SECTION 4

TRANSPORTATION IMPROVEMENTS

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SECTION 4
TRANSPORTATION IMPROVEMENTS

4-1 DEVELOPER'S PAVEMENT, SIGNAL, AND STREET LIGHT RESPONSIBILITY

A. Construction of street improvements shall conform to the centerlines established by the County Engineer.

B. Where an existing pavement section within, adjacent, or contiguous to the Developer's project does not generally meet the current structural section standard and/or the centerline grade and alignment, or existing pavement conditions are not satisfactory to the County Engineer, the Developer shall be responsible for the reconstruction of pavement section on all such streets.

The Developer shall overlay any areas beyond these limits where the design centerline grade deviates from the existing or where adjacent pavement conditions are not satisfactory to the County Engineer. The Developer shall also be responsible for overlaying any low areas where the new pavement meets the existing pavement to maintain a uniform cross slope, and overlaying areas necessary to create a smooth transition between the new and existing pavement sections. The Developer shall be responsible for repairing and overlaying areas damaged during construction.

C. When making a connection to an existing street end, the Developer shall be responsible for removing and reconstructing the existing roadway up to a maximum of twenty feet to make a satisfactory connection as required by the County Engineer.

When making connections to existing pavement, the Developer shall be responsible for a 1-foot wide minimum sawcut of the existing pavement along with an additional 1 foot minimum by 1-1/2" deep grinding and paving. Refer to Standard Drawing 4-16. When making connections to existing new pavement (less than 5 years old), the 1-1/2" deep grinding shall extend from the lip of gutter to the lip of the gutter, or as required by the County Engineer.

D. The Developer shall be responsible for all of the structural section and pavement on all streets within, adjacent, and contiguous to the project, including frontage roads, as required by the County Engineer. If the street is to be paved under a future Department contract, the County Engineer may require a cash deposit for the roadway and related work in lieu of actual construction and the Department shall include the work in the Department contract.

E. All temporary approaches to existing roadways required as a result of the development shall be at the Developer's expense. The temporary approaches shall be paved with a structural section to be determined individually for each situation.

F. The Developer shall be responsible for relocating existing traffic signals, streetlights, and utilities, and installing new traffic signals and street lights as necessary for required street improvements. Utilities shall be installed underground.

G. The Developer shall be responsible for constructing or modifying curbed median islands where required by these Standards, including landscaping and landscaping irrigation, or when required for traffic control as a result of the development, as determined by the County Engineer.

H. The Developer shall be responsible for installing plantings and irrigation in planter strips, and maintaining such landscaping until acceptance of the improvements. Following acceptance, maintenance of planter strips shall be the responsibility of the adjacent landowners.

I. The developer shall be responsible for bus stops, bus turnouts, and intersection widening as shown on Standard Drawing 4-29 and in accordance with Section 4-14 of these Standards.

J. Variances and exceptions to these Standards shall be specifically listed and requested in writing. Such requests shall be presented to the County Engineer along with substantiating evidence (plans, profiles, calculations, etc.) supporting the variance or exception. The request shall be made as early as possible in the review process and preferably prior to or concurrently with the first submittal.

K. The Developer shall be responsible for all drainage facilities (bridges, pipes, culverts, detention facilities, and appurtenances) within, adjacent, and contiguous to the project.

L. The Developer shall be responsible for all on-site modifications to allow for access for the disabled in accordance with the Americans with Disabilities Act including, but not limited to, sidewalk curb ramps in accordance with the Caltrans Standard Plans.

4-2 STREET TYPE AND DESIGN WIDTH

A. Local Residential Street The Local Residential Street section is required to serve individual lots in residential subdivisions.

A Local Residential Street shall have a face-of-curb to face-of-curb width of 36 feet, with the indicated minimum right of way width and improvements in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-1.

B. Local Residential-Low Volume Street The Local Residential-Low Volume Street section may be used for streets serving fewer than 12 single-family dwelling units, with average lot frontage less than 100', upon the approval of the County Engineer.

A Local Residential-Low Volume Street section shall have vertical curbs, 6.5' planter strips, and a face-of-curb to face-of-curb width of 32 feet, with the minimum right of way and improvements in accordance with Table 4-1, Street Cross Sections and Standard Drawing 4-2.

C. Primary Residential Street The Primary Residential Street section is required in residential areas in the vicinity of parks, schools, and other public facilities, in multiple family developments, and may be required elsewhere based on the County's review of the traffic circulation system.

A Primary Residential Street shall have a face-of-curb to face-of-curb width of 40 feet, with the indicated minimum right of way width and improvements in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-3.

D. Collector Street The Collector Street section is required in residential areas where traffic flows are projected to exceed 3000 vehicles per day, and in commercial areas.

Collector Streets shall have a face-of-curb to face-of-curb width of from 40 feet to 64 feet. The width shall be determined by the County Engineer considering the volume of traffic expected, the need for turn lanes, parking, bicycle lanes, and pedestrian facilities. The right of way width and improvements shall be in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-4. Additional right of way and pavement shall be provided at intersections for acceleration, deceleration, bus turnouts, and turn lanes, as specified by the County Engineer.

E. Industrial Street The Industrial Street section is required in industrial areas, or in commercial areas where a large proportion of the traffic is expected to be trucks.

Industrial Streets shall have a face-of-curb to face-of-curb width of from 48 feet to 64 feet, depending on the volume of traffic expected and the proportion of truck traffic expected. The indicated minimum right of way width and improvements shall be in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-5.

F. Arterial (2-lane) Street The Arterial (2-lane) Street standard may be required in commercial developments when warranted to provide a continuous center turning lane or raised landscaped median. The Arterial (2-lane) Street standard shall be required when shown on a Transportation, Circulation or Street Master Plan or when required by the project traffic analysis.

An Arterial (2-lane) Street shall have the indicated minimum right of way width and improvements in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-6. The street section shall have Class 1 off-street bike paths when warranted or required by the project approvals. Refer to Section 4-2(J) "Added Width at Intersections" for intersection widening requirements.

Arterial (2 lane) Streets shall have a solid non-traversable landscaped median between cross street intersections.

Minor street intersections (with right turns only) should be no closer than 450 feet from each other or from the cross street intersections. Major driveways which will serve significant traffic volume, as determined by the County Engineer, shall be considered as intersecting streets and shall be no closer than 450 feet from each other or from cross street intersections. All other driveways shall have right turns only. Driveways should be located as far apart as practical with a minimum of 150 feet between driveways or from driveways to intersections. Major driveways that will be signalized shall be designed in accordance with public street intersection standards.

