Chapter 23
TRANSPORTATION DESIGN

INTRODUCTION

Transportation in an urban environment is a complex interplay of different modes of travel, trip purposes, and variability of transportation characteristics through time. This chapter presents criteria established for use in the design of street systems and related features to accommodate these differing needs. These criteria are intended to assure acceptable levels of comfort, safety, quality and durability in completed designs.

Material presented is intended for use by qualified design professionals familiar with municipal street design. A brief overview of important governing regulations is presented together with references to commonly accepted standard publications related to the subject. Designers and others using this manual are expected to familiarize themselves fully with the following regulations, other pertinent regulations and the standard reference publications cited herein.

The purpose of this chapter is to promote consistently sound design of street systems having acceptable performance characteristics, to encourage innovative design, and to assert the need for exercise of sound, responsible, professional judgment by the designer.

While the use of minimum design standards typically results in the lowest cost for a project, the use of above minimum design may result in a more effective design with operational benefits and a more economic life cycle cost. The design values in this chapter represent the minimum standard. However the project designer is encouraged to use values above this minimum.

Section 1. GOVERNING REGULATIONS

Following are overviews of several of the most important City regulatory documents pertaining to street design. The list is not intended to be exhaustive, and the user is cautioned that these regulations are subject to change at any time. The competent designer must maintain a constant familiarity with these and other pertinent regulations as they evolve.

Subdivision Ordinance (Article 14-7 R.O.A. 1994)

The following topics in this Ordinance are particularly important to street design:

The requirement for Traffic Engineer approval of any plat which creates public right-of-way and private access easements.

The general right-of-way standards for streets, based upon roadway classification.

The requirement for the development of detailed design criterion and technical standards for construction in the Development Process Manual.

Comprehensive City Zoning Code (Article 14-16 R.O.A. 1994)

This document contains important regulations relating to access, circulation, and parking on private property; the interface with public right-of-way, to obstructions of sight distances within the right-of-

way, and to proximity of landscape elements to the traveled way. This document, current zone maps, the Albuquerque/Bernalillo County Comprehensive Plan, area plans, and sector plans govern the establishment of land use categories which, in turn, govern certain street design parameters presented in the Subdivision Ordinance.

Drainage Ordinance (Article 14-5-2 R.O.A. 1994)

This Ordinance establishes requirements governing design of storm runoff facilities as such facilities relate to the street system and the requirement for at least one all weather access to developments.

Traffic Code Ordinance (Chapter 8 R.O.A. 1994)

This document regulates general traffic control, enforcement of construction signing and establishes the criteria for clear sight geometry at intersections.

Sidewalk Ordinance (Article 6-5-5 R.O.A. 1994)

This Ordinance establishes the requirement for the construction of sidewalk and curb and gutter for properties, including dimensional, location, and construction regulations for sidewalks.

Curb Cut Ordinance (Article 6-5-4 R.O.A. 1994)

This Ordinance regulates the location, dimensions, and frequency of placement of driveway entrances through curbs to public rights-of-way.

Long Range Roadway System Plan (LRRSP)

This document is an overlay map depicting the long range plan for major street systems on the Albuquerque urban area as adopted by the Urban Transportation Planning Policy Board of the Mid-Region Council of Governments.

It is the guiding document in the selection of major street location and character. Since it is periodically updated, only current copies should be used.

Long Range Bikeway System Plan (LRBSP)

This document is essentially an overlay map of the Albuquerque urban area depicting the long range plan for bikeway systems as adopted by the Urban Transportation Planning Policy Board of the Mid-Region Council of Governments. It is the guiding document with respect to planned bikeway location and character. Since it is periodically updated, only current copies should be used.

Street Tree Ordinance (Article 6-6 R.O.A. 1994)

This Ordinance requires the installation of trees along major streets when obtaining building permits or paving parking lots.

Regulations for Street Tree Planting

These regulations are companion to the Street Tree Ordinance and govern plantings encouraged or required by the Ordinance. (EPC Resolution, adopted February 10, 1983)

Future Street Lines (Article 6-5 -3 R.O.A. 1994)

This Ordinance provides for establishment of future street lines by the City Council. It prohibits the construction of buildings and substantial alterations and additions to existing structures within such designated future street lines and setback areas. Locations of established future street lines are available in the Planning Department.

Approved Sector Development Plans

Sector development plans cover larger areas of land and normally include preliminary street configurations for the area involved. When approved, such sector development plans govern interior development plans within the sector. Sector development plans are available for review in the Planning Department.

Corridor Studies

Corridor studies have been made in several areas and there may also be studies in progress. Such studies may influence design of major streets on the LRRSP as well as those not yet included. The Transportation Division should be consulted for detailed information.

Street Names (Article 6-5-1 R.O.A. 1994)

This Ordinance establishes criteria for use in naming City streets and streets within the extraterritorial planning and platting jurisdiction of the City. The purpose is to promote consistency in the naming of streets.

Section 2. REGULATED CRITERIA

The following criteria are currently established in existing City regulations and are presented here for the convenience of the designer.

A. Street Location and Arrangement

1. Streets must conform in character, location and arrangement to adopted plans. Governing plans may be the Long Range Roadway Systems Map (LRRS), approved neighborhood, site development, or sector plans, or adopted future street lines. The Planning Director and the Traffic Engineer should be consulted for information regarding applicable plans for areas under design consideration.

2. Proposed street arrangements must provide for the continuation of existing principal streets or appropriate projections thereof if not otherwise governed by an adopted plan as discussed in paragraph 1, preceding.

3. The layout of subdivision streets must meet the detailed engineering criteria specified in the DPM. Variance conditions and procedures are also outlined in the DPM and Subdivision Ordinance.

4. Local and major local streets must be arranged to facilitate solar access where feasible. To accomplish this, such streets are encouraged to be oriented either in an east-west direction or so that lot lines would be oriented within 30o of north-south to the maximum extent feasible. These criteria may be waived if:

a. Other means of providing solar access to lots along such streets are provided.

b. Topographic conditions prevent reasonable achievement of such orientation.

c. Shape and size of property considered make such orientation unreasonable.

d. Adopted storm water management plans or policies dictate a different street orientation.

e. Existing or approved development contiguous to the property precludes adequate solar access by this orientation criteria.

f. Contiguous street patterns make this orientation unreasonable.

g. Such orientation would result in adverse environmental impacts.

h. Circulation requirements between streets require north-south linkages of limited length.

5. Street alignments must ensure that sanitary sewers installed within the right-of-way will never be closer than 150' to existing or proposed water wells or underground reservoirs. The PWD/Utility Development Division representative of the DRB should be consulted regarding the location of such facilities within the area under design.

6. The use of private ways in the design of exclusive access to lots is limited by the following requirements:

a. The length, width and permanent character of the private way must be suitably and legally defined by the plat establishing the lots so served, and the lots served must abut or front the proposed private way.

b. The Traffic Engineer must determine that the proposed private way will always function as a street classified as local street and that a public right-of-way would not better serve public purposes.

c. Easements for public utilities may be required.

d. Private ways must be created by legal instrument that shall insure future maintenance and operation as a private way. This may be done on a subdivision plat or by separate easement document.

e. "Private ways" for common drives are covered under Section 6.

7. Closely spaced driveways conflict with safe pedestrian movement by creating multiple vehicle crossings over sidewalks and by eliminating on-street parking that slows traffic speeds. Alleys may be provided to substitute for direct street access from closely spaced driveways that interfere with pedestrian movement, create a harsh environment, and/or prohibit on-street parking.

a. Direct driveway access to Major Local Streets is allowed provided it is designed to minimize vehicle and pedestrian conflicts and to reserve a minimum of one 20-foot long on-street parking space per lot.

b. Direct driveway access to Major Local Streets is not allowed within 100 feet of a street intersection unless justified by a traffic analysis or designed with driveways that allow vehicles to exit without backing out.

c. Lots facing a Major Local Street with only alley driveway access may be decreased in overall lot size and front yard building setback distance as specified in the Comprehensive Zoning Code's R-1, R-LT, and R-T zones.

8. Public right-of-way location for Primary Trails shall be as designated by the Long Range Bikeway System Map and the Trails and Bikeways Facility Plan. Primary, Secondary and Access Trails shall be built in accordance with the standards provided therein and/or the Subdivision Ordinance, the DPM, the Comprehensive On-Street Bicycle Plan, and Standard Specifications for Public Works Construction or as specified by adopted policies or plans. All new development and redevelopment shall follow the preceding requirements.

9. A Major Local Street generally accommodates vehicles collected from and distributed to several Normal and Access Local streets. Major Local Streets shall be designed to discourage high speed driving and to support walking:

a. Roundabouts at intersections, chokers, sidewalk bulb-outs, chicanes, medians, and/or other devices approved by the Traffic Engineer shall be incorporated into street design to calm traffic.

b. Residential Major Local Streets shall contain the following elements:

(1) No more than two (2) vehicle lanes (one in each direction) except at intersections with Collector or Arterial Streets where three (3) vehicle lanes may be provided: two (2) for vehicles exiting and one for vehicles entering the Major Local Street;

(2) Curb and gutter (on both sides of the street);

(3) On both sides of the street, minimum 6-foot wide areas for street trees between the back of the curb and the sidewalk that include the following areas: a 1-foot wide no-dig area back of the curb,

another 2.5-foot wide area to the tree trunk to ensure that the tree is set back 4 feet from the face of the curb, another 1.5-foot wide area to ensure an adequately sized tree planting area, and a 1-foot wide no-dig area next to the sidewalk, although wider areas may be required for trees that attain a height greater than 20 feet at maturity;

(4) On both sides of the street, minimum 6-foot wide sidewalks or sidewalk substitutes in the form of all-weather surfaced paths that meet City Construction Standards and ADA Guidelines (The City requires a private maintenance agreement for sidewalk substitutes); and

(5) A minimum of one street tree per lot selected from a City approved list and as specified in the Street Tree Ordinance. Responsibility for permanent maintenance of street trees and related improvements shall be identified as a condition of final plat approval in a form acceptable to the City.

c. Major Local Streets may also contain some of the following elements:

(1) Parking lanes on one or both sides of the street as required by City Engineering staff to ensure adequate parking for adjacent land uses;

(2) If the street is also designated as a bikeway or trail, adequate right-of-way and developed section to accommodate the extra width in accordance with DPM/AASHTO standards;

(3) A landscaped median or other traffic slowing devices;

(4) A wider landscape area between the curb and sidewalk, a wider sidewalk or trail, or a landscape area adjacent to rear yard walls.

d. The centerlines of streets intersecting a major local street shall be a maximum of 850 feet apart provided additional pedestrian access routes to and from the Major Local Street are provided on the side(s) of the Major Local Street being considered for development.

Unless existing abutting development precludes providing an opening, pedestrian access routes shall be provided from between lots or from stub streets or cul-de-sacs.

(1) Pedestrian access routes between lots shall consist of a minimum 6-foot wide path in a 12-foot wide space, shall meet ADA standards as required by law, and shall prevent vehicle entry. Access routes shall have no blind spots and access route exits shall be clearly visible from all points along the route. Pedestrian access routes longer than 120 feet shall be a minimum of 18 feet wide. (See 23.2.A.9.d.4. for exceptions.)

(2) Pedestrian street crossings associated with pedestrian access routes shall be evaluated for inclusion by City staff. If applicable, pedestrian street crossings shall include ADA accessible routes through street medians.

(3) On the side(s) of the Major Local Street with front yards facing the street, pedestrian access routes to the Major Local Street shall be located a maximum distance of 500 feet on center.

(4) On the side(s) of the Major Local Street with rear yards facing the street, pedestrian access routes that are a minimum of 25 feet wide shall be located a maximum distance of 500 feet on center. Pedestrian access routes narrower than 25 feet wide shall be located a maximum distance of 300 feet on center.

e. A minimum setback area between the sidewalk and rear yard property line equal to the additional height of the rear yard wall over 5 feet high from sidewalk grade shall be provided. Public utility easement requirements may necessitate a greater wall setback distance.

No property line setback is required for rear yard walls measuring 5 feet high or less from sidewalk grade unless additional space is needed for a public utility easement that is separated sufficiently from required street trees or to accommodate slope or drainage requirements. Walls shall be built in accordance with wall height and design regulations as specified in the Comprehensive Zoning Code Section 14-16-3-19. A wall setback easement may substitute for right-of-way.

f. Major Local Streets with on-street parking should be designed and built with sidewalk bulb-outs at street intersections and may also incorporate bulb-outs at other locations along the block to demarcate parking lanes and to shorten the street width for pedestrians at street crossing locations.

If the Major Local Street intersection has an anticipated AWDT of 2000 or more, the intersection shall be designed at a minimum, to allow a standard size school bus to negotiate turns without crossing the centerline of the roadway or encroaching onto curb or sidewalk.

g. Major local streets with rear yards on both sides of the street shall contain regularly occurring traffic calming devices. If a median is chosen, it shall be landscaped with trees and other plants and shall be accompanied by a private landscape maintenance agreement that is accepted by the City.

B. Right-of-Way, Private Way and Pavement Widths Minimum Standards

Required street right-of-way widths are established in the Subdivision Ordinance. Standards for the classifications of streets designated as collector, minor arterial or principal arterial are additionally governed by the LRRS. Tables 23.2.1A, B, C, and D show pertinent standards together with the pavement width requirements. Local Residential streets shall be defined as streets that are designed to primarily carry neighborhood traffic and are adjacent to residential land uses or parks or schools within residential neighborhoods. Local Residential Streets include Major Locals, Normal Locals, and Access Locals. Standards for public right-of-way and pavement widths other than local residential streets are shown in Table 23.2.1.A. Tables 23.2.1B, C, and D deal with the standards for local residential street design with varying subdivision requirements. The designers should note that all of the higher classifications of streets are subject first to the requirements of the current LRRS. It is, therefore, essential that the LRRS be consulted before proceeding with design of any street system involving arterial or collector streets.

Standards for all three types of local residential street right-of-way and pavement widths fall into three additional categories, based upon platting considerations and whether special provisions are made for off-street parking at the time of platting and/or building permit as outlined in the following tables. The provision of wider lots and off-street parking in accordance with these special requirements will ensure reduced on-street parking. With significantly reduced on-street parking, the street width needed to maintain adequate access in the neighborhood is reduced.

The three categories of design for all local residential streets are identified as standard design, intermittent parking design, and infrequent parking design. Standard design criteria shall be used unless the conditions specified for either infrequent parking or intermittent parking categories are met or exceeded.

Standard local residential street design provides the most on-street parking potential and is to be used unless there are specific conditions that reduce or restrict parking on the street. On-street parking demand and supply may be reduced for blocks with lots designated on a subdivision plat with the suffix "p1" for intermittent on-street parking or the suffix "p2" for infrequent on-street parking. These designations are related to Comprehensive Zoning Code Off-Street Parking Regulations 14-16-3-1 (A)(24)(c) and (d) that require more parking spaces per lot. Public Right-of-Way and pavement width standards for local residential streets are shown in Tables 23.2.1.B, C, & D.

Local residential street width standards are further classified by anticipated street traffic volumes. The Traffic Engineer shall review proposals for subdivision with local residential streets to determine the anticipated traffic volumes. The traffic volumes are to be determined based upon trip generation characteristics and the anticipated distribution of trips. An approximation of the number of trips generated is 10 trips per day for single family detached housing and 6 trips per day for townhouse units. Where anticipated traffic volumes are 250 vehicles per Average Week Day (AWDT) or less, these streets are classified as Access Streets. Typical streets with this traffic volume are cul-de-sacs, loop streets and connecting streets. Connecting streets are not continuous for more than 1 or 2 blocks and do not feed other streets within the neighborhood. Streets with anticipated traffic volumes from 250 to 1000 AWDT are classified as Normal Local streets. The Subdivision Ordinance defines a Major Local Street as "A street that takes traffic from other local streets to collector or arterial streets; is generally one-half mile or less in total continuous length between arterial and collector streets; carries larger volumes of traffic than local streets normally carry; and is designed to discourage high-speed driving and to support walking." Local streets with an anticipated AWDT of 1000 or greater are classified as major local streets. The intent of major local streets is that two moving lanes be available at all times.

Local and major local single-family residential streets may change in right-of-way and paving width, within a segment of roadway, in response to changes in street classification identified above (e.g. "major local" to "normal local" street design, "normal local" to "access local" to "normal local" street design for loop streets, see Section 23.5.D.5).

Private way width and construction standards are shown in Table 23.2.2.

C. Detailed Subdivision Geometry Development

Detailed intersection spacing and geometry, horizontal alignment, block corner property line configuration, and cul-de-sac configuration must meet the criteria specified in the Development Process Manual**.**

D. Technical Standards Adoption

The City shall prepare and adopt by rule technical standards for infrastructure improvements. This shall be contained in the Development Process Manual.

Typical Major Local Street Cross Section with Rear Residential Yards Facing Both Sides of the Street

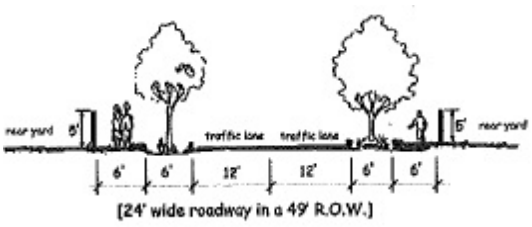


Figure 23-1A

Typical Major Local Street Cross Section with Rear Residential Yards Facing One Side of the Street and Front Yard on the Other

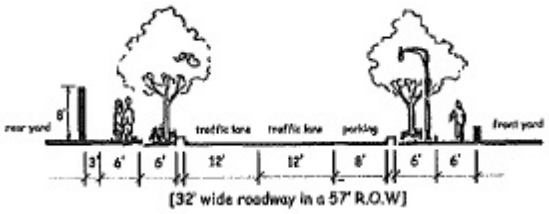


Figure 23-1B

Typical Major Local Street Cross Section with Rear Residential Yards Facing Both Sides of the Street

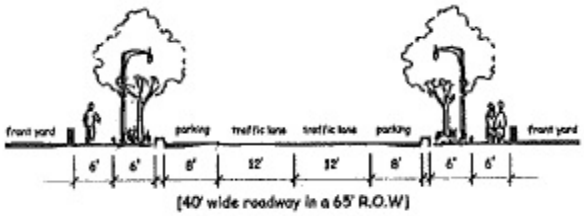


Figure 23-1C

(Median) Rear Yards on both Sides of the Street

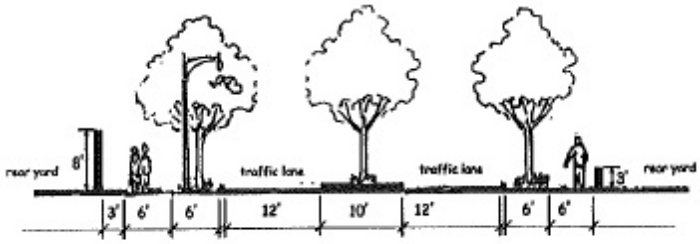


Figure 23-1D

Pedestrian Pathways

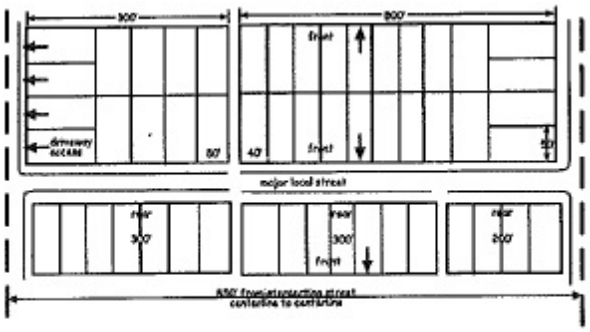


Figure 23-1E

Various Techniques to Discourage High Speed Driving and Support Walking

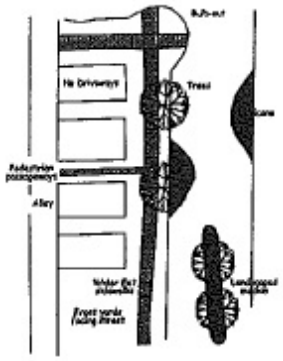


Figure 23-1F

Table 23.2.1A
Public Right-of-Way and Pavement Width Standards
(For All Streets except Local Residential Streets)

Street or Element Classification (as defined by Subdivision Ordinance)	***Minimum Required Right-of-Way Width (see notes: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12)***	***Recommended Bike Facility (see note 11)***	***Minimum Required Sidewalk (See note 7)***	***Required Pavement Width (See notes 2, 3, 4, 5, 6) (Flowline to Flowline)***
Principal Arterial	a)* As required by LRRS[(1)], if not established therein, or b)* 124 feet in Established and Redeveloping Areas, or c)* 156 feet elsewhere d)* Add 12 feet for bike lanes if	6-foot minimum bike lane or 5-foot paved shoulder bikeway for posted speeds of 35 mph or less; 7-foot bike lane or 6-foot paved shoulder bikeway for posted speeds of 40 mph or	6 feet with a 6-foot setback from back of curb (7)	a) As required by LRRS, or b) As required by Traffic Engineer/Development (2, 3, 4, 5, 6)

	road is on bikeway system (1, 2, 3, 4, 5, 7, 8, 9, 10, 11)	greater		
Minor Arterial	a)* As required by LRRS[1], if not established therein, or b)* 91 feet c)* Add 12 feet for bike lanes if road is on bikeway system (1, 2, 3, 4, 5, 7, 8, 9, 10, 11)	6-foot minimum bike lane or 5-foot paved shoulder bikeway for posted speeds of 35 mph or less; 7-foot bike lane or 6-foot paved shoulder bikeway for posted speeds of 40 mph or greater	6 feet with a 6-foot setback from back of curb (7)	a) As required by LRRS, or b) 66 feet to 74 feet including gutter and median/center turn lane (2, 3, 4, 5, 6)
Collector	a)* As required by LRRS[1], if not established therein, or b)* 73 feet c)* Add 12 feet for bike lanes if road is on bikeway system (1, 2, 3, 4, 5, 7, 8, 9, 10, 11)	6-foot bike lane or 4-foot paved shoulder bikeway (min.)	6 feet with a 6-foot setback from back of curb (7)	a) As required by LRRS, or b) 48 feet (2, 3, 4, 5, 6)
Major Local	See Table 23.2.1B for local street standards (Major, Normal, and Access)			
Local Streets – Abutting Lands Zones R-2, 3 – All others** ** One side development only or cul-de-sac	57 feet * 61 feet 53 feet [57' x 100']	—	4 feet with a 6-foot setback from back of curb [7, 10]	36 feet 40 feet 32 feet (36')[10] (2, 3, 4, 5, 6)
Alley	* 20 feet (paved, valley gutter)	—	N/A	20 feet (paved, valley gutter)
Primary Trail (on separate right-of- way)	* 18 feet minimum	—	N/A	10 feet minimum
Secondary Trail (on separate right-of-way)	* 15 feet	—	—	10 feet
Pedestrian Access Route to a street from a stub street, a	Minimum 12 feet (18 feet for pedestrian access routes longer			6 feet (12)

cul-de-sac, or from between lots	than 120 feet) (12)			

NOTES:

(1) LRMSP - means Long Range Major Street Plan; this document governs in all cases where criteria for the area considered have been incorporated into the plan.

(2) Standards indicated may require increase in individual circumstances to conform to drainage and/or landscaping requirements.

(3) Right-of-way and pavement width may require added widening up to 10 feet on each side at approaches to arterials and collectors.

(4) Right-of-way width requirements may be adjusted by the Traffic Engineer if necessary to properly accommodate existing right-of-way on the same street in the vicinity.

(5) Right-of-way and pavement widths may be increased by up to 12 feet by the Traffic Engineer to accommodate adopted bicycle facilities. Additional width may be required to accommodate required sidewalk and setback widths.

(6) See Standard Details

(7) Minimum sidewalk width shall be 10 feet on arterial streets adjacent to Major Activity Centers and Community Activity Centers as defined in the Albuquerque/Bernalillo County Comprehensive Plan. Minimum sidewalk width shall be 9 feet on collector streets adjacent to Major Activity Centers and Community Activity Centers. Minimum sidewalk width shall be six feet adjacent to arterial and collector streets other than those listed above. Minimum sidewalk width shall be 6 feet on local streets abutting the grounds of schools or churches, land zoned SU-3, or land zoned for a greater residential density than RT Residential Town homes. Otherwise, sidewalks shall be four feet wide adjacent to a local street. Right-of-way width shall be increased to accommodate increased sidewalk widths.

(8) Right-of-way shall be increased if required for public infrastructure.

(9) A developer, with the concurrence of the Traffic Engineer, may elect to dedicate additional R/W for future roadway widening.

(10) Right-of-way and pavement widths need to be increased within a specified distance of an arterial or collector street (measured as the tangent portion of the subject street). This width and required length of tangent is shown in brackets - ex. [56' X 100'].

(11) Width is measured from the gutter edge for a bike lane or from the edge of pavement for a shoulder bikeway toward the lane stripe or roadway centerline. On retrofit of existing roadways where right-of-way is limited, wide curb lanes, 16 feet from lane stripe to flowline, are recommended. In order to implement wide curb lanes, inner travel lane widths may be reduced within acceptable AASHTO guidelines.

(12) Pedestrian access routes shall be as described in 23.2.A.9.d. of the DPM:

"The centerlines of streets intersecting a major local street shall be a maximum of 850 feet apart provided additional pedestrian access routes to and from the Major Local Street are provided on the side(s) of the Major Local Street being considered for development.

Unless existing abutting development precludes providing an opening, pedestrian access routes shall be provided from between lots or from stub streets or cul-de-sacs.

(1) Minimum requirements for pedestrian access routes between lots are that they shall contain a minimum 6-foot wide path in a 12-foot wide space, shall meet ADA standards as required by law, and shall prevent vehicle entry. Access routes shall have no blind spots and access route exits shall be clearly visible from all points along the route. Pedestrian access routes longer than 120 feet shall be a minimum of 18 feet wide. (See 23.2.A.9.d.4. for exceptions.)

(2) Pedestrian street crossings associated with pedestrian access routes shall be evaluated for inclusion by City staff. If applicable, pedestrian street crossings shall include ADA accessible routes through street medians.

