SIGNAL AND LIGHTING:

General

Furnishing and installing traffic signal and highway lighting systems, and payment shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems", of the latest edition Standard Specifications, amendments to the Standard Specifications, and these Special Provisions.

Start of Work

Location where signalization and highway lighting work is to be performed:

	Location	Area
1.	Intersection of Grand Avenue and Blackwell Boulevard	Lakeland Village, Lake Elsinore Area

County Furnished Equipment

County furnished equipment shall conform to the provisions in Section 6-1.02, "State Furnished Materials", of the Standard Specifications and these Special Provisions.

The County of Riverside will furnish the following equipment and materials to the Contractor for installation:

1. Signal and Lighting Standards and Anchor Bolts
2. 10' Galvanized Steel IISNS Mast Arms

The Contractor shall pick up County furnished equipment and materials from the following location(s), or as directed by the Engineer, and transport them to the project site(s):

District 12 Maintenance Yard
Riverside County Transportation Department
23-315 Jefferson Avenue
Murrieta, CA 92567
Telephone (951) 677-5889

Any County furnished equipment that is damaged after the Contractor has taken possession of the items shall be repaired to the satisfaction of the Engineer. If the damaged equipment is considered irreparable, it shall be replaced meeting the requirements stated in the Standard Specifications and these special provisions at the Contractor's cost.

Equipment Orders

The Contractor shall furnish all equipment and materials specified in plans and these special provisions that are not furnished by the County. All equipment shall be new and purchased by the Contractor for this project only.

Submittals and issuance of Notice to Proceed
Within twenty one (21) calendar days after the award of the contract, the Contractor shall submit equipment and materials submittals to the Engineer for review and approval. The Contractor shall allow fourteen (14) calendar days for the Engineer to review the equipment and materials submittals. If revisions are required as determined by the Engineer, the Contractor shall revise and resubmit the equipment and materials submittals within seven (7) calendar days of receipt of the Engineer's comments and shall allow seven (7) working days for the Engineer to review the revisions. Once the submittals are approved by the Engineer, the Contractor must order equipment and materials and then submit a copy of each vendor Equipment and Material Purchase Order within (7) calendar days to the Engineer.

The Contractor must have copies of approved Equipment and Material submittal(s) and Purchase Order(s) prior to the coordination and issuance of the Notice to Proceed. Delay in equipment delivery shall not be considered as justification for the suspension of the construction contract.

Liquidated Damages:

In addition to the liquidated damages set forth in Special Provision section "Liquidated Damages" of these contract documents, the Contractor shall pay to the County of Riverside the sum of **$800.00 per day** for each and every calendar day delay in receiving all of the below listed equipment furnished by the Contractor, onto the job site or the Contractor's storage facility, and available for installation, within sixty (60) calendar days of the contract award date:

1. Traffic Signal Controller Assemblies
2. Service Equipment Enclosures
3. Traffic Signal and Pedestrian Signal Heads
4. LED Modules
5. Internally Illuminated Street Name Signs

Equipment List and Drawings

Equipment list and drawings shall conform to the provisions in Section 86-1.04, "Equipment List and Drawings", of the Standard Specifications and these Special Provisions.

The Contractor shall furnish four complete cabinet wiring diagrams for each furnished controller assembly, battery backup system, video detection system, and emergency vehicle preemption system. The cabinet wiring diagram shall include an approximately 6 inches x 8 inches or larger schematic drawing of the project intersection and on a separate 8 ½" x 11" sheet of paper, which shall include the following information, at a minimum:

1. North arrow
2. Street names
3. Pavement delineation and markings
4. Signal poles
5. Traffic signal heads with phase designations
6. Pedestrian signal heads with phase designations
7. Loop detectors with input file designations

Warranties, Guaranties, Instruction Sheets, and Manuals

Warranties, guaranties and instruction sheets shall conform to these Special Provisions.

a. 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. All other equipment and systems shall have at least one (1) year of manufacturer warranty.

Furnish the manufacturer's standard written warranty pertaining to defects in materials and workmanship for all equipment, and two (2) sets of user, operation, and maintenance manuals, written in English, on all equipments and components for the traffic signal and highway lighting system to the Engineer.

Foundations

Foundations shall conform to the provisions in Section 51, "Concrete Structures", and Section 86-2.03, "Foundations", of the Standard Specifications and these Special Provisions.

Portland cement concrete shall conform to Section 90-10, "Minor Concrete", of the Standard Specifications and shall be Class 3 except pole foundations shall be Class 2.

Construct Type 332 controller cabinet foundation per Standard Plans ES-3C.

Vibrate all foundation concrete to eliminate air pockets.

Standards, Steel Pedestals and Posts

Standards, steel pedestals, and posts shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts", of the Standard Specifications and these Special Provisions.

Type 1A pole material shall be spun aluminum unless otherwise specified.

Poles installed at the near-right approach of each intersection shall be banded conforming to the strap and saddle method per Standard Plans RS4 for the emergency installation of stop signs.

Signal mast arms shall be installed in accordance with the "Signal Arm Connection Details" of the Standard Plans unless otherwise specified.

Internally Illuminated Street name sign (IISNS) mast arm shall be 10 foot long galvanized steel mast arm constructed to prevent deformation or failure when subjected to 100 mph wind loads. IISNS mast arm shall extend from the shaft of the pole above and parallel to the signal mast arm in accordance with County Standard No. 1200. Two set-bolt /set-screw shall be used to assure the mast arm will not change position after it is installed and aligned.

If required by the serving electric utility, and confirmed by the Engineer, State Certified Electric Workers shall be utilized for the installation of standards, steel pedestals, and posts in accordance with State of California High Voltage Safety Orders.

Conduits

Conduit shall conform to the provisions in Section 86-2.05, "Conduit", of the Standard Specifications and these Special Provisions.

Conduits shall be Type 3, Schedule 80 Polyvinyl Chloride (PVC) conforming to requirements in UL Publication 651 for Rigid Non-Metallic Conduit, for underground installation only.

Conduit depth shall not exceed 60 inches below finish grade.

Conduit size shall be 2 inches minimum unless otherwise specified. New conduit shall not pass through foundations or standards.

Conduit bends shall be factory bends. Bend radius for signal interconnect conduits shall be 3 feet minimum.

A pull rope and a bare #12 AWG wire shall be installed in conduits intended for future use.

Bell bushings are required for all conduit ends. The ends of conduits terminating in pull boxes and controller cabinets shall be sealed with sealing compound approved by the Engineer after conductors have been installed.

Conduits shall be installed via jacking or drilling method per Section86-2.05C, "Installation", of the Standard Specifications.

Pot-holing shall be performed prior to all conduit installation to determine utility underground location, including service laterals, to avoid damage to utility owner facilities.

Trenching Installation

The Engineer shall approve trenching installation on a case-by-case basis where conduit cannot be installed by jacking or drilling. Jacking or Drilling shall be attempted a minimum of three times prior to requesting trenching installation.

If ordered by the Engineer, all pavements shall be cut to a depth of 3 inches with an abrasive type saw or with a rock cutting excavator specifically designed for this purpose. Cuts shall be neat and true with no shatter surface outside the removal area.

Trench shall be 2 inches wider than the outside diameter of the conduit being installed however not exceeding 6 inches in total width. The conduit shall be placed in the bottom of the trench. Conduit depth shall be at a minimum of 30 inches below finished grade, with a minimum of 26 inches cover over the conduit.

The trench shall be backfilled with two-sack slurry to the finish grade before final paving. Prior to final paving, grind pavement centered along the length of the trench a minimum width of 3 feet and depth of 0.10 feet, and excavate backfilled to a depth of 0.30 feet below the final pavement surface. Final paving with commercial Type A ½" PG 64-10 asphalt concrete.

If directed by the Engineer, the two-sack slurry backfill can be installed to a depth of 0.30 feet below the final pavement surface and cured for a minimum of two days prior to final paving if the trench area is not open to traffic.

Pull Boxes

Pull boxes shall conform to the provisions in Section 86-2.06, "Pull Boxes", of the Standard Specifications and these Special Provisions.

Traffic pull boxes shall conform to the provisions in Section 86-2.07, "Traffic Pull Boxes", of the Standard Specifications and these Special Provisions.

Pull boxes shall have a "Fibrelyte" or equivalent cover and bolt down design. Cover shall have a non-skid surface.

Pull box covers shall be marked in accordance with Standard Plans ES-8 without the word "CALTRANS" unless the project is on State of California right of way.

Pull boxes shall be placed with their tops flush with surrounding finish grade or as directed by the Engineer.

Pull boxes shall be installed behind the curb or as shown on the plans and shall be spaced at no more than 500 feet intervals. The Engineer shall determine the exact locations.

Pull boxes installed in unimproved areas, locations not protected by concrete curb and gutter, shall be traffic pull box and marked with Type L markers.

Conductors and Wiring

Conductors shall conform to the provisions in Section 86-2.08, "Conductors", of the Standard Specifications and these Special Provisions.

Wiring shall conform to the provisions in Section 86-2.09, "Wiring", of the Standard Specifications and these Special Provisions.

Specific cabling and wiring requirements for various systems or components shall be in accordance with the Special Provisions entitled to each herein.

Signal cable shall be installed continuously without splicing from the controller cabinet to each traffic signal pole. Traffic signal conductors, multiple circuit conductors, and signal cable conductors shall not be spliced unless otherwise shown.

All outer cable jacket for 12 conductor cable shall be removed from the traffic signal standard hand hole to the terminal block located at the side mount traffic signal head.

Where splice is required, Type C or Type T splice shall be used and insulated as shown in the Standard Plans, ES-13A.

Where splice is required, "Liquid Electrical Tape" or equivalent in black color shall be used to provide a watertight electrical insulating coating with "Method B" as shown in the Standard Plans, ES-13A.

Minimum luminaire wiring shall be No. 10 AWG, including wiring within poles and mast arms.

Bonding and Grounding

Bonding and grounding shall conform to the provisions in Section 86-2.10, "Bonding and Grounding", of the Standard Specifications and these Special Provisions.

Grounding jumper shall be attached by a 3/16 inch or larger brass bolt in the signal standard or controller pedestal and shall be run to the conduit, ground rod or bonding wire in the adjacent pull box.

Grounding jumper shall be visible after cap has been poured on foundation.

For equipment grounding jumper a No. 8 bare copper wire shall run continuously in all circuits except a No. 12 bare copper wire shall run continuously in conduits that contain only signal interconnect cable and/or loop detector cable.

Service

Service shall conform to the provisions in Section 86-2.11, "Service", of the Standard Specifications and these Special Provisions.

Service equipment enclosure shall be Type III-CF, as shown on the Standard Plans, ES-2F, and shall conform to the following:

1. 120 / 240 volt, 2 meter service unless otherwise shown on the plans.
2. Circuit breakers required:
   - 2 - 100 Amp 2 pole (signal main and lighting main)
   - 1 - 30 Amp 1 pole (luminaires)
   - 1 - 20 Amp 1 pole (illuminated street name signs)
   - 1 - 30 Amp 1 pole (signals)
   - 1 - 15 Amp 1 pole (luminaire photoelectric control)
   - 1 - 15 Amp 1 pole (street name sign photoelectric control)
   - 1 - 20 Amp 1 pole (for each beacon, if applicable)
3. Cabinet shall be fabricated from aluminum sheeting and finish shall be anodic coating in accordance with Section 86-3.04A "Cabinet Construction".
4. Circuit breakers shall be marked with identifying labels for each circuit breaker.

Type V photoelectric control contactor and test switch assembly shall be installed in the service cabinet. Photoelectric control contactors shall be as follows:

1. Luminaires - 60 Amp electrically held contact
2. Street name signs - 30 Amp electrically held contact

A GFCI outlet shall be installed on the interior side of service cabinet door.

Photo Electric Control assembly shall be installed within the circuit breaker compartment of the service equipment enclosure, and accessible to the County after installation of electrical meters.

Direct burial service conductors are not allowed.

The Contractor shall be responsible for contacting the power company, arranging and providing for the electrical service connection, and ensuring that adequate notice is provided to the serving electric company in advance of need. *The County of Riverside will pay all electric company fees required.*

The service equipment enclosure shall be a minimum of 15 feet from the controller cabinet, and a minimum of 10 feet from all utility poles, unless otherwise directed by the Engineer.

Service Identification

The service address shall be shown on the front upper panel of the service equipment enclosure, and the meters shall be labeled "LS3" (lighting meter) and "TC1" (signal meter) by lettering applied to the exterior of the enclosure in accordance with these special provisions, or as directed by the Engineer.

Lettering markings shall be black with a two-inch minimum size in block letter form. Markings shall be applied to a brushed aluminum, stainless steel, or other non-corroding metallic plate, as approved by the Engineer. Plate shall be white in color. All paint and markings shall conform in all respects to Federal Specification TT-E-489, latest revision, Class A, Air Drying. Said plate shall be affixed in a permanent manner by riveting or with stainless steel bolts and nuts. Bolts shall be peened after tightening. All materials used for affixing address plate shall be non-corroding. The Engineer shall approve all alternate materials and methods prior to installation.

Testing

Testing and Field Testing shall conform to the provisions in Section 86-2.14, "Testing", of the Standard Specifications and these Special Provisions.

Specific testing requirements for various systems and components shall be in accordance with the Special Provisions 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.

Controller Assembly

Controller assembly shall conform to the provisions in Section 86-3, "Controller Assemblies", of the Standard Specifications and these Special Provisions.

Controller assembly shall be Model 170 controller assembly consisting of the additional features:

1. Model 332L controller cabinet:

- Anodic coating for both interior and exterior finish
- A Corbin No. 2 door lock

2. An interior fluorescent lamp with an on/off switch and a door switch that will automatically turn on the lamp when cabinet door is opened.

3. A interior thermostatically controlled, 24 volt electric fan with ball or roller bearing that has capacity rating of 100 cubic feet per minute minimum.

4. Rack mounted push buttons for manual actuation of the following:
   - 8 vehicular phases,
   - 4 pedestrian phases,
   - 4 Emergency Vehicle Preemption (EVP) phases; and,
   - 2 Railroad preemption phases.

5. Model 170E local controller unit:
   - Dual Asynchronous Communications Interface Adaptor (ACIA) capability. ACIA shall be integral to the controller unit. Horizontal printed circuit board controllers will not be accepted.
   - A Model 412F Program Module with 32K 27256 EPROM, 16K RAM, and 8K zero power RAM (memory method two, memory select four).
   - Bitrans Systems, Inc. 233RV2.5 or latest version firmware, test program and a loopback cable.

6. If required, provide a Model 170E field master controller unit that has the same features as the 170E local controller except the firmware shall be Bitrans Systems, Inc. No. 245 FM. It shall be mounted above the local controller unit.

7. A pullout shelf/drawer assembly made of aluminum with telescoping drawer guides for full extension installed below the local controller unit. The top shall have a non-slip plastic laminate permanently attached. The non-slip laminate shall not be attached with silicon adhesive.

8. Load Switches:

   Switching circuit shall be contained in a replacement module (cube type) sealed in epoxy and rated at 15 amperes load (25 Amp triac). Pin 11 on all load switch sockets shall be wired to AC. Input and output indicators shall be installed on all load switches.

   All load switch sockets shall have individual wire terminals. Printed circuit boards will not be allowed.

9. Flasher units:

   Switching circuit shall be contained in a replacement module (cube type) sealed in epoxy and rated at 15 amperes load (25 Amps triac).

10. Conflict monitor shall be EDI Model 2010ECL or equivalent with a red monitor assembly circuit board and capable of monitoring green, amber and red indications.

11. Loop detector sensor unit shall be Model 222:
    - Detector unit shall have delay timers adjustable from zero to a minimum of 30 seconds and extension timers adjustable from zero to a minimum of 7 seconds.
    - Delay timers shall delay calls only during display of the associated red or yellow indications. If a vehicle departs the area of detection prior to expiration of the assigned delay period, the timer shall reset and no call shall be placed upon the controller. During display of the associated green indication, detectors shall operate in the present mode and calls shall not be delayed.

12. Power Distribution Assembly shall be Model PDA-2.

13. A twelve-position interconnect terminal strip.

The contractor shall furnish the following spare equipments / components:

Description	Model	Quantity
Cabinet	332	0
Controller Unit (local)	170E	0
Controller Unit (master)	170E	0
Switch Pack	200	0
Flasher Unit	204	0
Conflict Monitor Unit	2010	0
2-Channel Loop Detector	222	0
2-Channel DC Isolator	242	0
Modem Module	400	0
Program Module	412F	0

Spare equipments or components shall be delivered to the following location or as directed by the Engineer:

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

The controller unit and controller cabinet shall be manufactured and furnished by the same manufacturer to form a complete functional controller system capable of providing the traffic signal

operation specified. All traffic control equipment to be furnished shall be listed on the California Department of Transportation Qualified Products List.

The controller unit and controller cabinet manufacturer or supplier shall perform operational and functional testing of the supplied controller assembly and additional supplied equipment in accordance with the State of California Department of Transportation's Transportation Electrical Equipment specifications (TEES), and a Certificate of Compliance shall be issued for each successfully tested controller assembly and additional supplied equipment.

Modify traffic signal controller assembly if necessary and provide any necessary auxiliary equipment and cabling to achieve the intended traffic signal operation as shown on the plans. The Contractor shall make all field wiring connections to the terminal blocks inside the controller cabinet.

A technician who is qualified to work on the controller assembly from the controller manufacturer or their representative shall install the program module and program the signal controller in accordance with the Engineer provided signal timing sheets, and to be present when the equipment is turned on.

Vehicle Signal Assemblies

Vehicle signal assemblies and auxiliary equipment shall conform to the provisions in Section 86-4.01 "Vehicle Signal Faces", Section 86-4.01B (1), "Metal Signal Sections", Section 86-4.01D "Visors", Section 86-4.04, "Backplates", and Section 86-4.08 "Signal Mounting Assemblies" of the Standard Specifications and these Special Provisions.

Signal sections, backplates, visors and signal mounting assemblies shall be the metal type and shall be made from the same manufacturer. The section assemblies shall be uniform in appearance and alignment.

Backplates shall be louvered. Visors shall be the "tunnel" type. Top opening of signal sections shall be sealed with neoprene gaskets.

Vehicle signal indications shall be 12-inch diameter Light Emitting Diode (LED) modules in accordance with the following:

1. All circular LED modules shall comply with Institute of Transportation Engineers (ITE) Vehicle Traffic Control Signal Heads (VETCH) - LED Circular Supplement, Adopted June 27, 2005.

2. All arrow LED modules shall comply with ITE VETCH - LED Vehicle Arrow Traffic Signal Supplement, Adopted July 1, 2007.

3. All modules shall fit in existing signal housings without the use of special tools.

4. All modules shall be certified in the Intertek LED Traffic Signal Modules Certification Program and be labeled with the ETL Verified Label as follows:

5. Luminous intensity requirements of the VTCSH must be met across the entire temperature range from -40°C to + 74°C, (-40°F to +165°F).

6. The following cable colors shall be used for the AC power leads on all modules: white for common, red for the red module line, yellow for the yellow module line, and brown for the green module line.

7. The AC power leads shall exit the module via a rubber grommet strain relief, and shall be terminated with quick connect terminals with spade tab adapters. The leads shall be separate at the point at which they leave the module.

8. All external wiring used in the module shall be anti-capillary type cable to prevent the wicking of moisture to the interior of the module.

9. All power supplies shall be coated for additional moisture and thermal protection.

10. The module shall have an incandescent, non-pixilated appearance when illuminated.

11. Nominal power usage is measured at 25°C, 120 VAC. For the 8 inch modules, it shall not exceed 8 watts for Red, 8 watts for Yellow, and 8 watts for Green modules. For the 12 inch modules, it shall not exceed 10 watts for Red, 19 watts for Yellow, and 11 watts for Green modules. For the arrows, it shall not exceed 6 watts for any color.

12. All modules shall use LEDs that have been manufactured with materials that have industry acceptance as being suitable for uses in outdoor applications. At no time is the use of LEDs that utilize AlGaAs technology acceptable.

13. The external lens shall have a smooth outer surface to prevent the buildup of dirt and dust and shall be designed to minimize the potential for sun phantom signals.

14. The circular LED module lens material must be tinted. A tinted transparent film or coating is not permitted.

15. A module shall be sealed against dust and moisture intrusion, including rain and blowing rain per Mil-Std-810F Method 506.4, Procedure 1.

16. Arrow modules shall be clearly marked with the phrase "Suitable for mounting in any orientation".

17. Modules shall be repaired or replaced if the module fails to function as intended due to workmanship or material defects within warranty period.

18. Modules shall be repaired or replaced if the module exhibit luminous intensities less than the minimum specified values within 60 months of the date of delivery.

19. The Manufacturer shall clearly disclose the country in which the factory of module origin is located, the name of the company or organization that owns the factory including all of its parent companies and/or organizations, and their respective country of corporate citizenship.

Pedestrian Signal Assemblies

Pedestrian signals assemblies shall conform to the provisions in Section 86-4.06, "Pedestrian Signal Faces", of the Standard Specifications and these Special Provisions.

Pedestrian Signal Mounting Assemblies and Pedestrian Signal Housings shall be made from the same manufacturer and the section assemblies shall be uniform in appearance and alignment.

Pedestrian signals shall be provided with a polycarbonate egg crate or Z-crate screen.

Pedestrian signals shall be equipped with light emitting diode countdown pedestrian module in accordance to the following:

1. It shall comply with ITE specification: Pedestrian Traffic Control Signal Indications (PTCSI) Part 2: LED Pedestrian Traffic Signal Modules, Adopted March 19, 2004.

2. All modules shall fit in existing signal housings without the use of special tools.

3. All modules shall be certified in the Intertek LED Traffic Signal Modules Certification Program and be labeled with the ETL Verified Label as follows:

The PTCSI does not cover the countdown features of countdown pedestrian signal LED modules. The countdown features shall incorporate the following:

1. Fully compliant to NEMA TS-1, NEMA TS-2, Type 170, and Type 2070 traffic signal controller specifications.

2. The countdown portion of the pedestrian (ped) module shall have a high off-state input impedance so as not to provide a load indication to conflict monitors and interfere with the

monitoring of the pedestrian signal. The input impedance of the countdown circuitry shall maintain a voltage reading above 25 VAC to the conflict monitor for up to four units connected on the same channel.

3. The countdown drive circuitry shall not be damaged when subjected to defective load switches providing a half wave signal input.

4. The countdown ped module shall have an internal conflict monitor circuit preventing any possible conflicts between the Hand, Person, and Countdown signal indications. It shall be impossible for the display to countdown during a solid Hand indication.

5. Per CA MUTCD Manual, section 4E.07: " The countdown pedestrian signal shall display the number of seconds remaining until the termination of the pedestrian change interval. Countdown displays shall not be used during the walk interval or during the ~~yellow change~~ red clearance interval of a concurrent vehicular phase".

6. The countdown ped module shall have a micro-processor capable of recording its own time when connected to a traffic controller. It shall be capable of displaying the digits 0 through 99.

7. When power is first applied or restored to the ped module, the countdown display will be blank during the initial cycle while it records the countdown time using the walk (person) and don't walk (flashing hand) signal indications. The normal hand and person icons shall be displayed during this cycle.

8. The countdown ped module shall continuously monitor the traffic controller for any changes to the pedestrian phase time and re-program itself automatically if needed.

9. The countdown ped module shall register the time for the walk and clearance intervals individually and shall begin counting down at the beginning of the pedestrian clearance interval. The digits shall not flash during the countdown.

10. When the flashing hand becomes solid, the ped module shall display 0 for one second and then blank-out. The display shall remain dark until the beginning of the next countdown.

11. In the event of a pre-emption, the countdown ped module shall skip the remaining time, reach 0 at the same time as the flashing Hand becomes solid, and remain dark until the next cycle.

12. In the cycle following preemption call, the signal shall display the correct time and not be affected by the reduced previous cycle. The countdown shall remain synchronized with the signal indications and always reach 0 at the same time as the flashing Hand becomes solid.

13. If a pedestrian button is activated during the clearance interval, some controllers can change to a second walk cycle without a don't walk phase. The countdown module shall also be capable of consecutive walk cycles. The display digits will be blank during the second walk and countdown properly during the second flashing hand.

14. The countdown ped module shall not display an erroneous or conflicting time when subjected to defective load switches. Should there be a short power interruption during the ped clearance interval or if voltage is applied to both the hand and person simultaneously the display will go to "0" then blank.

15. The countdown ped module shall have accessible dip-switches for the user selectable options. The unit shall have a removable plug on the rear allowing easy access to control the user selectable functions. The countdown is disabled when all the switches are in the "ON" position. The unit shall be shipped from the factory with the specified default setting.

16. Switch 1 – Blank Cycle Following a Timing Change – Factory default is "OFF". When this switch is "OFF" the unit will allow the time to be displayed normally during the cycle following a truncated timing such as a preemption call. The countdown shall be capable of displaying the correct time and not affected by the previous reduced cycle. The unit will require 2 consecutive reduced cycles of identical value to validate and record a new time setting. If the timing is extended, the unit will record it immediately. In the "ON" position when a change in timing is detected the unit will blank out during the following cycle while the new cycle time is measured and recorded if confirmed.

17. Switch 2 – Disables Auto-sync Mode- Factory default setting is "OFF". When this switch is in the "OFF" position the auto-sync is enabled. When the clearance interval begins and the initial flash of the hand is not in sync with the walk signal the unit will measure the offset and reduce the duration of the first second by the value of the offset. This will ensure the countdown reached zero at the same time as the flashing hand becomes solid. In the "ON" position there is no time correction when the flashing hand is in offset with the walk signal. The duration of the first second will not be reduced and the hand will appear solid shortly before the countdown reaches zero.

18. Switch 3 – Countdown Starts with Flashing Hand Signal – Factory default setting is "ON". When this switch is "ON" the countdown begins when the hand signal is turned on. With this switch "ON" and the auto-sync mode enabled a short power interruption will have no effect on the countdown display. With switch 3 in the "OFF" position the countdown begins when the walk signal is turned off. This eliminates the effect of an offset hand signal. When switch 3 is in the "OFF" position the auto-sync switch 2 has no effect on the countdown. In this mode if the power to the walk signal is interrupted, the unit will interpret this as the start of the clearance interval and will display the countdown time for 2 seconds before the operation is cancelled. The countdown will resume with the normal ending of the walk signal.

19. Switch 4 – Stores Time Value in Memory, Immediate. Restart. - Factory default setting is "OFF". When this switch is in the "OFF" position and power is removed from the unit, the time value stored in the unit is erased. The unit will need to run a dark cycle before it can display the countdown again. In the "ON" position the countdown timing is stored in memory. Following a power interruption, the unit will restart with the stored value and not remain dark during the learning cycle. If the value is different after restart, it will be recorded and displayed correctly at the following cycle.

20. Switch 5 – All LEDs "ON", Test Mode – Factory default setting is "OFF". With this switch in the "ON" position all LEDs are turned on simultaneously. With both switches 4 and 5 in the "ON" position the LED test mode will also scan the 7 individual segments of both digits.

21. The countdown shall be disabled when all switches are placed in the "ON" position.

22. Nominal power usage for Ped Modules at 25°C (77°F), 120 VAC input shall not exceed the values shown in Table 1.

Table 1 -- Nominal Power of Pedestrian Signals

Size	Description	Wattage @ 25°C		
		Hand	Person	Countdown[1]
16"x18"	Side by Side Hand & Person	8	7	N/A
16"x18"	Hand & Person Overlay with Countdown	9	7	5

[1] Wattage for the countdown is measured when the digits 18 are displayed.

23. All wiring shall meet the requirements of Section 13.02 of the VTCSH standard. Secured, color coded, 600V, 18 AWG jacketed wires, 1 meter (39 in) in length, conforming to the NFPA 70, National Electrical Code, and rated for service at +105°C, shall be provided.

24. The following color scheme shall be used for the ped module's AC power leads: Orange for the upraised hand, Blue for the walking person, and White for common. The countdown portion of the LED ped module shall be internally wired to the hand and walking person power.

25. The AC power leads shall exit the ped module via a rubber grommeted strain relief, and shall be terminated with insulated female quick connect terminals with spade / tab adapters. The leads shall be separate at the point at which they leave the ped module.

26. All external wiring utilized in the ped modules shall be anti-capillary type wire to prevent the wicking of moisture to the interior of the ped module.

27. The Hand and Person Icons shall utilize separate power supplies. On countdown products, the countdown ped module must have its own power supply but may take the incoming AC power from the hand / person AC signal lines. All power supplies shall be located inside the ped module.

28. All power supplies shall be conformally coated for additional protection.

29. Off State Voltage Decay: When the hand or person icon is switched from the On state to the Off state the terminal voltage shall decay to a value less than 10 VAC RMS in less than 100 milliseconds when driven by a maximum allowed load switch leakage current of 10 milliamps peak (7.1 milliamps AC).

30. For a minimum period of 60 months, measured at 80 to 135 VAC RMS and over the ambient temperatures of -40°C to +74°C (-40°F to +165°F), the minimum maintained luminance values for the ped modules, when measured normal to the plane of the icon surface, shall not be less than:
    - Walking Person, White: 2,200 cd/m^2
    - Upraised Hand, Portland Orange: 1,400 cd/m^2
    - Countdown Digits, Portland Orange: 1,400 cd/m^2

31. The external lens shall have a textured outer surface to reduce glare.

32. Icons that are printed on the lens shall be on the interior surfaces in order to prevent scratching and abrasion to the icons.

33. All icons and numbers shall have a uniform incandescent non-pixilated appearance.

34. All exposed components of a ped module shall be suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance. As a minimum, selected materials shall be rated for service for a period of a minimum of 60 months in a south-facing Arizona Desert installation.

35. All LEDs used to illuminate the ped module shall use material that has industry acceptance for use in outdoor applications. At no time is the use of LEDs that utilize AlGaAs technology acceptable.

36. The countdown display shall consist of two 7 segment digits as shown below. All countdown display digits shall be 9 inches in height for use in all size crosswalks in compliance with MUTCD recommendations.

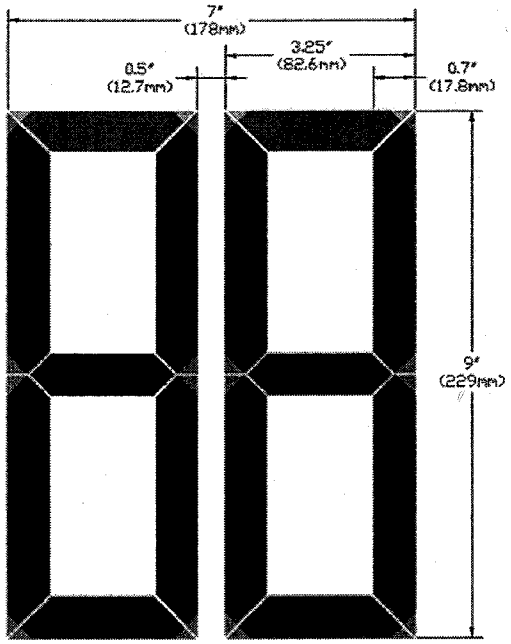


Figure 2: Countdown Display

37. Ped modules shall be repaired or replaced if the ped module fails to function as intended due to workmanship or material defects within warranty period.

38. Ped modules shall be repaired or replaced if the ped module exhibit luminous intensities less than the minimum specified values within 60 months of the date of delivery.

39. The manufacturer shall clearly disclose the country in which the factory of ped module origin is located, the name of the company or organization that owns the factory including all of its parent companies and organizations, and their respective country of corporate citizenship.

Pedestrian, Bicycle and Equestrian Push Buttons

Pedestrian, bicycle, and equestrian push buttons shall conform to the provisions in Section 86-5.02, "Pedestrian Push Button Assemblies", of the Standard Specifications and these Special Provisions.

Push button assembly shall be Type B per Standard Plans ES-5C.

Push button housing shall be die-cast or permanent mold cast aluminum powder coated frame with stainless steel inserts and sign screws.

Push button sign shall be white powder coat base with black heat cured ink. Right and left arrow signs shall be doubled sided.

Push button shall be Polara Engineering, Inc. model BDLM2-Y ~~MPBP-BY~~, or approved equal.

Push button shall utilize solid state Piezo switch technology, pressure activated, two-tone audible, visual LED confirmation of actuation and shall be ADA compliant.

The equestrian push buttons (EPB) shall be installed at 6 feet above finish grade or as directed by the Engineer. The Engineer shall approve the EPB placement on each pole prior to installation.

Detectors

Detectors shall conform to the provisions in Section 86-5, "Detectors", of the Standard Specifications and these Special Provisions.

Delay timers shall delay calls only during display of the associated red or yellow indications. If a vehicle departs the area of detection prior to expiration of the assigned delay period, the timer shall reset and no call shall be placed upon the controller. During display of the associated green indication, detectors shall operate in the present mode and calls shall not be delayed.

Inductive Loops

Detector loop configuration shall be Type E per Standard Plans ES-5B unless otherwise shown on the construction plan, in the Special Provisions, or as directed by the Engineer.

Limit Line detector loop configuration shall be modified Type E with diagonal saw cuts and wire winding conforming to Type D loop configuration.

Detector loop wire shall be Type 2.

Detector loop lead-in cable shall be Type B.

Detector loop curb terminations shall be Type A in accordance with Standard Plans ES-5D.

Loop sealant shall be the Hot-Melt Rubberized Asphalt sealant type, unless otherwise directed by the Engineer. Loop conductors and sealant shall be installed on the same day the loop slots are cut.

