

CHAPTER 2 - STREETS

2.00 Functional Classification

The functional classification of existing and proposed roads is established by the City on an individual basis using the existing land use and existing operational characteristics. Stevenson classifies roads and streets as follows:

A. Principal Arterials.

Arterial roads generally provide the fastest method of travel and typically have low accessibility from neighboring roads. They are usually designed with long-distance travel in mind and are not as common as the other functional classes of roads.

B. Major Collectors

Provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials.

C. Minor Collectors

Very similar to the Major Collectors but has less traffic and typically does not have access to traffic generators such as schools.

D. Local Streets.

Local streets are the most common roads by far, but are also the slowest for travel. They are designed specifically to have high accessibility and to connect to collector and arterial roads, and are typically not used for through traffic.

2.01 General Requirement for Layout

The City's Comprehensive Plan assumed that future street construction would encourage connectivity. Street sizing for collectors and local streets assumes that the transportation system would encourage non-motorized transportation. The City's objective is to impose a maximum spacing for new streets of five hundred (500) feet (a 500-foot maximum grid) within all new developments and to the limits of the entire parcel of property being developed. Layout of new development will provide the capability of extending future streets through adjacent parcels by having streets proposed for that development extended to the limits of the property and located so as to provide a spacing of feet. Where this requirement is not feasible due to topography, a 10-foot wide paved bikeway\multipurpose trail can be substituted for the street if approved by the City. The bikeway\multipurpose trail, located in a dedicated 30-foot easement for pedestrians and bicyclists, shall be extended to the limits of the property. Said bikeway\multipurpose trail shall follow the general grid pattern of the street layout (500 foot grid) and shall extend from the ends of dead-end streets where said dead-end street are not capable of being extended to the limits of the property due to topographic constraints. To meet the through street planning objectives, streets or bikeway\multipurpose trails shall be designed and constructed to extend to the limits of the property with the all costs borne by the developer of the property without reimbursement by the City.

2.02 Access

Access to public streets shall conform to the requirements listed herein. The City Engineer shall have the authority to limit access and designate access locations on public streets under the jurisdiction of the City. Access to streets and highways under Skamania County or State of Washington jurisdiction must be formally approved by those entities at the applicant's initiative and expense.

2.03 Width

Table 2.03A is a summary of width standards by functional classification. It should be noted that public utility easements beyond the right-of-way are typically required.

Table 2.03A Street Widths					
		Residential			
	Principal Arterial	Major Collector	Minor Collector	Local	Private [4]
Right-of-way	80	60	60	50 [1]	See 2.07.C
Total Pavement Width	60	46	38	28 [2]	20
No. of Drive Lanes	2	2	2	2	n/a
Width of Drive Lane	12	11	11	10	n/a
No. of Turn Lanes	0	0	0	0	n/a
No. of Parking Lanes	0	2	2	1 [2] [3]	n/a
Width of Parking Lane	0	8	8	8	n/a
No. of Sidewalks	2	2	2	1	0
Width of Sidewalks	8	6	6	6	n/a
No. of Planter Strips (Curb-sidewalk separation)	2	2	2	1	0
Width of Planter Strips	-	-	-	3	n/a
Design Volume	5,001 - 24,000	2,001 - 5,000	501 - 2,000	1 - 500	See 2.07.A
Design Speed	25	25	25	25	n/a
Notes to Table 2.03.A:					
[1]	Right-of-way width may be reduced by five (5) feet subject to Planning Commission, City Council, and Fire Marshal approval and provision of adequate public utility easements.				
[2]	The requirement for a parking lane may be waived subject to City Council, and Fire Marshal approval and Planning Commission verification that the lots served by the street contain adequate area for on-site parking.				
[3]	To separate automotive and pedestrian traffic, the parking lane should be adjacent to the sidewalk.				
[4]	Private Streets are subject to the criteria for authorization and additional requirements of				

2.04 Number of Lanes

The number of lanes for each class of road shall be as directed by the City Engineer. Additional lanes may be required at intersections in excess of the road sections shown in Table 2.03A. Right-of-way may be needed in addition to that shown in Table 2.03A to accommodate the increased number of lanes at intersections.

2.05 Design Speed

The minimum design speed for each road classification shall be as shown in Table 2.03A or as otherwise determined by the City Engineer.

2.06 Dedications

- A. Right-of-Way shall be deeded for streets and other improvements as required per Table 2.03A to accommodate motorized and non-motorized transportation, landscaping, utility and buffer requirements. Some reduction in the minimum right-of-way requirement may be granted by the City Engineer where it can be demonstrated that sufficient area has been provided for all functions within the right-of-way and/or alternate locations. Conveyance shall be fee simple using a statutory warranty deed.
- B. Easements for all public systems shall be provided as required. Specific requirements for sewer, water, and storm drainage easements are detailed in the relevant chapters. Particular design features of a road may necessitate slope, wall or drainage easements. Such easements may be required by the City Engineer in conjunction with dedication or acquisition of right-of-way and other standard easements (temporary construction, right of entry, sidewalk, pedestrian, street lighting, and traffic control devices, etc.).
- C. Special Access Easements or Tracts.

Where it is necessary to facilitate pedestrian circulation between neighborhoods, schools, shopping or other activity centers, public access easements or tracts shall be dedicated.

Improvements to the easement shall include a sidewalk or trail consistent with other non-motorized facilities in the area. Fences shall be constructed along access easements in residential areas where buildings will be located nearer than fifty feet (50') to the edge of the easement. Diverters or bollards shall be installed at the direction of the City Engineer.

- D. All subdivisions and short subdivisions (short plats) will be required to deed additional right-of-way, as a condition of approval of the subdivision, where the existing right-of-way for a public street is not adequate to incorporate necessary frontage improvements for public safety and provide compatibility with area's circulation system.

All short subdivisions (short plats) will be required to deed additional right-of-way, as a condition of approval of the short plat, under one or more of the following conditions:

1. The short plat abuts an existing substandard public street and the additional right-of-way is necessary to incorporate future frontage improvements necessary for public safety, or
 2. Additional right-of-way is needed to provide right-of-way for the extension of existing public street improvements necessary for public safety, or
 3. Additional right-of-way is needed to provide future street improvements necessary for public safety for planned new public streets.
- E. It is within the authority of the City Engineer to refuse to approve or sign any land partition, partition plat, or subdivision plat for a development that has not installed or completed the construction of the necessary public infrastructure to serve the proposed and affected existing lots. Such approval may be withheld until it can be verified that the location and width of proposed rights of way and easements are adequate for the completed infrastructure.
- F. Easements are subject to the approval of the City Attorney prior to recording. Variation from the City standard form of conveyance shall be allowed only when extraordinary circumstances warrant, as determined by the City Engineer and City Attorney.
- G. Bikeway\Multipurpose Trail. Where bikeway\multipurpose trails are constructed, a 30-foot dedicated right-of-way shall be granted to the City.
- H. Easement Widths
1. Pedestrian access easements or tracts shall be a minimum of ten feet (10') wide. If the easement is over one-hundred and fifty feet (150') in length but less than three-hundred feet (300'), the width shall be fifteen feet (15'); if over three-hundred (300') in length, the width shall be twenty feet (20'). Structure setbacks shall be a minimum of fifteen feet from the edge of the easement or tract.
 2. In residential subdivisions or residential short subdivisions, minimum panhandle width shall be twenty-five feet (25'). A greater width may be required to accommodate grading or utility requirements.

