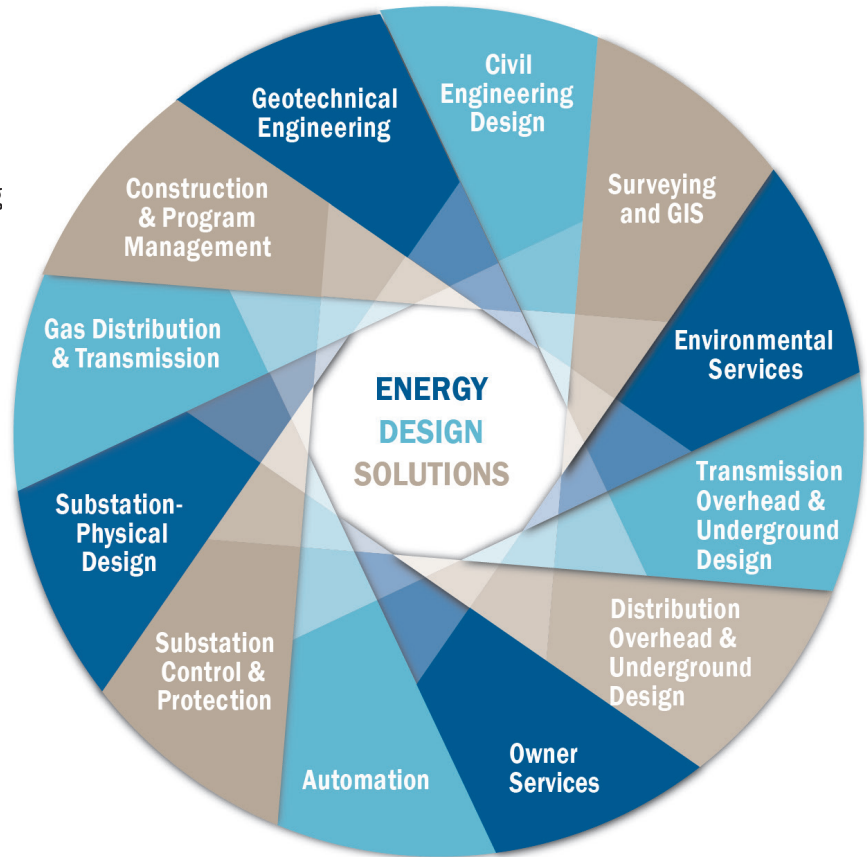


NV5 delivers cutting edge engineering and consulting services related to energy generation, transmission, distribution, and construction to help meet your project and maintenance needs.

With a growing demand for energy production, reliability, compliance, and efficiency along with the emerging importance of renewable energy, NV5 is positioning itself at the forefront with its value-added services focusing on efficient and sustainable design/construction making our communities better places in which to work and reside.

NV5 utilizes state-of-the-art tools and our nationally-recognized staff to turn innovative approaches into practical solutions. As a full-service engineering firm that brings a team approach to every project, we have the capabilities and resources to complete every project on-time and within budget. Our clients look to us to find the best underground or overhead path to minimize paperwork hurdles and visual impact, to provide them with electrical system designs that compliment facility aesthetics, and to solve all of the electrical, civil, structural, and construction challenges that face every project. NV5 seeks to remain a part of your project team throughout its duration providing services to ensure each project ends as smoothly as it begins.



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NV5 brings a unique combination of system protection, automation, and communications expertise to your utility, industrial, or large commercial project. We provide SCADA, automation, and communication system consulting and design services for any size project.

KEY SERVICES

- Secure real-time communications networks—Design and implementation
- SCADA and automation systems solution for Utility, Government, Industrial, and large Commercial sectors
- Load management
- Protection and control systems design and configuration
- Real-time data warehousing, trending, and historical information systems
- Enterprise operational systems integration
- On-Line equipment health diagnostics and data analysis models
- AMI/Meter management system design and implementation support
- Outage management system design and implementation support
- Maintenance management system design and implementation support

CASE STUDY

BRAC 133 at Mark Center

San Diego, CA | Department of Defense

NV5 provided commissioning services and conducted more than 1,500 functional performance tests to ensure that the building systems operate effectively. We applied extreme scrutiny to fundamental building components and assembled a team of top employees from our company to accommodate the demanding schedule and extraordinary scope of work.