All arterial streets shall be designed to the appropriate arterial standards regardless of whether or not they are apparent on a Transportation, Circulation or Street Master Plan. Where streets are constructed with the arterial standard widths, it is intended that they meet all the standards specified herein.

All arterial streets shall be subject to full or partial access control (relinquishment of access rights by abutting properties) at the discretion of the County Engineer.

G. Arterial (4-lane) Street – The Arterial (4-lane) Street standard may be required in developments when warranted to provide a continuous center turning lane or raised landscaped median. The Arterial (4-lane) Street standard shall be required when shown on a Transportation, Circulation or Street Master Plan or when required by the project traffic analysis.

An Arterial (4-lane) Street shall have the indicated minimum right of way width and improvements in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-7. The street section shall have Class 1 off-street bike paths when warranted or required by the project approvals. Refer to Section 4-2(J) "Added Width at Intersections" for intersection widening requirements.

Arterial (4-lane) Streets shall have a solid non-traversable landscaped median between cross street intersections. Median openings shall be spaced at least 650 feet apart.

Minor street intersections (with right turns only) should be no closer than 450 feet from each other or from the cross street intersections. Major driveways (those with left turn movements) which will serve significant traffic volume, as determined by the County Engineer, shall be considered as intersecting streets and shall be no closer than 650 feet from each other or from cross street intersections. All other driveways shall have right turns only. Driveways should be located as far apart as practical with a minimum of 150 feet between driveways or from driveways to intersections. Major driveways that will be signalized shall be designed in accordance with public street intersection standards.

All arterial streets shall be designed to the appropriate arterial standards regardless of whether or not they are apparent on a Transportation, Circulation or Street Master Plan. Where streets are constructed with the arterial standard widths, it is intended that they meet all the standards specified herein.

All arterial streets shall be subject to full or partial access control (relinquishment of access rights by abutting properties) at the discretion of the County Engineer.

H. Rural Street The Rural Street section is required in rural areas where Class C street improvements (see Section 4-4) are allowed.

A Rural Street shall have a minimum width of 32 feet in accordance with Table 4-1, Street Cross-Sections and Standard Drawing 4-8. Driveway connections to Rural Streets shall comply with Standard Drawing 4-23.

I. Frontage Road A street which provides service to abutting property and control of access alongside another street for which direct access is prohibited or undesirable. Frontage roads adjacent to State freeways shall conform to the full width standards for secondary collector streets, except the sidewalk may be omitted on the freeway side.

J. Added Width at Intersections Additional width shall be added for dedicated right turn lanes, additional left turn lanes, deceleration/transition lanes, as required by project approvals and (any) traffic impact study. All such width additions shall be subject to review and approval by the County Engineer.

All major streets shall be required to accommodate "U" turns at all traffic signals. A minimum outside clear path radius of 44 feet of pavement shall be required.

K. Private Streets and Driveways Private streets serving three (3) or more parcels with an average size of 5 acres or less, shall comply with the County Street Type and Design Width appropriate for the planned use, as determined by the County Engineer. The visibility requirements at private road intersections shall comply with Standard Drawing 4-13.

Access to a single parcel shall be provided via a driveway meeting the requirements of Section 4-9, and Standard Drawing or 4-23, depending on the street class (refer to Section 4-4), and the visibility requirements shown in Standard Drawing 4-13.

In all cases, access shall be provided that meets the requirements of the local fire district, or the requirements of California Code of Regulations, Title 14, Division 1.5, Chapter 7, "Fire Protection", whichever is more stringent.

L. Alleys Where alleys exist and are to be utilized to access existing lots, alleys shall be graded to drain and paved with 3 inches of hot mix asphalt pavement compacted to 96% relative compaction over 8 inches of aggregate base compacted to 95% relative compaction over native subgrade compacted to 95% relative compaction.

M. All compaction levels specified in these Standards, including those called out on the various Standard Drawings, shall be relative compaction, as determined by the test methods specified in Section 2-20, Table 1.

TABLE 4-1 STREET CROSS SECTIONS

Street Type	ROW[1]	Street Section[2]	Travel Lanes (#) width	Median[3]	Bike Lanes	Parking Lanes[4]	Curb	Planter Strip[8]	Sidewalk (separated)	Fronting Homes (Yes/No)
Local Residential	58’	36’	(2) 10’	N/A	none	8’	0.5’	5.5’	5’(5’)	Yes
Local Residential-Low Volume[9]	56’	32’	(1) 16’	N/A	none	8’	0.5’	6.5’	(5’)	Yes
Primary Residential	66’	40’	(2) 12’	N/A	Note[5]	8’	0.5’	7.5’	5’ (5’)	Yes
Collector	66’-94’	40’-64’	(2) 12’	N/A	Note[5]	8’	0.5’	7.5’	5’-7’	Yes
Industrial	68’-88’	48’-64’	(2) 14	N/A	Note[5]	10’	0.5’	N/A	5’-7’	No
Arterial (2-lane)[7]	94’	54’	(2) 14’	14’	6’	None	0.5’	7.5’	(6’)	No
Arterial (2-lane) with Off-Street Path[7]	102’	54’	(2) 14’	14’	10’	None	0.5’	7.5’	(10’ Bike Path)	No
Arterial (4-lane) [7]	118’	78’	(2) 14’ inside (2)12’outside	14’	6’	None	0.5’	7.5’	(6’)	No
Arterial (4-lane) with Off-Street Path[7]	126’	78’	(2) 14’ inside (2)12’outside	14’	10’	None	0.5’	7.5’	(10’ Bike Path)	No
Rural Street	54’	32’	(2) 12’	N/A	4’	None	N/A	N/A	N/A	No

Notes:

1: ROW = Minimum required Right of Way.

2: Face-of-Curb to Face-of-Curb.

3: Medians shall be landscaped unless noted otherwise

4: Includes 2 feet of width in the gutter.

5: An additional 10 feet of ROW and street width is required when on-street bike lanes are required

6: An additional 14 feet of ROW is required when a median is required.

7: Individual residential driveway access prohibited. Local Street access is discouraged.

8. When approved by County Engineer.

9: Local Fire District approval required. “No parking” zones may be required to provide adequate emergency vehicle access.

