

Tab C – Road Design Standards

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Tab C – Road Design Standards

C.1. General

C.1.A) *Requirement.* The standards apply to road improvements and other road-related improvements (e.g. roadside drainage systems) in subdivisions and other developments requiring county approvals, and which are required for property access subject to the expectation of public use by residential owners within a subdivision or business open to the general public, as well as improvements that are undertaken by the County Department of Transportation (DOT). They also apply to privately maintained roads and related improvements that are required for development projects subject to the expectation of public use where public health and safety is a factor. These standards do not apply to driveways or other access roads providing access within/on a particular property. Further, existing roads intended to serve a new or intensified use or development shall be modified to comply with the minimum standards and right-of-way lines set forth in this chapter or by resolution of the Board of Supervisors for said use.

C.1.B) *Other Applicable Standards.*

- 1) In cases where roads are designated State Highways, Caltrans Highway Design Standards shall apply in lieu of County of Mendocino Road Standards.
- 2) In cases where roads are within the boundaries of a specific plan, community plan, or area plan, the County of Mendocino Road Standards shall apply, except as modified by said plan.
- 3) Roads located within the California Department of Forestry (CDF) State Responsibility Area subject to the CDF Fire Safe Standards shall be subject to the approval of CDF.
- 4) The Planning and Building Services Department shall exercise its authority as may be granted by conditions of the approval or granting of a land use entitlement.
- 5) Discharge of drainage waters are subject to State Water Quality Control Board (SWQCB) standards, which include project, and regional discharge permits (such as NPDES) which must be adhered to. Furthermore, alterations to drainage courses both instream and upland are regulated by the California Department of Fish & Game (CDF&G).
- 6) Modifications to a stream by installation of culverts, etc. are regulated by CDF&G and in some instances the National Oceanic and Atmospheric Administration (NOAA Fisheries) through 1600 agreements and Army Corps of Engineers 404 permits respectively. CDF&G publishes “California Salmonid Stream Habitat Restoration Manual” and NOAA Fisheries publishes “Guidelines for Salmonid Passage at Stream Crossings”. These publications are available at these and other agencies and it is the applicants responsibility to obtain such current requirements from the respective agency.

C.1.C) *Purpose and Intent.* To ensure that roads, accessways and future road easements are provided to accommodate the vehicular and pedestrian traffic needs and related uses generated by development and use of the property, and the orderly development of the surrounding area. Roads must be designed so as not to cause or accelerate erosion that delivers sediment to water bodies while providing the intended access. Roads shall be designed for the following purposes:

- 1) Provide functional access to the properties that are intended to take access from the road.
- 2) Afford vehicular access to points of origin and destination.
- 3) Provide reasonably direct routes between points of origin and destination.
- 4) Provide for the orderly future development of the area.
- 5) Accommodate the amount of traffic projected to use the road.
- 6) Allow room for the passage and turning of the types of vehicles that will normally use the roads.
- 7) Provide room for the parking of vehicles where the intensity of abutting uses is likely to generate a need for such parking.
- 8) Provide facilities for walkways, bikeways, equestrian trails, buses, and other means of alternative transportation, when required.
- 9) Provide sufficient grade, cross slope, and/or facilities for the conveyance of storm water.
- 10) Storm water conveyance facilities within fish and aquatic life bearing jurisdictional streams shall, in addition to providing for storm flow, also meet any conditions set by appropriate agencies (California Department of Fish and Game, National Oceanic and Atmospheric Administration, etc.) for fish and aquatic life passage.
- 11) Accommodate the grade, turning, and passage needs of emergency and service vehicles.
- 12) Be free of structural defects.
- 13) Reasonably withstand wear.
- 14) Be easily and cost effectively maintained.
- 15) Integrate with and complement the natural terrain and vegetation, or be visually enhanced by the preservation and/or planting of appropriate trees and vegetation.
- 16) Not initiate or compound hydrologic or geologic problems.
- 17) Minimize surface area that cumulatively affects air quality, air temperature and storm water runoff.

C.1.D) *Urban Road Standards.* Urban road standards shall apply when any one of the following conditions are met:

- 1) Any of the property abutting the road has a General Plan land use classification with a base density of less than forty thousand square feet per parcel regardless whether public water or sewers are available or currently extended to the property.
- 2) Urban improvements, such as curb, gutter, or sidewalk, are in existence on the road frontage of property adjacent to or in the vicinity of the development.

- 3) The road is within an urban area on a map prepared by the State of California Department of Transportation or the County of Mendocino Department of Transportation.

