

2023

County Standard Specifications

COUNTY STANDARD SPECIFICATIONS

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The publications referred to herein are as follows:

- Standard Specifications of the California Department of Transportation, latest issue
- “Greenbook”, Standard Specifications for Public Works Construction, latest issue
- American Society for Testing Materials (ASTM), Standards and subsequent revisions
- American Association of State Highway and Transportation Officials (AASHTO), Parts I and II, latest edition
- American Water Works Association (AWWA), latest edition
- American National Standard Practice for Roadway Lighting, American National Standards Institute (ANSI)
- Department of Health Services’ publication “Criteria for the Separation of Water Mains and Sanitary Sewers, latest edition
- California Waterworks Standards, California Administrative Code
- City of Los Angeles Department of Transportation Special Provisions and Standard Drawings for the Installation and Modification of Traffic Signals “Red Book”

1. DEFINITIONS

- 1.01 Director of Transportation:** Shall mean the Director of Transportation of the County of Riverside, California, and any duly appointed deputies, inspectors or agents, as referred to herein.
- 1.02 County Standard Specifications:** Shall mean this document as approved by the County of Riverside Board of Supervisors by County Ordinance.
- 1.03 Caltrans Standard Specifications:** As herein referred to shall mean the Standard Specifications of the State of California, Department of Transportation, latest issue published on the Caltrans Website.
- 1.04 Caltrans Standard Plans:** As herein referred to shall mean the Standard Plans of the State of California, Department of Transportation, latest issue published on the Caltrans Website.
- 1.05 Contractor:** As herein referred to shall mean the agency or individual engaged in doing the work, and furnishing the materials herein discussed. Said Contractor shall represent the Developer insofar as the execution of the work shall be concerned, and it will be assumed that he has been so authorized by the Developer.
- 1.06 Agreement:** As herein referred to shall mean the formal Subdivision Improvement Agreements entered into with the Board of Supervisors of the County of Riverside by the Subdivider, as completed and executed by both parties. Said Agreements to set forth all requirements for improvement of the subject Subdivision, including roads, water supply systems, drainage structures, sewers, monuments or other work as set forth therein.
- 1.07 Plans:** The plans, profiles, detail sheets or other drawings or instructions as prepared by a Registered Civil Engineer in the State of California on behalf of the Developer to delineate the nature and scope of the improvement work to be done on the proposed Project. Said Plans are to be signed by the Director of Transportation as to substantial compliance with the County Road Standards and County Standard Specifications. Full responsibility for the design shown on the Plans rests with the Developer's Engineer that signed and stamped the Plans.
- 1.08 Project Specifications:** The approved project-specific specifications comprised of Caltrans Standard Specifications, County Standard Specifications, special provisions, or a combination thereof.
- 1.09 County Road Standards:** Standard drawings as prepared by the Director of Transportation and adopted by Ordinance, showing the nature of the various items of improvement work to be done and/or made a part of the Agreement.
- 1.10 Engineer:** An authorized representative of the Director of Transportation acting within the scope of his designated authority in the detailed inspection of the work.
- 1.11 Developer's Engineer:** A Registered Civil Engineer in the State of California responsible for the Plans and Project Specifications who is authorized to represent the Developer.
- 1.12 Subdivider:** Any person, firm, corporation, partnership or association who caused land to be divided into a Subdivision for himself or for others and has executed an Agreement with the County.

- 1.13 Developer:** Any person, firm, corporation, partnership or association who intends to cause improvements to be constructed within on real property and/or the public road right-of-way, including but not limited to Subdividers.
- 1.14 Acceptance:** Completion of all work in accordance with approved Plans and Project Specifications; in conformance with County of Riverside Ordinance 461, Road Improvement Standards and Specifications; and release of Securities by the Director of Transportation.
- 1.15 Laboratory:** The established Laboratory of the County of Riverside Transportation Department or other laboratories approved by the Engineer to test materials and work involved in the Agreement.
- 1.16 Terms and Definitions:** In lieu of the following terms and definitions as used in Section 1 of the Caltrans Standard Specifications, the intent and meaning shall be interpreted as follows:
- A. DEPARTMENT OF TRANSPORTATION. Shall mean the Board of Supervisors of the County of Riverside and Transportation Department, County of Riverside.
 - B. STATE or STATE OF CALIFORNIA. Shall mean the County of Riverside.

2. INSPECTION AND TESTING

- 2.01 Conformity with Agreement Documents and Allowable Deviations:** Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements including tolerances, shown on the Plans or indicated in the Project Specifications. Although measurement, sampling and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Plans and Project Specifications, and his decision as to any allowable deviations therefrom shall be final.
- 2.02 Lines and Grades:** Such stakes or marks will be set by the Developer as the Engineer determines to be necessary to establish the lines and grades required for the completion of the work specified in Plans, County Road Standards, and Project Specifications.
- 2.03 Advance Notice:** At least forty-eight (48) hours advance notice shall be given the Director of Transportation and/or their appointed agents when requesting inspection and no paving or concrete operations will be permitted except in the presence of an inspector.
- 2.04 Inspection:** The Contractor or Developer shall at all times provide safe access for inspection of the work by the Director of Transportation and/or their appointed agents; and to any shops, plants, or areas wherein materials or portions of the work are in process.
- 2.05 Materials Testing:** Unless otherwise permitted in the Agreement, all materials tests shall be performed in accordance with the current published method as specified and used by the following agencies:
- A. American Society for Testing and Materials.
 - B. American Association of State Highway and Transportation Officials.
 - C. Published Federal Specifications (Airports, etc.) (If applicable).

- D. Test Methods as developed by Materials and Research Department - California Department of Transportation, Sacramento, California.
- E. Should the Developer be authorized to use a private Laboratory for control of the work, and in the event that said Laboratory desires to perform the materials testing by methods not specified in County Standard Specifications, such testing methods will be submitted to the Engineer for approval together with all required data necessary to substantiate the validity of the testing results obtained by using such methods. Following a review of this proposal, the Engineer may indicate his approval of the use of such non-standard testing methods on the project.

- 2.06 Samples:** In general, all samples for testing will be taken by the Director of Transportation and/or their appointed agents from material at, or delivered to the site of the work, and such material should be available in ample time before intended use to allow for such testing. In the event that control testing for the work is performed by a private Laboratory, the Director of Transportation reserves the right to stipulate the number and location of those control tests which will relate to ultimate Acceptance of the work by the Transportation Department.
- 2.07 Removal of Rejected and Unauthorized Work:** All work which has been rejected shall be remedied or removed and replaced in an acceptable manner. Any work done beyond the lines and grades shown on the Plans or established by the Engineer, or any work done without written authority will be considered as unauthorized work. Upon order of the Engineer, work shall be remedied, removed, or replaced at no expense to the Transportation Department.
- 2.08 Equipment:** The Contractor shall provide adequate and suitable equipment to meet the above requirements, and when ordered by the Engineer shall remove unsuitable equipment from the work.
- 2.09 Final Inspection:** When the work has been completed, the Engineer will make the final inspection.

3. MATERIALS

- 3.01 Quality of Materials:** In general, materials shall be new, and of a quality equal to that specified. Any material equal to that specified, in the opinion of the Director of Transportation will be approved, provided a proper request for substitution is submitted containing sufficient data or information on the article or material to permit investigation and decision. Unless such a request is made, no substitutions will be permitted. Should it be proposed to include any materials in the work not covered within County Standard Specifications, said material will, in general, be required to conform to all details of its fabrication, composition and manufacture to the applicable designation specified for the material or article in the current publications of the American Society for Testing Materials (ASTM).
- 3.02 Specified Material:** Certain materials shall be of the grades or types specified by the Director of Transportation and said materials will be so specified in the formal Agreement with the Developer or will be shown on the approved Plans of the work. Unless otherwise provided in the Agreement, all materials will be furnished by the Contractor.

3.03 Certificate of Compliance: The Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance stating that the materials involved comply in all respects with the requirements of the County Standard Specifications. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials. A Certificate of Compliance must be furnished with each lot of material delivered to the work and the lot so certified must be clearly identified in the certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the Plans and Project Specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

The County reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

3.04 Local Material: Local material is defined as rock, sand, gravel, earth, or other mineral material obtained or produced from sources in the vicinity of the work specifically for use on the project. Local material must not be a material obtained from established commercial sources.

When requested by the Contractor or Developer in writing, the County will test materials from any local source which has not been previously tested. If the material passes the County administered tests, it is deemed satisfactory to be used in the work. The County will charge for administering the tests.

3.05 Disposal of Excess Excavation or Materials: Excess earth excavation or other materials resulting from construction operations shall be disposed of by the Contractor outside of the right-of-way. Material becomes Contractor's responsibility and shall be disposed at an established disposal facility or private property with valid grading/stockpiling permit. County shall have release of liability from disposal.

3.06 Specific Brand or Trade Name and Substitution: The Contractor or Developer may request in writing to use a product that is equal to or better than the specified brand or trade name. The request shall include substantiating data that proves the substitution causes no delay and is of equal or better quality and suitability.

4. SCOPE OF THE WORK

4.01 General: The scope of the work shall be set forth in the Agreement with the Developer, as shown on the Plans, County Road Standards, and as specified in the Project Specifications, or as directed by the Director of Transportation.

4.02 Alterations in the Work: Minor changes in the work due to unforeseen local conditions shall not be made without prior approval of the Director of Transportation. Major alterations in design or standard of work will only be permitted following execution of an amended Agreement and any work performed prior to the completion of such an amended Agreement will be performed at the owner's risk.

5. OBSTRUCTIONS

- 5.01 Utility Facilities:** Any relocation of existing power, telephone poles, sewers, waterlines, gas lines, or other utility installations necessary to clear the limits of the proposed work shall be the responsibility of and paid for by the Developer, and they shall make all necessary arrangements with the owners thereof.
- 5.02 Existing Facilities:** Revisions or relocations of existing Transportation Department installations shall be shown on the Plans. In addition, the Contractor will be required to cooperate with Transportation Department personnel on the work as may be necessary to maintain proper public service. The Contractor shall protect any existing signs, culverts or other highway facilities during their operations and will be liable for any damage to same.
- 5.03 Trees:** Tree removal as shown on the Plans or as directed by the Engineer shall be the responsibility of the Developer and shall be removed to a depth of 2 feet below the finish grade, including stump grinding. An existing tree whose trunk face is located closer than eight feet from the face of the curb shall be removed unless otherwise specifically directed by the Director of Transportation. In addition, a fixed object (such as a tree) shall have clearance of eight feet minimum from the edge-of-travel-way (ETW) and four feet minimum from the edge-of-pavement (EP) in accordance with County Road Standard No. 820.

6. PUBLIC SAFETY

- 6.01 Laws to be Observed:** The Contractor shall keep himself fully informed of all existing State and Federal laws and County and local ordinances and regulations which in any manner affect those engaged or employed in the work or the materials used in the work, or which in any way affect the conduct of the work. They shall at all times observe and comply with, and shall cause all of their agents and employees to observe and comply with, all such existing laws, ordinances, regulations, orders and decrees of bodies or tribunals having any jurisdiction or authority over the work; and shall protect and indemnify the County of Riverside, and all of its and their officers and agents and servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulations, order or decree, whether by themselves or their employees. If any discrepancy is discovered in the Plans, County Road Standards, County Standard Specifications, or Agreement for the work in relation to any such law, ordinance, regulations, order or decree, the Contractor shall forthwith report the same to the Director of Transportation in writing.
- 6.02 Permits and Licenses:** The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices pertinent or incidental to the lawful execution of the work. The Contractor shall obtain an encroachment permit from the Transportation Department for the various types of encroachment activities within County public right-of-way listed on County's website.
<http://rctlma.org/trans/Land-Development/Permits/Encroachment-Permit-Informational-Brochure-Fees>
- 6.03 Public Convenience:** The Contractor shall so conduct their operations as to offer the least possible obstruction and inconvenience to public traffic, and they shall have under construction no greater length or amount of work than they can actively prosecute. On existing roads, unless otherwise provided in the Agreement, traffic shall be permitted to pass through the work with as

little inconvenience and delay as possible. Spillage of materials resulting from hauling operations along or across the traveled way shall be removed immediately. Spillages of hazardous materials must be promptly reported to the Engineer. Existing traffic signal and highway lighting systems shall be kept in operation for the benefit of the traveling public during progress of the work, and other forces will continue routine maintenance of existing systems. When existing traffic signal detector loops are rendered inoperable at any time during construction, the Contractor shall install and maintain temporary video detection in coordination with the Engineer and in accordance with County Standard Specifications.

Convenience of abutting owners along the road shall be provided for as far as practicable. Convenient access to driveways, houses, and buildings along the line of the work shall be maintained by the Contractor and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition.

In order to expedite the passage of public traffic through or around the work, the Contractor shall install and maintain signs, lights, barricades and other facilities for the sole convenience and direction of public traffic. Such warning systems and devices shall be approved by the Director of Transportation. Also, when so directed by the Director of Transportation they shall provide and station flagmen whose sole duties shall consist of directing the movement of public traffic through or around the work.

Water or dust palliative shall be applied if ordered by the Engineer for the alleviation or prevention of dust nuisance. Applicable provisions of Section 10-5 "Dust Control", Section 14-9 "Air Quality", Section 10-6 "Watering", and Section 18 "Dust Palliative" of the Caltrans Standard Specifications; Rules no. 401, 402, 403 and 403.1 of the South Coast Air Quality Management District (AQMD); Riverside County Code, Chapter 8.52 "Fugitive Dust Reduction Program for Coachella Valley; and all other applicable Federal and State laws.