(3) On the side(s) of the Major Local Street with front yards facing the street, pedestrian access routes to the Major Local Street shall be located a maximum distance of 500 feet on center.

(4) On the side(s) of the Major Local Street with rear yards facing the street, pedestrian access routes that are a minimum of 25 feet wide shall be located a maximum distance of 500 feet on center. Pedestrian access routes narrower than 25 feet wide shall be located a maximum distance of 300 feet on center."

Table 23.2.1.B
Standard Local Residential Street Design - Public Right-of-Way and Pavement Width Standards

Street or Element Classification	***Required Total Right-of-Way (see notes: 5, 6, 7, 8, 11)***	***Recommended Bike Facility and Required Pedestrian Access Routes (see note 10)***	***Required Minimum Sidewalk (See notes 1, 3, 4)***	***Required Sidewalk Setback (see note 2, 11)***	***Required Pavement Width - Flowline to Flowline (See notes 8, 9)***
Major Local (A Residential Street with an anticipated AWDT of 1000 or more vehicles.)	Minimum total right- of-way includes the following basic elements:(5,7,8) (2) 6 ft wide sidewalks (2) 6 ft wide street tree planting areas between the curb and sidewalk (2) curbs (2) 12 ft wide traffic	A signed route without striped lanes. Minimum 6–foot wide paved paths within minimum 12-foot wide Pedestrian Access Routes between lots or from stub streets or cul-de- sacs (10)	6 feet (1, 3, 4)	Minimum 6 feet between the back of the curb and the sidewalk to include the following elements: (2,4) 1- foot wide no-dig area back of curb 2.5-foot wide area to the tree trunk An additional	Minimum required pavement width = 22 - 24 feet to include two vehicle lanes.(8) Additional pavement width may include: (1 or 2) 8 ft wide parking lanes (1) minimum 10 foot wide or wider median (See note 9

	lanes Additional right-of- way may include: (2) added widths for planting areas to accommodate trees that are greater than 20 feet high at maturity (1 or 2) rear yard wall setback areas adjacent to walls higher than 5 feet from sidewalk grade (1 or 2) 8 ft wide parking lanes (1) 10 ft wide or wider median (1) additional vehicle lane at egress point to collector or arterial street Additional 4 ft. for bicycle route			1.5- foot wide area from the tree trunk to accommodate tree planting area A 1-foot wide no-dig area adjacent to the sidewalk The setback can be wider to accommodate trees that grow higher than 20 feet at maturity. Trees require the following minimum planting areas to thrive. The areas described do not include the no-dig areas next to the curb and the sidewalk: 4 x 4 feet in a 6 foot wide area between the curb and sidewalk for street trees that grow to 20 feet high at maturity 5 x 5 feet in a 7 foot wide area between the curb and sidewalk for street trees that grow to 40 feet high at maturity A 6 x 6 feet in an 8 foot wide area between the curb and sidewalk for street trees that grow over 40 feet high at maturity	concerning fire vehicle requirements) (1) additional vehicle lane for exiting to collector or arterial street

a)Normal Local 1) wide lots 2) adjacent to special land uses 3) all others	* 51 feet 61 feet * 53 feet	Can be a signed route without striped bicycle lanes	4 feet	Minimum 6 feet	1) Subdivisions, or major subsections thereof, with 90% of lot equal to or exceeding width of 55' – 30' (29' w/mt cb) 2) -Adjacent to schools -Within 150' of arterial or collector street - Adjacent to Parks – 36' (35' w/mt cb) 3) All others – 32' (31' w/mt cb)
b)Access Local (6) 1. Loop 2. Cul-de-Sacs 3. Connecting Streets	47 feet 47 feet 47 feet	N/A	4 feet	Minimum 5 feet If the street generates less than 250 AWDT, then the minimum sidewalk setback shall be 5 feet.	1. Streets with a total of 45 D.U.'s or 70 Townhouse units maximum. -28' (27' w/mt.cb.) 2. Street with a total of 25 D.U.'s or 40 Townhouse units maximum, and length less than 400' -28' (27' w/mt.cb.) 3. 28' (27' w/mt.cb.)
c)In Areas Covered by City Adopted Plans	-Plan governs-	Recommended Bike Facility (see notes)	Plan governs		-Plan Governs-
d)Special circumstances	Right-of-way less than 50 ft., but not less than 42 ft. may be used if approved by DRB	A signed route without striped lanes.	* none		See Criteria for Local Streets - a) normal, b) loop, and c) cul-de-sac.

NOTES:

(1) Minimum sidewalk width shall be 6 feet on all major local streets and on portions of normal local streets that abut the grounds of schools, churches, land zoned SU-3 or land zoned for a greater

residential density than R-T (Residential Town homes), Major Activity Centers, or Community Activity Centers as defined and mapped in the Albuquerque/Bernalillo Comprehensive Plan.

(2) The minimum sidewalk setback width for Major Local Streets shall be 6 feet from back of the curb except where the sidewalk bulbs-out. This width includes a one-foot wide "no dig" zone next to the curb, a minimum 4-foot wide planting area for small street trees required on Major Local Street, and another one-foot wide "no-dig" zone next to the sidewalk.

The City standard for street tree placement is generally 6 feet from the face of the curb, however, street trees may be permitted 4 feet from the face of the curb on residential streets (including major local streets) if a detailed design acceptable to the City (DRC) is provided that addresses how the structural section of the roadway will be maintained and root effects on the road structure will be mitigated.

The sidewalk setback area may be increased to conform to drainage and/or landscaping requirements. Planting areas necessary for street trees are as follows: 4 x 4 feet for small trees (trees that attain 15-20 feet in height at maturity), 5 x 5 feet for medium trees (trees that attain 20-40 feet in height at maturity), and 6 x 6 feet for large trees (trees that attain 40 or more feet in height at maturity).

No large growing trees that can reach a natural final height of over 20 feet tall shall be planted under or within 10 lateral feet of any overhead public utility conductor. No trees shall be planted over or within 5 lateral feet of any underground gas or electric utility facility.

Utilities (including, but not limited to electric, gas, telephone, and cable) shall be placed so that they do not interfere with the planting and maintenance of required street trees.

(3) Sidewalks are normally required. A variance for sidewalk waiver based upon extraordinary physical constraints caused by geological or geographical conditions that existed prior to subdivision, no development on one side of the street, and/or type of street development such as short cul-de-sac or local access street with no more than an AWDT of 50 may be requested in accordance with the provisions for the Sidewalk Ordinance.

(4) Where a variance for waiver of sidewalk is granted, the border area (distance from curb to Right-of-Way edge) may be reduced to 4 feet.

(5) Lesser total right-of-way and pavement widths may be considered by the DRB where vehicular access and parking are controlled and less than 100 AWDT are anticipated on a street segment. Lesser pavement widths will be handled as a variance under Section 7- 16-7 of the Subdivision Ordinance.

(6) For definition of access streets see narrative section 23.2.B.

(7) Total right-of-way and pavement width shall be adjusted by the Traffic Engineer if necessary to properly accommodate existing right-of-way on the same street in the vicinity.

(8) Right-of-way and pavement widths shall be increased within 150 feet of an arterial or collector street. This will accommodate three vehicle lanes at intersections with Collector or Arterial Streets: two for vehicles exiting and one for vehicles entering the Major Local Street. A curb bulb-out or other traffic-calming device shall be used at the entrance to the residential street from the collector or arterial street.

(9) Fire vehicles and apparatus require a twenty foot wide drivable space.

(a) Major Local Streets with front yards facing the street that have less than 20 feet of pavement between the curb and a median longer than 100 feet are required to add an extra area to the median so that it and the street pavement provide 20 feet of drivable space for fire vehicles and apparatus. It is required to be made of an all- weather surface that differentiates it from the street pavement and that supports the imposed loads of fire apparatus. The mountable surface is in addition to the landscaped portion of the median and may not substitute for it.

(b) Major Local Streets with rear yards facing the street and a median require Fire Department approval.

(10) Pedestrian Access Routes shall be provided as described under A. 9.d. of this Chapter and Section.

(11) A minimum setback area between the sidewalk and rear yard property line shall be provided as described under DPM Chapter 23, Section 2 A.9.e.

Table 23.2.1C
Intermittent Parking Design - Residential Areas
Public Right-of-Way and Pavement Width Standards

In order to use the standards contained in the intermittent parking design table, one of the following criteria must be met or exceeded:

1. Off-street parking per Section 40.A.1.aa of Comprehensive Zoning Code as follows:

Residential use - house or townhouse

a. Three parking spaces for up to two bedrooms, or

b. Four parking spaces for three to four bedrooms, or

c. Five parking spaces for five or more bedrooms.

All lot numbers on streets designated for Intermittent Parking based on this off-street parking criteria shall be followed by the suffix "p1" on the subdivision plat.

2. Streets with lots fronting on one side only

3. 90% of Lot Widths 75', with 20 foot wide by 20 foot deep parking easement (20 foot wide drivepad required)

4. 90% of Lot Widths 65', with 30 foot wide by 20 foot deep parking easement (30 foot wide drivepad required)

5. 90% of Lot Widths 100'

Notes: Parking easement size for intermittent parking design - 10' by 20' per vehicle; all lot numbers on streets designated for Intermittent Parking based on parking easement criteria shall be followed by the suffix "pe" on the subdivision plat. Lots adjacent to streets designated for Intermittent Parking shall be appropriately marked in the Zone Atlas.

Street Type	***Required Right-of-Way*** (1), (3)	***Required Sidewalk*** (2)	***Required Pavement Width*** (1), (3) (Flowline to Flowline)
Major Local	61' [66' x 150'] See Table 23.2.1.B	6 feet and 6-foot sidewalk setback area behind the curb (includes 1-foot wide no-dig area back of curb, 4-foot wide planting area for street trees, and 1-foot wide no-dig area next to sidewalk)	36' [allows some parking for front facing lots] [40']
Normal Local	49' (1, 3) [57' x 100']	4 feet and 6-foot sidewalk setback area behind the curb	28' (27' w/mountable curb) [36']
Access Local (4) - Cul-de-sac, loop, and connecting streets	47' (1, 3) [51' x 50']	4 feet and 5-foot sidewalk setback area behind the curb. If the street generates less than 250 AWDT the sidewalk setback area behind the curb shall be 5 feet wide	26' (25' w/mountable curb) [30']

NOTES:

(1) Streets adjacent to schools, parks, and within 150' of an arterial or collector street shall be widened to 36' pavement width curb to curb.

(2) The minimum sidewalk setback width for Major Local Streets shall be 6 feet from back of the curb except where the sidewalk bulbs-out. This width includes a one-foot wide "no dig" zone next to the curb, a minimum 4-foot wide planting area for small street trees required on Major Local Street, and another one-foot wide "no-dig" zone next to the sidewalk.

The City standard for street tree placement is generally 6 feet from the face of the curb, however, street trees may be permitted 4 feet from the face of the curb on residential streets (including major local streets) if a detailed design acceptable to the City (DRC) is provided that addresses how the structural section of the roadway will be maintained and root effects on the road structure will be mitigated.

The sidewalk setback area may be increased to conform to drainage and/or landscaping requirements. Planting areas necessary for street trees are as follows: 4 x 4 feet for small trees (trees that attain 15-20 feet in height at maturity), 5 x 5 feet for medium trees (trees that attain 20-40 feet in height at maturity), and 6 x 6 feet for large trees (trees that attain 40 or more feet in height at maturity).

No large growing trees that can reach a natural final height of over 20 feet tall shall be planted under or within 10 lateral feet of any overhead public utility conductor. No trees shall be planted over or within 5 lateral feet of any underground gas or electric utility facility.

Utilities (including, but not limited to electric, gas, telephone, and cable) shall be placed so that they do not interfere with the planting and maintenance of required street trees.

(3) Where the use of reduced right-of-way and pavement widths are anticipated, utility needs must be reviewed to ensure adequate spacing of utility lines and offset from the street curbs for maintenance purposes.

(4) For definition of access streets see narrative 23.2.B. See also Table 23.2.1.B for definition of access streets for loop and cul-de-sac streets.

(5) An intermittent parking designation on a major local street requires "No Parking" signage.

Table 23.2.1.D
Infrequent Parking Design - Single-Family Residential Areas
Public Right-of-Way and Pavement Width Standards

In order to use the standards in the infrequent parking design table, one of the following criteria must be met or exceeded:

1. Off-street parking per Section 40.A.1.z of Comprehensive Zoning Code

Residential use - house or townhouse

a. Four spaces for up to two bedrooms, or

b. Five spaces for three to four bedrooms, or

c. Six spaces for five or more bedrooms.

All lot numbers on streets designated for infrequent parking based on this off-street parking criteria shall be followed by the suffix "p2" on the subdivision plat.

2. Streets with no lots fronting and with no vehicular access

3. 90% of Lot Widths 100 feet, with 20 foot wide by 40 foot deep parking easement (20 foot wide drivepad required)

4. 90% of Lot Widths 100 feet, with 30 foot wide by 20 foot deep parking easement (30 foot wide drivepad required)

5. 90% of Lot Widths 30 feet, with 20 foot wide by 20 foot deep parking easement (20 foot wide drivepad required)

6. 90% of Lot Widths 125 feet

Notes: parking easement size for infrequent parking design - 10' by 20' per vehicle: all lot numbers on streets designated for Infrequent Parking based on parking easement criteria shall be followed by the suffix "pe" on the subdivision plat. Lots adjacent to streets designated for Infrequent parking shall be appropriately marked in the Zone Atlas.

Street Type	***Required Right-of-Way*** (1), (3)	***Required Sidewalk*** (2)	***Required Pavement Width*** (1), (3) (Flowline to Flowline)
Major Local -w/No Parking (5)	57' [61' x 150'] [61' x 150'] See Table 23.2.1.B	6 feet and 6-foot sidewalk setback area behind the curb (includes 1-foot wide no-dig area back of curb, 4-foot wide planting area for street trees, and 1- foot wide no-dig area next to sidewalk)	32' [36'] 28' [36']
Normal Local	45' [53' x 100']	4 feet and 6-foot sidewalk setback area behind the curb	24' [32']
Access Local (4) - Cul-de-sac, loop, and connecting streets	45' [49' x 50']	4 feet and 5-foot sidewalk setback area behind the curb. If the street generates less than 250 AWDT the sidewalk setback area behind the curb shall be 5 feet wide	24' (22' w/mountable curb) [28']

NOTES:

(1) Streets adjacent to schools, parks, and within 150' of an arterial or collector street shall be widened to 36' pavement width curb to curb.

(2) The minimum sidewalk setback width for Major Local Streets shall be 6 feet from back of the curb except where the sidewalk bulbs-out. This width includes a one-foot wide "no dig" zone next to the curb, a minimum 4-foot wide planting area for small street trees required on Major Local Street, and another one-foot wide "no-dig" zone next to the sidewalk.

The City standard for street tree placement is generally 6 feet from the face of the curb, however, street trees may be permitted 4 feet from the face of the curb on residential streets (including major local streets) if a detailed design acceptable to the City (DRC) is provided that addresses how the structural section of the roadway will be maintained and root effects on the road structure will be mitigated.

The sidewalk setback area may be increased to conform to drainage and/or landscaping requirements. Planting areas necessary for street trees are as follows: 4 x 4 feet for small trees (trees that attain 15-20 feet in height at maturity), 5 x 5 feet for medium trees (trees that attain 20-40 feet in height at maturity), and 6 x 6 feet for large trees (trees that attain 40 or more feet in height at maturity).

No large growing trees that can reach a natural final height of over 20 feet tall shall be planted under or within 10 lateral feet of any overhead public utility conductor. No trees shall be planted over or within 5 lateral feet of any underground gas or electric utility facility.

Utilities (including, but not limited to electric, gas, telephone, and cable) shall be placed so that they do not interfere with the planting and maintenance of required street trees.

(3) Where the use of reduced right-of-way and pavement widths are anticipated, utility needs must be reviewed to ensure adequate spacing of utility lines and offset from the street curbs for maintenance purposes.

(4) For definition of access streets see narrative 23.2.B. See also Table 23.2.1.B for definition of access streets for loop and cul-de-sac streets.

(5) An infrequent parking designation on a major local street requires "No Parking" signage.

TABLE 23.2.2 PRIVATE WAY WIDTHS, STANDARDS AND INFRASTRUCTURE

(allowed for streets classified as local only)

1. Street easement and pavements widths for private ways should be the same as for public streets except that they may be narrower than equivalent public right-of-way to the extent appropriate to its function.

2. Construction and right-of-way standards shall be equal to or better than adopted City Standards for streets and sidewalks where there are more than 8 dwellings. (EPC Resolution April, 1979).

3. For private ways serving 8 or less lots the following minimum criteria must be met. Up to 8 dwellings may have their primary vehicular access via a gravel surfaced road. However, the initial 25 feet from the sidewalk on the intersecting street shall be paved, as a minimum, with 2 inches of asphalt on compacted subgrade as shown in the Standard Drawings.

	Access Easement Width	Improvements Required
a) access to 1 lot* -	15' minimum	15' gravel
b) access to 2 - 3 lots*	22' minimum	22' gravel
c) access to 4-8 lots		
1) one side frontage -	32' minimum	24' gravel, 4' sidewalk
2) frontage both sides -	38' minimum	24' gravel, 2 -4' sidewalks

*Access refers to the primary access for properties

4. Easement Radii for private access easements serving 8 or fewer lots

Easement Width	Right Angle Turn Within Easement	Connection at Public Street	Design Speed**
15-22'	25' inside edge easement radius	None required	15 mph
32-38'	50' Centerline Radius	20' radius	20 mph

** Refer to general design criteria Table 23.3.1

E. Access and Circulation - Private Property

1. The owner seeking access to any public right-of-way shall make application to the City Traffic Engineer for a permit for such access. An application for access is the Curb Cut Permit process described in Section 6.C..

2. An applicant for building permit must submit plans showing location, arrangement, and dimensions of off-street parking, turning spaces, drives, aisles and ingress and egress satisfactory to the Traffic Engineer.

3. Ingress and egress shall be designed to discourage parking lot traffic from using local streets for a distance of more than 150 feet.

4. Curb cut regulations regarding widths, spacing, location, and policy are noted in the Section-Miscellaneous Street Design Criteria.

F. Sidewalk, Curb and Gutter

1. All properties within the City shall have sidewalk, curb and gutter unless a variance is obtained.

2. Sidewalk widths, horizontal location, and transverse slope regulations are noted in Section 5A 'Sidewalks'.

G. Parking Area Dimensions and Required Improvements

1. Parking space dimensions shall be 8.5 feet by 20 feet.

2. If the premises contains more than 20, spaces one fourth may be 7.5 feet by 15 feet (small car).

3. Parking for the physically disabled shall be 12 feet by 20 feet or 8.5 feet by 20 feet if an additional delineated access aisle 3.5 feet on one side is provided. Two such spaces may share this aisle. Slopes disabled parking spaces and aisles shall not exceed 5%.

4. Parking areas shall be paved with a minimum 2 inches asphaltic concrete or equal.

5. Parking areas shall have barriers which prevent vehicle encroachment and which shall be located two feet from any public sidewalk, public right of way, abutting lot, pedestrian walkway, landscaped area or any wall or fence.

6. The required landscaping plan must be reviewed by the Traffic Engineer to insure that traffic safety needs are met.

7. The number parking spaces required, number of handicap spaces and landscaping requirements are contained in Section 40 of the City Zoning Code.

H. Naming of Streets

This section implements Article 8-1 R.O.A. 1994, governing the naming of streets within the City of Albuquerque and within its extraterritorial planning and platting jurisdiction. The Ordinance seeks to promote consistent practice in the naming of streets. This section seeks to limit ambiguities in the enforcement of street naming policy. The policy applies to all streets which normally provide primary

access to abutting property, whether by public right-of-way or by private way as defined in the City Subdivision Ordinance (Section 2.B.).

1. Inter-Governmental Cooperation Policy

a. The City shall rule on every new or changed name of a street within its planning and platting jurisdiction.

b. Where a street is or clearly will be both within and outside of the City of Albuquerque, the City shall confer with other concerned local governments and seek a mutually satisfactory name.

2. Method of Naming

a. By plat dedicating public right-of-way for an unnamed local or collector street, or by the continuation of a named principal or minor arterial; or

b. By the adoption of a surveyed streetline with name pursuant to Article 8-8 R.O.A. 1994, the Future Street Line Ordinance; or

c. By adoption of a resolution by the City Council concerning the name of a specific principal or minor arterial street.

3. Street Designations

a. New or the continuation of a principal and minor arterial as defined by the Long Range Roadway System Plan shall be designated "Boulevard".

b. Local and collector streets which run essentially North-South shall be designated "Street" or "Drive".

c. Local and collector streets which run essentially East-West shall be designated "Road" or "Avenue".

d. Local street cul-de-sacs may be designated "Court" or "Place", depending on the length of the cul-de-sac. ("Place" to be used for cul-de-sacs at or near maximum length).

e. Circular turn-arounds having less than six (6) lots may not require a street name.

f. An additional street name may be required where the change in direction of the street is greater than 90 degrees in order to comply with the Street Addressing Ordinance.

g. In places where the appropriate street designation is not clear, the City Engineer shall determine the designation.

4. Street Names

a. The name of a new street should be the name of an existing, nearby street which is essentially in line with it, unless the City Engineer finds that such name continuation would not be helpful to motorists searching for an address.

b. Where Item 4.a. does not apply, the following is recommended as per City Policies:

(1) Alphabetical sequences of street names.

(2) Grouping of names with similar content, such as: cities, trees, women's names, etc., is desirable.

(3) Names with double meaning, or names difficult to spell or pronounce are usually undesirable.

(4) Names already in use for streets in another area and not essentially in line with the new street are unacceptable.

(5) Names of over 13 letters and spaces are usually unacceptable. (Street designations such as Blvd., Dr. and quadrant designations such as NE are not counted in the 13 allowed letters).

5. Procedure

a. To change the name of an existing street, a request is filed with the City Surveyor as the designee of the City Engineer,

b. For new streets the Subdivider will apply for and submit to the City Surveyor, who is the City Engineer's Designee, a preliminary plat for review and approval. The City Surveyor will normally accept subdivider's proposal for street names which are consistent with the Street Name Ordinance, and the previous guidelines but the City Engineer reserves the right to name streets where the City Engineer finds that subdivider's name or designation is not consistent with City Policies and/or the public welfare.

c. Appeal of the City Engineer's decision is to the Environmental Planning Commission (EPC). The Planning Commission decision may be appealed to the City Council.

Section 3. ENGINEERING DESIGN CRITERIA

The criteria presented within this chapter are major controlling factors in the design of streets. It is expected that designers will carefully apply, with attention to detail, these criteria to individual design circumstances. Suitable transitional elements must be provided between changes in geometric configuration, pavement and curb character, and drainage carrying aspects of the ultimate street design.

In the following, the major criteria governing design speed, horizontal and vertical geometrics, sight distance, curvature and superelevation, gradients, and comfort controls are presented in table form first, followed by explanatory discussions of applications of the criteria. These materials are followed by sections treating the design of special elements related to streets.

The guidelines contained herein are intended to provide direction in the design of transportation facilities. While most of the design parameters that should be used are provided in the following pages, unusual conditions may occur in some projects. When additional guidance and explanation is needed, the designer should refer to the following publications or the most current edition thereof:

1. A Policy on Geometric Design of Streets and Highways, American Association of State Highway and Transportation Officials, 1990.
2. Traffic Engineering Handbook, Institute of Transportation Engineers, Fourth Edition, 1992.
3. Transportation Planning Handbook, Institute of Transportation Engineers, 1992
4. Roadside Design Guide, AASHTO, October 1988.
5. Highway Capacity Manual, Special Report 209, Transportation Research Board, 1994.
6. Trip Generation, 5th Edition, Institute of Transportation Engineering, 1991.
7. Manual on Uniform Traffic Control Devices, FHWA, 1988.
8. Transportation and Land Development, ITE, 1988.
9. Guide for Design of Pavement Structures, AASHTO, 1986.

Variances in design standards may be sought in order to cover unusual circumstances or alternative design concepts. Variances for these would be granted by the review body or person(s) that would have primary responsibility for those standards.

DRB - Variances:
Subdivision Ordinance
Right-of-Way, Infrastructure Requirements
Sidewalk Ordinance
Street Trees

DRC - Variances:
Standard Details
Design Procedures

Traffic Engineer:
Curb Cuts (Some variances require Hydrology approval also)
Parking, Circulation Standards

A. General Design Criteria

The fundamental approach to street design presented herein is to first identify the design speed the facility is to accommodate and the nominal vehicle type which is to govern the design. Design is then accomplished by selection of appropriate characteristics to accommodate the design vehicle at the design speed in a safe and efficient manner at reasonable cost on a durable street. Table 23.3.1 summarizes Albuquerque's minimum criteria for various classifications of streets. Design speeds given are intended to establish levels to which facilities are to be designed; posted legal speeds are established only after appropriate examination of the completed street by the Traffic Engineer.

B. Geometric Criteria

In general, criteria for the horizontal and vertical geometrics of street design given in Table 23.3.1 will be the minimum acceptable values. Other factors must also be considered in a balanced design:

1. Vertical Alignment

Long, flat gradients are undesirable because of poor drainage characteristics. The minimum desirable gradient consistent with acceptable drainage is 0.5 percent and, as such, should be observed as a general design principle. Grades in valley areas and other special circumstances may be flatter than 0.5 percent if approved by the City Engineer and the Traffic Engineer. Long, steep gradients are also undesirable since such are difficult for heavier vehicles to negotiate at desirable traffic speeds.

Vertical curve criteria stated in Table 23.3.1 are intended to provide adequate safety consistent with applicable design speeds. In the application of these criteria, the designer will be expected to apply good judgment in combining vertical geometry with horizontal geometry. Extreme vertical undulation is not acceptable. Vertical changes in grade occurring simultaneously with horizontal alignment changes must be carefully considered to preserve the maximum sight distance consistent with the design speed of the street. Horizontal curvature should not be introduced at or near the top of a crest vertical curve. Intersection sight distances must be maintained in all designs. Intersections on vertical curves should be placed at the crest where visibility in both directions can be maintained.