Street sections are minimum requirements; additional ROW, increased improved width, or other requirements may be added when warranted and/or required by the condition of adjacent streets, project approvals.

4-3 RIGHT-OF-WAY WIDTH

Building setbacks, landscaping requirements, and parking requirements shall be based on the ultimate right-of-way width regardless of the location of existing public street improvements or right-of-way lines. In case of conflict with any zoning code requirements, the higher standard shall apply.

The right of way and street widths shown in these Standards are intended for new streets. Where existing streets are to be extended, or where additional dedications are to be made along existing streets, the County Engineer shall consider conditions along the existing street when determining new right of way and street widths, and shall strive to maintain consistency of right of way and street widths in existing corridors.

4-4 STREET CLASS

A. Class 'A' Street

Class 'A' Streets shall be provided in all developments having a net average parcel size of not more than 14,500 square feet (1/3 acre) per lot.

Developments on land zoned or used for duplex, multi-family residential, business and professional, commercial, and industrial uses shall require Class 'A' street improvements, regardless of the individual lot area.

Class "A" Streets shall consist of:

a. Hot mix asphalt pavement on aggregate base and subbase (as required). Rigid and semi-rigid pavement structures may be used upon approval by the County Engineer.

b. Concrete curb, gutter, and sidewalk, including landscaped planter strips and/or medians, as may be required.

c. Side slopes not steeper than 3:1 (horizontal:vertical) or a reinforced concrete or masonry retaining wall beginning at the right of way line. Pedestrian railing may be required along sidewalks when the adjacent property slopes down from the street.

d. Street lights in accordance with Section 5.

e. Other required utility improvements in accordance with the appropriate sections of these Standards as appropriate, all of which shall be placed underground.

B. Class 'B' Street

Class 'B' Streets shall be provided in all residential developments having a net average parcel size of more than 14,500 square feet (1/3 acre) but less than 20,000 square feet (0.46 acre), per residential lot.

Class 'B' Streets shall be the same as Class 'A' Streets except that sidewalks may be omitted.

C. Class 'C' Street

Class 'C' Streets shall be provided in all residential developments having a net average parcel size of more than 20,000 square feet (0.46 acre) per residential lot.

Class 'C' Streets shall be the same as Class 'A' Streets except that sidewalks, curbs, and gutters may be omitted.

D. Other Streets

Streets or roads which do not fall into any of the above classifications shall be considered as individual cases, with determinations as to the appropriate level of improvement determined by the County Engineer. In these cases the minimum lane width shall not be less than twelve feet (12') and the minimum shoulder width shall not be less than four feet (4').

4-5 STRUCTURAL SECTION

The following standards for the design of structural sections shall govern the preparation of plans for proposed improvements.

A. Structural sections for all roadways 20 feet or wider shall be designed to conform to the California Department of Transportation Highway Design Manual (latest edition), "Chapter 630 – Flexible Pavement" or other method as approved by the County Engineer. The gravel equivalent shall be increased by a factor of safety of 1.35 for TI's less than or equal to 9, and increased by a factor of 1.25 for TI's greater than 9.

B. The minimum traffic indices (T.I.) used for the calculation of the roadway structural sections shall be based on a 20-year design life and shall comply with Table 4-2.

TABLE 4-2 MINIMUM TRAFFIC INDEX

Street Type	Minimum Traffic Index (20 year)
Local Residential Streets	5.0
Primary Residential	6.0
Collector Streets	7.0
Residential Cul-de-Sacs	6.5
Industrial Streets	9.0
Arterial (2-lane) Streets	9.0
Arterial (4-lane) Streets	10.0

T.I.'s will be provided to the Design Engineer for industrial cul-de-sacs, locations where high volumes of truck traffic are anticipated, or other unique conditions, and shall be approved by the County Engineer.

C. A soil report indicating the R-value of subgrade or basement soil, along with calculations for structural pavement sections, shall be submitted with any plan indicating construction of roadways. Samples of soils for R-value tests shall be taken on the following basis:

1. 3 tests minimum.
2. The samples for testing shall be taken at the estimated depth of the grading plane.
3. The location of the tests within the development area shall be selected such that an adequate representation of the quality of the basement soil may be tested.
4. For development areas in excess of 50 acres, at least one additional test shall be taken for each 25 acres.

In lieu of a field sampling, an R-value of 5 may be assumed. Design thickness shall be rounded up to the next 0.05-foot increment. Minimum design thickness for hot mix asphalt pavement shall be 0.4 feet. Lime or cement stabilization treatments shall be used to stabilize the top 12 inches of subgrades with an R-value less than 20.

Minimum structural sections shall comply with Table 4-3.

TABLE 4-3 MINIMUM HOT MIX ASPHALT SECTION

Street Type		
	Hot mix asphalt	
Local Residential, Primary Residential Streets	0.4 ft.	
Collector Streets	0.50 ft.	
Industrial Streets	0.50 ft.	
Arterial (2-lane) Streets	0.50 ft.	
Arterial (4-lane) Streets	0.55 ft.	
Minimum compaction of Subgrades and Aggregate Base : 95% relative compaction Minimum compaction of Hot Mix Asphalt: 96% relative compaction		

D. Portland cement concrete (PCC) streets may be constructed with the approval of the County Engineer. This is not generally practiced if there are utilities underneath the pavement. Collector or Arterial intersections expected to experience higher volumes of truck or bus traffic, may be required to be paved with PCC sections throughout acceleration zones, at the County Engineer's discretion.

E. The use of alternate road building materials may be allowed if supported by a thorough geotechnical study consisting of field and laboratory work summarized in a geotechnical report sealed by a geotechnical engineer, and a sound pavement design study prepared by a registered civil engineer and approved by the County Engineer. Alternate road building materials may include but are not limited to the following:

1. Subgrade stabilizing and/or isolating geotextiles and grids

2. Pavement stress absorbing interlayers

3. In-situ soil and subgrade stabilizing admixtures

4. The use of recycled materials in the manufacture of subbase, subgrade, and hot mix asphalt

5. Rubberized asphalt concrete

6. Subbase drainage facilities

F. Positive structural section drainage facilities may be required by the County Engineer if high groundwater levels indicate subbase drainage may be necessary and the basement soil has permeability less than 100 feet per day. Drainage system design shall be in accordance with California Department of Transportation Highway Design Manual (latest Edition) or other method as approved by the County Engineer. Subbase drainage shall be provided at all sag points in impermeable soils.**G.** In transition areas from one street section to another, the heavier structural section shall be used in the transition area.