6.04 Public Safety: Whenever the Contractor's operations create a condition hazardous to traffic or to the public, Contractor shall furnish at their own expense such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect and maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents, and avoid damage or injury to the public. Flagmen and guards while on duty and assigned to give warning to the public that the highway is under construction and of any dangerous conditions to be encountered as a result thereof shall be equipped in compliance with California Occupational Safety and Health Administration (Cal/OSHA) Standards. Flags, signs, lights, and other warning and safety devices shall conform to the requirements set forth in the current State of California Manual on Uniform Traffic Control Devices (CA MUTCD) and any signs furnished and erected by the Contractor shall be at his own expense.

Should the Contractor appear to be neglectful or negligent in furnishing and maintaining warning and protective measures as above provided, the Director of Transportation may direct attention to the existence of a hazard and the necessary warning and protective measure shall be furnished and installed by the Contractor at his own expense without cost to the County. Should the Director of Transportation point out the inadequacy of warning and protective measures, such action on the part of the Director of Transportation shall not relieve the Contractor from responsibility for public safety or abrogate his obligation to furnish and pay for these devices.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic, and at the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstruction from that portion of the roadway open for use by public traffic.

- 6.05 Use of Explosives:** When the use of explosives is necessary for the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. Contractor must obtain necessary local, state and/or federal permits required prior to the use of explosives.

All explosives shall be stored in accordance with the provisions of Division XI of the Health and Safety Code. Attention is called to local ordinances involving the use or storage of explosives and for excavating rock by blasting shall conform with applicable provisions of Section 19-4 of the Caltrans Standard Specifications.

- 6.06 Lane Closure:** Lane closures shall conform to the most current State of California Manual on Uniform Traffic Control Devices (CA MUTCD). Should it be necessary for the lane closure to remain in place after standard work hours, the Contractor shall provide a traffic control plan prepared and signed by a Traffic Engineer registered in the State of California. Lanes shall be opened back to Traffic after 2 weeks of no active work in the closure area. Standard work hours are from 7:00 am to 6:00 pm pursuant to Ordinance 847.

7. CLEARING AND GRUBBING

- 7.01 General:** Clearing and grubbing operations shall conform with the provisions of Section 17 of the Caltrans Standard Specifications and the details shown on the Plans.
- 7.02 Concrete Removal, Structure Removal or Pavement Removal:** This construction activity shall be considered a part of the clearing operation and shall conform with the applicable provisions of Section 15-1, Section 41-11 or Section 60-2 of the Caltrans Standard Specifications. Such removed materials shall be disposed of as elsewhere provided herein or as approved by the Engineer. When portions of existing concrete or paved surfaces are to be cut back to provide for joining or widening, such surfaces shall be sawed or otherwise cut to neat lines.

8. EARTHWORK

- 8.01 General:** Included under the term "Earthwork" will be all operations involved in grading roadway excavation or embankment construction required to bring the roadway section to the approved grade, and such drainage and structure excavation and backfill as may be required by the approved Plans. These operations to include the performance of all incidental work required to construct the roadway subgrade and the approaches thereto, and to maintain them in the form specified until the final Acceptance by the County.

All earthwork shall conform with the applicable provisions of Section 19 of the Caltrans Standard Specifications except as herein modified.

- 8.02** Relative compaction requirement of at least 95 percent for at least a depth of 2.5 feet below the finished grade for the width of the traveled way plus 3 feet on each side shall not be required.

This provision will not preclude the necessity of conforming to the provisions of the relative compaction requirement of Section 19-5 of the Caltrans Standard Specifications.

8.03 Watering: Embankments and subgrade shall be watered or sprinkled during construction so as to obtain the specified relative compaction of the material included therein.

8.04 Ditches and Channels: Drainage inlet and outlet ditches and channels shall be constructed to lines and grades shown on the approved Plans and profiles and as specified in Section 19-2 of the Caltrans Standard Specifications. Channels shall be constructed upstream and downstream of all culverts as necessary to insure proper capacity for same.

8.05 Structural Section Design of Roadbed: Unless otherwise approved by the Director of Transportation, structural section design requirements for the combined thickness of asphalt concrete (AC) and aggregate base (AB) surfacing will be determined by an accepted rational system of design, employing soil testing procedures; and the necessary sampling, testing and the design of the aggregate base and asphalt concrete surface courses will be performed by the County Materials Laboratory, unless otherwise provided in the Agreement. All street structural sections are tentative. Additional soil tests will be taken after rough grading to determine the exact street structural section requirements. The structural section shall be in accordance with County Road Standards and approved by the County Materials Engineer.

The table below lists the minimum asphalt concrete thickness for each of the road types. The road type and traffic index shown are in accordance with County Road Standard No. 114.

Road Type	Traffic Index	Minimum Structural Section ^{1,2} Thickness (feet)
Access Road ³	5.5	0.25' AC / 0.50' AB
Short Local Street ⁴	5.5	0.25' AC / 0.50' AB
Exterior & Local Street ⁴	5.5	0.25' AC / 0.50' AB
Enhanced Local Street at School or Park	6.5	0.30' AC / 0.50' AB
Collector	7.0	0.35' AC / 0.50' AB
Industrial Collector	8.0	0.40' AC / 0.50' AB
Secondary Highway	8.5	0.45' AC / 0.50' AB
Major Highway	9.0	0.45' AC / 0.50' AB
Mountain Arterial Highway	9.5	0.50' AC / 0.50' AB
Arterial Highway	9.5	0.50' AC / 0.50' AB
Urban Arterial Highway	10.0	0.55' AC / 0.50' AB
Expressway	11.0	0.60' AC / 0.50' AB

NOTES:

1. The minimum thickness for the Class 2 Aggregate Base is 0.50 feet.
2. The Transportation Department accepts alternate structural sections including full depth asphalt concrete or multi-layered aggregate subbase, lime or cement treated bases overlaid with Class 2 Aggregate Base. The thickness of the Class 2 Aggregate Base in these instances can be less than 0.5 feet provided the gravel equivalency of the total structural section is maintained.
3. For access roads, if the ultimate road classification is a General Plan Highway, the traffic index requirement is 7.0.

4. When the asphalt concrete section is constructed in two courses (base course and surface course), the construction of the asphalt concrete courses shall be placed as follows: (a) the bottom lift (base course) shall have a minimum thickness of 0.15 foot using 1/2-inch size aggregate or 0.20 foot using 3/4-inch size aggregate and (b) the top lift (surface course) shall be 0.15 foot using 1/2-inch size aggregate.

9. FINISHING ROADWAY

9.01 General: Upon completion of all construction operations, the entire street system shall be finished and cleaned in accordance with the provisions of Section 22 of the Caltrans Standard Specifications and these Special Provisions.

9.02 Shoulders: Roadways shoulders shall be trimmed and shaped to conform with the requirements of the approved typical section. This will include grading on optimum slope to the property lines if so directed. Included in this portion of the work shall be additional clearing, grubbing, or removal of debris not previously completed by the Contractor.

Concrete curbs-and-gutters, and cross-gutters shall be broomed clean and flushed with water to insure proper drainage. Any underground drainage systems or storm drain facilities shall be thoroughly flushed out to insure proper operation.

9.03 Appurtenances: Street name signs, barricades and warning devices shall be completed and in place.

9.04 Monuments: Unless otherwise approved by the Director of Transportation, all survey monuments located within the improved street area shall be in place and pavement cuts neatly patched.

9.05 Final Cleanup: Prior to inspection and Acceptance of the completed work, all items of finish work as outline above must be completed.

10. BASE MATERIALS

10.01 General: Base material to be used in construction of the upper layers of the roadbed shall consist of the following material classifications for the respective Land Division Schedules as identified in County of Riverside Ordinance 460.

- A. Aggregate Base, Class 3 or Disintegrated Granite - Schedule D H & I Land Division
- B. Aggregate Base, Class 2 - Schedule A, B, C, E, F & G Land Division
- C. Lime Treated Base
- D. Cement Treated Bases

NOTE: When roads are accepted for maintenance by the County, the aggregate base shall be Class 3 or higher. Disintegrated granite may be substituted for aggregate base when approved by the County Materials Engineer. When there is concrete curb and gutter, a Class 2 aggregate base shall be used.

The exact type of base material to be used on the work will be specified in the Agreement and shown on the Plans.

10.02 Disintegrated Granite: Disintegrated granite shall be clean and free from roots, vegetable matter and other deleterious substances, and be of such character that when wet it will compact to form a firm stable base. Disintegrated granite shall be any igneous rock, which has been weathered in place, or any sedimentary material principally derived from igneous rock. The material shall be of such sizes that the percentage composition by weight of material shall conform to the following grading at the time the material is deposited on the roadbed when determined by California Test Method (CTM) No. 202.

Sieve Size	Percentage Passing Sieve
1 inch	90 - 100
No. 4	50 - 95
No. 30	20 - 60
No. 200	3 - 15

The material shall conform to the following requirements:

Tests	CTM No.	Requirements
Resistance ("R" Value)	301	70 Min.
Sand Equivalent	217	30 Min.

10.03 Aggregate Base, Class 3: Aggregate Base, Class 3 shall conform to the provisions of Section 26 of the Caltrans Standard Specifications. Aggregate may include material processed from reclaimed asphalt concrete, Portland cement concrete, lean concrete base, cement treated base, or a combination of any of these materials. The amount of reclaimed material shall not exceed 50 percent of the total volume of the aggregate used.

The material shall conform to the following quality requirements:

Property	CTM No.	Requirements
Resistance (R-value)	301	60 Min.
Sand Equivalent	217	21 Min.

10.04 Aggregate Base, Class 2: Aggregate Base, Class 2 shall conform to the provisions of Section 26 of the Caltrans Standard Specifications and as modified herein. Section 26 shall include the following provision: Aggregate for Class 2 aggregate base shall be free from organic matter and other deleterious matter and shall be of such nature that it can be compacted readily under watering and rolling to form a firm and stable base. Aggregate may consist of broken and crushed asphalt concrete or Portland Cement Concrete and may contain crushed aggregate base (crushed rock and rock dust) or other rock materials. The material may contain no more than 3 percent brick by weight as determined by California test method 202 and as modified: Brick material retained on a No.4 sieve shall be identified visually and separated manually. Brick quantification shall be based on total weight of dry sample.

The Quality Requirements provisions contained in Section 26 for the Class 2 Aggregate Base shall be modified to read:

Property	Compliance Requirement
Resistance (R-value)	
Crushed Aggregate	80 Min.
Crushed Miscellaneous	78 Min.
Sand Equivalent	35 Min.
Durability Index	35 Min.
Percentage Wear	
100 revolutions	15 Max.
500 revolutions	52 Max.

- 10.05 Stabilized Soils:** Lime treated base shall conform to the provisions of Section 24 of the Caltrans Standard Specifications.
- 10.06 Cement Treated Base:** Cement treated base shall conform to the provisions of Section 27 of the Caltrans Standard Specifications.
- 10.07 Concrete Base:** Lean concrete or rapid strength concrete base shall conform to the provisions of Section 28 of the Caltrans Standard Specifications.

11. ASPHALT CONCRETE

11.01 General: Asphalt concrete shall be composed of mineral aggregate and asphalt binder, mixed in a suitable central mixing plant, and placed on the roadbed in accordance with County Standard Specifications and in conformity with the lines, grades and dimensions shown on the Plans and typical cross-sections. When required by the Director of Transportation, the Developer shall provide an asphalt concrete mix design as appropriate for the designated location, prepared under the direction of the Developer’s Engineer registered in the State of California competent to perform the work.

Asphalt concrete shall be placed on the prepared subgrade or base course in one or more courses to the required thicknesses, grades and cross-sections as shown on the Plans and/or specified in the Agreement. All underground utilities shall be in place prior to paving.

In advance of spreading the asphalt concrete, a prime coat of liquid asphalt or asphaltic emulsion shall be applied to the areas to be surfaced if so indicated on the Plans. Prime coat shall be applied to all roadbeds to receive surfacing, which have a gradient of ten percent or greater.

11.02 Asphalt Concrete: Asphalt concrete shall be hot mix asphalt (HMA) Type A, rubberized HMA, or minor HMA conforming to Section 39 of the Caltrans Standard Specifications and these Special Provisions. The grade of asphalt binder for the HMA shall be of the Performance Grade (PG)

designated below or as determined by the Engineer and shall conform to the provisions in Section 92 of the Caltrans Standard Specifications.

- A. PG 64-10 (Inland Valleys)
- B. PG 64-16 (South Mountain)
- C. PG 70-10 (Desert)

The PG designation for rubberized HMA is PG 64-16 for all regions.

The use of reclaimed asphalt pavement (RAP) in HMA production may be substituted in a quantity up to 15 percent of the aggregate blend in the base course (bottom layer) only. When proposing to use more than 15 percent RAP, the HMA mix design shall be approved by the County Materials Engineer prior to its use. RAP will not be allowed in the surface course (top layer). RAP in rubberized HMA will not be allowed unless directed. RAP will not be allowed on all repaired asphalt concrete surfaces.

A Job Mix Formula (JMF) shall be submitted for each type of HMA proposed using the County of Riverside Transportation Department Contractor Job Mix Formula Proposal form. The JMF shall be signed and stamped by a Civil Engineer registered in the State of California and shall include records of aggregate quality and mix design documentation. Records and documentation shall be dated within 12 months of the last test performed.

The HMA mix design shall comply with the Hveem mix design method using California Test 367 and laboratory procedures in combinations of aggregate gradations and asphalt binder contents to determine the optimum binder content (OBC) and HMA mixture qualities. When proposing a Superpave (SP) HMA, the SP mix design shall be approved by the County Materials Engineer prior to its use. The SP mix design method shall be used for roads with Traffic Index of 9.0 or higher or as determined by the Engineer.

