius should be increased, and vice versa. Table II.5 identifies the appropriate curb return radius and driveway width combinations that should be used for different types of driveways.

| <b>Table II.5<br/>Curb Return Radius &amp; Driveway Width Combinations<sup>1</sup></b> |                       |                     |   |                                |                          |
|--|-----------------------|---------------------|---|--------------------------------|--------------------------|
| <b>Land-Use</b>  | <b>Design Vehicle</b> | <b>Short Radius</b> |   | <b>Narrow Width</b>            |                          |
|  |                       | <b>Radius</b>       | <b>Associated Entry Width<sup>2</sup></b> | <b>Entry Width<sup>2</sup></b> | <b>Associated Radius</b> |
| Industrial   | WB-50                 | 15'                 | 42  | 20                             | 45'                      |
| Commercial and Large MF Residential  | Single Unit Truck     | 15'                 | 26  | 15                             | 35'                      |
| SF and small MF Residential  | Passenger Car         | 10'                 | 15  | 12                             | 15'                      |

<sup>1</sup> For a driveway angle of 90 degrees.

<sup>2</sup> Entry width should be one-half the total width for two-way access points.

8. Driveway Angles
- a) A driveway should intersect the street at a 90 degree angle.
  - b) If the site conditions (e.g., terrain, lot size, and shape, etc.) will not

permit a 90 degree approach, the angle may be reduced, with the Town Engineer’s approval, to the following minimums:

- (1) Two-way Driveway:
  - (a) 70 degrees for large multi-family complex, commercial, and industrial driveways.
  - (b) 60 degrees for single-family, duplex, townhouse, and small multi-family complex residential driveways.
  - (c) One-way Driveway: 45 degrees for all driveways.

**D. VERTICAL DRIVEWAY GEOMETRY**

- 1. Driveway Grades
  - a) The normal driveway grade within the street right-of-way is set at a one-quarter inch per foot rise from the top of the curb at the property line.
  - b) The minimum elevation of a driveway at the right-of-way line is two inches above the top of curb.
  - c) Barrier-free sidewalk construction requires a maximum driveway grade, as measured from the gutter, of eight percent.
  - d) Driveways should be profiled for a distance of at least 20 feet outside the right-of-way to ensure adequate replacement design.
  - e) Due to state laws requiring the barrier-free construction of sidewalks or steps, grades beyond what is ADA/PROWAG acceptable are prohibited at driveways.
  - f) Figure II.2 displays the acceptable range of grades outside the right-of-way which should be maintained for a minimum distance of 20 feet.

