CHAPTER 2 - ROAD POLICIES AND DRAINAGE DESIGN STANDARDS

A. ROAD POLICIES

1. General Requirements

   a. No parcel shall be created in the unincorporated area of the County unless it is directly served by a paved road meeting the requirements defined herein.

   b. A "paved road" includes the necessary subbase, base, concrete or, asphalt or chip seal surface and drainage facilities. Road width requirements are defined in Section B of these Standards.

   c. These Land Development and Engineering Design Standards provide the minimum standards for improvements required for development in Tehama County pursuant to the TEHAMA COUNTY CODE.

   d. Road improvements are required across the full frontage of properties that are developed. The minimum road improvement consists of a one half width road improvement with shoulder plus an additional 12-foot lane. The approving authority may also require improvements to the existing public road if it does not meet these Standards.

   e. Off site road improvements will be required as necessary to meet the appropriate traffic impact for the development and road type.

2. Exceptions

   a. The approving authority may permit a subdivider or developer to construct a gravel road in designated agriculture areas in conformance with Section B, providing that the following requirements are met:

      1) The minimum parcel size is twenty acres.

      2) In determining whether to allow the use of a gravel road the approving authority shall consider all of the following:

         a) whether the roadway serves ten (10) parcels or less
         b) whether the land division is created for family housing
         c) any other matters relative to whether such action is consistent with the public welfare.

3) The approving authority makes findings that the proposed road standard is appropriate for the proposed use and consistent with the definition of that standard in the publication entitled "A Policy on Geometric Design of Highways and Streets," the most current edition by the American Association of State Highway and Transportation Officials and these standards.

The approving authority reserves the right to require an asphalt concrete or chip seal road as described in Section A above.

3. Conformance to the Master Plan

The street design shall conform both in width and alignment to the Circulation Element of the General Plan of Tehama County.

4. Rights-of-Way and Access

a. All roads shall be through roads, except Local, Minor Local and Private roads. Local, Minor Local and Private roads that are not through roads must end at a cul-de-sac. Emergency ingress and egress shall be provided as required by Chapter 6 Fire Safety Standards.

b. All new and all on-site roads shall have minimum rights-of-way easement widths as shown on the applicable road sections established under Section B.

c. Rights-of-way or easements for all existing off-site roads used for access to the development shall be sufficient to permit construction of the required road improvements, but in no case less than 60 feet wide. Where additional off-site rights-of-way or easements must be obtained, the minimum width shall be as shown on the applicable road sections established under Section B. Developer shall exhaust all avenues to obtain necessary off-site rights of way or easements.

d. All on-site and off-site rights-of-way and easements shall be offered for dedication to the County including any interest the subdivider or developer has in the off-site rights-of-way and easements. The County reserves the right to accept or reject any offer of dedication.

e. When a street or road right-of-way is required to the boundary of the subdivision to facilitate future traffic circulation, the developer shall dedicate the future street right of way.

f. Where required by these Standards, appropriate width public service and slope easements adjacent to each side of the road right of way shall be provided and offered for dedication to the County.

5. Reimbursement To Developer

a. Whenever a requirement that improvements installed by the developer for the benefit of the development shall contain supplemental size, capacity, number, or length for the benefit of property not within the development, and that those improvements be dedicated to the public, the developer may request from the County an agreement that future development provide a reimbursement for costs for oversizing.

b. In the event of the installation of improvements required by Section 5.a., the County may enter into an agreement with the original developer providing that future development be required to reimburse the original developer for that portion of the cost of those improvements in excess of the construction required for the development if all of the following criteria are met:

1) The improvements must reasonably be expected to benefit other properties in the immediate area.

2) The improvements shall be limited to roads, water mains, sewer mains, traffic signals, intersection improvements, bridges, and major drainage structures which are constructed "off-site."

3) The off-site improvements must constitute an expenditure equal to at least 25% of the total project cost.

c. The County will recover costs for administration of the offsite improvements and the agreements, which will be added to the reimbursable amount and will be paid by the original developer.

d. These agreements shall only be applied to subsequent subdivisions or use permits for a maximum period of ten (10) years.

B. ROAD STANDARDS

1. Road Classes

a. The following classes of roads are established for all uses except agricultural, commercial and industrial uses:

1) Arterial - Designated in the County's General Plan, arterials generally provide a connection between the highway network and/or major destinations. Access is limited where feasible (See Chapter 9, Standard Drawings (DWG.) # 0901 and 0903).

2) Collector - Designated in the County's General Plan, collectors generally accommodate traffic between arterials and/or activity

centers. Access is limited where feasible, Collector Roads are classified under three categories based on the anticipated ADT; ADT 2000 to 6000, ADT 6000 to 12000, ADT >12,000 (See Chapter 9, DWG. # 0902, 0904, 0905).

3) Local – Local roads are classified under two categories based on ADT; ADT<400; and ADT 400 to 2000 (See Chapter 9, DWG. # 0905).

4) Private – Private roads are classified under two categories based on use (See Chapter 9, DWG. # 0906 and 0907).

b. Commercial and industrial roads are classified as an arterial or collector road based on the potential traffic generated by each use as determined by a traffic study approved by the Department of Public Works.

2. Construction Standards

a. Construction of improvements shall conform to the applicable sections and requirements of Chapter 9, DWG. # 0901 through # 0964 as incorporated herein by reference.

b. Where urban road sections are required, only that portion of the required roadway which fronts on or lies within the proposed development will be required to be constructed to the full urban width. The remainder of the roadway may be constructed to the rural standard which would be required for the same class of road.

c. In the case where the street improvements have a potential of serving more lots than is immediately being planned by the subdivider, to the extent that a four-lane road will be required or where the subdivision may have a street shown on the County General Plan as a collector or arterial road, the developer will be required to build only the street improvements indicated by the subdivision street standard for his subdivision, but will provide the right of way for the ultimate four-lane road. If curb and gutter is required, the developer shall install the outer portions of the road for one lane of travel in each direction plus parking.

3. Private Roads [‡]

Except as provided in Section B.1.a.4. of Chapter 2 of these Standards, private roads, as defined in Section 9.14.011 of the Tehama County Code, shall meet the minimum requirements set forth in these Standards for public roads in the same classification.