Laboratories testing the mineral aggregate and HMA qualities used to prepare the mix design and JMF shall be qualified under the State of California Department of Transportation's Independent Assurance Program.

Before production of HMA, the HMA plant must have a current qualification under the State of California Department of Transportation's Materials Plant Quality Program. Laboratories testing the HMA qualities shall be qualified under the State of California Department of Transportation's Independent Assurance Program.

11.03 Placing Asphalt Concrete: Asphalt concrete will not be permitted to be placed upon unstable, yielding or working subgrade.

In addition to the provisions in Section 39, "Construction" and "Spreading and Compacting Equipment" of the Caltrans Standard Specifications, asphalt paving equipment shall be equipped with automatic screed controls and a sensing device(s) or ski device(s). The use of a ski device will be required for roads with traffic index of 7.5 or higher. The ski device shall be a rigid one-piece unit with a minimum length of 30 feet and the entire length shall be utilized in activating the sensor.

When placing the initial mat of asphalt concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than 30

feet long. The end of the screed farthest from centerline shall be controlled by an automatic transverse slope device set to reproduce the cross slope designated by the Engineer, by a sensor activated by a similar ski device or as directed by the Engineer. When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.12 inch tolerance. The end of the screed farthest from the previously placed mat shall be controlled in the same way it was controlled when placing the initial mat.

Should the methods and equipment used fail to produce a layer of asphalt concrete conforming to the provisions, including straightedge tolerance, under “Constructions” of Section 39-2, Construction, of the Caltrans Standard Specifications or elsewhere in these County Standard Specifications, the paving operations shall be discontinued the equipment or methods shall be modified.

Hot mix asphalt shall be spread and compacted in the number of layers of the thicknesses indicated in the following table:

HMA Pavement Thickness Shown on Plans (ft)	No. of Layers^a	Gradation
Less than 0.15	1	3/8 inch
0.15 to less than 0.20	1	1/2 inch
0.20 to less than 0.25	1 ^b	3/4 inch
0.25 or greater	2 or more ^{c,d}	3/4 inch or 1 inch

^a Top layer shall not contain RAP in the HMA mix.

^b If 1/2 inch grading is used, the HMA shall be placed in two layers.

^c Bottom and all other lower layers shall contain up to 15 percent RAP in the HMA mix or as approved by the Engineer.

^d One layer of 0.25 foot for the 3/4 inch may be placed as approved by the Engineer.

In addition to the straightedge provisions in Section 36-3, “Pavement Smoothness” of the Caltrans Standard Specifications, asphalt concrete pavement shall conform to the surface tolerances specified herein.

When directed by the Engineer, the uppermost layer of asphalt concrete surfacing shall be profiled in the presence of the Engineer. Profiling will not be required for the following areas of the pavement surface but shall conform to the straightedge requirements in Section 36-3, “Pavement Smoothness” of the Caltrans Standard Specifications:

- A. Roads with traffic index of 6.0 or lower.
- B. Pavement with a total thickness less than 0.24 foot.
- C. Pavement on horizontal curves with a centerline curve radius of less than 1000 feet and the pavement within the superelevation transition on those curves.
- D. Pavement placed in a single lift when required by the special provisions with a total thickness of 0.25 foot or less.
- E. Pavement with extensive grade or cross slope correction which does not receive advance leveling operations in conformance with the provisions in Section 39 under "Leveling" of the Caltrans Standard Specifications.
- F. Pavement for ramps and connectors with steep grades and high rates of superelevation, as determined by the Engineer.
- G. Shoulders and miscellaneous areas.

When using the Inertial Profiler, the profiling operation shall conform to California Test 387. The final HMA surface shall conform to the provisions of Pavement Smoothness in Section 39 of the Caltrans Standard Specifications. Pavements profiled shall conform to the following surface requirements:

- A. Surface shall have no areas of localized roughness with an International Roughness Index (IRI) greater than 160 in/mi.
- B. Surface shall comply with the Mean Roughness Index requirements as shown below for a 0.1 mile section:

HMA Thickness	Mean Roughness Index Requirement
>0.20 foot	60 in/mi or less
≤0.20 foot	75 in/mi or less

When using the California Profilograph, the profiling procedure shall conform to California Test 526, except a zero (null) blanking band shall be used for determining the Profile Index. Prior to beginning profiles, the profilograph shall be calibrated in the presence of the Engineer. Two profiles shall be obtained within each traffic lane, 3 feet from and parallel with the edges of the lane. Pavements profiled shall conform to the following Profile Index requirements:

- A. Pavement on tangent alignment and pavement on horizontal curves having a centerline curve radius of 5940 feet or more shall have a Profile Index of 0.16 foot or less for each 330 feet section profiled.
- B. Pavement on horizontal curves having a centerline curve radius of 2970 feet or more but less than 5940 feet, including the pavement within the superelevation transition of these curves, shall have a Profile Index of 0.32 foot or less for each 330 feet section profiled.
- C. Pavement within any 330 feet section, containing high point areas with deviations in excess of 0.025 foot in a length of 25 feet or less, when tested in conformance with the requirements in California Test 526, shall be corrected by the Contractor regardless of the Profile Index.

Areas of the top surface of the uppermost layer of asphalt concrete pavement that do not meet the specified surface tolerances shall be brought within tolerance by abrasive grinding. Abrasive grinding shall be performed to reduce individual deviations in excess of 0.025 foot, and to reduce the Profile Index of the pavement to be within the specified tolerance. Areas which have been subjected to abrasive grinding shall receive a seal coat. Deviations in excess of 0.025 foot which cannot be brought into specified tolerance by abrasive grinding shall be corrected by either (1) removal and replacement or (2) placing an overlay of asphalt concrete.

11.04 Underground Installation: All underground facilities, including laterals, shall be in place and tested prior to paving the street section, including, but not limited to, the following: sewer, water, electric, gas, drainage, communications, cable TV, and irrigation. The Contractor shall provide written verification from the affected utilities of acceptable test results prior to proceeding with paving operations.

12. FOG SEALS AND CHIP SEALS

12.01 General: A fog seal shall conform to Section 37-4 of the Caltrans Standard Specifications. A chip seal shall conform to Section 37-2 of the Caltrans Standard Specifications.

12.02 Description: A fog seal shall consist of an application of a diluted slow-setting or quick-setting asphaltic emulsion to an existing asphalt pavement surface. The fog seal shall be applied at a rate of 0.02 to 0.06 gallon per square yard of surfacing. The exact rate of application of the emulsion will be determined at the time of application based on the age and surface texture of the pavement.

A chip seal shall consist of an application of a polymer modified asphaltic emulsion and stone screenings applied to the asphalt pavement surface. The chip seal shall use stone screening size of 5/16 inch with a spread rate of 16 to 25 pounds per square yard. The asphaltic emulsion shall be applied at rate of 0.25 to 0.35 gallon per square yard. The exact rate of application of the emulsion and the screenings will be determined at the time of the application by the Engineer.

12.03 Asphaltic Emulsion: The asphaltic emulsion shall conform to the requirements of Section 94 of the Caltrans Standard Specifications.

12.04 Application: A fog seal shall be applied on pavement of less than 4 years but more than 2 years in service or after placement of the asphalt surfacing and shall be used on roads with traffic index of 6.0 or lower. Chip seal shall be applied on rural roads with low volume traffic or as directed.

12.05 Road/Work Acceptance: Where applicable, a fog seal treatment shall be required for all pavement work prior to acceptance and/or issuance of a notice of completion for roads to be accepted into the County maintained road system.

13. SLURRY SEALS

13.01 General: A slurry seal shall conform to Section 37-3 of the Caltrans Standard Specifications.

13.02 Description: A slurry seal shall consist of an application of a mixture of polymer modified asphaltic emulsion, aggregate, water, and additives to an existing asphalt pavement surface. The

slurry seal shall be applied at a rate of 8 to 10 pounds per square yard for Type I and at a rate of 12 to 15 pounds per square yard for Type II. The asphaltic emulsion for Type I shall be within 17 to 20 percent and within 14 to 18 percent for Type II. The exact percentage of the emulsion will be determined at the time of application based on an approved mix design. The polymer content shall be a minimum of 2.5 percent.

13.03 Asphaltic Emulsion: The asphaltic emulsion shall conform to the requirements of Section 94 of the Caltrans Standard Specifications. The polymer shall be either neoprene or butadiene and styrene copolymer.

13.04 Application: A slurry seal shall be applied on pavement of 4 years or more in service or after placement of the asphalt surfacing. A Type I slurry seal shall be used on roads with Traffic Index of 6.0 or lower. A Type II slurry seal shall be used on roads with Traffic Index greater than 6.0. A slurry seal shall be applied when the following conditions exist:

- A. Use of abrasive grinding on the asphalt pavement as a result of surface profiling.
- B. Excessive scarring on the asphalt pavement due to the removal of existing or conflicting traffic striping.
- C. Where multiple trenches or potholing are cut on the asphalt pavement because of a utility replacement project.
- D. Other conditions that result in significant wear or damage to the pavement surface as determined by the Engineer.

13.05 Road/Work Acceptance: Where applicable, a slurry seal treatment shall be required for all pavement work prior to acceptance and/or issuance of a notice of completion for roads to be accepted into the County maintained road system.

14. CONCRETE STRUCTURES

14.01 Description: Bridges, culverts, head walls, catch basins, retaining walls, and all other types of transportation structures shall be constructed to the lines and grades in accordance with the designs shown on the Plans. Each type of structure shall comply with the minimum cementitious material content shown in the table below unless shown on the Plans.

Type of Structure	Cementitious Material Content# (lb/cu yd)	County Road Standard Number
Catch Basin No. 1	590	
Curb Inlet		300
Combination Inlet		301
Catch Basin No. 2	590	302
Combination Inlet		
Flat Outlet Drainage Structure	590	303
Dip Section	590	307
Curb Outlet Drain	590	308
Alley and Alley Apron Sections	590	500
Sewer & Manholes	590	601, 603, 604, 605, 606, 607, 610

Bus Turn Out	590	814
Slab for Backflow Prevention	505	1103
Sewer & Storm Drainage Facilities Catch Basins, Culverts, Drop Inlets, Pipe Collars, Beam Supports, Anchors, Thrust Block, Encasement	590	
Reinforced Structures Retaining walls, footings	590	
Minor Structures not specified	505	

- 14.02 Concrete Structures:** Except for minor structures, concrete structures shall conform to the provisions in Section 51 of the Caltrans Standard Specifications and these Special Provisions.
- 14.03 Reinforcement:** Bar reinforcing steel and mesh reinforcement used in construction shall conform to the provisions in Section 52 of the Caltrans Standard Specifications.
- 14.04 Air-Blown Mortar:** Air-blown mortar shall conform to the provisions in Section 53 of the Caltrans Standard Specifications.
- 14.05 Precast Concrete Structures:** Precast concrete catch basins and drop inlets shall conform to the provisions in Section 70 of the Caltrans Standard Specifications.

15. CULVERT PIPE

- 15.01 General:** The type, strength, classification, or gauge of drainage pipe to be furnished and installed will be designated on the Plans. Details of the materials and work will conform with Caltrans Standard Specifications and Caltrans Highway Design Manual Guidelines, latest editions.
- 15.02 Design Service Life:** All drainage facility material types shall have a minimum design service life of 50 years. All metal pipes shall be subject to the requirements of the Caltrans Chart for 50 years Maintenance Free Service Life as contained in the Caltrans Design Manual. Soil tests using Caltrans Test Method 643 shall be provided to determine the pH and resistivity levels of the native soils and imported backfill materials.
- 15.03 Alternate Materials:** When two or more materials meet the service life, the structural requirements, and the hydraulic requirements; the Plans and Project Specifications may provide for alternative pipe materials for optional selection by the Contractor. Allowable pipe materials are:
- A. Aluminum Spiral Rib
 - B. Cast-in-Place Concrete
 - C. Corrugated Aluminum
 - D. Corrugated Steel
 - E. Reinforced Concrete
 - F. Structural Aluminum Plate

G. Structural Steel Plate

H. Steel Spiral Rib

The use of aluminum pipe shall be limited to the acceptable levels for pH, resistivity, and flow velocities. The pH level of soil, backfill, and effluent shall range within 5.5 and 8.5, inclusive. The minimum resistivity of the soil, backfill, and effluent shall be 1500 ohm-cm. Flow velocities shall not exceed 20 feet per second.

When alterations or extensions of existing systems are required, the pipe material type may be selected to match the type used in the existing system.

Each pipe material type selected as an alternative must have the appropriate protection from deterioration from corrosion, abrasion, or both. Corrosion may result from active elements in the soil, the water, and the atmosphere. Abrasion depends upon the frequency, duration, and the velocity of flow, and the character and amount of bedload.

15.04 Protective Coatings and Linings: Protective coatings for corrugated steel pipe shall conform to Section 66 of the Caltrans Standard Specifications.

Plastic (asphalt mastic or polymeric) coatings are acceptable coatings for non-abrasive flow conditions on the inside of the pipe.

Paved invert lining shall be applied on all steel storm drain facilities. Invert lining may be required for metal pipes subject to excessive wear from abrasive flows. All lining material shall conform to the Caltrans Standard Specifications.

Extra metal thickness for aluminum pipes may be required when flow velocities exceed 5 fps.

