



CITY OF SAN DIEGO
MASTER USE AND OCCUPANCY AGREEMENT

between

THE CITY OF SAN DIEGO

and

MOBILITIE, LLC,
a Nevada limited liability company

for

Small Cell Installations on City-owned Poles

**CITY OF SAN DIEGO
MASTER SMALL CELL USE AND OCCUPANCY AGREEMENT**

This CITY OF SAN DIEGO MASTER USE AND OCCUPANCY AGREEMENT (“Master Agreement”) is entered into by and between THE CITY OF SAN DIEGO, a California municipal corporation (“CITY”), and Mobilitie, LLC, a Nevada limited liability company (“PERMITTEE”), hereinafter collectively referred to as the “Parties,” to be effective on the first day of the first month following the date of execution by CITY (“Effective Date”), once the Master Agreement is signed by the San Diego City Attorney.

RECITALS

- A. CITY is the record owner of certain public rights-of-way within the City of San Diego.
- B. PERMITTEE desires to erect, maintain and operate within the CITY’s public rights-of-way Small Cell wireless communication facilities, including utility lines, transmission lines, electric light poles to support antennas, electronic equipment, and transmitting and receiving antennas, which facilities are more fully defined below as “Communications Equipment.”
- C. PERMITTEE represents that it is designated by the California Public Utilities Commission (“PUC”) as a “Competitive Local Exchange Carrier” (“CLEC”); and PERMITTEE further represents that, pursuant to that designation, PERMITTEE qualifies as a “Public Utility” under the California Public Utilities Code.
- D. CITY is willing to grant PERMITTEE this Master Agreement for the right to use portions of CITY’s public right-of way for the construction, operation and maintenance of the Communications Equipment (defined below), including attaching the Communications Equipment to CITY Street Light or Signalized Poles in order to allow PERMITTEE to provide better service to its wireless customers
- E. Notwithstanding anything to the contrary contained in this Master Agreement, no provision contained herein shall be construed to mean that PERMITTEE is paying a use fee for any ground space portion of the public right-of-way.

FOR VALUABLE CONSIDERATION, the sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. DEFINITIONS.

As used in this Master Agreement, the terms listed below are defined as follows:

- 1.1. “Approved Site” – a Site (defined below) for which all approvals required for construction or installation to commence have been obtained.

- 1.2. "Communications Equipment" – includes, but is not limited to, PERMITTEE'S antennas, mounting brackets, equipment enclosures, AC disconnects, flexible metal conduits, grounding plates, grounding wires, grounding pipes, coils, NEMA boxes, and fiber optic cables installed by PERMITTEE, more particularly described in Exhibit B as may be updated from time to time at CITY's sole discretion.
- 1.3. "Emergency" – imminent danger to the public health, safety or welfare or property.
- 1.4. "Hazardous Substances" – those hazardous substances listed by the Environmental Protection Agency ("EPA") in regularly released reports and any other substances incorporated into the State of California's list of hazardous substances, and all types of petroleum-related substances and their chemical constituents.
- 1.5. "Permit Areas" – Up to a maximum of 1500 various CITY-owned Sites (defined below), more particularly described in Exhibit A and described in Exhibit B as updated from time to time.
- 1.6. "PERMITTEE's Operations" – PERMITTEE's development, occupancy, use, and/or maintenance of the Permit Areas.
- 1.7. "Signalized Pole" - any pole equipped with either vehicle signal indications, pedestrian signal indications, pedestrian pushbuttons, emergency vehicle preemption equipment, or any other components that comprise any part of a traffic signal/traffic control device that serves to control and direct traffic, including pedestrian traffic, by display of steady or flashing lighted indications.
- 1.8. "Site" – a Street Light Pole (defined below) or a Signalized Pole (defined above), where the Communications Equipment may be installed pursuant to this Master Agreement.
- 1.9. "Street Light Pole" – any Caltrans Type 15 pole (rounded, metal) street light pole that has a luminaire arm and luminaire for the purpose of providing roadway lighting in accordance with City Standard Drawing SDE-101 the ownership of which shall be retained by the CITY.

2. USE OF PERMIT AREAS.

PERMITTEE shall use the Permit Areas solely for the purposes, with proper permits and approvals obtained, of installing, constructing, modifying, operating, maintaining, and removing, all at PERMITTEE's sole cost and expense, the Communications Equipment ("Permit Use") only as described in Exhibit B.

- 2.1. Primary Purpose of Sites. Any Street Light Pole is for the primary purpose of providing lighting and in some instances traffic control, and any Signalized Pole is for the primary purpose of traffic control, but either may have the secondary purpose of accommodating PERMITTEE's Operations at the Permit Area.
- 2.2. Other Uses. PERMITTEE shall not operate the Communications Equipment or use the Permit Areas for other related or incidental activities of any kind without CITY's prior

written consent, which consent shall be in CITY's sole discretion. Communications Equipment shall not interfere with the operation of the Street Light, or cause visual impairment, distraction, or confusion to motorists.

- 2.3. No Nuisance. PERMITTEE shall not use the Permit Area in any manner which creates a nuisance, as defined in California Civil Code Section 3479.
- 2.4. No Limitation. Nothing contained in this Master Agreement shall be construed as a limitation, restriction or prohibition against CITY entering into agreements with other parties regarding the use of the Permit Areas, Sites or other facilities or the CITY issuing permits for the use of its rights-of-way.

3. RIGHT TO ENTER AND OCCUPY.

Subject to the terms and conditions of this Master Agreement, CITY hereby grants permission to PERMITTEE, its officers, employees, agents, and contractors to enter upon and occupy the Permit Areas solely for the purpose of the Permit Use.

- 3.1. License Only. This Master Agreement is a license to use CITY-owned property. It is not a lease.

4. TERM.

The term of this Master Agreement ("Term") shall not exceed ten (10) years, commencing on the Effective Date. "Agreement Year" shall mean each twelve (12) month period during the Term, commencing on the month and day of the Effective Date and continuing to the same month and day of the following year, minus one (1) calendar day.

- 4.1. Holdover. Any holding over by PERMITTEE after expiration or termination shall not be considered as a renewal or extension of this Permit. The occupancy of the of the Site after expiration or termination shall continue, and all other terms and conditions of this agreement shall continue in full force and effect; provided, however, CITY shall have the right to apply a reasonable increase in rent to bring the rent to fair market value and to terminate the holdover at will. Calculation of all prorated rents under this section shall be based on a 30-day month. Notice of any such increase in rent shall be given in writing at least thirty (30) days prior to becoming effective.

5. ANNUAL USE FEE.

PERMITTEE shall pay to CITY an Annual Use Fee in the amount of \$270.00 per Approved Site ("Annual Fee"). The Annual Fee will be calculated from the Effective Date, and shall be paid within thirty (30) calendar days of the Effective Date for the first Permit Year. The Annual Fee will be prorated for any Site that was not an Approved Site for the entire twelve-month period. Calculation of all prorated rents under this section shall be based on a 30-day month.

- 5.1. Time and Place of Payment. The Annual Use Fee is due in advance on or before the first

day of each Agreement Year during the Term (referred to hereinafter as the "Annual Payment"). The Annual Use Fee check shall be made payable to "City Treasurer" and delivered to the Office of the City Treasurer, Civic Center Plaza Building, 1200 Third Avenue, First Floor, San Diego, California 92101, or mailed with an invoice to:

The City of San Diego
Office of the City Treasurer
P.O. Box 129030
San Diego, California 92112-9030

PERMITTEE shall include CITY's customer project account number for PERMITTEE on each of the checks used for the Annual Payment so CITY can apply the Annual Payment to the appropriate account. The place of payment may be changed at any time by CITY upon thirty (30) calendar days written notice to PERMITTEE. Mailed Annual Payments shall be deemed paid upon the date the payments are postmarked by the postal authorities. If a postmark is illegible, the payment shall be deemed paid upon actual receipt by the City Treasurer. PERMITTEE assumes all risk of loss and responsibility for late payment charges if payments are made by mail.

- 5.2. Delinquent Payments. If PERMITTEE fails to pay the Annual Payment when due, PERMITTEE shall pay, in addition to the unpaid Annual Payment, five percent (5%) of the delinquent Annual Payment. If any portion of the Annual Payment is still unpaid fifteen (15) calendar days after the first day of the Permit Year, PERMITTEE shall pay an additional five percent (5%), for a total of ten percent (10%) of the delinquent Annual Payment, which is agreed by the Parties to be appropriate to compensate CITY for loss resulting from fee delinquency, including lost interest, opportunities, legal costs, and the cost of servicing the delinquent account. In no event shall the charge for late payments of the Annual Use Fee be less than \$25 (Twenty-Five Dollars). Acceptance of late charges and any portion of the late payment by CITY shall neither constitute a waiver of PERMITTEE's default with respect to late payment nor prevent CITY from exercising any other rights and remedies available at law or in equity.
- 5.3. Records. PERMITTEE shall maintain, in accordance with generally accepted accounting practices, complete and accurate financial records and other documents reasonably necessary to support all sums paid pursuant to this Agreement. To the extent necessary to confirm compliance with the terms of this Agreement, PERMITTEE shall make all such records available to CITY, promptly upon request, for inspection and audit at a reasonable location and time so that CITY can determine PERMITTEE's compliance with this Master Agreement. PERMITTEE shall maintain all such records for a minimum period of five (5) years past the expiration or earlier revocation or termination of this Master Agreement. This section shall survive the expiration or earlier revocation or termination of this Master Agreement. Failure to maintain records, make them reasonably available for inspection, or provide summary schedules and supporting documentation requested by CITY as reasonably necessary pursuant to this section, is a breach of this Agreement and cause for termination.

6. INSURANCE.

PERMITTEE shall not begin any work on any portion of the Permit Areas until it has: (a) provided to CITY insurance certificates reflecting evidence of all insurance required below; however, CITY reserves the right to request, and PERMITTEE shall submit, copies of any policy upon reasonable request by CITY; (b) obtained CITY approval of each insurance company or companies; and (c) confirmed with CITY that all policies contain the specific provisions required below. PERMITTEE's liabilities, including, but not limited to, PERMITTEE's indemnity obligations, under this Master Agreement, shall not be deemed limited in any way to the insurance coverage required herein. Maintenance of specified insurance coverage is a material element of this Master Agreement and PERMITTEE's failure to maintain or renew coverage or to provide evidence of renewal during the Term may be treated as a material breach of contract by CITY. PERMITTEE shall not modify any policy or endorsement thereto which increases CITY's exposure to loss for the Term.

6.1. Types of Insurance: At all times during the term of this Master Agreement, the PERMITTEE shall maintain insurance coverage as follows:

- a. Commercial General Liability (CGL). Insurance written on an ISO Occurrence form CG 00 01 07 98 or an equivalent form providing coverage at least as broad which shall cover liability arising from any and all personal injury or property damage in the amount of \$2 million per occurrence and subject to an annual aggregate of \$4 million. There shall be no endorsement or modification of the CGL limiting the scope of coverage for either insured vs. insured claims or contractual liability. All defense costs shall be outside the limits of the policy.
- b. Commercial Automobile Liability. For all of PERMITTEE's automobiles including owned, hired and non-owned automobiles, PERMITTEE shall keep in full force and effect automobile insurance written on an ISO form CA 00 01 12 90 or a later version of this form or an equivalent form providing coverage at least as broad for bodily injury and property damage for a combined single limit of \$1 million per occurrence. The insurance certificate shall reflect coverage for any automobile (any auto).
- c. Workers' Compensation. For all of PERMITTEE employees who are subject to this Master Agreement and to the extent required by the applicable state or federal law, PERMITTEE shall keep in full force and effect a Workers' Compensation policy. That policy shall provide a minimum of \$1 million of employers' liability coverage, and PERMITTEE shall provide an endorsement that the insurer waives the right of subrogation against CITY and its respective elected officials, officers, employees, agents and representatives.

6.2. Deductibles: All deductibles on any policy shall be the responsibility of PERMITTEE and shall be disclosed to CITY at the time the evidence of insurance is provided.

6.3. Acceptability of Insurers: Except for the State Compensation Insurance Fund, all insurance required by this Master Agreement shall only be carried by insurance companies with a rating of at least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State of California, and

that have been approved by CITY. CITY will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State of California and is included on the List of Eligible Surplus Lines Insurers (LESLI list). All policies of insurance carried by non-admitted carriers are subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

- 6.4. Modification: To assure protection from and against the kind and extent of risk existing with PERMITTEE's Operations, CITY, at its reasonable discretion, may require the revision of amounts and coverage at any time by giving PERMITTEE thirty (30) days prior written notice. PERMITTEE shall also obtain any additional insurance required by CITY for new improvements, changed circumstances, or CITY'S reasonable re-evaluation of risk levels related to the Site.
- 6.5. Accident Reports: PERMITTEE shall immediately report to CITY any accident causing property damage or injury to persons on the Permit Areas or otherwise related to PERMITTEE's Operations. Such report shall contain the names and addresses of the involved parties, a statement of the circumstances, the date and hour of the accident, the names and addresses of any witnesses, and other pertinent information.
- 6.6. Required Endorsements: The following endorsements to the policies of insurance are required to be provided to CITY before any work is initiated under this Master Agreement.

6.6.1. Commercial General Liability Insurance Endorsements:

- i. Additional Insured: To the fullest extent allowed by law, including, but not limited to, California Insurance Code Section 11580.04, the policy or policies must be endorsed to include as an Additional Insured the City of San Diego and its respective elected officials, officers, employees, agents and representatives with respect to liability arising out of (a) ongoing operations performed by PERMITTEE or on PERMITTEE's behalf, (b) PERMITTEE's products, (c) PERMITTEE's work, including, but not limited to, PERMITTEE's completed operations performed by PERMITTEE or on PERMITTEE's behalf, or (d) premises owned, leased, controlled or used by PERMITTEE.
- ii. Primary and Non-Contributory Coverage: The policy or policies must be endorsed to provide that the insurance afforded by the Commercial General Liability policy or policies is primary to any insurance or self-insurance of the City of San Diego and its elected officials, officers, employees, agents and representatives with respect to the operations of the named insured. Any insurance maintained by the City of San Diego and its elected officials, officers, employees, agents and representatives shall be in excess of PERMITTEE's insurance and shall not contribute to it.
- iii. Severability of Interest. The policy or policies must be endorsed to provide that PERMITTEE's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with

respect to the limits of the insurer's liability and shall provide cross- liability coverage.

6.6.2. Automobile Liability Insurance Endorsements:

- i **Additional Insured.** To the fullest extent allowed by law, including, but not limited to, California Insurance Code Section 11580.04, the policy or policies must be endorsed to include as an Additional Insured the City of San Diego and its respective elected officials, officers, employees, agents and representatives with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of PERMITTEE.
- ii **Severability of Interest.** The policy or policies must be endorsed to provide that PERMITTEE's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross- liability coverage.

7. PERMITTEE's RISK.

PERMITTEE shall bear all risks and liability arising out of or in any manner directly or indirectly connected with PERMITTEE's Operations and any damages to the improvements on, under, or in the vicinity of the Permit Areas resulting directly or indirectly thereby.

8. ACCEPTANCE OF PERMIT AREAS.

PERMITTEE represents and warrants that PERMITTEE has independently inspected the Site and Pole Attachment Area and made all tests, investigations, and observations necessary to satisfy itself of the condition of the Site and Pole Attachment Area and their suitability for the Allowed Uses. PERMITTEE acknowledges and agrees that PERMITTEE is not relying on any representation by CITY as to the condition of the Site or Pole Attachment Area or their suitability for the Allowed Uses, and PERMITTEE agrees that PERMITTEE is relying solely on its independent inspections, tests, investigations, and observations in entering into this Permit.

PERMITTEE acknowledges that the Site and Pole Attachment Area are in the condition called for herein, that CITY has performed all work with respect to the Site and Pole Attachment Area that is necessary and/or required by this Permit, and that PERMITTEE shall not hold CITY responsible for any defects, whether apparent or latent, in the Site and/or Pole Attachment Area. PERMITTEE accepts and assumes all risk of harm to all persons and property, including without limitation, PERMITTEE'S employees, from and defects within the Site and Pole Attachment Area, and shall be solely responsible therefor. PERMITTEE has been given the opportunity to investigate the Site and Pole Attachment Area for the presence of any Hazardous Substances, including, without limitation, the opportunity to perform soil borings and other tests. PERMITTEE shall notify CITY if PERMITTEE'S investigations indicate the presence of any substances on the Site and Pole Attachment Area. PERMITTEE waives any claims against CITY which may result from the presence of Hazardous Substances on the Site and Pole Attachment Area.

9. DEVELOPMENT OF SITES AND MODIFICATION OF PERMIT AREA.

- 9.1. Approved Sites. Prior to the execution of this Master Agreement, and at any time during the first five (5) years of the Term of this Master Agreement that PERMITTEE desires to add Sites to the Permit Area up to the maximum number of 1500 Sites, PERMITTEE shall provide to CITY's Real Estate Assets Department a list of Approved Sites that PERMITTEE request be included in the Permit Area of this Master Agreement. A list of all Approved Sites shall be attached hereto as Exhibit A, which shall be updated chronologically as Exhibit A-1, Exhibit A-2, etc., as PERMITTEE obtains additional Approved Sites, without the necessity of a formal amendment, provided that the Communications Equipment being installed on the Approved Sites complies with the Master Structural Plan attached as Exhibit B, or any approved updates thereto PERMITTEE acknowledges and understands that all requests for amendments to the Master Agreement, including those related to adding Approved Sites on which the Communications Equipment does not comply with the approved Master Structural Plan will be subject to appropriate environmental review subject to the California Environmental Quality Act.
- 9.2. Master Structural Plan. In lieu of site plans for each individual Approved Site, PERMITTEE shall provide to CITY, prior to the execution of this Master Agreement, a proposed Master Structural Plan which contains full and complete design plans that show all of the equipment that PERMITTEE proposes to install or construct in the Permit Area, which shall be attached as Exhibit B. Upon approval of the Master Structural Plan, PERMITTEE shall provide an approved Master Structural Plan to CITY which shall replace the proposed Master Structural Plan as Exhibit B. Within fourteen (14) calendar days of the completion of the installation and development of an Approved Site, PERMITTEE shall notify CITY's Real Estate Assets Department in writing that the Approved Site is installed and operating. If during the Term of this Master Agreement, PERMITTEE desires to modify the equipment that is being placed on an Approved Site from what is shown in the approved Master Structural Plan, PERMITTEE shall do the following:
 - 9.2.1. Minor Modifications. If the new equipment is the same size or smaller in all dimensions and weighs the same or less than the equipment previously approved through the Master Structural Plan, PERMITTEE may submit a form factor drawing with sufficient information for READ to determine the actual size, weight, location, and aesthetics of the new equipment in the Permit Area. PERMITTEE acknowledges that this form factor drawing, which may be sufficient for the City as the property owner to approve the amendment may not be sufficient for DSD to review and approve construction permits, and this requirement does not relieve PERMITTEE of its obligations to provide DSD staff with all required information for review and issuance of regulatory permits (construction, right-of-way, or any other type of permit determined necessary by DSD). Subject to the foregoing, the CITY will either consent to or deny consent, in its reasonable discretion, to the requested Minor Modification in writing within thirty (30) days of receiving the form factor drawing, provided that any applicable review required by CEQA has been completed and any associated appeal periods have run without an appeal being filed.

- 9.2.2. Major Modifications. If the new equipment is larger in any dimension than the previously approved equipment, or if the new equipment weighs more than the previously approved equipment, PERMITTEE shall prepare a new Master Structural Plan and submit that plan at the time the application for amendment of the MUOA is submitted to READ. Subject to the foregoing, the CITY will either consent to or deny consent, in its sole discretion, to the requested Major Modification in writing within thirty (30) days of receiving the form factor drawing, provided that any applicable review required by CEQA has been completed and any associated appeal periods have run without an appeal being filed.
- 9.3. PERMITTEE shall not develop any Approved Site in the Permit Areas unless and until this Master Agreement) has been executed (or if applicable, amended) by the Parties, and approved by the San Diego City Attorney. PERMITTEE shall develop each Site in the Permit Areas in accordance with the Master Structural Plan and any modifications authorized for the specific Approved Site(s). CITY may, in its sole discretion, authorize changes to the Master Structural Plan, or specific site plans, provided the principal components thereof are not modified, and a document evidencing approved changes is filed with READ.

10. IMPROVEMENTS AND ALTERATIONS.

Other than as approved by the site plans depicted in Exhibit B, PERMITTEE shall not construct any improvements, structures, or installations in the Permit Areas, or make any alterations to the Permit Areas (with the exception of necessary maintenance and/or repairs that does not include swapping out or replacing any of the Communications Equipment) without CITY's prior written consent, which consent shall be in CITY's sole discretion. This includes modifications that are considered "eligible facilities" under Section 6409 of the Middle Class Tax Relief and Job Creation Act. PERMITTEE shall not make any structural or architectural design alterations to approved improvements, structures, or installations in the Permit Areas without CITY's prior written consent, which consent shall be in CITY's sole discretion. CITY shall not be obligated by this Master Agreement to make, or assume any expense for, any improvements or alterations.

- 10.1. Alterations to Communications Equipment. PERMITTEE shall not make any alterations, additions or improvements to the Communications Equipment, except for routine maintenance that does not include swapping out or replacing any of the Communications Equipment, unless: (1) PERMITTEE obtains CITY's prior written consent, which consent shall be in CITY's sole discretion; (2) the alterations, additions or improvements do not damage or interfere with any adjacent improvements in the Permit Areas; and (3) the alterations, additions or improvements comply with the requirements set forth in Exhibit C. Nothing in this section shall be construed to eliminate PERMITTEE's obligation to obtain development related permits and approvals for any alterations to the Communications Equipment that may be required by CITY's Development Services Department or any other governmental agency. CITY, in its proprietary capacity, through READ, retains the right to deny any request for modification or alteration of a Site as a proprietary right, even if CITY's DSD is required by federal law to approve or permit such request.
- 10.2. Information to Permitting Authorities. In obtaining any required permits for

improvements, structures, installations, and/or alterations in the Permit Areas, PERMITTEE shall inform permitting authorities, in writing, that the Permit Areas are CITY-owned property.

- 10.3. Repair and Restoration. Nothing in this section shall relieve PERMITTEE of any obligation under this Master Agreement to maintain the Permit Areas in a decent, safe, healthy, and sanitary condition, as required in Section 18 of this Master Agreement.
- 10.4. Emergency. In the event of an Emergency, as soon as practicable thereafter and not later than two (2) business days after having taken such action, PERMITTEE shall advise CITY in writing of the emergency work performed or the action taken with respect to any emergency modification or alteration of PERMITTEE's Communications Equipment. PERMITTEE shall acquire any necessary permits, if any, to cover the emergency work performed.
- 10.5. Accidental Damage by CITY. In the event CITY should cut or damage PERMITTEE's communication line, PERMITTEE agrees to perform all repairs expeditiously, no later than twenty-four (24) hours from notice of cut. Simultaneously, CITY agrees to cease any and all work to the affected portion of the Permit Areas for a maximum of twenty-four (24) hours or until PERMITTEE completes all repairs, whichever is less.

11. COMPETENT MANAGEMENT.

Throughout the Term, PERMITTEE shall provide competent management of the Permit Areas for the Permit Use to the reasonable satisfaction of CITY. "Competent management" shall mean demonstrated ability in the management and operation of wireless communication facilities and related activities in a responsible manner and in accordance with industry standards.

12. COMPLIANCE WITH LAWS AND POLICIES.

- 12.1. General. PERMITTEE's Operations shall, at all times, comply with all applicable laws, statutes, ordinances, and regulations of CITY, county, state, and federal governments, at PERMITTEE's sole cost and expense. Upon receipt of the same, PERMITTEE shall comply with any and all notices issued by CITY under the authority of all laws, statutes, ordinances, or regulations.
- 12.2. Nondiscrimination/Equal Opportunity. PERMITTEE shall not discriminate in any manner against any person or persons on account of race, color, religion, gender, gender identity, gender expression, sexual orientation, medical status, national origin, age, marital status, or disability in PERMITTEE's Operations.

13. WATER QUALITY ASSURANCES.

CITY and PERMITTEE are committed to the implementation of controls (best management practices, or BMPs) to manage activities on the Site and Permit Area in a manner which aids in the protection of the City of San Diego's precious water resources. It is PERMITTEE's responsibility to identify and implement an effective combination of BMPs so as not to cause pollutant discharges to the storm drain system in violation of San Diego Storm Water

Management and Discharge Control Ordinance (San Diego Municipal Code Section 43.0301 to 43.0312).

Therefore, PERMITTEE shall at a minimum implement and comply, as applicable, with the Minimum Industrial and Commercial BMPs adopted under the San Diego Municipal Code Section 43.0307(a).

It is ultimately PERMITTEE's responsibility to prevent pollutant discharges to the storm drain system. Therefore, PERMITTEE will identify and implement any additional BMPs that may be required to avoid the discharge of pollutants to the storm drain system.

14. TELECOMMUNICATIONS PROVISIONS.

- 14.1. Entire Installation. PERMITTEE warrants that the Communications Equipment listed in Exhibit B constitutes the entire installation at each Site within the Permit Areas. PERMITTEE shall update Exhibit B from time to time as any changes to the Communications Equipment are made, or within thirty (30) calendar days after CITY's demand for such an update. No changes to the Communications Equipment shall be made without first obtaining written approval by CITY.
- 14.2. Radio Frequency Radiation. PERMITTEE shall maintain any radio frequency ("RF") radiation associated with the Communications Equipment within the levels allowed by federal regulations set forth in Section 1.1310 of CFR 47 and OET Bulletin 65. Any portion of the Permit Areas casually accessible by the general public or by any worker at ground level shall be maintained below limits stated for General Population/Uncontrolled Exposure. PERMITTEE shall report to CITY any portion of the Permit Areas discovered by PERMITTEE to exceed these federally mandated limits. PERMITTEE shall defend and hold CITY harmless for any liabilities, fines or other penalties claimed or imposed against CITY that result from the existence of excessive levels of radiation that are caused in whole or in part, or contributed to, by PERMITTEE's Operations. Hazardous RF radiation levels may be encountered when climbing on antenna structures (refer to FCC OET Bulletin 65). Any equipment installed within the Permit Areas may, at times, require shutdown to allow maintenance on antenna structures. PERMITTEE shall allow shutdown periods when required for this maintenance, provided CITY shall use reasonable efforts to ensure that these shutdowns do not occur during peak hours of operation. Protection of employees performing service on buildings, roofs, air-conditioning equipment, water tanks, communications equipment, or any other maintenance work is a primary concern. Any areas in which these employees may be subjected to radiation levels that exceed the General Population/Uncontrolled Exposure limits must be clearly identified as required by CAL-OSHA. PERMITTEE shall provide CITY with written shutdown procedures, contact names, and telephone numbers. PERMITTEE shall notify CITY, in writing, of any changes to the shutdown procedures, contact names, or telephone numbers at least ten (10) calendar days prior to such a change. Once the installation is complete, the PERMITTEE shall perform an on-air test and provide documentation to demonstrate that the communications equipment is operating within federally mandated limits. After the initial test, the PERMITTEE shall perform an on-air test within fifteen days of CITY requesting such a test.

- 14.3. Radio Frequency Interference. PERMITTEE warrants that all Communications Equipment installations, modifications, operation, and maintenance will not result in degraded performance or RF interference to any existing authorized uses within the Permit Areas by fulfilling the requirements of Exhibit C, which may be updated from time to time in CITY's sole discretion.
- 14.4. Industry Standards. PERMITTEE shall perform all Communications Equipment installations, modifications, operation, and maintenance in adherence to industry standards set by the "Standards and Guidelines for Communications Sites" Motorola R56© Manual, or any succeeding regulations or standards. In addition to the requirements of the Motorola R56© publication, installations on CITY property shall comply with the following supplemental requirements:
- 14.4.1. PERMITTEE shall remove all of its trash and debris from the Permit Areas at the end of each workday and on completion of each project;
- 14.4.2. Tower and structure climbing shall be done in compliance with all CAL-OSHA requirements and General Orders promulgated by the CPUC; and
- 14.4.3. All transmitters shall have all necessary protection, such as cavity filtering and transmitter isolators, to eliminate any RF degradation of the receive signal to any other user within the Permit Areas.
- 14.5. Collocation. PERMITTEE shall not access any other wireless communication facility or CITY-owned communications equipment (including any towers) within the Permit Areas without CITY's prior written consent.
- 14.6. Interference with CITY Operations or Public Use. PERMITTEE's Operations shall not unreasonably interfere with CITY operations or public use of CITY-owned property.

15. WASTE, DAMAGE, OR DESTRUCTION.

PERMITTEE shall immediately give notice to CITY of any fire or any other damage that occurs on or within the Permit Areas that occurs either during or after the completion of construction of approved improvements. PERMITTEE shall not commit, or allow to be committed, any waste or injury or any public or private nuisance in connection with the Permit Use. PERMITTEE shall keep the Permit Areas clean and clear of refuse and obstructions, and dispose of all garbage, trash, and rubbish in a manner satisfactory to CITY. If any portion of the Permit Areas is damaged by any cause that puts any portion of the Permit Area into a condition which is not decent, safe, healthy, and sanitary, PERMITTEE shall make, or cause to be made, full repair of the damage and restore the Permit Areas to the condition which existed prior to the damage; or, at CITY's option, PERMITTEE shall clear and remove from the Permit Areas all debris resulting from the damage and restore the Permit Areas in accordance with plans and specifications previously submitted to and approved by CITY, in writing, in order to replace in kind and scope the operation which existed prior to the damage. PERMITTEE shall commence preliminary steps toward performing repairs and/or restoration of the Permit Areas as soon as practicable, but no later than ten (10) calendar

days after the occurrence of the fire or damage, and shall complete the required repairs and/or restoration of the Permit Areas within sixty (60) calendar days after such occurrence. Failure to timely repair damage to the Site and/or Permit Areas will be considered a default under the Master Agreement.

16. HAZARDOUS MATERIALS.

PERMITTEE shall not allow the illegal installation, storage, utilization, generation, sale or release of any Hazardous Substance or otherwise regulated substances in, on, under or from the Permit Areas by any of PERMITTEE's officers, employees, agents, contractors, invitees and guests. PERMITTEE and PERMITTEE's officers, employees, agents, contractors, invitees and guests shall not install, store, utilize, generate or sell any Hazardous Substance on the Permit Areas without CITY's prior written consent. PERMITTEE shall, prior to initiating any operations, obtain all required permits from applicable regulatory agencies, including without limitation the San Diego County Department of Environmental Health, local fire agencies, the San Diego County Department of Weights and Measures, the San Diego County Air Pollution Control District, and the San Diego Regional Water Quality Control Board. Installing, utilizing, storing, or any other presence of a Hazardous Substance includes boxes, bags, bottles, drums, cylinders, above or below ground tanks, equipment with tanks, or any other type of container, equipment or device which holds or incorporates a Hazardous Substance or hazardous waste.

- 16.1. Release. For all purposes of this Master Agreement, a "release" shall include without limitation any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or otherwise disposing of a Hazardous Substance.
- 16.2. Remediation. If PERMITTEE's occupancy, use, development, maintenance, or restoration of the Permit Areas results in a release of a Hazardous Substance, PERMITTEE shall pay all costs of remediation and removal to CITY's satisfaction for unrestricted reuse of the Permit Areas, and in accordance with all applicable laws, rules, and regulations of governmental authorities.
- 16.3. Removal. If PERMITTEE or PERMITTEE's officers, employees, agents, contractors, invitees and guests have received approval and permits to store, utilize, generate or install, or otherwise bring Hazardous Substances to the Permit Areas, PERMITTEE shall remove all Hazardous Substances in any type of container, equipment or device from the Permit Areas immediately upon or prior to the expiration or earlier termination of this Master Agreement. CITY reserves the right to conduct inspections of the Permit Areas and/or request documentation demonstrating the legal removal and/or disposal of the hazardous materials, wastes or other containers, equipment or devices from the Permit Areas. PERMITTEE shall be responsible for any and all costs incurred by CITY to remove any container, equipment or device requiring disposal or removal as required by this provision.
- 16.4. Indemnity. PERMITTEE shall protect, defend, indemnify, and hold CITY harmless from any and all claims, costs, and expenses related to environmental liabilities resulting from PERMITTEE's occupancy, use, development, maintenance, or restoration of the Permit Areas, including without limitation: (i) costs of environmental assessments; (ii) costs of regulatory remediation oversight; (iii) costs of remediation and removal; (iv) any necessary

CITY response costs; (v) all fines, penalties or fees assessed by any regulatory agency; (vi) damages for injury to natural resources, PERMITTEE's officers, employees, invitees, guests, agents or contractors, or the public; and (vii) all costs of any health assessments or health effect studies.

- 16.5. Notice of Release. If PERMITTEE knows or has reasonable cause to believe that a Hazardous Substance has been released on, from or beneath any portion of the Permit Areas, PERMITTEE shall immediately notify CITY and any appropriate regulatory or reporting agency pursuant to California Code of Regulations Title 19 and any other applicable laws or regulations. PERMITTEE shall deliver a written report thereof to CITY within three (3) days after receipt of the knowledge or cause for belief and submit any required written reports to regulatory or reporting agencies as required by regulation or law. If PERMITTEE knows or has reasonable cause to believe that such substance is an imminent release or is an imminent substantial danger to public health and safety, PERMITTEE shall take all actions necessary to alleviate the danger. PERMITTEE shall immediately notify CITY in writing of any violation, notice to comply, or notice of violation received or the initiation of environmental actions or private suits related to the Permit Areas.
- 16.6. Environmental Assessment. Upon reasonable cause to believe that PERMITTEE's occupancy, use, development, maintenance, or restoration of the Permit Areas resulted in any Hazardous Substance being released on, from or beneath any portion of the Permit Areas, CITY may cause an environmental assessment under regulatory oversight of the suspect area to be performed by a professional environmental consultant registered with the State of California as a Professional Engineer, Certified Engineering Geologist or Registered Civil Engineer. The environmental assessment shall be obtained at PERMITTEE's sole cost and expense, and shall establish what, if any, Hazardous Substances have more likely than not been caused by PERMITTEE's occupancy, use, development, maintenance, or restoration of any affected portion of the Permit Areas, and in what quantities. If any such Hazardous Substances exist in quantities greater than allowed by CITY, county, state or federal laws, statutes, ordinances or regulations, or require future restricted re-use of the Permit Areas, then the environmental assessment shall include a discussion of such substances with recommendations for remediation and removal necessary to effect unrestricted re-use and in compliance with those laws or statutes, and estimates of the cost of such remediation or removal. PERMITTEE shall cause, or if PERMITTEE fails to do so within a reasonable period of time, as determined by CITY in its sole discretion, then CITY may cause, the remediation and/or removal recommended in the environmental assessment such that unrestricted re-use of the Permit Areas and compliance with environmental laws and regulations are achieved, and PERMITTEE shall pay all costs and expenses therefor.

17. SIGNS.

PERMITTEE shall only post signs required by federal, state, or local regulations, including, without limitation, safety signs required by OSHA, FAA, CPUC and/or FCC. PERMITTEE shall not erect or display any banners, pennants, flags, posters, signs, decorations, marquees, awnings, or similar devices or advertising within the Permit Areas without CITY's prior written consent, which consent shall be in CITY's sole discretion. If any such unauthorized item is found within

the Permit Areas, PERMITTEE shall remove the item, at PERMITTEE's sole cost and expense, upon forty-eight (48) hours' notice by CITY, or CITY may then enter the Permit Areas and remove the item at PERMITTEE's sole cost and expense. PERMITTEE shall post a clearly marked sign at each Site within the Permit Areas indicating PERMITTEE's name and emergency telephone number.

18. MAINTENANCE OF PERMIT AREAS.

PERMITTEE shall, at its sole cost and expense, continuously maintain the Permit Areas throughout the Term. In doing so, PERMITTEE shall, at its sole cost and expense, make all repairs, restoration, and replacements (including structural repairs and restoration of damaged or worn improvements) necessary to maintain and preserve the Permit Areas in a decent, safe, healthy, and sanitary condition. All such maintenance, repairs, restoration, and replacements shall be completed to the satisfaction of CITY, in conformance with the depiction of the Permit Areas set forth in Exhibit A, the approved site plans set forth in Exhibit B, and in compliance with all applicable codes and standards of CITY, state, and federal agencies.

18.1. CITY Maintenance. CITY reserves the right to perform any needed routine maintenance within the Permit Areas at any time without providing notice to PERMITTEE, including, but not limited to, the replacement of light bulbs on a Street Light Pole. However, should CITY perform non-routine maintenance, including, but not limited to, the replacement of a Street Light Pole, CITY shall provide PERMITTEE with at least forty-eight (48) hours' notice prior to commencing the work (except in the event of an emergency, in which case, no prior notice shall be required, but CITY shall give PERMITTEE notice as soon as reasonably possible thereafter), and PERMITTEE shall comply with all applicable safety requirements issued by CITY to ensure the safety of CITY personnel performing such maintenance within the Permit Areas. In the event CITY's non-routine maintenance includes replacing a Street Light Pole, CITY shall give fifteen (15) days advance notice to PERMITTEE so that PERMITTEE may remove its Communications Equipment prior to the replacement of the Street Light Pole.

18.2. Maintenance Procedures for Parties. The Parties shall comply with the emergency maintenance procedures set forth in Exhibit D, including the requirement to notify the other party, in writing, of any changes to its emergency contacts and telephone numbers. PERMITTEE shall provide and install an emergency shut-off switch which will terminate electrical service to PERMITTEE's equipment, with the switch to be used only as set forth in Exhibit D.

19. ENTRY AND INSPECTION.

CITY may, at any time, enter the Permit Areas for the purpose of viewing and ascertaining the condition of the Permit Areas, or to protect CITY's interest in the Permit Areas, or to inspect the operations conducted within the Permit Areas. If CITY's entry or inspection discloses that any portion of the Permit Areas is not in a decent, safe, healthy, and sanitary condition, CITY may, after ten (10) calendar days written notice to PERMITTEE, have any necessary maintenance work

done in order to keep the Permit Areas in a decent, safe, healthy, and sanitary condition, all at PERMITTEE's sole cost and expense, and PERMITTEE shall promptly pay any and all costs incurred by CITY in having the necessary maintenance work done. If at any time CITY determines that any portion of the Permit Areas is not in a decent, safe, healthy, and sanitary condition, CITY may, in its sole discretion, without additional notice, require PERMITTEE to file with CITY a faithful performance bond to assure prompt correction of any condition which is not decent, safe, healthy, and sanitary. The bond shall be in an amount adequate, in CITY's opinion, to correct the unsatisfactory condition. PERMITTEE shall pay all costs associated with the bond. The rights reserved in this section shall not create any obligation on CITY or increase CITY's obligations elsewhere in this Master Agreement. As part of its standard practice, PERMITTEE shall schedule a pre-construction inspection and post-construction inspection for each Site within the Permit Areas.

20. UTILITIES.

PERMITTEE shall order, obtain, and pay for all utilities, including installation and service charges, in connection with PERMITTEE's Operations. All utilities shall be installed underground unless such existing utilities are aerial and shall be used for PERMITTEE's Operations only.

21. TAXES.

PERMITTEE shall pay, before delinquency, all taxes, assessments, and fees assessed or levied upon PERMITTEE or the Permit Areas, including the land, any buildings, structures, machinery, equipment, appliances, or other improvements or property of any nature whatsoever erected, installed, or maintained by PERMITTEE, or levied by reason of PERMITTEE's Operations, including any licenses or permits. PERMITTEE acknowledges that this Master Agreement may create a possessory interest subject to property taxation, and that PERMITTEE may be subject to the payment of taxes levied on that interest. PERMITTEE shall pay all such possessory interest taxes. PERMITTEE's payment for such taxes, assessments, and/or fees shall not reduce any payment due CITY.

22. SUPERIOR INTERESTS.

This Master Agreement is subject to all liens, encumbrances, covenants, conditions, restrictions, reservations, contracts, permits, licenses, easements, and rights-of-way pertaining to the Permit Areas, whether or not of record. PERMITTEE shall obtain all licenses, permits, and agreements from such third parties as may be or become necessary or reasonably advisable to allow PERMITTEE's use of the Permit Areas, relative to any such superior interest. If PERMITTEE's use of the Permit Areas is or becomes inconsistent or incompatible with a preexisting superior interest, PERMITTEE shall take such actions and pay all costs and expenses necessary to remove such inconsistency or incompatibility to the satisfaction of the holder of the superior interest.

23. ENCUMBRANCES.

PERMITTEE shall not permit any encumbrance related to PERMITTEE's Operations. CITY may, in its reasonable discretion, consent to such an encumbrance if exclusively related to

PERMITTEE's development of the Permit Areas. If an encumbrance is placed on any portion of the Permit Areas, PERMITTEE shall diligently seek and obtain, at its sole cost and expense, the removal of the encumbrance as soon as possible upon completion of the development, if the encumbrance was authorized by CITY, or, if unauthorized, immediately upon CITY's demand.

- 23.1. Liens. PERMITTEE shall, at all times, protect, defend, indemnify, and hold CITY harmless from and against any and all claims for labor or materials in connection with PERMITTEE's Operations, and all costs of defending against such claims, including, without limitation, reasonable attorneys' fees. If PERMITTEE's Operations result in a lien or notice of lien being filed against any portion of the Permit Areas, PERMITTEE shall, within ten (10) calendar days after such filing, either: (a) take all actions necessary to record a valid release of the lien; or (b) deliver to CITY a bond, cash, or other security acceptable to CITY in an amount sufficient to pay in full all claims of all persons seeking relief under the lien.

24. ASSIGNMENT AND SUBLICENSING.

- 24.1 Assignment. This Master Agreement shall not be assigned by PERMITTEE without the express written consent of CITY, which consent shall be in CITY's sole discretion. Notwithstanding the foregoing, the transfer of the rights and obligations of PERMITTEE to a parent, subsidiary, or other affiliate of PERMITTEE or to any successor in interest or entity acquiring fifty-one percent (51%) or more of PERMITTEE's stock or assets (collectively "Exempted Transfers") shall not be deemed an assignment for the purposes of this Master Agreement and therefore shall not require the consent of CITY, provided that PERMITTEE reasonably demonstrates to CITY's lawfully empowered designee the following criteria (collectively the "Exempted Transfer Criteria"): (i) such transferee will have a financial strength after the proposed transfer at least equal to that of PERMITTEE immediately prior to the transfer; (ii) any such transferee assumes all of PERMITTEE's obligations hereunder; and (iii) the experience and technical qualifications of the proposed transferee, either alone or together with PERMITTEE's management team, in the provision of telecommunications or similar services, evidence an ability to operate PERMITTEE's network. PERMITTEE shall give at least thirty (30) days prior written notice (the "Exempted Transfer Notice") to CITY of any such proposed Exempted Transfer and shall set forth with specificity in such Exempted Transfer Notice the reasons why PERMITTEE believes the Exempted Transfer Criteria have been satisfied. CITY shall have a period of thirty (30) days (the "Exempted Transfer Evaluation Period") from the date that PERMITTEE gives CITY its Exempted Transfer Notice to object in writing to the adequacy of the evidence contained therein. Notwithstanding the foregoing, the Exempted Transfer Evaluation Period shall not be deemed to have commenced until CITY has received from PERMITTEE any and all additional information CITY may reasonably require in connection with its evaluation of the Exempted Transfer Criteria as set forth in the Exempted Transfer Notice, so long as CITY gives PERMITTEE notice in writing of the additional information CITY requires within fifteen (15) days after CITY's receipt of the original Exempted Transfer Notice. If CITY fails to act upon PERMITTEE's Exempted Transfer Notice within the Exempted Transfer Evaluation Period (as the same may be extended in accordance with the foregoing provisions), such failure shall be deemed an affirmation by CITY that PERMITTEE has in fact established compliance with the Exempted Transfer Criteria to CITY's satisfaction.

24.2 Sublicensing. PERMITTEE shall not sublicense, in whole or in part, the Site, or any right or appurtenant privilege to the Site, except as follows:

24.2.1. PERMITTEE'S Sublicense with **Sprint Spectrum L.P., a Delaware limited partnership**, (SUBLICENSEE). CITY hereby acknowledges that LESSEE intends to sublicense the Permit Areas to allow the use and occupancy of the Site(s) by SUBLICENSEE. The CITY hereby consents that a sublicense agreement between PERMITTEE and SUBLICENSEE may occur without additional approval by or consideration to the CITY, provided that all of the following terms and conditions are met. The use and occupancy of the Site by SUBLICENSEE is subject to all terms and conditions of this Permit. The sublicense will be and shall remain subject and subordinate to this Permit, as may be amended from time to time. If there is a conflict between the sublicense and this Permit, the terms, conditions, and obligations of this Permit shall control. CITY'S consent to the sublicense agreement with SUBLICENSEE shall be subject to the following conditions, and shall only be valid provided that all of the following conditions remain true:

- 24.2.1.1 The sublicense shall not release PERMITTEE from any liability, whether past, present, or future, under this Permit as to the Permit Areas or any portion thereof;
- 24.2.1.2 The sublicense shall not authorize any additional uses of the Permit Areas, not authorized in this Permit;
- 24.2.1.3 The sublicense shall not alter the primary liability of PERMITTEE to pay the rent and perform all of PERMITTEE's obligations under this Permit;
- 24.2.1.4 The sublicense shall not be construed as a waiver of the requirement to obtain CITY's written consent or act as a consent to any other proposed sublicense, assignment or transfer of any right to use or occupy the Permit Areas by PERMITTEE or SUBLICENSEE to any portion of the Permit Areas. Any transfer of the right to use and occupy the Permit Areas by operation of law shall automatically terminate the Sublicense;
- 24.2.1.5 The sublicense shall not grant any rights to the SUBLICENSEE greater than those rights granted to PERMITTEE under this Permit;
- 24.2.1.6 The sublicense shall not require CITY to recognize SUBLICENSEE in the event of a default in the Permit by PERMITTEE;
- 24.2.1.7 The sublicense shall not enlarge or in any manner increase CITY's obligations or duties under this Permit;
- 24.2.1.8 The sublicense shall not create obligations or costs to CITY with regard to the sublicense;

- 24.2.1.9 The sublicense shall not modify, waive, amend, or otherwise affect any provision of this Permit;
 - 24.2.1.10 The sublicense shall not be deemed to be any type of obligation by CITY to PERMITTEE, SUBLICENSEE or to any governmental agent, board, commission, or agency with regard to any other action relating to SUBLICENSEE's occupancy, use, or maintenance of any portion of the Permit Areas or improvements thereon;
 - 24.2.1.11 Prior to PERMITTEE allowing SUBLICENSEE's use or occupancy of the Permit Areas, PERMITTEE shall cause to be filed with the CITY, a certificate of insurance demonstrating that SUBLICENSEE is in compliance with the insurance requirements in Section 6, which shall name PERMITTEE and the "City of San Diego, its elected officials, officers, representatives, agents, and employees," as additional insureds for the entire term of the sublicense agreement.
 - 24.2.1.12 SUBLICENSEE shall assume the defense of, indemnify and hold harmless CITY from all claims, expenses and liability of every nature, directly or indirectly arising from, or alleged to have arisen from the operations conducted on the Permit Areas, the condition of the Permit Areas or from any act or omission of SUBLICENSEE, its agents, invitees, contractors, and guests; provided however, SUBLICENSEE's duty to indemnify and hold harmless shall not include any claims or liability arising from the established sole negligence or willful misconduct of the CITY, its agents, officers or employees.
- 24.2.2. No Other Sublicensing Allowed. PERMITTEE shall not sublicense, or attempt to transfer any other interest or right to use the Permit Area, in whole or in part, the Site or any right or appurtenant privilege to the Site other than to SUBLICENSEE, without CITY'S prior written consent, which consent shall be in CITY'S sole discretion and shall require additional compensation.
- 24.3 Provisions Binding on Successors. Except as otherwise provided in this Master Agreement, all of the terms, covenants, and conditions of this Master Agreement shall apply to, benefit, and bind the successors and assigns of the respective parties, jointly and individually.

25. INDEMNIFICATION.

PERMITTEE shall protect, defend, indemnify, and hold CITY, its elected officials, officers, representatives, agents, and employees harmless from and against any and all claims asserted or liability established for damages or injuries to any person or property, including injury to PERMITTEE's officers, employees, agents, contractors, invitees and guests, which arise out of or are in any manner directly or indirectly connected with this Master Agreement or PERMITTEE's occupancy, use, development, maintenance, or restoration of the Permit Areas, including damages arising out of release of hazardous materials, and all expenses of investigating and defending against same, including without limitation reasonable attorney fees and costs; provided, however, that PERMITTEE's duty to indemnify and hold harmless

shall not include any established liability arising from the sole negligence or willful misconduct of CITY, its elected officials, officers, representatives, agents and employees. CITY may, at its election, conduct the defense or participate in the defense of any claim related in any way to this indemnification. If CITY chooses at its own election to conduct its own defense, participate in its own defense, or obtain independent legal counsel in defense of any claim related to this indemnification, PERMITTEE shall pay all reasonable costs related thereto, including without limitation reasonable attorney fees and costs.

26. OTHER GOVERNMENTAL ACTIONS.

By entering into this Master Agreement, neither CITY nor the City Council is obligating itself to any other governmental agent, board, commission, or agency with regard to any other discretionary action relating to the development, occupancy, use, or maintenance of the Permit Areas. Discretionary action includes, but is not limited to, rezonings, variances, environmental clearances, or any other governmental agency approvals that may be required for PERMITTEE's Operations. PERMITTEE shall diligently seek, at its sole cost and expense, all entitlements and actions from both CITY and other governmental agencies with jurisdiction over the Permit Areas, as may be necessary for PERMITTEE's Operations.

27. CITY'S RESERVATION OF RIGHTS.

- 27.1. Resources. CITY reserves all rights, title, and interest in any and all subsurface natural gas, oil, minerals, and water on or within the Permit Areas.
- 27.2. Use. CITY may grant and use easements or establish and use rights-of-way over, under, along, and across the Permit Areas for utilities, thoroughfares, or access as CITY deems advisable, in its sole discretion, for the public good.
- 27.3. Entry. CITY may enter the Permit Areas at any time to develop or make repairs to municipal resources and services.

28. REASSIGNMENT OF SPACE.

CITY may reassign PERMITTEE to an equivalent amount of space in a different location within the Permit Areas or different Site, if and when reasonably necessary. PERMITTEE will, at the direction of CITY, relocate its Communications Equipment at PERMITTEE's sole cost and expense. This section shall not apply to underground vault sites. PERMITTEE shall cooperate with CITY and its contractors during any such relocation or any renovation, repair, or other alteration of the Permit Areas. During physical relocation of the Communications Equipment to the relocation site, CITY will work with PERMITTEE to attempt to secure an alternative CITY-approved site for PERMITTEE to operate temporary installed communications equipment, which will be installed and maintained at PERMITTEE's sole cost and expense. CITY warrants that every effort will be made to ensure continuous, uninterrupted broadcast and/or receiving capability during any such activity. If any relocation is not satisfactory to PERMITTEE, then PERMITTEE may, in its sole discretion, terminate this Master Agreement or the specific Approved Site or Permit Area upon thirty (30) calendar days written notice to CITY, without further obligation therefor.

29. REVOCATION AND TERMINATION.

29.1. Revocation by CITY.

29.1.1. **Revocable License.** This Master Agreement is not a lease; it is a license to use CITY-owned property. As such, the Parties hereby acknowledge and agree that CITY, as the licensor, may revoke this Master Agreement at will and at any time during the Term. However, CITY agrees that CITY will not exercise its right to revoke this Master Agreement at will unless CITY determines, in its sole discretion, that PERMITTEE is in default of this Master Agreement, the events of default being set forth in this section. Upon default, CITY may thereafter, in its sole discretion, exercise its right to revoke this Master Agreement at will and at any time during the Term. If CITY exercises its right to revoke this Master Agreement, CITY will provide PERMITTEE written notice of the revocation, and upon PERMITTEE's receipt of the notice, PERMITTEE shall immediately cease PERMITTEE's Operations and remove PERMITTEE's improvements and personal property from the Permit Areas (pursuant to Section 30 of this Permit).

29.1.2. **Events of Default.** Each of the following shall constitute an event of default under this Master Agreement:

29.1.2.1. PERMITTEE's failure to make any payment required under this Master Agreement when due, if the failure continues for twenty (20) calendar days following written notice of the failure by CITY;

29.1.2.2. PERMITTEE's breach of any of its obligations under this Master Agreement, other than those requiring payment to CITY, and PERMITTEE either:

29.1.2.2.1. fails to cure the breach within thirty (30) calendar days following written notice from CITY; or,

29.1.2.2.2. if such breach is not curable within thirty (30) calendar days following written notice from CITY, fails to immediately commence to cure the breach and to diligently pursue the cure to completion.

29.1.2.3. PERMITTEE voluntarily files any petition under any bankruptcy or insolvency act or law;

29.1.2.4. PERMITTEE has involuntarily filed against it any petition under any bankruptcy or insolvency act or law and the matter is not dismissed by a court of competent jurisdiction within ninety (90) calendar days of filing;

29.1.2.5. PERMITTEE is adjudicated a bankrupt;

29.1.2.6. PERMITTEE makes a general assignment for the benefit of creditors; and

29.1.2.7. PERMITTEE uses any portion of the Permit Areas for any unauthorized purpose.

- 29.2. Termination by PERMITTEE. PERMITTEE may terminate this Master Agreement, or remove any specific Site and/or Permit Area thereby terminating PERMITTEE's right to use said Site or Permit Area, for any reason upon thirty (30) days prior written notice to CITY. Upon PERMITTEE's termination of this Master Agreement, or removal of a specific Site or Permit Area from this Master Agreement, PERMITTEE shall immediately cease PERMITTEE's Operations and remove PERMITTEE's improvements and personal property from the affected Permit Areas (pursuant to Section 30 of this Master Agreement).
- 29.3. No Obligation. CITY shall not be obligated for any loss, financial or otherwise, which may be incurred by PERMITTEE as a result of CITY's revocation or PERMITTEE's termination of this Master Agreement. PERMITTEE expressly waives any claim for expense or loss which PERMITTEE might incur as a result of CITY's revocation or PERMITTEE's termination of this Master Agreement.
- 29.4. Cumulative Remedies. CITY's rights and remedies under this Master Agreement are cumulative and shall not limit or otherwise waive or deny any of its respective rights or remedies at law or in equity.
- 29.5. Waiver. The property constituting the Permit Areas is publicly owned and held in trust for the benefit of CITY's citizens. CITY's failure to insist upon the strict performance of any of PERMITTEE's obligations under this Master Agreement, in one or more instances, shall not be construed as a waiver of any such obligation, and the same shall remain in full force and effect. CITY's waiver of a default shall not be a waiver of any other default. Any waiver of a default must be in writing and executed by CITY to constitute a valid and binding waiver. CITY's delay or failure to exercise a right or seek a remedy shall not be deemed a waiver of that or any other right or remedy under this Master Agreement, at law or in equity. The exercise of any particular right or the use of any particular remedy for any default shall not waive the use of any other right or remedy for the same default or for another or later default. CITY's acceptance of any Annual Use Fee shall not be a waiver of any default preceding such payment. CITY's failure to discover a default or take prompt action to require the cure of any default shall not result in an equitable estoppel, but CITY may, at any and all times, require the cure of the default.
- 29.6. Effect of Termination of Specific Approved Site or Permit Area. Following the early revocation or termination of a specific Approved Site or Permit Area by either CITY or PERMITTEE, no Annual Use Fee will be due to the CITY for that Approved Site or Permit Area.

30. REMOVAL OF IMPROVEMENTS AND PERSONAL PROPERTY.

- 30.1. Improvements. Upon the expiration, revocation or termination of this Master Agreement or upon the termination of a specific Site or Permit Area, PERMITTEE shall, at PERMITTEE's sole cost and expense, remove the Communications Equipment, its improvements, trade fixtures, structures, installations, and/or additions as soon as practicable, but in no event later

than sixty (60) calendar days after the expiration or earlier revocation or termination of this Master Agreement. If any removal of such improvements, trade fixtures, structures, installations, and/or additions by PERMITTEE results in damage to any portion of the Permit Areas, PERMITTEE shall repair all such damage at PERMITTEE's sole cost and expense. If PERMITTEE fails to remove any such improvements, trade fixtures, structures, installations, and/or additions identified by CITY, CITY may, at its option, remove them at PERMITTEE's sole cost and expense.

30.2. Personal Property. Upon expiration of this Master Agreement (without the Parties' execution of a new permit for the Permit Areas) or upon earlier revocation or termination of this Master Agreement or any specific Site or Permit Area, PERMITTEE shall remove machines, appliances, equipment (other than trade fixtures), and other items of personal property installed by PERMITTEE as soon as practicable, but in no event later than sixty (60) calendar days after the expiration or earlier revocation or termination of this Master Agreement. If any removal of such personal property by PERMITTEE results in damage to any portion of the Permit Areas, PERMITTEE shall repair all such damage at PERMITTEE's sole cost and expense. Any such items which PERMITTEE fails to remove shall be deemed abandoned and become CITY's property free of all claims and liens, or CITY may, at its option, remove such items at PERMITTEE's sole cost and expense.

30.3 Intentionally omitted.

30.4 Performance Bond. PERMITTEE shall obtain and provide CITY on a yearly basis proof of security in the form of a performance bond in the amount of \$1,000.00 (One Thousand Dollars) per Site, in favor of CITY, to cover the cost to dismantle or remove PERMITTEE's improvements, trade fixtures, structures, installations, additions, and personal property, including machines, appliances, equipment ("Removal Performance Bond") constructed, installed or erected by PERMITTEE or PERMITTEE's sublicensees, contractors, or subcontractors within the Permit Areas. The Removal Performance Bond shall be for a term of one (1) year and shall be continuously renewed, extended or replaced so that it remains in place for the entire Term of this Master Agreement or until PERMITTEE's secured removal obligations are performed to the satisfaction of CITY, whichever is sooner. In order to ensure continuous renewal of the Removal Performance Bond with no lapse, each bond shall be extended or replaced at least one month in advance of its expiration date. Removal costs may, at CITY's sole discretion, be reevaluated at the conclusion of the fifth (5th) year of the Term of this Master Agreement to ensure sufficient funds for removal. PERMITTEE shall adjust the amount of the Removal Performance Bond at CITY's request. Failure to secure the Removal Performance Bond and all renewals and extensions thereof shall constitute breaches of the PERMITTEE under this Master Agreement.

31. NOTICES.

Any notice required or permitted to be given under this Master Agreement shall be in writing and may be served personally, sent by United States mail, postage prepaid, or sent by reliable overnight courier, addressed to the Parties as follows, or to any mortgagee, trustee, or beneficiary, as applicable, at the appropriate address designated, in writing, by the respective party:

If to PERMITTEE:

Mobilitie, LLC
Attn: Legal Department
660 Newport Center Drive, Suite 200
Newport Beach, CA 92660

With a copy to:
Mobilitie, LLC
Attn: Asset Management
660 Newport Center Drive, Suite 200
Newport Beach, CA 92660

Maintenance contact phone number: 877-244-7889
Agreement contact phone number: 877-999-7070

If to CITY:

City of San Diego
Real Estate Assets Department
Attn: Real Estate Assets Director
1200 Third Avenue, Suite 1700, MS 51A
San Diego, CA 92101-4155

Contact phone number: 619-236-6020

If to CITY's Transportation and Stormwater:

City of San Diego
Streets Division
Attn: Deputy Director
2781 Caminito Chollas
San Diego, CA 92105

- 31.1. Address Changes. Any party entitled or required to receive notice under this Master Agreement may, by like notice, designate a different address to which notices shall be sent.
- 31.2. When Effective. Notice shall be effective upon personal service, or five (5) calendar days after deposit in the United States mail.

32. MISCELLANEOUS PROVISIONS.

- 32.1. Governing Law. This Master Agreement shall be governed, construed, and enforced in accordance with the laws of the State of California.
- 32.2. Entire Understanding. This Master Agreement contains the entire understanding of the Parties. CITY and PERMITTEE agree that there is no other written or oral understanding between them with respect to PERMITTEE's Operations. Each party has relied on its own examination

of the Permit Areas, advice from its own attorneys, and the warranties, representations, and covenants within the Master Agreement itself. Each party agrees that no other party, agent, or attorney of any other party has made any promise, representation, or warranty whatsoever which is not contained in this Master Agreement. The failure or refusal of any party to read this Master Agreement or other documents, inspect the Permit Areas, and obtain legal or other advice relevant to this transaction shall constitute a waiver of any objection, contention, or claim that might have been based on such actions.

- 32.3. No Affiliation. Nothing contained in this Master Agreement shall be deemed or construed to create a partnership, joint venture, or other affiliation between the Parties, or between CITY and any other entity or party, or cause CITY to be responsible in any way for the debts or obligations of PERMITTEE or any other party or entity.
- 32.4. Standard of Conduct. PERMITTEE and its employees shall, at all times, conduct themselves and PERMITTEE's Operations in a creditable manner and in accordance with industry standards.
- 32.5. Joint and Several Liability. If PERMITTEE is comprised of more than one person or legal entity, such persons and entities, and each of them, shall be jointly and severally liable for the performance of each and every obligation of PERMITTEE under this Master Agreement.
- 32.6. Unavoidable Delay. If the performance of any act required of CITY or PERMITTEE under this Master Agreement is directly prevented or delayed by reason of strikes, lockouts, labor disputes, unusual governmental delays, acts of God, fire, floods, epidemics, freight embargoes, or other causes beyond the reasonable control of the party required to perform an act, that party shall be excused from performing that act for a period equal to the period of the prevention or delay. If CITY or PERMITTEE claims the existence of such a delay, the party claiming the delay shall notify the other party, in writing, of that fact within ten (10) calendar days after the beginning of any such claimed delay.
- 32.7. CITY's Consent or Approval. Whenever required under this Master Agreement, CITY's consent or approval shall mean the written consent or approval of CITY's Mayor or his designee, unless otherwise expressly provided. CITY's discretionary acts hereunder shall be made at the Mayor's discretion, unless otherwise expressly provided.
- 32.8. Permit Modifications. This Master Agreement shall not be modified, altered, or amended unless the modification, alteration, or amendment is in writing and signed by the Parties.
- 32.9. Cost Recovery. CITY collects various fees to offset the administrative costs incurred for CITY staff services. CITY shall process each of PERMITTEE's service requests upon receipt of PERMITTEE's payment of the applicable fee. The fee schedule, which is on file with the Office of the City Clerk, may be updated from time to time in CITY's sole discretion.
- 32.10. Survival. Any obligation under this Master Agreement that requires a party's performance of that obligation after the expiration or earlier revocation or termination of this Master Agreement shall survive such expiration, revocation, or termination.

