

ENGINEERING DESIGNER

JOB DESCRIPTION

Classification Responsibilities: Under general direction, an Engineering Designer performs advanced paraprofessional engineering or architectural work (*based on assignment*) entailing design layout and plan review, and related work as required. Employees in this class are responsible for project management, utility coordination and design. Project management involves taking a project from the initial development of the scope of work to the completed plans stage to construction in order to attain the desired results, whether the project is designed in-house or by a consultant. Employees in this class may also coordinate/manage projects performed by outside consultants. Work may include the design of public work improvements or installation of facilities such as: sanitary sewers, storm drains, street improvements, retention basins, site improvements, building remodels, parks, and new buildings. With preparation of bid documents, securing necessary permits and approvals, preparing cost estimates, tracking budgets, coordination with other City departments, and performing quality control and assurance. Engineering designers draft both 2D and 3D designs of piping systems, utilities, roadways, and other infrastructure systems for the City's Capital Improvement Program (CIP). Employees in this class are assigned to work on projects involving a variety of design work ranging in scope from standard or simple designs to those that are more difficult or complex in nature. Employees in this class may be responsible for supervising lower level clerical, paraprofessional, or technical staff. Considerable discretion is left to the employee in determining methods for accomplishing work objectives. Employees may be assigned to general civil projects, or to one of the specialty assignments listed below.

Gas Engineering Assignment: An employee assigned to gas engineering will also be responsible for performing specialized and difficult engineering and technical work related to the design and operation of the City's natural gas system. Work involves the ability to prepare routine and special reports, including required federal documents. In addition, an employee in this class may supervise technicians in the design and drafting of gas systems plans. Employees are expected to use specialized knowledge and developed technical skills in completing assignments, including sizing of gas meters, regulators, relief valves, and piping systems. This class is distinguished from the Senior Gas Engineering Technician class by its full supervisory responsibilities, as well as its overall accountability for the Gas Engineering Section.

Landscape Design Assignment: An employee assigned to landscape design will be responsible for performing the full range of landscape design tasks which includes preparing landscape plans and specifications used for landscape design projects; planning and developing landscape and irrigation designs; preparing design criteria and bid documents; monitoring and developing budget cost estimates; preparing reports and calculations related to landscape designs; assisting with the bidding and Council award process; directing and coordinating landscape design and construction of municipal projects, including designing Capital Improvement Program (CIP) landscape projects, from the conceptual draft phase through construction and completion of landscape projects for the City; performing comprehensive project management duties under the direction of the Landscape Architect; directing and coordinating projects with other departments and outside agencies and/or companies to review landscape design projects; performing project quality control and assurance through conducting construction inspections, and by securing permits and approvals for project work; verifying project quantities and pay applications, and negotiating change orders; communicating with the general public regarding landscape

projects; completing projects within established timeframes; managing consultants designing City landscape projects through reviewing consultant design work and project schedules to ensure compliance to project contract and plans and specifications; reviewing landscape plans for other project managers with the purpose of providing professional review and comment regarding the design of landscape projects, and ensuring compliance with project specifications; and acting as lead over paraprofessional technical staff in planning, designing, and creating landscape projects.

Subdivision/Streetlighting Assignment: An employee assigned to streetlighting will also be responsible for performing technical and skilled paraprofessional engineering work in the examination of construction plans for streetlighting systems and subdivision development. Incumbents of this class perform plans examination duties for one of two assignments: subdivision development review or streetlighting systems. In addition to the review of plans for the development of a parcel of land into residential (single family) lots, the subdivision development assignment also includes the review of utility (water and sewer) extension projects to a proposed development site, and review of off-site improvements (pavement, curb, gutter, and sidewalks). The streetlighting assignment entails plan review of streetlight systems for subdivisions, and either design or plan review for capital improvement projects and special improvement districts.

Technical Illustration Assignment: An employee assigned to perform technical illustration work will also be responsible for preparing a wide variety of detailed designs, commercial artwork, architectural renderings, special displays, and other visual aids; and providing project coordination for building remodeling work. The three major functions of an employee in this class are to: 1) prepare technical illustrations and graphics for a wide variety of City reports and presentations; 2) prepare plans and specifications for architectural, landscaping, and civil design projects; and 3) serve as a liaison between City departments and outside consultants for building design and remodeling work. Some drawing and design projects require creative work and individualized treatment.