Table 23.3.1 GENERAL DESIGN CRITERIA FOR STREETS
(Numbers in parentheses apply to footnotes below)
VERTICAL CURVE REQUIREMENTS(4)

MINIMUM CENTERLINE RADIUS - FEET[5] VERTICAL CURVATURE DESIGN VALUE K[2]

STREET CLASSIFICATION	DESIGN SPEED M.P.H	WITH 0.02 FT./FT/ SUPER-ELEVATION	WITH NORMAL CROWN [7]	MINIMUM LENGTH VERTICAL CURVE (FEET) [1]	FOR CREST STOPPING SIGHT DISTANCE [6]	FOR SAG STOPPING SIGHT DISTANCE	FOR SAG COMFORT CONTROL [3][6]	MAXIMUM GRADE CHANGE ALLOWED WITHOUT VERTICAL CURVE - %	MAXIMUM GRADE ALLOWED %
PRINCIPAL ARTERIAL	50[11]	[10]	[10]	150	160	110	N/A	0.4	6

MINOR ARTERIAL	45[11]	800	1,100	135	120	90	N/A	0.4	7
COLLECTOR	35[11]	450	650	100	50	50	26	0.7	8
MAJOE LOCAL	30	--	300	100	30	40	19	0.8	8
LOCAL RESIDENTIAL	25	--	180[9]	75	20	30	13	1.0	8
LOCAL RESIDENTIAL: ACCESS STREETS[12] CUL-DE-SACS & ALLEYS	20	--	120[9]	60	10	20	9	1.0	12
LOCAL INDUSTRIAL/ COMMERCIAL	30	--	380	90	30	40	19	1.0	8
LOCAL LEG OF "T" INTERSECTION	15	N/A	N/A	45	5	9	5	1.0	12

Footnotes:

(1) Controlling limit only when albegraic grade difference (A) times the design value K is less than minimum shown; in all other cases, L = KA shall control.

(2) The values for K shown are to be used in determining the minimum length of vertical curve required by the use of the relationship L = KA where:
L = Length of vertical curve in feet
A = Algebraic difference in grades expressed in percent
K = Design value indicative of rate of curvature

(3) Allowed only with express permission of Traffic Engineer. Use of K for comfort control is strongly discouraged.

(4) Lengths of vertical curves longer than the minimums resulting from the use of K values shown should be used wherever possible; however, K should not exceed 167' when curb and gutter is used.

(5) Source: Design of Urban Streets, Federal Highway Administration, U.S. Department of Transportation.

(6) Crest vertical curves are based on eye height of 3'6", object height of 0'6" and AASHTO minimum stopping distances. SAG vertical curves are based on AASHTO standards. If AASHTO standards are revised to more restrictive values, the more restrictive values shall supersede the values in this table.

(7) As given in Standard Details.

(8) A minimum of 50' must be maintained between vertical points in intersection.

(9) Local residential streets with 90o or near 90o turns may be designed with a minimum centerline radius of 75' with the approval of the Traffic Engineer. Appropriate advisory signs may be required.

(10) Minimum centerline radius is 1000' with a corresponding .04 ft/ft superelevation. For lesser values of superelevation in curves the following table should be used.

Radius	Superelevation e =
1,000'	.04
1,500'	.035
2,250'	.03
3,000'	.025
4,500'	.02
Above 5,000'	Normal Crown

(11) In areas of urban centers, or where existing speed limits are substantially below these values and unlikely to increase, the Traffic Engineer may choose a design speed less than these values.

(12) Access streets defined by Traffic Engineer on the basis of anticipated traffic volumes - see 23.2.B.

TABLE 23.3.2
SUPERELEVATION DESIGN

Runout Development Length -

Design Speed - Maximum Relative Gradient *
(Value for the design of a 2 lane facility)

- 35 mph (Collector) - 1:150
- 45 mph (Minor Arterial) - 1:175
- 50 mph (Principal Arterial) - 1:200

* As defined in AASHTO

Maximum Relative Gradient Factor for greater than 2 lanes:

- 4 lane - 1.5 times value for 2 lanes
- 6 lane - 2.0 times value for 2 lanes

Distribution of Runout with respect to PC:

- 2/3 on the approach
- 1/3 within curve
- For a reverse curve, the runout should be distributed 50-50% at the midpoint between curves.

2. Horizontal Alignment

Normal crown is generally preferred in urban streets to promote control of drainage and nuisance flows. This preference will lead to the use of longer radius horizontal curves in most major street circumstances. The use of superelevation (i.e., outside edge of pavement higher than inside edge) requires the careful design of transition reaches leading from normal crown sections to superelevated sections. Designs involving such transitions should show sufficient detail to demonstrate that drainage traps are avoided and to provide sufficient information for adequate construction staking to ensure the desired result. This will normally involve providing special vertical profile lines for all curblines as well as detailed superelevation run-out plans.

3. Balanced Design

A balanced design which avoids long straight segments on residential streets and abrupt, inconsistent changes in either horizontal or vertical alignment should be provided. This balance is necessary to avoid hazardous situations to help in meeting driver expectations.

The designer is particularly cautioned to maintain familiarity with current standards related to sight distances and stopping distances. Production vehicles, particularly passenger cars, have rapidly changing characteristics related to driver eye height above street surface and to braking effectiveness.

C. Drainage Considerations in Design

1. Streets will generally be designed to suit the essential traffic criteria as a first consideration. Consistent with this requirement, crown configuration and transitional reaches of pavement surfaces must be designed where possible to minimize traffic interference by drainage flow.

2. Detailed drainage design shall conform to criteria given in Chapter 22; however, the following criteria must be observed as minimums in street design.

a. Nuisance flows will not be conveyed across arterial or collector streets on the surface by valley gutters or other means. Valley gutter conveyance of nuisance flows across major local streets is discouraged. Provisions for storm drainage inlets to meet this requirement must be included at all intersections of major streets (collector or above) as defined by the Long Range Roadway System Plan.

b. The use of quarter point crown (i.e. high point of crown at mid-lane on high side of street) is preferred over the use of full side-hill street configuration to prevent sheet flow across pavement surfaces.

c. Transitional pavement surface approaches to intersections must be designed to contain nuisance flows within gutter lines; valley gutters must be provided to accommodate flows across intersections suitably, parallel to the major traffic carrying street.

d. Arterial, collector and sole access streets to subdivisions may not employ at-grade or dip section crossings of arroyos. Specific criteria for design of these crossings is given in Chapter 22.

Dip or overflow sections will only be permitted on local streets with the approval of the Traffic Engineer and the City Engineer.

Dip or overflow sections may only be used where the depth of flow times the velocity of flow over the roadway including sidewalks will not exceed 6.5 for that portion of the 10-year storm runoff crossing over the street. Velocity is to be calculated as the velocity measured in feet per second and the flow depth is to be measured in feet at the upstream edge of the roadway including sidewalk.

If dip sections are permitted, vertical alignment must satisfy the requirements given in Table 23.3.1 for sight distances considering the design speed of the street in question.

D. Intersection Design Criteria

1. Angle of Intersection

Streets must be designed to intersect at right angles (as nearly as practical) consistent with topography and sound design. The acute angles at intersections for all streets shall be 80o or greater.

2. Spacing of Intersections

Intersections of streets along arterial streets are to be minimized. Following are limiting values to be observed:

a. Continuous streets* intersecting arterials must generally be spaced no closer than 900 feet on center.

b. Intersections of streets which are not on continuous alignment through the street intersected are to be spaced as follows:

(1) Intersections of non-continuous streets must be spaced at least 150' between centerlines of streets on local streets.

(2) Three hundred feet (300') on collector streets

(3) Four hundred feet (400') on all arterial streets

c. Variances from these criteria will require approval of the Traffic Engineer.

*Continuous streets - Intersections where the streets on two side of the principal roadway are directly opposite each other that is not 'T' intersections.

3. Curb Return Radii

Minimum acceptable curb return radii are presented in Table 23.3.3. The given criteria are intended as requirements in new developments and as desirable where feasible in redeveloping areas. All radii are measured to the flowline of the curb section as defined in the Standard Details.

The selection of appropriate curb return radii at intersections depends largely upon the governing design vehicle expected to negotiate turning movements about the return and its effect on traffic flow. Streets commonly expected to experience large commercial vehicles or bus traffic will require larger radii at intersections than local streets.

The designer should consult the Traffic Engineer prior to beginning design of any intersection involving principal or minor arterials and collector streets with streets of like classifications. Radii requirements for intersections in commercial or industrial areas should also be reviewed with the Traffic Engineer prior to design. These classifications of streets frequently experience special traffic circumstances for which the Traffic Engineer will require the use of larger radii.

4. Intersection Grading

a. Intersections must be graded to provide characteristics consistent with the design speed of the through street. Projected curb flowline profiles through the intersection will be required for design review of major intersections involving arterial and collector streets. Alignment of arterial streets through intersections must be continuous without breaks in grade and meet the criterion for vertical curvature in Table 23.3.1 Grades within the intersection need to be flat enough to minimize problems with turning vehicles and to keep stopping distances reasonable. Grades should also be steep enough to ensure that proper drainage occurs. Grades should be between .5% minimum and 3% maximum. Grades established for channelized turning roadways need to be compatible with superelevation for design.

b. Minor leg approach tangent gradients to intersections generally must not exceed 4% for a distance of at least 50' back from the projected curb flowline of the through street. Deviations from this standard will require joint concurrence of the Traffic Engineer and the City Engineer.

c. Street crown should be reduced through intersections of collector and major local streets of approximately equal classification to promote driver comfort. Crown reduction should not generally exceed one half of standard crown unless special circumstances govern and the joint concurrence of the Traffic Engineer and City Engineer is obtained. Intersection grading must provide for rapid drainage.

d. Grades intended to serve as drainage water blocks may only be designed on minor approach legs of intersections. Maximum height of such water blocks allowed will be 12" as measured vertically from the projected gutter flowline elevation of the major or through street to the gutter flowline elevation at the high point of the minor leg gutter. Vertical curves of a minimum length of 50' must be provided for water block configuration. The vertical curve needs to begin at the intersection flowline to preserve reasonable intersection visibility. Adequate stopping sight distance must be provided in the design conforming to the criteria given in Table 23.3.1

e. Detailed drainage design must follow the requirements of Chapter 22; however, the designer should specifically investigate intersection design to assure that design flows will not overtop curbs resulting in damage outside the right-of-way

f. Intersections should be located so as to avoid roadway segments that are highly superelevated. Intersection grading for superelevated roadways needs to take into account the issues of grade compatibility, cross-over crown etc. to insure that the intersection will operate properly.

Table 23.3.3
STANDARD CURB RETURN RADII (AT FLOWLINE)
AND RIGHT-OF-WAY AT INTERSECTIONS

INTERSECTING STREETS	PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	LOCAL LOCAL	LOCAL-INDUSTRIAL RESIDENTIAL	LOCAL-INDUSTRIAL COMMERCIAL
PRINCIPAL ARTERIAL	(3) MIN.*	35'*	35'*	30'	30'	30'*
MINOR ARTERIAL	35'*	35'*	30'*	30'	30'	30'*
COLLECTOR	35'*	30'*	25'	25'	25'	30'*
MAJOR LOCAL	30'	30'	25'	20'	20'	30'*
LOCAL RESIDENTIAL	30'	30'	25'	20'	20'	N/A
LOCAL INDUSTRIAL COMMERCIAL	30'*	30'*	30'	30'	N/A	30'*
ALLEY RETURNS	Shall match the radii requirements for design vehicles expected - 25' minimum					

* MAY BE INCREASED OR DECREASED AT DISCRETION OF THE TRAFFIC ENGINEER.

Curb Return Radii may be adjusted to allow sidewalk bulb-outs for street crosswalk areas at intersections with Major Local Streets.

NOTES:

1. Radii needs to be evaluated in terms of design vehicle where significant percentages of WB-40, 50, and 60 vehicles are probable. 2- centered or 3-centered curves should be used to provide turning paths.

2. Intersecting property lines at intersections must be designed to allow construction of full-sized standard handicapped access ramps wholly within the public right-of-way. Ramps must conform to the Standard Details.

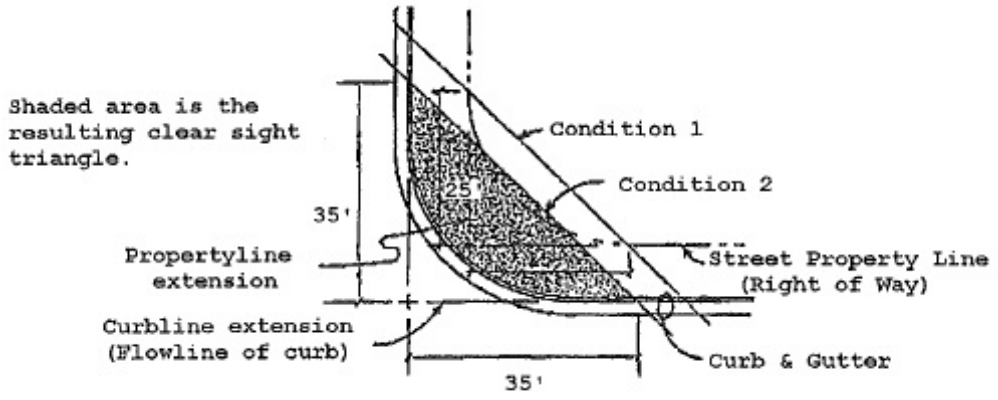
3. Flared transitions must be provided where local residential streets having less than 32 feet wide paving intersect other streets. The transition must provide for a 1 25:1 taper from the narrower street width to a full 32 feet pavement width at the ends of the curb returns on the narrow street leg of the intersection. Curb return radii will normally be 25 feet measured to the flowline.

4. Use three centered asymmetric curves with channelized right-turn lane. Island shall be large enough for pedestrian facilities and Traffic Control devices. A 180'-60'-300' three centered curve should be used. Contact the Traffic engineer for details.

5. Intersection Sight Distance

a. Intersection designs must provide for clear sight distances in the horizontal plane. Minimum intersection visibility should comply with the following specific language from Section 2-15 of the Traffic Code:

"No such obstruction to view between three and eight feet above the gutter line shall be placed or maintained within a triangular area at the street corner, which area is bounded by: (1) the street property lines of the corner lot and a line connecting points twenty-five feet distant from the intersection of the property lines of such lot, or (2) the curb lines of an intersection and a line connecting points thirty-five feet distant from the corner of the intersection and such corner is determined by projecting the curb lines out to a specific point, whichever is the lesser."



b. Intersections of local streets with major streets classified as collector or above shall not be located at or near horizontal curves without special evaluation of intersection sight distance. The location of an intersection on the "inside" of a horizontal curve is a situation that will typically result in intersection visibility problems. The location of any property lines, fences or other obstructions will need to be evaluated to ensure that the minimum sight distance is maintained. See figure IX-40 p 762, A Policy on Geometric Design of Highways and Streets, AASHTO, or latest update.

E. Curb and Gutter Criteria

1. Standard 8" high barrier type curb and gutter with 1 " gutter depth, as shown in the Standard Details, must be used as the exterior curb section for minor arterial, collector and major local streets. Deviation from these standards will require written approval of the Traffic Engineer and concurrence by the City Engineer. Curb type and/or drainage provision for principal arterials will be established by corridor. Designer should obtain cross section approval from Transportation Division and Hydrology Division prior to beginning the design of this kind of facility.

2. Six or eight inch (6" or 8") high barrier curb and gutter section with 1 " gutter depth is the standard curb that is to be used on local streets.

3. If both traffic requirements and drainage requirements can be met to the satisfaction of the Traffic Engineer and the City Engineer, mountable curb types as shown in the Standard Details may be used on local streets. Only in areas of extremely flat topography, where positive discharge of street water is impractical, will the use of flat curbs with drainage swales be permitted.

4. Median curb and channelization islands must be either 6" barrier or 6" mountable as required by the Traffic Engineer for the street in question.

F. Stage Construction of Streets

Stage construction is often required in building streets. This is required when a developer is responsible for only half or less of the full street section. When this occurs, additional temporary pavement may be required to provide for the following purposes:

- adequate width for two way traffic
- transition area to match with existing paving segments
- adequate laneage at an intersection for proper operation

On major streets where only 24 feet of paving are required of 3 or more future lanes in each direction, the outer lanes with curb, gutter and sidewalk shall be constructed. This is necessary to be able to design the interface with the adjacent property including drainage, elevations, access, etc. as well as ensure that all roadway items the property owner is responsible for are constructed.

G. Parking Area Dimensions and Required Improvements

1. Parking space dimensions shall be 8.5 feet by 20 feet (min.).

2. If the premises contains more than 20 spaces, one fourth may be 7.5 feet by 15 feet (small car). (Permitted vehicle overhang 2 feet for standard stall, 1.5 feet for small car, on private property only)

3. Parking for the physically disabled shall be constructed in accordance per the requirements of the uniform building code or other applicable regulations. Refer to the City of Albuquerque Building permit section.

4. Parking areas shall be paved per the City Zoning requirements.

5. Parking areas shall have barriers which prevent vehicles from extending over public sidewalk, public right of way or abutting lots.

6. The required landscaping plan must be reviewed by the Traffic Engineer to insure that traffic safety needs are met.

7. The number of parking spaces required, number of handicap spaces and landscaping requirements are contained in Section 40 of the City Zoning Code.

Section 4. STRUCTURAL DESIGN OF PAVEMENTS

A. Flexible Pavements for Arterial, Collector, and IndustrialStreets

Design of pavement structures for principal arterial, minor arterial, collector and streets which are abutted by industrial zoning must be based on acceptable design procedures.

The current acceptable method for design of flexible pavements is as follows:

1. Introduction

The design method contained herein was developed by the review of various methods which are now, or have been in use by different state transportation departments and/or municipalities within the southwestern United States. These methods were all based on adoption and enhancement of the Guide for Design of Pavement Structures which was published by the American Association of State Highway and Transportation Officials (AASHTO). These methods were selected due to history of performance and due to the City of Albuquerque being in an isolated location where experience can be called upon and certain factors will not change.

Three major overall assumptions which have been made in the development of these design procedures are:

(a) That the adequacy of the design will be established by soils and material surveys and laboratory studies.

(b) That the design strengths assumed for the subgrade and pavement structure will be achieved through proper construction methods.

(c) That an adequate present and projected traffic loading for the analysis period be derived from accurate present and historical data in order to achieve the intended serviceability of the roadway.

2. Materials Evaluation

A. Sampling- Methods, Frequency and Required Elements

The City of Albuquerque has chosen the R-Value test as its means of obtaining a soil support value for use in the AASHTO design equation for flexible pavements. The correlation between R-Value and soil support value is presented in Figure 23.4.1. All soil tests shall be conducted under the supervision of a Registered Engineer familiar with soil sampling procedures.

- Sampling frequency and techniques for subgrade materials (native and borrowed) shall be as follows:
- One each type of soil and at least one each 300 feet for collector and arterial streets.
- Two samples per project minimum.
- One "R" value and proctor sample per each soil condition or three per mile of the poorest soil.
- At least one and preferably two soil borings should go down to a depth comparable to any potential sewer or water line depth. A moisture determination should be made for each sample.
- Sampling is to be random and shall not be restricted along any given line, but shall be spread irregularly over the proposed roadway.

• The depth of sampling shall extend to a minimum depth of 1.5 feet below proposed subgrade elevation.

Tests to be performed on soil samples:

1. Sieve Analysis
2. Plastic Index
3. Soil correlation/analysis to determine representative soils, on which "R" value tests are to be performed.
4. "R" value: Proctor density-moisture
5. Stabilization Testing
6. Determination of in-situ moisture content

Soil test results shall be tabulated using Table 23.4.1 - Tabulation of Soil Test Results.

B. A design report is to be submitted with any project for the construction of arterial, collector, and industrial streets. This report documents existing pavement section(s) (thickness/width) information and design information regarding the proposed improvements. Any unusual circumstances which could affect design/construction should be noted. All test results shall be presented using Tables 23.4.1 & 23.4.2.

FIGURE 23.4.1
R-VALUE & SOIL SUPPORT VALUE RELATIONSHIPS

R-Value	Soil Support Value	R-Value	Soil Support Value	R-Value	Soil Support Value
0	1.750	30	4.570	60	7.390
1	1.844	31	4.664	61	7.484
2	1.938	32	4.758	62	7.578
3	2.032	33	4.852	63	7.672
4	2.126	34	4.946	64	7.766
5	2.220	35	5.040	65	7.860
6	2.314	36	5.134	66	7.954
7	2.408	37	5.228	67	8.048
8	2.502	38	5.322	68	8.142
9	2.596	39	5.416	69	8.236
10	2.690	40	5.510	70	8.330
11	2.784	41	5.604	71	8.424
12	2.878	42	5.698	72	8.518

13	**2.972**	**43**	**5.792**	**73**	**8.612**
14	**3.066**	**44**	**5.886**	**74**	**8.706**
15	**3.160**	**45**	**5.980**	**75**	**8.800**
16	**3.254**	**46**	**6.074**	**76**	**8.894**
17	**3.348**	**47**	**6.168**	**77**	**8.988**
18	**3.442**	**48**	**6.262**	**78**	**9.082**
19	**3.536**	**49**	**6.356**	**79**	**9.176**
20	**3.630**	**50**	**6.450**	**80**	**9.270**
21	**3.724**	**51**	**6.544**	**81**	**9.364**
22	**3.818**	**52**	**6.638**	**82**	**9.458**
23	**3.912**	**53**	**6.732**	**83**	**9.552**
24	**4.006**	**54**	**6.826**	**84**	**9.646**
25	**4.100**	**55**	**6.920**	**85**	**9.740**
26	**4.194**	**56**	**7.014**	**86**	**9.834**
27	**4.288**	**57**	**7.108**	**87**	**9.928**
28	**4.382**	**58**	**7.202**	**88 and higher**	**10.000**
29	**4.476**	**59**	**7.296**		

This table is based on the equation: SS = 1.75 + 0.094 (R-Value)

TABLE 23.4.1

TABULATION OF SOIL TEST RESULTS ***SHEET_____OF_____***
PROJECT NAME:_____PROJECT NO.:_____
STREET NAME:_____ FROM:_____TO:_____
SAMPLED BY:_____ DATE:_____

T-H NO.	*STATION*	*RT.LT.*	*DEPTH(INCH)*	*PI*	*R-VALUE*	*AASHTO CLASS.*	*PERCENT PASSING*

	#200	#40	#10	#4	2"	1"	12"	3"

TABLE 23.4.2

FIELD LOG SHEET__OF__PROJECT NAME:_____

STREET NAME:_____ FROM:_____TO:_____

SAMPLED BY:_____ DATE:_____

NO	STATION	RT.-LT	DEPTH	FROM	DESCRIPTION	SAMPLED

3. Traffic Analysis

A. Traffic Study and Traffic Design Criteria

The values of ADT, percent distribution of vehicle types, and the growth factor used for the design computations shall be obtained either from the Mid-Region Council of Governments (MRCG) (if available) or through a traffic count study conducted by a registered professional engineer. The values shall be compared against those in Table 23.4.3, and unless the values are based on historical data of more than five years, the greater value shall control. On smaller projects, (less than 1000 lineal feet of street construction) where traffic count data is not available and a traffic count study is not warranted, the values in Table 23.4.3 may be used, as approved by the Design Review Committee (DRC).

TABLE 23.4.3 TRAFFIC DESIGN CRITERIA

Street Classification	Current AWDT per lane	Truck Traffic (percent)				Directional Distribution (percent)Annual Growth Rate (percent)
		SUT	STT	MTT	BUS	
Principal Arterial	6000	3	1	1	*	505
Minor Arterial	4250	3	1	1	*	504

Collector	3000	3	1	1	*	504

* Contact the transit department

SUT - Single Unit Truck

STT - Single Trailer Truck

MTT - Multi-Trailer Truck

The calculation of the default ESAL (Equivalent Single Axle Loads) is as follows:

ESAL = Current AWDT * 365 * Growth Factor * (%SUT * Eq.F.$_{SUT}$ + %STT * Eq.F.$_{STT}$ + %MTT * Eq.F.$_{MTT}$ + %Bus * Eq.F.$_{BUS}$ + %Auto * Eq.F.$_{Auto}$)

Where:Eq.F. for various vehicle types is shown in Table 23.4.5

B. Analysis Period

The analysis period for design shall be 20 years and the classification of streets are obtained from the Long Range Roadway System Plan (most current plan).

C. Design Lane Traffic Computation

The following equation will determine the traffic (W_L) in the design lane:

$W_L = D_d * D_l * W_{18}$

Where: D_d = A directional distribution factor, expressed as a percentage, that accounts for the distribution of ESAL units by direction but not less than Table 23.4.3.

D_l = A lane distribution factor, expressed as a percentage, that accounts for distribution of traffic when two or more lanes are available in one direction (Table 23.4.4).

W_{18} = The cumulative two-directional 18-kip ESAL units predicted for a specific section of roadway for the analysis period.