- 32.11. Number and Gender. In this Master Agreement, words in the singular number shall include the plural, and *vice versa*, as appropriate to the context. Words of either gender shall include the other gender.
- 32.12. California Public Records Act. CITY shall determine, in its sole discretion, whether information provided to CITY by PERMITEE pursuant to this Master Agreement is or is not a public record subject to disclosure under the California Public Records Act ("CPRA"). PERMITEE shall hold CITY, its elected officials, officers and employees harmless for CITY's disclosure of any such information in response to a request for information under the CPRA.
- 32.13. Authority to Execute and Deliver Permit. Each individual executing this Master Agreement on behalf of another person or legal entity represents and warrants that he or she is authorized to execute and deliver this Master Agreement on behalf of such person or entity in accordance with duly adopted resolutions or other authorizing actions which are necessary and proper and under such legal entity's articles, charter, bylaws, or other written rules of conduct or governing agreement, and that this Master Agreement is binding upon such person or entity in accordance with its terms. Each person executing this Master Agreement on behalf of another person or legal entity shall provide CITY with evidence, satisfactory to CITY, that such authority is valid and that such entity is a valid, qualified corporation, limited liability company, partnership, or other unincorporated association, in good standing in its home state and that such entity is qualified to do business in the State of California.
- 32.14. Exhibits Incorporated. All exhibits referenced in this Master Agreement are incorporated into the Master Agreement by this reference.

IN WITNESS WHEREOF, this Master Agreement is executed by CITY and PERMITTEE, to be effective as of the Effective Date.

Date: 6/19/19

THE CITY OF SAN DIEGO, a California municipal corporation

By [Signature]
Cybele L. Thompson
Director, Real Estate Assets

Date: 6-18-2019

MOBILITIE, LLC, a Nevada limited liability company

By [Signature]
Name: Christopher Glass
Title: SVP, General Counsel

ENVIRONMENTAL ANALYSIS SECTION:

CEQA Exemption 15301 (Existing Facilities) and 15303 (New Construction)

Date: 06/19/2019

By: Jeff Szymanski
Name: JEFF SZYMAWSKI
Title: SENIOR PLANNER

APPROVED AS TO FORM:

Date: 06/26/2019

MARA W. ELLIOTT, City Attorney

By: Melissa Ables
Name: MELISSA ABLES
Title: Deputy City Attorney

Exhibit A: Approved Site List of Permit Areas

Candidate Code	Mount Type	Housing and Luminair	Latitude	Longitude	PTS#	Permit Issue Date	Mobilitie	SD	Effective Date
							Agreement ID	Agrément #	
SD90XS019A	Top Mount	ZM4	32.565008	-117.078982	577936	12/13/2017	A02142	2	1/1/2018
SD90XS020B	Top Mount	ZM4	32.566418	-117.078305	582631	1/29/2018	A02142	2	1/1/2018
SD90XS021C	Side Mount	YI4	32.563532	-117.077917	582443	5/11/2018	A02142	2	1/1/2018
SD90XS082D	Side mount		32.720796	-117.171201	607435	6/21/2019	A02142	2	1/1/2018
SD90XS083E	Side Mount	ZI4	32.718701	-117.169106	578466/ 6	1/17/2018 / pendin	A02142	2	1/1/2018
SD90XS091A	Side Mount	ZI4	32.722061	-117.1675	607426	10/26/2018	A02142	2	1/1/2018
SD90XS094E	Top Mount	A2	32.719053	-117.161212	577668	12/13/2017	A02142	2	1/1/2018
SD90XS095D	Side Mount	ZI4	32.720881	-117.158274	577665	12/13/2017	A02142	2	1/1/2018
SD90XS113D	Top Mount	ZI4	32.72811	-117.164019	582877	1/29/2018	A02142	2	1/1/2018
SD90XS114C	Top Mount	ZI4	32.727286	-117.166562	589868/ 6	2/12/2018/ 5/21/2	A02142	2	1/1/2018
SD90XS115D	Top Mount	ZI4	32.730445	-117.16385	584424	2/6/2018	A02142	2	1/1/2018
SD90XS116D	Top Mount	ZI4	32.732304	-117.164042	580333	12/14/2017	A02142	2	1/1/2018
SD90XS132D	Top mount	ZM4	32.682608	-117.048396	584431	2/12/2018	A02142	2	1/1/2018
SD90XS133B	Top Mount	YM4	32.680027	-117.046343	584429	1/25/2018	A02142	2	1/1/2018
SD90XS139B	Side Mount	ZM4	32.783722	-117.252546	578346	12/16/2017	A02142	2	1/1/2018
SD90XS152D	Side Mount	ZM4	32.80851	-117.260455	578281	1/24/2018	A02142	2	1/1/2018
SD90XS154D	Top Mount	YM4	32.75098	-117.249294	584428	2/6/2018	A02142	2	1/1/2018
SD90XS159B	Side Mount	ZI4	32.752571	-117.231074	577950	12/16/2017	A02142	2	1/1/2018
SD90XS166C	Top Mount	ZI4	32.75111	-117.161087	582451	9/20/2018	A02142	2	1/1/2018
SD90XS172G	Top Mount		32.760098	-117.170537	640690	Permit Pending	A02142	2	1/1/2018
SD90XS173C	Top Mount	YM4	32.760006	-117.173972	624889	Permit Pending	A02142	2	1/1/2018
SD90XS176C	Top Mount	YM4	32.762063	-117.165759	577627	1/17/2018	A02142	2	1/1/2018
SD90XS179D	Top Mount	ZM4	32.762905	-117.169699	577672	12/13/2017	A02142	2	1/1/2018
SD90XS188F	Top Mount	ZI4	32.77373	-117.20469	584430	12/20/2017	A02142	2	1/1/2018
SD90XS200A	Top Mount	YI4	32.802772	-117.235982	577946	12/13/2017	A02142	2	1/1/2018
SD90XS201B	Side Mount	ZI4	32.79994	-117.233236	577670/ 6	12/13/2017/ 4/24/	A02142	2	1/1/2018
SD90XS219B	Side Mount	ZI4	32.753113	-117.083804	577658	12/13/2017	A02142	2	1/1/2018
SD90XS224D	Top Mount	ZM4	32.758143	-117.076677	578303	12/20/2017	A02142	2	1/1/2018
SD90XS237E	Top Mount		32.771151	-117.08013	592934/ 6	2/12/2018/ Pendin	A02142	2	1/1/2018
SD90XS240C	Top Mount	ZI4	32.770478	-117.065033	577663 / 6	12/13/2017/ Pendi	A02142	2	1/1/2018
SD90XS251C	Top Mount	ZM4	32.769006	-117.059	583848	12/14/2017	A02142	2	1/1/2018

SD90XS266A	Top Mount	ZI4	32.78892	-117.097617	582666	5/1/2018	A02142	2	1/1/2018
SD90XS277A	Top Mount	ZI4	32.802774	-117.008264	584407	12/14/2017	A02142	2	1/1/2018
SD90XS291A	Side Mount	ZM4	32.834518	-117.177208	578348	12/16/2017	A02142	2	1/1/2018
SD90XS300F	Top Mount	ZI4	32.843166	-117.172702	577940	1/17/2018	A02142	2	1/1/2018
SD90XS303E	Top Mount	YM4	32.858952	-117.231022	585461	1/4/2018	A02142	2	1/1/2018
SD90XS306C	Side Mount	ZM4	32.867522	-117.237486	580320	12/14/2017	A02142	2	1/1/2018
SD90XS309C	Top Mount	YM4	32.864993	-117.229168	580276	1/24/2018	A02142	2	1/1/2018
SD90XS314A	Side Mount	ZM4	32.863393	-117.224682	578788	1/17/2018	A02142	2	1/1/2018
SD90XS317A	Top Mount	YM4	32.865237	-117.216423	584432	2/12/2018	A02142	2	1/1/2018
SD90XS331A	Side Mount	ZM4	32.871726	-117.2257	579471	12/20/2017	A02142	2	1/1/2018
SD90XS335B	Side Mount	ZM4	32.868311	-117.223635	578404	1/24/2018	A02142	2	1/1/2018
SD90XS336B	Side Mount	ZM4	32.868133	-117.220169	578778	1/17/2018	A02142	2	1/1/2018
SD90XS342B	Top Mount	ZI4	32.86976	-117.215002	580312	12/14/2017	A02142	2	1/1/2018
SD90XS355E	Top Mount	ZM4	32.868819	-117.198741	578767	12/13/2017	A02142	2	1/1/2018
SD90XS357A	Top Mount	ZM4	32.866824	-117.198004	585495	1/25/2018	A02142	2	1/1/2018
SD90XS380A	Top Mount	ZI4	32.878856	-117.214366	582871	12/13/2017	A02142	2	1/1/2018
SD90XS385E	Top Mount	ZM4	32.879054	-117.163968	580330	12/14/2017	A02142	2	1/1/2018
SD90XS401E	Top Mount	ZM4	32.896354	-117.196891	579363	1/24/2018	A02142	2	1/1/2018
SD90XS413A	Side mount	YM4	32.94678000	-117.22912100	585535	1/25/2018	A02142	2	1/1/2018
SD90XS418A	Top Mount	ZM4	32.950624	-117.229088	578442	1/24/2018	A02142	2	1/1/2018
SD90XS421D	Top Mount	ZM4	32.928703	-117.120361	578419	1/24/2018	A02142	2	1/1/2018
SD90XS431B	Top Mount	ZI4	32.973316	-117.092531	582623	1/25/2018	A02142	2	1/1/2018
SD90XS644A	Top Mount		32.782348	-117.085072	599800	6/29/2018	A02142	2	1/1/2018
SD90XS731B	Side Mount	ZI4	32.767826	-117.25087	580282	1/24/2018	A02142	2	1/1/2018
SD90XS786B	Top Mount	ZI4	32.885478	-117.215328	582449/ 6	1/4/2018/ Pending	A02142	2	1/1/2018
SD90XS974I	Side Mount	YM4	32.904868	-117.240206	584416	2/6/2018	A02142	2	1/1/2018
SD90XSB03C	Top Mount	YI4	32.97555	-117.082114	580336	1/24/2018	A02142	2	1/1/2018
SD90XSB04C	Top Mount	YI4	32.973859	-117.074801	582852	1/4/2018	A02142	2	1/1/2018
SD90XSB10F	Side Mount	G	32.711342	-117.159315	578464	1/24/2018	A02142	2	1/1/2018
SD90XSB11A	Top Mount	YI4	32.698746	-117.133763	578296	12/16/2017	A02142	2	1/1/2018
SD90XSB14D	Top Mount	ZM4	33.019924	-117.077029	583850	12/14/2017	A02142	2	1/1/2018
SD90XSB23C	Top Mount	YI4	32.906883	-117.139646	582453	1/4/2018	A02142	2	1/1/2018
SD90XSB24C	Top Mount	YM4	32.906827	-117.141531	580291	1/24/2018	A02142	2	1/1/2018
SD90XSB28B	Side Mount	ZI4	32.69966	-117.028618	577616	1/17/2018	A02142	2	1/1/2018

SD90XSB35C	Top Mount	ZM4	33.019762	-117.093394	578388	1/4/2018	A02142	2	1/1/2018
SD90XSB36C	Side Mount	YI4	32.799382	-117.155703	578465	1/29/2018	A02142	2	1/1/2018
SD90XSB37D	Side Mount	YM4	32.80428	-117.153238	578315/ 6	12/16/2017/ Pendi	A02142	2	1/1/2018
SD90XSB45D	Side Mount	YM4	32.757971	-117.108171	585538	12/16/2017	A02142	2	1/1/2018
SD90XSB52C	Top Mount	ZM4	32.81375	-117.151495	582902	1/4/2018	A02142	2	1/1/2018
SD90XSB56B	Top Mount	ZI4	32.763265	-117.120426	582734	1/4/2018	A02142	2	1/1/2018
SD90XSB58E	Side Mount	ZI4	32.746694	-117.208876	578338	12/16/2017	A02142	2	1/1/2018
SD90XSB60E	Top Mount	ZM4	32.824727	-117.144218	578332	12/16/2017	A02142	2	1/1/2018
SD90XSB65B	Side Mount	ZI4	32.708448	-117.15822	599818	5/11/2018	A02142	2	1/1/2018
SD90XSB68A	Top Mount	ZI4	32.750149	-117.192858	580308	1/24/2018	A02142	2	1/1/2018
SD90XSB75D	Top Mount	ZM4	32.764142	-117.192096	578321	12/16/2017	A02142	2	1/1/2018
SD90XSB81D	Top Mount	ZM4	32.75094	-117.221923	584388	1/24/2018	A02142	2	1/1/2018
SD90XSB82C	Side Mount	ZM4	32.754396	-117.218625	582727/ 6	1/4/2018/ Pending	A02142	2	1/1/2018
SD90XSB87C	Side Mount	A2	32.712636	-117.163919	580301	1/24/2018	A02142	2	1/1/2018
SD90XSD02D	Top Mount	ZI4	32.825418	-117.154868	578354	12/16/2017	A02142	2	1/1/2018
SD90XSD11C	Top Mount	ZI4	32.748532	-117.148247	578339	12/16/2017	A02142	2	1/1/2018
SD90XSD12E	Top Mount	YM4	32.74724	-117.145058	584865	1/4/2018	A02142	2	1/1/2018
SD90XSD24A	Top Mount	ZM4	32.782283	-117.129967	584398	2/6/2018	A02142	2	1/1/2018
SD90XSD36C	Side Mount	ZM4	32.703566	-117.149121	578430	1/25/2018	A02142	2	1/1/2018
SD90XSD40D	Side Mount	ZI4	32.708301	-117.146579	585541	1/25/2018	A02142	2	1/1/2018
SD90XSD43D	Top Mount	ZM4	32.701184	-117.116226	582638	1/25/2018	A02142	2	1/1/2018
SD90XSD45C	Top Mount	ZM4	32.701127	-117.126451	582858	12/20/2017	A02142	2	1/1/2018
SD90XSD54C	Side Mount	ZM4	32.87085	-117.234004	579506	1/4/2018	A02142	2	1/1/2018
SD90XSD62F	Top Mount	ZM4	32.784384	-117.127211	578462	12/20/2017	A02142	2	1/1/2018
SD90XSD63B	Top Mount	ZM4	32.786187	-117.124403	580325	12/14/2017	A02142	2	1/1/2018
SD90XSD69D	Side Mount	ZM4	32.747417	-117.202576	578819/ 6	1/17/2018/ 4/4/2C	A02142	2	1/1/2018
SD90XSD71D	Top Mount	ZI4	32.748772	-117.130259	578843/ 6	12/13/2017/ Pendi	A02142	2	1/1/2018
SD90XSD73C	Top Mount	YI4	33.027295	-117.07725	582662	5/1/2018	A02142	2	1/1/2018
SD90XSD74C	Top Mount	ZM4	32.772361	-117.135783	578463	1/24/2018	A02142	2	1/1/2018
SD90XSD77D	Top Mount	ZM4	32.82032	-117.179139	579403	1/24/2018	A02142	2	1/1/2018
SD90XSD86C	Top Mount	ZM4	32.888785	-117.163149	582636	1/29/2018	A02142	2	1/1/2018
SD90XSD93E	Side Mount	ZM4	32.787359	-117.108308	578399	1/24/2018	A02142	2	1/1/2018
SD90XSD94E	Top Mount	ZI4	32.781824	-117.110687	578870	2/6/2018	A02142	2	1/1/2018
SD90XSE02D	Top Mount	ZI4	32.77817	-117.157274	578359	12/16/2017	A02142	2	1/1/2018

SD90XSE03C	Top Mount	ZI4	32.777116	-117.158388	578803	1/17/2018	A02142	2	1/1/2018
SD90XSE07C	Top Mount	ZM4	32.701299	-117.122974	599804	6/25/2018	A02142	2	1/1/2018
SD90XSE08C	Side Mount	ZM4	32.692235	-117.133847	585547	1/4/2018	A02142	2	1/1/2018
SD90XSE13C	Top Mount	ZI4	32.713344	-117.114066	592948	5/11/2018	A02142	2	1/1/2018
SD90XSE15D	Top Mount	ZI4	32.75539	-117.116746	578828	1/17/2018	A02142	2	1/1/2018
SD90XSE16C	Top Mount	ZI4	32.756779	-117.113732	582932	1/29/2018	A02142	2	1/1/2018
SD90XSE36C	Top Mount	ZI4	32.796182	-117.150644	582923	1/29/2018	A02142	2	1/1/2018
SD90XSE41E	Top Mount	ZM4	32.754563	-117.13012	580322	12/14/2017	A02142	2	1/1/2018
SD90XSE45C	Top Mount	ZM4	32.723451	-117.082368	582929	1/2/2018	A02142	2	1/1/2018
SD90XSE46B	Top Mount	ZI4	32.724288	-117.085049	578800	1/17/2018	A02142	2	1/1/2018
SD90XSE47B	Top Mount	ZI4	32.721607	-117.08281	578862	1/17/2018	A02142	2	1/1/2018
SD90XSE60C	Top Mount	ZM4	33.006646	-117.093876	578455	12/20/2017	A02142	2	1/1/2018
SD90XSE62F	Top Mount	ZI4	32.75233	-117.130093	578374	12/18/2017	A02142	2	1/1/2018
SD90XSE63D	Side Mount	ZM4	32.750427	-117.130634	579379	1/24/2018	A02142	2	1/1/2018
SD90XSE72C	Top Mount	ZI4	32.748934	-117.153353	579441	1/4/2018	A02142	2	1/1/2018
SD90XSE74B	Top Mount	ZM4	32.721272	-117.084334	580332	12/14/2017	A02142	2	1/1/2018
SD90XSE87D	Top Mount	ZM4	32.750143	-117.100826	578458	1/17/2018	A02142	2	1/1/2018
SD90XSE94C	Side Mount	ZM4	32.904552	-117.145805	579422	1/4/2018	A02142	2	1/1/2018
SD90XSE98C	Top Mount	YI4	32.800465	-117.165315	582912	1/29/2018	A02142	2	1/1/2018
SD90XSF04E	Top Mount	ZM4	32.893964	-117.121656	578834	6/27/2018	A02142	2	1/1/2018
SD90XSF05F	Top Mount	ZM4	32.893824	-117.134918	578457	1/24/2018	A02142	2	1/1/2018
SD90XSF06H	Top Mount	ZM4	32.908176	-117.167823	592953/ 6	5/25/2018/ Pendin	A02142	2	1/1/2018
SD90XSF07D	Top Mount	ZI4	32.905373	-117.168319	584382	1/24/2018	A02142	2	1/1/2018
SD90XSF08F	Top Mount	YI4	32.906475	-117.164228	583852	1/24/2018	A02142	2	1/1/2018
SD90XSF10C	Side Mount	ZM4	32.754103	-117.214833	592956	2/12/2018	A02142	2	1/1/2018
SD90XSF11D	Top Mount	YI4	32.756234	-117.219271	584433	2/12/2018	A02142	2	1/1/2018
SD90XSF14C	Top Mount	ZM4	32.70962	-117.129599	582867	1/25/2018	A02142	2	1/1/2018
SD90XSF17C	Top Mount	ZM4	32.709564	-117.141547	583855	1/4/2018	A02142	2	1/1/2018
SD90XSF18A	Top Mount	YM4	32.711138	-117.142389	585550	1/4/2018	A02142	2	1/1/2018
SD90XSF19C	Side Mount	YI4	32.804367	-117.162204	584840	1/4/2018	A02142	2	1/1/2018
SD90XSF20C	Top Mount	ZM4	32.800763	-117.157379	578412	12/20/2017	A02142	2	1/1/2018
SD90XSF31C	Side Mount	ZI4	32.746631	-117.198273	584402	3/6/2018	A02142	2	1/1/2018
SD90XSF33C	Top Mount	YM4	32.913917	-117.111951	580335	12/14/2017	A02142	2	1/1/2018
SD90XSF37A	Top Mount	ZM4	32.724401	-117.079675	584846	1/4/2018	A02142	2	1/1/2018

SD90XSF38A	Top Mount	YI4	32.724676	-117.077098	584849	2/12/2018	A02142	2	1/1/2018
SD90XSF52C	Top Mount	ZM4	32.767213	-117.156861	584837	1/25/2018	A02142	2	1/1/2018
SD90XSF59C	Top Mount	YM4	32.749108	-117.136281	584869	2/22/2018	A02142	2	1/1/2018
SD90XSF67A	Side Mount	ZM4	32.744911	-117.199919	578453/ 6	12/20/2017/ 5/21/	A02142	2	1/1/2018

Exhibit B: Master Structural Plan

17

mobilitie®

intelligent infrastructure

2955 RED HILL AVE, SUITE 200

COSTA MESA, CA 92626

(657) 261-3863

E: www.mobilitie.COM

Wireless Mobilitie

APPROVED MASTER PLAN

SEPARATE BUILDING PERMIT(S) REQUIRED

550312

Master Plan Project No.

This set of plans is to be used in conjunction with the approved building permits for each project. It is unlawful to construct or alter any structure without written authorization of the City of San Diego. It is unlawful to construct or alter any structure without written authorization of the City of San Diego. It is unlawful to construct or alter any structure without written authorization of the City of San Diego.

W. Lee Date *6/21/17*

CC TRUCTION PERMIT

STRUCTURAL STAMP
ON SHEET 3

MOBILITIE INTELLIGENT INFRASTRUCTURE MASTER STRUCTURAL PLANS PTS #550312

SCOPE OF WORK: TO ATTACH MICRO-CELLULAR ANTENNAS AND ASSOCIATED EQUIPMENT TO EXISTING AND NEW TYPE 15, TYPE 15D AND TYPE 21 STREET LIGHT POLES WITHIN THE CITY OF SAN DIEGO RIGHT-OF-WAY.

APPROVED

JUN 07 2017

LAND DEVELOPMENT REVIEW
ENGR-BUILDING/STORMWATER

DESIGN CODE REFERENCES:

1. 2015 IBC
2. 2016 CBC
3. ASCE MINIMUM DESIGN LOADS - 7-10
4. 2010 & 2015 CALTRANS STANDARD PLAN RSP ES-6A + ES-6D
5. AISC, STEEL CONSTRUCTION MANUAL, 14th ADDITION, 2010
6. SAN DIEGO STANDARD DRAWING SDE-101
7. DWG B6 MONOTUBE OCTAGONAL LIGHT POLE SPECIFICATIONS SHEET

ENGINEER OF RECORD	
JERRY L. MICHAL 2499 ROCK VIEW GLEN ESCONDIDO, CA 92026 PHONE/FAX (760) 744-8284 TAX ID: 546-704372	
 Coastal Communications Telecommunications Engineering 2841 ELLISON PLACE, STE. 110 CARLSBAD, CA 92008 PH: (760) 925-0912 FX: (760) 925-0918	
	
SITE ADDRESS: <i>Varies</i>	
TITLE: MASTER STRUCTURAL PLANS	
PTS NO. 550312	SHEET
DRAWING NO. TBD	1
DATE 11/23/15	
SCALED N.T.S.	



Jerry L. Michal DATE *6-7-17*

JERRY L. MICHAL R.C.E. NO. 64288 EXP. 12-31-18

SHEET INDEX

TITLE SHEET
SHEET INDEX
SHEET INDEX

1
2
3

MASTER STRUCTURAL PLANS FOR EXISTING STREET LIGHT POLES

4

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

MASTER STRUCTURAL PLANS FOR NEW STREET LIGHT POLES

21

NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

22
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25



Jerry L. Michel
JERRY L. MICHEL
03-31-18

6-3-17
DATE

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MOBILITIE INTELLIGENT INFRASTRUCTURE Master Structural Schematic

SITE ADDRESS	
TITLE: SHEET INDEX	
PTB NO.	550312
DRAWING NO.	100
DATE	11/23/16
SCALED	N T B
SHEET 2	

SHEET INDEX

NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	26
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	27
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	28
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	29
2010 REVISED STANDARD PLAN RSP ES-6A	30
2015 REVISED STANDARD PLAN RSP ES-6A	31
2015 REVISED STANDARD PLAN RSP ES-6D	32
2010 REVISED STANDARD PLAN RSP ES-6D	33
DETAIL SHEET	34
DETAIL SHEET	35
DETAIL SHEET	36
DETAIL SHEET	37
DETAIL SHEET	38
DETAIL SHEET	39
DETAIL SHEET	40

550312

BUILDING DEVELOPMENT REVIEW
DIVISION-STRUCTURAL

B. V. S. 6/5/2017
VISWANATH BASAVARAJU Date

MASTER PLAN
COURTESY REVIEW ONLY
NO FUTURE BUILDING PERMIT



Jerry L. Michel 6/7/17
JERRY L. MICHEL REG. NO. C42800 EXP. 03-31-18 DATE

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MOBILITIE INTELLIGENT INFRASTRUCTURE Master Structural Schematic

SITE ADDRESS	
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SHEET INDEX	
PTS NO	550312
DRAWING NO	150
DATE	11/23/16
SCALED	N.T.S.
SHEET	
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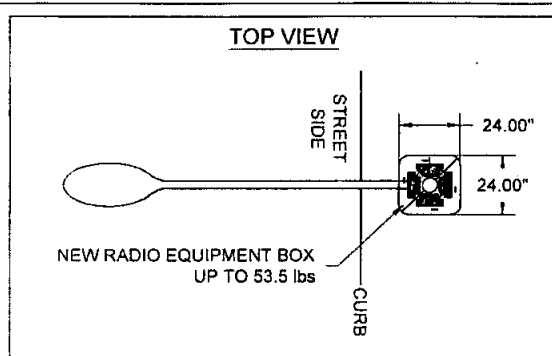
MASTER STRUCTURAL PLANS FOR EXISTING STREET LIGHT POLES


Jerry L. Mehal
 JERRY L. MEHAL REG. NO. 002580 EXP. 03-31-18 DATE 6-3-17

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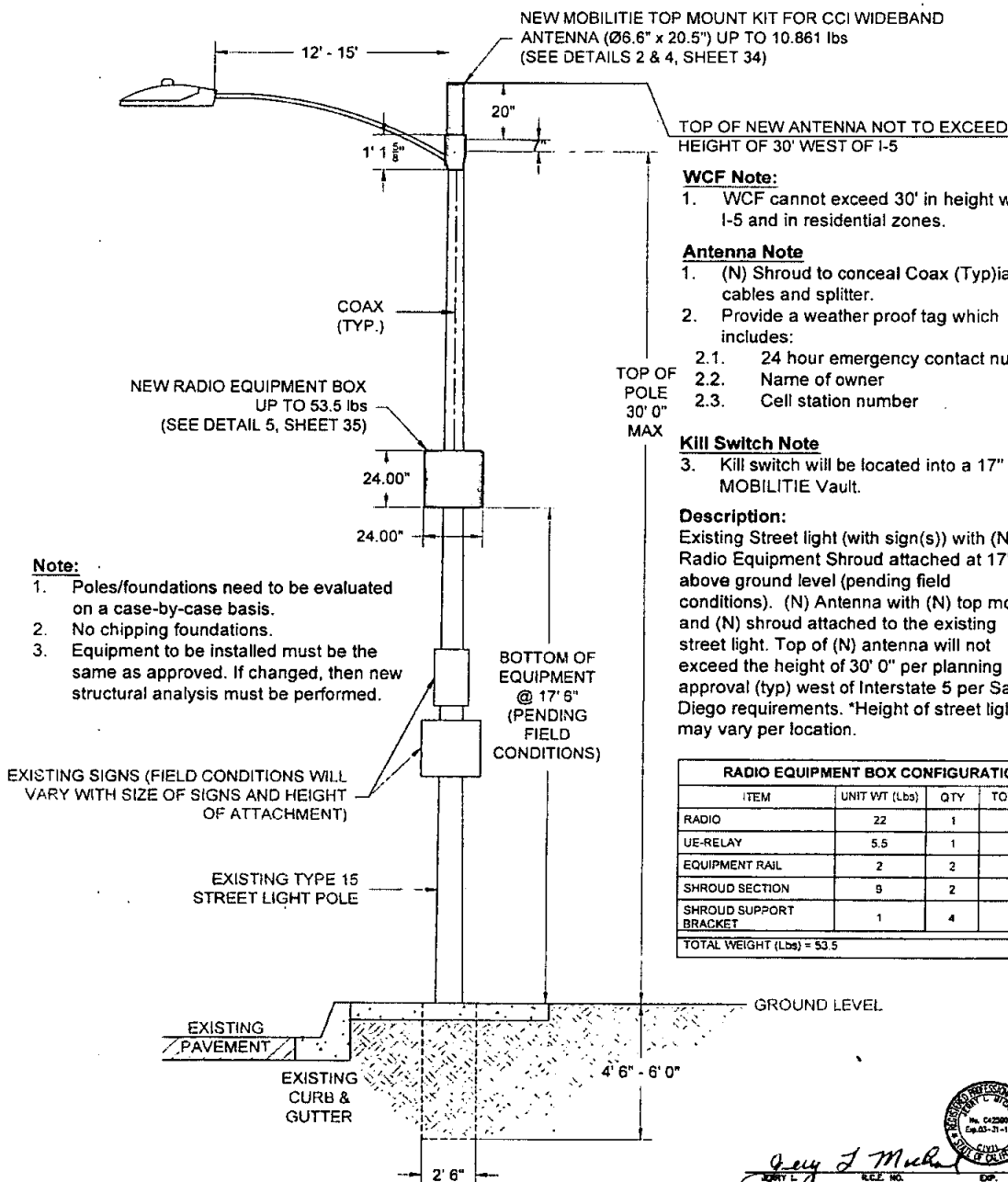
MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Vanco
TITLE: EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	55212	SHEET 4
DRAWING NO	180	
DATE	11/23/16	
SCALED	N.T.S.	



- Existing connections between type 15 street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Gregory J. Michel Signature of Licensed Architect/Engineer



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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Version
TITLE: EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX		
PTB NO	500312	5
DRAWING NO	TBD	
DATE	11/23/18	
SCALED	N.T.S.	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna wt. = 10.861 lbs Equipment Wt. = 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-FOOT round Type 15 steel light pole with top mount antenna, radio and signs.

1. Wind Loading:
 Wind Zone: (Fig. 3-2.3) $V = 110$ mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf
 $P_z(32.0) = (0.00256) K_z(32.0) G V^2 I_r = 23.8$ psf

2. AREA CALCULATIONS
 Area of pole: Ave. Dia. (0-16') = 9.75 in. $A_p = (16) (9.75/12) = 13.0$ sq. ft.
 Ave. Dia. (16-30') = 7.88 in. $A_p = (14.0) (7.88/12) = 9.19$ sq. ft.
 Area of antenna: $A = (7.18/12) (24/12) = 1.20$ sq. ft.
 Area of equipment unit: $A = (2) (2) = 4.00$ sq. ft.
 Area of light arm: $A = (0.25) (8) + (0.5) (2) = 3.00$ sq. ft.
 Area of sign: $A = (1.25) (1.25) = 1.56$ sq. ft.

Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w A + P_{a,w} A = 504.7$ pounds
 Force on Antenna: $F = P_w A_{ant} = 28.6$ pounds
 Force on equipment: $F = P_w A_{eq} = 95.2$ pounds
 Force on light arm: $F = (3.0) (23.8) = 71.4$ pounds
 Force on Sign: $F = (22.0) (1.56) = 34.3$ pounds

Total wind load = 734.2 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet per (SDE-101)
 $D = 0.5A (1 + [1 + (4.36h / A)]^2)$
 Where $A = (2.34 P/S, b) = [(2.34) (734.2 / (2200) (2.5))] = 0.31$
 Therefore $D_{req} = 3.34$ ft. < 4.50 feet ok

4. Bearing Capacity
 Gross pole wt: 1405 pounds (for pole + equipment)
 $Q_u = 1500$ psf (Street light at 4.5 foot embedment)
 Pole fig dia. = 2.5 ft. Footing area = 4.90 sq. ft.
 $Q = 1500$ psf > $Q = (1405) / (4.90) = 286.7$ psf OK

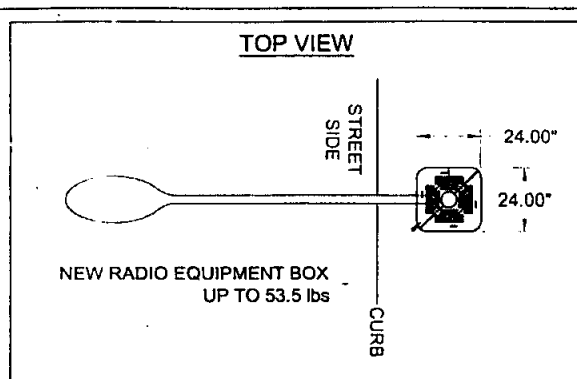
Page 2 of 2

MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

Views

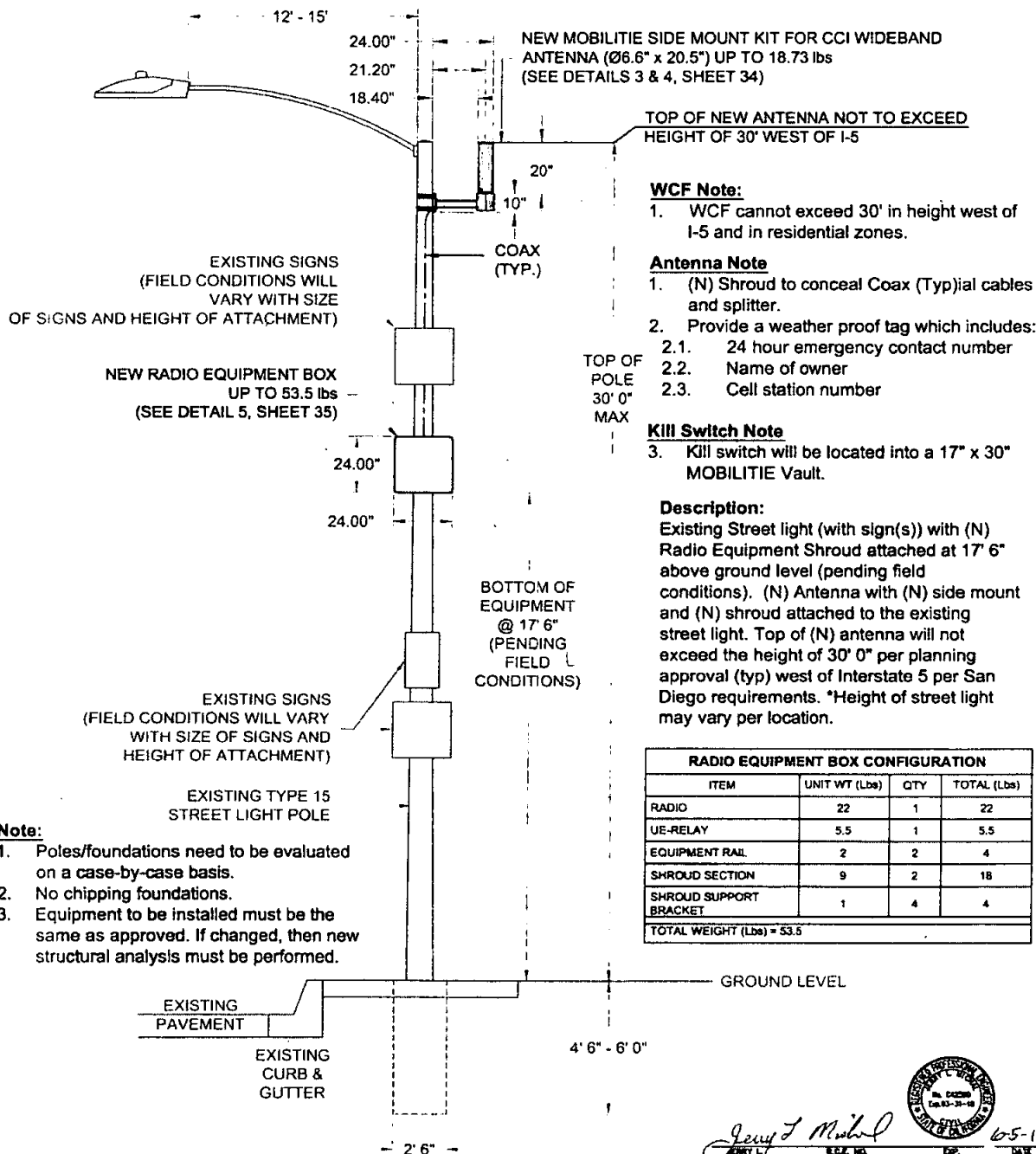
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PTS NO.	603-12
DRAWING NO.	TBD
DATE	11/23/16
SCALE	N/T S
SHEET	6

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- Existing connections between type 15 street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Geary T. Michael Signature of Licensed Architect/Engineer



WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

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**MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic**

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:	Varies
TITLE:	EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTS NO.	550312
DRAWING NO.	TBD
DATE:	11/23/18
SCALE:	N.T.S.
SHEET	7

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep.

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-FOOT type 15 steel pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I R = 22 \text{ psf}$

$P_z(35.0) = (0.00256) K_z(30.0) G V^2 I R = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 9.75 in. $A_w = (16) (9.75/12) = 13.0 \text{ sq. ft.}$
 Ave. Dia. (16-30') = 7.88 in. $A_m = (14.0) (7.88/12) = 9.91 \text{ sq. ft.}$

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$

Area of antenna: $A = (7.18/12)(24/12) = 3.3 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Sign: $A = (1.5)(1.5) = 2.25 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w + P_{sw} A = 521.9 \text{ pounds}$

Force on Antenna: $F = P_w A_m = 78.5 \text{ pounds}$

Force on equipment: $F = P_w A_m = 88.0 \text{ pounds}$

Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$

Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$

Total wind load = 862.4 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$D = 0.5A [1 + (1 + (4.36h/A))]^m$

Where $A = (2.34 P/S_b) = [(2.34) (862.4)/(2200) (2.5)] = 0.37$

Therefore $D_m = 3.66 \text{ ft.} < 4.50 \text{ feet ok}$

4. Bearing Capacity

Gross pole wt. 1405 pounds (for pole + equipment)
 $Q_w = 1500 \text{ psf}$ (Street light at 4.5 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$Q = 1500 \text{ psf} > Q = (1405)/(4.91) = 203.3 \text{ psf OK}$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

From Wind: $P_1 = (2)(48.1) = 96.2 \text{ ft-lbs}$ From Wt.: $P_2 = (1)(53.5) = 53.5 \text{ ft-lbs}$

Worst Case - Diagonal Bolts

$M_{max} = (96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft-lbs}$

$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

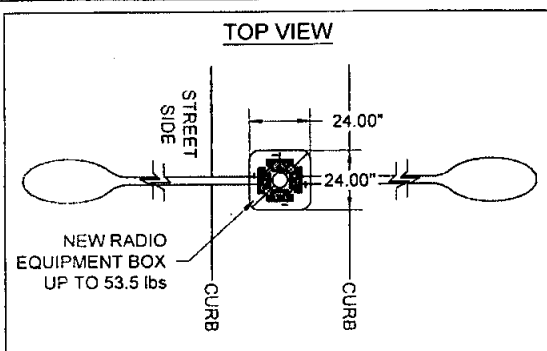
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	DRAWING NO. <u>TED</u>	DATE: <u>11/20/16</u>	SCALE: <u>NTS</u>

MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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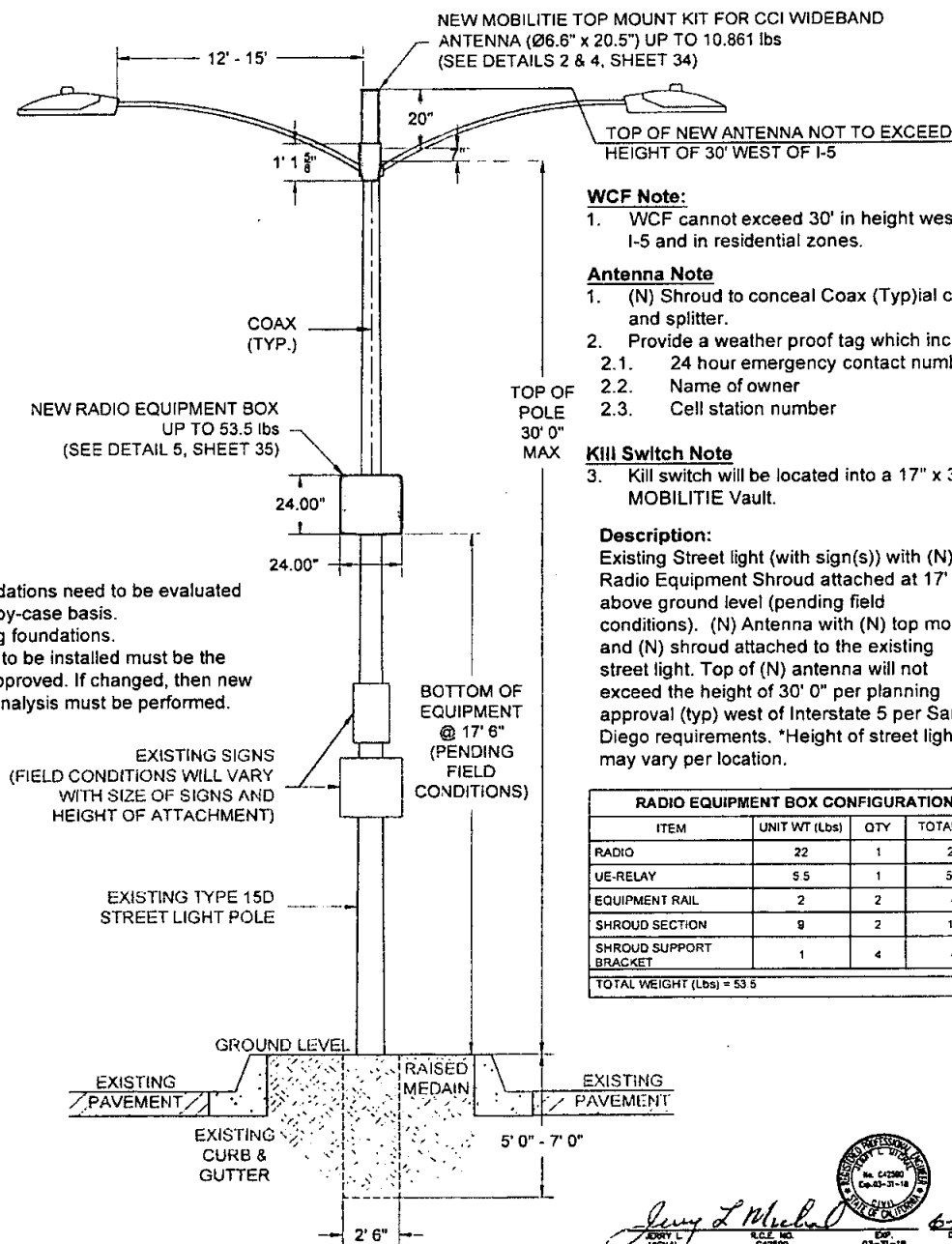
JERRY L. MCHAL
 R.C.E. NO. 42590
 EXP. 03-31-18
 DATE 6-1-17



- Existing connections between type 15D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michael

Signature of Licensed Architect/Engineer



WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ) cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
VE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Varies
FILE: EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX		
PTB NO	550312	SHEET
DRAWING NO	TBD	
DATE	11/23/18	
SCALE:	N.T.S.	
		9

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
PROJECT NAME: MOBILITITIE INTELELIGENT DATE : 6-01-2017
PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 30' Ave. Pole Dia. = as noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia = 2.5' dia x 5.0' deep. Equip. Wt. = 53.5 lbs Antenna Wt. = 18.3 lbs

References: 1. 2015 IBC 2. ASCE MINIMUM DESIGN LOADS - 7-10
3. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-60

Wind Zone: (Fig. 3-2.3) $V = 110 \text{ mph (3 sec. Gust)}$
Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Area of pole: Ave. Dia. (0-16') = 7.11 in. $A_u = (16)(7.11/12) = 9.48 \text{ sq.ft.}$
 Ave. Dia. (16-30') = 5.48 in. $A_n = (14.0)(5.48/12) = 6.39 \text{ sq.ft.}$

Area of Pedestrian Sign: $A = (1.25)(1.25) + (1)(1.5) = 3.06 \text{ sq. ft}$

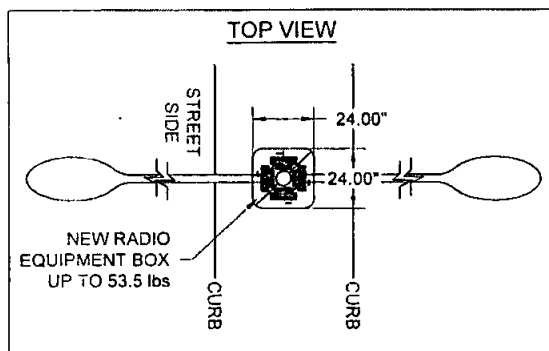
$$Q = 1500 \text{ psf} > Q = (1100)/(4.91) = 224.0 \text{ psf OK}$$

Page 2 of 2

DATE ADDRESS	VENUE
TITLE: EXISTING TRAC 150 STREET LIGHT POLE WITH SENSORS WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
FIG'S NO.	\$50012
DRAWING NO.	TBD
DATE	11/23/18
SCALE	N.T.S.
SHEET	
10	

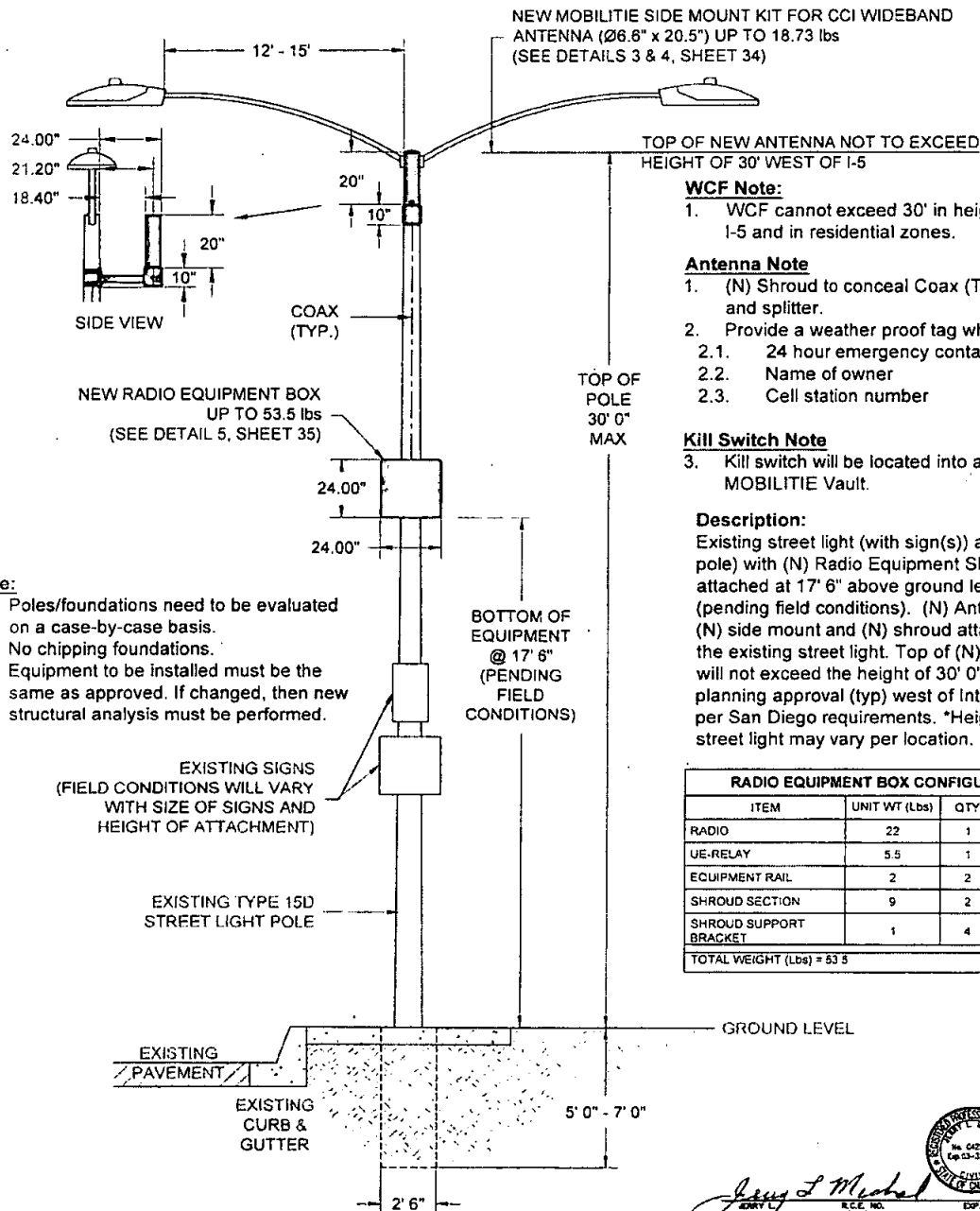
Master Structural Schematic
EXISTING TYPE 150 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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- Existing connections between type 15D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Greg L. Michael Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing street light (with sign(s)) attached to pole) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: V3mes	
TITLE: EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	
PTS NO: 530312	SHEET
DRAWING NO: TBD	11
DATE: 11/23/18	
SCALE: N.T.S.	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = 6.0 in. Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5.0' deep. Equip. Wt. = 53.5 lbs Antenna Wt. = 18.73 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6D

30-FOOT type 15D round steel pole with side mount antenna, radio, 2 light arms and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz (16) = 0.87 Kz(32) = 0.94
 I = 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GV^{1/2}I = 22 psf
 Pz(35.0) = (0.00256) Kz(30.0)GV^{1/2}I = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 6.00 in. A_p = (16) (6.00/12) = 8.00 sq. ft.
 Ave. Dia. (16-30') = 6.00 in. A_m = (14.0) (6.00/12) = 7.00 sq. ft.

Area of light arms(2): A = (2) (0.25)(8) + (0.5)(2) = 6.0 sq. ft.

Area of antenna: A = (7.18/12)(24/12) = 3.3 sq. ft.

Area of equipment unit: A = (2.0)(2.0) = 4.00 sq. ft.

Area of Signs: A' = (1.0)(2.0) + (2) (1.25)(1.25) = 5.06 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_{z16}A + P_{z35}A = 342.6 pounds

Force on Antenna: F = P_zA_{ant} = 78.5 pounds

Force on equipment: F = P_zA_{eq} = 88.0 pounds

Force on light arms(2): F = (2)(3.0)(23.8) = 142.8 pounds

Force on Signs (2): F = (22.0)(3.06) = 67.3 pounds

Total wind load = 719.2 pounds

Depth Requirement: Typical Standard Depth is 5.0 feet (per RSP ES-6D)

$$D = 0.5A (1 + [1 + (4.36h / A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (719.2) (2200) (2.5)] = 0.31$$

$$\text{Therefore } D_m = 3.34 \text{ ft.} < 5.00 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1100 pounds (for pole + equipment)
 Q_a = 1500 psf (Street light at 5.0 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q = (1100)/(4.91) = 224.0 \text{ psf OK}$$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P1 = (2)(48.1) = 96.2 \text{ ft-lbs From Wt: } P2 = (1)(53.5) = 53.5 \text{ ft-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2) + (53.5)) \frac{1}{2} = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$$

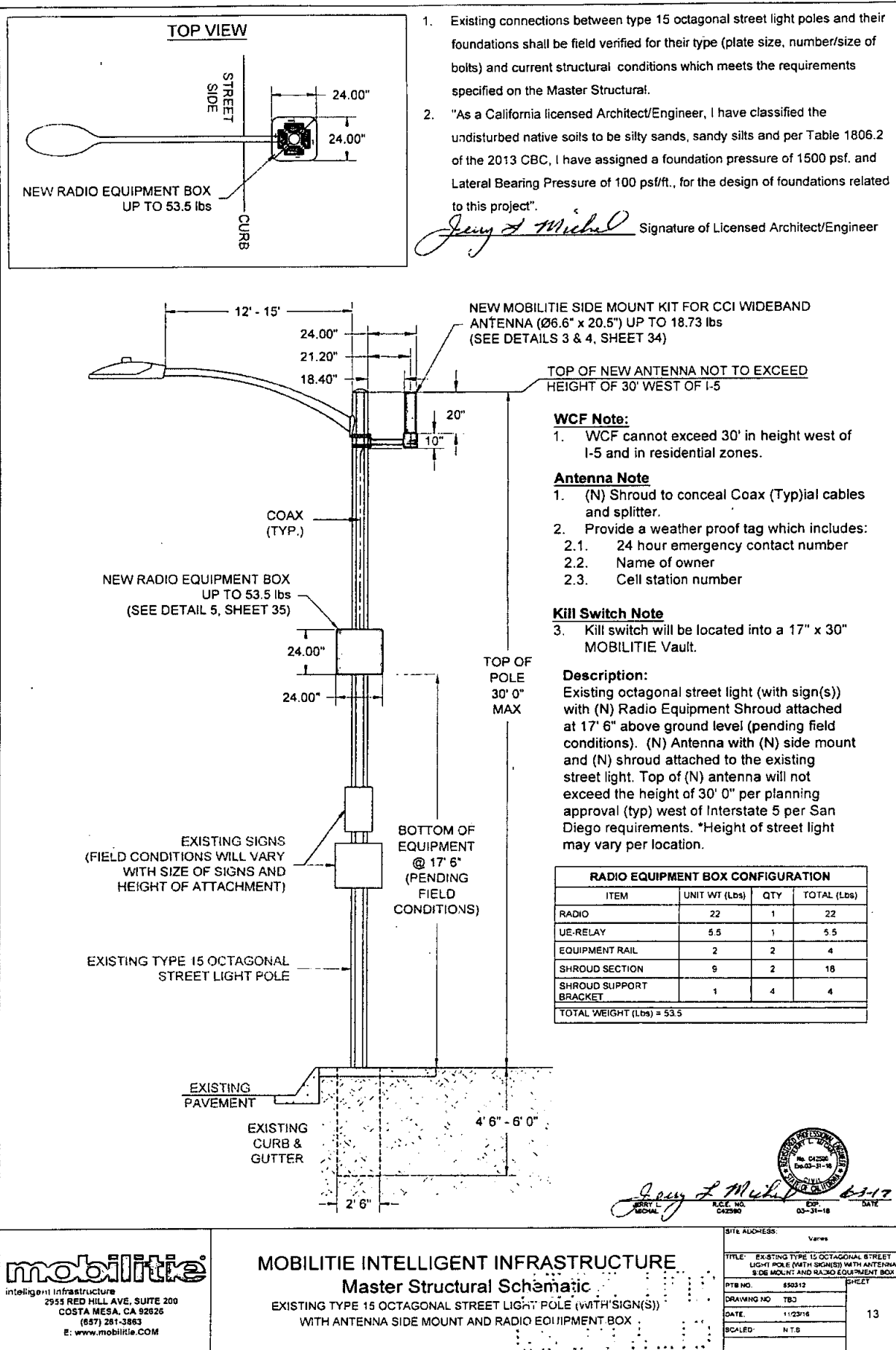
5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

SITE ADDRESS	V004
TITLE	EXISTING TYPE 15D STREET LIGHT POLE WITH ANTENNA, RADIO, 2 LIGHT ARMS AND SIGN BOX
DATE	11/23/16
SCALE	N.T.S.
DRAWING NO.	TED
DATE	11/23/16
SCALE	N.T.S.
SHEET	12

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15D STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 50,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Equip. Wt. = 53.5 Lbs Antenna Wt. = 10.861 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
 2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole Specification sheet.

30-FOOT type 15 Octagonal steel pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 6.88 in. $A_p = (16) (6.88/12) = 9.17$ sq. ft.
 Ave. Dia. (16-30') = 4.78 in. $A_m = (14.0) (4.78/12) = 6.37$ sq. ft.
 Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.
 Area of antenna: $A = (7.18/12)(24/12) = 1.2$ sq. ft.
 Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq. ft.
 Area of Signs (2): $A = (1.5)(1.5) + (1.5)(1) = 3.75$ sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{16} + P_{16} A = 353.4$ pounds
 Force on Antenna: $F = P_{16} A_m = 78.5$ pounds
 Force on equipment: $F = P_{16} A_e = 95.2$ pounds
 Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds
 Force on Signs (2): $F = (3.75)(22.0) = 82.5$ pounds

Total wind load = 681.0 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design sheet)

$$D = 0.5A (1 + [1 + (4.36h/A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (681) (2200) (2.5)] = 0.29$$

$$\text{Therefore } D_m = 3.23 \text{ ft.} < 4.50 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 $Q_m = 1500$ psf (Street light at 4.5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1405)/(4.91) = 286.3$ psf OK

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P_1 = (2)(48.1) = 96.2 \text{ ft-lbs From Wt: } P_2 = (1)(53.5) = 53.5 \text{ ft-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

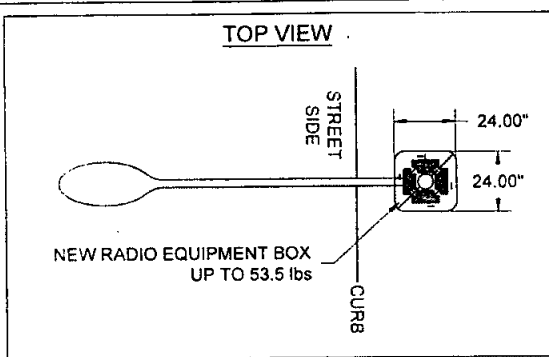
Page 2 of 2

DATE ADDRESS	Varies
TITLE	EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH ANTENNA, RADIO EQUIPMENT BOX, AND SIGNAGE
PROJECT NO.	550312
DATE	11/2/18
SCALE	N.T.S.
SHEET	14

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

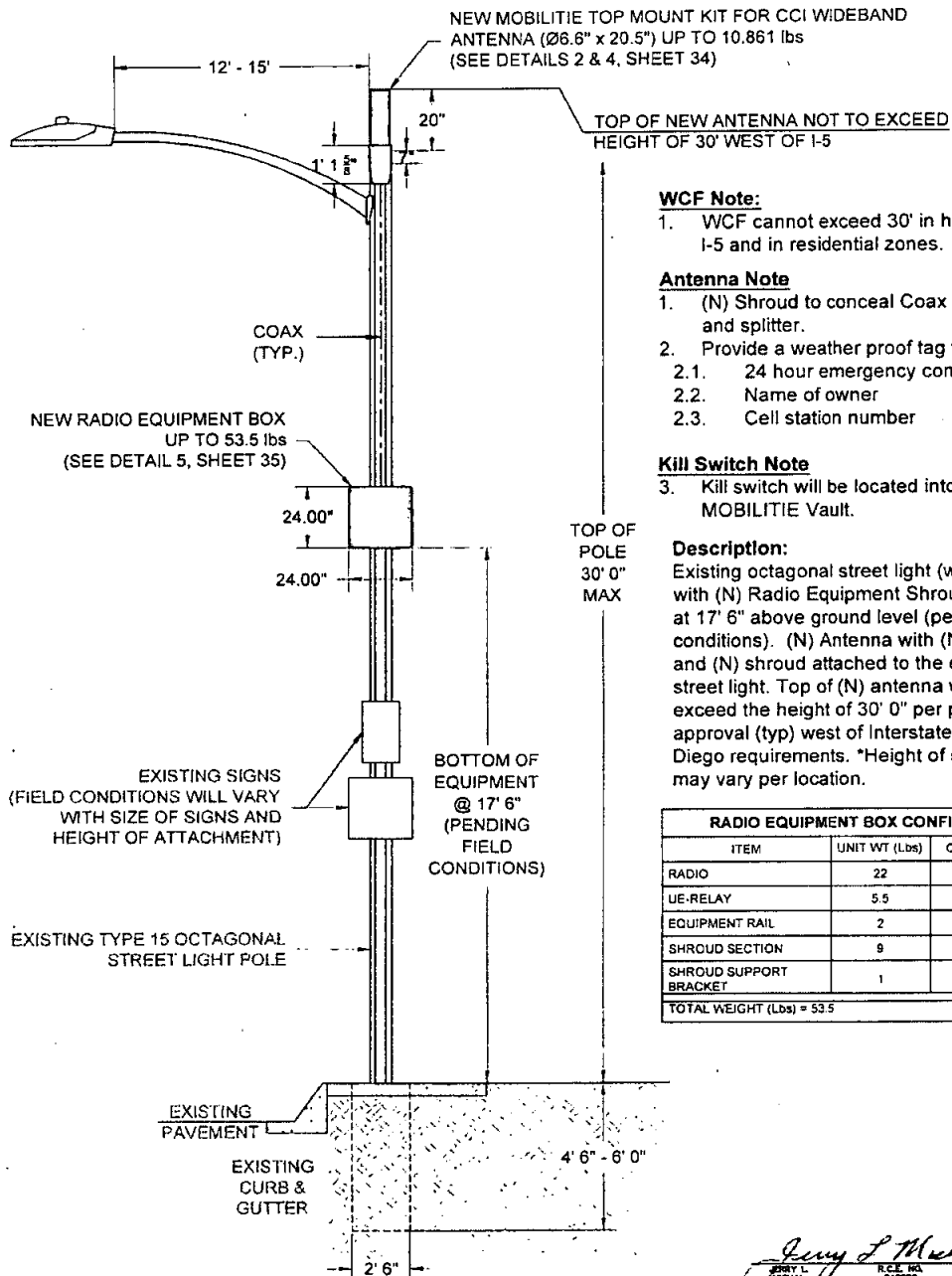
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Jerry L. Michal
 JERRY L. MICHAL
 P.E. No. 42590
 EXP. 03-31-18
 DATE 6-1-17



- Existing connections between type 15 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Greg L. Michel Signature of Licensed Architect/Engineer



WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ) cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing octagonal street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: _____

DATE: 03-31-18

DESIGNED BY: GREG L. MICHEL

CHECKED BY: _____

DATE: 03-31-18

SCALE: N.T.S.

