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INTRODUCTION

This document, Special Provisions and Standard Drawings for the Installation and Modification of Traffic Signals, governs the contractual construction activities related to traffic signals in the City of Los Angeles. Where no contract is applicable, but reference is made to “contractor”, said provisions apply to the City of Los Angeles Department of Transportation field forces. This edition supersedes all previous editions. This document supplements the Standard Specifications for Public Works Construction, or “Green book”, as adopted by the City of Los Angeles Board of Public Works and as modified by the corresponding issue of the “Brown Book.” Together, all of these documents govern all contractual construction activities.

All materials used in the installation and/or modification of traffic signal systems shall conform to the latest Material Specification of the City of Los Angeles Department of Transportation. The LADOT Material Specifications may be obtained from the Material Services Division, Department of Transportation, 100 South Main Street, 10th Floor, Los Angeles, California, 90012, telephone number (213) 928-9636 or can be downloaded in PDF format from the LADOT web site at: http://www.ladot.lacity.org/tf_Development_Review.htm.
PART I
SPECIAL PROVISIONS

A. GENERAL

1. DEFINITIONS

LABPW: City of Los Angeles Board of Public Works.
LADOT: City of Los Angeles Department of Transportation
MUTCD: Manual of Uniform Traffic Control Devices (California Supplement)
WATCH: Work Area Traffic Control Handbook

2. LADOT DISTRICT FIELD OPERATIONS YARD

The address and telephone numbers of the LADOT Field Operations Yards are listed below:

- Valley Yard: 14832 Raymer Street, Van Nuys; (818) 756-7845
- Central Yard: 1831 Pasadena Ave, Los Angeles; (213) 485-7689
- Western Yard: 2801 Exposition Blvd, Los Angeles; (213) 485-6818

3. PURCHASE OF THIS DOCUMENT

This document, Special Provisions and Standard Drawings for the Installation and Modification of Traffic Signals, may be purchased from the LADOT Records Section, 100 South Main Street, 10th Floor, Los Angeles, California, 90012, telephone number (213) 972-5060. This document can also be downloaded in PDF format from the LADOT web site at: http://www.ladot.lacity.org/tf_Development_Review.htm

4. MATERIAL

All materials used in the installation and/or modification of non-temporary signal systems shall be new and unused, unless otherwise specified on the plan and shall conform to the latest LADOT Material Specifications. Temporary signal standards and signal heads installed on these standards may be used, but shall be undamaged.
5. **NOTIFICATION**

The contractor shall notify LADOT Traffic Signal Inspector at Central Yard, (213) 485-1071, Valley Yard, (818) 756-7852, or Western Yard, (213) 485-6834, depending on the project location, five (5) working days prior to start of construction on any project involving work on traffic signals or signal systems. In case of emergency, the LADOT Traffic Signal Inspector may authorize requests for change orders. The signal inspector shall be notified for inspection approval of all underground substrutures, including foundations, 48 hours prior to covering the work or pouring foundations.

Any work that will affect a major ATSAC communication facility (i.e. fiber optic cable, main communication trunk cable, communication hub site, etc.) as determined by the LADOT Traffic Signal Inspector, shall be prohibited between the hours of 6:00 A.M. to 9:00 A.M. and 3:00 P.M. to 7:00 P.M. on weekdays, except national holidays. If such work requires that ATSAC communication system be off line for five (5) or more working days during the hours permitted, the contractor shall provide temporary facilities in order to maintain operation of the ATSAC system. These temporary facilities may include, but are not limited to, overhead spans of fiber optic or communication cable, and any related equipment. Any work required to install and remove these temporary facilities shall be done at the contractor’s expense. Once said temporary facilities are in place, the contractor shall have thirty (30) working days in which to complete construction and to fully restore the ATSAC communication system.

Failure to notify the LADOT Traffic Signal Inspector prior to start of work will result in suspension of work. Delays in the complete restoration of the signal system may require the contractor to pay liquidated damages as specified in the contract or may require LADOT forces to complete the work which will be charged to the contractor and/or permittee.

Traffic control shall be in accordance with the LADOT Standard Plan S-488.0, the latest edition of the WATCH manual, MUTCD (California Supplement), associated worksite traffic control plans or any additional requirements called for on the plan or in the special provisions.

6. **WORKSITE TRAFFIC CONTROL**

The contractor shall install and maintain overhead cable or wires to maintain existing signal operation when installing new conduit runs across the street, replacing cable runs across the street, or installing or replacing signal standards, foundations or heads.

Regular traffic signal control (including interconnect) shall be maintained from 6:00 A.M. to 9:00 A.M. and 3:00 P.M. to 7:00 P.M. on weekdays, except national holidays. National holidays are New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Veteran’s Day, Thanksgiving, and Christmas. Flashing, activation and deactivation of signals and interconnect may occur only between 9:00 A.M. and 3:00 P.M. and between 7:00 P.M. and 6:00 A.M. on weekdays, except national holidays, and shall be accomplished only by an LADOT traffic signal electrician. The LADOT traffic signal electrician may reschedule or cancel a scheduled signal deactivation in the event of unsafe working or weather conditions.

Arrangements to deactivate signals (signal shutdown) shall be made at least 24 hours in advance, Monday-Thursday at (213) 473-8478 before 9:00 A.M. on non-holiday weekdays. The LADOT project number as shown on the traffic signal plan must be given at this time. The contractor may be charged for electrical and traffic control work provided by LADOT.
7. CONTRACTOR REQUIREMENTS

All traffic signal and/or related electrical work shall be performed and inspected under the conditions of the most current, amended Board of Public Works “Enhanced Electrical Safety Policy”. The “Enhanced Electrical Safety Policy” is applicable for all work on traffic signals and/or related electrical work performed for LADOT regardless of contract cost.

The Contractor shall certify that all personnel employed in traffic signal and/or related work fully comply with the requirements of the “Enhanced Electrical Safety Policy”.

Failure to fully comply with the requirements of the “Enhanced Electrical Safety Policy” may result in a suspension of work and/or sanctions against the Contractor.

THE CONTRACTOR SHALL NOT WORK ON TRAFFIC SIGNAL CIRCUITS WHILE THEY ARE ENERGIZED

When a signal shutdown is approved by LADOT, it shall be two (2) hours maximum, unless approved for a longer period, and may occur only between the hours of 9A.M. to 3P.M. Monday-Thursday on non-holiday weekdays. The Traffic Signal Inspector may authorize work necessitating longer periods of time. Preliminary work associated with the signal shutdown shall be done prior to the actual shutdown in order to minimize the amount of time necessary for the completion of the work. Sufficient staffing and equipment shall be employed by the contractor to minimize the shutdown period. Once a shutdown is affected, all work shall be diligently pursued without interruption until the signals are back in normal operation.

8. TRAFFIC CONTROL SIGNING

Any traffic control signing damaged or lost by the contractor shall be replaced at the contractor's expense. Arrangements for obtaining replacement signing (with subsequent billing) shall be made with the LADOT Bureau of Accounting, General Accounting Division, at (213) 972-5908. Prior to the completion of construction, the contractor shall permanently mount all traffic control signing per LADOT standards.

Five (5) working days prior to any traffic signal pole removal, the appropriate yard Superintendent shall be notified for the removal and reinstallation of pole and mast arm mounted street name signs. The address and phone numbers of the LADOT Field Operations Yards are shown in Section 2.

9. LADOT SUPPLIED MATERIAL

Arrangements for obtaining materials, except traffic signal controller assemblies, to be supplied by LADOT as indicated on traffic signal design plans, shall be made ten (10) working days in advance by contacting the LADOT Field Operations Division at (213) 928-9620.
10. **CONTROLLER TESTING**

All traffic signal controller assemblies being furnished and installed by the contractor must be tested by LADOT. The completely assembled controller with cabinet and auxiliary equipment shall be delivered to the LADOT Traffic Signal Shop at Piper Technical Center, 555 Ramirez Street, Los Angeles, California, 90012, telephone number (213) 473-8468, at least thirty (30) working days prior to desired pick-up date. The traffic signal program for the Model 2070 controller will be supplied and installed by LADOT. Upon successful completion of the testing, the contractor shall pick up the traffic signal controller assemblies within fifteen (15) working days after notification for installation at the job site.

11. **SALVAGE EQUIPMENT**

All arrangements for traffic signal equipment specified to be returned to LADOT shall be made five (5) working days prior to the desired delivery date.

Controller cabinets shall become the property of the contractor, unless indicated otherwise on the project plans or by the LADOT Traffic Signal Inspector. The model 170 or 2070 controller units, model 210 or 2010 conflict monitor and specialized equipment, as determined by the LADOT Traffic Signal Inspector, contained within the cabinet remain the property of LADOT and will be removed from the controller cabinet by the LADOT Traffic Signal Inspector.

Return controller cabinets to the following location:

LADOT Equipment Repair Shop
447 Ducommun St, Los Angeles, California, 90012
Telephone: (213) 847-2944

The contractor shall exercise due care in the removal of traffic signal equipment, including signs and sign posts, that have been specified to be reused or salvaged, so that the equipment will remain in the same condition as that prior to removal. The contractor will be required to replace any traffic signal equipment that was damaged or destroyed while in the contractor's care. The contractor shall be responsible for cleaning traffic signal equipment prior to delivery.
B. CONSTRUCTION PRACTICES

1. PULLBOXES

The tops of pullboxes installed in the sidewalk areas shall be flush with the surrounding grade or the top of the adjacent curb. Where practical, pullboxes adjacent to standards shall be placed with a clearance of three (3) feet from the side of foundations. Pullboxes shall not be placed in curb ramp areas or driveways. Pullboxes shall be located beyond the door opening paths of traffic signal controllers. Unless physically impractical, pullboxes shall be installed at least six (6) inches from any substructure or back of curb. This is to allow for rock under and cement around the pullbox.

Type PB-3 pullboxes shall be used for all:
   a. Interconnect runs (telephone and/or fiber optic cables)
   b. Power service conduits
   c. Controllers
   d. Junctions with four or more conduits
   e. Junctions with three conduits, two of which are three-inch in diameter
   f. All street crossings

Type PB-2 pullboxes shall be installed at all other locations, unless otherwise noted on the plans.

The service pullbox shall be separated from the intersection wiring whenever possible.

For fiber optic runs, the spacing between the pullboxes shall be at intervals not to exceed 600 feet. For all other runs, pullboxes shall be spaced at intervals not to exceed 300 feet.

Existing pullboxes are considered to be an integral part of the surrounding concrete sidewalk. Where the surrounding sidewalk surface is composed of a special material, pullboxes with covers of compatible material shall be used to obtain a homogeneous appearance of the sidewalk area. The contractor shall be required to replace the pullboxes when modifying or replacing the surrounding concrete. Replacement of pullboxes shall be made per LADOT Standard Drawing S-78.5.1 or S-78.8. Under no circumstances is any pullbox to be reused or modified for reuse.

2. CONDUIT

a. Material

Rigid non-metallic conduits conforming to the requirements in UL Publication 651 for Rigid Non-metallic Conduit (PVC Schedule 80) shall be used, except where galvanized rigid steel conduit is required or permitted.

Galvanized rigid steel conduit shall be used where specified in this manual, where shown on the plans, or where jacking is required.

Galvanized rigid steel conduit is permitted where exposed above ground as a permanent installation or where authorized by the LADOT Traffic Signal Inspector. A separate #8 green ground wire and a Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent), shall be
included within the PVC conduits at the time of installation. For the galvanized steel conduit a Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent), shall be included. All the #8 green ground wires shall be spliced together and connected to the “equipment ground bus” bar inside the controller cabinet.

b. Trenching

PVC conduit shall be installed in open soil trenches and in pavement trenches whose edges have been saw cut, except in the vicinity of pullboxes where it may be bored in pre-drilled, augured or air-blown holes. Generally, trenches should be four inches wide. Where trenching occurs within Portland Cement Concrete, a 24-inch wide section of roadbed whose edges have been saw cut shall be removed.

Trenching is not permitted through Portland Cement Concrete structures, such as bus pads, spandrels and cross gutters. Where these are encountered, jacking with galvanized rigid steel conduit, or boring with PVC conduit is required.

Traffic signal conduits shall be separated from street lighting conduits. New conduit runs shall be of the same size and material throughout the run. Empty PVC conduit (conduit only) shall include a #8 green ground wire and a Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent). Empty galvanized rigid steel conduit (conduit only) shall include Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent). Existing underground conduit being incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air.

c. Installation in Roadways

Interconnect, fiber optic, system and bus detector loop conduits shall be installed at a consistent depth throughout a block with minimum cover of 18 inches (below the established edge of the gutters) on Major and Secondary highways, and 15 inches on all other streets or alleys, unless otherwise specified on the Plans.

Conduits containing traffic signal load wires (115 volts) shall be installed at a consistent depth, with the minimum and maximum depths as per Section 307-2.5 of the Standard Specifications for Public Works Construction. All street crossings shall be installed at 30-inch depth.

Conduit trenches approximately four (4) inches wide may be excavated at locations shown on the Plans using earth saw methods. The preferred alignment is along the outer edge of an existing gutter.

Where there is no gutter, the trench shall be at a distance of 36 inches from the existing or future curb face (which will accommodate the construction of a 24-inch wide gutter in the future), or as shown on the Plans. Removal and replacement of all pavement between the trench and the edge of the existing pavement shall be done at the discretion of the Engineer.
On Major or Secondary highways, the asphalt concrete pavement resurfacing shall conform to the Standard Specifications for Public Works Construction.

On all other asphalt concrete streets or alleys, the upper three inches of trench shall be completed with material matching the existing pavement. Major and Secondary Highways are shown on the Streets and Highways Designation map.

Portland Cement Concrete (PCC) roadway resurfacing shall be a minimum of six (6) inches thick and twenty-four (24) inches wide for all classifications of roadway.

Concrete pavement serving as bus pads, spandrels, cross gutters or local depressions shall not be cut. In addition, concrete curbs and gutters (regardless of gutter width) shall not be cut. At these locations, the conduit shall be bored or jacked.

