

MINIMUM STREET DESIGN
STANDARDS

CITY OF LAVACA, ARKANSAS

ARTICLE 1
PURPOSE AND DEFINITIONS

Section 1
PURPOSE

The City of Lavaca, Arkansas, wishes to establish minimum standards that will provide for the sound design and construction of new streets in the City. All construction of proposed public streets within the City Limits of Lavaca or within the planning jurisdictional area of the City of Lavaca shall conform to the requirements of the minimum standards set forth herein.

Section 2
DEFINITIONS

Definitions not expressly prescribed herein are to be construed in accordance with customary usage in municipal planning and engineering practices. Wherever used in these design standards, the word "may" is permissive, while the word "shall" will be interpreted in its mandatory sense. For purposes of interpreting these design standards, certain words used herein are defined as follows:

City: City of Lavaca, Sebastian County, Arkansas

City Council: The governing body of the City of Lavaca consisting of the Council Members elected to their respective positions by the citizens of the City of Lavaca.

City Clerk, City Inspector, etc.: Any office referred to in these design standards by title, i.e. City Administrator, City Attorney, City Inspector, etc., shall be the person so retained by the City or elected to this position or his duly authorized representative, that is qualified to perform the function referred to herein.

Cul-de-sac: A local street with only one outlet and having an appropriate terminal for the safe and convenient reversal of traffic movement.

Developer: The person, firm, partnership, corporation, or other entity planning or constructing a public street.

Engineer: A person registered and duly authorized under the provisions of the Arkansas Engineering Registration Act to practice the profession of engineering in the State of Arkansas.

Mayor: The Mayor of the City of Lavaca elected to his/her position by the citizens

of the City of Lavaca.

Pavement Width: The portion of a street available for vehicular traffic. Where curbs and gutters exist, it is the distance from edge of gutter to edge of gutter.

Street A public right of way, however designated, which provides vehicular access to adjacent areas.

Streets, Arterial: The term 'arterial street' shall designate the principal traffic thoroughfares continuous across the City, which are intended to connect distant parts of the City or adjacent thereto, and act as principal connecting streets with State and Federal highways. 'Arterial streets' shall be as designated on the Master Street Plan for the City.

Street, Collector: The term 'collector street' shall refer to a street which is continuous through several residential districts and is intended as a connecting street between residential districts and thoroughfares and business districts. 'Collector streets' shall be as designated on the Master Street Plan for the City.

Street, Classification: A description of streets based on their character of service. There are three major classes of streets: Arterial, Collector, and Local streets.

Street, Local: The term 'local street' shall refer to a street which is intended primarily to serve traffic within a neighborhood or limited residential district, and which is not necessarily continuous through several residential districts. All public streets are considered to be 'local streets' unless classified otherwise on the Master Street Plan for the City.

Street, Right of Way Width: The words 'street right of way width' shall refer to the perpendicular distance between the lines which delineate the right of way of a street. It runs from abutting property line to abutting property line.

ARTICLE II DESIGN AND CONSTRUCTION STANDARDS

Section 1 GENERAL PROVISIONS

The design and construction of new street improvements shall be in accordance with the design standards set forth herein and other codes and ordinances adopted by the City. Where there is a conflict between these design standards and other codes or ordinances previously adopted by the City, the more stringent provision shall apply.

Section 2
GEOMETRIC DESIGN STANDARDS

All new street improvements shall be designed in accordance with the Minimum Geometric Design Standards as shown in Table 1 and with the Street Design Cross Sections for the various classifications of streets shown on Figures 1 to 4.

A. **STREET RIGHT OF WAY WIDTHS**

All streets shall be constructed within right of way dedicated to the City of Lavaca. No private streets are allowed. The minimum street right of way width shall be as set forth in Table 1. The right of way line at the corners of intersecting streets shall be rounded to provide the normal distance between the radius of the curb return and the right of way line.

B. **INTERSECTIONS**

The center line of no more than 2 streets shall intersect at any point. Street intersections shall be as nearly at right angles as possible. No street shall intersect another street at an angle less than 75 degrees.