At NV5, we understand that developing energy projects requires careful planning and analyses to ensure the financial viability of our clients' investments. That is why major utilities and energy providers rely on NV5 to assess potential sites and deliver the necessary infrastructure upgrades. NV5 specializes in managing projects regulated by the Federal Energy Regulatory Commission (FERC). Whether it is a transmission and distribution line, solar site, wind farm, or natural gas pipeline, NV5 excels at designing and permitting energy infrastructure. We help our clients meet long-term energy demands by transforming their conceptual ideas into reliable-power sources.

KEY SERVICES

- Grading and Drainage Design
- Access Road Design
- Agency Permitting
- Jack and Bore
- Hydrology/Hydraulics/Drainage/Flood Control
- Pipelines
- Public Improvements
- Site Studies
- Directional Drill
- Civil Underground Transmission and Distribution Route Planning

CASE STUDY

Sunrise Powerlink Suncrest Substation San Diego, CA | San Diego Gas & Electric

NV5 provided civil site design for the Sunrise Powerlink 500/230kV MRDA Substation. The approximate 65-acre site includes 40 acres of substation pad, 2,000 lineal feet of Mechanically Stabilized Earth (MSE) retaining walls up to 40 feet in height, and ancillary grading for transmission tower placement and stormwater quality detention. The site is characterized by steep and rocky terrain requiring up to 150 foot depths of cut-and-fill grading. Because the site does not have a feasible location to balance earthwork during construction, NV5 prepared several preliminary models of grading iterations to assist the project team in determining appropriate design criteria. Design elements were added in response to several SDG&E groups including transmission, substation, distribution, real estate, and environmental staff as well as SDG&E subconsultants. Final construction documents for the substation included a grading and storm drain system for the site, stormwater detention basins, hydro-modification and detention basin outlet works design, MSE retaining wall structural design, and retaining wall plan and profiles.



At NV5, we understand the importance of delivering projects on time and on budget. A strong focus on project refinement, through constructability reviews and timelines, is key to a successful project. We excel at providing our clients with broad construction management services, identifying real savings, increasing revenue streams, obtaining matching funds, and managing client resources. We pride ourselves on being part of the communities we work in, and an active participant in all aspects of a project's life-cycle. Our staff is sensitive to local concerns and builds consensus through a collaborative partnership. Diversity of skills within NV5 provides the basis for effective, efficient, and focused delivery of construction management services.

KEY SERVICES

- Construction Management
 - » Inspection and Training
 - » Material Management
 - » Contract Administration
 - » Survey As-Built Management
 - » Quality Control
 - » Post Construction Evaluation
- Program Management
 - » Feasibility Studies
 - » Route/Site Selection
 - » Consultant Management
 - » Land Acquisition
 - » Support of Stakeholders

CASE STUDY

Substation Construction Management and Inspection Services

San Diego, CA | San Diego Gas & Electric

NV5 is providing contract administration and construction management support services for substation expansion and restoration projects. Services include administration of pre-bid and pre-construction meetings, contractor bid evaluation and award selection, construction weekly progress meetings, coordination of RFI and design change submittals, and daily site work coordination and oversight. The scope also includes being the lead liaison for SDG&E staff, civil engineering, geotechnical and water resource consultants. Projects have ranged from \$10,000-yard restoration projects to \$1M expansion projects including Lilac, Rincon and Santa Ysabel Substation Expansions, Miguel Substation Erosion Repairs, Proctor Valley Substation Erosion Repairs, Clairemont Substation Class II Yard Restoration, Elliot Class II Yard Restoration and Sunnyside Substation Class II Import and Concrete Swale Repair.



For any structure to serve its intended purpose it must be constructed according to the drawings and specifications. Years of experience have shown that first-class construction is obtained through systematic control of all operations, from the selection and production of material to the acceptance of the completed work. On construction projects, this control is achieved by competent personnel inspecting materials and workmanship at the construction site. The inspection staff's objective is to verify compliance with all provisions of the project drawings and specifications.

