Section 104

Traffic Signals

This section establishes the uniform policies and procedures for the preparation of traffic signal plans and construction requirements in the City of Irvine.

It is not intended as a textbook, or substitute for engineering knowledge, experience, or judgment but rather as a guideline to uniformity and to provide the designer with sufficient information for the preparation of desired plans with a minimum amount of uncertainty.

Please refer to the latest posted amendment for any updates or modifications to the standards herein.

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Traffic Signals
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Section 104
Traffic Signals

104.1 GENERAL

A. The Design Engineer preparing plans and specifications for traffic signals shall:

1. Comply with the requirements of the latest revision of the State of California Standard Plans and Specifications, except as modified herein, for the installation and/or modification of traffic signals, highway safety lighting, and internally illuminated street name signs (IISNS). Sign(s) installation shall comply with State of California Standard Specifications, Section 56. Traffic stripes and pavement markings shall comply with State of California Standard Specifications, Section 84, except that thermoplastic material shall not be allowed. All pavement-marking stencils shall match City of Irvine stencils (Hawkins). Pavement markers shall comply with State of California Standard Specifications, Section 85.

2. Use the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD) available on the Caltrans web site at: *http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/index.htm*

3. Use the latest Standard City Title Sheet (Attachment 1), Sample Traffic Signal Plan Sheet (Attachment 2) and other attachments for reference on completing plans.

4. Include the following:

   a. Title sheet with general notes. Title sheet shall also include a note identifying the approval date of the City of Irvine Standards and Design Manual Section 104 -Traffic Signals, and all other relevant standards documents, used in designing of the project.

   b. Reference sheet(s) with applicable detail plans from the attachments herein. Reference sheets shall include up to eight detail plan sheets tiled two vertically and 4 horizontally on each 24-inch x 36-inch sheet.

   c. Civil Engineering plans for any right-of-way and/or traffic signal maintenance easement.

d. Traffic signal plans shall include new and existing curb and gutter, right-of-way, maintenance easements showing all existing utilities, all traffic signal interconnect cable, and City boundary lines on both civil and traffic signal plans. All widths shall be clearly labeled and dimensioned to the centerline.

e. Signing and striping plans. (If applicable)

f. Traffic control plan for vehicles, bicycles and pedestrians, if applicable.

B. During the design phase of the project, the Design Engineer shall be responsible for potholing proposed traffic signal pole locations (Type 1A and pedestrian poles excluded) to foundation depth and width, prior to completion of the plans in order to identify potential conflicts with existing substructures. A log of the work performed showing depth, width, location, and unusual obstructions in the potholes shall be provided with the plans after potholing.

104.2 PLAN PREPARATION

A. General

1. The first plan-check submittal shall be at least 80% complete. Plans not conforming to the standards herein will be returned to the design engineer for correction without further review.

2. The City of Irvine requires the title sheet of “stand-alone” traffic signal plans to be prepared on 24-inch x 36-inch Mylar sheets with a ½ inch margin on all sides except the left side, which shall be 1½ inches. Deviations from these specifications shall be requested from the City Engineer prior to commencement of work.

3. All traffic signal plans shall be prepared using the latest version of AutoCAD. Prior versions of AutoCAD, released within four years of the plan submittal date, will be allowed. Provide files of completed plans in both AutoCAD and Adobe PDF format on CD-ROM disks to the City Engineer upon completion of design.

B. Plan Preparation

Plan preparation shall use AutoCAD layer descriptions (Attachment 3) and conform to the following requirements:

1. Signal plans shall be drawn at a 1" = 20' scale.

2. All lettering shall be 1/10” minimum in height when plotted or printed at full scale. The lettering size shall conform to the highest standards in order to issue legible reduced size prints

3. Streets shall always be oriented horizontally and vertically and the north arrow positioned near the upper left-hand corner of the plan. Refer to Standard Traffic Signal Plan Sheet, herein.

4. When preparing plans for crossing arterials, the major arterial shall be Phases 2 and 6: Phase 2 for eastbound direction on an East-West arterial and northbound direction on a North-South arterial. If the streets are apparently of equal importance, the designer shall request a determination from the City Engineer.

5. Squares shall be used to designate construction notes.

6. Triangles and clouding shall be used to indicate plan revisions.

7. All existing conditions shall be screened to appear lighter than the rest of the drawing.

8. Include standard traffic signal notes. Refer to Attachments, herein.

9. Signal pole schedule. Refer to Attachments, herein.

10. Detector/sensor schedule. Refer to Attachments, herein.

11. Conductor schedule. Refer to Attachments, herein.

12. The preferred location for cabinet placement shall be per Plan TS-9B, on the far-side corner of the main arterial, in the direction of the primary flow of traffic. A minimum of 48-inches of concrete pad shall be provided at the front and rear of the signal cabinet and electrical service/BBS. The police panel side of the signal cabinet may abut the ROW providing there are no physical barriers preventing access to the panel. Where sufficient ROW exists, up to 24-inches of clearance shall be provided on the police panel side of the signal cabinet. Clearances shall be unobstructed by any above ground facilities. A retaining wall shall be installed where required. The City Engineer must approve any variance from the preferred location.

13. Front side of traffic signal controller cabinet should open toward the intersection where possible.

14. Nearest practical Edison service vault shall be shown on plan.

15. Utilize N.E.M.A. phasing conforming to the California MUTCD.

16. Symbols shown shall conform to State of California Standard Plans ES-1A and ES-1B.

17. Pole identification numbering shall increase clockwise around the intersection, with the No. 1 being the first pole away from the controller corner. Refer to the Sample Traffic Signal Plan Sheet (Attachment 2) as an example.

18. All traffic signal plans shall indicate required traffic signal pole locations as referenced from BCR, ECR, and curb face.

19. Conduit run identification numbering shall start at the conduit crossing farthest from the controller corner and increase sequentially toward the home run pull box on the controller corner. The final home run conduits shall have the highest identification numbers. Refer to Attachments, herein.

20. Signing and striping, where applicable, shall be provided on separate plan sheets, drawn at a scale of 1”=40’. Traffic striping shall be in accordance to the latest editions of the State of California Standard Plans and California MUTCD.

21. Unless otherwise physically required, an exclusive/split phase shall not be used in the phase sequence.

C. Deviations

The City Engineer shall approve any deviation from the Sample Traffic Signal Plan Sheet or any of the specifications herein.

104.3 SPECIAL DESIGN REQUIREMENTS

A. THESE ADDITIONS, DELETIONS, AND AMENDMENTS MODIFY THE SPECIFICATIONS IN THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2009 EDITION.

B. THESE ADDITIONS, DELETIONS, AND AMENDMENTS SHALL TAKE PRECEDENCE IN THE EVENT OF A CONFLICT WITH ANY STANDARD SPECIFICATIONS.

C. AS A CONVENIENCE, THESE ADDITIONS, DELETIONS, AND AMENDMENTS HAVE BEEN ARRANGED IN A FORMAT THAT PARALLELS THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2009 EDITION.

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS

1-1 TERMS. *ADD the following term:*

The word *provide* shall be understood to mean furnish and install.

1-2 DEFINITIONS *MODIFY by adding the following new definitions:*

Agency/Board/City – The City of Irvine, a municipal corporation.

Agency Representative – The person or engineering/architectural firm authorized by the Agency to represent it during the performance of the Work by the Contractor and until Final Acceptance. The Agency Representative means the Agency Representative or his assistants.

Calendar Day – The 24-hour day as denoted on the calendar.

Calendar Month – The period including the first through the last day of a month.

City – See Agency.

Replace the definition for "Engineer" with the following:
City Engineer – The City Engineer acting either directly or through the Agency Representative.

Laboratory – The laboratory authorized by the Agency or the Agency Representative to test material and work involved in the project.

State Standard Specifications – Standard Specifications issued by the State of California, Department of Transportation, Current Edition.

1-3. ABBREVIATIONS

1-3.2 Common Usage *ADD the following abbreviations:*

Abbreviation	Word or Words
ADA	Americans with Disabilities Act
DBE	Disadvantaged Business Enterprise
ESA	Environmentally Sensitive Area
NPDES	National Pollutant Discharge Elimination System
NOI	Notice of Intent
SWMP	Storm Water Management Plan
SWRCB	State of California Water Resources Control Board
WATCH	Work Area Traffic Control Handbook
WPCP	Water Pollution Control Plan
WDID	Waste Discharge Identification Number

SQPL	State of California Qualified Products List, Current Edition
TEES	State of California Transportation Equipment Electrical Specifications, Current Edition

DELETE the abbreviation of MUTCD and SUBSTITUTE the following:

MUTCD	California Manual on Uniform Traffic Control Devices

1-3.3 Institutions *ADD the following Institutions:*

Abbreviation	**Word or Words**
ACI	American Concrete Institute
AI	The Asphalt Institute
AIA	American Institute of Architects
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance of Way Association
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
CRSI	Concrete Reinforcing Steel Institute
NFPA	National Fire Protection Association
PCA	Portland Cement Association
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code, Pacific Coast Building Officials Conference of the International Conference of Building Officials

SECTION 209 – STREET LIGHTING AND TRAFFIC SIGNAL MATERIALS

209-1 GENERAL. *After last paragraph, ADD the following:*

The City maintains a Traffic Signal Qualified Product List (QPL) included Section 209-6 of the Special Provisions. The City Engineer shall not be precluded from sampling and testing products on this list. The manufacturer of the product on the QPL shall furnish the City Engineer a Certificate of Compliance in accordance with subsection 4-1.5 "Certificate of Compliance" of these Special Provisions for each type of material supplied.

Requests for substitutions shall be in accordance with subsection 4-1.6 "Trade Names or Equals" of the Standard Specifications and these Special Provisions.

209-2 REFERENCE SPECIFICATIONS. *After last paragraph, ADD the following:*

p) The State Standard Specifications and State Standard Plans

q) The MUTCD

209-3.3 Standards.
REVISE as follows:

209-3.3.3.1 General. *DELETE last paragraph.*

209-3.3.3.3 Aluminum Standards. *DELETE in its entirety.*

209-3.3.4 Fiberglass Standards. *DELETE in its entirety.*

209-3.5 Conduit.
REVISE as follows:

209-3.5.2 Rigid Metallic Conduit. *DELETE in its entirety.*

209-3.5.3 Galvanized Pipe. *DELETE in its entirety.*

209-3.5.4 Rigid Non-Metallic Conduit. *DELETE in its entirety and SUBSTITUTE with the following:*

Rigid non-metallic conduit shall conform to the requirements of the UL Standard for Rigid Non-Metallic Conduit, Publication UL651 and UL 651B, and the State Standard Specifications Section 86-2.05A. Rigid non-metallic conduit connections shall be of the solvent weld type. Unless otherwise indicated, the minimum trade size and type of conduit shall be:

a) All primary signal wiring and interconnect conduits at the intersection, including street crossings, between boxes on the corners, and cabinet entry conduits shall be 4 inch.

b) Conduits for service wiring, primary pole entry and signal interconnect between intersections, except street and driveway crossings, shall be 3 inch.

c) Conduits for advance DLC, extending beyond the BCR box, shall be 2-1/2 inch.

d) Conduits for Type 1 pole entry shall be 2 inch.

e) Conduits for pedestrian push button pole entry shall be 1-1/2 inch.

f) Conduit installed behind curbs, other than foundation entry, shall be schedule 40 PVC.

g) Conduit installed beneath roadway, driveways and foundation entry shall be schedule 80 PVC.

209-3.7 Pull Boxes. *After the 1st paragraph, ADD the following:*

a) Traffic signal wiring and interconnect boxes shall be No. 6 size (17½-inch x 30½-inch lid), per the State Standard Plans plan ES-8B, with a lightweight lid and "TRAFFIC SIGNAL" marking, unless otherwise noted on the plans.

b) Electrical service boxes shall be No. 5 size (13¾-inch x 23¼-inch lid), per the State Standard Plans plan ES-8B, with a lightweight lid and "EDISON" marking.

c) Communications electrical boxes and primary signal wiring boxes, for storage of wire and cable adjacent to traffic signal cabinets, shall be C40 size (23 7/8 -inch x 35 ½ – inch lid) with a lightweight polymer lid and "TRAFFIC SIGNAL" marking.

209-3.10 Traffic Signal Service.
REVISE as follows:

209-3.10.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

Service conduit shall conform to the requirements of the serving utility and shall not be less than 3 inches in diameter.

Services enclosures shall conform to the Irvine Traffic Signal Standard Plan TS-7, shall be from a manufacturer listed on the Irvine Traffic Signal QPL, and shall have the following characteristics:

a) Rating: NEMA 3X enclosure and UL listed assembly

b) Main breaker capacity: 100-amp

c) Type: Modified State Standard Type-II for mounting to the side of a traffic signal controller cabinet with integral Battery Backup System (BBS).

d) Size: Enclosure width and height shall approximate the sidewall dimensions of the intended traffic signal cabinet.

e) Construction: Aluminum

f) Color: The service enclosure shall be powder coated the same color as the traffic signal cabinet, Irvine beige #20475.

g) Photoelectric Control (PEC): The service shall have a PEC controlled safety lighting circuit with a replaceable PEC located in the Service provider section and a test switch located in the Agency accessible section. The PEC window shall have a protective shroud to shield the PEC from headlights and warning beacons. Output switching shall be accomplished by the use of a solid state contactor. No mercury contactors will be allowed.

h) Circuits: The service shall provide for the following circuits using independent breakers:

   a. Metered circuits shall be provided for traffic signal cabinet (40-amp), street name signs (15-amp), CCTV (15-amp), as well as two spare breakers (15-amp).

   b. Unmetered circuits shall be provided for safety lighting (30-amp) and control (15-amp).

i) Door Lock Mechanism: The service enclosure door shall have a 3-point locking mechanism with a Corbin No.2 lock.

j) Battery Backup System (BBS): The service enclosure shall house an integral battery backup system as defined in subsection 209-3.10.2.

209-3.10.2 Battery Backup System (BBS).

Service enclosure assemblies shall include an Agency approved BBS. The system shall consist of bypass switch, Power Transfer Relay, BBS inverter, and batteries as shown in the City of Irvine Traffic Signal Standards Plan TS-7. Approved batteries and required cabling shall be provided with the BBS system. The battery pack shall have four completely sealed, maintenance-free, absorbed glass mat (AGM), valve regulated lead acid (AGM/VRLA), deep cycle batteries designated specifically for traffic signal

applications. Each battery shall have a rated capacity of 78 to 82 ampere hours (Ah). BBS components shall be from a model approved on the Irvine Traffic Signal QPL.

209-4.4 HPS Luminaires.
REVISE as follows:

209-4.4.1 General. *2nd paragraph, DELETE in its entirety and SUBSTITUTE with the following:*

All luminaires shall conform to the State Standard Specifications Section 86-6.01. They shall include power doors, 90-degree cutoff optics, 250-watt Ignitron HPSV lamps with internal starter, and a shorting cap in the photoelectric unit receptacle.

209-4.7 Photoelectric Controls.
REVISE as follows:

209-4.7.3 Contactor. *DELETE in its entirety and SUBSTITUTE with the following:*

The contactor shall have contacts rated to switch the specified lighting load. The contact configuration shall be "normally open" unless otherwise specified in the Special Provisions. The contactor shall be the solid state type. No mercury type contactors will be allowed. The contactor shall have a minimum rating of 30A, per contact, inductive load.

209-5.3 Conductors and Cable.
REVISE as follows:

209-5.3.1 General. TABLE 209-5.3.1(A) *REVISE the following:*

Circuit	Signal Phase Or Function	Identification			Size
		Insulation Colors		Band Symbols	
		Base	Stripe		
Sign Lighting	Ungrounded Line	Orange	White	NBR	14
Grounded and Common	Sign Lighting	White	Orange	NBR	14

209-5.3.3 Interconnect Cable. *DELETE in its entirety.*

209-5.3.4 Fiber Optic Cable.
REVISE as follows:

209-5.3.4.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

Signal Interconnect Cable (SIC) shall consist of two separate fiber optic cables; one 60-fiber hybrid multi-mode/single-mode cable and one 12-fiber single-mode cable as defined herein and on the Irvine Traffic Signal Standards Plan TS-3. Agency approved materials are listed on the Irvine Traffic Signal QPL. The 60-fiber hybrid cable shall contain 24 strands of multi-mode fiber and 36 strands of single-mode fiber. Multi-mode optical fiber shall have a nominal core diameter of 62.5 microns and a nominal cladding diameter of 125 microns.

209-5.3.4.2 Performance. *DELETE in its entirety and SUBSTITUTE with the following:*

Optical fiber shall be manufactured by Corning and meet the following minimum performance specifications:

Table 209-5.3.4.2 (A)

Fiber Type	Test Wavelengths (nm)	Maximum Attenuation (db/km)	Minimum Bandwidth (MHz)
Multi-mode	850	3.5	200
	1300	1.0	500
Single-mode	1310	0.4	-
	1550	0.3	-

209-5.3.4.3 Construction. *DELETE in its entirety and SUBSTITUTE with the following:*

The fiber optic cables shall be constructed as shown on the Irvine Traffic Signal Standards Plan TS-3. The construction shall be non-armored, loose-tube, completely dielectric, and free of gel. Water-swellable tape and yarns shall be incorporated to inhibit water intrusion. The buffer tubes shall be 3.0 mm diameter, each containing 6 optical fibers. The color codes and order for tubes and fiber strands shall be as shown on the Irvine Traffic Signal Standards Plan TS-3.

209-5.3.4.5 Identification. *ADD the following:*

Fiber optic cables must have “Corning Optical Cable” or “Corning Optical Fiber” on the labeling to identify the cable or optical fiber manufacturer.

209-5.4 Controllers.
REVISE as follows:

209-5.4.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The traffic signal controller assembly shall be an Irvine ATMS 332L as defined herein and in accordance with the Irvine Traffic Signal Standards Plan TS-9C.

ADD the following subsection:
209-5.4.1.1 Signal Control Cabinet Assembly.

The signal control cabinet assembly shall include the following components:

a) 2070E controller as defined in subsection 209-5.4.6 of these Special Provisions
b) Detection and isolation subsystem as defined in subsection 209-5.4.7 of these Special Provisions
c) Load control subsystem as defined in subsection 209-5.4.8 of these Special Provisions
d) Power distribution subsystem as defined in subsection 209-5.4.9 of these Special Provisions
e) Signal monitor unit as defined in subsection 209-5.4.10 of these Special Provisions
f) Fiber Interconnect Unit (FIU) as defined in subsection 209-5.4.11 of these Special Provisions
g) Communications data network as defined in subsection 209-5.4.12 of these Special Provisions
h) Retractable document storage tray below the controller
i) Call input test panel as defined in subsection 209-5.4.13 of these Special Provisions
j) Removable manual control pushbutton with coiled cable
k) Front and rear door florescent lighting (downward reflectorized) with door-actuated switches

209-5.4.3.2 Steel Cabinets. *DELETE in its entirety.*

209-5.4.3.3 Stainless Steel Cabinets. *DELETE in its entirety.*

209-5.4.3.4 Aluminum Cabinets. *DELETE requirement c in its entirety and SUBSTITUTE the following:*

Interior and exterior cabinet surfaces shall be powder coat finished in a beige color, color number FS20475, Federal Standard 595C with a gloss level of 60 or higher.

ADD the following subsection:
209-5.4.4.5 Contactor.

The power distribution assembly shall utilize a solid state type contactor. No mercury type contactors will be allowed. The contactor shall have a minimum rating of 50A, per contact, inductive load.

209-5.4.5 Dual 5-Way Active Data Bridge. *DELETE this subsection in its entirety.*

ADD the following subsections:
209-5.4.6 Controller Unit.

The Irvine traffic signal controller unit shall be a 2070E controller as defined in the 2009 TEES. The controller unit shall be from a manufacturer approved on the Irvine Traffic Signal QPL. The controller shall include 2070-1B CPU, 2070-3B (8-line) display, 2070-4A power supply, 2070-2A I/O and 2070-7A serial communication modules.

Firmware: The 2070E controller shall be delivered pre-loaded with Siemens SEPAC 3.33SEd firmware, unless otherwise specified in the project specifications. A client site license certificate shall be provided with each controller.

ATMS cabinet installations shall include a factory produced category 5e network cable to interface the 2070E controller to the communications network switch.

209-5.4.7 Detection and Isolation Subsystem.

Input Files: Irvine ATMS 332L signal control cabinets shall include two input file assemblies. Each input file shall be a TEES 332L standard, 14-channel unit with PC backplane, from a manufacturer approved on the most recent SQPL under the "Model 332L Cabinets" section or as amended by the Irvine Traffic Signal QPL. The input file slots shall be allocated and labeled as shown on the Irvine Traffic Signal Standards Plan TS-9C.

Detectors and Isolators: Inductive loop detectors shall be Model 222, two channel units. DC isolators shall be Model 242, two channel units. AC isolators shall be Model 252, two channel units. Detectors and isolators shall be from a manufacturer approved on the most recent SQPL under the respective sections or as amended by the Irvine Traffic Signal QPL.

209-5.4.8 Load Control Subsystem.

Output and auxiliary files: Irvine ATMS signal control cabinets shall include one TEES 332L standard, 12-position output file and one 6-position auxiliary file. The load control subsystem shall be fully populated with sixteen (16) Model 200 Switch Packs and all relays. Switch Packs shall be compatible for use with a model 2010 SMU with plus features activated (PDC SSS-86-3 or equivalent). All load control subsystem components shall be from a manufacturer approved on the Irvine Traffic Signal QPL. The output and auxiliary file slots shall be labeled for phase and function.

209-5.4.9 Power Distribution Subsystem.

The main power distribution assembly shall be a TEES 332L standard PDA No. 2L unit. The PDA No. 2L shall be populated with two (2) Model 204 flashers and a high efficiency (>80% at ½ load) Model 206L or 206G power supply. All power distribution subsystem components shall be from a manufacturer approved on the most recent SQPL under the "Model 206L Power Supply Module" sections or as amended by the Irvine Traffic Signal QPL.

209-5.4.10 Signal Monitor Unit.

The Signal Monitor Unit (SMU) shall be a 16-channel, RMS voltage monitoring, model 2010 with red-yellow-green displays for all phases, event recording, and an Ethernet communications port. Each SMU installation shall include a program card and red monitor interface cable. Agency approved models are listed on the Irvine Traffic Signal QPL.

209-5.4.11 Fiber Optic Interconnect Unit.

Cabinet assemblies shall include a Fiber Optic Interconnect Unit (FIU) to provide for termination of fiber optic cable. The FIU shall be assembled from components listed on the Irvine Traffic Signal QPL, unless otherwise specified in the project plans. The exact quantities of components required shall be defined by the fiber charts provided by the Agency before signal turn-on.

209-5.4.12 Communication Data Network.

Data switches shall meet the minimum standards listed below and shall fully integrate with the Irvine 'CiscoWorks' network management and Cisco Secure Access Control systems. The components listed on the Irvine Traffic Signal QPL have been verified to meet or exceed the minimum standards.

Minimum required switch standards:

- Wire speed switching
- NEMA TS-2
- Operational temperature range of -40 to +70 degrees Celsius
- Mean Time Between Failure (MTBF) rating of at least 30 years
- Virtual LANs (VLANs)
- VLAN Trunking Protocol (VTP)
- IEEE 802.1q Trunking Protocol
- IEEE 802.1d Spanning Tree Protocol
- Simple Network Management Protocol (SNMP v1, v2 and v3)
- Internet Group Multicast Protocol (IGMPv3) snooping
- Remote management via internal web server
- Cisco Discovery Protocol (CDP)

209-5.4.13 Call Input Test Panel.

