

**S-110**

**STANDARD SPECIFICATIONS FOR MATERIALS  
AND THE INSTALLATION OF  
TRAFFIC SIGNALS  
IN THE CITY OF SANTA MARIA, CA**

**SECTION 1. GENERAL REQUIREMENTS**

These specifications shall apply to all materials and work of construction of traffic signals on the street system of the City of Santa Maria constructed pursuant to the requirements of a contract, local ordinances, subdivision or other agreements, and to other work as may be required as a condition of any permit.

The work herein provided for is to be done in accordance with the Plans and the General and Special Provisions on file with the Department of Public Works of the City of Santa Maria and with these Specifications, and the latest edition of Caltrans Standard Plans and Specifications, which are intended to cover all items necessary for the complete construction and placing in operation of a traffic signal, together with all necessary miscellaneous appurtenances. All equipment shall be constructed by methods within Caltrans Electrical Equipment Specifications, dated March 12, 2009. No plans may be used unless signed by the City Engineer. All proposed equipment schedules and material lists must be submitted in quadruplicate and approved by the City Engineer prior to installation.

These specifications are written for the purpose of assisting developers, designers, and contractors with the proper methods of construction standards for traffic signal installations or modifications within the City of Santa Maria.

The traffic signal designer shall supply the City of Santa Maria with 24 hour, four direction traffic counts. The traffic counts shall include volumes for all phases that will be in operation after intersection turn-on. The traffic counts shall include projected volumes for any lanes that vehicles will utilize after intersection turn-on.

**SECTION 2. MATERIAL REQUIREMENTS**

- A. **Battery Back-up System (BBS):** Cabinet should be mounted on opposite side of 332L cabinet police panel, whenever possible. Other mountings should be approved by traffic signal technician. Cabinet shall be installed only by manufacturer approved methods. BBS shall be equipped with four 79aH batteries, approved by manufacturer.

BBS cabinet shall meet requirements set forth by Caltrans Specification for Battery Back-up System, July 7, 2009, TEES Chapter 4. BBS shall be an external mount cabinet and conform to Caltrans Standard Drawing B4-1. BBS shall be equipped with an inverter manufactured to meet the Caltrans specification for Battery Back-up System. Approved manufacturer include: Airpax-Dimensions Sensa 24 M11-WBE.

- B. **Cabinet:** All new cabinets shall be a 332L type, and shall be made of anodized aluminum only. Controller assemblies shall be type 170E. Controller program shall be Bi-trans Systems 233CA. Dual 100cfm fans shall be installed in each cabinet. Thermostat control. Acceptable surge protectors include Hesco HE 1700. Cabinet shall include a sliding drawer, installed under the controller unit. Cabinet shall include an 18" fluorescent light.
- C. **Conflict Monitor Unit:** EDI 2010EClip CMU shall be used. CMU unit shall be equipped with a red monitor kit. Clipping of the diodes from the diode board will be the responsibility of the contractor. The CMU, in conjunction with the diode board, shall give the intersection proper protection from any conflicting phases.
- D. **Conduit:** Conduit installed shall be Type 3 per STD. SPEC. 86-2.05A. Where ever possible, conduit should run under the asphalt roadway, 3' from the curb face with a minimum cover of twenty-four inches (24").
- E. **NISNS:** Non-illuminated street name signs (NISNS) shall be used at all new locations. Sign dimensions shall be as shown on the City of Santa Maria Standard Drawing for Traffic Signal/Street Name Signs and shall have a retroreflective sheeting of ASTM type III or type IX. All NISNS shall be installed by methods approved by the City Engineer or designee. See City of Santa Maria Standard Drawing for Traffic Signal/Street Name Signs.
- F. **Opticom Equipment:** Opticom detectors that are acceptable shall either be type 711, 721, 722. Only type 764 phase selectors are acceptable. All 764 installations shall also include the 757 green sense harness, properly terminated to output file.
- G. **Pedestrian Detectors:** Pedestrian pushbuttons provided shall be Type B mountings. Pushbutton signs shall be the international/alternative symbol and arrow per STD. PLAN ES-5C. Pedestrian pushbuttons shall be the 2" ADA style with non-moving parts. All screws and bolts that attach the pushbutton or pedestrian sign to pedestrian assembly shall be coated with an anti-seizing agent.
- H. **Service Equipment:** Type III-BF service enclosures shall be used at all new intersections. At modified intersections, either Type III-AF or Type III-BF service enclosures can be used. All service enclosures will be provided with a clear window for the photo electronic unit, per STD. PLAN ES-3B, ES-3C. Anodized aluminum only.
- I. **Signal Head Sections:** All portions of vehicle signal sections and pedestrian signal faces shall be made of Polycarbonate, per STD. SPEC. 86-4.01B(2). All signal and pedestrian indications are to be the LED type per STD. SPEC.86-4.02, 86-4.07. All vehicle signal visors shall be the tunnel style per STD. PLAN ES-4C. All vehicle signal backplates shall be the non-louvered style per STD. SPEC. 86-4.04 and shall include the use of washers and lock-washers for each point of attachment to the signal head. All signal and pedestrian mountings shall use the terminal mounts, with the exception of those that are mounted on the mastarm. For signal heads located on the mastarm, the MAS style shall be used