All detector loops shall be tested sequentially by the following methods:

- impedance (measured by megaohms)
- resistance (measured by ohms)
- inductance (measured in microhenries)

Video Detection

The contractor shall furnish and install video detection cameras (VDC), video detection processors (VDP), extension modules (EM), access module (AM), an industry standard 3-button USB mouse, a drawer mounted 17 inch LCD monitor, surge suppressors, and all necessary cabling and auxiliary equipment to make the video detection systems fully functional for the intended operation. The Contractor shall furnish an advance lens adjustment module (LAM), a spare VDC, a spare EM, and a spare VDP to the Engineer.

All equipment supplied shall come from and qualified by the VDP supplier to ensure proper system operation.

The VDC shall attach to the top of luminaire mast arm using mounting bracket provided by manufacturer, or the backside of signal mast arm using Pelco Astrobrac with 6' extension or approved equal. The Engineer shall approve the final camera placements.

The video detection systems shall be installed by supplier factory certified installers per recommended method provided in the supplier's installation manuals. Proof of factory certification shall be provided.

Video Detection Zones:

Placement of detection zones shall be done by using the supplied USB mouse connected to the VDP. Detection zones are drawn on the video image from the video camera displayed on a video monitor using the menu and graphical interface built into the VDP. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters.

Detection zone setup shall not require site-specific information such as latitude, longitude, date and time to be entered into the system. No separate computer shall be required to program the detection zones.

Each detection zone shall be user definable in size and shape to suit the site and the desired vehicle detection region. A detection zone shall be approximately the width and length of one car.

A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single phase of traffic movement.

The VDP shall provide a minimum of 24 channels of vehicle presence detection/detection zones per camera through a standard detector rack edge connector and one or more EMs.

The Video Detection System shall be in compliance with California State Assembly Bill 1581. The system will be able to discriminate between bicycles and automobiles and be able to send bicycle and vehicle actuations from the same lanes to different detection outputs. Additionally the system shall allow an extension time for bicycles that will not apply to vehicular traffic.

Functional Capabilities:

System must have a single point access to multiple rack-mounted video detection units. The access device shall provide interface capabilities to enable multiple rack-mounted video detection processors to be locally and remotely accessed from a single point via one set of user interface devices.

The camera shall be able to transmit the composite video signal, with minimal signal degradation, up to 1000 feet under ideal conditions.

The EM shall be plugged into the appropriate slot in the detector rack to avoid the need of rewiring the detector rack. The extension module shall be connected to the VDP by an 8-wire cable with modular connectors.

The EM and VDP communications shall be accommodated by methods using differential signals to reject electrically coupled noise. The EM shall be available in both 2 and 4 channel configurations programmable from the VDP.

The VDP shall have video input in NTSC composite video format and shall be digitized and analyzed in real time.

The VDP shall have a nine-pin RS232 port that is multi-drop compatible for communications with an external computer. The VDP shall be able to accept new detector patterns from and send its detection patterns to an external computer through this RS-232 port. A Windows™ based software designed for local or remote connection for uploading and downloading data, and providing video capture, real-time detection indication and detection zone modification capability shall be provided with the system.

The VDP shall store up to three different detection zone patterns within the VDP memory. The VDP's memory shall be non-volatile to prevent data loss during power outages. The VDP shall continue to operate (e.g. detect vehicles) using the existing zone configurations even when the operator is defining/modifying a zone pattern. The new zone configuration shall not go into effect until the operator saves the configuration. Each configuration can be uniquely labeled for

identification and the current configuration letter is displayed on the monitor. The selection of the detection zone pattern for current use shall be done through a local menu selection or remote computer via RS-232 port. It shall be possible to activate a detection zone pattern for a camera from VDP memory and have that detection zone pattern displayed within 1 second of activation.

The VDP shall provide dynamic zone reconfiguration to enable normal detector operation of existing channels except the one where a zone is being added or modified during the setup process. The VDP shall output a constant call on any detection channel corresponding to a zone being modified.

The VDP shall detect vehicles in real time as they travel across each detector zone.

The VDP shall output a constant call for each enabled detector output channel if a loss of video signal occurs. The VDP shall output a constant call during the background learning period. The background learning period shall be not more than three minutes.

The VDP shall be capable of detecting a low-visibility condition automatically, such as fog, and place all defined detection zones in a constant call mode. The VDP shall automatically revert to normal detection mode when the low-visibility condition no longer exists. A user-selected output shall be active during the low-visibility condition that can be used to modify the controller operation if connected to the appropriate controller input modifier(s).

Detection shall be at least 98% accurate in good weather conditions and at least 96% accurate under adverse weather conditions (rain, snow, or fog). Detection accuracy is dependent upon site geometry; camera placement, camera quality and detection zone location, and these accuracy levels do not include allowances for occlusion or poor video due to camera location or quality.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse, extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds.

Up to six detection zones shall be capable to count the number of vehicles detected. The count value shall be internally stored for later retrieval through the RS-232 port. The data collection interval shall be user definable in periods of 5, 15, 30 or 60 minutes.

System software shall

- Utilize a dual redundant hybrid tracking algorithm to enhance vehicle presence detection and data collection.

- Include a moving shadow and occlusion rejection algorithm that is activated by selection of a drop down menu tab.

- Include a menu selectable zone type labeled "Bike" that is specifically designed to detect bicycles.

- Include a virtual QWERTY keyboard that is present when performing any labeling functions for the detection zones and cameras.

- Include the ability to copy completed zones with one mouse click, drag and drop single zones, rows of zones together and entire detection configurations.

VDP & EM Hardware:

The VDP and EM shall be specifically designed to mount in a standard NEMA TS-1, TS-2, 2070 ATC, 170 type detector rack, using the edge connector to obtain power and provide contact closure outputs. No adapters shall be required to mount the VDP or EM in a standard detector rack. Detector rack rewiring shall not be required or shall be minimized.

Both VDP and EM shall operate in a temperature range from -34°C to +74°C and a humidity range from 0% RH to 95% RH, non-condensing.

Both VDP and EM shall be powered by 12 or 24 volts DC. These modules shall automatically compensate for the different input voltages.

Both VDP and EM shall include detector output pin out compatibility with industry standard detector racks.

Both VDP and EM shall have a detector test switch on the front panel to allow the user to place calls on each channel. The test switch shall be able to place either a constant call or a momentary call depending on the position of the switch.

The VDP power consumption shall not exceed 300 milliamps at 24 VDC. The EM power consumption shall not exceed 120 milliamps at 24 VDC.

The VDP shall utilize flash memory technology to enable the loading of modified or enhanced software through the RS232 port without modifying the VDP hardware.

The VDP shall include the following on the front panel:

- A multi-drop compatible RS232 port, a 9-pin "D" subminiature connector, for serial communications with a remote computer.
- Detection indication such as LED for each channel of detection that display detector outputs in real time when the system is operational.
- One or two BNC video input connection suitable for RS170 video inputs as required. The video input shall include a switch selectable 75-ohm or high impedance termination to allow camera video to be routed to other devices, as well as input to the VDP for vehicle detection. Video must be inputted via a BNC connector on the front face of the processor. RCA type connectors/jacks for video input are not allowed. Video shall not be routed via the edge connectors of the processor.
- One BNC video output providing real time video output that can be routed to other devices. A RCA type connector/jack for video output is not allowed.

Video Detection Camera:

The camera shall be housed in a weather-tight sealed enclosure consists of the following:

1. The enclosure shall be made of 6061 anodized aluminum.

2. The enclosure shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

3. The enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view. The camera enclosure with sunshield shall be less than 6" diameter, less than 18" long, and shall weigh less than 6 pounds when the camera and lens are mounted inside the enclosure.

4. The enclosure shall be design so that the pan, tilt and rotation of the camera assembly can be accomplished independently without affecting the other settings.

5. The enclosure shall include a proportionally controlled Indium Tin Oxide heater design that maximizes heat transfer to the lens. The output power of the heater shall vary with temperature, to assure proper operation of the lens functions at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.

6. The glass face on the front of the enclosure shall have:
    a. An anti-reflective coating to minimize light and image reflections.
    b. A special coating to minimize the buildup of environmental debris such as dirt and water.

The camera shall produce a useable video image of the bodies of vehicles under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 1.0 lux to 10,000 lux.

The imager luminance signal to noise ratio shall be more than 50 dB. In harsh backlit conditions, vehicles can be detected flawlessly with >100dB of dynamic range.

The camera shall be digital signal processor based and shall use a CCD sensing element and shall output color video with resolution of not less than 540 TV lines. The CCD imager shall have a minimum effective area of 811(h) x 508(v) pixels.

The camera shall include an electronic shutter control based upon average scene luminance and shall be equipped with an auto-iris lens that operates in tandem with the electronic shutter.

The camera shall utilize automatic white balance.

The camera shall include a variable focal length lens with variable focus that can be adjusted, without opening up the camera housing, to suit the site geometry by means of a portable interface device designed for that purpose and manufactured by the detection system supplier.

The horizontal field of view shall be adjustable from 5.4 to 50.7 degrees. This camera configuration may be used for the majority of detection approaches in order to minimize the setup time and spares required by the user. The lens shall have a 27x zoom.

The lens shall also have an auto-focus feature with a manual override to facilitate ease of setup.

The camera shall incorporate the use of preset positioning that store zoom and focus positioning information. The camera shall have the capability to recall the previously stored preset upon application of power.

The camera electronics shall include automatic gain control to produce a satisfactory image at night.

When mounted outdoors in the enclosure, the camera shall operate satisfactorily in a temperature range from -34 °C to +60 °C and a humidity range from 0% RH to 100% RH. Measurement of satisfactory video shall be based upon VDP system operation.

The camera shall be powered by120-240 VAC 50/60 Hz. Power consumption shall be 30 watts or less under all conditions.

The camera shall view approaching vehicles at a distance not to exceed 350 feet for reliable detection (height to distance ratio of 1:10). Camera placement and field of view shall be unobstructed and as noted in the installation documentation provided by the supplier.

There shall be at least 2 options for camera set up, diagnostic testing, and viewing video when it is mounted on mast arm or pole using lens adjustment module supplied by the VDP supplier:

1. Connected directly to the camera.
2. Connected to the coaxial cable from the cabinet.

The video signal shall be fully isolated from the camera enclosure and power
Cable terminations at the camera for video and power shall not require crimping tools.

No BNC or other connector shall be used for the coaxial video cable termination at the camera.

The power connection at the camera shall use connector terminations that only require the use of wire strippers and a standard screwdriver. No special crimping tools or other types of terminations shall be used.

A weather-proof protective cover shall be provided shall be provided to protect all terminations at the camera. No special tooling shall be required to remove or install the protective cap.

Cabling and Cable Connections:

The coaxial cable to be used between the camera and the VDP in the traffic cabinet shall be Belden 8281. The coax cable shall be a continuous unbroken run from the camera to the VDP. This cable shall be suitable for installation in conduit or overhead with appropriate span wire. A BNC plug connector shall be used at the cabinet end. The coaxial video cable shall be

stripped and terminated at the camera and cabinet per manufacturers' instructions (no BNC or other connector shall be used at the camera). The coaxial cable, BNC connector used at the cabinet termination, and crimping tool shall be approved by the supplier of the video detection system and the manufacturer's instructions must be followed to ensure proper connection.

The power cable shall be three 16 AWG conductor cable with a minimum outside diameter of 0.325 inch and a maximum diameter of 0.490 inch. The power cable shall be terminated at the camera per manufacturers' instructions and shall only require standard wire strippers and a screw driver for installation (no special connectors or crimping tools shall be used for installation). The cabling shall comply with the National Electric Code, as well as local electrical codes. Cameras shall not acquire power from the luminaire.

A Din Rail mounted AC power panel assembly shall be supplied by the video detection manufacturer that will include a minimum of one convenience receptacle, four camera chassis ground connections, four camera AC neutral (AC-) connections, four 2 amp camera circuit breakers for hot (AC+) connections, and one AC source connection for Line, Neutral and Ground wires. A Din Rail video surge suppression protection panel assembly shall also be supplied by the video detection manufacture. One panel shall accommodate up to six EDCO surge suppressors. This equipment shall be installed, including termination of all necessary wiring, per the video detection manufacturer requirements for the intended use.

Maintenance and Support:

The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the system. These parts shall be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale for said parts.

The supplier shall maintain an ongoing program of technical support for the access unit and video detection system. This technical support shall be available via telephone, or via personnel sent to the installation site upon placement of an acceptable order at the supplier's then current pricing and terms of sale for on-site technical support services.

Installation or training support shall be provided by factory-authorized representative.

All product documentation shall be written in the English language.

Luminaires

Luminaires shall conform to the provisions in Section 86-6, "Lighting", of the Standard Specifications and these Special Provisions.

Luminaires shall be of the cutoff type and shall be 200, 250 or 400 Watt High Pressure Sodium Vapor as shown on the plans. The fixtures shall be constructed with flat lenses, integral ballasts, and detachable power unit assemblies. The power unit assemblies shall contain the ballast, starter board, capacitors, and a heavy-duty terminal block.

Each luminaire shall be furnished without the photoelectric unit receptacle.

Each luminaire shall have a 5-amp inline fuse installed inside the standard's hand hole.

Internally Illuminated Street Name Sign

Internally illuminated street name signs (IISNS) shall conform to the provisions in Section 86-6.065, "Internally Illuminated Street Name Signs", of the Standard Specifications and these Special Provisions.

Sign panels shall be slide-mounted or rigid mounted in a frame with white translucent diamond grade reflective legend, symbol, arrows, and border on each face, the background shall be green. FHWA Series E 10" uppercase and 7.5" lowercase fonts.

If the 8' sign panel will not accommodate a long street name using FHWA Series E 10" uppercase and 7.5" lowercase fonts, then FHWA Series E 8" and 6" lowercase fonts can be used.

The sign fixture, panels, and mounting assemblies shall be designed and constructed to prevent deformation, warp or failure when subjected to 100 mph wind loads, as set forth in the latest AASHTO publication, "Standard Specifications for Structural Supports of Highway Signs, Luminaires, and Traffic Signals", and amendments thereto. The IISNS manufacturer shall submit a certificate of compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance", with each lot of IISNSs delivered.

The IISNSs shall be attached to the 10 feet IISNS mast arm per County Standard No. 1200.

Support brackets shall be 3/8" X 1.5" or larger that can withstand 100 mph wind load.

Lighting fixture shall be LED type and conform to the following provisions:

LED Specification:

1. The LED Light System shall be an operational unit consists of LED module or modules and power supply or supplies.
2. The LED Light System shall fit within the existing 6 feet or 8 feet internally illuminated street name sign (IISNS) housing.
3. The LED Light system components shall be UL certified, damp location rated and RoHS compliant.
4. The LED Light system's power consumption shall not exceed 60W for a 6 feet sign or 80W for an 8 feet sign.
5. The LED Light system shall not require the use of an additional or external diffuser to disperse the light.
6. The LED Light system manufacturer shall have been in business supplying LED products for signage or lighting at least 12 months (references required).
7. LED Light system shall meet the minimum criteria listed in the specification. All manufacturer documentation including specification and warranty for both LED modules and power supply shall be submitted and approved by the County prior to installation.

Power Supply

1. The power supply shall be Class 2.
2. The power supply shall provide efficiency greater than 87%.
3. The manufacturer shall warrant the power supply for a minimum of 60 months.

LED Modules

1. The LED correlated color temperature shall be 4100K or higher.
2. The LED shall have a minimum of 120-degree viewing angle.
3. The LED modules shall be available in single or double sided.
4. The average life of LEDs contained in the LED Module shall be rated for 50,000 hours or more.
5. The LED modules shall produce 4100 lumens minimum to the sign face of a 6' IISNS; and 5000 lumens minimum to the sign face of an 8' IISNS.
6. The manufacturer shall warrant the LED modules for a minimum of 48 months.

Photoelectric Controls

Photoelectric controls shall conform to the provisions in Section 86-6.07, "Photoelectric Controls", of the Standard Specifications and these Special Provisions.

Photoelectric controls shall be a dual Type V for luminaires and internally illuminated street name signs conforming to the County Standards No. 1207.

Photoelectric units shall be the delay type.

Emergency Vehicle Preemption System

Furnish and install complete and functioning emergency vehicle preemption (EVP) system as intended per plans, the manufacturer, and these special provisions.

The EVP system shall consist of the following equipments or components:

- Optical detector for each approach, as shown on the plans
- Rack-mounted ~~24~~-channel phase selectors for 8-phase operation
- Detector cable

The Contractor shall furnish the following spare EVP equipments or components:

- One (1) rack-mounted ~~24~~-channel phase selector
- One (1) optical detector

The EVP system shall be designed to prevent simultaneous pre-emption by two or more emergency vehicles on separate approaches to the intersection.

The Engineer shall approve EVP sequence of operation prior to timing and turn-on of each respective traffic signal.

At locations where optical detectors are not to be installed, EVP cable shall be installed for future use. The following also apply:

1. EVP cable shall be installed, without splices, between the controller cabinet and each mast arm traffic signal pole.

2. EVP cable shall be connected to the EVP rack terminals within the controller cabinet.

3. Each mast arm EVP detector mounting shall be drilled and tapped in its ultimate location. In lieu of the detector, install approved water tight UL listed electrical box. EVP cable shall be installed to terminate within the mast arm mounted electrical box. Excess cable shall be coiled within the electrical box sufficient for future installation of the EVP system.

Optical Detector

The optical detector shall be mounted on the indicated signal mast arm per ~~Riverside~~ County Standard No. 1202.

Each optical detector shall be waterproof unit capable of receiving optical energy from ~~a single~~ dual directions and have an adjustable turret configuration. The reception angle for each optical detector unit shall be a minimum of eight (8) degrees in all directions about the aiming axis of the unit.

Dual detectors shall utilize only one optical cable per detector.

Internal circuitry shall be solid state and electrical power shall be provide by the associated discrimination module.

Each optical detector unit shall have a minimum of a ½ 3/4 inch NPT opening used for mounting and for bringing the connecting cable into the terminal block located within the assembly. The housing shall be provided with weep holes to permit drainage of condensed moisture.

Each optical detector shall be installed, wired, and aimed as specified by the manufacturer.

Cable

Optical detector cable shall meet the requirements of IPCEA-S-61-402/NEMA WC 5, Section 7.4, 600 V Control cable, 75 degrees C, Type B, and the following:

1. The cable shall contain 3 conductors, each of which shall be AWG# 20 (7 x 28) stranded, tinned copper. Insulation of individual conductors shall be color-coded: 1-Yellow, 1-Orange, and 1-Blue.

2. The shield shall be either tinned copper braid or aluminized polyester film with a nominal 20% overlap. When film is used, an AWG# 20 (7 x 28) stranded, tinned, bare drain wire shall be placed between the insulated conductors and the shield and in contact with the conductive surface of the shield.

3. The jacket shall be marked as required by IPCEA/NEMA.

The cable run between each detector and the Traffic Controller cabinet shall be continuous without splices.

Phase Selector

Each phase selector shall be compatible and usable with a Model 170E or 2070 controller unit, and shall be mounted in the input file of a Model 332 or Model 333 JP controller cabinet.

Each phase selector shall be capable of operating at least two or more channels, each of which shall provide and independent output for each separate input.

Phase Selector shall be a four-channel, dual priority, Mulitimode encoded signal device designed for use with both infrared and GPS emitters and optical detectors.

Phase Selectors and Optical detectors shall me manufactured by a single manufacturer

Phase Selector shall recognize and discriminate among three distinct frequency rates via high priority, low priority and probe priority infrared and GPS signals.

Phase selector shall further discriminate among 254 agency ID's, 15 classes of vehicle identification codes and 10,000 individual vehicle codes per class, for more than 38 million total per priority level.

Phase selector shall be capable of operating unlimited intersections and directions.

Phase selector shall have on the front panel, USB, serial and Ethernet capabilities

Phase selector shall be capable of accepting infrared signals from LED and or strobe technologies

Phase selector shall store the following records:

Intersection name
Date and time of activity
Vehicle class and code of activating vehicle
Activating vehicle's ID number
Agency ID
Channel called
Priority of the activity
Final green activity displayed at end of call
Time spent in the final greens
Duration of the activity
Turn signal status
Relative priority level

Capability to playback up to the last 250 seconds of the 100 most recent calls

Each phase selector, when used with its associated optical detectors, shall perform as a minimum, the following:

1. Receive Class I and Class II signals.

2. Decode the signals based on optical frequency, at 9.639 Hz + or -0.119 Hz for Class I signals and 14.035 Hz + or –0.255 Hz for Class II signals.

3. Establish the validity of received signals based on optical frequency and length of time received. A signal shall be considered valid only when received for more than 0.50 second. No combination of Class I signals shall be recognized as a Class II signal regardless of the number of signals being received, up to a maximum of 10 signals. Once a valid signal has been recognized, the effect shall be held by the module, in the event of temporary loss of signal for a minimum period of 4.0 seconds.

4. Provide an output for each channel that will result in a "low" or grounded condition of the appropriate input of a Model 170 controller unit. For a Class I signal, the output shall be a 6.25 Hz + or – 0.1 %, rectangular waveform with a 50 % duty cycle. For Class II signal, the output shall be steady.

Each phase selector shall receive power from the controller cabinet at either 12 VDC or 120 VAC.

Auxiliary inputs for each channel may enter each module through a front panel connector or by a parallel hook-up of the associated detector cables at the input location.

The phase selector shall provide an optically isolated output for each channel to the Model 170 controller unit. All outputs signals shall comply with NEMA signal level definitions and shall be compatible with the Model 170 controller assemblies' inputs.

Each phase selector shall be provided with means of preventing transients received by the detector from affecting the Model 170 controller assembly.

Each phase selector shall have a single connector board and shall occupy one slot of the input file. The front panel of each phase selector module shall have a handle to facilitate withdrawal and have the following controls and functions for each channel:

1. Range adjustments for both class I and Class II signals.

2. A 3-position, center off, momentary contact switch, one position (down) labeled for test operation of Class I signals, and one position (up) labeled for test operation of Class II signals.

3. A "signal" indication and a "call" indication each for Class I and for Class II signals. The "signal" indications denote that a signal, which is not valid, has been received; a "call" indication denotes a steady, valid signal has been received. These 2 indications may be accomplished with a single indication lamp.

In addition, the front panel shall be provided with additional connectors or ports used to perform other functions as specified by the manufacturer.

Cabinet Wiring

Wiring for a Model 332 cabinet shall conform to the following:

1. Slots 12 and 13 of input file "J" shall be wired to accept either a 2 channel or a 4 channel module.

2. Field wiring for the primary detectors, except the 24 VDC power, shall terminate on either terminal block TB-9 in the controller cabinet or on the rear of input file "J", depending on cabinet configuration. Where TB-9 is used, position assignments shall be as follows:

   a. TB-9 – 1 = Not Used
   b. TB-9 – 2 = + 24 VDC Out (Orange)
   c. TB-9 – 3 = + 24 VDC Out (Orange)
   d. TB-9 – 4 = EVA Detector (Yellow)
   e. TB-9 – 5 = EVC Detector (Yellow)
   f. TB-9 – 6 = DC Common Out (Blue)
   g. TB-9 – 7 = EVB Detector (Yellow)
   h. TB-9 – 8 = EVD Detector (Yellow)
   i. TB-9 – 9 = DC Common Out (Blue)

   Assuming TB9 – 2 and TB9 – 3 are unused on the "J" File, move wires on J11-J & J11-K (Twisted Pair) to J12-E & J13-E, respectively.

Field wiring for auxiliary detectors may terminate on terminal board TB-0 (If unused) in the controller cabinet. Use manufactures recommended wiring for these connections.

System Operation

The contractor shall demonstrate that the components of each system are compatible and will perform satisfactorily as a system. Satisfactorily performance shall be determined using the following test procedure during the functional test period:

1. Each system to be used for testing shall consist of an optical detector, an optical detector cable and a phase selector module.

2. The phase selector shall be installed in the proper input file slot of the Model 332 or 333 controller cabinet assembly.

3. Two tests shall be conducted; one using a Class I signal emitter and a distance of 1000 feet between the emitter and the detector, the other using a Class II signal emitter and a distance of 1800 feet between the emitter and the detector. Range adjustments on the phase selector shall be set to "Maximum" for each test.

4. During the tests of the Class I and Class II emitters, the proper response from the Model 170E and 2070 controller unit during the "ON" interval and there shall be no improper operation of the Model 170E or 2070 controller unit or the monitor during the "OFF" interval.

Arrange for a technician from the EVP manufacturer, to be present for the first day of the traffic signal and lighting function test to insure proper installation and functioning of the EVP equipment.

Arrange for a technician from the controller assembly manufacturer to perform any controller modifications required for the installation, or operation, of the EVP equipment.

GPS Universal Time Sources

The GPS Universal Time Source shall be a McCain model M32755 or approved equal. The Engineer shall approve any alternate GPS time source prior to installation.

The GPS Universal Time Source shall incorporate a precision GPS receiver and a microprocessor to decode the time signals received from the GPS satellite network. The Universal Time Source shall interface this time signal to a model 170E controller (using Bi-Tran local software) to provide an accurate clock update to the traffic signal controller.

The GPS Universal Time Source shall meet or exceed the following criteria:

- Operate in temperatures from –30°C to +80°C.
- Receive power through 170E controller's ACIA port.
- Provide 170E controller with the time, date, and day of the week data.
- Software configured time zone and daylight savings operations.
- Support RS-232C serial data rates at 300, 600, 1200, 2400, 48000, 9600 and 19200 bps.
- Provide LED indicators for communication status to a satellite.
- Provide a weatherproof disc antenna no greater than 3" diameter x 1" height to be mounted directly to the top of the traffic signal controller cabinet.
- Provide all cabling and connectors with the correct pin assignments to interface the GPS unit to antenna and to 170E controller.

Proper gaskets or other weatherproofing materials for the antenna shall be supplied and installed to prevent water or moisture from entering the traffic signal controller cabinet.

Battery Backup System

This special provision establishes the minimum requirements for a battery backup system (BBS) that shall provide power to a traffic signal system in the event of a power failure or interruption.

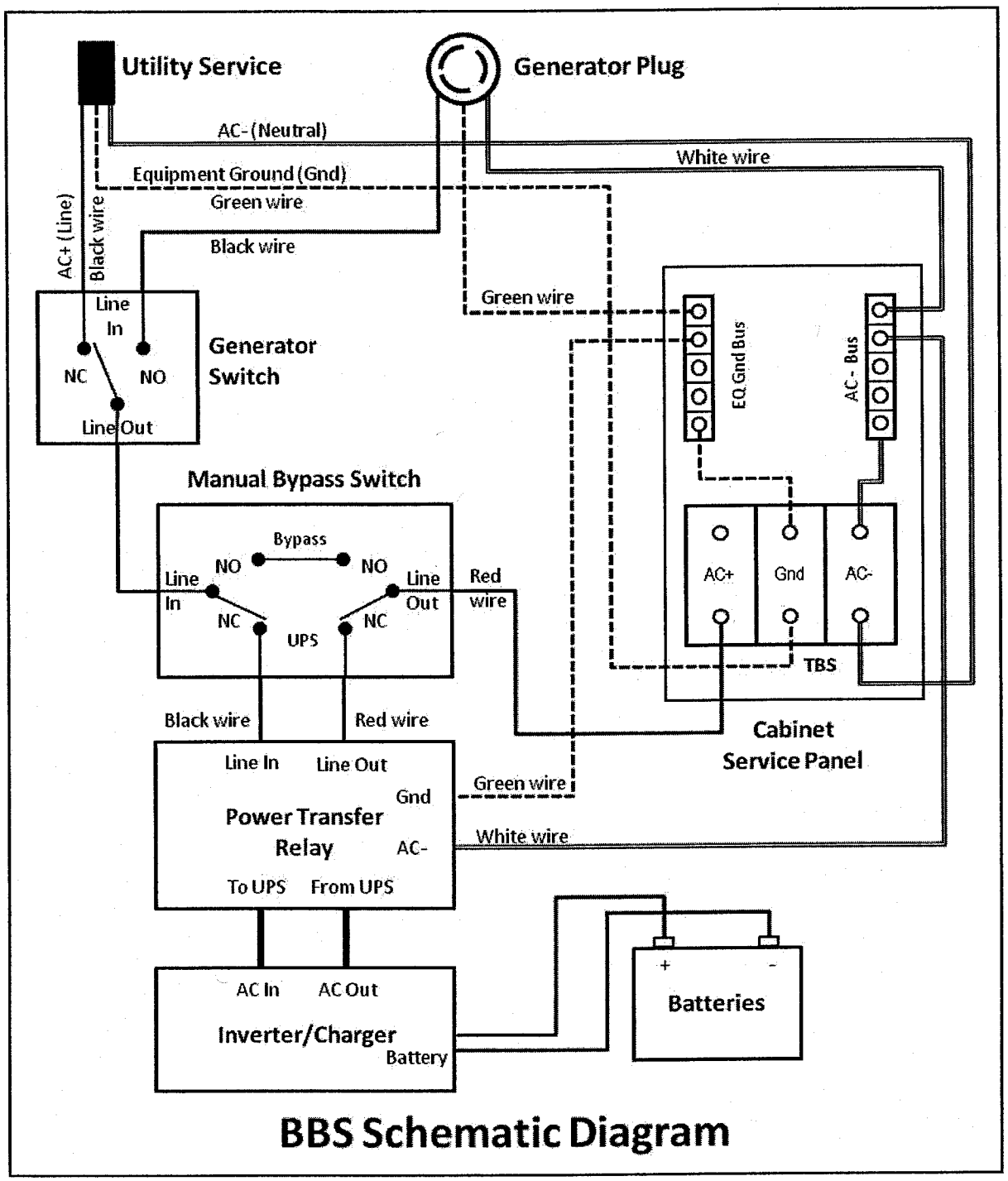
The BBS shall be designed for outdoor applications, in accordance with the current edition of Chapter 1, Section 8 requirements of Transportation Electrical Equipment Specifications (TEES).

The BBS batteries shall be external to the traffic signal controller cabinet as specified under "External Battery Cabinet Option" herein unless specified otherwise.

BBS cabinet shall be listed on the current Caltrans pre-qualified product list. The BBS shall include, but not limited to the following:

- cabinet,
- utility line/generator switch,
- inverter/charger,
- power transfer relay,
- a separate manually operated non-electronic bypass switch,
- batteries,
- all necessary hardware, shelving, and interconnect wiring.

The following figure shows BBS components interconnecting with each other and the controller cabinet to ensure interchangeability between all BBS manufacturers.

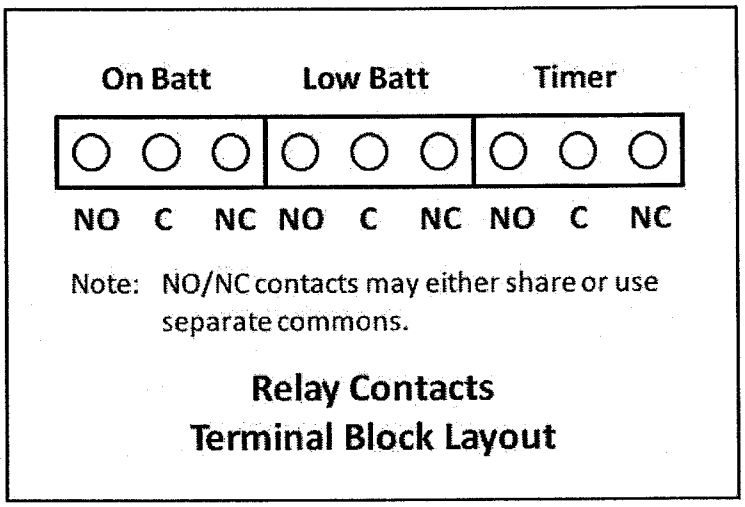


Operation

The BBS shall provide a minimum two (2) hours of full run-time operation for an intersection equipped with all LED traffic signal indications (minimum 1100W active output capacity, with 80% minimum inverter efficiency), and 2 (2) hours of flashing operation.

The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized inverter line voltage from batteries, shall be 65 milliseconds. The same maximum allowable transfer time shall also apply when switching from inverter line voltage to utility line voltage.

The BBS shall provide the user with six (6)-sets of fully programmable normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) dry relay contact closures, available on a panel-mounted terminal block, rated at a minimum 120V/1A, and labeled so as to identify each contact. See below figure for typical configuration.



The first set of NO and NC contact closures shall be energized whenever the unit switches to battery power. Contact shall be labeled or marked "On Batt".

The second set of NO and NC contact closures shall be energized whenever the battery approaches approximately 40% of remaining useful capacity. Contact shall be labeled or marked "Low Batt".

The third set of NO and NC contact closures shall be energized two hours after the unit switches to battery power. Contact shall be labeled or marked "Timer".

The six programmable NO and NC contact closures shall be independently configured to activate under any of the following conditions: On Battery, Low Battery, Timer, Alarm, or Fault.

Operating temperature for inverter/charger, power transfer relay and manual bypass switch shall be –37 °C to +74 °C.

Both the Power Transfer Relay and Manual Bypass Switch shall be rated at 240VAC/30 amps, minimum.

The BBS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 2.5 – 4.0 mV/ °C per cell.

The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 10' of wire.

Batteries shall not be recharged when battery temperature exceeds 50 °C ± 3 °C.

BBS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 100VAC to 130VAC (± 2VAC).

When utilizing battery power, the BBS output voltage shall be between 110 VAC and 125 VAC, pure sine wave output, ≤ 3% THD, 60Hz ± 3Hz.

BBS shall be compatible with NEMA and Model 332 and 333JP Cabinets, and Model 170, 390 & 2070 Controllers and cabinet components for full time operation.