15

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO: TYPICAL ANTENNA / RADIO INSTALLATION CALCULATIONS BY: JLM

PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017

PROJECT ADDRESS: VARIOUS AREAS

San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia.=2.5' dia. x 4.5'deep. Equip. wt. = 53.5 Lbs Antenna wt = 10.861 Lbs
References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole Specification sheet.

30-FOOT type 15 Octagonal steel pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V= 110 mph (3 sec. Gust)

Coefficients: Kz (16) = 0.87 Kz(32) = 0.94
I= 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GV²R = 22 psf

Pz(35.0) = (0.00256) Kz(30.0)GV²R = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16) = 6.88 in. A_w = (16) (6.88/12) = 9.17 sq.ft.
Ave. Dia. (16-30) = 4.78 in. A_w = (14.0) (4.78/12) = 6.37 sq.ft.

Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.

Area of antenna: A = (7.18/12)(24/12) = 3.3 sq.ft

Area of equipment unit: A = (2.0)(2.0) = 4.00 sq.ft

Area of Sign: A = (1.5)(1.5) = 2.25 sq.ft



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_wA P_wA = 353.3 pounds

Force on Antenna: F = P_wA_w = 78.5 pounds

Force on equipment: F = P_wA_w = 95.2 pounds

Force on light arm: F = (3.0)(23.8) = 71.4 pounds

Force on Signs (2): F = (2)(2.25)(23.8) = 102.6 pounds

Total wind load = 701.0 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design B6)

$$D = 0.5A (1 + [1 + (4.3Gb / A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (701.0) (2200) (2.5)] = 0.30$$

Therefore D_m = 3.29ft. < 4.50 feet ok

4. Bearing Capacity

Gross pole wt: 1347 pounds (for pole + equipment)

Q_w = 1500 psf (Street light at 4.5 foot embedment)

Pole fig dia. = 2.5 ft. Footing area = 4.91 sq. ft.

Q = 1500 psf > Q = (1347)/(4.91) = 274.3 psf OK

Page 2 of 2

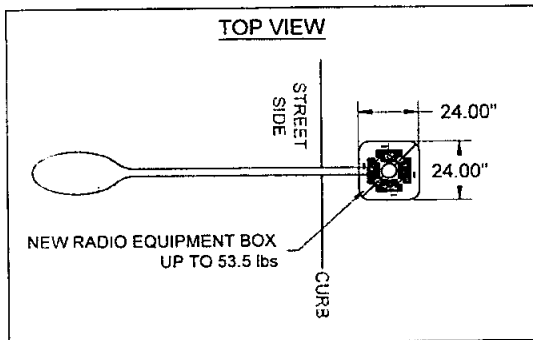
SITE ADDRESS:		EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH SIGN AND RADIO EQUIPMENT BOX
DATE	1/23/18	16
SCALE	N.T.S.	
DRAWING NO.	TBD	
DATE	1/23/18	
SCALE	N.T.S.	

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH SIGN(S)
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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(657) 281-3865
E: www.mobilitte.com

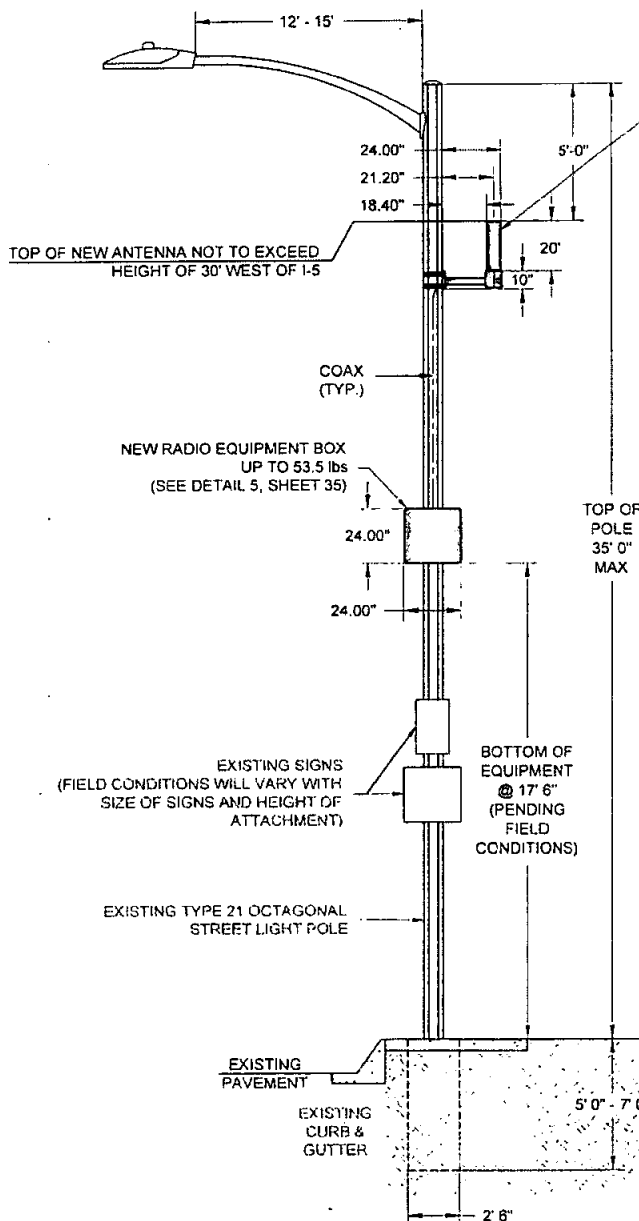


Jerry L. M. 6-3-17
B.C.E. No. 42580
Exp. 3-31-18
DATE



- Existing connections between type 21 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michael Signature of Licensed Architect/Engineer



NEW MOBILITIE SIDE MOUNT KIT FOR CCI WIDEBAND ANTENNA (26.6" x 20.5") UP TO 18.73 lbs (SEE DETAILS 3 & 4, SHEET 34)

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ) cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing octagonal street light (with sign(s)) attached to pole) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			



Jerry L. Michael 6-5-17
 JERRY L. MICHAEL
 S.C.E. NO. 642580
 EXP. 03-31-18 DATE

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 COSTA MESA, CA 92626
 (857) 361-3863
 E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		None
TITLE		EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTS NO.	550312	SHEET
DRAWING NO	YBD	
DATE	1/12/2018	17
SCALE	N.T.S.	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. 1 TYPICAL ANTENNA / RADIO INSTALLATION CALCULATIONS BY: JLM

PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017

PROJECT ADDRESS: VARIOUS AREAS

San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. = 18.73 lbs Equipment Wt. = 53.5 lbs
References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole Specification sheet.

35-foot type 21 steel light pole with side mount, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
Coefficients: Kz (16) = 0.87 Kz (32) = 0.94
Iz = 0.87 G = 1.142
Wind Pressures: Pz (16) = (0.00256) Kz (16) GVIR = 22 psf
Pz (35.0) = (0.00256) Kz (30.0) GVIR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. A_w = (16) (7.28/12) = 9.70 sq. ft.
Ave. Dia. (16-35') = 4.87 in. A_w = (19.0) (4.87/12) = 7.37 sq. ft.
Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.
Area of antenna: A = (7.18/12)(24/12) = 3.3 sq. ft.
Area of equipment unit: A = (2.0)(2.0) = 4.00 sq. ft.
Area of Sign: A = (1.5)(1.5) = (1)(1.5) = 3.75 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w A + P_{wv} A = 388.8$ pounds
Force on Antenna: $F = P_w A_w = 78.5$ pounds
Force on equipment: $F = P_w A_w = 95.2$ pounds
Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds
Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6$ pounds

Total wind load = 736.5 pounds

Depth Requirement: Typical Standard Depth is 5 feet (per design B6)

$$D = 0.5A (1 + [1 + (4.36h / A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (736.5) / (2200) (2.5)] = 0.31$$

$$\text{Therefore } D_w = 3.58 \text{ ft.} < 5 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1455 pounds (for pole + equipment)
Q_a = 1500 psf (Street light at 4.5 foot embedment)
Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
Q = 1500 psf > Q = (1455)/(4.91) = 296.3 psf OK

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

From Wind: P1 = (2)(48.1) = 96.2 ft-lbs From Wt.: P2 = (1)(53.5) = 53.5 ft-lbs

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$$

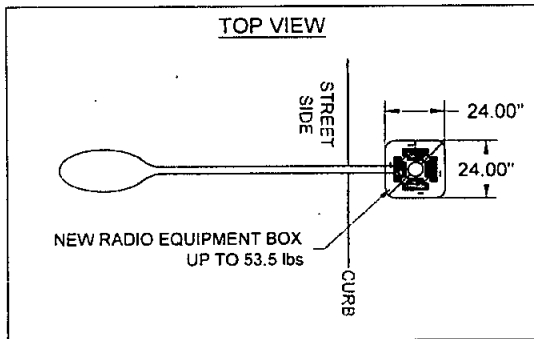
5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

SITE ADDRESS:	Various
TITLE:	EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
DATE:	6-01-17
SCALE:	NTS
SHEET:	18

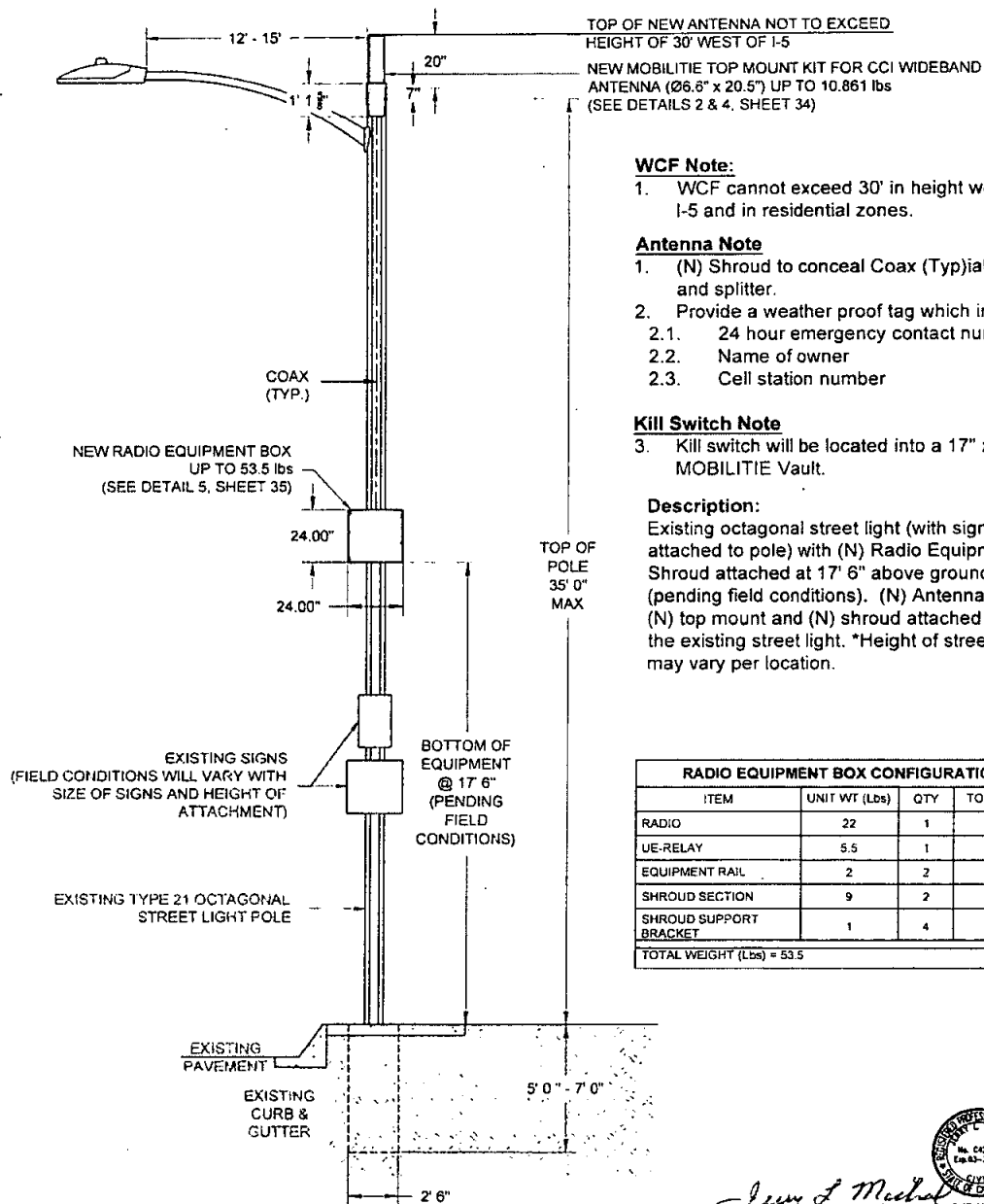
MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH SIGN(S)
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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intelligent infrastructure
2555 RED HILL AVE. SUITE 200
COSTA MESA, CA 92626
(657) 261-3853
E: www.mobilitie.com



- Existing connections between type 21 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft. for the design of foundations related to this project".

Gregory L. Michael Signature of Licensed Architect/Engineer



WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing octagonal street light (with sign(s)) attached to pole) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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intelligent infrastructure
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COSTA MESA, CA 92626
(657) 261-3863
E: www.mobilitie.COM

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

Gregory L. Michael 6-3-17
R.C.E. NO. 042590 EXP. 03-31-18 DATE

MOBILITIE ENGINEERING
No. 042590
Exp. 03-31-18
CIVIL
& ELECTRICAL

SITE ADDRESS: Venice

TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

PTB NO. 160512 SHEET

DRAWING NO. TBD

DATE: 11/23/16

SCALE: N.T.S.

19

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. TYPICAL ANTENNA / RADIO INSTALLATION

CALCULATIONS BY: JLM

PROJECT NAME: MOBILITE INTELLIGENT

DATE: 6-01-2017

PROJECT ADDRESS: VARIOUS AREAS

San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft

Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)

Footings by Design: Dia.=2.5' dia. x 5'deep. Antenna Wt.=10.861 lbs Equipment Wt. = 53.5 lbs

References: 1. 2015 IBC
2. 2016 CBC

3. ASCE MINIMUM DESIGN LOADS - 7 - 10
4. Dwg B6 Monotube Octagonal light pole Specification sheet.

35-foot type 21 octagonal steel light pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3)

V = 110 mph (3 sec. Gust)

Coefficients:

Kz (16) = 0.87

Kz(32) = 0.94

Ir = 0.87

G = 1.142

Wind Pressures:

Pz(16) = (0.00256) Kz(16)GV^{1/2}IR = 22 psf

Pz(35.0) = (0.00256) Kz(30.0)GV^{1/2}IR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in.

A_u = (16) (7.28/12) = 9.70 sq. ft.

Ave. Dia. (16-35') = 4.87 in.

A_p = (19.0) (4.87/12) = 7.37 sq. ft.

Area of light arm:

A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.

Area of antenna:

A = (7.18/12)(24/12) = 3.3 sq. ft.

Area of equipment unit:

A = (2.0)(2.0) = 4.00 sq. ft.

Area of Sign:

A = (1.5)(1.5) = (1)(1.5) = 3.75 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_u A + P_{u,eq} A = 388.8 pounds

Force on Antenna: F = P_u A_u = 78.5 pounds

Force on equipment: F = P_u A_e = 95.2 pounds

Force on light arm: F = (3.0)(23.8) = 71.4 pounds

Force on Signs (2): F = (2)(2.25)(23.8) = 102.6 pounds

Total wind load = 736.5 pounds.

Depth Requirement: Typical Standard Depth is 5 feet (per design B6)

D = 0.5A (1 + [1 + (4.36h / A)]²)

Where A = (2.34 P/S, b) = [(2.34) (736.5) / (2200) (2.5)] = 0.31

Therefore D_m = 3.58 ft. < 5 feet ok

4. Bearing Capacity

Gross pole wt: 1455 pounds (for pole + equipment)

Q_a = 1500 psf (Traffic signal at 4.5 foot embedment)

Pole fig dia. = 2.5 ft. Footing area = 4.91 sq. ft.

Q = 1500 psf > Q = (1455)/(4.91) = 296.3 psf OK

Page 2 of 2

SITE DETAILS

TITLE	EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
PTS NO	52932
DRAWING NO	TBD
DATE	11/27/16
SCALE	N.T.S.
SHEET	20

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH SIGN(S)
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

mobilitie
intelligent infrastructure
2315 S. MESA AVE, SUITE 200
COSTA MESA, CA 92626
(657) 261-3883
E: www.mobilitie.com



John F. Michael
J. L. MICHAEL
R.C.E. NO. 42590
EXP. 05-31-18
DATE 6-1-17

MASTER STRUCTURAL PLANS NEW STREET LIGHT POLES TO REPLACE CONCRETE POLES

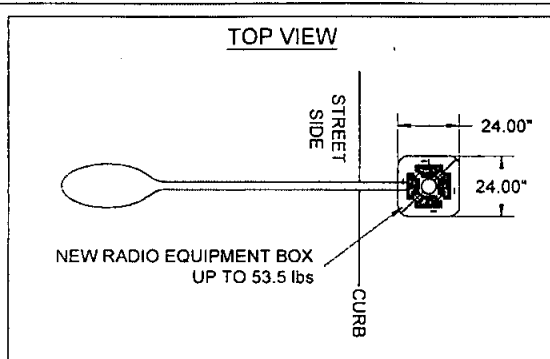
30
20
10
00

Jerry L. Miskel
JERRY L. MISKEL
No. 00238
Exp. 03-31-18
DATE 6-3-17

mobilitie
intelligent infrastructure
2955 RED HILL AVE, SUITE 200
COSTA MESA, CA 92626
(657) 261-3863
E: www.mobilitie.COM

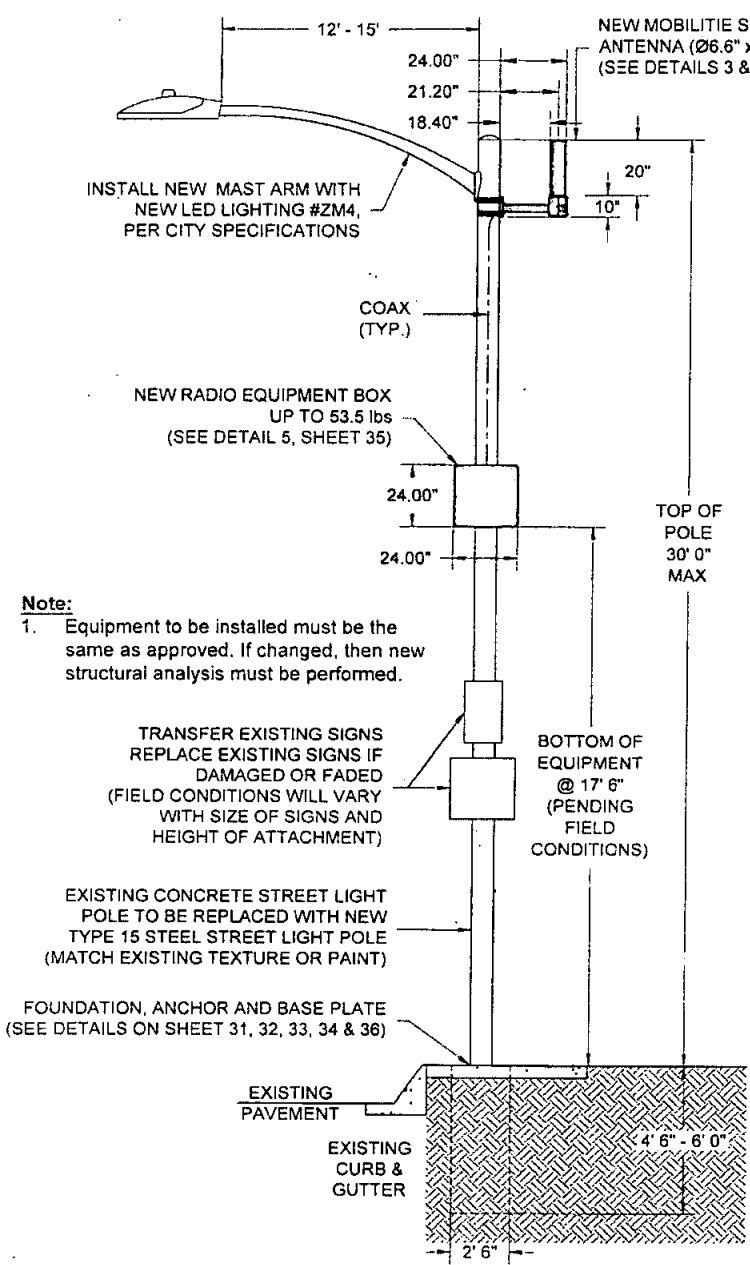
MOBITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 15 & 21 STREET LIGHT POLES (WITH SIGN(S))
WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:		Varies
TITLE		NEW TYPE 15 & 21 STREET LIGHT POLES (WITH SIGN(S)) WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX
PTS NO	550312	SHEET 21
DRAWING NO	TB3	
DATE	11/23/16	
SCALED	N.T.S.	



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michal Signature of Licensed Architect/Engineer



Note:
1. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

New Type 15 Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level. (N) Antenna with (N) mount and (N) shroud attached to the side of the new street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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COSTA MESA, CA 92626
(687) 281-3883
E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

Jerry L. Michal
JERRY L. MICHAL
6-3-2018
DATE

SITE ADDRESS:	Varies
TITLE:	NEW TYPE 15 STREET LIGHT (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTB NO:	550312
DRAWING NO:	T00
DATE:	11/23/16
SCALE:	N.T.S.
SHEET:	22

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep, Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-FOOT type 15 round steel pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 = 22$ psf
 $P_z(30.0) = (0.00256) K_z(30.0) G V^2 = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.13 in. $A_{16} = (16)(7.13/12) = 9.51$ sq.ft.
 Ave. Dia. (16-30') = 5.00 in. $A_{30} = (14.0)(5.00/12) = 5.84$ sq.ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (7.18/12)(24/12) = 3.3$ sq.ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq.ft.

Area of Sign: $A = (1.5)(1.5) = (1)(1.5) = 3.75$ sq.ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{16} A + P_{30} A = 366.2$ pounds

Force on Antenna: $F = P_{16} A_{16} = 78.5$ pounds

Force on equipment: $F = P_{16} A_{16} = 95.2$ pounds

Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds

Force on Signs (2): $F = (3.75)(23.8) = 102.6$ pounds

Total wind load = 703.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$$D = 0.5A \{ 1 + [1 + (4.36h / A)]^2 \}$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (703.9) / (2200) (2.5)] = 0.30$$

$$\text{Therefore } D_{16} = 3.29 \text{ ft.} < 4.50 \text{ feet OK}$$

4. Bearing Capacity

Gross pole wt: 1347 pounds (for pole + equipment)
 $Q_{16} = 1500$ psf

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q = (1347) / (4.91) = 274.3 \text{ psf OK}$$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P_1 = (2)(48.1) = 96.2 \text{ ft.-lbs From Wt.: } P_2 = (1)(53.5) = 53.5 \text{ ft.-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft.-lbs}$$

$$T = C = (12)(110.1) / (4.24) = 311.5 \text{ lbs}$$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

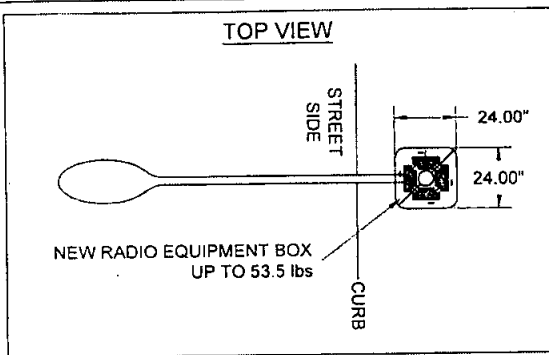


J. L. Michael
 JLM
 EXP. 03-31-18
 DATE 6-3-17

SITE ADDRESS	V.0004
TITLE	NEW TYPE 15 STREET LIGHT WITH BOXES WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PROJECT	23
DATE	11/2/15
SCALE	N.T.S.
DRAWING NO.	10017
TRD	

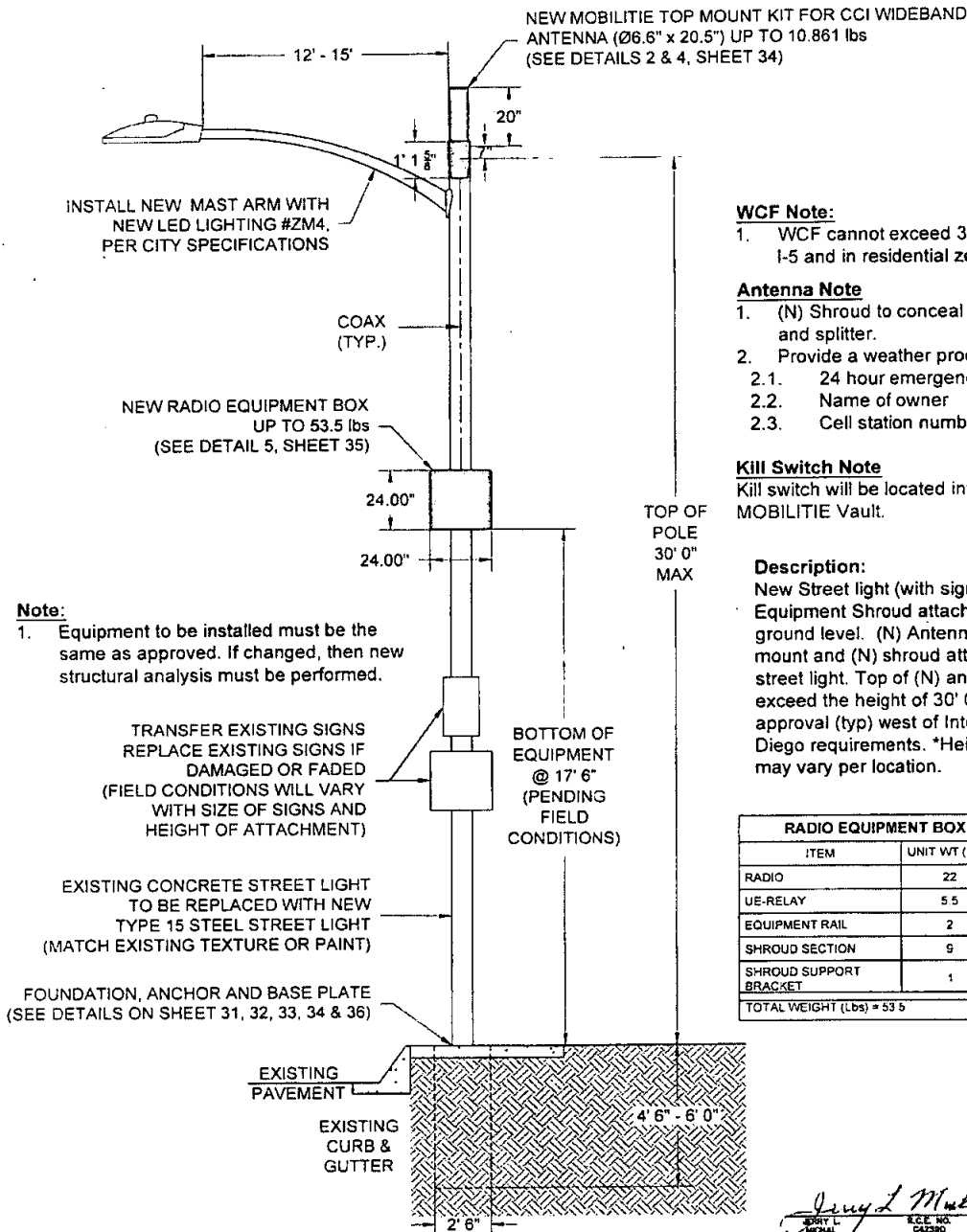
MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 15 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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 2955 RED HILL AVE, SUITE 200
 COSTA MESA, CA 92626
 (657) 281-3863
 E: www.mobilitie.com



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michael Signature of Licensed Architect/Engineer



WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typical cables and splitter).
2. Provide a weather proof tag which includes:
- 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

New Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17'-6" above ground level. (N) Antenna with (N) top mount and (N) shroud attached to the new street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

Note:

1. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

TRANSFER EXISTING SIGNS
REPLACE EXISTING SIGNS IF
DAMAGED OR FADED
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND
HEIGHT OF ATTACHMENT)

EXISTING CONCRETE STREET LIGHT
TO BE REPLACED WITH NEW
TYPE 15 STEEL STREET LIGHT
(MATCH EXISTING TEXTURE OR PAINT)

FOUNDATION, ANCHOR AND BASE PLATE
(SEE DETAILS ON SHEET 31, 32, 33, 34 & 36)

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Vanes
TITLE: NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	582012	SHEET
DRAWING NO	TBD	
DATE	11/23/18	
SCALE	N.T.S.	
		24

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-foot type 15 round steel pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 R = 22$ psf
 $P_z(30.0) = (0.00256) K_z(30.0) G V^2 R = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.13 in. $A_w = (16) (7.13/12) = 9.51$ sq. ft.
 Ave. Dia. (16-30') = 5.00 in. $A_w = (14.0) (5.00/12) = 5.84$ sq. ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (7.18/12)(24/12) = 3.3$ sq. ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq. ft.

Area of Sign: $A = (1.5)(1.5) = (1)(1.5) = 3.75$ sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_z A + P_{lateral} A = 366.2$ pounds

Force on Antenna: $F = P_z A_{ant} = 78.5$ pounds

Force on equipment: $F = P_z A_{eq} = 95.2$ pounds

Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds

Force on Signs (2): $F = (3.75)(23.8) = 102.6$ pounds

Total wind load = 703.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$$D = 0.5A \{ 1 + [1 + (4.36h / A)]^2 \}$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (703.9) (2200) (2.5)] = 0.30$$

$$\text{Therefore } D_w = 3.29 \text{ ft.} < 4.50 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1347 pounds (for pole + equipment)
 $Q_u = 1500$ psf

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q = (1347)/(4.91) = 274.3 \text{ psf OK}$$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P1 = (2)(48.1) = 96.2 \text{ ft-lbs From Wt.: } P2 = (1)(53.5) = 53.5 \text{ ft-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2) + (53.5)) / 2 = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

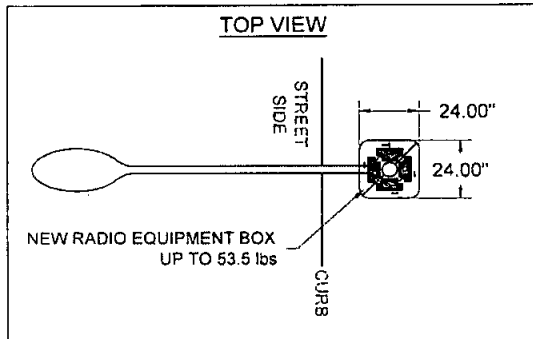
DATE ADDRESS	Version
TITLE	NEW TYPE 15 STREET LIGHT POLE WITH SIGN(S) AND RADIO EQUIPMENT BOX
DATE	11/23/18
SCALE	N.T.S.
25	

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 15 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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 2955 RED HILL AVE, SUITE 200
 COSTA MESA, CA 92626
 (657) 281-3863
 E: www.mobilitie.com

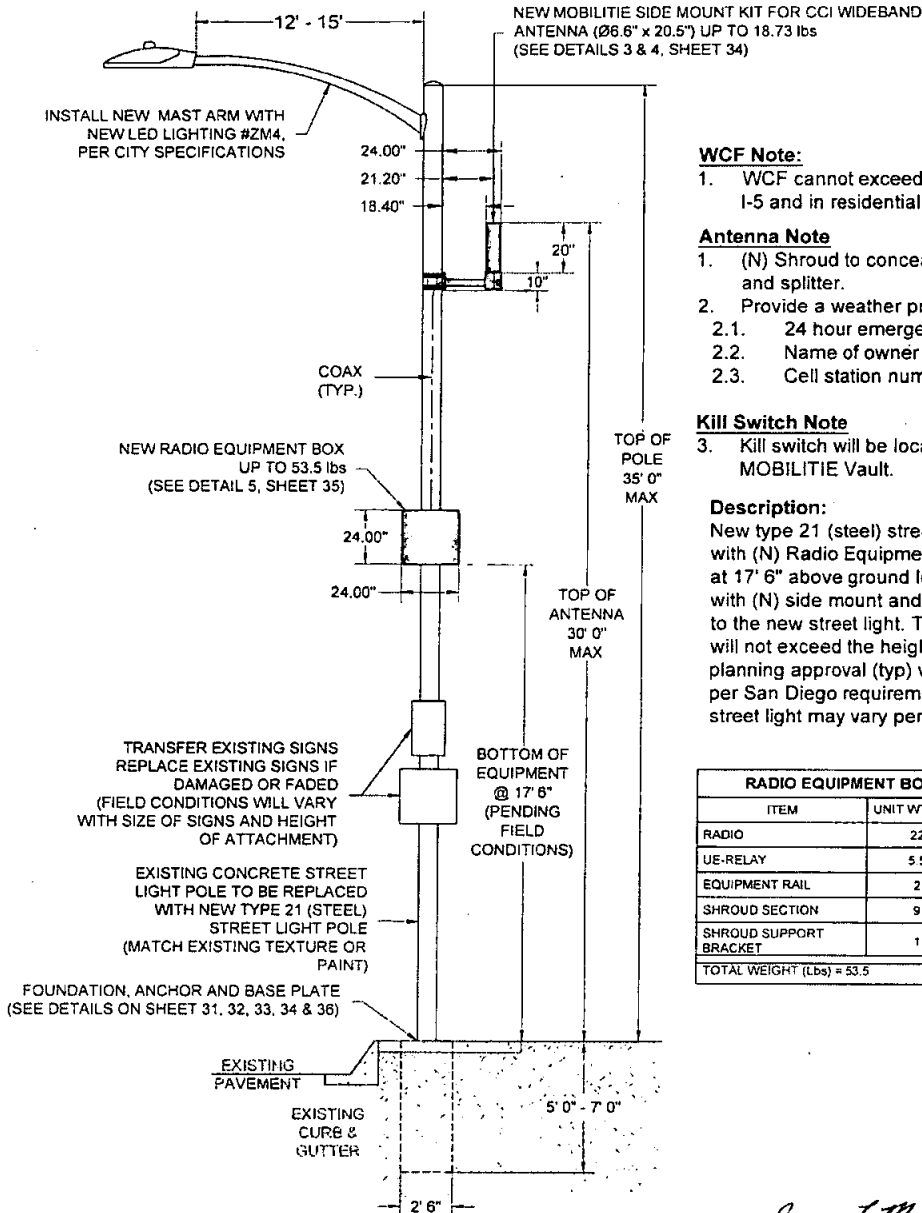


Jerry L. Michael
 JERRY L. MICHAEL
 A.C.E. NO. 42580
 EXP. 03-31-18
 DATE 6-30-17



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jimmy L. Michal Signature of Licensed Architect/Engineer



WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
2.1. 24 hour emergency contact number
2.2. Name of owner
2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

New type 21 (steel) street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level. (N) Antenna with (N) side mount and (N) shroud attached to the new street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBLITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		VARIATION
TITLE		NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
DATE	11/23/18	SHEET 26
SCALE	N.T.S.	
DRAWING NO.	TBD	
DATE	11/23/18	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2015 Caltrans Standard Plan RSP ES-6A

35-foot Type 21 round steel light pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz (16) = 0.87 Kz(32) = 0.94
 Ir = 0.87 G = 1.142
 Wind Pressures: Pz(16) = (0.00256) Kz(16)GVIR = 22 psf
 Pz(35.0) = (0.00256) Kz(35.0)GVIR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. A_u = (16)(7.28/12) = 9.70 sq.ft.
 Ave. Dia. (16-35') = 4.87 in. A_m = (14.0)(4.87/12) = 7.37 sq.ft.
 Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.
 Area of antenna: A = (7.18/12)(24/12) = 3.3 sq.ft.
 Area of equipment unit: A = (2.0)(2.0) = 4.00 sq.ft.
 Area of Sign: A = (1.5)(1.5) (1)(1.5) = 3.75 sq.ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_wA + P_{u,m}A = 388.8 pounds
 Force on Antenna: F = P_wA_m = 78.5 pounds
 Force on equipment: F = P_wA_e = 95.2 pounds
 Force on light arm: F = (3.0)(23.8) = 71.4 pounds
 Force on Signs (2): F = (3.75)(22.0) = 82.5 pounds
 Total wind load = 716.4 pounds

Depth Requirement: Typical Standard Depth is 5 feet
 D = 0.5A (1 + { 1 + (4.36h / A) }²)

Where A = (2.34 P/S_u) = { (2.34) (716.4) / (2200) (2.5) } = 0.30

Therefore D_m = 3.51 ft. < 5 feet ok

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 Q_u = 1500 psf
 Pole flg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 Q = 1500 psf > Q = (1405)/(4.91) = 286.1 psf OK

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

From Wind: P1 = (2)(48.1) = 96.2 ft-lbs From Wt.: P2 = (1)(53.5) = 53.5 ft-lbs

Worst Case - Diagonal Bolts

M_{max} = { (96.2) + (53.5) } / 2 = 110.1 ft-lbs

T = C = (12)(110.1)/(4.24) = 311.5 lbs

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

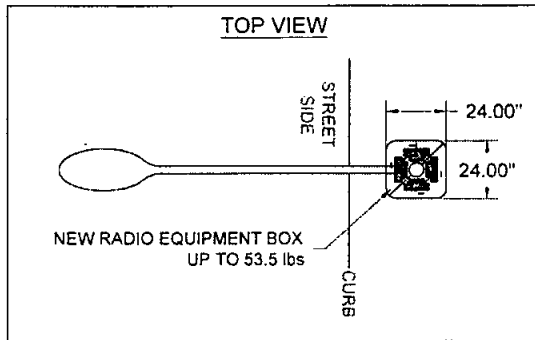
SITE ADDRESS	VIEWS
TITLE	NEW TYPE 21 STREET LIGHT POLE WITH SIGNAGE ATTACHMENT AND RADIO EQUIPMENT BOX
DATE	6/1/17
DRAWING NO.	117246
SCALE	N.T.S.
SHEET	27

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural: Schematic
 NEW TYPE 21 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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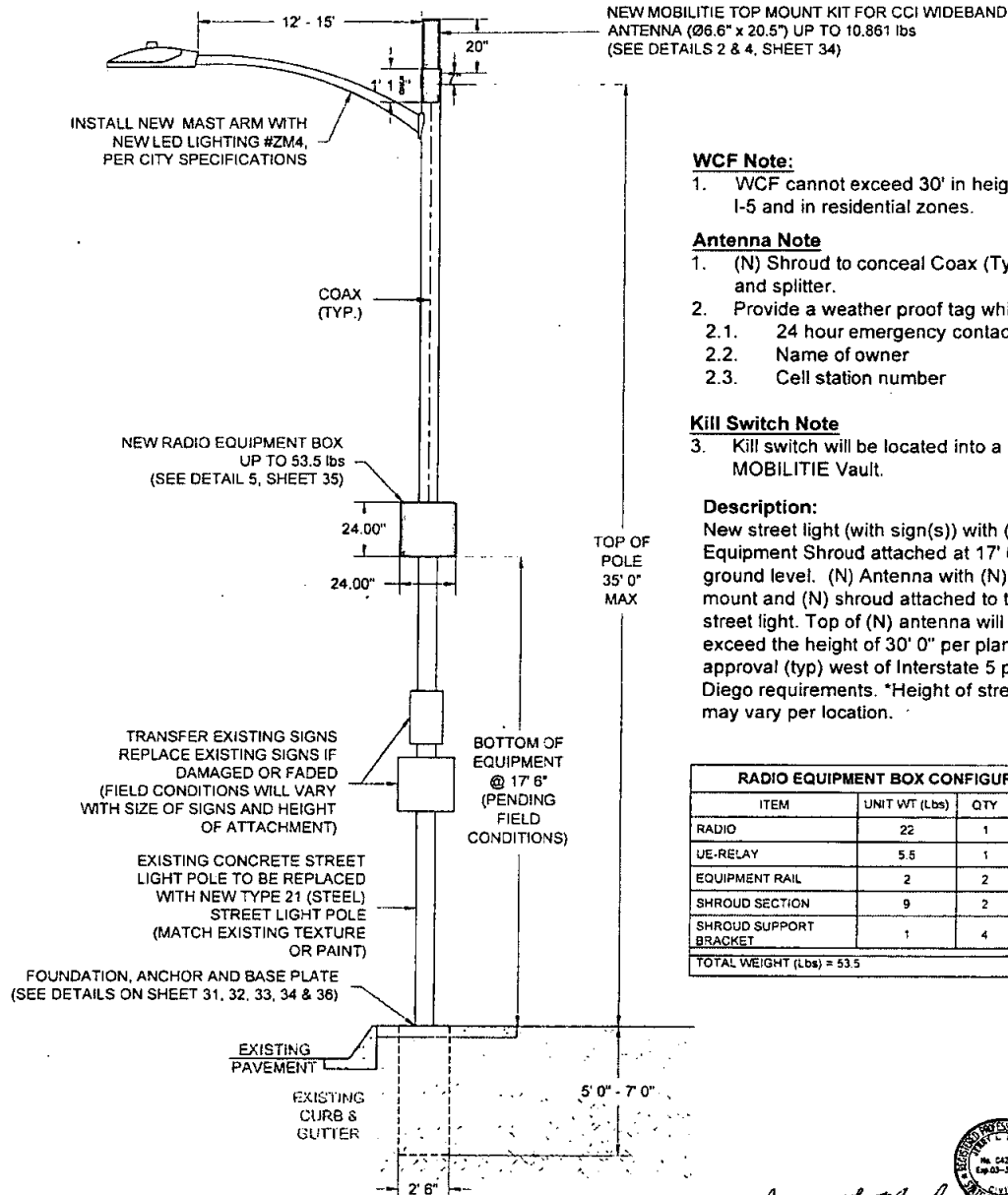


Jerry L. Michael
 R.C.E. NO. 042590
 DATE 03-31-18



1. 'As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project'.

Jerry L Michel Signature of Licensed Architect/Engineer



WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
- 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

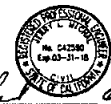
3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

New street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level. (N) Antenna with (N) side mount and (N) shroud attached to the new street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			



Jerry L Michel 6-3-17
DATE

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: Varies	
TITLE: NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
PTS NO: 550312	SHEET
DRAWING NO: TBD	28
DATE: 11/23/16	
SCALE: N.T.S.	

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APPROVED MASTER PLAN
SEPARATE BUILDING PERMIT(S) REQUIRED

550312

Master Plan Project No.

This set of plans is to be used in conjunction with separate approved building permits for each structure. No work shall be authorized by these plans in the field without written authorization of the City Engineer. No person shall be held to permit if Federal laws or restrictions.

W. Lee Date *6/21/17*

CITY OF SAN DIEGO CONSTRUCTION PERMIT

STRUCTURAL STAMP
ON SHEET 3

MOBILITIE INTELLIGENT INFRASTRUCTURE

MASTER STRUCTURAL PLANS

PTS #550312

SCOPE OF WORK: TO ATTACH MICRO-CELLULAR ANTENNAS AND ASSOCIATED EQUIPMENT TO EXISTING AND NEW TYPE 15, TYPE 15D AND TYPE 21 STREET LIGHT POLES WITHIN THE CITY OF SAN DIEGO RIGHT-OF-WAY.

APPROVED

JUN 07 2017

LAND DEVELOPMENT REVIEW
ENGR-BUILDING/STORMWATER

DESIGN CODE REFERENCES:

1. 2015 IBC
2. 2016 CBC
3. ASCE MINIMUM DESIGN LOADS - 7-10
4. 2010 & 2015 CALTRANS STANDARD PLAN RSP ES-6A + ES-6D
5. AISC, STEEL CONSTRUCTION MANUAL, 14th ADDITION, 2010
6. SAN DIEGO STANDARD DRAWING SDE-101
7. DWG B6 MONOTUBE OCTAGONAL LIGHT POLE SPECIFICATIONS SHEET



Jerry L. Michal JUN 07 2017
JERRY L. MICHAL R.C.E. No. 62560 EXP. 03-31-18 DATE

ENGINEER OF RECORD:	
JERRY L. MICHAL 2499 ROCK VIEW GLEN ESCONDIDO, CA 92026 PHONE/FAX (760) 744-8084 TAX ID: 940-70-6732	
Coastal Communications Telecommunications Engineering 5841 EDISON PLACE, STE. 110 CARLSBAD, CA 92008 PH: (760) 925-0938 FX: (760) 925-0938	
SITE ADDRESS: Varies	
TITLE: MASTER STRUCTURAL PLANS	
PTS NO.	550312
DRAWING NO.	TBD
DATE	11/23/10
SCALED	N.T.S.
SHEET 1	

SHEET INDEX

TITLE SHEET

1

SHEET INDEX

2

SHEET INDEX

3

MASTER STRUCTURAL PLANS FOR EXISTING STREET LIGHT POLES

4

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

5

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

6

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

7

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

8

EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

9

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

10

EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

11

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

12

EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

13

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

14

EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

15

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

16

EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

17

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

18

EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

19

STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

20

MASTER STRUCTURAL PLANS FOR NEW STREET LIGHT POLES

21

NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

22

STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

23

NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

24

STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

25



Jerry L. Michael
DATE: 03-31-18
DATE: 6-3-17

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MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic

SITE ADDRESS:	
TITLE: SHEET INDEX	
PTS NO.	550312
DRAWING NO.	TBD
DATE:	11/23/16
SCALED	N.T.S.
SHEET 2	

SHEET INDEX

NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	26
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	27
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	28
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	29
2010 REVISED STANDARD PLAN RSP ES-6A	30
2015 REVISED STANDARD PLAN RSP ES-6A	31
2015 REVISED STANDARD PLAN RSP ES-6D	32
2010 REVISED STANDARD PLAN RSP ES-6D	33
DETAIL SHEET	34
DETAIL SHEET	35
DETAIL SHEET	36
DETAIL SHEET	37
DETAIL SHEET	38
DETAIL SHEET	39
DETAIL SHEET	40

550312

BUILDING DEVELOPMENT REVIEW
DIVISION-STRUCTURAL

B. M. M. 6/5/2017
VISWANATH BASAVARAJA Date

MASTER PLAN
COURTESY REVIEW ONLY
NO FUTURE BUILDING PERMIT



Gary L. Michel 6-7-17
SEAL NO. 04230 EXP. 03-31-18 DATE

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MOBITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic

SITE ADDRESS	
TITLE:	
SHEET INDEX	
PTB NO	550312
DRAWING NO	150
DATE	11/23/16
SCALED	N.T.S
SHEET	
3	

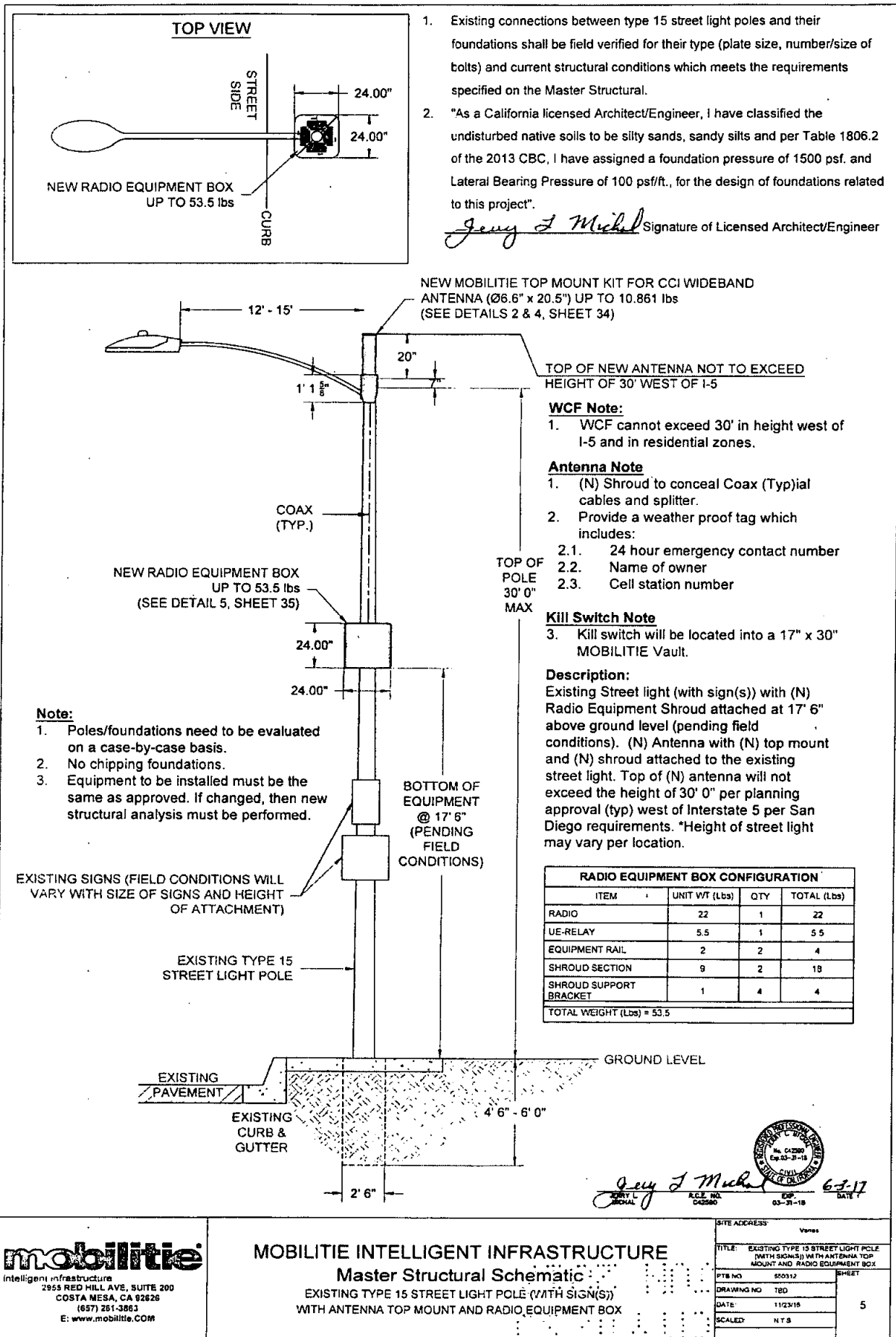
MASTER STRUCTURAL PLANS FOR EXISTING STREET LIGHT POLES


 Jerry Z. Muhl
 CIVIL ENGINEER
 03-31-18
 DATE 6-7-17

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MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Values
TITLE: EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	550312	SHEET 4
DRAWING NO	TBD	
DATE	11/23/16	
SCALED	N.T.S.	



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MOBILITIE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

6-3-17

DATE

EXP. 03-31-18

R.C.E. NO. C2580

GARY L. MICHEL

ARCHITECT/ENGINEER

SHEET ADDRESS: Varms

TITLE: EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

PTB NO: 50512

DRAWING NO: 780

DATE: 11/23/15

SCALED: N.T.S.

5

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia.=2.5' dia. x 4.5'deep. Antenna wt. = 10.861 lbs Equipment Wt. = 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-FOOT round Type 15 steel light pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V= 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf

$P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 9.75 in. $A_w = (16) (9.75/12) = 13.0$ sq.ft.
 Ave. Dia. (16-30') = 7.88 in. $A_m = (14.0) (7.88/12) = 9.19$ sq.ft.

Area of antenna: $A = (7.18/12)(24/12) = 1.20$ sq. ft.

Area of equipment unit: $A = (2)(2) = 4.00$ sq.ft

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.00$ sq. ft.

Area of sign: $A = (1.25)(1.25) = 1.56$ sq.ft

Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w A + P_{w,m} A = 504.7$ pounds

Force on Antenna: $F = P_w A_m = 28.6$ pounds

Force on equipment: $F = P_w A_m = 95.2$ pounds

Force on light arm: $F = (3.0) (23.8) = 71.4$ pounds

Force on Sign: $F = (22.0)(1.56) = 34.3$ pounds

Total wind load = 734.2 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet per (SDE-101)

$D = 0.5A (1 + [1 + (4.36h / A)]^2)$

Where $A = (2.34 P/S, b) = [(2.34) (734.2/ (2200) (2.5))] = 0.31$

Therefore $D_m = 3.34$ ft. < 4.50 feet ok

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)

$Q_a = 1500$ psf (Street light at 4.5foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.90 sq. ft.

$Q = 1500$ psf > $Q = (1405)/(4.90) = 286.7$ psf OK

Page 2 of 2

SITE ADDRESS: Views

TITLE: EXISTING TYPE 15 STREET LIGHT POLE
 EXISTING WITH ANTENNA FOR
 MOBILE INTELLIGENT INFRASTRUCTURE
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

PTS NO. 44012 SHEET 6

DRAWING NO. TBD

DATE: 1/22/16

SCALE: N.T.S.

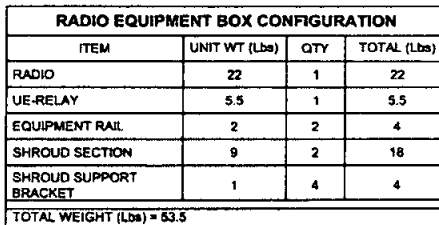
MOBILITIE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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 (949) 261-3883
 E: www.mobilitie.com



Note:

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

———— GROUND LEVEL

4' 6" - 6' 0"

- 2' 6" -

James L. Mitchell



65-17

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MOBILITE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:	Various	
TITLE:	EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGNS) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	
PTR NO.	SS0012	SHEET
DRAWING NO	TBD	
DATE:	11/23/18	
SCALED:	N.T.S.	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELEGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep.

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-FOOT type 15 steel pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I R = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I R = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. $(9-16) = 9.75 \text{ in.}$ $A_p = (16) (9.75/12) = 13.0 \text{ sq. ft.}$
 Ave. Dia. $(16-30) = 7.88 \text{ in.}$ $A_m = (14.0) (7.88/12) = 9.91 \text{ sq. ft.}$

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$

Area of antenna: $A = (7.18/12)(24/12) = 3.3 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Sign: $A = (1.5)(1.5) = 2.25 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u + P_{au} A = 521.9 \text{ pounds}$

Force on Antenna: $F = P_u A_m = 78.5 \text{ pounds}$

Force on equipment: $F = P_u A_m = 88.0 \text{ pounds}$

Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$

Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$

Total wind load = 862.4 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$$D = 0.5A [1 + \{1 + (4.36h/A)\}^2]$$

$$\text{Where } A = (2.34 P/S, b) = \{ (2.34) (862.4) / (2200) (2.5) \} = 0.37$$

$$\text{Therefore } D_m = 3.66 \text{ ft.} < 4.50 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$ (Street light at 4.5 foot embedment)

Pole fig dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q = (1405)/(4.91) = 203.3 \text{ psf OK}$$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P1 = (2)(48.1) = 96.2 \text{ ft-lbs From Wt.: } P2 = (1)(53.5) = 53.5 \text{ ft-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = (96.2) + (53.5) = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

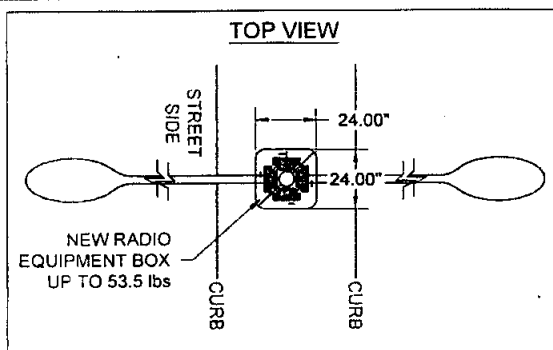
SITE ADDRESS: Varies	TITLE: EXISTING TYPE 15 STREET LIGHT POLE WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
DATE: 11/20/16	PROJECT NO: 550112
SCALE: N.T.S.	DRAWING NO: 100
	SHEET: 8

MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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 Intelligent Infrastructure
 25100 RED HILL AVENUE, SUITE 200
 COSTA MESA, CA 92626
 (657) 261-3863
 E: www.mobilitie.com

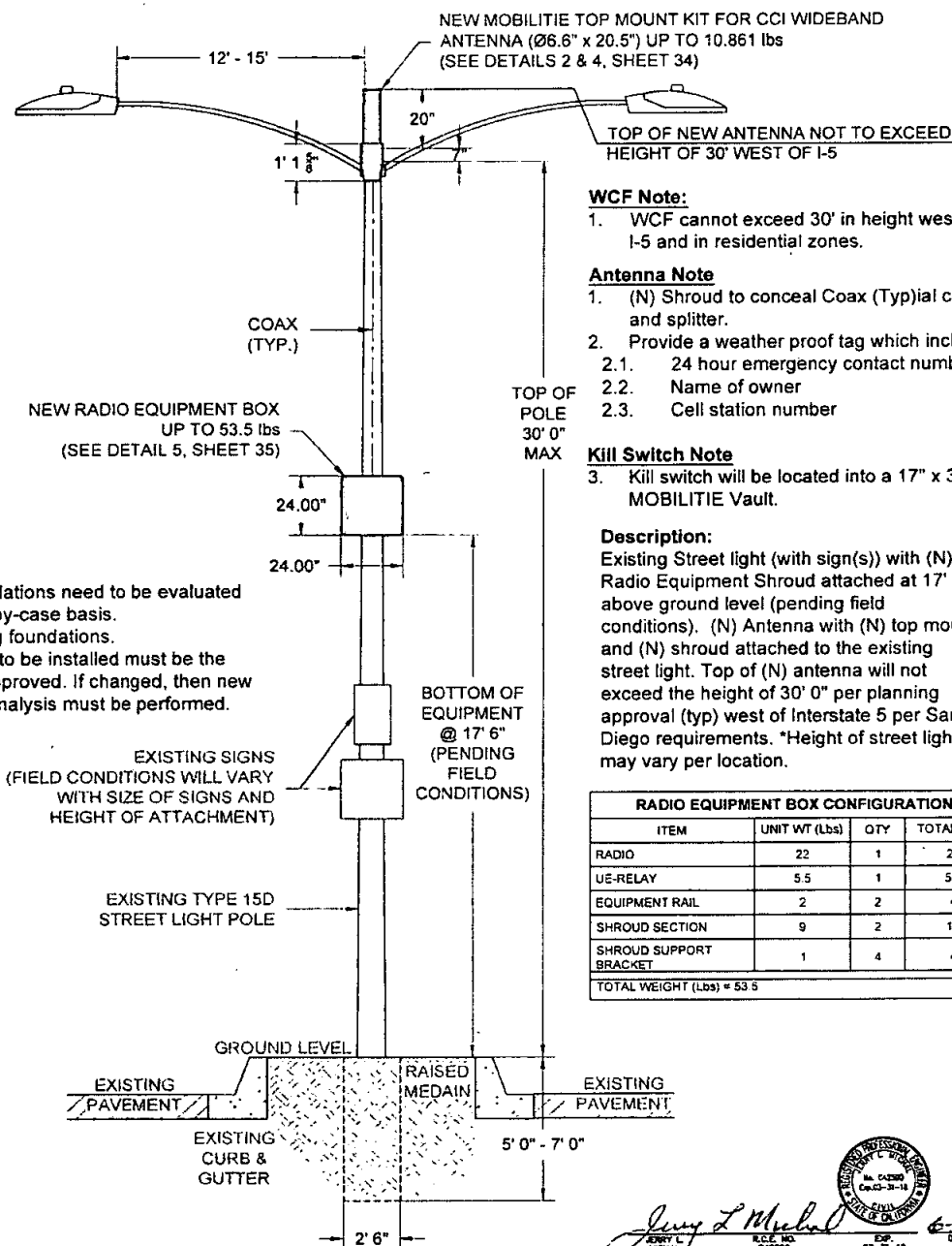


6-1-17
 J. L. M.
 DATE



- Existing connections between type 15D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jimmy L. Michael Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

EXISTING SIGNS
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND
HEIGHT OF ATTACHMENT)

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ) cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

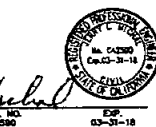
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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2955 RED HILL AVE, SUITE 200
COSTA MESA, CA 92626
(657) 261-3983
E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX



Jimmy L. Michael
JERRY L. MICHAEL
E.C.E. NO. 63530
ESP. 03-31-18

SITE ADDRESS	VANES
TITLE	EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
PTS. NO.	050312
DRAWING NO.	TBD
DATE	11/23/18
SCALE	N.T.S.
SHEET	9

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = as noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia.=2.5' dia. x 5.0'deep. Equip. Wt. = 53.5 lbs Antenna Wt. = 18.3 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6D

30-FOOT type 15D round steel pole with top mount antenna, radio 2 light arms and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz(16) = 0.87 Kz(32) = 0.94
 Ir = 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GV²IR = 22 psf
 Pz(35.0) = (0.00256) Kz(30.0)GV²IR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.11 in. A_{st} = (16) (7.11/12) = 9.48 sq.ft.
 Ave. Dia. (16-30') = 5.48 in. A_w = (14.0) (5.48/12) = 6.39 sq.ft.