15.05 Strength Requirements: The strength requirements for metal pipe fabricated under acceptable methods contained in the Caltrans Standard Specifications shall be governed by charts published by Caltrans and contained within their Highway Design Manual, latest edition. The minimum metal thickness for any pipe located within the roadway prism shall be 14 gauge.

15.06 Reinforced Concrete Pipe (round or oval): Reinforced Concrete Pipe shall conform to the provisions in Section 65 of the Caltrans Standard Specifications and Caltrans Standard Plans.

15.07 Cast In Place Concrete Pipe: Cast in place concrete pipe shall conform to the County Standard Specifications and specifications published by the Riverside County Flood Control and Water Conservation District.

16. CONCRETE CURB AND GUTTER AND SIDEWALK

16.01 Concrete Curbs and Sidewalks, etc.: Portland Cement Concrete curbs, gutters, sidewalks, curb ramps, cross-gutters, spandrels, driveway approaches and other items listed in the table below shall conform to the provisions in Section 73 of the Caltrans Standard Specifications and County Standard Specifications. Each type of structure shall comply with the minimum cementitious material content shown in the following table.

Type of Structure	Cementitious Material Content* (lb/cu yd)	County Road Standard Number
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Landscaped Median Maintenance Walk (and other median concrete paving)	505	113
Crossover Median	590	113A
Curb & Gutter (Type A-6, A-8, C, W) Curb only (Type D-1, D) Curb Transition	505	200, 201, 202, 202A 203, 204 211
Residential Drive Approach	505	206, 207, 213
Commercial Drive Approach	590	207A
Cross Gutter, Spandrel	590	209, 210
Flat Outlet Drainage Structure	505	303
PCC Dip Section	590	307
Curb Outlet Drain Under Sidewalk Drain (Cast in Place) Private Drain Through Curb	505	308 309 310
Gutter Depression Curb Opening Grate Opening	505	311 312
Sidewalk, Fire Hydrant and Utility Pole	505	400
Sidewalk and Curb	505	401
Curb Ramp	505	403
Meandering Sidewalk	505	404
Alley and Alley Apron	590	500
Multiple Mailbox Installation (sidewalk)	505	812, 813
Bus Turnout	590	814
Minor Concrete not specified	505	

*Higher cement content shown on plans or in these specifications shall govern

16.02 Joints: Expansion joints shall be 1/2" wide and shall use a preformed expansion joint filler material.

16.03 Expansive Soil: Where the soils report indicates the presence of expansive soils, or the soil indicates an R-value less than 10 and a Plasticity Index greater than 10, place a minimum of 6 inches of Class 2 Aggregate Base as directed by the Engineer under all concrete improvements and structures listed in the table in Section 16.01 .

16.04 High Sulfate Soil: High Sulfate soils are damaging to Portland Cement Concrete improvements and are defined as those soils where the Water-Soluble Sulfate in soil is greater than 0.10 percent. For soils with high sulfate content, use the following table to determine actual cement content and requirements for concrete work. In those areas where the soils report indicates the Water-Soluble Sulfate is greater than 0.20 percent, provide a minimum of 6 inches of Class 2 Aggregate Base material and a layer of 6 mil plastic sheeting under and around all concrete improvements and structures listed in the table in Section 16.01, as well as street light foundations, signal pole foundations, catch basins, riprap energy dissipators, pre-cast concrete manholes, and other pre-cast concrete items. The plastic sheeting shall be placed between the aggregate base and the compacted native soil.

Degree of Sulfate Attack	Water-Soluble Sulfate (as SO ₄) in Soil Samples (%)	p.p.m. Sulfate (as SO ₄) in Water Samples	Cement Type	Cement Content Lbs/Cuyd	Aggregate Base Required
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Negligible	0.00 to < 0.10	0 to 150	II	Sec 90	No
Moderate	0.10 to < 0.20	150 to 1000	II	590	No
Considerable	0.20 to 0.50	1000 to 2000	V	675	Yes ^{*d}
Severe	Over 0.50	Over 2000	V+SCM	675	Yes ^{*d}

^a maximum water to cement ratio of 0.50 with Type II Portland cement.

^b maximum water to cement ratio of 0.45 with Type V Portland cement.

^c maximum water to cement ratio of 0.40 with Type V Portland cement and Supplementary Cementitious Materials (SCM) per Caltrans Standard Specification 90-1.02H.

^d 6 mil plastic sheeting and Class 2 Aggregate Base to be placed under and around all concrete improvements and structures identified in this Section 16.04.

16.05 Compaction: Relative compaction of Subgrade shall be 95% minimum for concrete improvements subject to vehicle loading, including curbs, curb and gutter, driveway approaches, cross-gutters, spandrels, local depressions, median crossovers, low water crossing dip sections, alley aprons and bus turnouts. Relative compaction of Subgrade shall be 90% minimum for those concrete improvements not subject to vehicle loading, including sidewalks, curb ramps, landscaped median maintenance walks (and other median concrete paving), and undersidewalk drains.

16.06 Multiple Mailbox Installation for New or Existing Sidewalk: Sidewalk and mailbox foundation shall conform to County Road Standard No. 812 or No. 813, whichever applies. Specifications for mailboxes to be furnished by the Postmaster.

16.07 Returned Plastic Concrete: The use of Returned Plastic Concrete (RPC) may be allowed for minor concrete application and in conformance to Section 90-9 of the Caltrans Standard Specifications. If used, the quantity of RPC added to the concrete shall not exceed 15 percent.

17. SEWERS

17.01 Description: The sanitary sewers for the subdivision shall be constructed in accordance with the Plans as approved by the Director of Transportation and the Health Department. All plans shall be signed by a registered civil engineer under whose direction the Plans and Project Specifications were prepared. Approval of the operating agency or District shall also be provided.

This section is for the purpose of defining the minimum requirements for the construction of sanitary sewers and is not intended to prohibit the use of any material and methods of construction not specified herein, provided such alternate is approved by the Health Department. In those cases in which utility companies have specified construction standards pertaining to their utility, standards of the utility company shall be accepted in lieu of the County standards specified herein, excepting trench compaction and pavement restoration in County roads.

17.02 Scope of Work: The work under this section shall include all work required to complete the construction and testing of all facilities necessary for the satisfactory operation and protection of the system as shown on the Plans.

17.03 Sewer Pipe: All sizes of sewer pipe shall conform to the applicable requirements of Section 207 of the "Greenbook", Standard Specifications for Public Works Construction, latest revision. All

lining of pipe shall be in accordance with the requirements of the supervising agency and shall be approved by the Director of Transportation and the Riverside County Health Department. Plastic pipe shall conform to ASTM D-3034.

17.04 Installation: The installation of on-site main lines and outfalls shall be within the dedicated road right-of-way except where easements are necessary to provide a gravity flow system and shall be in accordance with requirements and standards of the County of Riverside.

17.05 Manholes and Structures: All manholes and structures, either precast or built up, to be installed within the roadway, shall be designed for a minimum AASHTO H-20 highway loading and shall conform to the requirements of Section 70-4 of the Caltrans Standard Specifications and Section 403-3 of the "Greenbook", Standard Specifications for Public Works Construction.

17.06 Sewer Connections: Unless otherwise permitted by the Director of Transportation and Health Department, sewer connections shall be laid in straight lines from the main sewers to a point beyond the curb or to the property line at the time of the laying of the mains in accordance with the approved sewer plans or Improvement Standards.

The Contractor shall place "Y" branches of the size and in the positions shown on the approved Plans, and the house connection lines shall be placed to the lines and grades shown thereon. Connections to be stubbed off shall be closed at their outer end with an approved stopper and cement grout.

17.07 Testing of Sewers: After completion of construction of sewers and manholes, the system shall be tested in accordance with the requirements of the sewer purveyor.

17.08 Separation of Water Mains and Sanitary Sewers: Water mains and sanitary sewers shall conform to the criteria as outlined and illustrated in the State of California, Department of Health Services' publication "Criteria for the Separation of Water Mains and Sanitary Sewers", latest edition; and the "California Waterworks Standards", Section 64630, Title 22, California Administrative Code.

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines. These Standards, contained in Section 64630, Title 22, California Administrative Code, specify:

- A. Parallel Construction: The horizontal distances between pressure water mains and sewer lines shall be at least 10 feet.
- B. Perpendicular Construction (Crossing): Pressure water mains shall be at least one foot above sanitary sewer lines where these lines must cross.
- C. Separation distances specified in A and B shall be measured from the nearest edges of the facilities (i.e., dimensions are from outside of water main to outside of sewer line or manhole).
- D. Common trench: Water mains and sewer lines must not be installed in the same trench. The lack of separation between water mains and sanitary sewers results in an increased potential for contamination of the water supply. Therefore, when adequate physical separation cannot be attained, an increase in the factor of safety should be provided by increasing the structural integrity of both the pipe materials and joints required herein.

17.09 Backfill Requirements: Pipe backfill shall be placed in accordance with the “Greenbook”, Standard Specifications for Public Works Construction Section 306-12, Backfill. The Contractor/Utility Owner shall provide a written report of trench compaction results signed by an Engineer registered in the State of California and competent in the Geotechnical Engineering field along with copies of the daily testing reports prior to paving operations taking place. Testing frequency shall be a minimum of one relative compaction test for every two feet of depth of trench per 200 lineal feet of trench. For example: 1,600 foot trench by 6 foot deep will have a minimum of 24 relative compaction tests. The testing frequency of laterals shall be one out of every two alternating between long and short.

18. WATER PIPELINES

18.01 Description: The water supply system for the subdivision shall be constructed in accordance with the Plans as approved by the Director of Transportation and Health Department. All plans shall be signed by a registered civil engineer under whose direction the Plans and Project Specifications were prepared and shall bear evidence of approval of the operating agency or District.

This section is for the purpose of defining the minimum requirements for the construction of water supply and distribution systems and is not intended to prevent the use of any material or method of construction not specified herein, provided such alternate is approved by the Director of Transportation and Health Department. Water facilities shall be designed and constructed in accordance with applicable requirements of either the California Section of AWWA or the Public Utilities Commission. In those in which utility companies have specific construction standards pertaining to their utility, standards of the utility companies shall be accepted in lieu of the County Standards specified herein, excepting trench compaction and pavement restoration in County roads.

18.02 Scope of Work: The work under this section shall include all work required to complete the construction and testing of all facilities necessary for the satisfactory operation and protection of the system as shown on the Plans.

18.03 Materials: All materials shall be of the sizes and classes as shown on the approved Plans and shall conform to the latest revision of the following Specifications and Standards. All materials shall be new, unless specifically approved by both County agencies involved.

- A. CAST IRON PIPE. Shall conform to AWWA C102, AWWA C106, AWWA C108.
- B. CEMENT-ASBESTOS PIPE. Shall conform to AWWA C400, with the selection of Class of pipe based on AWWA Manual H2.
- C. STEEL PIPE. Shall conform to AWWA C201, AWWA C202, or Federal Specification SS-P-385.
- D. CONCRETE PIPE. Shall conform to AWWA C300, AWWA C301, or Federal Specifications SS-P-381.
- E. PLASTIC PIPE. Shall conform to AWWA C900.

F. LININGS AND COATING. Minimum protective coating shall be asphalt dipped and asphalt felt wrapped. All coal-tar and cement mortar linings and coatings so designated on the Plans or stated in the Project Specifications shall conform to AWWA C104, AWWA C203, or AWWA C205, whichever is applicable. Asphalt mastic coatings shall conform to Specifications M-2 (CS-96) of the Asphalt Institute.

G. FITTINGS AND SPECIALS. Shall conform to the applicable sections of AWWA C100, AWWA C110, AWWA C207, AWWA C208, or other approved standard or specification under which the fitting or special is made.

18.04 Installation: The installation of on-site pipelines shall be within the road right-of-way of County roads except where easements are necessary to provide a circulating system and shall be in accordance with the requirements and standards of the County of Riverside.

Trenching, installation, and backfilling shall be in accordance with the applicable requirements of County Standard Specifications, County Road Standards, and the recommendations of the pipe manufacturer.

18.05 Backfill Requirements: Pipe backfill shall be placed in accordance with the "Greenbook", Standard Specifications for Public Works Construction Section 306-12, Backfill. The Contractor/Utility Owner shall provide a written report of trench compaction results signed by an Engineer registered in the State of California and competent in the Geotechnical Engineering field along with copies of the daily testing reports prior to paving operations taking place. Testing frequency shall be a minimum of one relative compaction test for every two feet of depth of trench per 200 lineal feet of trench. For example: 1,600 foot trench by 6 foot deep will have a minimum of 24 relative compaction tests. The testing frequency of laterals shall be one out of every two alternating between long and short.

18.06 Structures: Any structures necessary for the completion of the water supply system shall be constructed in conformity with the Plans and in accordance with applicable provisions of these standards. Concrete structures shall be constructed of minor concrete conforming to provisions in Section 90-2 of the Caltrans Standard Specifications.

18.07 Fire Hydrants: Unless specifically excluded from the Agreement, all water systems shall include fire hydrants installed in conformance with the subdivision Improvement Standards and at locations shown on the Plans.

18.08 Valve Casings: All valve stems shall be cased and provided with removable covers in accordance with the subdivision improvements standards. When located in a paved area, cover shall be flush with surfacing. Covers are to be set to the finished surface grade at the time asphalt concrete or sealcoat is placed.

18.09 Hydrostatic Test and Disinfection of System: After completion of the connections, the system shall be tested by the admission of water under not less than the full working pressure of the lines. All joints, valves, connections, and fittings shall then be visually inspected for leakage, or the pipe lines backfilled and a leakage tests made to determine the rate of leakage. The allowable rate of leakage shall not exceed 25 gallons per 24 hours per inch of diameter per mile of pipe. All leaks shall be repaired to the satisfaction of the Engineer.

