

COMPETENCY STANDARDS FOR QUANTITY SURVEYING PROFESSIONALS - INFRASTRUCTURE

INTRODUCTION

The AIQS Infrastructure Competency Standards (Standards) provides the basis for the development and evaluation of the level of competency of quantity surveying professionals involved in infrastructure projects covering the requisite skills to perform tasks and the management of those tasks. These Standards are used in the AIQS membership entry process.

These Standards detail the core and specialist requirements of a competent quantity surveying professional and are designed to:

1. evaluate university degrees and training programs available to those wishing to enter the profession
2. review the skills of built environment cost professionals and identify their ongoing education needs.

ABOUT AIQS

The Australian Institute of Quantity Surveyors (AIQS) is the peak professional body for quantity surveying professional who provide quantity surveying and related services across building (*including residential, commercial, education, healthcare, and industrial*), infrastructure (*including airports, ports, social, rail, road and rolling stock*), natural resources (*including mining, oil and gas refineries, onshore and offshore platforms and facilities*), and utilities (*including water, telecommunications, and energy*) projects.

The primary role of AIQS is to raise the profile of its members and the profession through the development and delivery of educational, professional, and technical standards, the delivery of new information, and continuing professional development.

CAVEAT

The competencies described in this publication may be acquired by quantity surveying professionals over a lifetime of professional practice, education, and training. The specialist competencies are optional and might only be acquired by built environment cost professionals working in a specific area or on specific projects. It is therefore unlikely that all these competencies will be found in any one quantity surveying professional.

ACKNOWLEDGEMENTS

AIQS would like to acknowledge the contribution of the AIQS Infrastructure Steering Committee, chaired by Mike O'Shea FAIQS, CQS, which resulted in Competency Standards relevant to the infrastructure sector.

CONTACT

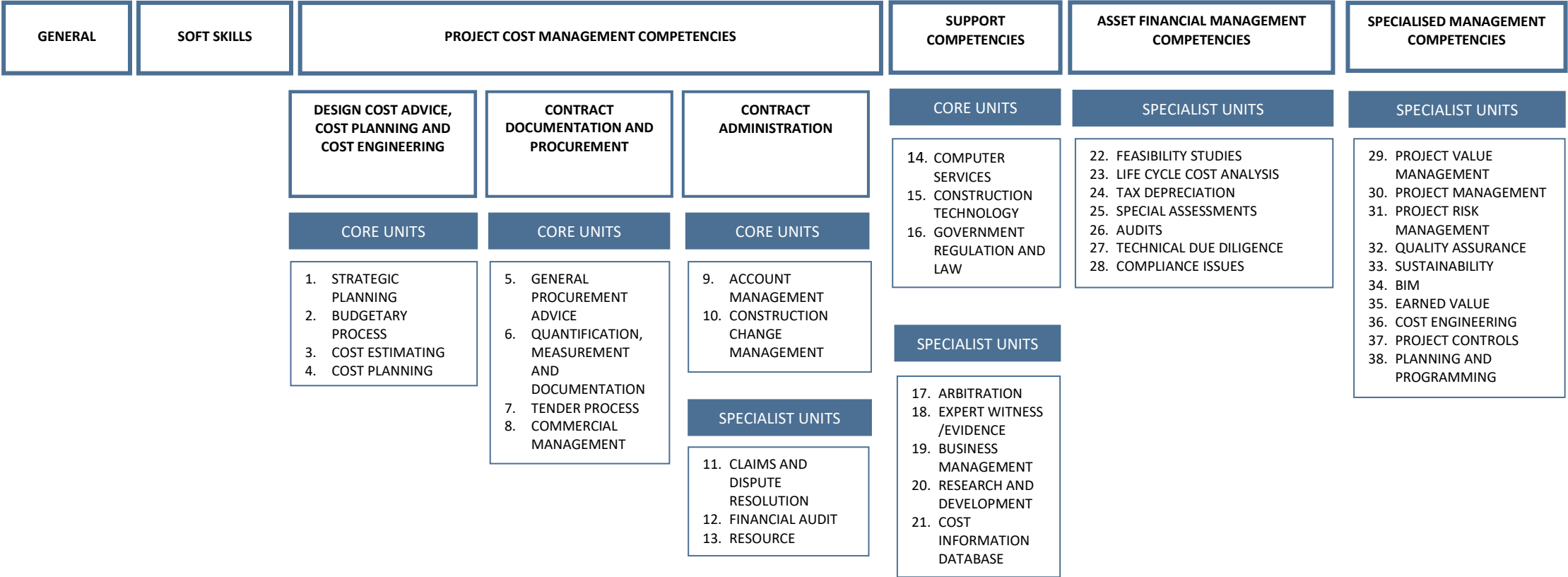
If you have any question relating to the AIQS Infrastructure Competency Standards or becoming a member of AIQS, email membership@aiqs.com.au or call +61 2 8234 4000.

