

POSITION DUTY STATEMENT

DOT PM-0924 (REV 01/2025)

CLASSIFICATION TITLE Transportation Engineer (Elect)	OFFICE/BRANCH/SECTION District 11/Electrical Systems Signal Operations	
WORKING TITLE Transportation Electrical Engineer	POSITION NUMBER 911-350-3609-003	REVISION DATE 05/07/2026

As a valued member of the Caltrans team, you make it possible to improve lives and communities through transportation.

GENERAL STATEMENT:

Under the direction of the Senior Transportation Electrical Engineer, Supervisor (Branch Chief, Electrical Systems), the Transportation Engineer, Electrical (Transportation Electrical Engineer) performs a wide variety of professional electrical and electronic engineering responsibilities in support of the Traffic Safety & Operations Division-Transportation Management Center. The incumbent supports the planning, design, operation, analysis, and performance of Transportation Management Systems (TMS). Duties include engineering analysis, system optimization, asset management, and coordination with internal and external stakeholders to improve system reliability, mobility, and safety on the State Highway System.

As the incumbent progresses in experience, assignments are more complex and may function as a lead person over the activities of various electrical and electronic engineering and technical personnel.

Appointment to Range D requires possession of a valid certificate of registration as an electrical engineer issued by the California State Board of Registration for Professional Engineers and Land Surveyors.

Appointment to this position requires passing the Department of Justice (DOJ) background check.

CORE COMPETENCIES:

As a Transportation Engineer (Elect), the incumbent is expected to become proficient in the following competencies as described below in order to successfully perform the essential functions of the job, while adhering to and promoting the Department's Mission, Vision, Values, Strategic Imperatives and Goals. Effective development of the identified Core Competencies fosters the advancement of the following Leadership Competencies: Change Commitment, Risk Appetite, Self-Development/Growth, Conflict Management, Relationship Building, Organizational Awareness, Communication, Strategic Perspective, and Results Driven.

- **Creativity and Innovation:** Thinks beyond the confines of traditional models to recognize opportunities, seek creative solutions and take intelligent risks. (Safety, Climate Action, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)
- **Decision Making:** Makes critical and timely decisions. Takes charge. Supports appropriate risk. Makes challenging and appropriate decisions. (Safety, Equity, Climate Action, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)
- **Ethics and Integrity:** Demonstrated concern to be perceived as responsible, reliable, and trustworthy. Respects the confidentiality of information or concern shared by others. Honest and forthright. Conforms to accepted standards of conduct. (Safety, Equity, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride)
- **Problem-solving and Decision-making :** Identifies problems and uses logical analysis to find information, understand causes, and evaluate and select or recommend best possible courses of action. (Safety, Equity, Climate Action, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)
- **Teamwork and Collaboration:** Sets team structure. Organizes, leads, and facilitates team activities. Promotes team cooperation and encourages participation. Capable of cross functionality and working well with others on a team to achieve personal goals, team goals, and organizational goals. Takes responsibility for individual actions in order to achieve consistent results. (Safety, Climate Action, Employee Excellence - Collaboration, Equity, Innovation, People First, Pride, Stewardship)
- **Organizational Awareness:** Contributes to the organization by understanding and aligning actions with the organization's strategic plan, including the mission, vision, goals, core functions, and values. (Safety, Equity, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)
- **Communication:** Expresses oneself clearly in all forms of communication. Gives feedback and is receptive to feedback received. Knows that listening is essential. Keeps others in the Division and other functional units informed as appropriate. (Safety, Climate Action, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)
- **Analytical Skills:** Approaches problems using a logical, systematic, and sequential approach. Weighs priorities and recognizes underlying issues. (Safety, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)
- **Thoroughness:** Ensures that work and information is complete and accurate. Ensures that assignment goals, objectives, and completion dates are met. Documents and reports on work progress. (Safety, Climate Action, Employee Excellence - Collaboration, Equity, Innovation, Integrity, Pride, Stewardship)

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TYPICAL DUTIES:

Percentage	Essential (E)/Marginal (M) ¹	Job Description
25%	E	<p>TRAFFIC SIGNAL OPERATIONS</p> <p>Monitors field traffic conditions at new and existing signalized intersections to evaluate performance, identify operational deficiencies, and support safe and efficient traffic flow on the State Highway System. Applies current engineering standards, policies, and regulations, including the California Vehicle Code, Californian Manual of Uniform Traffic Control Devices (CA MUTCD), applicable Federal Highway Administration (FHWA), and Federal Transit Authority (FTA) guidelines to ensure compliance in traffic signal operations and improvements. Analyzes and develops traffic signal timing based on traffic data, field observations, and engineering principles. Performs engineering analysis and calculations related to traffic signal operations, including timing, load, and system performance and applies sound engineering principles to evaluate conditions and develop effective solutions. Modifies and implements signal timing parameters as needed to improve traffic efficiency, reduce congestion, and enhance traffic safety. Evaluates the effectiveness of traffic signal timing using performance measures and recommends adjustments to improve system performance. Documents daily activities, field observations, and signal system changes in the TRAC system to maintain accurate and complete records of traffic signal operations. Supports the maintenance, operation, and utilization of traffic operations databases and systems and ensures data accuracy and accessibility for engineering analysis. Coordinates with Design, Construction, Maintenance, and Traffic & Safety Operations Divisions to support the planning, design, construction, and operational improvements of traffic signals systems. Evaluates, tests, and validates new and emerging technologies, hardware, and software for traffic signal systems to determine compatibility with existing infrastructure, compliance with Caltrans standards, and potential to improve system performance, reliability, and safety. Assists in managing resources related to traffic signal operations within the assigned area.</p>
20%	E	<p>SYSTEM MONITORING</p> <p>Monitors the District 11 traffic signal system using surveillance and Traffic Management System (TMS) to verify proper operation, identify malfunctions, and ensure signals operate in accordance with approved timing plans and operational standards. Coordinates with electrical maintenance staff to troubleshoot, diagnose, and resolve signal system deficiencies and ensures timely repairs and restoration of traffic signal functionality. Supports the operation, optimization, and timing of traffic signal systems throughout San Diego County and Imperial County by analyzing traffic data, field conditions, and system performance to improve mobility and safety. Collaborates with TMS Asset Manager to maintain and update field asset databases and ensures accurate inventory and data to support State Highway Operation and Protection Program (SHOPP) performance and asset management objectives. Tracks and evaluates inventory, condition, and operational health of TMS field elements and recommends corrective actions. Coordinates traffic signal operations, timing, and optimization with internal and external partners to ensure consistent and effective system performance.</p>
20%	E	<p>TRAFFIC SIGNAL SYSTEM SUPPORT</p> <p>Responds to requests for traffic signal timing information in accordance with the California Public Records Act and ensures timely, accurate, and compliant disclosure of records. Provides technical support and engineering expertise for the operations and maintenance of the State's traffic signal systems, including network communications, servers, and client systems, to ensure reliable system performance and data integrity. Evaluates and recommends improvements and future upgrades to traffic surveillance systems based on performance, emerging technologies, and operational needs to enhance system efficiency, reliability, and functionality. Configures, installs, and troubleshoots communication systems associated with traffic signals to ensure continuous and effective system operation.</p>