In cases of low (below 100VAC) or absent utility line power, when the utility line power has been restored at above 105 VAC ± 2 VAC for more than 30 seconds, the BBS shall transfer from battery backed inverter mode back to utility line mode.

In cases of high utility line power (above 130VAC), when the utility line power has been restored at below 125VAC ± 2 VAC for more than 30 seconds, the BBS shall transfer from battery backed inverter mode back to utility line mode.

The BBS shall have an automatic tap to step up or step down the output voltage by 10 percent. The resulting output voltages shall remain within the above prescribed voltage range: 100VAC to 130VAC. This capability will extend BBS range for operating on input AC and not reverting to battery power.

BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC (and de-energized) state, where utility line power is connected to the cabinet.

Recharge time for the battery, from "protective low-cutoff" to 80% or more of full battery charge capacity, shall not exceed twenty (20) hours.

Mounting / Configuration

Generator Switch, Inverter/Charger, Power Transfer Relay and manually operated Bypass Switch shall fit inside a typical fully equipped traffic signal controller cabinet.

Mounting method inside the 332 and 333JP cabinet shall be shelf-mount, rack-mount or combination of either. Available rack space for front-mounted inside the 332 and 333JP cabinet is 3U or approximately 6 inches.

All interconnect wiring provided between Generator Switch, Inverter/Charger, Power Transfer Relay, Bypass Switch and Cabinet Terminal Service Block shall be no less than 9 feet of UL Style 1015 CSA TEW with the following characteristics:

- AWG Rating: 10 AWG
- Stranding: 105 strands of ~~30~~ 10 AWG tinned copper
- Rating: 600 V, 105 °C, PVC Insulation

Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be 9 feet of UL Style 1015 CSA TEW 18 AWG wire, same ratings as above, except 16 strands of 18 AWG tinned copper.

All necessary hardware for mounting (shelf angles, rack, etc) shall be included in the **contract price paid** for the BBS, and no additional compensation will be allowed therefor.

Internal mounted battery option

(Allowed only if requested on the plans)

The controller cabinet shall be equipped with a generator twist lock flanged inlet receptable, manual transfer switch and bypass switch.

The twist lock flanged inlet receptacle shall be Hubbell 2615, NEMA L5-30P Twist Lock Flanged Male Inlet Rated for 30A/125VAC or approved equal. Receptacle shall be mounted flush to the cabinet in a weatherproof lift cover plate made of impact-resistant thermoplastic and gray in color.

The bypass switch shall transfer the load, including the UPS to the twist lock inlet receptacle. The manual transfer switch shall be wired to prevent any back feed to the utility service. Both the bypass switch and manual transfer switch shall be rack mounted independently in the controller cabinet meeting industry standards.

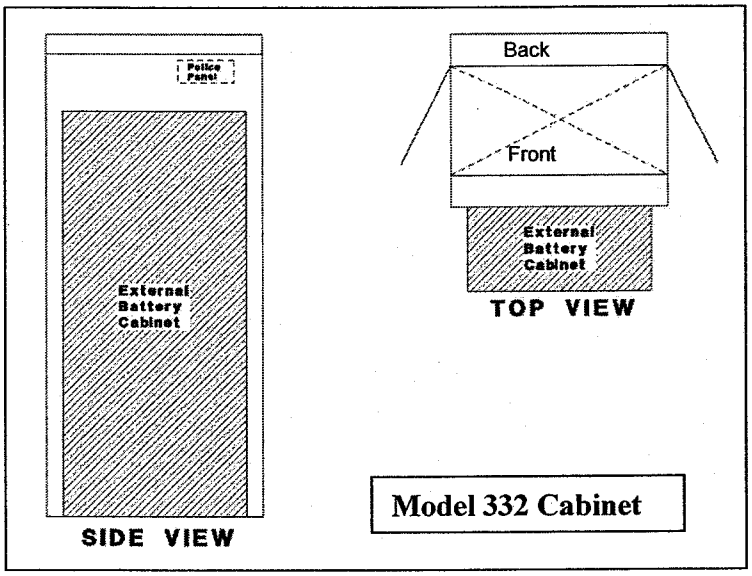
Batteries shall be mounted on swing-tray mounted below the controller shelf. A minimum of six (6) bolts/fasteners shall be used to secure swing-trays to the 332 Cabinet standard EIA 19" rack. All bolts/fasteners and washers shall meet the following requirements:

- Screw type: Pan Head Phillips machine screw
- Size and Thread pitch: 10-32
- Material: 18-8 stainless steel (Type 316 stainless steel is acceptable as an alternate)
- Washer: Use one 18-8 stainless steel flat washer under the head of each 10-32 screw; lock washers are unnecessary provided that the screws are properly tightened.

Number of screws per swivel bracket: minimum six (6) screws per swivel bracket. Screws are to be spaced evenly along bracket, with one screw near each end. Batteries may be shelf mounted in area behind controller so long as shelf and batteries do not interfere with controller unit and C1 plug.

External battery cabinet option

Batteries shall be housed in an external cabinet mounted to the side of the controller cabinet as shown in the following figure or as directed by the Engineer with a minimum of eight (8) bolts:



If BBS is installed at the back of controller cabinet, the modification shall include a minimum of 36 inches wide concrete walkway access to the BBS without encroaching outside the right-of-way. BBS shall be installed at the front of the controller cabinet (in locations where the back of the controller cabinet has limited ROW or conflicting structures and facilities and other obstructions), the BBS cabinet shall not cover the police panel. The BBS cabinet shall also not hinder the access ramp's compliance with ADA requirements.

Four shelves shall be provided within the battery cabinet. There shall be a minimum of 12 inches clearance between shelves. Each shelf shall be a minimum of 9" X 25", and capable of supporting a minimum of 125 lbs. Batteries shall be mounted on individual shelves.

The external battery cabinet shall be NEMA 3R rated in accordance to Section 2-Housings of the Chapter 7 of TEES, for the construction of the cabinet and anodic coating finish.

The external battery cabinet shall be ventilated through the use of louvered vents, filter, and one thermostatically controlled fan in accordance to Section 2-Housings of the Chapter 7 of TEES.

External battery cabinet fan shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the controller cabinet.

The external battery cabinet shall have a door opening to the entire cabinet. The door shall be attached to the cabinet through the use of a continuous stainless steel piano hinge or four, two-bolts per leaf, hinges in accordance to Section 2-Housings of the Chapter 7 of TEES. The door shall use a three-point, roller locking mechanism and standard #2 key lock to lock the door. The door shall have a stainless steel handle.

The external cabinet shall be equipped with a generator twist lock flanged inlet receptacle, manual transfer switch and bypass switch.

The twist lock flanged inlet receptacle shall be Hubbell 2615, NEMA L5-30P, Twist Lock Flanged Male Inlet Rated for 30A/125V or approved equal. Receptacle shall be mounted flush to the cabinet in a weatherproof lift cover plate made of impact-resistant thermoplastic and gray in color.

The bypass switch shall transfer the load, including the UPS to the twist lock inlet receptacle. The manual transfer switch shall be wired to prevent any back feed to the utility service. Both the bypass switch and manual transfer switch shall be rack mounted independently in BBS cabinet meeting industry standards.

The BBS with external battery cabinet shall come with all bolts, conduits and bushings, gaskets, shelves, and hardware needed for mounting.

Maintenance, Displays, Controls and Diagnostics

The BBS shall include a 2 line by 40 character LCD display to indicate current battery charge status, input/output voltages, time and settings of various conditions. The same parameters shall be available via RS232 or USB interfaces on the face of the BBS.

The BBS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.

The BBS shall be capable of accepting firmware upgrades of the non-volatile, read-only memory via serial port communications. The updates shall be accomplished by uploading the software to the BBS over the RS232 serial port located on the face of the BBS.

The BBS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.

The BBS shall be capable of performing a SELF-TEST, locally from the BBS front panel LCD, or remotely via RS232 or USB interface. The duration of the SELF-TEST shall be programmable in 1-minute increments from 1 minute to 255 minutes.

The BBS and batteries shall be easily replaced with all needed hardware and shall not require any special tools for installation.

The BBS shall include a re-settable inverter event counter to indicate the number of times the BBS was activated and the total number of hours the unit has operated on battery power, accessible via the LCD screen or remotely via RS232 or USB.

The BBS shall be equipped with an event log that stores for a minimum the last 100 events. The events shall be time and date stamped. The event log shall be retrievable vial RS232, USB or from the BBS LCD screen. The event log shall be display and print out in plain English when output the RS232 or USB ports.

Battery System

Individual battery shall be 12V, rated 105 amp-hour for 20 hours @ 77°F to 1.70 VPC, deep cycle, sealed prismatic lead-calcium based Absorbed Glass Mat/ Valve Regulated Lead Acid (AGM/VRLA) battery and shall be easily replaced and commercially available off the shelf.

The manufacturer shall certify batteries to operate over a temperature range of – 25 °C to +74 °C. The batteries shall be provided with appropriate interconnect wiring and corrosion-resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.

Batteries shall indicate maximum recharge data and recharging cycles.

Furnish four (4) batteries for the BBS.

Battery Harness

Battery interconnect wiring shall be via two-part modular harness:

- Part I shall be equipped with red (+) and black (-) cabling that can be permanently connected to the positive and negative posts of each battery. Each red and black pair shall be terminated into a Molex, polarized – keyed battery cable connector or equivalent. The length of the harness between batteries shall be a minimum of 12 inches.

- Part II shall be equipped with the mating Power Pole style connector for the batteries and a single, insulated Power Pole style connection to the inverter/charger unit. Harness shall be fully insulated and constructed to allow batteries to be quickly and easily connected in any order to ensure proper polarity and circuit configuration. The length of the battery interconnect harness shall be a minimum of 60 inches from the Inverter/Charger plug to the first battery in the string.

Power Pole connectors may be either one-piece or two-piece. If a two-piece connector is used, a locking pin shall be used to prevent the connectors from separating.

All battery interconnect harness wiring shall be UL Style 1015 CSA TEW or Welding Style Cable or equivalent, all of proper gauge with respect to design current and with sufficient strand count for flexibility and ease of handling.

Battery terminals shall be covered and insulated with molded boots to prevent accidental shorting.

BBS Quality Assurance

Each Battery Backup System (BBS) shall be manufactured in accordance with a manufacturer Quality Assurance (QA) program. The QA program shall include two Quality Assurance procedures:

1. Design QA - The manufacturer, or an independent testing lab hired by the manufacturer, shall perform Design Qualification Testing on new BBS system(s) offered, and when any major design change has been implemented on an existing design. A major design change is defined as any modification - material, electrical, physical, or theoretical, that changes any performance characteristics of the system, or results in a different circuit configuration. Where a dispute arises in determining if a system is a new design or if the system has had a major design change, the County will make the final determination if Design Qualification Testing is required prior to production consideration.

2. Production QA - The Production QA shall include statistically controlled routine tests to ensure minimum performance levels of BBS units built to meet this specification and a documented process of how problems are to be resolved.

QA process and test results documentation shall be kept on file for a minimum period of seven years.

Battery Backup System designs not satisfying Design QA Testing and Production QA Testing requirements shall not be labeled, advertised, or sold as conforming to this specification.

A technician whom is qualified to work on the battery backup system and employed by the battery backup system manufacturer or the manufacturer authorized distributor, shall be present at the time the equipment is turned on.

It shall be the responsibility of the Contractor to implement and fund any traffic signal controller assembly modifications required to achieve the traffic signal operation as shown on the construction plans and as required in the Special Provisions.

Method of Payment

See Signal and Lighting subsection O, "Service" for payment of all electric company fees required.

The contract price paid **per Lump Sum** for Signal and Lighting shall include full compensation for furnishing all labor, materials, tools, equipment, foundations, pole and mast arm mounted regulatory signs, documents, programming, testing, potholing required for utility verification prior to all conduit installation and incidents and for doing all the work specified herein, elsewhere in these Special Provisions, and plans including the complete installation of an operational traffic signal and lighting system and no additional compensation shall be allowed therefor.

Appendix A

AQMD Recommendations

Dust Abatement Attachments

Table of Contents

AQMD SIGNAGE RECOMMENDATIONS

November, 2001

Plan holder shall post signage at specified locations on the subject property in accordance with the standards specified below. The exception to the standards is that all letters shall be 4 inches high, with the names and telephone numbers of appropriate contacts and services in bold print, as indicated in the standards. These signs shall also include the SCAQMD toll free complaint line 1-800-CUT-SMOG (1-800-288-7664) and the telephone number for the Environmental Observer. These signs shall be posted within 50 feet of the curb on all four (4) corners of the subject property.

For each Dust Control Plan aggregating less than, or equal to, ten (10) acres:

1. The applicant shall install a sign on such property which is visible to the public that meets the following requirements:

   (a) Such sign shall measure at least four (4) feet wide by four (4) feet high and conform to the specifications in 1 (a) below.

For each Dust Control Plan aggregating over ten (10) acres:

2. The applicant shall install a sign on such property which is visible to the public that meets the following requirements:

   (a) Such sign shall measure at least eight (8) feet wide by four (4) feet high and conform to the specifications in 1 (b) below.

THE SIGN SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

1. **The sign boards shall be constructed with materials capable of withstanding the environment in which they are placed.**

   (a) For 4' x 4' signs, the District recommends the following:

   I. ¾ " A/C laminated plywood board
   II. Two 4" x 4" posts
   III. The posts should be attached to the edges of the plywood board with at least 2 carriage bolts on each post.
   IV. The front surface of the sign board should be painted in the contrasting color of a white background with black lettering.

   (b) For 4' x 8' signs, the District recommends the following:

   I. 1" A/C laminated plywood board
   II. Two 5" x 6" posts
   III. The posts should be attached to the 4' edges of the plywood board with at least 2 carriage bolts on each post.
   IV. The front surface of the sign board should be painted in the contrasting color of a white background with black lettering.

2. **The sign board shall be installed and maintained in a condition such that members of the public can easily view, access, and read the sign at all times until the expiration date of the Dust Control plan.**

   (a) For 4' x 4' signs, the District recommends the following:
   - I. The lower edge of the sign board should be mounted at least 2' above the existing ground surface to facilitate ease of viewing.
   - II. The posts should be set in a hole at least 3' deep with concrete footings to preclude downing by high winds.
   - III. On the construction site, the sign should be positioned such that nothing obstructs the public's view from the primary street access point.
   - IV. For construction projects that are developed in phases, the sign should be moved to the area that is under active construction.
   - V. In situations where all phases of the construction project are completed on a property prior to expiration of the Dust Control Plan, a written request for cancellation of the Dust Control Plan must be submitted to the Engineer.

   (b) For 4' x 8' signs, the District recommends the following:
   - I. The lower edge of the sign board should be mounted at least 2' above the existing ground surface to facilitate ease of viewing.
   - II. The posts should be set in a hole at least 4' deep with concrete footings to preclude downing by high winds.
   - III. On the construction site, the sign should be positioned such that nothing obstructs the public's view from the primary street access point.
   - IV. For construction projects that are developed in phases, the sign should be moved to the area that is under active construction.
   - V. In situations where all phases of the construction project are completed on a property prior to expiration of the Dust Control Plan, a written request for cancellation of the Dust Control Plan must be submitted to the Engineer.

3. **The sign board shall contain the following information:**

   (a) Project Name
   (b) Name of Prime Contractor
   (c) Phone Number of Contractor's Employee Responsible for Dust Control Matters
   (d) County designated phone number (to be provided by the Engineer)
   (e) South Coast Air Quality Management District Phone Number

4. **The sign board shall be designed to the following alpha and numeric text dimensions (sign boards written in longhand are unacceptable).**

   (a) For a permittee subject to the 4' x 4' sign requirement, the District provides the following example: (as modified by the County of Riverside for use on County Public Works projects)

1" UPPERCASE Letters →	PROJECT NAME:		← 3 ½ " Title Case Bold Letters
1" UPPERCASE Letters →	CONTRACTOR		← 3 ½ " Title Case Bold Letters
1" Title Case Letters →	Contractor's Dust Control Phone #		← 3" Bold Numbers
1" Title Case Letters →	County of Riverside Phone #		← 3" Bold Numbers
1" Title Case Letters →	Phone Number:	**SCAQMD 1-800-CUT-SMOG**	← 3 ½ " Bold Numbers

"Title Case" means the first letter of a word is capitalized and subsequent letters are lower case.

(b) For a permittee subject to the 4' x 8' sign requirement, the District provides the following example: (as modified by the County of Riverside)

2" UPPERCASE Letters →	PROJECT NAME:		← 4" Title Case Bold Letters
2" UPPERCASE Letters →	CONTRACTOR		← 4" Title Case Bold Letters
2" Title Case Letters →	Contractor's Dust Control Phone #		← 4" Bold Numbers
2" Title Case Letters →	County of Riverside Phone #	**909-**	← 4" Bold Numbers
2" Title Case Letters →	Phone Number:	**SCAQMD 1-800-CUT-SMOG**	← 4 ½ " Bold Numbers
2" Title Case Letters →	**COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT**		

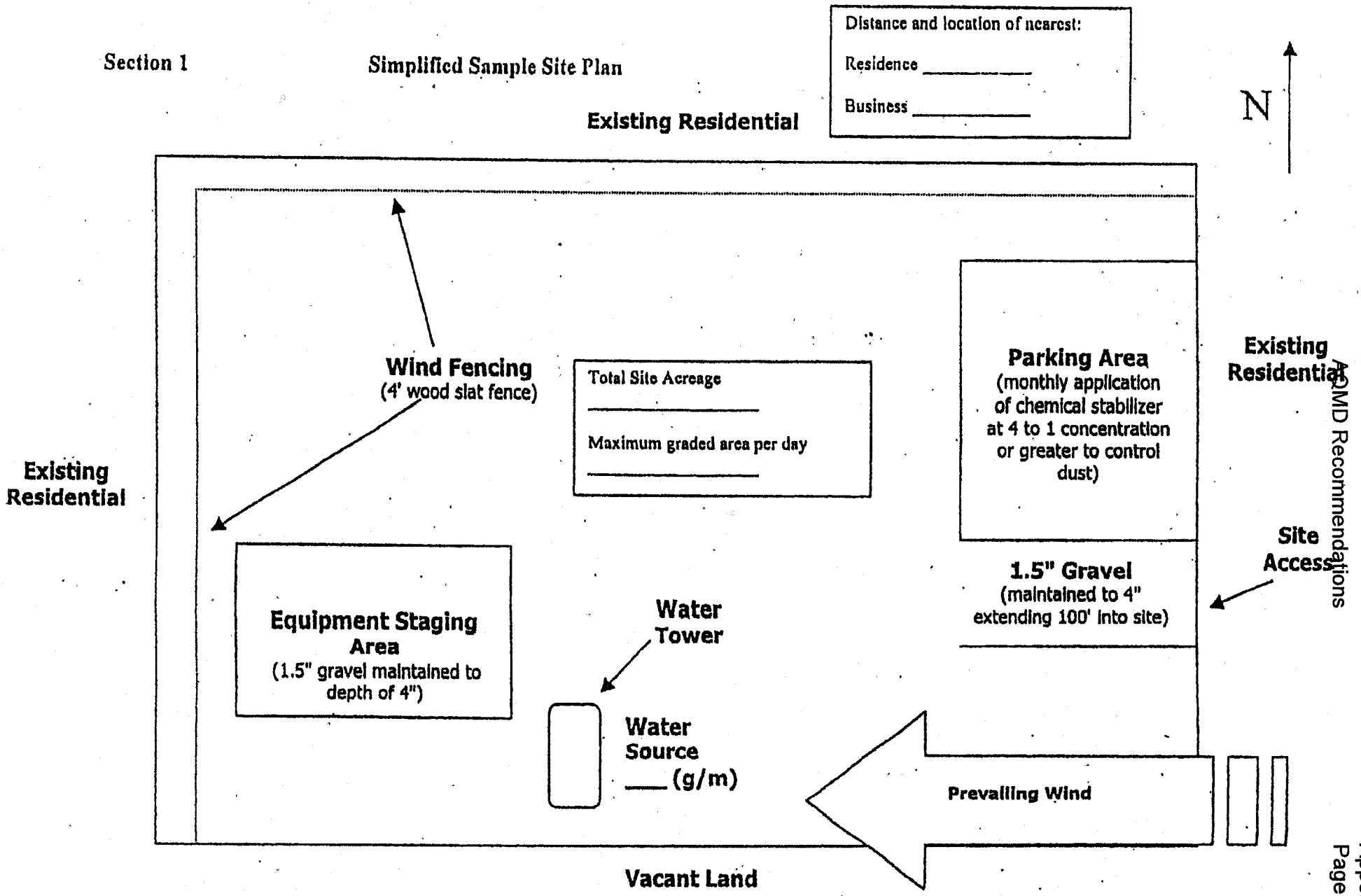
Section 1

Simplified Sample Site Plan

Distance and location of nearest:

Residence _____

Business _____



Remember...
DUST CONTROL IS REQUIRED 24 HOURS A DAY, 7 DAYS A WEEK, REGARDLESS OF CONSTRUCTION STATUS

AQMD Recommendations

Plan Review Checklist
Clearing/Grubbing/Mass Grading Phase

☐ If feasible, use grading permit conditions to break the project into phases so that only a portion of the site is disturbed at any given time to ensure control of fugitive dust. This technique is critical for project sites with greater than 100 acres.

☐ Prior to initiating activity, pre-water site through use of portable irrigation lines. At least 72 hours of pre-watering is recommended for each area prior to initiating earth-movement. Require the Applicant to specify water source and available flow rate (g/m).

☐ Water applied continuously to all disturbed portions of the site by means of water truck/water pull as necessary to maintain sufficient visible moisture on the soil surface. For reference, one 2,000 gallon water truck can treat approximately 4 acres of active construction per hour. Also, for cut and fill activities, one 10,000 gallon water pull is estimated to be necessary for each 7,000 cubic yards of daily earth-movement. Multiple 4,000-gallon water trucks may be used in place of one 10,000-gallon water pull. Touch and visual contrast are reasonably good indicators of soil moisture. Surface areas that are dry to the touch and appear lighter-colored require the application of additional water to prevent visible or fugitive dust. Require the Applicant to specify the number of watering vehicles available for dust control during mass grading and during off-hours as well as availability of back-up water trucks if the site experiences dust control problems.

☐ Water towers are necessary for projects with more than 10 acres of active construction. Without a water tower, it can take up to 30 minutes to fill a 2,000 gallon water truck. Also, multiple water towers are necessary for projects that use water pulls as filling one 10,000 gallon water pull can drain a water tower which takes up to 40 minutes to refill.

☐ Wind fencing is necessary between the site and nearby residences or businesses. Off-site upwind fencing and on-site wind fencing for larger projects can also keep blowsand from being deposited onto the site or traveling through the site.

☐ A perimeter watering system consisting of portable irrigation equipment may be an effective mitigation system to protect surrounding residences and businesses. The portable watering system may be used in place of or in conjunction with watering trucks. The local jurisdiction may also be provided access to this equipment.

Remember...
DUST CONTROL IS REQUIRED 24 HOURS A DAY, 7 DAYS A WEEK, REGARDLESS OF CONSTRUCTION STATUS

☐ Construction site accesses are to be improved with 1.5" gravel maintained to a depth of 4", at least 20' wide, and extending 100 feet into the site. If the project site is not balanced, a wheel washing system and/or ribbed steel plates should be placed in the roadway before the vehicle enters the graveled area to clean the tires and prevent trackout.

☐ Equipment staging areas are to be treated with 1.5" gravel maintained to a depth of 4".

☐ Employee parking areas are to be covered with 1.5" gravel maintained to a depth of 4" or treated with chemical dust suppressants at a 4 to 1 ratio on at least a monthly basis to prevent fugitive dust.

☐ Chemical dust suppressants are to be mixed at a ratio of 20 to 1 and applied to all disturbed surfaces that are proposed to remain inactive for a period of at least 10 consecutive days. These products are effective in preventing and controlling dust. Recordkeeping is necessary to demonstrate compliance.

☐ All project sites greater than 100 acres shall monitor daily wind speeds and AQMD forecasted wind events (call 1.800.CUT.SMOG; press one for air quality information, and then press five for Coachella Valley wind forecasts). Operators shall maintain these records for review by any local code enforcement officer or AQMD inspector.

☐ An environmental observer whose primary duty is to oversee dust control at the site is to be used for construction projects greater than 100 acres and/or sites with more than 50 acres of active construction. The environmental observer is tasked with monitoring dust abatement measures and authorized to deploy additional water trucks and other dust control actions (i.e., wind fencing, street sweepers, chemical dust suppressants, etc.) as necessary to prevent or control fugitive dust.

☐ Other (specify):_____

_____

_____

_____

_____

_____

_____

Remember...
DUST CONTROL IS REQUIRED 24 HOURS A DAY, 7 DAYS A WEEK, REGARDLESS OF CONSTRUCTION STATUS

Plan Review Checklist
Finish Grading Phase

☐ Water applied continuously to all disturbed portions of the site by means of water truck/water pull as necessary to maintain sufficient visible moisture on the soil surface. For reference, one 2,000 gallon water truck can treat approximately 4 acres of active construction per hour. Also, for cut and fill activities, one 10,000 gallon water pull is estimated to be necessary for each 7,000 cubic yards of daily earth-movement. Multiple 4,000-gallon water trucks may be used in place of a 10,000-gallon water pull. Touch and visual contrast are reasonably good indicators of soil moisture. Surface areas that are dry to the touch and appear lighter-colored require the application of additional water to prevent visible or fugitive dust. Require the Applicant to specify the number of watering vehicles available for dust control during finish grading and during off-hours as well as availability of back-up water trucks if the site experiences dust control problems.

☐ Water towers are necessary for projects with more than 10 acres of active construction. Without a water tower, it can take up to 30 minutes to fill a 2,000 gallon water truck. Also, multiple water towers are necessary for projects that use water pulls as filling one 10,000 gallon water pull can drain a water tower which takes up to 40 minutes to refill.

☐ Wind fencing is necessary between the site and nearby residences or businesses to reduce fugitive dust. Off-site upwind fencing and on-site wind fencing for larger projects can also keep blowsand from being deposited onto the site or traveling through a site.

☐ Chemical dust suppressants are to be applied at a concentration of at least 10 to 1 to finish graded areas once final elevations have been reached. For areas that will remain inactive for longer periods, vegetation can be a cost-effective alternative to chemical stabilization. Wind fencing or other obstructions can keep the stabilized area free from future disturbances.

☐ Construction site access(es) are to be improved with 1.5" gravel maintained to a depth of at least 4", with a minimum width of at least 20', extending 100 feet into the project site.

☐ Equipment staging areas are to be treated with 1.5" gravel maintained to a depth of 4".

☐ Internal roadway networks are to be treated with chemical dust suppressants at a minimum rate of at least 4 to 1 and retreated on a monthly basis once final roadway elevations have been reached.

☐ Employee parking areas are to be treated with chemical dust suppressants at a mix ratio of at least 4 to 1 and retreated on at least a monthly basis or covered with 1.5" gravel maintained to a depth of 4" to prevent fugitive dust.

☐ Other (specify):_____

_____

_____

_____

Remember...
DUST CONTROL IS REQUIRED 24 HOURS A DAY, 7 DAYS A WEEK, REGARDLESS OF CONSTRUCTION STATUS

Plan Review Checklist
Construction Phase

☐ Water applied continuously to all disturbed portions of the site by means of water truck/water pull is necessary to maintain sufficient visible moisture on the soil surface. For reference, one 2,000 gallon water truck can treat approximately 4 acres of active construction per hour. Touch and visual contrast are reasonably good indicators of soil moisture. Surface areas that are dry to the touch and appear lighter-colored require the application of additional water to prevent visible or fugitive dust. Require the Applicant to specify the number of watering vehicles available for dust control during the construction phase and during off-hours as well as availability of back-up water trucks if the site experiences dust control problems.

☐ Wind fencing is necessary between the site and nearby residences or businesses. Off-site upwind fencing and on-site wind fencing for larger projects can also keep blowsand from being deposited onto the site or traveling through the site. Block walls, if part of the final project, can replace wind fencing during the construction phase.

☐ Chemical dust suppressants are to be applied at a concentration of at least 20 to 1 to finish graded areas once final elevations have been reached. For areas that will remain inactive for longer periods, vegetation can be a cost-effective alternative to chemical stabilization. Wind fencing or other obstructions can keep the stabilized area free from future disturbances.

☐ Construction site accesses are to be improved with 1.5" gravel, maintained to a depth of 4", with a width of at least 20', extending 100' into the project site. Paving internal roadways can substitute for gravel.

☐ Internal roadway networks are to be paved as early as feasible in the construction phase. Street sweeping of internal and/or external access roads will likely be required to control entrained road dust.

☐ Employee parking areas are to be treated with chemical dust suppressants at a mix ratio of no less than 4 to 1 and retreated on a monthly basis, or more frequently if fugitive dust is observed. If internal roadway is complete, employees are to be instructed to park on paved roads.

☐ Other (specify):_____

_____

_____

_____

_____

_____

_____

Remember...
DUST CONTROL IS REQUIRED 24 HOURS A DAY, 7 DAYS A WEEK, REGARDLESS OF CONSTRUCTION STATUS

REASONABLY AVAILABLE CONTROL MEASURES

Paragraph (d)(3) of Rule 403 allows activities outside the South Coast Air Basin (see Figure 2-1) to implement reasonably available control measures in lieu of best available control measures. Additionally, as specified by subparagraph (f)(3)(D) of Rule 403, any person seeking approval of a fugitive dust emissions control plan for projects outside the South Coast Air Basin must demonstrate to the satisfaction of the District that the given activity is employing all reasonably available fugitive dust control measures.

The District has prepared the attached listing of reasonably available fugitive dust control measures for a variety of source categories. This list is based on the U.S. Environmental Protection Agency's reference document entitled, "Control of Open Fugitive Dust Sources," Midwest Research Institute, September 1988.

The District encourages the use of those dust control measures that minimize the use of potable water. When water is needed, reclaimed water should be utilized to the greatest extent feasible.

REASONABLY AVAILABLE CONTROL MEASURES

The left column contains a listing of the sources of fugitive dust which are intended for emission control under District Rule 403 and a listing of control measures and high-wind measures. The right column contains a description of the reasonably available fugitive dust control measures for each of the sources.

Source: (1) Land Clearing/Earth-Moving

CONTROL MEASURES	DESCRIPTION
(A) Watering	(1) Application of water by means of trucks, hoses and/or sprinklers prior to conducting any land clearing. This will increase the moisture content of the soils; thereby increasing its stability. (2) Pre-application of water to depths of proposed cuts. (3) Once the land clearing/earth moving activities are complete, a second application of water can generate a thin crust that stabilizes the disturbed surface area provided that it is not disturbed. (Security fencing can be used to prevent unwanted future disturbances of sites where a surface crust has been created).
(B) Chemical stabilizers	(1) Only effective in areas which are not subject to daily disturbances. (2) Vendors can supply information on product application and required concentrations to meet the specifications established by the Rule.
(C) Wind fencing	(1) Three- to five-foot barriers with 50% or less porosity located adjacent to roadways or urban areas can be effective in reducing the amount of windblown material leaving a site. (2) Would likely be used in conjunction with other measures (e.g., watering, chemical stabilization, etc.) to ensure that visible emissions do not cross a property line.
(D) Cover haul vehicles	(1) Entire surface area of hauled earth should be covered once vehicle is full.
(E) Bedliners in haul vehicles	(1) When feasible, use in bottom-dumping haul vehicles.

HIGH WIND MEASURE

(a) Cease all active operations; or
(b) Apply water within 15 minutes to any soil surface which is being moved or otherwise disturbed.

Source: (2) Unpaved Roads

CONTROL MEASURES	DESCRIPTION
(F) Paving	(1) Requires street sweeping/cleaning if subject to material accumulation.
(G) Chemical stabilization	(1) Vendors can supply information as to application methods and concentrations to meet the specifications established by the Rule (2) Not recommended for high volume or heavy equipment traffic use.
(H) Watering	(1) In sufficient quantities to keep surface moist. (2) Required application frequency will vary according to soil type, weather conditions, and vehicular use.
(I) Reduce speed limits	(1) 15 mile per hour maximum. May need to be used in conjunction with watering or chemical stabilization to prevent visible emissions from crossing the property line.
(J) Reduce vehicular trips	(1) Access restriction or redirecting traffic to reduce vehicle trips by a minimum of 60 percent.
(K) Gravel	(1) Gravel maintained to a depth of four inches can be an effective measure. (2) Should only be used in areas where paving, chemical stabilization or frequent watering is not feasible.

HIGH WIND MEASURE

(c) Apply a chemical stabilizer (to meet the specifications established by the Rule) prior to wind events; or
(d) Apply water once each hour; or
(e) Stop all vehicular traffic.

Source: (3) Storage Piles

CONTROL MEASURES	DESCRIPTION
(L) Wind sheltering	(1) Enclose in silos. (2) Install three-sided barriers equal to height of material, with no more than 50 percent porosity.
(M) Watering	(1) Application methods include: spray bars, hoses and water trucks. (2) Frequency of application will vary on site-specific conditions.
(N) Chemical stabilizers	(1) Best for use on storage piles subject to infrequent disturbances.
(O) Altering load-in/load-out procedures	(1) Confine load-in/load-out procedures to leeward (downwind) side of the material. (2) May need to be used in conjunction with wind sheltering to prevent visible emissions from crossing the property line.
(P) Coverings	(1) Tarps, plastic, or other material can be used as a temporary covering. (2) When used, these should be anchored to prevent wind from removing coverings.

HIGH WIND MEASURE

(f) Apply chemical stabilizers (to meet the specifications established by the Rule) prior to wind events; or
(g) Apply water once per hour; or
(h) Install temporary covers.

