

# POLICY FOR INSTALLATION OF MID-BLOCK PEDESTRIAN CROSSINGS WITHIN THE CITY OF BRENTWOOD, TENNESSEE

## I. Purpose

The purpose of this policy is to outline the conditions and process for determining where Mid-Block pedestrian crossings may be installed within the City of Brentwood and the appropriate pavement markings and signage for such crossings. The objective of this policy is to provide safe and efficient pedestrian crossing facilities at appropriate locations that can reduce vehicle trips by providing access to traffic generators such as schools, parks, multi-use trails, commercial centers, etc.

## II. Definitions

This section includes the definitions of some of the common technical terms used in this document.

### **Average Daily Traffic (ADT)**

The amount of vehicular traffic that crosses an imaginary line across a roadway in a 24-hour period. ADT information typically includes both directions of vehicle travel.

### **Controlled Pedestrian Crossing**

A pedestrian crossing where motorists are required to stop at intersections by a stop sign or traffic signal

### **Curb Extensions**

A roadway edge treatment where a curb line is bulged out toward the roadway to narrow the width of the street. Curb extensions are often used at the location of a pedestrian crosswalk to minimize the distance and time that a crossing pedestrian must be in the roadway.

### **Gap in Traffic**

A gap in traffic is the space between vehicles approaching the pedestrian crossing. Gaps are typically measured in seconds, not distance, as it is the length of the gap in time that a pedestrian must be able to cross in. If there is no median refuge at the crossing, a pedestrian will need to find an acceptable gap in traffic approaching from two directions at once. This is much more challenging than finding a gap in each approach direction separately.

### **Marked Crosswalk**

A pedestrian crossing that is delineated by white crosswalk pavement markings. Marked crosswalks typically also are delineated by a variety of traffic signs. Marked crosswalks would also have curb ramps if there is curb and gutter in an area.

### **Median Refuge**

An area in the middle of a roadway where a crossing pedestrian can take shelter from approaching traffic in either direction. In the context of these guidelines, the median refuge must include a raised median of some width. A median refuge allows a pedestrian to cross each direction of approaching traffic in a separate step. By using the refuge, the pedestrian must only find an acceptable gap in traffic for one approach direction at a time.

### **Mid-Block Crossing**

A marked pedestrian crossing that does not include a traffic signal or a stop sign that requires motor vehicles to stop before entering the crosswalk. These typically occur at locations between controlled pedestrian crossings and include variety of pavement marking and/or signing features.

### **Minimum Pedestrian Volume Threshold**

The minimum amount of pedestrian crossing traffic (typically in a one-hour period) that must be present to “warrant” the installation of a pedestrian crossing treatment.

### **Multi-Use Trail Crossing**

A location where a trail designated as a multi-use trail intersects a roadway at-grade, and the path extends on both sides of the roadway.

### **Raised Median**

An area in the middle of a roadway, commonly separating vehicles traveling in opposite directions, that is surrounded by curb and gutter and is physically raised above the surrounding pavement where vehicles travel. Raised medians often contain landscaped areas. See also Median Refuge.

### **Rectangular Rapid Flash Beacons (RRFBs)**

RRFBs are small rectangular yellow flashing lights that are deployed with pedestrian crossing warning signs. They are typically actuated by a pedestrian push button and flash for a predetermined amount of time, to allow a pedestrian to cross the roadway, before going dark. RRFBs are warning devices and do not themselves create a legal requirement for a vehicle to stop when they are flashing.

## **III. Background**

Many neighborhoods in Brentwood were developed when sidewalks were not required and prior to the focus on development of multi-use trails and other bike and pedestrian facilities. As a result, safe pedestrian facilities are limited or completely lacking in many areas of the community. Providing expanded pedestrian opportunities to access schools, parks, and commercial districts is an objective of the Brentwood 2030 plan, but retrofitting existing developed areas is extremely difficult or impossible due to the impacts on private property. In locations where facilities are available, they are often only on one side of the road. Installation of mid-block pedestrian crossings provides an opportunity to improve pedestrian

connectivity throughout the community but are not appropriate in all circumstances and must be considered carefully to insure pedestrian safety is not compromised and vehicular traffic is not overly impacted.

The Manual on Uniform Traffic Control Devices (MUTCD) states the following regarding installation of pedestrian crosswalks at mid-block locations:

*Crosswalk lines should not be used indiscriminately. An engineering study should be performed before a marked crosswalk is installed at a location away from a traffic control signal or an approach controlled by a STOP or YIELD sign. The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors.*

Any proposed mid-block pedestrian crossing proposed for installation under this policy must first undergo an engineering review by an independent traffic engineer to insure that the proposed crossing complies with the requirements of this policy as well as general traffic safety standards.