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20%	E	<p>PROJECT SUPPORT</p> <p>Reviews Project Initiation Documents (PIDs), Project Reports (PRs), Plans, Specifications, and Estimates (PS&E) for projects that modify or impact traffic signal systems within District 11 to ensure compliance with Caltrans standards, electrical engineering principles, and operational requirements. Processes Work Agreements to secure and track funding from capital projects for traffic signal operations, maintenance, and system enhancements. Supports construction inspection, electrical maintenance, and permit activities for the installation and modification of traffic signal systems by providing technical guidance, reviewing field conditions, and ensuring adherence to approved plans and specifications. Reviews permit application documents for conformance with Caltrans policies, standards, and electrical engineering requirements.</p>
10%	E	<p>TRAFFIC SIGNAL OPERATIONS RECORDS</p> <p>Maintains traffic signal operations records and ensures data accuracy, completeness, and compliance with departmental policies and record retentions requirements. Serves as the designated custodian of records for the District's traffic signal timing within the assigned area and ensures proper documentation, organization, and accessibility of timing plans and related materials. Responds and prepares responses to inquiries, complaints, maintenance concerns, resolution of claims, and potential litigation by gathering data and coordinating with appropriate personnel. Prepares meeting minutes, maintains organized project files, attends trainings, meetings, and public workshops. Develops and delivers presentations, updates databases, and creates web-based or digital materials.</p>
5%	M	<p>OTHER RELATED RESPONSIBILITIES</p> <p>Assists in developing training materials, guidance documents, and knowledge transfer resources to support staff development and maintains continuity of operations within the unit. Supports staff by sharing knowledge and contributes to a collaborative and effective team environment. Provides backup support to other team members during absences to maintain continuity of operations.</p>

¹ESSENTIAL FUNCTIONS are the core duties of the position that cannot be reassigned.

MARGINAL FUNCTIONS are the minor tasks of the position that can be assigned to others.

SUPERVISION OR GUIDANCE EXERCISED OVER OTHERS

This position does not supervise other staff. However, the incumbent may act as a lead person over the activities of various electrical engineers and electrical technician personnel.

KNOWLEDGE, ABILITIES, AND ANALYTICAL REQUIREMENTS**KNOWLEDGE REQUIREMENTS:**

- Electrical and electronic engineering principles, theories, techniques, methods, and standard practices related to the planning, design, construction, operation, troubleshooting, and maintenance of transportation electrical systems.
- Modern electrical equipment, materials, tools, and methods used in transportation management systems.
- Computer systems, engineering software, and database applications used in transportation engineering (e.g., Computer-Aided Design and Drafting (CADD), traffic operations software, asset management systems, stand-alone interactive systems, project management tools).
- Electrical and electronic diagnostic, testing, calibration, and troubleshooting procedures required to identify, analyze, and resolve system performance and resolve failures or malfunctions in electrical and electronic transportation systems.
- Construction methods, electrical installation practices, inspection procedures, and quality control standards applicable to electrical projects.
- Asset management principles, systems, and databases used to inventory, track, monitor, and evaluate electrical projects.
- Mathematics and physics related to electrical engineering, including circuit analysis, system design, load calculations, and cost estimating.
- Occupational safety and health regulations governing the design and installation of electrical and electronic equipment, including the National Electric Code and Title 8 Industrial Relations, Electrical Safety Orders of the Division of Occupational Safety and Health, and other applicable state, federal, and industry standards codes, standards, and specifications.

ABILITY REQUIREMENTS:

- Perform electrical and electronic engineering work using CADD and other engineering tools.
- Make neat, accurate, and complete engineering drawings, calculations, diagrams, plans, and technical documentation.
- Review and inspect electrical installations and construction work for conformance with approved plans, codes, specifications, and standards, and identify deficiencies requiring corrective action.
- Read, understand, and apply engineering drawings, electrical diagrams, highway plans, and technical specifications to support design, analysis, and field operations.
- Prepare clear and concise effective reports, correspondence, documentation, dashboards, charts, diagrams, and presentations.
- Establish and maintain cooperative and professional working relationships with Caltrans staff, contractors, consultants, local agencies, the public, and other stakeholders.

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- Manage and prioritize multiple assignments and meet project schedules and deadlines.
 - Adapt to changes in technology, procedures, and system requirements.
 - Communicate effectively, both verbally and in writing, with team, staff, contractors, consultants, local agencies, and the public.

ANALYTICAL REQUIREMENTS:

- Analyze engineering problems and evaluate technical data to develop logical, effective, and sound engineering solutions.
- Interpret and apply engineering standards, codes, laws, regulations, and policies to ensure compliance in planning, design, construction, and operation of electrical and electronic systems.
- Assess system performance, identify root causes of operational causes, and recommend appropriate corrective actions or improvements.
- Balance multiple priorities, projects, and stakeholder needs while maintaining quality, safety, and schedule commitments.