It is desirable to maintain a straight alignment. Routing of a conduit at a bus pad or at any other protrusions beyond the gutter edge must be approved by the Engineer. It should be noted that some installations might require locations in back of the curb. Locations where conduits are within one foot vertically and two feet horizontally from, or otherwise in conflict with, existing utilities will not be permitted.

d. Backfill

Backfill may be Portland Cement Concrete (PCC) when required by the Engineer, or a one-sack sand-Portland Cement slurry mix. Portland Cement Concrete backfill shall be a 520-C-2500 mix with a 4-inch maximum slump. For PCC, calcium chloride must be added up to the maximum amount allowed by Section 201-1.2.4 of the Standard Specifications.

e. Installation in Parkways

All conduit installations in parkways shall have a minimum cover of 16 inches below surface (LAMC Sec. 62.04). If directional bore is permitted by the Engineer, conduit depth shall have a minimum cover of 22 inches below surface.

All existing improvements in parkways, including landscaping and sprinklers, shall be protected from damage or restored to pre-construction condition.

f. Size

All cross street conduit runs and all interconnect conduit runs between intersections, except for fiber optic interconnect runs, shall be three-inch in diameter. All fiber optic interconnect runs shall be two-inch in diameter. Three-inch conduit shall be used between an F-8 foundation and the adjacent PB-3 pullbox. Two three-inch conduits are required between an F-332 foundation and the adjacent PB-3 pullbox. One-inch conduit shall be used between an F-7 foundation and the adjacent pullbox. All other new conduit runs shall be two-inch in diameter, unless otherwise specified on the plan.

When existing conduit runs are to be modified or extended, the material and size of the new conduit shall be the same as the existing conduit.
3. BACKFILLING

a. Schedule

All excavations for the installation of foundations, conduits and pullboxes, and removal of old systems, shall be backfilled, compacted and restored to match adjacent areas and excess material removed from the job site within the calendar days prescribed in the following Table I. The number of days allowed commences with the start of excavation unless otherwise permitted by the Engineer. All trenching activity, commenced each day, shall be fully backfilled to the finished surface grade at the end of the day; final resurfacing shall be completed within five (5) working days. All streets and all trenches shall be maintained in safe condition until final resurfacing.

b. Foundation Holes

A one-sack slurry mix shall be used to backfill foundation holes created as a result of removing the existing foundations. If the area excavated for a new foundation is deemed to have unstable soil as determined by the Engineer, then the area excavated shall be backfilled with one sack slurry mix, 24 hrs prior to re-excavation for the new foundation. Where the new foundation is within three (3) feet of the existing foundation, the removal and backfill of the existing foundation shall occur prior to the installation of the new foundation.

c. Trenches - See Section B.2, Conduit
**TABLE I**

BACKFILLING, RESTORATION OF EXCAVATIONS AND REMOVAL OF EQUIPMENT AND MATERIAL

<table>
<thead>
<tr>
<th>Description</th>
<th>Backfilled &amp; Compacted or covered</th>
<th>Excess Equipment &amp;/or Material removed from job site</th>
<th>Permanent Resurfacing</th>
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<tr>
<td>1. Parkway: Pilot Holes and Jacking Pits (1) (2)</td>
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<td>3 days</td>
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<td>3. Existing Foundation and Pullbox Removals</td>
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<td>4. Existing Standard (poles) and misc. equipment</td>
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<td>5. New Foundation Installations</td>
<td>Daily</td>
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<td>7 days</td>
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<tr>
<td>6. New Pullboxes: Excavation and Placement</td>
<td>3 days</td>
<td>5 days</td>
<td>7 days</td>
</tr>
</tbody>
</table>

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(1) Excavation for jacking pits and excavations within roadways shall be backfilled and compacted in accordance with Subsection 301-1.3 of the Standard Specifications for Public Works Construction.

(2) Approved protective plates/covers shall be placed immediately at the end of each day until excavations are no longer needed.

(3) Temporary asphalt concrete (cold mix) shall be placed immediately after the backfill is compacted in accordance with subsection 306-1.5.1 of the Standard Specifications for Public Works Construction.
The previous requirements do not relieve the Contractor of his/her obligation to properly place warning signs and barricades as well as maintain the job site in accordance with Subsections 7-9 and 7-10 of the Standard Specifications for Public Works Construction and the Work Area Traffic Control Handbook (WATCH) manual.

If the times specified in Table I are exceeded, the Contractor (as directed by the Engineer) shall stop all other work until the restoration work is brought into compliance. Contact time will continue to be charged during such periods.

Where field conditions are such that these Special Provision are conflicting, the Engineer shall be notified immediately.

Where excavations occur in the sidewalks or other pedestrian ways, the Contractor shall provide a safe and orderly pedestrian passage around the excavation area. The pedestrian passage shall not subject pedestrians to hazards from traffic or construction operations, or cause pedestrians to walk upon unsuitable or hazardous surfaces.

4. **CONDUCTORS AND CABLE**

   a. **Material**

   All permanent conductors shall be run inside conduits or standards. Multi-conductor cable shall be used for all circuits in lieu of individual conductors. The multi-conductor cable shall conform to the latest revision of the following LADOT Specifications:

   92-089-01 (28 conductor cable)  
   92-091-01 (13 conductor cable)  
   92-090-01 (9 conductor cable)  
   92-094-01 (5 conductor cable)

   Conductors shall be solid copper wire of the gauge shown on the plans, unless otherwise specified.

   Whenever new conductors are to be installed in a conduit with existing individual conductors (service wires excepted), all individual conductors shall be removed and replaced with multi-conductor cable. 28-conductor cable shall be installed in all new street crossings unless otherwise specified on the plans.

   Only Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent) shall be used for "pulling in" or installing cables in ANY TYPE CONDUIT. At no time shall any type "rope" be used to install cables or wires.

   All temporary overhead circuit runs shall be multi-conductor cable. Where exposed over the roadway, they shall be at least 20 feet above ground. Over the sidewalk and roadside areas not open to vehicular traffic, they shall be at least 12 feet above ground.

   Service conductors shall have black and white insulation.
b. **Identification**

Each communication cable shall be identified in all communication cabinets and splice vaults by a plastic tag 1-inch by 4-inch in size, with the cable run identification characters in ½-inch letters and secured to the cable with two nylon tie-wrap devices.

Each cable shall be identified in all controller cabinets by a plastic tag ½-inch by 2-inch in size, stamped with the cable run identification characters in ¼-inch letters and secured to the cable with two nylon tie-wrap devices.

Each conductor shall have clear, distinctive and permanent bands for identification. These identification bands shall be used even though the conductors have clear markings within their insulation. Bands shall conform to the latest edition of *Standard Specifications for Public Works Construction*. These permanent identification bands shall be marked as specified. All conductors shall be labeled within each affected pullbox.

c. **Interconnect**

1) **Direct Wire:** Interconnect cable with 7 - #14 wires per LADOT Specification 92-039-03 (latest revision) shall be continuous from controller to controller, unless splices are specifically authorized by the LADOT Traffic Signal Inspector. Where splices are authorized by the LADOT Traffic Signal Inspector, they shall be soldered and shall be secured using vinyl, water-tight, spring tensioned, silicone filled, direct burial wire connectors, as described in LADOT Specification 56-002-03 (latest revision).

2) **Multi-Pair Interconnect Cable:** Filled telephone type cable shall consist of paired #22 AWG solid annealed copper conductors. The cable shall be polyethylene insulated and aluminum shielded, conforming to the construction requirements and environmental, mechanical, and electrical tests of LADOT Specification 92-069-01 (latest revision) for filled telephone cable. The cable sizes shall be 6, 12, 25, 50, and 75 pair. Cable splices shall only be made at a communication cabinet, splice vault or controller. Punch down the “IN” cable on the left side of the T-66 block and the “OUT” cable(s) on the right side of the T-66 block.

3) **Telephone and Fire Alarm:** Interconnect cable using telephone lines or former fire alarm lines shall be #14 AWG stranded twisted pair copper wire having 600-volt insulation and overall shield and jacket.

d. **Inductive Loops Detector**

Inductive loop detectors shall be installed as per LADOT Standard Drawing S-70.1A or as otherwise approved by LADOT. To the greatest extent practical, loops should be installed in one continuous medium. Loop wire shall conform to LADOT Specification 92-093-01 (latest revision). All detector lead-in cable connections and terminations shall be soldered.

1) **Wire Splicing:** Where circuits are to be spliced, each splice shall be twisted
and soldered with rosin core (no acid core or acid paste shall be used) then sealed with vinyl, watertight, spring tensioned, silicone filled, direct burial wire connector per LADOT Specification 56-002-03 (latest revision).

2) **Loop Detector Wire Routing System:** Unless otherwise specified, all detector loops shall be wound in a clockwise direction. The input (or start) wire shall be tagged with an odd number, the output (or finish) wire with the next higher number. A plastic tag ½-inch by 2-inch shall be tie wrapped around each loop pair to identify each pair by phase and numbers of individual conductors.

3) **Sealant:** The loop wires shall be covered and sealed using Caltrans approved “Hot-Melt Rubberized Asphalt Sealant” for loop installation. Note: “Hot-Melt Crack Sealant” shall not be used in place of the above.

4) **Transit Bus or Photo Red-Light Detector Wire:** All Transit Bus or Photo Red-Light loop wire shall conform to IMSA Specification 51-7.

e. **Conductor Splicing and Termination**

1) **Connectors**
All spliced solid field conductors shall be twisted together and secured using vinyl, water-tight, spring tensioned, silicone filled, direct burial wire connectors, as described in LADOT Specification 56-002-03 (latest revision). At least 36 inches of surplus signal cable shall be neatly coiled in a clockwise direction within each pullbox. Of these 36 inches of cable, only 24 inches of outer jacket shall be removed. The remaining 12 inches of cable shall remain enclosed within the outer jacket for future emergency repair needs. Care shall be used in removing the outer cable jacket to ensure that the individual conductor insulation is not cut or nicked. Failure to protect the individual conductor insulation shall result in the replacement of the damaged cable at contractor’s expense.

2) **Multi-Conductor Signal Cables in the Controller Pullbox**
The installation of new multi-conductor cable(s) into and through the controller pullbox shall be spliced together as referenced in paragraph 1) and not looped through, except for:

   a) Service wires
   b) Communication cables
   c) Loop detector lead-in cables
   d) Railroad preemption cables or wires
   e) Telephone interconnect cables
   f) Video cables or conductors

3) All stranded wires shall be terminated with an LADOT approved terminal connector and properly compressed for minimum resistance at the attachment.

4) Where optimum operation of circuits requires minimum resistance, as determined by the LADOT Traffic Signal Inspector, the connections and
terminals shall be soldered.

f. **Inductive Loop Detector Lead-in Cable**

All inductive loop detector lead-in cable from the pullbox to the controller cabinet shall have two-, three- or four-pair conductors and shall conform to Standard Drawing S-70.2. and LADOT Specification 92-082-03 (latest revision). A maximum of 12” of outer jacket shall be removed.

g. **Transit Bus or Photo Red-Light Detector Lead-in Cable**

All Transit Bus or Photo Red-Light detector lead-in cable from the pullbox to the controller cabinet shall be one pair cable and conform to IMSA Specification 50-2.

h. **Conductors Attached to Controller Field Terminals**

Each controller field terminal shall have a maximum of one wire connected. If the intersection wiring plan requires more than the single wire to accomplish the correct operation, splicing the conductors in the controller pullbox shall be used.

1) Compression terminal connectors shall not be used when connecting solid wires to controller terminals.

2) Compression terminal connectors shall be used when connecting stranded wires to controller terminals, and shall be soldered.

i. **Field Testing**

Prior to start of functional testing, the Contractor shall perform the following tests on all circuits, in the presence of the DOT Inspector and/or Engineer.

1) **Continuity**: Each circuit shall be tested for continuity. When 120V AC is used to conduct a “dynamic, non-destructive” test of the circuit(s), then suitable circuit protection shall be used. Suitable circuit protection shall be in the form of a low amperage fuse or circuit breaker with a design curve that reacts fast enough to trip and protect the circuit under test without interrupting any of the cabinet circuit breakers.

2) **Ground**: Each circuit shall be tested for grounds.

3) **Insulation Resistance**: An insulation resistance test at 500 Volts DC shall be made on each circuit between the circuit and a ground. The insulation resistance shall not be less than 10 Megohms on all circuits, except for inductive loop detector circuits, which shall have an insulation resistance value of not less than 100 Megohms.
5. FIBER OPTIC CABLE

a. General

1) **Description:** Fiber Optic Trunk Cable shall be of loose-tube construction. The optical fibers shall be single mode optical glass or as specified by the Engineer. The fiber optic cable shall conform to ICEA S-87-640.

2) **Performance:** The optical performance of each single-mode fiber measured at wave lengths of both 1310 nanometers and 1550 nanometers shall have maximum attenuation of 0.4 decibels per kilometer at 1310 nanometers and 0.3 decibels per kilometer at 1550 nanometers and shall conform to TIA/EIA 49Z C4AA.

3) **Construction:** The cable shall be constructed using five or six gel-filled, color-coded buffer tubes stranded (reverse oscillation) around a dielectric central member. The color-coded fibers shall be contained in the buffer tubes and the remaining fillers shall be natural or white in color. A layer of aramid yarn (e.g. Kevlar) shall hold the tubes in position around the central member and provide tensile strength. The color code for the fibers shall be blue, orange, green brown, slate and white. Water blocking shall be of the dry-tape type within the interstitial spaces, and gel within the buffer tubes.

4) **Jacket:** The filled cable core shall be covered with a black, medium density polyethylene jacket. This outer jacket shall be abrasion and crack resistant, non-nutrient to fungus, electronically non-conductive and compatible with all cable components to which it may come in contact. The jacket shall be free from holes, splits, blisters or other imperfections.

5) **End Termination Cable:** Shall be of the tight-buffered type and shall contain two single-mode fibers protected by a yellow jacket and aramid yarn (e.g. Kevlar) strength member. The length of a typical end termination cable shall not exceed 100 feet. Connectors for end termination cables shall be ST unless otherwise specified by the Engineer.

6) **Identification:** Each length of cable shall be permanently identified by specifying the manufacturer and type of cable at intervals not greater than six feet along the outside of the outer jacket. Each length of cable shall be permanently marked with foot (or meter) markings at intervals not greater than three feet (or one meter).

7) **Reels:** The cable shall be wound on standard reels in a manner which provides access to both ends of the cable for testing while the cable is still on the reel.