[‡] Inserted December 2008

a. Road Maintenance Agreements - Any Subdivision of five (5) or more parcels that creates, utilizes, or is otherwise directly served by or accessed through, any private road shall be required to establish, execute, and record a Road Maintenance Agreement. The Road Maintenance Agreement shall be binding upon the owners of all parcels created by or otherwise subject to the Subdivision and their successors and assigns (collectively "owners"), and shall require such owners to permanently assume all responsibility for maintaining the road in a good, passable condition under all traffic and weather conditions. The Road Maintenance Agreement shall establish assessments or similar funding mechanisms to provide for such maintenance in perpetuity. The Road Maintenance Agreement shall provide that the County has no responsibility for such maintenance and is indemnified by the owners against any claims related to the road, and that the County has the right, but not the obligation, to enforce the Road Maintenance Agreement as an intended third-party beneficiary. The Road Maintenance Agreement shall be in the form approved by the Director of Public Works and the County Counsel.

b. Public Roads - Any Subdivision of five (5) or more parcels that creates, utilizes, or is otherwise directly served by or accessed through, any public road that is not part of the County maintained road system shall be subject to the requirements of Section B.3.a. of Chapter 2 of these Standards, provided that an encroachment permit shall be obtained for any maintenance work done pursuant to the Road Maintenance Agreement in the public right of way.

c. Permanent Road Division - Notwithstanding the foregoing, any Subdivision of five (5) or more parcels that creates, utilizes, or is otherwise directly served by or accessed through any collector street or road, as defined in these Standards, designated by the County Engineer, shall be required to form a Permanent Road Division in accordance with the requirements of the Streets and Highway Code for the maintenance of that collector street or road.

C. POLICIES AND STANDARDS NOT A LIMITATION

1. The policies and standards established by this chapter are not a limitation upon the powers of an approving authority to protect public health and safety and to ensure consistency between projects subject to these policies and standards, the General Plan, all other applicable laws, policies and standards of Tehama County, and all applicable state and federal laws.

2. The approving authority may, with appropriate findings, deviate from the road policy and construction standards for an individual project if each of the following applies to the subject property:

a. Because of special circumstances applicable to the property, including size, shape, topography, location or surroundings, the strict application of these road policy and construction standards deprives such property of privileges enjoyed by other property in the vicinity and under identical zoning classification;

b. That the applicant will accept such conditions to the granting of the deviation requested as will assure that the adjustment thereby authorized shall not constitute a grant of special privileges inconsistent with the limitations upon other properties in the vicinity and zone in which such property is situated;

c. That a hardship peculiar to the property and not created by any act of the owner exists; in this context, personal, family or financial difficulties, loss of prospective profits and neighboring violations are not hardships justifying a variance; further, a previous variance can never have set a precedent, for each case must be considered only on its individual merits;

d. That the granting of the deviation will not be materially detrimental to the public health, safety, or welfare or will not impair an adequate supply of light and air to adjacent property; and

e. That the deviation is so insignificant that granting it will not be incompatible with the county general plan.

D. CONSTRUCTION STANDARDS

1. Standard Specifications

The current edition of the "Standard Specifications" of the State of California, Business and Transportation Agency, Department of Transportation, are the Standard Specifications of the County of Tehama. Said Specifications are to be read and interpreted as though the following substitutions of terms were made:

a. County of Tehama for the State;

b. The Board of Supervisors for Director of Transportation;

c. Department of Public Works of the County of Tehama for Department of Transportation;

d. The Director of Public Works of the County of Tehama acting either directly or through duly authorized agents for the Engineer;

e. The established laboratory of the Department of Public Works of the County of Tehama or laboratories authorized by the County to test materials and work involved in the contract for laboratory;

2. Requirements

Construction of improvements shall conform to the applicable provisions of the current Standard Specifications, the approved plans and Special Conditions, where directed or approved by the Director of Public Works, and these Tehama County Land Development and Engineering Design Standards.

3. Control of Work

The Developer's Engineer shall set construction stakes, which shall include but not be limited to, initial control stakes, radius points, pipe grades, special ditch and centerline grades, and furnish adequate notes and copies of improvement plans that provide the contractor with sufficient information to construct the improvements and enable the County to check all work in the field. All work performed and materials incorporated therein shall be in strict conformance with the approved plans and specifications, and any change proposed must be approved by the Developer's Engineer and the County before it is incorporated in the work. All work done on the project site is subject to periodic inspection by the County and shall be certified by the Developer's Engineer.

All work done in the County right of way will be inspected by the County in accordance with the encroachment permit process. Each stage of construction must meet the compaction requirements established for subgrade, subbase, base, and asphalt concrete materials. A 24 hour notice is required for inspection requests.

The Developer shall reimburse the County for all on site and off site inspection costs incurred by County staff.

a. Permits - The developer shall obtain all necessary permits which may include, but are not limited to: encroachment permits for road, curb, gutter and sidewalk construction from Tehama County and from the California Department of Transportation; streambed alteration permit from the California Department of Fish and Game; and any other permits that may be applicable.

4. Trench Excavation and Backfill for Underground Utilities

All trench backfill between property lines in the street section shall conform to these Standards. In all cases, the class of backfill to be used shall be approved by the County.

Underground utilities shall include, but not be limited to, water, sewer, telephone, power service, and cable television (if applicable).

5. Chip Seal

This work shall consist of an application of asphaltic emulsion followed with an application of screenings, and another application of asphaltic emulsion followed with another application of screenings.

Screenings shall be medium (3/8" x No. 6) or medium fine (5/16" x No. 8) and conform to the requirements of Section 37-1.02, "Materials," of the Standard Specifications. Asphaltic emulsion shall be LMCRS-2H grade with a liquid rubber latex additive or CRS-2H grade and shall conform to AASHTO requirements and the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications.

Before applying asphaltic emulsion to an existing asphalt surface, all loose particles of paving, dirt and all other extraneous material shall be removed. When seal coats are to be applied to aggregate base, the base shall conform to the compaction requirements and be thoroughly dampened immediately before applying the first coat of asphaltic emulsion.

Asphaltic emulsion shall be spread at a uniform rate of between 0.35 and 0.40 gallon per square yard. Immediately following the application of the asphaltic emulsion, it shall be covered with screenings spread with a mechanical device which will spread the screenings at a uniform rate of between 20 and 30 pounds per square yard over the full width of the traffic lane in one application. After the screenings have been spread, any piles, ridges or uneven distribution shall be removed. Rolling shall consist of two complete coverage's and shall begin immediately behind the spreader.