H. The full pavement structural section shall be completed prior to issuance of building permits. In no case shall traffic be allowed on partial pavement sections, unless it has been designed for that purpose.

4-6 PROFILE STANDARDS

The following standards for the design of profiles shall govern the preparation of plans for proposed improvements. See Section 3-7(D).

A. The minimum grade on new streets shall be 0.65 percent (.0065) except that the minimum fall at the gutter flowline around curb returns shall be 0.5 foot. Curb and gutter elevations on crest and sag vertical curves shall be adjusted to conform to a 0.3 percent minimum grade. If minimum profile grade standards are used, a drainage analysis shall be submitted to the County Engineer to demonstrate that the allowable street inundation shown in Table 9-3 is not exceeded.

B. The minimum grade of gutter sections constructed on existing streets shall be 0.25 percent for vertical curb, and 0.35 percent for all others, with preferable minimum grade of 0.5 percent.

C. Standard cross slope on new streets shall be 2.0 percent. A minimum cross slope of 2.0 percent and a maximum of 3.0 percent shall be maintained throughout all areas of cul-de-sacs and 90° elbow intersections (knuckles).

D. The minimum cross slope on street widening shall be 1.5 percent and the maximum cross slope shall be 3.0 percent. The cross slope of the widening shall conform to the cross slope of the existing pavement whenever possible. Pavement overlay to street centerline shall be required when this is a feasible method of meeting this standard.

E. When two streets intersect, neither street shall have a grade greater than 2.0 percent for a minimum distance of 40 feet measured from the curb line of the intersecting street, except in unusually rough terrain, as determined by the County Engineer. The centerline of the lesser intersecting street shall meet the crown slope at the projected lip of the gutter. Crown slope may be reduced to 1.0 percent within the intersection, if necessary.

For streets with design speeds 40 mph or less, the minimum vertical curve length allowable at the intersection of two grades shall be 100 feet. Vertical curves on streets may be omitted where the algebraic difference in grades does not exceed 2.0 percent. The minimum vertical curve data to be computed and shown on the plans shall consist of the point of intersection elevation, the tangent gradients, the middle ordinate and the length of curve, BVC, EVC stationing, and elevations at ¼ points or every 50 feet whichever is less. Vertical curves for speeds greater than 40 mph shall be in accordance with the Caltrans Highway Design Manual.

F. The design speed and minimum stopping sight distance over any segment of urban roadway shall comply with Table 4-4, unless the County Engineer specifically approves a lesser design speed.

TABLE 4-4 DESIGN SPEED AND MINIMUM STOPPING SIGHT DISTANCE

Street Type	Recommended Design Speed	Minimum Stopping Sight Distance
Local Residential	30 MPH	200 feet
Industrial	35 MPH	250 feet
Secondary Collector	35 MPH	250 feet
Primary Collector	40 MPH	300 feet
Arterial (2-lane)	45 MPH	360 feet
Arterial (4-lane)	55 MPH	500 feet
Rural/unposted	65 MPH	660 feet

The minimum design speed for rural and/or unposted roadways shall be 65 MPH or as determined by performance of a recent Speed Survey. Stopping sight distance for other design speeds shall be in accordance with California Department of Transportation Highway Design Manual (Fifth or latest Edition) or as approved by the County Engineer.

Stopping sight distance is measured from the driver's eyes, which are assumed to be 3.5 feet above the pavement surface, to an object 0.5-foot high on the road.

4-7 PARTIAL STREET

Partial streets may be permitted by the County Engineer along the boundary of a subdivision or property of the developer where the full right-of-way cannot be dedicated or where the complete street cannot be constructed, but will ultimately be constructed with adjacent development.

The minimum right-of-way width shall be 40 feet or one-half of the proposed right-of-way plus 10 feet, whichever is greater. Lesser right-of-way widths may be allowed when approved by the Board of Supervisors in accordance with State of California Streets and Highways Code Section 906.

Partial streets shall be constructed to a complete geometric and structural section for a minimum paving width, not including gutter, specified by the following:

1. On Local Residential Streets, the pavement width shall be 26 feet.

2. On Collector and Industrial Streets, the pavement shall extend ten feet past centerline for a total of 28 feet.

Curb and gutter width is not included in the above pavement widths.

The intersection pavement edges shall have a minimum radius of 14 feet on the uncompleted side. All other edge of pavement radii shall be 25 feet or greater.

When paving partial construction of an ultimate street development, the edges of the current pavement on the uncompleted side are to be protected by use of 2"x6" pressure preservative treated wood or all-heart redwood headers, or by placing a minimum of 1-foot additional width of aggregate base material beyond the edge of pavement to the grade and depth of the adjacent structural section.

Partial streets shall be terminated with the end of the pavement perpendicular to the street unless otherwise specified below. A 2"x6" pressure preservative treated wood or all-heart redwood header, shall be required at the pavement ending.

Partial streets that terminate adjacent to an intersection or driveway shall be tapered 45 degrees to the street if right-of-way is available.

The end of a partial street that terminates a traveled lane in the direction of travel shall be tapered in accordance with the following equations:

Less than 45 mph, $L = WS^2/60$

Greater than or equal to 45 mph, $L = WS$

Where L = Taper Length along centerline, W = Taper Width reduction or widening (feet) and S = Design Speed (mph).

The design speed used in determining the taper shall be that given in Table 4-4.

The County Engineer may require pavement tapers for the termination of partial streets that are different from the above.

4-8 OFFSET INTERSECTION

A. Streets intersecting any residential street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 200 feet. Lesser distance may be approved for infill projects.

B. Streets intersecting any Industrial or Collector Street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 250 feet. Lesser distance may be approved for infill projects.

C. Streets intersecting a 2-lane arterial street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 450 feet. Streets intersecting a 4-lane arterial street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 650 feet. Pursuant to this section major access driveways

shall be considered as streets with respect to offsets. Lesser distance may be approved for infill projects.

D. The centerline of intersection streets shall be at right angles to each other, as nearly as practicable.

E. Infill project applicants shall consult with the County Engineer to determine specific offsets.

4-9 DRIVEWAYS

Driveway installation shall be in accordance with the Standard Drawings and the following:

A. The maximum algebraic difference in grade at any grade change within the public right-of-way and a driveway or between a driveway and public roadway shall be ten percent (10%). Driveway slopes and grade changes shall be designed to prevent "bottoming" or scraping of the intended vehicles' undercarriage on the pavement or concrete.