A call input test panel shall be installed at the uppermost position of the signal control cabinet rack, above the controller, facing the front. The panel shall include 12 tactile push button switches with ¼ inch minimum diameter head, one for each vehicle and pedestrian input phase. The panel shall be labeled to indicate the phase and function of each button. The push buttons shall be wired to the appropriate output terminals on the back of the input files, actuating the primary vehicle and pedestrian call inputs for each

phase. An in-line Molex connector shall be installed in the cabinet wiring harness within 12 inches of the panel to allow removal without cutting conductors.

209-5.5 Traffic Signal Faces and Fittings.
REVISE as follows:

209-5.5.5 Plastic Signal Sections. *DELETE in its entirety.*

209-5.5.10.2 Plastic Backplates. *DELETE in its entirety.*

209-5.5.11 Circular Light Emitting Diode (LED) Signal Modules. *DELETE this subsection in its entirety and SUBSTITUTE with the following:*

Traffic signal indications shall have light emitting diode (LED) modules conforming to the following standards and features:

- ITE VTCSH LED Circular Signal Supplement of June 27, 2005
- ITE VTCSH LED Vehicle Arrow Traffic Signal Supplement of July 1, 2007
- Uniform appearance
- Tinted lenses
- Intertek/ETL Certification: Certified full compliance to with ITE specifications by an independent 3rd party testing lab.

Agency approved models are listed on the Irvine Traffic Signal QPL.

209-5.6 Pedestrian Signal Sections.
REVISE as follows:

209-5.6.6 Pedestrian Signal Sections. *DELETE this subsection in its entirety and SUBSTITUTE with the following:*

Pedestrian indications shall have light emitting diode (LED) modules conforming to the following standards and features:

- PTCSI-2 LED Pedestrian Signal Specification of August 4, 2010
- Uniform appearance
- Countdown timer function to indicate remaining pedestrian clearance time
- Intertek/ETL Certification: Certified full compliance to with ITE specifications by an independent 3rd party testing lab.

Agency approved models are listed on the Irvine Traffic Signal QPL.

209-5.8 Detectors.
REVISE as follows:

209-5.8.2.2 Sensor Units. *ADD the following:*

ATMS cabinet applications shall use TEES standard Model 222 sensor units. Type-P cabinet applications shall use Model 262-FC sensor units.

209-5.8.2.3 Conductors. *REVISE as follows.*

DELETE specifications for Type 1 loop wire and Type C lead-in cable (DLC). Irvine Inductive loop installations shall use only Type 2 loop wire and Type B lead-in cable (DLC).

209-5.8.3 Magnetic Detectors. *DELETE this subsections in its entirety.*

ADD the following subsections:
209-5.8.4 Video Detectors.

209-5.8.4.1 General.

The term "video detector" shall be defined as a complete installation consisting of one or more video cameras, one or more video processors, extension modules and Input/Output (I/O) modules, a remote communications module, LCD display monitor, configuration device, mounting hardware, cabling, and any required interfacing equipment, providing the detection of vehicles and bicycles solely from visual image information. Agency approved models are listed on the Irvine Traffic Signal QPL.

209-5.8.4.2 System Components.

Video detection system boards shall be in a form factor designed for installation into NEMA TS-1 and TS-2 detector racks, as well as TEES standard 332L cabinet input files. The system shall also allow for a self-contained stand-alone operation by adding a shelf mountable rack and independent power supply. Modules shall be interchangeable between detector rack and stand-alone installations. The system modules shall meet or exceed NEMA TS1 environmental specifications.

Processor modules shall have one or more video camera inputs and four opto-isolated open collector outputs in a dual slot detector card form factor. Each processor module shall accommodate a minimum 20 detection zones per video input and a minimum of 20 detection outputs when used with expansion modules. ATMS cabinet applications shall require a single input processor module for each approach with four or less traffic lanes, or dual input processor module for each approach with five or more traffic lanes. Type-P cabinet applications shall require quad input processors.

Expansion modules shall have two opto-isolated open collector outputs in a single slot detector card form factor. Expansion modules shall interface with a processor module in a serial manner, allowing multiple expansion modules to connect together in series to provide additional outputs from detection zones. ATMS 332L cabinet applications do not require expansion modules unless otherwise defined in the project

specifications. ATMS dual 332 cabinet retrofit applications require at least one expansion module per approach.

Input/Output (I/O) modules shall provide multiple NEMA TS-1 and TS-2 compatible interfacing to the traffic signal controller. I/O modules shall interface with a processor module in a serial manner, allowing multiple modules to connect together, in series, with other system modules. Type-P cabinet applications require at least one I/O module.

A remote communications module shall provide access to the video detection system over an Ethernet network using Internet Protocol (IP) in a single or dual slot detector card form factor. The remote communications module shall provide connectivity for one to four processor modules through a single IP address. Remote connectivity shall be via both an embedded web browser interface and a remote Windows compatible application. Remote access shall be secured by the use of programmable user names and passwords. All applications require a remote communications module.

Video camera units shall include a color CCD camera, adjustable lens, NEMA IP67 rated housing, adjustable sun shield, and mounting hardware. Cameras shall have a minimum 470 TV lines of resolution, automatic white balance, and shall be capable of creating an acceptable video image at a 0.1 lux light level. Lenses shall have adjustable focal length, auto focus, and manual focus override. Cameras and lenses shall be preassembled, back focused, and installed in the housing prior to delivery. Video camera units shall have optional mounting hardware to accommodate pole, mast arm, or luminaire arm installations. Video camera units shall be mounted per Irvine Traffic Standards Plan TS-9F. All applications shall require one or two video camera units per approach.

Each video detection installation shall require a video monitor for configuration and maintenance use. ATMS cabinet applications shall include a rack-mounted, slide-out, LCD video monitor installed below the 2070E controller. Type-P cabinet applications shall include a shelf mounted LCD monitor.

Complete video detection systems shall include ground loop isolation for each camera, a power distribution and termination block, Belden 8281 or equivalent coaxial cable, and all additional wires, connectors, and hardware required to install a functional system per the manufacturer's instructions.

209-5.9 Pedestrian Push Button Assemblies. *DELETE this subsection in its entirety and SUBSTITUTE with the following:*

209-5.9 Push Button Assemblies.

All signalized intersections shall have ADA compliant pedestrian and bicycle push buttons as specified below:

a) PPB: New or modified pedestrian push buttons (PPB) shall be ADA compliant Accessible Pedestrian Signals (APS) with international symbol sign plates. The sign plates shall be per California MUTCD sign specifications.

b) BPB: New or modified bicycle push buttons (BPB) shall be ADA compliant, non-vibratory, Type B, with international symbol sign plates. The sign plates shall be with directional arrow and per California MUTCD sign specifications.

c) Special: When applicable, provide special height push buttons for equestrian trail street crossings.

d) ADA requirements: The pedestrian push button assembly shall be mounted such that the center of the PPB cap is located per ADA regulations or one meter (40") from the ground. Bicycle push buttons, and any other non-vibratory buttons, shall have a 2-inch diameter, stainless steel, ADA compliant push button caps.

e) Accessible Pedestrian Signals (APS): APS push button systems shall be the field wired type, employing pedestrian head mounted interface boards. Agency approved models are listed on the Irvine Traffic Signal QPL. Such units shall meet all MUTCD standards including a vibro-tactile push button, with an integrated arrow indicating crosswalk direction, an audible locator tone, programmable audible walk and clearance messages, and adjustable volume control. The ambient noise level sensor for volume control shall be co-located with the APS station, on the same pole. All programmable functions shall be accessible from ground level at the APS station.

ADD the following subsections:
209-5.10 Closed Circuit Television (CCTV).

Closed Circuit Television (CCTV) systems shall include a Pan/Tilt/Zoom (PTZ), dome style camera assembly, MPEG video encoder, wiring, connectors and all required hardware. Agency approved models are listed on the Irvine Traffic Signal QPL.

Video circuit wire shall be RG59/U coaxial cable, Belden 8241 or equivalent. Control circuit wire shall be three-wire 18 AWG cable, Belden 9493 or equivalent. Power circuit wire shall be three (3) individual THWN stranded 14 AWG conductors: black, white and green in color. An in-line Tron HEB-AA or equivalent water tight fuse holder with a 5-amp fuse shall be installed in the AC+ (black wire) circuit in the pull box adjacent to the camera mounting pole. An ICC model IC625SB8IV or equivalent modular surface jack shall be used to terminate the control circuit in the traffic signal cabinet. Data connections from the MPEG encoder to both the network switch and control termination modular jack shall be Category 5 or better cable with factory installed RJ-45 connectors. The cable color for the network connection shall be blue and the control connection shall be white.

209-5.11 Internally Illuminated Street Name Signs (IISNS).

Internally Illuminated Street Name Sign (IISNS) fixtures shall be 18-inch height and 72-inch or 96-inch length. Sign construction shall conform to State Standard Specifications Section 86-6.09 and State Standard Plan ES-7P for Type A signs, except as noted below. Agency approved manufacturers are listed on the Irvine Traffic Signal QPL.

Fixtures shall have two street name panels with 3M™ Scotchlite™ Series 4090 Diamond Grade DG³ reflective sheeting,. Lettering background overlay shall be 3M™ ElectroCut™ Film Series 1179 (Brown). Panels shall be covered with a UV protective, clear acrylic plastic film. Panels shall have aluminum frames compatible with approved fixtures. Design specifications for the IISNS panels are shown on the City of Irvine Traffic Signal Standards Plan 23.

Text font shall be "Highway Gothic, Series E," (12" upper case and 9" lower case), as adopted by U.S. Department of Transportation and Federal Highway Administration and California Manual on Uniform Traffic Control Devices (CA MUTCD).
Each panel shall have only one street name in a single line of text, unless otherwise approved by the City Engineer.

When opposing approaches have different street names, unique street name panels shall be used for each side of the intersection.

Street names placed on signs shall be approved through the City Planning Department before panels are ordered and installed.

Type IV photoelectric control shall be provided on each IISNS fixture.

The IISNS shall be illuminated by a solid-state high flux/high output ultra-high brightness white LED light engine panel (described in detail below), utilizing state-of-the-art high power LED's and highly efficient heat dissipating panel. This LED light panel shall be of adequate dimension to effectively uniformly light the sign face.

The following requirements shall be the minimum performance specifications for the LED Light Engine for illuminated street signs:

- The LEDs shall be white in color and utilize InGaN or UV thermally efficient technology.
- The LED light engine panel shall consist of adequate LED's to provide 200 nits (200 Candela per square meter) or an equivalent surface luminance of 660 lux over a –40º to +60ºC ambient temperature range.
- There shall be a sufficient quantity of white LED's to uniformly illuminate the viewing area with no more than a 20% deviation from any two points on the sign face in light output.
- Power use shall be 3-4 watts per square foot of viewing area. The failure of one (1) LED shall not reduce the light output by more than eight percent (8%) per

foot of sign face. If any one of the LEDs should fail it will not cause any other LEDs to fail.

- The LED light engine panel shall consist of a circuit board comprised of an insulated aluminum substrate, with a minimum thickness of 0.050 inch.
- Circuit conductors and LED attachment adhesive shall be minimally 90% silver to insure optimal electrical and thermal conductivity.
- The LED light engine panel face shall be entirely conformably coated with a 2 part urethane resin, no thinner than 0.002 inch (dry) to adequately protect the light engine from moisture and corrosion.
- The LED light engine panel shall be permanently attached to the LED panel and pass the following tests per NEMA standards:
    a) Thermal Shock Test: 85/-40ºC with 2-hour dwells for 5 cycles with a 2-hour presoak at –40ºC.
    b) Salt Spray and Soak Test: The LED panel shall endure 48 hours of continuous salt spray and 240 hours of salt water soak.
- All LED panels shall be burned-in for 24 hours and certified for compliance by the manufacture.
- The manufacturers name, date of manufacture and date of delivery along with a Quality Control tracking sticker shall be mounted on the inside of the LED light engine panel.
- The panel shall be painted white. Paint must meet GM4901 Specifications.
- All LED shall be warrantied for a period of (60) months from date of delivery.
- LED Light Engines shall be replaced or repaired if they fail to function as intended due to workmanship or material defects within the first sixty (60) months from the date of delivery.
- LED Light Engine that exhibit luminous intensities less than the minimum value specified herein within the first sixty (60) months from the date of delivery shall be replaced or repaired.

209-5.12 Emergency Vehicle Preemption (EVP).

209-5.12.1 General.

Emergency Vehicle Preemption (EVP) shall include encoded phase selectors, optical detectors, optical detector cable, card racks, and any wiring harnesses required to interface the phase selectors to the traffic signal cabinet to actuate the controller and monitor phase green status. EVP systems shall be GTT Opticom™ Priority Control System.

209-5.12.2 Components.

The encoded phase selector shall be a Global Traffic Technologies (GTT) model 764 with a model 768 auxiliary interface panel wired for green inputs. ATMS 332L cabinet installations shall include factory produced category 5e network cable to interface the 764 phase selector to the communications network switch.

The optical detectors shall consist of the following models.

a) GTT 722 Opticom™ Detector: Receives Optical signals from two directions and outputs two discrete electrical signals.

b) GTT 721 Opticom™ Detector: Receives Optical signals from two directions and outputs a single electrical signal.

c) GTT 711 Opticom™ Detector: Receives Optical signal from a single direction and outputs a single electrical signal.

When installing an EVP system in a Type P cabinet, the Contractor shall furnish and install a GTT model 760 card rack and all necessary electronics, wiring and devices required to interface with the traffic signal controller and the detector units in the controller cabinet. The Contractor shall also install an additional, City Furnished, shelf in the Type P cabinet to accommodate the GTT model 760 card rack, where the existing detection shelf does not have sufficient space.

The circuits from the optical detectors to the phase selectors shall use GTT model 138 optical detector cable. These circuits shall carry power to the optical detector from the phase selector and carry the optical detector signal to the phase selector.

209-5.12.3 Warranty.

At time of installation, the manufacturer shall warrant the system has been properly installed and is ready for operation. All component parts of the system shall be warranted to be free from workmanship and/or material defects during the first five (5) years from the date of shipment from the manufacturer. The system shall include an additional five-year maintenance coverage plan, providing repair or replacement at a fixed deductible charge to the Agency, for a total of ten (10) years of product coverage.

209-5.13 Lighted Crosswalks.

All signs and In-Roadway Warning Light (IRWL) units shall comply with current MUTCD requirements.

Lighted crosswalk systems shall provide an audible message when the crosswalk system is activated,

The system shall use ADA compliant push buttons, installed as defined in 209-5.9 “Push Button Assemblies” of these Special Provisions.

Conduits and pull boxes shall conform to 209-3.5 “Conduit” and 209-3.7 “Pull Boxes” of these Special Provisions.

ADD the following subsection:

209-6 IRVINE TRAFFIC SIGNAL QUALIFIED PRODUCTS LIST (Revised April 2012)

209-6.1 General. Specific models listed on this Qualified Products List (QPL) are approved by the Agency. Equivalency submittals for substitute products shall require submittal of specifications and/or samples, as deemed necessary by the Agency, to determine interchangeability, interoperability, and/or compatibility with existing hardware and equipment. Submittals shall be required before use or installation of any material not specifically listed or defined in the Special Provisions. Materials not specifically listed in the Irvine Traffic Signal QPL or Special Provisions by make and/or model shall comply with the characteristics defined in the Special Provisions or referenced base specifications.

Equipment equivalency submittals shall be coordinated with the City of Irvine Signal Operations and Maintenance lab**.** Such submittals will be reviewed for actual equivalency within 30 days of receipt and approved or declined by the City Engineer. Submittal for equivalency shall not guarantee acceptance. Only accepted equipment, as specified herein, shall be allowable for field installation. Approval of equivalency shall be conveyed to the submitter through the Agency representative in a written memo from the City Engineer modifying the specifications herein.

209-6.2 Reference Specifications. Except as modified herein and on the Plans, Specifications, and Special Provisions all components shall conform, where applicable, to the following:

a) State of California Department of Transportation, Qualified Products Lists (SQPL)

b) State of California Department of Transportation, Transportation Electrical Equipment Specifications (TEES)

c) The MUTCD

209-6.3 Pre-Qualified Materials and Equipment. Materials and equipment listed in Table 209-6(A) have been pre-qualified for use in the City of Irvine. Where no specific make is specified, or to determine the standards for equivalency, refer to the Irvine Technical Provisions specified in the reference column.

Table 209-6(A) Pre-Qualified Materials and Equipment

Material Type	Make	Model	Reference
Standards and Arms:			209-3.3
Conduit:			209-3.5
Pull Boxes:			209-3.7
#5 Box	Oldcastle/Christy	N30 Electrical Box	
	BES	C30 Electrical Box	
#5 Lid	Oldcastle/Christy	FL 30T	
	BES	PL30T	
#6 Box	Oldcastle/Christy	N36 Electrical Box	
	BES	C36 Electrical Box	
#6 Lid	Oldcastle/Christy	FL36T	
	BES	PL36T	
B40/C40 Box	Oldcastle/Christy	N40 Electrical Box	
	BES	C40 Electrical Box	
B40/C40 Lid	Oldcastle/Christy	SYN2436T	
	BES	PL40T	
Electrical Service for ATMS 332L Cabinet:			209-3.10
	Myers Power Products	B.M. No. 518636E	
Electrical Service for Type-P Cabinet:			209-3.10
Left Utility Entrance	Myers Power Products	B.M. No. 518606E	
Right Utility Entrance	Myers Power Products	B.M. No. 518642E	

Material Type	Make	Model	Reference
Side Mount BBS Cabinet			209-3.10.2
	Myers Power Products	B.M. No. 527341	
Communications/CCTV Cabinet			209-3.10.2.4
	Myers Power Products	B.M. No. 5051595 Irvine	
Battery Backup System:			209-3.10.2
	Myers	MP2000E	
Luminaires:			209-4.4
Conductors and Wiring:			209-5.3
Interconnect Cable:			209-5.3.3
60-Fiber Hybrid	Corning	060XU4-CP013D20	
12-Fiber SMF	Corning	012EU4-64701D20	
Traffic Signal Cabinet Assembly:			209-5.4
	SQPL Approved	332L (With Irvine Modifications)	
Controller Unit and Firmware:			209-5.4.6
2070E	Siemens/Eagle	8161-3500-000	
SEPAC 3.33SEd	Siemens/Eagle	MBU142471P333SED	
Input Files and Detector Units: SQPL			209-5.4.7
Output Files: SQPL			209-5.4.8
Load Switch Pack			209-5.4.8
	PDC	SSS-86-3	
Signal Monitor Unit:			209-5.4.10

Material Type	Make	Model	Reference
	EDI	2010ECLip	
Fiber Optic Splice Canister:			307-17.5.5.2
Splice Canister	Corning	SCF-6C22-01	
Splice Tray		SCF-ST-099	
Fiber Optic Interconnect Unit:			209-5.4.11
Term Housing	Corning	CCH-02U	
MM Coupler Panel		CCH-CP12-15T	
SM Coupler Panel		CCH-CP12-19T	
Fan-Out Kit		FAN-BT25-06	
MM ST Connector		95-000-51	
SM ST Connector		95-200-52	
Communication Data Network:			209-5.4.12
Ethernet Switch	Cisco	IE-3000-8TC	
FX Port Module		IEM-3000-8FM=	
Power Supply		PWR-IE3000-AC=	
Rack Mount		STK-RACKMNT-2955	
Vehicle and Pedestrian Signal Faces:			209-5.5
12”Red Ball	GE Lumination	DR6-RTFB-17A	
	Dialight	433-1210-003XL	
	Leotek	TSL-12R-LX-IL6-A1	
12”Amber Ball	GE Lumination	DR6-YTFB-17A-YX	
	Dialight	433-3230-901XL	
	Leotek	TSL-12Y-LX-IL6-A1	

Material Type	Make	Model	Reference
12”Green Ball	GE Lumination	DR6-GTFB-17A	
	Dialight	433-2220-001XL	
	Leotek	TSL-12G-LX-IL6-A1	
12”Red Arrow	GE Lumination	DR6-RTAAN-17A	
	Dialight	432-1314-001XOD	
	Leotek	TSL-12RA-IL6-A1	
12” Amber Arrow	GE Lumination	DR6-YTAAN-17A-YX	
	Dialight	431-3334-901XOD	
	Leotek	TSL-12YA-IL6-A1	
12” Green Arrow	GE Lumination	DR6-GTAAN-17A	
	Dialight	432-2324-001XOD	
	Leotek	TSL-12GA-IL6-A1	
PED Module	GE Lumination	PS7-CFF1-26A	
	Dialight	430-6479-001X	
	Leotek	TSL-PED-16-CIL-9	
Detection Systems:			209-5.8
Video Detection	Iteris	Vantage Edge 2	
Push Buttons:			209-5.9
Accessible Pedestrian Station	Polara	Navigator 4-Wire	
Closed Circuit Television (CCTV) System:			209-5.10.1
Camera System:	Pelco	Spectra IV:	
PTZ Dome		SD435-PG-E1	

Material Type	Make	Model	Reference
Arm	Pelco	IWM24-GY	
Pole Adapter	Pelco	PA402	
MPEG Encoder	Optelecom-nkf	Siqura C-60 E-MC/SA	
Power Supply	Optelecom-nkf	PSA-UN12DC with Ferrules	
Alternate Power Supply	FRIWO	1811971	
Internally Illuminated Street Name Signs (IISNS):			209-5.11
	NuArt		
	McCain		
Emergency Vehicle Preempt (EVP) System:			209-5.12
	GTT	Opticom	
Lighted Crosswalk System:			209-5.13
	Silicon Constellations		

SECTION 307 – STREET LIGHTING AND TRAFFIC SIGNAL SYSTEMS

307-1 GENERAL. *ADD the following:*

c) The State Standard Specifications and State Standard Plans

d) The MUTCD

307.1.1 Equipment List and Drawings. *ADD the following:*

Agency approved models are listed on the Irvine Traffic Signal Qualified Products List (QPL).

307-4 DAMAGE TO EXISTING OR MODIFIED SYSTEMS.
REVISE as follows:

307-4.1.1 Traffic Detectors. *REPLACE entire subsection with the following:*

307-4.1.1 Traffic Detection and Communication. The existing detection and communication systems shall be maintained at all times during construction. In the event of damage by the Contractor or any of his subcontractors as determined by the City Representative, the Contractor shall commence repairs immediately. The Contractor shall replace and restore to operation any damaged detector (inductive loop or other) within 24 hours after damage occurs. Repairs to damaged signal interconnect cable (SIC) shall be completed within 10 working days. The City shall have the option to complete necessary repairs and charge the responsible Contractor for any associated repair costs, pursuant to Sec. 6-3-317 of the City Municipal Code.

307-12 CONDUIT
REVISE as follows:

307-12.1 General. *7th paragraph, DELETE the 1st and 2nd sentences and SUBSTITUTE with the following:*

Conduit types and sizes for each application shall be as specified in 209-3.5 “Conduit” of the Standard Specifications and these Special Provisions.

307-12.2 Rigid Metallic Conduit. *DELETE in its entirety.*

307-12.3 Galvanized Pipe. *DELETE in its entirety.*

307-13 WIRES, CONDUCTORS AND CABLES
REVISE as follows:

307-13.1 General. 5th paragraph, DELETE the 1st sentence and SUBSTITUTE with the following:

Each multi-conductor cable shall be labeled in each pull box and at the signal cabinet per the State Standard Specifications Section 86-2.08D, indicating the signal standard to which it is connected.

307-13.2 Splices. 1st paragraph, DELETE the 3rd sentence and SUBSTITUTE with the following:

Each multi-conductor cable shall be continuous from the signal cabinet to the terminal block on the signal standard it services. No splicing of multi-conductor cable shall be permitted.