NV5 electrical inspectors work closely with other NV5 team members to ensure a high-quality and consistent product is delivered to the client. This includes working with NV5 survey teams to ensure that structures are properly staked and overhead lines are accurately sagged. NV5 geotechnical staff can also provide on-site support for soils and concrete testing and offer immediate hazard assessment during trenching and structure placement operations. Finally, NV5 Civil Engineers frequently provide SWPPP design and compliance support that can evolve as the project's scope of work varies throughout the construction lifecycle.

KEY SERVICES

- Drawings, Specifications, Standards and Code Review
- Verification of Work Execution
- Coordination of Inspection Activities and Contractor's Operations
- Construction Activity Reporting
- Review of Final Drawings of Record
- Construction Observation
- Construction Violation Tracking and Reporting
- Construction Meeting Attendance
- Safety and Environmental Hazard Reporting

CASE STUDY

Poseidon Desalination Plant—12kV Underground Extension

San Diego, CA | San Diego Gas & Electric

NV5's Construction Management team provided Quality Assurance inspection for the structural support system. Technical support and "timely insight" was provided to SDG&E's Facility / Site Manager thereby giving him a chance to administrate internally on behalf of the project. The Resident Structural Engineer (RE) and the Sr. Field engineer provided "Quality Assurance" for such scope items as the off-site plant material inspections and the structural assembly & installation of that material on-site. The team performed daily monitoring and inspections for portions of the civil site work, trench excavation, concrete placements and Champion Fiberglass & PVC conduit installations. NV5's Testing Engineers provided special inspections for the structural steel installation and concrete cylinder testing. NV5's RE attended weekly meetings with Poseidon to apprise them of the east side construction activities and to coordinate "use-of-space" for those work activities on the west side—which simultaneously overlapped those of the Contractor.

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KEY SERVICES

- Underground Route Design
- Alignment Studies (Route Planning)
- Cable Pulling Tensions
- Construction Support
- Power Quality Studies
- Distribution Line Relocation and Reconductor
- Local and Federal Agency Coordination and Processing
- Permitting/Right-of-Way
- Cable System Ampacity Studies
- Route Cost Comparisons
- Utility and Topographic Surveying
- Construction Plan and Profile Drawings
- Underground Conversion Design
- As-Built Surveying
- Power Flow Analysis
- Sitting and Permitting
- Foundation Analysis and Design
- Structure Modeling and Analysis
- Optimized Structure Spotting and Line Modeling with PLS-CADD
- NERC Compliance, Assessments and Mitigation

CASE STUDY

Poseidon Desalination Plant—12kV Underground Extension

San Diego, CA | San Diego Gas & Electric

NV5 provided the design and construction support for four 12kV distribution circuits to feed the milestone Poseidon Desalination Plant. In order to provide power to the project, NV5 proposed a unique approach to support fiberglass conduit via engineered steel supports down an abandoned pit from the decommissioned Encinca Power Station. NV5 completed the structural and conduit design with cutting-edge 3D modeling software to overcome complex physical obstacles and obstructions to ensure the design was constructible and electrically efficient. A complex above-ground conduit system was designed to withstand the pulling forces put on the system during cable installation. NV5 also designed the underground getaways from the nearby substation and the final distribution feeds from the pit through an existing tunnel to terminate at the four different switchgear locations. NV5 also provided an overhead and underground fiber design to bring nearby SCADA lines into the substation and to the desalination plant for equipment monitoring.



NV5 provides a variety of service related to the design of Gas Distribution and Transmission systems. These include the design of new pipelines, design for replacement/relocation and pipeline integrity services including design and review of hydrostatic tests, tap replacements, internal corrosion assessment and in-line inspections on pipelines. In addition, NV5 provides construction management, surveying, geotechnical and inspection, and environmental services for key Gas Distribution and Transmission projects.