8) **Installation:** Cable installation and handling procedures shall be in accordance with accepted industry standards and/or manufacturer’s recommendations and shall be performed by adequately trained and certified personnel. In all type 3 pullboxes, there shall be 10 feet minimum of extra looped cable for each cable entering or leaving the box.
b. **Splicing of Fiber Optic Cable**

Splicing of the Fiber Optic Cable shall be done by the fusion technique. All cables shall be carefully prepared and spliced in accordance with the cable manufacturer’s recommendations. Either heat shrinkable tubing shall protect the finished splices, metal protective sleeves or by some other method approved by the Engineer. All splices must be tested and documented after encasement. No splice shall exceed a 0.05 decibel loss.

The completed splices shall be enclosed in re-enterable splice enclosures that seal to form moisture resistant protection. The splice case or enclosure shall contain a removable splice organizer or crib that shall secure the individual fibers and protect the splices. The splice organizer shall be attached to the strength members in the fiber optic cable. There shall be adequate space inside the enclosure to hold at least three feet of buffer tubes from each cable. There shall be no splices except as authorized by the LADOT Traffic Signal Inspector. Splice enclosures shall be Corning 6C22-02 (or equivalent) unless otherwise authorized by the LADOT Traffic Signal Inspector. Fiber optic interconnect cables may only be spliced at special fiber optics splice boxes as shown on the plans. Video fiber optic cable shall be spliced in double-deep, type 3 pullboxes.

6. **CONTROLLER**

The contractor-supplied controllers shall conform to the latest LADOT material specification and addendum for the Model 2070 controller assembly, with either Type 332 or 337 cabinet as shown on the traffic signal plan, and all auxiliary equipment required to provide a complete functioning controller per LADOT Specifications 054-053-07 (latest revision).

7. **GROUND RODS**

Copper ground rods shall be installed in all controller foundations and all service pullboxes. For a post-top mounted controller cabinet on existing or new F-8 foundation, an 8-foot by ½-inch diameter ground rod shall be installed in the controller pullbox. For a Type 332 cabinet on F-332 foundation, an 8-foot by ½-inch diameter ground rod shall be installed in the foundation. For a Type M communication cabinet on F-12A foundation, an 8-foot by ½-inch diameter ground rod shall be installed in the foundation. A green #8 AWG copper wire (solid or stranded) shall be connected from the cabinet “Equipment Ground Bus” bar to the ground rod in the foundation or in RARE CASES as approved by the LADOT Traffic Signal Inspector, the controller pullbox. The connection device to the ground rod shall be appropriate for the copper wire used.
8. SERVICE

a. Service conductors shall be continuous without splices from the service pullbox to the controller service connection.

b. A voltage measurement shall be made between the service hot and neutral terminals before the main circuit breaker in the controller assembly.

If the voltage is less than 110 volts AC notify the LADOT traffic signal inspector.

c. A resistance measurement shall be made between the service neutral terminal and the chassis ground terminal.

If the resistance is more than 4.0 ohms notify the LADOT traffic signal inspector.

9. SIGNAL HEADS

a. Vehicle and Pedestrian Signal Heads Covers
Shall conform to LADOT Specification 92-086-03 (latest revision).

b. Vehicle Heads

1) Each signal section housing shall conform to LADOT Specification 92-061-06 (latest revision) for Vehicle Signal Heads, 8-inch and 12-inch glass filled polycarbonate.

2) A minimum of two vehicle heads for each and every phase shall be in operation while work is being performed at the intersection. Non-functioning vehicle heads shall be covered or turned away from the intersection.

c. Pedestrian Heads

1) Each pedestrian signal housing shall conform to LADOT Specification 92-064-06 (latest revision) for Pedestrian Signal Heads, glass filled polycarbonate.

2) One visible operating pedestrian head shall be provided at all times for each direction of each signalized crosswalk while work is being performed at the intersection. Non-functioning pedestrian heads at a signalized crosswalk shall be covered or turned away from the intersection.

d. Traffic Signal Visors – All vehicle signal indications shall be provided with removable visors per LADOT Specification 92-061-06 (latest revision). If beveled or long visors are specified on the traffic signal plans, they shall conform to Standard Drawings S-76.3, S-76.6 or S-76.7.

e. Light Emitting Diode (LED) Signal Modules – All new traffic signal modules shall be LED, and shall conform to LADOT Specification 92-088-06 (latest revision).
10. DETECTORS

The contractor shall replace and restore operation of any damaged detectors (inductive loop, video or other type) within two (2) working days after the completion of construction on the portion of the roadway where the detectors were damaged.

Devices other than those identified in the LADOT Specification 54-055-01 (latest revision), must be submitted for test, evaluation, and approval to the LADOT Traffic Signal Lab Research and Development Section, at least 90 days prior to expected date of activation. Contact the Signal Repair Section Supervisor at (213) 847-2943 for specifications applicable to the device being submitted.

11. LINES AND GRADES

a) All new or relocated traffic signal work shall be located as per the design plans and engineering specifications.

b) Any reference to curb line on the plans or in the engineering specifications shall be made once the permanent curb and gutter is installed, prior to excavating any new foundations that are called for on the plans.

c) Contractor shall assume all responsibility for accuracy of foundation installation, including removal of foundations installed at unacceptable elevations and restoration of the soil prior to reinstallation of proposed foundation, at their own expense.

12. ANCHOR BOLT HEIGHT

### CABLE 1

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<th>Signal Phase or Function</th>
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<td>Silver</td>
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<td><img src="image1" alt="Diagram" /></td>
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<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
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<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
<td>SIGNAL HEAD WITH BEVELED VISOR (LEFT BEVEL SHOWN) (Footnote A)</td>
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<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
<td>SIGNAL STANDARD</td>
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<td><img src="image9" alt="Diagram" /></td>
<td><img src="image10" alt="Diagram" /></td>
<td>SIGNAL HEAD, THREE 8&quot; (200 MM) SECTIONS WITH LONG VISOR (Footnote A)</td>
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<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
<td>SIGNAL HEAD, FOUR SECTIONS – THREE 8&quot; SECTIONS (R, Y, G) + 12&quot; GREEN ARROW (Footnotes A &amp; B)</td>
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<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
<td>SIGNAL HEAD, FOUR SECTIONS – THREE 12&quot; SECTIONS (R, Y, G) + 12&quot; GREEN ARROW (Footnotes A &amp; B)</td>
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<td><img src="image15" alt="Diagram" /></td>
<td><img src="image16" alt="Diagram" /></td>
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<td><img src="image17" alt="Diagram" /></td>
<td><img src="image18" alt="Diagram" /></td>
<td>SIGNAL HEAD, THREE SECTIONS – ONE 12&quot; SECTION (R) + 12&quot; YELLOW AND GREEN ARROWS (Footnotes A &amp; B)</td>
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<td><img src="image19" alt="Diagram" /></td>
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<td><img src="image21" alt="Diagram" /></td>
<td><img src="image22" alt="Diagram" /></td>
<td>SIGNAL HEAD, FIVE SECTIONS – THREE 8&quot; SECTIONS (R, Y, G) + 12&quot; YELLOW &amp; GREEN ARROWS (Footnotes A &amp; B)</td>
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<tr>
<td><img src="image23" alt="Diagram" /></td>
<td><img src="image24" alt="Diagram" /></td>
<td>SIGNAL HEAD, FIVE SECTIONS – THREE 12&quot; SECTIONS (R, Y, G) + 12&quot; YELLOW AND GREEN ARROWS – CLUSTER HEAD IF ON MAST ARM FOR LEFT TURN PHASE (Footnotes A &amp; B)</td>
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<td><img src="image25" alt="Diagram" /></td>
<td><img src="image26" alt="Diagram" /></td>
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<td><img src="image27" alt="Diagram" /></td>
<td><img src="image28" alt="Diagram" /></td>
<td>LOUVERED SIGNAL INDICATIONS (8&quot; OR 12&quot;), (FOOTNOTES A,F)</td>
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### Traffic Signal Symbols

**Title:**

**CITY OF LOS ANGELES**

**DEPARTMENT OF TRANSPORTATION**

**Approved:**

Jaime de la Vega, General Manager

**Drawing No.:**

S-50.1
PROPOSED EXISTING EXISTING TO BE REMOVED

SIGNAL HEAD, THREE 8" SECTIONS—STEADY RED, FOLLOWED BY FLASHING RED, FOLLOWED BY STEADY YELLOW (Footnote A)

LIGHT RAIL SIGNAL, PER PLAN DETAILS

STANDARD WITH MAST ARM AND WITHOUT LUMINAIRE (Footnotes A & C)

STANDARD WITH MAST ARM AND LUMINAIRE (Footnotes A & C)

CD954 STANDARD WITH MAST ARM AND WITHOUT LUMINAIRE; PLATFORM MOUNTED (TEMPORARY SIGNAL) (Footnotes A & C)

CD954 STANDARD WITH MAST ARM AND LUMINAIRE; PLATFORM MOUNTED (TEMPORARY SIGNAL) (Footnotes A & C)

TYPE 1 STANDARD, PLATFORM MOUNTED (TEMPORARY SIGNAL)

ELECTROLIER, PENDANT TYPE

ELECTROLIER, UPRIGHT TYPE

OVERHEAD CABLE

FIBER OPTIC CABLE

SIGNAL CONDUCTORS

FIBER SPLICE VAULT

PEDESTRIAN SIGNAL

PEDESTRIAN PUSHBUTTON

EQUESTRIAN PUSHBUTTON (MOUNTING HEIGHT PER PLAN)

BICYCLIST PUSHBUTTON

APS—INDICATES DEVICE WITH ACCESSIBLE PEDESTRIAN SIGNAL FEATURES
PROPOSED | EXISTING | EXISTING TO BE REMOVED
---|---|---
[type 7 pushbutton standard (ppb shown)]
[signal controller cabinet]
[signal controller with gps time receiver]
[communication cabinet]
[type 2 pullbox]
[type 3 pullbox]
[street lighting pullbox]
[tree (showing approximate overhang)]
[palm tree]
[fence]
[traffic sign]
[sign post]
[photo enforcement pole]
[service pole (with pole number listed)]
[power pole]
[power pole with guy anchor]
[fire hydrant]
### Traffic Signal Symbols

**PROPOSED** | **EXISTING** | **EXISTING TO BE REMOVED**
--- | --- | ---
C.B. | c.b. | [c.b.] CATCH BASIN

**MANHOLE**

**FLASHING BEACON**

**INDUCTIVE LOOP DETECTOR –6-FOOT DIAMETER**

**BICYCLE LOOP DETECTOR**

PER LADOT STD. DWG. NO. S-70.1D

**INDUCTIVE LOOP DETECTOR (SIZE NOTED PER PLAN)**

**OVERHEAD DETECTOR**

MICROWAVE/RADAR (MR), VIDEO (V.), OPTICAL (O.) INFRARED (I)

**VIDEO CAMERA**

**PHOTO ENFORCEMENT CAMERA**

**SPREAD SPECTRUM RADIO UNIT**

**IN ROADWAY LIGHTING**

**PEDESTRIAN BARRICADE**

---

**FOOTNOTES:**

A. WITH BACKPLATES

B. SYMBOL SHALL DESIGNATE EITHER RIGHT OR LEFT ARROW(S)

C. MAST ARM LENGTH SHALL BE 15', UNLESS OTHERWISE NOTED

D. ALL SIGNAL HEADS SHOWN WITH SIGNAL STANDARD.

E. PEDESTRIAN SIGNAL AND PUSH BUTTONS SHOWN WITH STANDARD.

F. FOR SPECIAL APPLICATIONS ONLY.
Notes:
1. All standards shall be tapered steel posts with 0.1196" wall thickness.
2. Max. taper of posts shall be 0.143" per foot.
Notes:
2. Finish: Hot dip galvanize after fabrication per ASTM spec. A-120

Base Detail

Section A-A

Foundation, Type F-7

No. 7 Drill, 1/4-20 Tap, 2 Holes

Push Button

9½"

6"

4-3 ¾"

1½" Drill

Hole Detail

3½" Bolt Circle
Cut hole to fit post

¾" Drill, 4 holes

½" R

5" sq.

4½" X 10½" X 1½" (4 required)

Approved
for Rita L. Robinson, General Manager
Detail

Door openings on Type 337 PTM cabinet

Typical cabinet installation
(Type 337 post-top mounted cabinet)

Note:
Type 337 PTM cabinet
to be mounted with doors perpendicular
to curb and doors swing towards curb.
See detail upper left.

Curb Face

Slip Fitter

 Shaft-Type 8

36"

Foundation, Type F-8

14" Min.

3" Conduit

DWN MT 3-1-16
CKD
T.E. JV 3-3-16
Sr. T.E. MA 3-8-16
Pr. T.E. VJ 4-11-16

Approved

S-51.8
Notes:

1. Round tapered steel tube with maximum taper of 15 inches per foot. End section O.D. of 2½" for mounting hardware. Standard 2" pipe extensions of 3'-0" max. length may be used at the option of the manufacturer.
2. 4 anchor bolts each base plate. Length indicated does not include required 4'-90° bend. Each anchor bolt is threaded 6" at the top and furnished with 2 nuts & 2 washers. One anchor bolt bonded to conduit.
3. Pole and signal arm shall be fabricated from sheet steel conforming to the specifications of ASTM Designation A611 Grade C, or ASTM Designation A 570 Grade C.
4. All welding shall conform to AWS D2.0 "Specifications for welded Highway and Railway Bridges."
5. All structural steel shall conform to ASTM designation A36, except as otherwise shown.

Drawn By
Title
CHECKED FOR STRUCTURAL DESIGN
Supervised By
Reviewed By

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Frances T. Banerjee, General Manager
Approved Nov. 13, 1998
Drawing No. S - 51.9.5

August 7, 1973
Note:
Standard must conform to
Bureau of Street Lighting
Plan L-103-0

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Mounting Height</th>
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<td>15'</td>
<td>22.3'±</td>
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<tr>
<td>18'</td>
<td>23.3'±</td>
</tr>
<tr>
<td>20'</td>
<td>23.3'±</td>
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</table>

CD954 STANDARD

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Frances T. Banerjee, General Manager

Approved Nov. 13, 1998
DRAWING NO. S–51.9.6
Side Mount Indications Drill Detail
SIDE-MOUNT OPTION
(SEE CLAMP & SIDE MOUNTED
CAME ARMM DETAIL - SHEET 2)
UPPER HANDHOLE AND COUPLING
(SEE DETAIL - SHEET 2)
TOP-MOUNT OPTION (SEE PAN & TILT MOUNTING
FLANGE DETAIL - SHEET 2)

TYPE C-1-100 POLE

SEE NOTE 3

OPTIONAL HEADS
HAN DOLE

15' MAX.
7-6" 11-3"
29'-6"
45'-0"
12'-6"
12'-6"
45'-0"
15' MAX.