3. In commercial subdivisions or commercial short subdivisions, minimum private roadway easement or panhandle width shall be thirty feet (30'). A greater width may be required to accommodate grading or utility requirements.
- I. All recording costs for easements created by private development shall be borne by the developer unless specifically agreed to by the City.

2.07 Private Streets

- A. Criteria for Authorization. Where private streets are permitted, they will only be under the following conditions:
 1. Covenants have been approved, recorded, and verified with the City which provide for maintenance of the private streets and associated parking areas by owners in the development, and
 2. Provision is made for the streets to be open at all times for emergency and public service vehicles, and
 3. The private streets will not obstruct public street circulation, and
 4. At least one of the following conditions exists:
 - a. The plat or short plat street will ultimately serve four (4) or fewer lots.
 - b. The roadways serve commercial or industrial facilities where no circulation continuity is necessary.
 - c. The City Engineer determines that no other access is available and the private road is adequate.
- B. Notice. A statement is required on the face of any plat or short plat containing a private road with the following: "Warning: Purchasers of a lot or lots in this plat are advised that the lot or lots in this plat are serviced by private roads. Private roads are not maintained by the City. Lot owners must pay for the maintenance of the private roads serving this plat, including grading, drainage, snowplowing, etc. The condition of the private road may affect subsequent attempts to divide your lot or lots. Private roads must comply with City of Stevenson private road requirements".
- C. Easements. Private roads shall be constructed within easements with easement width equal to the paved width plus sidewalk plus ten (10) feet.

- D. Design Requirements. Private streets shall conform to public street construction standards with the exceptions noted herein.
1. Private streets shall be improved with 2" of asphalt concrete over 8" of crushed rock.
 2. The maximum grade for all roadways shall be fifteen percent (15%).
 3. Drainage improvement requirements shall be as specified in Chapter 3 of these Standards.
 4. Utility requirements shall be per this chapter, and Chapters 4 & 5 of these Standards.
 5. Private street widths shall be provided as specified in Table 2.03.A.
- E. Acceptance as Public Streets. Acceptance of private streets as public streets will be considered if the street meets all applicable public street standards contained herein.

2.08 Horizontal Alignment

Street alignments shall meet the following requirements:

- 👉 Center line alignment of improvements should be parallel to the center line of the right-of-way.
- 👉 Center line of a proposed street extension shall be aligned with the existing street center line.
- 👉 Horizontal curves in alignments shall meet the minimum radius requirements as shown in Table 2.08A.
- 👉 Reversing horizontal curves shall be separated by no less than 50 feet of tangent. On arterials, the separation shall be no less than 100 feet.

**Table 2.08A
 Design Speed / Center Line Radius – Minimums
 Arterial Streets**

Design Speed (mph)	Friction Factor(F)	Slope / R min.					
		(e)-4%	(e)-2.5%	(e) 0%	(e)2.5%	(e)4%	(e)6%
25	0.165	335'	300'	255'	220'	205'	185'
30	0.160	500'	445'	375'	325'	300'	275'
35	0.155	710'	630'	530'	455'	420'	380'
40	0.150	970'	855'	710'	610'	560'	510'
45	0.145	1285'	1125'	930'	795'	730'	660'
50	0.140	1665'	1450'	1190'	1010'	925'	835'
55	0.130	2240'	1920'	1550'	1300'	1190'	1060'
60	0.120	3000'	2525'	2000'	1655'	1500'	1335'

Residential Streets

Design Speed (mph)	Friction Factor(F)	Slope / R min.					
		(e)-4%	(e)-2.5%	(e)0%	(e)2.5%	(e)4%	(e)6%
25	0.252	195'	185'	165'	150'	145'	135'
30	0.221	330'	305'	270'	245'	230'	215'
35	0.197	520'	475'	415'	370'	345'	320'

NOTES:

For Table 2.08A - off right-of-way runoff shall be controlled to prevent concentrated cross flow in super-elevated sections.

Super elevations may only be used with the written approval of the City Engineer. Where super elevation is used, street curves should be designed per AASHTO guidelines except that the maximum super elevation rate of 0.04 shall be used. If terrain dictates sharp curvature, a maximum super elevation of 0.06 is justified if the curve is long enough to provide an adequate super elevation transition.

On local streets, requests for design speeds less than 25 miles per hour shall be based on topography, right of way, or geographic conditions which impose an economic hardship on the applicant. Requests must show that a reduction in center line radius will not compromise safety. There will be posting requirements associated with designs below 25 miles per hour.

Off-set crown cross-sections are not acceptable as super elevation sections.

Super elevation transitions shall be designed to not allow concentrations of storm water to flow over the travel lanes.

2.09 Vertical Alignment

Street alignments shall meet the following requirements:

- 👉 Minimum tangent street gradients shall be one-half (0.5) percent along the crown and curb.
- 👉 Maximum street gradients shall be fifteen (15) percent for residential streets, and ten (10) percent for all other streets. Grades in excess of fifteen (15) percent must be approved in writing by the City Engineer on an individual basis.
- 👉 Local streets intersecting with a collector or greater functional classification street or streets intended to be posted with a stop sign shall provide a landing averaging five (5) percent or less. Landings are that portion of the street within twenty (20) feet of the projected curb line of the intersecting street at full improvement.
- 👉 Grade changes of more than one (1) percent shall be accomplished with vertical curves.
- 👉 At street intersections, the crown of the major (higher classification) street shall continue through the intersection. The roadway section of the minor street will flatten to match the longitudinal grade of the major street at the projected curb line.
- 👉 Street grades, intersections, and super elevation transitions shall be designed to not allow concentrations of storm water to flow across the travel lanes.
- 👉 Off-set crowns shall be allowed only with the specific prior approval of the City Engineer.
- 👉 Slope easements shall be dedicated or obtained for the purposes of grading outside of the right-of-way.
- 👉 Streets intersected by streets not constructed to full urban standards shall be designed to match both present and future (as far as practicable) vertical alignments of the intersecting street. The requirements of this manual shall be met for both present and future conditions.