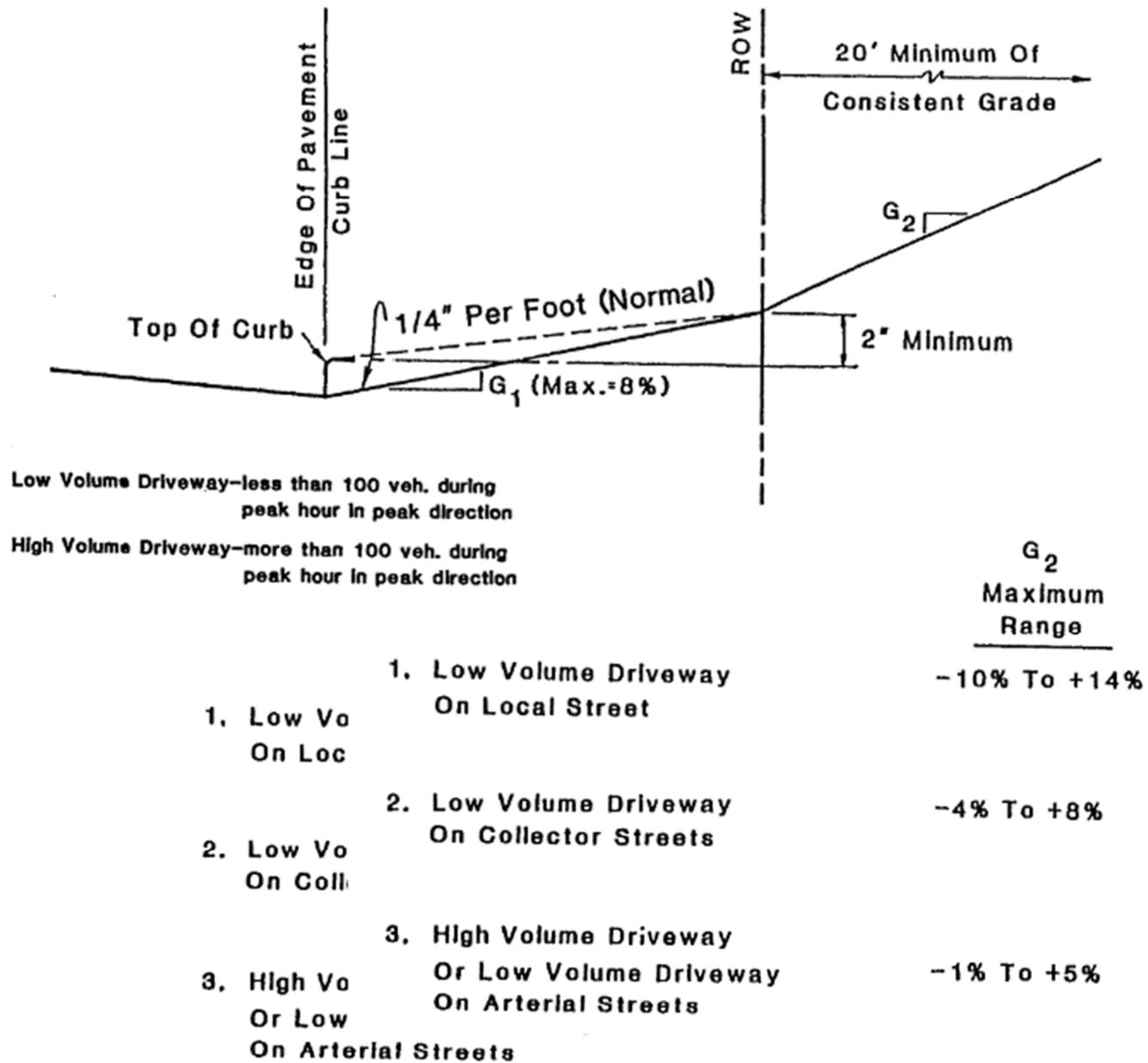
**E. CHANNELIZATION ISLANDS & MEDIAN DIVIDERS**

- 1. Islands should be constructed to clearly define the proper course of travel.
- 2. Turning Roadway Width
  - a) To facilitate the ingress and egress movements on high speed arterials, islands separating right turn movements may be used if the pavement width is sufficient to allow the vehicle to negotiate the turns at the proper design speed (see Table II.6).

| <b>TABLE II.6<br/>PAVEMENT WIDTHS FOR TURNING ROADWAYS</b> |   |                              |              |
|--|---|------------------------------|--------------|
| <b>RADIUS ON INNER<br/>EDGE OF PAVEMENT</b>                | <b>PAVEMENT WIDTH (ft) FOR DESIGN<br/>VEHICLE</b> |                              |              |
| <b>R (feet)</b>  | <b>Passenger<br/>Car</b>                          | <b>Single-Unit<br/>Truck</b> | <b>WB-50</b> |
| 50   | 13  | 18                           | 26           |
| 75   | 13  | 17                           | 22           |

- b) The pavement should be widened to permit the outer and inner wheel - tracks of the selected design vehicle to clear the pavement gores by two feet on each side.

c) Driveways that have right turn ingress movements separated by an



**Figure II.2 - Driveway Design Grades**

island, and that have more than ten percent truck traffic, should be designed for single-unit trucks, while industrial or commercial delivery driveways should be designed for WB-50 vehicles.

1. Island size
  - b) Islands shall have a minimum area of 100 square feet.
  - c) When an elongated island is used as a driveway divider, that island should have the following minimum dimensions to ensure adequate island visibility and width for the installation of traffic signs, while providing adequate lateral clearance:
    - (1) Minimum island width = five feet (5')
    - (2) Minimum island length = twenty feet (20')
2. Any island landscaping heights and densities shall be as specified in the visual obstruction regulations.

### III. TURN & DECELERATION LANES

#### A. RIGHT TURN LANES

1. A deceleration lane for right turns into a driveway eases the negative impact that a drive has on the flow of traffic. A turn lane enables right-turning traffic to slow down without impeding the flow of through traffic, and reduces the risk of rear-end accidents.
2. Warrants
  - a) A deceleration lane should be considered on roadways with average operating speeds of 35 mph or more, if the following conditions apply:
    - (1) The average peak hour inbound right turn volume is at least 75 vehicles.
    - (2) Where several successive driveways meet condition 1, and driveway spacing is not adequate to avoid encroachment of the right turn lane on another driveway, a continuous right turn lane should be used.
      - (1) A continuous right turn lane should be considered at a location where 20 percent of the directional volume on the arterial makes a right turn.
      - (2) If a professionally competent traffic analysis shows that a deceleration lane is needed.
  - b) For signalized intersections, lane requirements should be based on a capacity analysis.
3. Geometry & Storage
  - b) Deceleration lanes should be of adequate length to permit safe deceleration from the design speed to a stop within the deceleration lane. Traffic may be assumed to leave the through lane at 15 mph below the design speed.
  - c) The total right turn lane length is the summation of the deceleration length (Table III.1) and the transition length (Table III.2).
  - d) The transition length should be accomplished using reverse curve geometry.