Subject to the Approval Authority, urban road standards may apply when the road is within an urbanized or urbanizing area as evidenced by one or more of the following: the road is within a city sphere of influence and pre-zoned by the city at a base density of less than one acre; it is within the urban limit line within the Coastal zone.

C.1.E) Rural Road Standards. Rural Road Standards shall apply in all areas not designated for urban road standards. Rural Local Connector roads shall be used as the connector road when a new subdivision or business, open to the general public and requiring a county use permit, with urban roads is more than 2,500 feet from the connection to an existing public road.

C.1.F) Non Continuous Local Road Standards. Non Continuous Local Road Standards shall apply to both urban and rural settings depending on their existing use or planned use as set forth in County of Mendocino land use documents. Local Roads in Mendocino County will generally fit into the conditions described in the American Association of State Highway and Transportation Officials (AASHTO) “Very Low-Volume Local Roads – Under 400 vpd (vehicles per day) guidelines” with modifications as defined in these standards. Local Roads have some but not necessarily all of the following characteristics:

Such roads would likely never be upgraded to interconnect to other parts of the countywide transportation system as Connectors, but may potentially serve developable tracts of land capable of supporting the specified volume of vehicles.

The Local road designation does not preclude such roads from being interconnected to the countywide road system but does require that the proposed road is - by its location and/or length - not likely to become an alternative route for nonresident drivers as the AASHTO “Very Low-Volume Local Roads” guidelines are based on use by local drivers who learn the road.

Such roads would likely never be upgraded and used to interconnect parts of the countywide transportation system. These standards shall provide for non-connected local road systems serving low population density developments and larger residential lot division projects, which result in a very low volume traffic, up to 400 vehicles per day.

C.2. Definitions

C.2.A) Functional Classification. As defined and listed by the CALTRANS, Transportation System Network (TSN) can be viewed at:
<http://dot.ca.gov/hq/tsip/hpms/Page1.php>.

C.2.B) *Principal Arterial*. As defined and shown in County of Mendocino General Plan. U.S. 101 is the only Principal Arterial listed in the General Plan. Because Caltrans Highway Design Standards apply to State Highways, County Road Standards have not been developed for Principal Arterial roads. Roads in this category also have a functional classification of *Urban or Rural Principal or other Arterial* (01&11-Principal Arterial Interstate-PIA, 12-Principal Arterial – Other Fwys or Expwys-OFE, & 02&14-Other Principal Arterial-OPA) as defined by CALTRANS, Transportation System Network (TSN).

C.2.C) *Minor Arterial*. As defined and shown in the County of Mendocino General Plan. Roads in this category also have a functional classification of *Urban or Rural Minor Arterial* (06&16-MA- Minor Arterial) as defined by CALTRANS, Transportation System Network (TSN).

C.2.D) *Connector*. As defined and shown in the County of Mendocino General Plan. Roads in this category are the same as Minor Arterials that have the functional classification of *Minor Arterials* (06&16-MA- Minor Arterial) as defined by CALTRANS, Transportation System Network (TSN).

C.2.E) *Major Collector*. As defined and shown in the County of Mendocino General Plan. Roads in this category also have a functional classification of *Major Collector* (07-MJC- Major Collector) as defined by CALTRANS, Transportation System Network (TSN).

C.2.F) *Minor Collector*. As defined and shown in the County of Mendocino General Plan. Roads in this category also have a functional classification of *Minor Collector or (Urban) Collector* (08-MNC or 17-Collector-COL) as defined by CALTRANS, Transportation System Network (TSN).

C.2.G) *Local Connector*. As defined and shown in the County of Mendocino General Plan. Roads in this category ARE THE SAME AS *Local roads - Rural & Urban* which have a functional classification of (09&19-LOC-Local) as defined by CALTRANS, Transportation System Network (TSN).

C.2.H) *Local Road*. A road is defined as a local road when it is not classified by the County of Mendocino General Plan as any of the above classifications. Roads in this category also have a functional classification of *Local roads - Rural & Urban* which have a functional classification of (LOC) as defined by CALTRANS, Transportation System Network (TSN).

C.2. I) *Paved Width, Urban Roads*. Paved width for urban roads shall be defined as the distance between curb faces.

C.2. J) *Paved Width, Rural Roads*. Paved width for urban roads shall be defined as the distance between the outside edges of paved shoulders.

C.2. K) *Base Width, Rural Roads*. Base width for rural roads shall be defined as the distance between the outside edges of gravel shoulders.

C.2. L) *Road*. Road shall mean any public or private way that provides access to more than one lot.