Source: (4) Paved Road Track-Out

CONTROL MEASURES	DESCRIPTION
(Q) Chemical stabilization	(1) Most effective when used on areas where active operations have ceased. (2) Vendors can supply information on methods for application and required concentrations.
(R) Sweep/clean roadways	(1) Either sweeping or water flushing may be used.
(S) Cover haul vehicles	(1) Entire surface area should be covered once vehicle is full.
(T) Bedliners in haul vehicles	(1) When feasible, use in bottom dumping vehicles.
(U) Site access improvement	(1) Pave internal roadway system. (2) Most important segment, last 100 yards from the connection with paved public roads

HIGH WIND MEASURE

(i) Cover all haul vehicles; and
(j) Clean streets with water flushing, unless prohibited by the Regional Water Quality Control Board.

Source: (5) Disturbed Surface Areas/ Inactive Construction Sites

CONTROL MEASURES	DESCRIPTION
(Q) Chemical stabilization	(1) Most effective when used on areas where active operations have ceased. (2) Vendors can supply information on methods for application and required concentrations.
(R) Watering	(1) Requires frequent applications unless a surface crust can be developed.
(S) Wind fencing	(1) Three- to five-foot barriers with 50% or less porosity adjacent to roadways or urban areas can be effective in reducing the amount of wind blown material leaving a site.
(T) Vegetation	(1) Establish as quickly as possible when active operations have ceased. (2) Use of drought tolerant, native vegetation is encouraged.

HIGH WIND MEASURES

(k) Apply chemical stabilizers (to meet the specifications established by the Rule); or
(l) Apply water to all disturbed surface areas 3 times per day.

BEST AVAILABLE CONTROL MEASURES

Rule 403, paragraph (d)(2) requires active operations [defined in Rule 403, paragraph (c)(1)] within the South Coast Air Basin (see Figure 2-1) to implement at least one best available control measure for each fugitive dust source type on site. Additionally, as specified by subparagraph (f)(3)(D) of Rule 403, any person seeking approval of a fugitive dust emissions control plan for projects within the South Coast Air Basin must demonstrate to the satisfaction of the AQMD that the given activity is employing all best available fugitive dust control measures.

The AQMD has prepared the attached listing of best available fugitive dust control measures for a variety of source categories. This list is based on the U.S. Environmental Protection Agency's reference document entitled, "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures," Office of Air and Radiation, September 1992.

The AQMD encourages the use of those dust control measures that minimize the use of potable water. When water is needed, reclaimed water should be utilized to the greatest extent feasible.

BEST AVAILABLE CONTROL MEASURES

The left column contains a listing of the sources of fugitive dust which are intended for emission control under District Rule 403 and a listing of control measures and high-wind measures. The right column contains a description of the best available fugitive dust control measures for each of the sources.

Source: (1) Land Clearing/Earth-Moving

CONTROL MEASURES	DESCRIPTION
(A) Watering (pre-grading)	(1) Application of water by means of trucks, hoses and/or sprinklers prior to conducting any land clearing. This will increase the moisture content of the soils; thereby increasing its stability. (2) Pre-application of water to depths of proposed cuts.
(A-1) Watering (post-grading)	(1) In active earth-moving areas water should be applied at sufficient frequency and quantity to prevent visible emissions from extending more than 100 feet from the point of origin.
(A-2) Pre-grading planning	(1) Grade each phase separately, timed to coincide with construction phase; or (2) Grade entire project, but apply chemical stabilizers or ground cover to graded areas where construction phase begins more than 60 days after grading phase ends.
(B) Chemical stabilizers	(1) Only effective in areas which are not subject to daily disturbances. (2) Vendors can supply information on product application and required concentrations to meet the specifications established by the Rule.
(C) Wind fencing	(1) Three- to five-foot barriers with 50% or less porosity located adjacent to roadways or urban areas can be effective in reducing the amount of windblown material leaving a site. Must be implemented in conjunction with either measure (A-1) or (B).
(D) Cover haul vehicles	(1) Entire surface area of hauled earth should be covered once vehicle is full.
(E) Bedliners in haul vehicles	(1) When feasible, use in bottom-dumping haul vehicles.

HIGH WIND MEASURE

(a) Cease all active operations; or
(b) Apply water within 15 minutes to any soil surface which is being moved or otherwise disturbed.

Source: (2) Unpaved Roads

CONTROL MEASURES	DESCRIPTION
(F) Paving	(1) Requires street sweeping/cleaning if subject to material accumulation.
(G) Chemical stabilization	(1) Vendors can supply information as to application methods and concentrations to meet the specifications established by the Rule (2) Not recommended for high volume or heavy equipment traffic use.
(H) Watering	(1) In sufficient quantities to keep surface moist. (2) Required application frequency will vary according to soil type, weather conditions, and vehicular use.
(I) Reduce speed limits	(1) 15 mile per hour maximum. May need to be used in conjunction with watering or chemical stabilization to prevent visible emissions from crossing the property line.
(J) Reduce vehicular trips	(1) Access restriction or redirecting traffic to reduce vehicle trips by a minimum of 60 percent.
(K) Gravel	(1) Gravel maintained to a depth of four inches can be an effective measure. (2) Should only be used in areas where paving, chemical stabilization or frequent watering is not feasible.

HIGH WIND MEASURE

(a) Apply a chemical stabilizer (to meet the specifications established by the Rule) prior to wind events; or
(b) Apply water once each hour; or
(c) Stop all vehicular traffic.

Source: **(3) Storage Piles**

CONTROL MEASURES	DESCRIPTION
(L) Wind sheltering	(1) Enclose in silos. (2) Install three-sided barriers equal to height of material, with no more than 50 percent porosity.
(M) Watering	(1) Application methods include: spray bars, hoses and water trucks. (2) Frequency of application will vary on site-specific conditions.
(N) Chemical stabilizers	(1) Best for use on storage piles subject to infrequent disturbances.
(O) Altering load-in/load-out procedures	(1) Confine load-in/load-out procedures to leeward (downwind) side of the material. Must be used in conjunction with either measure (L), (M), (N), or (P).
(P) Coverings	(1) Tarps, plastic, or other material can be used as a temporary covering. (2) When used, these should be anchored to prevent wind from removing coverings.

HIGH WIND MEASURE

(a) Apply chemical stabilizers (to meet the specifications established by the Rule) prior to wind events; or
(b) Apply water once per hour; or
(c) Install temporary covers.

Source: (4) Paved Road Track-Out

CONTROL MEASURES	DESCRIPTION
Compliance with District Rule 403.	Paragraph (d)(5).

Source: (5) Disturbed Surface Areas/ Inactive Construction Sites

CONTROL MEASURES	DESCRIPTION
(Q) Chemical stabilization	(1) Most effective when used on areas where active operations have ceased. (2) Vendors can supply information on methods for application and required concentrations.
(R) Watering	(1) Requires frequent applications unless a surface crust can be developed.
(S) Wind fencing	(1) Three- to five-foot barriers with 50% or less porosity adjacent to roadways or urban areas can be effective in reducing the amount of wind blown material leaving a site. Must be used in conjunction with either measure (Q), (R), or (T).
(T) Vegetation	(1) Establish as quickly as possible when active operations have ceased.*

HIGH WIND MEASURES

(a) Apply chemical stabilizers (to meet the specifications established by the Rule); or
(b) Apply water to all disturbed surface areas 3 times per day.

* Use of drought tolerant, native vegetation is encouraged.

TABLE 1

BEST [REASONABLY]* AVAILABLE CONTROL MEASURES FOR HIGH WIND CONDITIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice [once] per hour during active operation; OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice [once] per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 1 may be used.

* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

TABLE 2
DUST CONTROL ACTIONS FOR EXEMPTION FROM PARAGRAPH (d)(4)*

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

TABLE 2 (Continued)*

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 [70] percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 [70] percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 [30] days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

TABLE 2 (Continued)*

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 [70] percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

* Measures in [brackets] are reasonably available control measures and only apply to sources not within the South Coast Air Basin.

TABLE 3

TRACK-OUT CONTROL OPTIONS

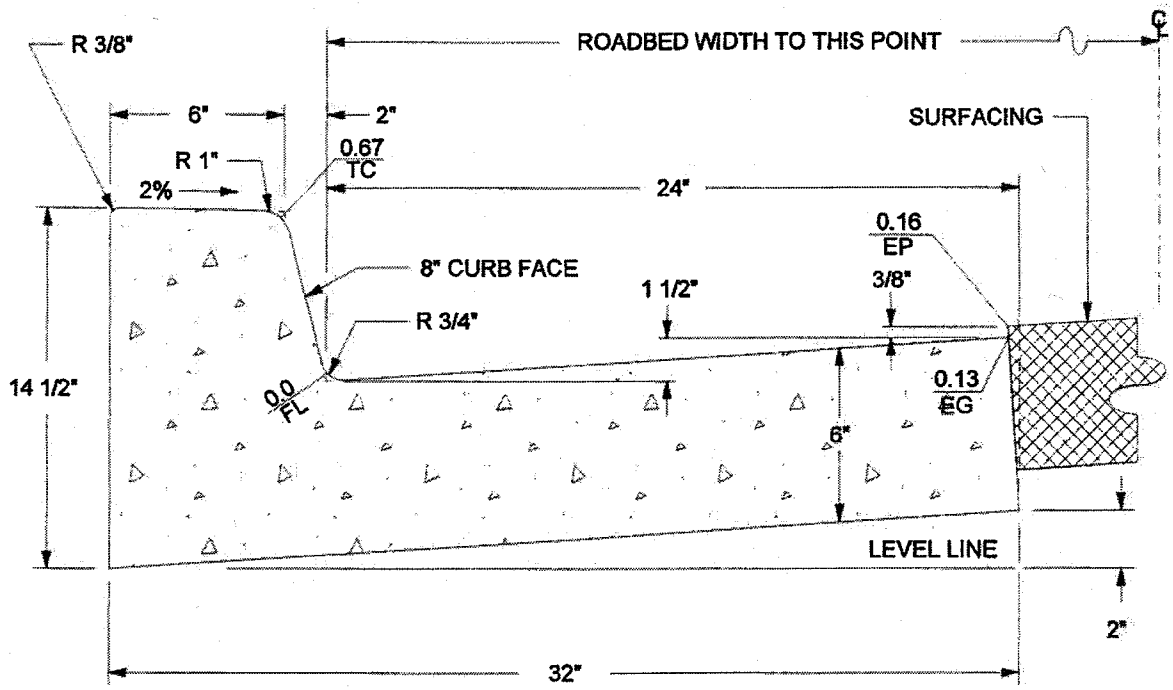
PARAGRAPH (d)(5)(B)

CONTROL OPTIONS

(1)	Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface, and extending for a centerline distance of at least 100 feet and a width of at least 20 feet.
(2)	Pave from the point of intersection with the public paved road surface, and extending for a centerline distance of at least 25 feet and a width of at least 20 feet, and install a track-out control device immediately adjacent to the paved surface such that exiting vehicles do not travel on any unpaved road surface after passing through the track-out control device.
(3)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Appendix B

Reference Drawings



CLASS "B" CONCRETE

1.73 CU. FT. / L.F.

1 CU. YD. = 15.60 L.F.

ABBREVIATIONS:

TC = TOP OF CURB
FL = FLOWLINE
EG = EDGE OF GUTTER
EP = EDGE OF PAVEMENT

APPROVED BY:

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

DATE: 05/01/07

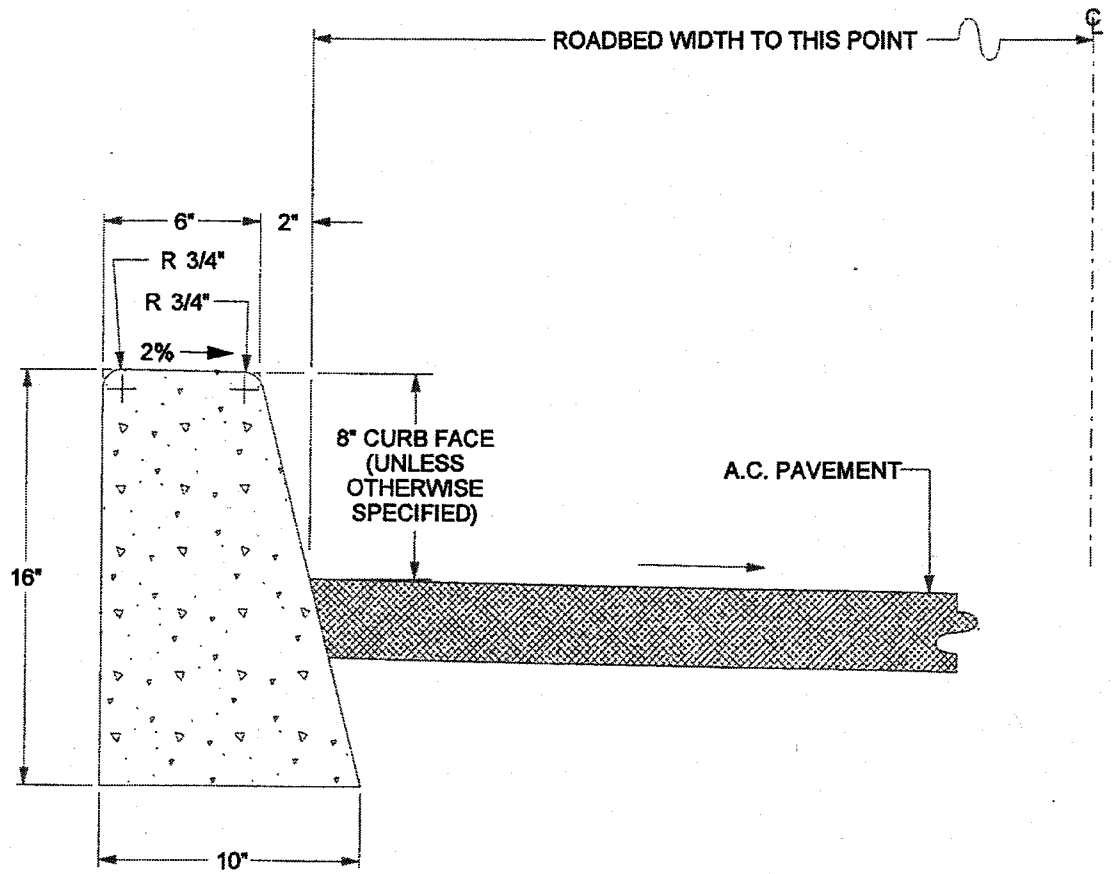
REGISTERED PROFESSIONAL ENGINEER
GEORGE A. JOHNSON
No. CE 42328
Exp. 3-31-08
CIVIL
STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

TYPE A-8 CURB

STANDARD NO. 201

REVISIONS	REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-71, 9-88	1				4			
2-90, 11-04	2				5			
	3				6			



CLASS "B" CONCRETE

0.888 CU FT. / L.F.

1 CU. YD. = 30.41 L.F.

APPROVED BY:

DATE: 05/01/07

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

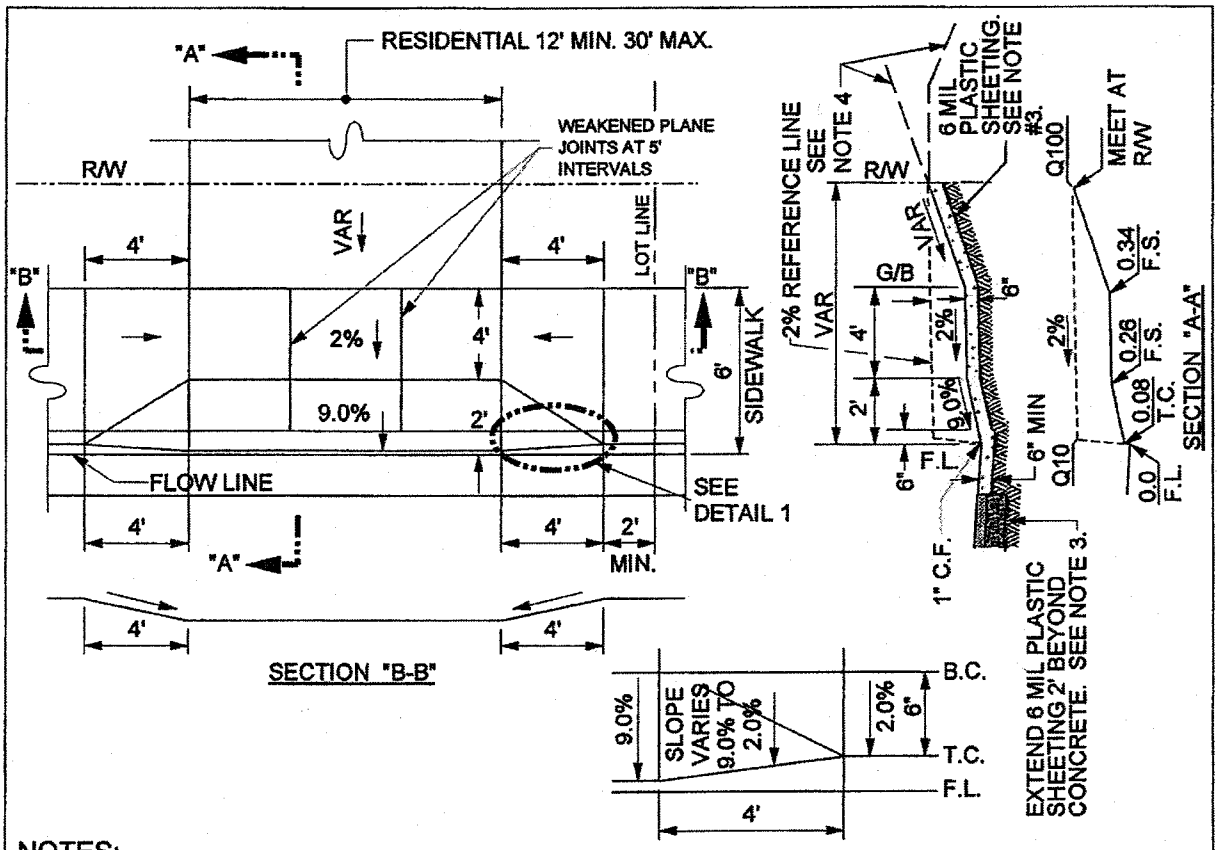
REGISTERED PROFESSIONAL ENGINEER
GEORGE A. JOHNSON
No. CE 42328
Exp. 3-31-08
Civil
STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

TYPE "D" CURB

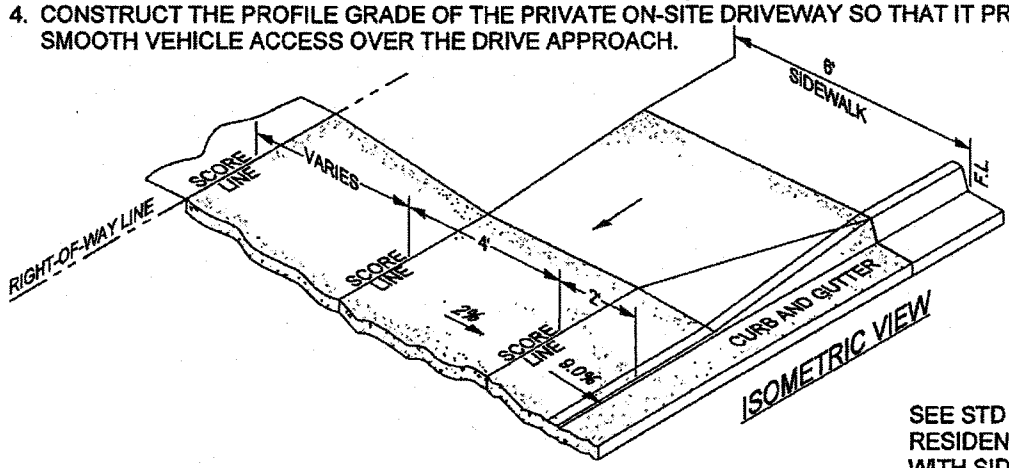
STANDARD NO. 204

REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-71, 2-90		1				4			
11-04		2				5			
		3				6			



NOTES:

1. ALL CONSTRUCTION SHALL BE CLASS "3" CONCRETE.
2. 20' OF FULL-HEIGHT CURB REQUIRED BETWEEN DRIVEWAYS WITHIN ANY ONE PROPERTY FRONTAGE.
3. USE 6 MIL PLASTIC SHEETINGWHEN ABUTTING SOIL HAS A HIGH SULFATE CONTENT, SPECIAL CONSIDERATIONS ARE REQUIRED. SEE SPECIFICATIONS (SECTION 16.04).
4. CONSTRUCT THE PROFILE GRADE OF THE PRIVATE ON-SITE DRIVEWAY SO THAT IT PROVIDES SMOOTH VEHICLE ACCESS OVER THE DRIVE APPROACH.



SEE STD NO. 213 FOR RESIDENTIAL DRIVEWAY WITH SIDEWALK AT R/W

NOT TO SCALE

APPROVED BY:

DATE: 11/15/04

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

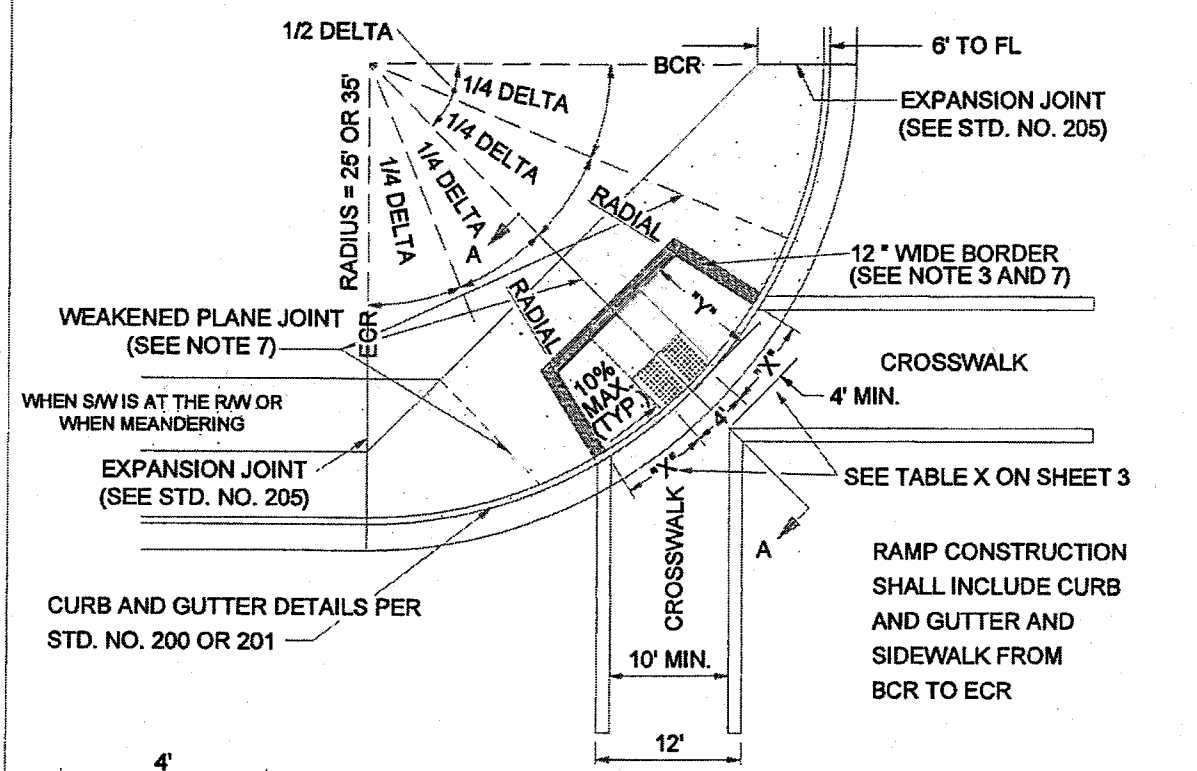
REGISTERED PROFESSIONAL ENGINEER
GEORGE A. JOHNSON
No. CE 42328
Exp. 3-31-05
STATE OF CALIFORNIA
CIVIL

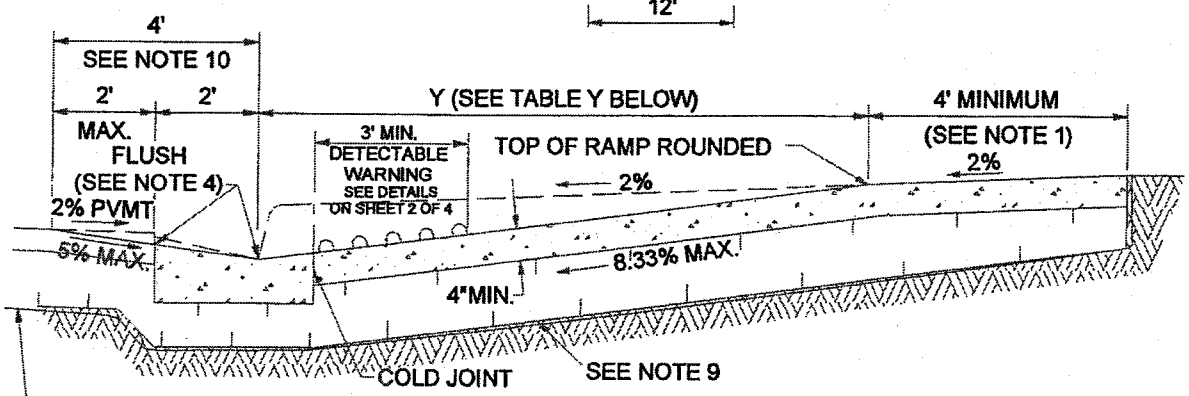
COUNTY OF RIVERSIDE

RESIDENTIAL DRIVEWAY WITH SIDEWALK AT CURB

STANDARD NO. 207

REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-71, 8-77	11-04	1				4			
5-80, 2-82		2				5			
2-90, 12-97		3				6			





SECTION A-A

TABLE Y

CF	Y
6"	7.90'
8"	10.53'

$$Y = \frac{\text{CURB FACE (FT.)}}{6.33\%}$$

SEE SHEET 4 OF 4 FOR NOTES.

NOT TO SCALE

APPROVED BY:

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

DATE: 11/15/04

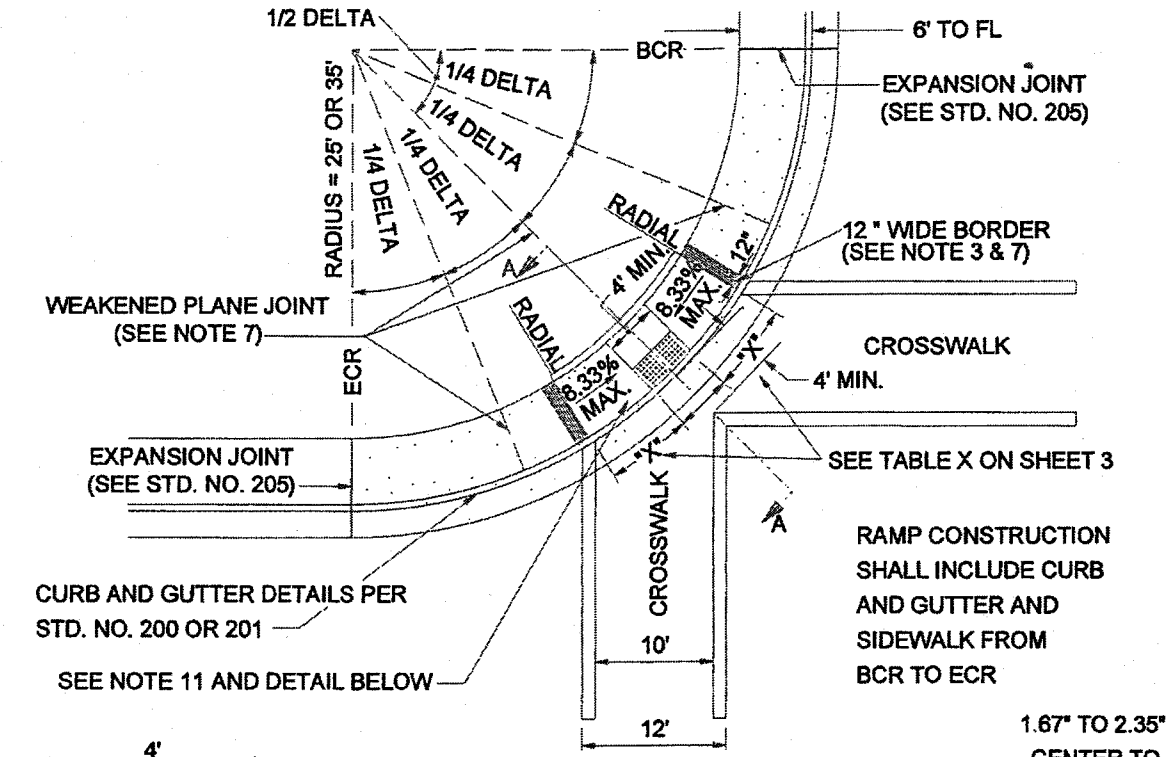
REGISTERED CIVIL ENGINEER — GEORGE A. JOHNSON — No. CE 42328 Exp. 3-31-06 — CIVIL — STATE OF CALIFORNIA

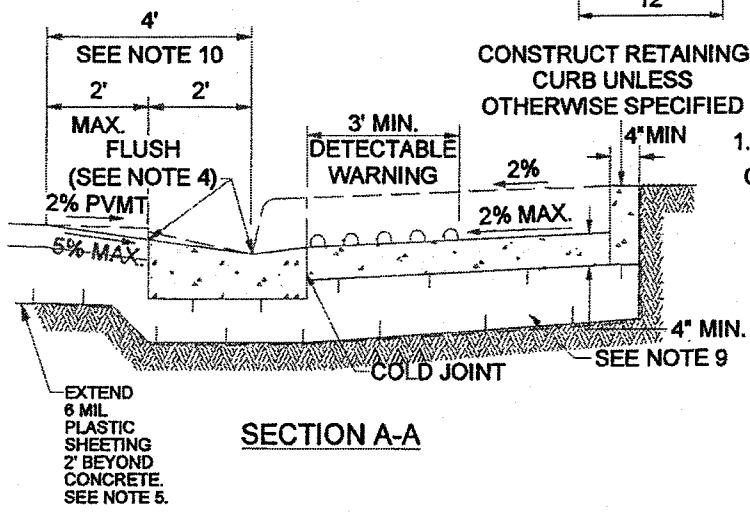
COUNTY OF RIVERSIDE

CURB RAMP CASE A

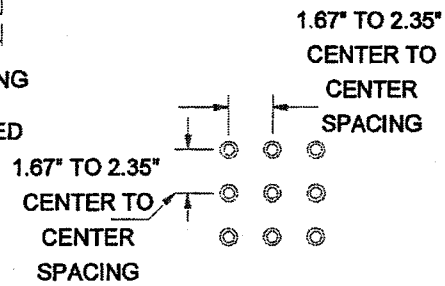
STANDARD NO. 403 (1 OF 4)

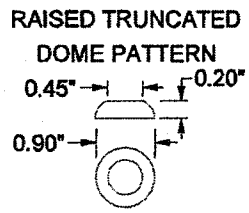
REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-77, 5-80	11-04	1				4			
10-81, 6-82		2				5			
9-88, 2-90		3				6			





SECTION A-A





RAISED TRUNCATED DOME
DETECTABLE WARNING SURFACE
SEE NOTE 11

SEE SHEET 4 OF 4 FOR NOTES.