Disinfection of the lines may be accomplished at this time by the inclusion of the disinfection solution to the water used for the test. All lines shall be flushed and disinfected in accordance

with AWWA C601 prior to Acceptance of the system. Lines shall be thoroughly flushed after treatment with disinfectant prior to being placed in service.

19. UNDERGROUND UTILITY INSTALLATION

19.01 General: All new and existing utility lines, including but not limited to, electrical service, communications and street lights conduits will be placed underground. The Developer shall make the necessary arrangements with the serving utilities for the installation of such facilities. Surface mounted transformers, pedestal mounted terminal boxes and meter cabinets, ducts, street lighting, signal control cabinets, and other associated equipment in an underground utility system may be placed above ground in accordance with the County Road Standards and County Standard Specifications herein and the requirements of a County Encroachment Permit.

All overhead communications conductors, and all overhead electrical distribution conductors, which exist on a road or easement to be improved by any land division and commercial development, which is subject to discretionary approval by the County of Riverside, shall be relocated to an underground location, except for overhead electrical circuits which exceed 34 Kilovolts.

The Director of Transportation may waive any of the above requirements if topographical, soil, economic, or any other conditions make such underground installations unreasonable or impractical.

19.02 Underground Installations: All underground facilities, including laterals, shall be in place and tested prior to backfilling and paving the street section, including, but not limited to, the following: sewer, water, electric, gas, drainage, communications, cable TV, and irrigation. The Contractor shall provide written verification from the affected utilities of acceptable test results prior to proceeding with backfilling and paving operation. If more than one cable TV company serves an area, cables for all TV companies shall be installed prior to paving of the street section or underground ducts shall be provided by the developer on all street intersections as such to provide future installation of TV cables in accordance with Standard No. 819 of the County Road Standards.

19.03 Surface Installations: All above ground appurtenances shall be placed so that no part of the appurtenance is less than 18 inches from curb face and must maintain a minimum 6 foot of sidewalk width per County Road Standards to meet ADA requirements. Where no curb is present, above ground appurtenances shall be placed so that no part of the appurtenance is less than 8 feet from the edge of traveled way.

20. STREET NAME SIGNS

20.01 General: Street name sign shall conform to the latest edition of State of California Manual on Uniform Traffic Control Devices (CA MUTCD) and these Special Provisions.

The Developer or its Agent shall fund the installation of street name signs in accordance with applicable County Standard No. 1220, 1221, and 1222.

- 20.02 Street Name Sign Plates:** Sign plate size, color, material and finish, and lettering sizes shall be in accordance with applicable County Standard No. 1220 or 1221.
- 20.03 Bracket Assembly:** Sign post cap and center cross saddle's size and material shall be in accordance with applicable County Standard No. 1220 or 1221.
- 20.04 Sign Posts:** Sign post size, material and installation method shall be in accordance with County Standard No. 1222.
- 20.05 Sign Locations:** Number of complete street name sign assembly per intersection shall be in accordance with applicable County Standard No. 1220 or 1221.

21. LAND SURVEY MONUMENTS

21.01 General Requirements: The subdivision boundaries, lot corners, road, street, highway centerline, angle points in all lines, beginning and end of all curved lines, shall be monumented in accordance with the hereinafter described standard monuments and procedures. Any monument having characteristics other than the hereinafter described may be used only upon written approval of the County Surveyor. If an existing record and identified monument is found on the ground at the location of a subdivision corner, this monument may be used in lieu of replacement with a new monument provided the existing monument is a type considered to be durable.

Due to fires, hot dry weather, floods, and other natural factors, the County Surveyor is no longer allowing the use of Plastic Plugs as durable monuments.

21.02 Standard "A" Monuments: This monument is to be one inch (inside diameter) iron pipe eighteen inches (18") long. A metal disc bearing the Registered Civil Engineer or Land Surveyor number shall be securely affixed to the top of the pipe. The top surface of the monument shall be flush with natural ground, flush with surface in paved streets and twelve inches (12") down in unpaved streets. See Monument Schedule and County Road Standard Drawing numbers 900, 901, and 903 for further information.

21.03 Standard "B" Monuments: This monument is to be an eighteen inch (18") long copper clad steel pin, to which is secured at one end, a one and one-half inch (1-1/2") conical brass cap. The monument may be used as an alternate to the type "A" monument to mark centerline control on streets. The monument is to be driven flush with the street pavement. The Registered Civil Engineer or Land Surveyor number shall be stamped into the surface of the brass cap. Modification of the above standard may be approved by the County Surveyor. See Monument Schedule and County Road Standard drawing numbers 900, 901 and 903 for further information.

21.04 Standard "C" Monuments: This monument to be of a 2" x 2" x 18" long redwood stake cut from clear heartwood firmly set in the ground. The exact point of intersection of the lines shall be marked on the top center of the stake by a suitable tack or nail, which in turn shall be used to secure to the stake the metal disk bearing the Registered Civil Engineer or Land Surveyor Number. A #5 (5/8") rebar, 18" long with appropriately stamped metal disk may be used in place of a redwood stake. The exact point of intersection of the lines shall be marked on the top center of the rebar, the Registered Civil Engineer or Land Surveyor number shall be stamped into the surface of the cap. Modification of the above standard may be approved by the County Surveyor.

See Monument Schedule and County Road Standard drawing numbers 900, 901 and 903 for further information.

21.05 Standard "D" Monuments: This monument to consist of a 3/4" inside diameter x 18" long galvanized iron pipe, driven to a point not to exceed 1" above the natural ground surface. The exact point of intersection of the lines shall be marked on the top center of the pipe by a suitable tack or nail, which in turn shall be used to secure to the pipe the metal disk bearing the Registered Civil Engineer or Land Surveyor Number with mark for exact point. See Monument Schedule and County Road Standard drawing numbers 900, 901 and 903 for further information.

21.06 Standard "E" Monuments: This monument to be of a metal identification disc bearing the Registered Civil Engineer or Land Surveyor Number that is set with a lead plug or steel pin set in concrete curb. See Monument Schedule and County Road Standard drawing numbers 900, 901 and 903 for further information.

21.07 Monument Schedule:

STANDARD	USE OF MONUMENT	REMARKS
"A"	Tract boundary control, street centerline control-unpaved and paved.	As specified by the County Surveyor
"B"	Street centerline control.	May be used in lieu of Type "A" monument in paved streets.
"C"	Lot corner, angle point in lot line, E. C. and B. C. lot line, and right-of-way line.	
"D"	Same as "C"	
"E"	Same as "D"	All lot corner monuments except when lot corner is coincident with boundary corner may be set in the top of the curb on the prolongation of the lot line or radial/perpendicular from the centerline at a specified distance as noted on the final map. In the event improvements in a subdivision include a block wall along the rear lot lines, a Standard "E" monument shall be set on both sides of the block wall to indicate direction of the side lot lines Such points shall be noted on the final map as "point on line". Otherwise all rear corners shall be set at the true corner location.

21.08 Monument Ties: Upon completion of the tract monumentation, the Registered Civil Engineer or Licensed Land Surveyor shall furnish to the County Surveyor ties to all street centerline monuments. Such ties are to be permanent physical objects, there being not less than four ties to each monument. Effort should be made to set ties with strong angular relationship, as close to

90° angles as practical. Additionally, consideration should be given to utilizing lot corner monuments as tie points.

Whenever curb-and-gutter is installed, street centerline monuments are to be tied to permanent points set in the curb, these permanent points to consist of a metal identification disc bearing the Registered Civil Engineer or Land Surveyor Number that is set with either of the following: lead and tack (L&T) or steel pin driven into the concrete. Use of a cross cut in the concrete will not be acceptable. Cross over ties are preferred when made with a total station and tape. The ties furnished to the County Surveyor are to be prepared on 8-1/2" x 11" sheets of paper. Sketch to be clear and legible and spaced to avoid confusion or misinterpretation.

22. STREET LIGHTING

22.01 General: Street light system shall conform to the latest National Electrical Code; the Electrical Safety Orders of the Division of Industrial Safety, Department of Industrial Safety, State of California; and shall conform to approved standards and procedures of the local servicing utility, and requirements of this section.

The Developer or its Agent shall fund the installation of street lightings and service connection when conditioned by the County of Riverside Transportation Department (Engineer).

Service Agreement between the Developer and serving utility shall define the serving utility as the owner of the streets lights who is liable of maintaining the street lights.

22.02 Special Provisions:

All street lighting shall conform to the following:

- A. Street lights shall be installed at intersections near the curb return at a far right approach
- B. Street lights shall be installed at a minimum of one street light for each 200-lineal feet of roadway, plus or minus 20 feet
- C. Street light luminaires shall be full cut off, light emitting diodes (LED) type with color temperature of:
 1. 4000K when the project is located outside of the 30-mile radius of Mt. Palomar Observatory
 2. 3000K color temperature if the project is located within the 30-mile radius of Mt. Palomar Observatory, or
 3. As directed by the Engineer
- D. Private lighting shall conform to County Ordinance No. 655 for private lighting regulation within 45-mile radius of Mt. Palomar Observatory and County Ordinance No. 915 for reducing outdoor light trespass
- E. Selection of street light pole height and luminaire wattage shall be in accordance with applicable County Standard No. 1000 or 1001
- F. Street light pole material shall be in accordance with the following:

1. Ornamental concrete type shall be considered as the standard street lighting pole type
 2. Other street lighting pole types or mast arm lengths may be used if mutually agreed upon by the Director of Transportation and the serving utility
- G. Street lighting shall be required on all County of Riverside expressway classification roadways in accordance with County design criteria and the following:
1. At-grade intersections
 2. Grade separations of expressways with other public roadways, railways, pedestrian walkways, and with other public or private facilities
 3. Acceleration and deceleration ramps and lanes
 4. Auxiliary lanes

The above-described requirements shall apply to County designated expressway classification roadways with access openings at spacing not less than the intersection intervals designated in County Standard No. 114. Said roadway shall be provided with physical controlled access barriers such as fences and block walls. In the absence of such physical access barriers, or if the access intervals are less than that set forth in Standard 114, the roadway shall not be considered as an expressway for purposes of street lighting, and street lighting shall therefore be installed at 200-foot spacing in accordance with the requirements of the County's Transportation Department and this section.

- H. Requests for street light layouts shall be submitted to the Transportation Department. Specific procedures and design criteria shall be in accordance with those established by the Transportation Department, the County Administrative Office and the serving utility.

23. TRAFFIC SIGNAL AND HIGHWAY LIGHTING SYSTEM

23.01 General: Traffic signal and highway lighting system shall conform to the following:

- A. Latest edition of California Manual on Uniform Traffic Control Device (CA MUTCD)
- B. Latest edition of Caltrans Standard Plans and Caltrans Standard Specifications
- C. Latest edition of County of Riverside Transportation Department Traffic Signal Construction Specifications (County Standard Specifications)
- D. Requirements of this section

Traffic signal plan shall identify which edition of the CA MUTCD, Caltrans Standard Plans, Caltrans Standard Specification, and County Standard Specifications that the traffic signal plan conformed to.

Traffic signal plan shall be amended to conform to the latest standards/specifications when Developer or its Agent did not secure encroachment permit for the project within 18 months of County of Riverside Transportation Department (Engineer) approving the plan.

Engineer shall review and approve project specific Special Provisions, including requirements of other public agencies that have an owning interest in the planned improvements that were not covered under this section.

The Developer or its Agent shall arrange and fund the following:

- A. Relocation of all conflicting utilities
- E. Electrical service connection
- F. Furnish and install the traffic signal and highway lighting system

23.02 Quality Assurance: Electrical equipment shall conform to the provisions in Section 86-1.01D, "Quality Assurance", of the Caltrans Standard Specifications and conform to the County Standard Specifications.

All furnished equipment shall be new

23.03 Warranties, Guaranties, Instruction Sheets, and Manuals: Warranties, guaranties and instruction sheets shall conform to these Special Provisions.

Minimum manufacturer warranty period:

- A. Light Emitting Diodes (LED) modules shall have five (5) years of manufacturer warranty
- B. Battery Backup System (BBS) shall have five (5) years of manufacturer warranty. The first three (3) years shall be termed the "Advanced Replacement Program". Under this program, the manufacturer will send out a replacement within two business days of the call notifying them of an issue. The replacement unit may be either a new unit or a re-manufactured unit that is up to the latest revision. The last two years of the warranty will be factory-repair warranty for parts and labor on the BBS.
- C. Video Detection System shall have three (3) years of manufacturer warranty. During the warranty period, technical support from factory-certified personnel or factory-certified installers shall be available via telephone within four (4) hours of the time when a service call is made.
- D. Internally illuminated LED street name sign shall have two (2) year of manufacturer warranty
- E. All other equipment and systems shall have at least one (1) year of manufacturer warranty

Furnished the following documents to Engineer:

- A. Manufacturer warranty
- F. Manufacturer standard written warranty pertaining to defects in materials and workmanship for all equipment
- G. Two (2) sets of user, operation, and maintenance manuals, written in English, on all equipment and components for the traffic signal and highway lighting system shall be furnished to the Engineer

23.04 Equipment Wiring Diagrams: Controller cabinet assembly diagrams shall conform to these Special Provisions.

The equipment wiring diagrams shall include the wiring diagrams of the following applicable equipment/systems:

- A. Controller cabinet assembly
- B. Traffic signal controller(s)
- C. Battery backup system
- D. Video detection system
- E. Emergency vehicle preemption system
- F. Railroad preemption system
- G. Signal Interconnect
- H. Radio and Ethernet network communication system

Contractor shall furnish four (4) complete sets of equipment wiring diagrams to the Engineer. The controller cabinet assembly wiring diagram shall include an approximately 6" x 8" drawing of the project intersection with the following information, at a minimum:

- A. North arrow
- I. Street names
- J. Pavement delineation and markings
- K. Signal poles
- L. Traffic signal heads with phase designations
- M. Pedestrian signal heads with phase designations
- N. Video detection zones/loop detectors with input file designations

Contractor shall submit manufacturers' maintenance manual or combined maintenance and operation manual as an informational submittal. The manual must have a master item index that includes:

- A. Specifications
- O. Design Characteristics
- P. General Operation Theory
- Q. Function of all controls
- R. Troubleshooting Procedure
- S. Parts List, Descriptions, Stock Numbers, and Settings
- T. Block Circuit Diagram
- U. Layout of Components
- V. Schematic Diagrams

23.05 Temporary Electrical Systems: Temporary Electrical Systems shall conform to the provisions in Section 87-20, "Temporary Electrical Systems", of the Caltrans Standard Specifications and

these Special Provisions. Temporary wood poles shall conform to the provisions in Section 48-6, "Temporary Wood Poles" and County Standard Specifications.

