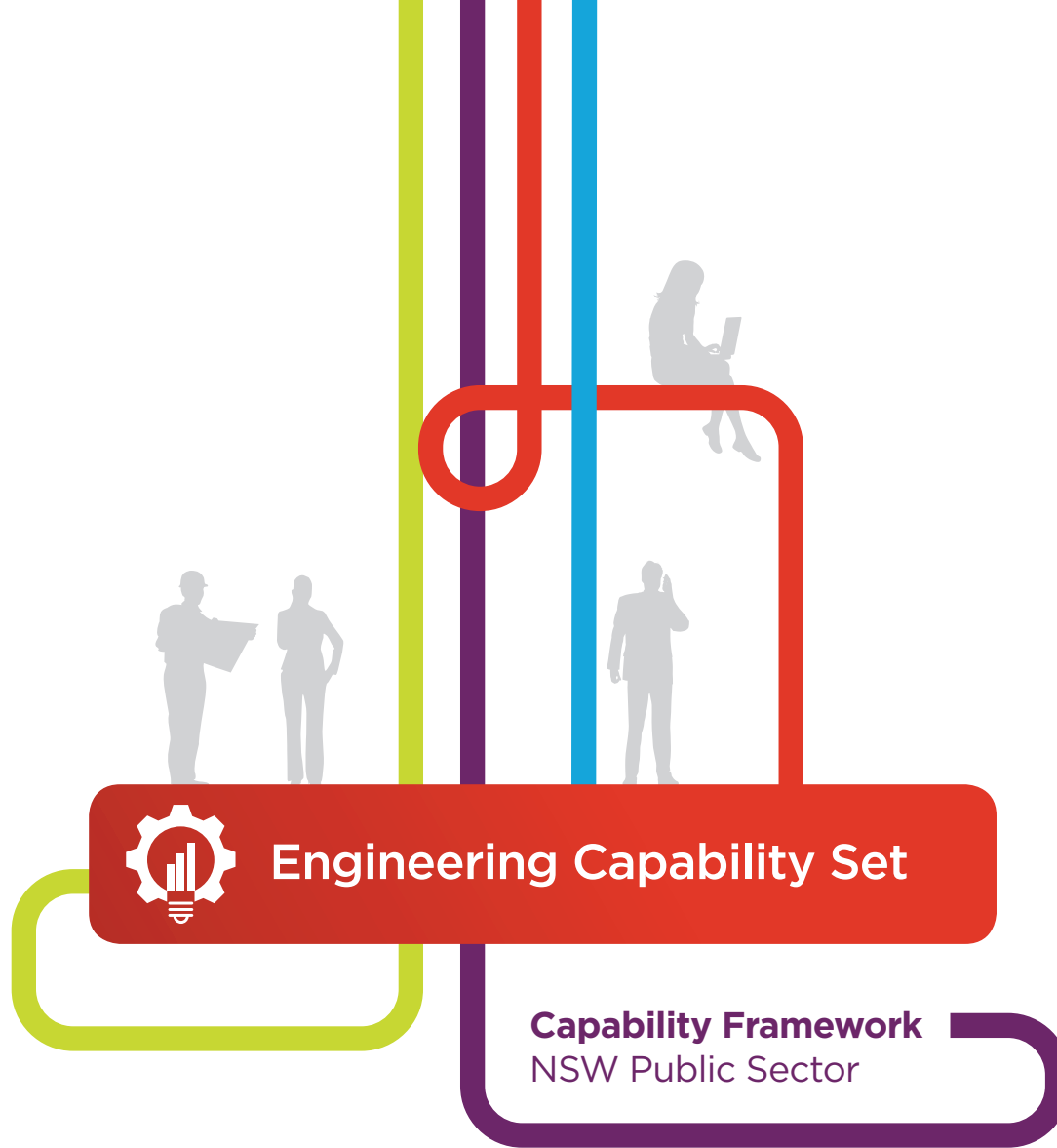




Transport
for NSW



NSW Public Sector Capability Framework and the Engineering Capability Set



The Engineering Capability Set at a Glance

Capability	Definition
Engineering Professional Knowledge	Acquire, comprehend and apply local and advanced knowledge to design, deliver and improve engineering activities, solutions and practices.
Creativity and Innovation	Develop creative and innovative solutions to engineering problems.
Evaluation	Evaluate the outcomes and impacts of engineering activities.



Engineering Professional Knowledge

Acquire, comprehend and apply local and advanced knowledge to design, deliver and improve engineering activities, solutions and practices.