per STD. PLAN ES-4E. All 1½" threaded pipe assemblies shall be coated with an anti-seizing agent. Any 1½" threaded pipe assemblies that have been constructed by manufacturer may be excluded. All terminal cover screws shall be coated with an anti-seizing agent. LED pedestrian signal indications shall be the incandescent look/countdown type.

- J. **Vehicle Detectors:** Loop detectors for advance locations shall use the Type A configuration. Loop detectors for call locations shall use the Type C configuration. Loop detectors for left turn lane shall be 60' in length. Loop detectors for through movement shall be 35' in length per STD. PLAN ES-5A, ES-6A. All call loops shall extend 5' past the limit line. Detector handholes shall be used on all new loop installations, with a maximum of 3 loops entering into a handhole. Type A detector handhole installations shall be used pursuant City of Santa Maria Standard Drawing. During construction near detector hand-holes, all conduit entering hand-holes shall be verified to be unharmed and continuous. Acceptable sealants are elastomeric sealant and hot-melt rubberized asphalt sealant per STD. SPEC. 86-5.01 A(5). Splicing method used shall be "B". Only type "S" splices acceptable per STD. PLAN ES-13A. The City of Santa Maria shall approve any vehicle detection that will be using the technology of video cameras.
- K. **Pull Boxes:** Pursuant Standard Plan ES-8, traffic signal designer to determine quantities and sizes. Minimum size accepted is No. 5.
- L. **Poles/Master Arms:** Pursuant Standard Plans for traffic signal standards, traffic signal designer to determine all appropriate quantities and dimensions.
- M. **Standard Drawings:** City Standard Drawings must be complied with and are a part of these specifications. They can be obtained at the Engineering Division office at 110 S. Pine Street, Suite 221 (mail: Suite 101), Santa Maria, CA 93458-5082 or web site: [www.ci.santa-maria.ca.us](http://www.ci.santa-maria.ca.us).
- N. **Traffic Signal Design Criteria Checklist:** The traffic signal designer shall supply the City of Santa Maria with all data, materials and design considerations included in the attached Exhibit "A" and submit them with the design public improvement plans.

### SECTION 3. CONSTRUCTION METHODS

- A. **Trenching:** Trenching shall be thirty-six inches (36") into the street from the face of curb for traffic signals. Minimum cover to be twenty-four inches (24") and if in an existing or future roadway, must be completely backfilled in a manner which will assure a minimum relative compaction of ninety-five percent (95%). All other trenches must be backfilled and compacted to a minimum relative density of ninety percent (90%).