A temporary electrical system consisting of the traffic signal and safety lighting system shall operate on a continuous basis using either new or used equipment that meets the latest standards /specifications.

Contractor shall obtain Engineer's authorization for the following temporary electrical systems and its installation method:

- B. Temporary signal with steel base plate and weights per City of Los Angeles Standard S-57.2C;
- A. Temporary wood poles, guyed with no signals on span cables, per Caltrans Standard Plan ES-18C, and/or guyed with signal faces on span cables, per Caltrans Standard Plan ES-18D, and
- B. Temporary overhead conductors for temporary signal operation.

23.06 Maintaining Existing Electrical System: Maintaining Existing Electrical System: Maintaining existing electrical systems shall conform to the provisions in Section 87-21.03B, "Maintaining Existing Electrical Systems", of the Caltrans Standard Specifications and County Standard Specifications.

Authorization and coordination from the Engineer is required for each traffic signal system shutdown. Traffic signal system shutdown shall be limited to hours between 9:00 A.M. and 3:00 P.M.

Equip existing flashing beacons with portable flashing beacons during flashing beacon shutdown. Portable flashing beacons shall conform to the provisions in Section 12-3.05, "Portable Flashing Beacons" of the Caltrans Standard Specifications or as directed by the Engineer.

If directed by the Engineer, a generator shall be furnished, connected, and maintained to keep traffic signal or flashing beacon system running in normal operation. All matters pertaining to the operation of existing traffic signal equipment shall be coordinated and cooperated with the County of Riverside traffic signal operation division.

Temporary "Stop" signs furnished and installed when traffic signal system is shutdown shall be 36 inches in size.

Temporary "Stop Ahead" signs furnished and installed when traffic signal system is shutdown shall be equipped with portable flashing beacons.

23.07 Removing Existing Electrical Equipment: The Contractor shall remove existing electrical systems as shown on plan(s). For any pole or cabinet that is removed, the unused foundation must also be removed.

23.08 Foundations: Foundations shall conform to the provisions in Section 51, "Concrete Structures", Section 56-3.01C(2), "Foundations", and Section 87-1.03E(3), "Concrete Pads, Foundations, and Pedestals", of the Caltrans Standard Specifications and County Standard Specifications.

23.09 Standards, Poles, Steel Pedestals and Posts: Standards, poles, steel pedestals, and posts shall conform to the provisions in Section 56-3, "Standards, Poles, Pedestals, and Posts", and

Section 87-1.03J, "Standards, Poles, Steel Pedestals and Posts", of the Standard Specifications and County Standard Specifications.

- 23.10 Conduit:** Conduit shall conform to the provisions in Section 86-1.02B, "Conduit and Accessories", and 87-1.03B, "Conduit Installation", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.11 Pull Boxes:** Pull boxes shall conform to the provisions in Section 86-1.02C, "Pull Boxes", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.12 Conductors and Cables:** Conductors and Cables shall conform to the provisions in Section 86-1.02F, "Conductors and Cables", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.13 Signal Interconnect Cable:** Signal Interconnect Cable shall conform to the provisions in Section 86-1.02F(3)(d)(v), "Signal Interconnect Cable" of the Caltrans Standard Specifications and County Standard Specifications.
- 23.14 Fiber Optic Cable:** Fiber Optic cable shall conform to the provisions in Section 87-19.02C "Fiber Optic Cable", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.15 Bonding and Grounding:** Bonding and grounding shall conform to the provisions in Section 86-1.02F(1)(c)(ii), "Bonding Jumpers and Equipment Grounding Conductors", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.16 Service:** Service shall conform to the provisions in Section 86-1.02P(2), "Service Equipment Enclosures", Section 87-1.03L, "Utility Service", Section 87-1.03P, "Service Equipment Enclosures", Section 86-2.11, "Service", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.17 Testing:** Testing and Field Testing shall conform to the provisions in Section 87-1.02D(2), "Quality Control", of the Caltrans Standard Specifications and County Standard Specifications.

Specific testing requirements for various systems and components shall be in accordance with the County Standard Specifications entitled to each herein.

The complete controller assembly and Battery Backup System shall be delivered to the following location or location as directed by the Engineer for testing:

Traffic Signal Shop
Riverside County Transportation Department
McKenzie Highway Operations Center
2950 Washington Street
Riverside, California 92504
Telephone (951) 955-6894

A minimum of 15 working days for operational testing and adjustment is required. An additional 15 working days period shall be allowed for retesting should the equipment fail.

The conflict monitor unit shall be tested in the field before signal turn on.

- 23.18 Controller Assembly:** Controller assembly shall conform to the provisions in Section 86-3, "Controller Assemblies", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.19 Wireless Radio System:** Wireless radio system shall conform to County Standard Specifications.
- 23.20 Vehicle Signal Assemblies:** Vehicle signal assemblies and auxiliary equipment shall conform to the provisions in Section 86-1.02R(4), "Signal Faces", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.21 Pedestrian Signal Assemblies:** Pedestrian signal assemblies shall conform to the provisions in Section 86-1.02S, "Pedestrian Signal Heads", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.22 Pedestrian, Bicycle and Equestrian Push Buttons:** Pedestrian, bicycle, and equestrian push buttons shall conform to the provisions in Section 86-1.02U, "Push Button Assemblies", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.23 Accessible Pedestrian Signals:** Accessible Pedestrian Signals shall conform to the provisions in Section 86-1.02T, "Accessible Pedestrian Signals", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.24 Detectors:** Detectors shall conform to the provisions in Section 87.103V, "Detectors", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.25 LED Luminaires:** Luminaires shall conform to the provisions in Section 86-1.02K (2), "LED Luminaires", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.26 Sign Illumination Systems:** Sign lighting fixtures shall conform to the provisions in Sections 87-3, "Sign Illumination Systems", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.27 Internally Illuminated Street Name Sign:** Internally illuminated street name signs (IISNS) shall conform to the provisions in Section 87-4.02C, "Internally Illuminated Street Name Signs", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.28 Photoelectric Controls:** Photoelectric controls shall conform to the provisions in Section 86-1.02M, "Photoelectric Controls", of the Caltrans Standard Specifications and County Standard Specifications.
- 23.29 Emergency Vehicle Preemption System:** Furnish and install complete and functioning emergency vehicle preemption (EVP) system as intended per Plans, the manufacturer, and County Standard Specifications.
- 23.30 GPS Universal Time Source:** The GPS Universal Time Source shall conform to County Standard Specifications.
- 23.31 Battery Backup System:** The battery backup system (BBS) shall conform to County Standard Specifications.
- 23.32 Solar Powered Flashing Beacon System:** Solar powered flashing beacon system shall conform to the provisions in Section 87, "Electrical Systems" of the Caltrans Standard Specifications, Chapter 4K, Flashing Beacons, of the CA MUTCD and County Standard Specifications.

23.33 Permits and Fees: The Developer or its agent shall obtain and pay all necessary encroachment permits, utility services and fees prior to the start of work.

24. ROADWAY LANDSCAPING

24.1 GENERAL

24.1.1 Authority: The following standards and guidelines have been developed and approved for the administration of landscape encroachments as such encroachments relate to roadway landscaping (County Ordinance No. 499 and Resolution No. 89-44).

24.1.2 Goals and Objectives: The standards and guidelines contained in this section have been developed to establish a minimum standard of quality associated with landscaping within the County Maintained Road rights-of-way, public rights-of-way, retained lots, and common open space areas. It is the goal of the County to facilitate the implementation of landscape improvements that are adequately designed, properly installed, and can be efficiently maintained. The following objectives should be incorporated into proposed landscapes in County rights-of-way:

- A. Landscaped improvements shall not jeopardize the public health, safety, and welfare, or interfere with the dedicated uses within the public rights-of-way.
- B. Landscaping shall be the product of functional design, aesthetic and public safety enhancements with a strong regard for maintenance and maintenance costs in perpetuity.
- C. Landscaping shall utilize water conservation practices, technology, and techniques. County Ordinance 859.X (X being latest County approved revision) shall be followed. Hardscape treatments shall be considered in combination with planting. Plants shall have low water requirements. Irrigation systems shall be designed for the efficient application of water to the plants.
- D. The facilitation of plant establishment, continued plant growth, vigor, health, and maintenance shall be part of the design process.
- E. The standardization of landscape construction and installation through the extended use of the "County of Riverside Comprehensive Landscape Guidelines and Standards" and to reduce plan check and inspection costs.
- F. Preservation of natural landscape resources, such as specimen or endangered plants, water features, land forms, etc., shall be encouraged.

24.1.3 Landscape Improvement Requirements

- A. Any landscape improvements, in conjunction with street improvements for industrial, commercial, or residential developments, involving grading, Hard scape construction (concrete walks, etc.), installation of walls, fences, lighting, planting, or irrigation systems, within the County of Riverside road rights-of-way, must be shown on plans and submitted for review by the Transportation Department.

- B. Plan submittal is not required for individual single-family residential landscaping, unless the proposed landscape work includes berm construction, excavations (other than for sprinkler lines or planting), hardscapes, walls fences, lighting, rockeries, signage, or other obstructions within the right-of-way.
- C. Encroachment permits are required for any work within the rights-of-way that requires a plan submittal.
- D. All landscape work is required to meet the standards set forth in this document.
- E. Landscape plans shall be prepared by a landscape architect registered/licensed in California.

24.1.4 Landscape Maintenance in Perpetuity

- A. Prior to the Transportation Department approval of any landscape plans, responsibility for the continued landscape maintenance (in perpetuity) must be established. There are two (2) forms of maintenance responsibilities, public or private.

Private landscape maintenance is typically done by the owner of a single parcel and/or their appointed representative or HOA. Public landscape maintenance involves a landscape maintenance district (such as Lighting Maintenance District 89-1-Consolidated [L&LMD 89-14-C]) typically overseen by a municipality or Special District. L&LMD 89-1-C is administered by the County of Riverside Transportation Department.

For Residential (tract) developments, ongoing landscape maintenance shall be the responsibility of a County approved (public) landscape maintenance district for all reverse frontage areas, medians, and ingress/egress parkways adjacent to fence lines (side lots). Maintenance shall pertain to all areas within a development as approved on the landscaping plan and, with the exception of walls and monuments, shall include all landscape elements in the rights-of-way, not just planting and irrigation. HOAs are not permitted to maintain reverse frontage landscapes or medians within the County Maintained Road right-of-way. Monuments shall be placed in an easement solely for the purpose of the monument and maintenance of said monument. Lighting for monuments will only be covered by the L&LMD if the lighting is on approved L&LMD plans and noted in the budget. Repeated acts of vandalism will not be covered by the L&LMD once budgeted monies are exhausted.

For commercial and industrial projects, ongoing landscape maintenance shall be the responsibility of a private entity if approved by the County of Riverside Transportation Department by an executed Landscaping Maintenance Agreement. Otherwise, ongoing landscape maintenance shall be done by a County approved landscape maintenance district. Maintenance responsibilities shall pertain to all areas within a development as approved on the landscaping plans, and shall include all landscape elements in the rights-of-way, not just planting and irrigation.

- B. Individual maintenance districts such as L&LMD 89-1-C, CSA, CFD, and Valley-Wide Recreation and Park District may have different requirements and standards in addition to those listed herein. Plans shall comply with pertinent standards and may need to be approved in conjunction with the associated maintenance district. In cases of discrepancy, the stricter requirements shall apply.

- C. Landscape areas shall be designed with respect to the maintenance mechanism utilized. Areas maintained by separate entities shall be designed so maintenance responsibilities do not overlap. Installation of a 6-inch-wide concrete header shall be required to clearly delineate maintenance boundaries.
- D. Areas maintained by separate entities shall have separate electrical and water meters, in separate enclosures/boxes. Special District Utilities shall be standalone.
- E. Parkways that have sidewalks that meander through the right-of-way area, dedicated landscape parkway easements or common areas contiguous to public rights-of-way shall be maintained by one maintenance entity for the entire area.

24.1.5 Utility Location and Obstructions Below Ground: Landscape designs shall consider all existing or proposed utilities, including but not limited to gas, sewer, water, storm drains, streetlights, and electrical. The locations of all known utilities shall be shown on the landscape plans. Contractor shall be responsible for having the location of all utility lines and structures verified by Underground Services Alert, or other utility locating service, so that proper precautions may be taken to avoid disruption of or damage to such improvements.