Area of light arms(2): A = (2) (0.25)(8) + (0.5)(2) = 6.0 sq. ft.

Area of antenna: A = (7.18/12)(24/12) = 3.3 sq.ft

Area of equipment unit: A = (2.0)(2.0) = 4.00 sq.ft

Area of Pedestrian Sign: A = (1.25)(1.25) + (1)(1.5) = 3.06 sq.ft



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_wA + P_{st}A = 541.8 pounds

Force on Antenna: F = P_wA_{st} = 78.5 pounds

Force on equipment: F = P_wA_e = 88.0 pounds

Force on light arms(2): F = (2)(3.0)(23.8) = 142.8 pounds

Force on Signs (2): F = (22.0)(3.06) = 67.3 pounds

Total wind load = 918.4 pounds

Depth Requirement: Typical Standard Depth is 5.0 feet (per RSP ES-6D)

$$D = 0.5A \{ 1 + [(4.36h / A)]^2 \}$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (918.4) / (2200) (2.5)] = 0.39$$

$$\text{Therefore } D_{req} = 3.77 \text{ ft.} < 5.00 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1100 pounds (for pole + equipment)
 Q_a = 1500 psf (Street light at 5.0 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q = (1100) / (4.91) = 224.0 \text{ psf OK}$$

Page 2 of 2

DATE	SCALE	NO.
11/23/16	N.T.S.	10
DRAWING NO.	100	
DATE	11/23/16	
SCALE	N.T.S.	

MOBILITIE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

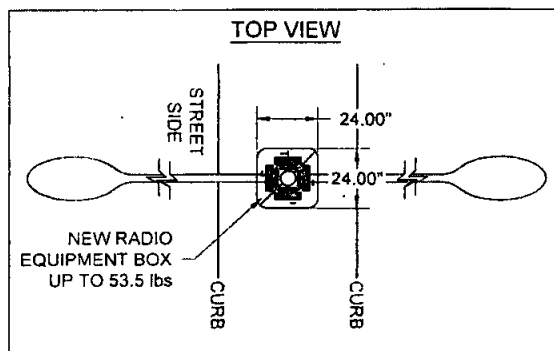
EXISTING TYPE 15D STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

mobilitie

intelligent infrastructure
 2955 RED HILL AVE. SUITE 200
 COSTA MESA, CA 92626
 (949) 261-8888
 E: www.mobilitie.com

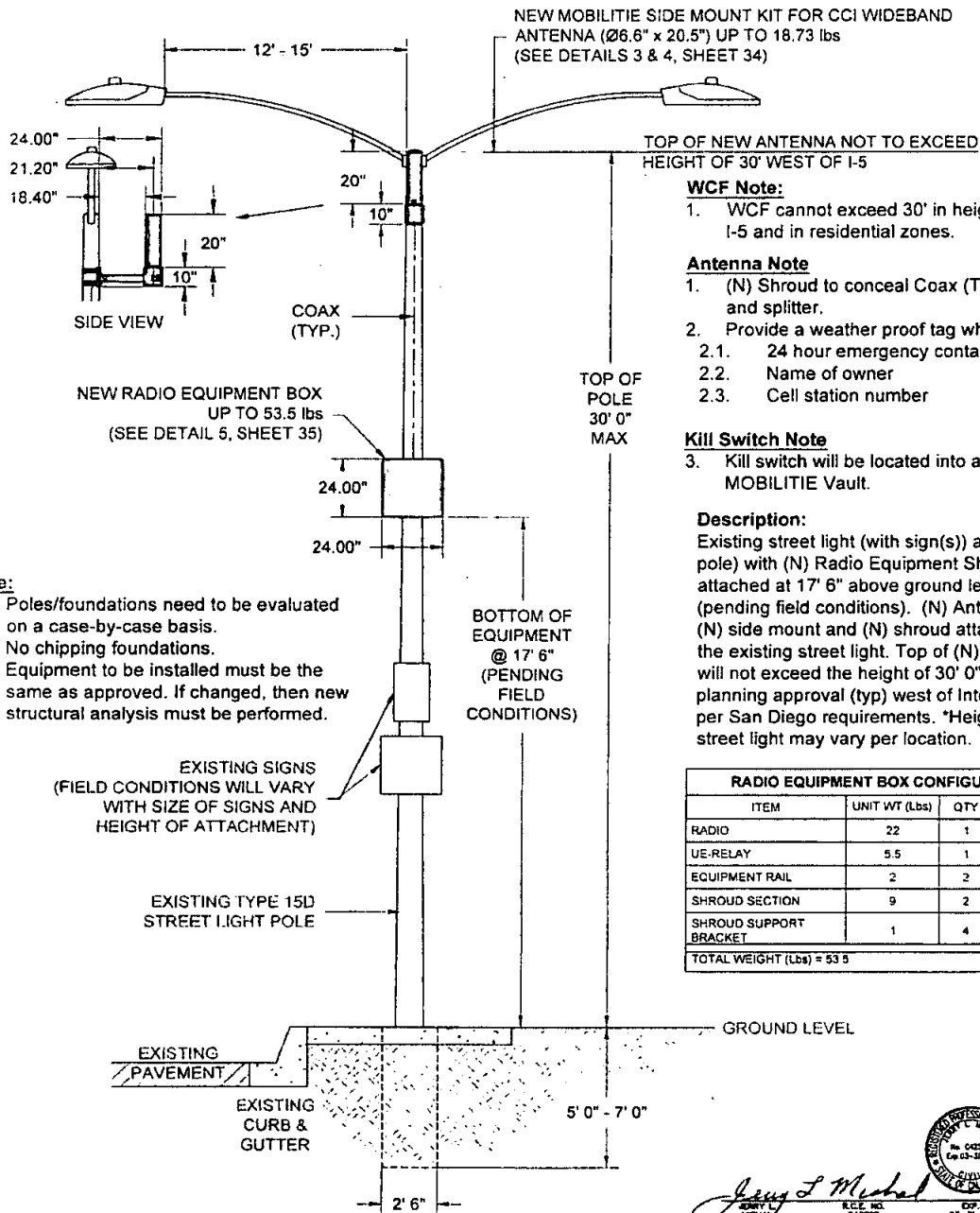


J. L. Michael
 R.C.E. NO. C42590
 EXP. 03-31-18
 DATE 6-5-17



- Existing connections between type 15D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michael Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typical cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing street light (with sign(s)) attached to pole) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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2955 RED HILL AVE, SUITE 200
COSTA MESA, CA 92626
(857) 261-3863
E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

DATE: 03-31-18
SHEET: 11

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = 6.0 in. Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia = 2.5' dia. x 5.0' deep. Equip. Wt. = 53.5 lbs Antenna Wt. = 18.73 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6D

30-FOOT type 15D round steel pole with side mount antenna, radio, 2 light arms and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 6.00 in. $A_p = (16) (6.00/12) = 8.00$ sq.ft.
 Ave. Dia. (16-30') = 6.00 in. $A_m = (14.0) (6.00/12) = 7.00$ sq.ft.

Area of light arms(2): $A = (2) (0.25)(8) + (0.5)(2) = 6.0$ sq. ft.

Area of antenna: $A = (7.18/12)(24/12) = 3.3$ sq.ft

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq.ft

Area of Signs: $A = (1.0)(2.0) + (2) (1.25)(1.25) = 5.06$ sq.ft



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{w,p} A + P_{w,e} A = 342.6$ pounds

Force on Antenna: $F = P_{w,e} A_m = 78.5$ pounds

Force on equipment: $F = P_{w,e} A_m = 88.0$ pounds

Force on light arms(2): $F = (2)(3.0)(23.8) = 142.8$ pounds

Force on Signs (2): $F = (22.0)(3.06) = 67.3$ pounds

Total wind load = 719.2 pounds

Depth Requirement: Typical Standard Depth is 5.0 feet (per RSP ES-6D)

$$D = 0.5A (1 + [1 + (4.36h / A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (719.2) (2200) (2.5)] = 0.31$$

$$\text{Therefore } D_m = 3.34 \text{ ft.} < 5.00 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1100 pounds (for pole + equipment)
 $Q_u = 1500$ psf (Street light at 5.0 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q_u = (1100) (4.91) = 224.0 \text{ psf OK}$$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P_1 = (2)(48.1) = 96.2 \text{ ft-lbs From Wt.: } P_2 = (1)(53.5) = 53.5 \text{ ft-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2) + (53.5)) (1/2) = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1) / (4.24) = 311.5 \text{ lbs}$$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

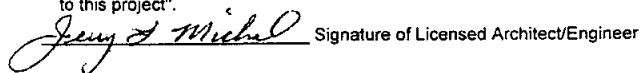
DATE	11/23/16
SCALE	N.T.S.
DRAWING NO.	TED
SHEET NO.	12
PROJECT NO.	180312
TITLE	EXISTING TYPE 15D STREET LIGHT POLE WITH ANTENNA, RADIO MOUNT AND RADIO EQUIPMENT BOX

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

mobilitie
 intelligent infrastructure
 2955 RED HILL AVE., SUITE 200
 COSTA MESA, CA 92626
 (657) 261-3853
 E: www.mobilitie.com



James J. Thibault
 JLM
 03-31-16
 DATE



1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing octagonal street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			



Jerry L. Michael  63-1-
JERRY L. MICHAEL R.C.E. NO. EXP. DATE
CA2380 03-31-18

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic

EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX .

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 50,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep, Equip. Wt. = 53.5 Lbs Antenna Wt. = 10.861 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
 2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole Specification sheet.

30-FOOT type 15 Octagonal steel pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I R = 22$ psf
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I R = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 6.88 in. $A_w = (16) (6.88/12) = 9.17$ sq. ft.
 Ave. Dia. (16-30') = 4.78 in. $A_w = (14.0) (4.78/12) = 6.37$ sq. ft.
 Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.
 Area of antenna: $A = (7.18/12)(24/12) = 1.2$ sq. ft.
 Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq. ft.
 Area of Signs (2): $A = (1.5)(1.5) + (1.5)(1) = 3.75$ sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w + P_{w,e} A = 353.4$ pounds
 Force on Antenna: $F = P_w A_w = 78.5$ pounds
 Force on equipment: $F = P_w A_e = 95.2$ pounds
 Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds
 Force on Signs (2): $F = (3.75)(22.0) = 82.5$ pounds

Total wind load = 681.0 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design sheet)

$$D = 0.5A (1 + (1 + (4.36h / A))^4)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (681) / (2200) (2.5)] = 0.29$$

$$\text{Therefore } D_w = 3.23 \text{ ft.} < 4.50 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 $Q_u = 1500$ psf (Street light at 4.5 foot embedment)
 Pole fig dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1405) / (4.91) = 286.3$ psf OK

5. Antenna Attachment Calculations:

Moment on Attachment Bolts
 From Wind: $P_1 = (2)(48.1) = 96.2$ ft-lbs From Wt.: $P_2 = (1)(53.5) = 53.5$ ft-lbs
 Worst Case - Diagonal Bolts
 $M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1$ ft-lbs
 $T = C = (12)(110.1) / (4.24) = 311.5$ lbs
 5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

SITE ADDRESS	V444
TITLE	EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH ANTENNA, RADIO AND SIGN EQUIPMENT BOX
DATE	6/1/2017
SCALE	N.T.S.
SHEET NO.	14

MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

mobilitie
 intellige nce infrastructure
 2955 RED HILL AVE., SUITE 200
 CARLSBAD, CA 92008
 TEL: (619) 591-3663
 E: www.mobilitie.com

Jerry L. Michael
 R.E., No. 42590
 Exp. 3-31-18
 Date: 6-1-17

Master Structural Schematic

EXISTING TYPE IS OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

15	DATE: 1/23/10
	DRAWING NO: 180
	NO: 12
	SECRET

RECEIVED
 MAY 17 1964
 U.S. DEPARTMENT OF JUSTICE
 FEDERAL BUREAU OF INVESTIGATION
 WASHINGTON, D.C. 20535
 FROM: SAC, NEW YORK (100-38861)
 TO: DIRECTOR, FBI (100-38861)
 SUBJECT: [REDACTED]
 RE: [REDACTED]

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (lbs)	QTY	TOTAL (lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (lbs) = 53.5			

Description: Existing octagonal street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITE Vault.

1. (N) Shroud to conceal Coax (Typical cables and splitter).
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

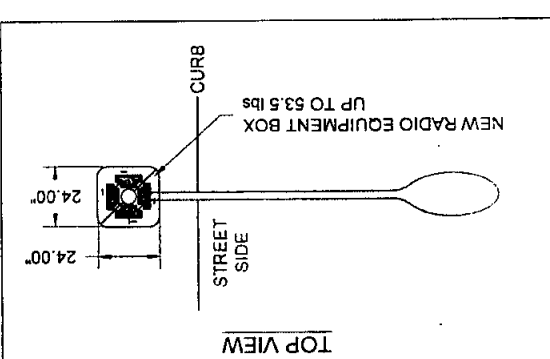
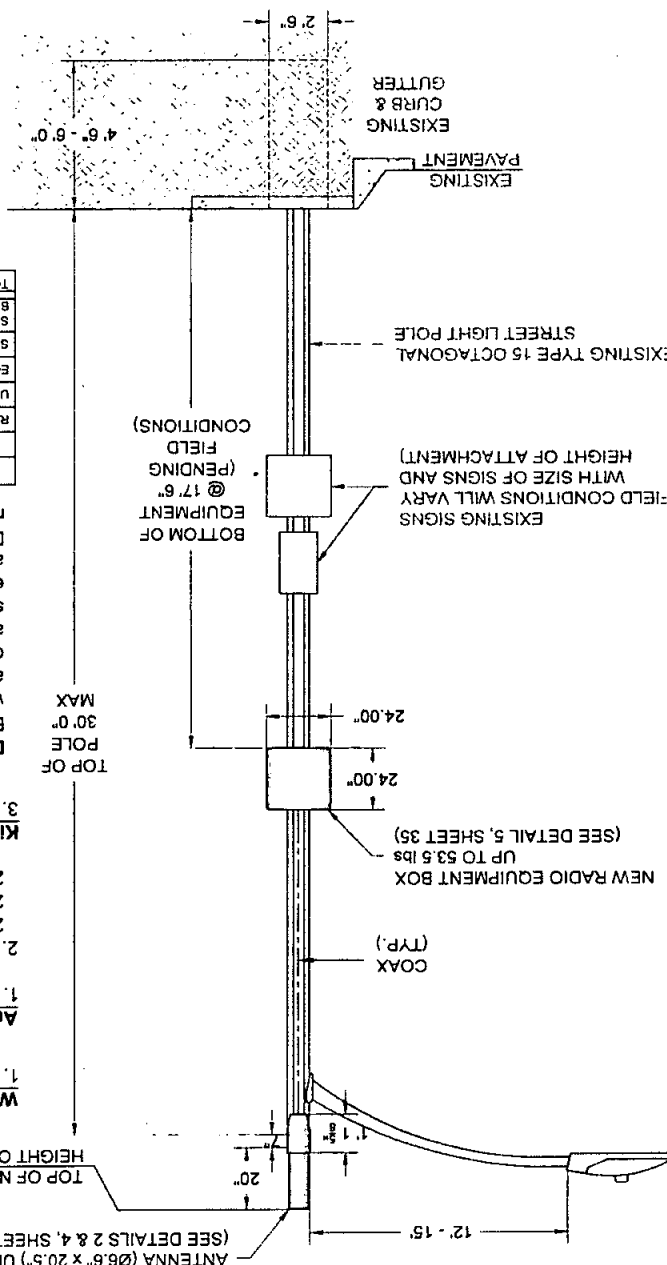
WCF cannot exceed 30' in height west of I-5 and in residential zones.

NEW ANTENNA NOT TO EXCEED
OF 30' WEST OF I-5

UNIT KIT FOR CCI WIDEBAND
UP TO 10.861 lbs
(ET 34)

Signature of Licensed Architect/Engineer

field verified for their type (plate size, number/size of structural conditions which meets the requirements of the Structural Engineer. I have classified the soils to be silty sands, sandy silts and per Table 1806.2 have assigned a foundation pressure of 1500 psc and a pressure of 100 psc/ft., for the design of foundations relative



STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. TYPICAL ANTENNA / RADIO INSTALLATION CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia = 2.5' dia. x 4.5' deep, Equip. wt. = 53.5 Lbs Antenna wt. = 10.861 Lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
 2. 2016 CBC 4. Dwg B8 Monotube Octagonal light pole Specification sheet.

30-FOOT type 15 Octagonal steel pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 R = 22$ psf

$P_z(32.0) = (0.00256) K_z(32.0) G V^2 R = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 6.88 in. $A_{16} = (16) (6.88/12) = 9.17$ sq.ft.
 Ave. Dia. (16-30') = 4.78 in. $A_{30} = (14.0) (4.78/12) = 6.37$ sq.ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (7.18/12)(24/12) = 3.3$ sq.ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq.ft.

Area of Sign: $A = (1.5)(1.5) = 2.25$ sq.ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{z16} A_{16} = 353.3$ pounds

Force on Antenna: $F = P_{z16} A_{16} = 78.5$ pounds

Force on equipment: $F = P_{z16} A_{16} = 95.2$ pounds

Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds

Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6$ pounds

Total wind load = 701.0 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design B6)

$$D = 0.5A [1 + (1 + (4.36h / A))^2]$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (701.0) / (2200) (2.5)] = 0.30$$

$$\text{Therefore } D_{16} = 3.29 \text{ ft.} < 4.50 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1347 pounds (for pole + equipment)

$Q_u = 1500$ psf (Street light at 4.5 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

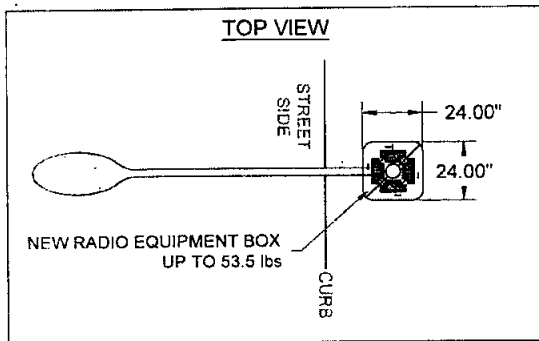
$Q = 1500 \text{ psf} > Q_u = (1347) / (4.91) = 274.3$ psf OK.

Page 2 of 2

SITE ADDRESS	TITLE: EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX		SHEET	16
	PTS NO	160-13		
DRAWING NO	180		DATE	11/03/16
	SCALE			

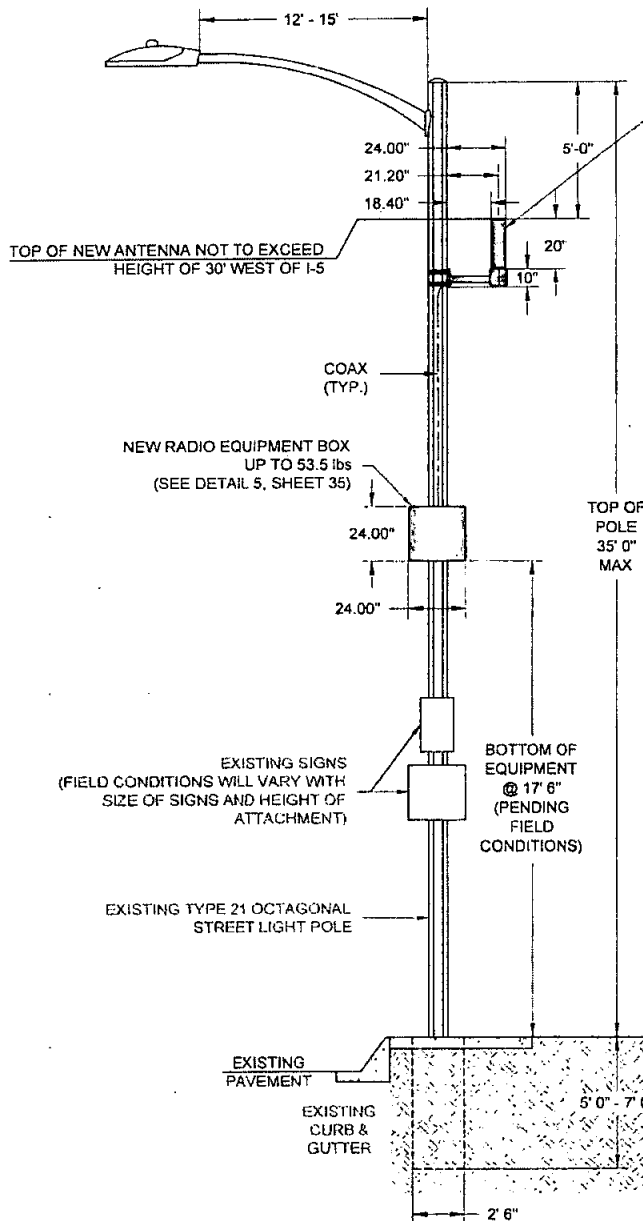
MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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 COSTA MESA, CA 92626
 TEL: (949) 261-3865
 E: www.mobilitie.com



- Existing connections between type 21 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jimmy L. Michal Signature of Licensed Architect/Engineer



NEW MOBILITIE SIDE MOUNT KIT FOR CCI WIDEBAND ANTENNA (Ø6.6" x 20.5") UP TO 18.73 lbs (SEE DETAILS 3 & 4, SHEET 34)

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing octagonal street light (with sign(s)) attached to pole) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. "Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

Jimmy L. Michal 6-1-17
R.C.E. NO. C42580 EXP. 03-31-18 DATE

SITE ADDRESS: Venice

TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

PTS NO: 550312 SHEET: 17

DRAWING NO: TBD

DATE: 11/23/16

SCALE: N.T.S.

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. TYPICAL ANTENNA / RADIO INSTALLATION CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. = 18.73 lbs Equipment Wt. = 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
 2. 2016 CBC 4. Dwg B6 Monolube Octagonal light pole Specification sheet.

35-foot type 21 steel light pole with side mount, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 R = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 R = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. $A_u = (16) (7.28/12) = 9.70 \text{ sq. ft.}$
 Ave. Dia. (16-35') = 4.87 in. $A_w = (19.0) (4.87/12) = 7.37 \text{ sq. ft.}$
 Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$
 Area of antenna: $A = (7.18/12)(24/12) = 3.3 \text{ sq. ft.}$
 Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$
 Area of Sign: $A = (1.5)(1.5) = (1)(1.5) = 3.75 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u A + P_{u,e} A = 388.8 \text{ pounds}$
 Force on Antenna: $F = P_u A_u = 78.5 \text{ pounds}$
 Force on equipment: $F = P_u A_e = 95.2 \text{ pounds}$
 Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$
 Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$

Total wind load = 736.5 pounds

Depth Requirement: Typical Standard Depth is 5 feet (per design B6)

$$D = 0.5A (1 + [1 + (4.36h / A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (736.5) / (2200) (2.5)] = 0.31$$

$$\text{Therefore } D_u = 3.58 \text{ ft.} < 5 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1455 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$ (Street light at 4.5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1455) / (4.91) = 296.3 \text{ psf OK}$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts
 From Wind: $P1 = (2)(48.1) = 96.2 \text{ ft-lbs}$ From Wt.: $P2 = (1)(53.5) = 53.5 \text{ ft-lbs}$
Worst Case - Diagonal Bolts
 $M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft-lbs}$
 $T = C = (12)(110.1) / (4.24) = 311.5 \text{ lbs}$
 5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

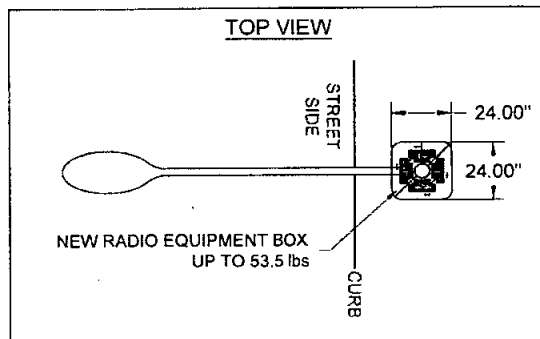
SITE ADDRESS	Varies
TITLE	EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
DATE	6/1/2017
SCALE	NTS
SHEET	18

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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 COSTA MESA, CA 92626
 (949) 261-3826
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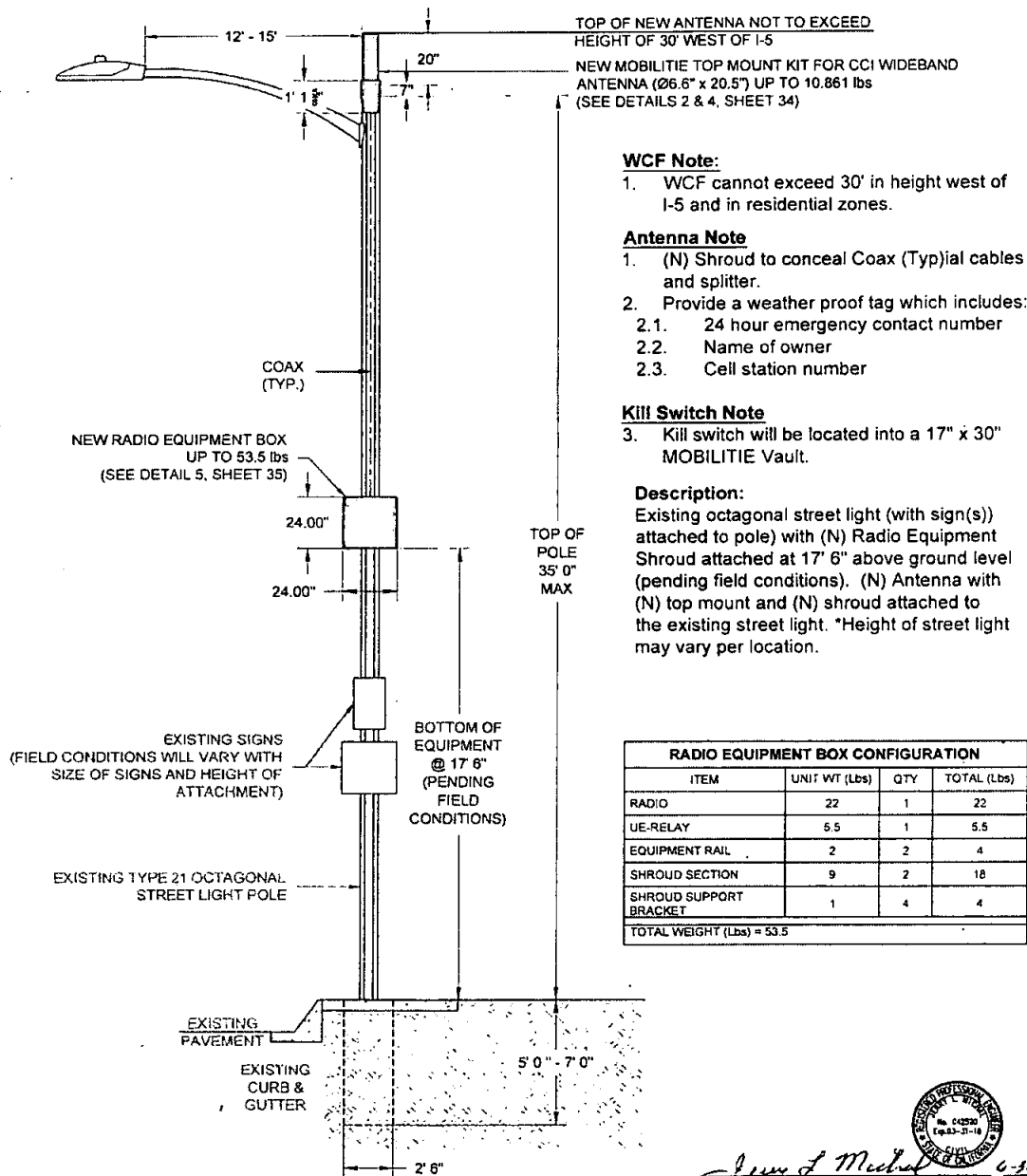


Jerry L. Mendenhall
 E.C.E. No. C42590
 Exp. 03-31-18
 DATE 6-3-17



- Existing connections between type 21 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft. for the design of foundations related to this project".

Jerry L. Michael Signature of Licensed Architect/Engineer



WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ) cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing octagonal street light (with sign(s)) attached to pole) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: Varies

TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

PTB NO: 500212

DRAWING NO: TBD

DATE: 1/23/16

SCALE: N.T.S.

SHEET: 19

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. TYPICAL ANTENNA / RADIO INSTALLATION CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia.=2.5' dia. x 5'deep. Antenna Wt.=10.861 lbs Equipment Wt. = 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
 2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole Specification sheet.

35-foot type 21 octagonal steel light pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. $A_n = (16) (7.28/12) = 9.70 \text{ sq. ft.}$
 Ave. Dia. (16-35') = 4.87 in. $A_m = (19.0) (4.87/12) = 7.37 \text{ sq. ft.}$
 Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$
 Area of antenna: $A = (7.18/12)(24/12) = 3.3 \text{ sq. ft.}$
 Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$
 Area of Sign: $A = (1.5)(1.5) = (1)(1.5) = 3.75 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_n A + P_{n,27} A = 388.8 \text{ pounds}$
 Force on Antenna: $F = P_n A_n = 78.5 \text{ pounds}$
 Force on equipment: $F = P_n A_m = 95.2 \text{ pounds}$
 Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$
 Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$

Total wind load = 736.5 pounds

Depth Requirement: Typical Standard Depth is 5 feet (per design B6)

$$D = 0.5A \{ 1 + [1 + (4.36h / A)]^2 \}$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (736.5) / (2200) (2.5)] = 0.31$$

Therefore $D_m = 3.58 \text{ ft.} < 5 \text{ feet OK}$

4. Bearing Capacity

Gross pole wt: 1455 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$ (Traffic signal at 4.5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q_u = (1455)/(4.91) = 296.3 \text{ psf OK}$

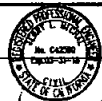
Page 2 of 2

SITE ANALYSIS

TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	DATE: 11/21/18	SCALE: N.T.S.	SHEET: 20
PROJECT NO. 550312	DRAWING NO. TUD	DATE: 11/21/18	SCALE: N.T.S.

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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 (657) 261-3883
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JOINT L. M. 6-1-17
 R.C.E. NO. 042280
 EXP. 03-31-18
 DATE

MASTER STRUCTURAL PLANS NEW STREET LIGHT POLES TO REPLACE CONCRETE POLES

2015
03-31-18

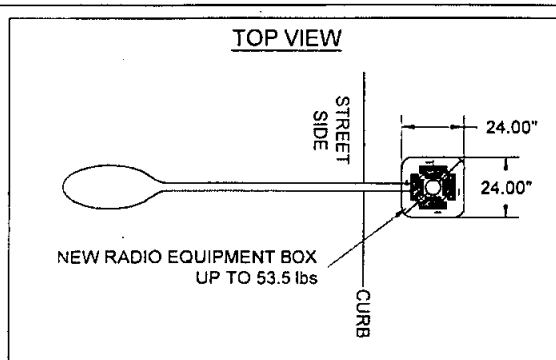
Greg L. Mohr

 GREG L. MOHR
 P.E. No. 00288
 03-31-18
 6-3-17

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 2955 RED HILL AVE, SUITE 200
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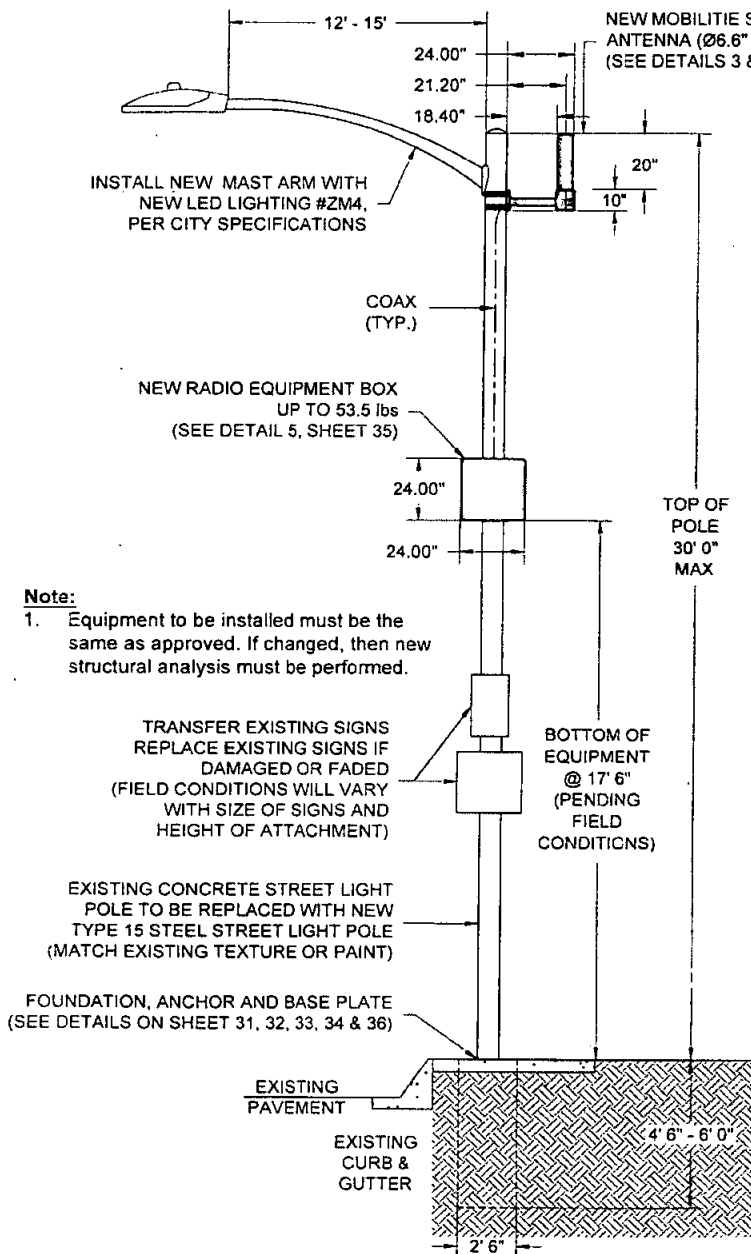
MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 15 & 21 STREET LIGHT POLES (WITH SIGN(S))
 WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:		Unnes
TITLE		NEW TYPE 15 & 21 STREET LIGHT POLES (WITH SIGN(S)) WITH ANTENNA MOUNT AND RADIO EQUIPMENT BOX
PTS NO.	150312	SHEET 21
DRAWING NO.	TBD	
DATE	11/23/16	
SCALE	N.T.S.	



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L Michal Signature of Licensed Architect/Engineer



Note:

1. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

TRANSFER EXISTING SIGNS
REPLACE EXISTING SIGNS IF
DAMAGED OR FADED
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND
HEIGHT OF ATTACHMENT)

EXISTING CONCRETE STREET LIGHT
POLE TO BE REPLACED WITH NEW
TYPE 15 STEEL STREET LIGHT POLE
(MATCH EXISTING TEXTURE OR PAINT)

FOUNDATION, ANCHOR AND BASE PLATE
(SEE DETAILS ON SHEET 31, 32, 33, 34 & 36)

WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ) cables and splitter.
2. Provide a weather proof tag which includes:
2.1. 24 hour emergency contact number
2.2. Name of owner
2.3. Cell station number

Kill Switch Note

Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

New Type 15 Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level. (N) Antenna with (N) mount and (N) shroud attached to the side of the new street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION

ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			



Jerry L Michal 6-3-2017
JLM:MSD C42880 03-31-18 DATE

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MOBILITIE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: Vans	
TITLE: NEW TYPE 15 STREET LIGHT (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	
PTS NO.	599312
DRAWING NO.	T6D
DATE:	11/23/16
SCALE:	N.T.S.
SHEET 22	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-FOOT type 15 round steel pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf
 $P_z(30.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.13 in. $A_u = (16)(7.13/12) = 9.51$ sq. ft.
 Ave. Dia. (16-30') = 5.00 in. $A_m = (14.0)(5.00/12) = 5.84$ sq. ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (7.18/12)(24/12) = 3.3$ sq. ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq. ft.

Area of Sign: $A = (1.5)(1.5) = (1)(1.5) = 3.75$ sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u A + P_{u,w} A = 366.2$ pounds

Force on Antenna: $F = P_u A_u = 78.5$ pounds

Force on equipment: $F = P_u A_m = 95.2$ pounds

Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds

Force on Signs (2): $F = (3.75)(23.8) = 102.6$ pounds

Total wind load = 703.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$$D = 0.5A(1 + [1 + (4.36h/A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34)(703.9)/(2200)(2.5)] = 0.30$$

$$\text{Therefore } D_m = 3.29 \text{ ft.} < 4.50 \text{ feet OK}$$

4. Bearing Capacity

Gross pole wt: 1347 pounds (for pole + equipment)
 $Q_u = 1500$ psf

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q = (1347)/(4.91) = 274.3 \text{ psf OK}$$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

$$\text{From Wind: } P_1 = (2)(48.1) = 96.2 \text{ ft-lbs From Wt.: } P_2 = (1)(53.5) = 53.5 \text{ ft-lbs}$$

Worst Case - Diagonal Bolts

$$M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft-lbs}$$

$$T = C = (12)(110.1)/(4.24) = 311.5 \text{ lbs}$$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

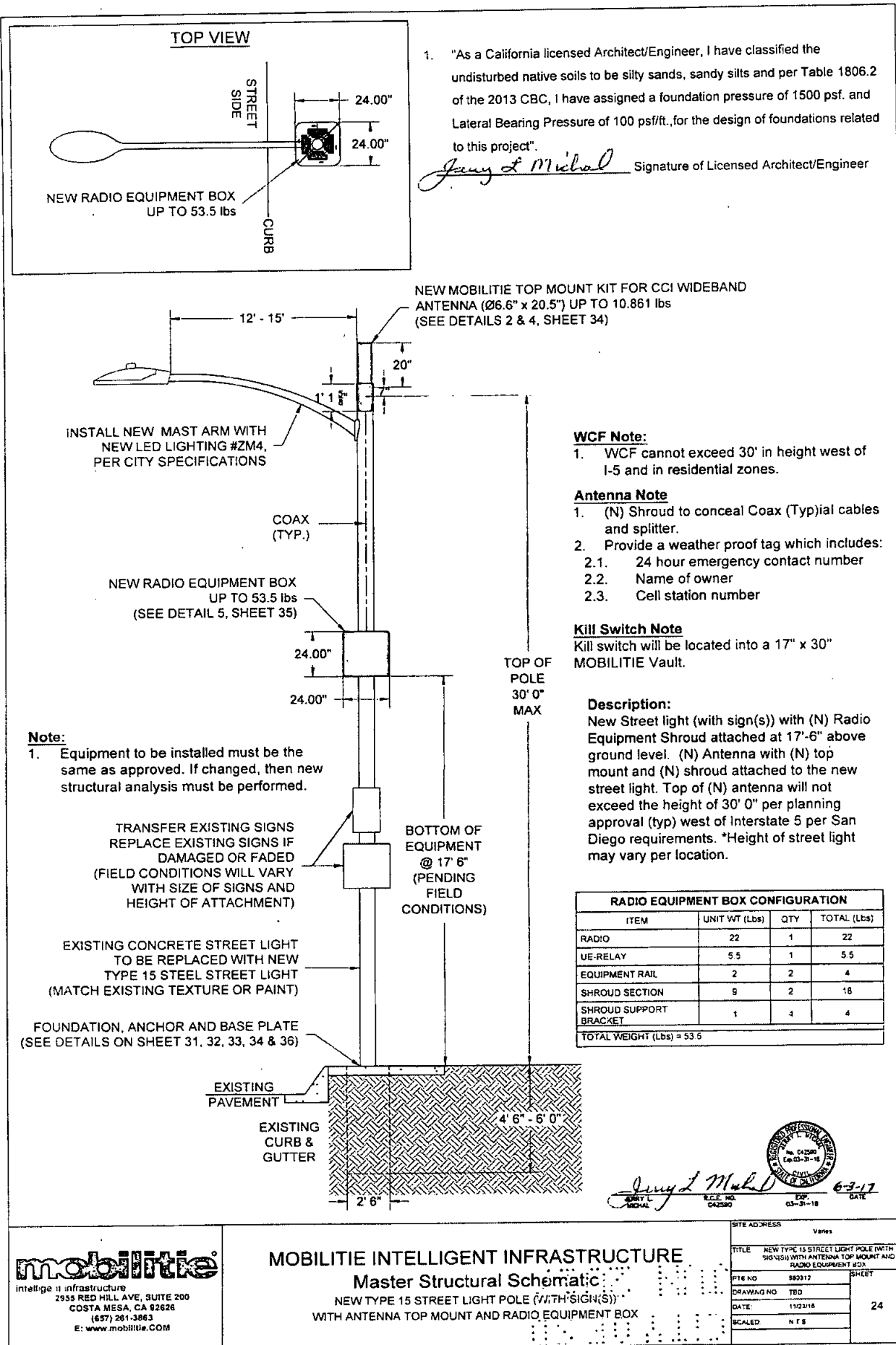
SITE ADDRESS	Yours
TITLE	NEW TYPE 15 STREET LIGHT WITH SIDE MOUNT ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
DATE	11/20/16
SCALE	AS SHOWN
PROJECT NO.	23
DESIGNER	JLM
CHECKED	JLM
DATE	11/20/16
SCALE	AS SHOWN

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 15 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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 2955 RED HILL AVE., SUITE 200
 COSTA MESA, CA 92626
 (877) 261-3963
 E: www.mobilitie.com



J. L. Michael
 R.C.E. NO. C42590
 DATE 6-3-17



STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-foot type 15 round steel pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22 \text{ psf}$

$P_z(30.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.13 in. $A_m = (16) (7.13/12) = 9.51 \text{ sq. ft.}$
 Ave. Dia. (16-30') = 5.00 in. $A_m = (14.0) (5.00/12) = 5.84 \text{ sq. ft.}$

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$

Area of antenna: $A = (7.18/12)(24/12) = 3.3 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Sign: $A = (1.5)(1.5) = (1)(1.5) = 3.75 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{16} A + P_{30} A = 366.2 \text{ pounds}$

Force on Antenna: $F = P_{30} A_m = 78.5 \text{ pounds}$

Force on equipment: $F = P_{30} A_m = 95.2 \text{ pounds}$

Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$

Force on Signs (2): $F = (3.75)(23.8) = 102.6 \text{ pounds}$

Total wind load = 703.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$$D = 0.5A \{1 + [1 + (4.36h / A)]^2\}$$

Where $A = (2.34 P/S, b) = [(2.34) (703.9) (2200) (2.5)] = 0.30$

Therefore $D_m = 3.29 \text{ ft.} < 4.50 \text{ feet ok}$

4. Bearing Capacity

Gross pole wt: 1347 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$Q = 1500 \text{ psf} > Q = (1347)/(4.91) = 274.3 \text{ psf OK}$

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

From Wind: $P_1 = (2)(48.1) = 96.2 \text{ ft-lbs}$ From Wt.: $P_2 = (1)(53.5) = 53.5 \text{ ft-lbs}$

Worst Case - Diagonal Bolts

$M_{max} = ((96.2)^2 + (53.5)^2)^{1/2} = 110.1 \text{ ft-lbs}$

$T = C = (12)(110.1)(4.24) = 311.5 \text{ lbs}$

5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

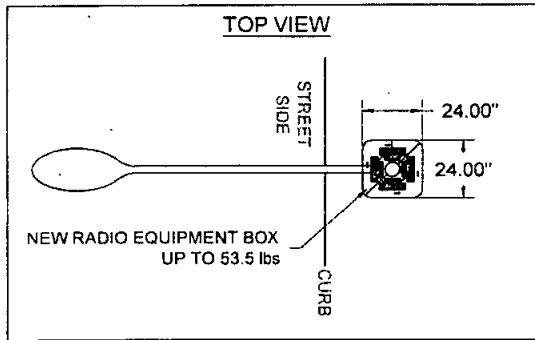
SITE ADDRESS	Varies
TITLE	NEW TYPE 15 STREET LIGHT POLE (WITH SIGN) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
PTS NO	55017
DRAWING NO	TBD
DATE	11/23/16
SCALE	N.T.S.
SHEET	25

MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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 COSTA MESA, CA 92626
 (949) 261-3852
 E: www.mobilitie.com

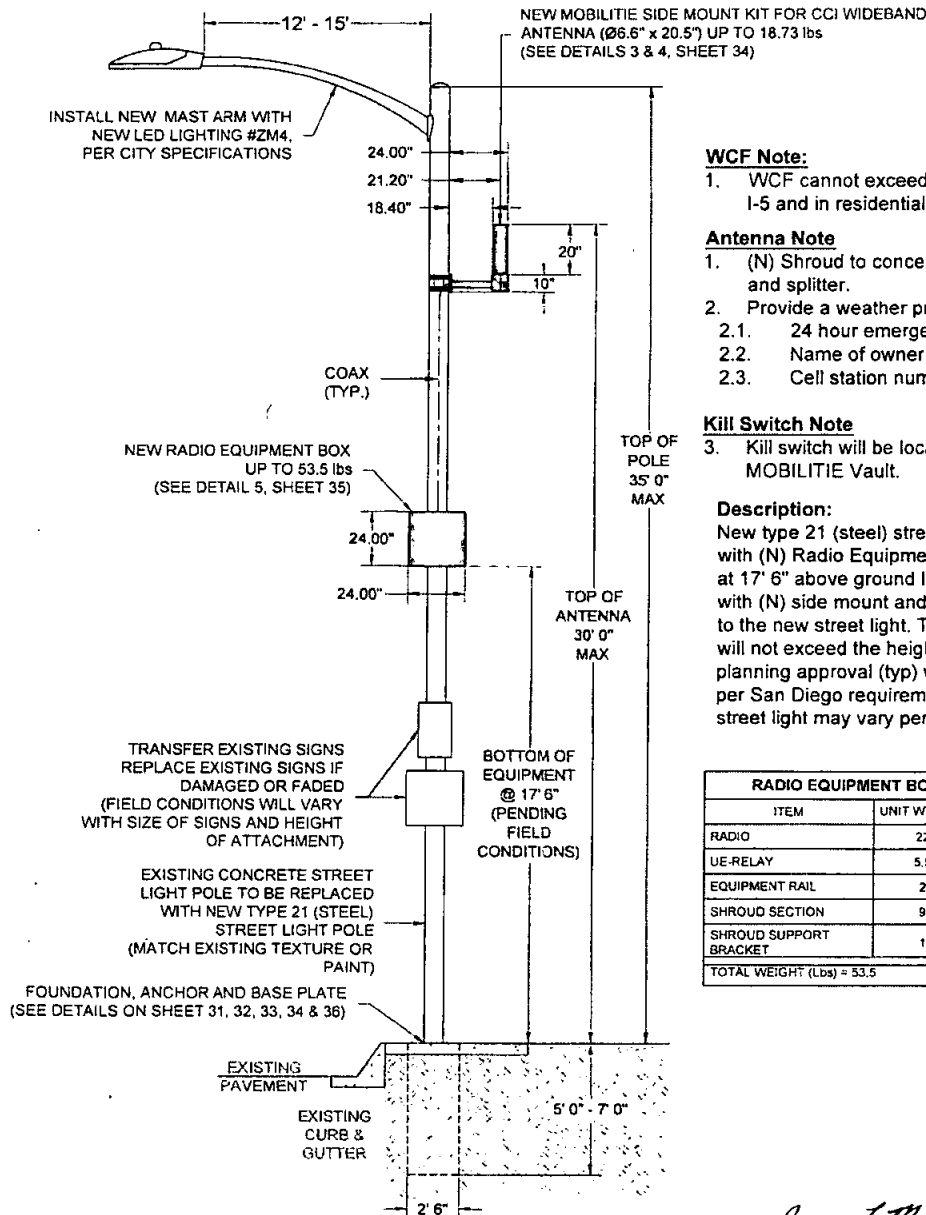


JERRY L. MICHAEL R.C.E. No. 42590 EXP. 03-31-18 DATE 6-3-2017



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michal Signature of Licensed Architect/Engineer



WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ) cables and splitter.
2. Provide a weather proof tag which includes:
- 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

New type 21 (steel) street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level. (N) Antenna with (N) side mount and (N) shroud attached to the new street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			



Jerry L. Michal 6327
JERRY L. MICHAL R.C.E. NO. 63270 EXP. 03-31-18 DATE

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E: www.mobilitie.COM

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Vacac
TITLE		NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTB NO	550212	SHEET 26
DRAWING NO	TBD	
DATE	11/29/18	
SCALED	N.T.S	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2015 Caltrans Standard Plan RSP ES-6A

35-foot Type 21 round steel light pole with side mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(35.0) G V^2 I_r = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. $(0-16) = 7.28 \text{ in.}$ $A_u = (16) (7.28/12) = 9.70 \text{ sq. ft.}$
 Ave. Dia. $(16-35) = 4.87 \text{ in.}$ $A_m = (14.0) (4.87/12) = 7.37 \text{ sq. ft.}$
 Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$
 Area of antenna: $A = (7.18/12)(24/12) = 3.3 \text{ sq. ft.}$
 Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$
 Area of Sign: $A = (1.5)(1.5) (1)(1.5) = 3.75 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u A + P_{u,eq} A = 388.8 \text{ pounds}$
 Force on Antenna: $F = P_u A_u = 78.5 \text{ pounds}$
 Force on equipment: $F = P_u A_m = 95.2 \text{ pounds}$
 Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$
 Force on Signs (2): $F = (3.75)(22.0) = 82.5 \text{ pounds}$

Total wind load = 716.4 pounds

Depth Requirement: Typical Standard Depth is 5 feet
 $D = 0.5A (1 + [1 + (4.36h / A)]^2)$

Where $A = (2.34 P/S, b) = [(2.34) (716.4) (2200) (2.5)] = 0.30$

Therefore $D_m = 3.51 \text{ ft.} < 5 \text{ feet}$ ok

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$
 Pole flg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1405)/(4.91) = 286.1 \text{ psf}$ OK

5. Antenna Attachment Calculations:

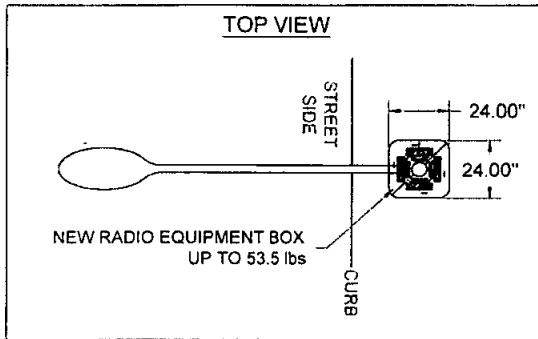
Moment on Attachment Bolts
 From Wind: $P_1 = (2)(48.1) = 96.2 \text{ ft-lbs}$ From Wt.: $P_2 = (1)(53.5) = 53.5 \text{ ft-lbs}$
 Worst Case - Diagonal Bolts
 $M_{max} = ((96.2) + (53.5)) / 2 = 110.1 \text{ ft-lbs}$
 $T = C = (12)(110.1)(4.24) = 311.5 \text{ lbs}$
 5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

SITE ADDRESS	Yours
TITLE	NEW TYPE 21 STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA SIDE MOUNT AND EQUIPMENT BOX
DATE	6/01/17
DRAWING NO.	27
DATE	11/03/16
SCALE	N.T.S.

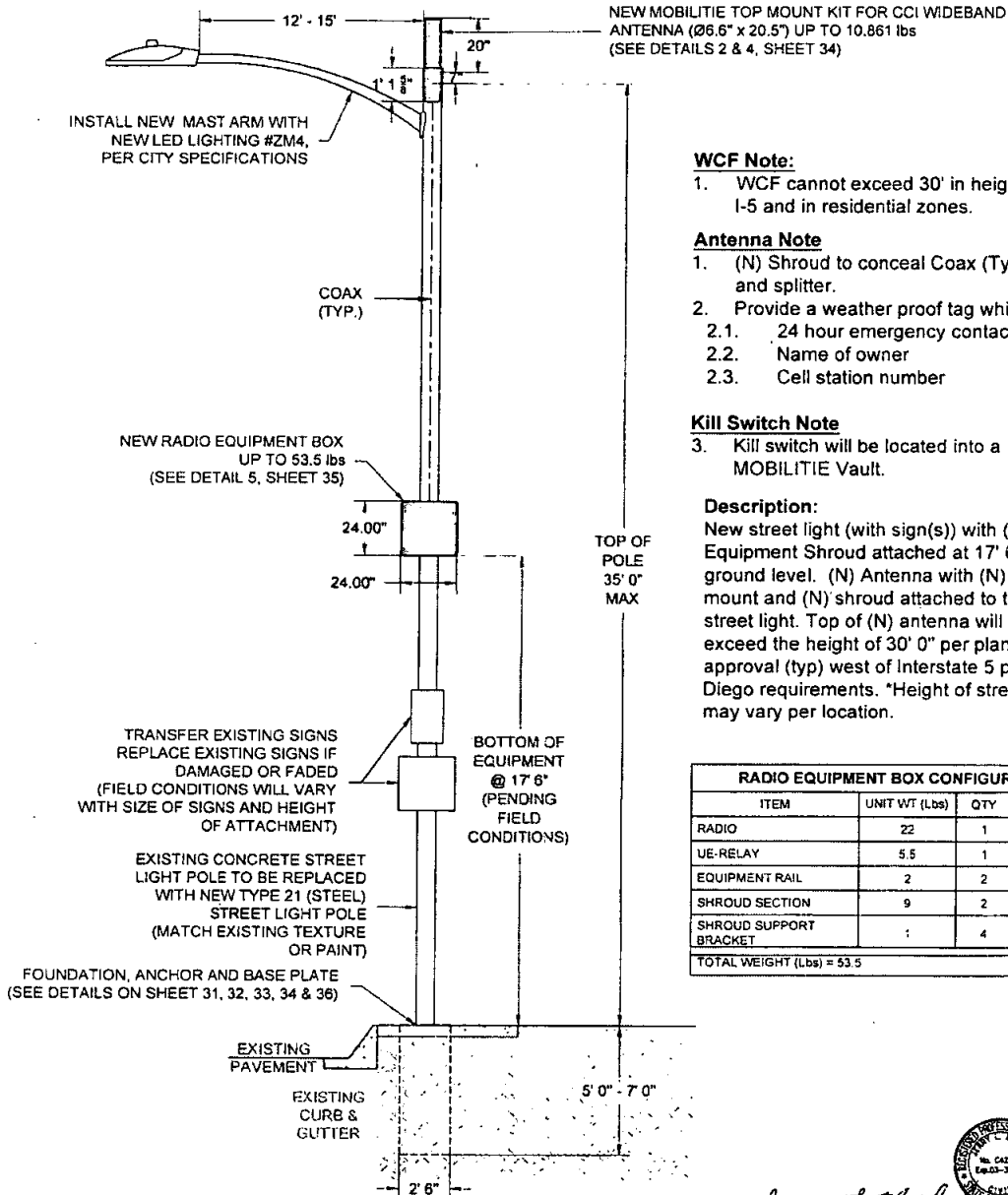
MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 21 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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 2955 RED HILL AVE, SUITE 200
 COSTA MESA, CA 92626
 (657) 261-3883
 E: www.mobilitie.com



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2013 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michal Signature of Licensed Architect/Engineer



WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
2.1. 24 hour emergency contact number
2.2. Name of owner
2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17\"/>

Description:

New street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6\"/>

RADIO EQUIPMENT BOX CONFIGURATION			
ITEM	UNIT WT (Lbs)	QTY	TOTAL (Lbs)
RADIO	22	1	22
UE-RELAY	5.5	1	5.5
EQUIPMENT RAIL	2	2	4
SHROUD SECTION	9	2	18
SHROUD SUPPORT BRACKET	1	4	4
TOTAL WEIGHT (Lbs) = 53.5			

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX



Jerry L. Michal 6-3-17
JERRY L. MICHAL R.C.E. NO. C42580 EXP. 03-31-18 DATE

SITE ADDRESS		Varies
TITLE	NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
PTS NO	550312	SHEET
DRAWING NO.	TBD	28
DATE	11/23/16	
SCALED	N.T.S	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 6-01-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 53.5 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7 - 10
 2. 2016 CBC 4. 2015 REVISED CALTRANS STANDARD PLAN RSA ES-6A

35-foot Type 21 steel light pole with top mount antenna, radio and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz (16) = 0.87 Kz(32) = 0.94
 Ir = 0.87 G = 1.142
 Wind Pressures: Pz(16) = (0.00256) Kz(16)GV^{1/2}IR = 22 psf
 Pz(35.0) = (0.00256) Kz(35.0)GV^{1/2}IR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. A_w = (16)(7.28/12) = 9.70 sq. ft.
 Ave. Dia. (16-35') = 4.87 in. A_m = (19.0)(4.87/12) = 7.71 sq. ft.
 Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.
 Area of antenna: A = (7.18/12)(24/12) = 3.3 sq. ft.
 Area of equipment unit: A = (2.0)(2.0) = 4.00 sq. ft.
 Area of Sign: A = (1.5)(1.5) + (1)(1.5) = 3.75 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_wA + P_{sw}A = 388.8 pounds
 Force on Antenna: F = P_wA_m = 78.5 pounds
 Force on equipment: F = P_wA_e = 95.2 pounds
 Force on light arm: F = (3.0)(23.8) = 71.4 pounds
 Force on Signs (2): F = (3.75)(22.0) = 82.5 pounds
 Total wind load = 716.4 pounds

Depth Requirement: Typical Standard Depth is 5 feet
 D = 0.5A (1 + [1 + (4.36h / A)]²)^{1/2}

Where A = (2.34 P/S, b) = [(2.34)(716.4)/(2200)(2.5)] = 0.30

Therefore D_m = 3.51 ft. < 5 feet OK

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 Q_a = 1500 psf

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

Q = 1500 psf > Q = (1405)/(4.91) = 286.1 psf OK

5. Antenna Attachment Calculations:

Moment on Attachment Bolts

From Wind: P1 = (2)(48.1) = 96.2 ft-lbs From Wt: P2 = (1)(53.5) = 53.5 ft-lbs

Worst Case - Diagonal Bolts

Mmax = ((96.2)² + (53.5)²)^{1/2} = 110.1 ft-lbs

T = C = (12)(110.1)/(4.24) = 311.5 lbs

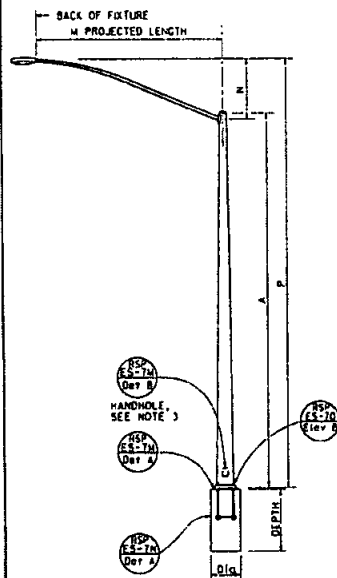
5/8" Bolt Capacity = 1000 lbs (per manufacturer) Therefore bolts are adequate.

Page 2 of 2

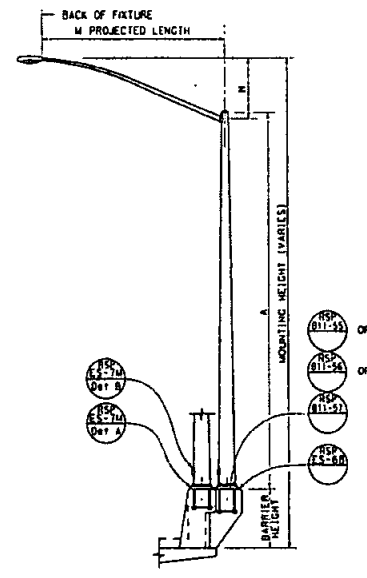
SITE ADDRESS	VARIOUS
TITLE	NEW TYPE 21 STREET LIGHT POLE WITH SIGNAGE AND RADIO EQUIPMENT BOX
PTS. NO.	850312
DRAWING NO.	TRC
DATE	11/22/16
SCALE	N.T.S.
	29

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural: Schematic
 NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

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TYPE 15 AND TYPE 21
ELEVATION A



TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED
ELEVATION B

POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION	
	A HEIGHT	MIN OD	WALL THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	DIA	DEPTH	
15	30'-0"	8"	3/4"	0.1196"	1'-0"	1'-0"	1 1/2"	1" x 36"	2'-6"	6'-0"
21	35'-0"	8 1/2"	3/4"	0.1793"	1'-0"	1'-0"	2"	1 1/2" x 36"	2'-6"	7'-0"

* FOR BARRIER RAIL BOLTS, SEE REVISED STANDARD PLAN RSP ES-6B.

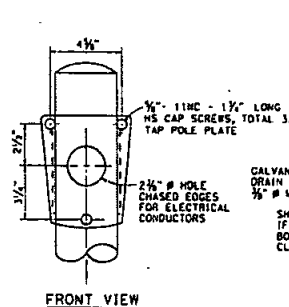
NOTES:

1. [] indicates mast arm length to be used unless otherwise noted on the plans.
2. For Type 15-SB, use Type 15 standard with Type 30 slip base plate details, see Revised Standard Plan RSP ES-6F.
3. Handhole shall be located on the downstream side of traffic.
4. For additional notes and details, see Revised Standard Plans RSP ES-1M and RSP ES-1N.