B. Driveways (measured from the driveway throat) shall be located at least 7 feet from the side property line. The County Engineer may approve exceptions where warranted based on allowable residential sideyard setbacks, for joint driveways, or in unusual cases. The County Engineer may require joint driveways and a joint use driveway agreement shall be required prior to approval of improvement plans.

C. On a Class 'A' or Class 'B' Street, the minimum width for a single-family residential and duplex driveway shall be 10 feet. Maximum single-family residential and duplex driveway width shall be 26 feet for 2 cars and 35 feet for 3 cars at face of curb. Residential driveways shall be placed at least 7 feet from the adjacent property line, as measured from the driveway throat, except on cul-de-sacs. Residential and duplex driveways with plus grades shall have a rise of no more than 8 inches above the back-of-sidewalk grade at a point 7 feet from the back of sidewalk. The driveway width (not including curb transitions) shall occupy not more than a maximum of 40 percent of the lot frontage, except in cul-de-sacs.

D. On a Class 'C' Street, driveways shall conform to Standard Drawing 4-23, or as may be required by the local fire district. Driveways shall be 10 feet wide minimum, and the maximum width shall be 35 feet, exclusive of flares. A culvert shall be provided for any roadside ditch and shall be a minimum of 20' in length and extend a minimum of 5' beyond the driveway on both sides. All driveway or culvert improvements within the public right of way are to be privately maintained.

E. All commercial and multiple family developments shall install heavy driveways as shown on Standard Drawing 4-22 except as otherwise provided in this section. All commercial and industrial driveways shall be a minimum of 24 feet wide, exclusive of flares or aprons. The design of major driveways, which will serve significant traffic volume, as determined by the County Engineer, shall be based on the width, cross section, and geometries of a secondary collector street. Based on anticipated uses, the County Engineer may require greater widths. Driveways on all arterial streets shall have a minimum clear spacing of 200 feet between driveways (see Standard Drawing 4-12). The County Engineer, when warranted by conditions at a particular site, may approve lesser spacing. Exceptions should be obtained as early as possible, prior to submission of improvement plans or development plans.

A center median up to 10 feet wide in the driveway may be approved by the County Engineer for certain driveways. The normal driveway width shall be increased by the median width.

F. The standard driveway for industrial developments shall be heavy, 45 feet wide, as shown on Standard Drawing 4-22.

G. Where Class "A" or "B" frontage improvements exist, medium driveways as shown on Standard Drawing 4-22 shall be installed for all accesses serving more than four single dwelling units. Where garbage collection vehicles will utilize the driveway to access waste containers, heavy driveways shall be installed, as shown on Standard Drawing 4-22.

H. When driveways are abandoned or relocated, the old driveway sections shall be removed and replaced with standard curb and gutter, sidewalk, and landscaping, as appropriate.

I. Driveways entering levee roads and driveways entering commercial property on all roads shall have a slope not exceeding 5 percent for a minimum distance of 20 feet, measured from the edge of existing pavement. Driveway slopes and grade changes shall be designed to prevent "bottoming" or scraping of the intended vehicles' undercarriage or the pavement or concrete. Driveways normally used by vehicles towing trailers shall have special requirements to be determined on an individual basis by the County Engineer.

J. Visibility requirements for driveways shall be in accordance with Standard Drawing 4-13. Increased visibility requirements may be required for driveways serving a significant amount of truck traffic.

K. Major commercial driveways which will serve significant traffic volume, as determined by the County Engineer, shall be considered as intersecting streets and shall conform to the requirements of Section 4-8 regarding offsets.

L. Driveways near major intersections shall be no closer than 100 feet from the present or future intersection curb return (see Standard Drawing 4-12). The County Engineer may grant exceptions for unavoidable, extreme conditions, or on small lots where there is frontage for only one driveway.

4-10 ELBOW INTERSECTION

Elbows shall be required at right angle intersections in accordance with Standard Drawing 4-10. Only under unavoidable or extreme conditions will an elbow other than 90°±5° be permitted by the County Engineer.

4-11 CENTERLINE RADII

The curve data (delta angle, length, tangent, and radius) for all centerline curves as well as for all curves of design features that are not concentric with the center line shall be computed and shown on the plans.

The minimum centerline radius curve for residential streets shall be 200 feet with the exception that streets exceeding 1,000 feet in length and functioning as collectors serving over 99 lots and connecting to arterial streets shall have a minimum radius curve of 500 feet.

The minimum centerline radius curve for collector and industrial streets shall be 500 feet.

The minimum centerline radius curve for arterial (2-lane) streets shall be 800 feet.

The minimum centerline radius curve for arterial (4-lane) streets shall be 2,000 feet.

Special consideration will be given to unusually difficult alignment problems. Any exception to the above minimum centerline radius requirements must be approved by the County Engineer.

Where a centerline radius on a major street that is less than the above requirements is approved by the County Engineer, superelevation may be required.

A minimum tangent length of 200 feet shall be required between reversing curves on residential, collector, and industrial streets. The tangent shall be increased on arterial streets depending on design speeds. A minimum tangent length of 50 feet is required for all local or collector streets approaching an intersection.

4-12 SIGHT DISTANCE AT INTERSECTIONS

Streets should not be designed to intersect the inside of curves or at any location where in general, sight distance will be inadequate for drivers to tell if they can safely enter the traffic flow or cross the street. The minimum distance from an intersection to a curve should be the applicable minimum sight distance listed below. The County Engineer may make exceptions for especially difficult design circumstances, only if visibility easements to provide adequate sight distances are dedicated. Minimum intersection design sight distance standards shall comply with Table 4-5.

TABLE 4-5 MINIMUM SIGHT DISTANCE STANDARD

Type of Street Being Entered	Recommended Design Speed	Minimum Sight Distance*
Residential	30 MPH	330 feet
Industrial	35 MPH	385 feet
Type of Street Being Entered	**Recommended Design Speed**	**Minimum Sight Distance***
Arterial (2-lane)	45 MPH	495 feet
Arterial (4-lane)	55 MPH	605 feet

*Distance measured from an entering driver's eye position to the position of the closest approaching vehicle's far front corner.

The entering driver's eye position shall be assumed 3 feet to the right of the entering street's centerline, 3.5 feet above the pavement surface, and 11 feet clear of the nearest vehicle lane on the street being entered.

