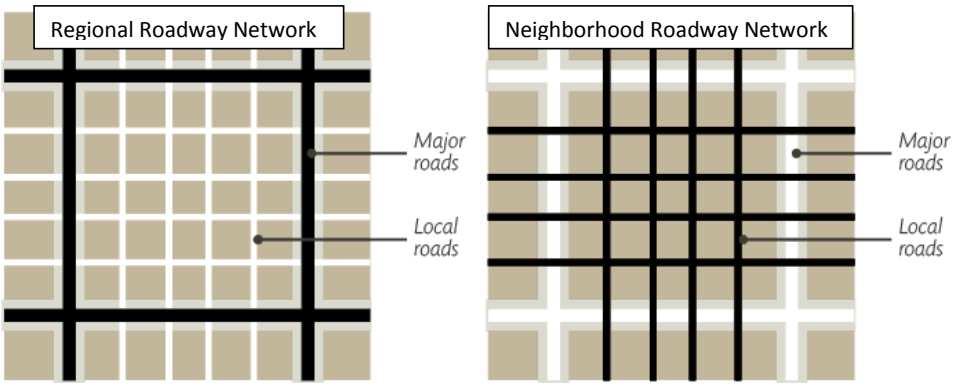
3. Design Standards

3.1 Network Design and Roadway Connectivity

3.1.1 Purpose of Section

1. This section provides guidance on the spacing of major roads, the general layout of roads, block lengths, pedestrian crossings, and the expectations for integrating road design and site development with the regional transportation system as defined in the Long Range Roadway System Map.
2. Definition of terms:
    - Regional roadway network refers to the system of collector and arterial roadways (also referred to as major roads) that provide mobility and access across the city. See Figure 3.1-1.
    - Neighborhood roadway network refers to the local streets, often in a residential area, that are surrounded by the regional roadway network.
    - Arterial/collector spacing refers to the distance between major roads along a corridor. Unless there is a grade separation, intersections of collectors and arterials are controlled by traffic signals.
    - Block length refers to length of roadway between two intersections. The intersections at the end of blocks maybe signalized or unsignalized depending on the roadway type.
    - Designated pedestrian crossing refers to the location where pedestrians are encouraged to cross a roadway, as indicated by a signal, signage, or pavement marking.
    - Signalized pedestrian crossing refers to a designated pedestrian crossing in which traffic is forced to stop and the pedestrian is protected via a traffic signal or pedestrian-activated signal device.

Figure 3.1-1 Regional and Neighborhood Roadway Networks



3.1.2 Connectivity

1. Connectivity affects the ability of travelers to efficiently reach their destinations. The following standards (see Table 3.1-1) are intended to promote well-connected networks, including numerous intersections, shorter block lengths, and adequate pedestrian crossings. See the Roadway Design Process section (23-2) for additional discussion.

Table 3.1-1: Network Characteristics by Location

Location	Arterial / Collector Spacing	Block Length	Signalized Pedestrian Crossing*	Designated Pedestrian Crossing*
Downtown	1,320-2,640' (¼ to ½-mile)	300-500'	≤660' (⅛-mile)	≤400'
Urban Center	1,320-2,640' (¼ to ½-mile)	300-500'	≤660' (⅛-mile)	≤400'
Activity Center	1,320-2,640' (¼ to ½-mile)	400-600'	≤1,320 (¼-mile)	≤600'
Employment Center	≤2,640' (½-mile)	≤800'	≤2,640 (½-mile)	As appropriate
Village Center	1,320-2,640' (¼ to ½-mile)	400-600'	≤1,320 (¼-mile)	≤600'
Residential Areas (Local Roads)	≤2,640' (½-mile)	≤600'	≤2,640 (½-mile)	As appropriate
Other Areas (Local Roads)	≤2,640' (½-mile)	≤600'	≤2,640 (½-mile)	As appropriate
Main Street Corridor	1,320-2,640' (¼ to ½-mile)	300-500'	≤660' (⅛-mile)	≤400'

Note: * indicates the values are recommended and strongly encouraged where feasible.

Comment [RMM1]: Block lengths based on guidance provided in the LRTS Guide and Comp Plan Table 7-3.
IDO calls for maximum block length in urban areas of 500. ITE indicates max block length should be 400 with 200-300 most desirable in intensive urban areas.