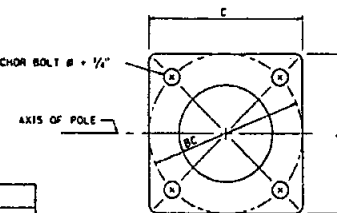
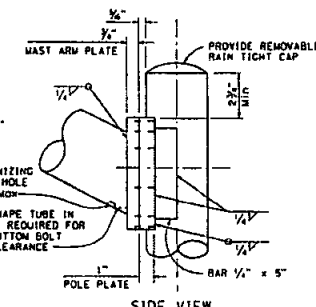


ACE NO. C42580
DATE 03-31-18

6-3-17



LUMINAIRE MAST ARM CONNECTION
DETAIL R



BASE PLATE
DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15 AND 21)
NO SCALE

RSP ES-6A DATED JULY 15, 2018 SUPERSEDES RSP ES-6A
DATED OCTOBER 30, 2015 AND STANDARD PLAN ES-6A DATED MAY 20, 2011 -
PAGE 452 OF THE STANDARD PLANS BOOK DATED 2010.

REVISED STANDARD PLAN RSP ES-6A

DIST	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
				30	

July 15, 2018
PLANS APPROVAL DATE

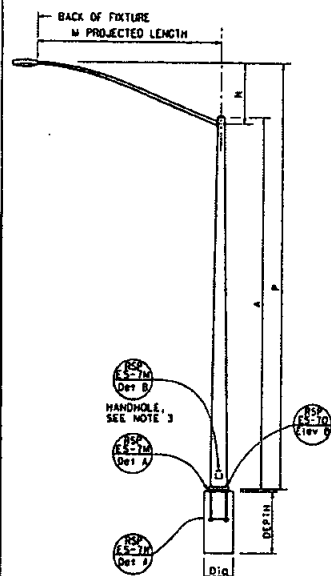
THE STATE OF CALIFORNIA ON THE 15TH DAY OF JULY 2018, I, JERRY J. MILLER, A PROFESSIONAL ENGINEER, DO HEREBY CERTIFY THAT I AM THE DESIGNER OF THE ABOVE PLANS AND THAT I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF CALIFORNIA.

TO ACCOMPANY PLANS DATED

2010 REVISED STANDARD PLAN RSP ES-6A

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW POLE DETAILS

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infrastructure
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COSTA MESA, CA 92626
(657) 281-3853
E: www.mobilitie.com



BACK OF FIXTURE
IN PROJECTED LENGTH

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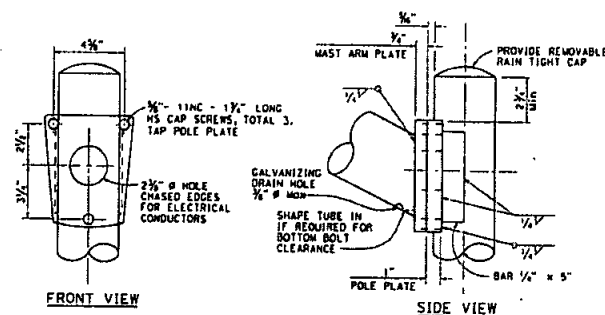
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461

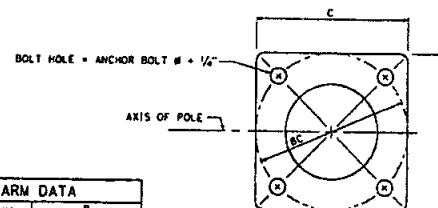
462

463</

TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED
ELEVATION B



LUMINAIRE MAST ARM CONNECTION
DETAIL R



BASE PLATE
DETAIL A

POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION	
	A HEIGHT	MIN OD		WALL THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	FOOTING	DEPTH
15	30'-0"	8"	3%	0.1196"			1 1/2"	1" Ø = 36"	2'-6"	6'-0"
21	35'-0"	8"	3%	0.1193"	1'-0"	1'-0"	2"	1 1/2" Ø = 36"	2'-6"	7'-0"

* FOR BARRIER RAIL BOLTS, SEE REVISED STANDARD PLAN RSP E5-6B.

LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	H RISE	MIN OD AT POLE	NOMINAL THICKNESS	P	
				TYPE 15	TYPE 2
6'-0"	2'-0"	3 1/4"	0.1198"	31'-6"	36'-6"
8'-0"	2'-6"	3 1/4"		32'-0"	37'-0"
10'-0"	3'-3"	3 1/4"		32'-6"	37'-6"
12'-0"	4'-3"	3 1/4"		33'-0"	38'-0"
15'-0"	4'-6"	4"		33'-6"	38'-6"
				34'-0"	39'-0"

NOTES:

1. ☐ Indicates main arm length to be used unless otherwise noted on the plans.
2. For Type 15-SB, use Type 15 standard with Type 30 slip base plate details, see Revised Standard Plans RSP ES-6f.
3. Manholes shall be located on the downstream side of traffic.
4. For additional notes and details, see Revised Standard Plans RSP

5-74 Jerry T. Michael  6-7-17
JERRY T. MICHAEL R.C.E. NO. CAT380 EXP. 05-31-18 DATE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 15 AND 21)

NO SCALE

RSP ES-6A DATED JULY 15, 2010 SUPERSEDES STANDARD PLAN ES-6A
DATED OCTOBER 30, 2015 - PAGE 449 OF THE STANDARD PLANS BOOK DATED 2015.

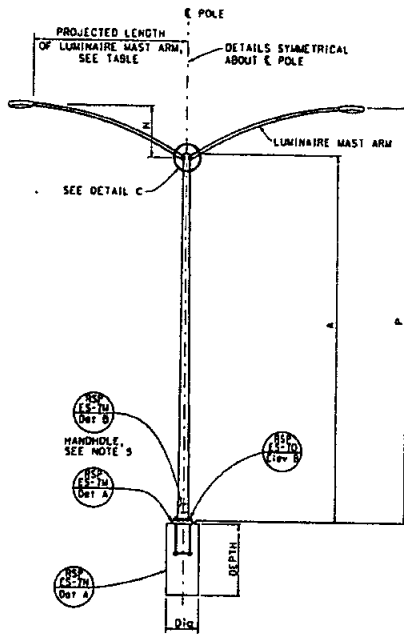
REVISÉ STANDARD PLAN RSP ES-6A

2015 REVISED STANDARD PLAN RSP ES-6A

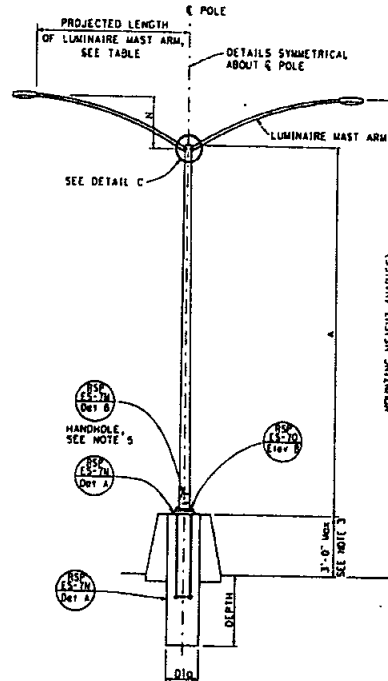
TELEPHONE ADDRESS	VERSUS	
TITLE:	NEW POLE DETAILS	
TS NO	550312	SHEET
DRAWING NO	1BD	
DATE:	11/22/6	31
SCALE	N 7 S	

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic 
NEW POLE DETAILS

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TYPE 15D AND TYPE 21D
ELEVATION A



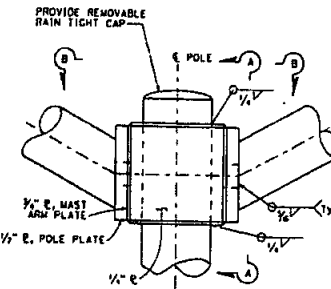
TYPE 15D AND TYPE 21D
MEDIAN BARRIER MOUNTED
ELEVATION B

POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION	
	A	HEIGHT	MIN OD	MIN THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	OD	DEPTH
15D	30'-0"	6"	3 3/4"	0.1793"	1'-0"	1'-0"	1 1/2"	1 1/4" # x 42"	2'-6"	7'-0"
21D	35'-0"	8"	3 3/4"	0.1793"	1'-0"	1'-0"	1 1/2"	1 1/4" # x 42"	2'-6"	7'-0"

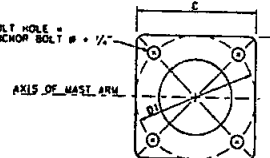
LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	RISE	MIN AT POLE	NOMINAL THICKNESS	TYPE 15D	TYPE 21D
6'-0"	2'-0"	3 3/4"	0.1196"	31'-6"	36'-6"
8'-0"	2'-6"	3 3/4"	0.1196"	32'-0"	37'-0"
10'-0"	3'-0"	3 3/4"	0.1196"	32'-6"	37'-6"
12'-0"	4'-0"	3 3/4"	0.1196"	33'-0"	38'-0"

NOTES:

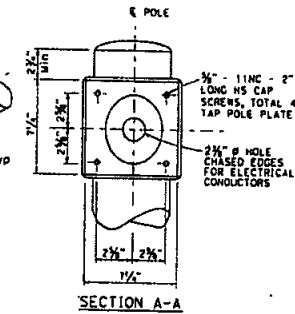
1. [] Indicates mast arm length to be used unless otherwise noted on the plans.
2. For additional notes and details, see Revised Standard Plans RSP ES-1M and RSP ES-7M.
3. See Concrete Barrier Details Type 60E and 60SE.
4. For locations with one arm, plug unused cap screw holes and chased outlet with galvanized cap screws and knockout plug.
5. Handhole shall be located perpendicular to the luminaire mast arm and as directed by the Engineer.



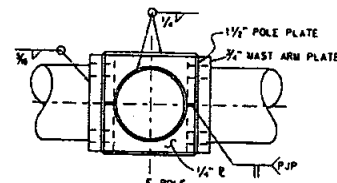
DETAIL C



BASE PLATE
DETAIL B



SECTION A-A



SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15D AND 21D,
DOUBLE LUMINAIRE MAST ARM)**
NO SCALE

RSP ES-6D DATED JULY 15, 2016 SUPERSEDES STANDARD PLAN ES-6D
DATED OCTOBER 30, 2013 - PAGE 452 OF THE STANDARD PLANS BOOK DATED 2013.

REVISED STANDARD PLAN RSP ES-6D



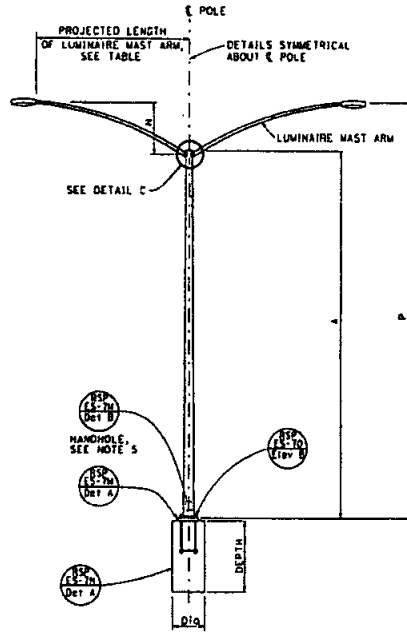
Gary L. Michal
GARY L. MICHAL
RCE NO. 042580
EXP. 03-31-18
DATE 6-3-17

MOBILE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW POLE DETAILS

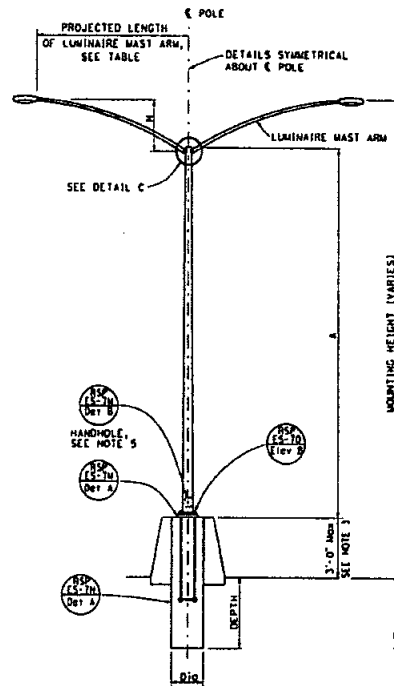
32

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TYPE 15D AND TYPE 21D
ELEVATION A



TYPE 15D AND TYPE 21D
MEDIAN BARRIER MOUNTED
ELEVATION B

POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION	
	A	MIN OD	BASE	TOP	THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	DIG DEPTH
15D	30'-0"	8"	3 1/2"	0.1793"	1'-0"	1'-0"	1 1/2"	1 1/4" # x 42"	2'-6"	7'-0"
21D	33'-0"	8 1/2"	3 1/2"	0.1793"	1'-0"	1'-0"	1 1/2"	1 1/4" # x 42"	2'-6"	7'-0"

LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	N	MIN OD	NOMINAL THICKNESS	TYPE 15D	TYPE 21D
6'-0"	2'-0"	3 1/2"	0.1198"	31'-6"	38'-6"
8'-0"	2'-6"	3 1/2"	0.1198"	32'-0"	37'-0"
10'-0"	3'-3"	3 1/2"	0.1198"	32'-9"	37'-9"
12'-0"	4'-3"	3 1/2"	0.1198"	33'-9"	38'-9"

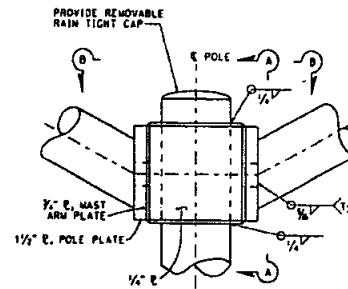
NOTES:

1. [] Indicates mast arm length to be used unless otherwise noted on the plans.
2. For additional notes and details, see Revised Standard Plans RSP ES-7a and RSP ES-7b.
3. See Concrete Barrier Details Type 60E and 60SE.
4. For locations with one arm, plug unused cap screw holes and chased outlet with galvanized cap screws and knockout plug.
5. Handhole shall be located perpendicular to the luminaire mast arm and as directed by the Engineer.

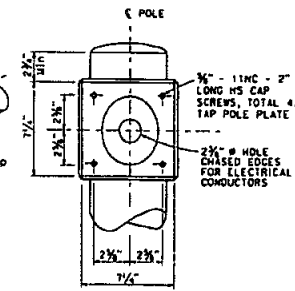
Dist	County	Route	Post Miles	Sheet	Total
				33	135

REGISTERED CIVIL ENGINEER
July 15, 2016
PLANS APPROVAL DATE
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION OR THE RESULTS OF THE DESIGN OR THE CONSTRUCTION OF THE PROJECT.

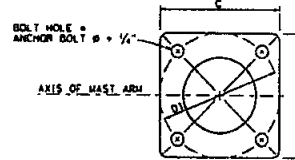
TO ACCOMPANY PLANS DATED _____



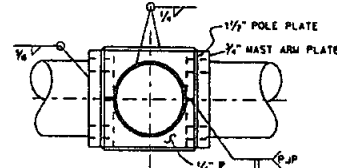
DETAIL C



SECTION A-A



BASE PLATE
DETAIL B



SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15D AND 21D,
DOUBLE LUMINAIRE MAST ARM)**

NO SCALE

RSP ES-6D DATED JULY 15, 2016 SUPERSEDES RSP ES-6D
DATED OCTOBER 30, 2015 AND STANDARD PLAN ES-6D DATED MAY 20, 2011 -
PAGE 458 OF THE STANDARD PLANS BOOK DATED 2010.

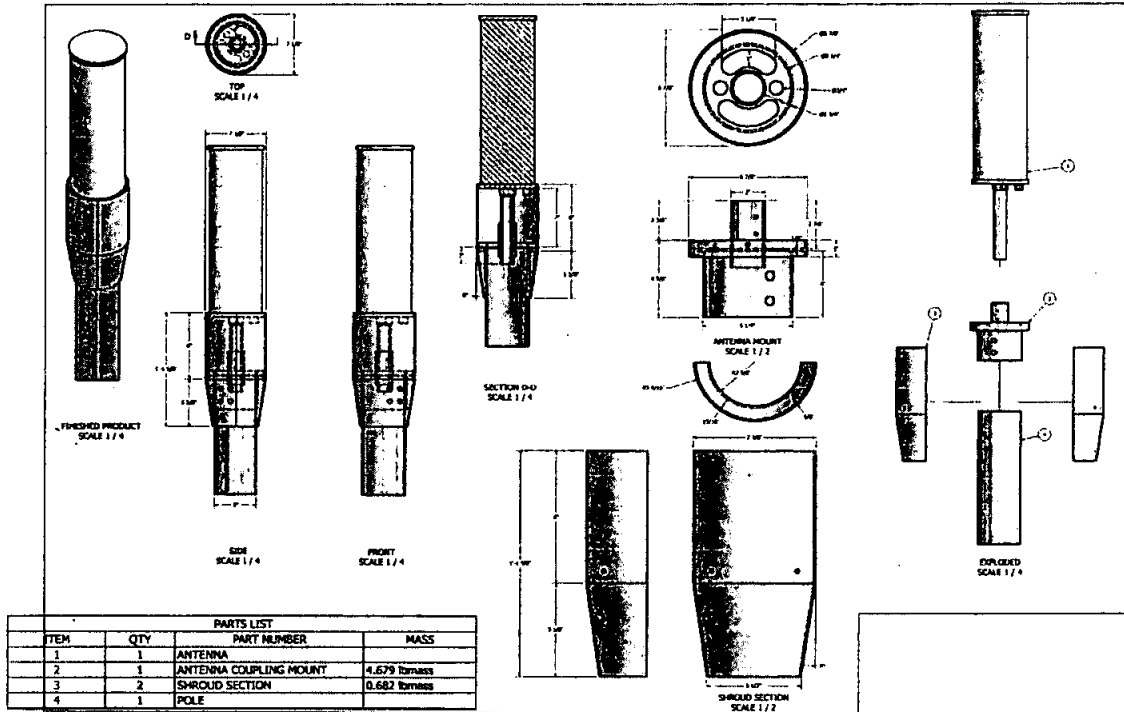
REVISED STANDARD PLAN RSP ES-6D

2010 REVISED STANDARD PLAN RSP ES-6D

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW POLE DETAILS

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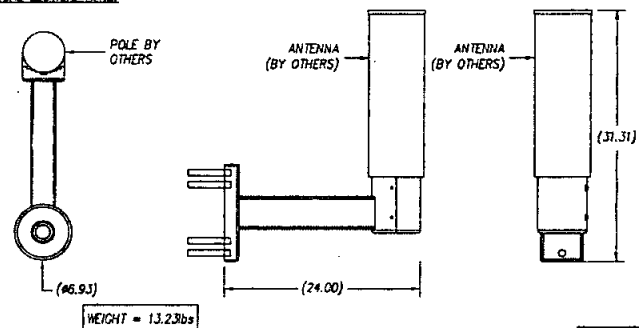
ANTENNA MOUNT TYPICAL SECTION: N.T.S.



2 SCALE
N.T.S.

ITEM NO.	ITEM	DESCRIPTION
1	1	SIDE ARM, CCI ANTENNA, SAN DIEGO, WELDMENT
2	1	PLATE, U-BOLT BACKER, CCI W/ 1.5" PIPE
3	1	SHROUD HALF, CCI ANTENNA, SIDEARM SIDE
4	1	SHROUD HALF, CCI ANTENNA
5	2	HHCS, 3/8"-16 UNC X 1" LG. FT. HEX, 18-8 SS
6	4	WASHER, FLAT, 3/8", 18-8 SS
7	2	WASHER, SPLIT LOCK, 3/8", 18-8 SS
8	2	NUT, HEX, 3/8"-16 UNC, 18-8 SS
9	2	U BOLT, 1/4"-20 UNC, 18-8 SS
10	4	WASHER, FLAT, 1/4", 18-8 SS
11	4	WASHER, SPLIT LOCK, 1/4", 18-8 SS
12	4	NUT, HEX, 1/4"-20 UNC, 18-8 SS

ANTENNA SIDEARM MOUNT TYPICAL SECTION: N.T.S.



3 SCALE
N.T.S.

CCI WIDE-BAND QUASI-OMNI ANTENNA (MODEL #SCA-03607-225) TYPICAL SECTION: N.T.S.

ELECTRICAL	
FREQUENCY RANGE:	1000-1985 MHz 2400-2550 MHz
CHAR:	7.8 dB
ELEVATION BEAMWIDTH (-3dB):	17.7° 13.6°
ELECTRICAL DOWNLINK:	2" (8" AND 12" TILTS AVAILABLE)
FIRST UPPER SIDELOBS:	<-14 dB <-14 dB
CROSS-POLAR PORT-TO-PORT ISOLATION:	> 20 dB > 20 dB
VOLTAGE STANDING WAVE RATION (VSWR):	< 1.5:1 < 1.5:1
PASSIVE INTERMODULATION (PIM20W):	< -150 dBc < -150 dBc
INPUT POWER CONTINUOUS WAVE (CW):	300 WATTS
POLARIZATION:	DUAL LINEAR 45°
INPUT IMPEDANCE:	50 ohms
LIGHTING PROTECTION:	DC GROUND
MECHANICAL	
DIMENSIONS (LxWxH):	20.5 x 6.6 in. (520 x 168 mm)
SURVIVAL WIND SPEED:	> 150 mph (>241 kph)
FRONT WIND LOAD:	17.000 (76.4 N) @ 100 mph (161 kph)
EQUIVALENT FLAT PLATE AREA:	0.7 m² (0.1 m²)
WEIGHT:	5.5 lbs (2.5 kg)
CONNECTOR (TYP):	2 x 41-0.5 FEMALE
CONNECTOR (OPTIONAL):	1 x TYPE N-FEMALE
MOUNTING HOLE:	1 TO 2.5 in. (25 TO 63 mm)

4 SCALE
N.T.S.

6-3-17
DATE

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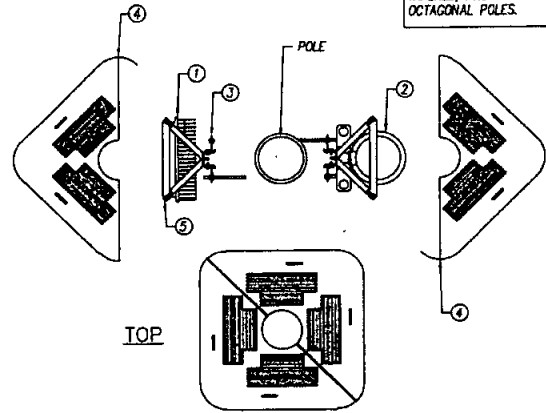
MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
ANTENNA DETAILS

SITE ADDRESS	Vares
TITLE	ANTENNA DETAILS
PTS NO	550312
DRAWING NO	TBD
DATE	11/23/18
SCALE	N.T.S.
SHEET	34

**EQUIPMENT CUBE
TYPICAL SECTION: N.T.S.**

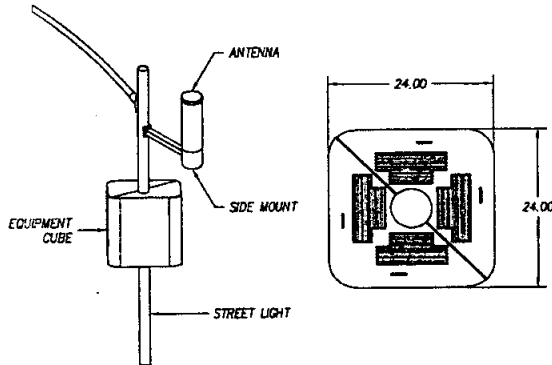
NOTE:
SUPPORT BRACKET WILL
MOUNT ON TO ROUND,
TAPERED, AND
OCTAGONAL POLES.

PARTS LIST			
ITEM NO.	ITEM	DESCRIPTION	ITEM APPROX. WEIGHT
1	1	RADIO	22 LBS
2	1	UE-RELAY	5.5 LBS
3	2	EQUIPMENT RAIL	2 LBS (4 LBS COMBINED)
4	2	SHROUD SECTION	9 LBS (18 LBS COMBINED)
5	4	SHROUD SUPPORT BRACKET	1 LB (4 LBS COMBINED)



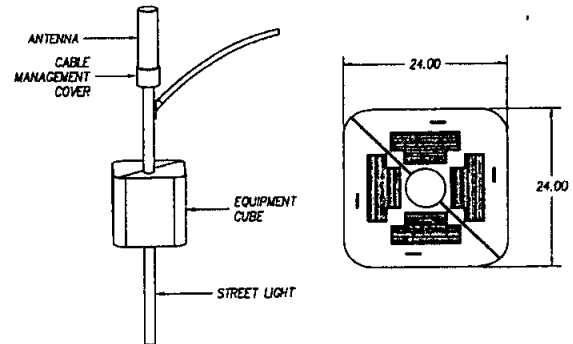
5 SCALE N.T.S.

**ANTENNA SIDE MOUNT &
EQUIPMENT CUBE ASSEMBLY
TYPICAL SECTION: N.T.S.**



6 SCALE N.T.S.

**ANTENNA TOP MOUNT &
EQUIPMENT CUBE ASSEMBLY
TYPICAL SECTION: N.T.S.**

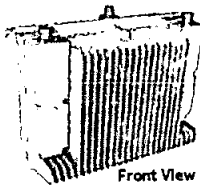


7 SCALE N.T.S.

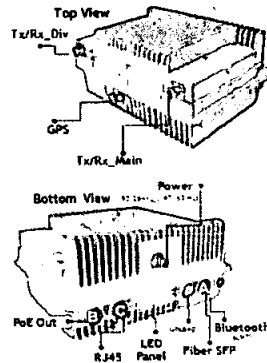
**MOUNTED RADIO NOKIA B41 HP
FWHR B41 HP - 473540A, 473603A, 476044A
TYPICAL SECTION: N.T.S.**

MANUFACTURER: NOKIA
MODEL: FWHR B41 HP
(OR APPROVED EQUAL)
HEIGHT: 9.7 IN
WIDTH: 12.8 IN
DEPTH: 6.3 IN
WEIGHT: 24.7 LBS

NOKIA



Front View



Top View

Bottom View

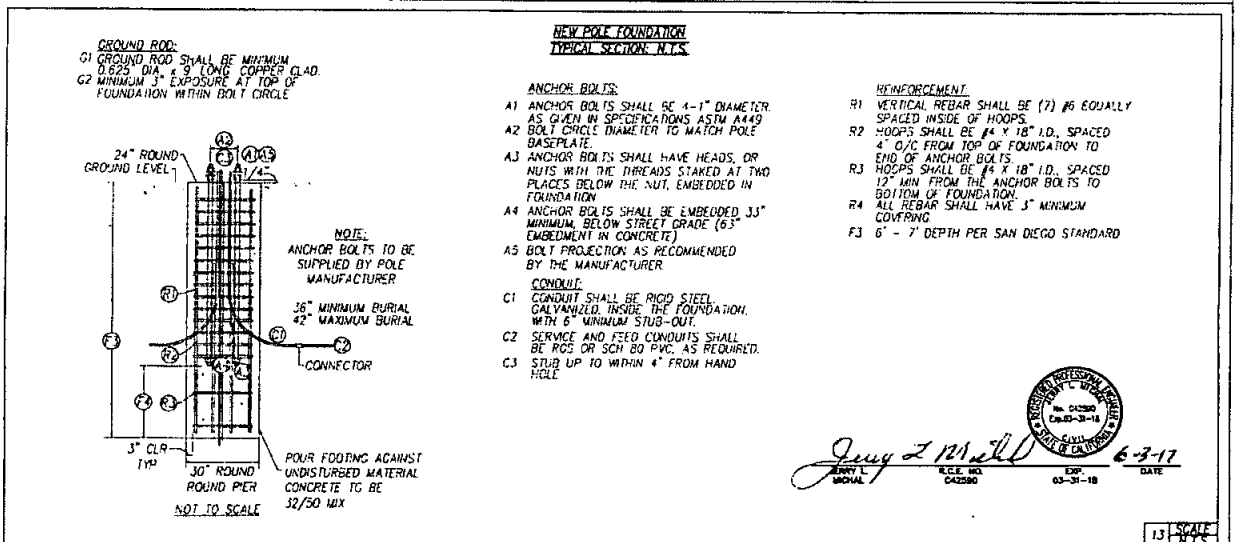
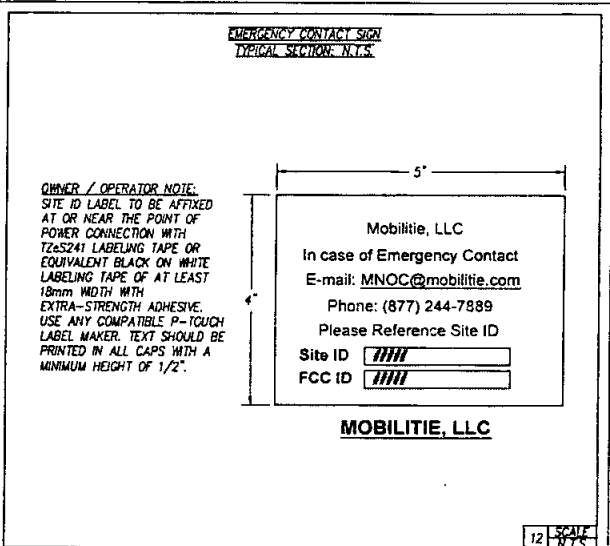
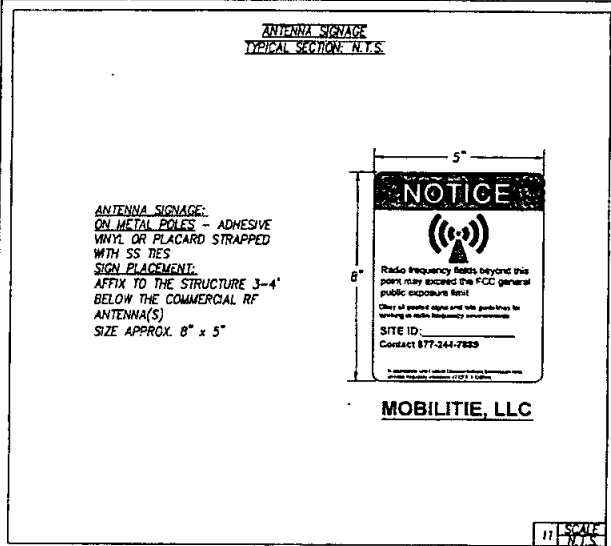
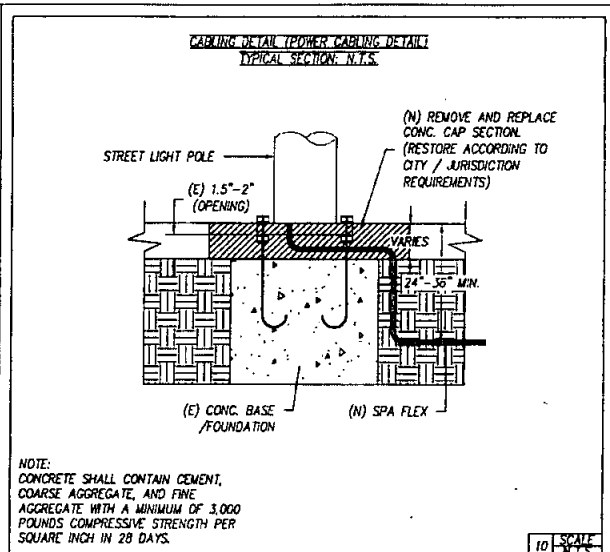
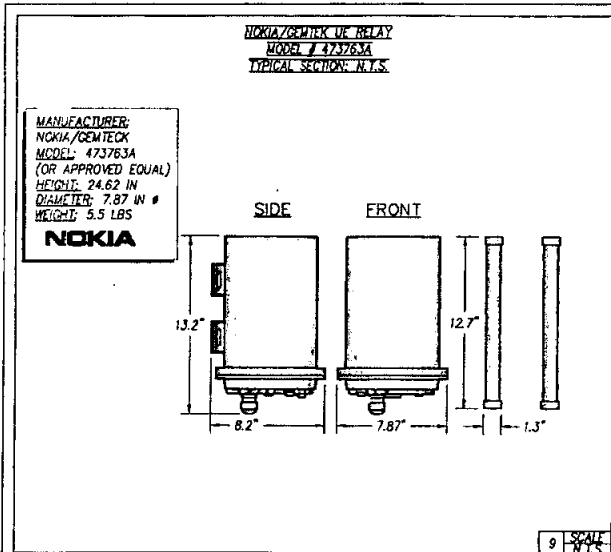
8 SCALE N.T.S.

James L. Michael
DESIGNED BY JLM
CHECKED BY JLM
DATE 6-3-17
SCALE 1:1

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Master Structural Schematic
EQUIPMENT DETAILS

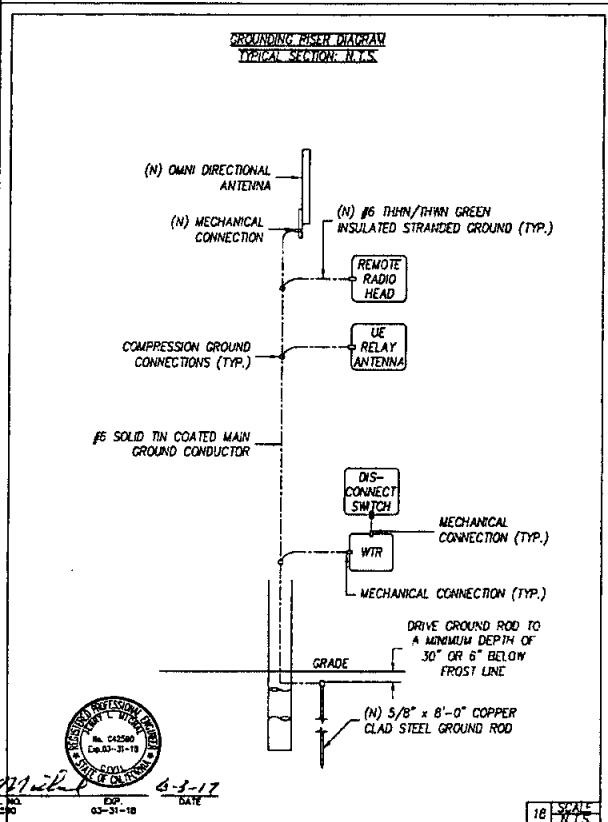
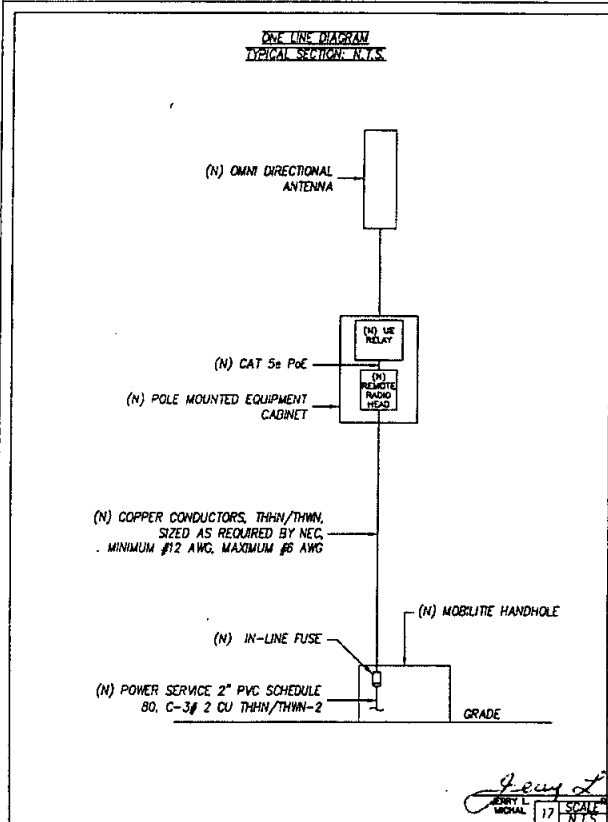
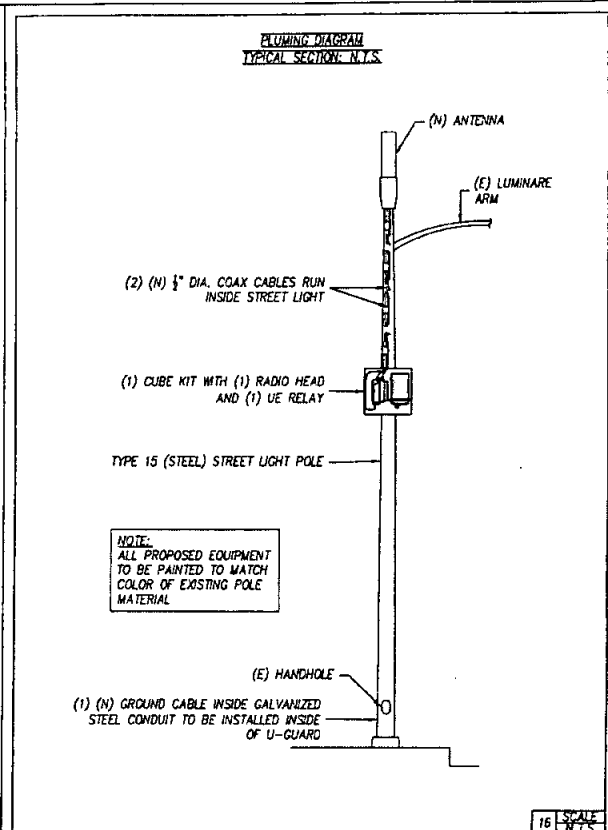
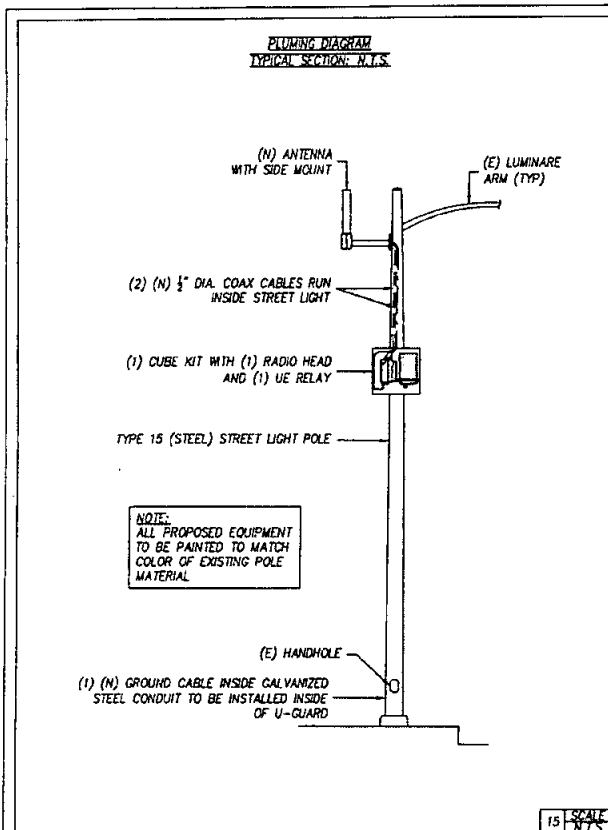
SITE ADDRESS		Varies
TITLE		EQUIPMENT DETAILS
PTS NO	550312	SHEET 35
DRAWING NO	TSD	
DATE	11/23/16	
SCALE	N.T.S.	



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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

SITE ADDRESS		Vars
TITLE		EQUIPMENT DETAILS
PTS NO.	550312	SHEET
DRAWING NO.	TBD	36
DATE:	11/23/16	
SCALED	N.T.S.	



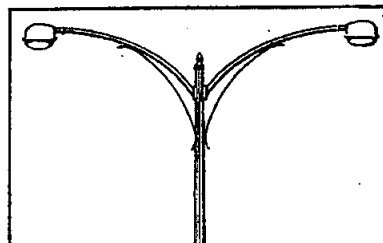
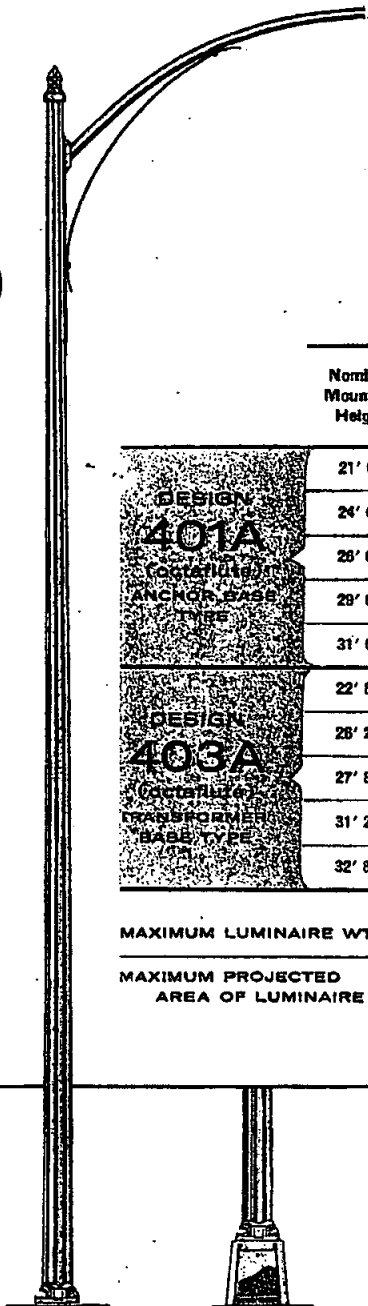
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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

SITE ADDRESS		Varies
TITLE		EQUIPMENT DETAILS
PTS NO.	550513	SHEET
DRAWING NO.	TSD	37
DATE	11/23/16	
SCALED	N.T.S.	

MONOTUBE LIGHTING POLES

STEEL poles for mercury and filament luminaires



	Nominal Mounting Height	CATALOG NUMBER			Pole Size
		4' 0" Bracket Spread	6' 0" Bracket Spread	8' 0" Bracket Spread	
DESIGN 401A (Catalina) ANCHOR BASE TYPE	21' 0"	E-200-A2	E-200-B2	E-200-C2	6.5" x 3.7" x 20' 0"
	24' 6"	F-236-A2	F-236-B2	F-236-C2	7" x 3.7" x 23' 6"
	26' 0"	F-250-A2	F-250-B2	F-250-C2	7" x 3.8" x 25' 0"
	29' 6"	H-286-A2	H-286-B2	H-286-C2	8" x 4" x 28' 6"
	31' 0"	H-300-A2	H-300-B2	H-300-C2	8" x 3.8" x 30' 0"
DESIGN 403A (Catalina) TRANSFORMER BASE TYPE	22' 6"	E-200-A2	E-200-B2	E-200-C2	6.5" x 3.7" x 20' 0"
	26' 2"	F-236-A2	F-236-B2	F-236-C2	7" x 3.7" x 23' 6"
	27' 8"	F-250-A2	F-250-B2	F-250-C2	7" x 3.5" x 25' 0"
	31' 2"	H-286-A2	H-286-B2	H-286-C2	8" x 4" x 28' 6"
	32' 6"	H-300-A2	H-300-B2	H-300-C2	8" x 3.8" x 30' 0"

NOTES:

1. Before ordering, see page B-167 for General Information.
2. Pole sizes are adequate for single or twin bracket application. Specify "twin" when required.
3. Maximum luminaire weight and maximum projected area of luminaire are determined from design criteria for poles as outlined in General Information on page B-167.
4. When ordering, specify both design and catalog numbers.

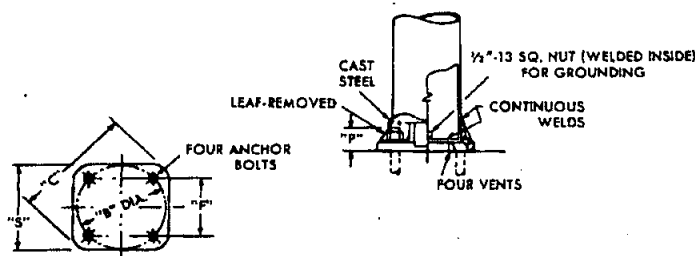
The Union Metal Manufacturing Company
Canton 5, Ohio Catalog No. 100
January 3, 1961 Printed in U.S.A.

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MOBILITE INTELLIGENT INFRASTRUCTURE
B6 MONOTUBE LIGHT POLES
STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES

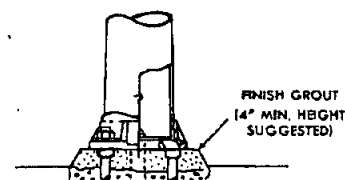
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TITLE: 86 MONOTUBE LIGHT POLES STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES			
PTS NO	552312	SHEET	
DRAWING NO.	T80		
DATE:	11/23/16	38	
SCALED	N T 8		

STEEL BASES AND ANCHOR BOLT DETAILS

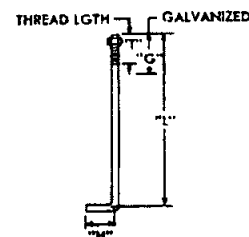
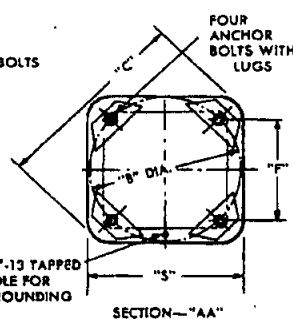
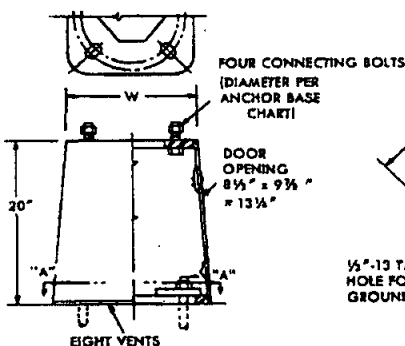


ONE 1/4" AND TWO 1/2" THICK
FURNISHED WITH EACH
POLE.

POLE SIZE	ANCHOR BASES					ANCHOR BOLTS POLE GAUGE		
	"B" BOLT CIRCLE	"C"	"E"	"F"	"S"	#11	#7	#3
6.5"	9 1/4"	12 1/4"	6 3/4"	2 1/4"	10"			
7"	10"	13"	7 1/4"	2 1/4"	10 1/4"			
7.5"	10 1/4"	13 3/4"	7 3/4"	2 3/4"	11"			
8"	11"	14 1/4"	7 3/4"	2 3/4"	11 1/4"			
8.5"	11 1/4"	14 3/4"	8 1/4"	2 3/4"	12"			
9"	12 1/4"	15 3/4"	8 3/4"	3"	12 3/4"			
9.5"	13"	16 3/4"	9 1/4"	3 1/4"	13 1/4"			
10"	13 1/4"	17 1/4"	9 3/4"	3 3/4"	14 1/4"			



SPECIAL PLUMBING FEATURE—
HEAVY SQUARE NUTS CAN
BE FURNISHED IN PLACE
OF STANDARD SHIMS.



BOLT SIZE	STANDARD ANCHOR BOLT			
	"L"	"H"	"T"	"G"
1" x 40"	36"	4"	6"	8"
1 1/4" x 48"	42"	6"	8"	10"
1 1/2" x 60"	54"	6"	9"	11"

DESIGN NO.		FABRICATED STEEL TRANSFORMER BASES						ANCHOR BOLTS		
#11 GA. POLES	#7 GA. POLES	#3 GA. POLES	POLE SIZE	"B" BOLT CIRCLE	"C"	"E"	"S"	"W"	#11 GA. POLES	#7 GA. POLES
1Y-82640-Y1	1Y-82640-Y3		6.5"							
	1Y-82640-Y4		7"							
	1Y-82640-Y2		7.5"							
1Y-82640-Y2	1Y-82640-Y5		8"							
	1Y-82640-Y4		8.5"							
	1Y-82640-Y1		9"							
1Y-82640-Y1	1Y-82640-Y2		9.5"							
	1Y-82640-Y4		10"							
	1Y-82640-Y3		10"							

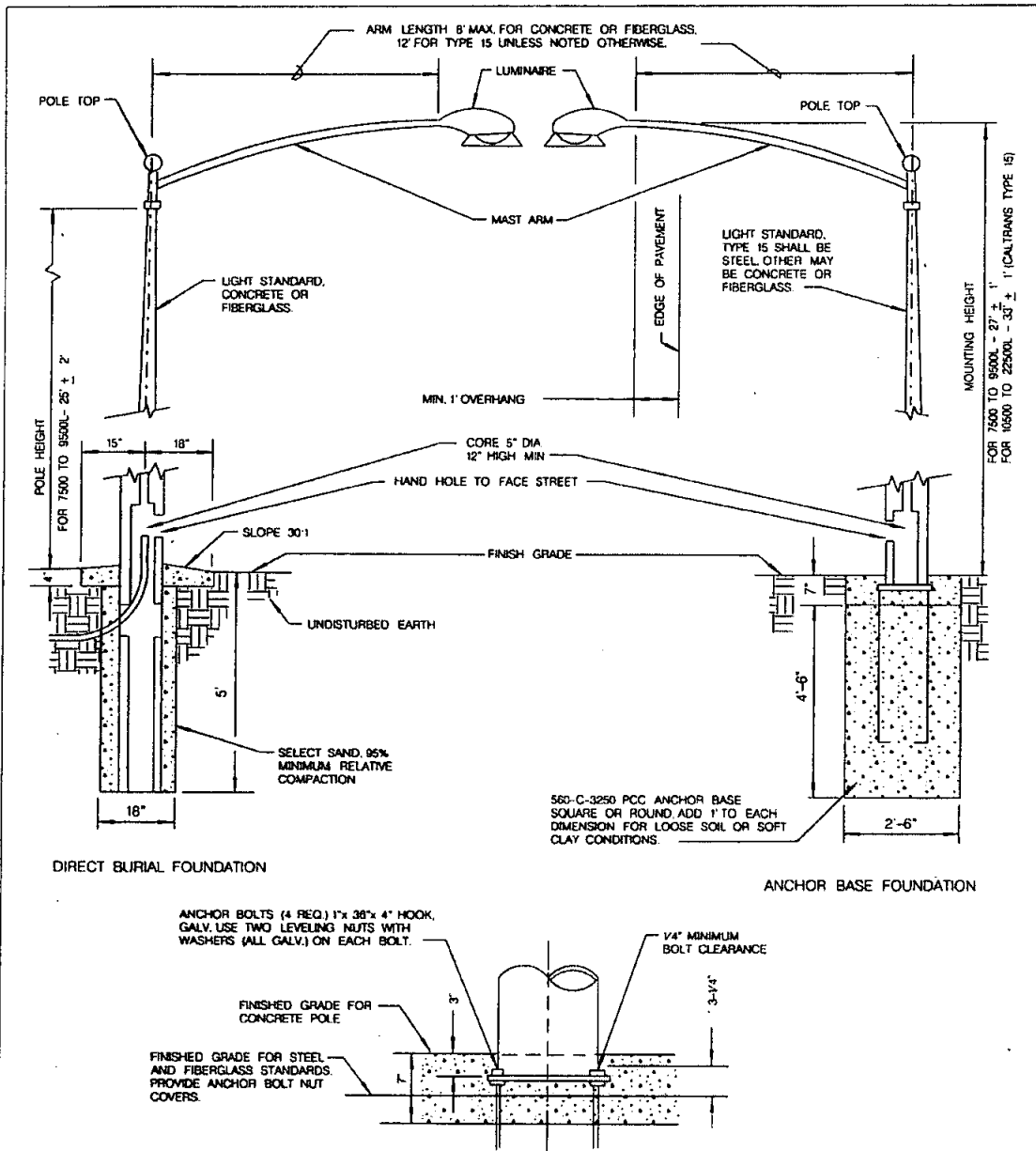
THIS DATA IS FOR GENERAL GUIDANCE ONLY.
TEMPLATE PRINT, GIVING COMPLETE INFORMATION
FOR SETTING ANCHOR BOLTS, IS FURNISHED WITH
EACH ORDER.

The Union Metal Manufacturing Company
Canton 5, Ohio
January 3, 1961
Catalog No. 100
Printed in U.S.A.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
B6: MONOTUBE LIGHT POLES
STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES

SITE ADDRESS		VARIANTS	
TITLE B6 MONOTUBE LIGHT POLES STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES			
PTS NO		840312	SHEET 39
DRAWING NO		TBD	
DATE		11/23/18	
SCALED		N.T.S.	



REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	06/03
UPDATED	KA	J. NAGELVOORT	09/12
UPDATED	KA	J. NAGELVOORT	03/28

CITY OF SAN DIEGO - STANDARD DRAWING

STREET LIGHTING STANDARD

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

CA/Design 56523 03/26/2014
COORDINATOR R.C.E. DATE

DRAWING
NUMBER **SDE-101**

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MOBILITE INTELLIGENT INFRASTRUCTURE
B5 MONOTUBE LIGHT POLES
STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES



Jerry L. Morral
JERRY L. MORRAL
S.D.E. NO. 042590
EXP. 03-31-18

SITE ADDRESS	V8-01
TITLE	B5 MONOTUBE LIGHT POLES STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES
PTS NO	556212
DRAWING NO	TBD
DATE	11/23/16
SCALED	N.T.S.
SHEET	40

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CITY OF SAN DIEGO
APPROVED

570163 2007451
Project Number Construction Approval Number

☒ Construction Change Project Number
☐ Returned Document Project Number

This set of plans and specifications shall be kept on the site of the structure or work at all times during which work authorized by these plans is in progress, and shall be made available to City officials upon request. It is unlawful to change, modify or alter the approved plans and specifications without the permission of the Building Official. The stamping of these plans and specifications SHALL NOT be held to permit nor approve the violation of any City, County, State or Federal laws, nor restrictions.

Approved By: *[Signature]* Date: 9/29/17

Project Number: 570163

Approved By: *[Signature]* Date: 9/29/17

657-55984

MOBILITIE INTELLIGENT INFRASTRUCTURE

MASTER STRUCTURAL PLANS

PTS # 570163

SCOPE OF WORK: TO ATTACH MICRO-CELLULAR ANTENNAS AND ASSOCIATED EQUIPMENT TO EXISTING AND NEW TYPE 15, TYPE 15D, TYPE 21 & TYPE 21D STREET LIGHT POLES WITHIN THE CITY OF SAN DIEGO RIGHT-OF-WAY.

DESIGN CODE REFERENCES:

1. 2015 IBC
2. 2016 CBC
3. ASCE MINIMUM DESIGN LOADS - 7-10
4. 2010 & 2015 CALTRANS STANDARD PLAN RSP ES-6A + ES-6D
5. AISC, STEEL CONSTRUCTION MANUAL, 14th ADDITION, 2010
6. SAN DIEGO STANDARD DRAWING SDE-101
7. DWG B6 MONOTUBE OCTAGONAL LIGHT POLE SPECIFICATIONS SHEET

STRUCTURAL
STAMP ON PAGE-3

APPROVED

SEP-20-2017
LAND DEVELOPMENT REVIEW
ENGR-BUILDING/STORMWATER

Danyk



Jerry L. Michael
JERRY L. MICHAEL
9-25-17

ENGINEER OF RECORD

JERRY L. MICHAEL
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Coastal Communications
Telecommunications Engineering
1941 EDISON PLACE STE 110
CARLSBAD, CA 92008
PH: (760) 929-0910
FX: (760) 929-0936

Sprint

SITE ADDRESS: Varies

TITLE: MASTER STRUCTURAL PLANS

PTS NO	570163	SHEET 1
DRAWING NO	TBD	
DATE	8/7/17	
SCALED	N.T.S.	

SHEET INDEX

TITLE SHEET	1
SHEET INDEX	2
SHEET INDEX	3
<u>MASTER STRUCTURAL PLANS FOR EXISTING STREET LIGHT POLES</u>	4
EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	5
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	6
EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	7
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	8
EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	9
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	10
EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	11
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	12
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	13
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	14
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	15
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	16
EXISTING TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	17
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	18
EXISTING TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	19
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	20
EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	21
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	22
EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	23
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	24
EXISTING OCTAGONAL TYPE 21D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	25
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	26
EXISTING OCTAGONAL TYPE 21D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	27
STRUCTURAL DESIGN AND CALCULATIONS FOR EXISTING OCTAGONAL TYPE 21D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	28

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MOBITIE INTELLIGENT INFRASTRUCTURE Master Structural Schematic

Jimmy J. Michael
JERRY J. MICHAEL
No. 048891
Exp. 03-31-18
DATE 9-25-17

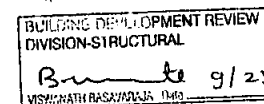


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TITLE	
SHEET INDEX	
PTB NO.	570183
DRAWING NO.	TBD
DATE	8/7/17
SCALE	N.T.S.
SHEET	2

SHEET INDEX

MASTER STRUCTURAL PLANS FOR NEW STREET LIGHT POLES	29
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	30
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	31
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	32
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	33
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	34
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	35
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	36
STRUCTURAL DESIGN AND CALCULATIONS FOR NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	37
2010 REVISED STANDARD PLAN RSP ES-6A	38
2015 REVISED STANDARD PLAN RSP ES-8A	39
2015 REVISED STANDARD PLAN RSP ES-6D	40
2010 REVISED STANDARD PLAN RSP ES-6D	41
DETAIL SHEET	42
DETAIL SHEET	43
DETAIL SHEET	44
DETAIL SHEET	45
DETAIL SHEET	46
DETAIL SHEET	47
DETAIL SHEET	48
DETAIL SHEET	49
DETAIL SHEET	50
DETAIL SHEET	51

#570163 (MASTER PLAN)



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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic



SHEET INDEX	
PTB NO.	SHEET
570163	
DRAWING NO.	TBD
DATE:	9/25/17
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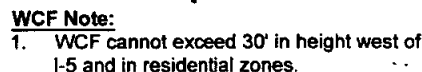
**MASTER STRUCTURAL PLANS
FOR EXISTING STREET LIGHT POLES**


Jerry J. Michael 9-25-17
JERRY J. MICHAEL, P.E. 012280 03-31-18 DATE

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
FOR EXISTING STREET LIGHT POLES WITH ANTENNA MOUNT & RADIO EQUIPMENT BOX

SITE ADDRESS		Varies
TITLE:		EXISTING STREET LIGHT POLES WITH ANTENNA MOUNT & RADIO EQUIPMENT BOX
PTS NO	ST0163	SHEET 4
DRAWING NO	TBD	
DATE	8/7/17	
SCALED	N.T.S.	



Antenna Note

1. (N) Shroud to conceal Coax (Typical cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

Note:

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

EXISTING SIGNS (FIELD CONDITIONS WILL VARY WITH SIZE OF SIGNS AND HEIGHT OF ATTACHMENT)

EXISTING TYPE 15
STREET LIGHT POLE

BOTTOM OF
EQUIPMENT
@ 17' 6"
(PENDING
FIELD
CONDITIONS)

- GROUND LEVEL

**EXISTING
PAVEMENT**

EXISTING
CURB &
GUTTER

2' 6"

Ferry T. Mah...
JERRY L. MAHAL R.C. NO. 042580

9-25-17

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MOBILITE. INTELLIGENT INFRASTRUCTURE
Master Structural Schematic

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Varies	
TITLE: EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGNS) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX			
PTS NO	\$70183	SHEET	
DRAWING NO	TBD		
DATE:	8/7/17	5	
SCALED:	N T S		

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO: Type 15 Pole/Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia.=2.5' dia. x 4.5' deep. Antenna wt. = 18.73 lbs Equipment Wt. = 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-foot round Type 15 steel light pole with top mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: K_z(16) = 0.87 K_z(32) = 0.94
 I = 0.87 G = 1.142

Wind Pressures: P_z(16) = (0.00256) K_z(16) G V² / I = 22 psf
 P_z(35.0) = (0.00256) K_z(30.0) G V² / I = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 9.75 in. A_u = (16) (9.75/12) = 13.0 sq. ft.
 Ave. Dia. (16-30') = 7.88 in. A_m = (14.0) (7.88 / 12) = 9.19 sq. ft.

Area of antenna: A = 6.60/12 (20.5/12) = 0.94 sq. ft.

Area of equipment unit: A = (2)(2) = 4.00 sq. ft.

Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.00 sq. ft.

Area of sign: A = (1.25)(1.25) = 1.56 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u A + P_{u,eq} A = 504.7$ pounds

Force on Antenna: $F = P_u A_u = 22.2$ pounds

Force on equipment: $F = P_u A_m = 95.2$ pounds

Force on light arm: $F = (3.0) (23.8) = 71.4$ pounds

Force on Sign: $F = (22.0)(1.56) = 34.3$ pounds

Total wind load = 727.8 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet per (SDE-101)

$D = 0.5A (1 + [1 + (4.36h / A)]^2)$
 Where $A = (2.34 P/S, b) = [(2.34) (727.8 / (2200) (2.5))] = 0.31$
 Therefore $D_m = 3.34 \text{ ft.} < 4.50 \text{ feet ok}$

4. Bearing Capacity

Gross pole wt: 1396 pounds (for pole + equipment)

$Q_u = 1500 \text{ psf}$ (Traffic signal at 4.5 foot embedment)

Pole fig dia. = 2.5 ft. Footing area = 4.90 sq. ft.