| <b>TABLE III.1<br/>RIGHT TURN LANE DECELERATION LENGTH</b> |                       |   |
|--|-----------------------|---|
| <b>Functional Classification</b>                           | <b>Initial speeds</b> | <b>Deceleration Length Excluding Taper (feet)</b> |
| Arterial   | 35 -45                | 150 – 250 <sup>1</sup>                            |
| Collector  | 25 - 35               | 50 – 150 <sup>1</sup>                             |

<sup>1</sup> Or as determined by an engineering study

| <b>TABLE III.2<br/>TRANSITION DISTANCE FOR DECELERATION LANES :-<br/>RIGHT &amp; LEFT TURN LANES</b> |                                 |
|--|---------------------------------|
| <b>Functional Classification</b>   | <b>Transition Length (feet)</b> |
| Arterial   | 100 -150 <sup>1</sup>           |
| Collector  | 100 – 150 <sup>1</sup>          |

<sup>1</sup> Or as determined by an engineering study

#### B. LEFT TURN LANES

1. The length required for left turn storage in the median left turn lane is a function of the number of left turn movements, opposing through movements, and, if the intersection is signalized, the cycle length and green time.
2. Each median opening where a left turn or U-turn movement will be permitted should be designed with a left turn lane of sufficient storage and taper distance.
3. Required storage length for various left turn and through movement conflicts at unsignalized intersections is shown in Figure III.1.
4. Left turn lanes constructed in the median should be a minimum width of 11 feet.

### IV. **MEDIAN OPENINGS**

#### A. LOCATION & SPACING

1. The location of openings in a median to allow left turn ingress and egress movements at a driveway or local street is a function of the type and operating speed of the roadway; the volume of traffic expected to make the left turn movements; and the location relative to other intersecting streets, driveways, and median openings.
2. Median openings may be permitted on divided thoroughfares at intersections with public streets and/or driveways. The order of priority for determining where median openings should be located is as follows:
  - a) First Priority - Designated Thoroughfares
  - a) Second Priority - Minor Streets
  - b) Third Priority – Driveways