3.1.2.1 Regional Connectivity and the Spacing of Major Roads

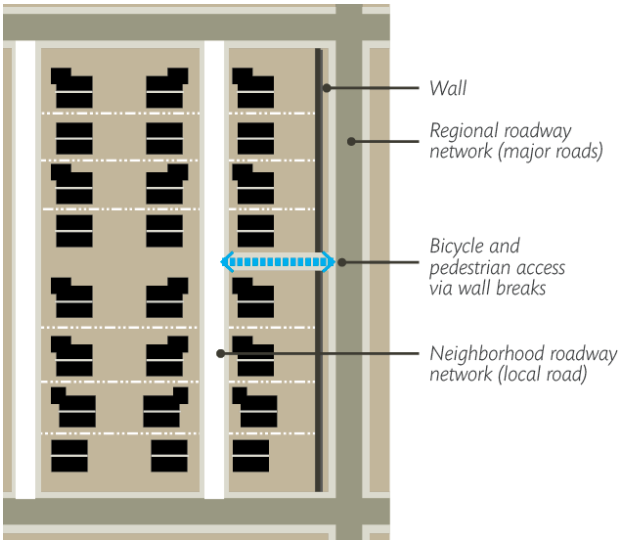
1. Table 3.1-1 provides the spacing between arterials and collectors (i.e. major roads). This table does not differentiate between principal and minor arterials or major and minor collectors, since the most important consideration from a connectivity perspective are the frequency of major roads.
2. The spacing between arterials should be no more than one mile apart. Arterials may be spaced as close as one-half mile apart in areas with high levels of pedestrian activity, such as Downtown or an Urban Center.
3. Arterials and collectors should be interspersed to create a system of thoroughfares and parallel facilities that collectively meet the needs of a range of users.
4. Arterials and collectors should be spaced more closely together in areas within denser networks and shorter block lengths. Larger spacing is more appropriate in rural and residential areas, though the network must provide adequate bicycle and pedestrian connections.

3.1.2.2 Neighborhood Connectivity

1. Local roads shall provide short, direct routes that connect residential neighborhoods with commercial areas, schools, other neighborhoods, and arterials where transit service is most likely to be found (See Figure 3.1-2).
2. Bicycle and pedestrian access points shall be provided to the regional roadway network or existing bicycle facility at least every ¼-mile. If street connections are not feasible or not appropriate for the location, access may be provided via wall breaks (see Figure 3.1-2 and 3.1-3).
3. Cul-de-sacs and stub streets limit the ability to access the regional roadway network. Cul-de-sac and stub streets are prohibited except as identified in section 14-16-5-3(E)(1)(d) – Stubs Streets and Cul-de-Sacs of the IDO. See the Local Roads section (23-3.10) for additional guidance on discontinuous streets and residential access via a single driveway.

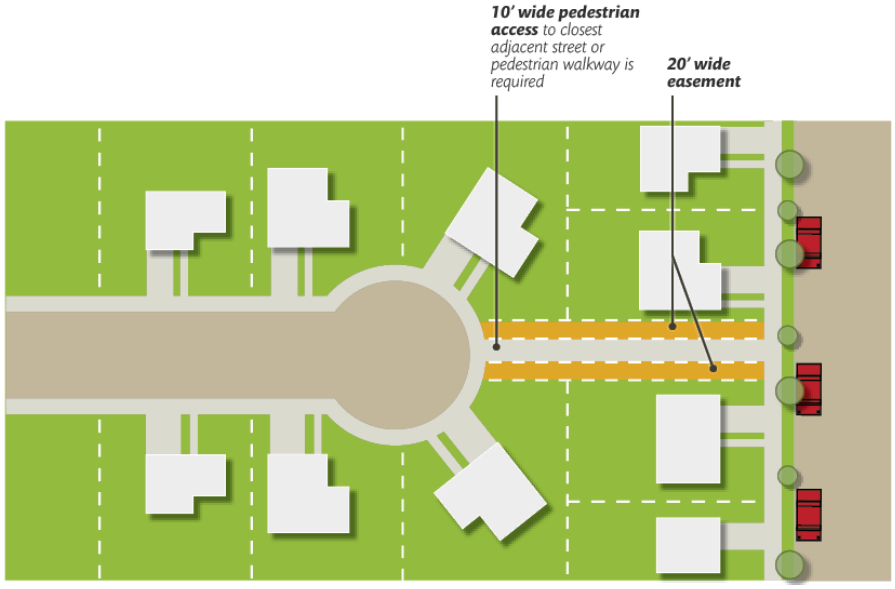
Comment [RMM2]: ITE, Access Management, April 2004, http://library.ite.org/pub/e26c5400-2354-d714-51b2-432d8f3da94d; http://dot.state.nm.us/content/dam/nmdot/planning/NMDOT_FC_Guide.pdf

Figure 3.1-2 Neighborhood Connectivity



Bicycle and Pedestrian Access Wall Break

Figure 3.1-3 Cul-de-Sac with Pedestrian Access



3.1.3 General Network Considerations

Comment [AS3]: Based on guidance in IDO

3.1.3.1 General Block Layout

1. Blocks shall generally follow a square or rectangular grid system, where applicable. Alignments may vary depending on topography, to protect natural features, to respond to site constraints, or to meet the needs of a particular set of land uses.