When new streets are built adjacent to or crossing drainage ways, the following standards shall govern the vertical alignment:

Functional Classification	Vertical Standard
Arterial Streets	Travel lanes at or above the 50 year flood elevation but not lower than 6 inches below the 100 year flood elevation.
All other streets	Travel lanes at or above the 25 year flood elevation but not lower than 6 inches below the 50 year flood elevation.

If alternate access is available for properties served by a particular local street, a design could be considered for approval by the City Engineer that would set the travel lanes at or above the 10 year flood elevation but not lower than 6 inches below the 25 year flood event.

Vertical curves shall conform to the values found in Tables 2.09A and 2.09B.

Table 2.09A
Design Controls for Crest Vertical Curves
Based on Stopping Sight Distance

Design Speed	Minimum k
25	20 - 20
30	30 - 30
35	40 - 50
40	60 - 80
45	80 - 120
50	110 - 160
55	150 - 220

$k = \frac{L}{A} = \frac{\text{feet}}{\text{Percent}}$

A = Algebraic Difference in grades, percent
 L = Length of vertical curve feet

Table 2.09B
Design Controls for Sag Vertical Curves
Based on Stopping Sight Distance

Design Speed	Minimum k
25	30 – 30
30	40 – 40
35	50 – 50
40	60 – 70
45	70 – 90
50	90 - 110
55	100 - 130

$k = \frac{L}{A} = \frac{\text{feet}}{\text{Percent}}$

A = Algebraic Difference in grades, percent
 L = Length of vertical curve feet

AASHTO provides the designer of sag vertical curves the option of using shorter curves with the installation of street lighting. These "comfort" designs can also be slightly modified by providing a one (1) percent grade break at each end of the curve. The following table compares sag curve lengths using these criteria:

Table 2.09C
Design Controls for Lighted Sag Vertical Curves
25 Miles per Hour

Algebraic Difference in Grades	Standard (k)	Comfort (k)	Comfort with Grade Breaks (k)
5.00%	30	13.4	8
7.50%	30	13.4	9.9
12.50%	30	13.4	11.3
17.50%	30	13.4	11.9

At the intersection of a local street with another local street or a minor collector street, a minimum design speed of 15 MPH is allowed on the intersecting street. Minimum k factors for sag curves are as follows:

Table 2.09D
Design Controls for Lighted Sag Vertical Curves
15 Miles per Hour

Algebraic Difference in Grades	Comfort (k)	Comfort with Grade Breaks (k)
5.00%	4.8	3
7.50%	4.8	3.6
12.50%	4.8	4.1
17.50%	4.9	4.3

2.10 Transitions

- A. Street width transitions from a narrower width to a wider width shall be designed with a 3 to 1 taper. Delineators, as approved by the City, shall be installed to define the configuration.
- B. For street width transitions from a wider width to a narrower width, the length of transition taper shall be determined as follows:

$$L = S \times W \text{ (for } S = 45 \text{ MPH or more)}$$

$$L = \frac{W \times S^2}{60} \text{ (for } S = \text{less than } 45)$$

Where L = minimum length of taper (feet)

S = Design speed (MPH)

W = EP to EP offset width

Delineators, as approved by the Engineer, may be installed to define the configuration. Maximum spacing of delineators shall be the numerical value of the design speed, in feet (i.e. 35-foot spacing for 35 MPH).

In situations where a tapered transition cannot be provided, a barricade shall be installed at the end of the wider section of the street and a taper shall be appointed and delineated as approved by the Engineer. The barricade shall conform to the Standard Drawing. If the wider section does not provide an additional travel lane, only a barricade is required without the transition.

2.11 Street Frontage Improvements

- A. All residential subdivisions, commercial developments and short plats shall install street frontage improvements at the time of construction as detailed in their subdivision or short plat approval, as detailed in their approved building plans, or as directed by the City Engineer. Such improvements may include curb and gutter; sidewalk; street storm drainage; street lighting system; traffic signal modification, relocation or installation; utility relocation; landscaping and irrigation and street widening all per these Standards. Plans shall be prepared and signed by a licensed civil engineer registered in the State of Washington.
- B. Plan Preparation shall be as specified in Chapter 1 of these Standards.
- C. Street Frontage design shall incorporate all applicable sections of these Standards and other standard reference materials. The designer shall utilize good engineering practice in any situation not specified in these Standards.

2.12 Street Ends

- A. Cul-de-sacs shall be provided at all public and private street ends.
- B. Hammerheads may be used in lieu of a cul-de-sac provided that the street serves six (6) or less lots and the street is less than two hundred feet (200') in length. Hammerheads shall have a minimum depth of 30 feet.
- C. Temporary Dead Ends. Where a street is temporarily dead ended, turn around provisions must be provided where the road serves more than one lot. The turn around may be a hammerhead if the dead end is less than two-hundred feet (200') in length. If over two-hundred feet (200') long, a cul-de-sac with a minimum radius of forty-one feet (41') is required for residential streets with mountable curbs, and forty-eight feet (48') for industrial streets.
- D. Design Requirements

The following specifies the minimum requirements for cul-de-sacs, eyebrows, and turnaround areas. Other turnaround geometrics may be used when conditions warrant and City Engineer approves the design and application of its use.

- ☞ Cul-de-sacs shall have a minimum outside curb radius of forty-one feet (41') for residential streets and forty-eight feet (48') for industrial streets.

- ☞ Cul-de-sacs, eyebrows, and turnaround areas shall be allowed only on local streets and commercial/industrial streets.
- ☞ Cul-de-sacs shall be not be more than 500 feet in length. The length of a cul-de-sac shall be measured along the center line of the roadway from the near side right-of-way of the nearest through traffic intersecting street to the farthest point of the cul-de-sac right-of-way.
- ☞ The minimum curb radius for transitions into cul-de-sac bulbs shall be 25 feet, and the right-of-way radius shall be sufficient to maintain the same right-of-way to curb spacing as in the adjacent portion of the road.
- ☞ Hammerheads may be used in lieu of a cul-de-sac provided that the street serves six (6) or less lots and the street is less than two hundred feet (200') in length.
- ☞ An eyebrow corner may be used on a local street where expected ADT will not exceed 500 vehicles per day or as otherwise approved by the Engineer. Minimum curb radius on the outside of an eyebrow corner is 36 feet; minimum right-of-way radius is 45 feet. Eyebrow geometry shall be evaluated on the basis of turning requirements for Fire Department vehicles.

2.13 Medians

- A. A median shall be in addition to, not part of, the specified roadway width. Medians shall be designed so as not to limit turning radius or sight distance at intersections. Landscaping and irrigation shall be installed when directed by the City Engineer.
- B. Where raised medians are allowed, the following criteria must be met:
 - 1. Edges shall be vertical curb in urban areas, and either vertical curb or thickened edge in suburban areas.
 - 2. Landscaping and irrigation are required. Plans shall be prepared by a qualified Landscape Architect.
 - 3. Shall be designed so as not to limit turning radius or sight distance at intersections.
 - ☞ The raised median shall be set back at least 2 feet from the median lane on both sides.
 - ☞ Street lighting shall be sufficient to provide illumination of the raised median.