C.2. M) *Lot or Parcel*. Lot or parcel shall mean a legally existing parcel or real property, which upon application is eligible for a Certificate of Compliance demonstrating its legality as an existing parcel.

C.2. N) *Right of Way*. Right of Way, as used in this chapter, shall be defined as one of the following:

- 1) Property offered to the County of Mendocino for public road purposes.
- 2) Access easements or private road easements.
- 3) Prescriptive rights held by the County of Mendocino for public road purposes.

C.2. O) *Approval Authority*. The public official or body empowered to act upon a permit or request for approval, or empowered to act upon an appeal of a decision on a permit or request for approval.

C.3. Standards

C.3.A) *General Standards and Responsibilities*. Many factors affect the design of roads. This chapter is intended to supplement such general standards by providing the minimum design parameters for roads in Mendocino County requiring county approvals, and which are required for property access subject to the expectation of public use by residential owners within a subdivision or business open to the general public. These standards do not apply to driveways or other access roads providing access within/on a particular property. The Engineer in Responsible Charge of the Work shall:

- 1) Be responsible for the use of initiative, skill and independent judgment in the design of road projects in the County of Mendocino. He/she shall exercise a reasonable standard of care in considering all of the applicable standards and how they apply to a specific design situation.
- 2) Refer to standards such as the Caltrans *Highway Design Manual*, the American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets*, Title 24/ADA, Fire Safe Standards adopted by the California Department of Forestry, and any other applicable law,

- community plan, specific plan, area plan, regulation, mitigation measure, or condition of approval applicable to the project.
- 3) Is subject to the Professional Engineers Act: California Business and Professions Code Sec. 6700-6799. Section 6730: Necessity for registration (Civil Engineers) - In order to safeguard life, health, property and public welfare, any person, either in a public or private capacity, except as in this chapter specifically excepted, who practices, or offers to practice, civil engineering, electrical engineering or mechanical engineering, in any of its branches in this state, including any person employed by the State of California, or any city, county, or city and county, who practices engineering shall submit evidence that he is qualified to practice, and shall be registered accordingly as a civil engineer, electrical engineer or mechanical engineer by the board. Section 6731: Definition of civil engineering: Civil engineering embraces the following studies or activities in connection with fixed works for ... drainage, ... highways, ... grading, ...etc.

C.3.B) *Private Roads*. Subject to the Approval Authority, minor subdivisions may include private roads, if the subdivider comes to that agreement with the Approval Authority not to meet full public road standards and/or thus not to dedicate the right-of-way for public use. Provisions for the ongoing maintenance of private roads shall be made through Conditions, Covenants, and Restrictions (CC&Rs), an assessment district, a maintenance agreement, or other suitable mechanism subject to approval by the Approval Authority. Improvement levels for private roads shall be defined as follows:

Improvement Level	Base Width	Base Thickness	Surfacing	Surfacing Width
A	18'-22'	4"-8" or Design*	None	None
B	18'-22'	6"-12" or Design*	Double Chip Seal	18'
C	26'	4"-8" or Design*	None	None
D	26'	6"-12" or Design*	Double Chip Seal	20'

* Structural section thickness may be reduced based on soil "R" value and $TI = 4$, per C.3.S.

The required improvement levels for private minor subdivision roads shall be as follows:

- 1) Residential minor subdivision; access from a proposed road or existing road not previously required for a land use entitlement or otherwise approved by the Department of Transportation: **Improvement Level A.**
- 2) Residential minor subdivision; existing access road, or portion of existing access road, at Improvement Level A; roadway serves, or has the potential to serve more than four parcels; smallest net parcel size of minor subdivision five acres or more, but less than forty acres: **upgrade to Improvement Level B.**
- 3) Residential minor subdivision; existing access road, or portion of existing access road, at Improvement Level A; roadway serves, or has the potential to serve

more than four parcels; smallest net parcel size of minor subdivision less than five acres: **upgrade to Improvement Level C.**

- 4) Residential minor subdivision; existing access road, or portion of existing access road, at Improvement Level C; roadway serves or has the potential to serve more than four parcels; smallest net parcel size of minor subdivision less than five acres: **upgrade to Improvement Level D.**
- 5) Commercial or industrial minor subdivisions: **Improvement Level D.**
- 6) Where no further road upgrade is specified, required improvement level to remain at existing level.

All other aspects of road and drainage design shall be in accordance with the standards for public local roads as contained in these Road Standards, except as modified in this Section.

Base Material. Base material shall be Class 2 or 3 aggregate base or locally available crushed rock, and shall be compacted to provide a firm driving surface. Where road upgrade requires placement of additional thickness of base material, the existing surface shall be scarified prior to placement of additional base material.