Utility Coordinator Assignment: An employee assigned to perform utility coordination work will also be responsible for coordinating and establishing working relationships with outside agencies and utility companies such as: federal, state, and local government; Salt River Project (SRP); CenturyLink; Verizon Wireless; Southwest Gas; cable television; school districts; and railroads. This class will serve as the City's single point of contact when coordinating with outside agencies and utility companies regarding the City's capital improvement projects including submitting plans and specifications for review comments and as-built plans. Duties also include: attending utility coordination meetings with in-house staff, outside agencies, and utility companies; reviewing plans; verifying field work is done according to plans and permits; and requesting licenses from outside agencies. Extensive verbal and written communication skills are required in order to perform utility coordination responsibilities.

Distinguishing Features: An Engineering Designer is distinguished from an Engineering Technician IV by having a greater percentage of design and project management work. Work is performed under the direction of a Supervising Engineer, Senior Civil Engineer, Civil Engineer, Right of Way Manager or a Landscape Architect (***based on assignment***). This class is FLSA nonexempt.

QUALIFICATIONS

Employee Values: All employees of the City of Mesa are expected to uphold and exhibit the City's shared employee values of Knowledge, Respect, and Integrity.

Minimum Qualifications Required. Any combination of training, education, or experience equivalent to extensive (5+ years) engineering experience (civil drafting, architectural drafting and design, natural gas systems, technical research, exhibit preparation, commercial graphical illustration, streetlighting, utility coordination, etc., *based on assignment*). Any combination of training, education, and experience equivalent to graduation from an accredited college or university with a Bachelor's Degree in Landscape Architecture or related field, and a minimum of one year of engineering experience (landscape drafting, landscape design, or related experience) (*Landscape Design Assignment*). Experience interpreting and applying engineering codes and standards related to streetlighting, landscaping, or other similar engineering codes/standards is required (*Subdivision/Streetlighting Assignment*).

Special Requirement. Must possess a valid Class D Arizona Driver's License by hire date.

Substance Abuse Testing. None.

Preferred/Desirable Qualifications. Civil engineering and/or architectural experience is desirable. College coursework or technical school coursework in Civil Engineering, Mechanical Engineering, Architecture, Commercial Art, or closely related field is also desirable. Experience designing gas distribution systems (gas mains, gas service lines, gas meters and regulators, gas regulator stations, and federal code experience) is preferred (*Gas Engineering Assignment*). Possession of a Bachelor's Degree in Landscape Architecture is preferred (*Landscape Design Assignment*). Experience reviewing plans and verifying field work is completed according to plans and permits are preferred (*Utility Coordinator Assignment*).

ESSENTIAL FUNCTIONS (*may vary by assignment*)

One position may not include all of the essential functions, knowledge and abilities listed, nor do the listed examples include all the knowledge and abilities which may be found in positions of this classification.

Communication: Communicates with outside agencies, utility companies, the general public, other City employees, vendors, management, contractors, and public officials in order to explain policies, procedures, and regulations relating to the development process. Instructs and trains staff in a classroom setting regarding design and drafting of City projects. Prepares letters, memos, and specifications with clearly organized thoughts and using proper sentence structure, punctuation, and grammar.

Manual/Physical: Reviews the work products of others to ensure compliance with standard operating procedures; government regulations such as: Environmental Protection Agency (EPA), Arizona Department of Transportation (ADOT), U.S. Department of Transportation Office of Pipeline Safety, Federal Highway Administration (FHA), Arizona Department of Environmental Quality (ADEQ), Arizona Department of Water Resources (ADWR), Arizona Corporation Commission (ACC); and City standards and guidelines. Inspects, monitors, and evaluates equipment and materials to determine compliance with prescribed operating, safety, or other standards. Operates a City vehicle requiring a standard Class D Arizona Driver's License in order to observe and measure field conditions at project locations during the design and construction phases, as well as to attend off-site meetings. Operates a variety of standard office equipment, including drafting equipment, to perform assigned duties. Enters

data or information into a personal computer (PC) in order to prepare reports and monitor data. Prepares bundles of plans and specifications for distribution and/or mailing to other City departments, agencies, or consultants. Moves plans and specifications of various weights for distances up to fifty feet. Meets scheduling and attendance requirements.