Proposed new intersections along one side of an existing street shall, wherever practicable, coincide with any existing intersections on the opposite side of the street. Street jogs with centerline offsets of less than 150 feet shall not be allowed without special approval of the Planning Commission. Intersections along Principal Arterial Streets of less than 600 feet shall not be allowed without special approval of the Planning Commission.

C. **CUL-DE-SACS**

Cul-de-sacs or courts designed to have one end closed shall not exceed 1000 feet in length without special approval of the City.

Section 3
STREET CONSTRUCTION STANDARDS

All new streets shall generally be improved with curbs and gutters, aggregate base, asphalt concrete or Portland cement concrete surface, underdrains, sidewalks, and driveways.

A. **PAVEMENT AND BASE**

1. **Design Criteria**

All streets shall be constructed with an asphalt concrete pavement constructed on crushed stone base material. Full depth asphalt pavement or Portland cement concrete pavement may be used as an alternate pavement section.

The thickness of the pavement and base shall be determined by the AASHTO Guide for Design of Pavement Structures, latest edition. The design parameters to be used in the design of the pavement section shall be as follows:

CBR Value: CBR (California Bearing Ratio) of the sub grade soils shall be determined by soil tests.

Traffic Loads: EWL loads for the different classifications of streets for developed and undeveloped conditions are set forth in Table 1. Local streets that will serve more than 100 lots (present and future) shall be designed as residential collector streets.

Design Period: 20 years

Terminal Serviceability Index: 2.0

The minimum thickness of asphalt concrete pavement shall be 2 inches and the minimum thickness of crushed stone base shall be 6 inches. Typical pavement designs, based on the AASHTO method, are provided in Table 2 and may be utilized for those street classifications and soil CBRs shown thereon.

2. **Soils Test**

CBR and Atterburg limits of the sub grade shall be made by an approved soils testing laboratory. A minimum of one soils test shall be performed for each 600 feet of street. Additional investigations will be required where a variation in soil types or other subsurface conditions exist. Depth of borings or test pits shall be a minimum of 4 feet below the proposed sub grade elevation. Soils having a CBR less than 3, a liquid limit greater than 40, or a plastic limit greater than 15 shall be removed to a minimum depth of 24 inches below the top of the sub grade elevation. The soils testing laboratory shall make a recommendation of the estimated amount of undercutting required for the construction of the street improvements.

3. **Compaction Requirements**

The compaction requirements for sub grade, crushed stone base, and asphalt pavement shall be as set forth below.

<u>Pavement Section</u>	<u>Maximum Lift-in)</u>	<u>% Compaction</u>	<u>AASHTO Test Method</u>
Sub grade-top 8"	8	100	T-99
Sub grade-below 8"	8	95	T-99
Crushed stone base	8	95	T-180 Method D
Asphalt Concrete Surface	3	92	T-209

Compaction tests of the sub grade and crushed stone base shall be taken by an approved testing laboratory during construction at a frequency of one test for each 7400 square feet for each lift. In addition, the sub grade shall be proof rolled prior to the construction of the crushed stone base and the crushed stone base shall be proof

rolled prior to the construction of the pavement. A dump truck loaded with approximately 20 tons of material, or equivalent loading, shall be used for the proof rolling. The proof rolling shall be done in the presence of the City Inspector.

A core sample of the completed pavement section shall also be taken at a frequency of one test for each 7400 square feet to determine the thickness of the crushed stone base and the thickness and density of the asphalt pavement.

B. CURBS AND GUTTERS

Concrete curbs and gutters, having a minimum thickness of 6 inches, a minimum height of 6 inches, and a minimum gutter width of 18 inches shall be constructed on both sides of a street. The crushed stone base required for the pavement section shall extend to the back of the curb and the curb and gutter shall be constructed on the crushed stone base.

C. UNDER DRAINS

Under drains shall be installed on both sides of new streets where curbs are constructed within areas in which the seasonal high water table is less than 3 feet as shown on the Soil Survey for Sebastian County, Arkansas, as published by the Soils Conservation Service.

The under drain shall be installed on the backside of the curb and shall consist of a trench approximately 12 inches wide and 3 feet deep, as measured from the top of curb. The under drain shall be backfilled with 1 1/4 to 3/4 inch concrete rock. A 4 inch perforated plastic pipe shall be installed approximately 2 inches above the bottom of the trench which shall collect and transport the underground seepage water to a drainage ditch, channel, or underground storm drain system. The longitudinal slope of the under drain shall have a positive gradient along its entire length with no sags. The top of the under drain shall be covered with 6 inches of topsoil and planted or sodded with Bermuda grass.