Engineering Plans/Reports. The Approval Authority may require that private minor subdivision roads be constructed in accordance with improvement plans, prepared by a California Registered Civil Engineer, and approved by the Department of Transportation. For Improvement Levels B and D, when such improvement plans are not required by the Approval Authority, road improvements shall instead be constructed under the direct supervision and control of a California Registered Civil Engineer who, upon completion of the improvements, shall file a report with the Department of Transportation verifying the road improvements have been constructed in substantial conformance with the prescribed minimum standards and accepted industry practices.

Access Easement Width. The minimum easement width for private minor subdivision roads shall be sixty feet, except where the road does not have the potential to serve more than four parcels, in which case the minimum easement width shall be forty feet. However, in all cases, the easement must be of adequate width to contain the roadway, utilities, and appurtenant drainage facilities. Roadway slopes shall also be contained within the easement width, or separate slope easements must be provided.

C.3.C) *Width Standards, Public Urban Roads.* The following table sets forth the minimum widths for paved width and right-of-way for urban roads:

Minimum Urban Road Classification	Minimum Paved Width	Minimum Right-of-Way	Desirable Right-of-Way
Principal Arterial	74 feet	120 feet	120 feet
Minor Arterial	74 feet	80 feet	100 feet
Major Collector	74 feet	60 feet	100 feet
Connectors	50 feet	70 feet	80 feet
Minor Collector	40 feet	60 feet	70 feet
Local Connector	40 feet	60 feet	70 feet
Local Road, Commercial or Industrial	42 feet	50 feet	70 feet
Local Road, Residential			
Standard	36 feet	50 feet	50 feet
Reduced	32-18 feet	50 feet	50 feet

C.3.D) *Width Standards, Public Rural Roads.* The following table sets forth the minimum widths for paved width and right-of-way for rural roads:

Rural Road Classification	Minimum Paved Width	Minimum Base Width	Minimum Right-of-Way	Desirable Right-of-Way
Principal Arterial	74 feet	60 feet	120 feet	120 feet
Minor Arterial	50 feet	40 feet	80 feet	100 feet
Major Collector	36 feet	40 feet	60 feet	70 feet
Connectors	36 feet	40 feet	70 feet	70 feet
Minor Collector	36 feet	40 feet	60 feet	70 feet
Local Connector	36 feet	40 feet	60 feet	70 feet
Local Road				
Standard	28 feet*	32 feet	50 feet	60 feet
Reduced	24-20 feet*	28-24 feet	50 feet	60 feet

* Surfacing as required by conditions of approval or other standards such as California Division of Forestry “Fire Safe Standards” but NOT necessarily AC paving.

C.3.E) *Additional Paved Width, Rural Roads.* The Approval Authority, during the approval process, or the DOT Director, during review of improvement plans, may require additional paved width or base width for rural roads if necessary in the interest of public safety for the following features:

- 1) Intersections
- 2) Road curvature
- 3) Emergency vehicle turnouts
- 4) Transition to existing roadway improvements

C.3.F) *Minimum Shoulder Width, Walkways, and Bikeways, Rural Roads.* Shoulders on rural roads above the local road classification shall be a minimum width of eight feet. Of that width, a minimum of five feet shall be paved to provide a walkway and bikeway. The Approval Authority may require additional walkways and/or bike paths for rural roads if necessary in the interest of public safety or convenience. The material used for rural walkways shall provide a smooth, even surface meeting the accessibility requirements of the Americans with Disabilities Act (ADA) and California Title 24. Asphalt concrete shall be considered as the standard material for rural walkways. Aggregate base, decomposed granite, and soil-cement will be considered as alternate materials for rural walkways, based on the recommendation of the DOT Director and subject to the Approval Authority.

C.3.G) *Future Right-of-Way Lines.* The County of Mendocino may establish right-of-way lines in addition to the corridor preservation setbacks established by the Zoning Code, for the purpose of reserving areas for future road, walkway, bikeway, or landscape area improvements. Furthermore, there is increasing demands for right-of-way to provide utilities, lighting, drainage and drainage filtration before discharge pursuant to the standards and conditions established by the appropriate agency(ies).