307-14 SERVICES
REVISE as follows:

307-14.3 Service in Vaults. After the last paragraph ADD the following:

The copper service feed wires from the service pull box to the electrical service shall have an Agency furnished tag at both ends identifying them as "City of Irvine Service Conductors" to power company officials.

307-16 STREET LIGHTING CONSTRUCTION
REVISE as follows:

307-16.8 Luminaries.
307-16.8.1 General. After the last paragraph, ADD the following text:

Luminaires mounted to traffic signal standards shall have an in-line 5-amp fuse in a fuse holder (Tron HEB AA) within the pull box closest to the corresponding traffic signal pole foundation per the State Standard Specifications Section 86-2.095, "Fused Splice Connectors."

307-17 TRAFFIC SIGNAL CONSTRUCTION
REVISE as follows:

307-17.1 General. *After the last paragraph, ADD the following:*

Agency approved materials are listed on the Irvine Traffic Signal Qualified Products List (QPL).

Per the State Standard Specifications Section 86-1.07, the initial turn-on shall be made between the hours of 9:00 a.m. and 2:00 p.m. Turn on shall occur on any working day except Friday or the day preceding a legal holiday. Prior to turn-on, all equipment as shown on the plans shall be installed and operable including pedestrian signals, pedestrian push buttons, vehicle detectors, communications to the ITRAC center,

lighting, signs and pavement delineation. All louvers, visors and signal faces shall be directed to provide maximum visibility.

The City Engineer shall be notified at least three working days prior to the intended traffic signal turn-on. The Contractor shall not proceed with the turn-on without the presence of the City Engineer or his representative. The Contractor shall arrange to have a signal technician, qualified to work on the controller and employed by the traffic signal controller cabinet manufacturer or his representative, present at the time of turn-on to verify operation of the equipment.

Pre-installation configuration and testing: Traffic signal cabinet assemblies, 2070 controllers, network communications switches, and MPEG video encoders shall be delivered to the Agency lab at least five (5) working days before installation for configuration and testing by Agency personnel. The Agency lab is located at 6427 Oak Canyon Road, Building 3, Irvine, CA 92618. Delivery and pick-up of equipment for pre-installation testing can be coordinated through the City of Irvine Signal Operations and Maintenance Division at 949-724-7649.

307.17.3 Pull Box Covers. *REPLACE entire subsection with following:*

Traffic signal pull box covers shall be marked “TRAFFIC SIGNAL”, except electrical service pull box covers, which shall be marked “EDISON”. All markings shall conform to the State Standard Specifications Section 86-2.06B, “Cover Markings.”

307-17.4 Conduit. *REPLACE entire subsection with following text:*

Conduit work shall conform to the provisions in subsection 307-12 of the Standard Specifications, the State Standard Specifications Section 86-2.05, "Conduit," and these Special Provisions:

a) Traffic signal conduits located beneath roadway shall be installed at a minimum depth of 42-inches below finished surface or 6-inches below the structural section, whichever is deeper, but no more than 66-inches. Traffic signal conduits located behind curb and gutter shall be installed at a minimum depth of 30-inches below top of curb.

b) All new intersections shall include separate conduits for Signal Interconnect Cable (SIC) and signal wiring (including DLC). Sharing of the DLC and CCTV wiring in the same conduits with SIC is allowed on intersection modifications where conduit fill is less than 40%.

c) All interconnect conduits shall contain a No. 10 green insulated solid copper trace wire. All other conduits shall contain a bare, No. 8 solid copper bonding wire, which shall be soldered and crimped in each pull box per the State Standard Specifications Section 86-2.09D, and connected to the ground bar in the traffic signal cabinet.

d) Conduit fill shall not exceed the NEC maximum of 40% for conduits with three or more conductors.

e) The ends of all conduits shall have Carlon, or approved equal bell fittings with conduit sealing compound to prevent dirt and rock from entering conduit.

f) All empty conduits for future conductors shall contain "mule tape" pull rope per the State Standard Specifications Section 86-2.05C.

g) All “Pot-holing” within the street to determine subsurface utility locations shall be back-filled and patched to the specifications on Irvine Standard Plan No. 223, “Utility Trench Repair.”

307-17.5 Wiring, Conductors, and Cables
REVISE as follows:

307-17.5.1 General. *After the last paragraph, ADD the following*

Whenever conductors or cables are installed or replaced in a conduit, the ends of the conduit shall have sealing compound applied to inhibit dirt and rock intrusion.

307-17.5.2 Conductor Splicing and Termination. *After the last paragraph, ADD the following*

Splicing and termination of traffic signal conductors shall be pursuant to the State Standard Specifications Section 86-2.09D, “Splicing and Terminations.” Line item E of the State Standard Specifications Section 86-2.09D shall not apply.

All individual conductors shall be labeled in the cabinet per NEMA numeric format. Conductor insulation colors and wire sizes shall be in accordance with the State Standard Specifications Section 86.2.08A, “Conductor Identifications,” except as required herein.

The conditions of this subsection shall apply for all new traffic signal installations and modifications where entire signal conductor legs are re-pulled.

New traffic signal field conductors shall be multi-conductor signal cable and individual wires as specified herein and in accordance with the State Standard Specifications Sections 86-2.08D, “Signal Cable,” and 86-2.08B, “Multiple Circuit Conductors.”

New traffic signal field conductors used for phase indications and buttons shall be State standard 12CSC, 5CSC, and 3CSC multi-conductor signal cable. IMSA cable shall not be utilized. Each signal cable shall be continuous from the signal cabinet to the terminal block on the signal standard it services. No splicing of signal cable shall be permitted. The signal cables shall be labeled in each pull box, per the State

Standard Specifications Section 86-2.08D, and at the signal cabinet, indicating the signal standard to which it is connected.

Primary and secondary signal standards shall receive one 12CSC cable for vehicle and pedestrian indications and one 3CSC cable for each button circuit. An additional 5CSC cable shall be provided for each additional vehicle phase serviced by the pole. All 12 CSC cable conductors shall terminate on the terminal block. The 3CSC cables shall service the buttons directly. The 12CSC conductor utilization shall be in accordance with the State Standard Specifications Section 86-2.08D, with the black conductors reserved as spares. The 3CSC conductor utilization shall be: blue/black stripe for pedestrian buttons, blue/orange stripe for bike buttons, and white/black stripe for common.

Pedestrian signal standards shall receive one 5CSC and one 3CSC cable. The 5CSC cable shall service the pedestrian indication and the 3CSC cable shall service button circuits.

Conductors and cables shall be as defined in the State Standard Specifications Section 209-5.3, “Conductors and Cable.” Conductors for internally illuminated street name sign (IISNS) and Safety Lighting circuits may be spliced to branch the circuits as they progress around the intersection.

Additional conductors must be installed for vibratory pedestrian button systems, CCTV, and emergency vehicle preemption systems. Please refer to subsections 209-5.9, 209-5.10 and 209-5.12 of these Special Provisions for additional conductor requirements of these systems.

When either new conductors are added or existing conductors are removed from existing conduits, all existing conductors shall be removed per the State Standard Specifications Section 86-2.09B, “Installation.” The conduit shall be cleaned as provided in the State Standard Specifications Section 86-2.05C, “Installation.” Both old and new conductors, as shown on the plans, shall be pulled into the conduit as a unit, unless otherwise approved by the City Engineer.

307-17.5.4 Interconnect.
REVISE as follows:

307-17.5.5 Fiber Optic Cable
REVISE as follows:

307-17.5.5.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

All Signal Interconnect Cable (SIC) installations shall include fiber optic cables as defined in subsection 209-5.3.4, “Fiber Optic Cable,” of these Special Provisions, and a solid No. 10 green insulated copper trace wire.

307-17.5.5.2 Installation. *DELETE in its entirety and SUBSTITUTE with the following:*

Signal Interconnect Cable (SIC) shall be continuous and unspliced between cabinets.

SIC Pull Boxes: SIC conduit shall be installed in pull boxes using 45-degree, UL approved elbows. These elbows shall be placed as far apart in the pull box as possible, oriented in the direction of the cable, and offset to one side to facilitate cable pulling and coiling (City of Irvine Traffic Signal Standards Plan 16). Approximately 10-feet of SIC shall be coiled inside of each pull box.

Slack and Termination: A minimum of 50 feet of SIC slack shall be coiled and stored in the communications electrical boxes (B40BOX or No. 6 pull box) adjacent to the cabinet foundations at each end of a run. SIC shall be terminated in the traffic signal cabinet and splice canister in the B40 Box per the City of Irvine Traffic Signal Standards Plans TS-10A and TS-10B. When re-terminating existing SIC, sufficient cable slack shall be pulled from adjacent pull boxes to allow for terminations. If necessary, the slack will be obtained from as many pull boxes in the run required to re-terminate the cable to specifications.

Cleaning: Prior to any termination or splicing of fiber optic cables, buffer tubes, fibers, etc. shall be cleaned with an acceptable industry cleaning agent to remove any gel or flooding materials used in the cable structure. Cabinet and surrounding area shall be cleaned of any debris and or gel flooding once termination procedure is completed.

Installation and Testing: Fiber optic SIC shall be installed, spliced, terminated, and tested in accordance with NECA/FOA 301-2009 standards. These standards are available for purchase from the National Electrical Contractors Association Web site at: http://www.necanet.org/store/products/index.cfm/NECA%20301%20(R-09). This includes pre-installation and post installation testing of the cable.

a) Pre-installation testing shall be performed on all fibers using an Optical Time-Domain Reflectometer (OTDR) to confirm no existing damage to the existing cable. The Contractor shall perform such testing on-site prior to completing termination in the communication cabinet.

b) Post-installation testing of all terminated fibers shall be performed using launch cables at both ends as specified in NECA/FOA 301-2009 Annex B.3. The Contractor shall perform such testing on-site after all termination and splicing work is completed.

Test results: Test results, in the form of pre-installation test data and post-installation OTDR traces, shall be provided to the Agency Representative in a bound hard copy format along with the electronic file and appropriate viewing software, for review and approval after installation and splicing/termination work are completed. The pre-installation test results shall be in the form of a spreadsheet detailing the length and

loss/kft for each fiber as well as the parameters used for testing. The post-installation OTDR traces shall clearly show each continuous fiber, the connectors on each end, and the loss for each event. An Agency representative shall approve the test results before final acceptance.

307-17.6 Signal Heads.
REVISE as follows:

307-17.6.1 General. *3rd sentence, DELETE in its entirety and SUBSTITUTE the following:*

Traffic signal indications shall be 12-inch diameter using Light Emitting Diode (LED) indications as defined in 209-5.5 of these Special Provisions. Pedestrian indications shall be LED with a countdown timer function as defined in 209-5.6 of these Special Provisions. All 1A pole mounted traffic signal heads shall be Types TV-1-T or TV-2-T, and pedestrian heads shall be clamshell side-mount Types SP-1-CS or top-mount TP-1-T.

Vehicle and pedestrian heads shall be visible from all normal operational directions, without obstructions.

307-17.7 Vehicle Detectors
REVISE as follows:

307-17.7.1 General. *ADD the following:*

Side Street Detection: Where a single phase is used on a side street approach, and both through (right turn) and left turn lanes are present, the left turn lane shall use phase 3 and/or 7 detection channels to facilitate future independent left turn phasing. Left turn lane detection shall output to the associated through phase.

Side Street Right Lane Presence: To facilitate right turn delay functionality in the 2070 controller, the 5 phase 4 and 5 phase 8 channels shall be exclusively used to serve the right-most stop bar detection loops on side street approaches. These detection channels shall not be combined with any other presence channels.

Single Lane/No Advance: Where a side street has only one lane of traffic, and no advance detection is installed, the loop configuration will consist of four Type-E loops or video detection zones. The front pair, closest to the stop bar, shall use channels 5 phase 4 or 5 phase 8 and be configured for delay capability as noted above. The back pair, farthest from the stop bar, shall use channels 4 phase 4 or 4 phase 8, configured as standard presence detection.

307-17.7.3 Inductive Loop Detectors. REPLACE entire subsection with the following:

Loop Detectors: Inductive loop detection shall be utilized only for advance detection on all new traffic signals. Modifications involving replacement of less than 50% of existing presence (limit line) detection loops may retain inductive loop detectors unless otherwise specified in project plans or at the direction of the City Engineer.

Loops: All detection loops shall be 6-foot-diameter Type E installed per the State Standard Plans ES-5A and ES-5B using Type 2 loop wire, unless otherwise approved by the City Engineer. Elongated, oval shaped, loops may be installed to accommodate lanes over 12 feet in width.

Loop Installation: Detector loops shall be installed in a saw-cut slot with a minimum of 3-inches depth below the finished pavement surface, and minimum 2-inches of sealant covering the loop wires (Irvine Traffic Signal Standards Plan TS-8A). All detection loops shall be sealed with hot melt adhesive.

Series Connection: Where two or more loops are to be on one channel of detection, or to a single DLC, the loops shall be connected in series.

Advance Loops: Advance detection loops shall be a single loop per lane with one DLC per loop. Each advanced loop shall be assigned to a separate detection channel. Each advance loop shall have four turns where the total length of the DLC is less than 500 feet; otherwise, five turns are required.

Advance Loop Placement: Advance detection shall be provided on streets where the approach speeds are 25 mph or greater. Separate loops shall be placed in each through lane. Advance loop setback requirements from intersections, based on approach speeds, are shown in Table 307-17.7.3 (A).

Table 307-17.7.3 (A) – Advance Detector Loop Setback
CA-MUTCD Table 4D-101

Approach Speed (mph)	Setback (feet from limit line)
25	105’
30	140’
35	185’
40	230’
45	285’
50	345’
55	405’
60	475’

Presence Loops (less than 50% replacement): There shall be a maximum of two through loops for each presence detection channel. (Irvine Traffic Signal Standards Plans TS-8A, TS-8D, and TS-8E). For each through lane up to 12 feet in width, there shall be two, 6-foot diameter loops placed ten feet apart, in the direction of travel. The City Engineer shall approve all other loop sizes. Each presence loop shall have 3 turns.

Presence Loop Placement (less than 50% replacement): All presence loops shall be installed with the leading edge positioned one foot before the limit line, or the stop bar, in the direction of travel. All presence loop home run detection wires shall be located ahead of the loops, within the crosswalk. The left-turn lanes shall have four loops, with the front two loops and the back two loops on separate DLC's (Irvine Traffic Signal Standards Plan TS-8A).

307-17.7.4 Magnetometer Detectors. DELETE subsection in its entirety and SUBSTITUTE with the following:

307-17.7.4 Video Detectors. All installations shall include video processor(s), a remote communications module, surge protection and video isolation assembly, one to four cameras, and sufficient extension modules to satisfy the presence detection requirements of the intersection, as defined in 209-5.8.4 "Video Detectors" of these Special Provisions.

ATMS 332L Cabinets: Single or dual video input processors shall be installed in slots I1-2, I3-4, I5-6, and I7-8. The remote communications module shall be installed in slots I9-10. A rack mount LCD monitor drawer shall be installed below the 2070E controller. The surge protection and isolation assembly shall be installed in place of TB0, above the power panel.

ATMS Dual 332 Cabinets: Single or dual video input processors shall be installed in the even phase slots I3-4, I7-8, J3-4, and J7-8. Dual channel extension modules shall be installed in the odd phase slots I1, I5, J1 and J5. The remote communications module shall be installed in slots I9-10. A rack mount LCD monitor drawer shall be installed below the 2070E controller. The surge protection and isolation assembly shall be installed in place of TB0, above the power panel.

Type-P Cabinets: One each quad video input processor, power supply, 32 channel I/O, and remote communications module shall be installed in a stand-alone rack placed on a shelf. The I/O module inputs and outputs shall be wired to the controller interface panel per the manufacturer's instructions. A shelf mounted monitor shall be installed on the controller shelf.

Temporary Video Detection: Where temporary detection is required due to road construction activity or extended overhead wiring, video detection shall be installed before construction commences to ensure continuous operation of the presence

detection. After construction, any wireless camera systems shall be removed and the entire intersection presence detection shall be converted to wired video detection per the above specifications. All temporary wireless hardware shall become property of the Agency after wired conversion is completed.

307-17.7.5 Magnetic Detectors. DELETE subsection in its entirety.

307-17.9 Controller Slabs. DELETE subsection in its entirety and SUBSTITUTE with the following:

ADD the following subsections:
307-17.10 Closed Circuit Television (CCTV) System.

307-17.10.1 Approved Traffic Signal Location.
All new traffic signal installations on any roadway shall include, as part of the standard safety systems, the installation of CCTV camera equipment, MPEG CCTV transmission equipment, and any additional wiring or hardware required to support an operational CCTV system. This requirement shall apply unless otherwise specified by the City Engineer. The approved location for new CCTV camera installations at traffic signals shall be the primary pole farthest from the traffic signal cabinet corner, unless otherwise specified by the City Engineer.

307-17.10.1.1 Installation. The CCTV system shall be installed per details on Irvine Traffic Signal Standards Plan TS-6, "CCTV System Mounting and Placement." All new or modified CCTV systems shall include MPEG CCTV transmission equipment as specified in 209-5.10, "Closed Circuit Television (CCTV)," of these Special Provisions, installed per Irvine Traffic Signal Standards Plan TS-11A (ATMS cabinets) or TS-11B (Type P cabinets). Service connections shall be provided inside the camera arm access cover. The video service connection shall be a female to male BNC connection with the female connector on the camera side. The control service connection shall utilize three, 18 AWG wire nuts on each of the white (+), black (-), and red (ground) conductors. The service connections shall have sufficient slack to be removed from the cover for usage, inspection, and repair.

307-17.10.1.2 Power. New CCTV Power: Power for CCTV systems at new intersections, shall consist of three individual No. 14 THWN stranded wires (black, white, and green), installed (un-spliced) from the designated 15-amp breaker in the service to the CCTV camera arm. A 5-amp fuse and holder shall be installed inline with the black wire (AC hot) in the pull box adjacent to the pole where the CCTV camera is mounted. The power wires shall be routed through the pole and terminated in the CCTV housing per the manufacturer's instructions.

Retrofit CCTV Power: Power for a CCTV retrofit system at an existing intersection shall conform to the above specification for locations with ATMS cabinets or Type P cabinets with BBS services. For a retrofit installation at a Type P cabinet location without a BBS service, the CCTV power shall be spliced into the IISNS circuit hot and

neutral conductors in the pull box adjacent to the pole where the CCTV camera is mounted, unless otherwise specified. The green (ground) wire shall be crimped and soldered to the bare copper bond wire in the pull box.

307-17.10.1.3 Transmission Equipment. Standard MPEG transmission components required for CCTV camera installations are defined in 209-5.10, "Closed Circuit Television (CCTV)," of these Special Provisions. The transmission equipment shall be installed and tested for operation by the Contractor to the satisfaction of the Agency Representative before acceptance of the system. Irvine Traffic Signal Standards Plans TS-11A and TS-11B depict typical communication systems installations, including the MPEG encoder unit.

MPEG units shall be delivered to the Agency lab at least five (5) working days before installation for testing and programming by City personnel as described in 307-17.1, "General," of these Special Provisions.

307-17.10.2 Approved Roundabout Location.
All new traffic roundabout or traffic circle installations on any roadway shall include, as part of the standard safety systems, the installation of CCTV camera equipment, MPEG CCTV transmission equipment, and any additional wiring or hardware required to support an operational CCTV system. The approved location for the CCTV camera installation shall be on a Type 15TS pole and be on the outer perimeter of the roundabout or traffic circle, unless otherwise specified by the City Engineer.

307-17.10.2.1 CCTV Installation. CCTV systems shall be installed per Section 209-5.10 Closed Circuit Television (CCTV) and per details on Irvine Traffic Signal Standards Plan TS-7A "CCTV Communications / Service Meter Cabinet".

307-17.10.2.2 Communication Cabinet. Communication cabinet shall be with TBS terminal block, AC neutral ground bus and an equipment ground bus.

a) Communication cabinet components shall include, but not limited to:
    1) Fiber Interconnect Unit (FIU) wall mounted;
    2) Power distribution center (Grainger Item No. 1BP98 or equal);
    3) Communications data network;
    4) MPEG video transmission equipment;
    5) 14" x 17" Plywood Back Board

The communication cabinet components shall be installed in accordance with manufacturer supplied documentation or as depicted in the Irvine Signal Standard Plan TS-7A.

307-17.10.2.3 Communication Cabinet Foundation. Communication cabinet shall be installed as shown in the Irvine Signal Standard Plan TS-7A.

307-17.10.2.4 Electrical Service

Services enclosures shall conform to the Irvine Traffic Signal Standard Plan TS-7A, shall be from a manufacturer listed on the Irvine Traffic Signal QPL, and shall have the following characteristics:

a) Service conduit shall conform to the requirements of the serving utility and shall not be less than 3 inches in diameter.

b) Rating: NEMA 3X enclosure and UL listed assembly

c) Construction: Aluminum

d) Type: Myers B.M. # 5051595Irvine

e) Color: The service enclosure shall be powder coated Irvine beige #20475.

f) Circuits: The service shall provide for the following circuits using independent breakers:

   a. Main breaker capacity: 100-amp

   b. Metered circuits shall be provided for CCTV (15-amp), Communications equipment (15-amp), Street light (15-amp), as well as one spare breaker (15-amp).

   c. Six (6) outlet power strip to be mounted on plywood board to allow for equipment power.

307-17.10.2.5 CCTV Power. Power for CCTV systems shall consist of three individual No. 14 THWN stranded wires (black, white, green), installed (un-spliced) from the designated 15-amp breaker in the service to the CCTV camera arm. A 5-amp fuse and holder shall be installed in-line with the black (AC hot) in the pull box adjacent to the pole where the CCTV camera is mounted. The power wires shall be routed through the pole and terminated in the CCTV housing per manufacturer's instructions.

307-17.10.2.6 Communication Equipment. Communication equipment shall be provided per provisions of Section 209-5.4.11 Fiber Optic Interconnect Unit and Section 209-5.4.12 Communication Data Network.

307-17.10.2.7 Transmission Equipment. Transmission equipment shall be provided per provisions in Section 307-17.10.1.3 Transmission Equipment.

ADD the following subsection:
307-17.11 Emergency Vehicle Preemption (EVP) System. The EVP shall be installed in accordance with manufacturer supplied documentation. The encoded phase

selector shall be installed in the input file slots J-11 (A, B) and J-12 (C, D) for ATMS applications. EVP channels A, B, C, and D shall be utilized for phases 2, 6, 4 and 8, respectively.

When installing an EVP system in a Type P cabinet, the Contractor shall furnish and install a card rack and any electronics, wiring and devices required to interface with the traffic signal controller and the detector units in the controller cabinet. The Contractor shall also install an additional shelf in the Type P cabinet to accommodate the card rack, where the existing detection shelf does not have sufficient space.