6. Asphalt Concrete

Asphalt concrete surfacing shall be l/2 inch maximum, Type "B" for less than 0.2 feet thick asphalt and ¾ inch maximum, Type "B" for 0.2 feet thickness and greater, and shall conform to the typical Section and Plans and to the provisions of Section 39 of the Standard Specifications.

A tack coat is to be applied to all existing asphalt surfaces to receive and overlay treatment.

7. Aggregate Base

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26 "Aggregate Bases," of the Standard Specifications and the details shown on the Plans.

Aggregate for Class 2 aggregate base shall be free from vegetable matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.

8. Dust Control

The subdivider, or his representative, shall be responsible for preventing excessive dust nuisance during the construction operations. Attention is directed to Section 10 of the Standard Specifications.

9. Embankment Construction

All work involved in embankment construction shall conform to the applicable provisions of the Standard Specifications.

10. Excavating Below Grade

Care shall be exercised to prevent excavating below grade, and any areas excavated below grade shall be filled with suitable material and thoroughly compacted as approved by the County. All brush, roots and debris shall be removed from excavated ditches or channels.

11. Aggregate Subbase

Aggregate Subbase shall be Class 3 in conformance with the Standard Specifications.

12. Concrete

The design, proportioning and mixing of all concrete shall be approved by the Director of Public Works and in accordance with the applicable provisions of the Standard Specifications. Curb and sidewalk shall be constructed in accordance with the Standard Specifications.

13. Construction Debris

Brush and timber removed during the construction of roads or building sites shall be removed or otherwise disposed of prior to the following fire season.

Debris shall be disposed of according to the requirements of the County Air Quality Management District and the Fuel Modification Standards – Disposal of Flammable Vegetation and Fuels – of the Tehama County Code, Chapter 9.14.

14. Standard Construction Details

The Tehama County Development and Engineering Design Standard details included herein shall be used in all cases unless approval is obtained from the Director of Public Works for use of an alternate detail.

15. Pipe Lines

All pipe and other conduit shall be constructed so as to prevent leakage of water due to defective materials, improper joining, corrosion, impact, freezing or other causes.

16. Miscellaneous Items

Miscellaneous items not specifically covered in these Standards shall be constructed in accordance with the appropriate section of the Standard Specifications; or, if not covered by the Standard Specifications, shall be approved by the Director of Public Works.

17. City of Red Bluff and City of Corning Standards

Any subdivision developed within the Sphere of Influence of the City of Red Bluff or the City of Corning shall comply with the respective city standards and specifications unless required otherwise.

18. Acceptance of Work

All work within the County right of way shall be inspected and approved by the County prior to final acceptance**.** The developer shall contact the County a minimum of 7 days prior to beginning work in order for the County inspector to coordinate an inspection schedule. Failure to contact the County in a timely manner may cause undue delays in the final acceptance of the work at no cost to the County.

Construction within private road subdivisions shall be certified by a registered civil engineer as meeting these Standards. The required compaction on all embankments, subgrade, subbase, aggregate base, and trench backfill shall meet the minimum standards. Such certification shall be provided to the County Department of Public Works prior to final acceptance.

19. Maintenance Bond Required

For newly constructed roads whether private or proposed for acceptance into the County system of maintained mileage, the developer will be required to enter into an agreement with the County guaranteeing workmanship and materials for a minimum of one year. The developer will also be required to post a financial surety acceptable to the County in the amount of 20% of the road improvement cost as approved by the Public Works Department.

20. Construction Bond

Prior to filing a parcel map or a final map, all improvements required by the conditions of approval shall be completed and approved or the developer will be required to enter into an agreement with the County guaranteeing to construct the improvements within one year. Also, the developer will be required to post a financial surety acceptable to the County in the amount of 100% of the estimated project development cost for labor, materials and performance as approved by the Public Works Department.

E. DRAINAGE

These Standards are to serve as a guideline for storm drainage design and indicate the type of design acceptable to the Department of Public Works.

1. Definitions

   a. Lateral: conduits receiving runoff from areas less than 30 acres.

   b. Collector: conduits receiving runoff from areas of more than 30 but less than 100 acres.

   c. Trunk: drainage conduits receiving runoff from areas of 100 acres or more.

   d. Cross Culvert: Drainage culvert transporting runoff across a roadway.

   e. Driveway Culvert: Drainage culvert transporting runoff across driveway.

   f. On-Site Drainage Facilities: Shall mean all surface drains and underground drainage pipe within the development that does not take underground or concentrated surface drainage waters from the adjoining properties.

   g. Surface Waters: Water that fall upon, arise from, and naturally spreading over lands and produced by rainfall, melting snow or springs. They continue to be surface waters until they percolate through the ground or flow vagrantly over the surface of the land into well defined watercourses or streams.

   h. Stream Waters: Former surface waters which have gathered together into a well defined watercourse.

   i. Flood Waters: Indicate waters that escape from a watercourse in great volume and flow over adjoining lands in no regular channel. Even though these errant waters may create a temporary channel or follow a natural channel, gully or depression, or give to the course which they follow the character of a natural watercourse, they retain the characteristic of flood waters.

j. Watercourse: A watercourse as used herein includes:

1) Any natural watercourses or

2) Any man-made watercourse constructed on land owned by a public agency or on land dedicated to public use for flood control or drainage purposes, or constructed to replace any natural watercourse.

k. Floodplain: Defined as the location where water will naturally go during a certain recurrence interval.

l. Floodway: Defined as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base (100-year) flood without cumulatively increasing the water surface elevation by more than a designated height (1 foot).

2. General Drainage Requirements

The project shall be designed to receive surface water, stream water, and floodwater emanating from outside its boundaries and from within and passing through and off the development. The project shall be protected from inundation, flood hazard, sheet overflow and ponding of local storm water, springs and other surface water.

The design of improvements shall be such that water accumulating within the project will be carried away from the project without adverse effect to any property within the project or any adjacent properties. Water accumulating within the project shall be gathered and conveyed under control to storm drainage facilities or to a natural watercourse by closed conduit or channel. All drainage design within the project shall accommodate the ultimate development within the drainage area.

Any off-site drainage facilities to carry storm water from the proposed project to a existing conduit or watercourse shall be adequately sized for the ultimate development in the drainage area. The diversion of natural drainage will be allowed only within the limits of the proposed improvement. All natural drainage must enter and leave the improved area at its original horizontal and vertical alignment.