SEE FOUNDATION DETAIL - SHEET 2

GENERAL NOTES:
1. FABRICATION OF THE STANDARDS, LUMINARIAE ARMS AND MAST ARMS MUST CONFORM TO THE 2006 DEPARTMENT OF TRANSPORTATION, STATE OF CALIFORNIA STANDARD PLANS.
2. REFER TO LADOT STANDARD DWG. NO. S-521.6 FOR "F" SPACING.
3. PROJECTED LUMINARIAE ARM LENGTH TO BE DETERMINED BY DEPARTMENT OF PUBLIC WORKS, BUREAU OF STREET LIGHTING.
   REFER TO CALTRANS STANDARD DWG. NO. ES-7C FOR LUMINARIAE ARM CONNECTION DETAIL.
4. SIGNAL ARM CONNECTION SHALL BE FOR 45 FT. ARM (CASE 4 ARM LOADING), AS PER CALTRANS STANDARD DWG. NO. ES-7F. SHORTER ARMS MAY BE USED AS APPROPRIATE.

POLE SPECIFICATIONS:
BASE PLATE AND FLANGES:
ASTM A-38
SHAFT: STEEL OF 48,000 PSI
MINIMUM YIELD AFTER FABRICATION. DESIGN YIELD OF Fy = 48,000 PSI IN ORDER THAT Fy/Fy > 1.5
PIPE: ASTM A-53 GRADE B
ANCHOR BOLTS: ASTM A-307
WELDS: ALL BUTT WELDS TO BE GROUND FLUSH WITH BASE METAL
LONGITUDINAL: BUTT WELD BY THE SUBMERGED ARC PROCESS
CIRCUMFERENTIAL: BUTT WELD WITH PERMANENT BACK-UP RING
FINISH POLE: HOT-DIP
GALVANIZED PER ASTM A-123
FINISH HARDWARE: HOT-DIP
GALVANIZED PER ASTM A-153

Camera Poles
(CASE 4 MAST ARM LOADING - 100 MPH WIND SPEED)

T. E. NA 3-11-08
Sr. T. E. JEM 3-11-08
Pr. T. E. SS 3-12-08

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved
March 16, 2008
Drawing No.
S-521.4B

Approved by:
SHAILA PATEL, s. e.
Division Engineer
Structural Engineering Division
Bureau of Engineering

Date
11-29-07
PAN & TILT MOUNTING FLANGE DETAIL

UPPER HANDHOLE & COUPLING DETAIL

CLAMP & SIDE MOUNTED CAMERA ARM DETAIL

FOUNDATION DETAIL

FOUNDATION DESIGN CRITERIA:

WIND LOAD DESIGN BASED ON 2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORT FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS. (FATIGUE REQUIREMENTS OF CHAPTER 51 ARE NOT CONSIDERED.) WIND SPEED = 100 MPH

NOTES:
1. BAR REINFORCEMENT SHALL CONFORM TO ASTM A615 GRADE 60.
2. ALL SOILS SUPPORTING AND SURROUNDING THE FOUNDATION SHALL BE UNDISTURBED NATURAL SOIL OR 90% COMPACTED FILL.
3. FOUNDATION CONCRETE SHALL BE 560-C, 3250.

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Title: Camera Poles
Drawing No.: S-52.1.4B

(CASE 4 MAST ARM LOADING - 100 MPH WIND SPEED)
BSL POLES (CD953A, CD953B, CD953C)
TYPICAL INSTALLATION
Not to scale

Tilt solar panel to 60° and rotate assembly so collector panel will face due south.

DETAIL B (Back to Back)
Control Cabinet
RRFB’s (Back to Back)
W16-7p(2)
Pedestrian Pushbutton

Foundation Details
See Sheet 4

BSL POLES (CD953-A2, CD953-B2, CD953-C2)
TYPICAL INSTALLATION
Not to scale

Tilt solar panel to 60° and rotate assembly so collector panel will face due south.

DETAIL B (Back to Back)
Control Cabinet
RRFB’s (Back to Back)
W16-7p(2)
Pedestrian Pushbutton

Foundation Details
See Sheet 4
SIGN ARM DATA

<table>
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<tr>
<th>ARM SPAN &quot;L&quot; (FT.)</th>
<th>FIXED DIA. (IN)</th>
<th>FREE DIA. (IN)</th>
<th>GA.</th>
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SIGN ARM MATERIAL DATA

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<td>A595 GR. A</td>
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<td>SIGN ARM CONN. BOLTS</td>
<td>A325</td>
<td>55</td>
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<td>HARDWARE COATING</td>
<td>HOT DIP ZINC</td>
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FINISH NOTES

SYSTEM: GALVANIZED (G)
BASE COAT: HOT DIP GALVANIZED TO ASTM A123
PRIME COAT: NONE
COLOR: NONE
FINISH COAT: NONE

SIGN DIMENSIONS

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<tr>
<th>SIGN DESIGNATION</th>
<th>SIGN OR PLAQUE</th>
<th>CONVENTIONAL ROAD</th>
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<td>MULTI–LANE</td>
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<tr>
<td>W11–2</td>
<td>PEDESTRIAN</td>
<td>30x30*</td>
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<tr>
<td>W16–7p</td>
<td>DOWNWARD DIAGONAL ARROW</td>
<td>24x12</td>
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* The minimum size required for diamond–shaped warning signs facing traffic on multi–lane conventional roads shall be 36x36 per MUTCD section 2C.04.
SIGN ARM ATTACHMENT

DETAIL D
Not to scale

DETAIL E
Not to scale

SIGN ARM ATTACHMENT DATA

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<th>CLAMP RANGE (DIAMETER)</th>
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<td>19.81&quot;</td>
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(4) 0.50" DIA. HEX BOLT
WITH (1) HH NUT,
(2) FL WASHERS &
(1)LK WASHER PER BOLT.

HOLE IN POLE FOR
0.63"x2" ANTI–ROTATION
PINS TO BE FIELD DRILLED

0.13"x1.50" COTTER PIN
(HOLDS ANTI–ROTATION
PIN IN PLACE)

1.25" DIAMETER WIRING
ACCESS HOLE IN POLE
SHAFT TO BE FIELD DRILLED.

0.313" THICK
MINIMUM

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Title
RECTANGULAR RAPID FLASHING BEACON
SIGN ARM

Drawing No.
S-52.1.7

3/4
Notes:
1. Use 1" galvanized conduit for street lighting and 2" schedule 80 PVC conduit for traffic signal unless otherwise specified.
2. Conduit stubs from foundation shall be in the direction of the nearest corresponding pullbox unless otherwise specified.
3. Topping shall be considered as a part of the foundation.
4. Coordinate bolt circle with light pole base plate prior to anchor bolt installation.
5. Coordinate conduit size and placement with electrical prior to installation.
USE 12" HEADS CORRESPONDING TO PERMANENT HEADS BEING REPLACED

36" SQ. x 1/4" THK. STEEL PLATFORM, HOT DIP GALVANIZED PER ASTM 123

TYPE 1 BASE W/ 4 1" DIA. x 3-1/2" BOLTS & NUTS W/ 2 WASHERS FOR EACH BOLT

3/8" DIA. STEEL COIL CHAIN TIED TO EACH 5 GAL BLOCK AND LOCKED AROUND THE TYPE 1 STANDARD

5 GAL CAN FILLED W/ CONCRETE. FOUR CANS ARE REQUIRED, SPACED AS SHOWN

2" HIGH x 1/4" THK. PERIMETER LIP RESTING ON GROUND

1-3/4" x 1-3/4" x 1/4" STEEL ANGLE BRACKETS WELDED TO PLATE

4 HOLES Ø 1-1/4" DIA.

5-1/2" DIA. BOLT CIRCLE

1" x 1" NOTCHES FOR CABLE

5 GAL CAN FILLED WITH CONCRETE

"LADOT" OR CONTRACTOR NAME EMBOSSED OR WELDED ON AT LEAST TWO SIDES

1/2" DIA. STEEL ROD EMBEDDED 9" DEEP

5 GAL CAN FILLED WITH CONCRETE. MIN. WEIGHT: 90 LBS.

WEIGHT BLOCK

Not To Scale

PLATFORM
(Top View Detail)
Not To Scale

36"

36"

PLATFORM
(Bottom View Detail)
Not To Scale

36"

36"

BASE ASSEMBLY

LIP

1" x 1" NOTCH FOR CABLE

FOR SLOPES GREATER THAN 1/2" RISE PER FOOT, TEMPORARY STANDARD TO BE SET LEVEL THROUGH THE USE OF GRADING OR WOOD SHIMS

TYPE 1 STANDARD

Not To Scale

TEMPORARY SIGNAL FOR TYPE 1 STANDARD

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved

S-57.2B

39
NOTES:
1. THE CD954 STANDARD (WITHOUT LUMINAIRE ARM) SHALL CONFORM TO DEPT. OF TRANSPORTATION, CITY OF LOS ANGELES STANDARD DWG. # S-51.9.6 (FOUNDATION EXCLUDED).
2. THE MAST ARM LENGTH SHALL NOT EXCEED 15"-0".
3. THERE SHALL BE A MAXIMUM OF 2 - 5 SECTION SIGNAL HEADS & 2 - PED. HEADS MOUNTED TO THE SHAFT AND ONE 5-SECTION SIGNAL HEAD MOUNTED AT THE END OF MAST ARM.

SECTION A-A

DRAWN BY
J.C. 6-17-84
CHECKED BY
R.O. 6-21-84
SUPERVISED BY
J.K. 6-21-84
REVISED
JAC 6-26-84

DEPARTMENT OF TRANSPORTATION
DONARD R. HOWERY, General Manager

CITY OF LOS ANGELES

S-57.2C

DRAWING NO.

Donald R. Howery General Manager
NOTES:
1. THE CD954 STANDARD SHALL CONFORM TO DEPT. OF TRANSPORTAION, CITY OF LOS ANGELES, STANDARD DRAWING # S–51.9.6 (FOUNDATION EXCLUDED).
2. THE MAST ARM LENGTH SHALL NOT EXCEED 15’–0”.
3. THERE SHALL BE A MAXIMUM OF 2 – 5 SECTION SIGNAL HEADS & 2 – PED. HEADS MOUNTED TO THE SHAFT AND ONE 3-SECTION SIGNAL HEAD MOUNTED AT THE END OF MAST ARM. ALL SIGNAL HEADS TO BE POLYCARBONATE TYPE.

![Diagram of signal head installation.

**PLAN**

- 23” X 23” X 30” PRECAST CONCRETE BLOCK (4 REQ.)
- 23” X 13” X 30” PRECAST CONCRETE BLOCK (4 REQ.)
- 2” HOLE
- 4” X 4” X 1/2” PLATE WASHER (4 REQ.)
- DRILL 1-1/2” DIAMETER HOLES (4 REQ.) FOR 1-1/8” BOLT SIZE AND 11-1/2” BOLT CIRCLE

**SECTION A–A**

- 3/8” CABLE, EMBED 12” DEEP (8 REQ.)
- TYPE CD954 STD.
- 1-1/8” X 4” HEX. HD. BOLT, HEX. NUT, FLAT WASHER (4 REQ.)
- WELD BOLTS & 4” X 4” X 1/2” PLATE WASHERS TO 3/4” PLATE
- MORTAR LEVELING BED, WEDGE EDGES UNTIL MORTAR SETS. (MORTAR IS NOT REQUIRED ON C.A.B., DIRT OR WHEN SLOPE IS LESS THAN 1/4” PER FOOT.)

**TYPE CD 954 STD.**

**SIGNAL, TEMPORARY FOR TYPE CD954 STD.**

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<tr>
<td>ROBERT R. YATES, General Manager</td>
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| CHECKED FOR STRUCTURAL DESIGN |
| C. W. Robins |

| DATE |
| 8–29–96 |

| DRAWING NO. |
| S–57.2D |

**NOTES:**

1. THE CD954 STANDARD SHALL CONFORM TO DEPT. OF TRANSPORTATION, CITY OF LOS ANGELES, STANDARD DRAWING # S–51.9.6 (FOUNDATION EXCLUDED).
2. THE MAST ARM LENGTH SHALL NOT EXCEED 15’–0”.
3. THERE SHALL BE A MAXIMUM OF 2 – 5 SECTION SIGNAL HEADS & 2 – PED. HEADS MOUNTED TO THE SHAFT AND ONE 3-SECTION SIGNAL HEAD MOUNTED AT THE END OF MAST ARM. ALL SIGNAL HEADS TO BE POLYCARBONATE TYPE.
Note:
Note:
Note:
NOTES:

1. ITEM "A" IS THE BASIC MOUNTING DESIGN FOR MOST MAST ARM SIGNAL INSTALLATIONS WHEN STANDARD TENON LOCATION ON THE MAST ARM CANNOT BE UTILIZED. IT USES A 6" TENON LENGTH WITH 2 ½" OUTSIDE DIAMETER FOR PLUMBIZER MOUNTING.

2. ITEM "B" IS USED FOR INSTALLATION OF TRAFFIC SIGNAL HEADS, EXCEPT PROGRAMMED VISIBILITY (P.V.) HEADS, WHEN IT IS DESIRED TO MOUNT THEM HORIZONTALLY OR TO ADJUST THE HEIGHT VERTICALLY BY MOVEMENT OF ITEM "E".

3. ITEM "C" IS USED FOR INSTALLATION OF HORIZONTAL OR VERTICAL PROGRAMMED VISIBILITY (P.V.) HEADS. IT IS EQUIPPED WITH 14" ARMS WHICH ALLOW FOR REPLACEMENT OF SIGNAL LAMPS LOCATED IN THE REAR OF THE SIGNAL HEAD.

4. ITEM "D" IS USED FOR INSTALLATION OF ELECTRIC SIGNS.

5. ITEM "E" IS A STANDARD CLAMP KIT DESIGNED TO BE USED FOR FASTENING ITEMS "B", "C", AND "D" TO MAST ARMS OR POLES IN A VERTICAL OR HORIZONTAL POSITION.