COMPETENCY STANDARDS FOR INFRASTRUCTURE QUANTITY SURVEYING PROFESSIONALS

GENERAL
 SOFT SKILLS
 PROJECT COST MANAGEMENT COMPETENCIES

- DESIGN COST MANAGEMENT, COST PLANNING AND COST ENGINEERING
- CONTRACT DOCUMENTATION
- POST CONTRACT SERVICES

 SUPPORT SYSTEM COMPETENCIES
 ASSET FINANCIAL MANAGEMENT COMPETENCIES
 SPECIALISED MANAGEMENT COMPETENCIES



SOFT SKILLS

The soft skills that lead to a competent quantity surveying professional are:

Communication skills	<p>The ability to:</p> <ul style="list-style-type: none"> • communicate effectively, orally, in writing and with visual aids • combine fact or ideas into a complex whole • prepare written information in a formal way which clearly conveys meaning.
Personal and interpersonal skills	<p>The ability to:</p> <ul style="list-style-type: none"> • demonstrate self-confidence time management and self-motivation and enthusiasm • understand the role and motivation of others and participate in professional and inter-professional teamwork • identify and assess problems and find innovative solutions • set and achieve personal objectives and targets • understand and, where appropriate, apply marketing and negotiating skills.
Business and management skills	<p>The ability to:</p> <ul style="list-style-type: none"> • recognise the need for cost-effective use of appropriate resources • understand the process of quality control and assurance, and understand appropriate certification • recognise consumer and client needs and the process for their satisfaction • understand accounting principles, including budgets and cash flows • understand the scale of fees and charges for professional services • be familiar with general economic principles.
Professional practice	<p>The ability to:</p> <ul style="list-style-type: none"> • understand the structure of AIQS, its by-laws and code of conduct. • recognise the nature and significance of construction development in all its forms • understand the role responsibilities and legal liabilities of quantity surveying professionals in matters of practice • understand and apply the ethics of professional practice • understand and apply legislation relevant to providing a professional service including registration of quantity surveying professional and quantity surveying practices • understand the role of a quantity surveying professional in a multi-disciplinary project team
Technology literacy	<p>The ability to:</p> <ul style="list-style-type: none"> • work independently and with others, to ethically and effectively use technology to access, manage, integrate, evaluate, create, and communicate information.

These soft skills form the platform from which a competent quantity surveying professional can develop and are an integral part of the various units of competence. These abilities and knowledge may be developed during tertiary education or by personal development. Some may be included as modules of quantity surveying and related courses.

PROJECT COST MANAGEMENT COMPETENCIES

AREAS OF CORE PROFESSIONAL COMPETENCIES

RANGE INDICATORS FOR ALL COMPETENCIES

Competencies in the various performance criteria will be demonstrated in the execution of typical work undertaken as a quantity surveying professional. The work in question will call for the application of extensive knowledge appropriate to the discipline. Such knowledge will normally be acquired through a structured program of education to degree level incorporating training and work experience.

This activity would be based on a clear understanding of the processes involved and includes:

- construction and financial practices in the construction industry.
- life cycle implications where required
- appropriate recording and documentation of information including costings.

Quantity surveying professionals would demonstrate a thorough understanding of:

- factors affecting the industry
 - micro and macro-economic factors
 - technological factors
 - the influence of escalation and market conditions on construction costs
 - Government policy
 - legislation
 - societal factors.
- principles of construction and the use of materials
- the legislative and regulatory requirements of the industry.