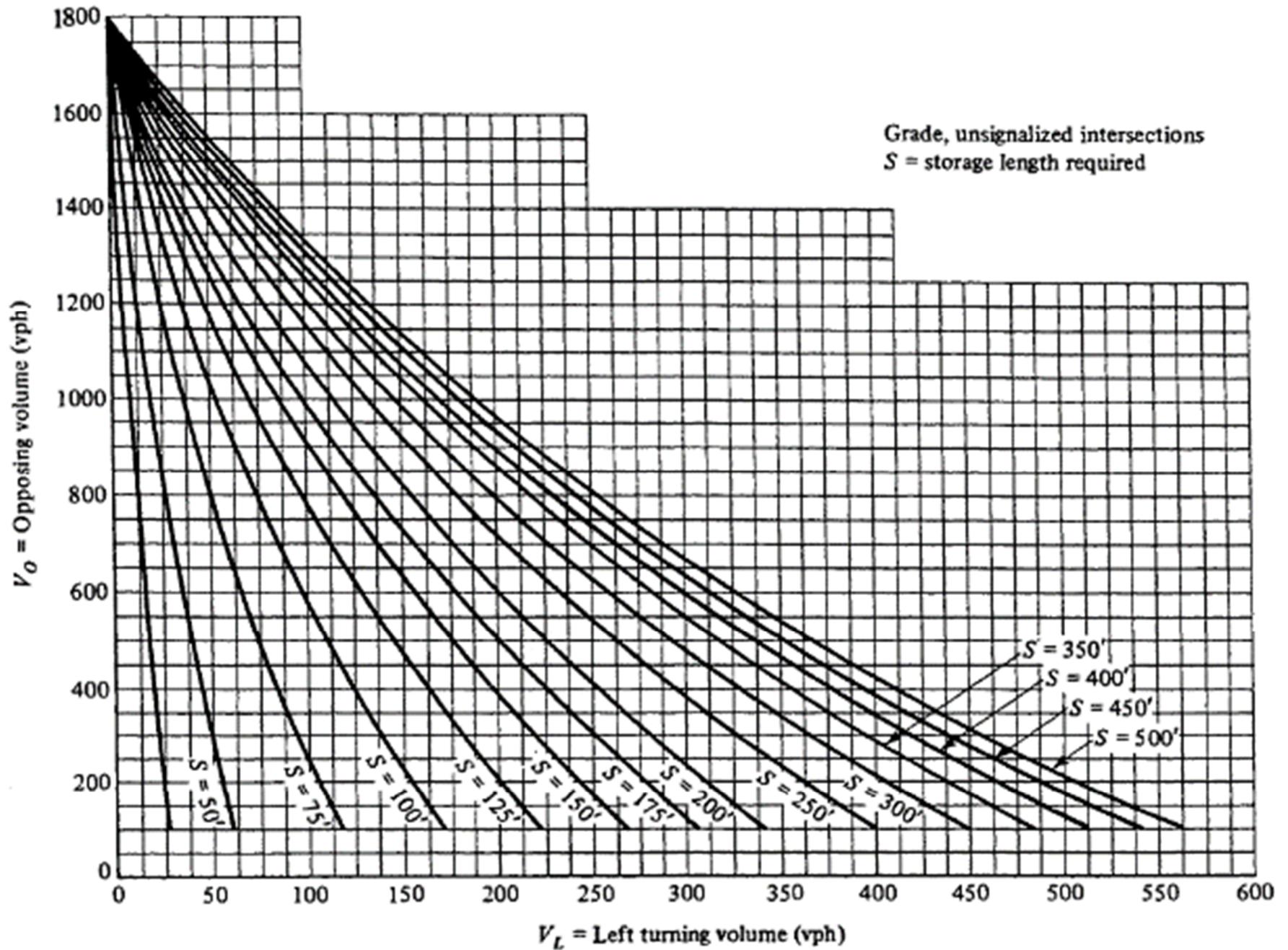


Figure III.1 - Storage Length Requirements for Unsignalized Left-Turn Lane

3. Median openings will be provided at all intersections with designated arterials and collectors. They will normally be permitted at all intersections with minor streets, with priority given to minor streets that serve collector functions. No median opening will be permitted at minor streets or driveways if specific conditions create an unsafe intersection. Vertical and horizontal sight distance must meet minimum standards, as previously specified in this report.
4. No median opening will be allowed to serve either alleys or emergency access easements, and the minimum distance of an opening to an intersecting public street will be governed by the combined left turn lane design requirements for that intersection and the median opening, as well as the functional classification of the two intersecting streets.
5. Median openings should not be granted unless all of the following conditions exist:
  - a) The property to be served has a driveway at the median opening and is a significant traffic generator with demonstrated or projected trip generation of not less than 100 left turn ingress or egress vehicles during the peak hour.
  - b) The median width is sufficient to permit construction of a left turn storage lane.
  - c) The median is sufficiently long so that adequate distance will be available to properly design deceleration taper and storage lanes, as shown in Table 3.12, if exclusive left turn lanes are needed at both ends of a median.

| <b>TABLE III.3<br/>LENGTH OF MEDIAN</b> |   |   |
|---|---|---|
| <b>Functional Classification</b>        | <b>Cross-Street Functional Classification</b>   | <b>Minimum Median<sup>1</sup> Length (ft)</b> |
| Arterial                                | Freeway   | 600   |
|   | Arterial  | 600   |
|   | Collector   | 450   |
|   | Local   | 400   |
|   | Driveway – Less than 40 ft. in width <sup>2</sup><br>– 40 ft. or more in width <sup>3</sup> | 400<br>400                                    |
| Collector                               | Freeway   | 600   |
|   | Arterial  | 450   |
|   | Collector   | 400   |
|   | Local   | 300   |
|   | Driveway – Less than 40 ft. in width <sup>2</sup><br>– 40 ft. or more in width <sup>3</sup> | 300<br>350                                    |

<sup>1</sup> Measured from end to end.

<sup>2</sup> 2-way driveway; 1-way driveway less than 20 feet in width.

<sup>3</sup> 2-way driveway; 1-way driveway 20 feet or more in width.

B. DESIGN

1. Median Opening Length

a) The nose-to-nose length of median openings is a function of turning angles and left-turning radius (based on the expected traffic volume vehicle mixture, i.e., passenger cars, single unit trucks, semi-trailers, etc.).

b) Median openings that will be expected to handle a large number of trucks should be designed to accommodate design vehicles appropriate for the driveway.

c) The minimum median opening length should be 60 feet.

2. Median End Treatment

a) Median nose geometry shall be per Town standard construction details.

b) The median nose should have a minimum of a 15 foot setback from the cross street curb line for single left turn lanes and 18 feet for dual left turn lanes.

**V. TRAFFIC SIGNALS**

A. GENERAL

1. The design engineer shall coordinate with the Town of Addison traffic staff, and/or their designee, regarding all signal timing, spacing, and modifications.

2. Current TxDOT standards shall govern unless otherwise specified by the Director of Public Works & Engineering Services.

B. SIGNAL PHASING

1. Follow standard NEMA phasing.

2. Conduct traffic analysis to determine appropriate lane configurations, turn bay storage lengths, and signal phasing.

3. Split-phased operations are discouraged and should be justified by an engineering analysis.

C. DESIGN REQUIREMENTS

1. Protected-permitted left-turn heads – Flashing Yellow Arrow is preferred for approaches with exclusive left-turn lane

2. Push buttons – provide APS push buttons & place according to PROWAG.

3. Ground boxes – provide ground box adjacent to each signal pole

4. Cable requirements for powering luminaires and ILSNs – use homerun cable, do not “daisy-chain.”

5. Conduit layout – provide conduit run across each leg of intersection for future capacity

6. Cabinet and electrical service pedestal co-located on 12’x8’ concrete pad,

7. 40 % maximum conduit fill percentage allowed.