D. SIDEWALKS

Where sidewalks are constructed, the sidewalk shall have a width of 5 feet and a minimum thickness of 4 inches. Where sidewalks cross driveways, the sidewalk shall be minimum of 5 inches thick at residential driveways and 6 inches thick at commercial driveways. The sidewalk shall be installed adjacent to property line and shall slope toward the curb at a slope of 1/4 inch per foot unless otherwise approved by the City.

E. DRIVEWAYS

Driveway approaches, between the curb and property line, shall be constructed of concrete and shall be a minimum of 5 inches thick for residential areas and 6

inches thick for commercial areas. Where driveways are constructed adjacent to existing curbs, the existing curb and gutter shall be removed and reconstructed within the limits of the new driveway. As an alternative, the existing gutter shall be saw cut along the flow line to full depth of concrete and the existing curb and gutter removed up to the saw cut.

F. **ROADSIDE DITCHES AND CULVERTS**

Existing streets or estate type streets that do not have curbs and gutters shall have roadside ditches. A minimum 6 foot wide shoulder shall be provided from the edge of pavement to the top of ditch slope. The maximum slope for roadside ditches shall be 4:1. The bottom and banks of earthen ditches, that are disturbed, shall be sodded with solid Bermuda grass.

All culverts shall consist of reinforced concrete pipe, reinforced concrete arch pipe or reinforced concrete boxes and shall have either flared end sections or headwalls at the inlet and outlet of the culvert.

G. **CONCRETE**

All non-reinforced concrete used in street pavement, curbs, gutters, sidewalks, driveways, and drainage structures shall be 3000 psi, air entrained (5%), Fiber Mesh reinforced (1 1/2 lbs/CY). All reinforced concrete shall be 3500 psi, air entrained (5%). No fiber mesh reinforcement shall be used in reinforced concrete. All concrete shall be poured with a maximum slump of 3 inches.

H. **TRENCH BACKFILL**

All trenches for utility and drainage lines that cross existing or proposed streets shall be backfilled with a sand/cement/fly-ash slurry. For existing streets, the slurry backfill shall extend to within 6 inches of the surface and a 6 inch thick concrete cap constructed. For new streets being constructed, the slurry shall extend to within 6 inches of the sub grade for the crushed stone aggregate base.

Section 4

IMPROVEMENT PLANS

All street improvements shall be constructed in accordance with drawings and specifications prepared by the developer's engineer and approved by the City. The City, or its designated representative, shall review all street improvement drawings and specifications. The City may require changes in the drawings and specifications or submittal of additional design data required for its approval. Upon approval, the City shall issue a written notice to the developer's engineer. When the improvements required by these design standards have been completed and installed, the developer's engineer shall submit a letter to the City certifying that the improvements have been installed and constructed in accordance with the City Design Standards and the approved construction drawings and specifications.

Section 5
INSPECTION OF IMPROVEMENTS

All improvements shall be subject to the inspection of the City Inspector or his designated representative. Inspections will be made by the City Inspector from time to time during the course of construction to insure that the improvements have been or are being constructed in conformance with the approved plans and specifications and with the applicable design and construction standards. The street sub grade shall be inspected and approved by the City Inspector prior to the construction of the crushed stone base and the crushed stone base shall be inspected and approved by the City Inspector prior to the construction of the asphalt concrete pavement. These inspections will not be performed until the pertinent test data have been completed and submitted to the City.

The City Inspector shall also make a final inspection of all improvements. If such final inspection reveals that there are any defects or deficiencies in such improvements as installed or that the improvements differ from the approved construction drawings and specifications, the City Inspector shall notify the developer's engineer in writing of such defects, deficiencies or deviations. The developer's engineer shall have the contractor correct such defects or deviations within 2 months of the date of notification. When such defects, deficiencies or deviations have been corrected, the developer's engineer shall notify the City Inspector in writing that the improvements are again ready for final inspection.