NOT TO SCALE

APPROVED BY:

DATE: 11/15/04

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

REGISTERED PROFESSIONAL ENGINEER
GEORGE A. JOHNSON
No. CE 42328
Exp. 3-31-05
CIVIL
STATE OF CALIFORNIA

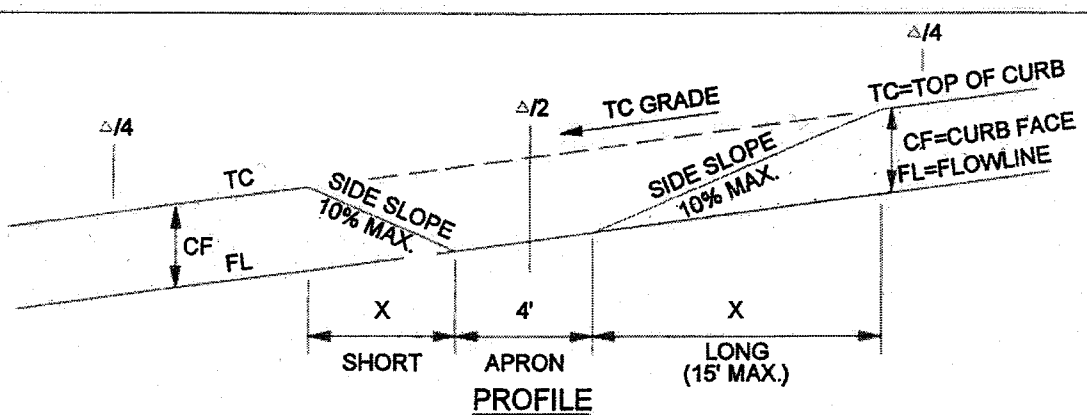
COUNTY OF RIVERSIDE

CURB RAMP CASE B

STANDARD NO. 403 (2 OF 4)

12-97

REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-77, 5-80	11-04	1				4			
10-81, 6-82		2				5			
9-88, 2-90		3				6			



PROFILE

TABLE X

CF (IN)	RADIUS (FT)	SIDE SLOPE	X	TC GRADE (ALONG CURB RETURN)					
				1%	2%	3%	4%	5%	6%
6"	35'	10%	X_S	4.6	4.2	3.9	3.6	3.4	3.2
			X_L	5.6	6.3	7.2	8.4	10.0	12.5
8"	35'	10%	X_S	6.1	5.6	5.2	4.8	4.5	4.2
			X_L	7.5	8.4	9.6	11.2	13.4	15.0

TO CALCULATE "X" DIMENSION:

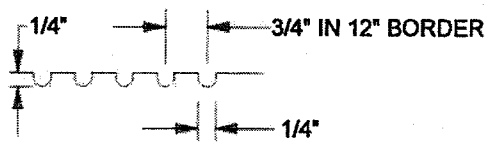
SHORT SIDE (DOWN SLOPE):

$$X_S\ (FT) = \frac{\text{CURB FACE (FT)}}{\text{SIDE SLOPE + TC GRADE}}$$

LONG SIDE (UP SLOPE):

$$X_L\ (FT) = \frac{\text{CURB FACE (FT)}}{\text{SIDE SLOPE - TC GRADE}}$$

ENGINEER TO SHOW X_S AND X_L ON IMPROVEMENT PLANS



GROOVING DETAIL

APPROVED BY:

DATE: 05/05/08

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

REGISTERED PROFESSIONAL ENGINEER GEORGE A. JOHNSON No. CE 42328 Exp. 3-31-08 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

CURB RAMP

STANDARD NO. 403 (3 OF 4)

REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-77, 5-80	11-04	1				4			
10-81, 6-82		2				5			
9-88, 2-90		3				6			

CONSTRUCTION NOTES:

1. IF DISTANCE FROM CURB TO BACK OF SIDEWALK IS TOO SHORT TO ACCOMODATE RAMP AND 4' LANDING, THEN USE THE CASE "B" RAMP.
2. IF SIDEWALK IS LESS THAN 6' WIDE, THE FULL WIDTH OF THE SIDEWALK SHALL BE DEPRESSED AS SHOWN IN CASE B. MINIMUM SIDEWALK WIDTH IS 4' FROM BACK OF CURB.
3. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH GROOVES 1/4" WIDE AND 1/4" DEEP APPROXIMATELY 3/4" ON CENTER. SEE GROOVING DETAIL.
4. TRANSITIONS FROM RAMPS TO WALKS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES.
5. WHEN ABUTTING SOIL HAS A HIGH SULFATE CONTENT, SPECIAL CONSIDERATIONS ARE REQUIRED. SEE SPECIFICATIONS (SECTION 16.04).
6. RAMP SIDE SLOPE VARIES UNIFORMLY FROM A MAXIMUM OF UP TO 10% AT CURB TO CONFORM WITH LONGITUDINAL SIDEWALK SLOPE ADJACENT TO TOP OF THE RAMP (EXCEPT IN CASE B).
7. CONSTRUCT WEAKENED PLANE JOINTS AT 1/4 DELTAS WHEN RADIUS EQUALS 35' AND AT INSIDE EDGE OF GROOVED BORDER WHEN RADIUS EQUALS 25'.
8. IF EXPANSIVE SOIL IS ENCOUNTERED, THEN RAMP SHALL BE CONSTRUCTED OVER CLASS 2 AGGREGATE MATERIAL.
9. CONCRETE SHALL BE CLASS B.
10. MAXIMUM SLOPES OF ADJOINING GUTTERS: THE ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP AND CONTINUOUS PASSAGE TO THE CURB RAMP SHALL NOT EXCEED 5% WITHIN 4' OF THE BOTTOM OF THE CURB RAMP.
11. DETECTABLE WARNING SURFACES ARE REQUIRED ON ALL CURB RAMPS THAT ENTER INTO A VEHICULAR TRAVEL WAY.

APPROVED BY:

DATE: 11/15/04

DIRECTOR OF TRANSPORTATION
GEORGE A. JOHNSON, RCE 42328

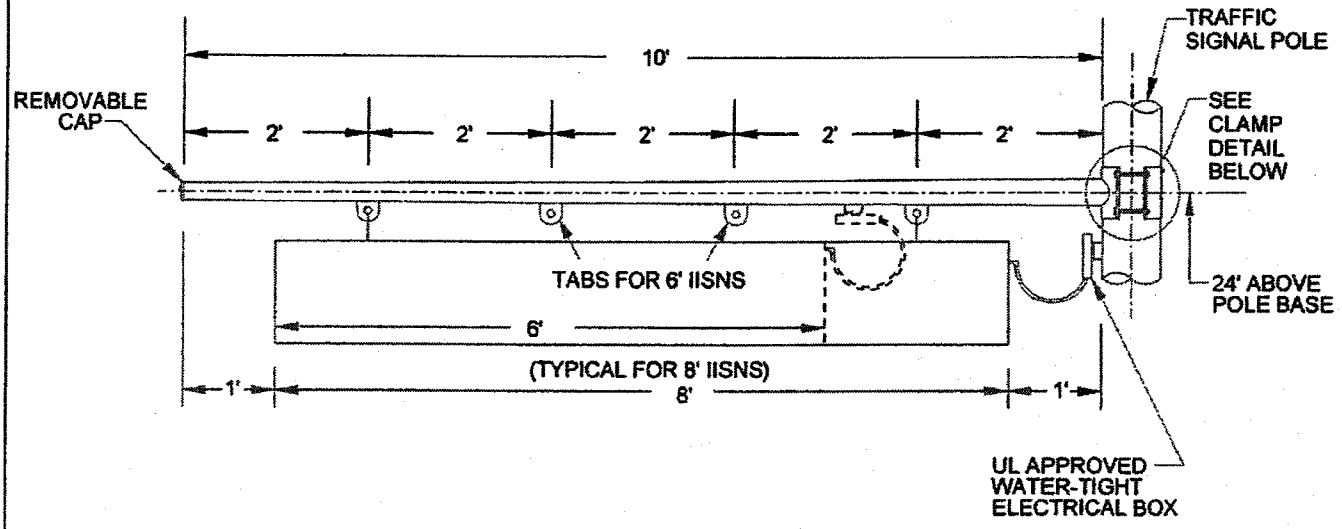
COUNTY OF RIVERSIDE

CURB RAMP CONSTRUCTION NOTES

STANDARD NO. 403 (4 OF 4)

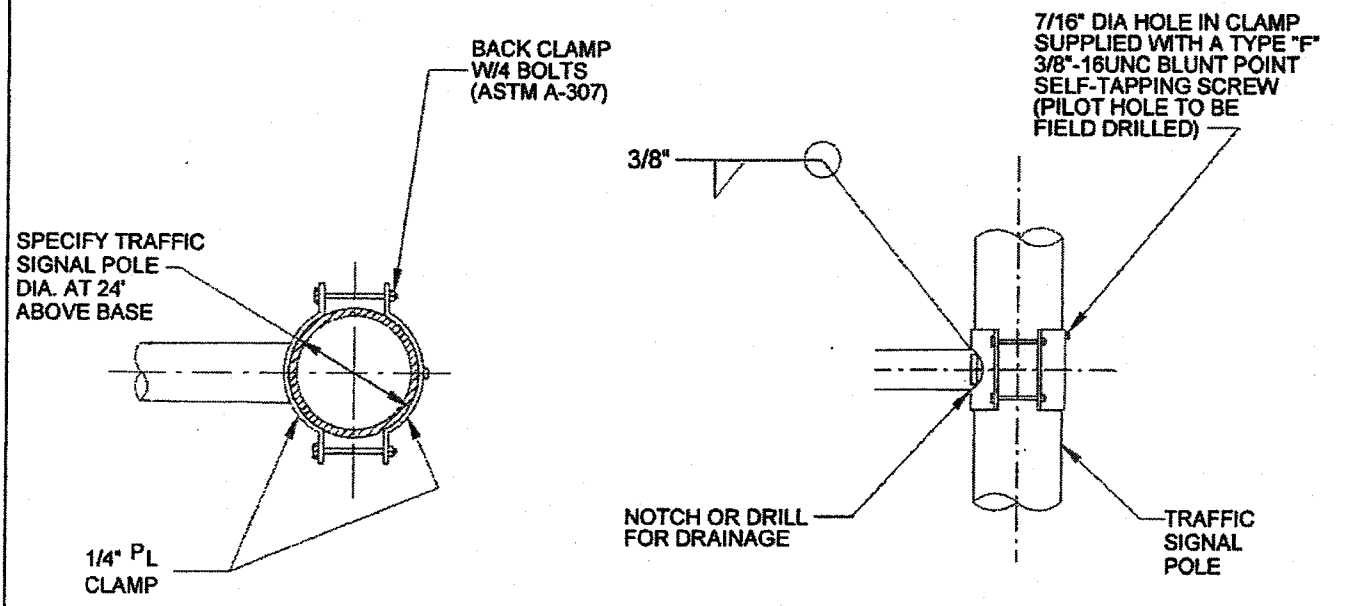
12-97

REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
8-77, 5-80	11-04	1				4			
10-81, 6-82		2				5			
9-88, 2-90		3				6			



IISNS STRAIGHT ARM MOUNTING

NOT TO SCALE



TOP VIEW

ELEVATION

CLAMP DETAIL

NOT TO SCALE

APPROVED BY:

DIRECTOR OF TRANSPORTATION DATE
JUAN C. PEREZ, RCE 49568

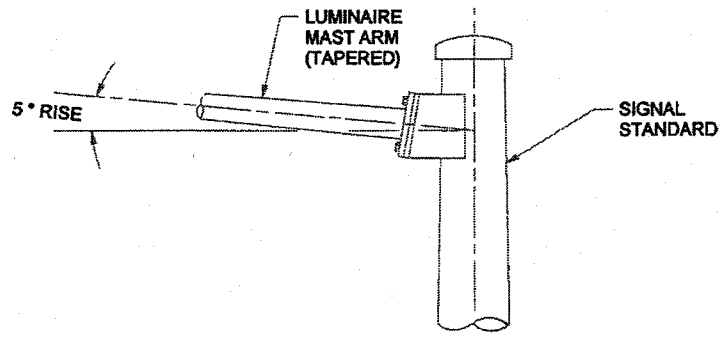
REGISTERED PROFESSIONAL ENGINEER No. Exp. Civil STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

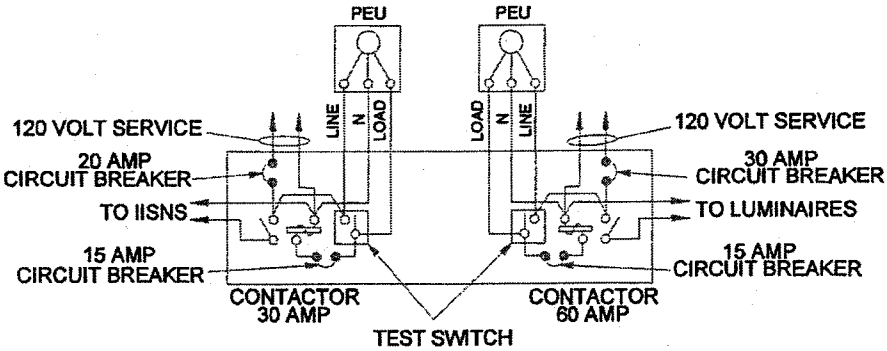
TRAFFIC SIGNAL POLE IISNS STRAIGHT ARM MOUNTING DETAIL

STANDARD NO. 1200

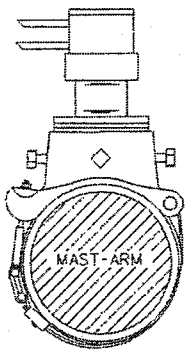
REVISIONS		REV.	BY:	APR'D	DATE	REV.	BY:	APR'D	DATE
		1				4			
		2				5			
		3				6			



STRAIGHT LUMINAIRE MAST ARM DETAIL



DUAL PEC WIRING DIAGRAM



MOUNTING CLAMP FOR OPTICAL DETECTOR

APPROVED BY:

DIRECTOR OF TRANSPORTATION — DATE
JUAN C. PEREZ, RCE 49568

REGISTERED PROFESSIONAL ENGINEER — NO. — EXP. — CIVIL — STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

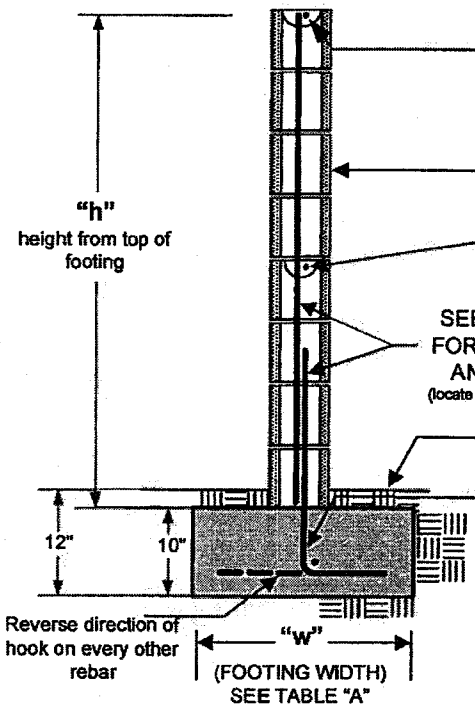
TRAFFIC SIGNAL DETAIL SHEET

NO SCALE

STANDARD No. 1207

REVISIONS		REV	BY:	APR'D	DATE	REV	BY:	APR'D	DATE
		1	JK	JP	08-05-10	4			
		2				5			
		3				6			

FOOTING OPTION "A"



FOOTING OPTION "B"

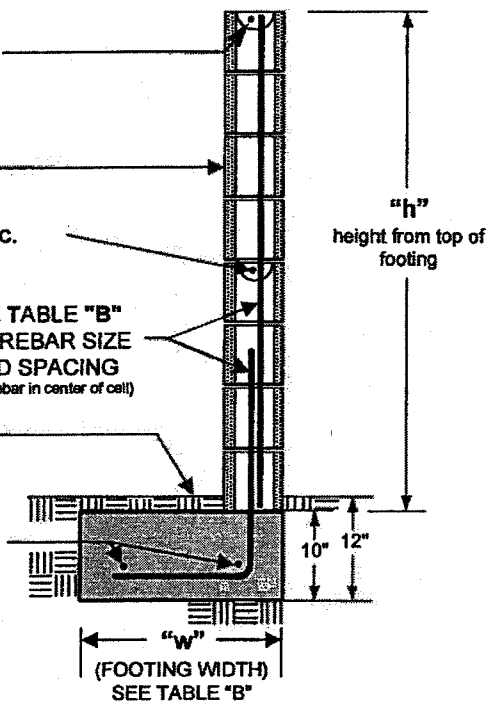


Table "a"		
"h"	"w"	Vertical reinforcement
3'	17"	#4 @ 48" O.C.
4'	20"	#4 @ 48" O.C.
5'	23"	#4 @ 48" O.C.
6'	29"	#4 @ 24" O.C.

All footings adjacent to slopes to be at least 5' to daylight as shown below.

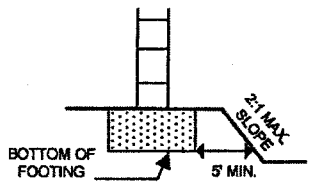


Table "b"		
"h"	"w"	Vertical reinforcement
3'	19"	#4 @ 48" O.C.
4'	22"	#4 @ 48" O.C.
5'	29"	#4 @ 48" O.C.
6'	34"	#4 @ 24" O.C.

NOTES:

1) this design does not allow grade differentials of more than 6" on opposing sides of the wall. This is not a retaining wall.
2) fence heights are regulated – consult zoning regulations before beginning construction.
3) no water course or natural drainage shall be obstructed.
4) grout only the cells containing rebar. This wall is not designed for all cells to be grouted.
5) all rebar to be astm spec. A615, grade 40 minimum.
6) all rebar lap splices to be 24" minimum.
7) all masonry units to be astm C-90 grade N.
8) rebar to be centered in masonry cells.

Check with the Building Department to verify if a building permit is required.

When a permit is required, the following inspections are required:

1) **FOOTING**: Excavation trench clean with steel in place and supported 3" above and away from the surrounding earth/dirt.
2) REBAR/PRE-GROUT: Bond beam rebar and vertical rebar in place - inspection prior to placing grout.
3) FINAL: After grout is placed - prior to any decorative cap placement.

SEE PAGE 2 FOR ADDITIONAL INFORMATION

DISCLAIMER:
Alternate designs may be possible when provided with an engineered analysis. Use of this standard design is at the user's risk and carries no implied or inferred guarantee against failure or defects.

Western Riverside County Code Uniformity Program

COUNTY OF RIVERSIDE
BUILDING DEPARTMENT

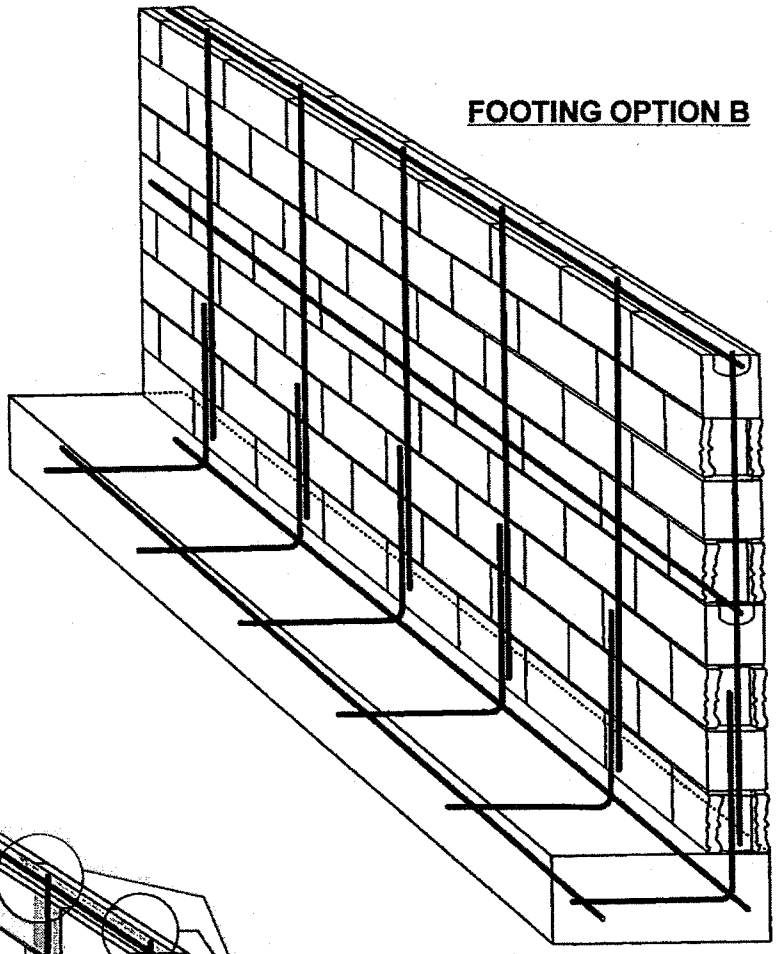
Freestanding block wall

4080 Lemon St. 2nd FL "P.O. Box 1629"
Riverside, CA 92501

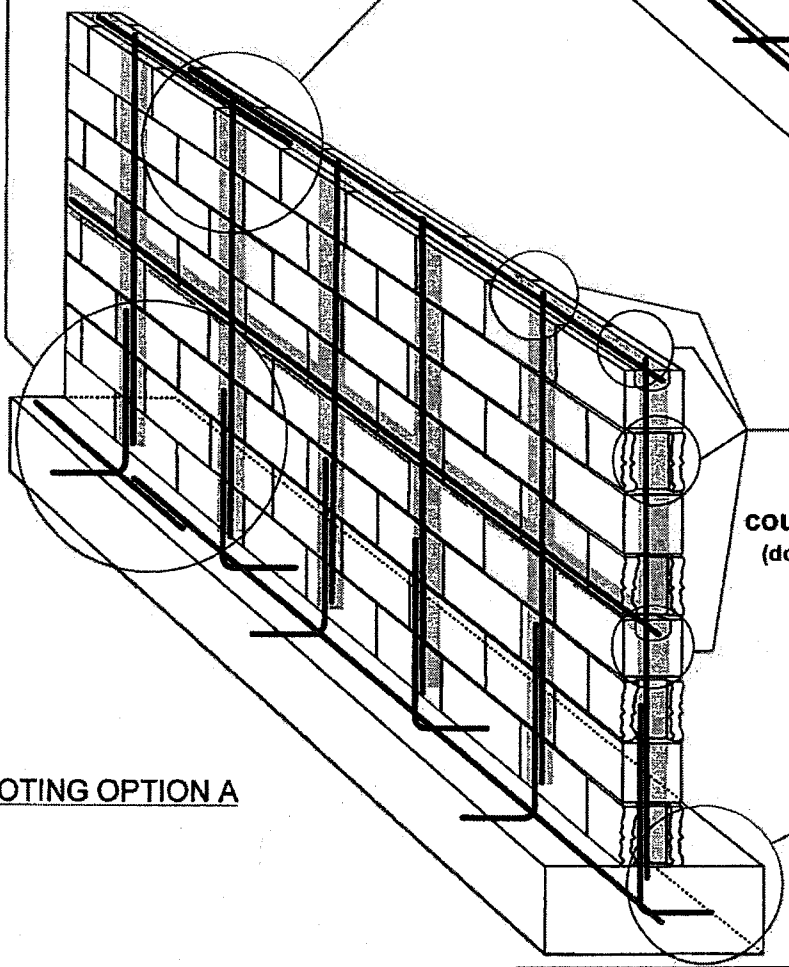
(951) 955-1800
(951) 955-1806
1/1/2008
GardenWallfinal2008.vsd

REBAR PLACEMENT ILLUSTRATION

FOOTING OPTION B



(TYPICAL)
All rebar splices 24" min. overlap



(TYPICAL)
only cells and bond beam courses with rebar to be grouted
(do not solid grout entire wall - use grout stop mesh as appropriate)

FOOTING OPTION A

(TYPICAL)
All rebar shall have a minimum of 3" concrete cover at footings

DESIGN PARAMETERS:

ACTIVE SOIL PRESSURE (PSF)	= 30
PASSIVE SOIL BEARING (PSF)	=150
COEFFICIENT OF FRICTION	= 0.25
ALLOWABLE SOIL BEARING (PSF)	=1500

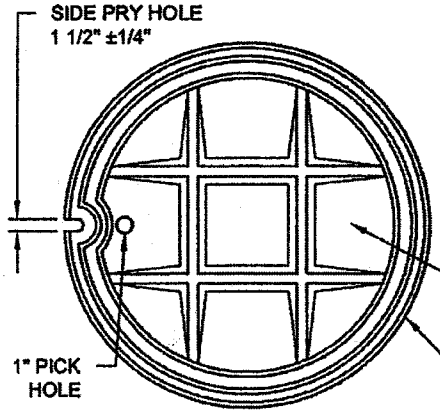
⚠1 WIND = 85 MPH, EXPOSURE C
SEISMIC DESIGN CATEGORY 'E', SITE CLASS 'D'

Western Riverside County Code Uniformity Program

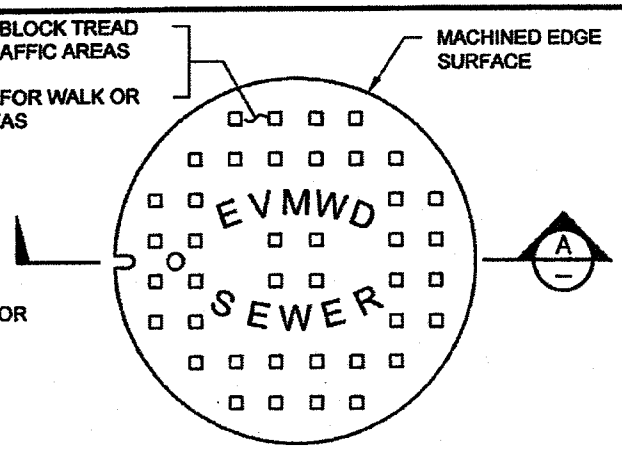
COUNTY OF RIVERSIDE
BUILDING DEPARTMENT

Freestanding block wall

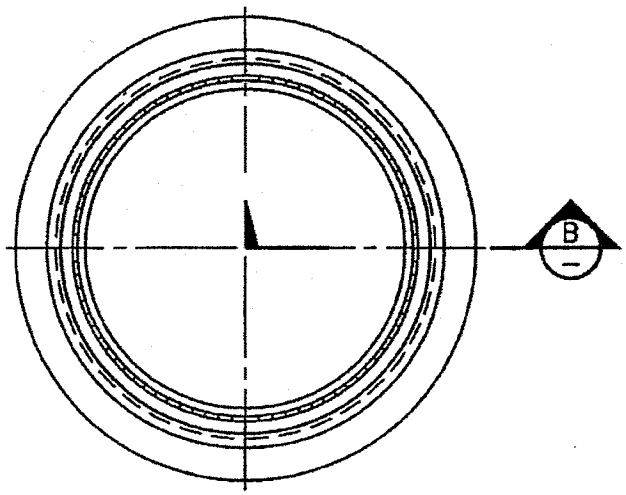
4080 Lemon St. 2nd FL "P.O. Box 1629"
Riverside, CA 92501
(951) 955-1800
(951) 955-1806



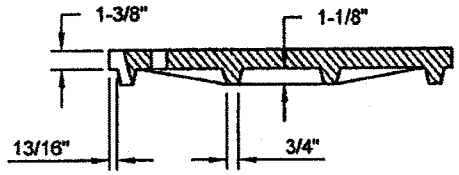
COVER-BOTTOM VIEW



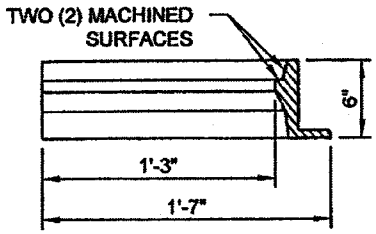
COVER-TOP VIEW



RING PLAN



SECTION A-A



SECTION B-B

TYPICAL INSTALLATION NOTES:

1. FRAME AND COVER SHALL BE MACHINED TO PROVIDE A NON-ROCKING SURFACE. MACHINED TOLERANCE BETWEEN FRAME AND COVER SHALL BE ±1/8" TOTAL. FRAME AND COVER TO BE SELECTED FROM ACCEPTED MATERIALS GUIDELINE.
2. GRAY CAST IRON SHALL CONFORM TO A.S.T.M. A48, CLASS 30B.
3. MANHOLE COVERS 36" DIAMETER AND GREATER SHALL BE OF 2-PIECE CONSTRUCTION WITH INSERT NOT SMALLER THAN 24" IN DIAMETER.
4. THE 30" MANHOLE FRAME AND COVER WEIGHT SHALL CONFORM TO A.S.T.M. A48, CLASS 30B.
5. THE MARKING LETTERS SHALL BE CAST IN THE COVER AND SHALL BE A MINIMUM 2 1/2" HIGH.
6. CASTINGS TO BE ASPHALT DIPPED PRIOR TO INSTALLATION.

BOLT-DOWN COVER INSTALLATION NOTES:

1. WATER PROOF, BOLT DOWN LIDS WITH S.S. BOLTS REQUIRED FOR COVERS NOT IN PUBLIC STREETS/ALLEYS.
   - A. SIDE PRY AND PICK HOLE SHALL BE REPLACED WITH A CLOSED PICK HOLE.
   - B. GASKET MATERIAL SHALL BE 1/2" x 1/2" NEOPRENE GASKET.
   - C. BOLTS SHALL BE 1 1/2" x 1/2" S.S. TYPE 307, SIX EQUALLY SPACED.
   - D. BOLT DOWN LIDS SHALL BE SELECTED FROM APPROVED MATERIALS LIST.

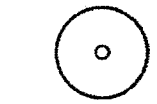
REVISION	BY	APPR	DATE

Elsinore Valley Municipal Water District

Paul B. Carver R.C.E. 31518 11/7/12 DATE

MANHOLE FRAME AND COVER

STD. DWG. NO. S-9



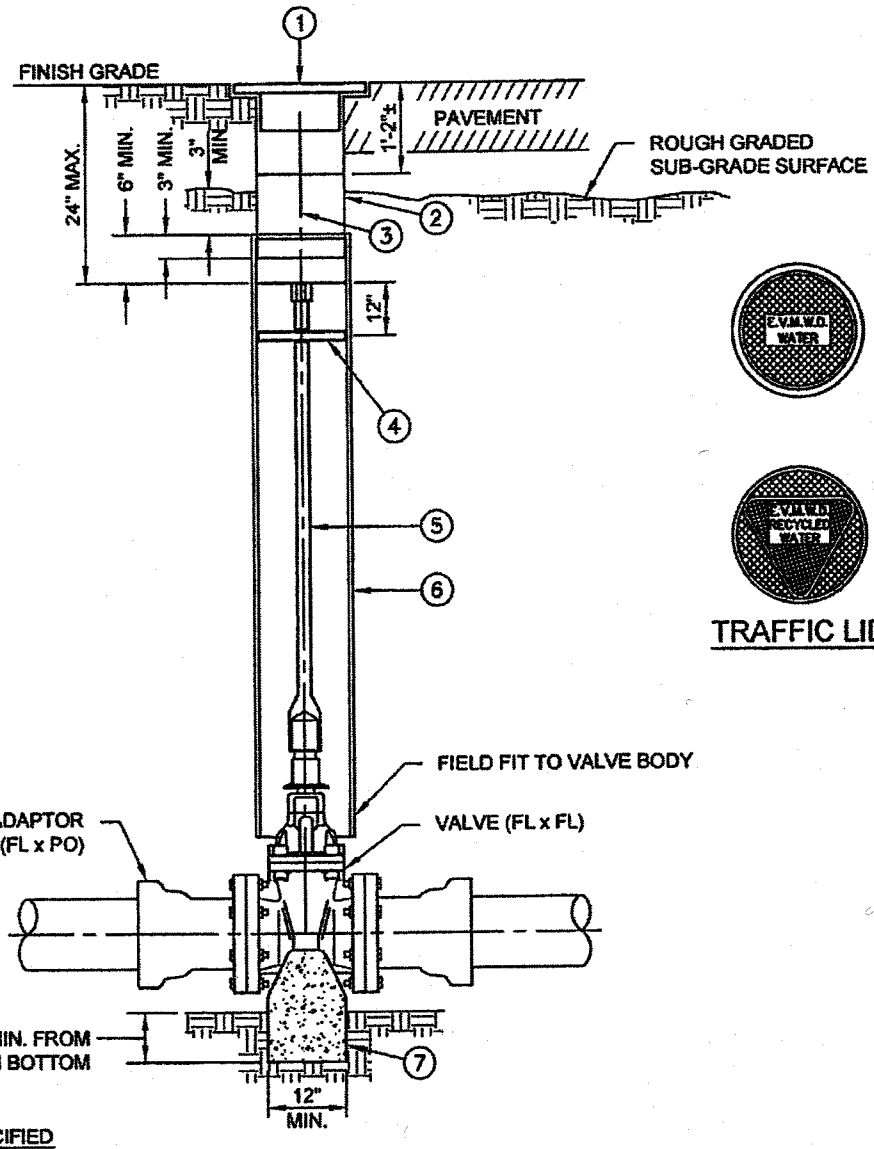
BRACING PLATE

PLAN VIEW

AXONOMETRIC VIEW

TOP VIEW

SLIP CAN



TRAFFIC LID

NOTES:
EXCEPT OTHERWISE SPECIFIED

1. CONTRACTOR SHALL RAISE SLIP CAN TO GRADE AFTER STREET IS PAVED WHERE PAVING IS PROPOSED.
2. ALL VALVE CANS SHALL BE EXPOSED AT ALL TIMES DURING CONSTRUCTION UNLESS BURIAL FOR GRADING IS AUTHORIZED BY THE INSPECTOR.
3. MATERIALS SHALL BE SELECTED FROM THE ACCEPTED MATERIALS GUIDELINE.
4. WELL CAPS FOR RECYCLED WATER SHALL HAVE A TRIANGULAR SHAPED CAP, BE PURPLE AND MARKED "EVMWD RECYCLED WATER".