D. EQUIPMENT REQUIREMENTS

1. Design engineer shall verify current signal equipment requirements with Town of Addison traffic staff .
2. Traffic signal cabinet and electrical service pedestal powder-coating – PFJ-407-A5 Statuary Bronze.
3. o Traffic signal pole powder-coating – IFS Coatings, Inc. Product #SRSL 90259, Batch #C11341, Description: Kim Platinum Silver .
4. Street name signs – provide ILSNs.

**VI. LANE CLOSURES AND TRAFFIC CONTROL**

A. Any proposed work within/near public street or sidewalk pavement (in Town ROW or easement) shall require submittal of a Traffic Control Plan (TCP). TCPs shall incorporate the standards and details in the most recent edition of the Texas Manual of Uniform Traffic Control Devices (TMUTCD).

1. For simple work zones, standard/generic TMUTCD Temporary Traffic Control plans may be submitted for review and approval.
2. A site-specific TCP, prepared and sealed by a licensed engineer in the State of Texas, may be required by the Public Works & Engineering Services.
3. Hours of work and other restrictions shall be as noted on the approved Right-of-Way Permit.

B. Total street closures are not allowed without permission from the Director of Public Works & Engineering Services.

**VII. TRAFFIC IMPACT ANALYSIS AND MITIGATION**

A. GENERAL

1. Purpose – The purpose of a Traffic Impact Analysis (TIA) is to assess the effects of specific development activity on the existing and planned thoroughfare system. Development activity may include, but is not limited to, rezoning, preliminary site plans, site plans, preliminary plats, driveway permits, certificates of occupancy, and Thoroughfare Plan amendments.
2. Determination of Applicability – The need for a TIA shall be determined by the Director of Public Works & Engineering Services based upon the results and recommendation from a pre-submission meeting. It shall be the responsibility of the applicant to demonstrate that a TIA should not be required. If a TIA is required, the level of TIA submission shall be determined based on the following criteria:
  - a) Level I : Fewer than 100 trips (total vehicles per hr – peak hr adjacent street)
  - b) Level II : 100-300 trips (total vehicles per hr – peak hr adjacent street)
  - c) Level III : More than 300 trips (total vehicles per hr – peak hr adjacent street)

3. Pre-submission Requirements – Prior to the commencement of a TIA, an initial discussion or pre-submission meeting with Town staff is required to establish a base of communication between the Town and the applicant and to define the requirements and scope relative to conducting a TIA and ensure that any questions by the applicant are addressed. A meeting is only required if a Level III TIA is needed. Level I & II TIA pre-submission discussions can be via email correspondence.

4. Depending upon the specific site characteristics of the proposed development, one or more of the following elements may also be required as part of the TIA: an accident analysis, sight distance survey, traffic simulation, roundabout analysis, traffic signal warrant analysis, queuing analysis, turn lane analysis, and/or traffic circulation plan.

5. Requirements for TIA Updates – A TIA shall be updated when time or circumstances of the original study fall within the parameters presented in Table VII.1. The applicant is responsible for preparation and submittal of appropriate documentation for Town staff to process the zoning or development application. A TIA for site development requests must be updated if two years have passed since the original submittal, or if existing or assumed conditions have changed within the defined study area. The Director of Public Works & Engineering Services shall make the final determination as to the extent of a TIA update.

6. Cost of TIA review by the Town – the cost for review of TIA submittals shall be based on the current Development Review Fee Schedule, and shall be paid in full at the time of submission.

| <b>TABLE VII.1<br/>CRITERIA FOR DETERMINING TIA UPDATE REQUIREMENTS</b>         |  |  |
|---|--|--|
| <b>Original TIA Report was based on:</b>  | <b>Changes to the Originally Proposed Development</b>                                    |  |
|   | <b>Access Changed<sup>1</sup> or Trip Generation Increased by more than 10%</b>          | <b>Access Has Not Changed<sup>1</sup> and Trip Generation Increased by Less than 10%</b> |
| Zoning <u>OR</u> Preliminary Site Plan or Site Plan that is less than 2 yrs old | Letter Amendment required – identify & report only analysis conditions that have changed | Letter Documenting Change (No additional analysis is required)                           |
| Zoning <u>OR</u> Preliminary Site Plan or Site Plan that is more than 2 yrs old | Prepare new study – must meet all current TIA requirements.                              | Prepare new study – must meet all current TIA requirements.                              |

<sup>1</sup> Changed access includes proposed new access or refinement of general access locations not specifically addressed in original proposed development

B. APPLICABILITY OF TIA REQUIREMENTS

1. Zoning – These TIA requirements shall apply to all zoning requests for land uses which will generate 2,500 or more vehicle trips per day or contain a density of 0.75 Floor Area Ratio (FAR) or greater. Applicable requests include zoning requests and Thoroughfare Plan amendments, if no previous traffic assessment was performed. Special circumstances including, but not limited to, development with no case history, which do not meet the daily trip generation threshold, may also require a TIA. Such circumstances, as determined by the Director of Public Works & Engineering Services may include, but are not limited to, impacts to residential neighborhoods from non-residential development, inadequate site accessibility, the implementation of the surrounding Thoroughfare Plan is not anticipated during the estimated time period of the proposed development, the proposed land use differs significantly from that contemplated in the Comprehensive Plan, or the internal street or access is not anticipated to accommodate the expected traffic generation.