6. THE BOTTOM ARMS IN ITEMS "B", "C", AND "D" ARE STATIONARY AND ARE HELD IN PLACE WITH PIPE THREADS AND SET SCREWS. THE UPPER ARMS SLIDE ALONG THE SHAFT AND ARE HELD IN PLACE WITH SET SCREWS.

7. THE STANDARD 29" BAND FOR ITEM "A" AND "E" FITS A 4" TO 8.6" DIAMETER. BAND LENGTHS UP TO 56" CAN BE USED FOR LARGER DIAMETER INSTALLATIONS.

8. ITEMS "A" THROUGH "E" ARE AVAILABLE FROM PELCO PRODUCTS INC. OR EQUIVALENT.

9. THE 1 1/2"X 1 1/2" ALUMINUM LOCK NUT SHOWN WITH ITEM "D" IS COMMONLY USED FOR SIGNAL HEAD & PEDESTRIAN HEAD INSTALLATIONS.

10. THE 4 1/2"X 4 1/2"X 1/4" ALUMINUM PLATE IS USED FOR SIGN BOX REINFORCEMENT AT BRACKET INSTALLATION LOCATION AND MUST BE SPECIALLY FABRICATED.

DETAIL "A"

4½"X 4½" X ¼"
ALUMINUM PLATE
NOT TO SCALE

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<th>AC</th>
<th>5-7-98</th>
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<th>AM</th>
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<th>AN</th>
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SPECIAL MAST ARM MOUNTINGS

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
THOMAS K. CONNER, General Manager

Approved: MAY 27, 1998

Thomas Conner
General Manager

DRAWING NO. S-63.1.4
Note:
Notes:
Note:
Bevel opposite side for Right Beveled Visor. Refer to LADOT Purchase Specification # 92-061-06 for all other details.

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<td>VISOR, 8&quot; DIA., BEVELED</td>
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</table>

CITY OF LOS ANGELES  
DEPARTMENT OF TRANSPORTATION

January 24, 2011  
Drawing No. S-76.3  
for Amir Sedadi, Interim General Manager
Note:
Bevel opposite side for Right Beveled Visor. Refer to LADOT Purchase Specification # 92-061-06 for all other details.
Long Visor, 8" X 18" full circle
Not to Scale

Long Visor, 12" X 27" full circle
Not to Scale

Note:
Refer to LADOT Purchase Specification # 92-061-06 for all other details.
Visor, 8" X 8" Tunnel  
Not to Scale

Visor, 12" X 12" Tunnel  
Not to Scale

Note:  
Refer to LADOT Purchase Specification # 92-061-06 for all other details.
Visor, 8" full circle
Not to Scale

Visor, 12" full circle
Not to Scale

Note:
Refer to LADOT Purchase Specification # 92-061-06 for all other details.

Title
VISOR
8" & 12" DIAMETER FULL CIRCLE

City of Los Angeles
Department of Transportation

Approved: January 26, 2011
Drawing No. S-76.9
**Steel Standards**

Standard inserts for concrete standards, tapped ¼"—20 N.C.

**Concrete Standards**

1 ½" drill

5/8" hole

No. 7 drill, ½"—20 N.C. tap 2 holes

Parallel to crosswalk for which intended

Curb

Typical arrangement

Pushbutton

3' 6" typical *

* Adjust pushbutton mounting height to 42" above the surface pedestrians are expected to access pushbutton from.
**POST–TOP MOUNTING**  
(See S–51.7 for installation)

**SIDE MOUNTING**  
(See S–72.0A for installation)

**SIGN**

1. Pedestrian pushbuttons – see Standard Drawings S–73.0 and S–73.1.  
Bicycle pushbuttons – see Standard Drawings S–72.2.

2. Mounting hardware consists of four(4) 8–32 x 3/4" long.

**HOUSING**

Construction, materials and finish painting shall conform to LADOT material specification 92–052–02 or latest version.

**ASSEMBLY**

Construction, materials and finish painting shall conform to LADOT material specification 92–053–02 or latest version. Pushbuttons shall be 2" in diameter.

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**PUSHBUTTON**

CITY OF LOS ANGELES  
DEPARTMENT OF TRANSPORTATION  

Approved  
December 9, 2005  
Drawing No. S–72.1.1
Note: Sign shall be powder coated aluminum with black legend on white background as shown
Material: .063 Aluminum
* Use left, right or double arrow as necessary.
Notes:

1. Sign shall be .063 aluminum.
2. Powder coated with black legend on white background and orange hand and timer symbols.
Notes:
1. Sign shall be .063 aluminum.
2. Powder coated with black legend on white background and orange hand and timer symbols.
* Use left, right or double arrow as necessary.
NOTES:

1. INSTALL 3 CLOCKWISE TURNS OF LOOP WIRE FOR EACH DETECTOR, UNLESS OTHERWISE SHOWN ON SIGNAL PLAN.

2. SEE LADOT MATERIAL SPECIFICATION NO. 92-081-05 OR LATEST REVISION.

3. ANY NON-ROUND SHAPED LOOPS MUST CONFORM TO ALL OTHER SPECIFICATIONS SHOWN ON THIS STANDARD DRAWING.

* DEPTH OF SLOT NOT TO EXCEED DEPTH OF PAVEMENT, FOR P.C.C. (CONCRETE) SURFACES, THE MINIMUM COVER ABOVE LOOP WIRE SHALL BE 2.5" MINIMUM.
CONDUIT DETAIL

STUB-OUT DETAIL
(Top View)

NOTES:
Perform Loop Installation in the Following Order:

1. OPEN THE PAVEMENT AT LEAST 42" FROM CURB FACE AND AT LEAST 18" FROM EDGE OF GUTTER USING A STAR DRILL OR A JACK HAMMER (ASPHALT CONCRETE ONLY). OPEN NO MORE THAN A 12" X 16" AREA. IN CASES WHERE THERE IS A CONCRETE BUS PAD ADJACENT TO THE GUTTER, INSTALL THE STUBOUT BEYOND THE EDGE OF THE BUS PAD.

2. INSTALL 2" PVC (SC80) OR PVC FLEX (SC40) FROM THE PULLBOX PIT WITH A 45 DEGREE ELBOW AT THE STUB-OUT AS SHOWN. DEPTH OF THE CONDUIT SHALL BE AT LEAST 18" BELOW THE STREET GRADE.

3. PATCH STREET USING HOT PATCH ASPHALT CONCRETE AND SAND AS SHOWN.

4. INSTALL DUCT SEAL WHERE WIRES ENTER 2" PVC OR 2" PVC FLEX.

5. FILL SAWCUT SLOT WITH CALTRANS APPROVED HOT-MELT RUBBERIZED ASPHALT SEALANT.

* NO MORE THAN 8 LOOPS OR 16 WIRES PER STUB-OUT.
Notes:
1. INSTALL FOUR (4) COMPLETE ALTERNATING TURNS OF LOOP WIRES, UNLESS OTHERWISE SPECIFIED.
2. FOR STUB-OUT AND CONDUIT DETAILS REFER TO PAGE 2 OF S-70.1A.
3. SEE LADOT MATERIAL SPECIFICATION NO. 92-081-06 OR LATEST REVISION.
4. USE CASE I LOOPS FOR BIKE LANE INSTALLATIONS. USE CASE II LOOPS WHEN VEHICULAR LOOPS ARE INTENDED TO DETECT BICYCLES.
5. AN OCTAGONAL SHAPED LOOP OR OTHER NON-ROUND SHAPED LOOP MAY BE USED INSTEAD OF THE ROUND-LOOP WITH PRIOR LADOT APPROVAL.
6. SAME WINDING PATTERN TO BE USED IN BOTH LOOPS FOR CASE 1 WITH 1 PAIR FROM EACH LOOP LEADING TO THE PULLBOX.
7. LOOPS INSTALLED IN BIKE LANES WITH PARKING SHALL BE PLACED WITH THE NEAR EDGE OF THE LOOP 1' TO THE RIGHT OF THE BIKE LANE DELINEATION LINE, UNLESS OTHERWISE SPECIFIED.
8. LOOPS INSTALLED IN BIKE LANES ADJACENT TO THE ROADSIDE WITHOUT PARKING SHALL BE CENTERED IN THE BIKE LANE, OR BETWEEN THE GUTTER AND THE BIKE DELINEATION LINE, UNLESS OTHERWISE SPECIFIED.
9. ANY LADOT APPROVED NON-ROUND SHAPED LOOPS MUST CONFORM TO ALL OTHER SPECIFICATIONS SHOWN ON THIS STANDARD DRAWING.

BICYCLE DETECTOR

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Seleta J. Reynolds, General Manager
NOTES:

1. PRE-FORMED LOOP SHALL BE CONSTRUCTED FROM 1/2" I.D. POLYPROPYLENE, WITH AN O.D. OF 3/4" INCH.

2. LOOP IS TO HAVE ONE CONTINUOUS #16 TFFN WIRE THROUGH THE LOOP HEAD AND LEAD-IN TO PREVENT LOOP MALFUNCTION DUE TO SPLICING. LOOP SHALL HAVE FOUR (4) TURNS OF WIRE.

3. THE CONDUIT SHALL BE COMPLETELY FILLED WITH HOT, RUBERIZED ASPHALT WHICH WILL ALLOW THE LOOP TO RETAIN FLEXIBILITY ONCE COOLED, PREVENT INCURSION OF MOISTURE AND SET THE WIRE TURNS FIRMLY IN PLACE.

4. EACH LOOP HEAD SHALL BE PROVIDED WITH A 5" CONTRACTION/EXPANSION JOINT TO ALLOW FOR MOVEMENT OF PAVEMENT AND TO PREVENT BREAKAGE OF THE WIRE AND/OR CONDUIT. THE JOINT IS TO HAVE A 9" LONG BY 3/4" SCHEDULE 80 PVC COVER SLIDE TO BE PLACED OVER THE JOINT FOR PROTECTION FROM THE ELEMENTS.

5. ENCASE LEAD-IN WIRE IN A NON-CONDUCTIVE 250 PSI FLEX HOSE SEAMLESS FIBER BRAID REINFORCEMENT AND A NON-CONDUCTIVE SEAMLESS EXTRUDED URETHANE NON-PERFORATED JACKET. FILL LEAD-IN HOSE COMPLETELY WITH HOT RUBERIZED ASPHALT. TWIST WIRES AT LEAST TWO TIMES PER FOOT FOR ENTIRE RUN. ATTACH LEAD-IN TO LOOP HEAD WITH A SCHEDULE 80 CPVC TEE AND A CPVC ADAPTER BUSHING.

6. ANY VARIATION TO THE INSTALLATION AS DESCRIBED ABOVE SHALL BE APPROVED BY THE DESIGN ENGINEER PRIOR TO INSTALLATION.

7. THE 3/8" O.D. LEAD-IN HOSE SHALL BE INSTALLED IN 2" PVC CONDUIT BETWEEN PULLBOX AND ENTRY TO PAVEMENT SLAB. LOOP SHALL BE ATTACHED TO TOP OF REINFORCING BARS WHEN USED IN THE PAVEMENT SLAB.

Drawn By: RMQ 02-12-93
Checked By: AM 3-30-98
Supervised By: KF 02-12-99
Revised By: TLJ 02-12-99

PREFORMED LOOP INSTALLATION

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved 2-16-99 Drawing No. S-70.1E
**NOTES:**

1. THIS STANDARD DRAWING DESCRIBES A TWO, THREE OR FOUR LOOP DETECTOR LEAD-IN CABLE, INDIVIDUALLY SHIELDED AND JACKETED AND SUITABLE FOR INSTALLATION IN A PAVEMENT SAWCUT, CONDUIT, OR DIRECT BURIAL.

2. THE DETECTOR LEAD-IN CABLE CAN BE WIRED IN EITHER A SINGLE, DOUBLE, TRIPLE OR QUADRUPLE CHANNEL CONFIGURATION.

3. ELECTRICAL CONNECTIONS SHALL BE CAREFULLY SOLDERED AND WATERPROOFED.

4. SEE LADOT MATERIAL SPECIFICATION NO. 92-082-03 OR LATEST REVISION.

5. LOOP NUMBERS SHOWN ARE TYPICAL.

6. SYSTEM LOOPS USE A SINGLE PAIR FOR EACH LOOP.

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<td>Pr. T. E. TLJ</td>
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**CITY OF LOS ANGELES**
**DEPARTMENT OF TRANSPORTATION**

**SYSTEM DETECTOR LOOP LEAD-IN CABLE (2,3,4 PAIR)**

Approved: February 25, 2005

Wayne K. Tanda, General Manager

Drawing No. S-70.2
NOTES:
1. CONNECT TWO TO FOUR LOOPS IN SERIES TO EACH PAIR, DO NOT USE PARALLEL CONNECTIONS.
2. DO NOT CONNECT ANY UNUSED CABLE PAIRS.
3. TYPICAL INSTALLATION SHOWN. TWO OR THREE PAIR CABLE MAY BE USED WHEN SHOWN ON SIGNAL PLAN.
LRT DETECTOR FOR EXISTING TRACK (EMBEDDED)

**SECTION D-D**

**EMBEDDED TRACK**

- 4 -Turns of wire
- Embedded track
- Install detector wires in Saw cut (5" deep)
- Detector handhole type 'A'
- Termination pull box
- Conduit

**SECTION C-C**

- Fill slot with loop sealant to within 1/16" of top (do not overfill)

Notes:
1. Saw cut loops (octagonal or circular) to be used for existing installations only.
2. See LADOT Std. Dwg. S-70.1A for inductive loop installation details not shown hereon.

LRT DETECTOR FOR NEW TRACK (BALLASTED)

**SECTION B-B**

**BALLASTED TRACK**

- Concrete track tie
- 4 -Turns of wire
- Pre-formed loop
- Train track
- Detector handhole type 'A'
- Termination pull box
- Conduit
- Ballasted or concrete track bed
- 2" PVC Sched. 80 conduit 30" deep

Notes:
1. Preformed loop to be used for all new construction.
2. See current LADOT material specification for traffic loop.
3. See page 2 and 3 for preformed LRT loop details.
LRT DETECTOR FOR NEW TRACK (EMBEDDED)

Notes:
1. Preformed loop to be used for new installations in embedded track...
2. No rebar or metal of any kind other than the track rails shall be placed within three feet (3') horizontally or vertically from LRT loop.
3. See page 2 and 3 for preformed LRT loop details.