- ↳ Objects, such as trees, shrubs, signs, and light poles shall not physically or visually interfere with vehicle or pedestrian traffic in the travel way.
- ↳ The style and design of the raised median shall be site specific. The raised median shall be safe for the design speed, and shall be subject to City approval.

2.14 Intersections and Curb Returns

- A. Traffic control will be as specified in the Manual of Uniform Traffic Control Devices (M.U.T.C.D.) or as modified by the Engineer as a result of appropriate traffic engineering studies.
- B. Traffic signal modification, relocation or installation is required when roadway or driveway geometrics interfere with existing signal facilities, or would result in an unsignalized approach or intersection that meets signal warrants.
- C. Angle between intersections.

The following specifies the minimum requirements for intersections:

The interior angle at intersecting streets shall be kept as near to 90 degrees as possible and in no case shall it be less than 75 degrees. A tangent section shall be carried a minimum of 25 feet each side of intersecting right-of-way lines.

- D. Maximum street spacing - 500 feet.
- E. Minimum centerline offset of adjacent streets.
 - 1. Residential - 160 feet
 - 2. Residential or arterials intersecting arterials - 300 feet
- F. Sloping approaches.

On sloping approaches, including commercial driveways, garage entrances, and private street openings, landings are not to exceed two feet (2') difference in elevation for a distance of thirty feet (30') approaching an arterial or twenty feet (20') approaching a local collector or industrial or commercial street, measured from the back of sidewalk or the back of curb if no sidewalk exists.

G. Curb returns.

Curb radii at intersections shall be as shown in Table 2.14A for the various functional classifications. The right-of-way radii at intersections shall be sufficient to maintain at least the same right-of-way to curb spacing as the lower classified street.

Sidewalk access ramps shall be provided at all corners of all intersections, regardless of curb type, and shall conform to Standard Drawings.

Table 2.14A
Turning Radii (Feet)
Edge of Pavement/Curb -Minimums

Street Classification	Principal Arterial Street	Major Collector Street	Minor Collector Street	Local Street
Principal Arterial Street	55	30	40	20
Major Collector Street	30	20	30	15
Minor Collector Street	40	30	40	25
Local Street	20	20	15	15

* If bike lane or on-street parking exists, above radii may be reduced by five (5) feet.

* The radii of the major street will be used for all intersection curb returns.

2.15 Sight Obstruction Requirements

- A. Sight distance should be maintained at all driveways, building or garage entrances where structures, wing walls, etc. are located adjacent to or in close proximity to a pedestrian walkway.
- B. Sight lines to traffic control devices (signs, signals, etc.) should not be obscured by landscaping, street furniture, marquees, awnings or other obstructions. Refer to the Manual of Uniform Traffic Control Devices for required sightlines (M.U.T.C.D.).
- C. Sight Distance

It is the policy of the City to have the developer's engineer evaluate safe intersection sight distance using the principles and methods recommended by AASHTO. The following minimum standards shall apply.

The following table is for intersection and driveway sight distances:

**Table 2.15A
Corner Sight Distance**

Design Speed (MPH)	Minimum Corner Sight Distance* (Feet)
20	210
30	310
40	415
50	515
60	650

Sight distance should always be measured from a driver's eye 3.5 feet high and 15 feet from the near edge of the nearest lane to a distance of 4.25 feet. Sight distances must be checked on the actual vertical and horizontal values of the proposed improvement. There shall be nothing to block observation of objects between 6 inches and 4 feet, 3 inches above grade in both directions. The only exceptions should be for luminaire or utility poles, conforming traffic control devices, and fire hydrants. Cumulative effects must be considered, and all efforts taken to minimize sight obstructions.

Modifications or exceptions to these standards shall be approved by the City Engineer.

2.16 Curb and Gutter - Types and Application

- A. Curb and gutter shall be utilized for street edges whenever possible and shall always be used under the following conditions:
1. All streets - Local, Collector, Arterial.
 2. Modified curb and gutter shall be used on designated bicycle lanes.
- B. Vertical Curb shall be used for edges of islands and medians except when emergency vehicle access across the median is required.
- C. Rolled Curb may be used at the end of cul-de-sacs where approved by the City Engineer.
- D. The following specifies the requirements for curbs and cross-slope grading for streets:
- ☞ All streets shall include curbs on both sides except in the situations of interim width improvements. Interim designs, where approved in writing by the Engineer, shall have shoulders and ditches.
 - ☞ Interim width streets shall have 6-foot side shoulders adjacent to the street at a 2-1/2 percent cross-slope and roadside ditches each side of the shoulders with a maximum side-slope of 2 horizontal to 1 vertical. The 6-foot shoulder area may consist of a section of pavement and/or a section of crushed rock. The pavement section shall be a minimum of 2 feet wide and a maximum of 6 feet wide.
 - ☞ Cross-slope of the street section shall be no less than 2-1/2 percent and no greater than 5 percent. Whenever possible, the crown of the street shall be the same elevation as the top of the curbs.

Grading outside the improved areas shall be as follows, unless approved in writing by the Engineer:

- ☞ Arterials shall have a maximum 2 percent upward grading to the right-of-way line, and no steeper than 2 to 1 up, or 2 to 1 down, outside the right-of-way.
- ☞ Local Street and Collector functional classifications shall have a maximum 2 percent upward grading to the right-of-way line, a 5 to 1 upward or downward grading within the public utility easement, and no steeper than 2 to 1 up, or 2 to 1 down outside the public utility easement.

- ↳ Retaining walls shall be used if slopes are greater than the 2 to 1 requirement in the paragraphs above or where slope stability is a problem. If slopes are to be maintained (mowed) by the City, a maximum of 3 to 1 slope will be required. Retaining walls shall be constructed to a height where the slope is no more than 2 to 1.

2.17 Survey Monuments

A survey monument shall be located at each street intersection in all subdivisions and short plats.

2.18 Concrete Sidewalks

A. Where Required. Concrete sidewalks shall be provided as follows:

1. Both sides of all arterial streets.
2. Both sides of all other streets (through street or dead-end) except permanent dead-end streets less than three-hundred feet (300') in length.
3. One side of local permanent dead-end streets less than three-hundred feet (300') in length.
4. Both sides of dead-end streets over three-hundred (300'), except in the cul-de-sacs or hammerhead turn-arounds. In these circumstances installed sidewalks may end at the property line nearest the street/cul-de-sac transitions, unless a bikeway/multi-purpose trail is located at the end of the street in which case the sidewalk shall be extended to connect to that trail.