24.1.6 Sight Distance: The sight distance is the distance a driver approaching an intersection, whether signalized or not, or leaving a driveway should be able to see down the street for oncoming traffic. The area between the sight line and the curb is a restricted use area. No trees, plants, walls, or other obstructions higher than 18 inches from top of pavement (12" from top of curb) where ground is flat shall be placed in these restricted use areas (see County Road Standard 1101).

24.1.7 Quality and Standards of Materials, Installation, and Guarantees

- A. All landscape materials and installation procedures shall meet the minimum requirements as set forth in the "Greenbook", Standard Specifications for Public Works Construction, latest edition, and the County Standard Specifications contained in this document. Unacceptable materials or improper installation procedures shall be cause for rejection/removal of work.
- B. The County of Riverside Comprehensive Landscape Guidelines and Standards (referred to herein as "Guidelines") shall be used as a reference for current landscape construction within the rights of ways and adjacent landscape easements. The Guidelines are a dynamic document which is updated from time to time to reflect ever evolving Landscape Industry and Water District Regulations. When a conflict occurs between iterations of the Guidelines the stricter detail/standard/specification shall prevail. A current copy of The County of Riverside Comprehensive Landscape Guidelines and Standards may be found at: <https://rctlma.org/trans/Land-Development/Landscape-Development>
- C. All tree, shrub, and other woody plant work shall be completed in accordance with Approved American National Standard (ANSI) A300 and Z133 Standards, latest edition.
- D. Landscape maintenance districts may require additional plan check and inspection time and fees. The County may relinquish final inspection of the project to the County approved landscape maintenance district through written notification. The County will also seek written notice from the maintaining entity for their final Acceptance of the landscape improvements.

- E. Plant material shall be guaranteed for 90 days from time of landscape Acceptance by the County. Trees shall be guaranteed for one year from Acceptance date. Guarantees shall be in the form of bonds or cash deposits combined with written Agreements.
- F. Irrigation systems shall be guaranteed against material defects or improper installation methods for one year from acceptance date. Guarantees shall be in the form of bonds or cash deposits combined with written Agreements.

24.1.8 Plant Material: Plants shall be typical of their species or variety, have normal habits of growth, be healthy, vigorous, well rooted, but not rootbound or have girdling roots.

- A. Plants shall be free of disease, insects or pests, including their eggs or larvae.
- B. Plants with spines, thorns, or poisonous leaves, seeds, or berries, etc., are prohibited in areas adjacent to high pedestrian traffic. Plant selection shall be appropriate for the specific geographic location and climate zone in which they will be planted. Plants with thorns may be planted in areas where access is not warranted. Plant materials shall be selected from the “County of Riverside California Friendly Plant List” within The County of Riverside Comprehensive Landscape Guidelines and Standards.
- C. In order to comply with the County of Riverside objectives for attractive, low maintenance landscapes, the following characteristics shall be considered in plant selection:
 1. Appropriate growth habit and mature size for the intended planting area to avoid excess maintenance, such as frequent pruning or shearing to control growth. Minimal pruning and/or shearing for natural appearance is preferred.
 2. Drought tolerance, to minimize water usage.
 3. Fire resistance in natural fire hazard areas and fuel modification zones.
 4. Deep rooting properties.
 5. Hydrozone based design, grouping plants with similar water needs and other horticultural requirements.
- D. Trees shall be selected per the “County of Riverside California Friendly Plant List” within the County of Riverside Comprehensive Landscape Guidelines and Standards. Trees shall have straight, undamaged trunks, be well branched, well rooted without being rootbound, and have no girdling roots. Any old tree wounds shall be well healed or callused over. Minimum tree size shall be 15 gallons.
- E. Trees with aggressive roots shall be avoided. Approved root barriers (minimum 24” in depth) are required when trees are planted within certain distances from County maintained curbs, gutters, and/or sidewalks. See guidelines for specific requirements.
- F. Plants shall be non-invasive Refer to “County of Riverside California Friendly Plant List” within The County of Riverside Comprehensive Landscape Guidelines and Standards for a general listing of plants not allowed within various areas of the County.
- G. Trees shall not be topped (unless by governing utility as allowed by the PUC).

24.2 EROSION CONTROL AND LANDSCAPE GRADING PLANS

24.2.1 Erosion and Sediment Control: Landscape designs shall comply with the County of Riverside Building and Safety Department’s Grading Policy for Erosion Control Landscape Plans, Ordinance No. 457.

24.2.2 Landscape Grading

- A. Any grading in landscape areas shall be as shown on the grading plan.
- B. Parkway and common areas shall not drain onto private property.
- C. Medians shall be graded per County of Riverside Ordinance No. 461.
- D. Toe of slope shall not extend into any line of sight restricted use area (see County Road Standard 821).
- E. Hardscape grades shall be per County of Riverside codes and requirements. Desirable grades for landscape planting areas are indicated below.

Landscape	Minimum Slope	Maximum Slope	Comments
Shrub and Groundcover	2% (50H:1V)	50% (2H:1V)	If slope is 5:1 or steeper, the toe of slope shall be 1 foot away from any hardscape or wall.

- F. No grading shall be permitted within the drip line of existing trees indicated to remain and work shall be completed in compliance with Section 24.83.

24.3 PARKWAY LANDSCAPING

24.3.1 Trees

- A. Trees shall be selected “County of Riverside California Friendly Plant List” within County of Riverside Comprehensive Landscape Guidelines and Standards.
- B. Tree selection and design may be reviewed in relation to the species selected and the space in which it is to be planted. Factors to be considered are planting area size, proximity to utilities (above or below ground), growth rate and mature tree size, tree spacing, rooting characteristics, horticultural requirements, and maintenance needs.
- C. Trees located within the parkway shall be a minimum of 6 feet from the sidewalk edge, 6 feet or less from the sidewalk edge with a root barrier or as indicated within the County of Riverside Comprehensive Landscape Guidelines and Standards. In parkways without sidewalks, trees shall be planted a minimum of 7.5 feet from the face of curb. These conditions may vary for specific plans or special conditions approved by the Director of Transportation.
- D. The following standards shall apply in tree selection and location. Trees shall be:
 - 1. Planted on private property where feasible and street tree requirements are not required, a minimum of 2 feet from the right-of-way line on local and collector

streets. The exception shall be along the side yards (ingress/egress conditions) and backs of residential properties (reverse frontage) where a wall exists or is proposed. For all other street sections, trees shall be planted outside the rights-of-way if setback requirements can be met.

2. A minimum of 10 feet from residential driveways and 15 feet from commercial driveways (see County Road Standard 1101).
3. A minimum of 10 feet from corner cutbacks for local and collector streets, and 20 feet from corner cutbacks for secondary, major and arterial streets (see County Road Standard 1101).
4. A minimum of 3 feet from fences or the face of walls, either existing or proposed, and a minimum of 2 feet away from any wall footings.
5. A minimum of 6 feet from any underground utility line or vault, or per the particular utility, which may have further restrictions.
6. A minimum of 20 feet from street lights and 12 feet from traffic or street signs.

24.3.2 Shrubs, Ground Covers, and Cactus

- A. Shrubs, Ground Covers and Cactus shall be per “County of Riverside California Friendly Plant List” within The County of Riverside Comprehensive Landscape Guidelines and Standards.
- B. The minimum distance shrubs shall be planted from hardscape/sidewalk shall be equal to half the mature shrub’s diameter. The minimum distance shrubs shall be planted from curbs shall be equal to the mature shrubs diameter. Ground cover may be planted up to the sidewalk or curb, depending on Ground cover trimming needs and suitability.
- C. Within the road right-of-way, no shrubs, ground covers, and cactus with a normal growth habit over 18 inches in height from top of pavement (12” from top of curb) may be planted within or encroach into any sight distance restricted use areas (see Standard 821).
- D. Where cactus are allowed in desert landscaping, cactus shall be placed so as not to encroach within 5’ of any pedestrian or bike path areas at maturity.

24.3.3 Vines

- A. Vines shall be per “County of Riverside California Friendly Plant List” within The County of Riverside Comprehensive Landscape Guidelines and Standards.
- B. Vines shall be self-clinging or have an appropriate support system provided.
- C. A minimum of 18”-24” shall be left between any self-clinging and/or twining vines and shrubs or trees at their maturity.

24.3.4 Lawn/Turf

- A. Turf is only allowed in the right-of-way where it is contiguous with recreational park turf with no barriers present, in high pedestrian use areas such as schools, or as approved by the Transportation Director on a per case basis.
- B. Per Ordinance 859.3, turf is prohibited in the front yards of new residential tract developments prior to building permit final.

24.3.5 Sidewalks

- A. Sidewalks shall be designed per Ordinance 461.
- B. Meandering sidewalks, that do not go to the curb, shall meander no closer than 3 feet to the face of the curb consistent with County Road Standard 404.
- C. Intersections with other walkways shall be designed to be located within one maintenance entity area. At the line where the walkway crosses into another maintenance area, an expansion joint shall be installed in the walkway (see Standard 400).

24.3.6 Mulch

- A. All non-turf planting areas, except as noted herein, shall be mulched to retain moisture, suppress weeds, and moderate soil temperature. A granular pre-emergent shall be applied prior to mulching activities.
- B. Planting areas shall be mulched with a three inch (3") minimum layer of organic mulch. Areas of groundcover planted from flats shall be mulched with a one and one half inch (1-1/2") minimum layer of organic mulch. Organic mulch material shall be 3/8"-1/2" diameter screened fir bark or approved equal.
- C. Where maintenance districts require a different depth of mulch, the more stringent (deeper) requirement shall prevail.
- D. Color enhanced mulches shall not be used.
- E. Mulch may be omitted for native revegetation projects upon the recommendation of the project biologist.
- F. Mulch may be omitted for hydro-seeded areas.
- G. Slopes shall receive stabilizing mulch products per Ordinance 859.X (X being latest revision).
- H. Planting areas in desert regions (Sunset Climate Zones 11 and 13) shall be mulched with a two inch (2") layer of decomposed granite / gravel mulch. 1" minimum (sieve gradation/size) decomposed granite mulch shall be used.
- I. When used in lieu of mulch, cobble areas within the right-of-way shall be grouted in place unless maintained by commercial / industrial private entity.

24.3.7 Walls/Fences/Boulders

- A. Walls or fences to be maintained by a maintenance district shall be designed to be located totally within the maintenance area of the maintenance district that will maintain the wall or fence. No private individual residential walls or fences, nor their footings shall be located within the County right-of-way.
- B. Walls shall be screened with vines to discourage graffiti. Vines shall be self-clinging or secured to a support. Vines should eventually provide a minimum wall screen of 80 percent coverage. Walls shall have a minimum of three (3) applications of anti-graffiti coating applied prior to any planting.

- C. Placement of Boulders within the right-of-way shall take into consideration sight distance zones, fall zones for cyclists, pedestrians, etc. A 10' clearance to pedestrian or bike path areas is recommended.

24.3.8 Trail Stabilizer

- A. Stabilizer product shall be appropriate for use by pedestrians, bicyclists and, where used for multi-purpose trails, equestrians.
- B. Subsurface for stabilized decomposed granite shall be prepared per product manufacturer specifications and warranty terms (compacted greater than 90% or Geotechnical Engineer's recommendation).
- C. Depth of stabilized decomposed granite to be a minimum of 50% of the overall trail section. The remaining section may be class 2 aggregate base as approved by the Director of Transportation.

24.4 MEDIAN LANDSCAPING

24.4.1 General: Planting and irrigation is required for medians 5' wide or greater unless sight distance restricts planting. Median noses and transitions from turn lanes less than 24 inches shall be hardscape material. Irrigation shall be point source in nature, with 12" flexible riser with drip emitters or bubblers. Drip irrigation less than ½" pipe diameter and/or rated less than schedule 40/80 pipe is not permitted within medians.

24.4.2 Median Hardscape

- A. To reduce plant maintenance and conserve water, hardscape, rockeries, or other non-plant treatments shall be incorporated into the median design. As a general rule, a minimum of 40 percent of the median's plantable area shall receive hardscape treatment.
- B. Median hardscape shall be cobblestone river rock, 4" – 12" dia. and grouted with a min. thickness 4"; or colored concrete (with or without a stamped pattern) with a 4" min. thickness. Color shall be red, brown, sand, or tan. A gray or slate color is not permitted, since this color will not differentiate the median from the roadway.
- C. As a general rule, fixed objects such as boulders shall not be located in medians. In cases where special permission is granted, use shall be limited.
- D. Monument signs in medians may be allowed on a 'per case basis' with Transportation Department approval and will require a maintenance agreement. The Transportation Department will not be responsible for the maintenance and repairs/replacement to Monument signs.

24.4.3 Median Trees

- A. Trees shall be planted a minimum of 6 feet from the face of curb. Median must be a minimum of 12 feet wide for tree planting. Where trees are requested in a median less than 12 feet wide, root barriers are required.
- B. Trees shall be a minimum of 20 feet away from street lights and 10 feet away from traffic or street signs.

- C. Trees shall not be planted in median sight distance restricted use areas (see Standard 821)
- D. Trees planted in the median shall be from the County of Riverside California Friendly Plant List. Trees should be small diameter trunks and high canopies at full maturity.
- E. Tree 'clear trunk height' shall be 5' minimum above finish grade for viewing under foliage canopy of tree. If mature spread diameter of tree extends beyond the curb face, there shall be 14' minimum clearance above the road to the branching/foliage.
- F. Trees planting, location and size shall comply with Caltrans requirements for highways classified per County Standards 91, 92, 93 and Expressway.