LRT PREFORMED LOOP DETAILS

Notes:
1. Pre-formed loop shall be constructed from 1/2" I.D. Polypropylene, with an O.D. of 3/4 inch.

2. Loop is to have one continuous #16 TFFN wire through the loop head and lead-in to prevent loop malfunction due to splicing. Loop shall have four (4) turns of wire.

3. The conduit shall be completely filled with hot, rubberized Asphalt which will allow the loop to retain flexibility once cooled, prevent incursion of moisture and set the wire turns firmly in place.

4. Each loop head shall be provided with a 5° contraction/expansion joint to allow for movement of pavement and to prevent breakage of the wire and/or conduit. The joint is to have a 9" long by 3/4" schedule 80 PVC cover slide to be placed over the joint for protection from the elements.

5. Encase lead-in wire in a non-conductive 250 psi Flex hose, seamless, with fiber braid reinforcement and a non-conductive seamless extruded Urethane non-perforated jacket. Fill lead-in-hose completely with hot rubberized Asphalt. Twist wires at least two times per foot for entire run. Attach lead-in to loop head with a schedule 80 CVPC tee and a CVPC adapter bushing.

6. Any variation to the installation as described above shall be approved by the design engineer prior to installation.
LRT PREFORMED LOOP DETAILS (CONT'D)

3/4" O.D. Asphalt rubber filled hydraulic hose
CVCC tee

3/8" O.D. Asphalt rubber filled hydraulic hose to Type A Handhole
Twisted tail

Twisted clockwise (at least 2 turns per ft.) into a pair
1 2 --- to Type A Handhole
WINDING DETAILS
Not to scale

TYPE 'A' LRT DETECTOR HANDHOLE

Ballast, PCC or hot AC to match adjacent roadbed material
Precast reinforced concrete box
Conduit to termination pullbox
2" Schedule 80 PVC (30" deep)
Clean, crushed rock sump

9" Throat Dia.
4" min.

Loop sealant
Cables of shielded loop conductor pairs
Portland cement concrete

Notes:
1. Splices shall only be made in the handhole.
2. Splices shall be soldered and water proofed.
Identification (Required on front door)

Removable lifting plates per S-68.1

Rear door

Fan Vent

5/8" dia. bolt circle

3 1/2" Dia.

3 1/6" dia. 4 holes equally Spaced

3/8" dia. 4 holes required for drainage/M-found.
adapter.

Bottom View
(Post-Top Mount)

2 1/2" 2 1/2"

6 1/2" 6 1/2"

6 1/2" 10"

Cabinet doors shall be secured by a 3-point latch mechanism. Latch handle shall be equipped with hasp for addition of pad lock (Required on front & rear doors.)

Notes:
1. Cabinet construction, ventilation requirements and other necessary accessories shall conform to the latest specification for "Cabinet Assembly – Type 337 post – top mounted", Dept. of Transportation, City of Los Angeles.

2. Cabinet shall be equipped with rails for mounting equipment. Rails shall be of standard 19” rack configuration.

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Cabinet Details
Dimension Tolerance ±0.125 inch

---

337 Cabinet
(Post-top mounted)

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery, General Manager

Drawn By: JC 5-8-84
Checked By: RO 5-9-84
Supervised By: JK 5-9-84
Reviewed By: JAC 5-14-84

Revisions:
Revision JK JAC 2-15-85
Revision JMO RMO 9-18-86
Revision JMO RMO 3-4-87
CHANGE 170 TO 337 SS 8-2-87

Approved: May 15, 1984
Donald R. Howery
General Manager

DRAWING NO. S-75.9A
\( \text{Note:} \)

1. When this cabinet is used as an ATSAC type I communication cabinet, a one-inch (1") screened drain pipe shall be provided through the foundation. A 19" X 33" or larger 3/4-inch thick plywood mounting panel shall be installed on the inside of the rear wall. Machine screws and bolts shall not protrude beyond the outside wall of the cabinet.
CONTINUOUS HINGE STAINLESS STEEL
12"

VENTING LOUVERS WITH PROTECTIVE SCREENS
12"

ADJUSTABLE PANEL MOUNTING STUDS
7-1/4"

REMOVABLE STAPLE FOR PADLOCK
4-5/16"

3/4" PLYWOOD PANEL
33" 36-1/16"

1-1/2"x1-1/2"x1/4" THK. ALUMINUM MOUNTING FLANGE WELDED TO CABINET

1/2" DIA. x 8" GROUND ROD

14" Min.

PLAN VIEW

NOTES:
MATERIAL – .125" THK. AL 5052 H32
FINISH – ANODIZED PER MIL-A-8625C SPEC.

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

TYPE II COMMUNICATION CABINET & FOUNDATION

S. E. ROWE, General Manager

DRAWING NO. S-75.0C

SPEC. NO. 92-067-02
NOTES:
1. Pullbox details not shown on this plan shall conform to Dept. of Public Works Standard Drawing # L-201-0.
2. Outside Dimension: Type PB2—15”X25”, Type PB3—22”X34”
3. Galvanized conduits must be bonded with copper ground strap around the neck of each conduit. PVC conduits must have their #8 green ground wires spliced together.
NOTES:

1. Traffic pullboxes in driveways, alleys and locations with vehicular traffic shall be metal covered per this standard.

2. Pullbox details not shown on this plan shall conform to Caltrans Standard Plan ES-8.

3. Traffic pullbox shall be provided with steel cover and special concrete footing. Steel cover shall have embossed non-skid pattern.

4. Galvanized conduits must be bonded with copper ground strap around the neck of each conduit. PVC conduits must have their #8 green ground wires spliced together.

5. Top of pull boxes shall be flush with surrounding grade or top of adjacent curb, except that in unpaved areas where pull box is not immediately adjacent to and protected by a concrete foundation, pole or other protective construction, the box shall be placed with its top 1 1/4" above surrounding grade. Where practicable, pull boxes shown in the vicinity of curbs shall be placed adjacent to the back of curb, and pull boxes shown adjacent to standards shall be placed on side of foundation facing away from traffic, unless otherwise noted. When pull box is installed in sidewalk area, the depth of the pull box shall be adjusted so that the top of the pull box is flush with the sidewalk.

6. Pull box cover shall be marked as "TRAFFIC SIGNAL".

7. Bonding jumper for metal covers shall be flat braided strap, 2’ long minimum, Panduit Part # BS202448EU or equivalent.

8. Hold-down bolt shall be 5/8” and coarse threaded.
Notes:
1. Pullbox details not shown on this plan shall conform to Dept. of Public Works Standard Drawing # L-201-1.
2. Refer to Dept. of Transportation Standard Drawing # S-78.5.1 for additional construction details.
3. Galvanized conduits in pullbox must be bonded with copper ground strap around the neck of each conduit. PVC conduits must have their #8 green ground wires spliced together.
4. Pullbox to be used in non-traffic areas; may be stacked no more than 2 deep.
5. Stencil TRAFFIC SIGNAL in 1" lettering on backside of cover and inside of box.

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Seleta J. Reynolds, General Manager

Approved Date 7-13-22

S-78.5.3
Notes:
1. Pullbox details not shown on this plan shall conform to Dept. of Public Works Standard Drawing # L-201-1.
2. Refer to Dept. of Transportation Standard Drawing # S-78.5.1 for additional construction details.
3. Galvanized conduits in pullbox must be bonded with copper ground strap around the neck of each conduit. PVC conduits must have their #8 green ground wires spliced together.
4. Pullbox to be used in non-traffic areas; may be stacked no more than 2 deep.
5. Stencil TRAFFIC SIGNAL in 1" lettering on backside of cover and inside of box.

COMPOSITE PULLBOX TYPE 3

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

DWN SB 7-13-22 Title
CKD SB 7-13-22 COMPOSITE PULLBOX TYPE 3
T. E. SB 7-13-22
Sr. T. E. JV 7-13-22
Pr. T. E. 7-13-22

Approved Date 7-13-22 Drawing No.

for Seleta J. Reynolds, General Manager

S-78.5.4
Notes:
1. All metal surfaces for special frame and cover shall have a galvanized finish.
2. All welding, machining and drilling shall be done before galvanizing.
3. Plug threads must be greased thoroughly prior to installation.

<table>
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<tr>
<th></th>
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<td>19&quot;</td>
<td>29&quot;</td>
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<td>37(\frac{7}{8})&quot;</td>
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<td>36(\frac{3}{4})&quot;</td>
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NOTES:
1. LIFTING RINGS AND BOLTS SHALL BE PROVIDED.
2. PARKWAY COVER SHALL BE 3/16" SAFETY PLATE, 5/16" SAFETY PLATE FOR TRAFFIC COVER.
3. ALL METAL SURFACES FOR SPECIAL FRAME AND COVER SHALL HAVE A GALVANIZED FINISH.
4. ALL WELDING, MACHINING AND DRILLING SHALL BE DONE BEFORE GALVANIZING.
5. PLUG THREADS MUST BE GREASED THOROUGHLY PRIOR TO INSTALLATION.
NOTES:
1. TWO 1" DIA. GROUNDING ROD KNOCKOUTS SHALL BE PROVIDED.
2. LIFTING RINGS AND BOLTS SHALL BE PROVIDED.
3. PARKWAY COVER SHALL BE 3/16" SAFETY PLATE, 5/16" SAFETY PLATE FOR TRAFFIC COVER.
4. ALL METAL SURFACES FOR SPECIAL FRAME AND COVER SHALL HAVE A GALVANIZED FINISH.
5. ALL WELDING, MACHINING AND DRILLING SHALL BE DONE BEFORE GALVANIZING.
6. PLUG THREADS MUST BE GREASED THOROUGHLY PRIOR TO INSTALLATION.
Notes:
1. Type F-1 –2" nominal size conduit, unless otherwise specified.
2. Type F-8 & Type F-8A –3" nominal size conduit, unless otherwise specified.
3. Unless otherwise specified, in unpaved areas a 36" X 24" X 4" slab shall be provided for each door opening in the case of a model 336 cabinet.
4. On Type F-8 & Type F-8A, ground rod shall be installed in controller pull box.

0.50" NC square nut holder with fastener for grounding welded to interior of pole shaft at 180° from hand hole rim.

#8 Green bonding wire

Anchor bolt-thread top 8" and galvanize 12" (2 nuts and 2 washers required per bolt), total 4

Base plate 10" X 10" X 3/4"

2" Min. to 3" Max. Mortar

Curb Face

After plumbing standard, place mortar all around bolts. Finish with slope ranging from 45° to 90° including drain holes

1"Ø X 3'-0" anchor bolts thread bottom 6", (2 nuts and 2 washers, total 4 required per bolt)

Anchor plate 10" X 10" X 3/4"
Notes:
1. Use 1" galvanized conduit for street lighting and 2" schedule 80 PVC conduit for traffic signal unless otherwise specified.
2. Conduit stubs from foundation shall be in the direction of the nearest corresponding pullbox unless otherwise specified.
3. Topping shall be considered as a part of the foundation.
Notes:
1. Use 1" galvanized conduit for street lighting and 2" schedule 80 PVC conduit for traffic signal unless otherwise specified.

2. Conduit stubs from foundation shall be in the direction of the nearest corresponding pullbox unless otherwise specified.
NOTES:
1. Conduit shall be 1" nominal size unless otherwise specified.
2. Topping shall be considered a part of the foundation.
Note
Base plate shall be hot dipped galvanized after machining in accordance with the latest edition of ASTM designation A-123.
NOTES:
1. Conduit consists of (2) 3" nominal size unless otherwise specified.
NOTE:

1. NO PULLBOX TO BE LOCATED WITHIN THE FRONT OR REAR 24"X36" CONCRETE SLAB.

2. SEE STANDARD DRAWING NO. S-79.9B FOR GROUNDING DETAILS.
Notes:

1. Department of Water & Power to install 3 #2 stranded aluminum wires from service pole to pullbox. At the terminus of each #2 aluminum wire the Dept. of Water & Power to splice 2 #6 stranded copper wires, (12" long) using compression type connectors. The exposed ends of each copper wire shall be taped when not in use.

2. Install continuous and dedicated #6 green service ground conductor to controller cabinet.

3. See Standard Specifications for Public Works Construction, Sec. 307-2.8

4. See Standard Drawing S-79.9B for grounding details.
Notes:
1. Department of Water & Power to install 3 #2 stranded aluminum wires from service pole to pullbox. At the terminus of each #2 aluminum wire the Dept. of Water & Power to splice 2 #6 stranded copper wires, (12" long) using compression type connectors. The exposed ends of each copper wire shall be taped when not in use.

2. Install continuous and dedicated #6 green service ground conductor to controller cabinet.

3. See Standard Specifications for Public Works Construction, Sec. 307–2.8

4. See Standard Drawing S–79.9B for grounding details.
NOTES:

1. FOR CABINET AND FOUNDATION DETAIL SEE CITY OF LOS ANGELES DEPARTMENT OF TRANSPORTATION STANDARD DRAWING NO.S-75.0C.

2. SERVICE DISTRIBUTION CABINET SHALL HAVE INSTALLED ON ITS BACK PANEL A 100-AMPS LOADCENTER EQUIVALENT TO SQUARE D CAT. NO.Q06-12L100.

3. CIRCUIT BREAKERS SHALL BE PROVIDED AND INSTALLED AS FOLLOWS:

   1EA  2 POLE  50A
   1EA  1 POLE  50A
   1EA  1 POLE  30A
   2EA  1 POLE  20A
PVC Conduit System

* Note:
Use a ground rod wire clamp for each wire (Acorn)

Service Pullbox

Controller Pullbox

Traffic Signal Cabinet

Galvanized Conduit System

* Note:
Use a ground rod wire clamp for each wire (Acorn)

Service Pullbox

Controller Pullbox

Traffic Signal Cabinet

Dedicated Service
# 6 Black
# 6 Green
# 6 White

Black Green White

Black Green White

Schedule 80 PVC

Schedule 80 PVC

Schedule 80 PVC

Schedule 80 PVC

Schedule 80 PVC

Cabinet Ground Rod: 8FT X 1/2"
Notes:

1. Raintight box with three knockouts in bottom for 3/4", 1", 1 1/4" or 1 1/2" inch conduit, U.L. approved; 10"W X 12"H X 4"D. Box to be galvanized ASTM Spec. A-525; Similar to circle A-W catalog number 10124 RTSC.