3. Easements

Drainage facilities must be located in a public street, road or within an easement offered for public dedication. Necessary dedication of easements for drainage facilities to be constructed on private property must be completed before the improvement plans will be approved for construction.

The County will not accept the maintenance of drainage facilities which are outside of the County maintained right-of-way.

Where the improvement of a drainage facility falls on adjacent property, a right of entry must be obtained from the affected property owner for construction of the facility and submitted to the County prior to approval of the improvement plans. Drainage easements shall be used for drainage purposes exclusively and shall not be combined with easements required for other public utility purposes unless it can be shown to the County that dual use of said easement will not be conflicting.

All drainage easements shall be shown on the improvement plans and the final map and identified by the words, “Drainage Easement”.

Easements shall be provided for all ditches, culverts and closed conduit systems whether constructed as newly built improvements or as rebuilt improvements and shall adequately meet the minimum width specified below.

4. Closed Conduits

Easements for closed conduits shall meet the following requirements:

a. Minimum width of fifteen (15) feet with the centerline of the pipe at third point; pipe may reverse sides at angle points.

b. Provide access points and working space right of way and easements.

c. For pipes exceeding 24” in diameter or trenches exceeding five (5) feet in depth, the easement shall have additional width to provide ample working space as required by the County.

5. Open Channels

Easements for open channels shall have sufficient width to contain the open channel with side slopes, fencing where required, and a twelve (12) foot wide service road when required by the County. Suitable ramps must be provided for access to the bottom when required. Open channel easements without roads will have a minimum width of ten (10) feet.

6. Existing Facilities

Easements shall be provided for all existing drainage facilities within the boundaries of and/or affected by any land areas to be improved. These existing facilities shall be reconstructed to conform with the County Standards in effect at the time of the overall improvement where such conformance is required.

7. Extent

All drainage easements shall have public access and extend from the point at which a flow is concentrated to the point of confluence with a natural drainage course.

8. Natural Watercourse

All natural watercourses within the boundaries of an area to be improved shall be provided with drainage easements, extending the full length of the drainage courses within the improved area, and the individual width being consistent with the limit of the 100-year flood way. A natural watercourse is defined as any natural watercourses or any man-made watercourse constructed on land owned by a public agency or on land dedicated to public use for flood control or drainage purposes, or constructed to replace any natural watercourse.

9. Drainage Diverted into Swales

All natural depressions through which drainage travels but not having well defined sides and bottom shall be provided with easements adequate enough in width to provide for both flow and maintenance. At no point shall the width of the drainage easement be less than ten (10) feet. If the waters collected in such swales are not terminated into natural drainage courses within the boundaries of the improvement area, they shall be carried offsite to the point of confluence of the swale with the natural drainage course; adequate drainage easements or drainage release letters from the affected downstream property owner(s) are required.

10. Offsite Drainage & Facilities

All concentrated drainage leaving the boundaries of the area to be improved shall be designed and retained or detained to have no net increase of discharge and shall cause no adverse impacts to downstream property. Specific easements and drainage release letters will be required from the property owners of the lands from the point at which the drainage leaves the limits of the improvement to the point at which it is deposited in a natural water course. At no point shall the drainage easement be less than ten (10) feet in width. The required easements must include adequate provision for all of the drainage structures to be used in the offsite drainage (i.e., culverts, ditches, dissipaters, etc…). Additionally, the developer is required to design and construct any offsite drainage improvement required.

11. Drainage Release

Whenever surface water is discharged from a project's boundary and the location or method of discharge has been changed, the engineer of work

shall investigate the impact of such on the downstream property owners. Said investigation shall include all properties affected to the point where the surface waters collect into a defined water course. Whenever the engineer determines that the proposed change in surface water runoff has the potential to do damage or where the downstream facilities are not adequate to handle the runoff, the improvement plans shall include all work necessary to mitigate the impact of the change within the project property. If the engineer determines that there is no potential for downstream damage and/or that the downstream facilities are adequate, a statement of such shall appear on the improvement plans. No increase of discharge rate or volume is allowed.

In addition to the above, it will be the developer's responsibility to obtain and record all easements and/or releases necessary to perform or facilitate the work.

12. Alignment

The location of storm drainage pipelines in new streets shall be behind the curb and gutter.

Lines are to be as near parallel with the centerline of the road as possible.

Avoid meandering and unnecessary angular changes.

Angular changes greater than 45 degrees must be located at a manhole type structure with an access for maintenance.

Open ditches, lined channels, swales and floodway areas shall be maintained as nearly as possible in their existing alignment. When an open ditch, other than a roadside ditch, is to be constructed parallel to an existing roadway the ditch shall be constructed outside the proposed right of way of the ultimate roadway development along with an appropriate easement.

The vertical alignment shall be so designed to preclude any ponding within the drainage system.

13. Drainage Design

Drainage calculations and a drainage map shall be submitted with the improvement plans. The following information shall be shown:

a. Offsite drainage in natural water courses

The runoff in any natural water course that collects runoff from an improved area shall no be increased by the designed improvements. All existing drainage facilities offsite and downstream shall be reviewed to

insure that their capacity is sufficient to safely pass the runoff as calculated at the inlet of the downstream structure. If the existing capacity should prove to be inadequate, the structure and drainage ditch facilities shall be removed and replaced in accordance with County Standards. Any and all additional easement acquisitions necessitated by the rebuilding or relocation of an offsite structure pursuant to this section shall be the responsibility of the developer.

b. Watershed Map

A watershed map shall be required with each set of improvement plans and shall reflect the following criteria:

1) Must be of adequate scale and sufficient accuracy with contour lines clearly shown and referenced.

2) Individual watershed basins are to be clearly defined by shading with color or patterns and the areas specified in acres.

3) Travel paths must be shown where concentrated flows exist. Specify if there is sheet flow.

4) Times of concentration for each basin.

5) The quantity of water arriving at each structure, pipe or ditch from a 10-year and a 100-year frequency storm.

c. Drainage Plan

A Drainage Plan shall be required with each set of improvement plans and shall reflect the following criteria:

1) The size of pipe or ditch, proposed length, gradient, type of material, thickness or class and station location.

2) Invert elevations at both inlet and outlet for each pipe, ditch and structure.

3) Channel dimensions and water surface profile calculations.

4) Downstream conditions that may affect upstream flow.