B. Exceptions

Where subdivision design provides an acceptable surfaced and maintained internal walkway system as approved by the Engineer, a sidewalk may not be required adjacent to the street.

C. Width.

1. Local Streets: six feet (6').
2. Collector Streets: six feet (6').

3. Arterial Streets: eight feet (8').

5. Width of sidewalk does not include curb. When the sidewalk is adjacent to the curb, the width shall be increased by one (1) foot.

6. Meandering sidewalks shall maintain the full design width around obstructions that cannot be relocated. Additional Right-of-Way (or easement) may be required to either relocate the obstruction or meander the sidewalk.

7. Sidewalk widening behind the mailbox shall be five feet (5') long with a ten to one (10:1) taper to the standard sidewalk section.

D. Material.

All sidewalks shall be five inches (5") thick Class B concrete over 2 inches of crushed rock. At driveways the concrete shall be six inches (6") thick.

E. Landscape/Separation.

A minimum six foot (6') separation between the back of the curb and sidewalk is required for landscaping and appurtenance locating purposes unless no practicable alternative exists and when approved in writing by the Engineer. Sidewalks shall meander no more than six feet (6') from the curb at all pedestrian crossings and at driveways.

The Planning Commission has the authority to control the design of sidewalks with respect to there connection directly to a curb or require a six foot separation for a landscape strip.

F Wheelchair Ramps.

In accordance with State law, wheelchair ramps shall be provided at all pedestrian crossings with curb sections.

G. Curb Ramps.

The edge of the sidewalk shall merge into curb ramps. One ramp is used on each curb return on residential streets and unsignalized intersections. At signalized intersections, a curb ramp shall be aligned with each crosswalk.

2.19 Asphalt Sidewalks

Asphalt sidewalks may be allowed in lieu of concrete sidewalks where the sidewalk as determined by the City is deemed to be of a temporary nature (such as during construction activities) or due to future construction considerations.

2.20 Multi-Use Trail

Design requirements:

- A. Multi-use trails shall be a minimum of six feet (6') wide.
- B. Materials shall be per the requirements of Section 2.32.
- C. Multi-use trails shall be a minimum of four feet (4') from the edge of the vehicular travel way unless no practicable alternative exists and when approved by the Engineer.
- D. Maximum grade is fifteen percent (15%). Minimum curve radius is ten feet (10').
- E. Access easement termination (Type II) shall be installed as directed by the City Engineer.
- F. Multi-use trails may be used as a substitute for concrete sidewalks in planned unit developments where the City Engineer deems that non-motorized transportation goals of the City are being met.

2.21 Bikeways/Bike lanes

- A. Bikeway construction is required in conjunction with commercial development, plat or short plat approval, when the need for such a bikeway is established by the Planning Director.
- B. Separated bikeways (bicycles only) shall be a minimum of five feet (5') wide for one way and ten feet (10') wide for two (2) way flow. Separated bikeways combined with pedestrian facilities shall be a minimum of ten feet (10') wide.
- C. Where joint vehicular and bicycle facilities (bike lanes) are constructed, the curb lane shall be fourteen feet (14') wide and use eighteen inch (18") wide Type A curb and gutter.
- D. Surfacing requirements for separated bikeways shall be as specified in Section 2.32.

- E. Maximum grade for separated bikeways shall be ten percent (10%). Minimum curve radius is one-hundred feet (100'). Curves should be minimized.
- F. Bump outs. A "bump out" at street intersections per Standard Drawings shall be installed on all routes with bike lanes using the following criteria:
 - 1. Two-lane roadway - not applicable.
 - 2. Three-lane roadway - "bump out" at all signalized intersections only.
 - 3. Four- to five-lane roadway - "bump out" at all signalized intersections and at major side street intersections where the right turn volume onto the minor street exceeds 600 ADT.

2.22 Driveways

- A. General Requirements.
 - 1. Standard residential or commercial driveways shall be required for all developments.
 - 2. A private intersection opening shall be used in lieu of a conventional driveway in commercial areas where the following criteria as determined by the City are met:
 - a. Projected driveway usage is greater than two-thousand (2,000) vehicles per day.
 - b. In any case where traffic signalization is approved and provided.
 - c. A minimum one-hundred (100') foot storage area is provided between the street and any turning or parking maneuvers within the development.
 - d. The opening is at least one-hundred and fifty feet (150') from any other intersection opening.
 - e. The opening is at least one-hundred and fifty feet (150' away from any other driveway on the property frontage under control of the applicant.
 - f. Easement dedication is made for traffic control devices.
 - 3. New driveway approach construction shall include a minimum 30' length of culvert installation, size as required.

4. [Reserved].

B. Conditions of Approval.

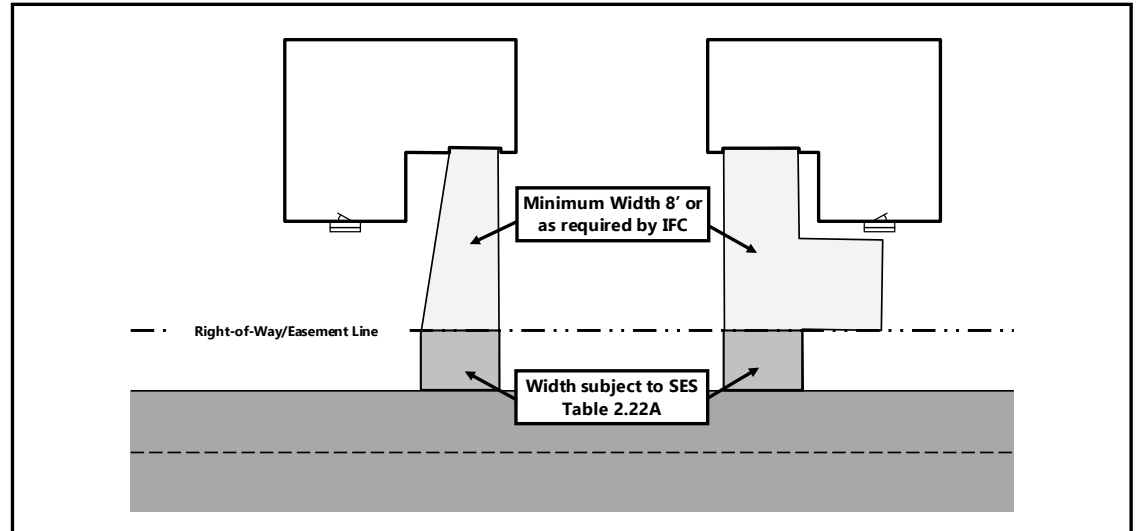
1. Driveways directly giving access onto arterials or major collectors may be denied if alternate access is available.
2. All abandoned driveway areas on the street frontage to be improved shall be removed and new curb, gutter, and sidewalk shall be installed.
3. No commercial driveway shall be approved where backing onto the sidewalk or street will occur.
4. Left turns from and to a driveway may be restricted as a development condition or in the future if such maneuvers are found to be unduly hazardous.
5. Driveways shall be aligned wherever possible with existing driveways on the opposite side of the street.
6. [Reserved].
7. All driveways shall be angled ninety-degrees (90°) to the street, unless designated as right turn only with the approval of the Engineer.
8. A shared driveway serving 2 lots shall be approved subject to compliance with the width and surfacing criteria below and the recording of a roadway maintenance agreement.
9. Parking lot circulation needs shall be met on site. The public right-of-way shall not be utilized as part of a one way parking lot flow.