$Q = 1500 \text{ psf} > Q = (1401)/(4.90) = 285.9 \text{ psf OK}$

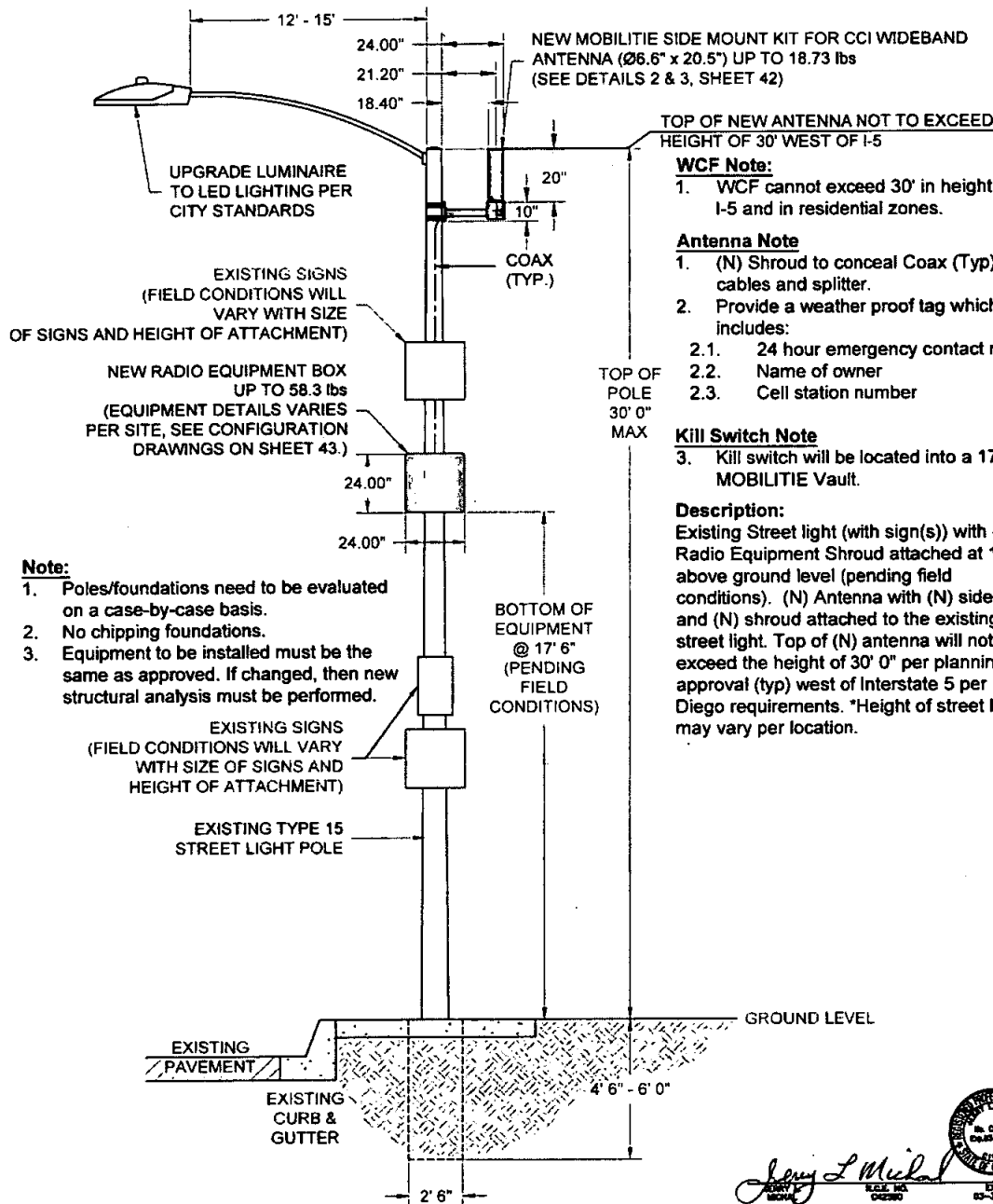
Page 2 of 2

SITE ADDRESS: <u>Various</u>		SHEET NO. <u>6</u>	
TITLE: <u>EXISTING TYPE 15 STREET LIGHT POLE WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX</u>		DATE: <u>7/17</u>	
DRAWING NO. <u>TED</u>		SCALE: <u>N.T.S.</u>	
MOBILITE INTELLIGENT INFRASTRUCTURE Master Structural Schematic EXISTING TYPE 15 STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX			
mobilitie intelligent infrastructure 2955 RED HILL AVE, SUITE 200 COSTA MESA, CA 92626 (949) 261-3863 E: www.mobilitie.com			

James J. M. D. 7-25-17
 JLM
 03-31-16

Diagram illustrating the installation of a new radio equipment box. The box is mounted on a wall, with dimensions indicating it is 24.00 inches wide and 24.00 inches high. A line points to the box with the text "NEW RADIO EQUIPMENT BOX UP TO 58.3 lbs". The diagram also shows a "STREET SIDE" and a "CURB".

- Jerry L. Michel Signature of Licensed Architect/Engineer



TOP OF NEW ANTENNA NOT TO EXCEED
HEIGHT OF 30' WEST OF I-5

WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typical cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

MOBILITIE. INTELLIGENT INFRASTRUCTURE
Master Structural Schematic

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:		Vanes
TITLE: EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGNS) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	570183	SHEET 7
DRAWING NO	TBD	
DATE:	8/7/17	
SCALED:	N.T.S	

PROJECT NO. Existing Type 15 / Antenna Installation CALCULATIONS BY: JLM
PROJECT NAME: MOBILITE INTELLIGENT DATE : 8-15-2017
PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia=2.5' dia. x 4.5' deep. Antenna Wt. = 18.73 lbs Equip. Wt. = 58.3 lbs

References:

1. 2015 IBC	3. ASCE MINIMUM DESIGN LOADS - 7-10
2. 2016 CBC	4. 2010 Caltrans Standard Plan RSP ES-6A
5. San Diego Standard Drawing SDE-101	

Wind Zone: (Fig. 3-2.3) $V = 110 \text{ mph (3 sec. Gust)}$
Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8 \text{ psf}$

Area of pole: Ave. Dia. (0-16') = 9.75 in. $A_u = (16)(9.75/12) = 13.0$ sq. ft.
Ave. Dia. (16-30') = 7.88 in. $A_u = (14.0)(7.88/12) = 9.91$ sq. ft.

Area of traffic arm: $A = (0.43)(30) + (1.0)(3)(2) = 16.9$ sq. ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (6.60/12)(20.5/12) + (4.2/12)(2) = 1.64$ sq. ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq. ft.

Area of Sign: $A = (1.5)(1.5) = 2.25$ sq. ft.



9-25-17

Gross pole wt: 1414 pounds (for pole + equipment)
 $Q_u = 1500$ psf (Pole at 4.5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1414)/(4.91) = 288.0 \text{ psf}$ OK

Page 2 of 2

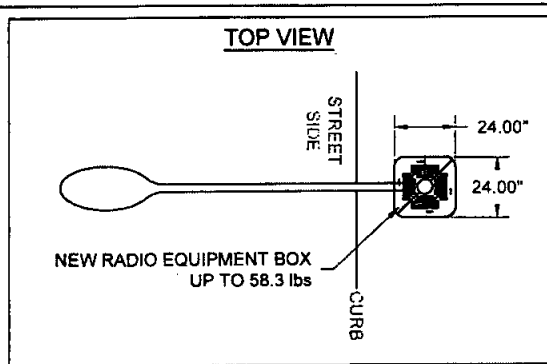
SITE ADDRESS		VIEWS	
TITLE: EXISTING TYPE 16 STREET LIGHT POLE (WITH SIGNING) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX		SHEET	
PTS NO	570103		
DRAWING NO	TBD		
DATE	8/7/17	8	
SCALED:	N T 8		

MOBILITIE: INTELLIGENT INFRASTRUCTURE
Master Structural Schematic

EXISTING TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

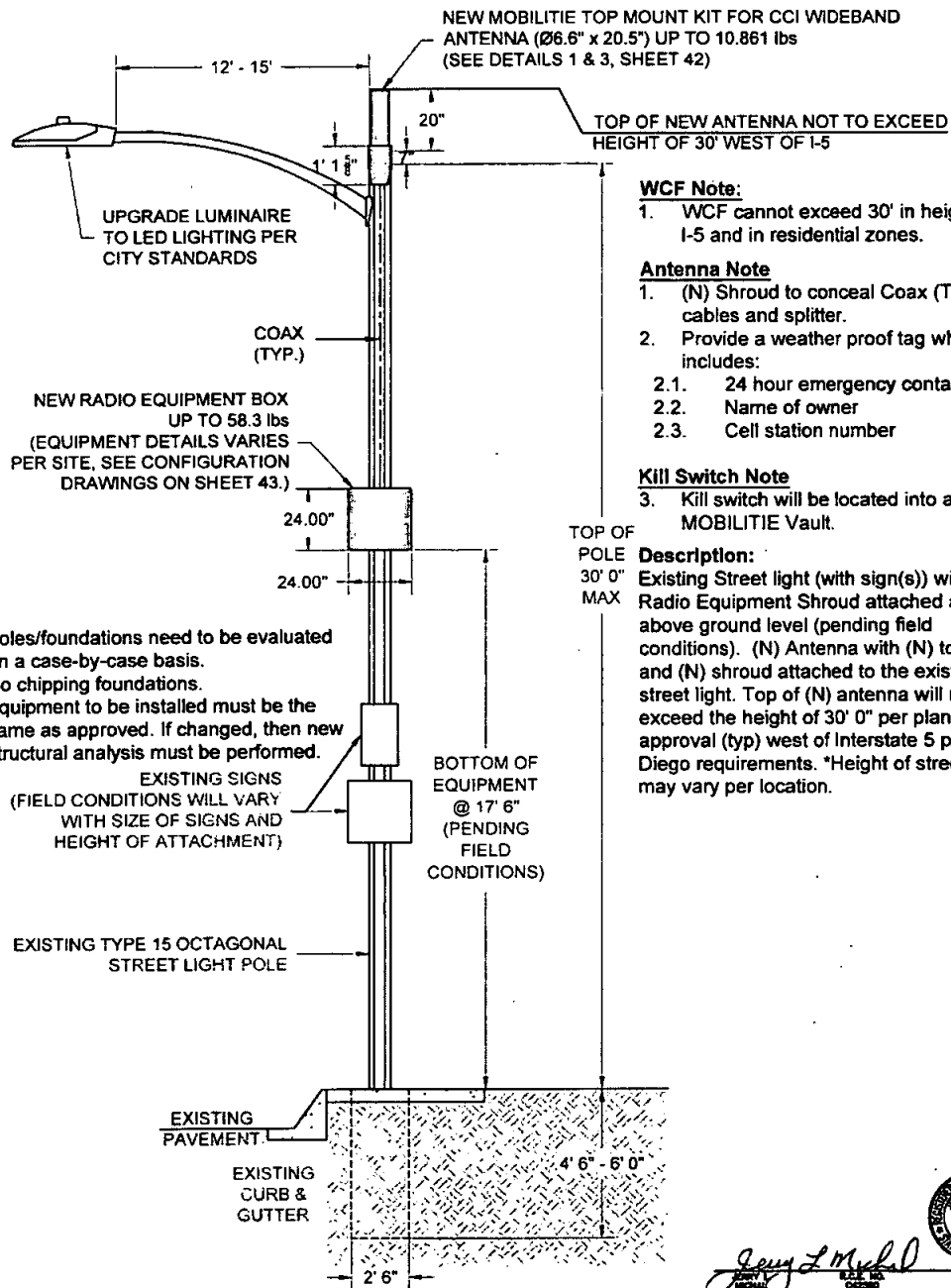
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COSTA MESA, CA 92626
(866) 261-3663
E: www.mobilelife.com



- Existing connections between type 15 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L Michel Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

EXISTING SIGNS
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND
HEIGHT OF ATTACHMENT)

EXISTING TYPE 15 OCTAGONAL
STREET LIGHT POLE

EXISTING
PAVEMENT

EXISTING
CURB &
GUTTER

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: Verdes	
TITLE: EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
PTS NO	570163
DRAWING NO	TBD
DATE	8/7/17
SCALE	N.T.S.
SHEET	
9	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Existing Type 15 Radio / Antenna Installation CALCULATIONS BY: JLM

PROJECT NAME: MOBILITIF INTELLIGENT DATE: 8-15-2017

PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna Wt. = 18.73 lbs Equip. wt. = 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. Dwg B6 Monotube Octagonal Pole Spec. Sheet

30-foot type 15 Octagonal steel pole with top mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 / R = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 / R = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16) = 6.88 in. $A_w = (16) (6.88/12) = 9.17 \text{ sq. ft.}$
 Ave. Dia. (16-30) = 4.78 in. $A_w = (14.0) (4.78/12) = 6.37 \text{ sq. ft.}$

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$

Area of antenna: $A = (6.60/12)(20.5/12) = 0.94 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Sign: $A = (1.5)(1.5) = 2.25 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{w,16} A$ $P_{w,16} A = 353.3 \text{ pounds}$

Force on Antenna: $F = P_{w,16} A_w = 22.4 \text{ pounds}$

Force on equipment: $F = P_{w,16} A_w = 95.2 \text{ pounds}$

Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$

Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$

Total wind load = 644.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 ft (per design B6)

$D = 0.5A (1 + [1 + (4.36h / A)]^2)$
 Where $A = (2.34 P/S, b) = [(2.34) (644.9) / (2200) (2.5)] = 0.27$
 Therefore $D_w = 3.09 \text{ ft.} < 4.5 \text{ feet ok}$

4. Bearing Capacity

Gross pole wt: 1356 pounds (for pole + equipment)

$Q_w = 1500 \text{ psf}$ (Traffic signal at 4.5 ft embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$Q = 1500 \text{ psf} > Q = (1356) / (4.91) = 276.7 \text{ psf OK}$

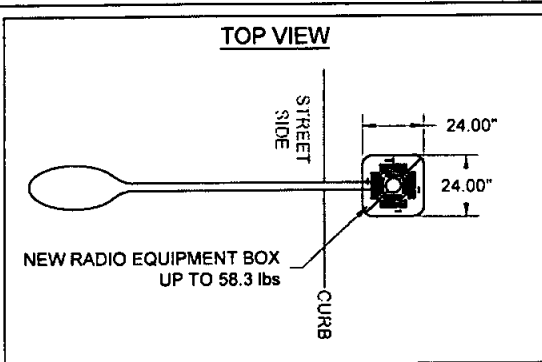
Page 2 of 2

Jerry F. Michael
 JERRY F. MICHAEL
 REG. NO. 42580
 EXP. 03-31-19
 DATE 9-25-17

SITE ADDRESS		Notes	
TITLE: EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX		SHEET 10	
PTS NO.	SERIES	DRAWING NO.	DATE
			8/17
		SCALE	N.T.S.

MOBILITIF INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

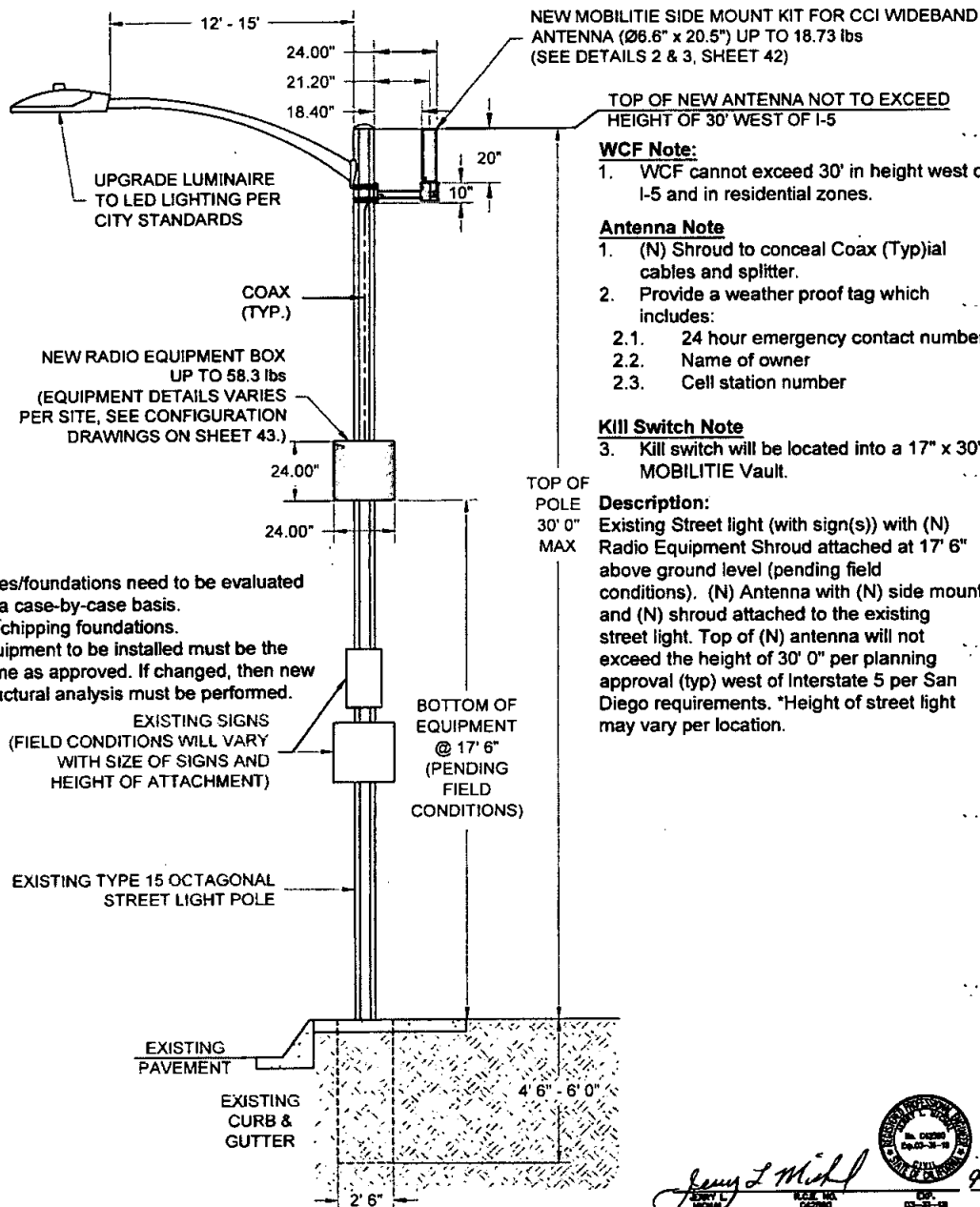
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 COSTA MESA, CA 92626
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- Existing connections between type 15 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jimmy L. Michal

Signature of Licensed Architect/Engineer



WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

EXISTING SIGNS (FIELD CONDITIONS WILL VARY WITH SIZE OF SIGNS AND HEIGHT OF ATTACHMENT)



Jimmy L. Michal

9-25-17

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Varies
TITLE: EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX		
PTS. NO.	570183	SHEET
DRAWING NO.	TBD	
DATE:	8/7/17	
SCALE:	N.T.S.	
		11

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Type 15 Oct. pole/Antenna Installation CALCULATIONS BY: JLM

PROJECT NAME: MOBILITIE INTELLIGENT DATE: 7-11-2017

PROJECT ADDRESS: VARIOUS AREAS

San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 50,000 psi (per manufacturer)

Footings by Design: Dia. = 2.5' dia. x 4.5' deep Equip. Wt. = 58.3 Lbs Antenna Wt. = 18.73 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
2. 2016 CBC 4. Dwg B6 Monotube Oct. Light Pole Spect. sheet

30-foot type 15 Octagonal steel pole with side mount antenna, radio with associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: Kz(16) = 0.87 Kz(32) = 0.94

Ir = 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GV^{1/2}R = 22 psf

Pz(35.0) = (0.00256) Kz(30.0)GV^{1/2}R = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 6.88 in. A_p = (16) (6.88/12) = 9.17 sq.ft.
Ave. Dia. (16-30') = 4.78 in. A_w = (14.0) (4.78/12) = 6.37 sq.ft.

Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.

Area of antenna: A = (6.60/12)(20.5/12) = 0.94 sq.ft.

Area of equipment unit: A = (2.0)(2.0) = 4.00 sq.ft.

Area of Signs (2): A = (1.5)(1.5) + (1.5)(1) = 3.75 sq.ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_w + P_{sw}A = 353.4 pounds

Force on Antenna: F = P_wA_{ant} = 22.4 pounds

Force on equipment: F = P_wA_{eq} = 95.2 pounds

Force on light arm: F = (3.0)(23.8) = 71.4 pounds

Force on Signs (2): F = (3.75)(22.0) = 82.5 pounds

Total wind load = 624.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 ft (per design sheet)

D = 0.5A (1 + [1 + (4.36h / A)]^{0.5})

Where A = (2.34 P/S, b) = [(2.34) (624.9) / (2200) (2.5)] = 0.27

Therefore D_m = 3.13 ft < 4.5 feet OK

4. Bearing Capacity

Gross pole wt: 1418 pounds (for pole + equipment)

Q_a = 1500 psf (Light pole at 4.5 ft embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

Q = 1500 psf > Q = (1418)/(4.91) = 288.7 psf OK

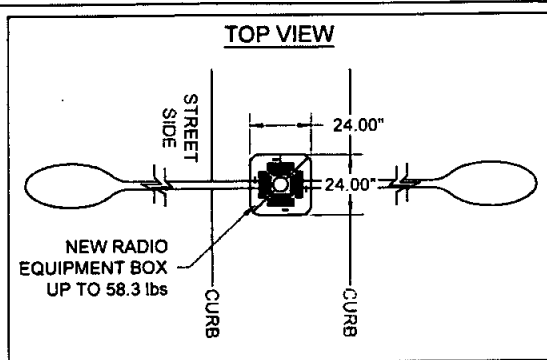
Page 2 of 2

SITE ADDRESS:	Various
TITLE: EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE WITH ANTENNA, RADIO EQUIPMENT BOX	SHEET
PROJECT NO.	985-17
DRAWING NO.	TBD
DATE:	8/7/17
SCALE:	N.T.S.
	12

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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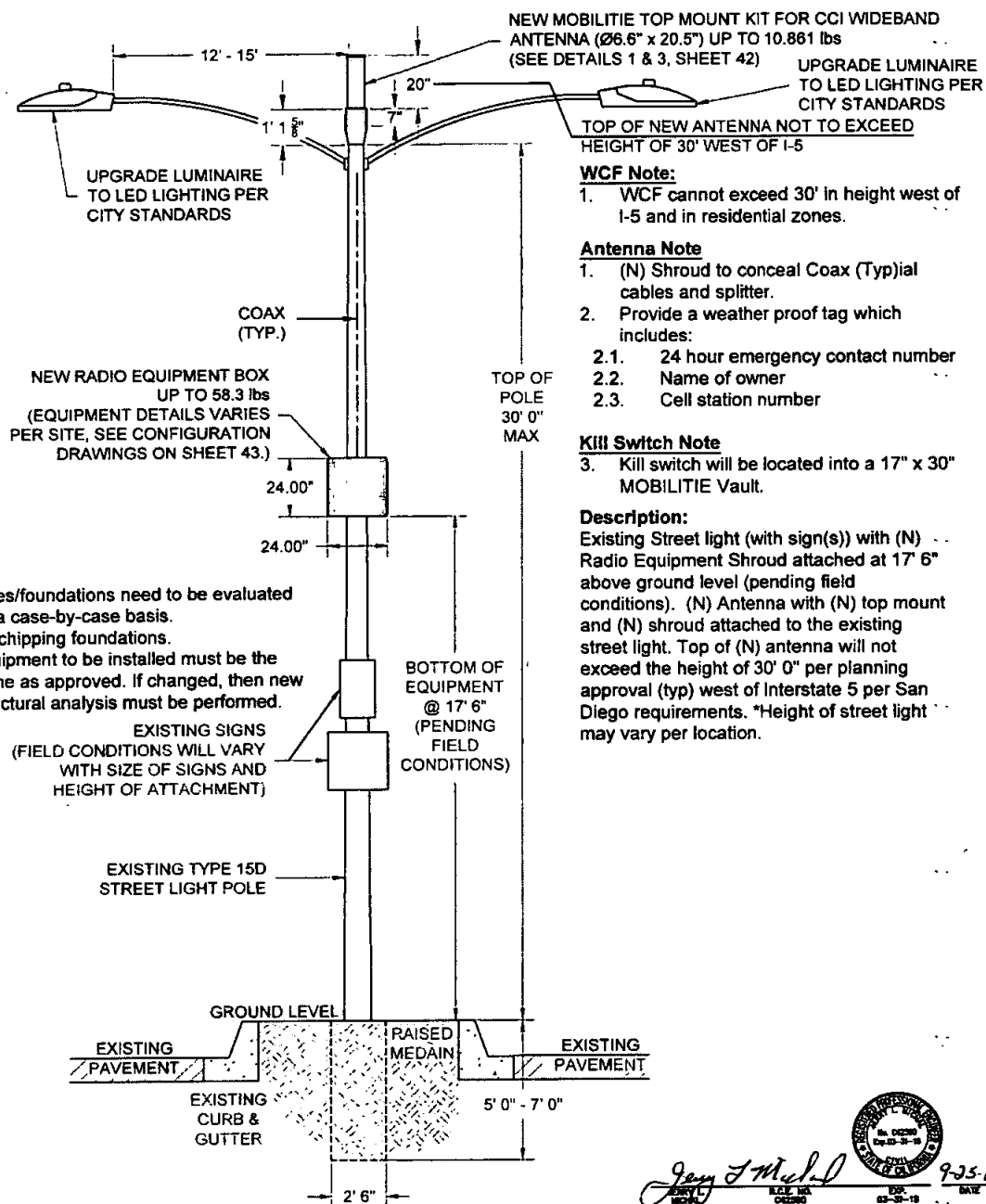
Jerry L. Michael
JERRY L. MICHAEL
No. 42590
Exp. 3-31-18
DATE 9-25-17



- Existing connections between type 15D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jerry L. Michal

Signature of Licensed Architect/Engineer



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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: Varies	
TITLE: EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
PTB NO	570183
DRAWING NO	TBD
DATE	8/7/17
SCALE	N.T.S.
SHEET 13	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = as noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5.0' deep, Equip. Wt. = 58.3 lbs Antenna Wt. = 18.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6D

30-foot type 15D round steel pole with top mount antenna, radio and associated equipment, 2 light arms and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz(16) = 0.87 Kz(32) = 0.94
 Ir = 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GVIR = 22 psf
 Pz(35.0) = (0.00256) Kz(30.0)GVIR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.11 in. $A_H = (16)(7.11/12) = 9.48 \text{ sq. ft.}$
 Ave. Dia. (16-30') = 5.48 in. $A_H = (14.0)(5.48/12) = 6.39 \text{ sq. ft.}$

Area of light arms(2): $A = (2)(0.25)(8) + (0.5)(2) = 6.0 \text{ sq. ft.}$

Area of antenna: $A = (6.60/12)(20.5/12) = 0.94 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Sign: $A = (1.25)(1.25) + (1)(1.5) = 3.06 \text{ sq. ft.}$

Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w A + P_{s.e} A = 541.8 \text{ pounds}$
 Force on Antenna: $F = P_w A_m = 22.4 \text{ pounds}$
 Force on equipment: $F = P_w A_m = 88.0 \text{ pounds}$
 Force on light arms(2): $F = (2)(3.0)(23.8) = 142.8 \text{ pounds}$
 Force on Signs (2): $F = (22.0)(3.06) = 67.3 \text{ pounds}$
 Total wind load = 862.3 pounds

Depth Requirement: Typical Standard Depth is 5.0 feet

$D = 0.5A [1 + (4.36h / A)^{1/4}]$
 Where $A = (2.34 P/S, b) = [(2.34)(918.4)/(2200)(2.5)] = 0.39$
 Therefore $D_m = 3.77 \text{ ft.} < 5.00 \text{ feet OK}$

4. Bearing Capacity

Gross pole wt: 1209 pounds (for pole + equipment)
 $Q_m = 1500 \text{ psf}$ (Traffic signal at 5.0 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1200)/(4.91) = 245.9 \text{ psf OK}$

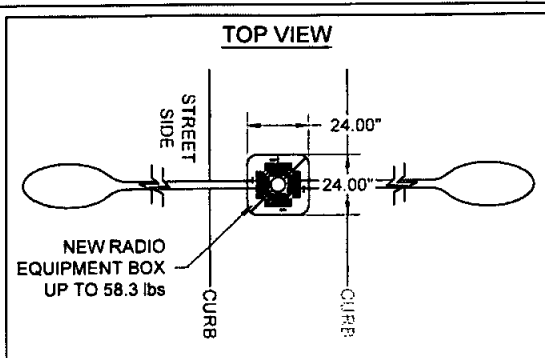
Page 2 of 2

MOBILITIE INTELLIGENT INFRASTRUCTURE Master Structural Schematic EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
TITLE: EXISTING TYPE 15D STREET LIGHT POLE (WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX) SHEET NO.: 14 DRAWING NO.: TBD DATE: 8/7/17 SCALE: N.T.S.	SITE ADDRESS: Various



Gregory L. Michael
 P.E.
 No. 00289
 Exp. 3-31-18

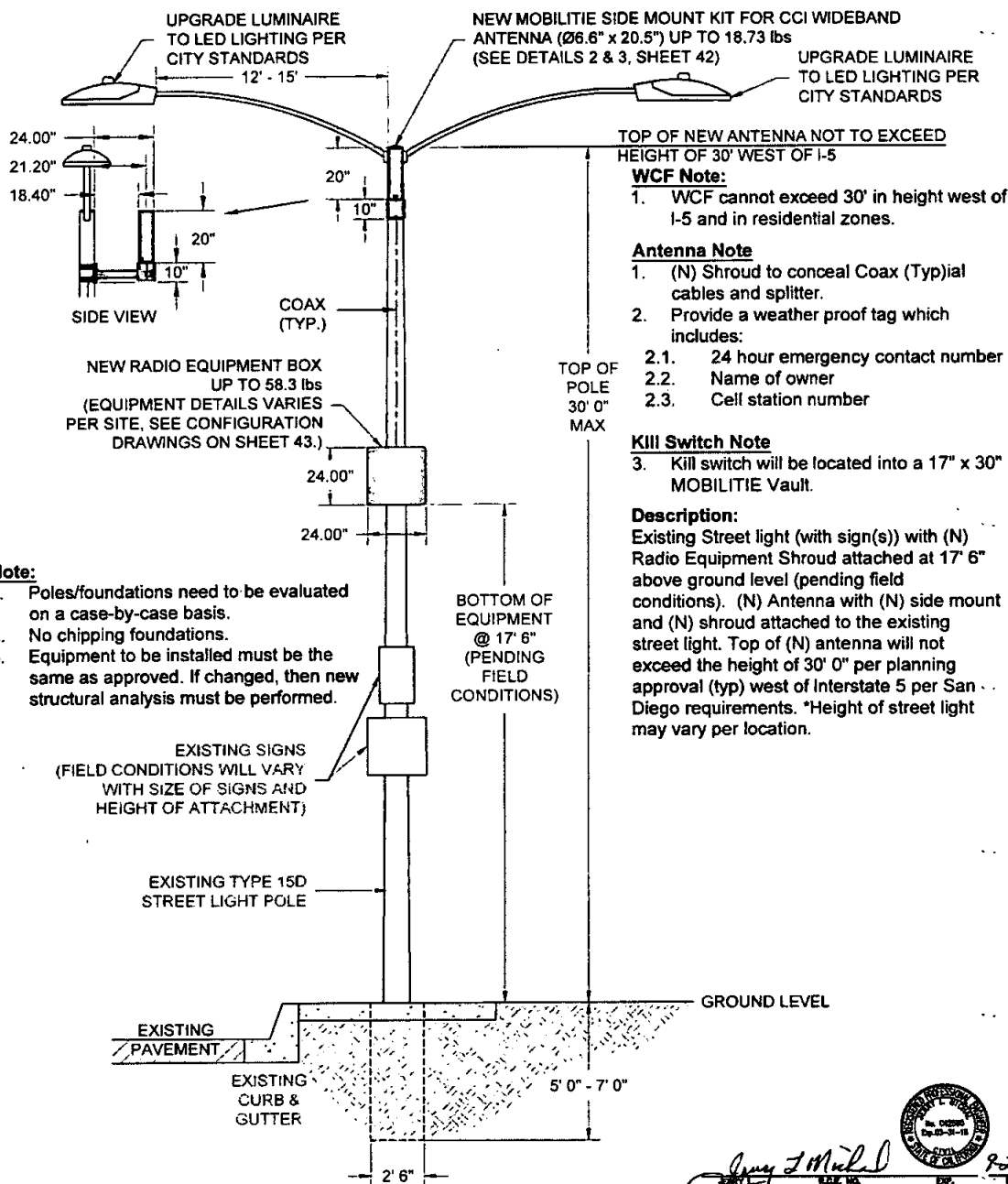
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 COSTA MESA, CA 92626
 (877) 261-3863
 E: www.mobilitie.com



- Existing connections between type 15D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project."

Gregory J. Michel

Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: _____		Version: _____
TITLE: EXISTING TYPE 15D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	570163	SHEET
DRAWING NO	TBD	15
DATE	6/7/17	
SCALE	N.T.S.	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Type 15D Pole/Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = 6.0 in. Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia.=2.5' dia. x 5.0' deep. Equip. Wt. = 58.3 lbs Antenna Wt. = 18.3 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6D

30-foot type 15D round steel pole with side mount antenna, radio and associated equipment, 2 light arms and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I R = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I R = 23.8 \text{ psf}$

2. AREA CALCULATIONS

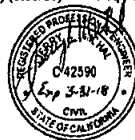
Area of pole: Ave. Dia. (0-16') = 6.00 in. $A_{16} = (16) (6.00/12) = 8.00 \text{ sq. ft.}$
 Ave. Dia. (16-30') = 6.00 in. $A_{30} = (14.0) (6.00/12) = 7.00 \text{ sq. ft.}$

Area of light arms(2): $A = (2) (0.25)(8) + (0.5)(2) = 6.0 \text{ sq. ft.}$

Area of antenna: $A = (6.60/12)(20.5/12) = 1.64 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Signs: $A = (1.0)(2.0) + (2) (1.25)(1.25) = 5.06 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{w,16} A + P_{w,30} A = 342.6 \text{ pounds}$

Force on Antenna: $F = P_{w,16} A_{ant} = 31.9 \text{ pounds}$

Force on equipment: $F = P_{w,16} A_{eq} = 88.0 \text{ pounds}$

Force on light arms(2): $F = (2)(3.0)(23.8) = 142.8 \text{ pounds}$

Force on Signs (2): $F = (22.0)(3.06) = 67.3 \text{ pounds}$

Total wind load = 672.6 pounds

Depth Requirement: Typical Standard Depth is 5.0 feet

$$D = 0.5A \{ 1 + [1 + (4.36h / A)]^2 \}$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (672.6) / (2200) (2.5)] = 0.29$$

$$\text{Therefore } D_{min} = 3.23 \text{ ft.} < 5.00 \text{ feet OK}$$

4. Bearing Capacity

Gross pole wt: 1209 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$ (Pole at 5.0 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

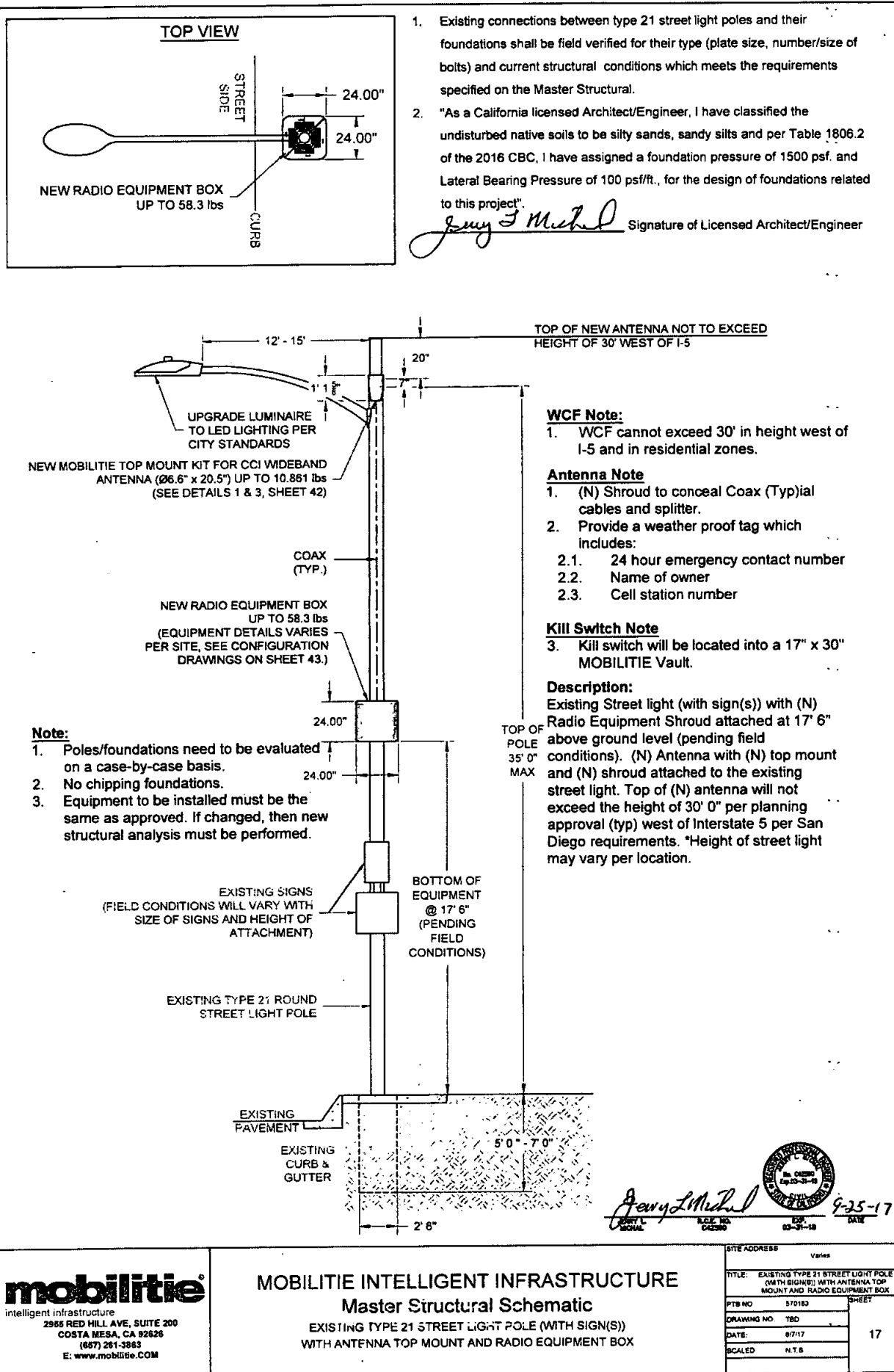
$$Q = 1500 \text{ psf} > Q = (1209)/(4.91) = 246.2 \text{ psf OK}$$

Page 2 of 2

SITE ADDRESS		VIEWS	
TITLE: EXISTING TYPE 15D STREET LIGHT POLE WITH ANTENNA, RADIO EQUIPMENT BOX, SIDE MOUNT AND RADIO EQUIPMENT BOX		SHEET	
DATE: 7/11/17	SCALE: N.T.S.	16	

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 15D STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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 (657) 281-3883
 E: www.mobilitie.com



STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Antenna Installation CALCULATIONS BY: JLM
PROJECT NAME: MOBILITIE INTELLIGENT DATE: 7-11-2017
PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia. = 2.5' dia. x 5' deep, Antenna Wt. 18.73 lbs Equip. Wt. 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
2. 2016 CBC 4. 2015 Revised Caltrans Standard Plan RSA ES-6A

35-foot Type 21 round steel pole with top mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
Coefficients: Kz (16) = 0.87 Kz(32) = 0.94
Ir = 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GV²IR = 22 psf
Pz(35.0) = (0.00256) Kz(35.0)GV²IR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. A₁₆ = (16) (7.28/12) = 9.70 sq.ft.
Ave. Dia. (16-35') = 4.87 in. A₃₅ = (19.0) (4.87/12) = 7.71 sq.ft.

Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.

Area of antenna: A = (6.60/12)(20.5/12) = 0.94 sq.ft.

Area of equipment unit: A = (2.0)(2.0) = 4.00 sq.ft.

Area of Sign: A = (1.5)(1.5) + (1)(1.5) = 3.75 sq.ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w A + P_{w,eq} A = 388.8$ pounds
Force on Antenna: $F = P_w A_{ant} = 22.4$ pounds
Force on equipment: $F = P_w A_{eq} = 95.2$ pounds
Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds
Force on Signs (2): $F = (3.75)(22.0) = 82.5$ pounds
Total wind load = 660.3 pounds

Depth Requirement: Typical Standard Depth is 5 feet

$D = 0.5A (1 + [1 + (4.36h / A)]^2)$
Where A = (2.34 P/S, b) = [(2.34) (660.3) / (2200) (2.5)] = 0.32
Therefore D_{req} = 3.67 ft. < 5 feet ok

4. Bearing Capacity

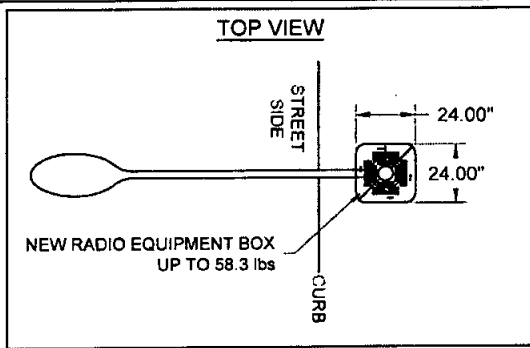
Gross pole wt: 1414 pounds (for pole + equipment)
Q_a = 1500 psf
Pole fig dia. = 2.5 ft. Footing area = 4.91 sq. ft.
Q = 1500 psf > Q = (1414)/(4.91) = 288.6 psf OK

Page 2 of 2

Jerry L Michel

DATE: 07-11-17

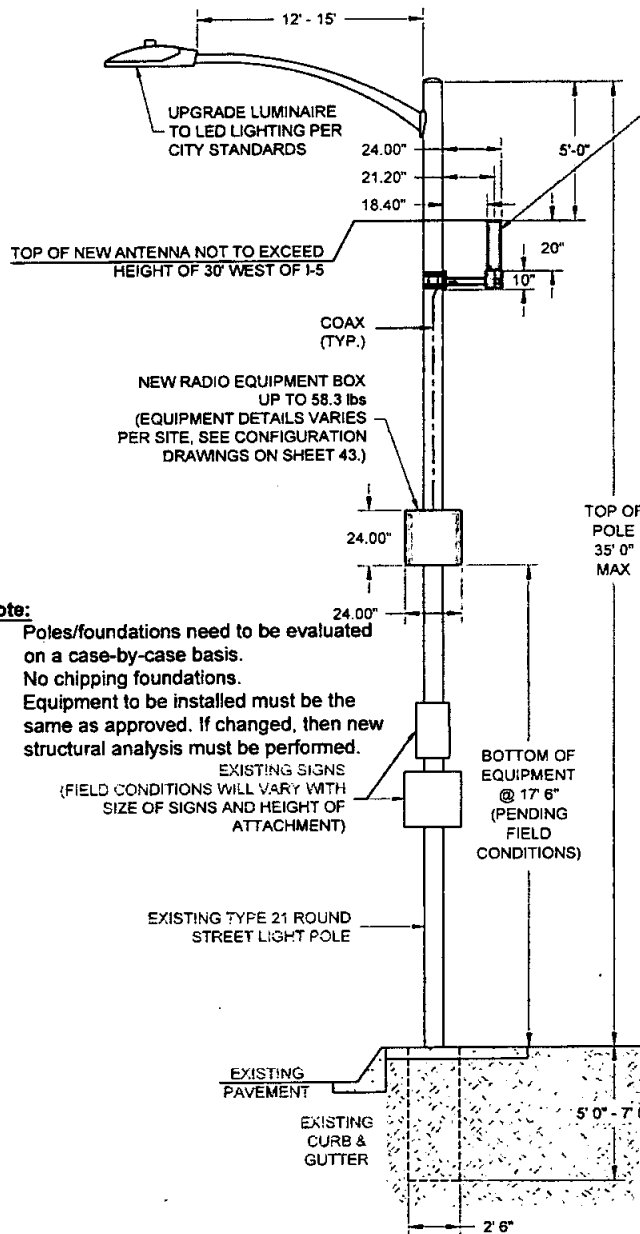
SITE ADDRESS: <u>Various</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="font-size: small;">TITLE: EXISTING TYPE 21 STREET LIGHT POLE WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX</td> </tr> <tr> <td style="font-size: x-small;">SHEET NO.</td> <td style="font-size: x-small;">18</td> </tr> <tr> <td style="font-size: x-small;">DRAWING NO.</td> <td style="font-size: x-small;">TBD</td> </tr> <tr> <td style="font-size: x-small;">DATE:</td> <td style="font-size: x-small;">8/7/17</td> </tr> <tr> <td style="font-size: x-small;">SCALE:</td> <td style="font-size: x-small;">N.T.S.</td> </tr> </table>	TITLE: EXISTING TYPE 21 STREET LIGHT POLE WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX		SHEET NO.	18	DRAWING NO.	TBD	DATE:	8/7/17	SCALE:	N.T.S.
TITLE: EXISTING TYPE 21 STREET LIGHT POLE WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX											
SHEET NO.	18										
DRAWING NO.	TBD										
DATE:	8/7/17										
SCALE:	N.T.S.										
MOBILITIE INTELLIGENT INFRASTRUCTURE Master Structural Schematic EXISTING TYPE 21 STREET LIGHT POLE WITH SIGN(S) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX											
 intelligent infrastructure 2955 RED HILL AVE, SUITE 200 COSTA MESA, CA 92626 (657) 281-3863 E: www.mobilitie.com											



- Existing connections between type 21 street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project."

Jerry L. Michol

Signature of Licensed Architect/Engineer



NEW MOBILITIE SIDE MOUNT KIT FOR CCI WIDEBAND ANTENNA (Ø6.6" x 20.5") UP TO 18.73 lbs (SEE DETAILS 2 & 3, SHEET 42)

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

(FIELD CONDITIONS WILL VARY WITH SIZE OF SIGNS AND HEIGHT OF ATTACHMENT)

EXISTING TYPE 21 ROUND STREET LIGHT POLE

EXISTING PAVEMENT

EXISTING CURB & GUTTER

Jerry L. Michol



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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:		Varies
TITLE:		EXISTING TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTS NO.	870183	SHEET
DRAWING NO.	150	
DATE:	8/7/17	
SCALE:	N.T.S.	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Type 21 Pole/Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Caltrans Standard Plan RSA ES-6A

35-foot Type 21 round steel pole with side mount antenna, radio with associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) $V = 110$ mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf
 $P_z(35.0) = (0.00256) K_z(35.0) G V^2 I_r = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. $A_{16} = (16) (7.28/12) = 9.70$ sq.ft.
 Ave. Dia. (16-35') = 4.87 in. $A_{35} = (14.0) (4.87/12) = 7.37$ sq.ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (6.60/12)(20.5/12) = 1.64$ sq.ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq.ft.

Area of Sign: $A = (1.5)(1.5) (1)(1.5) = 3.75$ sq.ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u + P_{u,w} A = 521.9$ pounds

Force on Antenna: $F = P_u A_{u,w} = 39.0$ pounds

Force on equipment: $F = P_u A_{u,w} = 88.0$ pounds

Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds

Force on Signs (2): $F = (3.75)(23.8) = 102.6$ pounds

Total wind load = 822.9 pounds

Depth Requirements: Typical Standard Depth is 5 feet (per reference)

$$D = 0.5A (1 + [1 + (4.36h / A)]^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (822.9) / (2200) (2.5)] = 0.35$$

$$\text{Therefore } D_u = 3.56 \text{ ft.} < 5 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1414 pounds (for pole + equipment)

$Q_u = 1500$ psf (Pole at 5 foot embedment)

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q = 1500 \text{ psf} > Q_u = (1414) / (4.91) = 288.0 \text{ psf OK}$$

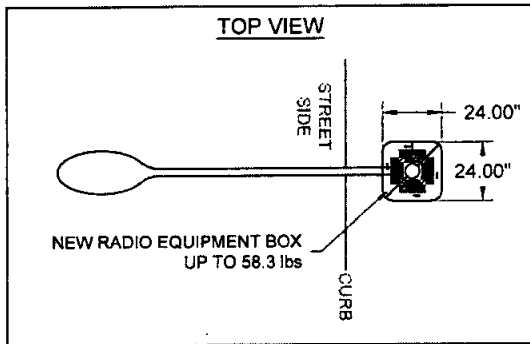
Page 2 of 2

SITE ADDRESS:	
TITLE: EXISTING TYPE 21 STREET LIGHT POLE WITH ANTENNA, RADIO AND EQUIPMENT BOX	20
PTS NO.	STUDIED
DRAWING NO.	TBD
DATE:	8/7/17
SCALE:	N.T.S.

MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 EXISTING TYPE 21 STREET LIGHT POLE WITH SIGN(S)
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

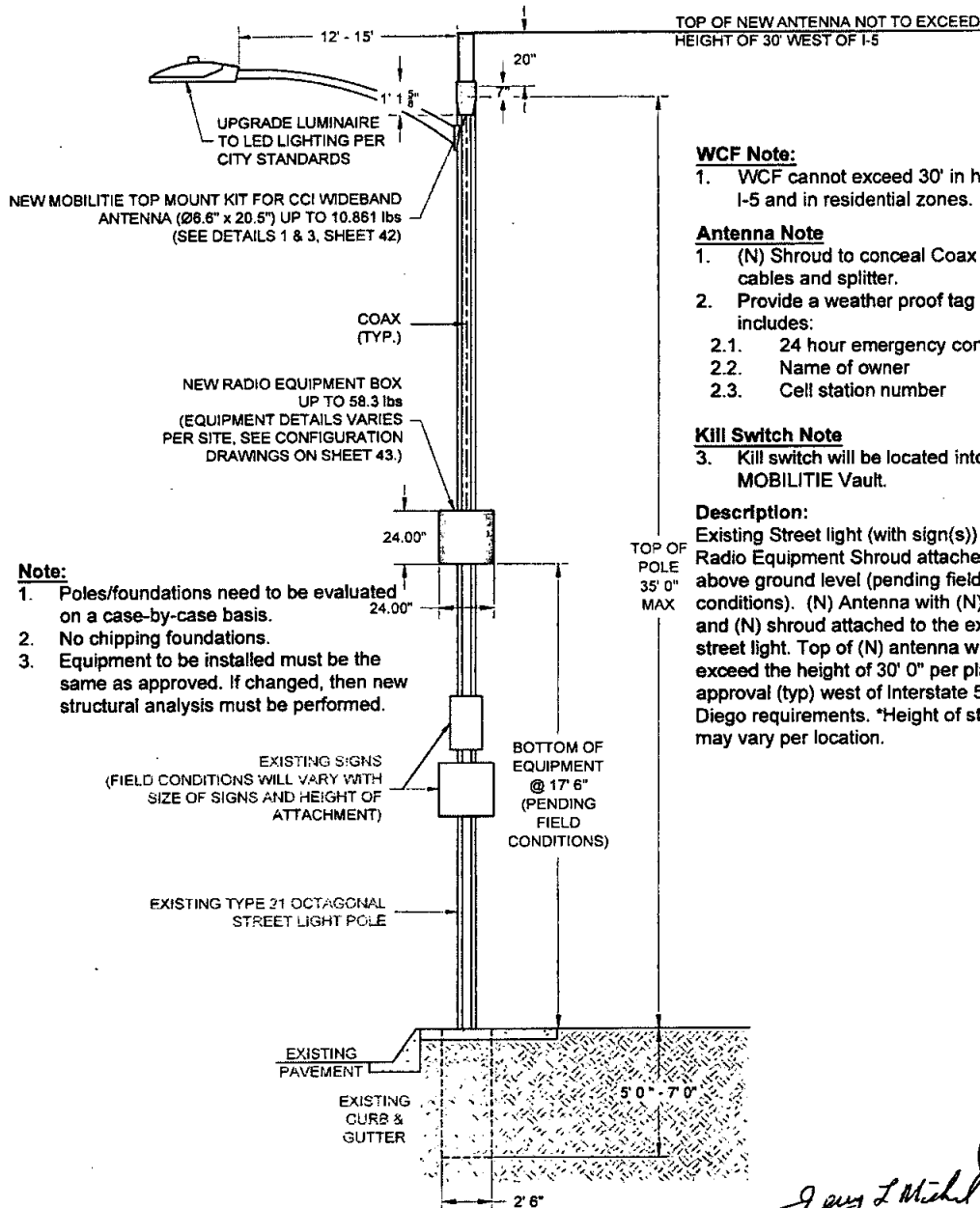
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 COSTA MESA, CA 92626
 (877) 261-3843
 E: www.mobilitie.com

Jerry L. Michael
 JERRY L. MICHAEL
 9-25-17
 DATE



- Existing connections between type 21 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project"

Gregory L. Michel Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

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MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:	Varies
TITLE:	EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
PTB NO.	570183
DRAWING NO.	TBD
DATE:	8/7/17
SCALE:	N.T.S.
SHEET	21

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Type 21 Octagonal Pole/Antenna Installation **CALCULATIONS BY:** JLM
PROJECT NAME: MOBILITIE INTELLIGENT **DATE:** 7-11-2017
PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. = 18.73 lbs Equipment Wt. = 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole spec. sheet

35-foot type 21 Octagonal Steel pole with top mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz(16) = 0.87 Kz(32) = 0.94
 I = 0.87 G = 1.142
 Wind Pressures: Pz(16) = (0.00256) Kz(16)GV^{1/2}R = 22 psf
 Pz(35.0) = (0.00256) Kz(30.0)GV^{1/2}R = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. A₁₆ = (16) (7.28/12) = 9.70 sq. ft.
 Ave. Dia. (16-35') = 4.87 in. A₃₅ = (19.0) (4.87/12) = 7.37 sq. ft.

Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.
 Area of antenna: A = (7.18/12)(24/12) = 0.94 sq. ft.
 Area of equipment unit: A = (2.0)(2.0) = 4.00 sq. ft.
 Area of Sign: A = (1.5)(1.5) = (1)(1.5) = 3.75 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: F = P_w A + P_{sw} A = 388.8 pounds
 Force on Antenna: F = P_w A_{ant} = 22.4 pounds
 Force on equipment: F = P_w A_{eq} = 95.2 pounds
 Force on light arm: F = (3.0)(23.8) = 71.4 pounds
 Force on Signs (2): F = (2)(2.25)(23.8) = 102.6 pounds

Total wind load = 670.4 pounds

Depth Requirement: Typical Standard Depth is 5 feet (per design B6)

$D = 0.5A (1 + [1 + (4.36h / A)]^2)$
 Where A = (2.34 P/S, b) = [(2.34) (670.4) / (2200) (2.5)] = 0.28
 Therefore D_{req} = 3.38 ft. < 5 feet ok

4. Bearing Capacity

Gross pole wt: 1459 pounds (for pole + equipment)
 Q_a = 1500 psf (Traffic signal at 5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 Q = 1500 psf > Q = (1459)/(4.91) = 297.9 psf OK

Page 2 of 2

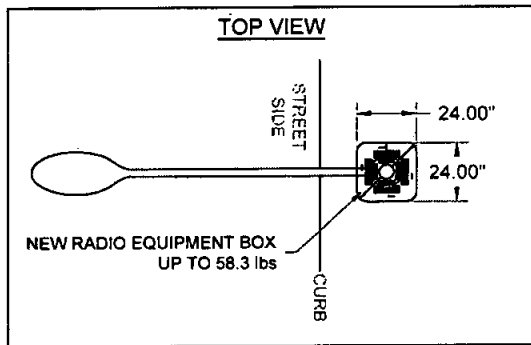

 Jerry L. Michel 8-25-17
 8-25-17

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
 P/S NO. 87018 TBS
 DRAWING NO. TBS 87017
 DATE: 8/11/17
 SCALE: NTS

22

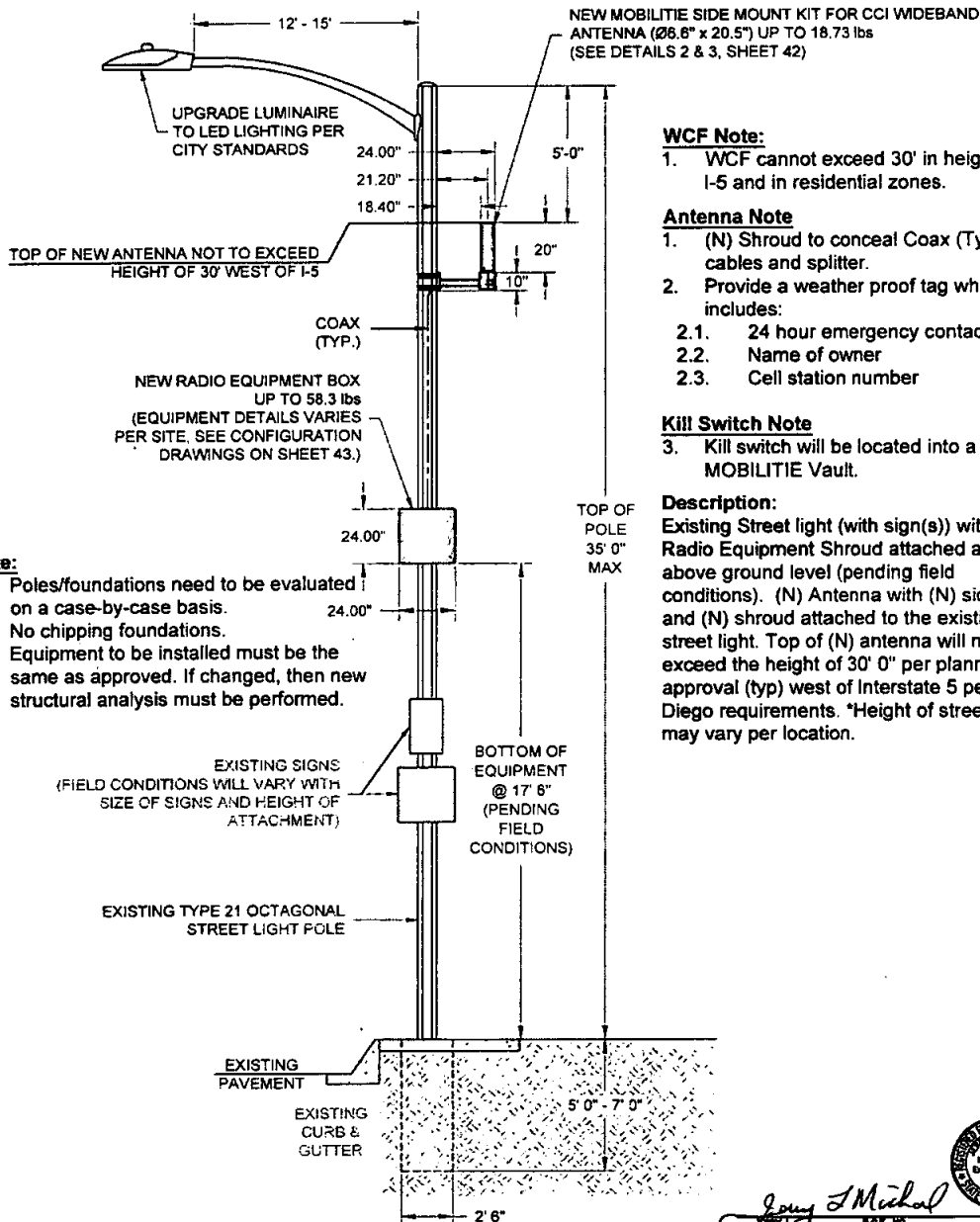
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 E: www.mobilitie.com



- Existing connections between type 21 octagonal street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Jeong T. Michal

Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ) cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS		Vance
TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	570163	SHEET
DRAWING NO	TBD	
DATE	5/7/17	
SCALE	N.T.S.	
		23

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Type 21 Oct Pole/Antenna Installation CALCULATIONS BY: JLM
PROJECT NAME: MOBILITIE INTELLIGENT DATE: 7-11-2017
PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. = 18.73 lbs Equipment Wt. = 58.3 lbs
References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
2. 2016 CBC 4. Dwg B6 Monotube Octagonal light pole spec. sheet

35-foot type 21 Octagonal steel pole with side mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_r = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. $A_u = (16) (7.28/12) = 9.70 \text{ sq. ft.}$
Ave. Dia. (16-35') = 4.87 in. $A_m = (19.0) (4.87/12) = 7.37 \text{ sq. ft.}$

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$

Area of antenna: $A = (6.60/12)(20.5/12) = 1.64 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Signs: $A = (1.5)(1.5) = (1)(1.5) = 3.75 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u A + P_{u,eq} A = 388.8 \text{ pounds}$
Force on Antenna: $F = P_u A_m = 39.0 \text{ pounds}$
Force on equipment: $F = P_u A_{eq} = 95.2 \text{ pounds}$
Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$
Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$
Total wind load = 697.0 pounds

Depth Requirement: Typical Standard Depth is 5 feet (per design B6)

$D = 0.5A (1 + [1 + (4.36h / A)]^2)$
Where $A = (2.34 P/S, b) = [(2.34) (697.0) / (2200) (2.5)] = 0.30$
Therefore $D_m = 3.54 \text{ Ft.} < 5 \text{ feet ok}$

4. Bearing Capacity

Gross pole wt: 1459 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$ (Traffic signal at 4.5 foot embedment)
Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1459) / (4.91) = 297.7 \text{ psf OK}$

Page 2 of 2

John L. M.