- 1) Findings. A right-of-way line shall be designated by resolution of the County Board of Supervisors after a noticed public hearing, based on the findings that:
 - a) The reserved area between the existing right-of-way and the designated right-of-way line is necessary for one or more of following purposes: widening, extension, or creation of roads, space for future utilities, walkways, bikeways, emergency or access routes.
 - b) The future road improvement is consistent with the County of Mendocino General Plan.
- 2) Restrictions. After the County Board of Supervisors has established a future right-of-way line, no person shall install, construct, or maintain a structure or use within the designated right-of-way except by obtaining an exception to these road standards and the following. A structure or use that exists in the designated right-of-way is a legal non-conforming structure or use, commencing on the date that the County Board of Supervisors adopts the right-of-way line, and is subject to any regulations, limitations, abatement, and amortization provided for in the County Zoning Ordinance.

C.3.H) *Exceptions to Width Standards.* All exceptions to width standards shall be subject to the review of the DOT Director and consideration of the Approval Authority. See Tab

H for Exception Procedures. The following modifications shall be considered as consistent with the intent of the Road Standard under the stated conditions:

- 1) **Parking.** Parking lanes may be eliminated from the urban roads with a minimum paved width of greater than thirty-six feet under the following conditions:
 - a) Off-street parking is provided in an amount equal to or greater than the amount specified in the County of Mendocino Zoning Code.
 - b) The paved width is not reduced to less than thirty-six feet, except that one-way streets with no parking may have a minimum paved width of twenty feet.
- 2) **Minor Arterial and Major Collector Urban Roads.** The minimum paved width may be reduced by twenty-four feet in conditions where four travel lanes are not required by current or cumulative twenty-year traffic projections. The minimum paved width may be reduced to twelve feet –OR– fourteen feet, where center turn lanes or medians are not required.
- 3) **Minor Arterial Rural Roads.** The minimum paved width of minor arterial rural roads may be reduced by twelve - fourteen feet where center turn lanes or medians are not required.
- 4) **Urban Local Roads** may be designed per AASHTO “Very Low-Volume Local Roads – Under 400 vpd (vehicles per day) guidelines” under the following two sub categories: **Standard** having a development density of 3 to 6 dwelling units (DU) per acre, or **Reduced** (or environmentally sensitive areas where minimum disturbance by the road width is desirable) having low development density of 2 or fewer dwelling units (DU) per acre. The reduced road standards in the AASHTO “Very Low-Volume Local Roads” guidelines is based on local drivers who learn the road and assumes that parcels in most areas of the United States are usable land flat enough for structures, parking and storage of boats and RV’s.

The following describes some, but not all, of the conditions for which the **Reduced** width sub category of **Urban Local Roads** may be applied:

- 2 or fewer dwelling units (DU) per acre.
25’ paved width on streets with parking on one side of the street.
- 18’ paved width on streets with NO parking on the street. The project must demonstrate that parcels will have at least .5 acres of usable area to accommodate structures, vehicle parking and RV storage.
- Streets will not likely connect to commercial, industrial, Business areas, and thus, not need to accommodate related large vehicles.
- Streets are short (under 600 feet) and/or straight, and it is determined that a narrow street will in fact reduce traffic speeds creating safer condition.

- 5) *Rural Local Roads* may be designed per AASHTO “Very Low-Volume Local Roads – Under 400 vpd (vehicles per day) guidelines” under the following two sub categories: **Standard** - 15 to 60 mph, and, **Reduced** (or environmentally sensitive areas where minimum disturbance by the road width is desirable) 15 to 30 mph and **NO ROAD PARKING**. The reduced road standards in the AASHTO “Very Low-Volume Local Roads” guidelines is based on local drivers who learn the road and assumes that **Rural** lots in most areas of the United States are on larger parcels with room to park off the road and in many cases homes so far from the road that street parking is not feasible.

The following describes some, but not all, of the conditions for which the **Reduced** width sub category of *Rural Local Roads* may be applied:

- 24’ paved width on roads with the possibility for through traffic that might include Agricultural vehicles and **NO ROAD PARKING**.
- 22’ paved width on roads **without** the possibility for through traffic that might include Agricultural vehicles but could serve resource recovery/commercial/ industrial traffic and **NO ROAD PARKING**.
- 20’ paved width on roads without the likelihood for through traffic that might include Agricultural vehicles and **NO ROAD PARKING**.
- Project with **NO ROAD PARKING** must demonstrate that lots will have at least .5 acres of usable area to accommodate structures, vehicle parking and RV storage.

C.3.I) *Road Alignment*.