C. Design Criteria.

1. Width. Driveways within a public right-of-way or private road easement shall be subject to the width standards in Table 2.22A. Where a driveway extends onto private property, it shall have a minimum width of eight feet (8') or such wider dimension as may be required by the most recent version of the International Fire Code adopted by the City. See Figure 2.22A.

Table 2.22A Driveway Widths		
	Minimum Width	Maximum Width
Residential Driveways		
One-Way Residential	-	10'
Two-Way Residential	-	20'[1]
Shared Residential	20'	30'
Commercial Driveways		
One-Way Commercial	-	22'
Two-Way Commercial	-	26'[2][3]
Shared Commercial	[4]	[4]
Private Intersection	[4]	[4]
Notes to Table 2.22A		
[1] Where serving a single family home from a local street, the City Engineer may approve a larger width up to 30'.		
[2] Where serving a commercial use from an arterial street, the maximum width shall be 30'.		
[3] Where a commercial driveway serves a substantial percentage of oversized vehicle traffic, the City Engineer may approve a larger width to accommodate the largest vehicles using the driveway.		
[4] As determined by the City Engineer.		

Figure 2.22A – Applicability of Width Standards



2. Elevation. Back edge of driveway shall be at the same elevation as the back of the sidewalk adjacent to the driveway approach.
3. Clearance from structures.
 - a. No object (including fire hydrants, light or power poles, street trees) shall be placed or allowed to remain within fifteen feet (15') of the driveway edge.
 - b. Where the building facade or other design element is less than ten feet (10') behind the sidewalk front setback both pedestrian and vehicular sight distance shall be maintained.
4. Sight Distance.
 - a. Vehicular Sight Distance. Vehicular sight distance shall be per section 2.15.
 - b. Pedestrian Sight Distance. Pedestrian sight distance shall be as follows:
The driver of an exiting vehicle shall be able to view a one-foot (1') high object fifteen feet (15') away from either edge of the driveway throat when the driver's eye is fourteen feet (14') behind the back of the sidewalk.

5. Maximum driveway grade shall be fifteen percent (15%).
6. On sloping approaches, a landing as described in section 2.09, shall be provided.
7. Approach grades and configuration shall accommodate future street widening to prevent major driveway reconstruction.
8. Surfacing. All portions of a driveway within a public right-of-way and/or within 30' of a public right-of-way shall be surfaced with a minimum 2" Class A HMA, or suitable alternative, over 6" compacted aggregate base. The Engineer may exempt driveways serving a single-family residence from the asphalt surfacing requirement.

2.23 Bridges

- A. Design Principles. All bridges whether on public or private roadways shall meet the minimum requirements set forth in the latest addition of "Standard Specifications for Highway Bridges", adopted by AASHTO. All new bridges shall be designed to carry an AASHTO HS-20-44 live load or greater.
- B. Geometrics. In the general case, the bridge shall comprise the full width and configuration of the road being served (traveled way plus curb, sidewalk, walkway, bike lane, and/or shoulder on one or both sides). Requirements of utilities shall be considered. Traffic and pedestrian railings or combination traffic-pedestrian railings shall meet AASHTO specifications. Overhead vertical clearances on the traveled street or under overpasses shall be sixteen and one-half feet (16.5') minimum.

2.24 Landscaping in the Right-Of-Way, Easements and Access Tracts

- A. Plantings established in the right-of-way shall be maintained by the abutting property owner.
- B. Any existing planting areas within the right-of-way that are disturbed by construction activity shall be restored to their original condition.
- C. Any plantings or other improvements placed within the right-of-way (by abutting property owners) are subject to removal when the right-of-way is needed for public use. The property owner is responsible for removing any landscaping or other improvements upon official notice. The property owners shall be responsible for survival of the relocated plantings.

- D. Measures shall be taken by the developer to provide groundcover in areas within the right-of-way which have been stripped of natural vegetation or have a potential for erosion. Native plants shall be used whenever possible.
- E. Plantings within the right-of-way shall comply with the following provisions:
 - 1. All landscaping shall comply with the sight distance provisions of these standards.
 - 2. Where existing landscaping maintained by the City exists every effort shall be taken to protect and preserve the existing vegetation during construction. Plants shall be relocated or removed only upon approval of the Public Works Department. Damaged landscape areas shall be restored prior to issuing a final occupancy permit.
 - 3. In areas where an existing landscaping concept or pattern has been established or approved, all new landscaping shall conform to the intent of the concept. Plantings shall be of a similar variety, size, and spacing to those already established and/or approved for the area.
 - 4. All trees planted in areas with adjacent pedestrian usage shall maintain a seven foot (7') clearance to the lowest branches.
 - 5. Approval from the Public Works Department must be received before trees are planted in or adjacent to sidewalk sections.

2.25 Mailboxes

- A. Mailboxes should be clustered together when practical and when reasonably convenient to the houses served.
- B. When mailboxes are located in the sidewalk, individually or in clusters, sidewalk shall be widened to provide the full design width around the mail boxes.
- C. In the case of new road construction, or reconstruction requiring mail boxes to be moved back or rearranged, the designer and builder shall coordinate with the local postmaster of the U.S. Postal Service. Mailbox locations approved by the Post Office shall be shown on approved road construction plans.

2.26 Street Illumination

Complete guidelines for preparing plan specifications and construction details can be found in the City of Stevenson Design Standards for Street Lighting Arterial and Residential Applications.

A. Plats and Short Plats.

Street lighting is required for all public streets. The street lighting design shall be reviewed and approved by the Engineer prior to final plat approval. The cost of all street lighting shall be paid for by the developer.

The City will accept maintenance and power cost responsibility for the public street light system when a plat is fifty percent (50%) or more occupied. Until the plat is fifty percent (50%) occupied, the developer is responsible for the maintenance and energy charges for the street lighting system.

Street lighting is not required on private streets within a plat. However, a street lighting system is encouraged. The City does not install or maintain private street lighting systems. On private streets, all street light maintenance and power cost shall be paid by the developer, homeowner, or homeowners association.

B. Existing Residential Areas.

If a resident or group of residents desires the installation of a new street light they must apply to the Public Works Director.