2. Development – These TIA requirements shall apply to all development requests for land uses, except single-family residential development, which will generate over 100 total trips during the AM or PM peak hour. Applicable development requests include concept plans, preliminary site plans, specific use permits, site plans and preliminary plats. Special cases, in which site generated peak hour trip activity is different from that of the adjacent street (weekdays 7:00-9:00 a.m. and 4:00-6:00 p.m.), may require an additional separate analysis as determined by the Director of Public Works & Engineering Services. Such circumstances may include, but are not limited to, commercial/retail, entertainment or institutional activity. The Director of Public Works & Engineering Services may waive the TIA for a development request if a TIA was performed previously with the Zoning request and conditions listed in the report are still current.

3. Single-Family Residential Exception – A TIA for single-family residential development will not be required if the development contains fewer than six dwelling units unless special circumstances exist, as determined by the Director of Public Works & Engineering Services. These special circumstances may include, but are not limited to, impacts to other residential development from cut-through traffic, inadequate site accessibility, the implementation of the surrounding Thoroughfare Plan is not anticipated during the estimated time period of the proposed development, the internal street or access system is not anticipated to accommodate the expected traffic generation, or the development is outside the urban core of the community.

4. Daycares and Schools – All development requests and/or specific use permit requests for a daycare, Montessori school, private school, charter school, or public school shall include, at a minimum, a traffic circulation and queuing study. This study shall include the estimated maximum peak hour trip generation of the facility, the planned circulation of inbound and outbound traffic during drop-off and pick-up operations, and the estimated length of the queue of cars waiting to pick up students. The design of the site and the circulation plan shall ensure that school traffic does not back up onto any public street. The traffic

circulation study shall include a statement that the owner and/or operator of the daycare or school agrees to operate the facility in accordance with the approved circulation plan. The circulation plan must be approved by the Director of Public Works & Engineering Services before the development request or the specific use permit can be approved.

C. TIA PREPARATION AND REVIEW

1. 1. A TIA shall be prepared in accordance with all of the guidelines in this section. The responsibility for TIA preparation shall rest with the applicant and must be performed by a Professional Engineer licensed in the State of Texas with experience in traffic and transportation engineering. The final TIA report must be signed and sealed by the P.E. responsible for the analysis to be considered for review by the Town. Town staff shall serve primarily in a review and advisory capacity and will only provide data to the applicant when available.

2. It shall be the responsibility of the applicant to submit draft TIA reports and executive summaries with the zoning and/or development request submission. The proper number of reports, the timing for submission, and the review of these reports shall be based on standard Town development review procedures. Incomplete TIAs or failure to submit a TIA with the submission shall delay consideration of zoning and development requests. Should it be determined during the review of any zoning and/or development plans that a TIA is required, consideration shall be deferred until the applicant submits a completed TIA and the Town has reviewed the assessment.

3. The Town shall review the TIA and provide comments to the applicant. It shall be the responsibility of the applicant to submit finalized TIA reports and executive summaries once all review comments have been addressed.

D. TIA STANDARDS

1. Design Level of Service – The minimum acceptable level of service (LOS) within the Town shall be defined as LOS “D” in the peak hour for all critical movements and links. All development impacts on both thoroughfare and intersection operations must be measured against this standard.

2. Trip Generation Resources

a) The Town’s standard for trip generation rates for various land use categories shall be those found in the latest edition of Trip Generation published by the Institute of Transportation Engineers (ITE) or other published or recognized sources applicable to the region.

b) Alternate trip generation rates may be accepted on a case-by-case basis if the applicant can provide current supporting data substantiating that their development significantly differs from the ITE rates.

c) Special cases/circumstances, and certain types of high-volume developments may require statistical references or exact case studies

d) The Director of Public Works & Engineering Services must approve alternative trip generation rates in writing in advance of the TIA submission.

3. Trip Reductions – Trip reductions for passer-by trips and mixed-use

developments will be permitted, subject to analytical support provided by the applicant and approval by the Director of Public Works & Engineering Services on a case-by-case basis.

4. Study Horizon Years – The TIA must evaluate the impact of the proposed development on both existing traffic conditions and future traffic conditions. These applications should also assume full development of the Master Thoroughfare Plan or pending amendments.

E. TIA METHODOLOGY

1. Site Location/Study Area – A brief description of the size, general features, and location of the site, including a map of the site in relation to the study area and surrounding vicinity.

2. Existing Zoning – A description of the existing zoning for the site and adjacent property, including land area by zoning classification and density by square footage, number of hotel rooms, and dwelling units (as appropriate).