- 1) Centerline Continuity. The centerlines of all roads shall be the continuation of existing centerlines on adjacent and contiguous roads. In cases where such continuation is not physically possible, such centerlines may be continued by curves, and shall be consistent with reasonable design and development practices.
- 2) Centerline Radii. Minimum centerline horizontal curve radii shall be as follows:

Classification	Minimum Centerline Radius
Minor Arterial	500 feet
Connector	300 feet
Major Collector	300 feet
Minor Collector	200 feet
Local Connector	200 feet
Local Road, Commercial or Industrial Areas	200 feet
Local Road, Residential Areas	
Standard	125 feet
Reduced	60 feet with 4’ road widening

C.3.J) *Intersections.*

- 1) Angle. All roads shall intersect at right angles, or along radial lines when the intersection is within a curve, and shall have at least fifty feet of centerline tangent adjacent to the intersection.
- 2) Alignment. A new road being added to an existing road intersection shall be aligned with its centerline directly opposite the existing road or shall be separated by at least 200 feet.
- 3) Curb Returns. Curb return radii shall be as follows, as determined by the highest road classification in the intersection:

Classification	Minimum Curb Return Radius
Minor Arterial	45 feet
Connector	45 feet
Major Collector	45 feet
Minor Collector	35 feet
Local Connector	45 feet
Local Road, Commercial or Industrial Areas	45 feet
Local Road, Residential Areas	25 feet
Standard	25 feet
Reduced	25 feet

C.3.K) *Easements for Future Road Extensions.* Where a development adjoins undeveloped land, which is identified as developable in the General Plan, provision shall be made for adequate road access through the development to such undeveloped land, unless it is determined that equally adequate access is or will be provided by other achievable routes. At a minimum, easement width for future road extensions shall be consistent with right of way width within the development, future right-of-way lines adopted by the Board of Supervisors, or as required to serve future cumulative development pursuant to the County of Mendocino General Plan.

C.3.L) *Access from Existing Substandard Roads.* Where a development proposes to gain access from an existing road that does not meet the applicable standards for private or public roads, the development shall be responsible for improving the full length of the existing access road to the point where the existing road is adequate to meet the intent of these road standards, as reviewed by the DOT Director and determined by the Approval Authority. Where other properties would benefit from the required road improvements, the developer may establish an assessment district; however, all costs and administration needed for such an assessment district shall be the responsibility of the developer.

C.3.M) Road Profile Grades.

- 1) Local Road Maximum. Grades shall not exceed sixteen percent (16%) on all local roads. For minor subdivisions and other land use permits the County DOT Director, during review of improvement plans, could approve grades exceeding 16% if surfacing and additional features such as turn outs etc., consistent with acceptable practice (such as CDF Fire Safe Standards) were presented. *The process of allowing grades exceeding 16% shall be in accordance with Tab H – Exception Procedures.*
- 2) Other Roads. On all roads other than local roads, grades shall not exceed twelve percent, except that grades up to sixteen percent may be used for isolated road segments that do not exceed 500 feet in length.
- 3) Minimum. Minimum grade rate for all roads with curb and gutter shall be 0.5 percent. Roads with asphalt concrete dike shall have a minimum grade rate of 1.0 percent.
- 4) Intersections. The grade of the pavement surface across an intersection shall not be more than seven percent, except as approved by the County DOT Director during the review of improvement plans. The grade of each road entering an intersection shall not be more than seven percent within a distance of twenty-five feet, as measured from the alignment of the curb face or edge of pavement of the crossing road, except as approved by the County DOT Director during review of improvement plans.
- 5) Vertical Curves. Vertical parabolic curves shall be used to connect grade profiles where the algebraic difference in grade rates exceeds one percent. For urban roads, the minimum length of vertical curve shall as follows:

Urban Road Classification	Minimum Stopping Sight Distance	Minimum Length of Vertical Curve
Minor Arterial	350 feet	200 feet
Connector	350 feet	200 feet
Major Collector	350 feet	200 feet
Minor Collector	200 feet	100 feet
Local Connector	200 feet	100 feet
Local Road, Commercial or Industrial Areas	350 feet	200 feet
Local Road, Residential Areas	100 feet	100 feet

For Rural Local Roads, the minimum length of vertical curve shall be determined by the Engineer in Responsible Charge of the Work based on the design speed.

C.3.N) *Cross Slope and Superelevation.* Superelevation shall be required on curves for the design of all roads with a design speed at or above twenty-five miles per hour or when the road profile grade is 8% or more. Superelevation shall be required in accordance with design speeds shown below based on length of strait tangent regardless of the posted speed limit because drivers have been shown to increase their speed on straight segments of road, and the likelihood of “run-off” accidents is greater.

<u>Tangent Length</u>	<u>Design speed for</u>
<u>Superelevation</u> 400 to 600 feet	30 mph
600 to 900 feet	35 mph
900 to 1,400 feet or more	40 mph

Superelevation shall be required for all roads classified as major collectors or higher based on the required design speed. A minimum cross slope of two percent and a maximum cross slope of five percent shall be provided on all roads, except where superelevation is required.