C. Commercial

Street lighting is required on all public street frontages. The developer is responsible for design, installation or relocation of new or existing lighting. Commercial development shall replace existing lighting systems on power poles with a new lighting system serviced by underground power if the system will not conflict with essential distribution lines.

D. General Considerations

All public street light designs shall be prepared by a licensed engineer experienced in lighting design. The design calculations should indicate luminaire spacing,

illumination levels, uniformity ratio, line losses and the electrical and physical layout of the system, including its connection to the existing system.

All public street light systems shall be accessible for public maintenance by a wheeled vehicle weighing twenty-thousand pounds (20,000 lbs.).

All street light installations including wiring, conduit, and power connections shall be located underground. Exception: existing residential areas with existing above ground utilities may have street lighting installed on the existing power poles.

As-built drawings on 24" x 36" mylar are required for all new or relocated underground street lighting systems prior to receiving a final occupancy permit.

All street lights shall be on 120 volt single phase systems. The exact location of the power source should be indicated together with the remaining capacity of that circuit. System continuity and extension should be considered.

Contractor cabinets equipped with electrical meters, time clocks, circuit breakers and other required components are required on commercial installations of five (5) or more street lights.

Particular attention shall be given to locating luminaires near intersections, at all street ends and at pedestrian and/or equestrian crossings.

2.27 Traffic Control and Signing

- A. Traffic Control Devices. The City Engineer shall review and approve all traffic control devices.
- B. Signing. In new plats the developer shall install all traffic control signs which shall include but not be limited to street name, parking, stop, dead end, and pedestrian signing. The developer will be responsible for supplying and installing the required signs.
- C. Pavement Marking. In new plats or commercial developments pavement markings, including buttons, paint, thermoplastics and delineators will be required for roadway safety. Such markings shall be provided and installed by the developer. All markings shall be approved by the City Engineer prior to installation.

- D. Temporary Traffic Control. It is the responsibility of the developer to provide adequate temporary traffic control to ensure traffic safety during construction activities.
- E. Speed Humps. Speed humps are demonstration devices used to control vehicle speeds on local access/neighborhood collector streets.
- F. Traffic Signal Modification. Traffic signal modification designs shall be prepared by a licensed engineer experienced in traffic signal design.
- G. Design Requirements
 - 1. Traffic Control Devices. All traffic control devices shall conform to the "Manual on Uniform Traffic Control Devices" (M.U.T.C.D.) as adopted by the Washington State Department of Transportation (WDOT).
 - 2. Signing. See WDOT Standard Drawings for typical installations and details.
 - 3. Pavement Marking. All markings shall conform to the current "Manual on Uniform Traffic Control Devices" (M.U.T.C.D.) as adopted by the Washington State Department of Transportation (WDOT).
 - 4. Temporary Traffic Control. All traffic control devices shall conform to the "Manual on Uniform Traffic Control Devices" (M.U.T.C.D.) as adopted by the Washington State Department of Transportation (WDOT) or as modified by the City Engineer.
 - 5. Speed Humps. Speed humps are approximately three inches (3") in height with a length of at least twelve feet (12') at base.
 - 6. Traffic Signal Modification. The developer's engineer shall use the standard specifications developed by the City Engineer in conjunction with the current edition of the Washington State Department of Transportation's (WDOT) "Standard Plans and Specifications for Road, Bridge, and Municipal Construction". Traffic Signal plans shall be submitted on 22" x 34" mylar.
 - 7. Amenity, destination, and directional signage shall be designed and installed as identified in the Stevenson Wayfinding Master Plan, as amended.

2.28 Appurtenances

An appurtenance shall be considered to be any fixed object located adjacent to the roadway and deemed to be a possible safety hazard.

- A. All appurtenances shall be located a minimum of three feet (3') behind the face of the curb to the face of the object. Where no curb exists the distance from the edge of the travel way to the face of the object shall be at least six feet (6').
- B. All breakaway objects shall be located a minimum of two feet (2') behind the face of curb to the face of the object. All objects having properties up to that of a 4" x 4" wooden post shall be considered breakaway.
- C. Appurtenances shall be located outside of the sidewalk area except when the sidewalk is widened around the appurtenance to the satisfaction of the Engineer.

2.29 Franchise Utilities

- A. Non-City owned franchise utilities are required to relocate existing facilities at their own expense when a conflict results between their facilities and public street improvements. The improvement work must be required by the non-City owned utility in order for the relocation work to be the financial responsibility of the utility, otherwise all costs shall be the responsibility of the developer.
- B. All non-City owned franchise utility distribution or collection systems including power, telephone, and T.V. cable in new plats or short plats shall be underground.
- C. As a minimum on all new single family plats and short plats, a minimum five foot (5') wide common or individual non-exclusive utility easement shall be provided connecting any lots without public street frontage to a public street. Easements for existing or future utility lines which do not lie along rear or side lot lines shall be of a width specified by the serving utility.

2.30 Safety Railing

- A. Where a sidewalk or other non-motorized transportation facility is to be constructed above a slope or adjacent to a rock wall or retaining wall where the lowest finished elevation of the slope, rock wall or retaining wall is to be thirty inches (30") or more below the finished elevation of the sidewalk or other facility, a safety railing shall be required when:

1. The plane of a wall face is less than four feet (4') in horizontal distance from the near side face of the sidewalk or other facility.
 2. The plane of the wall face is greater than four feet (4') horizontal distance to the near side face of the sidewalk or other facility but the slope down to the wall top exceeds three to one (3:1).
 3. The slopes adjacent to the sidewalk or other facility average greater than two to one (2'H:1'V).
- B. Safety railings or other approved devices (such as walls, high curbs, landscape features or guard rails) shall be required where grading operations will produce a parking area, service yard or other vehicle area which has a drop-off grade separation in relation to adjoining properties or streets.
- C. Safety railings shall be constructed of 2" galvanized steel pipe or aluminum with vertical supports ten feet (10') on center and 3 horizontal railings fourteen inches (14") on center, the lowest railing center being fourteen inches (14") above finished grade. All joints shall be welded, cold galvanized if welded after galvanizing, and the entire safety railing may be painted or vinyl coated to assure corrosion protection and a pleasing appearance. Railings shall be erected and adjusted, if necessary, after initially set to assure a continuous line and grade.
- D. Wooden railings may be used when approved by the Engineer. Wooden railings shall be sturdily constructed of pressure treated timbers and galvanized carriage bolts (no nails allowed). Posts shall be minimum 4" x 4" on four-foot (4') centers. Three (3), 3" x 6" rails shall be bolted to the posts. Alternate designs may be considered.

2.31 Guard Rails

For purposes of warrants, design, and location, all guard rails along roadways shall conform to the criteria of the "Washington State Department of Transportation Design Manual" as may be amended or revised. The decision of whether to install a guardrail or not shall be based on information found in AASHTO publication, Guide for Selecting, Locating, and Designing Traffic Barriers.