3.1.3.2 Major Roads and Designated Centers

1. Arterials and collectors shall provide direct connections to designated Centers.
2. Major roads should comprise a network in which a series of parallel facilities collectively meet the needs of all users and provide sufficient capacity within designated Centers. See the Roadway Design Process section (23-2) for additional discussion.
3. Networks should be designed to ensure delivery trucks are accommodated and may reach their destinations. Accommodations for large delivery trucks (i.e. greater than SU-30) are not required on all roads.
4. Commuter Corridors should pass along the edges rather than through a Comp Plan-designated Center. Where Commuter Corridors pass through or bisect Centers, the road design should transition to a typical section that supports the adjacent land use with slower design speeds and improved access to businesses and residential areas.

3.1.3.3 Limited Access Facilities

1. Consult the MRCOG roadway access policies for designated limited access facilities. These roadways are subject to additional guidance with regards to driveways, intersection spacing and the intervals between traffic signals.

3.1.3.4 Right-of-Way Allocation

1. See the Roadway Design Process chapter (23-2) for the required right-of-way allocation by functional classification for new roadways. Per the LRTS Guide, right-of-way values at the low end of the range are most appropriate if there is a high density of parallel facilities. Narrower facilities also reduce barriers for pedestrians and cyclists when crossing the street.

3.1.4 Block Lengths

3.1.4.1 General Provisions

1. Block length refers to the distance along a roadway between intersections. Block lengths vary depending on the roadway type and whether the roadway is

located in a Comp Plan-designated Center, with shorter block lengths most appropriate in high pedestrian-activity areas.

2. See Table 3.1-1 for maximum block length by location.
3. Block lengths at the low end of the ranges in Table 3.1-1 are preferable in Downtown and Urban Centers and along Main Street Corridors.
4. The maximum block length for collectors and arterials is 600 feet, except where access limitations are applied.
5. Along limited access facilities, business access or backage roads are strongly encouraged with pedestrian connections to the arterial provided every 600 feet or less.
6. The maximum block length along local roads is 600 feet (see IDO section 14-16-5-4(E)(3)(b) for exceptions). See the Local Roads section (23-3.10) for guidance on cul-de-sacs and stub streets.
7. Mid-block crossings are required for new streets in the following circumstances:
   - Downtown and Urban Centers and along Main Street Corridors where block lengths exceed 400 feet. The mid-block crossing shall be designed to the middle of the block to the greatest extent feasible.
   - Other areas and any new development where block lengths exceed 600 feet. The mid-block crossing shall be designed to the middle of the block to the greatest extent feasible.
8. See the section below on Designated Pedestrian Crossings for more information on crossings at intersections and mid-block locations.

3.1.5 Traffic Signal Spacing

3.1.5.1 General Provisions

1. Traffic signals are located at intersections to manage the flow of traffic and allow for safe pedestrian crossing. See the Intersection Design Criteria section (23-3.9.6) for additional information on traffic control devices.
2. Standards for intervals between traffic signals can be found in Table 3.1-2. Outside of designated Centers, traffic signal spacing less than ¼-mile is discouraged and requires approval by the City Engineer.
3. Unless the intersection is grade-separated, all intersections between arterial and collector roadways shall be controlled with signalized pedestrian crossings.
4. Intersections where arterials and collectors intersect with local roads may be unsignalized. Pedestrian crossings are permitted at unsignalized intersections,

though crossings may or may not be marked. See Figure 3.1-4 for an example of the signals and pedestrian crossings.

5. Intersections involving two local roads are generally served by stop or yield-sign controls.
6. Along high auto mobility roadways, such as Commuter Corridors, signalized intersections should be evenly spaced and at intervals that ensure efficient flow of vehicles (generally ½-mile).
7. The spacing between signals along Major Transit, Multi-modal, and Main Street corridors should be at the low end of the range provided in Table 3.1-2, where practical, to ensure greater connectivity and opportunities for pedestrian crossings.
8. Within Comp Plan-designated Centers, signalized intersections may be appropriate at intervals below the distance ranges provided in Table 3.1-2.