TABLE 23.4.4 LANE DISTRIBUTION FACTORS

No. of Lanes in Each Direction	Percent ESAL in Design Lane
1	100
2	90
3	70
4	65

TABLE 23.4.5 ESAL VEHICLE EQUIVALENCY FACTORS

Vehicle Type	ESAL Factor
Passenger Car	0.0008
Other 4 wheel vehicle	0.0087
Single Unit Truck	0.1890
Single Trailer Truck	2.3719
Multi-Trailer Truck	2.3187
Bus	0.6808

TABLE 23.4.6 GROWTH FACTOR*

Design Period,Years (n)	Annual Growth Rate, Percent (r)

	No Growth	2	4	5	6	7	8	10
1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	2.0	2.02	2.04	2.05	2.06	2.07	2.08	2.10
3	3.0	3.06	3.12	3.15	3.18	3.21	3.25	3.31
4	4.0	4.12	4.25	4.31	4.37	4.44	4.51	4.64
5	5.0	5.20	5.42	5.53	5.64	5.75	5.87	6.11
6	6.0	6.31	6.63	6.80	6.98	7.15	7.34	7.72
7	7.0	7.43	7.90	8.14	8.39	8.65	8.92	9.49
8	8.0	8.58	9.21	9.55	9.90	10.26	10.64	11.44
9	9.0	9.75	10.58	11.03	11.49	11.98	12.49	13.58
10	10.0	10.95	12.01	12.58	13.18	13.82	14.49	15.94
11	11.0	12.17	13.49	14.21	14.97	15.78	16.65	18.53
12	12.0	13.41	15.03	15.92	16.87	17.89	18.98	21.38
13	13.0	14.68	16.63	17.71	18.88	20.14	21.50	24.52
14	14.0	15.97	18.29	19.16	21.01	22.55	24.21	27.97
15	15.0	17.29	20.02	21.58	23.28	25.13	27.15	31.77
16	16.0	18.64	21.82	23.66	25.67	27.89	30.32	35.95
17	17.0	20.01	23.70	25.84	28.21	30.84	33.75	40.55
18	18.0	21.41	25.65	28.13	30.91	34.00	37.45	45.60
19	19.0	22.84	27.67	30.54	33.76	37.38	41.45	51.16
20	20.0	24.30	29.78	33.06	36.79	41.00	45.76	57.28
25	25.0	32.03	41.65	47.73	54.86	63.25	73.11	98.35
30	30.0	40.57	56.08	66.44	79.06	94.46	113.28	164.49
35	35.0	49.99	73.65	90.32	111.43	138.24	172.32	271.02

*Factor = $\frac{(1 + r)n - 1}{r}$, where r = $\frac{\text{rate}}{100}$ and is not zero. If Annual Growth is zero, Growth Factor = Design Period

4. Structural Design

A.Minimum Pavement Component Thickness

The following criteria governing minimum pavement component thickness shall apply to all major (arterial and collector) roadways. This criteria is derived based on engineering judgement and past experience in construction quality control.

TABLE 23.4.7 MINIMUM PAVEMENT COMPONENT THICKNESS

Pavement Component	Minimum Thickness
Asphaltic Concrete (AC)	4 inches
Cement-Treated Base Course (CTB)	4 inches
Bituminous Treated Base Course (BTB)	4 inches
Aggregate Base Course (ABC)	4 inches
Subbase Material	4 inches
Soil Cement	6 inches
Asphalt Emulsion Treated Soil	6 inches

B. Structural Coefficients of Pavement Components

The following coefficient shall be used for the computation of design structural number for each type of component selected:

TABLE 23.4.8 STRUCTURAL COEFFICIENTS OF PAVEMENT COMPONENTS

Component	Coefficient/Inch
Plant Mix Seal Coat (PMSC)	.25
Asphaltic Concrete (AC)	.42
Bituminous Treated Base Course (BTB)	.25
Cement Treated Base Course (CTB)	.20
Aggregate Base Course (ABC)	.10
Sub-base Material	0
asphalt Emulsion Treated Soil	Tentative
Soil Cement	Tentative
Lime Stabilization	Tentative

C. Regional Factor

A regional factor of 2.0 shall be used for the City of Albuquerque.

D. Serviceability Index

The serviceability of a pavement is defined as the ability to serve high-volume automobile and truck traffic. In the design equation, the serviceability index enters into the equation as the lowest index that will be tolerated before resurfacing or reconstruction becomes necessary.

A scale with a range of 0 through 5 was established for present serviceability rating, with a value of 5 as the highest index of serviceability and 0 as the lowest. Albuquerque uses a serviceability index of 2.5 for major streets.

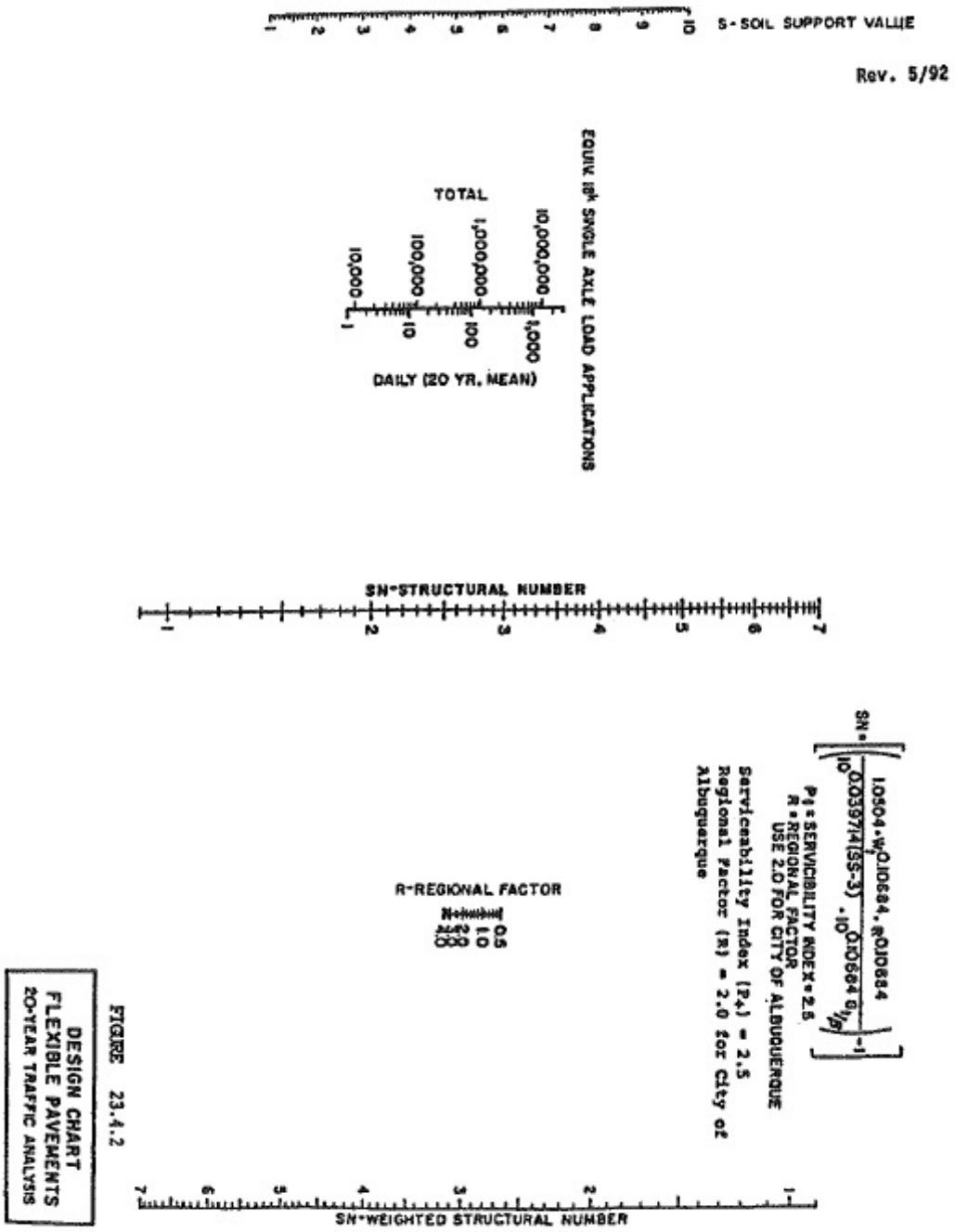
E. Economic Factors

The design engineer is encouraged to investigate the use of various combinations of pavement components in order to derive a most economic design applicable to the project characteristics and structural requirements.

F. Design Procedure

A nomograph has been constructed to simplify the solution to the mathematical relationship of the soil support value, ESAL, and the structural number (Figure 23.4.2 - "Design Chart"). Alternative pavement structural designs shall be submitted in the format as shown on Figure 23.4.3 - "Structural Design Computation Form".

Figures 23.4.2 - Design Chart Flexible Pavements



SHEET NO. ____OF ____

FIGURE 23.4.3 - STRUCTURAL DESIGN COMPUTATION FORM

PROJECT NAME:_____ STREET:_____

PROJECT NO:_____ FROM:_____

DESIGN ADL:_____ TO:_____

DESIGN SN:_____ COMPUTED BY:_____

Alternate	Subbase	CTB	BTB	ABC	AC	PMSC	SN
A	x(0) =	x(.2)=	x(.25)=	x(.1)=	x(.42)=	x(.25)=	
B							
C							
D							
E							
F							

Design SN_____

B. Flexible Pavements for Local Streets

Pavement structure designs for local streets serving residential areas have been standardized and are presented in the Standard Details. These designs are also predicated on an assumed subgrade bearing value of 50 or greater (as specified in the Standard Specifications). Soils investigation as outlined in the materials evaluation section, preceding will be required to determine the nature of subgrade treatment needed to achieve the minimum subgrade bearing values.

NOTE: *In accord with Environmental Planning Commission Resolution of April 5, 1979, the criteria in this section apply to private streets.*

C. Portland Cement Concrete Streets

The current acceptable method for design of portland cement concrete pavement is the procedure in the AASHTO interim guide for design of pavement structures, 1972, published by the American Association of State Highway and Transportation officials, Washington D.C.

Design criteria to be used in the structural design of Portland Cement concrete pavement are as follows:

(1) All Portland Cement concrete pavements shall be fly-ash modified concrete as specified in the Standard Specifications.

(2) Design shall be based on flexural strength value of 600 p.s.i. at 28 days as measured by ASTM Method C 78.

(3) Stabilized base course values used in conjunction with Portland Cement concrete pavement designs shall be the same as indicated below:

Portland Cement Related Base - 300 psi compressive strength as measured by ASTM Method D1633.

Asphalt Treated Base - 1000 pound minimum Marshal stability as measured by ASTM Method D1559 (as modified in the Standard Specifications)

Section 5. MISCELLANEOUS STREET DESIGN CRITERIA

A. Sidewalks

Refer to Tables 23.2.1.A and 23.2.1.B for detailed information about sidewalk widths and location.

Sidewalks must be provided for all properties within the City of Albuquerque as required by the Sidewalk Ordinance. The fundamental requirements governing sidewalk design are established by this ordinance. Sidewalk designs must provide for the mobility, safety and comfort of the pedestrian and provide for adequate pedestrian access to abutting property. Pertinent sidewalk design criteria are collected herein for the convenience of the designer.

1. *Sidewalk Widths

a. Six feet (6') width is required when constructed with streets designated as follows:

(1) Arterial - except that sidewalks on arterial streets adjacent to Major Activity Centers and Community Activity Centers, as defined in the Albuquerque/Bernalillo County Comprehensive Plan, shall be a minimum of 10' wide.

(2) Collector - except that sidewalks on collector streets adjacent to Major Activity Centers and Community Activity Centers, as defined in the Albuquerque/Bernalillo County Comprehensive Plan, shall be a minimum of 9' wide.

(3) Major Local.

(4) Local - abutting grounds of schools or churches, lands zoned SU-3, or land zoned for a greater residential density than R-T Residential Zone.

b. Four feet (4') width where constructed with local or collector streets for lands zoned other than those designated above.

c. Special widths as per adopted plans

2. Sidewalk Location - Horizontal

a. *Along arterial streets, sidewalks must be located within the right-of-way so that the street side edge of the walk is 12' from the back of the curb, where sufficient right-of-way is available. If right-of-way is insufficient, the walk must be set within the right-of-way with the property side edge at the property line.

b. Along collector and major local streets, sidewalks must be located within the right-of-way so that the property side edge of the walk is a minimum of 12' from the back of the curb to accommodate a 6'-wide setback area between back of curb and sidewalk.

c. Along local streets, sidewalks must be located within the right-of-way so that the property side edge of the walk is a minimum of 10' from the back of the curb to accommodate a 6'-wide setback area between back of curb and sidewalk. If the street generates less than 250 AWDT, then the minimum sidewalk setback shall be 5', as indicated in Table 23.2.1.B.

d. *Variances from sidewalk standards will require application through the Development Services Division and approval by the Development Review Board. In most cases, variances for waiver of installation will be approved by the Development Review Board based on the following criteria:

e. Sidewalk location adjacent to curbs is discouraged. Interference of other items of street furniture such as street lighting standards and fire hydrants and the resultant close proximity between pedestrian and vehicular traffic make this location highly undesirable. Sidewalk setbacks from the back of the curb shall be consistent with those listed in Tables 23.2.1.A and 23.2.1.B.

f. Unless a variance has been granted by the Traffic Engineer, a minimum of 3' of separation must be maintained between sidewalk and the back of any mountable or flat curb.

3. *Transverse Slope

The transverse slope of the sidewalk and setback area shall be no greater than a ratio of 1:50, or 2% sloping toward the street, to include sidewalk sections across intersecting driveways. This proposed slope must remain safe for all pedestrian traffic, including people with physical disabilities.

4. Sidewalk Location - Vertical

The sidewalk must be located vertically such that the top surface of the sidewalk will be at or above the top of curb at the lowest point on the sidewalk and must be appropriate to the overall street section design within the right-of-way.

5. Sidewalk Materials

Sidewalks are to be of Portland Cement concrete of minimum 4" thickness as shown in the Standard Details. Designs incorporating alternate materials must be approved by the Design Review Committee. The basis for consideration of such approval will be appropriateness, safety and durability resulting in a useful life expectancy equal to that of the standard Portland Cement concrete walks.

6. Handicap Accessibility

Handicap accessibility needs to be designed into sidewalk facilities. The details for construction to accommodate handicapped individuals are as shown in the Standard Details.

*Criteria specifically Regulated by Sidewalk Ordinance

B. Bus Bays

Additional right-of-way may be required for bus bays on arterial and collector streets at locations determined by the Traffic Engineer. The width of the additional right-of-way will be whatever is necessary to provide 10' from face of the curb along the bus bay and the additional area for a shelter. (Dedication of right-of-way is required as a condition of approval for subdivisions, SU zonings and shopping center site plans. An easement for these purposes - bus bay, shelter and sidewalk - is satisfactory provided platting is not otherwise occurring on the property.) Bus bay design must provide for conveyance of nuisance drainage flow by valley gutter or other approved means. (See Figure 23.5.1)

If bus bays and shelters are to be provided because the developer elects to utilize an additional 5% reduction in required parking allowed in accordance with Section 40-A-4f(2) of the Comprehensive City

Zoning Code, the entire cost of constructing the bus bay and shelter will be borne by the developer. Otherwise, the cost of constructing the bus bay will be borne by the City.

C. Median Cuts and Left Turn Lanes

1. On all streets with medians, the allowable minimum distance between the ends of adjacent median cuts is 300'. Since median cuts vary from 60' to 96', the allowable minimum centerline to centerline spacing of median cuts varies from 360' to 396'. At intersections with arterial streets, the allowable minimum distance is normally increased to 400' (centerline to centerline spacing of approximately 500'). A median cut will not be approved automatically because it meets the spacing requirements; type of development, internal circulation and traffic operating conditions (existing or projected) on the street also will be considered.

Where a median opening is desired, access to both sides of the street need to be considered. If development exists on both sides of the street, left turn bays for both directions will need to be constructed with the opening of the median.

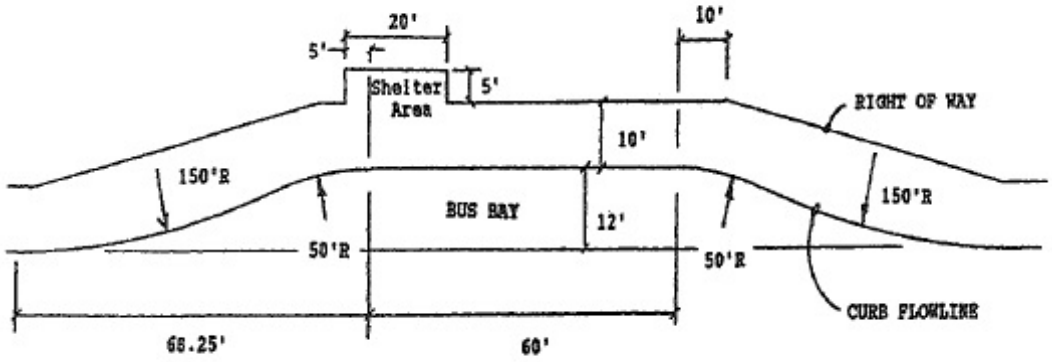
Only one drive on each side of the roadway is to be served by the median opening. Where a property line falls within the median opening area, a common drive serving both properties must be utilized.

2. The location and design of median cuts are subject to approval of the State Highway Department for all streets which are maintained by the New Mexico State Highway and Transportation Department. Information on which streets are maintained by the State is available from the Traffic Engineer.

3. If a new median cut is desired, the applicant must apply in writing to the Traffic Engineer, Transportation Development giving:

location
name and address of the applicant
name and address of the party(s) who will pay for the cut
proposed use of the property on both sides of the street
a site plan showing buildings and parking

Figure 23.5.1 - Bus Bay and Shelter



The Traffic Engineer will then determine whether the median cut will be approved and notify the applicant. If approved, a geometric plan prepared by a registered Engineer will be required. The applicant has the option of having the median cut constructed either by the City's Public Works contract or by a contractor employed by the applicant and approved by the City. An Engineering Design fee will be required of the applicant prior to issuance of construction work order. (See Chapter 5, Volume 1.)

4. The construction of appropriate left turn lanes must be included with any new median cuts. The costs of new median cuts and turn lanes is borne by the applicant.

5. All median cut designs must address drainage needs and control.

6. Left Turn Lanes

Left turn lanes are required at all existing or proposed median openings which will serve a particular development. Details for the construction of left turn lanes are shown in the standard details. See Section 6 regarding left turn bay lengths and transitions.

D. Cul-de-Sac, Stub, Loop and Special Design Street Criteria

1.The maximum length permitted in a cul-de-sac for single family residential streets is as shown in Table 23.5.1 and is measured from the centerline of the intersecting street to the center of the turnaround.

TABLE 23.5.1
MAXIMUM CUL-DE-SAC LENGTH - SINGLE-FAMILY RESIDENTIAL STREETS

Lot Width	Maximum Cul-de-Sac Length
Less than or equal to 60'	700'
Greater than 60', less than or equal to 75'	800'
Greater than 75', less than or equal to 90'	900'
Greater than 90'	1000'

2. Maximum number of dwelling units allowed to be served by a cul-de-sac is 50 unless otherwise specifically approved by the Traffic Engineer.

3. The maximum length permitted in a cul-de-sac for other local streets is shown in Table 23.5.2 and is measured as 1. above. In addition, the acceptability of cul-de-sacs as a single access needs to be evaluated as in section 23.5.E.7.

TABLE 23.5.2
MAXIMUM CUL-DE-SAC LENGTH - OTHER LOCAL STREETS

Land Use	Street Width (Pavement Width)	Maximum Cul-de-Sac Length
Multi-Family Residential	36' 40'	700' 1000'
Commercial/Industrial	32' 40'	1000' 1500'

Acceptable standard designs for turnarounds are shown in the Standard Details.

a. Circular turnarounds must have the minimum right-of-way and paving as shown in Table 23.5.3.

TABLE 23.5.3
CIRCULAR TURNAROUNDS

	Without Center Island		With Center Island		
	R/W Radius	Curb Radius	R/W Radius	Curb Radius	Island Radius
Standard Design	45'	40'	52'	47'	17'
Intermittent Parking Design(1)	40'	35'	52'	47'	17'
Infrequent Parking Design(2)	35'	30'	52'	47'	22'
Industrial/ Commercial Area	55'	50'	55'	50'	20'

NOTES: *(1) For the requirements of intermittent design designation, see Table 23.2.1.C*
(2) For the requirements of infrequent design designation, see Table 23.2.1.D.

b. Hammerhead Type

(1) Requires written approval of Refuse Division and Fire Department for use.

(2) Minimum dimensions required

(a) Right-of-way = 100' x 40'

(b) Pavement = 88' x 24' as measured to flowline of curb

NOTE: Acceptable standard designs for turnarounds are shown in the Standard Details.

5. Stub Streets

Stub streets are the extension of a street past an intersection where the number of units is low enough and the length is short enough that a turn around is not required. The maximum number of units is 4 and the maximum length is 150' measured from the centerline of the intersecting street to the end of the stub street.

6. Loop Streets

Loop streets shall have a maximum length of 1320 feet and a maximum of 45 dwelling units and 70 townhouse units to be designated an access street as described in Table 23.2.1.B. For a street which is longer than this maximum, the interior portion of the loop street shall be designated an access street and exterior portions shall be designated a normal local street. The length of street which is allowed on a loop is such that the layout must provide measures to prevent excessive traffic speeds and/or volumes as outlined in section 23.5.F.

E. Single Access Criteria

1. The maximum number of dwelling units which can be served by a single point of access is 50.

2. Where a single access is combined with a strategically located emergency access, the maximum number of units to be served is 100.

3. Where a single access is widened to four lanes divided, with 2 lanes for both in and out directions (22 feet minimum each for the segment which serves as a single access), the maximum number of units to be served is 150.

4. Where a single access with 4 lanes divided (as in No.3 above) are combined with a strategically located emergency access, the maximum number of units to be served is 250.

5. Projects that contain over 250 units must provide 2 access points at all times unless a variance is granted (See paragraph 9 below).

6. The emergency access shall have the following minimum criteria:

   a. Width 30' with 25' radii at intersections with streets

   b. Improved low maintenance surface

   c. Breakaway gate for closure during non emergency times

7. Any single access to an arterial must be evaluated to ensure that signalization would not be warranted. If warrants for intersection signalization would be exceeded, then two points of access must be provided.

8. At least one access to all developments shall be all-weather.

9. Variance:

Variances to the single access criteria shall be considered on a case by case basis based upon factors which demonstrate that public safety and adequate design concerns are covered. The factors which will be addressed include the following:

a. Signalization - Providing long distances between traffic signals on arterial and collector streets is critical in maintaining signal progression characteristics and adequate capacity on these facilities. If analysis indicates that a single access design will create the need for signalization, the effects to traffic signal progression and the street network shall be reviewed to determine acceptability.

b. Collection of traffic from several developments - An additional factor in the acceptability of a new traffic signal is the ability to collect traffic from several developments which would otherwise experience significant vehicular delay with multiple access points.

c. Type of street intersected - Street classification will be a factor for review both in general acceptability of the proposal and in the review of signal spacing in a. above. The reduction in signal spacing will be more acceptable on lower classification streets than on higher classification streets such as principal arterials.

d. The creation of a single access point shall not unduly impair fire or emergency access due to excessive out of direction travel. This review shall require written concurrence by the Fire Department.

e. Layout of the subdivision -

- Distribution of traffic from the single access within the subdivision
- Anticipated directional split of traffic at subdivision entrance
- Depth of the subdivision
- General circulation as in d. above

F. Local Street Layout

The layout of a local street pattern in residential areas is an essential feature that affects the quality of the neighborhood in the long-term. High traffic speeds and volumes can result from improper street pattern layout. To minimize potential long-term problems, the designer needs to carefully design block lengths, street alignment, continuity, and connectivity. Long straight streets should not be used in residential areas. Block lengths of normal local streets should be no longer than 600 feet in length. Short street blocks allow for quick emergency response and vehicular and walking route choices for residents. Good vehicular access needs to be maintained to all lots within a subdivision, however, long continuous streets that accommodate excessive speeds and volumes are inappropriate in a residential setting.

Major local streets are established within larger subdivisions where traffic will be concentrated and traffic volumes are likely to exceed an ADT of 1000 vehicles. Limiting the number of cul-de-sacs, loops, and other non-connecting or circuitous streets that funnel their traffic to one location should minimize subdivision design requiring major local streets.

G. Lighting and Signage

1. Street Lighting

The policy of the City is that arterial (and selected collector) streets be lit to Illuminating Engineering Society standards for arterial streets. On all other streets, 100 watt High Pressure Sodium Vapor lights shall be located at all intersections, on cul-de-sac streets over 200' in length, at right angle turns, and at

mid-block locations where block lengths exceed 500'. In new subdivisions, the developer submits a copy of the plat with required street lighting marked to the Traffic Engineer. This is then forwarded to PNM for street light installation plat to Public Service Company of New Mexico (PNM) for design of the street lighting system. PNM then submits it to the Traffic Engineer for approval. Following approval, PNM installs the street lights in conjunction with the installation of electrical service to the subdivision. A fixed fee per street light is paid to PNM by the developer for the installation of these lights.

2. Traffic Signs

Street name signs are installed by the City. The developer of a subdivision pays a street name sign fee for each intersection at the time of application as set forth in the Subdivision Ordinance. The developer is also responsible for special curve warning signs required in accordance with the reduced radius provisions per note 9, Table 23.3.1. All other traffic signs are installed by the City at City expense.

H. Signals and Markings

Traffic signals and markings are important elements to be considered in the design of all street systems. The application of these elements to the design of streets are described in several of the references in this chapter. The latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) shall be used to define the design of these elements.

1. Traffic Signals

The determination of where and when traffic signals are to be installed shall be by the Traffic Engineer. This decision is based upon the evaluation of traffic conditions at an intersection in accordance with the warrants contained in the MUTCD. Where traffic signals may be warranted at a future date, the installation of a portion of the future signal elements needs to be included in the construction of the streets. Where signalization is not likely in the near future, only the underground conduit and pull boxes need to be constructed. Foundations for the signals also need to be constructed for intersections which may require signalization in the near future (see also section 6.B.16).

2. Markings

Street markings in accordance with the MUTCD shall be included in the construction of new streets. For new construction, the layout of these markings need to be shown in the plans and included in the work to be performed by the contractor.

I. Traffic Control, Construction Phasing and Construction Permits

A critical element to maintaining safe traffic conditions during street construction activities as well as an efficient method of implementation of needed improvements is that of traffic control and phasing of construction activities. All construction activities shall address these elements through a plan which will identify the phasing of construction activities and the necessary traffic control devices in accordance with the latest edition of the Manual on Uniform Traffic Control Devices.

The Right-of-Way for a street typically accommodates many different underground and overhead utilities. The designer of a construction project needs to coordinate his activities with the other users of the right-of-way including existing an future utilities. The construction and phasing plans need to incorporate provisions for these other users.