Level 1

Display a theory based understanding of the underpinning knowledge fundamental to the engineering discipline.

Identify and describe the basic principles pertinent to a specific area of engineering practice and context.

Analyse client requirements and data to systematically design engineering solutions to address a well-defined problem or need.

Assist in the preparation of standard engineering reports, designs and fundings in the required format using agreed technologies techniques and tools.

Adhere to engineering professional, workplace and statutory controls, policies and codes for ethics, compliance and risk.

Create and maintain documentation and data associated with a small scale engineering project.

Display broad understanding of the scope, principles, norms, accountabilities and bounds of sustainable practice in engineering.



Level 2

Engage with the client and immediate stakeholders to isolate constraints and the requirements for an engineering design or process.

Work with the client or stakeholder to prepare the optimal engineering report, design and solution that meets the requirements.

Apply systematic tools, techniques and methods to effectively plan and implement a well-defined engineering project.

Understand the environmental and economic and societal impacts of project alternatives and explain the impact of those alternatives to the client or to stakeholders.

Apply an appropriate hazard and risk framework to engineering design and activities and escalate major risks.

Develop, test and operate engineering designs or activities within an appropriate hazard and risk framework.



Level 3

Display understanding of engineering theory and application relevant to competent practice in the chosen discipline.

Apply specialist bodies of knowledge and contextual factors to shape engineering outcomes in a specific area of engineering practice and context.

Collaborate with internal and external clients or stakeholders to correctly specify the optimal capability or functionality of the required product, project, process or system.

Utilise risk and hazard frameworks to manage and mitigate hazards effectively through the project lifecycle.

Coordinate and manage client or stakeholder relationships to ensure fulfilment of the engineering project, report, design or solution.

Understand all relevant laws, regulations, codes, standards and other instruments affecting engineering designs or work and assure conformance.

Develop a business case and implementation plan for an engineering project, report, design or solution.

Assess and determine the environmental, economic, and societal impacts of project alternatives and explain the impacts of those.



Level 4

Comprehend and apply advanced theory- based understanding of engineering fundamentals to predict the effect of engineering outcomes.

Acquire, synthesise and apply specialist engineering knowledge from internal and external relationships to improve operational, design or project outcomes.

Coordinate the end-to-end engineering planning and design process.

Develop systems for accurately capturing and reporting client or stakeholder requirements and consultative findings into successful engineering solutions.

Coordinate and review the management of risk across engineering operations or projects.

Direct and coordinate planning, execution, evaluation and reporting of complex engineering projects or a portfolio of projects.

Execute and review engineering activities to optimise sustainable operations and client / stakeholder outcomes.



Level 5

Provide expert advice and strategic direction for advancing complex engineering knowledge, theory and practices.

Display deep, theoretical understanding of the underpinning mathematical, scientific, natural and physical sciences required to practice in a specialist area of engineering practice.

Identify, evaluate and advise on how advances in specialist engineering knowledge, practice or technology can be harnessed to optimise current practices, processes and activities in a specific context and area of practice.

Research and anticipate how global advances in knowledge or technology will impact engineering practices, processes and activities in specific area of engineering practice or operational context.

Drive strategic engineering planning and integrated management of complex engineering operations.

Drive high level stakeholder relationships within and beyond the business and engineering profession.

Establish engineering risk management and compliance frameworks, policies and systems for an organisation or area of operation.

Review and assess work across a portfolio of projects to optimise business and client or stakeholder outcomes.

Optimise the contribution of engineering systems, technologies and operations to organisational or wider societal standards for sustainability outcomes.



Creativity and Innovation

Develop creative and innovative solutions to engineering problems.



Level 1

Apply basic engineering techniques, tools and resources, under supervision improve designs or overcome simple engineering problems.

Invite feedback to secure different points of view.

Employ principles and use knowledge from one or more areas of engineering practice to design a project, product or system that solves or improves a well-defined engineering problem.

Identify opportunities for innovating in ways that will improve engineering practice.



Level 2

Apply engineering techniques, tools and resources in a fluent manner to solve complex engineering problems or to select the optimal design option.

Seek and use feedback from clients, experts and peers to question, experiment and improve engineering designs, products, projects, processes or systems.

Use specialist engineering knowledge of materials and physical and abstract objects to improve the performance and functionality of existing products or solutions.

Challenge and continually search for better options and innovative engineering solutions.