ITEM	DESCRIPTION
1	8" VALVE WELL CAP W/ 4" SKIRT PAINTED SAFETY PRECAUTION BLUE ENAMEL & PRIMER, & MARKED "E.V.M.W.D. WATER" ON CAP
2	8" O.D.x18 GA. SPLIT VALVE CAN TOP SECTION, GALVANIZED FOR SLIP CAN, SLIP CAN LENGTH 12", 18" OR 24" AS REQ'D
3	4"x4" REDWOOD POST IF VALVE HAS BLIND FLANGE PER STD. DWG. NO. W-14
4	1/8" + 1/32" SOLID DISC 7-3/4" DIA. AT 5' INTERVALS TACKWELD BRACING PLATE TO STEM
5	PROVIDE VALVE STEM EXTENSION WHERE DEPTH TO OPERATOR NUT EXCEEDS 5'
6	8" PVC, SDR-35 OR C-900 FOR GATE VALVES 3" AND LARGER, 6" PVC FOR GATE VALVES LESS THAN 3" DIAMETER
7	VALVE SUPPORT BLOCK PER STD. DWG. NO. W-15

REVISION	BY	APPR	DATE

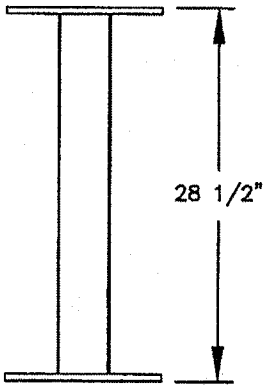
Elsinore Valley Municipal Water District

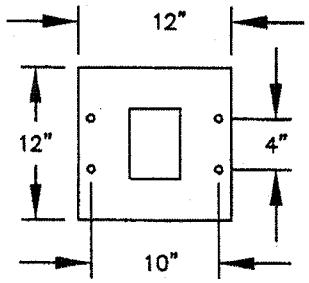
Paul S. Carver R.C.E. 31516 11/7/12 DATE

VALVE WELL AND RISER DETAIL

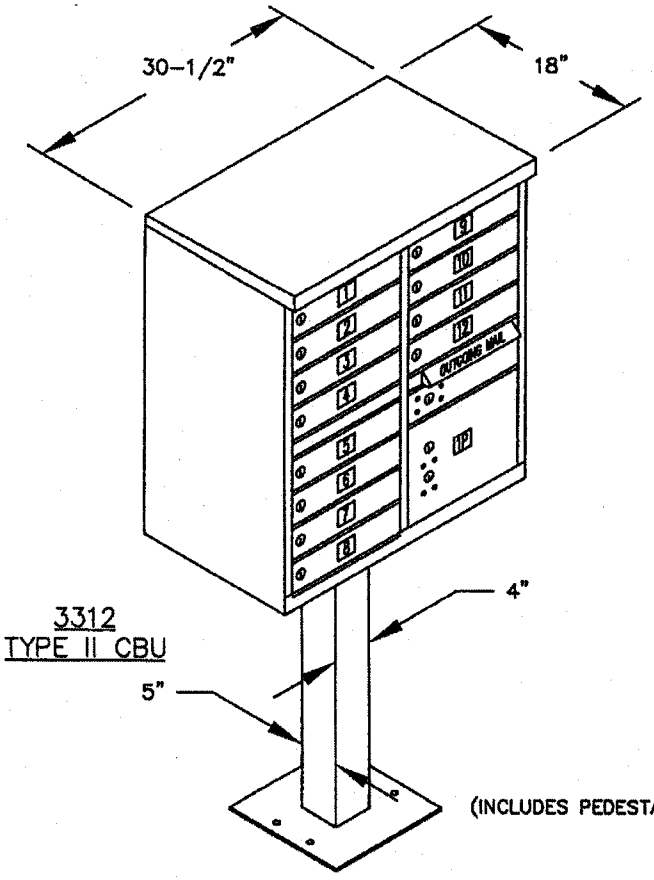
STD. DWG. NO.

W-13



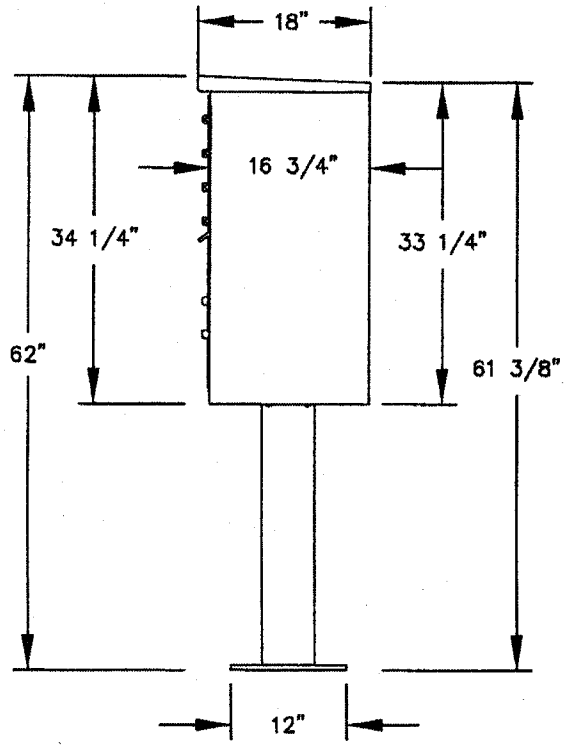


PEDESTAL BASE
BOLT PATTERN



3312
TYPE II CBU

(INCLUDES PEDESTAL)



MODEL #3312
CLUSTER BOX UNIT
(F SERIES)

AVAILABLE COLORS:
SANDSTONE, BRONZE, GREEN, BLACK, WHITE
OR GRAY (FOR REPLACEMENT UNITS)

DRAWN: 10/10

Appendix C

Elsinore Valley Municipal Water District
Specifications

Contract Documents
For
Construction of New Water Mains at
Grand Ave. and Blackwell Boulevard Project
Work Order No. 75859

ELSINORE VALLEY MUNICIPAL WATER DISTRICT

CONTRACT DOCUMENTS
FOR
CONSTRUCTION OF NEW WATER MAINS AT
GRAND AVENUE AND BLACKWELL BOULEVARD PROJECT
IN THE CITY OF LAKE ELSINORE, CA
WORK ORDER NO. 75859

TABLE OF CONTENTS

SECTION 3 – PAVING

SECTION 4 – CONCRETE AND GROUT

SECTION 5 – REINFORCEMENT STEEL

SECTION 6 – WATER PIPING AND APPURTENANCES

PART II - STANDARD AND REFERENCE SPECIFICATIONS, DEFINITIONS AND ABBREVIATIONS

1-1 STANDARD AND REFERENCE SPECIFICATIONS

The work to be done under this Contract requires the completion of all work in accordance with the Contract Documents, including the current edition of the following documents (collectively, the "Standard Specifications"), as modified herein. In the case of conflict between the Standard Specifications and the General Conditions or Special Provisions, the General Conditions and Special Provisions shall take precedence over all of the following referenced Standard Specifications, in all areas, and said referenced Standard Specifications shall take precedence in the following order:

A. Elsinore Valley Municipal Water District, "Standard Specifications and Drawings," as last revised, which are incorporated herein by this reference.

B. "Standard Specifications for Public Works Construction", (the Green Book), and "Standard Plans for Public Works Construction", latest editions (hereinafter, SSPWC), including all supplements which said "Standard Specifications for Public Works Construction" are incorporated herein by this reference. Copies may be purchased from Building News, Inc., 10801 National Blvd., Los Angeles, California 90064, telephone (714) 517-0970, FAX (714) 535-8078 or 1612 S. Clementine St., Anaheim, California 92802, telephone (714) 517-0970, FAX (714) 533-8078.

C. County of Riverside "Standard Specifications," as last revised, which are incorporated herein by this reference.

1-2 DEFINITIONS

Whenever the words defined in this article, or pronouns used in their stead, occur in these specifications or in any of the other contract documents, they shall have the meanings here given:

A. Acceptable, Acceptance or words of similar import shall be understood to be the acceptance of the Engineer and/or the District.

B. Act of God an Act of God is an earthquake of magnitude 3.5 on the Richter scale and tidal waves.

C. Approval means written authorization by Engineer and/or District.

D. Contract Documents includes all documents as stated in the Contract.

E. District and Contractor are those stated in the Contract. The terms District and Owner may be used interchangeably.

F. Day shall mean calendar day unless otherwise specifically designated.

G. Engineer shall mean the General Manager, or his or her designee, of the Elsinore Valley Municipal Water District, acting either directly or through properly authorized agents, such as agents acting within the scope of the particular duties entrusted to them. Also sometimes referred to as the "District's Representative" or "Representative" in the Contract Documents.

H. Equal, Equivalent, Satisfactory, Directed, Designated, Selected, As Required and similar words shall mean the written approval, selection, satisfaction, direction, or similar action of the Engineer and/or District.

I. Indicated, Shown, Detailed, Noted, Scheduled or words of similar meaning shall mean that reference is made to the drawings, unless otherwise noted. It shall be understood that the direction, designation, selection, or similar import of the Engineer and/or District is intended, unless stated otherwise.

J. Install means the complete installation of any item, equipment, or material such that it is operable and can be used by the District.

K. Material shall include machinery, equipment, manufactured articles, or construction such as form work, fasteners, etc., and any other classes of material to be furnished in connection with the Contract. All materials shall be new unless specified otherwise.

L. Perform shall mean that the Contractor, at Contractor's expense, shall take all actions necessary to complete The Work, including furnishing of necessary labor, tools, and equipment, and providing and installing Materials that are indicated, specified, or required to complete such performance.

M. Project is The Work planned by District as provided in the Contract Documents.

N. Provide shall include provide complete in place, that is furnish, install, test and make ready for use.

O. Recyclable Waste Materials shall mean materials removed from the Project site, which are required to be diverted to a recycling center rather than an area landfill. Recyclable Waste Materials include asphalt, concrete, brick, concrete block, and rock.

P. Specifications means the Standard Specifications referenced in Part II Section 1-1 of EVMWD Standard Drawings and Specifications.

Q. The Work means the entire improvement planned by the District pursuant to the Contract Documents.

R. Work means labor, equipment and materials incorporated in, or to be incorporated in the construction covered by the Contract Documents.

1-3 ABBREVIATIONS

The following abbreviations, of the names of agencies promulgating reference specification are used herein:

AWWA	American Water Works Association
AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
ANSI	American National Standards Institute, Inc.
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CalTrans	Department of Transportation, State of California
DIS	California Division of Industrial Safety
DWP	Department of Water and Power, City of Los Angeles
EVMWD	Elsinore Valley Municipal Water District
LACPWD	Los Angeles County Public Works Department
MWD	Metropolitan Water District of Southern California
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration

SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
WCLIB	West Coast Lumber Inspection Bureau

PART IV – TECHNICAL SPECIFICATIONS

SECTION 2 - EARTHWORK

2-1 GENERAL

2-1.1 The Contractor shall be required to perform earthwork for construction of the facilities as specified herein and as shown on the drawings. The earthwork shall be in accordance with Section 300 of the SSPWC and the Grading and Excavation Code of the County of Los Angeles except as modified herein. Earthwork shall consist of excavation, preparation of subgrade, ditching, structural excavation, trenching, backfill and fine grading as shown on the plans or contained in these Specifications. The Contractor shall furnish all labor, material, tools and equipment necessary for earthwork operations and perform all incidental work thereto which may be required.

2-1.2 Earthwork shall include clearing and grubbing, removal of water, excavation of all classes of material of any nature, which interfere with the construction work and disposal of all excess excavated material.

2-2 STRUCTURE EXCAVATIONS

2-2.1 Structure excavations shall be made to the levels and alignments as shown on the drawings. All subgrades for footings shall be approved by the Engineer as to compliance with the drawings and these Specifications before form work steel work, or any other work is done. The subgrades shall be free from any loose material at the time concrete is deposited.

2-2.2 Footing excavation shall be sharp and true and any excavation below that required for footings shall be backfilled with concrete Class 420-C-2000, and no payment will be made for excess excavation or concrete required to replace this excess excavation.

2-3 STRUCTURE BEDDING

A gravel subbase shall extend from firm ground undisturbed by the Contractor's operations to the structure base slab for all concrete structures. Any remaining disturbed or loose material shall be removed before the subbase is placed. The subbase shall be compacted by means of a vibratory roller, with lifts not exceeding 6-inches. The subbase shall have a minimum thickness of 6-inches and the subbase material shall be 3/4-inch crushed rock meeting the gradation listed in Section 200-1.2 of the SSPWC. The building footing and slab shall be constructed on a 10-mil vapor barrier.

2-4 STRUCTURE BACKFILL

2-4.1 Backfill outside of the structures shall conform to the requirements of Section 300.3.5 of the SSPWC. The Contractor shall fine grade the areas around the structures to provide for drainage away from the structures.

2-4.2 Fills for overexcavation and backfill shall be placed in 8-inch lifts and compacted to obtain a relative compaction of not less than 90% as determined by ASTM D 1557, as last revised.

2-5 DISPOSAL OF EXCAVATED MATERIAL

All unsuitable material as described per Section 2-6 excavated from the project site shall be removed from the site and disposed of at the Contractor's expense at locations approved by all cognizant agencies.

2-6 GRADING

2-6.1 All grading shall be accomplished under the observation and testing of the project Soils Engineer or his authorized representative in accordance with the following requirements.

2-6.2 **Removals** - Any unsuitable materials such as stockpiled fill, trash or debris, shall be removed from the previously graded surfaces as recommended by the Soils Engineer.

2-6.3 **Compaction, Grading or Trenching Operations shall be as follows:**

A. Fill Placement - After removals, scarification and compaction in place are completed, additional fill may be placed. Fills should be placed in thin lifts (8-inch bulk), compacted and tested as grading progresses until final grades are attained.

B. Oversized Material - Oversized cobbles and boulders (6-inch in diameter) may be encountered during grading operations in the terrace material. Oversized material shall be disposed of away from the job-site in a manner and at a location acceptable to all cognizant agencies.

C. Haul Roads - No haul roads, ramps or other grading shall take place beyond the limits of the previously graded site.

D. Import Materials - All imported fill and/or borrow sites shall be approved by the Engineer prior to use in compacted fills. All imported fill should be free of deleterious or oversize materials.

E. Mixing - In order to prevent layering of different soil types and/or different moisture contents, mixing of materials may be necessary. The mixing shall be accomplished prior to and as part of compaction of each fill lift. Under excessively dry or wet conditions discing may be required.

2-6.4 Compaction shall be as follows:

A. Suitability and Selective Grading - on-site soil material may be suitable for use as compacted fill, except where granular import materials are required, if care is taken to remove all significant organic and other decomposable debris and to separate and either stockpile or selectively place rock materials larger than 6 inches in maximum diameter.

B. Compaction Standard - All soil material used as compacted fill or material processed in-place or used to backfill pipeline trenches shall be moistened, dried or blended, as necessary, to achieve near-optimum moisture content for compaction and densified to at least 90% relative compaction as determined by ASTM Test Method D 1557, as last revised, unless otherwise noted for a specific application.

2-7 EROSION CONTROL

The Contractor shall maintain and implement at all times erosion control devices to protect the Owner property from erosion due to adverse conditions. In addition, the Contractor is required to prevent damage to Owner and adjoining properties from erosion resulting from the Contractor's operations. Any damage to Owner property due to adverse conditions or any damage to Owner and adjoining properties as a result of the Contractor's operation or the Contractor's failure to maintain or implement satisfactory erosion control devices shall be corrected by the Contractor at no additional cost to the Owner.

All temporary erosion control devices including, but not limited to, sandbags and V-Ditches shall be disposed of off site at the Contractor's expense.

The costs for all maintenance, implementation and disposal of erosion control devices shall be included in the Contractor's bid for this project and no additional compensation shall be made.

2-8 SHEETING, SHORING, AND BRACING OF TRENCHES

Trenches shall have sheeting, shoring, and bracing conforming to CAL/OSHA requirements and the corresponding provisions in the SSPWC. Lateral pressures for design of trench sheeting, shoring, and bracing shall be based on type of soil exposed in the trench, groundwater conditions, surcharge loads adjacent to the trench, and type of shoring that will be used in the trench.

2-9 FINE GRADING

Backfill shall conform to the adjacent areas and provide for drainage.

2-10 IMPORT OR EXPORT OF BACKFILL MATERIAL

2-10.1 Contractor shall be responsible, at no additional cost to the Owner, to import any required additional backfill material necessary to return all grades to plus or minus 0.2-feet from the grade encountered at the beginning of construction or as shown on the Contract Drawings. All backfill shall be granular sand material (SE 30), including imported or existing material.

2-10.2 Excess excavation soil material shall be removed and disposed of by the Contractor off the project site at the Contractor's expense. Excess soil material shall be disposed of in accordance with local regulations.

2-11 MOISTURE CONTENT OF BACKFILL MATERIAL

During the compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of the backfill material. Maintain moisture content uniform throughout the lift. If placement is discontinued and proper moisture content is not maintained, bring upper layer back to proper moisture content by sprinkling, cultivating and rolling the backfill material before placing new material. At the time of compaction, the water content of the material shall be at optimum water content plus or minus two percentage points. Do not compact material that contains excessive moisture to obtain the required compaction. Aerate material by balding, discing, or harrowing to hasten the drying process.

2-12 GRADE

Excavate the trench to the lines and grades shown on the drawings with allowance for pipe thickness and for pipe base or any special subbase. If the trench is inadvertently excavated below the required grade, refill with imported sand any part of the trench excavated below the grade at no additional cost to the Owner. Place the refilling material over the full width of the excavated area in compacted layers not exceeding 6-inches deep to the established grade with allowance for the pipe base or special subbase.

2-13 DEWATERING

2-13.1 The Contractor is referred to subsection 306-3.3, "Dewatering" of the latest edition of the SSPWC. The Contractor shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods that will ensure a

dry excavation and preservation of the final lines and grades of the bottoms of excavations.

2-13.2 Dewatering shall commence when groundwater is first encountered, and shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this section or other requirements.

2-13.3 Standby pumping equipment shall be provided on the job-site. A minimum of one standby unit (a minimum of one for each ten in the event well points are used) shall be available for immediate installation should any well unit fail. The design and installation of well points or deep wells shall be suitable for the accomplishment of the work.

2-13.4 Disposal of water from dewatering operations shall be the sole responsibility of the Contractor. Disposal methods shall conform to the Porter-Cologne Water Quality Control Act, 1974, the Federal Water Pollution Control Act Amendment of 1972; and the California Administrative Code, Title 23, Chapter 3.

2-13.5 The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property. Conveyance of the water shall be such as to not interfere with traffic flow or other construction. No water shall be drained into work built or under construction without prior consent of the Engineer.

2-13.6 Water shall be desanded before disposal in any sewer or storm drain system. The system used for desanding the water shall be a baffled structure and shall provide not less than five minutes detention time and shall be designed to have a "flow-through" velocity not exceeding 0.2-feet per second at the anticipated peak flow. The desanding box shall be cleaned as required to maintain the detention time and flow-through limitations specified above.

2-14 LOCATION OF EXCAVATED MATERIAL

During excavation, place the excavated material only within the working area. Do not obstruct any roadways or access ways. Conform to Federal, State, and Local Codes governing the safe loading of trenches with excavated material.

SECTION 3 – PAVING

3-1 GENERAL

Material for asphalt concrete paving and methods of construction shall be in accordance with referenced sections of the SSPWC. Thickness and extent of base courses, paving courses and other construction details shall be as shown on the drawings, and constructed according to applicable local regulations and standards.

3-2 WEED KILLER

3-2.1.1 Weed killer shall be applied at the manufacturer's recommended rate and uniformly applied to the surface of the aggregate base by means of a calibrated power spray device satisfactory to the Engineer. The weed killer solution shall contain a dye indicator and shall be covered with asphalt the same day as applied to the base surface.

3-2.1.2 The weed killer shall be applied to the subgrade in all areas where pavement is to be placed unless otherwise specified by the Engineer. Extreme care shall be taken to confine the material to the proper areas, to strictly conform with the manufacturer's recommendation, and to avoid damage to any vegetation to be retained.

3-3 AGGREGATE BASE

Aggregate base shall be crushed aggregate base, crushed miscellaneous base (fine gradation), or processed miscellaneous base (fine gradation) as specified in Section 200-2 of the referenced SSPWC. Placement shall be as specified in Section 301-2. The aggregate base shall be as shown in the plans.

3-4 ASPHALT CONCRETE

Asphalt concrete shall be of the types specified herein, and in accordance with the requirements of Section 400-4 of the referenced SSPWC. A prime coat and a tack coat shall be provided as specified in Subsections 302-5.2 and 302-5.3. The asphalt concrete shall be Type III-C3-PG64-10, and shall be placed after the construction of all other improvements have been completed.

3-5 SEAL COAT

A fog seal coat meeting the requirements of Section 37 of the State of California, Department of Transportation (Caltrans) Standard Specifications, latest edition, shall be provided and applied to the finished asphalt concrete surface course. The Contractor shall protect all adjacent concrete and stucco surfaces from overspray and shall clean all asphalt from these surfaces to the satisfaction of the Engineer.

SECTION 4 – CONCRETE AND GROUT

4-1 GENERAL

The Contractor shall furnish all materials for concrete and mortar, and shall form, mix, place, cure, repair, finish and do all other work required to produce finished concrete structures. Concrete shall be Class 560-C-3250 unless otherwise specified.

4-2 PROPORTIONING

All concrete required hereunder shall be composed of Portland cement and properly graded sand and rock. The proportions of cement and aggregates shall be such as to produce a workable mix with a minimum compressive strength of 3,250 psi at the age of 28 days. The quantity of water used shall be just sufficient, with a normal mixing period, to produce a concrete, which in the judgment of the Engineer, can be worked properly into place without segregation. The consistency of the concrete in successive batches shall be determined by slump tests. The maximum slump for concrete to be used in footings and slabs shall be 3-inches; the maximum slump for all other concrete work shall be 4-inches.

4-3 MATERIALS

4-3.1 **Cement** - All cement used on the work shall be standard brand Portland cement conforming to the "Specifications for Portland Cement" (ASTM Designation C150), Type II Low Alkali.

4-3.2 **Aggregates** - Aggregates shall be non-reactive and conform to the requirements set forth in Section 201 of the SSPWC and shall be Grade C unless otherwise specified.

4-3.3 **Water** - Water shall conform to the requirements set forth in Subsection 201-1.2.3 of the SSPWC.

4-3.4 **Admixtures** - Admixtures shall not contain chlorides or other ingredients that affect the reinforcing steel and shall be subject to acceptance by the Engineer.

4-4 FORMS

Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall furnish all materials for concrete formwork, bracing, shoring, and supports and shall assume full responsibility for the adequate design of all forms and falsework. Except as otherwise provided herein, forms for all exposed concrete surfaces, including the interior surfaces of all underground structures, shall be of new Plyform at least 5/8-inch thick. All other forms shall be smooth, tongue and grove boards, shiplap or plywood. Exposed corners of all concrete structures shall be given a 3/4-inch chamfer. Forms shall not be removed or back filled against until the

concrete has obtained a minimum of 80% of its compressive strength, and removal of forms shall be subject to the approval of the Engineer.

4-5 PLACEMENT OF CONCRETE

Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. As concrete is placed in forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer that is being consolidated into a dense homogeneous mass. Except in special cases where their use is deemed impractical by the Engineer, the Contractor shall use high-speed internal vibrators of an approved immersion type.

4-6 FINISH OF CONCRETE SURFACES

4-6.1 All finished or formed surfaces shall conform accurately to the shape, alignment, grades, and sections as shown on the plans or prescribed by the Engineer. Surfaces shall be free from fins, bulges, ridges, offsets, honey-combing, or roughness of any kind, and shall present a finished, smooth continuous, hard surface, and shall in no place vary more than 3/16-inch from the lower edge of a 10-foot straightedge laid on the slab in any direction.

4-6.2 Exposed unformed surfaces of concrete shall be given a steel trowel finish. Excessive floating of surfaces while the concrete is plastic will not be permitted. Dusting on of dry cement and sand to absorb excess moisture will not be permitted. Edges of exposed surfaces shall be worked with a suitable edging tool.

4-7 CURING

Exposed concrete surfaces shall be treated with a liquid membrane curing compound conforming to ASTM C309 type 1 Clear (suitable for application on horizontal and vertical surfaces) immediately after finishing in accordance with the manufacturer's printed instructions. The Contractor shall not backfill against concrete structures and footings until the concrete has obtained a minimum of 80% of the required 28-day compressive strength or unless otherwise authorized by the Engineer.

4-8 READY-MIXED CONCRETE

At the Contractor's option, ready-mixed concrete may be used meeting the requirements as to materials, batching, mixing, transporting and placing as specified herein, and the requirements of the "Specifications for Ready-Mixed Concrete" (ASTM Designation C94). The use of non- agitating equipment for transporting ready-mixed concrete will not be permitted. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted. The quality and quantity of materials used in read-mixed concrete and in batched aggregates shall be subject to inspection at the batching plant.

4-9 SLUMP

The Contractor shall supply test cylinders of fresh concrete pours for use by the Engineer in accordance with Subsection 201.1.1.4 of the SSPWC. The maximum slump for concrete to be used in footings and slabs shall be 3-inches; the maximum slump for all other concrete shall be 4-inches.

4-10 REINFORCING

All concrete reinforcing steel shall conform to the requirements of fabrication, placement, and fastening as described in Section 5 – Reinforcement Steel.

4-11 CONCRETE VAULTS

4-11.1 **General** - The Contractor shall comply with the requirements of this section that describes the materials and specifies the requirements for the concrete vaults.

4-11.2 **Submittals** - Shop drawings for the concrete vaults shall be submitted in accordance with the General Conditions and Requirements. The Contractor with his submittal for all vaults shall include structural calculations demonstrating the integrity of the vault to withstand all dead and live loads including soil pressure.

4-11.3 **Vault** - The Contractor, where indicated on the plans, shall provide a precast concrete vault as manufactured by Jensen Precast, Eisel Enterprises or approved equal.

4-11.4 **Joint Sealing Compound** - All joints shall be made watertight by the use of a plastic joint sealing compound as recommended by the manufacturer of the vault.

4-11.5 **Dampproofing** - The exterior of the vaults shall receive a minimum of two (2) coats, 15 mils each (30 mils total) of Koppers Bitumastic Concrete Penetrant, Dehydratine No. 4 or approved equal.

4-11.6 **Vault Hatch** - The Contractor shall provide the access hatches as shown on the plans. The access hatches will consist of an opening as shown on the plans and as manufactured by the Bilco Company, USF Fabrication or approved equal. The door leaf shall be a minimum of 1/4-inch aluminum diamond pattern plate capable of parkway loading. Channel frame shall be 1/4-inch aluminum with an anchor flange around the perimeter. Door shall be equipped with heavy forged stainless steel hinges, stainless steel pins, compression spring operators for each operation and an automatic hold-open arm with release handle. Provide 316 Stainless Steel Slamlock with watertight plug and removable key wrench. A 1-1/2-inch drainage coupling shall be located in the channel frame and is to drain to outside of vault into CAB backfill. Hardware shall be stainless steel. Mill finish with bituminous coating applied to exterior of the frame. Installation shall be in accordance with

manufacturer's instructions. Contractor shall coordinate openings and installation for the hatch with the manufacturer of the precast vault.

4-11.7 **Vault Lid** – Vault reading lid is to be 12-inch x 6-inch aluminum rectangular diamond plate to match hatch door leaf with stainless hinges and pins. Reading lid is to have 3/8-inch x 1-inch opening for lifting hook on center, 1-inch from edge opposite hinges.

4-12 GROUT

4-12.1 The Contractor shall furnish all materials for grout in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished grout.

4-12.2 **Non-Shrink Grout** - Non-shrink grout shall be prepackaged, inorganic, non-gas liberating, non-metallic, cement based grout requiring only the addition of water and conforming to the Corps of Engineers specification for non-shrink grout, CRD-C621-82B. Grout shall be Upcon High Flow, Master Flow 713, or equal.

4-12.3 **Cement Grout (Dry Pack)** - Cement grout shall be composed of one part cement, two parts sand (100% passing a No. 8 sieve), and the minimum amount of water necessary to obtain a damp formable consistency.

4-13 CONCRETE JOINTS

The Contractor shall construct all joints in concrete at the locations shown, in compliance with the requirements of this section.

4-13.1 **Joint Sealant** - The joint sealant shall be a 2-part, gray, non-staining, non-sagging, polyurethane, gun grade sealant, which cures at ambient temperature to a firm, flexible, tear-resistant rubber. The sealer shall be resistant and have excellent recovery characteristics after extended periods of compression or elongation. Sealant shall be PRC270, Vulkum 227, or equal.

4-13.2 **Pre-molded Joint Filler** - Joint filler shall be preformed, non-extruded type, constructed of closed-cel neoprene conforming to ASTM D 1752, Type I as manufactured by W.R. Grace Company of Cambridge, Massachusetts; W.R. Meadows, Inc., Elgin, Illinois, or equal.

SECTION 5 - REINFORCEMENT STEEL

5-1 GENERAL

5-1.1 The Contractor shall furnish, fabricate and install all reinforcement steel as shown and specified. The work shall further include the furnishing and installation of all tie wires, clips, supports, chairs, spacers, concrete inserts and other appurtenances for use in reinforced concrete and masonry construction necessary to fulfill the requirements of these Specifications and produce finished concrete structures in accordance with the best engineering practice.

5-1.2 Unless the Engineer issues a waiver in writing, the Contractor shall furnish shop bending diagrams, placing lists, and drawings of all reinforcement steel prior to fabrication in accordance with Part III, Subsection 1-4. Approval of shop drawings by the Engineer will be limited to general compliance with the Contract Drawings. The Contractor shall be fully responsible for accuracy of dimensions and details, and said dimensions and details will be checked in the field by the Engineer at the time of placement.

5-2 MATERIALS

Reinforcement steel shall be deformed steel bars or cold-drawn steel wire, or fabricated forms of those materials, as required by the applicable drawings and specifications. Materials shall conform in quality to the requirements of the "Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement." (ASTM A615) Grade 60.

5-3 INSTALLATION

5-3.1 **Cleaning.** Reinforcement steel, before being positioned, shall be free from loose mill and rust scale, and from coatings that may destroy or reduce the bond. Where there is delay in depositing concrete, reinforcement steel shall be reinspected and cleaned when necessary.

5-3.2 **Fabrication.** Reinforcement steel shall be accurately formed to the dimensions and shapes indicated on the applicable drawings, and the fabricating details shall be prepared in accordance with the ACI Building Code (ACI 318), except as modified herein or by the drawings. Stirrups and tie bars shall be bent around a pin having a diameter not less than 4 times the minimum thickness of the bar for #5 bar and smaller. Bends for other bars shall be made around a pin having a diameter not less than 6 times the minimum thickness, except for bars larger than 1 inch, in which case the bends shall be made around a pin of 8 bar diameters. Bars shall be bent cold.

5-3.3 **Straightening.** Reinforcement steel shall not be straightened or rebent in a manner that will injure the material. Bars with kinks or bends not shown on the drawings shall not be used. Heating of the reinforcement will not be permitted.

5-3.4 **Placing**

A. Reinforcement steel shall be accurately positioned in accordance with the drawings and secured by using annealed iron wire ties or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers or metal hangers. Metal clips or supports shall not be placed in contact with the forms. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage. Bars additional to those shown on the drawings that may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at his own expense.

B. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties that are embedded in the blocks.

C. Place reinforcing steel a minimum of two inches clear of any metal pipe or fitting.

5-3.5 **Splicing.** When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be determined by the Engineer. Unless otherwise shown, splices of horizontal bars shall be staggered. The lapping of splices shall be 40 bar diameters unless otherwise shown. Reinforcement bars, other than tie bars, shall not be spliced at points other than shown on the approved shop bending diagrams and placing lists. Laps of wire mesh shall be one width of wire spacing, and adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each two running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

5-3.6 **Chairs, Spacers And Bolsters.** Chairs, spacers, and bolsters shall be standard design and shall be furnished by the Contractor as part of reinforcement steel to hold reinforcement in place.

SECTION 6 – WATER PIPING AND APPURTENANCES

6-1 GENERAL

6-1.1 General. The Contractor shall furnish and install all piping materials and work in accordance with the Owner's Standard Specifications and the SSPWC, unless otherwise noted on the Plans or specified herein. The piping shall include all pipe, fittings, valves, pipe supports, bolts, nuts, gaskets, jointing materials and appurtenances as shown and specified. The Contractor shall furnish and install all auxiliary piping and connections to equipment or existing facilities, all as required for a complete and operable piping system.

Before any equipment or pipe is fabricated or purchased and any work is installed, the Contractor shall verify the location, dimensions and type of connection on the existing systems and determine that pipe or equipment will properly fit the space available and that piping and ductwork can be run as contemplated without interference between systems with structural elements or with the work of other trades. Submit for review shop drawings clearly showing the interrelationship of the various portions of the work, along with its relationship to the work of other trades prior to commencing fabrication or installation of the work. No piping shop drawings submittals shall be reviewed without prior pipe connection pothole date as required per plans.

The Contractor shall furnish and install all pipe fittings, pipe supports, necessary components and attachments, whether shown on the Plans or not, to make all piping work as a complete operable system.

6-1.2 Lead Free Brass. All brass components with wetted surfaces that come in contact with water intended for human consumption shall be made of "Lead Free" brass.

"Lead Free" brass is defined in this specification as a brass alloy having not more than 0.25% total lead content by weight. These components are to meet requirements of AWWA Standard C800 and be made from CDA/UNS Copper Alloy C89520 (EnviroBrass) in accordance with the chemical and mechanical requirements of ASTM B584, copper alloy CD No. C89833 (Federalloy) or approved equal.

"Lead Free" fittings are to be cast, stamped or embossed with a mark, such as "NL", "EBII", "DF" or approved other, to indicate that the product is made from a "Lead Free" alloy and to visually differentiate "Lead Free" fittings from non-lead free fittings.

Brass components that do not come in contact with water intended for human consumption, including but not limited to brass used for recycled water systems,

are to be made of CDA/UNS Copper Alloy C83600 per ASTM B62, ASTM B584 and AWWA Standard C800.

6-2 SHOP DRAWINGS

Shop drawings of all welded steel pipe specials three inches diameter and larger, including that adjacent to the pumps, fittings, and specials shall be submitted in accordance with Part III, Subsection 1-4.

6-3 WELDED STEEL PIPE

6-3.1 General. Welded steel pipe and fittings shall be manufactured of steel plate with a minimum of ¼-inch thickness for 6-inch pipe and larger. The suppliers shall be responsible to provide the minimum pipe thickness size as required by AWWA M-11 corresponding with the required pressure shown on these plans and minimum thickness noted in these specifications. For all piping and fittings within the limits of the buildings or vaults, including all buried and above grade pipelines, the thickness shall not be less than 3/8 of an inch. Pipe materials, fabrication and shop testing of straight pipe shall conform to the requirements of the "AWWA Standard for Steel Water Pipe 6 Inches and Larger" (AWWA C200). All outlets, four inches in diameter and larger shall be provided with reinforcing designed for the water working pressure specified or shown. Shop drawings of all welded steel pipe and fittings, three inches in diameter and larger, shall be furnished in accordance with Section 1-14. Unless otherwise provided, the nominal diameter shown shall be considered to be the inside diameter after lining.