Mental: Plans, organizes, and directs the activities of design projects. May supervise technical paraprofessional staff by evaluating work involving drafting, design, and calculations of landscape projects, utility coordination, or technical illustration. Plans, organizes, and reviews development plans. Assists with the bidding and Council award process. Performs project quality control and assurance. Monitors project budgets. Prepares design criteria. Directs the work of outside consultants. Performs illustrative artwork and drafting. Prioritizes own work. Resolves design-related problems by performing calculations, evaluating alternatives, and/or interviewing affected parties. Coordinates work activities. Conducts research and analyzes data involving as-built drawings, service and operation data, and design standards to perform assigned duties. Performs mathematical calculations, statistical computations, and financial and cost analyses. Comprehends and makes inferences from written material such as plans, specifications, and correspondence. Understands and interprets blueprints, schematic drawings, and layouts to perform design review. Reviews shop drawings, verifies project quantities, verifies pay applications, and negotiates change orders. Prepares budget estimates. Estimates labor and material costs from blueprints. Learns job-related material through on-the-job training and classroom instruction regarding project design.

Knowledge/Skills/Abilities: (*common to all assignments*)

Knowledge of:

the principles and practices of civil engineering, and the methods and techniques used in the design of: public water, natural gas, sanitary sewer, storm sewer, underground utility lines, retention basins, pump stations, water storage tank sites, and public street improvements;
symbols and terminology used in engineering drawings;
engineering mapping and drafting techniques and standards;
federal, state, and local regulations and codes, and the engineering standards pertaining to the design of the project assigned;
the Maricopa Association of Government's Uniform Standard Specifications and Details, and the City of Mesa's amendments thereto;
mathematics, including algebra, geometry, and trigonometry; and
computer-aided design (CAD) programs.

Ability to:

analyze various design concepts in order to recommend the most feasible approach to meet project requirements, using engineering principles in estimating the cost of each option, comparing the cost estimates to the available budget, and considering conflicting or unusual conditions that may exist, performance versus cost, budget constraints, public safety, new technology, and alternative construction material;

research City maps, past City drawings, and rights-of-way documents, and compare this data with observed field conditions in order to acquire predesign information;

identify requirements for coordination with other agencies and City departments impacted by the project's design to ensure that their requirements are incorporated into the project design;

establish the topographic survey parameters for the design, and provide concise instructions for obtaining survey data on existing topography and elevations;

analyze topographic survey information for various physical or environmental constraints that could impact design or require removal or relocation of an existing facility;

review preliminary drafting work to determine the accuracy of the transfer of survey notes and existing facilities from as-built information previously gathered, and to determine if the conceptual design is compatible with the existing features;

create profile designs indicating proper clearance between underground facilities such as: irrigation lines, sewer, gas, water, storm drains, electrical banks, and telephone ducts;

calculate trench loads to determine special bedding details for utility lines;

prepare a project specifications book containing all contract documents, performance and payment bond forms, insurance forms, and special permits or licenses, including the necessary special provisions and technical specifications for specialty items of work which must be brought to the attention of the contractor;

respond to inquiries from representatives of the construction industry and potential bidders to clarify points about the plans and specifications (contract documents) and the bidding process;

review consultant's construction cost estimate by analyzing each item on the plans and determining their respective projected cost at bid time, and make modifications to the project design if the projected amount exceeds budget;

coordinate the project construction schedule and activities of the various agencies involved within the project limits;

explain policies, procedures, and regulations relating to the development process to a diverse audience which includes: consultants, contractors, other City employees, and the general public;

oversee and direct consultants and subordinate personnel in the design of capital improvement projects and other duties and responsibilities;

perform design duties with minimal direct supervision; and

establish and maintain effective working relationships with coworkers, management, and representatives of other City departments.

Gas Engineering Assignment:

Knowledge of:

natural gas systems principles, practices, and methods of operation;

cathodic protection methods and tests; and

the pipes, meters, regulators, and materials common to natural gas distribution systems, and sizing of those items.

Skill in the use of drafting tools and equipment.

Ability to:

design natural gas distribution systems;
design cathodic protection systems and elements;
supervise technicians in the design and drafting of gas system plans;
review requests for gas services and meters for size, location, and safety requirements;
provide information to homeowners, developers, architects, engineers, and the general public on matters relating to the gas system;
prepare or oversee the preparation of routine and special reports, including required federal documents;
calculate gas load; and
estimate project and construction costs.

Landscape Design Assignment:

Knowledge of:

full-range of landscape design tasks involving preparing landscape design plans and specifications, and designing and managing landscape projects in the City's CIP through the full lifecycle of a project;
design standards and specifications for landscape projects;
principles of municipal project management; and
principles and practical application of leading and/or supervising paraprofessional technical staff.