C.3.O) *Horizontal Alignment, Vertical Profile and Superelevation for unpaved roads.* The designers of Private Roads (C.3.B) are directed to carefully consult the subject AASHTO guidelines in reference to unpaved roads.

Designers who apply these road standards should exercise care when combining the Low Impact to Hydrology (LITH) Design Guidelines option defined in tab Ca of this standard.

For example, AASHTO guidelines allow an unpaved road designed for 15mph, with a 50ft. min. radius horizontal curve and no super elevation, provided the traction coefficient is at least 0.7. Wet clay and snow conditions fall well below a 0.7 traction coefficient. The designer must account for wet clay if there is no super elevation. In a combination LITH design approach where reverse super elevation is possible the designer must give design consideration to larger radius horizontal curves or deviation from the LITH system.

C.3.P) *Cul-de-Sacs and Turnarounds.* Cul-de-sacs or turnarounds shall be provided for any non-through road according to the Standard Road Plans and the requirements of State and local fire service providers, as applicable.

C.3.Q) *Curb, Gutter, and Walkways.* Curb, gutter, and walkways shall be required on all urban roads, and shall be constructed according to the Standard Road Plans. Walkways may be either monolithic with the curb or separate from it - hydrologically disconnected walkways and curbs leaving a vegetated or otherwise porous median for storm water filtration has been shown to be an effective practice. Curb and gutter on urban roads shall be Portland cement

concrete. The material used for walkways shall provide a smooth, even surface meeting the accessibility requirements of the Americans with Disabilities Act (ADA) and California Title 24. Porous materials, as shown on MENDOT STD NO. A40, shall be encouraged for urban walkways. Appropriate porous materials, asphalt concrete, brick, interlocking pavers, and wood will be considered as alternate materials for urban walkways, based on the recommendation of the DOT Director and subject to the Approval Authority. Developers utilizing such alternate materials may be required to provide a supply of such alternate materials to DOT for use in future repairs.

C.3.R) *Driveway Approaches on Urban Roads*

- 1) Driveway approach width shall be defined as the overall width of the curb cut to provide driveway access, including the transitions on either side of the depressed curb area. Driveway approaches on urban roads shall comply with the following requirements:
 - a) Driveway approaches shall be a maximum of forty feet in width for non-residential uses. The width shall not exceed thirty-five percent of the lot frontage, except as otherwise approved by DOT Director during review of improvement plans. The minimum driveway approach width shall be twenty feet for each legal lot of record.
 - b) Driveway approach (see pg. xviii) widths, within residential areas, shall be a minimum of twelve feet in width for single driveways, a minimum of sixteen feet for double or triple driveways up to a maximum of twenty-four feet, except as otherwise approved. The driveway beyond the end of the approach can vary in width and layout at the discretion of the developer and Approving Authority. Driveway strips to accommodate the track of the wheels leaving a vegetated or otherwise porous median for storm water filtration has been shown to be an effective practice.
 - c) Only one driveway approach may be installed for any parking or loading facility, except that one or more additional curb cuts may be allowed if the County DOT Director, during review of improvement plans, determines that each such additional driveway approach is necessary for the efficient operation of the facility and will not significantly reduce road capacity and traffic safety. The minimum separation between driveway approaches on a single parcel shall be twenty feet, as measured from the top of the curb transitions.
 - d) Any driveway approach on a corner lot in a residential area shall be located at the farthest point possible from the curb return and outside of the controlled zone for corner sight distance. Driveway approaches in residential areas shall be located a minimum of ten feet from curb returns, except as otherwise approved by the County DOT Director, during review of improvement plans.
 - e) In commercial/industrial areas, there shall be a minimum separation of 200 feet between driveway approaches and any intersection with a road classified as minor collector or higher, except as otherwise approved by the Approval

Authority. Driveway approaches in commercial/industrial areas shall be located a minimum of twenty feet from a curb return or thirty feet from a crosswalk, whichever distance is greater.

- f) Except as otherwise approved by the County DOT Director during review of improvement plans, driveway approaches for any circular residential driveway must meet the following requirements:
 - i) The driveway approaches for such driveway shall be at least twenty feet apart, as measured from the top of the curb transitions.
 - ii) Properties with lot widths of fifty feet or less shall be limited to one driveway approach.