KEY SERVICES

- Route/Site Selection
- Land Acquisition
- Pipeline Design
- Hydrotest/Pressure Test Calculations
- Pipe Span Calculations
- Pipeline Network Analysis
- Regulator/Meter Station Design
- Pressure Limiting Station Design
- Project Controls
- Pipeline Controls/SCADA Design, Automation
- Right-of-Way/Encroachment Permitting Coordination
- Support of Stakeholder Outreach
- Contract Administration
- Federal, State and Local Agency Permitting
- Agency Coordination
- FERC Certificate Filings

CASE STUDY

Mid-Coast Corridor Pipeline Project San Diego, CA | San Diego Gas & Electric

NV5 provided engineering, project management and construction support services for the relocation of the 400psig high pressure gas line, line 49-28. The relocation was required due to a direct conflict with the proposed \$2.6B Mid Coast Corridor Transit Project improvements along Rose Creek Canyon. Design and engineering for this project was extremely unconventional as industry, federal and utility standards could not be implemented. The management team coordinated efforts to fulfill environmental, CPUC, FTA, SANDAG, Caltrans, MTS, NCTD and City of San Diego agency requirements for federal funding and regulatory compliance.

The unconventional nature of this project required engineering beyond Natural Gas Industry Standards. This project included multiple trenchless technology installation methods for which two segments required non-standard compound radii horizontal directional drill engineering. This project also required exceptions to several agency standard policies including the Department of Transportation and the Federal Transit Administration.



NV5 has provided geotechnical engineering, materials testing, construction inspection, and consulting services on over 1,000 projects for utilities in southern California. These projects have included: structure pads, micro-piles, drilled pier foundations, underground trench materials and backfill, jack and bore materials, thermal concrete, underground concrete vault fabrications, testing of locally fabricated lattice tower member material, and structural steel towers.

NV5's materials testing laboratories provide comprehensive field and laboratory inspection and testing services. Our laboratories have the capability to provide testing of construction materials and inspections of construction workmanship to cover all aspects of a construction quality assurance program. Special inspections for soils, asphalt, concrete, masonry, welding, bolting, and fireproofing are part of our comprehensive portfolio of services.

Our laboratories are inspected and certified by local, state and federal agencies, resulting in a traceable, in-house quality assurance process.

KEY SERVICES

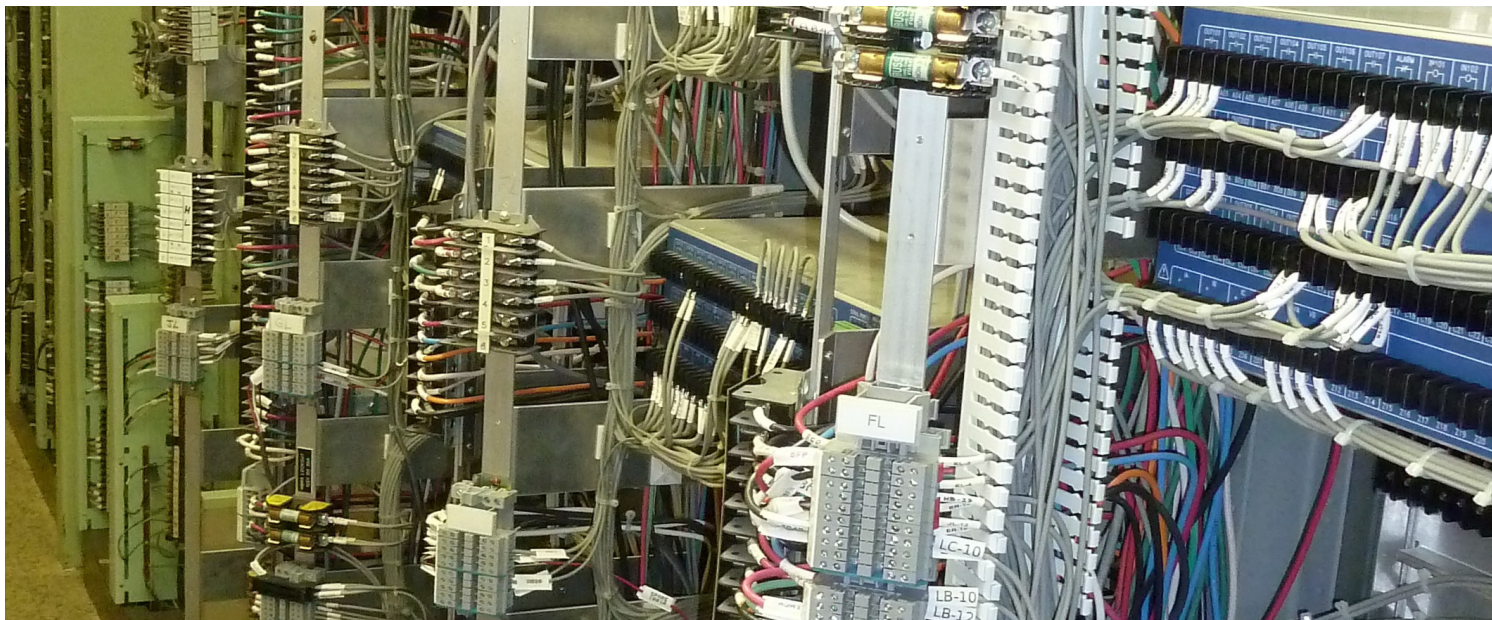
- Special Inspections
- Materials Testing
- Forensic Studies
- Foundation Studies
- Expert Witness
- Failure Analysis
- Off-Site Fabrication Inspections
- Non-Destructive Testing