Construction activities within the right-of-way require an excavation permit. Prior to the issuance of the permit, plans must be submitted with appropriate approvals which define the construction activities, appropriate traffic control measure, and evidence of notification through the One Call System.

Where construction is required on a newly constructed street, a street restoration fee shall be assessed in accordance with street restoration fee policy.

J. Guardrail, Clear Roadside Criteria and Related Subjects

The evaluation of roadside safety and the determination of the design of features such as guardrails, drainage swales, etc. shall be as prescribed in Roadside Design Guide, AASHTO, October 1988 or latest update.

K. Fences, Walls, Footings and Encroachments

Encroachments of fences, walls and footing will only be permitted in R-1 zoning developed prior to March 1983 and H-1 zoning areas. In new residential subdivisions, walls, footings and fences will not be permitted in the right-of-way.

In existing, mostly developed subdivisions, walls and fences are discouraged but may be placed within the right-of-way if approved by Traffic Engineering, City Engineering, Zoning and Building Inspection, and Utilities Engineering. An encroachment agreement must be applied for from the City Engineer, approved by the listed agencies and then executed on behalf of the City by the Chief Administrative Officer (CAO).

The encroachment agreement provides that the applicant must remove the wall, footing or fence within a specific time (normally 72 hours) upon notification by the City, and makes the applicant responsible for indemnifying the City from any negligent actions by the applicant. There is a fee for recording this document with the County.

Walls or fences over 3' in height will not be approved within the right-of-way if the wall or fence will be less than 9' from face of curb on local streets and less than 10' from face of curb on arterial and collector streets. All walls or fences over 3' in height and within the right-of-way must be field checked by Traffic Engineering prior to approval. Any walls or fences which are within the clear sight triangle are restricted to a height of 3' measured from the flowline of the gutter.

L. Railroad Crossings

The design and construction details for any Railroad Grade Crossing of public roadways, bikeways or sidewalk must be coordinated for acceptability by the railway owner. In some instances, the railway owner may require that work on their line and the crossing be performed by their own crews or contractor. Such requirements should be identified during the design phase of a project to ensure proper scheduling for construction. The location of any proposed crossing must also be reviewed and approved by the Traffic Engineer.

Rubberized crossing structures shall be installed on all new or rehabilitated railroad crossings on streets classified as collector or above in accordance with Standard Specifications and Standard Details.

M. Barricades at Ends of Pavement

A barricade will be required at the end of any street pavement within or at the limits of a project regardless of the class of street involved or how soon additional pavement will be placed beyond the current project limits. The only exception will be where the Traffic Engineer determines that the unpaved portion of the street beyond the project limits has been and will continue to be open to and used by through traffic. The installation of the barricade must be shown on the plans and included as a part of the street improvements. The contractor must notify Traffic Engineering three (3) working days in advance of the placement of any barricade, or completion of paving in the event a barricade is not required, so that the City can install proper warning signs as necessary.

N. Bikeway Location and Design Guidelines

1. General Provisions

a. Classes of bikeways may be defined as follows:

The American Association of State Highway and Transportation Officials (AASHTO) *1999 Guide for the Development of Bicycle Facilities* (or current revision) serves as the principal resource for the location and design of on-street and off-street bicycle facilities.

The guidelines presented in this section of the DPM primarily address the development of on-street bicycle facilities. All new roadways which are legal for bicycle use should be designed and constructed under the assumption that they will be used by bicyclists. The bikeway system referenced herein are defined in the *Albequerque Comprehensive On-Street Bicycle Plan.*

Final design approval of bicycle facilities developed through the use of these guidelines or through the use of other guidelines acceptable to the City of Albuquerque shall be through the authority of the Traffic Engineer or personnel delegated such authority by the Traffic Engineer.

Variances to the bicycle facility guidelines shall be considered on a case by case basis, based upon factors which demonstrate that public safety and current design standards are addressed. Variances shall require consultation with the City of Albuquerque Bicycle/Pedestrian Planner and approval by the Traffic Engineer.

a. Definitions of bicycle facilities and general design guidelines are listed in the following sections. Refer to the AASHTO *1999 Guide for the Development of Bicycle Facilities* for detailed design criteria.

(1) SHARED USE PATH/TRAIL (BIKE TRAIL) – A shared use path is a bikeway physically separated from motorized vehicle traffic by an open space or barrier, and constructed within the street right-of-way or within an independent right-of-way including shared-use rights-of-way or utility or drainage easements.

Trails should be expected to accommodate other uses including walking, jogging, and rollerblading and should be designed to recommended standards for these uses. The recommended width for a trail is 10 feet, with 12 feet or more recommended in high use areas (See Figure 1). High use areas are those trails identified on the Long-Range Bikeway System.

Trail design considerations include: signing; striping; markings; horizontal, vertical and intersection sight distance; surfacing; and trailside clear zones.

Where trails intersect with the street network, safe connections to the on-street bikeway system should be designed. Raised or protected median refuge areas should be considered for bicyclists at mid-block crossings of arterial roadways.

Traffic signal warrant analyses, per the *Manual on Uniform Traffic Control Devices(MUTCD),* and other studies may be conducted for bike trail crossings of major roadways which have been identified as high-priority bicycle and pedestrian crossings. See the references in Section N.5.a., b., and e. for evaluation considerations.

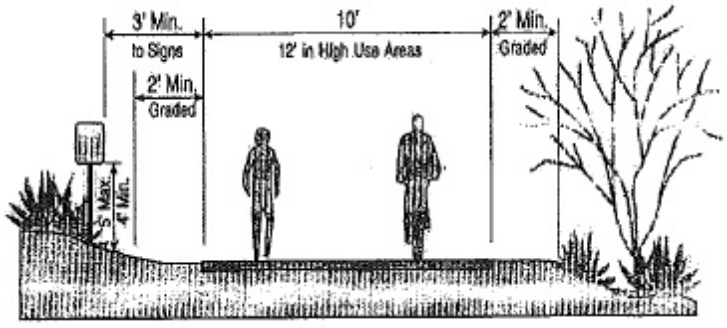


Figure 1
MULTI-USE TRAIL TYPICAL CROSS SECTION

(2) BICYCLE LANE (BIKE LANE) - A bike lane is a lane on the roadway that has been designated by striping, signing, and pavement markings for preferential or exclusive use by bicyclists. Bike lanes or paved shoulders are part of the standard arterial and collector cross-section. These lanes provide access to destinations that include parks, schools, shopping and employment centers. Bike lanes at signalized intersections should have bicycle-sensitive actuation capability such as loop detectors, video detection, curbside push buttons, or other detection devices approved by the City Traffic Engineer. Adequate sight distance shall be maintained at all intersections and driveways along a bike lane.

(a) Development of Bike Lanes on New or Reconstructed Roadways

Bike lanes should be provided on all new or reconstructed arterial and collector roadways. Recommended minimum widths for bicycle lanes are as follows:

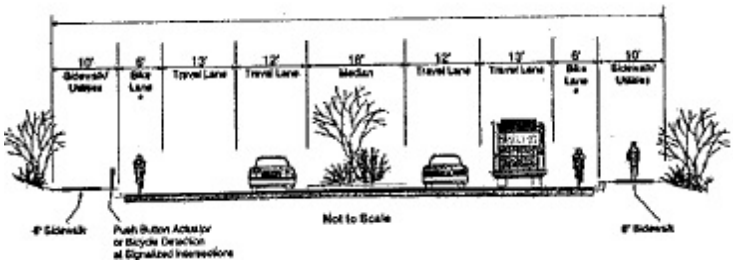
- 5 feet, measured from painted edgeline to edge of gutter, on roadways with posted speed limits of 40 mph or greater.

- 4 feet, measured from painted edgeline to edge of gutter, on roadways with posted speed limits of 35 mph or less.

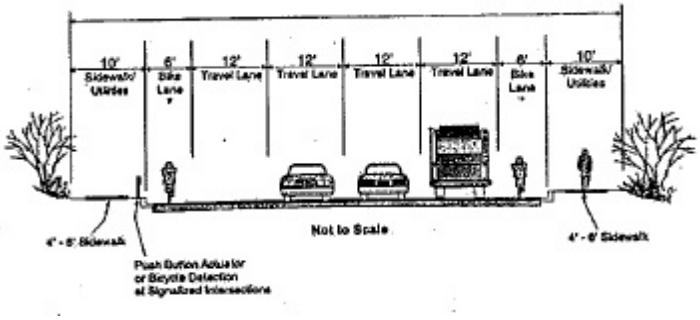
Bike lanes shall be flush with roadside gutters and should be marked in accordance with the MUTCD and AASHTO guidelines. (See Figure 2.)

Figure 2
MINOR ARTERIAL AND COLLECTOR ROADWAY TYPICAL CROSS SECTIONS

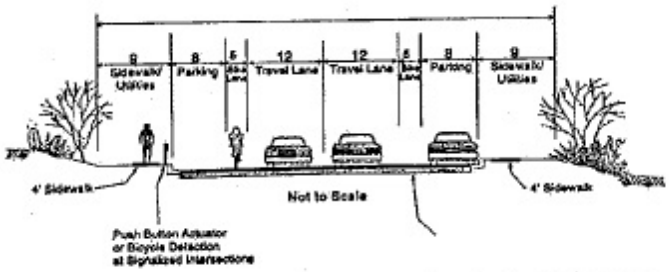
DIVIDED ROADWAY WITH BIKE LANES



FOUR-LANE ROADWAY WITH BIKE LANES



TWO-LANE COLLECTOR STREET WITH BIKE LANES



* Includes 2-foot gutter and AASHTO-standard 4' - 5' bike lane from edge of gutter to edge stripe.

NOTE: For retrofit of existing roadways to provide bike lanes, travel lane, median left-turn lane , and right-turn lane widths may be reduced within acceptable city standards.

Future roadway improvements should retain existing bike lanes, including intersection approaches where additional turn-lanes may be constructed. Bike lane intersection design guidelines are provided in Sections N.4.a. of this chapter.

(b) Development of Bike Lanes on Existing Roadways

The addition of bike lanes as part of arterial and collector rehabilitation is recommended where feasible. Bike lanes may be implemented on existing roadways by reducing travel lane and median widths within acceptable City guidelines, as part of restriping, resurfacing, or rehabilitation projects. Narrower bike lanes may be considered where the inclusion of bike lanes in desirable, but standard widths are not feasible.

(c) Development of Bike Lanes with On-Street Parking

Bike lanes may be developed along arterial and collector roadways with or without on-street parking. Where on-street parking is present, bike lanes should always be located to the left of the parking lane and should have a minimum width of 5 feet. Bike lanes are travel lanes, therefore, automobile parking or motor vehicle use of a bike lane as a driving or passing lane should be prohibited. Parking demand should be evaluated to determine whether parking can be eliminated to reduce vehicle-bicycle conflicts or to convert the parking lane to a bike lane.

(3) PAVED SHOULDER BIKEWAYS – Paved shoulder bikeways are located on uncurbed arterials and collectors and consist of a smooth paved surface that covers all or part of the roadway shoulder. Recommended widths for paved shoulder bikeways are as follows:

- 6 feet, measured from painted edgeline to edge of pavement, on roadways with posted speed limits of 40 mph or greater.

- 5 feet, measured from painted edgeline to edge of pavement, on roadways with posted speed limits of 35 mph or below.

In addition, on low-speed, low-volume local streets, a 4-foot width may be considered where right-of-way constraints exist.

Paved shoulder bikeways may be implemented on existing roadways through use of measures similar to those described in Section N.1.a.(2.)(b). Intersection sight distance should be verified at all intersections and driveways along a paved shoulder bikeway.

(4) BICYCLE ROUTE (BIKE ROUTE) - Bike routes are designated roadways with appropriate directional and informational signing, with or without a specific bicycle route number, in accordance with the MUTCD. Bicycle routes shall be primarily located on local streets and low-volume, low-speed collector streets.

Bicycle routes on local streets should have 28-foot wide pavement widths. A collector roadway should have a minimum curb lane width of 14 feet, exclusive of parking, and can be implemented with minor or no additional provisions.

(5) WIDE CURB LANES - Wide curb lanes are located on shared roadways with outside lane widths of 14 to 16 feet. Lane widths greater than 16 feet may encourage operation of two motor vehicles in one lane, therefore, consideration should be given to striping a bicycle lane.

Wide curb lanes are recommended as part of rehabilitation and reconstruction projects on existing roadways where implementation of bicycle lanes or paved shoulder bikeways are infeasible. To implement wide curb lanes on existing roadways, travel lane widths and median widths may be reduced per City design guidelines and/or the curb and gutter may be reconstructed.

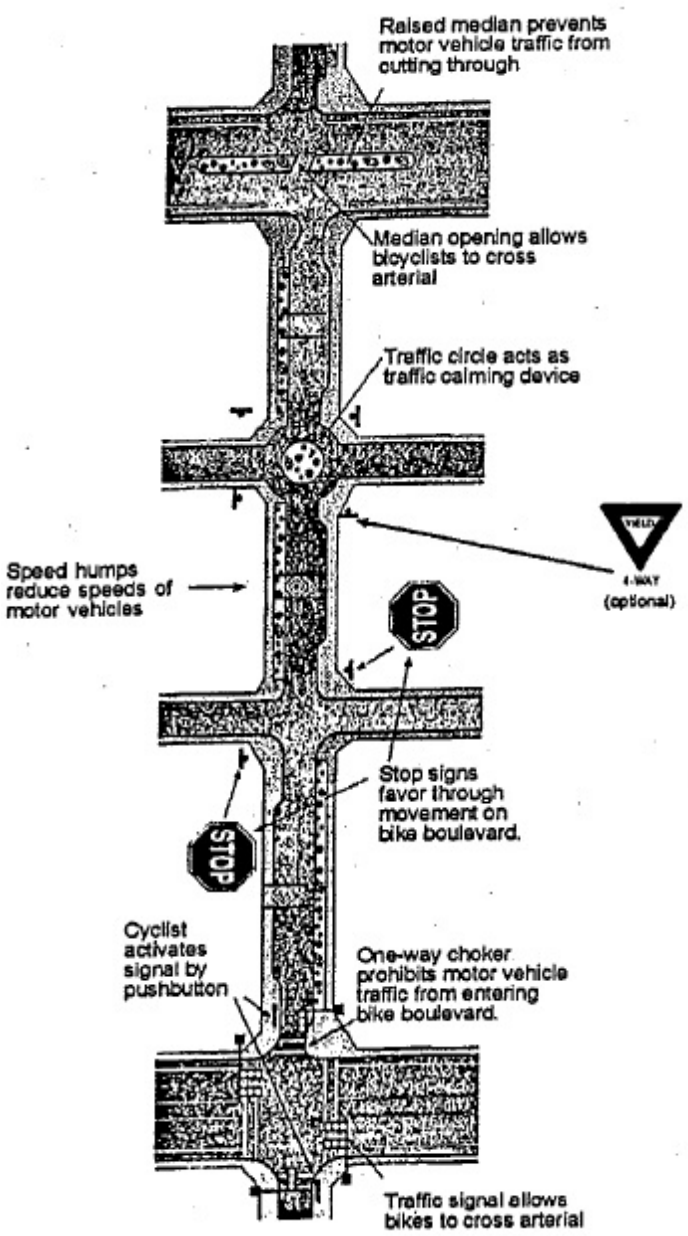
(6) SHARED ROADWAY - A shared roadway is any roadway that may be legally used by both motor vehicles and bicycles and is not specifically designated as a bikeway.

(7) BIKEWAY - A bikeway is any road, path, or way that is specifically designated for bicycle travel.

(8) BICYCLE FACILITIES - Bicycle facilities are the infrastructure that accommodates or encourages bicycling including bikeways, shared roadways not specifically designated for bicycle use, bicycle parking and storage facilities, and bicycle signal actuation hardware.

(9) BICYCLE BOULEVARD (Modified Bike Route) - A bike boulevard is a bike route designed to encourage the through movement of bicycles while maintaining local access for motor vehicle travel. (See Figure 3) Traffic calming devices are used to control motor vehicle speeds and discourage through vehicle trips. These devices may include diverters, speed humps, traffic circles, or pocket parks which allow through access by bicycles. A bicycle boulevard may be constructed with wide curb lanes or with standard travel lanes and bike lanes. Bicycle boulevards should limit bicycle stops to one per quarter-mile or preferably one per half-mile spacing. (Contact Albuquerque Public Works Department Neighborhood Traffic Management Program for additional traffic calming details.)

Figure 3
BICYCLE BOULEVARD



b. The bikeway system is intended to safely connect residential areas, employment, retail services, businesses, education centers, and recreational facilities. It is also intended to include recreational bikeways. Other elements of the bikeway system include the following:

(1) to provide safe bicycle facilities;

(2) to provide a system of bikeways interconnecting the four quadrants of the City and surrounding communities;

(3) to establish primary bikeways along routes with substantial bicycle commute volume;

(4) to provide a variety of bikeways which meet or exceed AASHTO or other approved State/Local guidelines;

(5) to provide extensions and connections to the existing network;

(6) to include provisions for bicycle transportation, commuting, and recreational travel associated with future development of arroyos, irrigation ditches, and drains;

(7) to provide for bicycle access to the bikeway system as expansion or modification of the metropolitan street system occurs;

(8) to provide for the safe crossing of bicycling barriers such as freeways, railroads, arroyos, acequias and the Rio Grande;

(9) to preserve and enhance existing bikeways on streets that change their traffic carrying function or are reconstructed;

(10) to achieve approximately one-half mile intervals between bikeways; and,

(11) to encourage frequent bicycle access between new developments and adjacent bikeways and to identify that access on the sketch plat, preliminary plat and/or site development plan as appropriate.

2. Off-Street Bicycle Facilities

a. Generally, Bike Trails should be located to serve corridors not served by streets and highways or where wide rights-of-way exist, permitting such facilities to be constructed away from the influence of parallel streets.

b. Bike Trails should provide either a recreational opportunity or serve as direct high-speed commute routes, if cross-flow by motor vehicles can be minimized.

c. In locating a Bike Trail, consideration should be given to the provision of adequate access points.

d. The scenic value is particularly important along a Bike Trail intended to serve a recreational purpose.

e. Recommended rights-of-way are:

(l) the arroyo (drainage) system coming from the mountains and from the uplands of the west mesa;

(2) the network of irrigation and drainage ditches in the valley;

(3) abandoned railroad rights-of-way;

(4) utility easements and rights-of-way; and

(5) paths through parklands.

(6) along roadways with sufficient R/W and appropriate design features.

3. On-Street Bicycle Facilities

a. Purpose

(1) On-street bikeways are designated as bike routes or bike lanes and are designed for transportation mobility.

(a) On-street bikeways emphasize functional service qualities such as the fastest, most direct, and unencumbered access to destinations.

b. General Bikeway Location Criteria

(1) Major on-street bikeways are located primarily along roadways classified as arterial or collector to provide access to destinations.

(2) Minor on-street bikeways, such as bike routes, are located on local streets and low-volume collectors to provide access between residential areas and major bikeways.

(3) It is desirable for bikeways to be located on roadways where on-street parking is infrequent, prohibited, or can be prohibited.

(4) High-speed traffic (posted speed of 40 mph or greater) and the presence of large vehicles (truck, bus, or recreational vehicle) are significant factors affecting the acceptability of potential bikeway locations. In locations where these conditions exist, bike lane widths of 5-feet or greater are recommended.

(5) An on-street bikeway should be located only where the pavement will be smooth and properly maintained. Dense graded asphalt concrete surfaces are preferable to open graded or seal-coated surfaces.

(a) Manhole and utility covers should not be located in bikeways, and where relocation is impractical, these features should be adjusted to grade.

(b) Drop inlet or other drainage grates should be designed to prevent the snagging of bicycle wheels.

(c) Construction joints or large transverse pavement surface cracks (greater than 1 inch in width) in on-street bikeways should be repaired.

(d) Pavement edges, including where the asphalt concrete roadway meets the Portland cement concrete gutter, should be flush to enhance bikeway safety. Gutters may be reduced (e.g., 1-foot), where drainage conditions permit, on new or reconstructed roadways to provide greater curb lane width for bicycling.

(6) In new residential or commercial developments adjacent to bikeways, contiguous walls or fences should provide breaks for paved bicycle access which link the development to the bikeway system. Access(es) should be delineated on the sketch plat, preliminary plat, and/or site development plan as appropriate.

(7) Potential on-street bikeway locations should include no more than one stop sign or traffic signal per 1/4 mile. Local street stop control should be reassigned to facilitate through bicycle traffic on designated bikeways. Stop control reassignment requires an engineering study to determine additional measures necessary to minimize neighborhood impacts. Concurrently, traffic calming strategies for through motorized traffic should be analyzed.

c. Location Considerations for Bike Lanes

(1) Bike lanes should be located along arterial and collector roadways. Bike lane widths are a function of the posted speed limit and automobile volumes.

(2) Where automobile parking lanes are included within the roadway, the parking lanes and bike lanes should be delineated separately to prevent use of bike lanes by motor vehicles. Parking demand should be evaluated to determine whether parking can be eliminated or the parking lane can be converted into a bike lane. Bike lanes are traffic lanes, therefore, automobile parking or motor vehicle use of a bike lane as a driving or passing lane should be prohibited.

d. Location Considerations for Bike Routes

(1) Bicycle routes are primarily on low-volume, low-speed collectors and local streets. If adequate space is provided for a vehicle to safely pass a bicyclist, a bike route may be signed on an arterial.

(2) It may be necessary to sign a bike route for a short distance along an arterial with minimal 4-foot bicycle lanes, 5-foot paved shoulders, or a 10-foot multi-use sidewalk trail where local streets are not feasible to continue the bikeway. (See Section 4.c.(2) for additional information on design of sidewalks as multi-use trails.)

4. Special Provisions for Bikeway Facilities

a. Proposed facilities require a safety assessment of potential motor vehicle-bicycle conflicts. These conflicts are considered in four categories.

(1) Parallel Conflicts: Speed differential between automobiles and bicycles and the average daily volume of motor vehicle traffic reduce bikeway safety. Lower speed and lower volume roadways should produce less conflicts, resulting in safer bicycle travel.

(2) Right Turn Conflicts:

(a) Dual Right-Turn Lanes

Dual right-turn lanes on bikeways present safety concerns for cyclists traveling straight through an intersection. Warrants for dual right-turn lanes should be used to ensure that they are provided only where warranted. Intersections with dual right-turn lanes should be constructed in accordance with guidelines that minimize bicycle-automobile conflicts. All designs must be approved by the City Traffic Engineer.

(b) Free Right-Turn Lanes

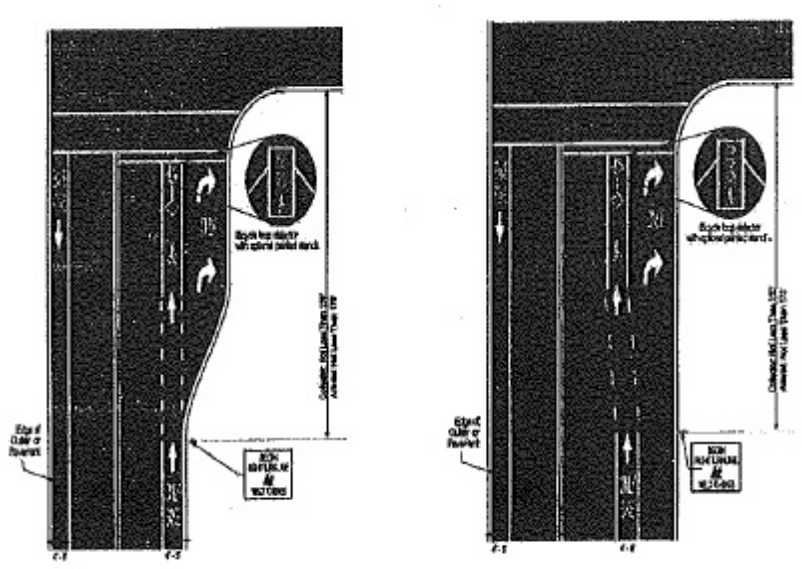
Free right-turn lanes at intersections are not advised due to potential adverse impacts to bicyclist and pedestrian safety. Free right turns permit higher motor vehicle speeds approaching and through the right-turn movement. Where free right-turns are warranted, signing, marking, and geometric enhancements designed to warn motorists of pedestrian and bicycle traffic and to slow motor vehicles on approaches should be considered. These enhancements may include over-sized signing and marking, and reduced lane and turning radii widths for right-turning vehicles.

(c) Separate Right-Turn Lanes

Separate right-turn lanes should only be constructed where warranted by an engineering study. These lanes must be clearly signed and marked in accordance with the MUTCD. These lanes create bicycle-automobile conflicts because right-turning vehicles must cross the bikeway.

Where right-turn lanes are warranted, bicycle lanes and bicycle signal actuation systems should be provided at intersection approaches. Minimum curb return radii should be utilized to reduce motor vehicle speeds and reduce pedestrian crossing distances at intersections. (See Figure 4)

Figure 4
RIGHT TURN LANES



(d) Access Controlled Facility Right-Turn Access

Oversized signing and marking is recommended for bike lanes and bike routes at access ramps to access controlled roadways.

(3) Left Turn Conflicts: Where left turn phases are warranted at signalized intersections along a designated bikeway, left turn bicycle actuation via bicycle detection or median push button should be provided.

(4) Crossing Conflicts: Signalized intersections are a positive means of crossing a roadway. MUTCD pedestrian signal warrant analyses should be performed for unsignalized arterial crossings which serve as barriers within the continuous bikeway system. Raised median refuge islands that allow bicycle passage should be considered to improve the safety of unsignalized arterial crossings.

b. Bikeway Grades

Guidance for grade acceptability is a function of the slope and length of roadway grade. Bikeways with grades equal to or exceeding 5.0 percent for more than 500 feet are less desirable because the ascents may be difficult for bicyclists and the descents may cause bicyclists to exceed a comfortable speed. The table below summarizes the acceptability and design concerns for the bikeway types.