2. Install one nipple with two 3/4" bushings for each 1" Galvanized conduit installed as shown on plans.

3. Raintight box shall be drilled or otherwise configured to accept a padlock.
Design:
Design loading
Wind loading 20 psf

Design Stresses:
Concrete: n=10
fc = 1,200 psi
Reinforcing Steel
fs = 20,000 psi
Structural steel
fb = 18,000 psi
Soil Bearing Pressure
= 3,000 psi

Detail "B"

Detail "A"

General Notes:
1. All metal parts shall be galvanized after fabrication.
2. All pipes shall conform to ASTM A53 Grade B.
4. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.
5. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.
6. All structural steel shall conform to ASTM designation A7 or A36.
7. See S-45.0 for sign dimensions, positioning and mounting.
Monotube Overhead Sign Supports

Not to Scale

Bar 7\(\frac{3}{4}\)" x \(\frac{3}{4}\)" x 14\(\frac{3}{4}\)" long, 2 req'd. Cut to fit flush with pipe

Bar 1\(\frac{1}{4}\)" x \(\frac{3}{4}\)" Backing Ring

Arm, Pipe 10 Std.

3\(\frac{3}{8}\)" Std. half coupling

Post, Pipe 14X—Strong

See Detail "C"

3'-0" Dia. C.I.D.H. foundation (PF-34)
See Section A-A for reinforcement

Specification

Design:

Loading: Wind, Normal to sign face; 23.3 psf
Transverse to face; 0.2 of normal force

Unit Stresses:
Concrete: n=10
f = 3000 psi
f = 1200 psi
Reinforcing Steel
f = 24,000 psi
Structural steel
f = 23,000 psi
Soil Bearing Pressure = 23,000 psi

Robert R. Yates
General Manager

34' CANTILEVER SIGN
STANDARD AND FOUNDATION DETAILS

Robert R. Yates, General Manager

City of Los Angeles
Department of Transportation

S-92.2
General Notes:

1. Total sign area shall not exceed 180 sq. ft.

2. Length "B" shall not exceed 22' with maximum sign area.

3. See plan for positioning of panel.

4. All metal parts shall be galvanized after fabrication.

5. All pipes shall conform to ASTM A53 Grade B specification.


7. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.

8. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.

9. All structural steel shall conform to ASTM designation A36, except where otherwise shown.
### LAMINATED OVERHEAD SIGN MOUNTING SYSTEM

**CITY OF LOS ANGELES**  
**DEPARTMENT OF TRANSPORTATION**  
ROBERT R. YATES, General Manager

**LAMINATED SIGN PANELS**  
- **Type A** laminated sign panel per LDAT SPECIFICATION 82-052-01
- I-Beam 6" x 3.33", 43 Lbs/Linear Ft., 6061-T6 Aluminum Alloy 1 per panel
- Mast arm per LDAT STD. DWG. Nos. S-92.2, S-92.3, or S-98.0
- 1/2"-13 UNC-2A, stainless steel or hot-dipped galvanized U-bolt (4 threads) with hex nut and tapered washer (ASTM A307) 2 per I-beam
- 1/4" x 2" x 6" Aluminum Straps for each Panel closure per LDAT SPECIFICATION 82-052-01 4 per closure
- Aluminum Mounting Clamp 4 per I-beam
- 3/8" x 1.750" (16-8) stainless steel post clip bolt (16 threads) with hex head nylon insert stop nut and flat washer 4 per I-beam

**GENERAL NOTES:**
1. Overhead sign panels shall be type "A" laminated sign panel per LDAT SPEC. 82-052-01.
2. See LDAT STD. DWG. Nos. S-92.2, S-92.3, or S-98.0 for dimensions, spacings, quantities, and other requirements dependent on mast arm specifications.
3. All bolts, nuts and washers shall be stainless steel or hot-dipped galvanized in accordance with section 210-5, Std. Spec. for Public Works Construction (1985 Edition).
4. Guide signs shall have a white legend and border made of F92 Type II (High Intensity) Reflective Material on a green background made of F92 Type II (Super-Engineering Grade) Reflective Material.
5. Regulatory signs shall have a black (Scotch-Cal) legend and border, on a white background made of F92 Type II (VIP Grade) Reflective Material.

**Drawn By:** RMO 5-12-94  
**Checked By:**  
**Supervised By:**  
**Reviewed By:** KF 5-17-96  
**Title:** Laminated Overhead Sign Mounting System

**Revision History:**

**Approved:** 5-28-96  
**Drawing No.:** S-45.0
Specifications

Design:

Wind Velocity:
85 MPH

General Notes

1. All pipes shall conform to ASTM A53 Grade B Specifications.
2. Bar reinforcements shall conform to ASTM A615, Grade 60.
3. All structural steel shall conform to ASTM designation A36, except as shown on the plan.
4. Welding design and fabrication shall be in accordance with the latest edition of the AWS Structural Welding Code D1.1—Steel.
5. All metal parts shall be galvanized after fabrication.
6. Sign Arm shall be made level by roking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.
7. Mounting Brackets shall be per Caltrans Standard Drawing No. S40R.
FWY ALT  +→ WEST

FWY ALT  EAST +

Unistrut Installation (Detail "A")

Installation Per Std. Dwg. S-98.0

Cantilever Pole with 12" Arm (Std. Dwg. S98.0)

1" Flex Conduit

* WIDTH CAN BE INCREASED BY 12 INCHES TO ACCOMMODATE "NORTH" OR "SOUTH" LEGEND.

REAR VIEW
(Not To Scale)

FRONT VIEW
(Not To Scale)

TRAILBLAZER SIGN

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

ROBERT R. YATES, General Manager

Approved
Robert R. Yates
8-19-96

General Manager

DATE
S-58.16
1. Trailblazer signs to be used in conjunction with static freeway overhead guide signs.
2. Use one or two arrows on the trailblazer sign as appropriate.
3. Sign shall utilize Light Emitting Diodes (LED) for message illumination. The individual LED's shall equal or exceed in quality as those manufactured by Hewlett-Packard, high power AlInGAP amber type, catalog #HLM-5L00.
4. Sign text shall be 10" U.C. with 1" spacing between each letter and a minimum of one letter width spacing between words.
5. The overall sign size shall be 60" in height x 60" in width and 8" in depth.
6. The weight of the sign (enclosure + all components) shall not exceed 115 lbs.
7. The sign shall be constructed so that the front face panel shall be contained within an extruded 0.90 aluminum frame having full welded seams and powder coat painted with high gloss black finish meeting the color standards of Fed. Spec. 595b, 17038.
8. The transparent Lexan front face panel shall be hinged at the top allowing front access to the interior of the sign. Support shall be provided to hold the Lexan panel open during maintenance.
9. A honeycomb formed black anodized screen shall be provided between the LED’s lamp clusters and the front face panel to enhance resistance to “sun phantom” effect.
10. The sign shall use a closed cell neoprene gasket making the sign watertight.
11. Sign enclosure hardware materials shall be stainless steel AISI303, for corrosion resistance.
12. An opening shall be made on the bottom side of the sign so that all conductors, enclosed in flexible conduit, may exit from the sign into the cantilever arm.
13. The sign shall be vented in the bottom portion on the opposite end from the conductor opening.
14. The LED elements shall be comprised of individual removable modules. Each LED module shall be composed of 1" pixels (clusters) having 8 each LED's per pixel. One module shall be used for each letter of the message.
15. Each pixel shall be removable or replaceable on the module without the use of any tools other than a screwdriver.
16. The sign shall be equipped with a photoelectric cell mounted on the enclosure to measure ambient light intensity and automatically compensate for ambient light conditions.
17. The LED sign shall be mountable using unistrut mounting system.
18. Sign shall be equipped with a terminal block to provide separate power inputs to each of the text and arrow modules. The sign shall be powered with 120V AC.
19. A full set of proposed sign specifications and drawings shall be supplied to the City prior to manufacturing.

Title
TRAILBLAZER SIGN

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

DRAWING NO.
S-58.16

Approve
Robert R. Yates
General Manager
8-19-96

General Manager
8-20-96

Reviewed By
VJ
8-20-96

Supervised By
VJ
8-20-96

Checked By
ID
8-20-96

Drawn By
MH/MH
6-20-96
NOTES:
1. THE WIDTH DIMENSION, "A" SHALL BE 5-1/2" AND THE CORNER RADIUS DIMENSION, "R", SHALL BE 2". THE BACKPLATE SHALL HAVE A NOMINAL THICKNESS OF 1/8".
ALL OUTSIDE AND INSIDE EDGES SHALL BE FORMED WITH A 1/2" TO 5/8" FLANGE (INSIDE DIMENSION), TURNED AWAY FROM THE FRONT SURFACE.

2. FOR ALL MANUFACTURED SIGNAL HEADS, BACKPLATES SHALL BE DESIGNED SO AS TO SHOW NO BACKGROUND LIGHT BETWEEN THE BACKPLATE AND THE HEAD. THE FABRICATION SHALL BE VACUUM FORMED AS ONE PIECE WITH A BLACK LUSTERLESS, HAIRCELL FINISH ON THE FRONT SIDE. ALL SURFACES SHALL BE FLAT AND STRAIGHT WITHOUT BLISTERS, BUCKLING OR WARPING. FLANGES SHALL BE STRAIGHT, UNIFORM AND HAVE A CONSISTENT FLANGE DIMENSION THROUGHOUT.

3. THE BACKPLATE MATERIAL SHALL BE COMPOUNDED FROM VIRGIN ABS CONTAINING 60% STYRENE, 20% RUBBER AND 20% ACRYLIC. IT SHALL CONTAIN ULTRA VIOLET INHIBITORS AND STABILIZERS FOR PROTECTION AGAINST ULTRA VIOLET DEGRADATION. THE BACKPLATE MUST MEET A FALLING DART IMPACT TEST OF 16 FT/LB.

4. THE INTERNAL SHAPES AND DIMENSIONS SHALL MATCH VARIOUS MANUFACTURED SIGNAL HEADS.

5. RETROREFLECTIVE SHEETING MUST BE TYPE XI AND COMPLY WITH ASTM D4956. RETROREFLECTIVE SHEETING MUST HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING. THE ADHESIVE BACKING MUST BE PRESSURE SENSITIVE AND FUNGUS RESISTANT. RETROREFLECTIVE SHEETING MUST BE APPLIED AT THE FABRICATION PLANT UNDER THE RETROREFLECTIVE SHEETING MANUFACTURER'S INSTRUCTION WITHOUT APPRECIABLE STRETCHING, TEARING OR OTHER DAMAGE.
A. STREET NAME SIGNS

NOTES
1. LEGEND SIZE: 8" UPPER CASE, 6" LOWER CASE, SERIES "E" LETTERS; 11-1/4"x12-3/4" ONE-LINE ARROW
2. COLOR: WHITE LEGEND, BLUE BACKGROUND
3. REFLECTIVITY: HIGH INTENSITY LETTERS ON SUPER ENGINEER GRADE BACKGROUND OR REVERSE SCREENING ON HIGH INTENSITY SHEETING
4. WHERE THE LENGTH OF THE SIGN BLADE WOULD EXCEED 96" (GENERALLY 16 LETTERS AND SPACES) THE STREET NAME TITLES, "ST","AVE","BL","PL","DR","RD", ETC. MAY BE DELETED

B. FREEWAY RAMP SIGNS

NOTES
1. LEGEND SIZE: 8" AND 6" SERIES D CAPITAL LETTERS; 11-1/4" X 12-3/4" ONE-LINE ARROW; 18" HIGH US, CALIFORNIA OR INTERSTATE SHIELD, AS APPROPRIATE WITH PROPORTIONAL NUMBERS
2. COLOR: WHITE LEGEND, WARBOYS GREEN (L.A. NO.1) BACKGROUND; BLACK ON WHITE US SHIELD; WHITE ON GREEN CALIFORNIA SHIELD; WHITE ON BLUE AND RED INTERSTATE SHIELD
3. REFLECTIVITY: HIGH INTENSITY LETTERS ON SUPER ENGINEER GRADE OR REVERSE SCREENING ON HIGH INTENSITY SHEETING
NOTES:

1. For installation details see Std. Plan S-457.0
2. For Signfix aluminum channel framing system details see standard plan S-476.0
M10J-OCB250AL
ADJUSTABLE LENGTH
SWING SIGN BRACKET
All Aluminum 6061T6 Alloy and Stainless Steel Components

M10J-OCB250FL
FIXED LENGTH NON-ADJUSTABLE
SWING SIGN BRACKET
All Aluminum 6061T6 Alloy and Stainless Steel Components

NOTES:
1. Brackets available from:
   Hawkins Traffic Safety Supply
   1285 Eastshore Highway
   Berkeley, CA 94710 (415)525–4040

2. If another sign is installed on the mast arm next to the
   sign head, the street name sign shall be installed with
   12" clearance to the edge of that sign.

3. Sign bracket shall be attached to mast arm with 3/4" wide
   type 201 stainless steel sign banding secured with a banding
   buckle. Bonding shall be 0.020" thick double banded or 0.030"
   thick single banded.

APPROVED
12–1–88
S. E. Rowe

M10J-OCB250FL
Bracket

M10J-OCB250AL
Bracket

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
S. E. Rowe, General Manager

OWN. HH T.E. FR. T.E.
SKN. SR T.E.

S–457.0
Notes:
1. Sign shall be capable of displaying the following messages:
   R3-1 (No Right Turn symbol), R3-2 (No Left Turn symbol)
   Message Colors:
   Red – Circle & Diagonal.
   Lunar White – Left Arrow or Right Arrow.
   Width of Circle and Diagonal – 1.5” stroke – 3 pixel
   Width of Arrow – 2” stroke – 4 Pixel
2. The "NO LEFT TURN" and "NO RIGHT TURN" symbols shall be formed by rows of fiber optic bundles
   spaced 0.50 inch (center to center).
3. Fiber optic bundles shall alternate between two or more lamp sources so that in the event
   of a lamp failure the sign shall continue to display a discernible and readable message.
4. Refer to LADOT STD. DWG. No. S-63.1.4 for mounting assembly.
5. Sign shall conform to LADOT Specification No. 82-049-03.
6. For housing description, see LADOT STD. DWG. S-58.21
7. 24” X 24” electric sign shall include a visor enclosure as shown.
8. Lamps shall be solid state, 7W maximum.
SIGN FACE
Not To Scale

VISOR ENCLOSURE
Not To Scale
REGULAR PEDESTRIAN SIGNAL HEADS

18-1/2"

SEE NOTE 4

18-3/4"

LED SIGNS
Not To Scale

NOTES:

1. THE "USE TUNNEL" SIGN SHALL BE INTERNALLY ILLUMINATED BY SUPER LED DIODES. THE DIODES SHALL_EMIT RED COLORED LIGHT. THE SIGN BACKGROUND SHALL BE BLACK.