7-25-17
DATE

Views	
SITE ADDRESS	TITLE: EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGNS) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTB NO.	STUDIES
DRAWING NO.	TBD
DATE	8/7/17
SCALE	NTS
24	

MOBILITIE INTELLIGENT INFRASTRUCTURE

Master Structural Schematic

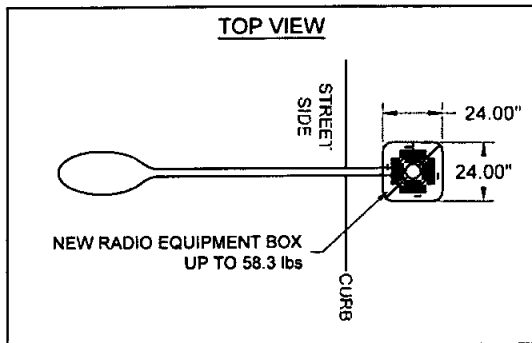
EXISTING TYPE 21 OCTAGONAL STREET LIGHT POLE (WITH SIGNS)

WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

mobilitie

Intelligent Infrastructure

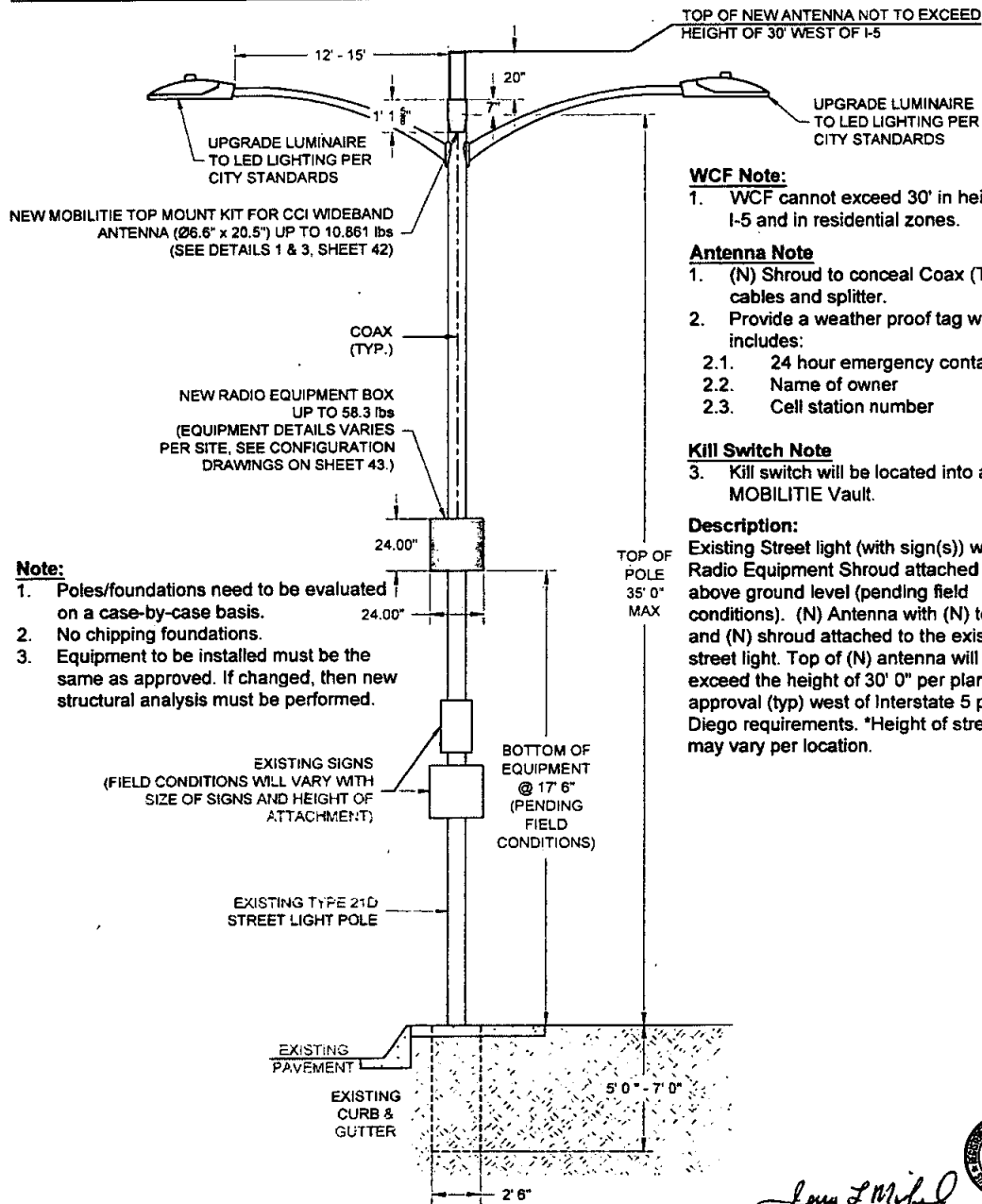
2885 RED HILL AVE, SUITE 200
COSTA MESA, CA 92626
(951) 281-3883
E: www.mobilitie.com



- Existing connections between type 21D street light poles and their foundations shall be field verified for their type (plate size, number/size of bolts) and current structural conditions which meets the requirements specified on the Master Structural.
- "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf/ft., for the design of foundations related to this project".

Lucy L. Michel

Signature of Licensed Architect/Engineer



Note:

- Poles/foundations need to be evaluated on a case-by-case basis.
- No chipping foundations.
- Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

WCF Note:

- WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

- (N) Shroud to conceal Coax (Typ)ial cables and splitter.
- Provide a weather proof tag which includes:
 - 24 hour emergency contact number
 - Name of owner
 - Cell station number

Kill Switch Note

- Kill switch will be located into a 17" x 30" MOBILITE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

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MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS	Varies
TITLE	EXISTING TYPE 21D STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX
PTS NO	570163
DRAWING NO	TBD
DATE	8/7/17
SCALE	N.T.S.
SHEET	25

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Pole Type 21D/Antenna CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 58.35 lbs

References: 1. 2015 IBC. 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2010 Revised Caltrans Standard Plan RSP ES-6D

35-foot Type 21D steel pole two light arms, with top mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: Kz(16) = 0.87 Kz(32) = 0.94
 Ir = 0.87 G = 1.142
 Wind Pressures: Pz(16) = (0.00256) Kz(16)GV^{1/2}IR = 22 psf
 Pz(35.0) = (0.00256) Kz(35.0)GV^{1/2}IR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.47 in. A_u = (16) (7.47/12) = 9.96 sq. ft.
 Ave. Dia. (16-35') = 4.87 in. A_u = (19.0) (4.87/12) = 7.71 sq. ft.

Area of light arm: A = (0.25)(8) + (0.5)(2) = 3.0 sq. ft.

Area of antenna: A = (6.60/12)(20.5/12) = 0.94 sq. ft.

Area of equipment unit: A = (2.0)(2.0) = 4.00 sq. ft.

Area of Sign: A = (1.5)(1.5) + (1)(1.5) = 3.75 sq. ft.



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u A + P_{u,eq} A = 402.6$ pounds
 Force on Antenna: $F = P_u A_u = 22.4$ pounds
 Force on equipment: $F = P_u A_u = 95.2$ pounds
 Force on light arm: $F = (3.0)(23.8) = 71.4$ pounds
 Force on Signs (2): $F = (3.75)(22.0) = 82.5$ pounds
 Total wind load = 681.1 pounds

Depth Requirement: Typical Standard Depth is 5 feet
 $D = 0.5A [1 + \{1 + (4.36h / A)\}^2]$
 Where $A = (2.34 P/S, b) = [(2.34) (681.1) / (2200) (2.5)] = 0.28$
 Therefore $D_u = 3.41$ ft. < 5 feet ok

4. Bearing Capacity

Gross pole wt: 1405 pounds (for pole + equipment)
 $Q_u = 1500$ psf
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1405) / (4.91) = 286.1 \text{ psf OK}$

Page 2 of 2

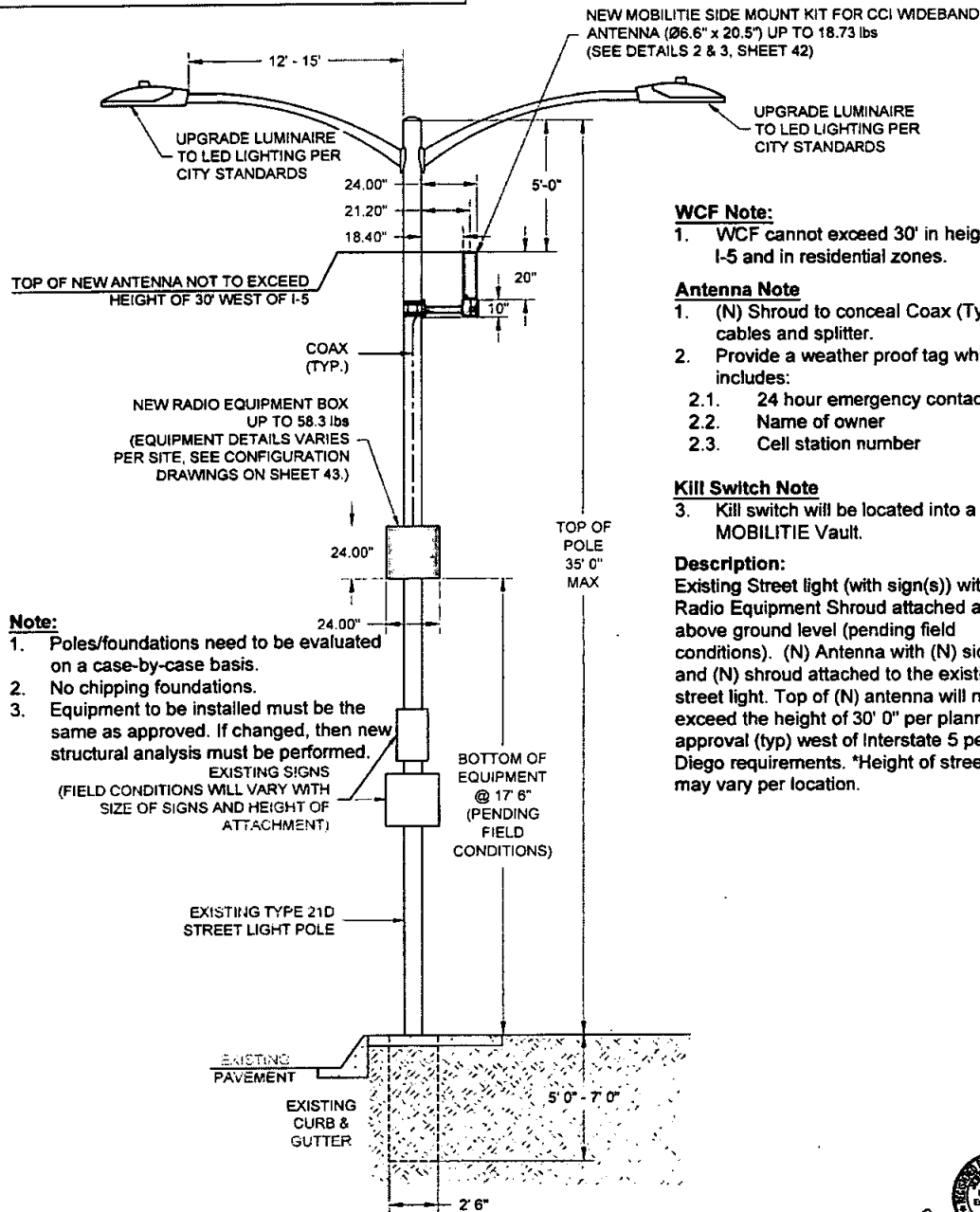
MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 EXISTING TYPE 21D STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

26

www.mobilite.com

A diagram showing a radio equipment box mounted on a street corner. The box is square, with dimensions of 24.00" by 24.00" indicated. It is positioned at the intersection of a 'STREET SIDE' and a 'CURB'. A line points from the text 'NEW RADIO EQUIPMENT BOX UP TO 58.3 lbs' to the box. The box has a circular feature in the center, possibly a lens or a speaker.

- Jerry L. Michal Signature of Licensed Architect/Engineer



1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

1. (N) Shroud to conceal Coax (Typical cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

EXISTING SIGNS
(FIELD CONDITIONS WILL VARY WITH
SIZE OF SIGNS AND HEIGHT OF
ATTACHMENT)

BOTTOM OF
EQUIPMENT
@ 17' 6"
(PENDING
FIELD
CONDITIONS)

EXISTING TYPE 21D
STREET LIGHT POLE

EXISTING
PAVEMENT

EXISTING
CURB &
GUTTER

- 2' 6"

Lucy I Michel
JURY
NOV 14 1964
R.C.E. NO.
042280



9-25-17

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Master Structural Schematic

EXISTING TYPE 21D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS.		Vanes	
TITLE: EXISTING TYPE 21D STREET LIGHT POLE (WITH SIGNS) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX			
PTS NO.	570183	SHEET	
DRAWING NO	TBD	27	
DATE:	8/7/17		
SCALED:	N.T.S.		

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Steel Pole Type 21D/Antenna

CALCULATIONS BY: JLM

PROJECT NAME: Mobilitie Intelligent

DATE: 7-11-2017

PROJECT ADDRESS: Various locations

San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60000 psi (per manufacturer)

Footings by Design: Dia. = 2.5' dia. x 5.0' deep. Antenna wt. = 18.73 Equip. Wt. = 58.3 lbs

References: 1. 2015 UBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
2. 2016 CBC 4. 2010 Caltrans Standard Plan RSP ES-6A

35-foot Type 21D steel light pole and two light arms, side mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V=110 mph (3 sec. Gust)

Coefficients: Kz(16) = 0.87 Kz(32) = 0.94
Ir = 0.87 G = 1.142

Wind Pressures: Pz(16) = (0.00256) Kz(16)GVIR = 22 psf
Pz(33.0) = (0.00256) Kz(30.0)GVIR = 23.8 psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.47 in. $A_{16} = (16)(7.47/12) = 9.96 \text{ sq. ft.}$
Ave. Dia. (16-35') = 4.87 in. $A_{35} = (19.0)(4.87/12) = 7.71 \text{ sq. ft.}$

Area of antenna: $A = (20.5/12)(6.60/12) = 0.94 \text{ sq. ft.}$

Area of Radio: $A = (2)(2) = 4.0 \text{ sq. ft.}$

Area of light arms: $A = (0.25)(8) + (0.5)(2) = 6 \text{ sq. ft.}$

Area of signs: $A = (1.5)(1.5) + (31.06)(7.125/12) = 3.75 \text{ sq. ft.}$



Page / of 2

3. FORCE ON POLE

Force on pole: $F = P_w A + P_{sw} A = 401.0 \text{ pounds}$

Force on Antenna: $F = P_w P_z H_{eff} A_{eff} = 22.4 \text{ pounds}$

Force on Radio: $F = P_w P_z H_{eff} A_{eff} = 95.2 \text{ pounds}$

Force on light arms (2): $F = (6)(23.8) = 142.8 \text{ pounds}$

Force on signs: $F = 82.5 \text{ pounds}$

Total wind load = 736.6 pounds

3. Depth Requirement: Typical Standard Depth is 5.0 feet (per reference 4)

$$D = 0.5A \left(1 + \left[1 + (4.36h / A) \right]^2 \right)^{1/4}$$

$$\text{Where } A = (2.34 P/S, b) = \left[(2.34)(736.6) / (2200) (2.5) \right] = 0.31$$

$$\text{Therefore } D_{min} = 3.58 \text{ ft.} < 5.0 \text{ feet OK}$$

4. Bearing Capacity

Gross pole wt: 1464 pounds (for pole + equipment) $Q_u = 1500 \text{ psf}$

Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$$Q_u = 1500 \text{ psf} > Q = (1464)/(4.91) = 299.0 \text{ psf OK}$$

Page 2 of 2

SITE ADDRESS		Version
TITLE	EXISTING TYPE 21D STREET LIGHT POLE WITH ANTENNA, RADIO, AND SIGN MOUNT AND RADIO EQUIPMENT BOX	SHEET
PTS NO.	570153	28
DRAWING NO.	TBD	
DATE	8/1/17	
SCALE	N.T.S.	

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EXISTING TYPE 21D STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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(657) 251-3563
E: www.mobilitie.com

Jerry L Michel
J. L. MICHEL
07-31-18
DATE

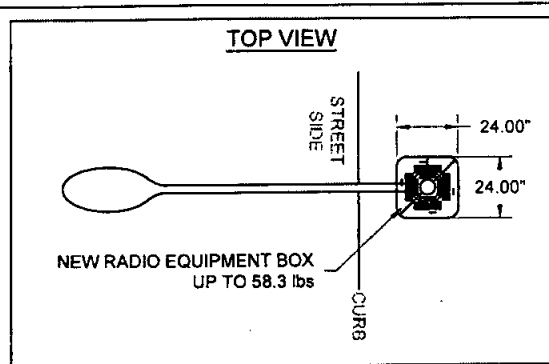
MASTER STRUCTURAL PLANS NEW STREET LIGHT POLES TO REPLACE CONCRETE POLES


 Jerry J. Michel
 P.E. No. 01228
 Exp. 03-31-18
 DATE 9-25-17

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 2955 RED HILL AVE, SUITE 200
 COSTA MESA, CA 92626
 (657) 261-3883
 E: www.mobilitie.COM

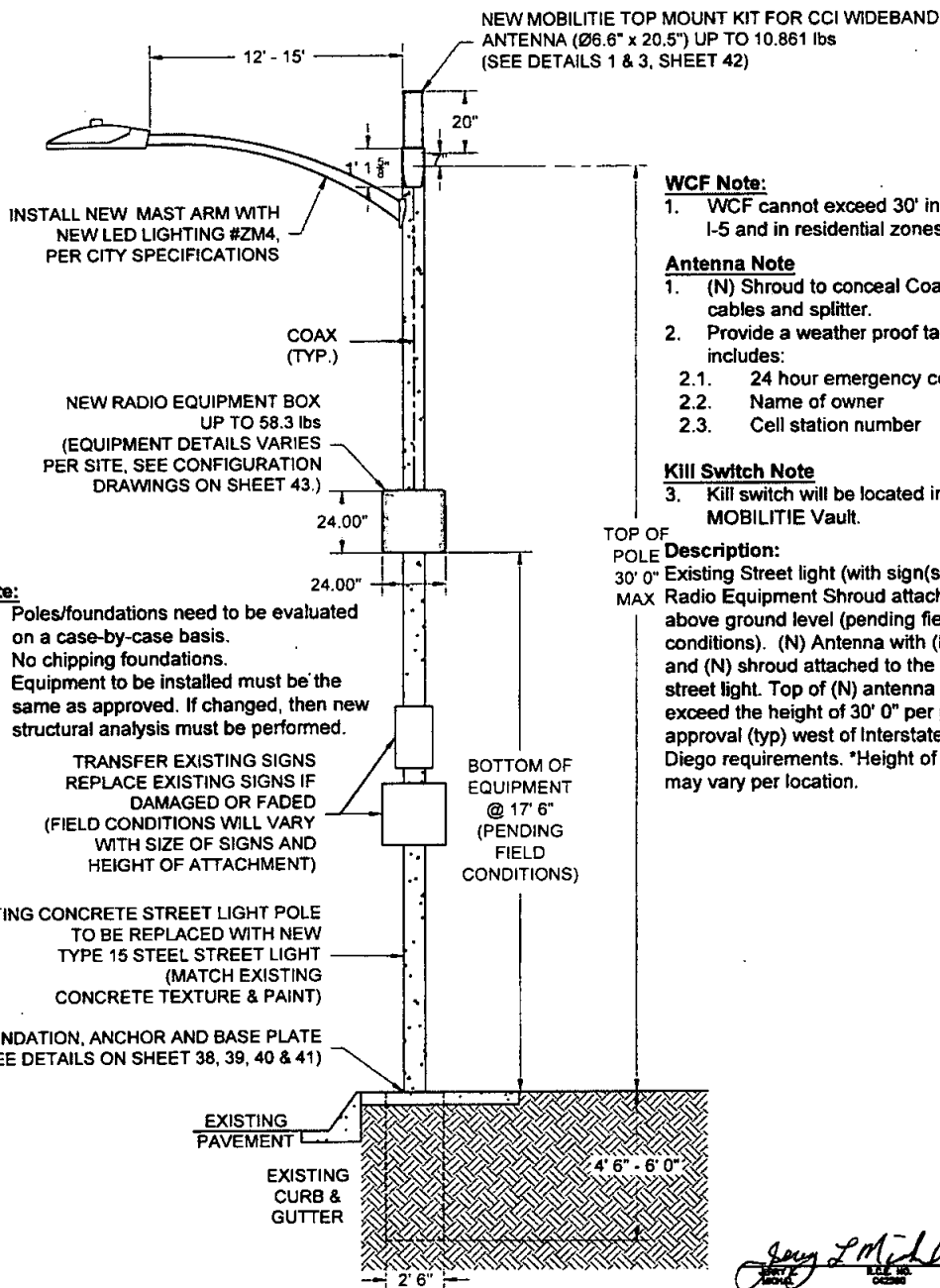
MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW STREET LIGHT POLES TO REPLACE CONCRETE POLES

SITE ADDRESS: Varies	
TITLE: NEW STREET LIGHT POLES TO REPLACE CONCRETE POLES	
PTS NO. 570183	SHEET 29
DRAWING NO. TBD	
DATE: 8/2/17	
SCALED: N T S	



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 2500 psf. for the design of foundations related to this project".

Gregory L. Michael Signature of Licensed Architect/Engineer



WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Note:

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS: Varies	
TITLE: NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
PTS NO.	570163
DRAWING NO.	TSD
DATE:	8/7/17
SCALE:	N T S
SHEET 30	

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Replacement Type 15 Pole/Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna wt. = 18.73 lbs Equipment Wt. = 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2015 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-foot round Type 15 steel light pole with top mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)

Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 = 22$ psf
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 = 23.8$ psf

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 9.75 in. $A_{p1} = (16) (9.75/12) = 13.0$ sq. ft.
 Ave. Dia. (16-30') = 7.88 in. $A_{p2} = (14.0) (7.88/12) = 9.19$ sq. ft.

Area of antenna: $A = 6.60/12 (20.5/12) = 0.94$ sq. ft.

Area of equipment unit: $A = (2)(2) = 4.00$ sq. ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.00$ sq. ft.

Area of sign: $A = (1.25)(1.25) = 1.56$ sq. ft.


 Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_{w1}A + P_{w2}A = 504.7$ pounds
 Force on Antenna: $F = P_{w1}A_{ant} = 22.2$ pounds
 Force on equipment: $F = P_{w1}A_{eq} = 95.2$ pounds
 Force on light arm: $F = (3.0) (23.8) = 71.4$ pounds
 Force on Sign: $F = (22.0)(1.56) = 34.3$ pounds

Total wind load = 727.8 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet per (SDE-101)

$D = 0.5A (1 + [1 + (4.36h/A)]^2)$
 Where $A = (2.34 P/S, b) = [(2.34) (727.8 / (2200) (2.5))] = 0.31$
 Therefore $D_{min} = 3.34$ ft. < 4.50 feet ok

4. Bearing Capacity

Gross pole wt: 1396 pounds (for pole + equipment)
 $Q_u = 1500$ psf (Traffic signal at 4.5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.90 sq. ft.
 $Q = 1500$ psf > $Q = (1401)(4.90) = 285.9$ psf OK

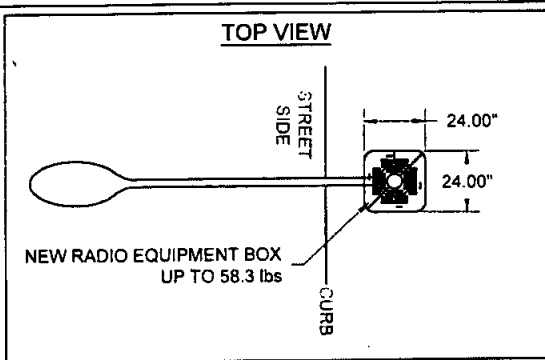
Page 2 of 2

SITE ADDRESS		VARIATION	
TITLE: NEW TYPE 15 STREET LIGHT POLE WITH SIGN/STREET LIGHT AND RADIO EQUIPMENT BOX SHEET NO. 31			
STATION	DATE	SCALE	REVISION
8/7/17			

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
 NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

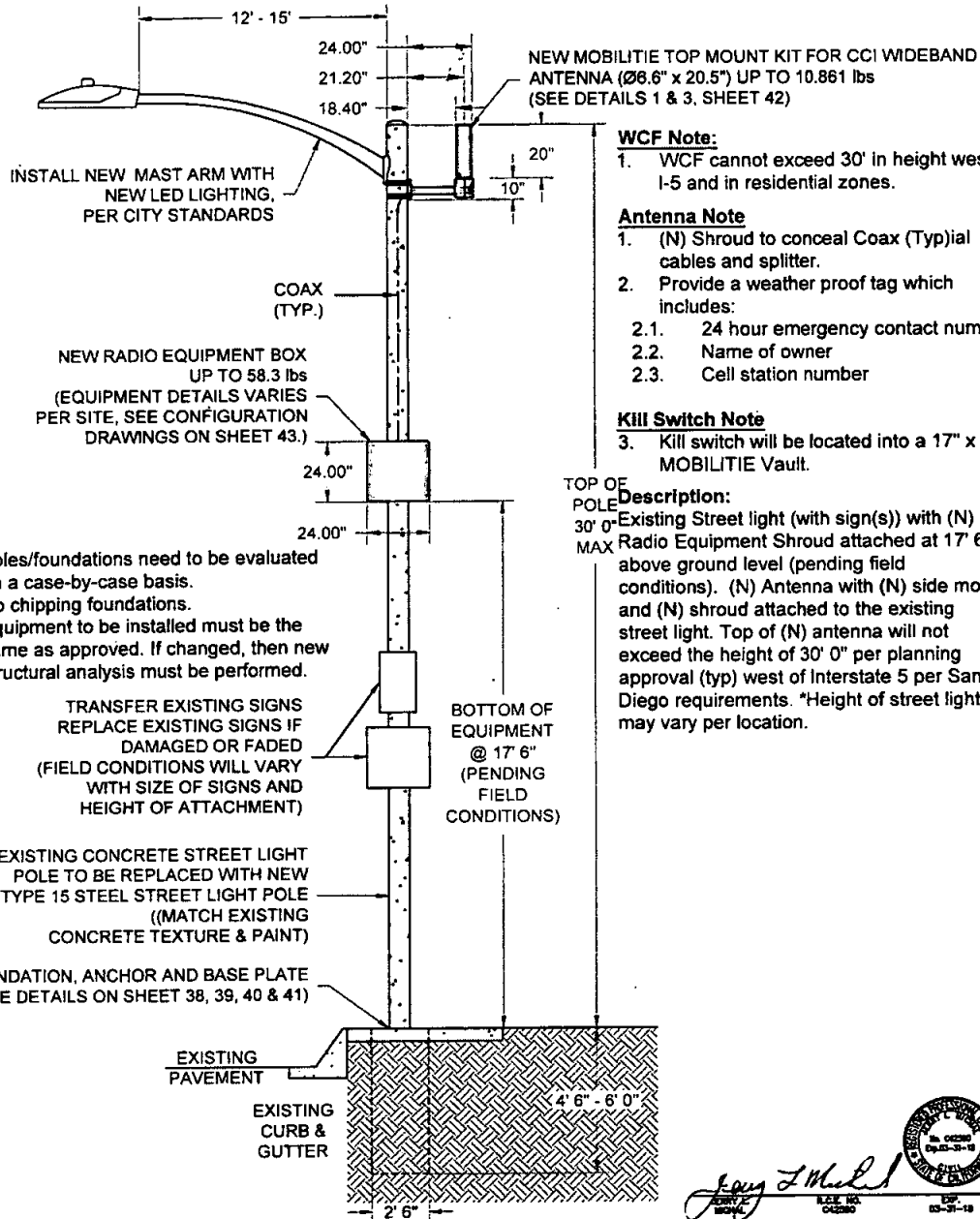
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 2955 RED HILL AVE, SUITE 200
 COSTA MESA, CA 92626
 (657) 381-3363
 E: www.mobilitie.com


 Jerry L. Michel
 DATE 7-25-17



1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 2500 psf. for the design of foundations related to this project".

Jerry F. Michel Signature of Licensed Architect/Engineer



Note:

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

TRANSFER EXISTING SIGNS
REPLACE EXISTING SIGNS IF
DAMAGED OR FADED
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND
HEIGHT OF ATTACHMENT)

EXISTING CONCRETE STREET LIGHT
POLE TO BE REPLACED WITH NEW
TYPE 15 STEEL STREET LIGHT POLE
(MATCH EXISTING
CONCRETE TEXTURE & PAINT)

FOUNDATION, ANCHOR AND BASE PLATE
(SEE DETAILS ON SHEET 38, 39, 40 & 41)

WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ)ial cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

30' 0" Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS	Varies
TITLE	NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX
PTS NO	570183
DRAWING NO	TBD
DATE	8/7/17
SCALE	N.T.S.

32

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Replacement Type 15 Pole/Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITIE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 30' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 4.5' deep. Antenna Wt. = 18.73 lbs Equip. Wt. = 58.3 lbs

References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2015 Caltrans Standard Plan RSP ES-6A
 5. San Diego Standard Drawing SDE-101

30-foot type: 15 steel pole with side mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_w = 0.87$ $G = 1.142$

Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_w = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(30.0) G V^2 I_w = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 9.75 in. $A_w = (16) (9.75/12) = 13.0 \text{ sq. ft.}$
 Ave. Dia. (16-30') = 7.88 in. $A_w = (14.0) (7.88/12) = 9.91 \text{ sq. ft.}$

Area of traffic arm: $A = (0.43)(30) + (1.0)(3)(2) = 16.9 \text{ sq. ft.}$

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$

Area of antenna: $A = (6.60/12)(20.5/12) + (4.2/12)(2) = 1.64 \text{ sq. ft.}$

Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$

Area of Sign: $A = (1.5)(1.5) = 2.25 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_w + P_{w,w}A = 521.9 \text{ pounds}$

Force on Antenna: $F = P_w A_w = 39.0 \text{ pounds}$

Force on equipment: $F = P_w A_w = 88.0 \text{ pounds}$

Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$

Force on Signs (2): $F = (2)(2.25)(23.8) = 102.6 \text{ pounds}$

Total wind load = 822.9 pounds

Depth Requirement: Typical Standard Depth is 4.5 feet (per design SDE-101)

$D = 0.5A [1 + (1 + (4.36h / A))^2]$

Where $A = (2.34 P/S, b) - [(2.34) (822.9) / (2200) (2.5)] = 0.35$

Therefore $D_w = 3.56 \text{ ft.} < 4.50 \text{ feet ok}$

4. Bearing Capacity

Gross pole wt: 1414 pounds (for pole + equipment)
 $Q_w = 1500 \text{ psf}$ (Pole at 4.5 foot embedment)

Pole fig dia. = 2.5 ft. Footing area = 4.91 sq. ft.

$Q = 1500 \text{ psf} > Q = (1414) / (4.91) = 288.0 \text{ psf OK}$

Page 2 of 2

SITE ADDRESS	VIEW			
	TITLE: NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX			
	DATE	7/11/17	33	
	SCALE	NTS		

MOBILITIE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 15 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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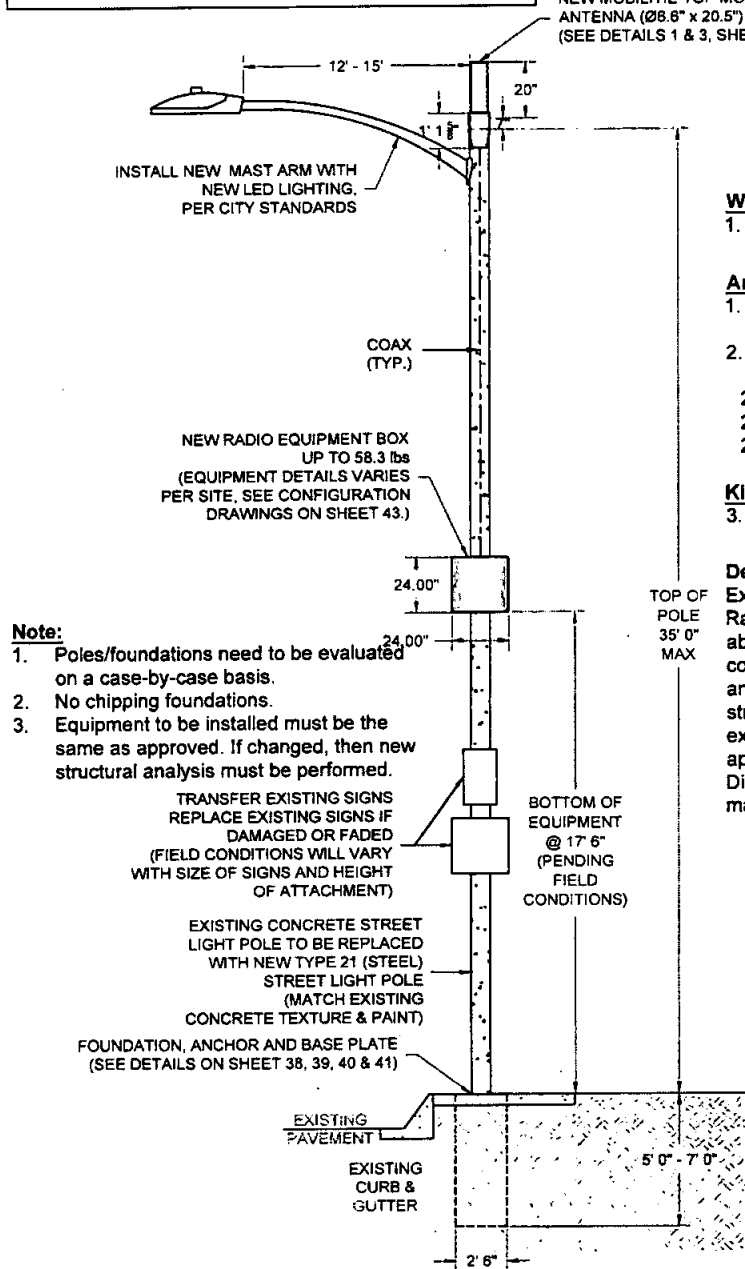
John J. Miller
 J. L. MILLER
 9-25-17
 03-31-18

TOP VIEW

Diagram illustrating the top view of a radio equipment box mounted on a curb. The box is square, measuring 24.00" by 24.00". It is positioned on the curb, with the "STREET SIDE" indicated above it. A line points to the box with the text: "NEW RADIO EQUIPMENT BOX UP TO 58.3 lbs". The curb is labeled "CURB".

- to this project".
Jerry L. Muhl Signature of Licensed Architect/Engineer

NEW MOBILITE TOP MOUNT KIT FOR CCI WIDEBAND
- ANTENNA (Ø8.6" x 20.5") UP TO 10.861 lbs
(SEE DETAILS 1 & 3, SHEET 42)



1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

1. (N) Shroud to conceal Coax (Typical cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

3. Kill switch will be located into a 17" x 30" MOBILITE Vault.

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) top mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

TRANSFER EXISTING SIGNS
REPLACE EXISTING SIGNS IF
DAMAGED OR FADED
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND HEIGHT
OF ATTACHMENT)

EXISTING CONCRETE STREET
LIGHT POLE TO BE REPLACED
WITH NEW TYPE 21 (STEEL)
STREET LIGHT POLE
(MATCH EXISTING
CONCRETE TEXTURE & PAINT)

FOUNDATION, ANCHOR AND BASE PLATE
(SEE DETAILS ON SHEET 38, 39, 40 & 41)

EXISTING
PAVEMENT

EXISTING
CURB &
GUTTER

TOP OF
POLE
35' 0"
MAX

BOTTOM OF
EQUIPMENT
@ 17' 6"
(PENDING
FIELD
CONDITIONS)

5' 0" - 7' 0"

2' 6"

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Master Structural Schematic

NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX



9-25-15

SITE ADDRESS	Varies	
TITLE:	NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
PTS NO	570163	SHEET 34
DRAWING NO	TBD	
DATE:	8/7/17	
SCALED:	N.T.S	

PROJECT NO. Replacement Type 21 Pole/Antenna Installation CALCULATIONS BY: JLM
PROJECT NAME: MOBILITY INTELLIGENT DATE: 7-11-2017
PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
Footings by Design: Dia.=2.5' dia. x 5'deep. Antenna Wt. 18.73 lbs Equip. Wt. 58.3 lbs

References: 1. 2015 IBC 2. ASCE MINIMUM DESIGN LOADS - 7-10
3. 2016 CBC 4. 2015 Revised Caltrans Standard Plan RSA ES-6A

Wind Zone: (Fig. 3-2.3) $V = 110$ mph (3 sec. Gust)
Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I_r = 0.87$ $G = 1.142$
Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I_r = 22$ psf
 $P_z(35.0) = (0.00256) K_z(35.0) G V^2 I_r = 23.8$ psf

Area of pole: Ave. Dia. (0-16') = 7.28 in. $A_w = (16)(7.28/12) = 9.70$ sq. ft.
Ave. Dia. (16-35') = 4.87 in. $A_w = (19.0)(4.87/12) = 7.71$ sq. ft.

Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0$ sq. ft.

Area of antenna: $A = (6.60/12)(20.5/12) = 0.94$ sq. ft.

Area of equipment unit: $A = (2.0)(2.0) = 4.00$ sq. ft.

Area of Sign: $A = (1.5)(1.5) + (1)(1.5) = 3.75$ sq. ft.

A circular official stamp of the Federal Bureau of Investigation (FBI) is located in the bottom right corner. The outer ring contains the text "FEDERAL BUREAU OF INVESTIGATION" at the top and "U.S. DEPARTMENT OF JUSTICE" at the bottom. Inside the ring, the word "CIVIL" is printed at the bottom. Handwritten in the center of the stamp are the notations "C 42580" and "Exp 3-4-15". There are also some illegible handwritten marks at the top of the stamp.



9-25-17

Gross pole wt: 1414 pounds (for pole + equipment)
 $Q_s = 1500$ psf

Pole ftg dis. = 2.5 ft. Footing area = 4.91 sq. ft.

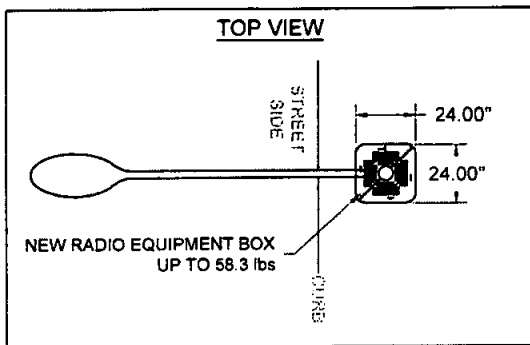
$Q = 1500 \text{ psf} > Q_c = (1414)/(4.91) = 288.6 \text{ psf}$ OK

Page 2 of 2

SITE ADDRESS	VH-443	
	TITLE: NEW TYPE 21 STREET LIGHT POLE (WITH BGNSS) WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX	
	570183	SHEET
	DRAWING NO. T80	35
	DATE: 8/7/17	
UNSCALED	N.T.S.	

MOBILITE INTELLIGENT INFRASTRUCTURE
Master: Structural Schematic
 NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA TOP MOUNT AND RADIO EQUIPMENT BOX

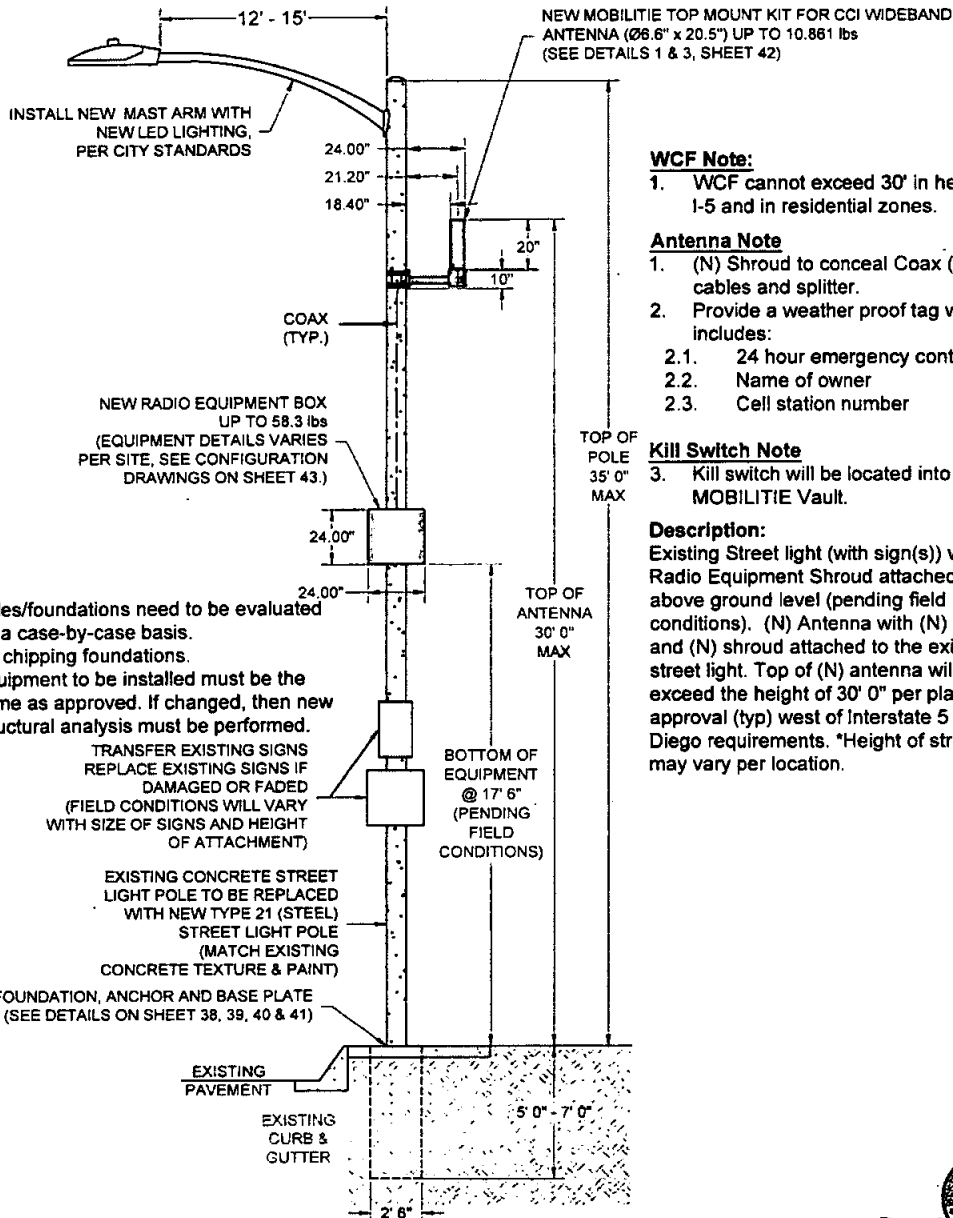
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1. "As a California licensed Architect/Engineer, I have classified the undisturbed native soils to be silty sands, sandy silts and per Table 1806.2 of the 2016 CBC, I have assigned a foundation pressure of 1500 psf. and Lateral Bearing Pressure of 100 psf./ft., for the design of foundations related to this project".

Jerry L. Michael

Signature of Licensed Architect/Engineer



Note:

1. Poles/foundations need to be evaluated on a case-by-case basis.
2. No chipping foundations.
3. Equipment to be installed must be the same as approved. If changed, then new structural analysis must be performed.

TRANSFER EXISTING SIGNS
REPLACE EXISTING SIGNS IF
DAMAGED OR FADED
(FIELD CONDITIONS WILL VARY
WITH SIZE OF SIGNS AND HEIGHT
OF ATTACHMENT)

EXISTING CONCRETE STREET
LIGHT POLE TO BE REPLACED
WITH NEW TYPE 21 (STEEL)
STREET LIGHT POLE
(MATCH EXISTING
CONCRETE TEXTURE & PAINT)

FOUNDATION, ANCHOR AND BASE PLATE
(SEE DETAILS ON SHEET 38, 39, 40 & 41)

WCF Note:

1. WCF cannot exceed 30' in height west of I-5 and in residential zones.

Antenna Note

1. (N) Shroud to conceal Coax (Typ) cables and splitter.
2. Provide a weather proof tag which includes:
 - 2.1. 24 hour emergency contact number
 - 2.2. Name of owner
 - 2.3. Cell station number

Kill Switch Note

3. Kill switch will be located into a 17" x 30" MOBILITIE Vault.

Description:

Existing Street light (with sign(s)) with (N) Radio Equipment Shroud attached at 17' 6" above ground level (pending field conditions). (N) Antenna with (N) side mount and (N) shroud attached to the existing street light. Top of (N) antenna will not exceed the height of 30' 0" per planning approval (typ) west of Interstate 5 per San Diego requirements. *Height of street light may vary per location.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

SITE ADDRESS:		Varies
TITLE: NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S)) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX		
PTS NO	570163	SHEET 36
DRAWING NO	TSD	
DATE	8/7/17	
SCALED	N.T.S.	

Jerry L. Michael
JERRY L. MICHAEL
A.C.E. NO.
042580



9-25-17
DATE
03-31-18

STRUCTURAL DESIGN AND CALCULATIONS

PROJECT NO. Replacement Type 21 Pole/Antenna Installation CALCULATIONS BY: JLM
 PROJECT NAME: MOBILITE INTELLIGENT DATE: 7-11-2017
 PROJECT ADDRESS: VARIOUS AREAS
San Diego, California

DESIGN PARAMETERS

Bearing Capacity: 1500 psf (per CBC Table 1806.2) Allowable Lateral Pressure: 100 psf/ft
 Steel Pole Ht. = 35' Ave. Pole Dia. = As Noted, Steel Strength = 60,000 psi (per manufacturer)
 Footing by Design: Dia. = 2.5' dia. x 5' deep. Antenna Wt. 18.73 lbs Equip. Wt. 58.3 lbs
 References: 1. 2015 IBC 3. ASCE MINIMUM DESIGN LOADS - 7-10
 2. 2016 CBC 4. 2015 Caltrans Standard Plan RSA ES-6A

35-foot Type 21 round steel pole with side mount antenna, radio and associated equipment and signs.

1. Wind Loading:

Wind Zone: (Fig. 3-2.3) V = 110 mph (3 sec. Gust)
 Coefficients: $K_z(16) = 0.87$ $K_z(32) = 0.94$
 $I = 0.87$ $G = 1.142$
 Wind Pressures: $P_z(16) = (0.00256) K_z(16) G V^2 I R = 22 \text{ psf}$
 $P_z(35.0) = (0.00256) K_z(35.0) G V^2 I R = 23.8 \text{ psf}$

2. AREA CALCULATIONS

Area of pole: Ave. Dia. (0-16') = 7.28 in. $A_p = (16) (7.28/12) = 9.70 \text{ sq. ft.}$
 Ave. Dia. (16-35') = 4.87 in. $A_p = (14.0) (4.87/12) = 7.37 \text{ sq. ft.}$
 Area of light arm: $A = (0.25)(8) + (0.5)(2) = 3.0 \text{ sq. ft.}$
 Area of antenna: $A = (6.60/12)(20.5/12) = 1.64 \text{ sq. ft.}$
 Area of equipment unit: $A = (2.0)(2.0) = 4.00 \text{ sq. ft.}$
 Area of Sign: $A = (1.5)(1.5) (1)(1.5) = 3.75 \text{ sq. ft.}$



Page 1 of 2

3. FORCE ON POLE

Force on pole: $F = P_u + P_{u,w} A = 521.9 \text{ pounds}$
 Force on Antenna: $F = P_u A_{u,w} = 39.0 \text{ pounds}$
 Force on equipment: $F = P_u A_{u,w} = 88.0 \text{ pounds}$
 Force on light arm: $F = (3.0)(23.8) = 71.4 \text{ pounds}$
 Force on Signs (2): $F = (3.75)(23.8) = 102.6 \text{ pounds}$

Total wind load = 822.9 pounds

Depth Requirement: Typical Standard Depth is 5 feet (per reference)

$$D = 0.5A (1 + (1 + (4.36h / A))^2)$$

$$\text{Where } A = (2.34 P/S, b) = [(2.34) (822.9) / (2200) (2.5)] = 0.35$$

$$\text{Therefore } D_{req} = 3.56 \text{ ft.} < 5 \text{ feet ok}$$

4. Bearing Capacity

Gross pole wt: 1414 pounds (for pole + equipment)
 $Q_u = 1500 \text{ psf}$ (Traffic signal at 4.5 foot embedment)
 Pole ftg dia. = 2.5 ft. Footing area = 4.91 sq. ft.
 $Q = 1500 \text{ psf} > Q = (1405) / (4.91) = 288.0 \text{ psf OK}$

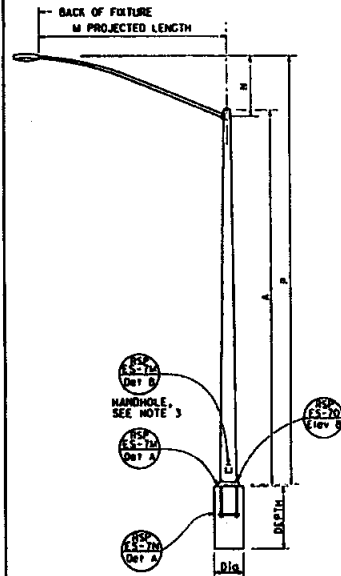
Page 2 of 2

SITE ADDRESS:		Version
TITLE: NEW TYPE 21 STREET LIGHT POLE (WITH SIGN) WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX	DATE: 7/11/17	37
PROJECT NO.	DRAWING NO.	DATE
SYMBOLS	TBD	8/7/17
SCALE	DATE	N.T.E.

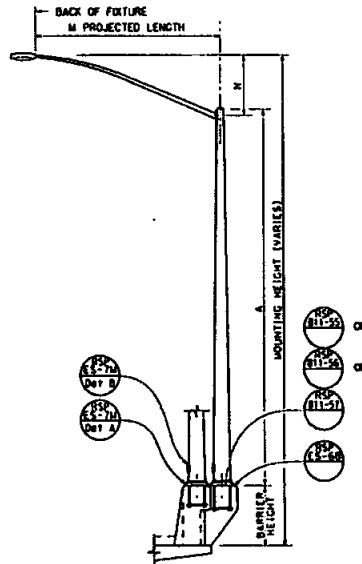
MOBILITE INTELLIGENT INFRASTRUCTURE
 Master Structural Schematic
 NEW TYPE 21 STREET LIGHT POLE (WITH SIGN(S))
 WITH ANTENNA SIDE MOUNT AND RADIO EQUIPMENT BOX

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Jimmy J. M. L.
 JLM
 925-17
 DATE: 07-11-17



TYPE 15 AND TYPE 21
ELEVATION A



TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED
ELEVATION B

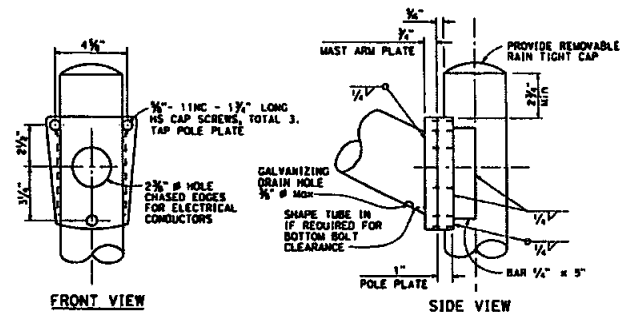
POLE TYPE	POLE DATA			BASE PLATE DATA				CIDH PILE FOUNDATION	
	A HEIGHT	Min OD	WALL THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	DIG	DEPTH
15	30'-0"	8"	3/8"	0.1196'	1'-0"	1'-0"	1" # 36"	2'-6"	6'-0"
21	35'-0"	8 1/2"	3/8"	0.1193'	1'-0"	1'-0"	1 1/2" # 36"	2'-6"	7'-0"

* FOR BARRIER RAIL BOLTS, SEE REVISED STANDARD PLAN RSP ES-6B.

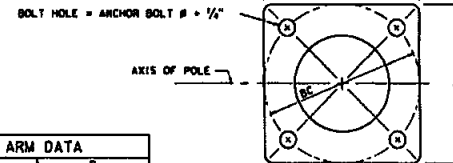
NOTES:

1. [] Indicates mast arm length to be used unless otherwise noted on the plans.
2. For Type 15-55, use Type 15 standard with Type 30 slip base plate details, see Revised Standard Plan RSP ES-6F.
3. Handhole shall be located on the downstream side of traffic.
4. For additional notes and details, see Revised Standard Plans RSP ES-7M and RSP ES-7N and RSP ES-7P.

John L. Michel
DATE 09-21-16
BY 825-17



LUMINAIRE MAST ARM CONNECTION
DETAIL R



BASE PLATE
DETAIL A

LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	R	MIN OD AT POLE	NOMINAL THICKNESS	P	
6'-0"	2'-0"	3/4"	0.1198"	TYPE 15	TYPE 21
8'-0"	2'-6"	3/4"		31'-8"	36'-6"
10'-0"	3'-0"	3/4"		32'-0"	37'-0"
12'-0"	3'-6"	3/4"		32'-8"	37'-8"
14'-0"	4'-0"	4/5"		33'-0"	38'-0"
15'-0"	4'-6"	4/5"		34'-0"	39'-0"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15 AND 21)**
NO SCALE

RSP ES-6A DATED JULY 15, 2016 SUPERSEDES RSP ES-6A
DATED OCTOBER 30, 2015 AND STANDARD PLAN ES-6A DATED MAY 20, 2011 -
PAGE 452 OF THE STANDARD PLANS BOOK DATED 2010.

REVISED STANDARD PLAN RSP ES-6A

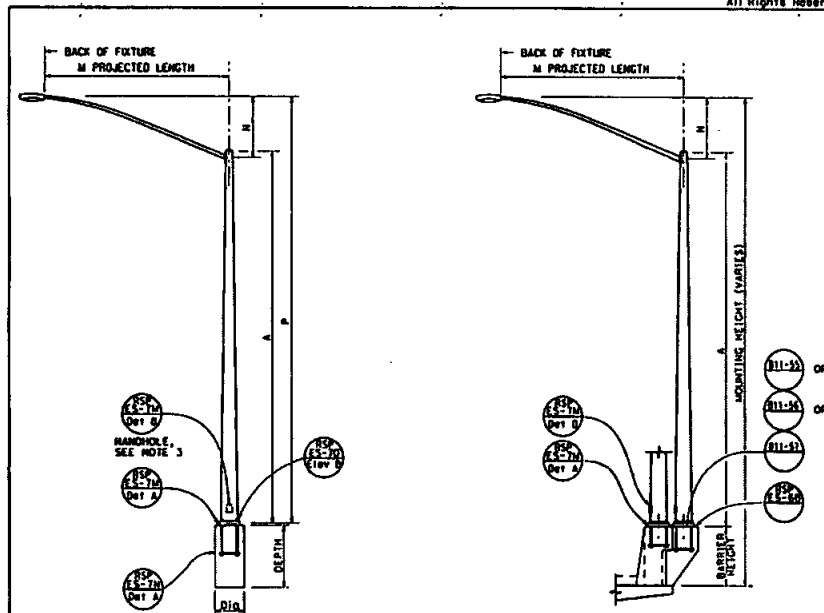
SHEET NO.	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
38			

REGISTERED CIVIL ENGINEER
July 15, 2016
PLANS APPROVAL DATE
THE SEAL OF CALIFORNIA IN ITS OFFICE
AND HEREIN IS NOT TO BE USED FOR
ANY ACCOUNT OR PURPOSES OF SCALE
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2010 REVISED STANDARD PLAN RSP ES-6A

MOBILITE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW POLE DETAILS

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TYPE 15 AND TYPE 21
ELEVATION A

TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED
ELEVATION B

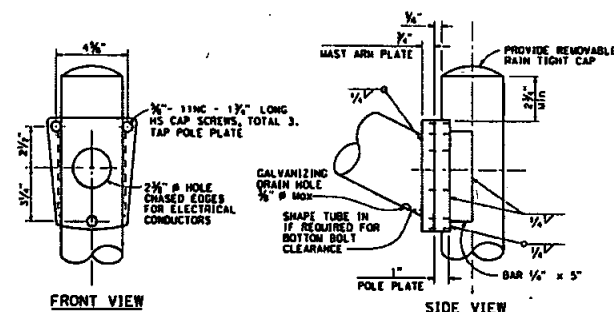
POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION	
	HEIGHT	MIN OD	BASE	TOP	WALL THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	
15	30'-0"	8"	3 1/2"	3 1/2"	0.1196"	1'-0"	1'-0"	1 1/2"	1" Ø x 36" L	6'-0"
21	35'-0"	8 1/2"	3 1/2"	3 1/2"	0.1196"	1'-0"	1'-0"	2"	1 1/2" Ø x 36" L	7'-0"

* FOR BARRIER RAIL BOLTS, SEE REVISED STANDARD PLAN RSP ES-68.

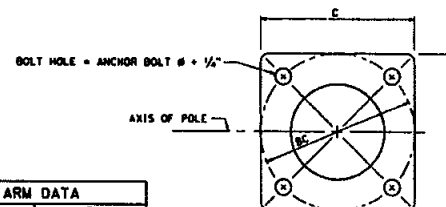
NOTES:

1. [] Indicates mast arm length to be used unless otherwise noted on the plans.
2. For Type 15-SB, use Type 15 standard with Type 30 slip base plate details, see Revised Standard Plan RSP ES-67.
3. Handhole shall be located on the downstream side of traffic.
4. For additional notes and details, see Revised Standard Plans RSP ES-7M and RSP ES-7H.

July 2, 2016
R25-17
DATE



LUMINAIRE MAST ARM CONNECTION
DETAIL R



BASE PLATE
DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15 AND 21)**
NO SCALE

RSP ES-6A DATED JULY 15, 2016 SUPERSEDES STANDARD PLAN ES-6A
DATED OCTOBER 30, 2015 - PAGE 449 OF THE STANDARD PLANS BOOK DATED 2015.

REVISED STANDARD PLAN RSP ES-6A

DATE	COUNTY	ROUTE	POST MILE	TOTAL PROJECT	NO. SHEETS
July 15, 2016					
PLANS APPROVAL DATE					
BY STATE OF CALIFORNIA ON ITS OFFICIAL SEAL AND SEAL OF THE ENGINEER					
THE STATE OF CALIFORNIA ON ITS OFFICIAL SEAL AND SEAL OF THE ENGINEER					
THE STATE OF CALIFORNIA ON ITS OFFICIAL SEAL AND SEAL OF THE ENGINEER					

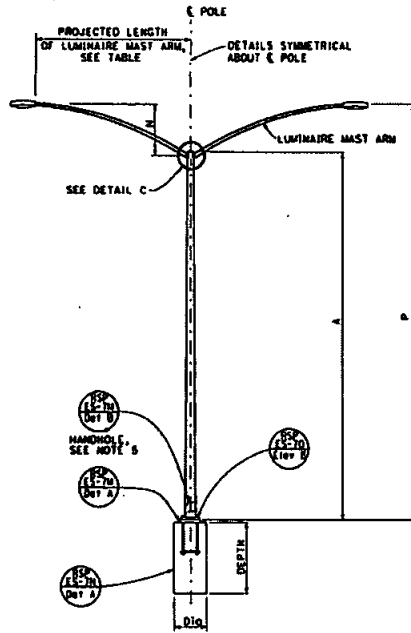
TO ACCOMPANY PLANS DATED

2016 REVISED STANDARD PLAN RSP ES-6A

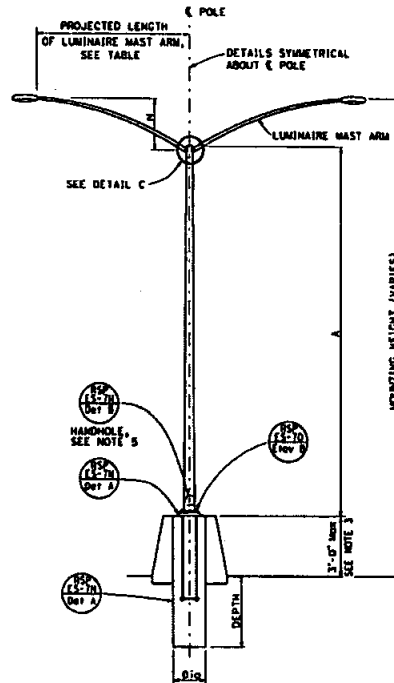
NEW POLE DETAILS	
STANDARD	39
DRAWING NO	
DATE	
SCALE	

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
NEW POLE DETAILS

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TYPE 15D AND TYPE 21D
ELEVATION A



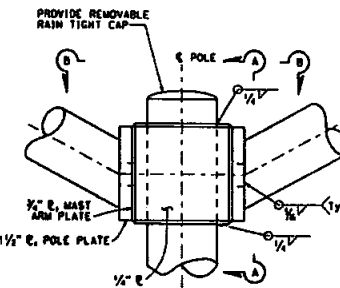
TYPE 15D AND TYPE 21D
MEDIAN BARRIER MOUNTED
ELEVATION B

POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION	
	A	HEIGHT	Min OD	THICKNESS	C	DC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	Dia	DEPTH
15D	30'-0"	8"	3 1/2"	0.1793"	1'-0"	1'-0"	1 1/2"	1 1/2" # x 42"	2'-6"	7'-0"
21D	35'-0"	8 1/2"	3 1/2"	0.1793"	1'-0"	1'-0"	1 1/2"	1 1/2" # x 42"	2'-6"	7'-0"

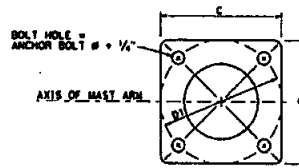
LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	H	RISE	Min OD AT POLE	NOMINAL THICKNESS	P
6'-0"	2'-0"	3 1/2"	0.1196"	31'-8"	36'-6"
8'-0"	2'-6"	3 1/2"	0.1196"	32'-0"	37'-0"
10'-0"	3'-3"	3 1/2"	0.1196"	32'-0"	37'-0"
12'-0"	4'-3"	3 1/2"	0.1196"	33'-0"	38'-0"

NOTES:

1. Indicates mast arm length to be used unless otherwise noted on the plans.
2. For additional notes and details, see Revised Standard Plans RSP ES-7N and RSP ES-7N.
3. See Concrete Barrier Details Type 60E and 60SE.
4. For locations with one arm, plug unused cap screw holes and chased outlet with galvanized cap screws and knockout plug.
5. Handhole shall be located perpendicular to the luminaire mast arm and as directed by the Engineer.