Bikeway Grades Greater than 5.0%

Bikeway Type	*Distance (Ft.)*	*Distance (Ft.)*	*Design Concerns*
Bike Trail	< 500	Good	30 mph design speed/12 foot width
Bike Trail	> 500	Poor	30 mph design speed/12 foot width
Bike Lane	< 500	Good	4 to 5 foot width (stripe to edge of gutter)
Bike Lane	> 500	Good	5 to 6 foot width (stripe to edge of gutter)
Bike Route	< 500	Good	Good sight distance, advance warning of traffic control
Bike Route	> 500	Poor	Consider alternate location or provide good sight distance, advance warning of traffic control

c. The crossing of physical barriers is an important factor in providing bikeway continuity and increasing bike usage. Two primary barriers are the Rio Grande and access controlled highways. Railroad tracks, arterial crossings, and large tracts of land not allowing through access are also barriers. Three solutions to provide safe crossing of major transportation barriers include the following:

(1) A bike lane may be created on an existing arterial through restriping, reducing vehicle travel lane or median widths.

(2) The sidewalk may be designated as a legal trail for short distances of up to one-quarter mile to serve as a linkage within the bikeway network. Two-way bicycle traffic as well as pedestrian traffic should be expected on sidewalks under these conditions. Sidewalk trails should be designed per Section N.1.a.(1) and this section to safely accommodate both pedestrian and bicycle traffic.

Driveways and cross-streets should be limited to 4 or less per quarter-mile before sidewalk trails are implemented. If the distance between the sidewalk trail and roadway is less than 5 feet, a physical divider should be considered.

Sidewalk bikeways or trails immediately adjacent to the roadway are not recommended. This is due to several factors including wrong-way travel by bicyclists, conflicts at intersections and driveways, insufficient sight distance due to walls and other obstructions, and conflicts within the right-of-way such as utility poles.

(3) All new or reconstructed roadway over-passes should include wide curb lanes, multi-use emergency breakdown lanes, or bike lanes to improve bicyclist and motorist safety. Cantilevered structures attached to existing bridges should be considered where widening is not cost effective.

d. Construction within Right-of-Way

If construction or utility work is necessary within a bike lane, the full width of the bike lane should be repaved to grade after work is complete. Safe detour provisions for bicyclists should be made when bike lanes are temporarily closed for utility work.

5. Planning and Design Guideline References

a. *Albuquerque Comprehensive On-Street Bicycle Plan*. City of Albuquerque, 2000.

b. *Guide for the Development of Bicycle Facilities*. American Association of State Highway and Transportation Officials, 1999.

c. *Manual on Uniform Traffic Control Devices*. Federal Highway Administration, 1988 (including current adopted amendments).

d. *Selecting Roadway Design Treatments to Accommodate Bicycles*. Federal Highway Administration, 1994.

e. *New Mexico Bicycle-Pedestrian-Equestrian Transportation Pla*n. Bicycle/Pedestrian/ Equestrian Advisory Committee, New Mexico State Highway and Transportation Department, 1996.

f. *Trails and Bikeways Facility Plan*. City of Albuquerque, 1996 (Revised).

g. *Pedestrian and Bicyclist Safety and Accommodation*. National Highway Institute, Federal Highway Administration, 1996.

h. *Oregon Bicycle and Pedestrian Plan*. Oregon Department of Transportation, 1995.

i. *Neighborhood Traffic Management Standards*. Albuquerque Public Works Department.

Appendix A
Advantages of Bicycle Lanes/Paved Shoulders

1. Improved space is provided for bicycle use and in limited cases for pedestrian use; safety is improved for motorists who will not have to travel out of the lane in order to pass bicyclists.

2. Improved space is provided for motor vehicles to stop out of the travel lane because of mechanical difficulty, a flat tire, or other emergency.

3. Improved space is provided to escape potential accidents or reduce their severity.

4. Improved space is provided for emergency vehicle access through congested areas as motorists pull to the curb to allow emergency vehicles to pass.

5. The sense of openness created by bike lanes/paved shoulders improves the safety and drivability of the roadway.

6. Sight distance is improved both for users traveling along the roadway with bike lanes/paved shoulders as well as for users entering the roadway from a side street or driveway.

7. Highway capacity is improved; uniform speed is encouraged.

8. Improved space is provided for maintenance work such as snow removal and maintenance of utilities.

9. Improved space is provided for motorists who have accidentally left the travel lane to recover and return to the lane.

10. Improved space is provided to discharge stormwater from the travel lanes, increasing safety for users and capacity of the roadway.

11. Pavement life is increased because structural support is given to the pavement, reducing the raveling effect caused by motor vehicles traveling on the edge of pavement or traveling immediately adjacent to the gutter pan.

12. Improved space is provided for bus stops.

13. Increased safety is provided for right-turning vehicles due to increased turning radii at intersections and driveways; rear-end accident potential is reduced.

14. Increased safety is provided for motorists to avoid fixed objects such as telephone and signal poles due to provision of additional clear zone area.

15. Improved space is provided by paved shoulders for motorists to pass on the right of left-turning vehicles, where allowed by law.

16. Air quality benefits are provided due to provision of space for alternative modes of travel and to reduced particulate matter caused by vehicles traveling on unpaved shoulders.

a. Classes of bikeways may be defined as follows:

(1) Class I Bikeway: A Bike Trail located in a completely separated right-of-way designated by signs and pavement markings for the exclusive use of bicycles with cross flows by the motor vehicles minimized. The right-of-way for these bikeways could accommodate other uses such as hiking and jogging if properly designed.

(2) Class II Bikeway: A Bike Lane that is located in a portion of the roadway designated by signs and pavement markings for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with vehicle parking and cross flows by pedestrians and motorists permitted.

(3) Class III Bikeway: A Bike Route located in a roadway and designated by signs and shared with pedestrians or motorists. The bike route provides continuity to other bicycle facilities.

b. The Bikeway Network is intended to safely connect residential areas, employment, retail services, businesses education centers and recreational facilities. It is also intended to include recreational bikeways. Other elements of the Bikeway Network concept include the following:

(1) safety;

(2) to provide a system of bikeways interconnecting the four quadrants of the City and surrounding areas;

(3) to establish primary bikeways along patterns of heavy bicycle commuting;

(4) to provide a variety of bikeways for study and experimentation;

(5) to provide extensions and connections to the existing network;

(6) to include provisions for bicycle transportation and recreation associated with further development of arroyos, irrigation ditches, and drains;

(7) to provide for bicycle access to the Bikeway Network along with further expansion or modification of the metropolitan street system;

(8) to provide for the safe crossing of bicycling barriers, such as freeways, railroads and the river;

(9) to provide for relocation of Bikeways if necessary where any street changes significantly in its traffic carrying function; and

(10) to achieve approximately one-mile intervals between bike facilities.

c. The Bikeways Master Plan is a graphic representation of an updated version of the Bicycle Network established in 1974. The Master Plan identifies the locations, alignments, connections and type of bicycle facilities for the Albuquerque Urban Area. The status of program priorities for bicycle facility development is identified in the following categories:

(1) Existing bicycle facilities that are currently in operation.

(2) Planned bicycle facilities that either are included in the Transportation Improvement Program for the Albuquerque Urban Area or are expected to be developed along with associate roadways, drainageways or as funds become available.

(3) Study corridors where bicycle facility type and alignment have not been established but are under consideration.

(4) Existing or planned major grade separated overcrossings.

2. Off-Street Bicycle Facilities

a. Generally, Bike Trails should be located to serve corridors not served by streets and highways or where wide rights-of-way exist, permitting such facilities to be constructed away from the influence of parallel streets.

b. Bike Trails should provide either a recreational opportunity or serve as direct high-speed commute routes, if cross-flow by motor vehicles can be minimized.

c. In locating a Bike Trail, consideration should be given to the provision of adequate access points.

d. The scenic value is particularly important along a Bike Trail intended to serve a recreational purpose.

e. Recommended rights-of-way are:

(1) the arroyo (drainage) system coming from the mountains and from the uplands of the west mesa;

(2) the network of irrigation and drainage ditches in the valley;

(3) abandoned railroad rights-of-way;

(4) utility easements and rights-of-way; and

(5) paths through parklands.

(6) along roadways with sufficient R/W and appropriate design features.

3. On-Street Bicycle Facilities

a. General Locational Criteria are as follows:

(1) The on-street bikeways are designated as Bike Routes or Bike Lanes and are primarily designed for transportation purposes.

(2) These types of bicycle facilities generally emphasize functional service qualities such as the quickest, most direct, and unencumbered access to most destinations.

(3) It is desirable to select a location where on-street parking is light or where it can be prohibited.

(4) High-speed traffic and/or truck, bus, and recreational vehicle traffic are significant factors affecting the acceptability of potential bikeway locations. In locations where these vehicles and bicycles must share a right-of-way, extra separation must be available between cyclists and vehicles.

(5) An on-street bikeway should be located only where pavement can be maintained at a reasonable standard. Dense graded asphalt concrete surfaces are preferable to open graded or seal-coated surfaces. All manhole covers, utility covers, drop inlet grates, and construction joints or cracks in the surface should be at grade or brought to grade and safety standards before establishing a bikeway.

(6) For an on-street bikeway, the speed and volume of auto traffic is a factor, along with the available width, in determining the best location. Areas where mixed flows may be acceptable are:

(a) In urban centers where traffic conditions constrain motor vehicle speeds to be less than 40 mph resulting in considerable overlap of bicyclist and motor vehicle speed distributions;

(b) Within the approaches to intersections where motor vehicle speed is depressed preparatory to stops, turning movements and intersection related decisions;

(c) On streets with less than 14,000 average daily traffic volumes.

(7) Potential on-street bikeway locations should include no more than one stop sign or traffic signal per 1/4 to 1/2 mile intervals. Stop signs should be rearranged to the extent possible to permit through bicycle traffic. At the same time, deterrents to motorized through-traffic should be implemented.

b. Locational considerations for Bike Lanes include the following:

(1) Adequate pavement width must be available for both bicycles and motor vehicles.

(2) A location should be able to provide a minimum of four feet of operating width for one-way bicycle travel, exclusive of the gutter width.

(3) Bike Lanes should be placed primarily on collector streets.

(4) At locations where on-street parking is allowed to remain, the adjacent Bike Lane should be wide enough to permit a bicyclist to pass a parked car.

(5) Bike Lanes, if necessary, may be placed on arterials where the center divider can be reconstructed and the traffic lanes moved in toward the center.

(6) Bike lanes may be placed on Principal Arterials on shoulder areas when appropriately designed.

c. Locational considerations for Bike Routes include the following:

(1) Local streets in the Bikeway Network should be designated as Bike Routes.

(2) Bike Routes may be placed where bicycle traffic is already heavy and where other bicycle facilities are not feasible.

(3) Arterials should be avoided if at all possible; however, it may be necessary to use arterials when other bicycle facilities are not feasible.

4. Special Provisions for Bikeways

a. Each proposed and existing facility should be evaluated on a safety basis of potential motor vehicle-bicycle conflicts, as categorized into four categories:

(1) Parallel Conflicts: Close proximity of auto and bike travel, speed differential between the two, and the average daily volume of motor vehicle traffic.

(2) Right Turn Conflicts: An unchannelized intersection presents relatively minor problems for cyclists; a double right-turn lane presents unacceptable hazards.

(3) Left Turn Conflicts: Intersections with left-turn phase signalization present no hazards and should be highly rated. Signalized intersections, without separate phasing should be on the basis of turning volume and opposing traffic, as should major unsignalized intersections and driveways on major streets.

(4) Crossing Conflicts: Signalized intersections are the most positive means of dealing with crossing traffic and should therefore be highly rated for safety. Any location which controls cross traffic by STOP or YIELD signs is also relatively safe.

b. Grade acceptability is judged in terms of the slope and length of the grade. A general standard to apply is that a grade of 10 percent would be tolerable for a distance of 50 feet or less. Also, grades of five percent, for a length of 150 feet and longer, should be avoided.

c. The breaching of barriers may be one of the most important factors in providing continuity and increasing bike usage. The two most obvious physical barriers locally are the Rio Grande and the Interstate Highways. Three possibilities for safe bicycling crossings are recommended:

(1) A Bike Lane may be marked on the roadway. This criterion would not apply in those instances where insufficient roadway would result in decreasing the number of required motorized vehicle lanes.

(2) The sidewalk may be designated as a legal Bike Lane. Although bicycles and pedestrians generally do not mix well, the short distance of mixed use in this case is a mitigating factor. If sidewalks are used, then curb cuts and on and off-ramps must be provided, and sidewalks should be screened to protect bicyclists from automobiles and to prevent the rider from toppling over a low railing into the freeway or river below.

(3) Even in its safest form, a Bike Lane on a highway bridge forces the cyclist onto a busy street. A far better solution is to have a completely separate bridge for non-motorized traffic.

5. References:

Copeland, Roy Jr. Bikeway Design Data Manual, New Mexico State Highway Department, l976.

Guide for the Development of New Bicycle Facilities. American Association of State Highway and Transportation Officials, 1981.

New Mexico State Trails Handbook. New Mexico Park & Recreation Commission, 1974.

Smith, D. T. Jr. Safety and Locational Criteria for Bicycle Facilities, User Manual Volume I Bicycle Facility Location Criteria. Federal Highway Administration, U. S. Department of Transportation, 1976.

The Bikeway Study. Ad Hoc Bikeway Advisory Committee, Albuquerque, New Mexico, 1974.

The City of Albuquerque Subdivision Ordinance. Albuquerque Planning Department, 1979.

Guide For Development of New Bicycle Facilities, AASHTO, 1981 or latest.

Section 6. CURB CUTS AND DRIVEPADS

* Indicates regulation as established by Curb Cut Ordinance Article 8-13 R.O.A. 1994

A. Residential Curb Cut Requirements

This section applies to applications for curb cuts for single family, townhouse and duplex residences with individual lots.

1. Private driveway access to single family lots is not permitted on principal arterial, minor arterial, or collector streets. Access to single family lots is discouraged on major local streets.

2. *The width of drive allowed is 12-22' - Exceptions: 3 Car Garage, Parking of Recreation Vehicle or Boat off-street. Verification is needed for these exceptions. The drivepad can then be increased to 30' in width.

3. Common Drives - This is a common entrance area from the curb to the back of sidewalk. The driveways can be separated beyond the back edge of the sidewalk. The width allowed is up to 40' total. A letter of concurrence, signed by both property owners, needs to be provided prior to issuance of the permit.

4. Townhouses - For very small lots (40' frontage or less), the drives should be located such that drives are common for two lots, leaving some on-street parking area.

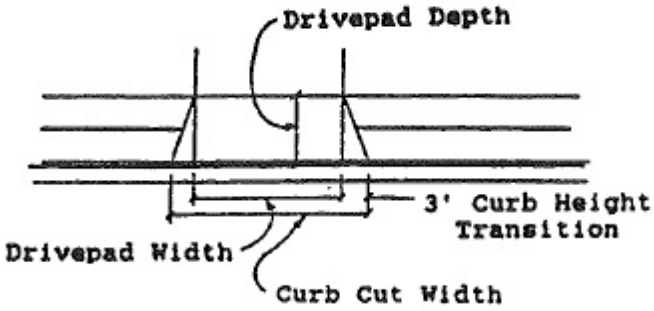
5. *The minimum distance between two drives on one lot is 22' of full height curb (6' is necessary for two curb height transitions for a total of 28' between the two drivepads).

6. *The minimum distance (for other than common drives) from the property line is 5-1/2' (3' transition + 2-1/2' separation to the property line). This can be reduced to 3' if:

   a. the drivepad for the adjacent lot is on the other side of the lot, and

   b. the owner presents a letter from the adjacent property owner agreeing to this reduction.

Drivepad Nomenclature



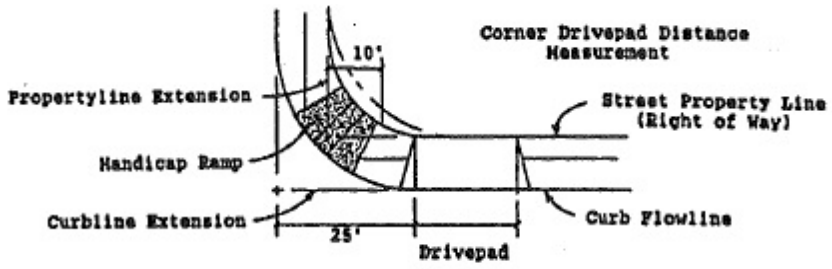
7. *The minimum length of frontage for two drives is 60'. Exception: Where frontage is on a street classified as collector or arterial the minimum is reduced to 50'

8. *Corner Properties - There are two governing conditions for the location of the drivepad:

a. A minimum of 25' from the face of curb from the point of intersection of the two curblines extended.

b. 10' from the point of intersection of the two property lines extended

The greater distance from the corner governs.



9. Drives are not to be located on major streets (collector or arterial streets) unless that street is the only frontage. Where this condition occurs the required width of drive is 16' minimum to a 25' maximum.

B. Curb Cuts Other Than Residential

The number of drives and characteristics of construction are dependent upon the classification of the street and the generation of traffic by the proposed development.

1. Street Classification

These are given on the Long Range Roadway System Plan as adopted by the UTPPB - Mid-Region Council of Governments.

General Policy

Street Classification	Access Policy
Principal Arterial	Most Restrictive
Minor Arterial	
Collector	
All others considered Local	Less Restrictive

2. Special Situations -

a. Limited Access Roadways - These are shown on the LRRSP*

Currently Designated Limited Access Roadways

Gibson Blvd. - From I-25 to San Mateo, Louisiana to Juan Tabo
Juan Tabo - Gibson to I-40
Montano - Coors to Rio Grande
Paseo del Norte Tramway

* -No driveways permitted. These are typically only on principal arterials or on the interstate/frontage road system. This may be for the entire roadway length or only segments - Check with Traffic Engineer - Transportation Development Division.

b. Roadways with Special Access Restrictions**

Roadways Currently Designated for Special Access Restrictions

Coors Blvd. - Central to Corrales - (Controlled by Coors Corridor Plan)
Coors Bypass - Central to South City Limits
Gibson Blvd. - From San Mateo to Louisiana
Unser Uptown Loop Rd.

**Others are to be added as access policies are determined by the Urban Transportation Planning Policy Board of the MRGCOG or through purchase of access control rights - contact Transportation Development Division.

c. State Highways with New Mexico State Highway Dept. Jurisdiction

For these areas, a permit from the District office is required in addition to City concurrence (located at 7500 East I-25 Frontage Road).

Roadways Currently Requiring State Highway Access Permits

I-25 Frontage Roads
State Road 528

Coors - St. Josephs to Alameda
Unser - I-40 to Ouray
Alameda - City Limit cast to I-25
Broadway - Souty City Limit to Candelaria
Candelaria - 2nd St. to Broadway
2nd St. - Candelaria North to City Limit.

3. Traffic Generation Factors:

Points of access which generate significant amounts of traffic need to be designed to a high standard to minimize operational and safety problems. Driveway characteristics for higher traffic generators include: greater throat widths, curb return style construction, reduced entrance grades, and potentially deceleration lanes. Traffic generation from developments are characteristically described by factors such as the size and type of the development.

a. Size of Development - This is described by the building square footage in the proposed development.

b. Type of Development - This determines the rate of generation per square foot which in turn will determine the impact on the adjacent roadway facility. In general, the following characterize some of the developments which generate at high and medium rates:

1. High volume traffic generators: Restaurants, Banks, Convenience Markets, Service Stations, Super Markets, Auto Car Wash, etc.

2. Medium volume traffic generators: Retail Shopping Centers, Offices, etc.

4. Maximum Number of Drives

Where driveway spacing is not prescribed by policy, the following can be used by a designer in laying out a proposed development:

a. Principal Arterials - 1-2 drives per 300' frontage depending upon various factors including the general layout of the site.

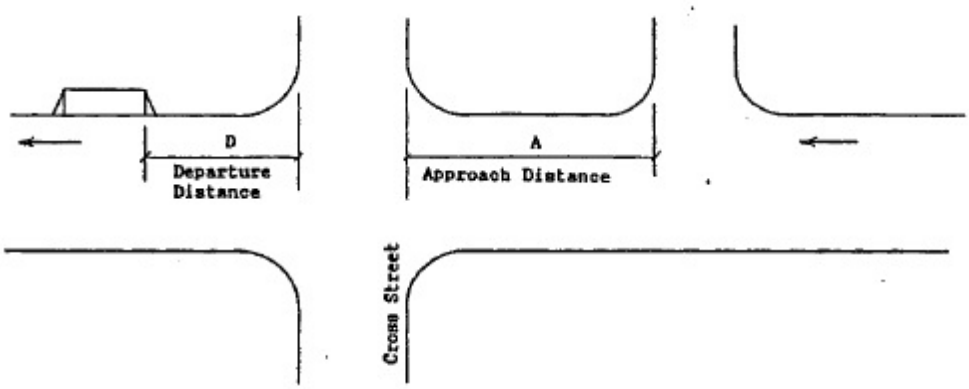
b. Minor Arterials - 1-2 drives per 200' frontage

c. Collectors - 1 drive per 100' frontage

Drives on major streets need to be located 20' or more from a property line or shared with the adjacent property.

5. Location of Drives

Drive locations are to be somewhat evenly spaced where there is a proposal for more than 1 drive. The following distances should be used as minimums from an intersection.



Cross Street Classification

	Arterial		Collector		Local*	
	A	**D**	**A**	**D**	**A**	**D**
Principal Arterial	**300'**	**200'**	**200'**	**150'**	**150'**	**100'**
Minor Arterial	**200'**	**150'**	**150'**	**100'**	**100'**	**100'**
Collector	**150'**	**150'**	**100'**	**100'**	**75'**	**75'**
Local*	**50'**	**50'**	**50'**	**50'**	**25'**	**25'**

A - approach distance, D - departure distance

* Additional distance may be required based upon queuing

6. Drives With Median Access

a. Streets with median channelization - Drives need to be placed such that the centerline of the drive is approximately centered on the median openings. Where a drive exists on the opposite side of the street, the centerline of new drive needs to be within 10' of the existing drive centerline.

b. Streets without median channelization - Where drives are to be constructed on opposite sides of the street, unless they are offset 50' or more, the centerlines need to be within 15' of each other.

7. Curb Return Construction vs. Drivepad Construction

Curb returns provide better entering and exiting characteristics for vehicles. These will be required where there are sufficient numbers of vehicles entering and exiting developments on arterials. They will be permitted in other cases given sufficient traffic generation or substantial use by vehicles with a large turning radius.

a. Curb Returns Required

On Arterials:

1. For high volume traffic generators
2. Development has median access with 25 or more parking spaces
3. Developments with 50 or more required parking spaces

b. Curb Returns Permitted

Arterials and Collector Streets - The construction of access points using curb return style construction is encouraged on Arterials and Collector streets.

Local Streets - 50 or more required parking spaces per drive or to accommodate large vehicles

8. Drivepads - Widths

a. Arterials and Collectors

1. Two Way Drives

- 30' minimum for right-turn in and out (no left turn access) - 35' desirable
- 36' minimum with left-turn access - 40' desirable

2. One-Way Drives (20' - 25') - These are only permitted where the circulation is self enforcing - that is when angle parking and one way aisles are used establishing the one way pattern from entrance to exit.

3. Widths for Larger Vehicles - Up to 50' width for tractor trailer combinations, mobile homes.

b. Local Streets

1. 25' minimum for two-way access - 25' to 35' permitted

NOTE: *Exception where 5 or less parking spaces are required - minimum 12' with reasonable access to and from street.*

2. No backing from designated parking stalls into the streets is permitted.
3. 40' to 50' where substantial large vehicle usage will occur
4. 12-20' for one-way drives (with appropriate signs and parking layout)

9. Widths, Radii for Curb Return Entrances

The width and radius of the entrance are dependent upon the design vehicle.

a. Arterial and Collector Streets

	Single Entrance/Exit Widths	Divided Entrance/Exit Widths

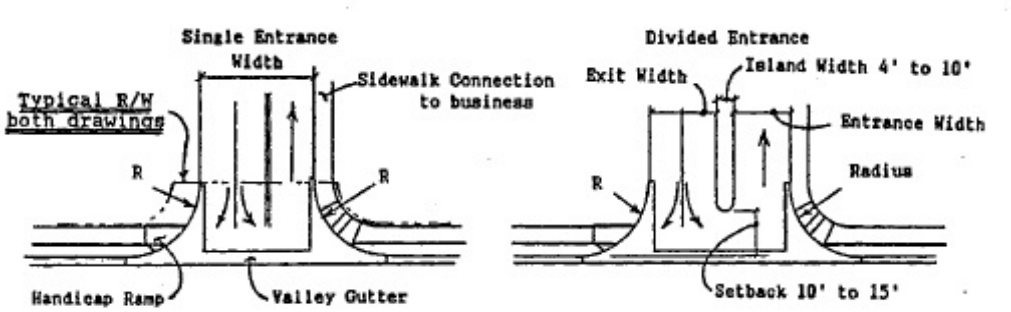
				Entrance	Exit

Design Vehicle	Radius at FL.	No Median Access	With Median Access		No Median Access	With Median Access
Car Only	20-30'	25-30'	36-40'	18'	18'	22'
SU-30*	25-30'	30'	36-40'	20'	18'	22'
WB-40**	30-40'	30-40'	40-45'	22'	20'	24'
WB-50***	35-40'	40-45'	45'	25'	20'	24'

* single unit truck-30' long wheel base 20' (refuse truck)

** tractor trailer-50' long-wheel base 40'

*** tractor trailer-55' long-wheel base 50' (18 wheeler)



b. Local Streets - Widths and radii are dependent upon the vehicle the access point is designed for:

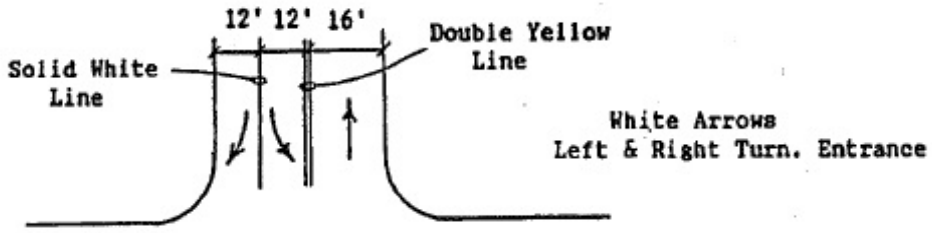
Radius	Width
15-35'	15-40'

c. Additional Requirements

- All curb return entrances require handicap ramps, valley gutters.
- Additional R/W or public roadway easement is required to be dedicated or granted to the return as shown on the above drawing.
- Arterial paving section is required in the area within the public R/W or easement.