RESPONSIBILITY FOR DECISIONS AND CONSEQUENCES OF ERROR

The incumbent exercises professional electrical engineering judgment in performing analyses, calculations, system configuration, and technical evaluation to support the operation and improvement of transportation electrical systems and ensures compliance with applicable standards, codes, policies, and procedures. Errors in judgment, calculations, analyses, or system configuration may result in degraded system performance, inaccurate or unreliable traffic data, equipment malfunctions, or operational failures, potentially impacting traffic flow, mobility, and public safety. Inaccuracy or incomplete plans, specifications, reports, or system documentation may lead to construction delays, contract change orders, increased project or maintenance costs, and potential claims. Failure to properly apply engineering principles or standards may adversely affect the quality and reliability of system designs and operations, increase the Department's exposure to liability and compromise the integrity and safety of the State Highway System.

PUBLIC AND INTERNAL CONTACTS

The incumbent establishes and maintains effective, professional, and cooperative working relationships with internal and external stakeholders such as with regional and District functions, contractors, engineering consultants, local and regional agencies, regulatory agencies, utility companies, broadband partners, and members of the public. These interactions occur verbally and in writing. Strong interpersonal and communication skills are essential to facilitate collaboration, support project delivery, maintain system reliability, and promote the safe and efficient operation of the State Highway System.

PHYSICAL, MENTAL, AND EMOTIONAL REQUIREMENTS

The incumbent performs work using standard office equipment, including a computer, keyboard, mouse, and telephone, and may stay stationary for extended periods. The position may involve moving or transporting files, plans, equipment, or materials of varying weights. The incumbent may be required to travel to field locations, which can include driving for extended periods, walking on uneven terrain, and working outdoors in varying environmental conditions.

The incumbent must be able to analyze engineering data, perform calculations, and evaluate technical information with accuracy and attention to detail. The position requires the ability to manage multiple assignments, prioritize tasks, and meet deadlines in a dynamic work environment. The incumbent must sustain concentration for extended periods while reviewing data, preparing reports, and solving engineering problems.

The incumbent must demonstrate the ability to interact effectively and professionally with a diverse group of stakeholders, including handling difficult situations with tact and diplomacy. This position requires maintaining composure under pressure, responding appropriately to changing priorities, and exercising sound judgment in stressful or time-sensitive situations. The incumbent must foster cooperative working relationships and maintain a professional, respectful, and customer service-oriented approach in all interactions.

WORK ENVIRONMENT

The incumbent works in a combination of office and field environments. Office work is performed in a climate-controlled setting under artificial lighting and may require use of multi-level buildings equipped with elevators and stairs. Field work is conducted at or near active roadways and transportation facilities, where the incumbent may be exposed to traffic, loud noise, dust, dirt, uneven terrain, varying weather conditions, and other environmental factors. The incumbent is required to follow all applicable safety policies and procedures and use appropriate personal protective equipment when performing field duties. Travel throughout the District, including San Diego County and Imperial County, is required. Possession of a valid driver's license is required to operate a State-owned or leased vehicle. Work hours may include occasional overtime, night work, or irregular shifts based on operations or project needs.

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I have read, understand and can perform the duties listed above. (If you believe you may require reasonable accommodation, please discuss this with your hiring supervisor. If you are unsure whether you require reasonable accommodation, inform the hiring supervisor who will discuss your concerns with the Reasonable Accommodation Coordinator.)

I agree that by providing my electronic signature for this form, I agree to conduct business transactions by electronic means and that my electronic signature is the legal binding equivalent to my handwritten signature. I hereby agree that my electronic signature represents my execution or authentication of this form, and my intent to be bound by it.

EMPLOYEE (Print)

EMPLOYEE (Signature)

DATE

I have discussed the duties with, and provided a copy of this duty statement to the employee named above.

SUPERVISOR (Print)

SUPERVISOR (Signature)

DATE

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