6-3.2 Joints. Unless otherwise shown, all joints in welded steel pipe shall be circumferentially welded in the field using slip-bell joints or butt-welding straps. Where butt straps are used, 5-inch diameter hand holes shall be provided to facilitate repair of the mortar lining.

6-3.3 Steel Welded Fittings. Steel welding fittings shall conform to the requirements of the "Specifications for Factory-Made Wrought Carbon Steel and Ferritic Alloy Steel Welding Fittings" (ASTM A234).

6-3.4 Flanges. Where the design pressure is 275 psi or less, flanges shall conform either to AWWA C207 Class E, or ANSI B16.5 150-lb. class. Where the design pressure is greater than 275 psi, flanges shall conform to AWWA C207 Class F or ANSI B16.1, Class 250. All pipe and flanges shall be of the class as noted on the plans. Flanges shall have flat faces. Pipe flanges shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise shown. Attachment of the flanges to the pipe shall conform to the applicable requirements of the above-referenced AWWA Standard C207. All pipe flanges shall match the pipe inner diameter and the flanges shall be lined in accordance with Subsection 10-3.7.

6-3.5 **Welding.** All hand welding shall be done by welders certified in accordance with ASME "Boiler and Pressure Vessel Code", Section IX or the "Standard for Field Welding of Steel Water Pipe Joints" (AWWA C206).

6-3.6 **Shop Testing** - Upon completion of the welding but before lining, each steel plate special shall be bulk-headed and tested under a hydrostatic pressure of not less than 1.5 times the pressure for which the pipe has been designed, provided however, that if straight pipe used in fabricating the specials has been previously tested in accordance with Subsection 10-3 herein, the circumferential welds may be tested by a dye penetrant process using Turco Dy-Chek, or approved equal, with no further hydrostatic test. Any pinholes or porous welds, which may be revealed by the test, shall be chipped out and re-welded and the pipe or fitting re-tested. The Contractor shall notify the Owner at least two weeks prior to shop testing to allow the Owner to witness the tests.

6-3.7 **Lining** – Except as otherwise provided, welded steel pipe and fittings shall be lined with cement mortar in accordance with the "Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe" (AWWA C205).

6-3.8 **Coating** - The exterior surfaces of welded steel pipe and fittings, which are in valve structures or above ground shall be cleaned, primed and finish painted as specified in the Section 10. All buried welded steel pipe and fittings shall be coated with cement mortar in accordance with the "Standards for Cement – Mortar Protective Lining and Coating for Steel Water Pipe" (AWWA C205).

6-3.9 **Installation**

A. At all times when the work of installing pipe is not in progress, all openings into the pipe shall be kept tightly closed to prevent entrance of animals and foreign materials. The Contractor shall maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the Owner.

B. The pipe sections shall be laid in place to true alignment and grade in accordance with the drawings. Special care shall be taken in placing the pipe and making the field joints.

C. Bell holes of ample size shall be dug where they are to be welded. Joints to be field-welded shall be done by welders certified for this Contract in accordance with the "Standard for Field Welding of Steel Water Pipe Joints" (AWWA C206). The cost of qualifying the welder shall be borne by the Contractor.

D. In the case of mortar-lined pipe, before the spigot is inserted into the bell, the bell end of the pipe shall be daubed with mortar containing 1 part lumnite cement of not more than 3 parts of sand, inserted into the bell and forced to the bottom of the bell. Excess mortar on the inside shall be swabbed out.

E. In the case of mortar coated pipe, after the welding is completed and inspected by the Engineer, the outside annular space between pipe sections shall be completely filled with grout. The grout shall be poured in such a manner that all exposed portions of the metal joint shall be completely protected with cement mortar. Grout used on the outside of joints shall be mixture of 1 part of cement to 3 parts of sand, by weight, and shall be sufficiently fluid to permit to be poured into the joint space. It shall be poured down one side of the pipe and allowed to flow up the other side. The outside mortar joints shall be properly formed by the use of heavy-duty diapers as manufactured by Industrial Specialties, El Monte, California, or approved equal.

F. Where butt-straps or closure pieces are used, both the interior and exterior surfaces of the butt-straps or closure pieces shall be given a coating equivalent to the factory-applied cement mortar or enamel coating of the adjoining pipe sections. Any exterior cement mortar coating in such cases shall be reinforced with wire mesh. Any interior cement mortar lining shall be similarly reinforced where the exposed length of the butt-strap or closure piece, as measured between the ends of connected pipe section, exceeds 4 inches.

6-4 DUCTILE IRON PRESSURE PIPE

Ductile iron Pipe shall be installed in accordance with Section 15056 of the EVMWD Standard Specifications and Drawings, including tracer wire installation and polyethylene encasement.

Ductile iron pipe shall be designed in accordance with the requirements of the latest revision of ANSI/AWWA C-150/A21.50 and shall be manufactured, inspected and tested in accordance with the requirements of the latest revision of ANSI/AWWA C-151/A21.51 and these Special Provisions. Cement-mortar linings shall be standard thickness and in accordance with the latest revisions of ANSI/AWWA C-104/A21.4. The Ductile Iron Pipe shall be encased in polyethylene in accordance with the requirements of the latest revision of ANSI/AWWA C-105/A21.5.

6-5 MECHANICAL COUPLINGS

Mechanical couplings shall be designed for a water working pressure equal to the design pressure for the pipe on which they are to be installed, and shall be equipped with Grade E rubber gaskets.

6-6 GASKETS

Except as otherwise provided, gaskets for flanged joints shall be 1/16-inch thick asbestos-free, NBR rubber binder, Garlock Blue-Guard 3000, or approved equal.

Wherever blind flanges are shown, the gaskets shall consist of 1/16-inch thick reinforced rubber which shall cover the entire inside surface of the blind flange and shall be cemented to the surface of the blind flange.

6-7 INSULATING BUSHINGS OR UNIONS

Where shown, pipe or fittings made of non-ferrous metals shall be isolated from ferrous metals by Lochinvar "V"-Line insulating couplings as distributed by Corrosion Control Products Company, or approved equal.

6-8 SMALL STEEL PIPE

Unless otherwise shown, galvanized steel pipe and black steel pipe in sizes six inches in diameter and smaller shall conform to the requirements of the "Specifications for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses" (ASTM A120), and shall be standard weight, unless otherwise shown. Galvanized steel pipe shall be wrapped with PVC tape, one half lap. Fittings shall be of galvanized malleable iron, unless otherwise shown.

6-9 COPPER TUBING AND SOLDERS

When copper pipe is to be furnished, the pipe shall conform to ASTM B-88 for Type K hard drawn or soft annealed, as shown on the Plans for Standard Drawings.

When wrought copper solder-type fittings are shown on the Plans or Standard Drawings, the joints shall be soldered with 95/5 non-leaded solder.

When brass or bronze fittings with threaded, copper flare or sweat weld (solder) ends are shown on the Plans or Standard Drawings, the fittings shall conform to AWWA C-800. Fittings shall be furnished by Mueller, Jones, Ford, or Company approved equal.

6-10 FLANGE INSULATING KITS

Flange insulating kits shall be installed where indicated on the drawings. Each kit shall consist of full length polyethylene insulating sleeves and double washer sets for each flange bolt and full face Type "E" phenolic insulating gasket.

6-11 DISINFECTING

See EVMWD Standard Specifications Section 15041.

6-12 HYDROSTATIC PRESSURE TESTING

See EVMWD Standard Specifications Section 15044.

6-13 POLYVINYL CHLORIDE PLASTIC PRESSURE PIPE (PVC)

See EVMWD Standard Specifications Section 15064.

6-13.1 Joint Restraints. See EVMWD Standard Specifications Section 15000.

6-13.2 Underground Conduit Construction. See EVMWD Standard Specifications Section 15000.

6-13.3 Installation. See EVMWD Standard Specifications Section 15064.

6-14 HIGH DENSITY POLYETHYLENE PRESSURE PIPE (HDPE) AND FITTINGS

See ANSI/AWWA C906-99.

6-15 RECYCLED WATER PIPELINES

6-15.1 Pipelines

Recycled water pipelines will be constructed per Elsinore Valley Municipal Water District Standard Specifications. Pipelines 12-inches in diameter and smaller will be constructed from PVC pipe that is purple in color. Pipelines with diameters greater than 12-inches will be constructed from DIP pipe and enclosed in purple colored polyethylene encasement. Further, for recycled water pipelines, a 2-inch wide purple warning tape with text stating "Recycled Water Pipeline 1-foot below" will be buried in the pipe trench 12-inches above the pipe.

6-15.2 Above Grade Facilities

All above grade facilities that are connected to the Recycled Water Systems shall be painted per the EVMWD Standard Specifications. However, these facilities are to be painted purple in color. Submittal of paint color must be approved by the Engineer prior to construction.

6-16 BOLTS AND NUTS

See EVMWD Standard Specifications Section 15000.

SECTION 7 – VALVES

7-1 GENERAL

The Contractor shall furnish and install all valves shown and specified. All valves shall be new and of current manufacture.

7-1.1 The flanges of valves shall be flat faced. Flanges shall conform in dimensions and drilling to ANSI B16.1 Class 125 for valves designed for a working pressure of 200 psi or less; flanges for class 250 valves shall conform to dimensions and drilling of ANSI B16.1 Class 250 for valves designed for a working pressure of greater than 200 psi.

7-1.2 Unless otherwise specified, each valve body shall be shop tested under a test pressure equal to twice its design water-working pressure.

7-1.3 Unless otherwise specified, all interior bronze parts of valves shall conform to the requirements of the "Specification for Composition Bronze or Ounce Metal Castings" (ASTM B 62). Unless otherwise specified, all interior stainless steel components shall be Type 18-8 stainless steel.

7-1.4 Except where otherwise provided, ferrous surfaces, exclusive of stainless steel surfaces, in the water passages of all valves, 4 inch and larger, shall be factory epoxy-coated by the valve manufacturer as specified in Section 11 – Epoxy Coating. The exterior of all valves for buried service shall be epoxy-coated as specified in Section 11 - Epoxy Coating. **The epoxy lining and coating of all valves will be inspected by the Owner prior to any valve being installed. The Contractor shall notify the Owner seven days prior to valve installation to arrange for inspection.**

7-1.5 Valve operators shall turn clockwise to close the valve.

7-1.6 Shop drawings on all valves shall be furnished in accordance with Part III, Subsection I-4.

7-1.7 The Contractor shall furnish at no additional cost to the Owner, the services of a factory representative to adjust all valves over 4 inches to assure satisfactory operation.

7-1.8 All brass components with wetted surfaces that come in contact with water intended for human consumption shall be made of "Lead Free" brass.

"Lead Free" brass is defined in this specification as a brass alloy having not more than 0.25% total lead content by weight. These components are to meet requirements of AWWA Standard C800 and be made from CDA/UNS Copper

Alloy C89520 (EnviroBrass) in accordance with the chemical and mechanical requirements of ASTM B584, copper alloy CD No. C89833 (Federalloy) or approved equal.

"Lead Free" fittings are to be cast, stamped or embossed with a mark, such as "NL", "EBII", "DF" or approved other, to indicate that the product is made from a "Lead Free" alloy and to visually differentiate "Lead Free" fittings from non-lead free fittings.

Brass components that do not come in contact with water intended for human consumption, including but not limited to brass used for recycled water systems, are to be made of CDA/UNS Copper Alloy C83600 per ASTM B62, ASTM B584 and AWWA Standard C800.

7-2 BUTTERFLY VALVES

7-2.1 Butterfly valves shall conform to the latest edition of AWWA C504. Valves shall be of the class and end type specified on the plans. All body bolts shall be Type 316 stainless steel. Valves shall be provided with a 2-inch square AWWA operating nut and opened by turning counterclockwise.

7-2.2 All butterfly valves shall be of the tight-closing, rubber-seat type, with rubber seats which are recess mounted and securely fastened to the valve body and in full compliance with AWWA C504. Valves shall be bubble tight at rated pressures and shall be satisfactory for applications involving valve operation after long periods of inactivity. Valve discs shall rotate 90 degrees from the full open position to the tight shut position. Valves shall meet the full structural requirements of the applicable classes of AWWA C504.

7-2.3 Valve bodies shall be constructed of cast-iron ASTM A126, Class B unless otherwise specified on the Plans. Flange drilling shall be in accordance with ANSI B 16.1 standard for cast-iron flanges. Two trunnions for shaft bearings shall be integral with each valve body. Body thickness shall be strictly in accordance with AWWA C504.

7-2.4 All valve discs shall be constructed of high-strength cast iron in accordance with ASTM A48, Class 40. All disc seating edges shall be smooth and polished.

Shafts of all valves shall be turned, ground, and polished. Valve shafts shall be constructed of 18-8, Type 304 stainless steel.

7-2.5 Valve seats shall be of a continuous natural rubber or a synthetic rubber compound mounted on the body and a stainless steel seat mounted on the disc. Bonded-in seats must be simultaneously molded-in, vulcanized, and bonded to

the body and the seat bond must withstand 75-pound pull under test pressure in accordance with ASTM A276. Valve seats on valves 24-inches and larger shall be field adjustable and replaceable without dismantling operator, disc, or shaft and without removing the valve from the line. Valves employing a complete rubber liner will not be acceptable in any size.

7-2.6 Each valve shall be provided with one or more thrust bearings in accordance with AWWA C504. Thrust bearings which utilize a ferrous metal bearing surface in direct rubbing contact with an opposing ferrous metal surface will not be acceptable.

Valves shall be fitted with sleeve-type bearings. Bearings shall be corrosion resistant and self-lubricating. Bearing load shall not exceed 2,500 psi.

7-2.7 The use of a stop or lug cast integrally with or mechanically secured to the body for the purpose of limiting disc travel by means of direct contact or interference with the valve disc in either the open or closed position will not be acceptable.

7-2.8 Valve operators shall be designed to hold the valve in any intermediate position between fully opened and fully closed without creeping or fluttering.

For buried service operation, valve operators shall be of the enclosed worm gear type. For non-buried service, operator shall be enclosed worm gear type with handwheel and valve position indicator.

7-3 SMALL BALL VALVES

Small ball valves, less than 4 inches in diameter, shall be all brass with screwed ends designed for a water-working pressure of 300 psi.

7-4 AIR-RELEASE, AIR/VACUUM, AND COMBINATION AIR VALVES

7-4.1 **Standards** – Valves shall meet or exceed the latest revision of ANSI/AWWA C512 Standard for: Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service, and as additionally specified herein.

7-4.2 **Valve Design and Operation**

A. Air-release valves shall function to slowly release pockets of air which accumulate at high points, changes in the line gradient, or sharp directional changes of the piping system.

B. Air and vacuum valves shall function to exhaust large quantities of air upon pump start up or from pipelines when being filled and to admit large

quantities of air when pipelines are drained to prevent vacuum collapse of the pipe or prevent pump air lock.

C. Combination valves perform both the functions of the air/vacuum and air release valves. Functions of both may be contained in one valve body, or as separate valves of each function piped together as one unit. When two valves are piped together, an isolation valve shall be installed between the two units.

D. Manufacturer's identification tag indicating function and size shall be affixed to the valve.

7-4.3 Materials of Construction

Item	Material	Specification
Body and cover	Cast iron Or Ductile Iron	ASTM A126, Class B ASTM A536, Grade 65-45-12
Float, and all Internal Parts/Trim	All 316 Stainless Steel	Type 316
Seats/Seals	Buna N	Chlorine resistant
Drain Plugs	Cast Iron	ASTM A126, Class B
Casing Bolts/nuts	Steel	ASTM A 307

7-4.4 Valve Inlet Connections

A. Valves 2 inches and smaller shall have threaded inlets.

B. Valves 3 inches and larger shall have flanged inlets.

C. The contractor shall install a shut off valve at the inlet of all air-release, air/vacuum, or combination valves, as shown on plans and standard details.

7-4.5 Special Provisions

A. Class 300.

B. Valves 3-inch and smaller: Contractor shall install a downward facing screened vent opening. Valves 4-inch and larger shall be ordered with factory domed screened outlet.

7-4.6 Manufacturer - APCO, Valmatic, Crispin

7-5 AIR RELEASE VALVES

Air release valves shall be of the size shown on the plans and shall have screwed ends. Bodies shall be high-strength cast iron, and the float, seat, and all moving parts shall be constructed of Type 316 Stainless Steel. Seat washers and gaskets shall be of a material insuring water-tightness. Valves shall be designed for a water-working pressure of 250 psi. The air release valve is to release the small pockets of air, which gather at the high point of a system. The air release valve shall be an APCO Model No. 200A, Valmatic or approved equal.

7-6 GATE VALVES AND RESILIENT WEDGE VALVES

7-6.1 Gate Valves

7-6.1.1 The flanges of valves may be raised or plain faced. Flanges of valves designed for a working pressure of 200 psi or less shall be faced and drilled to a 125-pound American Standard dimension. Flanges of all valves designed for a working pressure of greater than 200 psi shall be faced and drilled to 250-pound American Standard dimensions.

7-6.1.2 Each valve body shall be tested under a test pressure equal to twice its design water working pressure, in accordance with AWWA C500.

7-6.1.3 All interior parts of valves manufactured of bronze or brass, except valve stems, shall conform to the requirements of ASTM B62. Gate valve stems shall have a minimum tensile strength of 70,000 psi, a yield strength of 40,000 psi, and elongation of at least 15 percent in 2-inches. The stem is to be visibly marked so that it meets this requirement.

7-6.1.4 All valves connecting to mains shall be flanged on the main side, unless otherwise specified.

A. Gate Valves: Gate valves shall conform to AWWA C500. Gate valves shall be designed for a minimum working water pressure of 150 psi (and appropriate for the pressure class of the pipe connecting to them) and shall be iron bodied, bottom wedging, ABIP double disc with parallel seats, non-rising stem opening to the lest, and provided with O-ring stem seal, and a 2-inch square operating nut for buried service and handwheel for above-ground service. All interior parts of gate valves, including discs, but not including valve stems, shall be constructed of bronze confirming to the requirements of ASTM B62. After the valves are assembled and tested, the manufacturer's name or symbol, the size of the valve, the year of manufacture, and the working water pressure shall be cast in the

bonnet or body of the valve. Gate valves shall be furnished with ends as specified on the Plans or by the Owner's Representative.

B. Tapping Valves and Sleeves: Tapping valves shall conform to and be testing in accordance with AWWA C500 with the exception of the ends and the seat rings. The valves shall be designed for a minimum working water pressure of 150 psi and shall be iron bodied, bottom wedging, ABIP double-disc with parallel seats, opening to the left, provided with a 2-inch square operating nut, non-rising stem, and O-ring stem seal. The ends shall be flanged. The flange on one end shall have slotted bolt holes to fit all standard tapping machines. Seat rings shall be oversized to permit the use of full-size cutters. The cast-iron tapping sleeves may be provided with mechanical joints, caulking joint, or corey type.

7-6.2 Resilient Wedge Valves

7-6.2.1 All valves shall be new and of current manufacture. Resilient wedge valves may be used only for nominal pipe sizes from 3-inches to 12-inches in diameter.

7-6.2.2 Valves shall be furnished and installed with the type of ends shown on the Plans and as herein specified.

7-6.2.3 Valves shall be manufactured to meet all applicable requirements of the latest edition of AWWA C509. Flange drilling shall be in accordance with ANSI B 16.1 standard for cast-iron flanges.

7-6.2.4 Valves shall have non-rising stems, opening by turning counter-clockwise. Buried valves shall be provided with 2-inch square operating nut with arrow cast in metal to indicate direction of opening, and above-ground valves shall be equipped with a handwheel. Valve stems shall be cast integral with stem collar and furnished of cast, forged, or rolled bronze. Stem nuts shall be independent of the wedge and shall be made of solid bronze. All body nuts and bolts shall be AISI type 316 stainless steel.

7-6.2.5 Cast-iron wedge shall have sealing surfaces of the wedge permanently bonded with resilient material to meet ASTM tests for rubber to metal bond ASTM D429. Each valve shall have a smooth unobstructed waterway free from any sediment pockets. Stuffing boxes shall be O-ring seal type with two rings located in stem above thrust collar. Low friction torque reduction thrust bearings shall be located above and below the stem collar.

7-6.2.6 Valves shall have hydrostatic shell test of 400 psi and shutoff test of 200 psi. At the 200 psi shutoff test, the valve must be bubble tight – zero leakage will be allowed.

7-7 SWING CHECK VALVE

7-7.1 Horizontal Swing Check Valve

Horizontal swing check valve shall conform to AWWA and shall be Class 150 flanged as indicated, external lever and weight operated type, designed for minimum friction head loss. The valve shall be designed for a water-working pressure of 150 psi. Valve body shall be of cast iron. Seat ring, gate ring, gate stud and appurtenant items shall be bronze mounted to a cast-iron gate. Lever shaft and hinge pin shall be Type 18-8 stainless steel. Ferrous surfaces in the water passages of valves 4-inch and larger shall be epoxy-coated in accordance with Section 11. Valve shall be as manufactured by Mueller, Cla-Val or approved equal.

7-7.2 Wafer Swing Check Valve

Wafer swing check valve shall have a quick, spring-assisted, closure that minimizes the possibility of water hammer. Horizontal wafer swing check valve shall conform to AWWA C508 and shall be Class 150 as indicated, designed for minimum friction head loss. The valve shall be designed for water-working pressure of 150 psi. Valve body and disc shall be Carbon Steel. Disc, shaft, pivot, washer, cap screws and spring shall be stainless steel.

Manufacturer – Cla-Val Model 501A
Size – per project plans.

7-8 CORPORATION STOPS

Unless otherwise shown in plans, use ball-type corporation stops for all corporation stop installations. Use male iron pipe thread inlet by copper tube size outlet for copper tube size (CTS) Polyethylene Pressure Pipe.

7-9 ANGLE METER VALVES

Unless otherwise shown in plans, use ball type meter valves for all curb stop installations at the meter inlet. Use CTS Polyethylene Pressure Pipe inlet by meter swivel nut outlet with padlock wings for locking the valve in the closed position.

7-10 SMALL VALVES

Valves 2-inch and smaller, unless otherwise shown, shall be all bronze with screwed ends designed for a water-working pressure of 300 psi. Gate valves shall be rising stem with double disc and parallel seats.

7-11 WELL FLUSH VALVE

7-11.1 **Type** – Pilot controlled, solenoid actuated, hydraulically operated diaphragm valve. Globe body, 250 lb flanged ends, size for plans.

7-11.2 **Operation** – Normally open, pump start signal energizes solenoid and valve closes. Closing time adjustable between 1 and 10 minutes.

7-11.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer. Stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut, and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers, in place of in-line strainers, external position indicator.

7-11.4 **Solenoid** – Stainless steel, NEMA 4X enclosure, 120 VAC, 60 Hz, ASCO Redhat.

7-11.5 **Manufacturer** – Cla-Val Model 61-02 BYK CX-all stainless pilot control.

7-12 ALTITUDE VALVE

7-12.1 **Type** – Pilot controlled, hydraulically operated diaphragm valve. Globe body, 150 lb. flanged ends, size per plans.

7-12.2 **Operation** – Hydraulic control with opening and closing speed adjustment between 30 seconds and 180 seconds. Valve shall control high water level in reservoir without floats or other devices. Value shall not be throttling type, and remain fully open until "shut-off" point in reservoir is reached valve then closes slowly. This valve is designed for one way flow only.

7-12.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer. Stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut, and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers, in place of in-line strainers, external position indicators.

7-12.4 **Manufacturer** – Cla-Val Model 81-02

7-13 PRESSURE RELIEF VALVE

7-13.1 **Type** – Pilot controlled, hydraulically operated diaphragm valve. Globe body, 150 lb flanged ends, sized as shown in the plans.

7-13.2 **Operation** – Operation valve opens fast on high pressure to maintain steady line pressure, but closes gradually to prevent surges.

7-13.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer, stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers in place of in-line strainers, external position indicator.

7-13.4 **Manufacturer** – Cla-Val Model 50-01

7-14 PUMP CONTROL VALVE

7-14.1 **Type** – Pilot controlled, solenoid activated, hydraulically operated diaphragm valve with built-in check feature. Globe body, 150 lb flanged ends, sized as shown in the plans.

7-14.2 **Operation** – Pump starts against closed valve, valve opens slowly. Opening time adjustable between 1 and 3 minutes. When pump stop signal is sent, valve closes slowly. Closing time adjustable between 1 and 3 minutes. When valve is completely closed, limit switch signals PLC and pump de-energizes. During power failure check feature closes valve to prevent reverse flow.

7-14.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer, stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers in place of in-line strainers, external position indicator.

7-14.4 **Solenoid** – Stainless steel body, NEMA 4X enclosure, 120 VAC, 60 Hz, ASCO Red-hat.

7-14.5 **Manufacturer** – Cla-Val Model 60-19.

7-15 PRESSURE REDUCING VALVE

7-15.1 **Type** – Pilot controlled, hydraulically operated diaphragm valves. Globe body, 150 ob flanged ends, size per ideal plans.

7-15.2 **Operation** – Hydraulic control to close valve when ideal downstream pressure is reached. Valve opens and closes gradually to prevent surges.

7-15.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer. Stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers in place of in-line strainers, external position indicator. Valve will open and allow reverse flow when downstream pressure exceeds upstream pressure.

7-15.4 **Manufacturer** – Cla Val Model 50-01.

7-16 CHECK (HYDRAULIC) AND PRESSURE SUSTAINING VALVE

7-16.1 **Type** – Pilot controlled, hydraulically operated diaphragm valve. Globe body, 250 lb. flanged ends, size per plans.

7-16.2 **Operation** – Normally closed, opens when upstream pressure exceeds set point. Opening time adjustable between 1 and 3 minutes. Opening pressure setting adjustable between 20 psi and 200 psi. Closes when downstream pressure exceeds upstream pressure. Closing time adjustable between 1 and 3 minutes.

7-16.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer. Stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut, and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers, in place of inline strainers.

7-16.4 **Valve Position Indicator Limit Switch** - CLA VAL model:X105L, weather-proof enclosure.

7-16.5 **Manufacturer** – Cla-Val Model 50-01 GBCDS KCX - all stainless pilot control.

7-17 FLOW CONTROL VALVE

7-17.1 **Type** – Pilot controlled, solenoid actuated, hydraulically operated diaphragm valve. Angle body, 150 lb. flanged ends, internal and external epoxy coating, size per plans.

7-17.2 **Operation** – Solenoid control with opening and closing speed adjustment between 30 seconds and 3 minutes.

7-17.3 **Materials and Coating** – Ductile iron body and cover, epoxy coated. Cast steel disc retainer and diaphragm washer. Stainless steel valve trim. Buna-n disc. Nylon reinforced Buna-n diaphragm. Stainless steel stem, nut, and spring. Bronze pilot with stainless steel trim and Buna-n diaphragm. Stainless steel external tubing and components with y-type strainers, in place of inline strainers, external position indicator check feature.

7-17.4 **Solenoid** – Stainless steel body, NEMA 4X enclosure, 120 VAC, ASCO Red-hat.

7-17.5 **Manufacturer** – Cla-Val Model 131-01.

SECTION 10 – PAINTING

10-1 GENERAL

Paintwork shall include, but not be limited to, the following: all exposed exterior and interior wood, gypsum board, all new equipment as well as exposed conduit and pipe. In addition, any existing pipe, conduit, equipment or portions of the structure damaged during the Contractor's operations shall be repaired and repainted to the satisfaction of the Owner at the Contractor's expense.

10-1.1 Weather Conditions. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather. Except as provided herein, painting will not be permitted when weather conditions are such that the atmospheric temperature is at or below 35°F (2°C), or when freshly painted surfaces may become damaged by rain, fog, or condensation, or when it can be anticipated that the atmospheric temperature will drop below 35°F (2°C) during the drying period. If fresh paint is damaged by the elements, it shall be replaced by the Contractor at its expense.

Subject to the approval of the Engineer, the Contractor may provide suitable enclosures to permit painting during inclement weather. Provisions must be made to artificially control atmospheric conditions within limits suitable for painting inside the enclosure throughout the painting operation. The cost of providing and maintaining such enclosures shall be considered as included in the prices paid for the various items of work and no additional payment will be made therefore.

10-1.2 Application. Painting shall be done in a neat and workmanlike manner. Unless otherwise specified, paint shall be applied by brush, roller, or spray methods.

If brushes are used, they shall have sufficient body and length of bristle to spread the paint in a uniform coat. In general, the primary movement of the brush shall be such as to fill thoroughly all irregularities in the surface, after which the coating shall be smoothed by a series of parallel strokes. Paint shall be evenly spread and thoroughly brushed out. The paint will be considered to have been improperly applied if an inordinate amount of residual brush marks remain. If rollers are used, they shall be of a type that do not leave a stippled texture in the paint film.

On all surfaces which are inaccessible for brushing, the paint shall be applied by spray or by sheepskin daubers especially constructed for the purpose, or by other means approved by the Engineer.

If spray methods are used, the operator shall be thoroughly experienced. Runs, sags, thin areas in the paint coat, or skips and holidays shall be considered as evidence the work is unsatisfactory and the Contractor may be required to apply the remainder of the paint by brush.

A water trap acceptable to the Engineer shall be furnished and installed on all

equipment used in spray painting.

Mechanical mixers shall be used to mix the paint a sufficient length of time prior to use to thoroughly mix the pigment and vehicle. To keep the pigment in suspension, paint shall be kept thoroughly mixed while being applied.

10-1.3 Submittals

A. Submit shop drawings in accordance with General Specifications Section 1-4.
B. Submit coating manufacturer's technical and material safety data sheets for the products to be applied. Data sheets shall show the following information:
   1. Percent solids by volume.
   2. Minimum and maximum recommended dry film thickness per coat for prime, intermediate, and finish coats.
   3. Recommended surface preparation.
   4. Recommended thinners.
   5. Statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.
   6. Application instructions including recommended equipment and temperature limitations.
   7. Curing requirements and instructions.
C. When abrasive blasting is to be used, submit the name of the company and abrasive to be used, the generic type of abrasive, the CARB certification, and the product data sheets.

10-1.4 Restriction on Contact with Potable Water

A. Under no circumstances shall paint materials specified in this Section be used where they may come in contact with the public water supply or for buried installations. These products are intended for exposed exterior use only.

10-1.5 Quality Control

A. Notify the District 48 hours in advance of field operations involving surface preparation and coating application.
B. The District will inspect shop- and field-prepared surfaces. The Contractor shall not proceed with paint application until the surface preparation has bee approved by the District Engineer.
C. The District will inspect application of all prime, intermediate, finish, and touch-up coatings to verify the integrity of the coating and compliance with the specifications. Each coating application will be checked and deficiencies marked. Items exhibiting an improper finish or color, or insufficient surface preparation or dry film thickness shall be prepared as necessary and corrected, utilizing the specified paint materials to obtain compliance.
D. Remove, mask, or otherwise protect hardware, switch plates, aluminum

surfaces, machined surfaces, couplings, shafts, nameplates and other surfaces not intended to be painted. Protect working parts of mechanical and electrical equipment from damage during surface preparation and the painting process. Provide drop cloths or masking to prevent paint materials from dripping or accumulating on adjacent surfaces. The Contractor shall be responsible for any damage caused by its operations to vehicles, persons or property.

10-1.6 Surfaces Not to be Field Painted

A. Generally, the following items or materials are not to be field painted unless specifically required elsewhere in the specifications:
   1. Nameplates
   2. Interior surfaces of valves, fittings and pipe
   3. Stainless steel
   4. Buried mortar-coated pipe and fittings
   5. Buried pipe and piping for appurtenances except as required in the piping specifications
   6. Grease fittings
   7. Brass, copper, bronze, or galvanized items except as required for recycled water system identification

10-1.7 Paint Colors

All colors and shades of colors of all coats of paints and protective coating material shall be as selected by the District. Each coat shall be of a slightly different shade, as directed by the District, to facilitate inspection of surface coverage of each coat.

10-1.8 Color Schedule for Piping and Valves

The following tables designate the color coding and type of paint which shall be used to identify the District's potable and recycled facilities. A description of specific paint types to be used can be found in Section 10-2 Paint Materials and in the Accepted Materials Guideline. All services shall be cleaned and have primer coat before painting.

A. Potable Water:

ITEM	COLOR	PAINT TYPE
Fire Hydrant	Safety Yellow	Silicone Alkyd
Gate Well Lids-Potable Valves	Precaution Blue	Silicone Alkyd
Air/Vac Assemblies	Precaution Blue	Silicone Alkyd
Air/Vac Enclosures	Safety Yellow	Powder Coated
Water Test Station Enclosures	Safety Yellow	Powder Coated
Guard Posts	Safety Yellow	Silicone Alkyd
Vault Piping	Desert Tan	Silicone Alkyd
Above Ground Piping	Desert Tan	Silicone Alkyd
Normally Closed Valve (Aboveground)	Precaution Blue with Red Stripe	Silicone Alkyd

ITEM	COLOR	PAINT TYPE
Backflow for Recycled Water Connection	Hunter Green	Silicone Alkyd
Above Ground Meters & Backflow Devices	Precaution Blue	Silicone Alkyd

B. Recycled Water:

ITEM	COLOR	PAINT TYPE
Gate Well Lids	Safety Purple	Silicone Alkyd
Air/Vac Assemblies	Safety Purple	Silicone Alkyd
Air/Vac Enclosures	Safety Purple	Powder Coated
Water Test Station Enclosures	Safety Purple	Powder Coated
Guard Posts	Safety Purple	Silicone Alkyd
Vault Piping	Safety Purple	Silicone Alkyd
Above Ground Piping	Safety Purple	Silicone Alkyd
Normally Closed Valve	Safety Purple with Red Stripe	Silicone Alkyd
Meters	Safety Purple	

10-2 PAINT MATERIALS

10-2.1 Painting Systems

A. Paint, coating products and color selections shall be selected from the table above and the Accepted Materials Guideline.
B. All materials of a specified painting system, including primer, intermediate and finish coats, shall be produced by the same manufacturer.
C. Additives shall be used only as recommended by the paint manufacturer and as permitted by the Engineer.
D. Deliver all paint products to the job site in the original, unopened containers.