5) Provide a complete set of engineering calculations for each drainage basin.

d. Drainage Calculations

One set of drainage calculations, for each basin, shall be submitted with each set of improvement plans.

1) Design Criteria:

The hydrology analysis criteria shall be used to determine stream flow rates and run off volumes. (Refer to Chapter 10)

This method is applicable to all uncontrolled streams regardless of watershed size or watershed condition. It should not be used where runoff is significantly affected by reservoirs or diversions nor where sufficient (20 years or more) stream flow data exists to permit the use of standard statistical methods.

Once the stream flow rate and runoff volumes have been established, the required drainage facilities shall be designed using accepted engineering practices. Where charts or tables are used, copies shall be submitted.

a) No net increase of runoff from 10, 25 or 100 year events.

b) For developments with one-quarter (1/4) acre zoning a Rainfall-Runoff method of analysis, such as HEC-HMS, SCS method or equivalent method accepted by the industry, shall be used to calculate the runoff of the watershed.

c) For developments with a watershed less than 40 acres in size, the rational method that was modified for Tehama County shall be used to calculate the runoff of the watershed. Refer to Chapter 10 for a flow chart of the calculations.

d) For developments with a watershed greater than 40 acres in size, a Rainfall-Runoff method of analysis, such as HEC-HMS, SCS method or equivalent method accepted by the industry, shall be used to calculate the runoff of the watershed

2) Design Flows:

a) Design all private driveway culverts to accommodate a 10-year flow without exceeding the allowable headwater depth as determined by Hw/D<1.5.

b) Design all cross culverts to accommodate a 25-year flow with out causing inundation to the roadway.

c) A 100-year design flow check shall be used to ensure that no flooding occurs on or off site due to the development.

3) Bridges:

a) All bridges shall be designed to pass a storm with a 100-year design frequency. Minimum freeboard at bridges will be 2 feet at minor streams and 3 feet at major streams or at sites where stream debris is probable.

4) Detention/Retention Basin:

a) Detention basins shall be required to control runoff so there is no net increase.

b) Runoff-Rainfall design methods are required in determining the size of a required detention basin.

c) A 100-year design shall be used to design the size of the detention basin so that no net increase in runoff occurs.

d) Provide discharge calculations for existing predevelopment 10, 25, 100 year flows.

5) Inlets and Outfalls:

a) Inlets shall be examined to determine if inlet flares are needed to prevent erosion or ensure inlet capacity in the application they are designed. Inlet riser screens shall be used on all detention facilities to prevent debris from entering and becoming clogged inside the structure,

b) All storm drain and pipe outfalls exceeding thirty (30) inches in diameter shall have steel grates that cover the entire inlet and are removable for service.

c) All outfalls shall have energy dissipaters sized to prevent erosion and scouring.

e. Culverts and Storm Drains

1) Culverts under driveway entrances for roadside ditches shall be adequate to carry the design flow, but shall be not less than twelve (12) inches inside diameter.

2) Culverts crossing streets shall be of a size adequate to carry the design flow, but not less than 15 inches inside diameter for concrete and 18 inches for CMP.

3) Culverts under roadway embankment shall extend a minimum of two (2) feet beyond the toe of the embankment.

4) Culverts for use outside the roadway may be of any County approved type and strength to meet field conditions. CMP shall have a minimum thickness of 0.064 inches (16 GA.).

5) Culverts in the roadway shall be designed to standard HS20-44 live load and shall have a design life of 25 years. CMP shall have a minimum wall thickness of 0.064 inches (16 GA.).

   Soil resistivity tests by a private soils laboratory shall be performed to determine the appropriate culvert to be used. The engineer's calculations and the laboratory tests shall be submitted with the initial submittal of the improvement plans. If other evidence is available (existing culvert history in the area for example), it may be used in lieu of the resistivity tests at the discretion of the Director of Public Works.

6) The minimum cover, as measured from the top of the culvert to subgrade, shall be one (1) foot for culverts crossing streets and one-half (0.5) foot for culverts under driveways. The minimum cover, as measured above, for culverts crossing streets may be reduced to one-half (0.5) foot when a Class "C" concrete backfill is used to support the middle third of the culvert diameter.

7) All drainage structures shall be standard Department of Public Works structures or as approved by the Director of Public Works. Inlet and outlet capacity shall be equal to the design flow.

8) Storm drains shall be provided where the capacity of the curb and gutter is less than the design storm or where the product of the velocity in feet per second times the depth of flow in feet exceeds six (6).

9) The use of high density polyethylene corrugated pipe may be used inside and outside of the public right of way under the following conditions:

   a) Corrugated high density polyethylene pipe from 12 to 36 inches in diameter shall meet the requirements of AASHTO Designation: M-294 Type S, outer corrugated pipe wall and smooth inner liner, may be used within the roadway prism or under driveway approaches, and where the application is approved by the Director of Public Works.

   b) Maximum allowable fill heights over culverts shall be limited to 15 feet for all sizes, unless approved otherwise by the Public Works Department.

c) Excavation and backfill shall conform to the requirements of Caltrans Standard Specifications, Section 19-3, and as shown for metal pipe on Standard Plan A62F.

d) The couplings shall be corrugated to match the pipe corrugations and the width shall not be less than 1/2 the nominal diameter of the pipe. Split couplings shall engage an equal number of corrugations on each side of the pipe joint.

e) The minimum depth of cover below finish subgrade shall be two (2) feet when crossing County maintained roads.

f) The material shall not be used under driveway encroachments unless the ends are protected by a rigid material such as a concrete headwall.

g) Storm drain culvert ends shall be protected with concrete headwalls at all locations where mechanical cleaning of ditches or culvert entrances will be necessary.

10) The maximum length of pipe between cleanout access points shall be 200 feet for culverts having a diameter smaller than 24 inches and 300 feet for those having a diameter of 24 inches or larger. Manholes may also be required at additional locations. See Section 838.5 of the Caltrans Highway Design Manual for examples.

14. Valley Gutters

Valley gutters may be provided to carry drainage across intersections whenever underground drainage facilities cannot be reasonably provided. Valley gutters shall not be permitted on arterial, collector, and major local streets.

15. Channels

Developments requiring street sections with curb and gutter shall be constructed with underground drainage facilities or formed and finished reinforced concrete lined ditches.