Ability to:

direct and coordinate landscape design and construction of municipal projects including parks, recreation, and cultural development programs; streetscapes; multi-use paths; and other City site developments;
plan and develop landscape and irrigation designs;
design and develop municipal CIPs;
design projects that range from simple in design to more complex projects;
design landscape projects using drafting equipment;
prepare design criteria and budget estimates;
manage consultants to ensure project compliance to design standards and contract requirements;
project manage landscape design projects from conceptual phase through final phase of construction;
prepare design and bid documents;
secure permits and approvals for project work;
prepare cost estimates and monitor budget;
coordinate with other City departments, outside agencies, and consultants to conduct design review;
perform quality control and assurance on projects;
review landscape designs for other project managers;
communicate with the general public, outside agencies, and other City departments;
assist with the bidding and Council award process; and
coordinate change orders due to utility conflicts.

Subdivision/Streetlighting Assignment:

Knowledge of:

street improvement requirements (example: location and width of sidewalks, dedication of necessary rights-of-way, and survey monuments of the correct types at all necessary locations);
water utility improvement requirements (example: water main sizing, locations, materials, and appropriate water valves and spacing);
sewer utility improvement requirements (example: trench load calculations and correct separation of sewer and water utilities);
irrigation improvement requirements (example: construction of irrigation structures);
storm drainage improvement requirements (example: compliance with policies governing street runoff retention, on-lot retention, and drainage of retention areas);
streetlight improvement requirements (example: lighting design appropriate for land usage, light pole setback and spacing, and type of pole arm and length); and
the City of Mesa amendments to the Maricopa Association of Government's Uniform Standard Specifications and Details.

Ability to:

review plans of underground or overhead power, television, and phone lines to determine whether there are possible conflicts with streetlight poles;
calculate voltage drops for streetlight installation purposes;
review gas and water line plans for possible conflicts with streetlight pole bases, conduit, pull boxes, and lighting control cabinets;
design streetlight systems for City capital improvement projects and special improvement district projects by using the same procedures, regulations, details, codes, and guidelines used in reviewing the plans and checking calculations of engineering consultants;
handle the stress of meeting deadlines of having streetlight plans and special provisions for a project ready for advertisement for bid and plan pickup, while incorporating numerous last minute changes in plans and specifications;
review plans to confirm proper street and rights-of-way widths, alignment, and grades of curb and gutter, pavement sections, and compatibility with existing improvement within the adjacent areas already developed;
check soils reports to determine if special treatment of subgrade under curb, gutter, and sidewalk is necessary to expansive soil conditions;
review plans to confirm that all curve data for curves and cul-de-sac have been provided, and that cul-de-sac radii comply with the requirements;
check plans for proper sewer line slopes, sizes, and depths to ensure adequate flows and capacities;
coordinate acquisition of easements and rights-of-way with the Real Estate Services Unit;
work with the Utility Operations Unit to coordinate water and sewer projects which will have a direct impact on their daily operations and future service areas;
coordinate with Gas Engineering the incorporation of gas system design onto plans;

work with cable and utility companies to coordinate street improvements that may affect their facilities;
and
explain policies, procedures, and regulations relating to the development process to a diverse audience
which includes: professional engineers, contractors, other City employees, and the general public.

Technical Illustration Assignment:

Knowledge of:

the principles and practices of architecture, and the methods and techniques used in the design of site improvements, building remodels, and new buildings;
computer based photo rendering/simulation;
graphic arts techniques including: design, color, composition, and graphic arts media;
graphic arts reproduction methods and costs;
symbols and terminology used in architectural drawings;
architectural drafting procedures;
techniques, materials, and equipment used in commercial art;
federal, state, and local regulations and codes, and architectural standards pertaining to the design of assigned projects;
Uniform Building Codes (UBC), and fire, electrical, and mechanical codes;
reprographics and micrographics; and
screen printing and offset lithography.

Ability to:

communicate engineering and architectural concepts through multi-media drawings in order to clarify ideas for consideration by management, the public, and the City Council;
translate the generalized wishes for building design and remodeling into conceptual drawings depicting the finished project;
research and provide the background information needed by the architectural consultant in order to ensure that the consultant has all the information needed to start the program and to maintain timely progress toward completion;
create logo designs, posters, and flyers which are seen as attractive, eye-catching, and easy to understand in order to convey a message at a glance;
prepare plans and specifications for architectural, landscaping, and civil design projects;
apply fine hand dexterity;
think using images in place of or in addition to words;
apply the art of calligraphy; and
use a proportion scale.

The duties listed above are intended only as general illustrations of the various types of work that may be performed. Specific statements of duties not included does not exclude them from the position if the work is similar, related, or a logical assignment to the position. Job descriptions are subject to change by the City as the needs of the City and requirements of the job change.

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