104.4 REVISION PROCESS

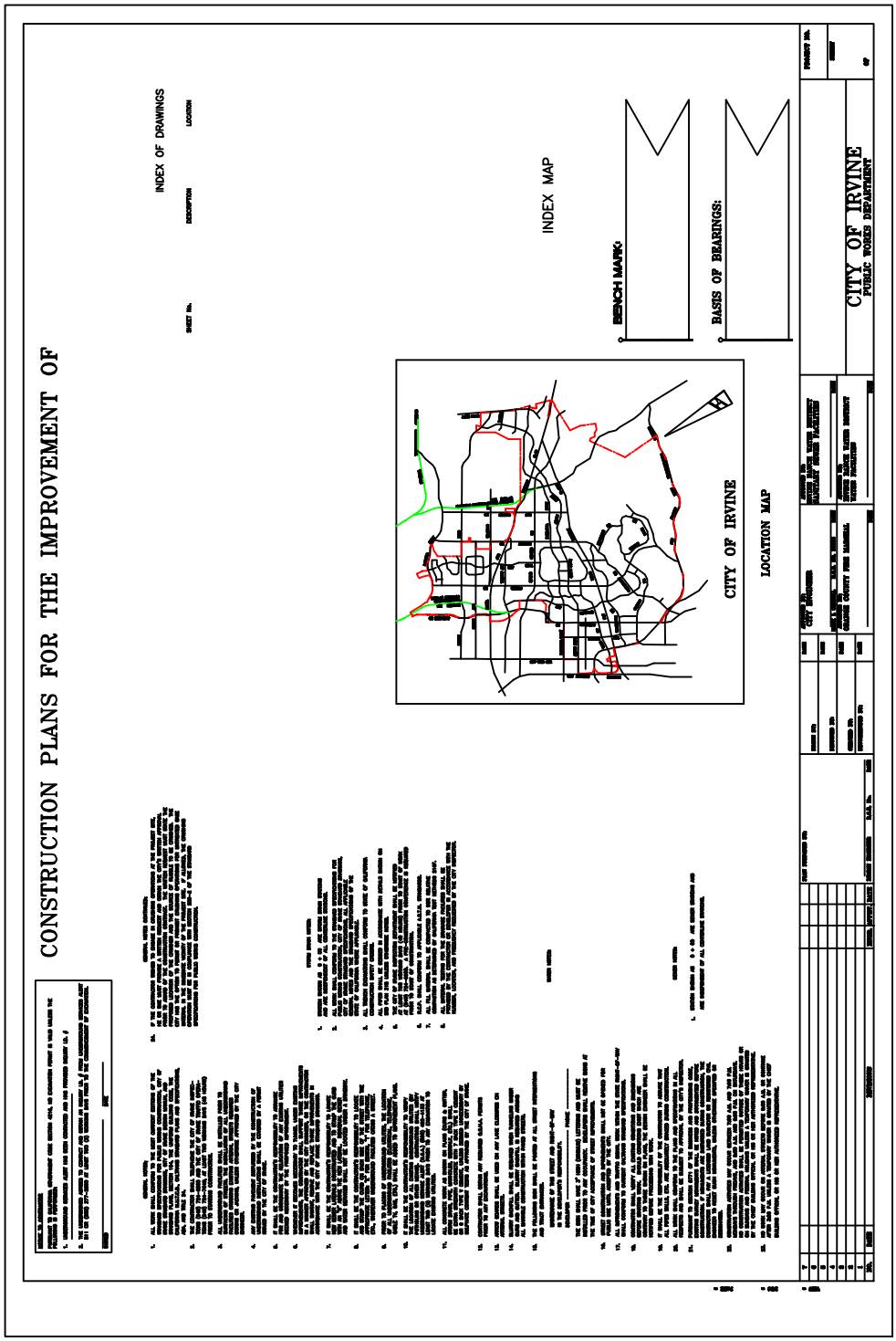
All users are encouraged to suggest revisions to this document. Suggestions should be submitted in writing to the City of Irvine, Signal Operations and Maintenance, for consideration. Each suggestion will be reviewed and responded to. Suggestions meeting the approval of the City Engineer will be incorporated in the next revision of this document.

Equipment equivalency submittals shall be coordinated with the City of Irvine maintenance and testing lab. Such submittals will be reviewed for actual equivalency within 30 days of receipt and approved or declined by the City Engineer. Submittal for equivalency shall not guarantee acceptance. Only accepted equipment, as specified herein, shall be allowable for field installation. Approval of equivalency shall be conveyed to the submitter, and the City inspection department, in a written memo from the City Engineer modifying the specifications herein. December 31st is the cutoff date to have submittals approved for the next revision of these standards.

104.5 ATTACHMENTS AND TRAFFIC SIGNAL PLANS

CITY OF IRVINE

PUBLIC WORKS



STANDARD CITY TITLE SHEET

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

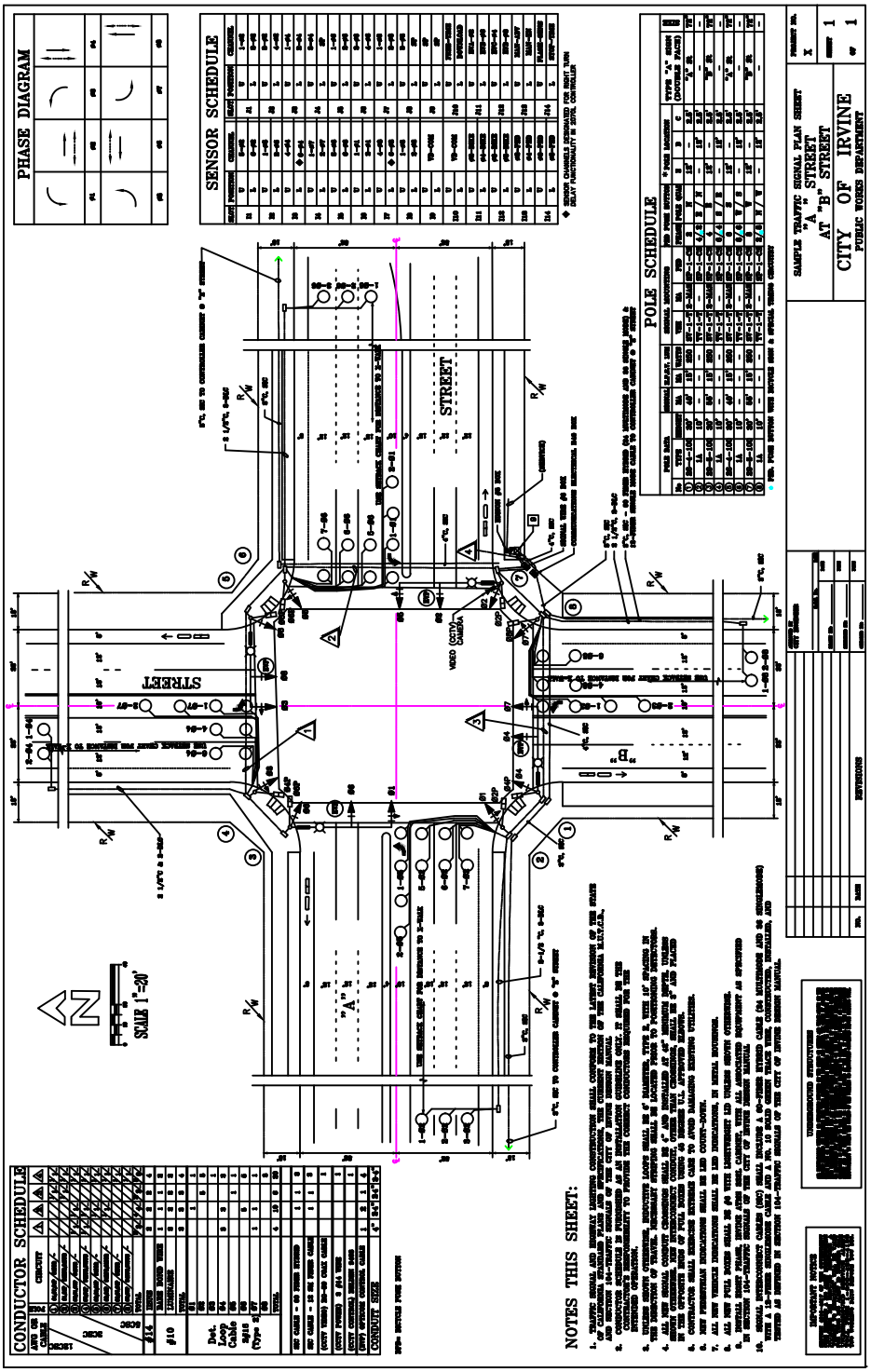
AUGUST 2013
DATE

ATTACHMENT 1

SHEET 1 OF 1

CITY OF IRVINE

PUBLIC WORKS



SAMPLE TRAFFIC SIGNAL PLAN

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

ATTACHMENT 2

SHEET 1 OF 1

CITY OF IRVINE
PUBLIC WORKS

AutoCAD - Layers

LAYER NAME	LINE WIDTH	COLOR	PATTERN	LINE TYPE	USE
0	1.20	WHITE		CONTINUOUS	
CL	0.25	MAGENTA		CL	Centerlines, Stationing, Station Numbers, "CL" text
CURB	0.60	GREEN		CONTINUOUS	Curbs (curbs to be removed can be show n on a different layer)
CUTLINE	0.20	140		CONTINUOUS	Sheet Cutline
DEFPOINTS	0.00	WHITE		CONTINUOUS	
DIMS	0.30	CYAN			Dimensions
EX-CO	0.30	8		CONDUIT	Existing Conduit
EX-EQ	0.25	MAGENTA		EXISTING	Existing Equipment, Controller Boxes, Loops, Pullboxes, Signal Equipment, Signs, Ped. Ramps
EX-ST	0.25	MAGENTA		EXISTING	Existing Striping, Pavement Legends
HATCH	0.25	40		CONTINUOUS	All Hatchw ork
PROP-CO	1.00	WHITE		CONDUIT	Proposed or New Conduit
PROP-EQ	0.70	BLUE		CONTINUOUS	Proposed or New Equipment, Controller Boxes, Loops, Pullboxes, Signal Equipment, Signs, Ped. Ramps
PROP-ST	0.30	CYAN		CONTINUOUS	Proposed or New Striping, Pavement Legends
RW	0.35	RED		RW	Street Right-of-Way Lines
SW	0.25	11	253	CONTINUOUS	Sidew alks, Ped. Ramps, Drivew ays
TABLE-1	0.30	CYAN		CONTINUOUS	Schedules, Diagrams, Border
TABLE-2	0.50	YELLOW		CONTINUOUS	Schedules, Diagrams, Border
TABLE-3	1.00	WHITE		CONTINUOUS	Schedules, Diagrams, Border, and Street Names
TEXT	0.50	YELLOW		CONTINUOUS	General Notes, Construction Notes
UTIL-1	0.20	9	254	DASHED	Utilities (Single Line)
UTIL-2	0.20	9	254	EXISTING	Utilities (Catch Basin, Storm Drain, etc.)

TRAFFIC SIGNAL - AUTOCAD LAYERS

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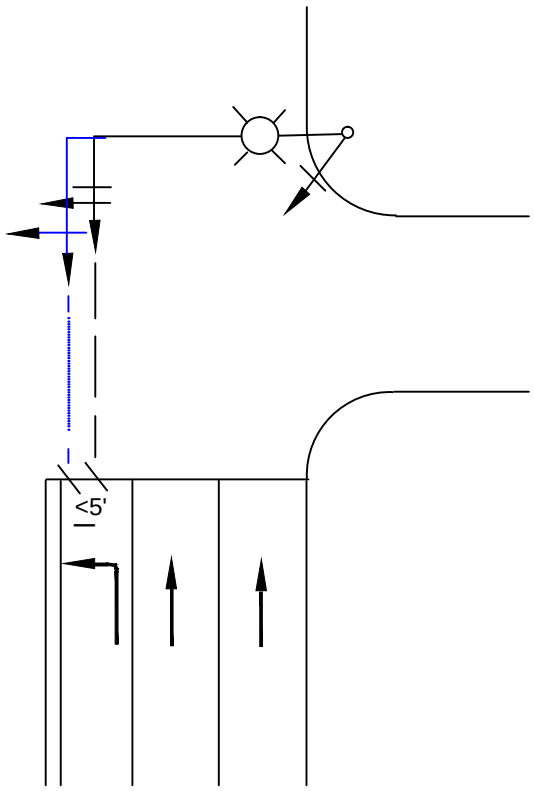
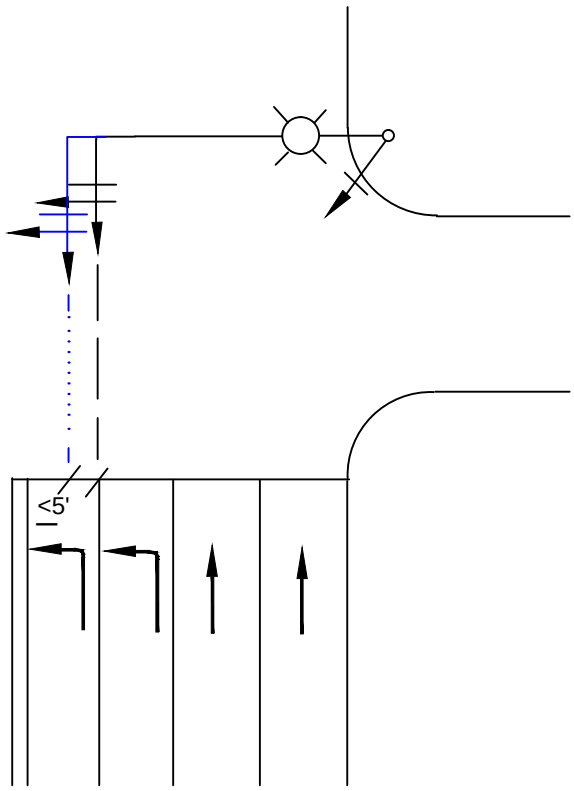
AUGUST 2013
DATE

ATTACHMENT 3

CITY OF IRVINE
PUBLIC WORKS



SINGLE LEFT TURN

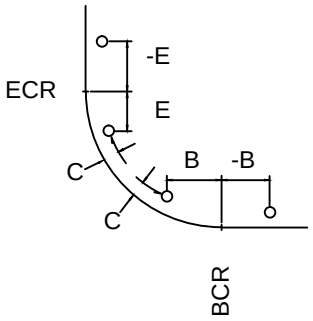


DUAL LEFT TURN

LEGEND

PREFERRED PLACEMENT

MAXIMUM DEVIATION LEFT OF DIVIDING LINE



POLE PLACEMENT

NOTE :
1. THE LEFT-TURN TRAFFIC SIGNAL HEAD SHALL BE CENTERED ON THE LEFT-TURN MOVEMENT OR AT A MAXIMUM OF 5 FEET LEFT FROM THE LEFT-TURN MOVEMENT.
2. POLE PLACEMENT DIMENSION C SHALL BE 2.5 FEET FROM FACE OF CURB TO CENTERLINE OF POLE. DIMENSIONS B AND E SHALL BE PER POLE SCHEDULE, OR AS DIRECTED BY THE ENGINEER.

MAST ARM & SIGNAL POLE PLACEMENT

TS-1

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

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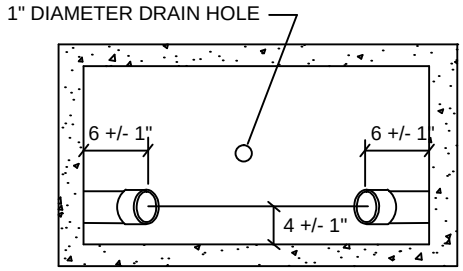
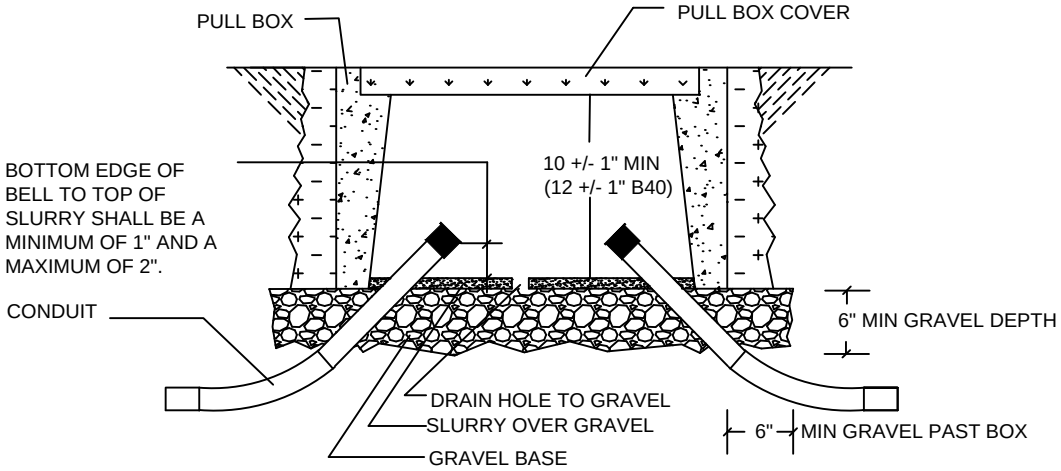
MODIFIES CALTRANS STANDARD PLAN ES-8B

TOP VIEW



SIDE VIEW



1. INTERCONNECT PULL BOXES ARE TO BE NO. 6, EXCEPT FOR THE C40 ELECTRICAL BOX ADJACENT TO THE COMMUNICATION CABINET, PLACED NO GREATER THAN 400 FOOT INTERVALS, AND HAVE 45 DEGREE CONDUIT ELBOWS.
2. NO. 6 PULL BOXES SHALL HAVE FIBRELYTE COVERS. C40 PULL BOXES SHALL HAVE "LIGHTWEIGHT" POLYMER CONCRETE LID.
3. ALL PULL BOXES ARE TO BE MARKED "TRAFFIC SIGNAL" EXCEPT THE EDISON PULL BOX.
4. THERE SHALL BE A MINIMUM OF 10 INCHES (±1) OF VOID FROM TOP OF SLURRY TO THE BOTTOM OF THE COVER, IN A SINGLE STACK PULL BOX. B40 BOXES SHALL HAVE AN ADDITIONAL 2" SUMP.
5. GRAVEL BED SHALL BE 6" DEEP, BELOW PULL BOX AND EXTENDING 6" PAST THE OUTER EDGES IN ALL DIRECTIONS.
6. PULL BOX FLOOR SHALL HAVE CEMENT GROUT (MINIMAL SLOPE TO CENTER) COVERING BASE MATERIAL.
7. DRAIN HOLE SHALL ALLOW WATER TO DRAIN THROUGH GROUT TO GRAVEL BASE MATERIAL.
8. PULL BOXES SHALL BE INSPECTED FOR PROPER CONSTRUCTION PRIOR TO WIRE INSTALLATION.

TRAFFIC SIGNAL PULL BOXES

TS-2

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

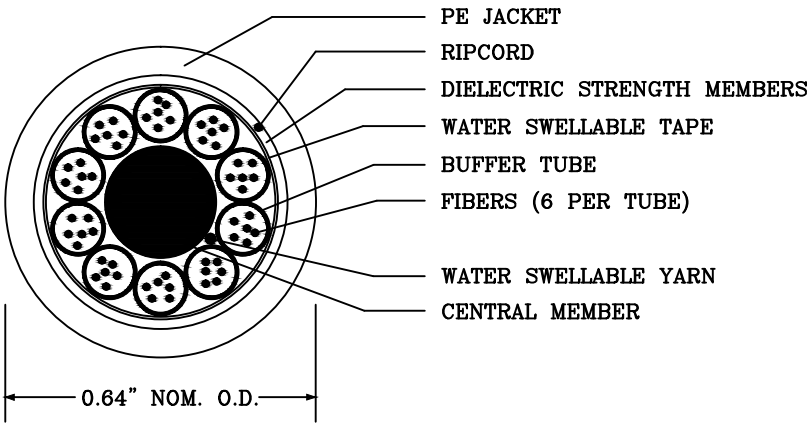
AUGUST 2013
DATE

CITY OF IRVINE

PUBLIC WORKS

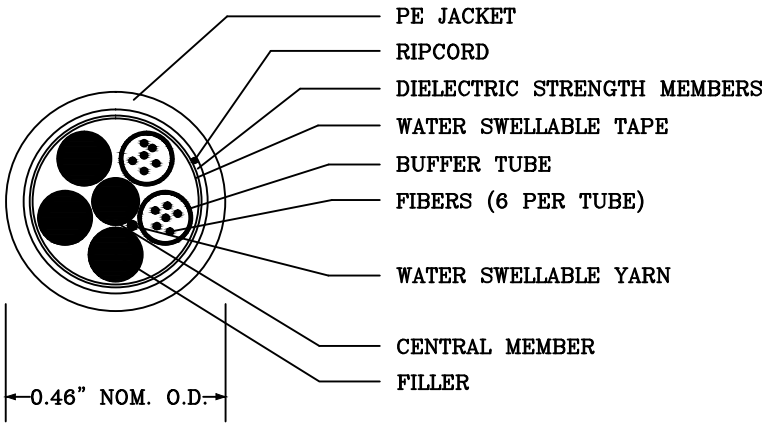
60 FIBER HYBRID CABLE
(CORNING ALTOS 060XU4-CP013D20)

TUBE COLOR	FIBER TYPE
BLUE	62.5/125 MMF
ORANGE	62.5/125 MMF
GREEN	62.5/125 MMF
BROWN	62.5/125 MMF
SLATE	8.3/125 SMF
WHITE	8.3/125 SMF
RED	8.3/125 SMF
BLACK	8.3/125 SMF
YELLOW	8.3/125 SMF
VIOLET	8.3/125 SMF



12 FIBER SINGLEMODE CABLE
(CORNING ALTOS 012EU4-64701D20)

TUBE COLOR	FIBER TYPE
BLUE	8.3/125 SMF
ORANGE	8.3/125 SMF



SIGNAL INTERCONNECT CABLES

TS-3

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

CITY OF IRVINE
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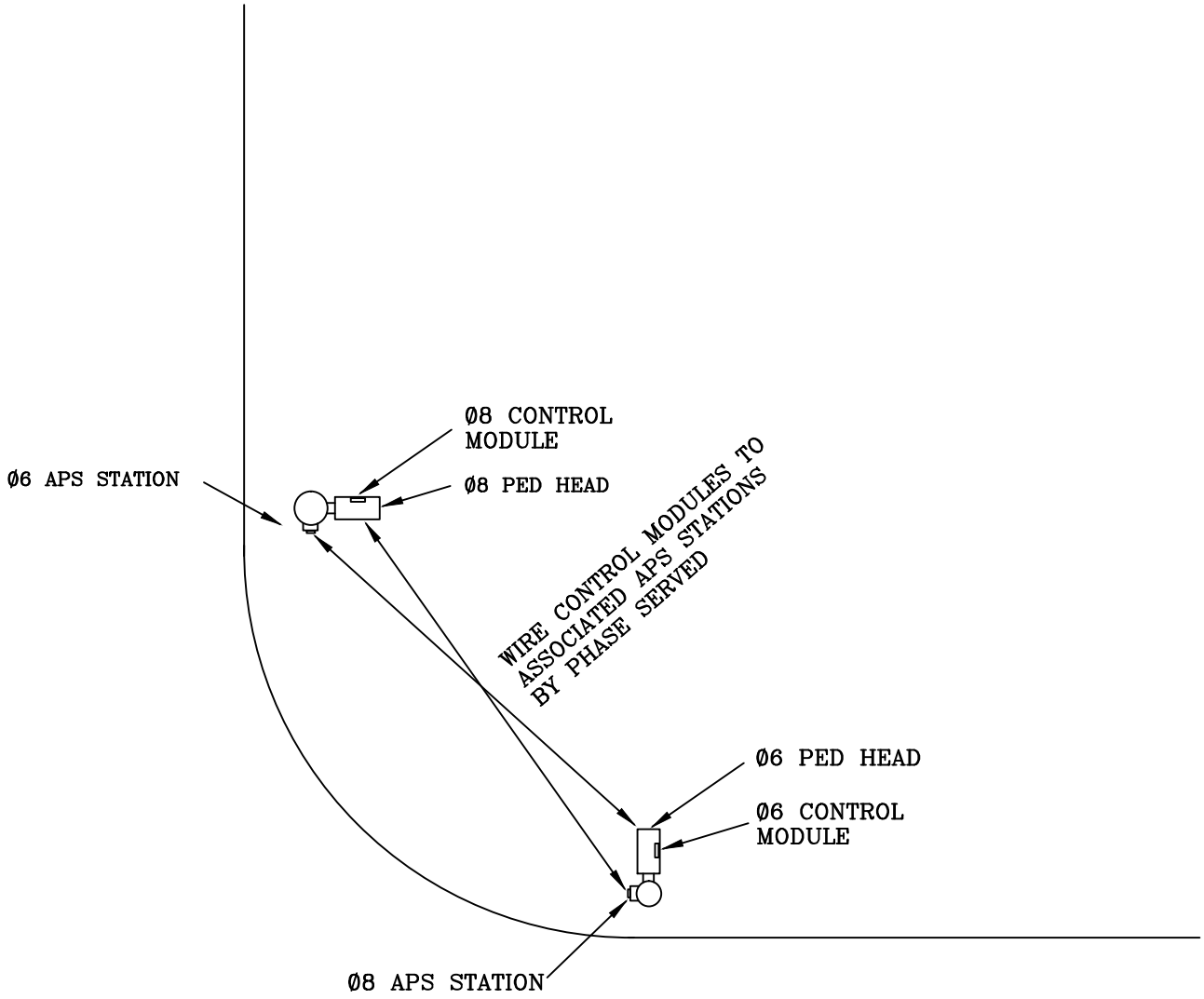


NOTES:

1. ACCESSIBLE PEDESTRIAN SYSTEM (APS) SHALL BE FIELD WIRED MODELS UTILIZING PEDESTRIAN HEAD MOUNTED CONTROL MODULES.
2. SYSTEMS SHALL BE FROM THOSE APPROVED IN THE IRVINE TRAFFIC SIGNAL QPL.
3. A PROGRAMMER UNIT SHALL BE PROVIDED TO THE CITY WHEN REQUIRED FOR INSTALLATION.