The position of the closest approaching vehicle's far front corner shall be assumed 3 feet from the edge of the nearest approaching vehicle lane and 4.25 feet above the pavement surface for each direction of travel.

Major driveways serving significant traffic volume, as determined by the County Engineer, shall be considered as intersecting streets with regard to intersection sight distance requirements. Minor driveways and private streets should provide the recommended intersection sight distance, and at a minimum, shall provide for stopping sight distance.

All streets and driveways shall conform to Standard Drawing 4-13 for corner visibility requirements, as well as to the requirements herein. Visibility easements shall describe an area to be maintained clear of any and all obstructions to a clear view from the adjacent streets. No sign, hedge, structure, natural growth, fence, or other obstruction to a clear view, higher than 2 1/2 feet above the nearest pavement surface (or traveled area where no pavement exists) shall be installed or maintained or shall be permitted to be installed or maintained within the easement area.

Visibility easements shall be recorded on subdivision maps when required, or by separate document if no map will be recorded.

All visibility easement areas between fences or walls and curbs or sidewalks shall be landscaped with low profile landscaping.

4-13 INTERSECTION CORNER RADII

Minimum right-of-way and edge of pavement radii for intersection corner roundings shall comply with Table 4-6 and the Standard Drawings.

TABLE 4-6 MINIMUM INTERSECTION CORNER RADII

Street Type	Face of Curb Radius	R/W Radius
Residential Streets	25 feet	14 feet or chord
Collector Street	30 feet	Chord
Arterial Streets	35 feet	Chord

All intersection pavement edges on partial streets shall have a minimum radius of 14 feet on the uncompleted side. All other edge of pavement radii shall be 25 feet or greater as determined by turning requirements at the subject location.

4-14 BUS STOP

Bus stop turnouts and shelters shall be provided on primary collectors and all arterial streets at all intersections with collector or arterial streets. Bus stop turnouts may also be required at other locations as determined by the County Engineer, in consultation with the Yolo County Transportation District (YCTD). Bus stop turnouts shall be located on the far right hand side of the intersection, unless otherwise required by the County Engineer, and shall be in accordance with Standard Drawing 4-29. Bus stop turnouts, whether mid-block or corner, shall be provided at approximately ¼ mile intervals along arterial streets.

The Design Engineer shall be responsible for submitting improvement plans to the YCTD and obtaining YCTD's approval of bus stop locations, shelters, and signage.

4-15 SIDEWALK RAMP

Sidewalk ramps shall be constructed at all street intersections and at other locations where required by the County Engineer, in accordance with the American with Disabilities Act and Caltrans Standard Plans A88A and A88B, as appropriate, and Standard Drawing 4-11.

Case “F” is the preferred standard at residential and collector intersections where planter strips are provided

Case “C” with retaining curb is the preferred standard at residential and collector intersections where sidewalks are not separated from the curb and gutter.

Case “A” is the preferred standard at arterial intersections.

At "T" intersections, one ramp shall be constructed in the appropriate position at the nearest property line on the far side of the through street, opposite the ramps at the corner rounding of the intersecting street so that pedestrians are encouraged to cross the through street on the leg unaffected by left-turning traffic from the "T" street.

Detectable warning surfaces shall be wet set into concrete in accordance with the manufacturer’s instructions, and shall be fully supported by the underlying concrete. Glue-on or mechanically fastened detectable warning surfaces shall not be allowed.

4-16 CURB AND GUTTER

Curb and gutter shall be installed adjacent to all developments in accordance with Section 4-4, Table 4-2, and Standard Drawings 4-19 or 4-20, as determined by the County Engineer.

Type “C” Roll Curb and Gutter in accordance with Standard Drawing 4-21 may be used in certain urban in-fill areas to match adjacent curbs and gutters, as approved by the County Engineer. Sidewalk grades at driveways must meet the requirements of the Americans with Disabilities Act.

Temporary hot mix asphalt dikes when permitted by the County Engineer shall be Caltrans Type “A” (6” high) per Caltrans Standard Plan A87B.

4-17 VALLEY GUTTER

Valley (cross) gutters may be permitted on local residential streets with the specific approval of the County Engineer only when the intersection cannot reasonably be drained to an underground system. See Standard Drawing 4-15. No valley gutter shall be allowed on collector or arterial streets. Valley gutters shall not be allowed on any approach to a signalized intersection.

4-18 SIDEWALK

Sidewalks shall be provided in accordance with these Standards and the Standard Drawings.

All school, park, and commercial developments shall have minimum 8-foot sidewalks along all frontages, with the exception that 5-foot sidewalks may be used along fenced play areas where no access is provided, as determined by the County Engineer.

Where existing utility poles and other obstructions are situated within the planned sidewalk section, a minimum of 4 feet of clear uninterrupted sidewalk area shall be provided, subject to approval of the County Engineer. Where it is necessary to widen the sidewalk beyond its standard width to attain the 4-foot clearance, the widened area shall extend a minimum of 5 feet beyond each side of the obstruction and a 10-foot taper on each side of the widening shall be required.

Where sidewalks end in fill areas, the fill shall be extended beyond the end of the sidewalk for a minimum distance of 6 feet. As an alternate, a cut-off wall may be constructed at the end of the sidewalk and appropriate connection to the existing public street shall be provided for pedestrians traveling beyond the end of the sidewalk. Sidewalk barricades in accordance with Standard Drawing 4-26 may be required.

With approval by the County Engineer, sidewalks may meander within the right of way behind the curb on arterial streets shown on Standard Drawings 4-6 and 4-7. The cross slope on meandering sidewalks shall be 2%. The distance between the back of the curb and the edge of the sidewalk can vary, but shall not be less than 5 feet nor more than 25 feet, except at transitions. If trees are to be planted in the landscaping strip, the minimum distance between the back of the curb and the edge of the sidewalk shall be 5 feet. The sidewalk shall have no abrupt changes in direction and shall be constructed using only tangents of any length and inside radii of at least 150 feet. The County Engineer may approve other configurations of meandering sidewalks to save existing trees or for special design applications, provided adequate right of way is dedicated.

Sidewalks shall be constructed of Class A, 6-sack concrete and shall be finished and cured in accordance with Caltrans Standard Specifications.