When all improvements have been completed to the satisfaction of the City Inspector, the City Inspector shall certify in writing that all improvements have been completed and approved. The City Council shall act on the acceptance of the improvements within 15 days of the receipt of the Certification by the City Inspector.

Section 6
MAINTENANCE BOND

A Maintenance Bond or an irrevocable Letter of Credit shall be furnished to the City to cover any defects in materials and workmanship for all improvements constructed or installed under the jurisdiction of review and approval of the City of Lavaca. The Maintenance Bond or Letter of Credit shall be in a form approved by the City Attorney; shall be in the amount of 50 percent of the total cost of the improvements to be covered by such bond or letter of credit; shall be in full force and effect for not less than two years from the date of the letter in which the City Inspector certifies that all improvements have been completed and approved; and shall state that any and all defects in materials or workmanship shall be corrected prior to the end of the two year period of the bond or letter of credit. Work performed under the terms of the Maintenance Bond or irrevocable Letter of Credit shall be approved by the City Inspector.

ARTICLE IV
LEGAL STATUS

Section 1
CONFLICTING REGULATIONS

The requirements of these street design standards shall supersede any conflicting City of Lavaca street design and construction criteria including those given by existing ordinances.

Section 2
SEVERABILITY

The provisions of these street design standards are hereby declared to be severable and a decision by any court of competent jurisdiction that a provision of these design standards or any application thereof is illegal, invalid, or unconstitutional, shall in no way affect the legality, validity or constitutionality of the remaining provisions or applications of these design standards.

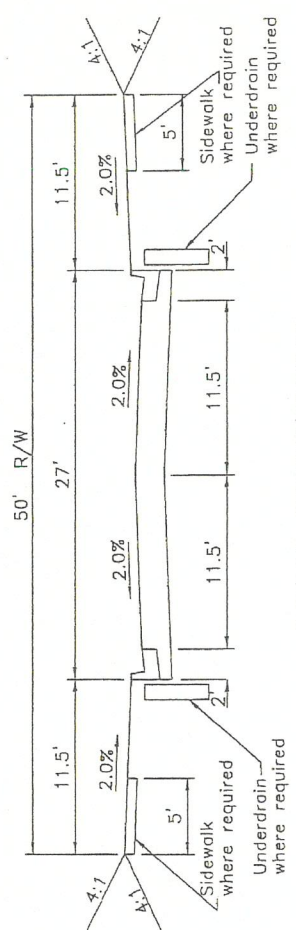
Section 3
EFFECTIVE DATE

These street design standards shall take effect upon adoption by the City Council of the City of Lavaca, Arkansas. These regulations shall be printed in booklet form and made available to the general public. No fewer than 3 copies shall remain on file in the office of the City Clerk for examination by the public. These regulations shall be published as required by law.