#### **IV. General Conditions**

The following are general criteria to be satisfied in addition to the warrant criteria when considering installation of mid-block pedestrian crossings:

1. Crossings must connect to established sidewalks or a multi-use trail at both ends or construction of such facilities must be included as part of the crossing installation.
2. ADA accessible ramps shall be included at both ends of a crossing installation unless there are engineering reasons they cannot be provided.
3. If applicable, street parking must be restricted adjacent to crossings to allow for adequate sight lines for both the motorists and the pedestrians. The length of the parking restriction shall be based on an engineering study.

#### **V. Basic Warrants**

The following warrants must be satisfied in order for a mid-block pedestrian crossing location to be considered for approval:

a. Minimum Pedestrian Volume Threshold

Crosswalks at locations with low pedestrian levels lose their effectiveness and become less safe as drivers rarely see pedestrians and ignore the warning signage. Therefore, the pedestrian volume at a proposed mid-block crossing location must be equal to or greater than twenty (20) pedestrians during the peak pedestrian hour.

Children/students count double, so ten (10) children/students meets the twenty pedestrian volume threshold. Alternatively, if the peak hour pedestrian volume establish above cannot be achieved, this warrant can also be met if the pedestrian volume averages five (5) or more per hour over the course of any eight hours in a day.

b. Induced Pedestrian Demand

In lieu of the Minimum Pedestrian Volume Threshold above, a location may be considered for a mid-block pedestrian crossing if it can be reasonably assumed that the required Minimum Pedestrian Volume Threshold level of pedestrian activity would be present except for the lack of an appropriately marked pedestrian crossing. Such locations must be located in the immediate vicinity of an entrance to a residential subdivision and within 1/2 mile of a recognized pedestrian attractor/generator as listed below, provided complete pedestrian facilities exist from the proposed crossing point to the pedestrian attractor/generator:

- Elementary/Middle/High Schools
- Community Civic Facility (i.e. library, senior citizens center, etc.)
- Government or Non-Profit Park and Recreation Facility
- Office and retail/restaurant developments

c. Minimum Vehicular Volume for Installation of Crossings

Gaps in traffic on streets with low traffic volumes normally allow pedestrians to cross the street safely and quickly without marked crosswalks. Therefore, mid-block pedestrian crossings should only be installed at locations where the average daily traffic (ADT) is at least 3,500 vehicles per day (vpd). Crossings can also be installed if hourly vehicle traffic exceeds 10% of required ADT during a peak hour of activity when pedestrian volumes also exceed their minimum threshold.

d. Maximum Vehicular Volume for Installation of Crossings

Due to safety concerns, installation of mid-block pedestrian crossings is not appropriate on high traffic volume roads. Therefore, mid-block pedestrian crossings shall not be installed at locations where the average daily traffic (ADT) is greater than 15,000 vehicles per day (vpd) or on state highways.

e. Posted Speed Warrant

The posted speed limit must be equal to or lower than 40 MPH except when the crossing would be located within a marked school speed zone.

f. Nearest Controlled Crossing

The proposed location must be farther than 350 feet from the nearest controlled pedestrian crossing (measured from the nearest edge of the proposed marked crosswalk to the closest edge of the controlled crossing).

g. Visibility Warrant

The motorist must have an unrestricted view of all pedestrians at the proposed location for a distance required by the following table (stopping sight distance is to be interpolated when 85th percentile speed is between 5 mph increments):

<b>Posted Speed Limit (MPH)</b>	<b>Stopping Sight Distance (feet)</b>
25	155
30	200
35	250
40	305

h. Illumination Warrant

The proposed location must have existing street lighting sufficient to adequately illuminate the proposed crossing location or such street lighting must be planned as part of the crossing installation.

i. Accessibility Warrant

The proposed location must have existing accessibility to disabled pedestrians or have accessibility improvements programmed.

## **VI. Multi-Use Trail Crossings**

Brentwood has an established multi-use trail network in many areas of the city, and roadway crossings often create barriers for pedestrians and bicyclists. Therefore, crossing locations connecting a multi-use trail on each side of a roadway are not subject to minimum pedestrian volume criteria for installation of crossings.

## **VII. Crossing Location Evaluation Procedures and Considerations**

Evaluation of an individual crossing location for potential crossing treatments in the City of Brentwood should include the following four basic steps:

- Step 1: Request for Consideration
- Step 2: Physical Data Collection

Step 3: Traffic Data Collection and Operational Observations

Step 4: Apply Data to Warrant Criteria

### **Step 1: Request for Consideration**

The consideration for installation of a mid-block pedestrian crossing at or in close proximity to a neighborhood entrance shall be initiated by a written request from the homeowner's association representing the affected neighborhood to the City of Brentwood's Public Works Department. If no homeowner's association exists for the neighborhood, the request may come from a petition signed by residents representing 20% of the homes in a neighborhood located within 1,000 feet of the proposed crossing point. The request shall specifically identify the location of the requested mid-block pedestrian crossing.