- B. **Standards/Posts/Handholes:** Placement of handholes shall be located 180° from the direction of oncoming traffic.
- C. **Testing:** Controller cabinet shall be delivered to the City of Santa Maria, Public Works Yard, 810 W. Church, with sufficient time to allow for in-house testing. Testing typically takes no longer than five working days. Testing arrangements shall be made through the Streets and Facilities Division or its designee prior to delivery.
- D. **Intersection turn on:** The contractor shall provide a notice of 5 working days in advance of desired turn on date. City of Santa Maria traffic signal inspectors will complete a full inspection of the intersection before a turn-on will be allowed. The City of Santa Maria reserves the right to delay the initial turn-on, if traffic signal inspectors deem that critical corrections must be made in order for the intersection to operate properly. New intersections shall operate in red flash for a period of 24 to 48 hours prior to initiating full operation. The Streets and Facilities Division or designee will determine the red flash operating time. A signal technician qualified to represent the controller manufacturer shall be present at the time of signal turn-on. The manufacturer representative shall verify proper installation of components and operation of traffic signal in the presence of the City Engineer or designee.
- E. **Salvaging:** All poles and signal heads that are deemed to be salvageable shall be delivered to the City of Santa Maria Landfill site at 2065 East Main Street. Hardware and components that are deemed to be salvageable shall be delivered to the City of Santa Maria Public Works Yards, 810 W. Church Street. Prior to delivery of any salvageable parts, arrangements shall be made with City of Santa Maria Streets and Facilities Division or designee for acceptance and proper placement of material.

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**Exhibit "A"**

**TRAFFIC SIGNAL DESIGN CRITERIA CHECKLIST  
CITY OF SANTA MARIA**

Name of Intersection: \_\_\_\_\_  
Form Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

1. Controller Model  
170E
2. Controller Cabinet  
Model 332L
3. Controller Programming (check with City Traffic Engineering Division)  
BiTrans Systems 233CA Local Intersection Program
4. Service Equipment Enclosure  
Type III-BF
5. Detection  
Inductive Loops (Standard)  
Video (Special condition or as required by the City)
6. Loop or Video Detection Zone Size
  - a. Left-Turn Traffic Detector – 6' x 60' Type C
  - b. Through Traffic Detector – 6' x 35' Type C
  - c. Advance Detector – 6' x 6' Type A
7. Loop Detector Hand Holes Location  
6' from the left lane line of the lane closest to the curb
8. Design Speed for detection  
\_\_\_\_\_ mph (check street sign or check with the City)
9. Luminaire  
Refer to City of Santa Maria Standard Specification S-106
10. Signal and Lighting Standards
  - a. Luminaire Arm Length – 15'
  - b. Signal Pole Height – 30'
11. Street Name Sign  
Non-illuminated
12. Street Name Sign Mounting  
Strap & Saddle on pole and mast arm corner
13. Sign Panels  
ASTM Type III or Type IX Sheeting
14. Signal Wiring  
Cable
15. Emergency Vehicle Pre-emption  
Yes
16. Signal Head Illumination  
LED (Light Emitting Diode)  
Incandescent look  
Countdown type (for pedestrian modules)
17. Signal Head Housing

- Plastic
- 18. Size of Signal Lens  
12"
- 19. Visors and Backplate  
Tunnel Visor  
Solid Backplate
- 20. Pedestrian Push Button  
Polara 4 wire automated system
- 21. Battery Back-up System (BBS)  
Myers BC-100G  
Inverter to be Myers 1250  
Caltrans standard BBS cabinet  
Airpax-Dimensions SENSEA 24 M11-WBE, or equivalent  
Four ea. 79 AH AGM/VRLA Batteries
- 22. Serving Utility  
PG & E
- 23. Pedestrian Crosswalk (check with City Traffic Engineering Division)  
 Yes  
 No
- 24. Pedestrian Signal Head and Push Button (check with City Traffic Engineering Division)  
 Installed  
 Wired, but not installed  
 None

**SIGNAL MODIFICATIONS:**

- 25. Retrofit all existing non-LED vehicular signal light sources with LED.
- 26. Retrofit all existing non-LED and non-Man/Hand Combination pedestrian signal heads with LED Man/Hand Combination pedestrian signal heads.
- 27. Retrofit all non-solid state pedestrian push buttons with solid-state pedestrian push button.  
 Yes  
 No
- 28. Repaint or retrofit signal heads  
 Yes  
 No
- 29. Upgrade retro-reflective signs