ACCESSIBLE PEDESTRIAN SYSTEM INSTALLATION

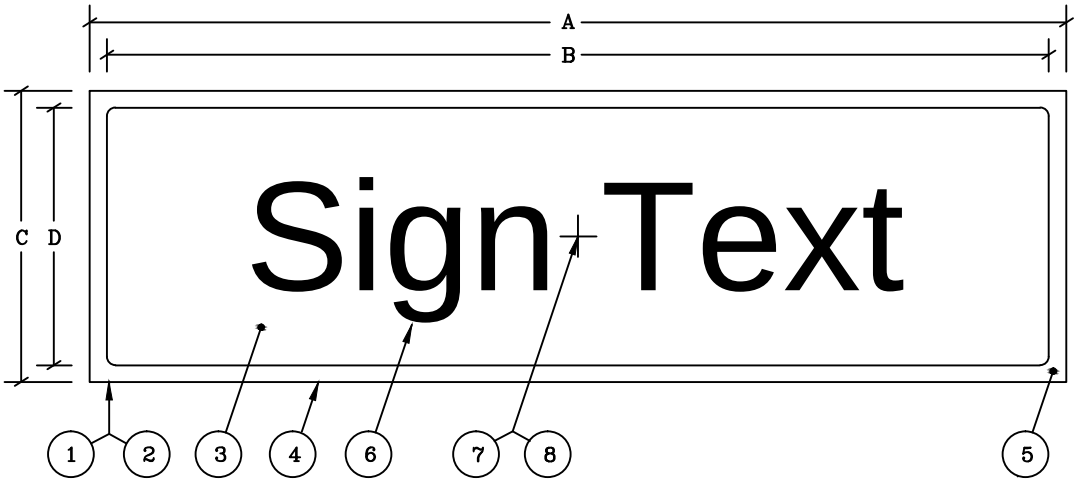
TS-4

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

CITY OF IRVINE
PUBLIC WORKS



	FIXTURE SIZE	
DIMENSION	6 FOOT	8 FOOT
A	72”	96”
B	69”	93”
C	18”	18”
D	15”	15”

* PANELS DIMENSIONS WITHOUT FRAME

1. PANELS SHALL BE CONSTRUCTED WITH 3M DG REFLECTIVE SHEETING, SERIES 4090.
2. PANELS AND FRAMING SHALL BE DESIGNED TO FIT THE ISNS FIXTURE DEFINED IN 209-5.11.
3. LETTERING BACKGROUND OVERLAY SHALL BE 3M ELECTROCUT FILM, 1179 (BROWN).
4. PANELS SHALL BE COVERED WITH A UV PROTECTIVE, CLEAR ACRYLIC FILM.
5. WHITE BORDER SHALL BE 1 INCH AROUND ALL EDGES OF PANEL.
6. TEXT SHALL BE HIGHWAY GOTHIC, SERIES E, WITH 12" UPPER CASE AND 9" LOWER CASE.
7. TEXT SHALL BE CENTERED VERTICALLY ON THE PANEL, RELATIVE TO THE UPPER CASE LETTERS.
8. TEXT SHALL BE CENTERED HORIZONTALLY ON THE PANEL.
9. SIGN PANELS SHALL HAVE ONLY ONE STREET NAME IN A SINGLE LINE OF TEXT.

ILLUMINATED STREET NAME SIGN PANELS

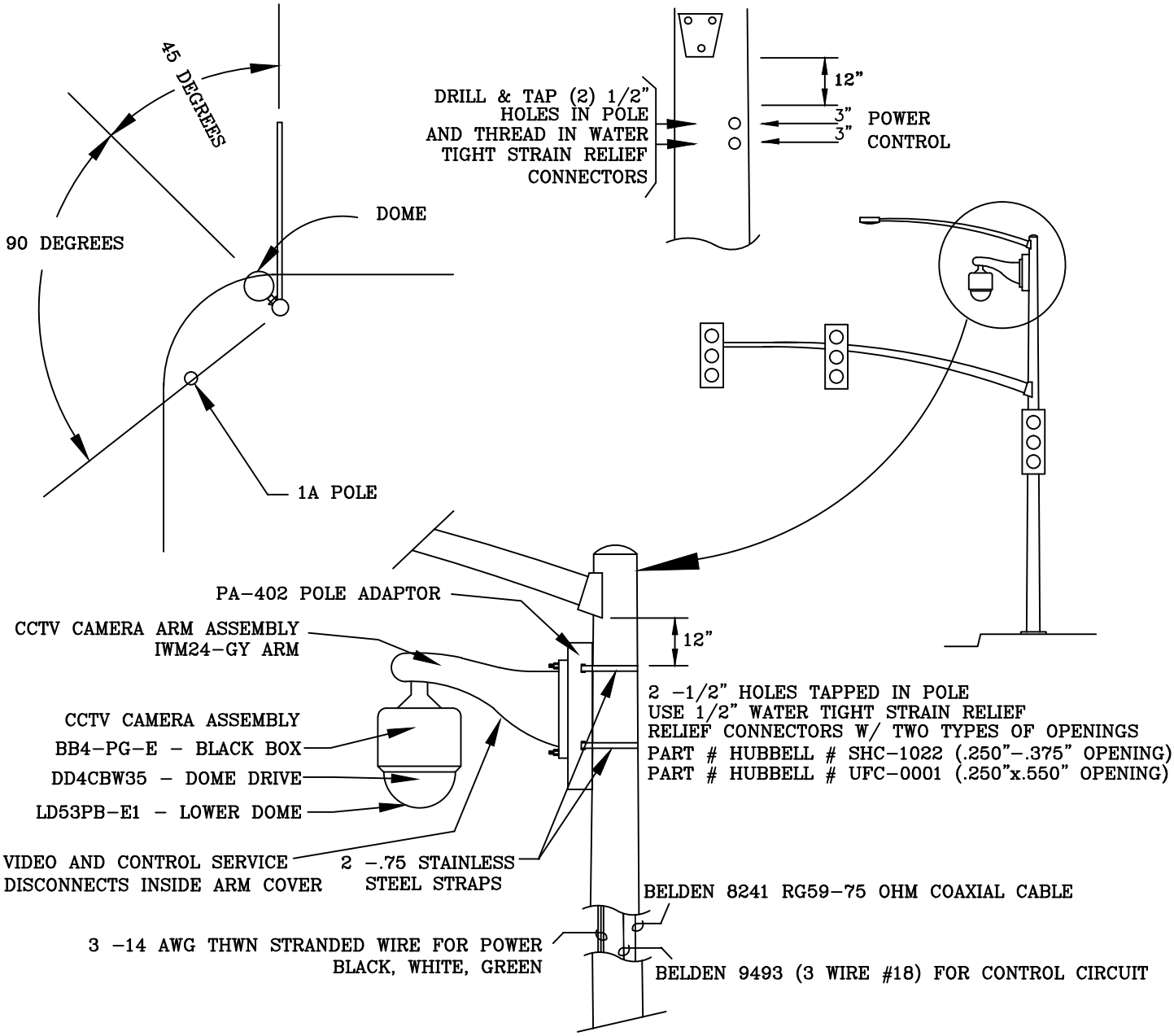
TS-5

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

CITY OF IRVINE
PUBLIC WORKS



NOTES:
1. USE TRON "HEB-AA" FUSE HOLDER & 5AMP FUSE IN PULL BOX.
2. CRIMP AND SOLDER GREEN GROUND WIRE TO BOND WIRE IN PULL BOX.
3. ATMS INSTALLATIONS REQUIRE CCTV POWER CIRCUIT BACK TO DESIGNATED SERVICE BREAKER.
4. TYPE P INSTALLATIONS REQUIRE CCTV POWER SPLICED TO IISNS CIRCUIT IN PULL BOX.

CCTV SYSTEM MOUNTING AND PLACEMENT

TS-6

SHEET 1 OF 1

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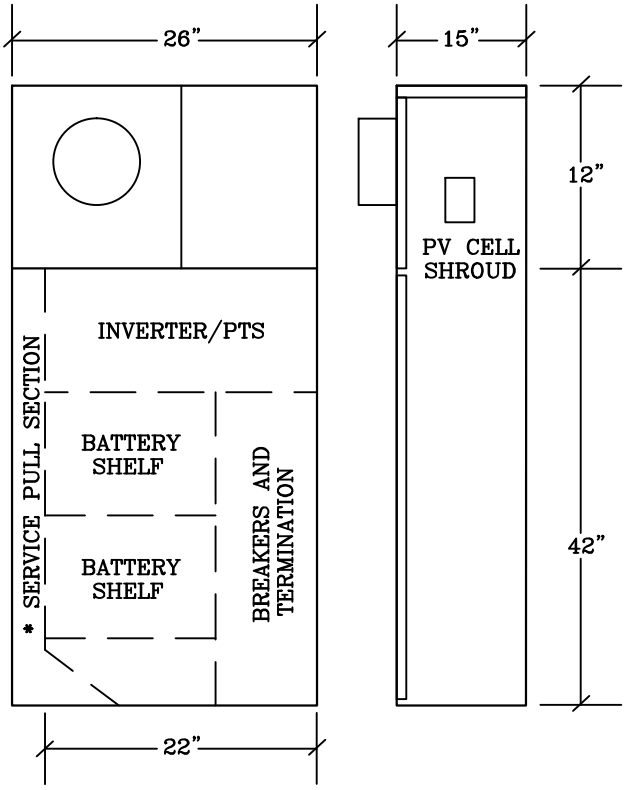
PUBLIC WORKS

TYPE P CABINET
SERVICE/BBS ENCLOSURE

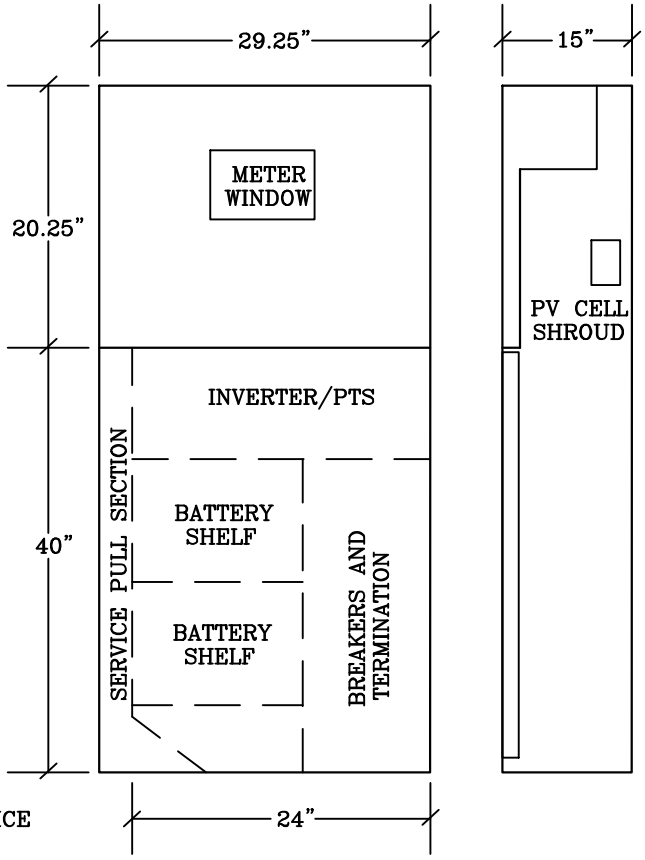
EXTERNAL SERVICE METER



* SOME TYPE-P RETROFIT LOCATIONS REQUIRE SERVICE PULL SECTION ON THE RIGHT SIDE.

ATMS 332L CABINET
SERVICE/BBS ENCLOSURE

INTERNAL SERVICE METER



1. SERVICE/BBS ENCLOSURE AND COMPONENTS MUST CONFORM TO 209-3.10 SPECIFICATIONS.
2. SERVICE/BBS ASSEMBLIES MUST BE UL LISTED.
3. A PULL SECTION ACCESS DOOR SHALL BE PROVIDED ON THE LEFT SIDE OF THE SERVICE.
4. SEPARATE METERED AND UNMETERED BREAKER BUSSES SHALL BE PROVIDED.
5. METERED CIRCUITS SHALL INCLUDE SIGNAL (40A), IISNS (15A), CCTV (15A), AND SPARE (15A).
6. UNMETERED CIRCUITS SHALL INCLUDE LIGHTING (30A) AND CONTROL (15A).
7. DETAILED SPECIFICATIONS MAY BE OBTAINED FROM SIGNAL OPERATIONS & MAINTENANCE: 949-724-7649
8. BREAKER/BBS SECTION DOOR SHALL HAVE A 3-POINT LATCHING SYSTEM WITH CORBIN #2 LOCK AND PADLOCK HASP.

TYPE IIB SERVICE/BBS DETAILS

TS-7

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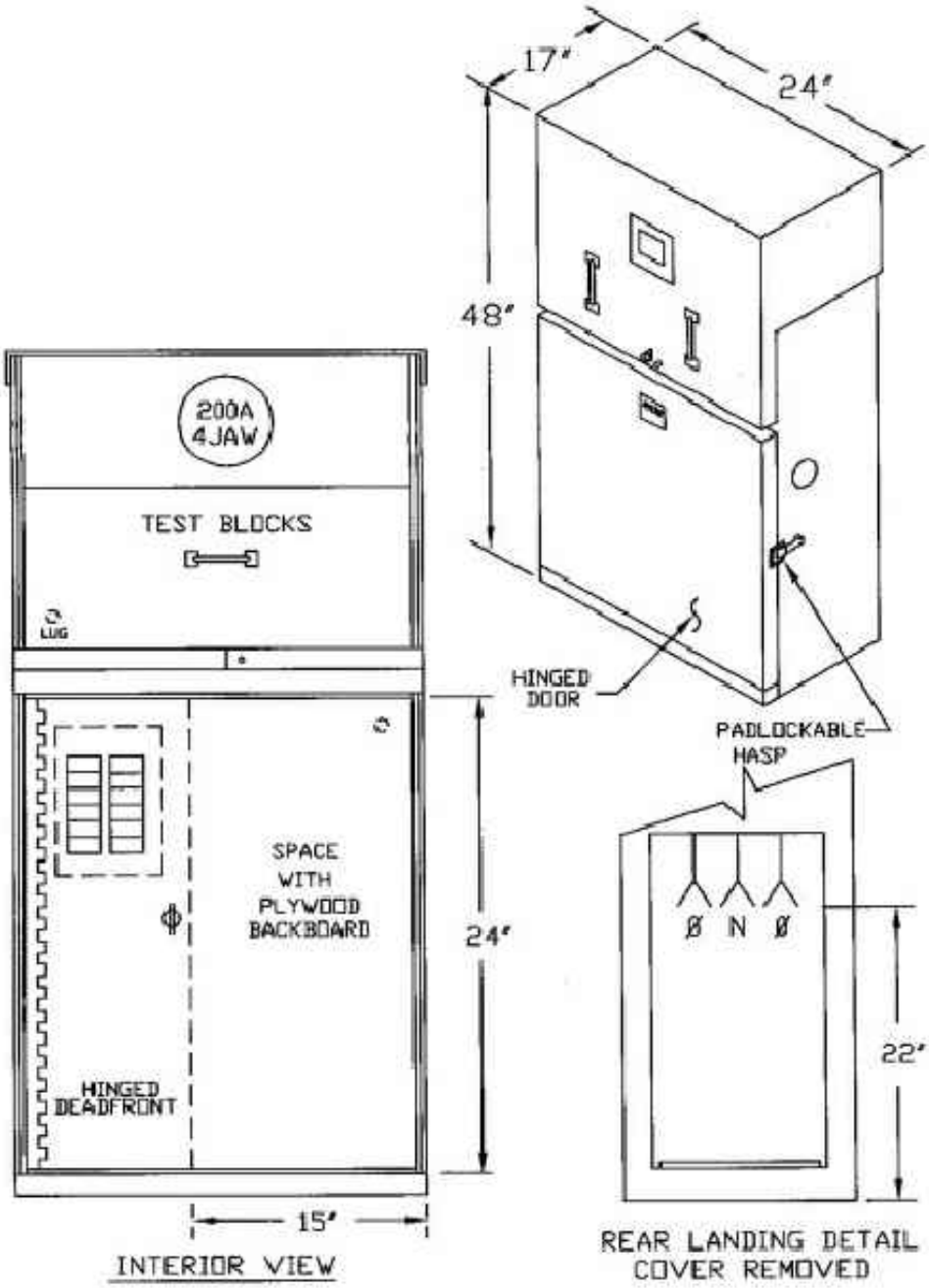

CAT. NO. MEUG24-I-M100 (MOD)

SEE DRAWING 5051595 FOR WIRING DIAGRAM

CCTV COMMUNICATIONS/SERVICE METER CABINET

TS-7A

SHEET 1 OF 1

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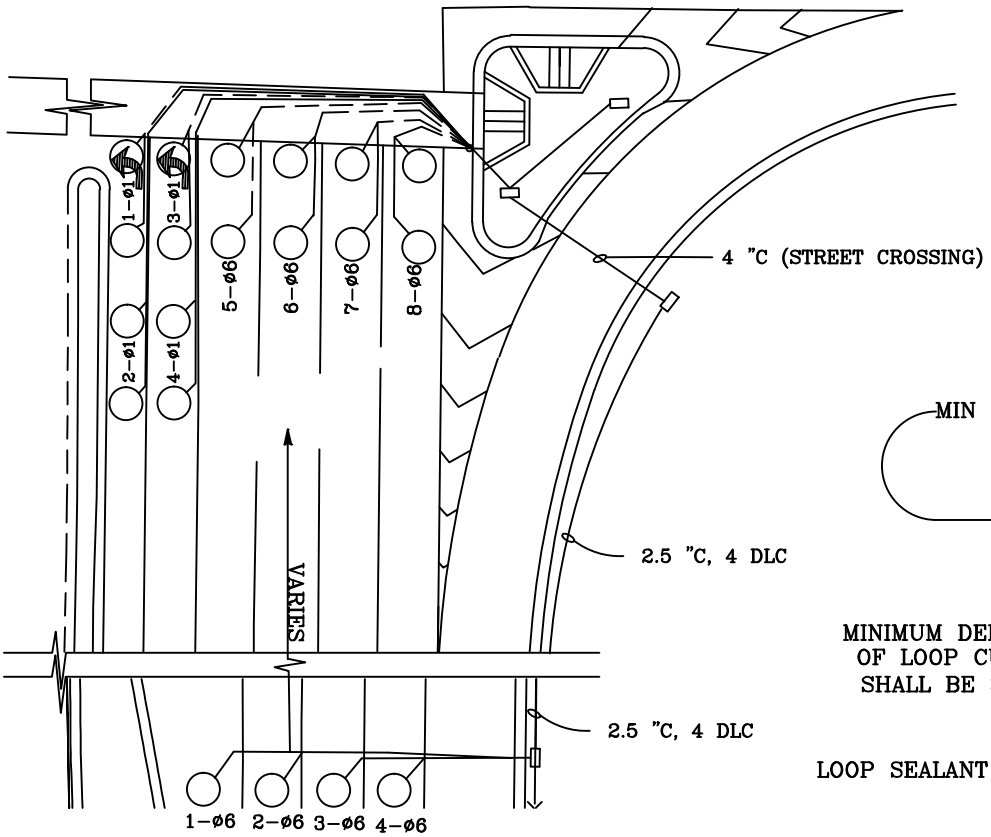
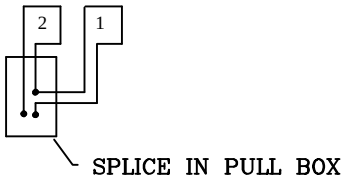
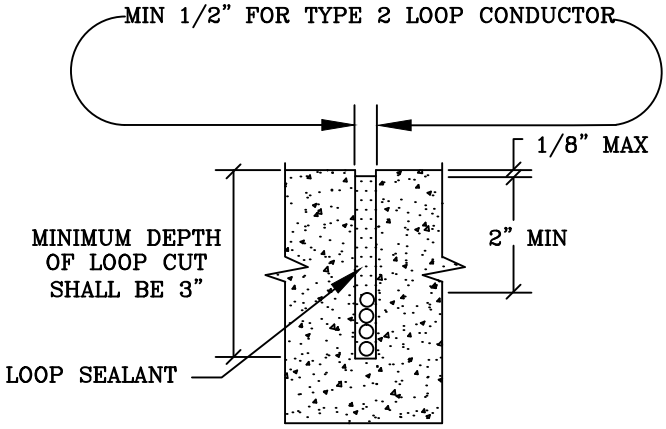
(MODIFIES CALTRANS STANDARD PLAN ES-5A)



STANDARD LOOP CONNECTIONS
NUMBER 1 LOOP CLOSEST TO THE CROSSWALK





NOTES :

1. TRAFFIC SIGNAL LOOPS SHALL BE TYPE E.
2. LOOP CONDUCTORS SHALL BE TYPE 2.
3. LOOPS SHALL HAVE A MINIMUM OF 3-TURNS FOR PRESENCE AND 4-TURNS FOR ADVANCE.
4. LOOPS SHALL BE SEALED WITH HOT MELT ADHESIVE.
5. LOOPS SHALL BE SPLICED IN SERIES, AND BY LANE.
6. PRESENCE LOOPS SHALL BE INSTALLED ONE FOOT BEHIND THE LIMIT LINE.
7. ADVANCE LOOPS SHALL BE INSTALLED PER SET BACK REQUIREMENTS (104.3.V.10).
8. LOOP DESIGNATIONS SHALL REMAIN CONSISTENT WITH THIS PLAN, REGARDLESS OF LANE COUNT.
9. LOOPS SHALL BE LOCATED 1 FOOT FROM THE CROSSWALK OR LIMIT LINE.