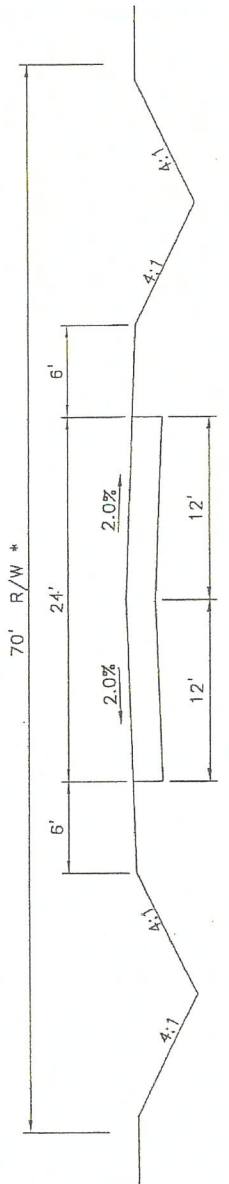
TABLE 1
MINIMUM GEOMETRIC DESIGN STANDARDS - CITY OF LAVACA, ARKANSAS

	Local Residential		Estate Residential		Collector Residential		Collector Commercial		Collector Industrial		Minor Arterial		Principle Arterial	
	50	23	70 (a)	24	60	33	70	45	60	33	80	55	90-100	60
Right-of-Way (Ft)	27	27	(b)		37	48			37	37	59	64		
Pavement Width (Ft)														
Back to Back of Curb (Ft)														
Crown Traverse Slope (%)	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0
Normal Crown	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Tipped Section, Maximum	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Cul-de-sac, Maximum	150	200	200	200	240	240	240	240	240	275	310	425	425	425
Design Daily Traffic	700	1,500	1,500	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Service volume (vpd) (ADT - 2 directions)	10	50	50	200	200	200	200	200	200	200	200	200	200	200
Daily EWL for Pavement Design (developed lots)	50	200	200	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Daily EWL for Pavement Design (undeveloped lots)														
HORIZONTAL ALIGNMENT														
Minimum Centerline Radius (Ft)	200	200	200	250	250	300	300	300	300	300	300	300	300	300
Curb Return Radius (Ft)	20	20	20 (d)	25	25	35	35	35	35	35	35	35	35	35
Cul-de-Sac Back Curb Diameter (Ft)	80	80	80 (d)	--	--	100	100	100	100	100	100	100	100	100
Minimum Intersection Angle (Degrees)	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Minimum Length between Reverse Curves (Ft)	--	100	100	100	100	100	100	100	100	100	100	100	100	100
VERTICAL ALIGNMENT														
Longitudinal Grade (%)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Minimum	12	12	12	10	10	8	8	8	8	8	8	8	8	8
Maximum	6	6	6	5	5	4	4	4	4	4	4	4	4	4
Maximum within 100 feet of intersection	20	30	30	40	40	40	40	40	40	40	40	40	40	40
Vertical Curve Coefficient (K) (L=KA)	25	35	35	45	45	45	45	45	45	45	45	45	45	45
Crest														
Sag														
L = Length of Vertical Curve, (Feet)														
A = Algebraic Difference in Grade, (%)														

(a) Additional R/W may be required depending on depth of roadside ditch
 (b) Curb and Gutter not required. Requires 6 feet minimum shoulder each side
 (c) Requires individual design
 (d) Distance measured from back of curb or edge of pavement



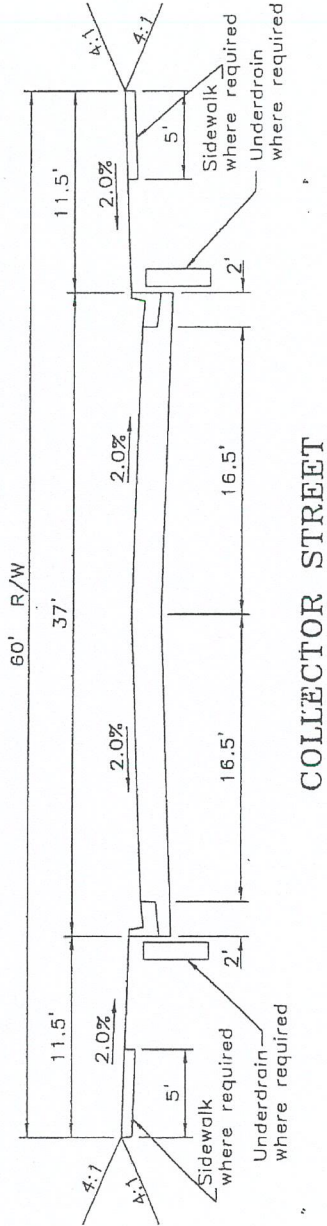
LOCAL RESIDENTIAL



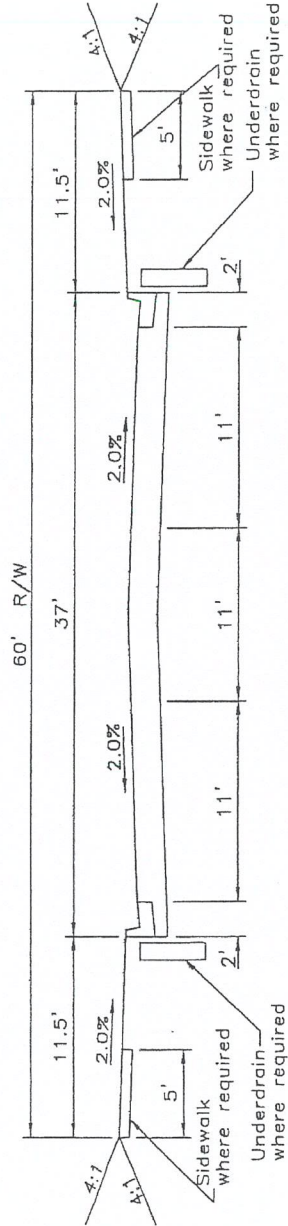
ESTATE RESIDENTIAL

* Additional R/W may be required depending upon the depth of Roadside ditch and the height of ground above roadway.