C.3.S) *Road Names*. All road names, both public and private, shall be subject to the approval of the Approval Authority. Road names shall not be duplications of existing roads within the various regions of the County, nor shall they be so similar to existing road names as to be confusing. Roads that are obvious extensions of existing roads shall continue with the same name, if possible.

C.3T) *Pavement Design*. Design of the structural section for all roads shall be in accordance with the Caltrans Highway Design Manual, as supplemented by the following specific criteria:

2) Traffic Index (TI)

- a) The minimum TI for county maintained roads shall be 4.5.
- b) For residential roads that serve or may serve 300 lots or less, the TI shall be as shown on MENDOT STD NO. A21.
- c) For other roads, the minimum TI shall be as follows:

Classification	Minimum TI
Minor Arterial, Urban or Rural	9.0
Connector, Urban or Rural	9.0
Major Collector, Urban or Rural	8.0
Local Road, Commercial or Industrial Areas	8.0
Minor Collector, Rural	7.0
Minor Collector, Urban	7.0
Local Connector, Rural or Urban	7.0

- d) The DOT Director may require a higher TI on roads where heavy truck traffic exists or is expected.

3) Resistance "R" Values

- a) A qualified professional shall determine the R Value of the various materials that lie immediately under the planned structural section based on sufficient soil samples within the proposed road right-of-way. The cost of sampling and testing shall be at the developer's expense.
- b) The basement soil shall be tested according to California Test 301 "Method for Determination of the Resistance "R" Value of Treated and Untreated Bases, Subbases, and Basement Soils by the Stabilometer" in use by the California Department of Transportation, Transportation Laboratory. Design of the structural section for a particular road will normally be based on the lowest R Value material encountered.
- c) If the Engineer in Responsible Charge of the Work elects to utilize an "R" Value of 5, then R Value tests will not be required.
- d) The developer shall submit to the County a Materials Report, prepared by a qualified professional, showing the location and elevation of sampling points and R Value data.
- e) At the developer's option, improvement plans may be noted with the TI and an assumed R Value, with a requirement to determine the actual R Value and resulting structural section after excavation for the road subgrade.

4) Gravel Equivalents (GE). Structural section shall be determined by the GE shown on MENDOT STD. NO. A22.

- a) The gravel equivalent factor for asphalt concrete surface courses shall be obtained from the following equation: $G_r = 2.5 (5.14/T.I.)^{0.5}$
- b) In no case shall the gravel equivalent factor exceed 2.5.

5) Rural Local Residential Road Surfacing. Where the road serves or may serve not more than 25 lots, in lieu of pavement design per the Caltrans Highway Manual, structural section of rural local roads shall be a minimum of nine inches of Class 2 Aggregate Base and a minimum of 2-1/2-inch asphalt concrete.

6) Local Road, Rural. Where surfacing is required by conditions of approval or other standards such as California Department of Forestry and Fire Protection (Cal Fire) "Fire Safe Standards", then the structural section shall be designed with a minimum TI of 4.5. Where the road serves or may serve not more than 10 lots, in lieu of pavement design per the Caltrans Highway Manual, structural section of Local Road - Rural shall be a minimum of nine inches of Class 2 Aggregate Base and a minimum of 2-1/2-inch asphalt concrete OR 14 inches Class 2 Aggregate Base with or without any required double chip seal surfacing.

C.3U) *Improvement Plans.* See Tab G for standards regarding the completeness of Improvement Plans. Improvement plans shall be required when any of the following conditions apply:

- 7) All encroachments in County roads accept those encroachments that can be built using standard plans. DOT Director reserves the right to determine when improvement plans are required.
- 8) When required by the Conditions of Approval for a development project.
- 9) County road improvement projects.

C.3V) *As-Built Plans.* Within sixty days after the completion of a development, the developer shall furnish to the County DOT an as-built reproducible set of improvement plans. Plans shall be permanent polyester based film, three mil thick, or other medium as approved by the County DOT.

C.3W) *Phased Subdivisions.* For phased subdivisions of more than four lots, the subdivider shall be responsible for all roads, utilities, and drainage needed to serve the subdivision, even if the facilities are outside of the limits of that phase. This responsibility includes obtaining offers of dedication for any easements and right-of-way outside of the limits of the phase.

C.3X) *Roadside Landscaping.* The Approval Authority may require roadside landscaping for subdivisions. Said landscaping shall be constructed per the “H” series of the Standard Plans. Maintenance and operational costs for the roadside landscaping within the subdivision, including any irrigation systems, shall be the responsibility of the property owners through Conditions, Covenants, and Restrictions (CC&Rs), an assessment district, a maintenance agreement, or other suitable mechanism subject to approval by the Approval Authority.