All open ditches having a top width of ten (10) feet or more shall be designed in an easement wide enough to allow motor vehicles on one side. The access shall have a minimum width of ten (10) feet. This requirement may be waived when, in the opinion of the Director of Public Works, access will not be needed for future maintenance and when, in the opinion of the Mosquito Abatement District Director, access is not needed for mosquito control.

The gradient for earth ditches shall not be less than 0.7%. The gradient for

lined or paved ditches and gutters shall be not less than 0.25%. Ditches shall be paved or lined when the design velocity exceeds that shown below. Ditches adjacent to the roadway section shall be paved with a dike and down drains as required by the Director of Public Works.

New unlined drainage ditches or relocated natural drains may not be installed closer than 50 feet to the existing or proposed leach lines.

PERMISSIBLE VELOCITIES FOR UNLINED CHANNELS		
TYPE OF MATERIAL IN EXCAVATION SECTION	**PERMISSIBLE VELOCITY (FEET PER SECOND)**	
	INTERMITTENT FLOW	**SUSTAINED FLOW**
Fine Sand (Noncolloidal)	2.5	2.5
Sandy Loam (Noncolloidal)	2.5	2.5
Silt Loam (Noncolloidal)	3.0	3.0
Fine Loam	3.5	3.5
Volcanic Ash	4.0	3.5
Fine Gravel	4.0	3.5
Stiff Clay (Colloidal)	5.0	4.0
Graded Material (Noncolloidal)		
Loam to Gravel	6.5	5.0
Silt to Gravel	7.0	5.5
Gravel	7.5	6.0
Coarse Gravel	8.0	6.5
Gravel to Cobbles (Under 6 Inches)	9.0	7.0
Gravel and Cobbles (Over 8 Inches)	10.0	8.0

STANDARDS FOR CONCRETE CHANNEL LININGS			
MEAN VELOCITY FEET PER SECOD	**THICKNESS OF LINING (INCHES)**		**MINIMUM REINFORCEMENT**
	SIDES	**BOTTOM**	
Less than 10	2 – 3.5	2 – 4	6”x 6” 10 GA. Wire Mesh
10 to 16	4 – 5	4 – 6	# 3 Bars at 15” Centers Both Ways
16 or more	6 or more	7 or more	# 3 Bars at 12” Centers Both Ways

STANDARDS FOR CHANNEL LISTINGS			
MEAN VELOCITY (FEET PER SECOND)	**THICKNESS OF LINING (INCHES)**		**MINIMUM REINFORCEMENT ***
	SIDES	**BOTTOM**	
ASPHALT CONCRETE			
Less than 5	2	2-3	None
5-10	3	3-4	None
PORTLAND CEMENT CONCRETE **			
Less than 10	3-32	32-4	#3 bars @ 18" centers both ways
10-15	4-5	5-6	#3 bars @ 15" centers both ways
15 or More	6 or More	7 or More	#3 bars @ 12" centers both ways

*For small 'V' ditch or trapezoidal concrete lined channels less than 3' deep and 8' wide, minimum reinforcement shall be welded wire fabric 6x6-10x10.

**Air Blown Mortar may be substituted for Portland Cement Concrete where construction complies with Caltrans specifications.

F. DESIGN

1. General

a. The design of all streets shall be in conformance with these development standards. Where specific information is not given, "A Policy on Geometric Design of Highways and Streets, AASHTO" current edition, or the current Caltrans "Highway Design Manual" and "Standard Plans" should be used as approved by the Director of Public Works.

b. Where streets are shown on the General Plan or any adopted Specific Plans but no plan line has been adopted by the County, the developer will be required to provide the data and establish the alignment of the streets, to the approval of the Director of Public Works.

c. The centerlines of streets entering upon opposite sides of any intersecting street shall align directly opposite of each other or the centerlines shall be offset at least 200 feet on local and 500 feet on collector streets.

d. All design values shown are minimum. The designer should strive for higher values whenever possible.

e. Unless otherwise approved by the Director of Public Works, all improvement plans shall be submitted on standard 24" X 36" mylar plan sheets.

f. Computer generated improvement plans shall conform to the standard Caltrans drawing format and nomenclature in English units.

g. Definitions

1) LEVEL terrain is the condition where highway sight distances, as governed by both horizontal and vertical restrictions, are generally long or could be made to be so without construction difficulty or major expense.

2) ROLLING terrain is that condition where the natural slopes consistently rise above and fall below the highway grade line and where occasional steep slopes offer some restriction to normal highway horizontal and vertical alignment.

3). MOUNTAINOUS terrain is that condition where longitudinal and transverse changes in the elevation of the ground with respect to a highway are abrupt and where the roadbed is obtained by frequent benching or side hill excavation.

2. Design Speeds

Geometric features of design shall be consistent with the following minimum design Speeds.

a. Minor Local (ADT<400) and Local (ADT 400-2000).

1) Suburban/Rural Designations:

Table 1 (Reference AASHTO)
Minimum Design Speeds (MPH)

CLASSIFICATION	TERRAIN		
	LEVEL	ROLLING	MOUNTAINOUS
Minor Local	30	20	20
Local	40	30	20
Major Local	50	40	30

2) Urban Designations:

The minimum Design Speed for all classifications is 30 MPH. When conditions warrant, and as approved by the Director of Public Works, the Design Speed may be reduced to 20 MPH.

b. Collector and Arterial Streets

1) Suburban/Rural Designations:

Table 1 (Reference AASHTO)
Minimum Design Speeds (MPH)

CLASSIFICATION	TERRAIN		
	LEVEL	ROLLING	MOUNTAINOUS
Two Lane ADT 2000-6000	60	50	40
Two Lane ADT 6000-12,000	60	50	40
Four Lane ADT >12,000	60	50	40

2) Urban Designations:

The required design speed for all classifications is 30 MPH.

3. Sight Distance

Minimum stopping sight distance and passing sight distance are a direct function of the design speed. A height of eye of 3.50 feet and a height of object of 2.0 feet is used to determine stopping sight distance. A height of eye of 3.50 feet and a height of object of 4.5 feet is used to determine passing sight distance. All streets shall be designed using the minimum stopping sight distance criteria.

DESIGN SPEED (MPH)	STOPPING SIGHT DISTANCE (FT)	MIN *K VALUE FOR CREST VERTICAL CURVES	MIN *K VALUE FOR SAG VERTICAL CURVES
20	125	12	19
25	150	17	24
30	200	30	38
35	250	47	49
40	300	68	62
45	360	98	78
50	430	139	97
55	500	188	116
60	580	253	138
65	660	328	161
70	750	423	188
	Minimum stopping sight distance (wet pavements)		

*K value is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide minimum sight distance.