Use advanced idea generation tools and techniques to effectively engage with diverse individuals that can stimulate breakthrough engineering thinking and practice to develop creative engineering solutions.



Level 3

Coordinate the search for ways to innovate or create improved engineering processes, products or systems.

Use creative insights and innovative practices to enhance value, develop improved design or aesthetics, or improve engineering solutions for a client or stakeholder.

Promote activities that extend the current thinking and performance in a specific field of practice.

Establish systematic approaches to the conduct of innovation in engineering projects, processes and practices.

Study and draw on contemporary engineering research and literature to advance professional thinking and practice.



Level 4

Champion opportunities to improve final engineering processes, products or systems.

Stimulate and model creative thinking and innovative practices and processes in an engineering team.

Champion and encourage creativity and innovation within an engineering team or project.

Determine the business benefit and risk parameters for the conduct of improvement and innovation in engineering operations.

Experiments and nurtures creative thinking and questioning in the engineering workforce.



Level 5

Establish mechanisms to evaluate engineering operations and to promote opportunities to continuously improve and learn.

Sponsor a positive culture of engineering professional practice that embraces and proactively encourages creativity and innovation.

Remove obstacle for identifying and sharing advances in professional practice within a specific engineering field or context.

Coordinate the collection and reporting of the benefits derived from the conduct of improvement and innovation in engineering operations.

Harness creative thinking and idea development in the engineering profession or a workforce to enhance strategic outcomes.

Partner with academia and industry to identify opportunities for technical and process advancement.



Evaluation

Evaluate the outcome and impacts of engineering activities.



Level 1

Demonstrate use of foundation engineering evaluation theories, models, methodologies and tools.

Establish a clear, precise understanding of the end-to end business process and the role of an engineer and the engineering activity in achieving business or client outcomes.

Identify reliable and valid measures and data collection methods for measuring the success of a well-defined engineering design or activity.

Test the feasibility and limitations of an engineering design or planned action against well-defined requirements.

Collect, analyse and make insights using data relating to a well-defined engineering activity or task.

Plan and document results from testing small scale engineering products, processes or systems.

Apply standard evaluation methodologies for engineering activities.



Level 2

Design, implement, evaluate and report on engineering activities.

Confirm the lifecycle and particular stage to determine the type and optimal means to undertake evaluation.

Establish the most accurate and appropriate measures for testing and evaluating if an engineering design or activity meets planned requirements and outcomes.

Ensure costs, risks and limitations are properly understood in the context of the desired engineering and client or stakeholder outcome.

Collect, analyse and make insights using data relating to complex engineering activities or projects.

Develop models, scenarios, concepts or means to test, verify, validate, measure and evaluate engineering products, processes or systems.

Implement a range of evaluation methodologies for engineering activities.



Level 3

Evaluate ongoing engineering projects, products and processes to identify and diagnose performance deficiencies, impending or actual failures, and propose remedies and solutions.

Monitor and evaluate product, project, process or system against whole of life criteria.

Set and communicate criteria to monitor and review the effectiveness of engineering designs or activities.

Use internal and external experts to evaluate and validate product, process or systems outcomes.

Assess and use technical information and statistics correctly to evaluate engineering activities and make sound evidence-based recommendations.

Diagnose performance deficiencies, conceive and design remedial measures and predict performance of engineering products, processes or systems.

Evaluate overall engineering processes and projects to gain data and input to drive future design or process improvement.



Level 4

Coordinate evaluation across multiple engineering projects, programs, or processes and report high level insights or opportunities to improve.

Establish and coordinate work flow for engineering activities and asset management that effectively support organisational or client strategic outcomes.

Evaluate overall engineering operations, including ongoing maintenance and support.

Develop data collection and management policy and systems for engineering operations.

Report clear, evidence-based insights into the strengths and limitations of current engineering products, processes or systems.

Source specialist advice in review and evaluation of engineering projects, processes, products, or systems and identify opportunities for improvement.



Level 5

Oversee the policy, scope and governance procedures for the evaluation of engineering operations.

Establish organisational, lifecycle or cross-program (portfolio) engineering measurement and evaluation systems.

Sponsor and model a culture of professionalism that actively seeks to improve engineering operations and organisational or client outcomes.

Advise on technology and systems required to develop comprehensive, reliable and valid data-driven insights into engineering operations.

Verify client, organisational or market benefits from an engineering strategy or operations.

Ensure evaluation processes drive continuous strategic support and investment in engineering operations.