CASE STUDY

TL633 Underground, Carmel Substation to Rancho Bernardo Substation

San Diego, CA | San Diego Gas & Electric

NV5 provided geotechnical investigation services for SDG&E's TL 633 Underground Carmel Substation to Rancho Bernardo Substation project which consists of construction of a 69kV underground transmission line. The transmission line alignment, connecting SDG&E's Rancho Bernardo and Carmel substations, is approximately 16,000 feet in length and is located within various streets' right-of-way in the City of San Diego and unincorporated areas of the County of San Diego, California. Also included within the scope of the project is the construction of 2 cable poles at the Rancho Bernardo substation and eleven underground vaults along the alignment. NV5's geotechnical investigation services included drilling thirteen exploratory test borings along the alignment. The underlying geologic materials were variable.



NV5 brings a wealth of protection and control expertise to your substation or generating facility project. Utilizing our experience, we can assist you with a variety of relay devices and functions, along with communication systems and protocols.

We take great pride in providing innovative solutions to challenges that are often presented in brown field designs. We perform a wide range of solutions to utility companies across the nation—ranging from single relay/single panel replacements to complete control house designs.

KEY SERVICES

- Protection and Control Design
- Relay Protection Settings and Logic Settings
- SCADA and Communications Design
- Assistance with NERC Compliance Discovery and Remediation
- DC Calculations and Battery Sizing
- Wiring Design and Cable Routing
- Commissioning Assistance
- Construction Support
- Third Party Review
- Integration of New Control and Protection Devices into Legacy Systems
- Development of Standard Panels and Systems to Streamline Designs
- System Studies Required for Equipment Rating and Relay Setting

CASE STUDY

Gresham Substation Protection and Control Refurbishment

Portland, OR | Portland General Electric

NV5 completed the Protection and Control refurbishment design at the existing Portland General Electric Gresham substation. This included replacing all 115 and 230 kV panels and integration with the existing equipment at the station. Specific challenges in this design involved the evolution of the current switching, relay transfer scheme within the main & transfer bus configuration to a modern design, using the capabilities of digital relaying.



NV5 provides customized expertise to your substation projects. Using our experience, we can assist you with any substation creation, expansion, or modification. We have gained our experience providing refurbishment services to existing 4.16-kV through 765-kV substations and generation facilities varying in age from 20-80 years old. We pride ourselves on performing our design efforts in the challenging environment that older facilities provide.

We support project of various types and sizes ranging from large greenfield projects to single component replacement for utility clients nationwide. Our goal is to supplement your own staff and produce a design effort that matches your internally-produced product.