4. Grades

a. Arterial Streets

1) Suburban/Rural

For rural arterials decrease the maximum grade shown for urban by 2%.

2) Urban

TYPE OF TERRAIN	DESIGN SPEED (MPH)						
	30	35	40	45	50	55	60
	MAXIMUM GRADE (PERCENT)						
Level	8	7	7	6	6	5	5
Rolling	9	8	8	7	7	6	6
Mountainous	11	10	10	9	9	8	8

b. Collector Streets

1) Suburban/Rural

TYPE OF TERRAIN	DESIGN SPEED (MPH)									
	20	25	30	35	40	45	50	55	60	70
	MAXIMUM GRADE (PERCENT)									
Level	7	7	7	7	7	7	6	6	5	4
Rolling	10	10	9	9	8	8	7	7	6	5
Mountainous	12	11	10	10	10	10	9	9	8	6

2) Urban

TYPE OF TERRAIN	DESIGN SPEED (MPH)									
	20	25	30	35	40	45	50	55	60	70
	MAXIMUM GRADE (PERCENT)									
Level	9	9	9	9	9	8	7	7	6	5
Rolling	12	12	11	10	10	9	8	8	7	6
Mountainous	14	13	12	12	12	11	10	10	9	7

Maximum grades shown for rural and urban conditions of short lengths (less than 500 ft) and on one-way down grades may be two percent steeper.

c. Private Driveways

The maximum grade at any individual section of the driveway is 16%. Driveways with a grade of over 12% slope shall be paved.

d. Minimum grade (Urban streets)

To provide for proper drainage, the desirable minimum grade that should be used for streets with outer curbs is 0.30%, but a minimum grade of 0.20% may be used, if approved by the Director of Public Works.

e. Stopping Area (All Roads)

A stopping area needs to be provided at all street intersections and on the end of Cul-de-sac streets.

The grade within the intersection of streets shall not exceed 4% in the area bounded by the curb returns except that the street anticipated to handle the major movement of traffic may exceed 4%, but shall not be greater than the grade approaching the intersection. The grade of the turn around bulb at the end of cul-de-sac streets shall not exceed 8%.

5. Minimum Horizontal Curve Radius

Horizontal curves shall be designed with superelevation based on the formula:

$$R = \frac{V^2}{15(S+F)}$$

where: R = Radius of curve (feet)
V = Design speed (MPH)
S = Superelevation (ft/ft)
F = Friction factor

(V) DESIGN SPEED (MPH)	(F) FRICTION FACTOR
20	0.17
30	0.16
40	0.15
50	0.14
60	0.12
70	0.10

Every effort should be made to exceed the minimum calculated R values, and such minimum radii should be used only when the cost or other adverse effects of realizing a higher standard are inconsistent with the benefits.

For rural roads, superelevation shall be not more than 0.10 except where snow and ice conditions prevail, in which case the superelevation should be not more than 0.08.

For urban roads, superelevation shall not be more than 0.03.

Superelevation diagrams with transitions shall be shown on the improvement plans whenever the combination of curve radius and design speed indicates a need for superelevation.

For central angles smaller than 30 minutes, no curve is required.

Curve widening is required for all curves with a radius of 300 feet or less

6. Corner Site Distance at Rural Intersections

Intersections, including median openings, should be designed with adequate corner sight distance as follows:

DESIGN SPEED (MPH)	CORNER INTERSECTION SIGHT DISTANCE (FT)[a]
60	660[b]
50	550
40	440
30	330
20	210

[a] Corner sight distance measured from a point on the minor road at least 15 feet from the edge of the major road pavement and measured from a height of eye at 3.50 feet on the minor road to a height of object at 2.0 feet on the major road.

[b] At 60 MPH stopping sight distance governs.

Intersections should be carefully situated to avoid steep profile grades and to ensure adequate approach site distance. An intersection should not be situated on a short-crest vertical curve, just beyond a short-crest vertical curve, or on a sharp horizontal curve. When there is no practical alternate to such a location, the approach sight distance on each leg should be checked carefully.

7. Delineation

At the expense of the developer, street signs, striping, traffic delineation devices, warning and regulatory signs, guard rail, barricades and other similar devices, where required by the Department of Public Works, shall be installed according to accepted engineering practices. Signing shall be in conformance with the Department of Public Works' standards and the current

MUTCD and the California Supplement. Installation of traffic devices shall be subject to review and modification after construction.

8. Curb and Gutter

When required, standard vertical curb and gutter shall be used in all commercial areas, on all curb returns and at all drainage inlets. In residential areas, either vertical curb and gutter or rolled curb and gutter may be used provided that drainage capacity criteria is met. The minimum transition length from rolled curb to vertical curb shall be five (5) feet.

Curb, gutter, and/or sidewalk will not be required on the portion of the required access road not located within or on the boundaries of the development.

9. Structural Design of Paved Streets

The structural design of paved streets shall be based upon "R" values determined by the current California Test Method 301.

The developer shall have a private soils laboratory perform field tests to determine the "R" value of the material to be used for road construction. Using these values, the developer's engineer will establish the appropriate structural section to be used for each road. Laboratory reports and engineer's calculations used shall be submitted with the initial submittal of the improvements plans.

The following traffic indexes will be used in determining the structural design:

The traffic index shall be: *commercial industrial min 7.0*

(1)	minor	5.0
(2)	local	6.0
(3)	collector	7.0
(4)	arterial	9.0

The TI's may be higher as determined by AADTT numbers based on the Public Works Director's approval.

The minimum thickness of asphalt concrete shall be 0.20 feet and the minimum thickness of Aggregate Base Class II shall be six (6) inches, Chip Sealed, roads shall have a minimum thickness of aggregate base Class II of six (6) inches with a Double Chip Seal surface constructed in accordance with Subsection F.20.

10. Plan Check and Inspection Fee

The developer shall have improvement plans prepared by a registered civil engineer for all required construction. The plans shall be approved by the Director of Public Works prior to commencement of construction.

The developer shall show existing and proposed location of all utilities, as approved by the utility company and the Director of Public Works, on the improvement plans.