3. Existing Development – A description of any existing development on the site and adjacent to the site and how it would be affected by the development proposal.

4. Proposed Zoning Site Development – A description of the proposed development for the site, including square footage, number of hotel rooms, and dwelling units (as appropriate); identify other adjacent land uses that have similar peaking characteristics as the proposed land use; identify recently approved or pending land uses within the area.

5. Existing Traffic Volumes – Recent traffic counts for existing thoroughfares and major intersections within the study area.

6. Projected Traffic Volumes – Background traffic projections for the planned thoroughfare system within the study area for the horizon year(s). Background traffic projections shall include the growth in regional traffic as well as the traffic that will be generated by the undeveloped land adjacent to the site and/or within the study area that is likely to develop by the horizon year(s), as determined by the Director of Public Works & Engineering Services. These traffic projections shall be based upon recently approved development applications, the current zoning on the undeveloped land, or the Town's Future Land Use Plan.

7. Density of Development – A table displaying the amount of development assumed for existing zoning and/or the proposed development (using gross floor area, dwelling units, occupied beds, etc., as required by the trip generation methodology).

8. Existing Site Trip Generation – A table displaying trip generation rates and total trips generated by land use category for the AM and PM peak hours and on a daily basis, assuming full development and occupancy based on existing zoning (if applicable) and including all appropriate trip reductions (as approved by the Director of Public Works & Engineering Services).

9. Proposed Site Trip Generation – A table displaying trip generation rates and total trips generated by land use category for the AM and PM peak hours and on a daily basis, assuming full development and occupancy for the proposed development, and including all appropriate trip reductions (as approved by the

Director of Public Works & Engineering Services).

10. Net Change in Trip Generation : Proposed trip generation minus existing trip generation (if applicable); the net increase in trips to be added to base volumes for the design year.

11. Trip Distribution and Traffic Assignment – Tables and figures of trips generated by the proposed development (or net change in trips, if applicable) added to the existing and projected volumes, as appropriate, with distribution and assignment assumptions, unless computer modeling has been performed.

12. Level of Service Evaluations – Capacity analyses for weekday AM and PM peak hours of the roadway and peak hour of the site, if different from the roadway, for both existing conditions and horizon year projections for intersections, thoroughfare links, median openings and turn lanes associated with the site, as applicable.

13. Roundabout and Traffic Signal Evaluations – The need for new roundabouts and/or traffic signals based on warrants and their impact on the performance of the transportation system(see Section 2.12.I.4).

14. Evaluation of Proposed/Necessary Mitigation – Capacity analyses for weekday AM and PM peak hours of the roadway and peak hour of the site, if different from the roadway, for intersections, thoroughfare links, median openings and turn lanes associated with the site under proposed/necessary traffic mitigation measures.

15. Conclusions – Identification of all thoroughfares, driveways, intersections, and individual movements that exceed LOS D or degrade by one or more LOS, the percentage of roadway volume change produced by the proposed development, and any operational problems likely to occur.

16. Recommendations – Proposed impact mitigation measures consistent with Subsection I below.

17. Other information required for proper review – As requested by the Director of Public Works & Engineering Services.

#### F. TIA REPORT FORMAT

1. The TIA report must be prepared on 8½" x 11" sheets of paper. However, it may contain figures on larger sheets, provided they are folded to this size (if hard copies are submitted).

2. All text and map products shall meet Engineering Standards be computer-based and provided in both published format and computer file format (PDF). In addition, all electronic files used as part of the traffic analysis (i.e., Synchro, HCS, Passer II/III, CORSIM, VISSIM, ARCADY, etc.) shall be provided.

3. The sections of the TIA report should be categorized according to the outline shown below:

- a) Executive Summary
- b) Introduction
  - (1) Purpose
  - (2) Methodology
- c) Existing And Proposed Land Use
  - (1) Site Location/Study Area

- (2) Existing Development
- (3) Proposed Development
- d) Existing And Proposed Transportation System
  - (1) Thoroughfare System
  - (2) Existing Traffic Volumes
  - (3) Projected Traffic Volumes
- e) Site Traffic Characteristics
  - (1) Existing Site Trip Generation (if applicable)
  - (2) Proposed Site Trip Generation
  - (3) Net Change in Trip Generation (if applicable)
  - (4) Trip Distribution and Traffic Assignment
- f) Traffic Analysis
  - (1) Level of Service Evaluations
  - (2) Roundabout and Traffic Signal Evaluations
- g) Mitigation
- h) Conclusions
- i) Recommendations
- j) Appendices