10. Striping and Signing

a. Entrances require striping and arrows to define proper usage by entering and exiting vehicles.



b. Appropriate signing needs to be included with the construction of any driveway access, typically:

- One way exit and entrance signs
- Turn restriction signs

For further details on appropriate signing and striping that should be used for entrances, see the Manual for Uniform Traffic Control Devices, latest edition.

11. Grades

a. Curb return entrances - maximum initial grades

- For entrances with left turn access - 4%
- For right turn in and out only entrances - 6%

b. Drivepads

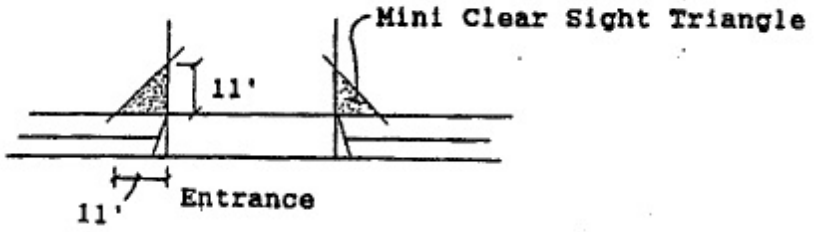
Drivepads are to be constructed to the street R/W line per City standard drawings except that a minimum of 6 feet drivepad depth shall be used.

If the R/W is 14' or more from the curb line, a 10' depth for drivepad construction is satisfactory.

12. Visibility for Driveways

Driveways need to have sufficient visibility for the motorist utilizing the entrance or exit to perform his maneuver safely. Visibility needs to be maintained in accordance with the AASHTO guidelines for intersection visibility (see figure IX-40 p762) For all driveways on collector or arterial streets, the applicant must check the driveway visibility to determine whether these guidelines are met. Landscaping, fencing and/or berming will need to meet the requirements for driveway

visibility. In addition, a mini-clear sight triangle needs to be maintained starting at the sidewalk and measuring 11 feet on a side as shown below.

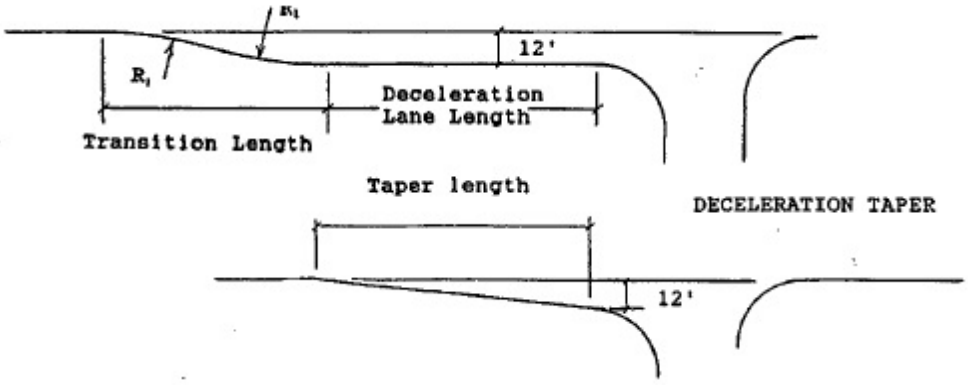


13. Right Turn Deceleration Lanes or Tapers

A right turn deceleration lane or a taper is required on arterial streets where the right turning volumes will exceed the following numbers in either the AM or PM peak of the adjacent street traffic.

	Design Speed of Roadway	Length
Taper Required:		
40 to 60 generated vehicles/hour	45-50	150'
	30-40	100'
Deceleration Lane Required:		
60 or more vehicles per hour	45-50	150'
+ 300'-150' reverse curve transition		
+ 150'-150' reverse curve transition	30-40	100'

Additional right-of-way for deceleration lanes or tapers must be dedicated.



14. Left Turn Lanes

These will be required if a drive utilizing a median opening is constructed. See Section B (median cuts) miscellaneous criteria. The left turn lane provides for both the storage and deceleration of left turning vehicles. Left turn lane lengths are dependent upon a number of factors including the cycle length of the upstream signal, left turn arrival rate, queuing factor. For unsignalized left turns, the following formula or table should be used to determine turn bay length.

Mean Arrival Rate Vehicles/Min	**Turnbay Length**	**Width**
.25	100' taper	12'
.25-1	50' + transition	12'
1.5	75' + transition	12'
2	100' + transition	12'

For mean arrival rates above 2 vehicles/min the following formula should be used:

Length = VL/c * * L

where: VL = number of left turns in the peak hour

c = cycle length of upstream signal

VL/c = mean arrival rate

= poisson arrival factor for 95% confidence level

L = ave. vehicle length - use 20' per vehicle for queues with 1% trucks

Transitions:

Design Speed	Length
45-50 MPH	300' - 150' Radius Reverse Curve
30-40 MPH	150' - 150' Radius Reverse Curve

15. Channelized Right and Left Turns

Right and/or left turn channelization may be required based upon factors such as one way roadways or the necessary restriction of movements at a drive. See Figures 23.6.1, 23.6.2.

16. Signalization

Where a development will cause significant traffic generation to possibly warrant a signal, the developer will be financially responsible for the signal installation that is required or Subdivision Improvements Agreement with appropriate financial guarantee in the case of potential future signal.

17. Abandoned Drives

Any drivepads which are abandoned must be replaced with sidewalk, curb and gutter by the property owner.

18. Common Drives

Drives that straddle property lines, or are entirely on one property but are to be used by another must be covered by an access easement(s). Sufficient area behind the drive for the proper operation of the drive must also be covered. A sample easement is shown in Figure 23.6.3. This easement must also recognize any existing lot line utility or other easements.

Figure 23.6.3
RECIPROCAL EASEMENTS FOR COMMON ACCESS

This Easement Agreement is entered into between (Party #1) owner of (Lot Description), City of (Albuquerque), County of (Bernalillo), State of New Mexico, and of (Party #2) owner of (Lot Description), City of (Albuquerque), County of (Bernalillo), State of New Mexico.

The parties have an interest in adjoining real estate situated in the City of Albuquerque, County of Bernalillo, State of New Mexico and described as follows:

(Property Descriptions)

The parties desire to create a common access easement between the above-described adjoining lots providing access, from a single access point on the abutting street, to said lots owned by them for the benefit of each of them; and therefore agree as follows.

An easement for a common access in favor of Lot (#1), owned by (Party #1), is created over the strip of land (Width) feet wide along the (direction) boundary line of Lot (#2), owned by (Party #2) and an easement for a common access in favor of Lot (#2), owned by (Party #2), is created over the strip of land (Width) feet wide along the (direction) boundary of Lot (#1), owned by (Party #1) for the purpose of creating a common access (width) feet wide for the benefit of both of the above described lots.

This easement is superior and paramount to the rights of any of the parties hereto in the respective servient estates so created, and the parties further agree that it is a covenant that shall run with the land.

The maintenance of the easement areas are the responsibility of the respective property owners.

In witness whereof, the parties hereto have executed this agreement as follows:

ACKNOWLEDGED:

Date _____, 19 ____

(Owner #1)

WITNESSED:
STATE OF NEW MEXICO)
COUNTY OF BERNALILLO)

On this __day of _____, 19___, before me personally appeared _____, and to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he (or they) executed the same as his (or their) free act and deed.

_____
Notary 1st Party

My Commission Expires

_____:

ACKNOWLEDGED:

Date _____, 19_____

_____
Owner #2

WITNESSED:

STATE OF NEW MEXICO)

COUNTY OF BERNALILLO)

On this __day of _____, 19__, before me personally appeared _____, and to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he (or they) executed the same as his (or their) free act and deed.

_____
Notary 2nd Party

My Commission Expires:

_____

Figure 23.6.1 - CHANNELIZED TURN - DRIVES & INTERSECTIONS

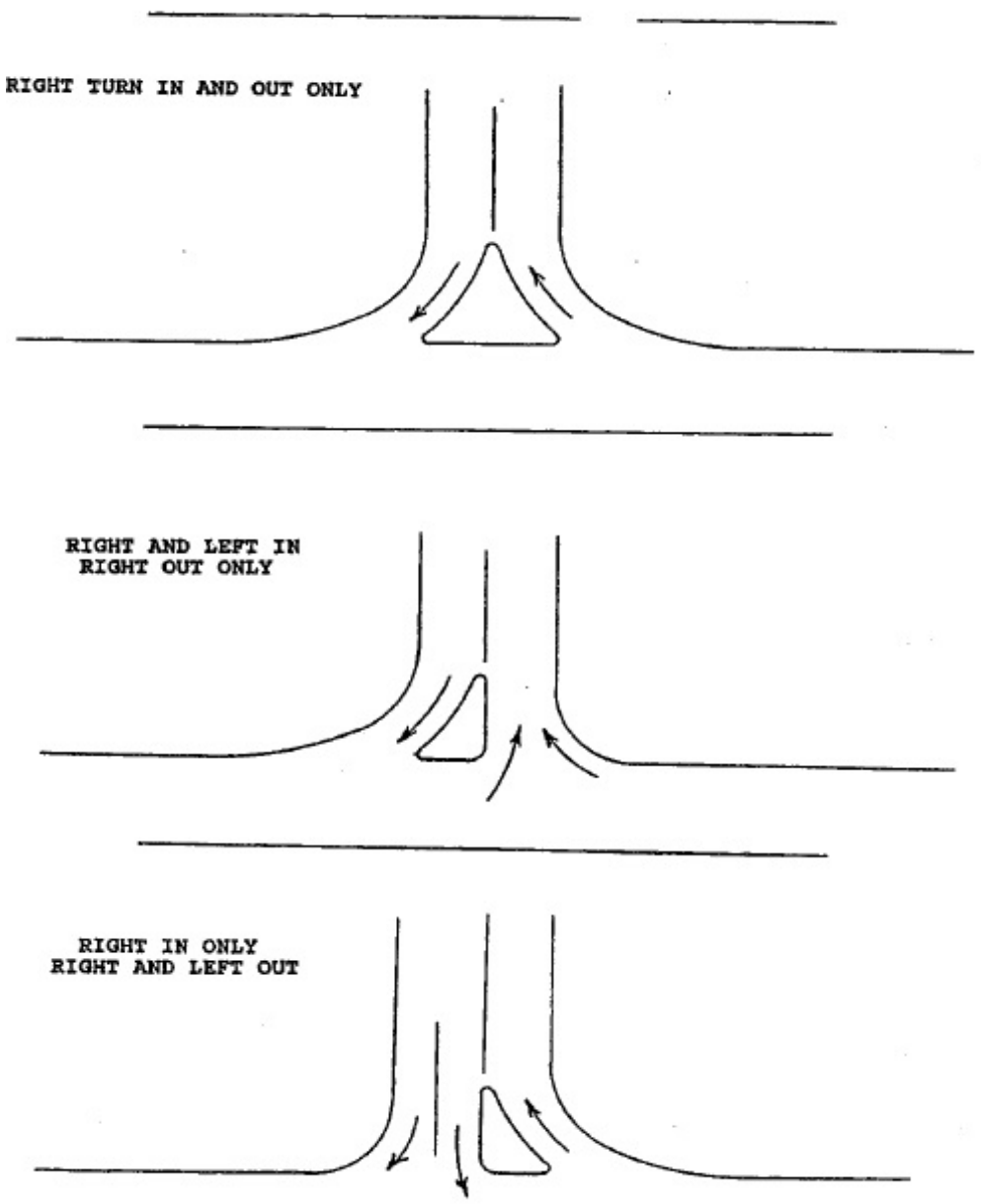
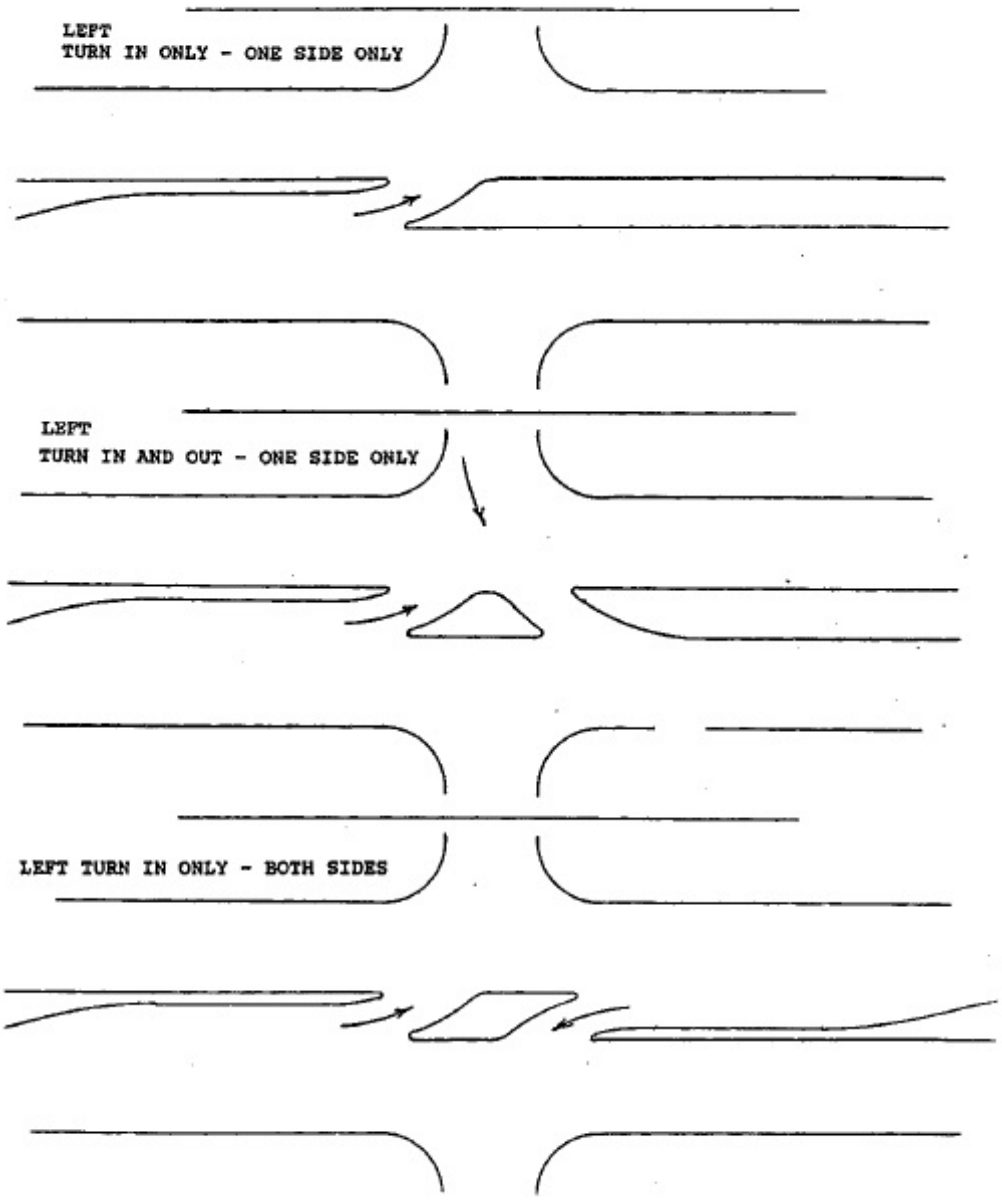


Figure 23.6.2 - CHANNELIZED TURN - MEDIAN OPENING



C. Drivepad Construction Procedure

There are two permits necessary to construct a drivepad. These are: 1. Curb Cut Permit, 2. Excavation/Barricading Permit. Permits are to be obtained in the order stated. The requirements for each of these permits is described below.

1. Curb Cut Permit Obtained from Transportation Development

In order to obtain a curb cut permit, a scaled site plan (see following sample drawings) is necessary to review its compliance with current policy. A curb cut permit is required for any construction in the street R/W which will permit access to a site. If the plan is in conformance with current policy, then a

curb cut permit will be issued. A building permit signed by Transportation Development does not require a separate curb cut permit plan.

a. For Residential Drivepads - Single Family and Townhouse type developments

The site plan needs to show the following elements:

1. The street name (s), address, width of lot along the street(s).

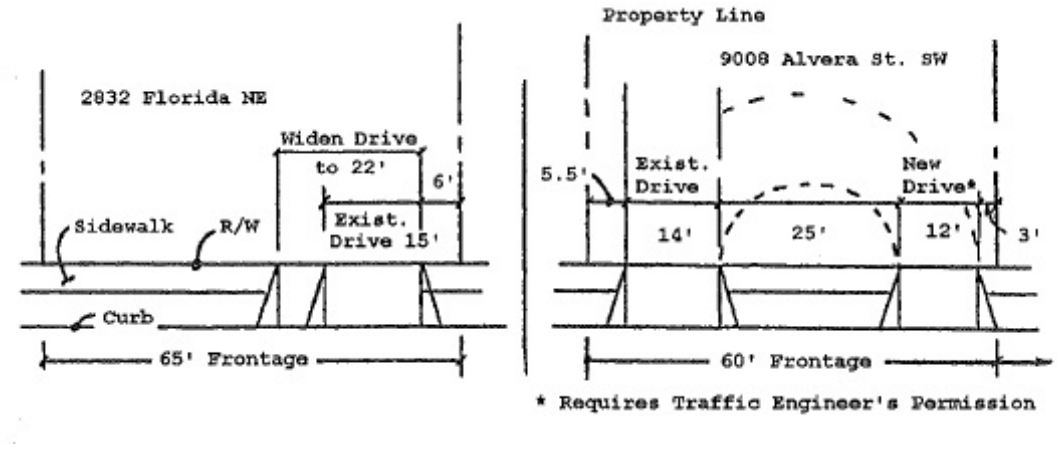
2. Any existing drivepads and obstacles such as fire hydrants, street lights etc. - width and location.

3. Show new drivepad or modification - width and location.

4. If the drivepad is to be located closer than 5.5' from the property line, a letter of concurrence signed by the neighbor affected is required. Also, the width and location of the neighbors drive is needed.

5. If a common drive is requested, the letter signed by both property owners is required.

Sample Drawings for Curb Cut Permits



b. For Non Residential Drivepads

The site plan needs to show:

1. The street name (s), address (lot and block), lot dimensions, R/W and curb lines.

2. Show any existing drives (width and location), any obstacles-including signs, street lights, fire hydrants, etc.

3. The location of any medians and openings (if any)

4. Parking layout, location of buildings, doors etc. in the building-landscaping areas-anything that influences parking and circulation on the site.

5. Show the proposed drivepad(s) on the plan.

If the plan is in conformance with current policy, then a curb cut permit will be issued.

c. Building Permit Plans

Driveways/curb cuts are reviewed at the time of building permit review. Upon approval of the building permit by Transportation Development, a separate curb cut permit is not required.

2. Excavation/Barricading Permit - Obtained from Construction Coordination

In order to obtain an excavating/barricading permit, the following information is required:

1. A New Mexico One Call Number (obtained at) 260-1990
2. Drivepad permit or Building permit signed by Transportation Development.
3. The name of the company that is doing the barricading (contractor or barricading company)
4. When the work is to be performed and for how long.
5. If any lane closures are required for major streets, a barricading plan is required.
6. The name of person or contractor doing the work (the contractor must be licensed and bonded for the kind of work to be performed).

If a homeowner wishes to construct the drivepad, he/she must:

1. Be the property owner
2. Post a $1000 Homeowners maintenance Bond
3. Present evidence of $500,000 liability insurance
4. Be approved by the excavation permit personnel
5. Have a contractor perform any curb and gutter replacement or modification

Note: *The homeowner may save a significant amount of money by having the curb "saw-cut" by a contractor.*

Fees - The excavation/barricading permit is the only permit for which a fee must be paid. The fee is based on the types and amount of construction required.

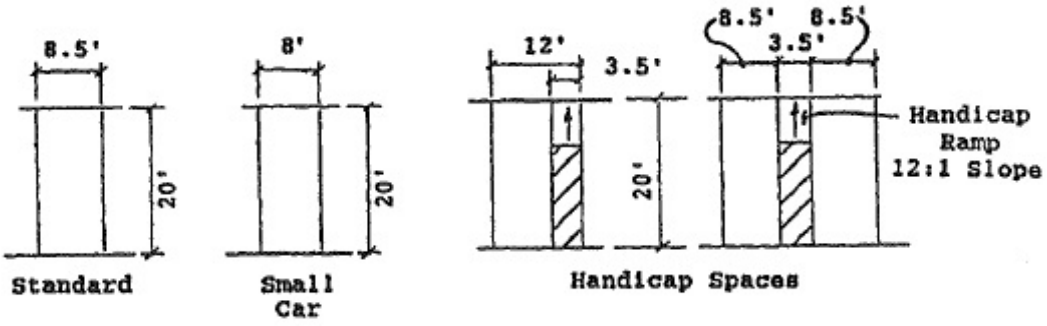
Section 7. PARKING AREA AND DRIVE THROUGH FACILITY CRITERIA

The City Zoning Code requires the design of access and circulation for parking areas and drive through facilities to be satisfactory to the Traffic Engineer. The design of these parking areas is a melding of a number of objectives of a development including safety, efficiency, aesthetics, etc. From a vehicular transportation point of view, one of the most critical areas of concern is the location and manner of access from the adjacent street. Section 6 should be consulted regarding the location and design standards for access points. The interface of the development adjacent to these areas also play a major role in how safely and efficiently they operate.

These guidelines for the layout of the parking areas represent engineering design standards which will result in good operational and safety characteristics. However, with the many variables in design and unique characteristics that can be encountered, the designer may need to investigate other ways of providing these desirable operational and safety characteristics. Prior to embarking on a design for these unusual conditions, the designer should contact the Traffic Engineer to reach agreement on the modifications to these guidelines.

A. Parking Stall Sizes

Parking stalls are required by the Zoning Code to be 8.5 feet wide and 20 feet long with a provision that if the premises contains more than 20 spaces, then one fourth of the spaces may be for small cars with dimensions of 8 feet wide and 20 feet long. Parking for the disabled shall be provided in accordance with the City Zoning Code, or other applicable requirements. Overhang areas are 2 feet for normal size spaces and 1.5 feet for small car spaces (Distance from wheel stop to the front of the parking stall). Vehicles may not overhang public right-of-way.



B. Circulation

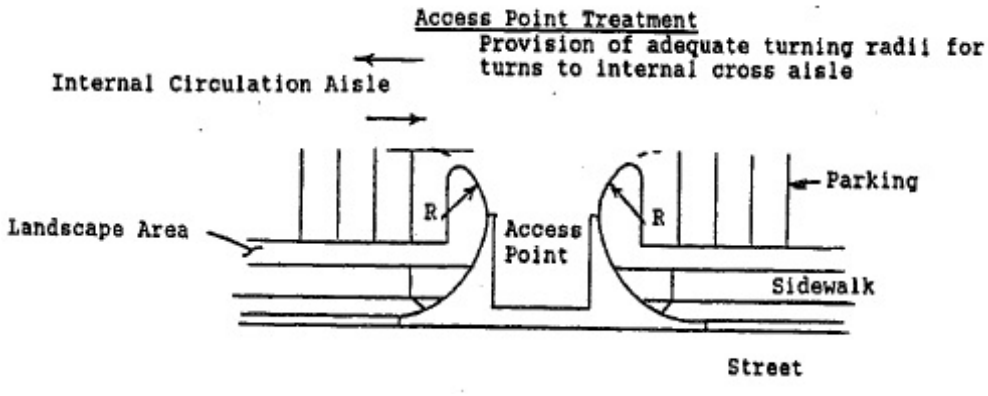
Parking areas need to provide for good internal circulation with a logical pattern that the driver can easily understand and follow.

1. General Layout Dimensions

Figure 23.7.1 space provides the layout relationships between parking stalls and aisle widths for both large and small car parking areas. Where a large number of small car spaces are utilized, these spaces should be spread throughout the parking area instead of being clustered in one area.

2. Treatment Of Access Points

The interface of parking and the access from the adjacent street is an important feature which needs to be held to a high standard. This is necessary to ensure that vehicles are able to pull in and out of the street without interference from other vehicles in this critical area. Adequate turning radii and queuing areas need to be maintained in order to meet this objective. Landscaped islands at the entrance need to be included which will provide for this protection and adequate turning area. 15 foot radii should be used where the design needs to accommodate cars only, while 25' radii should be used to accommodate turns by refuse, fire, and larger service vehicles.



3. Internal Aisle Connections

In parking areas of 100 spaces or more, the ends of parking aisles need to be defined by landscaped islands. These islands serve to not only define the parking stalls but also to provide adequate radii for vehicle turns and intersection visibility. Where the design vehicle is a passenger car, the radius to be used should be 15 feet (See Figure 23.7.2). Where the aisles will function for deliveries by larger trucks, refuse, and/or fire vehicles, a 25' radius or larger should be used.

4. Maximum Aisle Lengths

Aisle lengths should not exceed 400 feet and desirably 300 feet without providing for internal circulation between aisles. This maximum is necessary to discourage high vehicular speeds and volumes within parking aisles.