Each set of plans will require an engineer's estimate which itemizes all work including unit cost amounts for each major item of work, such as grading, base, paving, concrete work, drainage facilities, etc. Unit cost amounts should reflect what it would cost the County to do the work if the contract was put out to bid. The unit costs will be verified by the County.

A deposit to cover the improvement plan check and construction inspection is required prior to the improvement plan check. The amount of the deposit shall be as specified in the latest adopted County of Tehama County Public Works and County Surveyor Fee Schedule.

11. Improvement Plans

Maps to be recorded shall be legibly drawn, printed, or reproduced by a process guaranteeing a permanent record in black on tracing cloth, or polyester base film, 24 by 36 inches. If ink is used on polyester base film, the ink surface shall be coated with a suitable substance to assure permanent legibility. A one-inch blank margin shall be left on each edge of the map.

No certificate stick-ons will be accepted and no stick-on shaded film to denote greenbelt areas or other purposes will be accepted.

A complete set of Improvement Plans, for both Parcel maps and Tract maps, are required and shall meet the following **minimum** criteria:

a. Cover sheet with project location, vicinity map, legend, project quantities, approval signature blocks, sheet index, general notes and all owner and engineer information.

b. Project layout sheet showing the entire project and sheet references.

c. General plan sheet showing existing topographic details and project features.

d. Grading plan including total cut, fill, and import/export quantities.

e. Watershed Map

f. Erosion control plan showing BMP's, locations, erosion control notes and erosion control methods.

g. Drainage Plan

h. Roadway plan and profile sheets with a horizontal scale of one (1) inch to fifty (50) feet and a vertical scale of one (1) inch to five (5) feet or ten (10) feet depending upon the terrain and special details with a horizontal scale of one (1) inch to twenty (20) feet. An alternate scale may be used on smaller projects to include more detail.

i. Detail plan sheet outlining all pertinent details that are common to the project.

j. Traffic control plan (if applicable) including all temporary and permanent traffic control stripping, devices and delineation.

k. All sheets shall have a defined scale, title block, and revision block in accordance with these Standards (See Chapter 9, DWG. # 0964).

l. Permanent elevation bench marks referring to an approved datum may be required to be set at a location approved by the County Surveyor.

12. Railroad Crossings

Provisions shall be made for any and all railroad crossings necessary to provide street access to or circulation within the proposed development, including the preparation of all documents necessary for approval from the California State Public Utilities Commission and appropriate railroad for establishment and improvement of such crossing. The cost of such railroad crossing improvement, including all necessary approval documents, shall be borne by the developer.

13. Utility Systems

In the case of developments included within an existing and operating Water, Public Utility, or Community Services District, the developer shall install the utility system and appurtenances in conformance with the standards established by the district. The developer shall furnish a letter from the district certifying that the improvement design is to their standards prior to approval of construction plans by the Director of Public Works. Prior to the placement of permanent surfacing over utility trenches, the developer shall furnish evidence from the district certifying that the improvements have been installed to their satisfaction. Within sixty (60) days of project completion as-built drawings of all constructed facilities shall be submitted to the County.

14. Bridges

All highway bridges shall be designed in accordance with the current edition and interims of the AASHTO Standard Specifications for Highway Bridges, including Caltrans revisions, unless specified otherwise in these standards.

When the Service Load Method of design is allowed, the design live load shall be HS20-44 and alternate loading.

All structures designed with the Load Factor Design (LFD) criteria shall apply the permit design live loads ("P" loads).

All bridge plans shall show General Notes containing a statement as to the criteria for design, either AASHTO Service Load or AASHTO Load Factor. In addition, as a minimum, the design live loads, allowable and design footing pressure, pile design load, and allowable design stresses for reinforced concrete, prestressed concrete or structural steel, shall be shown.

The width of all new highway bridges, shall equal the full width of the traveled way and additional width as required by AASHTO. The width shall be measured normal to the centerline between vertical faces of curb, parapet or rail.

Vertical and horizontal clearances for traffic ways under bridges shall comply with the current AASHTO standards.

Allowable bridge materials are:

1) Structural Steel
2) Reinforced Concrete
3) Treated Timber (driveways only)

a. Bridge Railings

All bridges, culverts, retaining walls or other structures will be reviewed for installation of protective railings.

The railing will conform to current applicable AASHTO, OSHA, or Caltrans standards for geometric layout and design standards.

b. Foundation Investigation for Design

A foundation investigation by an engineering geologist or civil engineer will generally be required at all bridge sites. This requirement may be waived by the Director of Public Works if site conditions show the report to be unnecessary.

All reports shall contain recommendations by the civil engineer or engineering geologist for specific design considerations for the site. Soil support values, pile tip elevations, and point of fixity or piles with extensions should be included.

When required by the Director of Public Works, the foundation report shall also contain the following information:

1) Maximum credible rock acceleration
2) The magnitude of the maximum credible event
3) Depth to "rock-like" material

c. Private Bridges (Driveways Only)

All bridges require submission of plans and calculations (prepared by a civil engineer with a current valid registration in the State of California) to the County Building Department for issuance of a building permit in consultation with the Public Works Department.

For all permanent structures, foundations shall be constructed of masonry or concrete and, in all cases, extend below the frost lines as provided for in Section 2907 of C.B.C. Other types of foundation materials may be permitted upon submission of acceptable test data, calculations, or other information relating to the properties and load-carrying capacity of such material. Section 2517 (c), C.B.C., provides for treated timber for the support of permanent structures embedded or in direct contact with the earth. The remainder of the bridge may be constructed of any material suitable for the structural capacity.

All permanent structures shall comply with Chapter 6, Section B for width and vertical clearance requirements.

The minimum design live load should be as required by Chapter 6, but in no case less than the minimum loading of AASHTO H-15-44.

For all pedestrian bridges, the design live load should be as recommended by AASHTO at 85 pounds per square foot of walkway area.

15. Embankment Guardrail

Embankment guardrail shall be designed in accordance with the height and slope of the embankment or sidehill as shown in the latest version of the Roadside Design Guide published by the American Association of State Highway and Transportation Officials. Where guardrail is required, the embankment shall be widened to accommodate the guardrail flare as shown in Caltrans Standard Plans.

16. Horizontal Distance To Fixed Object

On new alignments, without sidewalks, the minimum horizontal clearance from the edge of pavement to the fixed object shall be as determined from the latest version of the Roadside Design Guide. All effort should be made to exceed this minimum. Objects at or near the ends of horizontal curves may have to be relocated to increase this minimum distance.