KEY SERVICES

- Custom Steel and Foundation Design
- Constructability and Construction Phasing Assistance
- Ground Grid Design and Analysis Including Integration and Refurbishment
- Electrical Equipment General Arrangements, Plans, Sections and Elevations
- Shielding Design
- Bus Calculations
- Trench and Conduit Design
- Control Enclosure Equipment Layouts
- Commissioning Assistance
- Construction Support
- Third Party Review
- Substation Inspections and Documentation

CASE STUDY

Gresham Substation Design

Portland, OR | Portland General Electric

Portland General Electric (PGE) upgraded the Gresham substation to accommodate two new 230KV line positions and replace over-duty breakers for a total of six (6) 230KV 3000A gas circuit breakers, ten (10) new 230KV 3000A disconnect switches and seven (7) 230KV CVTs. The complete 230KV protection and control equipment was replaced, including the protection of two 230/115KV transformers. Below grade design required completely new conduit and vault system to reconnect all 230KV equipment to new 230KV control house. The overall integration of the new protection and control equipment required interfacing with the existing substation control house as well as a new 230KV control house. AC and DC station service studies were completed for 230KV system.



The fundamentals of collecting, processing, and delivering survey information have changed dramatically in the 60 years we've been providing surveying and mapping services. Our clients' needs have evolved, as has the technology. From traditional surveying techniques to cutting edge technology, NV5's survey crews are at the forefront of meeting our clients' needs.

KEY SERVICES

- ALTA/Boundary Surveys and Mapping
- As-Built Surveys
- Construction Staking
- Topographic Design/Site Surveys
- Photogrammetric Mapping
- Preparation of Legal Descriptions
- Right of Way and Route Surveys
- Control/High Precision Surveys
- Global Positioning System Surveys
- Hydrographic Surveys
- Environmental Hazardous Waste Surveys
- Expert Testimony
- Subdivision Maps and Plats
- Record of Survey Maps

CASE STUDY

Laguna Niguel Reliability Enhancement Project

Laguna Niguel, CA | San Diego Gas & Electric

This important project relocated two 138kV transmission wood pole lines which ran through steep unstable canyons in a narrow corridor to an underground system in adjacent city roadways. The two 138kV transmission lines were originally built in 1978 to provide electricity to the rapidly growing residential and commercial areas in Laguna Niguel. The two 138kV lines, providing the only source of utility power to over 48,000 customers, became of great concern to the City of Laguna Niguel and San Diego Gas and Electric when heavy rains eroded 90% of the embedment around crucial structures. The project to move the lines out of the canyon into a highly reliable and accessible underground system in City Streets was a solution embraced by the City of Laguna Niguel, San Diego Gas and Electric, and the community adjacent to the project. As part of our contract, NV5 provided comprehensive survey and mapping services throughout the life of the project.

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KEY SERVICES

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- Cable Pulling Tensions
- Construction Support
- Power Quality Studies
- Transmission Line Relocation and Reconductor
- Local and Federal Agency Coordination and Processing
- Permitting/Right-of-Way
- Cable System Ampacity Studies
- Route Cost Comparisons
- Utility and Topographic Surveying
- Construction Plan and Profile Drawings
- Underground Conversion Design
- As-Built Surveying
- Power Flow Analysis
- Siting and Permitting
- Foundation Analysis and Design
- Structure Modeling and Analysis
- Duct Bank Optimization