2. THE SIGN MESSAGE "USE TUNNEL" SHALL BE 4" IN HEIGHT WITH BRUSH STROKE WIDTH OF 1/2". THE ARROW SHALL BE 6-1/2" LONG WITH BRUSH STROKE WIDTH OF 1".

3. THE SIGN HOUSING SHALL CONSIST OF TWO (2) STANDARD PEDESTRIAN SIGNAL ENCLOSURES CONNECTED TO ONE ANOTHER IN A VERTICAL MANNER.

4. MINIMUM SPACE SHALL BE PROVIDED TO ALLOW FREE MOVEMENT OF DOOR OPENINGS.

5. THE "USE TUNNEL" ELECTRIC SIGN SHALL BE DISPLAYED ONLY WITH THE HAND SYMBOL OF THE PEDESTRIAN SIGNAL HEAD.

* MEETING LADOT SPECIFICATIONS

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<td>ERA 03-11-92</td>
<td>ELECTRIC SIGN</td>
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CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
S. E. ROWE, General Manager

Approved 3-18-92
S. E. Rowe
General Manager
DRAWING NO. S-58.14
NOTES:

1. SIGN SHALL BE CAPABLE OF DISPLAYING THE FOLLOWING MESSAGES:
   A: LUNAR WHITE – R3−5L (LEFT ARROW W/ONLY). WIDTH OF ARROW – 1.5” STROKE
   B: LUNAR WHITE – R3−5R (RIGHT ARROW W/ONLY). LETTERS ARE SERIES "C", 1” STROKE

2. MESSAGES SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES,
   SPACED 0.50 INCH (CENTER TO CENTER).

3. FIBER OPTIC BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES SO THAT IN THE EVENT
   OF A LAMP FAILURE THE SIGN SHALL CONTINUE TO DISPLAY A DISCERNABLE AND READABLE MESSAGE.

4. SIGN SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.

5. DOOR FRAME, FACE PLATE, AND INTERIOR OF HOUSING AND VISOR SHALL BE PAINTED FLAT BLACK
   NON-REFLECTIVE FINISH.

6. VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.

7. REFER TO LADOT STD. DWG. NO. S−63.1.4 FOR MOUNTING ASSEMBLY.

8. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82−049−03.

9. FOR HOUSING DESCRIPTION, SEE LADOT STD. DWG. NO. S−58.21.
NOTES:
1. SIGN SHALL BE CAPABLE OF DISPLAYING THE FOLLOWING MESSAGES:
   A: RED – "X" WIDTH OF "X" – 1.5" STROKE
   B: GREEN ARROW (↓) WIDTH OF ARROW – 1.5" STROKE
2. THE RED "X" SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES SPACED 0.50 INCH (CENTER TO CENTER).
   THE GREEN DOWN ARROW SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES, SPACED 0.50 INCH (CENTER TO CENTER).
3. FIBER OPTIC BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES SO THAT IN THE EVENT OF A
   LAMP FAILURE THE SIGN SHALL CONTINUE TO DISPLAY A DISCERNABLE AND READABLE MESSAGE.
4. SIGN SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.
5. DOOR FRAME, FACE PLATE, AND INTERIOR OF HOUSING AND VISOR SHALL BE PAINTED FLAT BLACK
   NON-REFLECTIVE FINISH.
6. VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.
7. REFER TO LADOT STD. DWG. NO. S–63.1.4 FOR MOUNTING ASSEMBLY.
8. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82–049–03.
NOTES:

1. SIGN SHALL BE CAPABLE OF DISPLAYING THE FOLLOWING MESSAGES:
   A: LUNAR WHITE - R3-9a (LEFT ARROWS) WIDTH OF ARROWS - 1.5" STROKE

2. MESSAGES SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES, SPACED 0.50 INCH (CENTER TO CENTER).

3. FIBER OPTIC BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES SO THAT IN THE EVENT OF
   A LAMP FAILURE THE SIGN SHALL CONTINUE TO DISPLAY A DISCERNABLE AND READABLE MESSAGE.

4. SIGN SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.

5. DOOR FRAME, FACE PLATE, AND INTERIOR OF HOUSING AND VISOR SHALL BE PAINTED FLAT BLACK
   NON-REFLECTIVE FINISH.

6. VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.

7. REFER TO LADOT STD. DWG. NO. S-63.1.4 FOR MOUNTING ASSEMBLY.

8. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. B2-049-03.

Heli-arc weld one side of corner post to door frame, both ends.

Heli-arc weld all seams of housing, 4 corners.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HOUSING, .125&quot; EXTRUDED ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>DOOR FRAME, .125&quot; EXTRUDED ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>FACE PLATE, .08&quot; ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>MATTE/CLEAR POLYCARBONATE LENS, .125&quot; THICK</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>VISOR, .063&quot; ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>BACK PLATE, .063&quot; ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>OPTICS ENCLOSURE, .02&quot; ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>TRANSFORMER SHELF, .063&quot; ALUMINUM</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>LAMPS, SOLID STATE 7W MAX.</td>
<td>AS REQ.</td>
</tr>
<tr>
<td>10</td>
<td>TRANSFORMERS, 120 VAC PRL, 12 VAC 25 VA SEC.</td>
<td>AS REQ.</td>
</tr>
<tr>
<td>11</td>
<td>COMMON ENDS (LIGHT INPUT), ALUMINUM</td>
<td>AS REQ.</td>
</tr>
<tr>
<td>12</td>
<td>END TIPS (LIGHT OUTPUTS), NYLON</td>
<td>AS REQ.</td>
</tr>
<tr>
<td>13</td>
<td>FIBER OPTIC GLASS BUNDLES, DIA. VARIES</td>
<td>AS REQ.</td>
</tr>
<tr>
<td>14</td>
<td>CONTINUOUS HINGE, 1-1/4&quot; (OPEN) X .040&quot; STAINLESS STEEL</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>1/4-TURN LINK LOCKS, STAINLESS STEEL</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>DOOR GASKET, 1&quot; x 3/16&quot; NEOPRENE (ALL SIDES CONTINUOUS)</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>TERMINAL BLOCK (3 PT.)</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>CORNER POSTS, ALUMINUM</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>#8 X 5/16&quot; SLOTTED PAN HEAD SCREWS, STAINLESS STEEL</td>
<td>AS REQ.</td>
</tr>
<tr>
<td>20</td>
<td>4 1/2&quot; X 4 1/2&quot; X 1/4&quot; REINFORCEMENT ALUMINUM PLATE (SEE DETAIL &quot;A&quot;)</td>
<td>2</td>
</tr>
<tr>
<td>21</td>
<td>#10 X 3&quot; SLOTTED ROUND HEAD MACHINE SCREW, HEX NUT &amp; LOCK WASHERS (STAINLESS STEEL)</td>
<td>32</td>
</tr>
<tr>
<td>22</td>
<td>LENS STIFFENER BLOCKS, ACRYLIC</td>
<td>2</td>
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<tr>
<td>23</td>
<td>5/16&quot; X 1-1/4&quot; HEX HEAD MACHINE SCREW BOLT &amp; HEX NUT VISOR SCREWS (STAINLESS STEEL)</td>
<td>12</td>
</tr>
<tr>
<td>24</td>
<td>5/16&quot; X 1&quot; HEX HEAD MACHINE SCREW BOLT &amp; HEX NUT &amp; LOCK WASHERS (STAINLESS STEEL)</td>
<td>8</td>
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<tr>
<td>25</td>
<td>MOUNTING BRACKET</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>1/2&quot; WIRE ENTRY BUSHING</td>
<td>1</td>
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</tbody>
</table>

SIGN ENCLOSURE
CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

DWN | MT | 11-07-07 | Title
---|----|----------|---
CKD | T. E. | Sr. T. E. | Pr. T. E. | SS | 6-26-08

Approved
for
Rito L. Robinson, General Manager

John E. Reicher
June 26, 2008
DRAWING NO.
S-58.21
NOTES:

1. MESSAGES SHALL BE FORMED BY ROWS OF FIBER OPTIC GLASS BUNDLES.
2. DUAL ROWS OF FIBER OPTIC BUNDLES SHALL BE USED TO FORM THE WORD "TRAIN." LETTERS IN THE BUS WARNING SIGN MESSAGE SHALL HAVE A BRUSH STROKE OF 1-INCH. BUS SYMBOL AND LETTERS SHALL ALSO CONFORM TO THE LATEST EDITION OF THE FHWA STANDARD HIGHWAY SIGNS BOOK.
3. THE FRONT VIEW OF THE TRAIN OR BUS SHALL BE SOLID FORMED BY ROWS OF FIBER OPTIC GLASS BUNDLES.
4. THE BACKGROUND OF THE MESSAGES SHALL BE YELLOW. THE SIGN BACKGROUND SHALL BE BLACK.
5. FIBER OPTIC GLASS BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES. IN THE EVENT OF A LAMP FAILURE, THE SIGN SHALL CONTINUE TO DISPLAY A READABLE AND DISCERNABLE MESSAGE.
6. SIGN HOUSING SHALL BE EQUIPPED WITH FOUR (4) 3/16" DRAIN HOLES AT THE BOTTOM.
7. THE VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.
8. HOUSING SHALL CONTAIN 4 1/2" X 4 1/2" X 1/4" REINFORCEMENT PLATE LOCATED ON THE TOP AND BOTTOM FOR USE WITH THE PELCO ASTRO SIGN BRAC INSTALLATION.
9. REFER TO STD. DWG. NO. S-63.1.4 FOR THE MOUNTING ASSEMBLY (T=46", L=29").
10. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82-049-03.
11. FOR HOUSING DESCRIPTION SEE LADOT STD. DWG. NO. S-58.21
NOTES:

1. THIS DRAWING DEPICTS A TWO SENSOR CONFIGURATION. EACH SENSOR CAN ACCOMODATE UP TO TWO LOOPS.

2. INSTALL 283LA TRANSIT SENSORS IN SLOTS 10 OF THE I & J INPUT FILES. CONNECT SENSOR CABLE ENDS (B1/B2, B3/B4) TO THE SENSOR J1 SERIAL PORTS.

3. ROUTE SERIAL COMMUNICATIONS CABLE BEHIND CABINET CHASSIS. CONNECT 2070 CABLE END TO THE 2070 C21S PORT. SECURE CABLE TO CABINET CHASSIS WITH WIRE TIES.
NOTE:
1. INSTALL C20 HARNESS AND PANEL ON RACK ABOVE C2 PANEL.
NOTES:
1. CONNECT 2070 CABLE END TO THE 2070 C21S PORT.
2. INSTALL INPUT FILE HARNESS FROM TBO TO INPUT FILE BACKPLANE.
3. CONNECT C20 HARNESS TO THE C20S PORT.
12-POSITION DUAL BARRIER STRIP

B2 HARNESS (FILE I SLOT 10 BACKPLANE)

B1 HARNESS (FILE I SLOT 10 BACKPLANE)

B3 HARNESS (FILE J SLOT 10 BACKPLANE)*

B4 HARNESS (FILE J SLOT 10 BACKPLANE)*

GROUND TO PIN D TO PIN E TO PIN F TO PIN G TO PIN H TO PIN I

NOT USED

DRAIN WIRES

DLC (1-PAIR #12 AWG)

B1 B2 B3* B4*

* SECOND HARNESS TO INPUT FILE J IS ONLY REQUIRED FOR 3 AND 4 LOOP INSTALLATION.

NOTE:
1. ALL CONNECTIONS SHALL BE SOLDERED.
LENGTH = 1 FT.

#22 AWG. STRANDED 5 CONDUCTOR CABLE (LENGTH = 3 FT.)

DB9 MALE TO 283LA SENSOR J1 PORT

DB9 MALE TO 2070 CONTROLLER C21S PORT

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION 2070</th>
<th>FUNCTION 283 LA</th>
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<tr>
<td>1</td>
<td>N/C</td>
<td>N/C</td>
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<tr>
<td>2</td>
<td>TX</td>
<td>RX</td>
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<td>N/C</td>
</tr>
<tr>
<td>7</td>
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<td>RTS</td>
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<tr>
<td>8</td>
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<tr>
<td>9</td>
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C20 CONNECTOR

<table>
<thead>
<tr>
<th>PIN</th>
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<tbody>
<tr>
<td>A</td>
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<tr>
<td>B</td>
<td>AUDIO IN-</td>
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<tr>
<td>C</td>
<td>AUDIO OUT+</td>
</tr>
<tr>
<td>D</td>
<td>+5 VDC</td>
</tr>
<tr>
<td>E</td>
<td>AUDIO OUT-</td>
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<tr>
<td>F</td>
<td>N/C</td>
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<tr>
<td>H</td>
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<td>M</td>
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<td>DC GND</td>
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<tr>
<td>P</td>
<td>N/C</td>
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<tr>
<td>N</td>
<td>N/C</td>
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</tbody>
</table>

NOTES:
1. PROVIDE TWO (2) 1/4" MOUNTING HOLES CENTERED 0.325" FROM TOP AND BOTTOM EDGES.
2. ALL CONNECTIONS SHALL BE SOLDERED.
Post Anchorage Detail

Notes:
1. Pipe post to be set 1'–6" back from face of curb unless otherwise specified.
2. For minimum pipe diameters and wall thickness refer to ASTM A6M.
3. Use left, right or double arrow on sign as needed.

<table>
<thead>
<tr>
<th>DWN</th>
<th>MT</th>
<th>05–03–06</th>
<th>Title</th>
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<tr>
<td>CKD</td>
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<tr>
<td>T. E.</td>
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<tr>
<td>Sr. T. E.</td>
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<tr>
<td>Pr. T. E.</td>
<td>SS</td>
<td>06–26–08</td>
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</table>

Pedestrian Barricade

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved
June 26, 2008
for Rita L. Robinson, General Manager

S–454.2