24.4.4 Median Shrubs and Ground Covers

- A. Shrubs planted in a median shall be the low growing varieties. The shrubs normal growth habit shall not exceed 4 feet in height. Median shall be a minimum of 5 feet wide for shrub planting.
- B. Shrubs planted in the sight distance restricted use areas shall not have a growth habit exceeding 18 inches in height from top of roadway (12" from top of curb or less depending on vertical curve sight visibility restrictions). See County Road Standard 821.
- C. Shrubs and hedges shall be designed and planted the same as for parkways.
- D. Ground covers shall be designed and planted the same as for parkways.
- E. Lawns shall not be permitted in medians.

24.5 WATER CONSERVATION AND IRRIGATION

24.5.1 Water Conservation

- A. Landscapes installed in County rights-of-way and open space/common areas shall contain water conservation elements in both the planting and irrigation design.
- B. Mulch shall be used in planting areas as required herein.
- C. Plans shall conform to the requirements of the most recent version of Ordinance No. 859. Projected landscape water use shall be calculated using the water budget formula found in Ordinance No.859. Landscaping within the County Maintained Road rights-of-way shall be calculated at an ETo budget of 0.45 (or 45% ETo).
- D. Irrigation plans shall also conform to any requirements established by the local water purveyor servicing the project area.

24.5.2 Irrigation System Design and Equipment

- A. Irrigation design shall conform to the requirements of Ordinance No.859.X (X being latest County approved revision).
- B. Irrigation systems shall be designed according to maintenance areas. All irrigation system equipment (controllers, valves, piping, heads, etc.) shall be installed within the maintenance area. In landscape areas that include the right-of-way and a contiguous dedicated landscape easement, the irrigation system need not be separated if the entire

landscape area is being maintained by one entity. Areas maintained by different maintenance entities shall also have their own water and electrical points of connections (POC).

- C. Backflow prevention devices shall be covered with a vandal-resistant stainless steel or aluminum enclosure, powder-coated green (or tan in the Desert areas near DG), with locks.
- D. Irrigation systems, other than private individual homeowner areas, installed within road rights-of-way shall include the following:
 - 1. A wye filter or basket strainer shall be installed before backflow prevention devices (verify with local water entity). Backflow shall be painted 'Hunter Green' or Tan to deter theft (protect handles, serial numbers, and ports from paint).
 - 2. A Climate-Based smart controller (IA-SWAT tested) with access to real time EvapoTranspiration (ET_o) rates shall have at least as many stations as valves indicated or per the irrigation design. Controller shall be solid state and equipped with multiple programs, water budgeting, and repeat cycles. Controller shall be enclosed in a vandal-resistant steel or aluminum enclosure.
 - 3. Irrigation systems shall be scheduled so the precipitation rate does not exceed the infiltration rate of the soil.
 - 4. Irrigation systems shall be equipped with a normally closed (NC) master valve and a flow sensor.
 - 5. Irrigation systems shall be equipped with a rain sensor which shall be located within an unobstructed natural rainfall area above the irrigation spray pattern.
 - 6. Gate valves shall be installed in pressure main lines at each valve along the system to allow shutting down portions of the system. Gate valves shall also be installed on the supply side of a main line that crosses a street.
 - 7. Remote control valves shall be installed below ground in valve boxes. Control valve wire shall be UGF wire, minimum 14 gauge. Common wire shall be UGF wire, WHITE, minimum of 12 gauge or larger. Wire shall be a continuous run from controller to valve for runs less than 2500 feet. Common wire splice shall occur at valve boxes or splice boxes. Two-wire systems shall be installed in conduit, minimum 1" size for a single two-wire cable. Conduit for wires shall be sleeved across hardscape and roadways for additional protection.
 - 8. Quick coupling valves (QCV) shall be located along pressure main line at maximum intervals of 25 feet. QCV shall be installed in a minimum 10" round valve box.
 - 9. Antidrain devices shall be installed where low head drainage may occur.
- E. High efficiency irrigation methods (for example drip, low volume rotators or rotors, micro-sprays, etc.) are encouraged.
- F. All spray heads and rotor heads shall be of the "pop-up" type with a minimum 6-inch pop up in turf areas and 12 inches in shrub areas. Medians shall be point source drip only.

- G. Where risers are necessary within the right of way, they shall be of flexible sch. 40 PVC pipe. Fixed/rigid risers are not permissible.
- H. Irrigation systems shall be designed to provide uniform coverage. The design for rotors and sprays shall be head-to-head coverage with a maximum of 60% diameter overlap. Irrigation system shall be designed to minimize and prevent spray on roadways and sidewalks.
- I. Pressure calculations shall be provided for valve with highest gpm and the farthest valve from point of connection. Slope system will require a pressure calculation for system with the greatest elevation increase.
- J. Pipe shall be sized to reduce pressure loss and as to not allow velocities to exceed 5 feet per second.
- K. If a pump is required, calculations shall be submitted for review.
- L. In areas designated to become part of the Landscaping & Lighting Maintenance District 89-1-Consolidated (L&LMD 89-1-C) or another Special District such as CFD or CSA, the County or District reserves the right to specify additional irrigation equipment that would reduce or minimize annual landscape operation costs Such features would be dependent upon the nature and extent of the proposed landscaping.

24.5.3 Installation

- A. The landscape contractor shall coordinate the irrigation installation work, such as point of connections, sleeving, and utilities, with work of other trades. The irrigation installation shall be done in such a manner to avoid problems with the planting of trees and shrubs or other related work as called for on the Plans.
- B. Irrigation pressure mainlines shall be a minimum of 18 inches below finish grade. Non-pressure lateral lines shall be buried a minimum of 12 inches below finish grade. Where any pipes pass under vehicle access ways, the minimum pipe depth shall be 36 inches below finish surface and shall be installed in PVC sleeving including wire conduits.
- C. Valves and controllers shall be located in an accessible parkway or open space areas locations. Where and when possible, valves should be grouped together, utilizing a common shut-off device. Valves may be installed in medians, if necessary. Controllers shall not be placed in the median.
- D. Wiring for valves shall follow the mainline. Wiring shall be a minimum of 18 inches below finish grade. Where wiring passes under vehicle access ways, or the wiring does not follow the mainline, then the wiring shall be installed in a separate PVC conduit, minimum 1 inch size. A pull box shall be located at each end of the conduit. Two-wire systems shall be install in conduit, minimum 1" size for a single two-wire cable. Conduit for wires shall be sleeved across hardscape and roadways for additional protection.
- E. Provide an 18-inch-long expansion loop in wire run for each change in wiring direction and at valve boxes.
- F. Controller charts and reproducible as-built plans shall be provided to the County for all landscaping with the rights-of-way.

- G. Landscape architect of record shall certify that all landscaping and related irrigation was installed per plan and per these standards.

24.6 INSPECTION AND SUBMITTAL

- 24.6.1 General:** All work within the County rights-of-way shall be subject to inspection to verify that work has been done according to approved Plans, County Road Standards, and per County Standard Specifications. The County Transportation Department shall be notified two working days prior to the work requiring inspection.

24.7 CONSTRUCTION CLEAN UP

- 24.7.1 General:** During the course of the work, the sidewalks and street shall be left in an orderly, neat and clean condition. Equipment, supplies and materials shall be stored in a safe way and in a location so as not to interfere with other work or impair site distance. Excess equipment, material, soil, etc., shall be removed from the site.

24.8 STREET TREE MAINTENANCE, REMOVAL, PROTECTION, AND PRESERVATION

24.8.1 Tree Maintenance

- A. The Transportation Department provides street tree crews to perform limited tree trimming, when notified, where trees located within County rights-of-way have branches that overhang roadways or walkways and present a hazard to the traveling public, in accordance with County Resolution No. 73-142:

TREES: Trees overhanging County roads, but whose trunks are off the County right-of-way, shall be the responsibility of the owner and made safe for traffic at their expense

Trees upon the County right-of-way shall be maintained by the County as to the safety and convenience of road travel. Their maintenance, or removal desired to benefit adjoining property, shall be at the expense of the adjoining property owner. Any work on trees situated on County right-of-way, performed by the adjoining property owners, shall be done under a permit issued by the Road Department (currently Transportation Department). (Resolution No. 73-142)

Trees shall be pruned to meet the following criteria:

1. All branches overhanging roadways beyond curb face shall have 14'-0" minimum vertical clearance.
 2. All branches overhanging walkway shall be 8'-0" minimum vertical clearance.
 3. All branches overhanging trails shall be 10'-0" minimum vertical clearance.
- B. Trees covered by a landscape maintenance agreement or district shall be maintained or removed as necessary per the agreement or by the district.
- C. Utility pruning is a dangerous practice. Tree branches entangled in, or interfering with, overhead utility wires will be referred to the appropriate utility for maintenance requests.

- D. Tree Maintenance performed by County Contract, County Contractor, or hired by a private entity or individual shall be overseen by an International Society of Arboriculture (ISA) Certified Arborist. All tree work shall be completed in accordance with Approved American National Standard (ANSI) A300 and Z133 Standards, latest edition.
- E. Tree trimming operations shall be limited to those addressed within ANSI A300 and Z133 Standards, latest edition and line of sight issues. Tree Trimming for recreation purposes and commercial signage is not permitted, unless within a dedicated View Easement

24.8.2 Tree Removal (On or Adjacent to County Road Rights-of-Way)

The purpose of this standard is to establish a procedure to ensure that proper review is provided prior to the determination and ordering of work to remove trees from County maintained rights-of-way or trees located on private property which pose a public safety hazard to public-dedicated activities within County rights-of-way. Formerly Road and Survey Department Policy #26.

- A. Conditions upon which trees may be considered for removal:
 - 1. Dead or diseased.
 - 2. Danger to traffic or private property.
 - 3. Conflict with construction work or major maintenance project
 - 4. Trees creating unsafe conditions such as a sight distance restriction.
 - 5. Tree or trees located near the edge of the traveled way and are regarded as a target location of an errant vehicle.
 - 6. Removal is requested by adjacent property owners and justifiable by above stated conditions.
- B. The recommendation for such removal is to be submitted to the Deputy Director of Transportation for approval prior to commencing any removal activities. This report should provide, but is not limited to, the follow information:
 - 1. Road book map showing locations
 - 2. Accident data (at least three years).
 - 3. Contacts with the property owners.
- C. The Deputy Director of Transportation or Highway Operations Superintendent are authorized to approve such tree removal. However, any location where tree removal may be a sensitive issue in the neighborhood should be brought to the attention of the Director of Transportation who will in turn advise the County Supervisor for that Supervisorial District.
- D. The owner of trees on private property adjacent to County rights-of-way and whose trees have been designated for removal per the above shall be notified by the County to have the trees removed. Trees may be removed by the County, at the property owner's expense, if owner fails to comply with tree removal notice.
- E. Tree removals may require an ISA Certified Arborist Report outlining most of the following: existing tree characteristics, health, site conditions, target, defects, hazard rating, and abatement.

F. Tree removals shall follow the Migratory Bird Treaty Act.

24.8.3 Tree Protection During Construction

Trees that have been targeted for preservation or are within the existing landscape (formal or informal), or adjacent to the County maintained right of way must be protected from any construction damage and/or construction activity around the tree. This should be kept in mind during the planning and/or permitting processes to ensure that the area around the tree is not planned to have utilities that would require trenching or otherwise affect the root zone, and that the area is not intended to be used as a staging area or even as a pass-through area where foot traffic or vehicular traffic will compact the soil.

- A. Each tree likely or near the construction area shall have a designated Tree Protection Zone (TPZ). Within this area is the Critical Root Zone (CRZ).
- B. Typically, a tree's dripline dictates the TPZ. On larger species, an estimated radius of 8-12 inches per every 1 inch of Diameter Breast Height (DBH) should be protected, depending on age and tolerance to construction damage.
- C. The TPZ shall be delineated or fenced prior to, during, and after construction operations.
- D. Construction activities which require access into the TPZ and/or CRZ or include root pruning for roots greater than 1" shall have a Tree Management Report outlining specifications for protecting said trees approved by the County.
- E. Construction activities shall minimize the following: root damage, trunk damage, soil compaction, irrigation interruption, reduction of crown by greater than 25%, exposure to the elements, grade changes.
- F. Tree Protection operations shall be limited to those addressed within ANSI A300 and Z133 Standards, latest edition.

24.8.4 Tree Preservation

- A. Rapid population growth and vigorous development have resulted in the loss of a great number of trees throughout Riverside County. While new trees are being planted, the loss of specimen trees is an alarming situation. Therefore, a standard for tree preservation has been established to protect these precious resources as outlined below and also in the County Oak Tree Management Guidelines and Ordinance No. 559 pertaining to native trees above 5,000 feet in elevation.
- B. All tentative subdivision and parcel maps shall identify all trees located within proposed or existing road rights-of-way having a trunk diameter of 8 inches or more for trees 25 feet in height or greater. Trees shall be noted as to location, diameter, drip line extent, species name and common name. Trees of similar species and size which are part of a group or orchard need not be identified individually. Upon review by the Transportation Department staff, all trees identified as "specimen trees" shall be retained.
- C. Specimen trees are identified as being any tree which may possess historical value. Specimen trees shall be healthy and typical of species.

Olea Europaea (Olive), *Quercus agrifolia* (Coast Live Oak), *Populus fremontii* (Fremont's Cottonwood), *Plantanus racemosa* (Western Sycamore), *Salix lasiolepis* (Arroyo willow), *Salix gooddingii* (Black willow), *Salix laevigata* (Red willow), *Salix exigua* (Sandbar willow), and all Palm

species shall be retained whenever possible. When retention is not feasible, trees of these species shall be studied to be relocated.