2.32 Surfacing Requirements

All materials and workmanship shall be in accordance with the Standard Specifications, these Standards, and as approved by the Engineer.

A. Minimum Structural Section

The following are the *minimum* requirements for surfacing for specific facilities as described elsewhere in these Standards. Existing roads built before the adoption of these standards are not subject to automatic rebuild to meet requirements.

<u>Facility</u>	<u>Surfacing Requirements</u>
1. Arterials	5" Class A (HMA pg. 64-22) asphalt over 14" crushed surfacing
Collectors	4" Class A (HMA pg. 64-22) asphalt over 12" crushed surfacing
Local Access	3" Class A (HMA pg. 64-22) asphalt over 10" crushed surfacing
2. Concrete Sidewalks	5" Portland Cement Concrete over 3" of crushed surfacing
3. Multi-Use Trail	6" Crushed Rock 1/4" Minus or cinders
4. Bikeway	2-1/2" Class A (HMA pg. 64-22) Asphalt over 4" Crushed Rock Base

All minimum surfacing requirements assume an acceptable, well drained, stable, compacted subgrade. Additional requirements may be imposed at the discretion of the Engineer if suitable subgrade conditions are not met. A pervious material, such as Grasscrete or Ritter Ring, may be used in parking lots upon approval of the Engineer.

B. Alternative Sections

Streets may be constructed of either of the following:

1. Asphaltic concrete with crushed rock base or treated bases.
2. Full depth asphaltic concrete.
3. Portland cement concrete with cushion course of crushed rock or on a base of crushed rock or treated base.

For pavement sections, other than those in Section 2.33, alternative sections may be approved by the City Engineer following submission of calculations by a registered engineer and per the design requirements described herein. Soil testing to obtain the strength of the soil is required for all roads and streets in order to analyze and design

the structural section. Soil tests are needed on undisturbed samples of the subgrade materials that are expected to be within three (3) feet of the planned subgrade elevation. Samples are needed for each five hundred (500) feet of roadway and for each visually observed soil type. Soil tests are required from a minimum of three (3) locations.

The selected design structural strength of the soil needs to be consistent with the subgrade compaction requirements. The strength and compaction moisture content, at optimum to slightly over optimum, needs to be specified. The soils report shall address subgrade drainage and ground water considerations for year round conditions.

Recommendations for both summer and winter construction shall be included. The required density of treated and untreated subgrade materials shall not be less than 95 percent maximum density as determined by AASHTO T-99.

C. Aggregate Base

All aggregate shall meet WDOT specifications for base rock.

During compaction, materials shall be maintained within 2 percent of the optimum moisture content. The contractor shall begin compaction of each layer immediately after the material is spread, and continue until a density of not less than 95 percent of the maximum density has been achieved. Maximum density will be determined by AASHTO T-180, or WDOT Test Method 705.

D. Asphalt Pavement Design

The base course of asphalt concrete (AC) streets shall be WDOT class "A" (HMA pg. 64-22) and the wearing course shall be WDOT class "A" (HMA pg. 64-22).

The compaction shall be at least 91 percent based on a Rice theoretical maximum density, as determined in conformance with AASHTO T 209, as modified by WDOT. In addition, for each mix used, a 50 blow Marshall (AASHTO T 245) shall be performed and all related test data shall be provided to the City Engineer. The minimum stability shall be 1800 pounds, the flow shall be between 8.0 and 16.0 hundredths of an inch, and the voids shall be between 3.0 and 5.0 percent. The Marshall requirement may be waived by the City Engineer on a case-by-case evaluation.

Asphalt pavement shall be designed by the Asphalt Institute Method, or an approved equivalent method provided it is a nationally recognized procedure.

Design of asphalt concrete pavement structures by the Asphalt Institute Method shall conform to the guidelines of The Asphalt Institute Publication, Thickness Design Asphalt Pavements for Highways and Streets Manual Series No. I.

- ☞ AASHTO T-193 (CBR Method), or
- ☞ AASHTO T-190 (R-Value Method), or

If the CBR value of the subgrade exceeds twenty (20) or the R value of the subgrade exceeds sixty (60) then CBR and R-value methods shall not be used.

E. Portland Cement Concrete Pavement

The design of Portland cement concrete streets shall be governed by the guidelines and requirements of the Portland Cement Association (PCA) design procedures found in the below listed publications:

Concrete Streets: Typical Pavement Sections and Jointing Details

Thickness Design for Concrete Highway and Street Pavements

Joint Design for Concrete Highway and Street Pavements

The subgrade shall be tested to determine the Modulus of Subgrade Reaction, k , in order to design the street structure. A correlation of CBR to k may be made using Figure 2, Thickness Designs for Concrete Highway and Street Pavements. In addition, the City will require that the following be incorporated into the design and construction specifications:

1. Use a minimum twenty (20) year design period.
2. Minimum thickness of Portland cement concrete shall be five (5) inches.
3. The minimum concrete specifications shall be 5000 psi (compressive) and 650 psi (flexural) in 28 days. The minimum cement content will be 660 pounds per yard, with a maximum water / cement ratio of 0.48. The slump shall range from 3-inch to 4-1/2-inch. The entrained air shall be from 4.0 to 6.0 percent.

4. A design joint plan shall be prepared and incorporated into the street construction plans. Longitudinal and transverse joint locations shall be clearly delineated. Transverse joints shall be skewed forward two (2) feet per lane with right and left curb street stationing noted for each end. Joint spacing (in feet) should not exceed 1.5 to 1.75 times the slab thickness (in inches). For example, an 8-inch thick slab would have a maximum joint spacing of 12 to 14 feet. The maximum length to width ratio shall be 1.25 : 1.0 for any panel unless there are other constraints that the City will examine on a case by case basis.

2.33 Utilities

A. Depth.

Underground utilities shall be buried a minimum depth of thirty (30) inches as measured from finished grade to top of utility. See Chapters 4 and 5 for additional requirements.

B. Curb Markings.

When new curbing is being placed, a stamp shall be placed to mark where each water and sanitary sewer service crosses the curb line. The method of marking the curb shall be approved by the City Engineer and noted on the approved construction plans. If an imprinting stamp is used, the impression left for a water service shall be the letter "W"; for a sanitary sewer service, it shall be the letter "S". These impressions shall be two (2) inches high, placed on the top of the curb.

C. Trench Restorations.

Trench restoration shall be either by a patch or overlay method. When a patch method is used, the trench limits shall be sawcut prior to the final patch.

All trench and pavement cuts shall be made by saw cuts. The saw cuts shall be a minimum of 1 foot (1') outside the trench width. If the permit requires an overlay, the contractor may use a jack hammer for the cutting of the existing pavement.

D. Utility Locations.

Utilities shall be located horizontally within the right-of-way in accordance with City Standards.