Additional range indicators for specific competencies are included where required. Communication and computing skills would also be applied in conjunction with these competencies.

Project cost management involves various cost management and procurement procedures to ensure that the Client's budget is properly established and maintained.

DESIGN COST ADVICE, COST PLANNING AND COST ESTIMATING COMPETENCIES

Cost management of a project includes establishing the budget and then effectively monitoring and reporting against that budget on a regular basis, cost planning the evolving design, preparing appropriate contract documentation, and advising on variations and claims during the progress of the project.

ADDITIONAL RANGE INDICATORS

- Strategies for gathering data and carrying out research on current construction costs and future predictions
- Analysis of data relating to costing, budgeting and cashflows including financial implications of various options
- Use of appropriate analysis and evaluation techniques in reporting
- Application of principles of cost management, elemental cost analysis, first principles estimating and benchmarking.

COMPETENCY STANDARD UNIT 1 - STRATEGIC PLANNING (CORE UNIT)

ELEMENT	PERFORMANCE CRITERIA
1.1 Provide strategic advice on the costs and benefits of various courses of action on a construction project	1.1.1 Various techniques for value optimisation established and implemented 1.1.2 Advice on various courses of action provided
1.2 Conduct economic and financial analyses for the life of a construction project	1.2.1 Relevant financial and economic data collected 1.2.2 Financial and economic data analysed for life of project
1.3 Provide input into the development of the project brief	1.3.1 Relevant data collected 1.3.2 Input into project brief provided
1.4 Conduct compliance and management studies	1.4.1 Requirements of relevant government planning and environmental legislation and regulation researched 1.4.2 Strategy developed for compliance and management of the project in line with established requirements
1.5 Prepare cost benefit analyses	1.5.1 Data for cost benefit analyses accessed and evaluated 1.5.2 Cost benefit analyses prepared

DESIGN COST ADVICE, COST PLANNING AND COST ENGINEERING COMPETENCIES COMPETENCY STANDARD UNIT 2 – BUDGETARY PROCESS (CORE UNIT)

ELEMENT	PERFORMANCE CRITERIA
2.1 Establish and maintain cost management and monitoring procedures	2.1.1 Control systems established 2.1.2 Cost administration procedures established 2.1.3 Cost reporting and forecasting systems established and maintained 2.1.4 Variation control systems established and maintained
2.2 Co-ordinate Client's cash flow	2.2.1 Required data collected 2.2.2 Appropriate procedures established for co-ordination of cash flow
2.3 Appraise Contractor's cost reporting systems	2.3.1 Contractor's cost reporting systems evaluated 2.3.2 Advice on required changes and adjustments given
2.4 Establish budget for project	2.4.1 Cost budgets for all contracts prepared and established 2.4.2 Work package scope established
3.5 Prepare cost reports	2.5.1 Format of cost reports established 2.5.2 Cost section of project progress report prepared based on appropriate data

DESIGN COST ADVICE, COST PLANNING AND COST ENGINEERING COMPETENCIES

AIQS COMPETENCY STANDARDS FOR QUANTITY SURVEYING PROFESSIONALS - INFRASTRUCTURE

COMPETENCY STANDARD UNIT 3 – COST ESTIMATING (CORE UNIT)

Traditionally, cost estimating in infrastructure has often included elements that are often seen as cost planning elements in building construction. This competency focuses on the key activities of estimating. Cost estimating being defined as the calculation of anticipated costs of proposed solution or design. It covers all the activities to develop an estimate including first principles pricing, using market coverage and risk and contingency considerations.