4-19 PEDESTRIAN LANE

Pedestrian lanes or walkways within a development shall be constructed with a minimum of six inches (6") of Concrete Pavement on six inches (6") of aggregate base compacted to 95% relative compaction for the full width of the easement. Pedestrian lanes likely to be subject to maintenance vehicle traffic shall be reinforced in accordance with Standard Drawing 4-22, medium driveway.

The maximum grade for pedestrian lanes shall be 5.0 percent in the direction of travel, except at any curb ramps. The maximum cross slope shall be 2 percent. The design shall also comply with ADA requirements for an accessible path.

Pedestrian lanes, where situated between lots, shall be fenced with chain link fencing from the street right of way to the back lot line. These fences shall be 6 feet high from the building setback line to the back lot line and 36 inches high from the building setback line to the street right-of-way line.

All pedestrian lanes shall have lighting installed in accordance with Section 5, Street Light Design.

4-20 REPLACING CULVERTS

The Developer shall replace existing inflow and outflow cross culverts as determined by the County Engineer.

4-21 TRENCHING/BORING IN EXISTING PAVED ROADWAYS

Directional boring, or other trenchless methods, may be required under streets where, in the opinion of the County Engineer, high peak hour traffic volumes or other unusual conditions exist, or on any street that has been recently constructed, reconstructed, overlaid, or has had any surface treatment (streets considered "new"). Streets shall be considered "new" for a minimum period of ten years following construction, reconstruction, overlay, or any surface treatment. The developer shall provide TV camera inspection of existing sewer and stormdrain facilities following boring operations to demonstrate that boring has not damaged these facilities.

The Developer may be required to coordinate trenching work schedules to avoid cutting new pavement surfaces in instances where maintenance is planned by the Department. When trenching is allowed, trenching and backfill shall be in accordance with Standard Drawing 4-17.

4-22 TESTING OF MATERIALS

Testing of materials to be utilized in work shall be performed in accordance with the methods of the Laboratory of the State of California, Department of Transportation, or other test methods provided for in these Standards, or accepted by the County Engineer. The Contractor shall schedule operations to facilitate all field testing. The County Engineer shall determine the minimum required tests.

4-23 STREET NAMES

All roads and streets within a development shall be named in accordance with the Yolo County Master Address Numbering System. No duplication of names already in use or previously proposed shall be permitted. Sound-alike names or names with more than 17 spaces are not acceptable. Street names at intersections shall be continued on both sides of the intersecting streets. Streets that change direction by an angle equal to or greater than 90° shall be known by a different name, except for those roads deemed as meandering by the County Engineer.

Street name signs shall be furnished and erected by the Developer. Street name signs shall conform to these Improvement Standards. Street names and street name sign locations shall appear on plans submitted for approval. Sign details shall be as shown on Standard Drawing 4-28.

Private roads serving more than 4 dwellings and/or businesses shall have street name signs and other signs installed as required by the County Engineer. Street name signs for private roads shall be the same as for public streets (Standard Drawing 4-28), except that the background color of private signs shall be brown. Also, a separate additional sign must be placed on the same post saying "Private Road", which shall be 9 inches wide, 8 inches high, and have 1-3/4 inch high black letters on a white background.

4-24 STREET SIGN LOCATION

Street sign locations shall conform to the following:

A. Two street name sign installations, consisting of double-faced signs conforming to Standard Detail 4-28, are required at each intersection. At a four-way intersection, the installations shall be located on both far right-hand corners of the intersection relative to the street having the greater right-of-way width or relative to the more important street if right-of-way widths are equal.

At a "T" intersection, the first installation shall be located on the near right-hand corner of the terminating street, and the second installation shall be located adjacent to the through street at a point in line with the centerline of the terminating street.

B. For highways with frontage roads, the street name sign installations shall be located in the divider strip between the frontage road and the main traveled lanes of the highway. All other requirements shall be as outlined above, except that only one sign shall be required (in the divider strip in line with the centerline of the minor street) when there is no opening in the divider strip for access to the main highway.

C. On arterial streets, the street name sign installations are to be located as required by the County Engineer.

D. Street name signs shall be placed on street light poles where possible, using standard clamp-on "L" brackets.

E. At signalized intersections, illuminated street name signs shall be placed on all four corners of four-legged intersections and on three corners on "T" intersections.

4-25 TRAFFIC SIGNS

Regulatory and warning signs to control and advise traffic shall comply with the Manual of Uniform Traffic Control Devices, California Supplement, latest edition. All traffic signs shall be installed by the Developer. At the County's discretion, installation may be performed by County forces, with costs reimbursed by the Developer.

All cul-de-sac and dead-end (stub) streets where the curb at the centerline of the end of the street is not visible from the standard driver's eye position at the entering intersection shall be posted with a standard 24" x 24" code W53A (No Outlet) sign. The bottom of the sign shall be a minimum of 7 feet above the sidewalk. The standard location for the W53A sign is on the right hand side at the tangent point of the corner rounding, 6 inches (minimum) from the back of sidewalk.

4-26 SURVEY MONUMENTS

Survey monuments shall be installed in accordance with Section 12, Survey Monuments.

All monuments set shall comply with Standard Drawing 12-1 and shall be shown on the recorded Map for the project. Each monument set shall clearly show the registration number of the licensed Civil Engineer or Land Surveyor who set it.

4-27 PERMANENT BARRICADE

Where improvements are temporarily terminated on a street that may be extended in the future, the improvements shall include a permanent type barricade at the end of the street extending completely across the right-of-way to prohibit access and to serve as a warning to the public. The barricade shall be constructed, erected, painted, and signed in accordance with Standard Drawing 4-26.

Gates may be required where streets stub into public park areas or like areas.

Sidewalk barricades shall be constructed at the end of sidewalks where pedestrians cannot safely continue beyond the end of the sidewalk. Sidewalk barricades shall conform to Standard Drawing 4-26.

4-28 STREET TREES

In accordance with the County Code, Section 8-1.708, existing trees shall be preserved within any public right of way wherever such trees are suitably located, healthy, and of desirable variety and where approved grading permits the preservation of such trees. Where required, street trees of an approved type shall be planted.

Permission to remove any tree in a public right-of-way or easement shall be obtained from the County Engineer in advance. An Encroachment Permit is required.

All trees removed from within the ultimate right-of-way shall be replaced with trees from the approved street tree list if required per the project conditions of approval, or required by the County Engineer.