TRAFFIC SIGNAL LOOP DETECTION DETAILS

TS-8A

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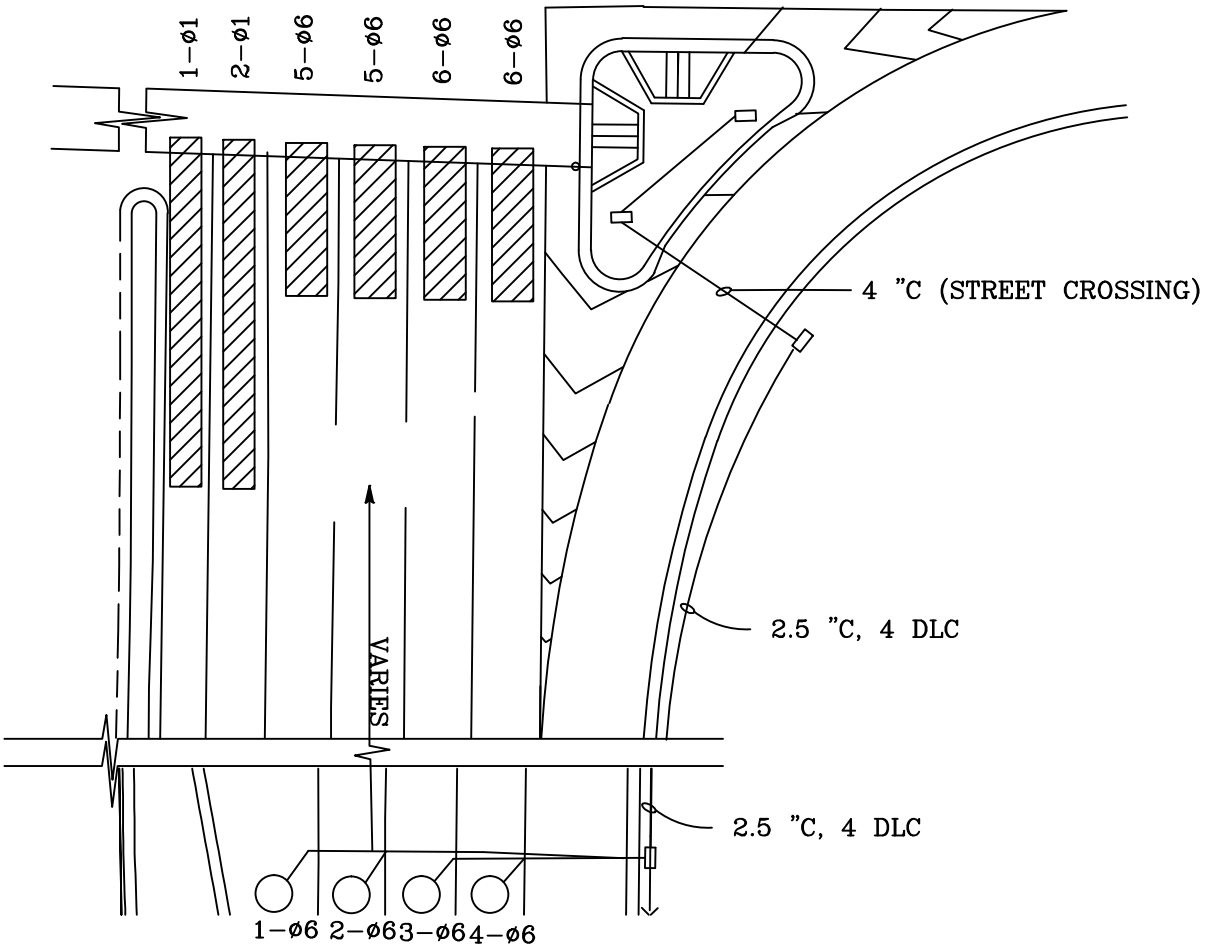

NOTES :

1. ADVANCE DETECTION LOOPS SHALL BE TYPE E CONFORMING TO PLAN TS-8A SPECIFICATIONS.
2. PRESENCE SHALL BE VIDEO DETECTION CONFORMING TO 209-5.8.4 AND 307-17.7 SPECIFICATIONS.
3. PRESENCE DETECTION ZONES SHALL BE CONSISTENT WITH PLANS TS-8C, TS-8D, OR TS-8E.
4. BICYCLE DETECTION ZONES SHALL BE PLACED AT THE FRONT OF ALL STOP BAR ZONES.
5. ONE OR TWO VIDEO DETECTION CAMERAS MAY BE USED FOR EACH APPROACH.
6. PREFERRED PLACEMENT FOR VIDEO DETECTION CAMERAS IS ON THE LUMNAIRE ARM.

TRAFFIC SIGNAL VIDEO DETECTION DETAILS

TS-8B

SHEET 1 OF 1

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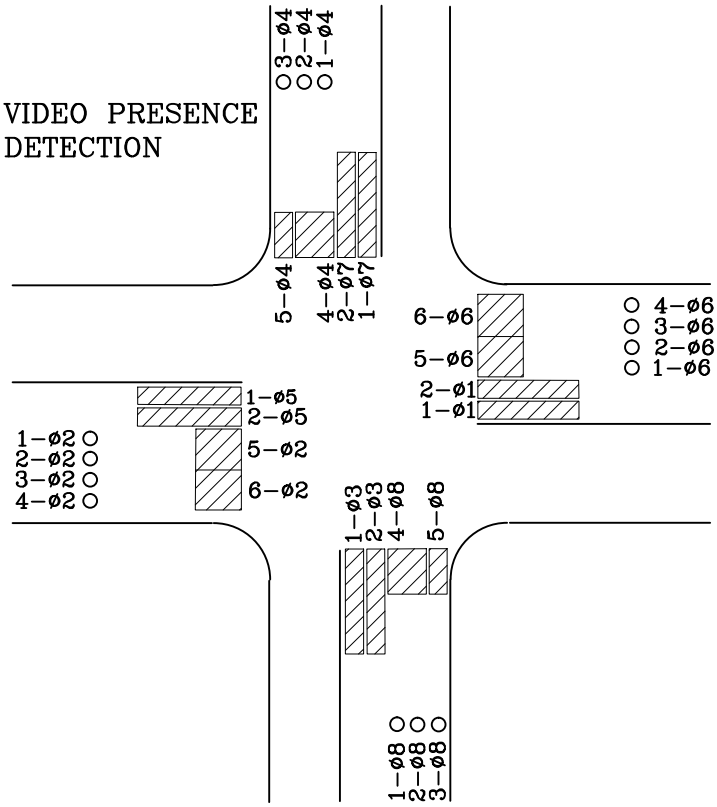
CITY OF IRVINE
PUBLIC WORKS

SENSOR SCHEDULE

SLOT	POSITION	CHANNEL	SLOT	POSITION	CHANNEL
I1	U	5–ø2	J1	U	1–ø2
	L	6–ø2		L	2–ø2
I2	U	1–ø5	J2	U	3–ø2
	L	2–ø5		L	4–ø2
I3	U	4–ø4	J3	U	1–ø4
	L	◆5–ø4		L	2–ø4
I4	U	1–ø7	J4	U	3–ø4
	L	2–ø7		L	SP
I5	U	5–ø6	J5	U	1–ø6
	L	6–ø6		L	2–ø6
I6	U	1–ø1	J6	U	3–ø6
	L	2–ø1		L	4–ø6
I7	U	4–ø8	J7	U	1–ø8
	L	◆5–ø8		L	2–ø8
I8	U	1–ø3	J8	U	3–ø8
	L	2–ø3		L	SP
I9	U	VD COM	J9	U	SP
	L			L	SP
I10	U	VD COM	J10	U	FREE
	L			L	DL
I11	U	ø2 BIKE	J11	U	EVA–ø2
	L	ø4 BIKE		L	EVB–ø6
112	U	ø6 BIKE	J12	U	EVC–ø4
	L	ø8 BIKE		L	EVD–ø8
I13	U	ø2 PED	J13	U	MAN ADV
	L	ø4 PED		L	MAN EN
I14	U	ø6 PED	J14	U	FLASH SEN
	L	ø8 PED		L	STOP TIME

◆ SENSOR CHANNELS DESIGNATED FOR RIGHT TURN DELAY FUNCTIONALITY IN CONTROLLER



NOTES:
1. THIS DETECTION SCHEDULE IS APPLICABLE ONLY TO ATMS 332L CABINET INSTALLATIONS AND MODIFICATIONS.
2. VIDEO DETECTION PROCESSORS SHALL BE INSTALLED IN SLOTS I1-2, I3-4, I5-6, AND I7-8.
3. DETECTION CHANNELS 6-Ø4 AND 6-Ø8 SHALL ALWAYS BE UTILIZED FOR THE RIGHT-MOST LANE PRESENCE LOOPS ON SIDE-STREETS TO ACCOMODATE DELAY FUNCTIONALITY.

ATMS 332L DETECTOR SCHEDULE

TS-8C

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
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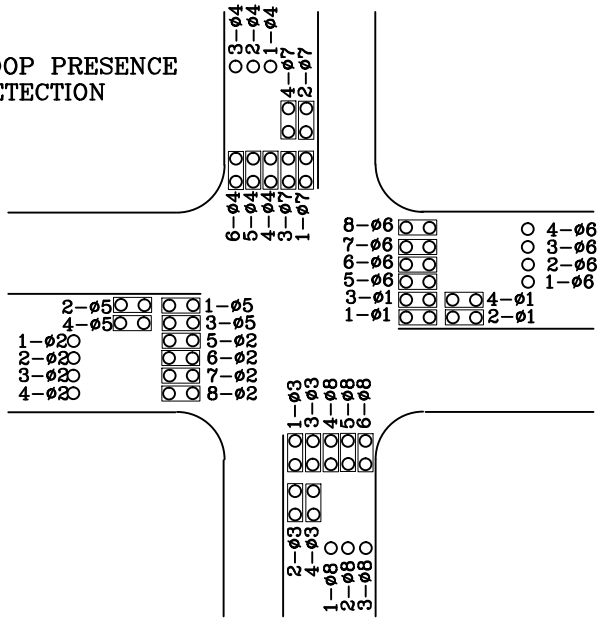
SENSOR SCHEDULE

UNIT	CHANNEL	DETECTOR	UNIT	CHANNEL	DETECTOR
I1	1	1–ø1	J8	1	◆6–ø8
	2	2–ø1		2	FUT
I2	1	3–ø1	J9	1	FUT
	2	4–ø1		2	FUT
I3	1	5–ø2	K1	1	1–ø2
	2	6–ø2		2	FUT
I4	1	7–ø2	K2	1	2–ø2
	2	8–ø2		2	FUT
I5	1	1–ø3	K3	1	3–ø2
	2	2–ø3		2	FUT
I6	1	3–ø3	K4	1	4–ø2
	2	4–ø3		2	FUT
I7	1	4–ø4	K5	1	1–ø4
	2	5–ø4		2	FUT
I8	1	◆6–ø4	K6	1	2–ø4
	2	FUT		2	FUT
I9	1	FUT	K7	1	3–ø4
	2	FUT		2	FUT
J1	1	1–ø5	K8	1	1–ø6
	2	2–ø5		2	FUT
J2	1	3–ø5	K9	1	2–ø6
	2	4–ø5		2	FUT
J3	1	5–ø6	K10	1	3–ø6
	2	6–ø6		2	FUT
J4	1	7–ø6	K11	1	4–ø6
	2	8–ø6		2	FUT
J5	1	1–ø7	K12	1	1–ø8
	2	2–ø7		2	FUT
J6	1	3–ø7	K13	1	2–ø8
	2	4–ø7		2	FUT
J7	1	4–ø8	K14	1	3–ø8
	2	5–ø8		2	FUT

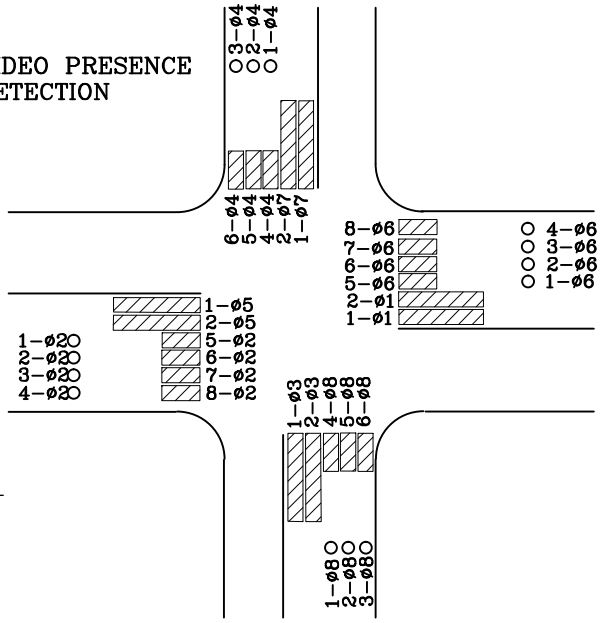
■ SENSOR UNITS SHALL BE RACK MOUNT WITH WITH TWO CHANNELS PER DETECTOR UNIT

◆ SENSOR CHANNELS DESIGNATED FOR RIGHT TURN DELAY FUNCTIONALITY IN CONTROLLER

LOOP PRESENCE DETECTION



VIDEO PRESENCE DETECTION



NOTES:

1. THIS DETECTION SCHEDULE IS APPLICABLE ONLY TO ATMS DUAL 332 CABINET INSTALLATIONS AND MODIFICATIONS.
2. WHEN UTILIZED, VIDEO DETECTION PROCESSORS SHALL BE INSTALLED IN SLOTS I3-4, I7-8, J3-4, AND J7-8. EXTENSION MODULES SHALL BE INSTALLED IN SLOTS I1, I5, J1, AND J5
3. DETECTION CHANNELS 6-Ø4 AND 6-Ø8 SHALL ALWAYS BE UTILIZED FOR THE RIGHT-MOST LANE PRESENCE LOOPS ON SIDE-STREETS TO ACCOMODATE DELAY FUNCTIONALITY.

ATMS DUAL 332 DETECTOR SCHEDULE

(FOR MODIFICATION REFERENCE USE ONLY)

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CITY OF IRVINE - CITY ENGINEER

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TS-8D

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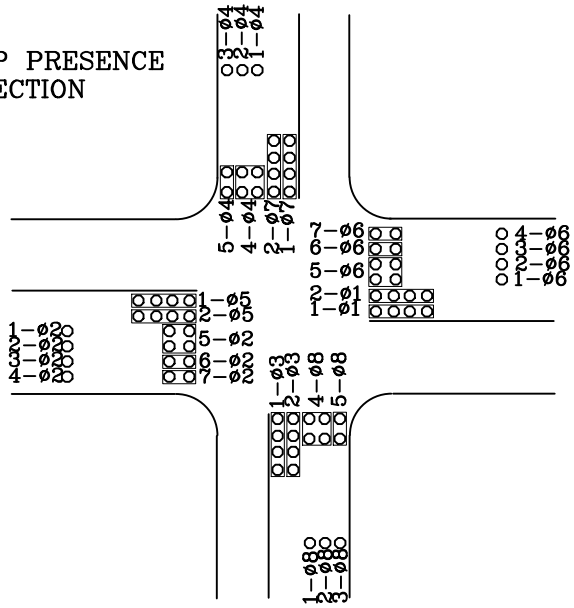
PUBLIC WORKS

SENSOR SCHEDULE

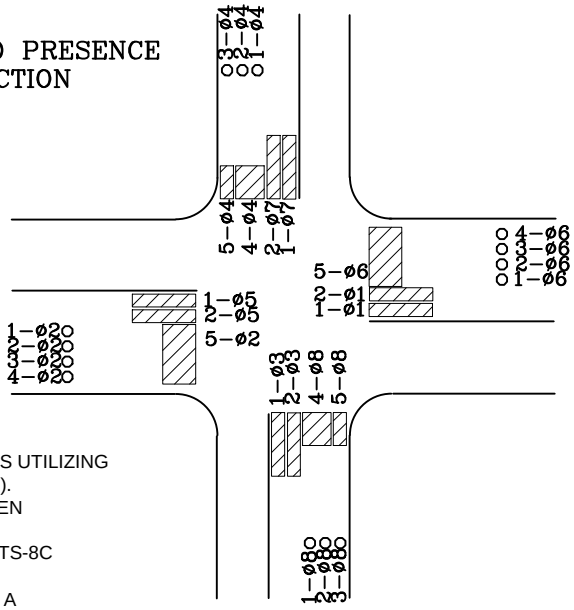
SENSOR UNIT	CHANNEL	ULTIMATE	EXISTING
1	1	5–ø2	
	2	6–ø2	
2	1	1–ø5	
	2	2–ø5	
3	1	4–ø4	
	2	5–ø4	
4	1	1–ø7	
	2	2–ø7	
5	1	5–ø6	
	2	6–ø6	
6	1	1–ø1	
	2	2–ø1	
7	1	4–ø8	
	2	5–ø8	
8	1	1–ø3	
	2	2–ø3	
9	1 ● ▲	1–ø2	
	2 ● ▲	2–ø2	
10	1 ● ▲	3–ø2	
	2 ● ▲	4–ø2	
11	1 ● ▲	1–ø4	
	2 ● ▲	2–ø4	
12	1 ● ▲	3–ø4	
	2 ● ▲	1–ø6	
13	1 ● ▲	2–ø6	
	2 ● ▲	3–ø6	
14	1 ● ▲	4–ø6	
	2 ● ▲	1–ø8	
15	1 ● ▲	2–ø8	
	2 ● ▲	3–ø8	
16	1 ◆	7–ø2	
	2 ◆	7–ø6	

◆ DELAY CALL
● CALL HOLD
▲ SYSTEM SAMPLING

LOOP PRESENCE DETECTION



VIDEO PRESENCE DETECTION



NOTES:
1. THIS DETECTION SCHEDULE IS APPLICABLE ONLY TO TYPE-P CABINETS UTILIZING 2-CHANNEL DETECTOR UNITS WITH TIMING FUNCTIONS (MODEL 262FC).
2. THIS SCHEDULE IS FOR REFERENCE USE AND SHALL ONLY APPLY WHEN MODIFYING EXISTING TYPE-P CABINET INSTALLATIONS. ALL NEW INSTALLATIONS OR CABINET REPLACEMENTS SHALL REFER TO PLAN TS-8C "ATMS 332L DETECTOR SCHEDULE".
3. WHEN UTILIZED, VIDEO DETECTION MODULES SHALL BE INSTALLED IN A STAND-ALONE RACK AND WIRED TO THE CONTROLLER INTERFACE PANEL.

TYPE P DETECTOR SCHEDULE

(FOR MODIFICATION REFERENCE USE ONLY)

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TS-8E

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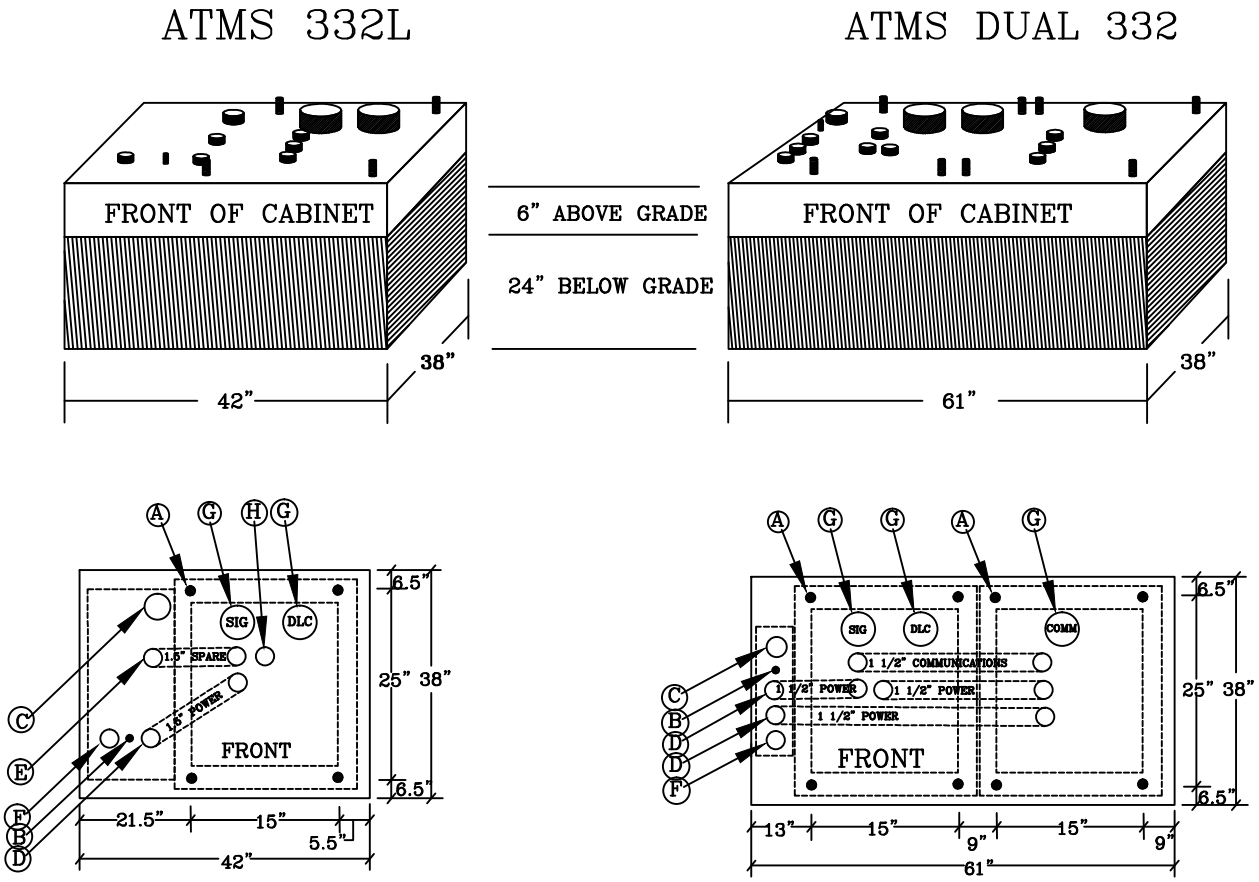

Ⓐ ANCHOR BOLT
Ⓑ 5/8-INCH GROUNDING ROD
Ⓒ 3-INCH EDISON SERVICE CONDUIT
Ⓓ 1.5-INCH POWER CONDUIT
Ⓔ 1.5-INCH SPARE CONDUIT
Ⓕ 1.5-INCH FIELD CIRCUITS CONDUIT
Ⓖ 4-INCH ENTRY CONDUIT
Ⓗ 1.5-INCH SIC PIGTAIL CONDUIT

NOTES :

1. CABINET LOCATION SHALL BE APPROVED BY A CITY REPRESENTATIVE PRIOR TO INSTALLATION OF THE CABINET BASE FORMS.
2. CONDUIT LOCATIONS ARE PROVIDED AS A GENERAL REFERENCE. FINAL CONDUIT PLACEMENT SHALL BE INSPECTED AND APPROVED PRIOR TO POURING THE CONCRETE FOUNDATION.