The consideration for installation of a mid-block pedestrian crossing within a commercial area may be initiated by a petition from a minimum of 20 employees who work within 1,000 feet of the proposed crossing point. For a proposed crossing located adjacent to a school, the request must come from the principal of the school or the President of the Parent Teacher Organization.

### **Step 2: Physical Data Collection**

Upon receipt of a valid request, the City will first conduct a physical review of the location to determine whether it meets the applicable warrant criteria. This review will:

- a. Document the posted speed along the major street at the crossing location.
- b. Identify the existing traffic control (if any) and any existing crossing treatments (signs, markings, etc.)
- c. Document the presence or absence of street lighting.
- d. Document the presence or absence of sidewalks or multi-use trails connecting both ends of the proposed crossing location.
- e. Document the presence or absence of appropriate curb ramps and any other ADA related facilities adjacent to the proposed crossing location.
- f. Determine the existing roadway configuration including the number of lanes and the presence of painted or raised medians at the crossing location.
- g. Identify the nearest marked or protected crossing and measure the distance to this crossing.
- h. Measure the stopping sight distance on all vehicular approaches to the crossing.
- i. Identify any other physical features such as horizontal or vertical curves that could impact the safety of the proposed crossing.

If, based on the results of the data collected in Step 2, it is determined that the proposed location does not meet the physical criteria established by this policy, the request shall be denied.

### **Step 3: Traffic Data Collection and Operational Observations**

If the information gathered in Step 2 meets all of the required crossing warrants, the City will proceed with gathering required traffic and operational data. This will include:

- a. Collect pedestrian crossing volumes during the peak hours of use. This will typically involve AM, mid-day, and PM peak hours. Locations near schools may only require two hours of data collection (AM and PM peak hours corresponding to school opening and closing times). All pedestrian volumes should include and differentiate between pedestrians and bicyclists and should note separately the number of children/student pedestrians.

Whenever possible, pedestrian and bicycle volumes should be collected during warm weather months and during fair weather conditions to represent peak crossing activity (i.e.: no snow, rain, or high winds). Counts should be scheduled at a time when nearby businesses are open or on school days when classes are in session. Given the potential fluctuation in pedestrian traffic from day to day, it may be necessary to collect up to three days of data to determine if a mid-block pedestrian crossing is warranted under this policy.

- b. Collect average daily traffic (ADT) volumes and 85<sup>th</sup> Percentile speed data for automobile traffic along the major roadway at the crossing location. A one-day sample should be adequate, with hourly volumes collected during the same hour as the peak pedestrian crossing volumes.
- c. Due to the potential for vehicular traffic queues to impact safety at the crossings, the presence of queues extending from downstream signals or intersections back into the crossing location should be observed. While collecting automobile traffic data, the formation of vehicle queues from adjacent intersections should be noted. If one or both directional queues reaches back to the crossing location, the number of times per hour that it reaches the crossing location should be noted and the maximum queue length should also be recorded.

### **Step 4: Apply Data to Warrant Criteria**

The data collected in Steps 2 and 3 above shall be applied to the warrant criteria established in this policy to determine if a mid-block pedestrian crossing is appropriate. A summary report shall be prepared to document the results of the analysis completed in Steps 2 and 3.

## **VIII. Signage and Pavement Markings**

The requirements for appropriate signage and pavement markings at a mid-block pedestrian crossing will vary by location. Any proposed crossing that meets the warrant

criteria established in this policy will be subject to review by a traffic engineer who will recommend all appropriate signage and a pavement marking plan for the location.

Note that installation of additional treatments such as flashing beacons, raised medians, curb extensions, etc. at the crossing location will be subject to the recommendation of the traffic engineer taking into consideration factors such as traffic and pedestrian volumes, road width, 85<sup>th</sup> percentile speed, gaps in traffic, etc.

## **IX. Funding**

Engineering analysis and installation of required signage and pavement markings for a mid-block pedestrian crossing will be the responsibility of the City subject to available funds as provided through the normal budgeting process. If installation of the crossing includes the addition of pedestrian facilities beyond the roadway itself (i.e. installation or extension of a sidewalk) and the cost of these added facilities exceeds \$10,000, approval by the City Commission is required.

Use of private funding by residents or homeowner's association to leverage city funding to expedite implementation is permissible, subject to approval by the City Commission.