#### G. TRAFFIC IMPACT MITIGATION

1. Mitigation of traffic impacts shall be required if the proposed development will cause a facility or traffic movement to exceed LOS D, or where it already exceeds LOS D and the development will contribute five percent (5%) or more of the total traffic. If mitigation is required, the applicant must only mitigate the impact of the proposed development and would not be responsible for alleviating any deficiencies in the thoroughfare system that may occur without the proposed development.
2. Acceptable mitigation measures shall include:
  - a) Staging of development in order to coordinate timing of site development to the construction of the required thoroughfare system.
  - b) Staging of development so that the site contributes less than five percent (5%) of the total traffic to the affected facility or traffic movement.
  - c) Off-site improvements, including the provision of right-of-way and/or the participation in funding for needed thoroughfare and intersection improvement projects (including, but not limited to through lanes, turn lanes, and intersection improvements).
  - d) On-site improvements, including access controls and site circulation adjustments.
3. Mitigation is not required if it can be shown that the traffic impacts of the project are fully mitigated ten (10) years after the final opening with any improvements that are already programmed to be implemented within five (5) years of the initial opening.
4. Any intersections under consideration for a higher form of traffic control that is located along an arterial that is not expected to be widened in the foreseeable future must be analyzed for the implementation of a multilane

roundabout. The roundabout must be shown to fail or proven to be infeasible before a traffic signal will be considered at that location.

H. ADMINISTRATION OF THE TIA

1. Based on the results of the TIA and actions recommended by the Director of Public Works & Engineering Services, the Planning & Zoning Commission, an/or the City Council, as appropriate, shall take one or more of the following actions:

- a) Approve the development request, if the project has been determined to have no significant impact, or where the impacts can be adequately mitigated.
- b) Approve the development request, subject to a phasing plan.
- c) Recommend study of the Master Transportation Plan to determine amendments required to increase capacity.
- d) Recommend amendment of the current Capital Improvement Plan (CIP) to expedite construction of needed improvements.
- e) Deny the development request, where the impacts cannot be adequately mitigated.

**VIII. OTHER TRANSPORTATION ITEMS**

A. These items should be considered in addition to the standards incorporated herein. These topics should be discussed/coordinated with the Public Works & Engineering Services and/or their designee.

1. Complete Streets Components – see NACTO Urban Street Design Guide.
2. Bicycle facility selection and design – see standards from NACTO, FHWA, AASHTO.
3. Midblock pedestrian crossings and treatment – see FHWA guide for improving pedestrian safety at uncontrolled crossing locations.
4. Public transit stop placement and design, bus lanes, & transit signal priority.

**IX. DEVIATION FROM STANDARDS**

A. It is intended that the design standards presented in this report be used throughout the Town of Addison. However, some exceptions may be necessary, including, but not limited to:

1. Special intersection treatments to provide left or right turn lanes on collector streets may be desirable.
2. Design exceptions to accommodate the special needs of certain areas may be necessary.

B. Each potential exception shall be carefully reviewed to determine if other alternatives exist. This is particularly important for any proposal which would reduce the potential capacity offered by standard criteria.

C. Any proposed variation from these standards must be submitted for review and approval by the Public Works & Engineering Services prior to submittal of civil construction plans.



## APPENDIX A - REFERENCES

The most recent edition(s) / current version(s) of the following documents have been referenced, and are herein incorporated by reference:

1. AASHTO A Policy on Geometric Design of Highways & Streets
2. TxDOT Access Management Manual
3. Federal Highway Administration
  - 3.1. *Access Management for Streets and Highways*
  - 3.2. *Technical Guidelines for the Control of Direct Access to Arterial Highways*
  - 3.3. *Evaluation of Techniques for the Control of Direct Access to Arterial Highways*
  - 3.4. *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*
4. Institute of Transportation Engineers
  - 4.1. *Guidelines for Driveway Design and Location*
  - 4.2. *Guidelines for Urban Major Street Design, A Recommended Practice*
5. Texas Manual on Uniform Traffic Control Devices (TMUTCD)
6. Texas Accessibility Standards
7. Public Right-of-Way Accessibility Guidelines (PROWAG)
8. NACTO *Urban Street Design Guide*
9. National Electric Code & National Electric Safety Code
10. NCTCOG *Specifications & Details*
11. Town of Addison, TX
  - 11.1. *Master Transportation Plan*
  - 11.2. *Master Trails Plan*
  - 11.3. *Standard Construction Details*
  - 11.4. *ADA Self-Evaluation and Transition Plan*
  - 11.5. *Addison Bottleneck Study*
12. Town of Dallas, TX
  - 12.1. *Paving Design Manual*
  - 12.2. *Guidelines for Driveway Design and Operation*
  - 12.3. *Parkway Center Project – Development Program*
13. Town of Fort Worth, TX
  - 13.1. *Transportation Engineering Manual*
  - 13.2. *Traffic Signal Design Guideline*
14. Town of Lakewood, CO, *Engineering Design Standards*
15. *Arterial Driveway Access Guidelines for Glendale Heights*, Barton-Aschman Associates, Inc.
16. Bochner, Brian S. *"Regulation of Driveway Access to Arterial Streets", Compendium of Technical Papers*
17. Highway Research Board. National Cooperative Highway Research Program Report 93, *Guidelines for Medial app Marginal Access Control on Major Roadways*