ATMS CABINET FOUNDATIONS

TS-9A

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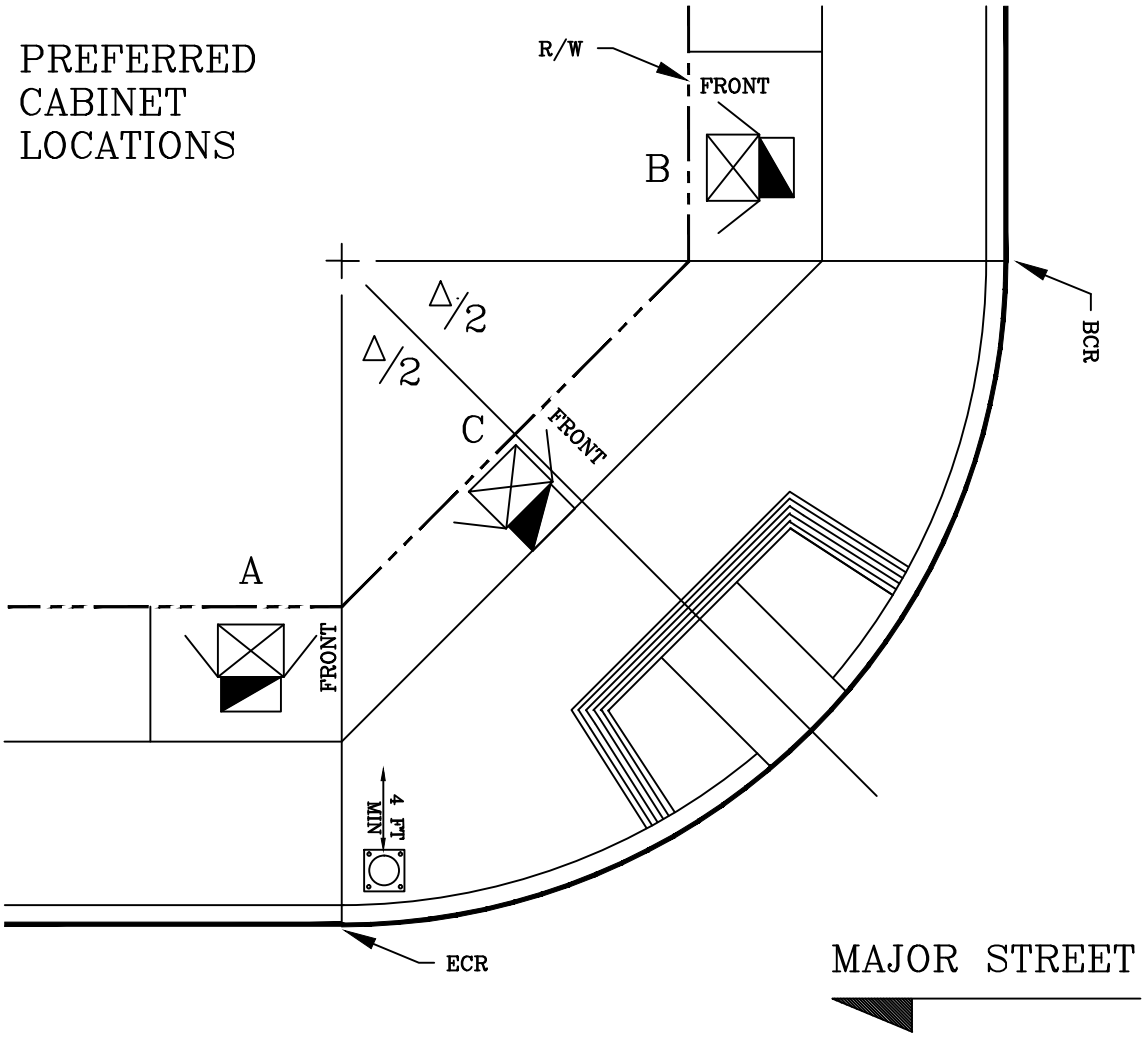

NOTES :

1. THIS DETAIL SHOWS OPTIONAL ATMS 332L CABINET LOCATIONS IN ORDER OF PREFERENCE A TO C. DEVIATIONS FROM THESE PREFERRED LOCATIONS MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER.
2. THE CABINET FRONT SHALL BE MINIMUM OF 36-INCHES FROM THE ECR OR BCR FOR PREFERRED LOCATIONS A OR B WITH THE FRONT DOOR FACING THE INTERSECTION.
3. HALF DELTA PREFERRED LOCATION C IS DIRECTLY IN LINE WITH THE PEDESTRIAN RAMP.
4. THERE SHALL BE A MINIMUM OF 48-INCHES OF CONCRETE FRONTING BOTH CABINET DOORS AND THE ELECTRICAL SERVICE. THE BACK SIDE OF THE CABINET MAY ABUT THE RIGHT-OF WAY LINE.
5. TO MITIGATE FOR SLOPED CONDITIONS BEHIND THE CABINET, INSTALLATION OF RETAINING WALL/CURB MAY BE REQUIRED TO MAINTAIN CLEAR ACCESS TO CONCRETE PAD AROUND CABINET. WHEN RETAINING WALL/CURB IS REQUIRED, THE TOP OF THE RETAINING WALL/CURB SHALL HAVE FEATURES TO PREVENT SKATEBOARDING.

ATMS 332L CABINET PLACEMENT

TS-9B

SHEET 1 OF 1

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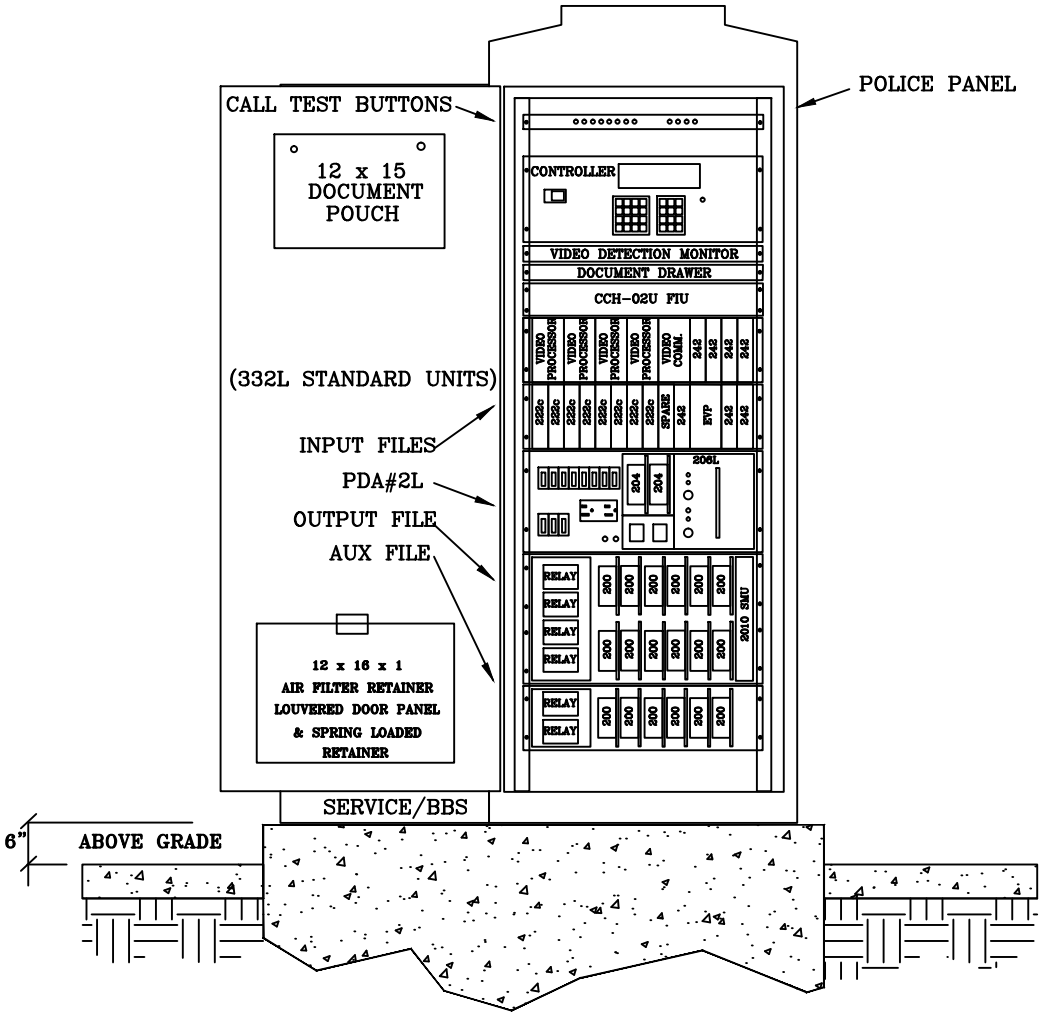

INPUT FILE SLOT ALLOCATION

I	5-2	1-5	4-4	1-7	5-6	1-1	4-8	1-3	VD COM	VD COM	2 BIKE	6 BIKE	2 PED	6 PED
	6-2	2-5	5-4	2-7	6-6	2-1	5-8	2-3			4 BIKE	8 BIKE	4 PED	8 PED
J	1-2	3-2	1-4	3-4	1-6	3-6	1-8	3-8	SP	FREE	EVA 2	EVC 4	MAN ADV	FLSH SENS
	2-2	4-2	2-4	SP	2-6	4-6	2-8	SP	SP	DL	EVB 6	EVD 8	MAN EN	STOP TIME

1. ATMS 332L CABINETS ARE BASED UPON THE CALTRANS TEES STANDARDS.
2. COMPONENTS SHALL BE MOUNTED IN THE RACK IN THE APPROXIMATE POSITIONS SHOWN.
3. INPUT FILE SLOT ALLOCATIONS SHALL BE AS SHOWN.
4. COMMUNICATIONS NETWORK SWITCHES SHALL BE RACK MOUNTED TO THE BACK OF THE RACK, BEHIND THE CONTROLLER.
5. THE EXTERNAL SWITCH PANEL (PD PANEL) SHALL INCLUDE SWITCHES FOR FLASH, ON/OFF, AND MANUAL CONTROL.

ATMS 332L CABINET LAYOUT

TS-9C

SHEET 1 OF 1

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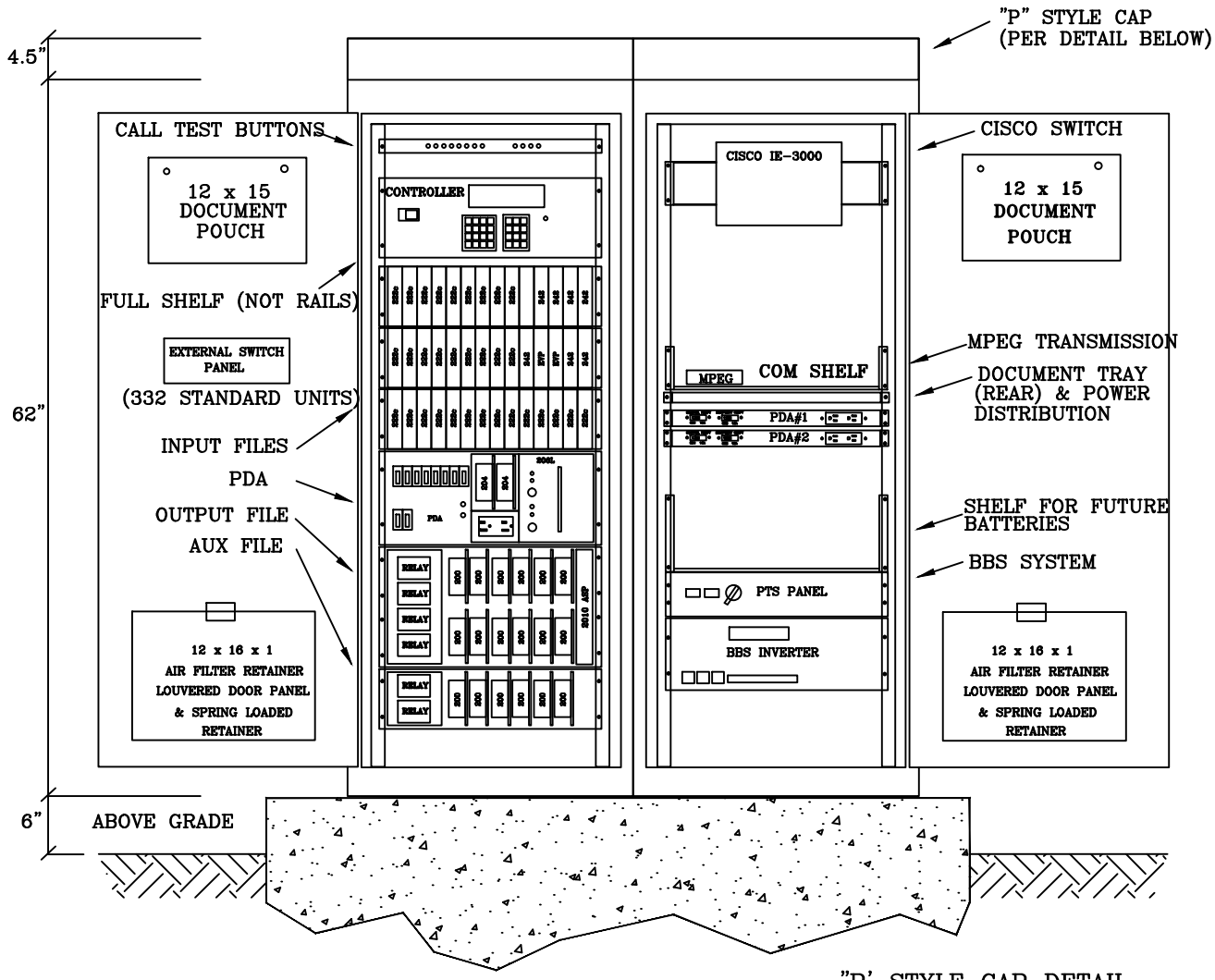
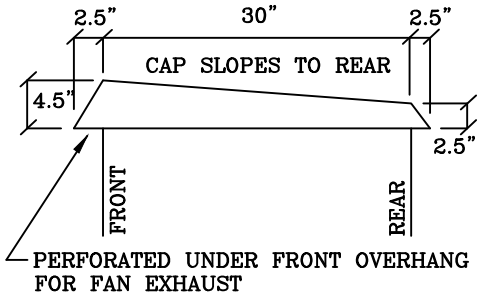


INPUT FILE SLOT ALLOCATION

I	1-1	3-1	5-2	7-2	1-3	3-3	4-4	6-4	SP	SP	2 BIKE	6 BIKE	2 PED	6 PED	PRES
	2-1	4-1	6-2	8-2	2-3	4-3	5-4	SP	SP	SP	4 BIKE	8 BIKE	4 PED	8 PED	
J	1-5	3-5	5-6	7-6	1-7	3-7	4-8	6-8	SP	FREE	EVA 2	EVC 4	MAN ADV	FLSH SENS	PRES
	2-5	4-5	6-6	8-6	2-7	4-7	5-8	SP	SP	SF	EVB 6	EVD 8	MAN EN	STOP TIME	
K	1-2	2-2	3-2	4-2	1-4	2-4	3-4	1-6	2-6	3-6	4-6	1-8	2-8	3-8	ADV
	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	

"P' STYLE CAP DETAIL



ATMS DUAL 332 CABINET LAYOUT

(FOR MODIFICATION REFERENCE USE ONLY)

MARK CARROLL, R.C.E. 31515
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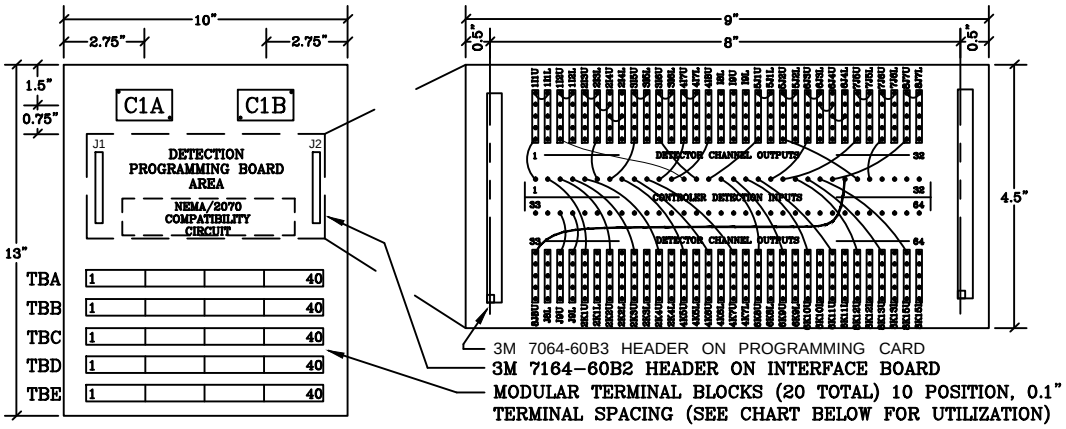
TS-9D

SHEET 1 OF 1

CITY OF IRVINE
PUBLIC WORKS

ATMS CABINET INTERFACE BOARD
MOUNTS TO RIGHT SIDE WALL BEHIND INPUT FILES
(MUST BE COMPATIBLE WITH US TRAFFIC MODEL 104767)

DETECTION PROGRAMMING CARD
JUMPERS USED TO PROGRAM DETECTION, DEFAULT SHOWN
(MUST BE COMPATIBLE WITH US TRAFFIC MODEL 104773)



	TBA-NEMA	C1A/B		TBB-DRIVERS	C1A/B		TBC-DET	C1A/B		TBD-DET	C1A/B		TBE-OTHER	C1A/B
1	1 CHECK	C1B-20	1	8 ON	C1B-63	1	DET 1 OUT	DPC-1	1	DET 41 OUT	DPC-41	1	OL A RED	C1A-97
2	1 NEXT	C1B-22	2	8 HOLD	C1B-59	2	DET 2 OUT	DPC-2	2	DET 42 OUT	DPC-42	2	OL A YEL	C1A-98
3	1 ON	C1B-24	3	8 OMIT	C1B-62	3	DET 3 OUT	DPC-3	3	DET 43 OUT	DPC-43	3	OL A GRN	C1A-99
4	1 HOLD	C1B-21	4	8 PED OMIT	C1B-60	4	DET 4 OUT	DPC-4	4	DET 44 OUT	DPC-44	4	OL B RED	C1A-94
5	1 OMIT	C1B-23	5	1 VEH RED	C1A-16	5	DET 5 OUT	DPC-5	5	DET 45 OUT	DPC-45	5	OL B YEL	C1A-95
6	2 CHECK	C1B-25	6	1 VEH YEL	C1A-17	6	DET 6 OUT	DPC-6	6	DET 46 OUT	DPC-46	6	OL B GRN	C1A-96
7	2 NEXT	C1B-28	7	1 VEH GRN	C1A-18	7	DET 7 OUT	DPC-7	7	DET 47 OUT	DPC-47	7	OL C RED	C1A-88
8	2 ON	C1B-30	8	2 VEH RED	C1A-12	8	DET 8 OUT	DPC-8	8	DET 48 OUT	DPC-48	8	OL C YEL	C1A-89
9	2 HOLD	C1B-26	9	2 VEH YEL	C1A-13	9	DET 9 OUT	DPC-9	9	DET 49 OUT	DPC-49	9	OL C GRN	C1A-90
10	2 OMIT	C1B-29	10	2 VEH GRN	C1A-15	10	DET 10 OUT	DPC-10	10	DET 50 OUT	DPC-50	10	OL D RED	C1A-85
11	2 PED OMIT	C1B-27	11	2 PED DW	C1A-10	11	DET 11 OUT	DPC-11	11	DET 51 OUT	DPC-51	11	OL D YEL	C1A-86
12	3 CHECK	C1B-31	12	2 PED CLR	C1A-35	12	DET 12 OUT	DPC-12	12	DET 52 OUT	DPC-52	12	OL D GRN	C1A-87
13	3 NEXT	C1B-33	13	2 PED WK	C1A-11	13	DET 13 OUT	DPC-13	13	DET 53 OUT	DPC-53	13	AUX 3 RED	C1A-91
14	3 ON	C1B-35	14	3 VEH RED	C1A-7	14	DET 14 OUT	DPC-14	14	DET 54 OUT	DPC-54	14	AUX 3 YEL	C1A101
15	3 HOLD	C1B-32	15	3 VEH YEL	C1A-8	15	DET 15 OUT	DPC-15	15	DET 55 OUT	DPC-55	15	AUX 3 GRN	C1A-93
16	3 OMIT	C1B-34	16	3 VEH GRN	C1A-9	16	DET 16 OUT	DPC-16	16	DET 56 OUT	DPC-56	16	AUX 6 RED	C1A-83
17	4 CHECK	C1B-36	17	4 VEH RED	C1A-4	17	DET 17 OUT	DPC-17	17	DET 57 OUT	DPC-57	17	AUX 6 YEL	C1A100
18	4 NEXT	C1B-39	18	4 VEH YEL	C1A-5	18	DET 18 OUT	DPC-18	18	DET 58 OUT	DPC-58	18	AUX 6 GRN	C1A-84
19	4 ON	C1B-41	19	4 VEH GRN	C1A-6	19	DET 19 OUT	DPC-19	19	DET 59 OUT	DPC-59	19	FREE TIME	C1B-5
20	4 HOLD	C1B-37	20	4 PED WK	C1A-2	20	DET 20 OUT	DPC-20	20	DET 60 OUT	DPC-60	20	SP. STAT. 1	C1B-6
21	4 OMIT	C1B-40	21	4 PED CLR	C1A-37	21	DET 21 OUT	DPC-21	21	DET 61 OUT	DPC-61	21	NEMA CNA	C1B-7
22	4 PED OMIT	C1B-38	22	4 PED DW	C1A-3	22	DET 22 OUT	DPC-22	22	DET 62 OUT	DPC-62	22	NEMA MAX2	C1B-8
23	5 CHECK	C1B-42	23	5 VEH RED	C1A-32	23	DET 23 OUT	DPC-23	23	DET 63 OUT	DPC-63	23	NEMA ORC	C1B-10
24	5 NEXT	C1B-44	24	5 VEH YEL	C1A-33	24	DET 24 OUT	DPC-24	24	DET 64 OUT	DPC-64	24	NEMA RR	C1B-11
25	5 ON	C1B-46	25	5 VEH GRN	C1A-34	25	DET 25 OUT	DPC-25	25	2 PED CALL	C1A-67	25	NEMA WRM	C1B-12
26	5 HOLD	C1B-43	26	6 VEH RED	C1A-29	26	DET 26 OUT	DPC-26	26	4 PED CALL	C1A-69	26	FL LOGIC	C1B-2
27	5 OMIT	C1B-45	27	6 VEH YEL	C1A-30	27	DET 27 OUT	DPC-27	27	6 PED CALL	C1A-68	27	FL SENSE	C1B-4
28	6 CHECK	C1B-47	28	6 VEH GRN	C1A-31	28	DET 28 OUT	DPC-28	28	8 PED CALL	C1A-70	28	INT ADV	C1A-80
29	6 NEXT	C1B-50	29	6 PED WK	C1A-27	29	DET 29 OUT	DPC-29	29	EVP 1 OUT	C1A-71	29	FL SENSE	C1A-81
30	6 ON	C1B-52	30	6 PED CLR	C1A-36	30	DET 30 OUT	DPC-30	30	EVP 2 OUT	C1A-72	30	STOP TM	C1A-82
31	6 HOLD	C1B-48	31	6 PED DW	C1A-28	31	DET 31 OUT	DPC-31	31	EVP 3 OUT	C1A-73	31	DET RESET	C1A102
32	6 OMIT	C1B-51	32	7 VEH RED	C1A-24	32	DET 32 OUT	DPC-32	32	EVP 4 OUT	C1A-74	32	MAN ENBL	C1A-53
33	6 PED OMIT	C1B-49	33	7 VEH YEL	C1A-25	33	DET 33 OUT	DPC-33	33	RR 1 OUT	C1A-51	33	SPARE 2	C1A-54
34	7 CHECK	C1B-53	34	7 VEH GRN	C1A-26	34	DET 34 OUT	DPC-34	34	RR 2 OUT	C1A-52	34	SPARE 3	C1A-75
35	7 NEXT	C1B-55	35	8 VEH RED	C1A-21	35	DET 35 OUT	DPC-35	35	2 BK CALL	C1B-13	35	WATCHDOG	C1A103
36	7 ON	C1B-57	36	8 VEH YEL	C1A-22	36	DET 36 OUT	DPC-36	36	4 BK CALL	C1B-64	36	CVM	C1B-3
37	7 HOLD	C1B-54	37	8 VEH GRN	C1A-23	37	DET 37 OUT	DPC-37	37	6 BK CALL	C1B102	37	1 EVP OUT	C1B-16
38	7 OMIT	C1B-56	38	8 PED WK	C1A-19	38	DET 38 OUT	DPC-38	38	8 BK CALL	C1B103	38	2 EVP OUT	C1B-17
39	8 CHECK	C1B-58	39	8 PED CLR	C1A-38	39	DET 39 OUT	DPC-39	39	SPARE		39	3 EVP OUT	C1B-18
40	8 NEXT	C1B-61	40	8 PED DW	C1A-20	40	DET 40 OUT	DPC-40	40	SPARE		40	4 EVP OUT	C1B-19