STREET DESIGN CROSS-SECTION

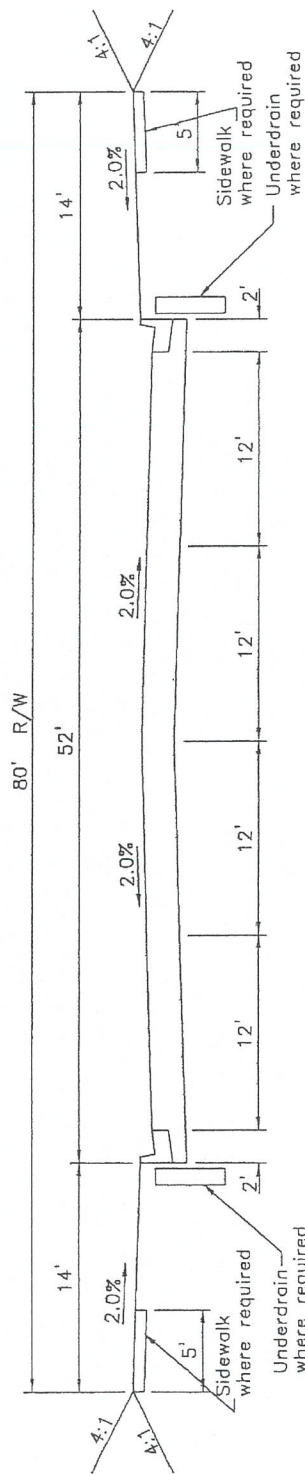


COLLECTOR STREET

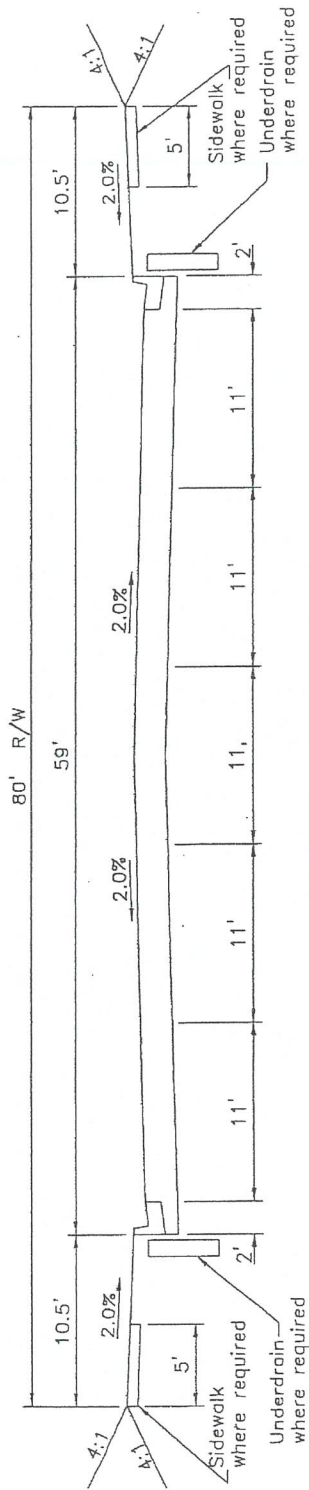


COLLECTOR STREET
WITH CENTER TURN LANE

STREET DESIGN CROSS-SECTION

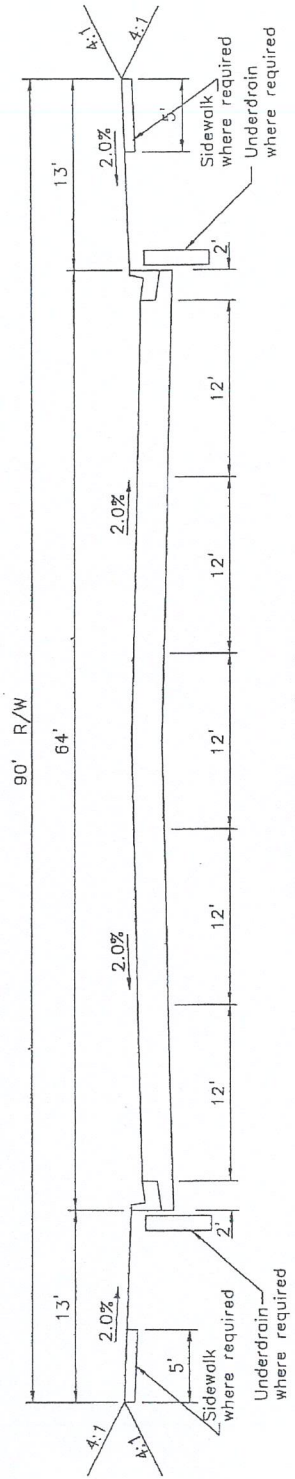


MINOR ARTERIAL

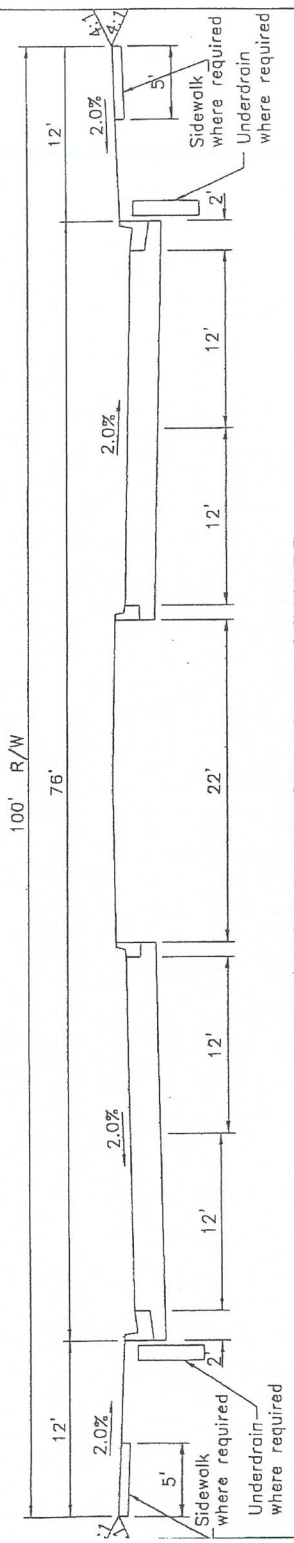


MINOR ARTERIAL
WITH CENTER TURN LANE

STREET DESIGN CROSS-SECTION



PRINCIPAL ARTERIAL



PRINCIPAL ARTERIAL - DIVIDED

STREET DESIGN CROSS-SECTION

TABLE 2
 MINIMUM PAVEMENT THICKNESS STANDARDS
 CITY OF LAVACA, ARKANSAS

WITH DEVELOPED LOTS

Minimum Subgrade CBR**	Local Residential and Estate Street			Residential Collector Street		
	Asphalt Pavement		Concrete * Pavement (in)	Asphalt Pavement		Concrete * Pavement (in)
	Asphalt (in)	Agg Base (in)		Asphalt (in)	Agg Base (in)	
3	3.0	10.0	7.0	4.0	12.0	8.0
6	2.5	8.0	6.0	3.0	10.0	7.0
10	2.0	6.0	5.0	2.5	8.0	6.0

WITH UNDEVELOPED LOTS

Minimum Subgrade CBR**	Local Residential and Estate Street			Residential Collector Street		
	Asphalt Pavement		Concrete * Pavement (in)	Asphalt Pavement		Concrete * Pavement (in)
	Asphalt (in)	Agg Base (in)		Asphalt (in)	Agg Base (in)	
3	4.0	12.0	8.0	5.0	14.0	9.0
6	3.0	10.0	7.0	4.0	12.0	8.0
10	2.5	8.0	6.0	3.0	10.0	7.0

* A minimum of 4-inch thick Aggregate Base is required for all concrete streets

** CBR of final subgrade material having a minimum thickness of 24 inches