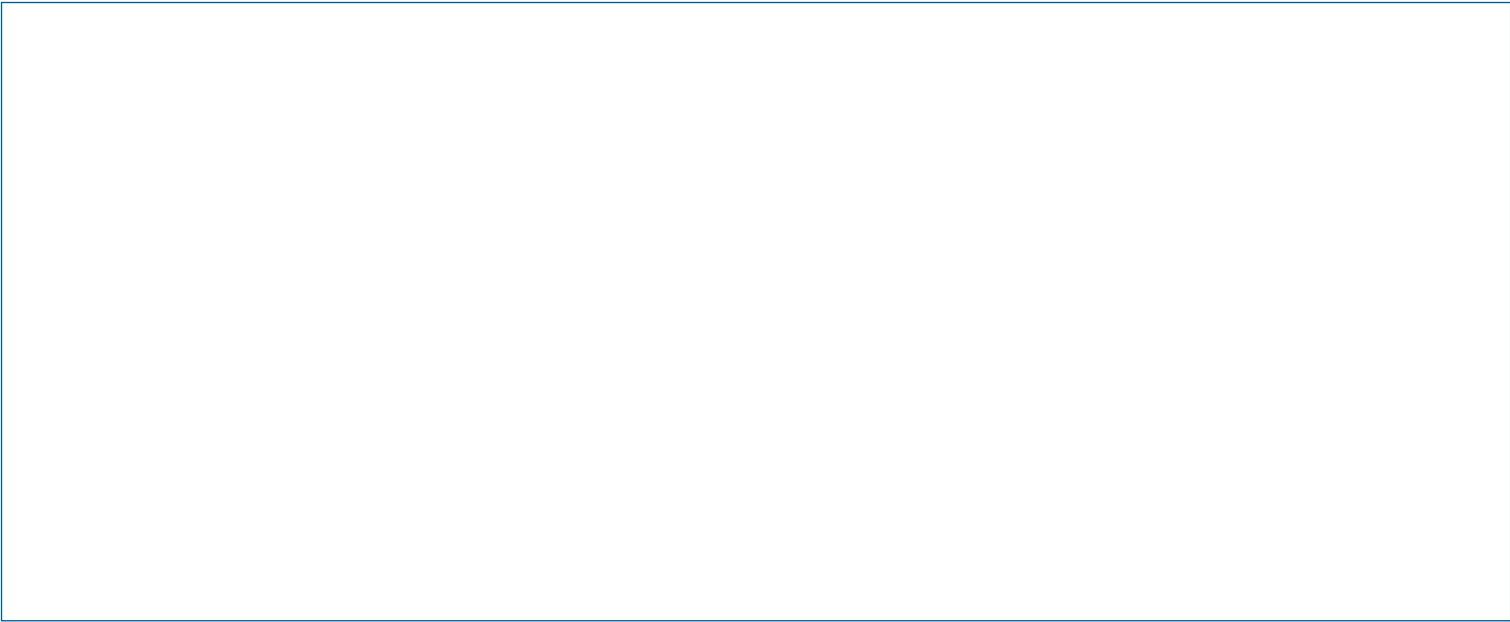
CASE STUDY

30th Street Rule 20A

Transmission Undergrounding

San Diego, CA | San Diego Gas & Electric

The project involved the undergrounding of a 3.5 mile, 138 kV overhead electric transmission line to provide a safer and more reliable energy source. NV5 provided design, project management, construction inspection, research and analysis of right-of-way maps, boundaries and easements, and topographic and utility surveys for the project. NV5 designed the final plan and profile drawings, performed construction staking and completed the as-built drawings as the trench was being constructed to ensure the accuracy of the final design. In addition, NV5's civil/structural division designed the access openings through the 30th Street Overcrossing Bridge at SR 94 and provided inspection services during the construction to ensure compliance with the plans and specifications which were completed to Caltrans' Standards.



NV5 specializes in the protection of people, property, and the environment. Our environmental services measure and define challenges so we can develop and implement solutions to reduce business and environmental risks. Our staff includes registered engineers, geologists, hydrogeologists, archeologists, inspectors, certified industrial hygienists, certified safety professionals, and certified indoor environmental consultants who provide consulting and testing services. At NV5, we understand what it takes to complete high quality monitoring projects and address concerns regarding environmental issues and corrective action.

KEY SERVICES

- Archaeology
- Cultural Resource Services
- Ecology & Wetlands
- Environmental Project Management
- Environmental Training
- FERC Experience
- Hazardous Materials, Site Investigation and Remediation
- Hydrogeology
- NORM/TENORM
- Occupational Health and Safety
- Permitting and Agency Coordination
- Radiation Safety
- Wetlands and Habitats

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CASE STUDY

TBD
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