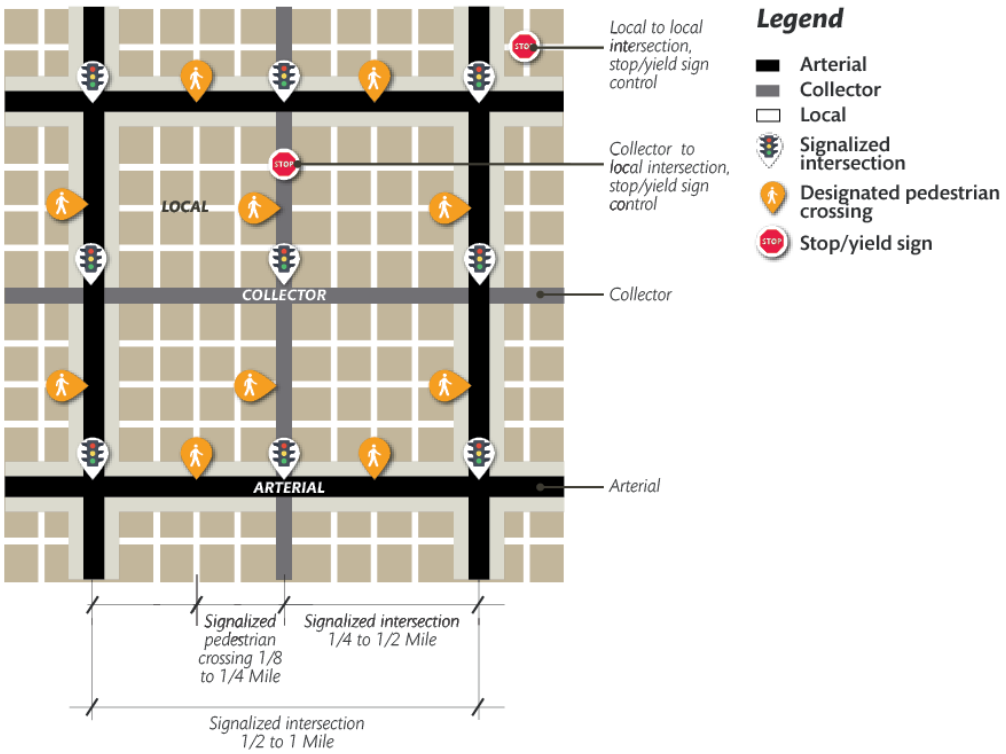
Table 3.1-2: Recommended Distance between Signalized Intersections by Corridor Type

Corridor	Distance between Signalized Intersections	Distance between *Signalized* Pedestrian Crossings
Major Transit	1,320-2,640' (¼ to ½-mile)	≤1,320 (¼-mile)
Multi-Modal	1,320-2,640' (¼ to ½-mile)	≤1,320 (¼-mile)
Main Street	≤1,320 (¼-mile)	≤660' (⅛-mile)
Commuter	2,640-5,280' (½ to 1-mile)	≤2,640' (½-mile)
Other Arterial	≤2,640' (½-mile)	≤2,640' (½-mile)
Minor Arterial	1,320-2,640' (¼ to ½-mile)	≤1,320 (¼-mile)
Collector	1,320-2,640' (¼ to ½-mile)	≤1,320 (¼-mile)

Comment [AS4]: The tables in this section are based on guidance provided in Comp Plan Tables 7-3 and 7-4, including block length along different corridor types. The station areas for Premium Transit Corridors fall within the interval ranges for signalized intersections and are not included in the table.

For reference, the State Access Manual for Urban Principal Arterials calls for signals at least every ½-mile for urban principal arterials. Minimum signal spacing is 1/3 in SAM. "1/3 mile for posted speeds of 40 mph or less, 1/2mile for 45 to 50 mph, and 1 mile for 55 mph or more" (26).

Figure 3.1-4 Signalized Intersections and Pedestrian Crossings



3.1.6 Designated Pedestrian Crossings

3.1.6.1 Definitions and Appropriateness

1. Pedestrian Crossing: The location where pedestrians are encouraged to cross a roadway, as indicated by a signal, signage, or pavement marking. While motorists are required by state law to stop for pedestrians crossing a roadway within a crosswalk, some forms of pedestrian crossings provide a higher level of safety and comfort than others. The type of crossing infrastructure depends on the location, traffic volume, and other considerations (see warranting criteria below in section 3.1.6.3.1).
2. Designated pedestrian crossings may be located at unsignalized or signalized intersections, and may be protected via a traffic signal or pedestrian-activated signal device, or unprotected such as a simple marked crosswalk.