ATMS DUAL 332 INTERFACE PANEL

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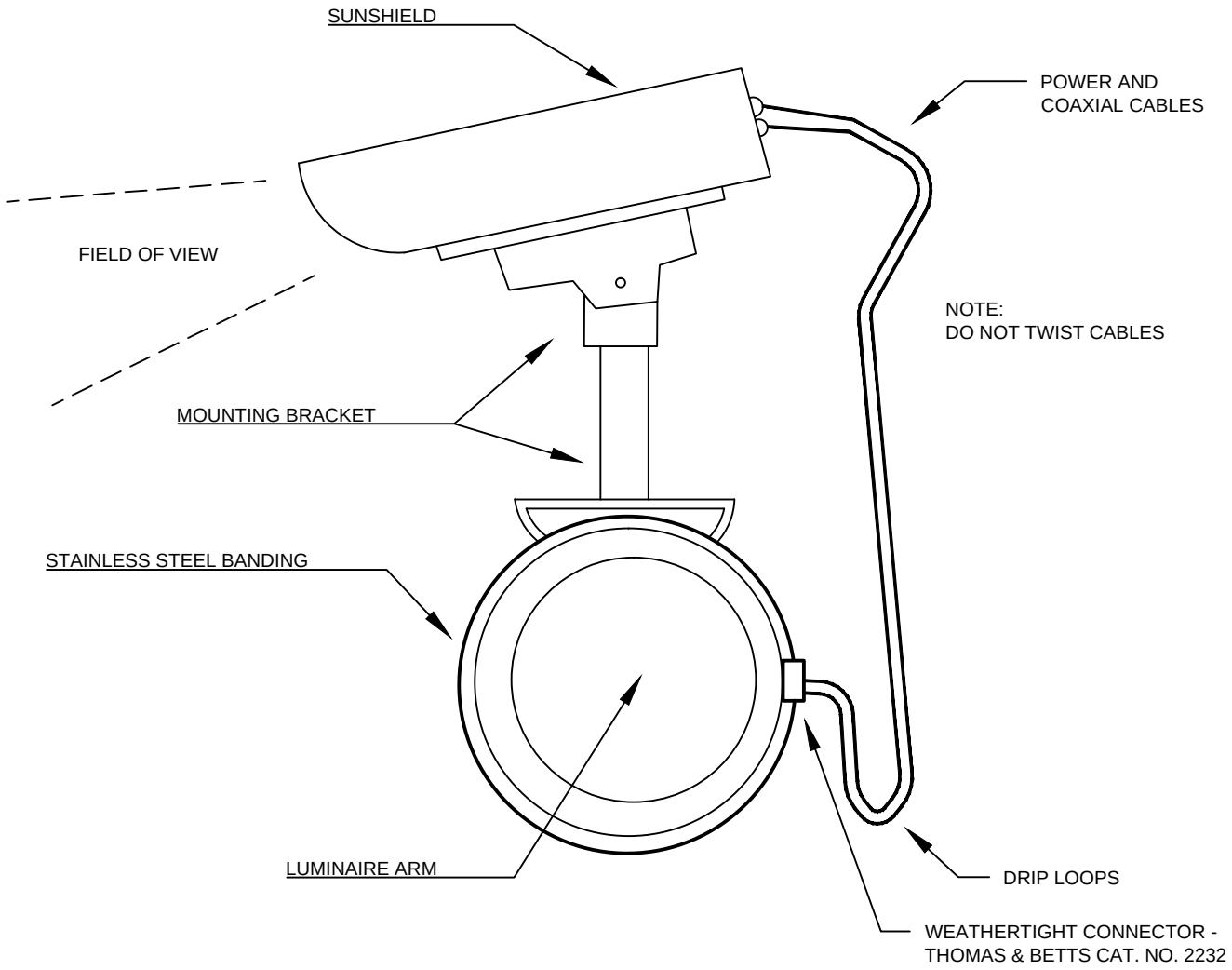

VIDEO DETECTION CAMERA MOUNTING

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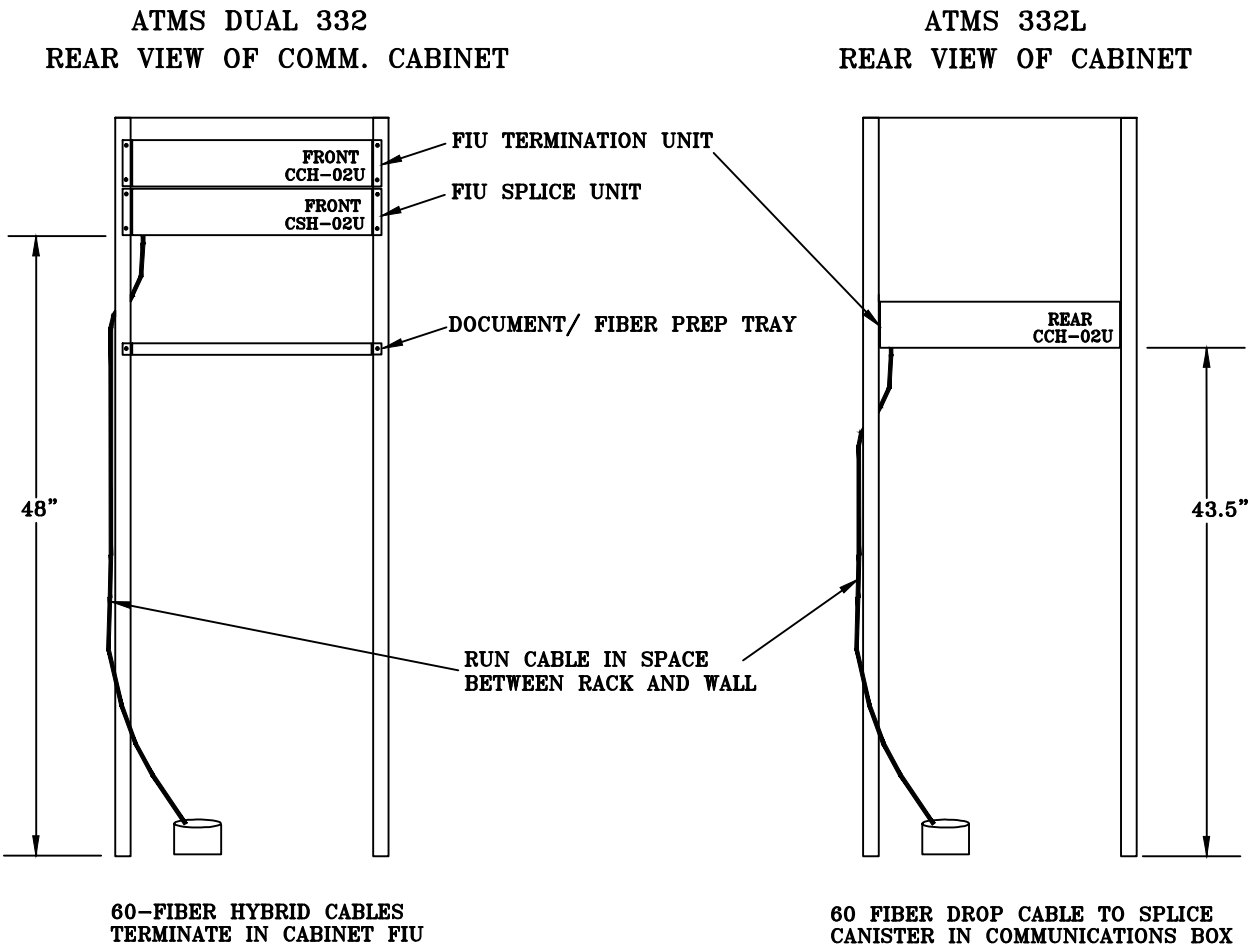

1. ATMS DUAL 332 CABINETS: 60-FIBER HYBRID CABLES TERMINATE IN CABINET FIU.
2. ATMS 332L CABINETS: 6-FIBER HYBRID CABLES TERMINATE IN SPLICE CANISTER (CORNING SCF-6C22-01), SPLICE TRAY (CORNING SCF-ST-099), AND 60 FIBER HYBRID DROP CABLE TERMINATE IN CABINET FIU.
3. ALL FIBERS ARE TO BE SPLICED AND TERMINATED PER THE CITY PROVIDED FIBER CHART.
4. A MAXIMUM OF 6 FUSION SPLICES ARE TO BE PLACED IN EACH SPLICE TRAY.
5. SPLICE TRAYS ARE TO BE INSTALLED INTO SPLICE ADAPTER AND SECURED WITH VELCRO WRAPS PER MANUFACTURER SPECIFICATIONS.
6. FIBER SPLICING AND TERMINATION TO CONFORM TO MANUFACTURER SPECIFICATIONS.
7. 12-FIBER SINGLE MODE SLACK TO BE SEALED AND LEFT IN COMMUNICATIONS BOX.
8. ALL CABLE SLACK TO REMAIN IN COMMUNICATIONS BOX, NO SLACK COILS IN CABINET.

ATMS CABINET INTERCONNECT TERMINATION

TS-10A

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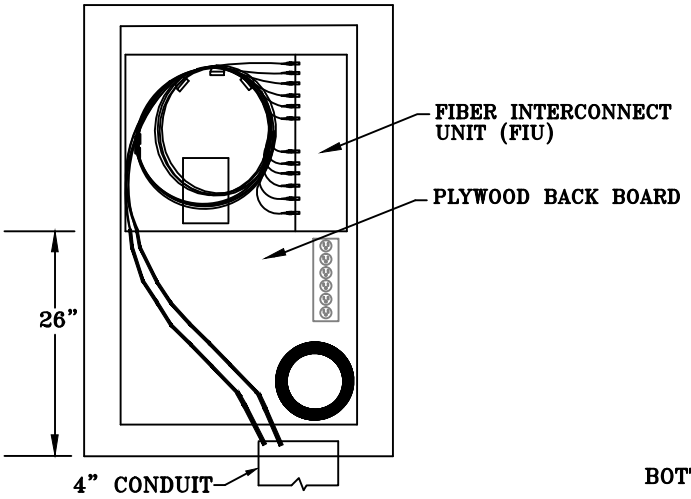
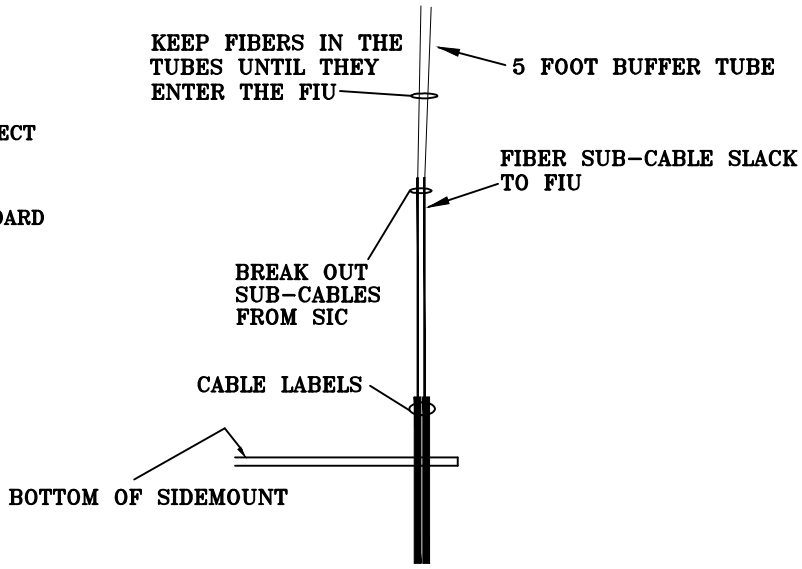
SIDE MOUNT CABINET
INTERCONNECT TERMINATION CABINET ENCLOSURE



CABLE BREAKOUT
(OLD HYBRID FIBER/ COPPER CABLE SHOWN)



1. ALL FIBERS ARE TO BE SPLICED AND TERMINATED PER THE CITY PROVIDED FIBER CHART.
2. A MAXIMUM OF 6 FUSION SPLICES ARE TO BE PLACED IN EACH SPLICE TRAY.
3. SPLICE TRAYS ARE TO BE INSTALLED INTO FIU SPLICE ADAPTER AND SECURED WITH VELCRO WRAPS PER MANUFACTURER SPECIFICATIONS.
4. FIBER SPLICING AND TERMINATION TO CONFORM TO MANUFACTURER SPECIFICATIONS.
5. 12-FIBER SINGLE MODE SLACK TO BE SEALED AND LEFT IN COMMUNICATIONS BOX.
6. ALL CABLE SLACK TO BE LEFT IN COMMUNICATIONS BOX, NO SLACK COILS IN CABINET.

TYPE P CABINET INTERCONNECT TERMINATION

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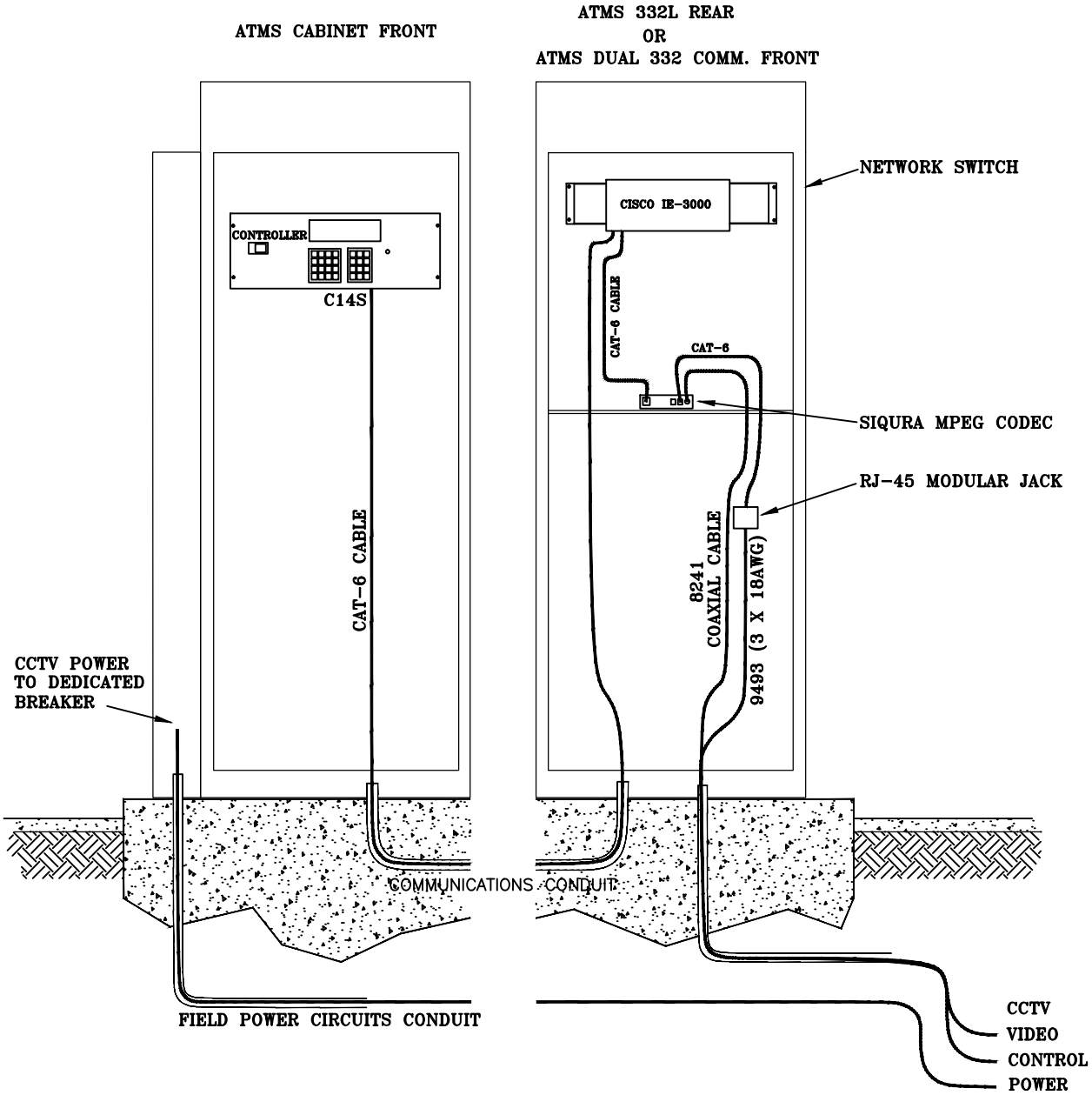

1. DELIVER CONTROLLER, SWITCH AND MPEG CODEC TO CITY FOR CONFIGURATION AT LEAST 5-DAYS PRIOR TO TURN-ON. COORDINATE WITH SIGNAL OPERATIONS & MAINTENANCE: 949-724-7649
2. OBTAIN FIBER CHART FOR SIGNAL INTERCONNECT TERMINATION FROM CITY: 949-724-7649
3. CONTROLLER ETHERNET COMMUNICATIONS (C14S) CONNECTS TO SWITCH PORT 1
4. MPEG CODEC COMMUNICATIONS CONNECTS TO SWITCH PORT 9
5. OPERATIONAL TESTING: VERIFY CCTV CAMERA, MPEG SYSTEM, AND CONTROLLER COMMUNICATIONS OPERATIONAL ON-SITE.
6. VERIFY OPERATION OF ALL EQUIPMENT ON NETWORK WITH SYSTEMS SUPPORT STAFF: 949-724-7649

ATMS CABINET COMMUNICATION

TS-11A

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MARK CARROLL, R.C.E. 31515
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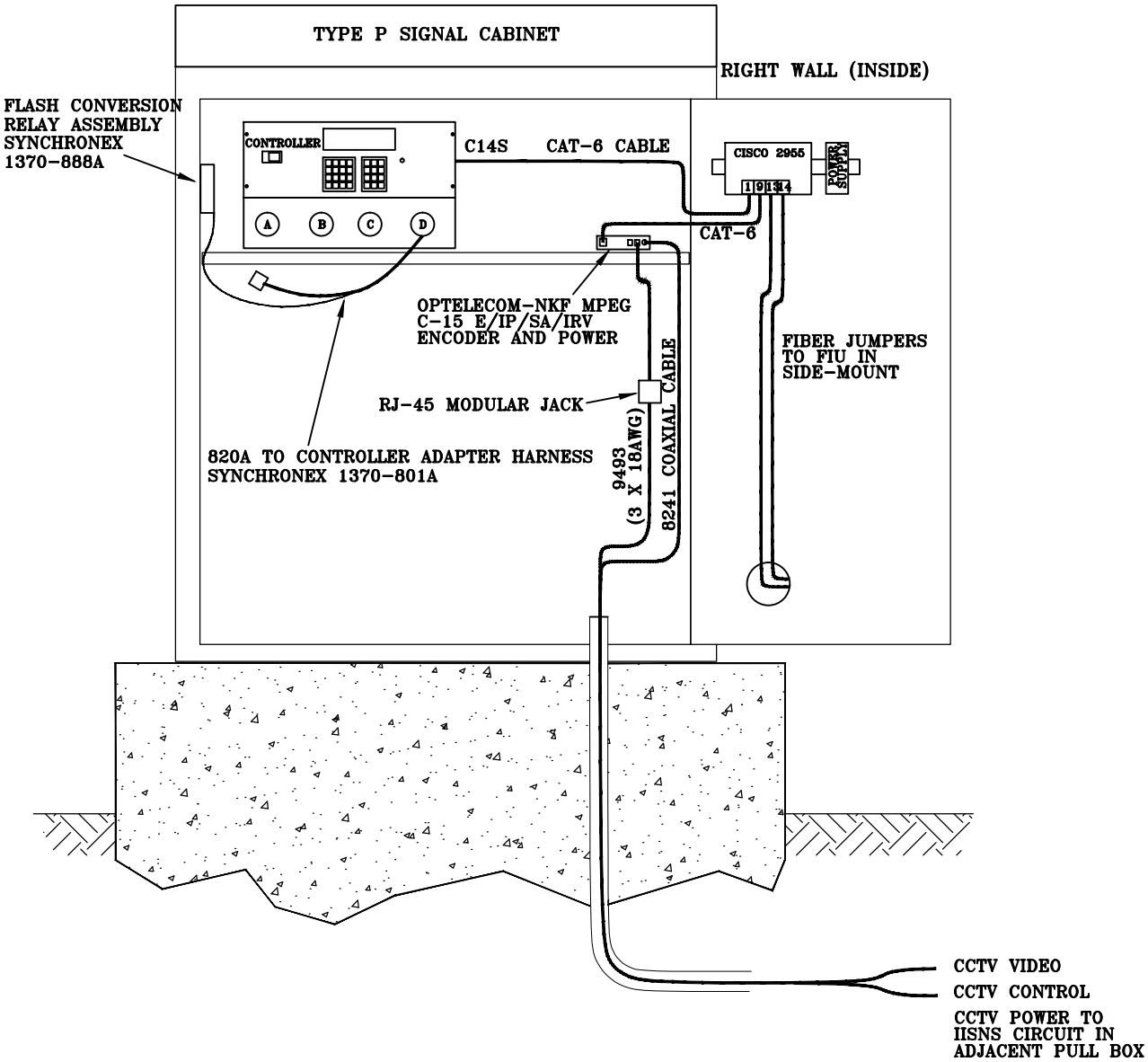
CITY OF IRVINE
PUBLIC WORKS



1. DELIVER CONTROLLER, SWITCH, AND MPEG CODEC TO CITY FOR CONFIGURATION AT LEAST 5-DAYS PRIOR TO TURN-ON. COORDINATE WITH SIGNAL OPERATIONS & MAINTENANCE: 949-724-7649
2. OBTAIN FIBER CHART FOR SIGNAL INTERCONNECT TERMINATION FROM CITY: 949-724-7649
3. CONTROLLER INSTALLATIONS REQUIRE AN 820A TO CONTROLLER D ADAPTER HARNESS, SYNCHRONEX 1370-801A OR EQUIVALENT.
4. CONTROLLER INSTALLATIONS REQUIRE A FLASH SIGNAL CONVERSION RELAY AND HARNESS, SYNCHRONEX 1370-888A OR EQUIVALENT.
5. CONTROLLER ETHERNET COMMUNICATIONS (C14S) CONNECTS TO SWITCH PORT 1
6. MPEG ENCODER COMMUNICATIONS CONNECTS TO SWITCH PORT 9
7. MPEG DECODER (FOR PRE-ACCEPTANCE TESTING) CONNECTS TO SWITCH PORT 10
8. OPERATIONAL TESTING: VERIFY CCTV CAMERA, MPEG SYSTEM AND CONTROLLER COMMUNICATIONS OPERATIONAL ON-SITE.
9. VERIFY OPERATION OF ALL EQUIPMENT ON NETWORK WITH CITY SUPPORT STAFF: 949-724-7649

TYPE P CABINET COMMUNICATIONS

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CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
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