Figure 23.7.1 - PARKING STALL LAYOUT DIMENSIONS

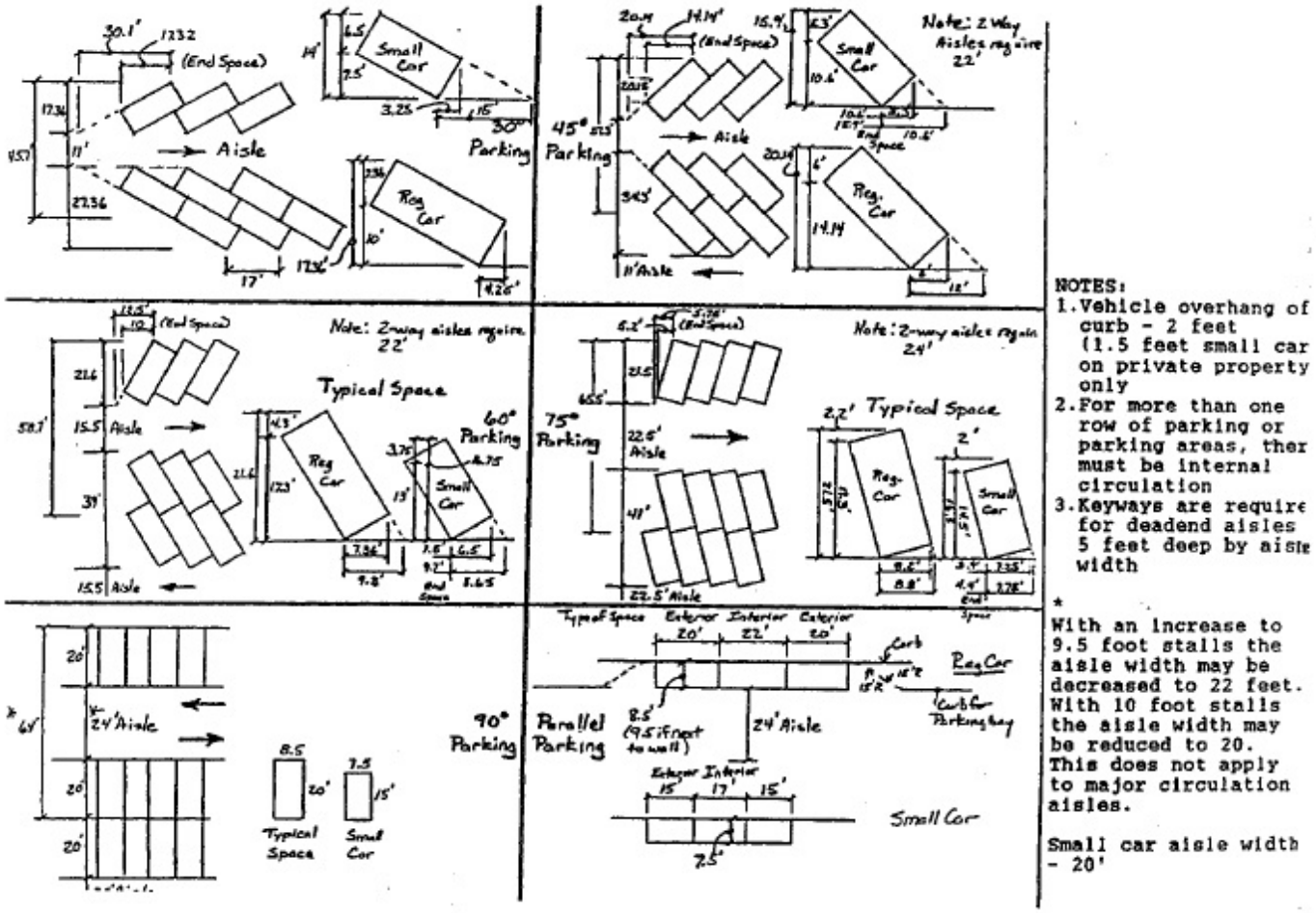
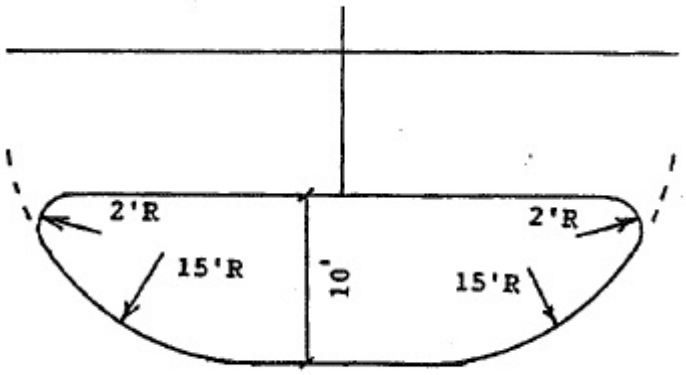
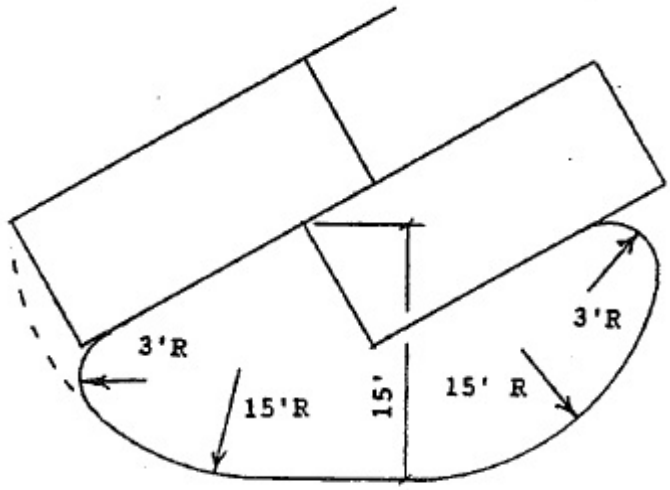


Figure 23.7.2 - END OF AISLE ISLANDS



90° PARKING



60° PARKING

5. Sidewalk Connections

A separate pedestrian path, minimum six feet wide needs to be included connecting the sidewalk in the public right-of-way to the buildings within the development. This path needs to conform to handicap accessibility requirements.

6. Curbing

Curbing should be used to separate landscaping from parking areas and pedestrian ways. Also curbing should be provided to prevent overhang of parking stalls or circulation of vehicles or sidewalk or right-of-way. A visual barrier needs to be maintained along the public street clearly defining the points of access. This should be accomplished through a landscaping strip between the parking area and the

sidewalk with a minimum width of 4 feet (Landscaping regulations may require a greater width). Where this is not feasible, a minimum 2 foot wide island should be used to create this separation.

7. Fire and Emergency Access

Provision for access by fire and emergency vehicles needs to be in accordance with the Fire Code.

8. Service Areas

Adequate service areas and circulation need to be provided for in the layout for a site. The analysis for this needs to include circulation, backing, and storage requirements for the design vehicle. Minimum 30 foot aisles at the rear of buildings need to be provided where this kind of service access is to be used. Truck ramps, refuse/compactors and similar facilities need to be separated from the service circulation aisle. Visibility for parking and drive need to be maintained in service areas. The design for service should provide for access without vehicles backing from the street.

9. Layout of Large Parking Areas

In large developments, where significant accumulations of traffic occur, main aisles or circulation roadways need to be established which do not have any parking spaces backing into them. These are needed to provide adequate visibility for vehicles and to increase visibility of pedestrians. A critical area of pedestrian concentration is in the pedestrian entrance to buildings. In developments with more than 400 parking spaces, a circulation aisle needs to be established which will help to provide for pedestrian safety in this area. The perimeter roadway separating the parking area from the building should be narrow enough to discourage parking. A 28 foot roadway accomplishes this need while providing adequate width for 2-way traffic, emergency vehicles, and the passing of loading and unloading vehicles.

In very large developments, perimeter roadways need to be established which circulate vehicles internally between parking areas and to access points. Ring roads or partial ring roads should be provided for centers larger than 250,000 sq. ft. Widths of these roadways need to be based upon traffic volumes which will be using these facilities as well as the numbers of turning vehicles and types of intersections that are incorporated. Flairing of the roadways for separate turning lanes will be dependent upon the type of intersection control that is anticipated. For centers with 500,000 sq. ft. or more dedicated turning lanes or additional lanes may be required.

Long straight roadways within parking areas lead to unacceptable vehicular speeds where a mix of vehicles and pedestrians occur.

Careful attention to design which introduces curves and/or breaks in the pattern should be used to help control speeds.

10. Signing, Striping

Adequate signing and striping needs to be incorporated into the design of the parking area which will help to convey to the motorist the proper use of the facility.

C. Access Point Lanes and Queuing

Queuing needs and the number of lanes that should be provided for access points will need to be evaluated with each proposed entrance to a development. The location of any cross access aisles will

need to preserve the queuing area for peak generation periods. Where divisional islands are used on major entrances with long queuing areas, intermediate access aisles should not be established which would encourage wrong way movements. The following table should be used in determining the access point throat lengths necessary to make adequate provisions for queuing. For those land uses which are not represented, comparable lengths should be established based upon traffic generation characteristics contained in the ITE publication Trip Generation.

TABLE 23.7.1 QUEUING - THROAT LENGTHS FOR ACCESS POINTS

	Minimum Throat Length		
Land Use	**Size of development**	**Collector**	**Arterial**
Light & Heavy Industrial (sq.ft.)	<100,000	25	50
	100,000-500,000	50	100
	>500,000	50	200
Discount Store (sq.ft.)	<30,000	25	50
	>30,000	25	75
Shopping Center (sq.ft.)	<250,000	25	50
	250,000-499,999	50	75
	500,000-750,000	75	200
	>750,000	125	250
Supermarket (sq.ft.)	<20,000	50	75
	>20,000	75	125
Apartments (units)	<100	25	50
	100-200	50	75
	>200	75	125
Quality Restaurant (sq.ft.)	<15,000	25	50
	>15,000	25	75
Drive-In Restaurant (sq.ft.)	<2,000	25	75
	>2,000	50	100
General Office (sq.ft.)	<50,000	25	50
	50,000-99,999	25	75
	100,000-199,999	50	100
	200,000-500,000	100	150
	>500,000	125	250
Motel (rooms)	<150	25	75
	>150	25	100

D. Grading

Maximum grades should not exceed 8% in parking areas. For major circulation aisles and adjacent to major pedestrian entrances, the grades should be kept to 6% or less. Handicap access to buildings needs to be maintained. Contact City Zoning for details.

E. Drive-Through Facilities

The layout of drive through facilities needs to take into account the queuing characteristics of the facility that is being designed. The integration of the drive through into the overall site should be such that queuing will not interfere with either the entry/exit to the site or with parking and circulation aisles.

Typical queuing lengths that must be provided for drive through facilities are as follows:

- Banks - 6 vehicles per window (120 ft.)
- Fast food restaurants - 5 vehicles (100 ft.)
- Other uses - the number of vehicles that should be designed for will be based upon the expected queue- check with Traffic Engineer.

Minimum lane widths are 12 feet minimum with a 25 foot minimum radius (inside edge) for all turns. (A 15 foot radius can be used with an increase in lane width to 14 feet).

F. Traffic Circulation Layout Site Plan Checklist

The City Zoning Code requires the design of access and circulation for parking areas and drive through facilities to be satisfactory to the Traffic Engineer. The design of these parking areas is a melding of a number of objectives of a development including safety, efficiency, aesthetics, etc. From a vehicular transportation point of view, one of the most critical areas of concern is the location and manner of access from the adjacent street. The interface of the development adjacent to these areas also plays a major role in how safely and efficiently they operate. These guidelines for the layout of the parking areas represent engineering design standards that will result in good operational and safety characteristics. However, with the many variables in design and unique characteristics that can be encountered, the designer may need to investigate other means of satisfying desirable operational and safety characteristics. Prior to embarking on a design for these unusual conditions, the designer should contact the Traffic Engineer to reach agreement on the modifications to these guidelines. Typically, Traffic Circulation Layout (TCL) Site Plans are required for commercial and institutional buildings, multi-family residential buildings and commercial additions of 500 square feet or more, refer to the procedures for TCL and drainage.

NOTE: *The following checklist is intended to be used as a guide for preparing your Traffic Circulation Layout Plan to meet any or all of the traffic requirements. It is only a guide. Some items may not be applicable to your particular project; some items may require more detail.*

I. General Information

A. Completed Drainage/TCL Information Sheet - (DPM Volume 1, Chapter 17)

B. Planning History-Relationship to approved site plans, masterplans, and/or sector plans site

C. Description:

1. Vicinity map (zone atlas map) showing location of the development in relation to well-known landmarks, municipal boundaries and zone atlas map index number

2. Address and legal description or copy of current plat

3. All requests for variances from policies, ordinances or resolutions which are necessary to implement this plan must be specifically identified

4. Type of development (restaurants, banks, convenience markets, service station, super markets, auto car wash, etc.)

5. Size of development

6. Parking spaces required by Zoning Code or prior EPC approved Site Development Plan

7. Executive Summary-Provide a brief yet comprehensive discussion of the following:

a. General project location

b. Development concept for the site

c. Traffic circulation concept for the site

d. Impact on the adjacent sites

e. Reference any applicable Traffic Impact Studies (TIS) or previously approved plans

f. Variance required to accommodate unusual site circumstances

II. Plan Drawings

A. Professional Architect's/Engineer's stamp with signature and date

B. Drafting standards: (Reference City Standards, DPM Volume 2, Chapter 27)

1. North Arrow

2. Scales-recommended engineer scales:

a. 1" = 20' for sites less than 5 acres

b. 1" = 50' for sites 5 acres or more

3. Legend-see DPM manual, Volume 2, Tables 27.3a - 27.3d for recommended standard symbols (or provide a clear, concise, alternate legend)

4. Plan drawings size: 24" x 36"

5. Notes defining property line, rights-of-way, signs, street lights, fire hydrants, medians, water meter boxes, pavement limits and types, sidewalks, landscape areas, project limits, and all other areas whose definition would increase clarity

C. Existing Conditions:

1. On-site

a. Identification of all existing buildings, doors, structures, sidewalks, curbs, drivepads, walls, etc., and anything that influences parking and circulation of the site

b. Indication of all existing access easements and rights-of-way on or adjacent to the site with dimensions and purpose shown

2. Off-site

a. Identification of the right-of-way width, medians, curb cuts, street widths, etc. (both sides of street)

D. Proposed Conditions: Proposed conditions should generally be superimposed on the drawings showing existing on-site and off-site conditions. Separate sheets may be used for on-site and off-site areas depending upon circumstances.

1. On-site

a. Indication of all proposed access easements and rights-of-way on or adjacent to the site with dimensions and purpose shown

b. Slopes

(1) Parking lots require a slope between 1% min and 8% max.

(2) Parking areas adjacent to major circulation aisles or adjacent to major entrances 1% min to 6% max

(3) Handicap parking 1% min to 2% max

c. Clearly delineate project phasing. A key map is recommended.

d. Parking stall sizes: (Reference City Standards, DPM, Figure 23.7.1)

e. Circulation:

(1) General layout dimensions: Figure 23.7.1 provides the layout relationships between parking stalls and aisle widths for both large and small car parking areas

(2) Treatment of access points-curb cuts and/or drivepads need to comply with Chapter 23, Section 6 (if not, discuss in Executive Summary)

(3) Internal aisle connection:

(a) Parking lots with 100 or more spaces must have landscaped islands at the ends of each row of parking

(b) Landscape island radius for passenger car is 15 feet (see DPM Figure 23.7.2)

(c) Landscape island radius for delivery trucks, fire trucks, etc. is 25 feet or larger (see DPM figure 23.7.2)

(4) Maximum aisle lengths 400 feet without internal circulation between aisles

(5) Sidewalk connections:

(a) Provide a 4' sidewalk from the public sidewalk to the buildings within the development

(b) Provide a min 5' wide sidewalk when the stall will overhang the sidewalk

(c) Clear pedestrian route accessible should be provided when the parking space may overhang the sidewalk

(6) Curbing: Provide a min 6" or max 8" high concrete barrier curb or other acceptable barrier between landscaping and parking areas and/or drive aisles

(7) Fire and emergency access: Provision for access by fire and emergency vehicles needs to be in accordance with the Albuquerque Fire Plan Checking Division

(8) Service Areas:

(a) Circulation:

1) Design delivery vehicle route needs to be shown

2) No truck ramps, refuse/compactors or similar facilities permitted within circulation aisle

(b) No backing into or from public street allowed

(c) Service vehicle and/or refuse vehicle maneuvering must be contained on-site

(d) Service aisle width required:

1) Two-way traffic is 30'

2) One-way traffic is 20'

(9) Signing, Striping: Adequate signing (one-way, do not enter, etc.) and striping needs to be incorporated into the design of the parking area which will help to convey to the motorist the proper use of the facility

2. Off-site

a. Rights-of-way and easements to accommodate existing or proposed public street infrastructures shall be provided when necessary to support this development

b. Handicap ramps are required at street corner if site abuts the corner

E. Access point lanes and queuing: (See Table 23.7.1)

F. Drive through facilities-Discuss compliance with Chapter 23, Section 7

Section 8. TRAFFIC IMPACT STUDIES

***Note**: This section outlines the basic warranting criteria, review process and format for traffic impact studies. Much of this material is provided as general guidance. Site specific circumstances may mandate more or less study requirements.*

A. Warranting Criteria

1. Determination must be made whether a Traffic Impact Study (TIS) is required to be submitted with applications for rezoning, subdivision, sector plan, site development plan, building permit based upon traffic generation.

2. Site generated traffic of 100 or more additional (new) peak direction, inbound or outbound vehicle trips to or from the site in the morning or evening peak period of the adjacent roadways or the developments peak hour.

B. Report Preparation and Review

1. Traffic Impact Study Review Task Force

Once the determination is made that a Traffic Impact Study is required, a scoping meeting with the Traffic Engineer and the TIS Task Force needs to be scheduled. As identified in the recommendations for traffic impact study review, a review task force will be established from affected City staff to scope and review any required traffic impact studies.

2. Steps in report preparation and review (in order):

- Scoping letter for TIS including turning movement counts for signalized intersections and signal timing data as provided by City staff.
- Prepare draft TIS for review in accordance with prescribed format and scoping letter utilizing the most current edition or reference material and the latest version of analysis software.
- Submit draft TIS .
- Staff comments provided for necessary revisions to produce final report.
- Submit final report.

C. Report Format

1. Introduction and Summary

a. Study Purpose

A general statement describing the intent of the report, and the reason it is being submitted (e.g., in support of a zoning change request, site plan, etc.).

b. Study Procedures

1. Information sources

2. Service levels to be provided - The minimum standard level of service shall be LOS D on roadway elements where the level of service is controlled by traffic control devices, e.g., signalized or

stop controlled intersections. For intersections, this applies for each approach and each traffic movement. For arterial roadway segments where the level of service is not controlled by traffic control devices, the minimum standard level of service shall be LOS C.

3. Scope of considerations (e.g., influence area and time frame) - The influence area is the area encompassing the roadway elements that are assumed to be impacted by the proposed development, and will be included in the impact study. The influence area will be defined by the City of Albuquerque Traffic Impact Study Task Force in the initial scoping meeting with the study preparer.

c. Executive Summary (as required)
(To be submitted under a separate cover)

1. Site Location and Study Area

2. Development Description

3. Principal Findings

4. Conclusions

5. Recommendations

2. Existing Metropolitan Area Characteristics

This characterization should represent current conditions and should generally be no more than one year old. This information should include the following:

a. General Area Characteristics

1. Location within the urban area (vicinity map).

2. General land use development adjacent to the site.

3. Existing zoning at the site and for adjacent lands.

4. Site accessibility - A general plan depicting the existing and proposed access locations.

5. Other planned and approved developments - A description of the location and type of other planned and approved developments in the influence area.

b. Area Street Network

A detailed description of the street network in the influence area which includes all of the geometric elements necessary for capacity analysis.

c. Existing Traffic Volumes

For all arterials and collectors in the influence area. Existing traffic volumes will be provided with the initial scoping letter for existing signalized intersection. For intersections where existing traffic counts are not available, the applicant will count the intersections in accordance with NMSH&TD standards.

d. Existing Levels of Service

For all roadway elements in the influence area, including site access facilities. The existing levels of service will generally be provided by City staff.

e. Existing Transit Service

3. Proposed Site Traffic Characteristics

a. Development Characteristics

- The development characteristics must include the following:

- An estimate of implementation phasing of the proposed development, to include the location and estimated date of occupancy of each phase.

- The specific type of land use to be implemented in each project phase, for example, gas station, hotel, residential dwelling units, etc., and the intensity of land use (e.g., square feet of floor space, number of dwelling units, etc.). The land use type and intensity should be expressed in the same terms as indicated in the ITE Trip Generation Manual for a given land use type.

- Proposed access locations for each project phase, indicated on a drawing of the highway network and showing approximate distances to existing or proposed signalized intersections on the adjacent roadway system.

b. Trip Generation Rates

For the proposed development, and other planned developments in the influence area (data for other planned developments shall be taken from previous impact studies as appropriate). The source of trip generation rates shall be the current edition of Trip Generation, published by the Institute of Transportation Engineers (ITE). Other trip generation rates that are deemed to represent local conditions may be used as prescribed by the City staff, or as suggested by the study preparer and agreed to by City staff. In the latter case, however, the burden of justifying the validity and use of trip rates other than those in the ITE Manual is on the study preparer.

c. Trip Generation

For the proposed development and the other planned developments in the influence area (data for other planned developments shall be taken from previous impact studies as available). Assumptions regarding the types of trips must be clearly stated, and discussed with City staff at the initial coordination meeting.

d. Metropolitan Trip Distributions

The directional distribution of traffic accessing and egressing the study site. This distribution is to be determined using the most recent edition of the Mid-Region Council of Governments (MRCOG) socioeconomic forecasts document.

e. Traffic Assignment

The assignment of trips entering and exiting the study site. These assignments will generally be required for both morning and evening peak hour condition.

4. Future Traffic Conditions and Analysis Years

a. Project Implementation Year

Traffic forecasts shall be developed for the year the development is to be completed. A project implementation year analysis must be performed for every project, or for each phase of a project, that satisfies the traffic impact study warrant criteria. It is recognized that a projection of current trends may not always be reasonable based on the existing roadway level of service, location and degree of land development. Therefore, transportation system improvements in the study area that are programmed, committed or highly likely to occur during the forecast period should be included in the analysis.

If the implementation of the proposed development is to be phased in over several years, analyses will be required for the implementation date of each phase where the criteria for performing a traffic impact study is met, or as directed by City Public Works Department staff. Traffic volumes must be determined which will account for three conditions:

1. Growth in through traffic - Through traffic can be estimated using growth factors based on the most recent five years of historical volume data. The use of growth factors is most appropriate for development periods of five years or less. Beyond a five year period growth rates should be reviewed with respect to reasonableness in comparison to roadway capacity limitations, and the long-range traffic forecast from the MRGCOG regional forecast model.

2. Other planned development - Other, off-site development which is to occur prior to the project implementation year must be accounted for, and the traffic associated with this development included in the analysis. Where previous impact studies have been produced, the traffic results should be incorporated into the analysis. For sites without impact studies, trip generation, distribution, and assignment should be based on an estimate of the "most likely" land use.

The sum of the through traffic and the traffic generated by off-site development in the study area represents the background traffic for the implementation year analysis.

3. Site traffic - This is the implementation year traffic attributable to the site development. The site traffic plus the background traffic represents the total traffic on the study area roadway system.

5. Traffic Analysis

a. Intersection and Roadway Analyses

1. Identified intersections and roadways to be studied (includes site access and egress points).

2. Identify typical signal timing for existing signalized intersections.

3. Calculate intersection and roadway capacity and LOS for morning and afternoon peak periods under the following conditions:

(a) Existing traffic (may be given by City Public Works Department staff)

(b) Project implementation year (includes other planned developments)

(i) without proposed development (background traffic only)

(ii) with proposed development (background plus site traffic)

4. The analysis shall include the programmed or planned elements of the highway system for the implementation year. The analysis of existing, or other warranted, signalized intersections shall be based on the operational/design procedures in the Highway Capacity Manual (HCM) (or equivalent as approved by City staff) for the project implementation year. The analysis of the implementation year may be performed using the planning or operational method as described in Chapter 9 of the HCM, as deemed appropriate by City Public Works Department staff. Analysis of unsignalized locations, including major access driveways shall be based on the methodology contained in Chapter 10 of the HCM.

b. Identify Alternative Intersection and Roadway Designs

Alternative configurations shall be proposed for each intersection and roadway which fails to maintain the standard levels of service in the implementation year when considering either of the following conditions:

1. Background traffic only

2. Background plus site traffic

General description of roadway and intersection improvements are required for the horizon year, as deemed appropriate by City Public Works Department staff.

c. Evaluate Alternative Intersection and Roadway Designs

The capacity and level of service of each of the alternative intersection and roadway design shall be determined using the operational/design procedures of the 1985 HCM for the implementation year. Intersection analysis may be performed for the horizon year using the planning or operational methods of the 1985 HCM, as deemed appropriate by City Public Works Department staff.

d. Perform Signalization and Stop Sign Warrant Analyses

All locations meeting signal and stop sign warrants based on traffic volume in the implementation year should be identified. If an intersection is found to meet signal warrants based on the criteria contained in the Manual on Uniform Traffic Control Devices (MUTCD) in the project implementation year, a signalized intersection operational analysis shall be performed using the procedures contained in the HCM. If the signal warrants are met in the horizon year, a planning level analysis shall be conducted according to the procedures described in the HCM. Recommendations for signal installation should be made as signal warrants are met. Upon review of the recommendations contained in the Traffic Impact Study, the Traffic Engineer will make a determination of whether the signal should be installed and/or provisions made for future signal installation. This determination shall be included in the final copy of the Traffic Impact Study.

e. Site Circulation and Parking

An assessment shall be provided of the on-site circulation system and parking requirements, queuing needs, and access lane requirements.

6. Site Access Requirements

A description of the improvements needed to meet design and operational standards both on and off site.

a. Site Access/Circulation Plan

b Roadway Improvements

1. On-site

2. Off-site

3. Implementation Phasing

c. Transportation System Management Actions

d. Other

7. Conclusions

A summary of the report which highlights changes in intersection or street configurations necessary to meet design and operation standards.

8. Appendix

a. Support Data for Analyses

b. Capacity Analysis Worksheets

9. Off-site Mitigation Recommendations for the Subject Site