3.1.6.2 Types of Designated Crossings

1. The greatest level of safety and comfort for pedestrians are provided by traffic control signals, including pedestrian hybrid beacons that completely stop the flow of traffic through a pedestrian-activated sensor.
2. The crossing types listed in Table 3.1-3 below are ordered from highest to lowest form of safety and comfort.
3. Multiple measures may be combined at a crossing, such as a marked crosswalk and a pedestrian refuge island (see the Pedestrian Facilities section 23-3.5 for guidance on these elements).
4. Traffic volume and the number of lanes of traffic that must be crossed should be considered when determining the most appropriate type of designated pedestrian crossing.
5. See the Figure 3.1-5 for pedestrian crossing examples and the Pedestrian Facilities section (23-3.5) for guidance on crosswalk design.

Table 3.1-3: Designated Pedestrian Crossing Types

Safety ↑ Comfort	**Signalized Intersections**	Traffic signal control
		Pedestrian hybrid beacon
	Unsignalized Intersections	Flashing beacon (rapid rectangular flash beacon, in-pavement flashers)
		Pedestrian refuge island
		Signage (in-street, overhead, or sign post)
		Marked crosswalk (no signs or signals)

Figure 3.1-5: Pedestrian Crossing Examples

3.1.6.3 Frequency of Pedestrian Crossings

3.1.6.3.1 General Warranting Criteria

1. Designated crossings shall be provided at regular intervals (see Table 3.1-1), with un-signalized crossings available in between signalized crossings as appropriate, and with the frequency of pedestrian crossings depending on the location, block length, and the type of corridor. More frequent crossings shall be provided along corridors with high levels of pedestrian activity and within designated Centers.
2. Designated pedestrian crossings shall be provided at intersections unless blocks exceed desired lengths, in which case mid-block crossings may be required.
3. Designated pedestrian crossings should be provided with sufficient frequency to ensure the following:
   - The maximum distance between designated crossings in Downtown and Urban Centers and along Main Street Corridors is 400'.
   - The maximum distance between designated crossings in Village Centers and Activity Centers is 600'.
   - The maximum distance between designated crossings for other areas (including residential neighborhoods) should be 1320' unless there is no pedestrian activity in the area. Additional crossings may be provided as appropriate.
4. Designated pedestrian crossings should also be provided in the following situations:
   - Within 100' of a transit station area and 400' of a transit stop.
   - At special generators, including schools or major shopping/retail sites.
   - Areas with identified safety concerns, as demonstrated through a Road Safety Audit, crash rates above the regional average, or the result of other study or data collection effort.
5. Designated pedestrian crossings may be required at the discretion of the City Engineer, and may be omitted with the approval of the City Engineer if it can be clearly demonstrated that a crossing is not warranted.

3.1.6.3.2 Signalized Pedestrian Crossings

1. Signalized pedestrian crossings (e.g. traffic signals or pedestrian hybrid beacons) should be provided in the following situations, also see Table 3.1-1:
   - All at-grade intersections with a traffic signal.
   - Every 660 feet (1/8-mile) or less within Downtown and Urban Centers and along Main Street Corridors.
   - Every 1,320 feet (1/4-mile) or less in Activity Centers and Village Centers and along Major Transit and Multi-Modal Corridors.
   - Every 2,640 feet (1/2-mile) or less in all other circumstances, unless no pedestrian activity is present or is unlikely to be present in the future.

3.1.6.3.3 Considerations for Unsignalized Pedestrian Crossings

1. In some cases, including situations where traffic volumes exceed 12,000 vehicles per day and there are 3 or more lanes of traffic, introducing an unsignalized crossing may make conditions less safe for pedestrians by creating a false sense of security.
2. See the National Cooperative Highway Research Program (NCHRP) Report 562 Improving Pedestrian Safety at Unsignalized Crossings and the FHWA publication Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Intersections for additional guidance on appropriate locations for unsignalized pedestrian crossings.

Comment [RMM5]: Add link to pdf of these reports

3.6.1.3.4 Consideration of Mid-Block Crossings during Reconstruction Projects

1. Mid-block crossings shall be considered and are strongly encouraged during roadway reconstruction projects in Downtown, Urban Centers, and along Main Street Corridors where existing block lengths exceed 500 feet.
2. Mid-block crossings shall be considered and are strongly encouraged during roadway reconstruction projects where existing block lengths exceed 600 feet and where pedestrians are present.
3. Mid-block crossings are strongly encouraged where two major pedestrian generators are located on opposite sides of the street and are separated by a collector or arterial roadway, or to provide direct access to a school where no designated crossings are nearby.
4. The spacing of traffic signals must be evaluated during the consideration of mid-block crossings. See the MUTCD for guidance on traffic signal spacing.