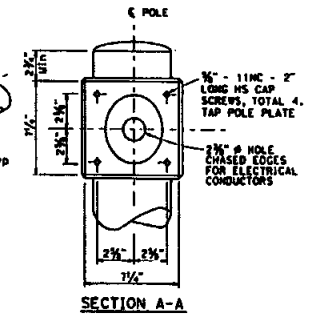


DETAIL C

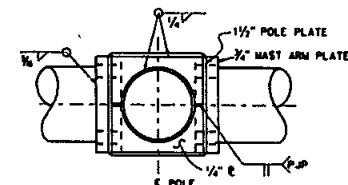


BASE PLATE

DETAIL B



SECTION A-A



SECTION B-B

ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15D AND 21D,
DOUBLE LUMINAIRE MAST ARM)

NO SCALE
RSP ES-6D DATED JULY 15, 2016 SUPERSEDES RSP ES-6D
DATED OCTOBER 30, 2015 AND STANDARD PLAN ES-6D DATED MAY 20, 2011 -
PAGE 456 OF THE STANDARD PLANS BOOK DATED 2010.

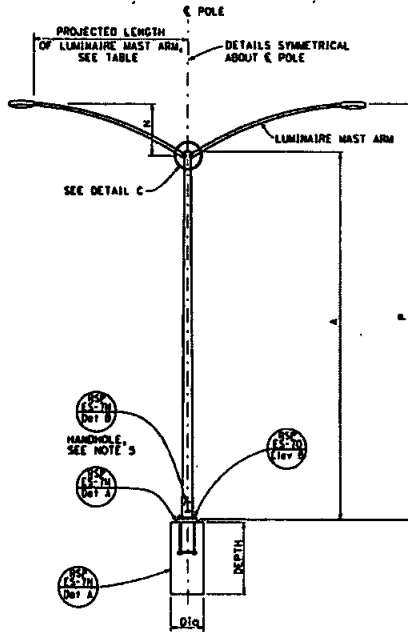
REVISED STANDARD PLAN RSP ES-6D

SHEET NO.	40
DATE	7/15/16
SCALE	AS SHOWN
PROJECT	2010 REVISED STANDARD PLAN RSP ES-6D
DESIGNED BY	J. Michel
CHECKED BY	J. Michel
DATE	7/15/16
PROJECT	2010 REVISED STANDARD PLAN RSP ES-6D

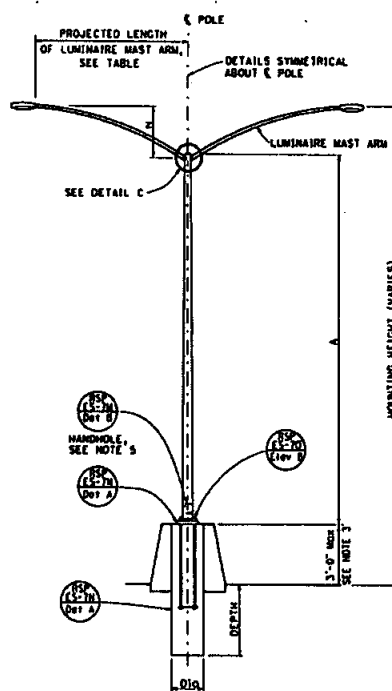
2010 REVISED STANDARD PLAN RSP ES-6D

MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural: Schematic
NEW POLE DETAILS

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TYPE 150 AND TYPE 210
ELEVATION A



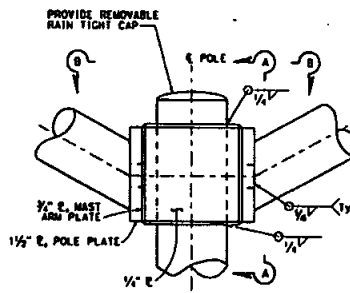
TYPE 150 AND TYPE 210
MEDIAN BARRIER MOUNTED
ELEVATION B

POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE FOUNDATION
	A HEIGHT	Min OD	Min THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	Dia	
150	30'-0"	8"	3/8"	0.1793	1'-0"	1 1/2"	1 1/4" Ø x 42"	2'-6"	1'-0"
210	35'-0"	8"	3/8"	0.1793	1'-0"	1 1/2"	1 1/4" Ø x 42"	2'-6"	1'-0"

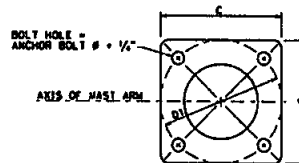
LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	H RISE	Min OD AT POLE	NOMINAL THICKNESS	TYPE 150	TYPE 210
6'-0"	2'-0"	3 1/2"	0.1196"	31'-6"	36'-6"
8'-0"	2'-6"	3 1/2"	0.1196"	32'-0"	37'-0"
10'-0"	3'-3"	3 1/2"	0.1196"	32'-6"	37'-6"
12'-0"	4'-3"	3 1/2"	0.1196"	33'-0"	38'-0"

NOTES:

1. [] Indicates mast arm length to be used unless otherwise noted on the plans.
2. For additional notes and details, see Revised Standard Plans RSP ES-74 and RSP ES-75.
3. See Concrete Barrier Details Type 60E and 60SE.
4. For locations with one arm, plug unused cap screw holes and chased outlet with galvanized cap screws and knockout plug.
5. Handhole shall be located perpendicular to the luminaire mast arm and as directed by the Engineer.

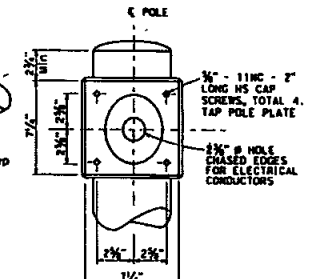


DETAIL C

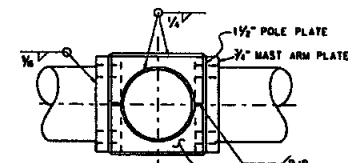


BASE PLATE

DETAIL B



SECTION A-A



SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 150 AND 210,
DOUBLE LUMINAIRE MAST ARM)

NO SCALE

RSP ES-60 DATED JULY 15, 2016 SUPERSEDES STANDARD PLAN ES-60
DATED OCTOBER 30, 2015 - PAGE 452 OF THE STANDARD PLANS BOOK DATED 2015.

REVISED STANDARD PLAN RSP ES-60

DIST.	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
				41	

July 15, 2016
PLANS APPROVAL DATE

ONE STATE OF CALIFORNIA OR ITS OFFICES OF RECORD SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCHEMATIC DRAWINGS OF THIS PLAN SHEET.

TO ACCOMPANY PLANS DATED _____

2016 REVISED STANDARD PLAN RSP ES-60

MOBILITIE INTELLIGENT INFRASTRUCTURE

Master: Structural Schematic

NEW POLE DETAILS

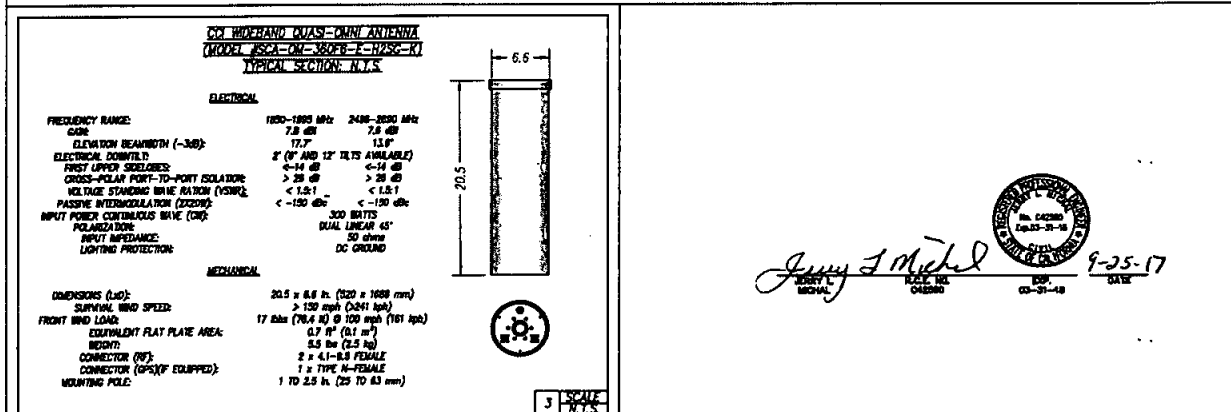
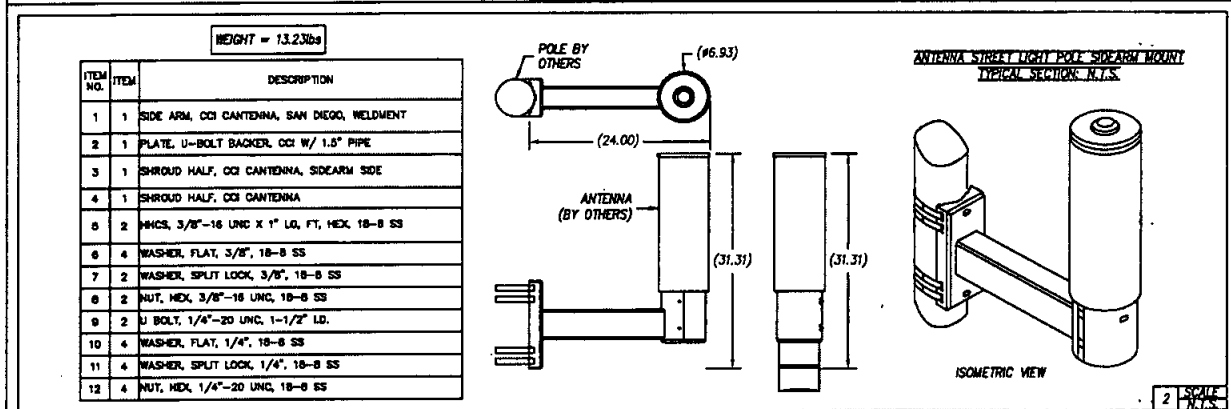
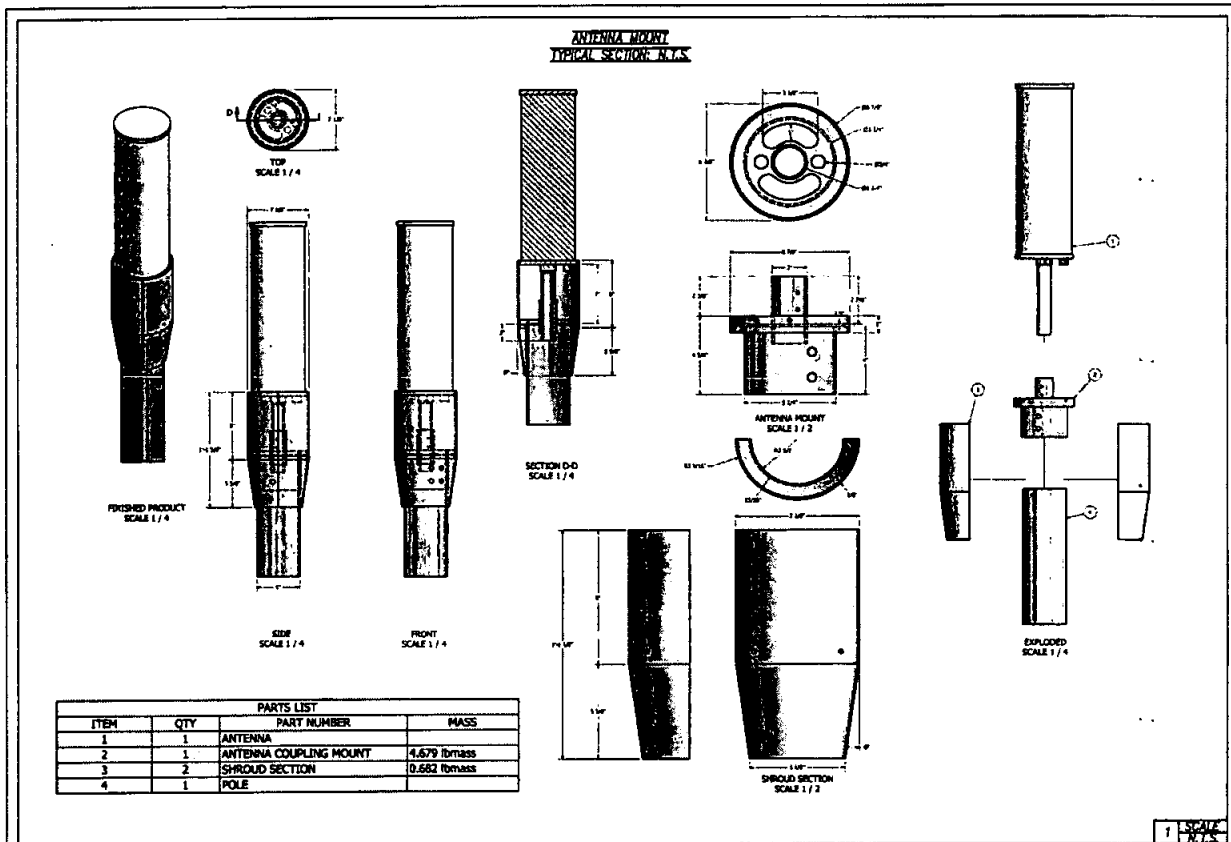
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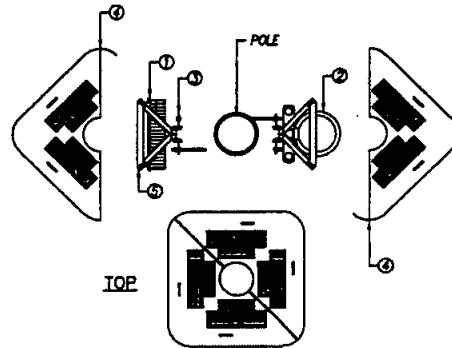
NEW POLE DETAILS



NOTE:
SUPPORT BRACKET WILL
MOUNT ON TO ROUND,
TAPERED, AND
OCTAGONAL POLES.

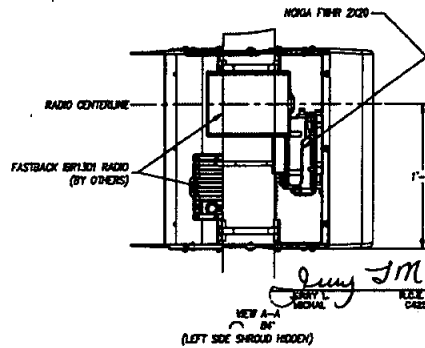
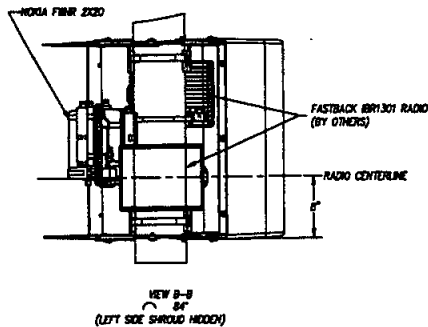
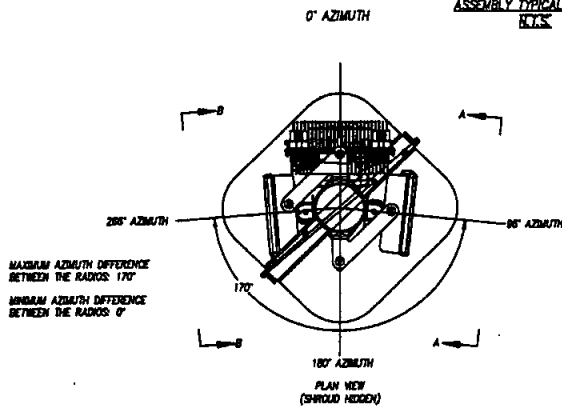
EQUIPMENT CUBE
TYPICAL SECTION N.T.S.

CONFIGURATION 1 PARTS LIST			
ITEM NO.	ITEM	DESCRIPTION	ITEM APPROX. WEIGHT
1	1	RADIO	24.7 LBS
2	1	AIRSPAN UE-RELAY	8.8 LBS
3	2	EQUIPMENT RAIL	2 LBS (4LBS COMBINED)
4	2	SHROUD SECTION	9 LBS (18 LBS COMBINED)
5	4	SHROUD SUPPORT BRACKET	1 LB (4 LBS COMBINED)



4 SCALE
N.T.S.

CONCEALED CUBE
ASSEMBLY TYPICAL SECTION
N.T.S.



CONFIGURATION 2 PARTS LIST		
ITEM	DESCRIPTION	ITEM APPROX. WEIGHT
1	NOKIA RADIO	24.7 LBS
2	1BR FASTBACK SERIES	8.8 LBS
3	PoE	1.83 LBS
4	EQUIPMENT RAIL	2 LBS (4LBS COMBINED)
5	SHROUD SECTION	9 LBS (18 LBS COMBINED)
6	SHROUD SUPPORT BRACKET	1 LB (4 LBS COMBINED)

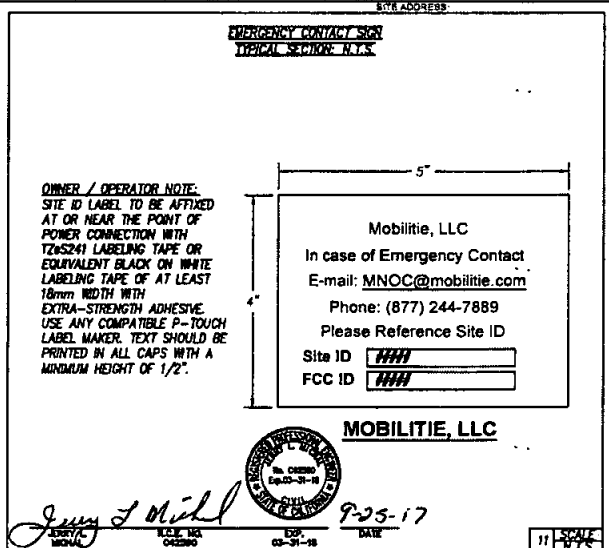
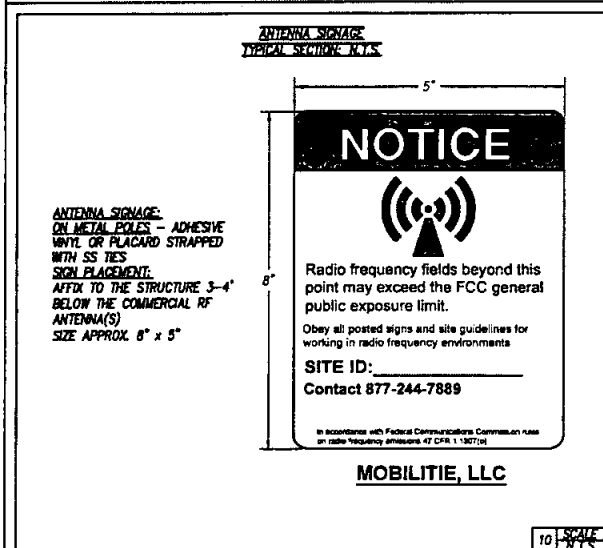
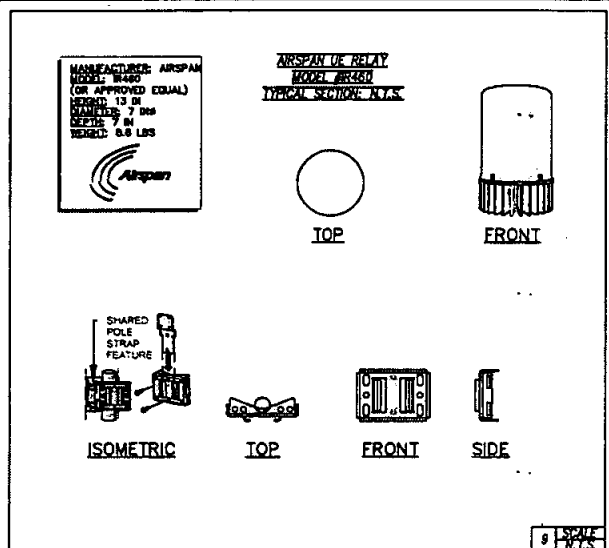
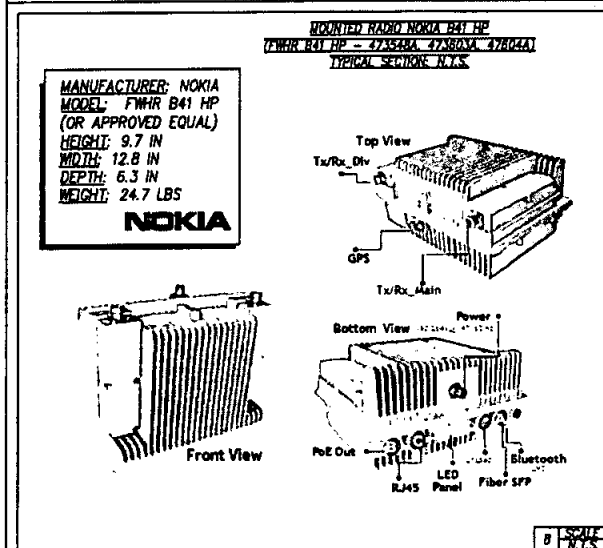
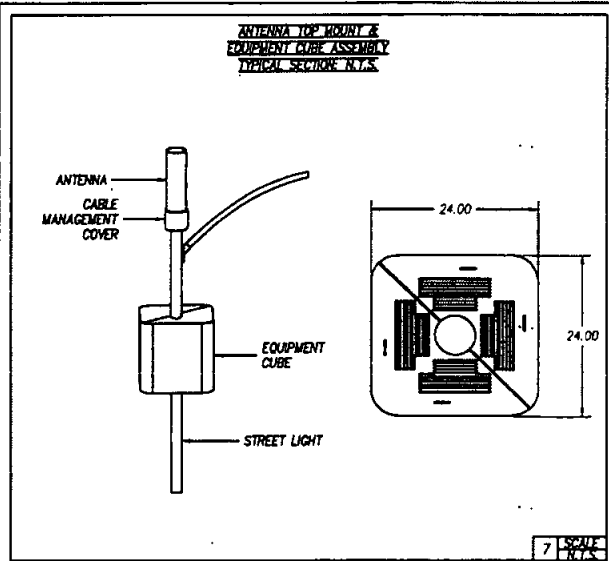
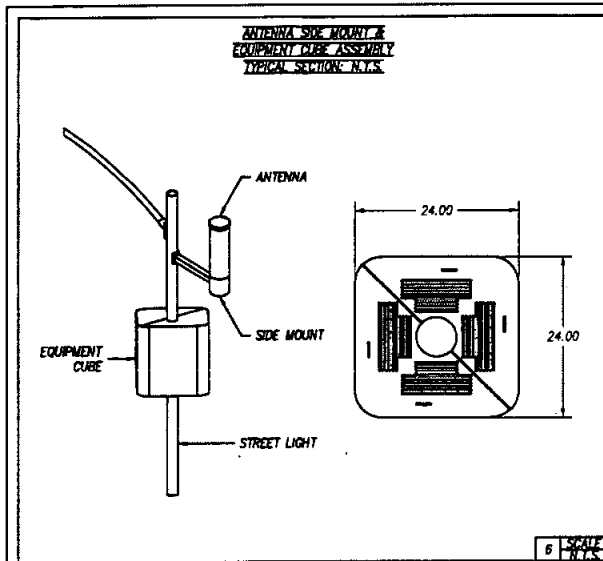
CONFIGURATION 3 PARTS LIST		
ITEM	DESCRIPTION	ITEM APPROX. WEIGHT
1	NOKIA RADIO	24.7 LBS
2	(2) 1BR FASTBACK SERIES	8.8 LBS (17.6 LBS COMBINED)
3	PoE	1.83 LBS
4	EQUIPMENT RAIL	2 LBS (4LBS COMBINED)
5	SHROUD SECTION	9 LBS (18 LBS COMBINED)
6	SHROUD SUPPORT BRACKET	1 LB (4 LBS COMBINED)

5 SCALE
N.T.S.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

SITE ADDRESS:		Varies
TITLE:		EQUIPMENT DETAILS
PTB NO.	670163	SHEET 43
DRAWING NO.	TSD	
DATE:	8/7/17	
SCALE:	N.T.S.	



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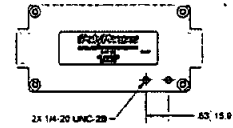
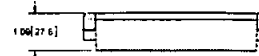
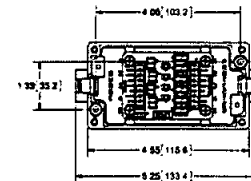
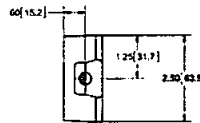
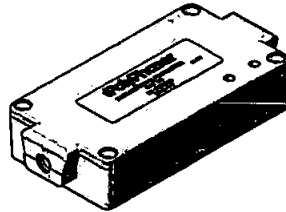
MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

SITE ADDRESS:	Varies
TITLE:	EQUIPMENT DETAILS
PTB NO:	570183
DRAWING NO:	TBD
DATE:	8/7/17
SCALED:	N.T.S.
SHEET	44

MAXIMUM CHARACTERISTICS

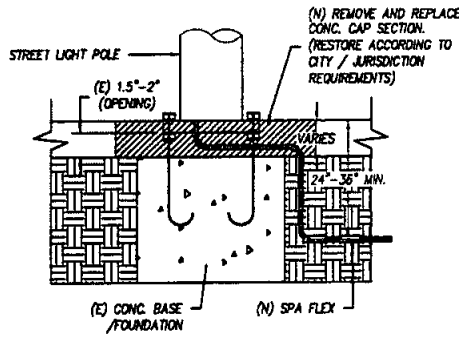
PARTS PROTECTED
12, 45, 38, 7.8
PINS PROTECTED
ALL 8, L-L, L-G
TURN DRIVE (100%)
175VDC TYPICAL, L-G
175VDC TYPICAL, L-L
SERIES RESISTANCE:
<10
TYPICAL CAPACITANCE:
40F, L-L
20F, L-G
MAX SURGE:
10KA, 8/20µs (IEC 61000-4-5), L-L, L-G
20KA, 10/100µs (BELLCORE 1089), L-L, L-G
MAX HOLDING CURRENT:
500mA @ +20°C
175mA @ -40°C
250mA @ -80°C
HUMIDITY:
0 TO 100% CONDENSING
TEMPERATURE:
-40°C TO +60°C STORAGE/OPERATING
WIRE RANGE:
18-26 AWG
CORD DIAMETER:
0.114 TO 0.225 INCH W/ SMALL GROMMET
0.250 TO 0.350 INCH W/ LARGE GROMMET
APPLICATION:
PANEL MOUNT
WEATHERIZED AFTER PROPER INSTALLATION OF
GROMMETS AND TIGHTENING OF LID
APPLICATION:
MEETS BELLCORE #7A-NWT-00048T PROCEDURE 4.11
WIND DRIVEN RAIN (TDMPH) RAIN INTRUSION TEST.

NOTES:
1. TORQUE ALL M4-20mm LID SCREWS TO 1184in MINIMUM.
2. ENSURE THAT ALL GROMMETS ARE PROPERLY SEATED FOR ENVIRONMENTAL SPECIFICATIONS.



16 SCALE N.T.S.

CABLING DETAIL (POWER CABLING DETAIL) TYPICAL SECTION, N.T.S.



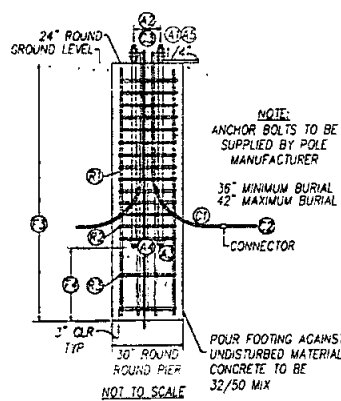
NOTE:
CONCRETE SHALL CONTAIN CEMENT, COARSE AGGREGATE, AND FINE AGGREGATE WITH A MINIMUM OF 3,000 POUNDS COMPRESSIVE STRENGTH PER SQUARE INCH IN 28 DAYS.

17 SCALE N.T.S.

18 SCALE N.T.S.

NEW POLE FOUNDATION TYPICAL SECTION, N.T.S.

GROUND ROD:
G1 GROUND ROD SHALL BE MINIMUM 0.525 DIA. 6' LONG COPPER CLAD
G2 MINIMUM 1" EXPOSURE AT TOP OF FOUNDATION WITHIN BOLT CIRCLE.



- ANCHOR BOLTS:
- A1 ANCHOR BOLTS SHALL BE 4-1" DIAMETER, AS GIVEN IN SPECIFICATIONS ASTM A449.
 - A2 BOLT CIRCLE DIAMETER TO MATCH POLE BASEPLATE.
 - A3 ANCHOR BOLTS SHALL HAVE HEADS, OR NUTS WITH THE THREADS STAKED AT TWO PLACES BELOW THE NUT, EMBEDDED IN FOUNDATION.
 - A4 ANCHOR BOLTS SHALL BE EMBEDDED 33" MINIMUM, BELOW STREET GRADE (63" EMBEDMENT IN CONCRETE).
 - A5 BOLT PROJECTION AS RECOMMENDED BY THE MANUFACTURER.

- CONDUIT:
- C1 CONDUIT SHALL BE RIGID STEEL GALVANIZED, INSIDE THE FOUNDATION, WITH 6" MINIMUM STUB-OUT.
 - C2 SERVICE AND FEED CONDUITS SHALL BE RGS OR SCH 80 PVC, AS REQUIRED. STUB UP TO WITHIN 4" FROM HAND HOLE.
 - C3

- REINFORCEMENT:
- R1 VERTICAL REBAR SHALL BE (7) #6 EQUALLY SPACED INSIDE OF HOOPS.
 - R2 HOOPS SHALL BE #4 X 18" I.D., SPACED 4" O/C FROM TOP OF FOUNDATION TO END OF ANCHOR BOLTS.
 - R3 HOOPS SHALL BE #4 X 18" I.D., SPACED 12" MIN FROM THE ANCHOR BOLTS TO BOTTOM OF FOUNDATION.
 - R4 ALL REBAR SHALL HAVE 3" MINIMUM COVERING.
 - F3 6" - 7" DEPTH PER SAN DIEGO STANDARD

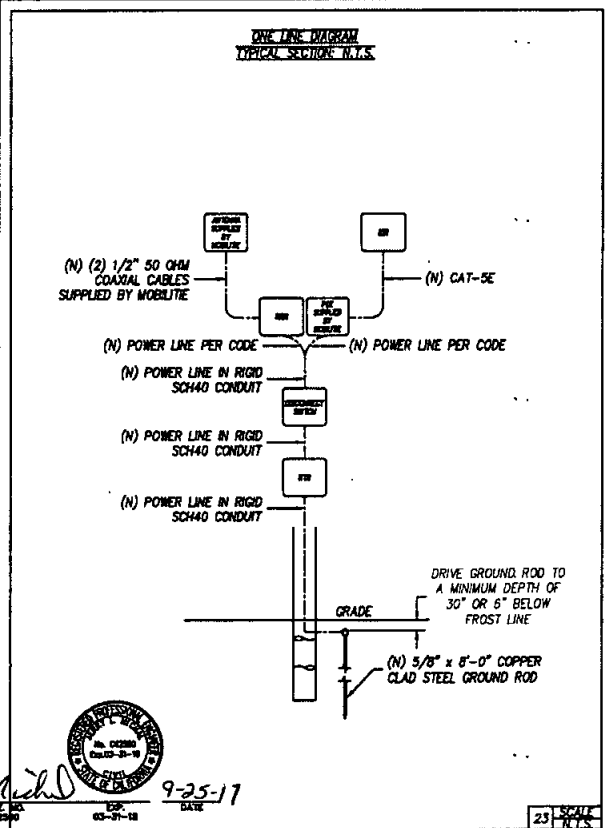
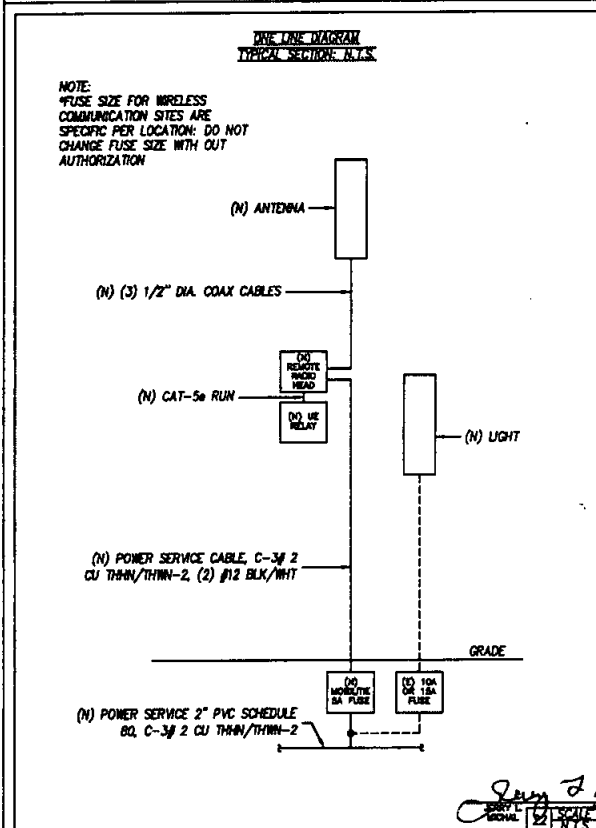
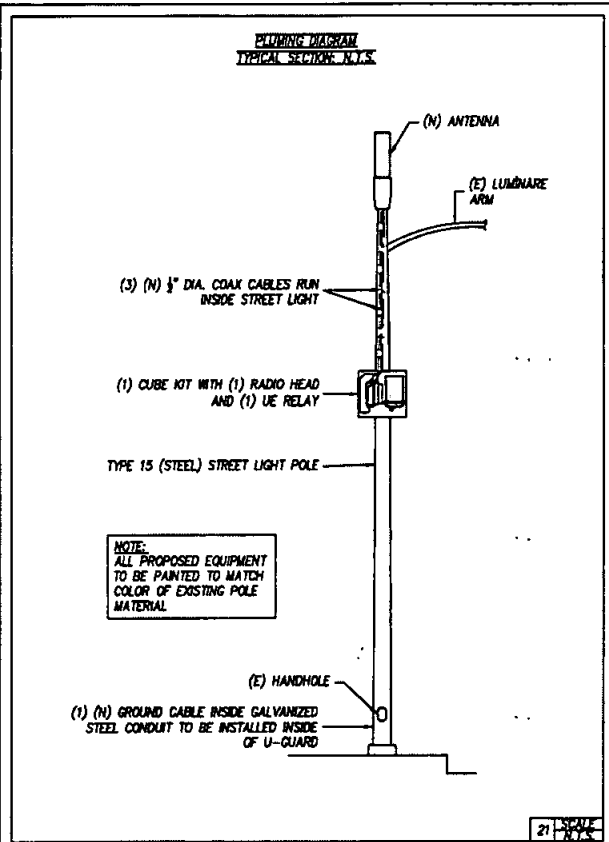
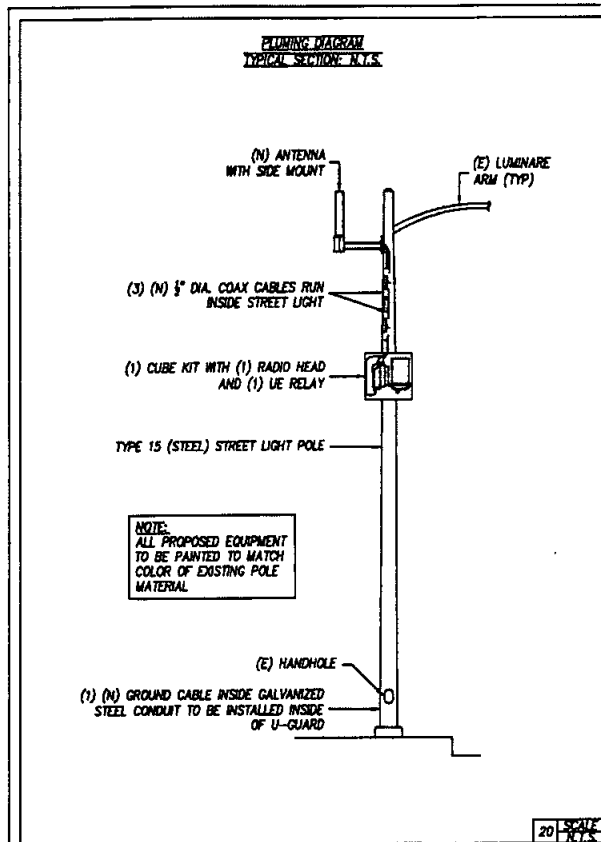
John J. Michael
DATE 9-25-17
BY [Signature]
CHECKED [Signature]
DATE 03-27-18

19 SCALE N.T.S.

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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

SITE ADDRESS:		Varies
TITLE:		EQUIPMENT DETAILS
PTS NO	XXXXX	SHEET
DRAWING NO	TBD	46
DATE:	6/7/17	
SCALE:	N.T.S.	

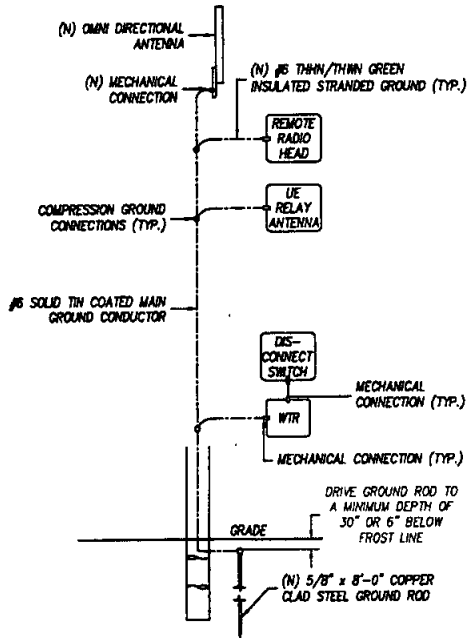


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MOBILITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

SITE ADDRESS:	Veritas
TITLE:	EQUIPMENT DETAILS
PTS NO:	XXXXX
DRAWING NO:	TSD
DATE:	8/7/17
SCALED:	N.T.S.
SHEET	47

GROUNDING RISER DIAGRAM
TYPICAL SECTION: N.T.S.



24 SCALE
N.T.S.

25 SCALE
N.T.S.

26 SCALE
N.T.S.

28 SCALE
N.T.S.



James J. Mohr
JAMES J. MOHR
R.E.C. NO. 42888
EXP. 03-31-18
DATE 9-25-17

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MOBITIE INTELLIGENT INFRASTRUCTURE
Master Structural Schematic
EQUIPMENT DETAILS

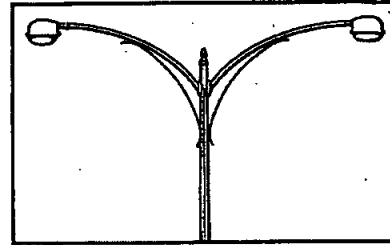
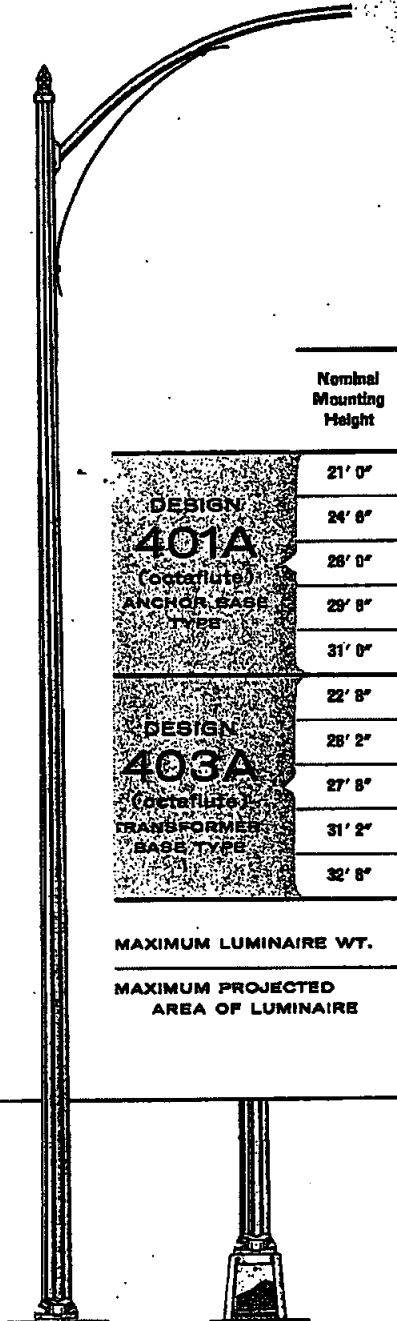
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TITLE: EQUIPMENT DETAILS	
PTB NO. XXXXX	SHEET
DRAWING NO. TBD	48
DATE: 8/7/17	
SCALED: N.T.S.	

B6

MONOTUBE LIGHTING POLES

STEEL poles for mercury and filament luminaires

Handwritten: 4-25-17
 Stamp: 4-25-17
 Stamp: 4-25-17



Nominal Mounting Height	CATALOG NUMBER			Pole Size	
	4' 0" Bracket Spread	6' 0" Bracket Spread	8' 0" Bracket Spread		
DESIGN 401A (octaflets) ANCHOR BASE TYPE	21' 0"	E-200-A2	E-200-B2	E-200-C2	8.5" x 3.7" x 20' 0"
	24' 6"	F-238-A2	F-238-B2	F-238-C2	7" x 3.7" x 23' 6"
	26' 0"	F-250-A2	F-250-B2	F-250-C2	7" x 3.8" x 25' 0"
	29' 6"	H-288-A2	H-288-B2	H-288-C2	8" x 4" x 28' 6"
	31' 0"	H-300-A2	H-300-B2	H-300-C2	8" x 3.8" x 30' 0"
DESIGN 403A (octaflets) TRANSFORMER BASE TYPE	22' 8"	E-200-A2	E-200-B2	E-200-C2	8.5" x 3.7" x 20' 0"
	26' 2"	F-238-A2	F-238-B2	F-238-C2	7" x 3.7" x 23' 6"
	27' 6"	F-250-A2	F-250-B2	F-250-C2	7" x 3.8" x 25' 0"
	31' 2"	H-288-A2	H-288-B2	H-288-C2	8" x 4" x 28' 6"
	32' 6"	H-300-A2	H-300-B2	H-300-C2	8" x 3.8" x 30' 0"

MAXIMUM LUMINAIRE WT.	75 lbs.	87 lbs.	40 lbs.
MAXIMUM PROJECTED AREA OF LUMINAIRE	3.3 sq. ft.	3.3 sq. ft.	3.3 sq. ft.

NOTES:

1. Before ordering, see page B-167 for General Information.
2. Pole sizes are adequate for single or twin bracket application. Specify "twin" when required.
3. Maximum luminaire weight and maximum projected area of luminaire are determined from design criteria for poles as outlined in General Information on page B-167.
4. When ordering, specify both design and catalog numbers.

The Union Metal Manufacturing Company
 Canton 8, Ohio
 January 8, 1961
 Catalog No. 100
 Printed in U.S.A.

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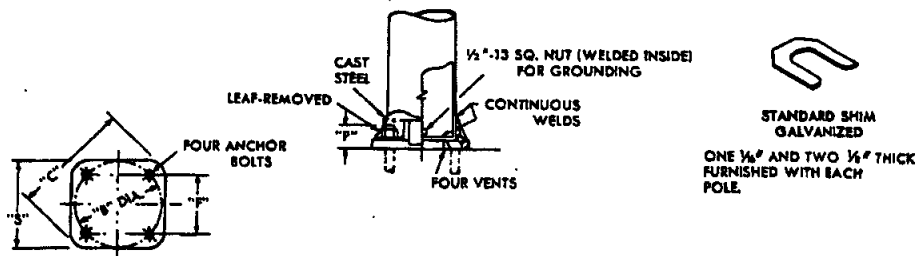
MOBILITIE INTELLIGENT INFRASTRUCTURE
 88 MONOTUBE LIGHT POLES
 STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES

DATE ADDRESS:	Venue
TITLE:	88 MONOTUBE LIGHT POLES STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES
PTB NO	570153
DRAWING NO	TBD
DATE:	8/7/17
SCALE:	N.T.S.
SHEET	49

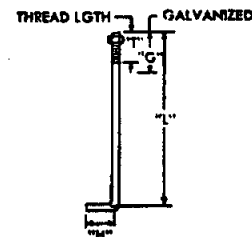
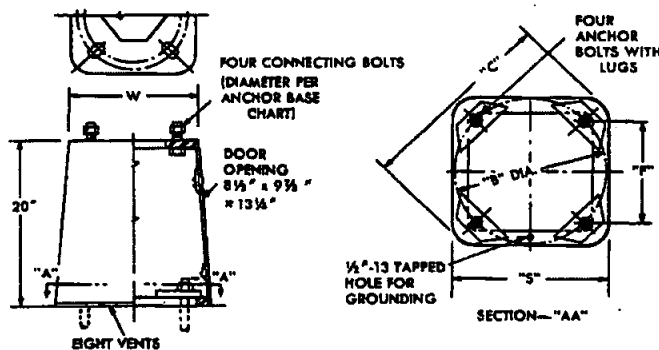
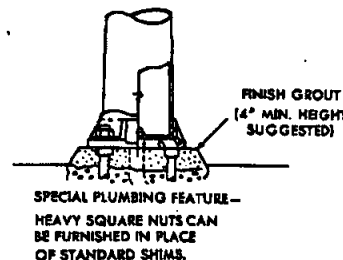
MONOTUBE LIGHTING POLES

B16

STEEL BASE AND ANCHOR BOLT DETAILS



ANCHOR BASES						ANCHOR BOLTS		
POLE SIZE	"B" BOLT CIRCLE	"C"	"F"	"S" PROF. H.	"S" SQUARE	POLE GAUGE		
						#11	#7	#3
6.5"	9 1/4"	12 1/4"	6 1/4"	2 1/4"	10"			
7"	10"	13"	7 1/4"	2 1/4"	10 1/2"			
7.5"	10 1/4"	13 1/4"	7 3/4"	2 3/4"	11"			
8"	11"	14 1/4"	7 3/4"	2 3/4"	11 1/2"			
8.5"	11 1/4"	14 1/4"	8 1/4"	2 3/4"	12"			
9"	12 1/4"	15 1/4"	8 3/4"	3"	12 1/2"			
9.5"	13"	16 1/4"	9 1/4"	3 1/4"	13 1/2"			
10"	13 1/4"	17 1/4"	9 3/4"	3 1/4"	14 1/4"			



STANDARD ANCHOR BOLT				
BOLT SIZE	"L"	"H"	"T"	"G"
1" x 40"	36"	4"	6"	8"
1 1/4" x 48"	42"	6"	8"	10"
1 1/2" x 60"	54"	6"	9"	11"

DESIGN NO.		FABRICATED STEEL TRANSFORMER BASES					ANCHOR BOLTS		
#11 GA. POLES	#7 GA. POLES	#3 GA. POLES	POLE SIZE	"B" BOLT CIRCLE	"C"	"F"	"S" SQ.	"W"	
1Y-82640-Y1	1Y-82640-Y3		6.5"						
	1Y-82640-Y4		7"	15"	20 1/4"	10 1/4"	16"	13"	
1Y-82640-Y2	1Y-82640-Y5		7.5"						
	1Y-82640-Y4		8"						
1Y-82640-Y1	1Y-82640-Y2		8.5"						
	1Y-82640-Y4		9"	17 1/4"	23 1/4"	12 1/4"	18"	15"	
1Y-82640-Y2	1Y-82640-Y4		9.5"						
1Y-82640-Y3	1Y-82640-Y5		10"						

THIS DATA IS FOR GENERAL GUIDANCE ONLY. TEMPLATE PRINT, GIVING COMPLETE INFORMATION FOR SETTING ANCHOR BOLTS, IS FURNISHED WITH EACH ORDER.

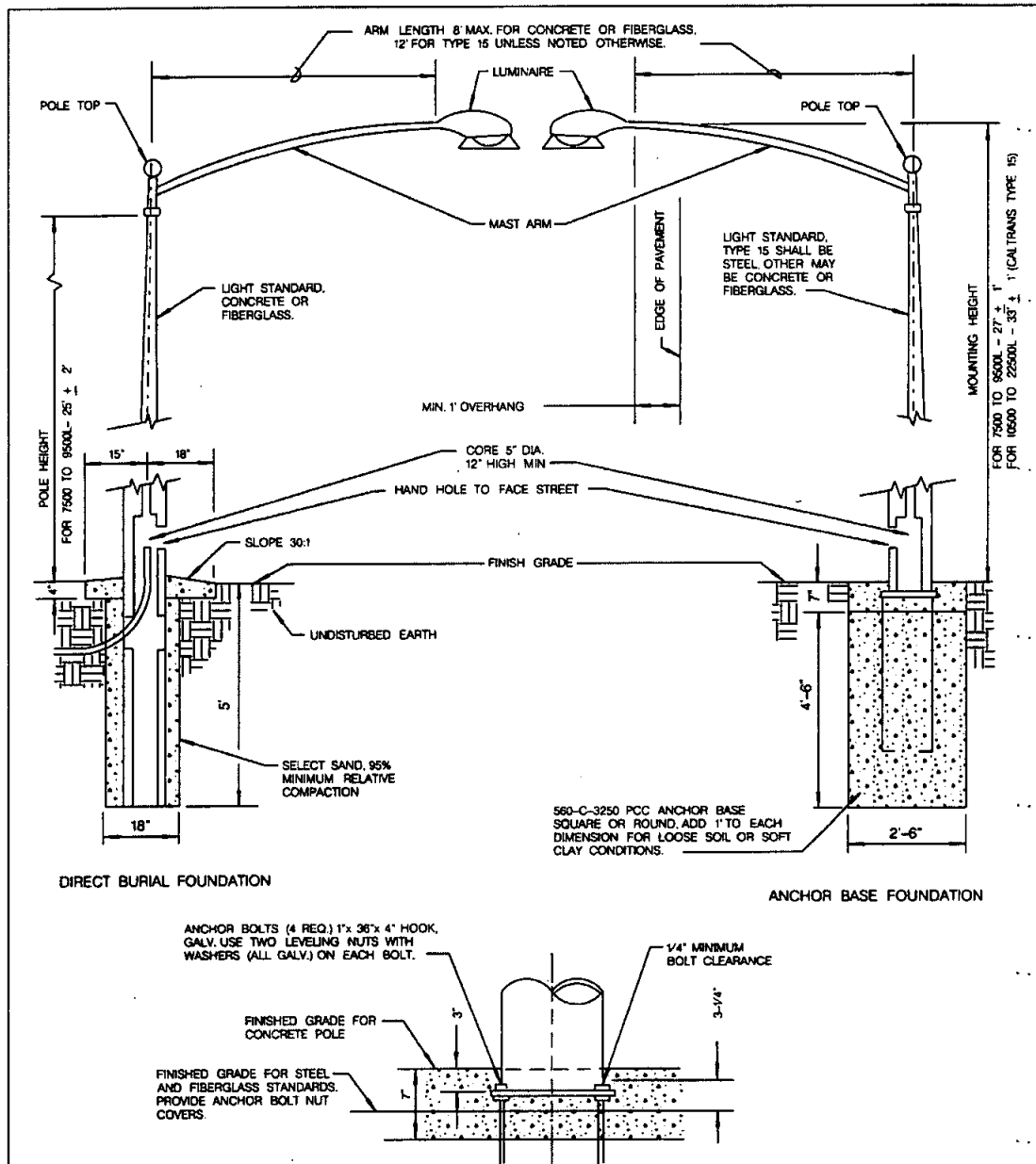
The Union Metal Manufacturing Company
Canton, Ohio
January 3, 1981
Catalog No. 100
Printed in U. S. A.

mobilitie
intelligent infrastructure
2855 RED HILL AVE, SUITE 200
COSTA MESA, CA 92626
(657) 261-3863
E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE
B6 MONOTUBE LIGHT POLES
STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES

SITE ADDRESS		Varies
TITLE:		B6 MONOTUBE LIGHT POLES STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES
PTS NO.	570163	SHEET
DRAWING NO.	TBD	
DATE:	8/7/77	
SCALE:	N.T.S.	

50



REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE <i>Change</i> 56523 03/28/2014 COORDINATOR R.C.E. DATE
ORIGINAL		J. CASEY	06/03		
UPDATED	KA	J. NAGELVOORT	01/12		
UPDATED	KA	J. NAGELVOORT	03/28		
				STREET LIGHTING STANDARD	
					SDE-101

STREET LIGHTING STANDARD

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intelligent infrastructure
2955 RED HILL AVE, SUITE 200
COSTA MESA, CA 92626
(657) 261-3863
E: www.mobilitie.com

MOBILITIE INTELLIGENT INFRASTRUCTURE
95 MONOTUBE LIGHT POLES
STEEL POLES FOR MERCURY AND FILAMENT LUMINAIRES

John L. Miller
CITY OF SAN DIEGO
9-25-17

SITE ADDRESS: V4100

TITLE: 95 MONOTUBE LIGHT POLES
STEEL POLES FOR MERCURY AND
FILAMENT LUMINAIRES

PTS NO: 570163

DRAWING NO: TBD

DATE: 8/7/17

SCALE: N.T.S.

SHEET 51

Exhibit C: Interference Protection Requirements

1. **Interference.** Anytime during the term of this Master Agreement, PERMITTEE may be required to provide an intermodulation report ("Report") to CITY. This Report shall include the calculation parameters used to compile the Report, all intermodulation "hits," a brief description of the results of the intermodulation calculations, a list of possible interference situations that may result from the proposed equipment, transmission frequencies that are currently being operated on-site, and similar or other relevant data from the licensees and/or users operating on-site. The information required to compile this report, including transmit frequencies currently operated on-site, may require collection of data from other licensees operating on-site. A list of other licensees within the Permit Areas can be obtained from CITY. CITY is not responsible for any omitted data provided for the purpose of creating this Report. If required, the Report shall be provided to CITY's General Services Department, Communications Division, and Senior Communications Engineer.
2. **Pre-installation Notification.** PERMITTEE shall notify all licensees and/or users operating within the Permit Areas of any proposed installation and/or modification at least fourteen (14) calendar days prior thereto. A list of all licensees and/or users operating within the Permit Areas may be obtained from CITY and used to compile a notification list. The notification shall be in the form of a letter to each listed licensee and/or user operating within the Permit Areas, giving a technical data summary of the proposed new and/or modified equipment and/or installation to be installed within the Permit Areas, and shall specify the approximate date of the installation or modification. An additional notification letter shall be sent to CITY's Communication Engineer at CITY's General Services Department, Communications Division. This letter shall include a list of all licensees and/or users notified. PERMITTEE shall make complete arrangements and conduct all tests and operations in accordance with all applicable Federal (including FCC) Rules and Regulations.
3. **Radio Frequency Interference to CITY Radio Equipment.** The radio equipment use proposed by PERMITTEE shall not directly or indirectly result in degraded technical performance of CITY's existing radio equipment installed within the Permit Areas or used in the general area. Resulting degraded technical performance in this instance includes, but is not limited to: (a) detectable or measurable received intermodulation; (b) audio distortion or noise; and (c) receiver desensitization in excess of 3.0 dB with respect to 12dB SINAD test.
4. **Modifications to Equipment.** Modifications to transmitting equipment (including, but not limited to, those which change effective radiated power, transmitter frequency, transmitter modulation, and/or transmitter spurious and harmonic emissions) may require re-notification to existing licensees and/or users operating within the Permit Areas, as well as a new Report.
5. **Resulting Interference.** Should an interference problem occur within the Permit Areas (or surrounding area) as a result of any new and/or modified equipment and/or installation, PERMITTEE shall initiate mutually agreeable actions among the affected parties to mitigate or resolve the interference problem. If harmful interference cannot be resolved, CITY may recognize the right of other authorized users and, in CITY's sole discretion, withhold consent or disallow use of the new and/or modified equipment and/or installation, pending settlement of the interference problems between PERMITTEE and other authorized users.

6. No Obligation by CITY for Loss. CITY shall not be obligated for any loss, financial or otherwise, which may be incurred by PERMITTEE as a result of the foregoing interference protection requirements, and PERMITTEE expressly waives any claim for expense or loss which PERMITTEE might incur as a result of CITY's enforcement thereof.

Exhibit D: Emergency Maintenance Procedures

If PERMITTEE discovers that any of the Communications Equipment is damaged, PERMITTEE shall immediately notify **CITY's Station 38 at (619) 527-7660**.

If CITY discovers that any of the Communications Equipment is damaged, CITY shall immediately notify **PERMITTEE's Network Operation Call Center at (877) 244-7889**.

CITY may require any replacement Communications Equipment to be relocated, as provided for in this Master Agreement.

If the Communications Equipment causes any interference to CITY's telecommunications equipment and/or system, CITY may require such Communications Equipment to be removed permanently and replaced at another location, as provided for in this Master Agreement.

If CITY's telecommunications and/or lighting systems require emergency repair or maintenance by CITY, CITY shall employ use of PERMITTEE's emergency shut off switch, per Section 18.2, and notify PERMITTEE immediately at the number above.

PERMITTEE shall not unreasonably interfere with pedestrian or vehicle traffic while installing or maintaining the Communications Equipment.

If a party changes its emergency contact telephone information, that party shall immediately notify the other party of the new contact information at the telephone number provided above, and, within ten (10) calendar days, provide the other party with written notice of the new contact information, in accordance with this Master Agreement.



THE CITY OF SAN DIEGO

DATE OF NOTICE: February 14, 2019

NOTICE OF RIGHT TO APPEAL ENVIRONMENTAL DETERMINATION

DEVELOPMENT SERVICES
DEPARTMENT

SAP No. 12002049

PROJECT NO:	N/A
PROJECT NAME:	Mobilities and Master Use and Occupancy Permit (MUOP) for Installation of a Small Cell Network
COMMUNITY PLAN AREA:	Mira Mesa and Downtown Community Planning areas.
COUNCIL DISTRICT:	6 and 3
LOCATION:	Pole number 1- Southeast corner of Mira Mesa Blvd. and Black Mountain Rd. (32.916459, -117.12037) Pole number 2- Northwest corner of 16TH Street and Island Ave., (32.71054, -117.149596) Pole number 3- Northeast corner of 17th Street and G Street (32.712798, -117.148468) Pole number 4- East of the intersection of Compass Point Dr. S. and Campus Point Dr. N. (32.92702, -117.120374)

PROJECT DESCRIPTION: The project includes a Master Use and Occupancy Permit (MUOP) to allow for the installation of a Small Cell Network in the locations listed above. The sites would be installed on City of San Diego owned street lights. The small cell network would be built within the public right of way. Each of the small cell sites would support an antenna with associated equipment and a power switch that would be placed on the existing streetlights at each site. Some installations would involve the replacement of a streetlight.

ENTITY CONSIDERING PROJECT APPROVAL: City of San Diego

ENVIRONMENTAL DETERMINATION: CEQA Exemption 15301 (Existing Facilities) and 15302 (Replacement or Reconstruction)

ENTITY MAKING ENVIRONMENTAL DETERMINATION: City of San Diego

STATEMENT SUPPORTING REASON FOR ENVIRONMENTAL DETERMINATION: The City of San Diego conducted an environmental review that determined the project would not have the potential for causing a significant effect on the environment. The project, as described in the Project Description section of this notice, meets the criteria set forth in CEQA Sections 15301 and 15302, the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing facilities (public or private), involving negligible or no expansion of use beyond that existing at the time of the determination, and replacement of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced, respectively. Additionally, none of the exceptions described in CEQA Guidelines Section 15300.2 apply.

CITY PROJECT MANAGER: Enza Charles
MAILING ADDRESS: 1200 Third Avenue, Suite 1700, MS 51A
San Diego, CA 92101
PHONE NUMBER/E-MAIL: (619) 236-6052/ECharles@sandiego.gov

On February 14, 2019 the City of San Diego made the above-referenced environmental determination pursuant to the California Environmental Quality Act (CEQA). This determination is appealable to the City Council. If you have any questions about this determination, contact the City Project Manager listed above.

Applications to appeal CEQA determination made by staff (including the City Manager) to the City Council must be filed in the office of the City Clerk within 10 business days from the date of the posting of this Notice (by March 1, 2019). The appeal application can be obtained from the City Clerk, 202 'C' Street, Second Floor, San Diego, CA 92101.

This information will be made available in alternative formats upon request.

POSTED IN THE OFFICE OF DSD	
Posted	FEB 14 2019 <i>ml</i>
Removed	MAR 04 2019
Posted by	<i>myralee</i>