10-2.2 Silicone Alkyd Enamel Paint System

All materials of a specified system including prime, intermediate, finish, and touch-up coats shall be provided by the same manufacturer in accordance with the Accepted Materials Guideline. Thinners, cleaners, driers, and other additives shall be as recommended by the coating manufacturer for the specified system.

A. Primer: Field-applied, single-component, VOC-compliant, solvent-curing primer. The primer shall be as recommended by the manufacturer for the substrate to be painted with the silicone alkyd enamel finish paint. Intermediate primer coats may be required by the manufacturer of the painting system.

B. Intermediate and Finish Coats: The silicone alkyd finish paint shall be an industrial-type single-component, high-solids, high-gloss, VOC-compliant, lead-free alkyd enamel. The silicone alkyd paint shall contain 30% silicone and a minimum 47% solids by volume. The silicone alkyd paint system to be used shall be easily applied by brush, roller or spray. The silicone alkyd enamel system shall be used as a protective coating and for applying color code identification to the exterior of potable and recycled water facilities.

10-2.3 Waterborne Acrylic Latex Painting System

All materials of a specified system including prime, intermediate, finish, and touch-up coats shall be provided by the same manufacturer selected from the Accepted Materials Guideline. No solvent-based thinners, cleaners, driers and other additives are required for this painting system.

The water facility items requiring color code identification with this paint system can be found under Color Schedule shown above.

A. 100% waterborne acrylic latex paint shall be a rapid-drying paint, resistant to weather and abrasion, containing a minimum of 100% solids by volume. The waterborne acrylic latex painting system shall be used to apply color code identification to fire hydrant valve gate well lids.

10-2.4 Paint Colors

Paint colors (safety yellow, safety purple and safety red) for the silicone alkyd paint shall be the safety colors as specified in Federal OSHA regulations. The paint color (white) for the waterborne acrylic latex paint system shall be as specified by Cal Trans for striping. The areas shall then be primed and finish coated in accordance with the specifications. Finished surfaces shall be free from defects and blemishes prior to final acceptance.

10-2.5 Silicone Alkyd Enamel Paint System Application

A. The following items shall be field painted using the silicone alkyd enamel paint system.
   1. All recycled water ferrous metal piping and appurtenances, meters, blowoff piping, backflow preventers, where located above ground, exposed, or in vaults.
   2. All potable water ferrous metal piping and appurtenances, where located above ground, exposed, or in vaults.
   3. All potable water fire hydrant bodies, blowoff box lids, the exterior of air/vacuum assemblies and protector posts around potable water facilities.
   4. All potable water and recycled water gate well lids and frames, the

exterior of air/vacuum assemblies and protector posts around recycled water facilities.

5. Normally closed valves.

B. The silicone alkyd enamel painting system shall consist of a prime coat, an intermediate coat (if required) and sufficient finish coats to provide a total dry film thickness of 6 mils to 8 mils. Apply the coatings in accordance with the manufacturer's recommended film thickness, adding finish coats as necessary to meet the minimum total dry film thickness specified above.

C. Observe minimum and maximum re-coat times as specified by the manufacturer. If these times are exceeded, the surface shall be prepared as recommended by the manufacturer and as directed by the Engineer prior to receiving additional coats.

10-2.6 Waterborne Acrylic Latex Paint System Application

A. The following items shall be field painted using the waterborne acrylic latex system.

1. Potable water fire hydrant valve gate well lids and frames.

B. The waterborne acrylic latex paint system shall consist of two coats of paint to provide a total dry film thickness of 8 mils to 12 mils. Apply the paint system in accordance with the manufacturer's recommendations. Add finish coats as necessary to achieve the mil thickness specified above.

10-3 SURFACE PREPARATION

A. Do not prepare more surface area than can be coated in the same workday.

B. Surface preparation shall conform to the SSPC specifications as follows:

Solvent Cleaning	SP-1
Hand Tool Cleaning	SP-2
Power Tool Cleaning	SP-3
White Metal Blast Cleaning	SP-5
Commercial Blast Cleaning	SP-6
Brush-Off Blast Cleaning	SP-7
Pickling	SP-8
Near-White Blast Cleaning	SP-10

C. Wherever the words "solvent cleaning", "hand tool cleaning", "wire brushing" or "blast cleaning" or similar words are used in these specifications or in paint manufacturer's specifications, they shall be understood to refer to the applicable SSPC Surface Preparation Specifications listed above.

D. Surface preparation shall be as recommended by the produce manufacturer or as directed by the District in the field. In general, surface preparation shall be SSPC-SP-1, SP-2 or SP-3. Water blasting or sandblasting may be utilized as required by field conditions or as directed by the Engineer.

E. Unless otherwise directed by the District, do not blast clean items that have previously been factory primed or painted.

10-3.1 Field Touch Up of Shop-Applied Prime Coats

A. Prior to field touch up, prepare the surface in accordance with the manufacturer's recommendations and as directed by the Engineer.

B. Reapply primer as required to cover all scratched, abraded, or deficient areas.

10-3.2 Surface Preparation for Painting Steel Structures

10-3.2.1 Hand Cleaning. Hand cleaning is a method of preparing metal surfaces for painting by removing loose mill scale, loose rust, dirt, and loose paint by hand brushing, hand sanding, hand scraping, hand chipping, with other hand impact tools, or by a combination of these methods. It is not intended that all mill scale, rust, and paint be removed by this process, but loose mill scale, rust paint, and other detrimental foreign matter present shall be removed.

Oil, grease, or salts shall first be removed by the methods prescribed in Section 10-3.2.2. Other detrimental foreign matter shall be removed by the following operations:

A. Stratified rust (rust scale) shall be removed by hand hammering, hand chipping, other hand impact tools, or a combination thereof.

B. All loose mill scale and all loose or nonadherent rust shall be removed by hand wire brushing, hand sanding, hand scraping, or by a combination of these methods. Rust and mill scale are classified as "loose mill scale' and "loose or nonadherent rust" if they can be removed from a steel surface by vigorous hand brushing with a new, commercially-acceptable wire brush, of suitable type, at a rate of 2-square-feet per minute. This test shall be conducted on an area not previously brushed, scraped, or sanded, but from which all detrimental stratified rust (rust scale), oil, and grease (if present) have been removed. This test establishes a standard for surface preparation and shall not be considered as establishing the production rate by cleaning. Regardless of the methods used for cleaning under this specification, the surface shall be cleaned at least as well as the surface resulting from this test.

In preparing surfaces for repainting, all loose or nonadherent paint shall be removed. Edges of remaining old paint shall be feathered so that the repainted surface will have a smooth appearance. The remaining old paint shall have sufficient adhesion so that it cannot be lifted as a layer by inserting the blade of a dull putty knife under it. All accessible weld flux and spatter shall be removed by hand scraping or by hand impact tools followed by wire brushing. The accessible portions of all partially enclosed steel members

shall be cleaned. On new work, areas which will be inaccessible after assembly shall be cleaned before assembly.

All rivets, welds, corners, joints, and openings shall be properly cleaned. The steel wire of the wire brushes shall have sufficient rigidity to clean the surface, shall be kept free of excess foreign matter, and shall be discarded when they are no longer effective. Hand scrapers shall be made of suitable material and shall be kept sharp enough to be effective. The tools shall be operated in such a manner that no burrs or sharp ridges are left on the surface and no sharp cuts made into the steel.

After hand cleaning is completed, dust and other loose matter shall be removed from the surface. If detrimental amounts of grease or oil are still present, these areas shall be spot cleaned with solvent. The pretreatment (if any is specified) or prime coat of paint shall be applied as soon as possible after cleaning and before deterioration of the surface occurs.

10-3.2.2 **Solvent Cleaning.** Solvent cleaning is a procedure for removing detrimental foreign matter such as oil, grease, soil, drawing and cutting compounds, and other contaminants from steel surfaces by the use of solvents, emulsions, cleaning compounds, steam cleaning, or other materials and methods which may not involve a solvent action. It is intended that solvent cleaning, if specified, shall be used prior to the application of paint and with other specified surface preparations for the removal of rust, mill scale, or paint.

Soil, cement spatter, drawing compounds, salts, or other foreign matter (other than grease or oil) shall be removed by brushing with stiff-fiber or wire brushes, by scraping, or by cleaning with solutions of alkaline cleaners, provided such cleaners are followed by a fresh water rinse, or by a combination of these methods. When specified, the fresh water rinse shall be followed with a passivating dichromate or dilute chromic acid wash.

Oil or grease shall be removed by any of the following methods:

A. Wiping or scrubbing the surface with rags or brushes wetted with solvent. The final wiping shall be done with clean solvent and clean rags or brushes.
B. Spraying of the surface with solvent. The final spraying shall be done with clean solvent.
C. Complete immersion in a tank or tanks of solvent. Solvent for the last immersion shall not contain detrimental amounts of contaminant.

Emulsion cleaners may be used in lieu of the methods in this subsection, provided that after treatment, the surface shall be washed to remove detrimental residue.

Steam cleaning, using detergents or cleaners if specified, may be used in place of the methods in this subsection, provided that the surface shall finally be steamed or washed to remove detrimental residues.

If chemical paint strippers are used for the removal of paint, all wax from the stripper remaining on the surface shall be removed by the use of suitable solvents. All alkaline residues from the paint strippers shall be removed by washing the surface with fresh water. All detrimental paint residue or stripping agent residue shall be removed.

Regardless of the method used to clean oil, grease, or contaminants from a surface, there shall be no detrimental residue left on the surface.

Solvent-cleaned surfaces shall be primed or prepared as specified before any detrimental corrosion or recontamination occurs.

10-3.2.3 Power Tool Cleaning. Power tool cleaning is a method of preparing metal surfaces for painting by removing loose mill scale, loose rust, and loose paint with power wire brushes, power impact tools, power grinders, power sanders, or by a combination of these methods. It is not intended that all mill scale, rust, and paint be removed by this process, however, loose mill scale, rust, paint, and other detrimental foreign matter present shall be removed.

Oil, grease, and salts shall first be removed by the methods prescribed in Section 10-3.2.2. Other detrimental foreign matter will be removed as described below.

Stratified rust (rust scale) shall be removed by power impact tools. If minor quantities of stratified rust are present, they may be removed as outlined in Section 10-3.2.1.

Large areas of tight, well-adhered paint, even though they may be removable, shall be removed only if specified. All loose mill scale and all loose or nonadherent rust and all loose paint, as defined below, shall be removed by one or more of the following methods:

A. Power wire brushing using rotary, radial, or cup brushes of suitable size, entering all accessible openings, angles, joints, and corners. The steel wire of such brushes have sufficient rigidity to clean the surface, shall be kept free of excess foreign matter, and shall be discarded when they are no longer effective. The surface shall be cleaned, but not burnished to a detrimental degree.

B. Power impact tool cleaning using power driven chipping or scaling hammers, rotary scalers, single-or multiple-piston scalers, or other similar impact cleaning tools. Cutting edges of such tools shall be

kept in effective condition.

C. Power grinding using abrasive wheels or power sanding using abrasive materials. Sanding or abrasive materials shall be discarded when they become ineffective.

Mill scale, rust, and paint are classified as "loose mill scale," loose and nonadherent rust," and "loose" or "removable paint" if they can be removed from a steel surface by power wire brushing using a commercial electric or air wire brushing machine operated at a speed under load of 3,450 rpm and equipped with a 6-inch (150 mm) diameter cup brush of double-row, knotted construction, made of No. 20 gage music wire. The brush shall be held against the steel surface with a force of 16 pounds and the rate of cleaning shall be 2 square feet of surface per mite. This test must be conducted on an area not previously brushed, scraped, or sanded, but from which all detrimental stratified rust (rust scale), oil, and grease, if present, have been removed. This test establishes a standard for surface preparation and shall not be considered as establishing the production of cleaning. Regardless of the methods used for cleaning under this specification, the surface shall be cleaned at least as well as the surface resulting from this test.

In preparing surfaces for repainting, all loose paint shall be removed. Thick edges of remaining old paint shall be feathered so that the repainted surface will have a smooth appearance. The remaining old paint shall have sufficient adhesion so that it cannot be lifted as a layer by inserting the blade of a dull putty knife under it. All accessible weld flux and spatter shall be removed by power tools. The accessible portions of all partially enclosed steel members shall be cleaned. On new work, areas which will be inaccessible after assembly shall be cleaned before assembly.

Rivet heads, cracks, crevices, lap joints, fillet welds, and re-entrant angles shall be cleaned by the use of power wire brushing, sharp chisels used in chipping, scaling hammers, rotary grinders, sanders, or by a combination of such tools. All tools shall be operated in such a manner that no burrs or sharp ridges are left on the surface and no sharp cuts are made into the steel. Areas inaccessible for cleaning by power tools but accessible for hand cleaning shall be cleaned by methods outlines in Section 10-3.2.1.

After these cleaning operations are completed, dust and other loose matter shall be removed from the surface. If detrimental amounts of grease or oil are still present, these areas shall be spot cleaned with solvent. The pretreatment (if any), or the prime coat of paint shall be applied as soon as possible after cleaning and before further deterioration of the surface occurs.

10-3.2.4 Blast Cleaning

A. **Definition.** Blast cleaning is a method of preparing metal surfaces for painting by removing mill scale, rust, rust scale, paint, or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to obtain one of the degrees of surface cleanliness described below.

B. **White Metal.** A white metal blast-cleaned surface finish is defined as a surface with a gray-white, uniform metallic color, slightly roughened to form a suitable anchor pattern for coatings. The surface, when viewed without magnification, shall be free of all oil, grease, dirt, visible mill scale, rust, corrosion products, oxides, paint, or any other foreign matter. The color of the clean surface may be affected by the particular abrasive medium used.

C. **Near-White.** A near-white blast-cleaned surface finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint, or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks, or slight discolorations caused by rust stain, mill scale oxides, or slight, tight residues of paint or coating that may remain.

At least 95 percent of each square inch of surface are shall be free of all visible residues, and the remainder shall be limited to light discoloration mentioned above.

D. **Commercial.** A commercial blast-cleaned surface finish is defined as one from which all oil, grease, dirt, rust scale, and foreign matter have been completely removed from the surface and ll rust, mill scale, and old paint have been completely removed except for slight shadows, streaks, or discolorations caused by rust stain, mill scale oxides, or slight, tight residues of paint or coating that may remain; if the surface it pitted, slight residues of rust or paint may be found in the bottom of pits. At least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light discoloration, slight staining, or light residues mentioned above.

E. **Brush-Off.** A brush-off blast-cleaned surface finish is defined as one from which all oil, grease, dirt, rust-scale, loose mill scale, loose rust, and loose paint or coatings are removed completely, but tight mill scale and tight-adhered rust, paint, and coating are permitted to remain, provided that all mill scale and rust have been exposed to the abrasive blast pattern sufficient to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.

Heavy deposits of oil or grease shall be removed by the methods prescribed in Section 10-3.2.2.

Small quantities of oil or grease may be removed by the blast-cleaning operation.

Excessive rust scale shall preferably be removed by impact tools, as prescribed in Section 10-3.2.1 and Section 10-3.2.3.

10-3.2.5 Methods. The surface of the metal may be blast-cleaned by one of the following methods:

A. Grit blasting using compressed air blast nozzles and crushed grit made of cast iron, malleable iron, steel, or synthetic grits other than sand. The largest commercial grade of metal grit permitted by this specification shall be SAE Grit No. G25 abrasive material.

B. Shot blasting using compressed air nozzles and cast iron, malleable iron, steel, or synthetic shot. The largest commercial grade shot permitted by this specification shall be SAE Shot No. S330.

C. Closed, re-circulating nozzle blasting using compressed air, vacuum, and any of the preceding abrasives.

D. Grit blasting using centrifugal wheels and crushed grit made of cast iron, malleable iron, steel, or synthetic grits. The largest commercial grade permitted gy this specification shall be SAE Shot No. S330.

The surface, if dry blasted, shall be brushed with clean brushes made of hair, bristle, or fiber, blown off with compressed air (from which detrimental oil and water have been removed), or cleaned by vacuum, for the purpose of removing any traces of blast products from the surface, and also for the removal of abrasive from pockets and corners.

The compressed air used for nozzle blasting shall be free of detrimental amounts of condensed water or oil. Adequate separators and traps shall be provided. Blast cleaning operations shall be done in such a manner that no damage is done to partially or entirely complete portions of the work.

The blast-cleaned surface shall be further treated, or primed, as specified, within 8 hours after blasting when practicable, but in any event, no later than 24 hours after blasting and also before any visible or detrimental rusting occurs. Surfaces which rust before painting is accomplished shall be re-cleaned by the Contractor at its expense.

10-3.3 Surface Preparation for Painting Galvanized Surfaces

10-3.3.1 Hand Cleaning. Concrete spatter, heavy grease, and other foreign matter shall be removed from galvanized surfaces by hand scraping or wire brushing.

10-3.3.2 Solvent Cleaning. After hand cleaning, all galvanized surfaces shall be cleaned by the solvent cleaning procedures prescribed in Section 10-3.2.2 herein to remove oil, grease, and other detrimental foreign matter. After washing, all areas shall be roughened by abrasive blasting using an abrasive that is no larger than No. 30 mesh (600 μm). Galvanizing shall not be removed by this operation.

10-3.4 Surface Preparation for Painting Wood Surfaces. Wood surfaces shall be prepared for painting by removing all cracked or peeled paint, loose chalky paint, dirt, and other foreign matter by wire brushing, scraping, sanding, or other approved means immediately prior to painting. All surfaces shall be wiped or dry brushed to remove any dust or chalky residue that may result from cleaning operations. All wood designated to be painted shall be thoroughly dry before paint is applied.

10-4 PAINTING VARIOUS SURFACES

10-4.1 Painting Structural Steel. Unless otherwise specified, paints shall consist of a primer (applied in not less than two coats), a pre-treatment, and two finish coats. The total dry film thickness of the primer shall not be less than 3 mils (80 μm), and the total dry film thickness of two finish coats shall be not less than 2 mils (50 μm). The dry film thickness of the paint will be measured in place with a calibrated magnetic film thickness gage. Pre-treatment thickness shall be sufficient to completely coat the underlying primer.

Excessively thick coats of paint will not be permitted. The thickness of each coat shall be limited to that which will result in uniform drying throughout the paint film.

Paint shall conform to Section 10-2. Succeeding coats of paint, not otherwise materially different in color, shall have carbon black mixed into the paint 0.25 lbs. per gallon (30 g/L) lamp black, Federal Specification TT-P-00350, or slightly varying pigments to produce a shade contrasting with the paint being covered. Such changes shall be in undercoats, and the final finish coat shall be the specified finish color.

10-4.1.1 Cleaning. Unless otherwise specified, after erection and riveting or welding, all surfaces of structural steel which will be exposed to air in the completed structure, shall be commercially blast-cleaned as prescribed by Section 10-3.2.2 prior to painting.

In repainting existing steel structures where partial cleaning is required, the method of cleaning will be as specified.

Any damage to sound paint on areas not designated for treatment, which results from Contractor's operations, shall be repaired as directed by the Engineer.

10-4.1.2 **Application of Paint.** Painting of finish coats of structural steel, except for sections which will be inaccessible after erection as described herein, shall be done after erection unless otherwise specified. Requests to do any painting other than undercoats prior to erection shall be submitted by the Contractor and approved by the Engineer in writing before such work is started. Any deficiencies in the first coat of paint shall be corrected prior to the application of succeeding coats of paint.

Surfaces exposed to the atmosphere which would be inaccessible for painting after erection shall be painted the full number of coats prior to erection.

All previous coats of paint shall be dry and fully cured and the surface of the paint coat being covered shall be free from moisture, dust, grease, or any other deleterious material which would prevent the bond of the succeeding paint coats. In spot painting, any old paint which lifts after application of the first spot coat, shall be removed by scraping and the area repainted before application of the next coat.

The application of finish coats will not be permitted until the repaired total film thickness of the undercoats of paint, as described in Section 10-3.5.1, is obtained.

Open seams at contact surfaces of stiffeners and built-up members which would retain moisture shall be caulked with non-sag polysulphide material conforming to Federal Specification TT-S-230, Type 2, or other approved material before applying the second coat of primer.

Except for anchor bolt assemblies, steel surfaces embedded in concrete need not be painted. Ungalvanized anchor bolt assemblies shall be painted or dipped with one coat of zinc-rich primer prior to installation.

The bottom surfaces of masonry plates and surfaces of structural steel to be in contact with elastomeric bearing pad or preformed fabric pads shall be cleaned and painted with the full number of specified coats prior to erection.

With the exception of abutting chord and columns splices and column and truss shoe bases, machine finished surfaces shall be coated with a rust inhibitor which can be easily removed. Surfaces of iron and steel castings which have been machine finished shall be painted with a coat of shop paint.

Zinc-rich primer shall be applied by spray methods. On areas inaccessible to spray application, the paint may be applied by brush or daubers. Mechanical mixers shall be used in mixing the primer. After mixing, the primer shall be strained through a metal No. 30 to 60 (600 μm to 250 μm) mesh screen or a

double layer of cheesecloth immediately prior to or during pouring into the spray pot. An agitating spray pot shall be used in all spray application of primer. The agitator or stirring rod shall reach within 2 inches (50 mm) of the bottom of the spray pot and shall be in motion at all times during primer application. Such motion shall be sufficient to keep the primer well mixed. Whenever painting operations are interrupted, the primer remaining in the fluid hose shall be expelled from the hose. Primer shall be free from dust, dirt, salt, or other deleterious deposits and thoroughly dry before applying pre-treatment vinyl wash primer.

The wash primer shall not be applied more than 72 hours before application of finish coats. The vinyl wash primer wash shall be applied by spraying to produce a uniform wet film completely coating the underlying surface.

10-4.2 Painting Machinery. Prior to installation, all surfaces of machinery exposed to the atmosphere, which are subject to corrosion and are normally painted, shall be painted with two coats of paint. Unless otherwise specified, after installation of the machinery, such surfaces shall be painted with a finish coat. All coats shall be as specified for structural steel. Full compensation for painting machinery shall be considered as included in the price paid for the machinery or in the item of which the machinery is part.

10-4.3 Painting Galvanized Surfaces. Unless otherwise specified, galvanized surfaces shall be left unpainted. When required to be painted, the surfaces shall be prepared as specified in 310-3 and then painted in accordance with 210-1, one coat of zinc dust-zinc oxide primer. The primer shall be applied by spraying to produce a complete covering of the galvanized surface. After the primer is applied, one coat of pre-treatment vinyl wash primer shall be applied. One finish coat shall be applied the same day as the wash primer is applied.

Full compensation for painting such surfaces shall be included in the price paid for the various contract items involving galvanized metal objects and no separate payment for such painting will be made.

10-4.4 Painting Metal Guard Rails. Metal guard rails, when required to be painted, shall be painted with three coats of paint of the type specified for metal guard rails in 210-1.5. Full compensation for painting guard rails shall be considered as included in the price paid for the guardrails and no separate payment for such painting will be made.

10-4.5 Painting Lumber. Unless otherwise specified, all new lumber requiring painting shall consist of a primer and two finish coats or as specified by the Engineer.

10-4.5.1 Preparation of Surfaces. Wood surfaces designated to be painted shall be cleaned in accordance with Section 10-3.4.

10-4.5.2 Application of Paint. When permitted by the Engineer, the first coat of

paint may be applied prior to erection.

After the first coat has dried and the lumber is in place, all cracks, checks, nail holes, etc. shall be puttied flush with the surface and allowed to dry before the second coat is applied.

Skips, holidays, thin areas, or other deficiencies in any one coat of paint shall be corrected before the succeeding coat is applied.

The surface of any paint coat being covered shall be free of deleterious material before additional paint is applied.

10-4.6 Concrete Block

10-4.6.1 Preparation of Surfaces. Faulty mortar joints shall be filled with 1:1 cement-sand grout applied to a wet surface and then shall be damp-cured for a period of not less than 48 hours. Interior surface defects shall be repaired with a spackling material. All patched areas shall be textured to match the surrounding surfaces.

10-4.6.2 Application of Paint. Apply first coat to give complete and even coverage to block surface. After first coat has dried, re-check surface for defects and correct with spackling material.

Apply second coat to give complete and even coverage.

Apply third coat after second coat has dried.

10-4.7 Gypsum Board

10-4.7.1 Preparation of Surfaces. Prior to receiving paint, all joints shall be reinforced with tape and filled and troweled flush to create a smooth and even surface. All texturing shall be completed and dry before painting begins.

10-4.7.2 Texturing of Surface. Unless otherwise directed the plans and specifications, surface texturing shall be a medium orange peel applied by a spray gun designed for the purpose.

10-4.7.3 Application of Paint. Apply first coat to give complete and even coverage to wall surface. After first coat has dried, re-check surface for defects and correct with spackling material.

Apply second coat to give complete and even coverage.

Apply third coat after second coat has dried.

10-5 PROTECTION OF BURIED GALVANIZED PIPES AND CONDUITS

10-5.1 Surface Preparation. Surfaces shall be cleaned in accordance with SSPC-SP-3 (Power Tool Cleaning). Hand or power wire brushes not permitted.

10-5.2 Protective Wrapping. Prior to wrapping the pipe with PVC tape, the pipe first shall be primed using a primer recommended by the PVC tape manufacturer. After being primed, the pipe shall be wrapped with a 20 mil adhesive PVC tape, half-lapped, to a total thickness of 40 mils. Application shall be in accordance with the tape manufacturer's instructions.

10-5.3 Electrical Metallic Conduits and Cabinetry. All exposed metallic electrical conduit and cabinetry shall be painted with at least 2 coats of ASA 49 gray epoxy enamel. Each coat shall produce a minimum dry film thickness as specified above.

SECTION 11 - EPOXY COATING

11-1 GENERAL

Where specified or shown, an epoxy coating shall be applied as specified herein. Except where otherwise indicated, ferrous surfaces, exclusive of stainless steel surfaces, in water passages of all valves 3-inch and larger, shall be fusion-bonded epoxy-coated in accordance with AWWA C550-90.

11-2 SCOPE OF WORK

The Contractor shall complete all cleaning, surface preparation and coating of ferrous surfaces, as specified herein, in a shop or fabrication facility. The coating shall be inspected and approved by a qualified coatings inspector acceptable to the engineer prior to shipment to the job site. The Contractor shall be understood to include all parties: subcontractors, manufacturing companies and equipment suppliers under the General Contractor's authority by virtue of work purchased or contracted for the job.

11-3 MATERIAL

11-3.1 **NSF61 Fusion Bonded Epoxy** - Except as otherwise provided herein, the material used shall be 100 percent powder epoxy and shall be 3-M Company "Scotchcoat" 206N or 134, Michigan Chrome and Chemical Company "Miccron 650 or 651", or approved equal.

11-3.2 **NSF61 Spray Applied Epoxy** - Where, in the Engineer's opinion, because of the nature of the item being coated, it would be impossible to use the powder epoxy method without causing damage to the item, the use of a liquid epoxy will be permitted. Said liquid epoxy shall be 3-M Company No. 312 or 134, DeVoe Coating Co., Devran 184 or SOC-CO Plastic Coating Company Keysite 740, or approved equal.

11-4 SURFACE PREPARATION

The surface shall be blast-cleaned in accordance with SSPC-SP-5 (White Metal Blast Cleaning). The grit size used shall be as recommended by the epoxy manufacture

11-5 APPLICATION

Application of the epoxy coating shall be in accordance with the manufacturer's instructions; provided that, if liquid epoxy is permitted, it shall be applied in not less than 3 spray coats to give the required total thickness.

11-6 THICKNESS OF COATING

The minimum dry coating thickness shall be 12 mils, provided, however, that the thickness of coating in the grooves for valves or fittings designed to receive a rubber gasket shall be approximately 5 mils.

11-7 INSPECTION

Coating thickness shall be checked with a nondestructive magnetic type thickness gage. Coating integrity shall be tested in accordance with AWWA C 550-90, Subsection 5.3.3. All pinholes shall be marked, repaired, and retested. No pinholes or other irregularities will be permitted in the final coating.

11-8 FIELD REPAIRS

If small local repairs are necessary, they shall be made using a liquid epoxy recommended by the manufacturer of the epoxy with which the item was initially coated. The surface must first be hand tool cleaned in accordance with SSPC-SP-2 (Hand Tool Cleaning). The repair epoxy material shall be applied in accordance with the manufacturer's instructions.

OFFICE OF
CLERK OF THE BOARD OF SUPERVISORS
1st FLOOR, COUNTY ADMINISTRATIVE CENTER
P.O. BOX 1147, 4080 LEMON STREET
RIVERSIDE, CA 92502-1147
PHONE: (951) 955-1060
FAX: (951) 955-1071

KECIA HARPER-IHEM
Clerk of the Board of Supervisors

KIMBERLY A. RECTOR
Assistant Clerk of the Board

August 26, 2013

THE PRESS ENTERPRISE
ATTN: LEGALS
PO BOX 792
RIVERSIDE, CA 92501

FAX (951) 368-9018
E-MAIL: legals@pe.com

RE: NOTICE INVITING BIDS: COMMUNITY OF LAKELAND VILLAGE C0-0533

To Whom It May Concern:

Attached is a copy for publication in your newspaper for **TEN (10) TIMES:**

Wednesday	- August 28, 2013	Monday	- September 2, 2013
Thursday	- August 29, 2013	Tuesday	- September 3, 2013
Friday	- August 30, 2013	Wednesday	- September 4, 2013
Saturday	- August 31, 2013	Thursday	- September 5, 2013
Sunday	- September 1, 2013	Friday	- September 6, 2013

We require your affidavit of publication immediately upon completion of the last publication.

Your invoice must be submitted to this office in duplicate, WITH TWO CLIPPINGS OF THE PUBLICATION.

NOTE: PLEASE COMPOSE THIS PUBLICATION INTO A SINGLE COLUMN FORMAT.

Thank you in advance for your assistance and expertise.

Sincerely,

Cecilia Gil

Board Assistant to:
KECIA HARPER-IHEM, CLERK OF THE BOARD

Gil, Cecilia

From: kgribbin@pe.com on behalf of Master, PEC Legals <legalsmaster@pe.com>
Sent: Monday, August 26, 2013 10:12 AM
To: Gil, Cecilia
Subject: Re: [Legals] FOR PUBLICATION: Bids for Community of Lakeland Village C0-0533

Received for publication on 8/28-9/6

Please Note: The Press-Enterprise offices will be closed on Monday, September 2, 2013 in observance of the Labor Day Holiday. Advanced deadlines will apply. Below are our Labor Day deadlines:

Publication Date:	**Deadline:**
Fri., Aug. 30 – Sat., Aug. 31	Wed., Aug. 28 @ 10:30 AM
Sun., Sept. 1 – Tues., Sept. 3	Thurs., Aug. 29 @ 10:30 AM
Wed., Sept. 4	Fri., Aug. 30 @ 10:30 AM
Thurs., Sept. 5	Tues., Sept. 3 @ 10:30 AM

Thank You!

Publisher of The Press-Enterprise
Inland Southern California's News Leader
Legal Advertising
Phone:1.800.880.0345
Fax: 951.368.9018
E-mail: legals@pe.com
Please Note: Deadline is 10:30 AM two (2) business days prior to the date you would like to publish.
Additional days required for larger ad sizes

On Mon, Aug 26, 2013 at 8:02 AM, Gil, Cecilia <CCGIL@rcbos.org> wrote:

Notice Inviting Bids for publication from Aug. 28 to Sept. 6, 2013. Please confirm. THANK YOU!

Cecilia Gil

Board Assistant

Clerk of the Board

951-955-8464

MS# 1010

Notice to Bidders

County of Riverside, herein called Owner, invites sealed proposals for:

Grand Avenue and Blackwell Boulevard
Traffic Signal, Lighting and Intersection Improvements Project
Community of Lakeland Village
Project No. C0-0533

Bid shall be delivered to the County of Riverside Transportation Department, 14th Street Annex, 3525 14th Street, Riverside, California 92501, telephone (951) 955-6780 not later than 2:00 p.m., on Wednesday, **September 11, 2013** to be promptly opened in public at said address. Each bid shall be in accordance with plans, specifications and other contract documents, dated **July 2013,** and prepared by County of Riverside, whose address is same as the above, from whom they may be obtained upon deposit of **$25.00** per set with 24" x 36" plans, plus mailing costs. No refund. Prospective bidders may preview the plans, specifications and other contract documents at no charge prior to purchase at the above noted location.

The Contractor is required to have a Class "A" license at the time of bid submission.

Engineering Estimate	$443,000 - $518,000 (Base Bid) $ 49,000 - $ 60,000 (Alternate Bid Schedule)
Bid Bond	10%
Performance Bond	100%
Payment Bond	100%
Working Days	45 Working Days
Website:	http://www.rctlma.org/trans/con_bid_advertisements.html

Dated: August 26, 2013

Kecia Harper-Ihem, Clerk of the Board
By: Cecilia Gil, Board Assistant