Except in planter strips, trees shall not be planted any closer than 10 feet from sidewalks or curbs, unless approved by the County Engineer. If trees are approved closer than 10 feet, then a root control barrier shall be installed adjacent to the sidewalk at all tree plantings. A 20-foot long root control panel shall be centered on the trunk of each tree planted. Root control panels shall be 24" deep minimum and extend to the finish grade of the surrounding sidewalk or curb.

Root control barriers shall be geosynthetic panels commercially manufactured for the purpose of controlling root growth, and approved by the County Engineer. Backfill materials placed adjacent to root control panels shall comply with the compaction requirements of the adjacent road or sidewalk subgrades.

Where trees are located within 20 feet of an intersecting street, the main trunks of such trees shall be trimmed free of branches to a height of 8 feet above the curb grade.

Approved trees for planting in public rights-of-way and public easements are listed in Tables 4-7, 4-8, and 4-9. (Desired trees not listed may be planted with the approval of the County Engineer):

TABLE 4-7 ORNAMENTALS-DECIDUOUS

COMMON NAME (*Scientific Name*)	**Height**	**Spread**	**Growth Rate**	**Minimum Planter Width**	**Description**
CREPE MYRTLE (*Lagerstromia indica*)	30’		Moderate	4'	Vase shaped with attractive trunk and branch pattern. Fall foliage yellow. Crinkled, crepe-like flowers July-Sept.
EASTERN REDBUD "FOREST PANSY" (*Cercis candensia*)	25’-35'	25'	Moderate	4'	Round-headed but with horizontally tiered branches in age. Purple foliage and reddish branches.

TABLE 4-8 SHADE TREES - DECIDUOUS

COMMON NAME *(Scientific Name)*	**Height**	**Spread**	**Growth Rate**	**Minimum Planter Width**	**Description**
CHINESE HACKBERRY *(Celtis sinensis)*	40’-60'	40'	Moderate	6'	Rounded tree with grayish bark. Leaves to 4" long, with scallop-toothed edges.
CHINESE PISTACHE *(Pistache chinensis)*	35’-60'	50'	Slow	6'	Beautiful fall foliage -- scarlet, crimson, orange, yellow.
COLUMBIA PLANE TREE *(Platanus acerifolia "Bloodgood Strain")*	60'	50'	Rapid	8'	Upper trunk and limbs cream-colored. Lobed maple-like leaves 4-10" wide. Brown ball-like seed clusters.
MAIDENHAIR "AUTUMN GOLD" *(Ginko b. "Autumn Gold")*	60'	45'	Slow	6'	Spectacular yellow fall color. Semi-columnar shape.
MAIDENHAIR "SARATOGA" *(Ginko b. "Saratoga")*	60'	45'	Slow	6'	Dense, compact tree with ascending branches and a distinct central leader. Leaves have an unusual "fish tail" shape. Fall color soft golden yellow.
CALIFORNIA SYCAMORE *(Platanus racemosa)*			Moderate	8’	

TABLE 4-9 SHADE TREES - EVERGREEN					
COMMON NAME ***(Scientific Name)***	**Height**	**Spread**	**Growth Rate**	**Minimum Planter Width**	**Description**
CORK OAK *(Quercus suber)*	40’	40’	Moderate	8’	Trunk and principal limbs covered with thick corky bark. 3” toothed leaves shiny dark green above and gray beneath.
HOLLY OAK *(Quercus ilex)*	40-70'	40’-70'	Moderate	8'	Spreading umbrella-shaped form at maturity. Upper side of oval leaves dark green underside silvery. Leaves are either toothed or smooth-edged.

4-29 FENCES

Fences or walls along public streets shall conform to the setback and height requirements of the County Code. Fences or walls shall not encroach upon visibility easements required by Section 4-12 and Standard Drawing 4-13.

Rear and side yard fences and walls adjacent to freeways, major highways, arterials and collectors shall be constructed of masonry or concrete, in accordance with the requirements of Section 6. Rear and side yard fencing adjacent to other public spaces shall be either masonry, concrete, chainlink with slats, or tubular steel.

Fences and walls may require modification to accommodate street light poles and/or foundations.

4-30 PRIVATELY OWNED BRIDGE

A bridge intended for the sole use of the occupants of a multi-family type development or any bridge on a private road shall be designed to withstand an HS-20 load, unless specifically approved by the County Engineer for a lesser loading. Other design features of the bridge, including but not limited to widths, railings, clearances and materials shall be in conformance with Department and State Standards. Developer shall obtain a County Building Permit for private structures. A foundation report prepared by a licensed geotechnical engineer shall be required. Design calculations stamped and signed by the Design Engineer are required, along with any other information required by the Chief Building Official.

4-31 VEHICLE ACCESS AT STREET TERMINATIONS

Vehicular access shall not be permitted from the end of a stub street. To obtain vehicular access, the street must be extended through the property or be properly terminated with a standard cul-de-sac bulb.

4-32 PAVEMENT STRIPING AND MARKINGS

All pavement striping and markings shall be designed and installed per the California Manual on Uniform Traffic Control Devices, and as follows:

A. Pavement striping shall be a high-build, ready-mixed, one-component, waterborne acrylic traffic paint conforming to the requirements of State Specification No. PTWB-01R2, or current edition, with an acrylic polymer emulsion such as Dow Fastrack HD-21A, or approved equivalent. The liquid paint shall be applied at no less than 25 mil wet film thickness. Both large gradation and small gradation retroreflective elements shall be embedded into the wet paint. Large gradation retroreflective glass

beads shall be white or yellow 3M Microcrystalline Ceramic elements, or approved equivalent. The small gradation glass beads shall conform to the requirements in AASHTO Designation: M247, Type 1.

B. Thermoplastic pavement markings for limit lines and legends shall be "Premark Plus" preformed thermoplastic markings as manufactured by Flint Trading, Inc, or an approved equivalent preformed thermoplastic approved by the County Engineer. The preformed thermoplastic markings shall be 125 mil thick and installed in accordance with the manufacturer's installation requirements, except that bicycle lane markings shall be 90 mil thick.

C. Crosswalk pavement markings materials shall be determined by the County Engineer on a case by case basis, and shall be one of the following:

a. Striping as described above.
b. Thermoplastic markings as described above.
c. "Series 380I ES (white)" or "Series 381I ES (yellow)" pavement marking tape as manufactured by 3M, or an approved equivalent pavement marking tape. Pavement marking tape shall be installed in accordance with the manufacturer's installation requirements.