ELEMENT	PERFORMANCE CRITERIA
3.1 Prepare estimates	3.1.1 Scope of estimates researched and prepared 3.1.2 Detailed estimates prepared 3.1.3 Estimates for proposed changes and variations prepared 3.1.4 Cash flow prepared 3.1.5 Work/Cost Breakdown Structure established 3.1.6 Contingencies developed
3.2 Develop cost components	3.2.1 Cost factors researched and developed 3.2.2 Productivity rates developed 3.2.3 Procurement/packaging strategy considered 3.2.4 Estimated rates developed 3.2.5 Unit rates developed for cost resources such as labour rates and plant rates 3.2.6 Time related costs identified and developed (preliminaries) 3.2.7 Development of first principle cost estimate elements
3.3 Develop estimate contingencies	3.3.1 Appropriate risk approach developed and applied 3.3.2 Researched escalation factors developed and applied 3.3.3 Foreign exchange strategy 3.3.4 Design growth allowances 3.3.5 Construction growth allowances
3.4 Assess and advise on the accuracy of cost estimates	3.4.1 Cost estimates reviewed and evaluated 3.4.2 Advice provided on accuracy of estimates 3.4.3 Costs benchmarked against relevant projects
3.5 Prepare estimating procedures and conduct estimate reviews	3.5.1 Procedures for estimating researched and appropriate procedures prepared 3.5.2 Estimate reviews conducted according to sound principles and accepted professional practice

DESIGN COST ADVICE, COST PLANNING AND COST ENGINEERING COMPETENCIES COMPETENCY STANDARD UNIT 4 – COST PLANNING (CORE UNIT)

Traditionally, cost planning in infrastructure has often been referred to as the process of producing a high-level indication or order of cost of a project however cost planning is the process through which budgets and project objectives can be managed. This competency covers the process of cost planning. It is focused on the planning of how cost is going to be allocated and includes activities such as understanding project objectives, selecting appropriate cost data, analysis of design solution costs and value engineering.

ELEMENT	PERFORMANCE CRITERIA
4.1 Establish project cost objectives and parameters	4.1.1 Project cost objectives clarified with Client, colleagues, and other appropriate personnel 4.1.2 Project cost parameters, any Client guidelines and constraints identified and verified 4.1.3 Understanding of development processes involved in costing demonstrated

4.2	Access data to produce estimate/indicative costs	4.2.1	Appropriate data gathering structures to collect drawings, specification and information and develop relevant schedules
		4.2.2	Data for cost estimates/indicative costs collected and evaluated
		4.2.3	Documentation inputs to estimates/indicative cost processes prepared
		4.2.4	Productivity and benchmark data collected from sources
		4.2.5	Consideration how methodology influences cost data and selection of cost data to match methodologies
4.3	Analyse time related cost data	4.3.1	Time related cost data analysed (i.e., Preliminaries, Traffic Management)
		4.3.2	Interface Management and Associated costs
		4.3.3	Staging of part or all of the works
4.4	Undertake project cost estimate	4.4.1	Project cost estimate completed using appropriate methods considering level of information available and construction execution strategies
4.5	Analyse and advise on various alternative design solutions	4.5.1	Analyses of design construction details completed
		4.5.2	Design solutions evaluated
		4.5.3	Appropriate design solution developed, compared, and selected
		4.5.4	Identify and report alternatives, options, and value engineering
		4.5.5	Consider life cycle cost on cost advice
4.6	Prepare project implementation and procurement plan	4.6.1	Implementation and procurement plan clearly specified
		4.6.2	Any staging of the project identified with appropriate cost allowances
		4.6.3	Develop procurement packaging and procurement models and consider market engagement on packaging strategy
4.7	Prepare cost plan	4.7.1	Documentation input into cost plan prepared based on sound principles and accepted practice
		4.7.2	Cost plan developed based on estimated work and benchmarking considering life cycle costing
4.8	Undertake scope audit	4.8.1	Scope of works audit undertaken based on sound principles and accepted practice
4.9	Provide advice to Clients on estimate, cost alternatives and cost plan	4.9.1	Involvement in on-going planning/review cycle maintained
		4.9.2	Advice on cost plan provided to Client based on analysis of data
		4.9.3	Timelines and deadlines met
		4.9.4	Involvement in demonstration of value for money options, alternatives, and solutions
4.10	Cost planning during design development phases	4.10.1	Review design documents at each design stage
		4.10.2	Update cost plan and track cost plan at each design stage
		4.10.3	Report cost variances with design development and provide cost advice
		4.10.4	Participate in design development and evaluation
		4.10.5	Review the impact of constructability reviews, construction methodology and temporary works requirements
4.11	Continuous improvement in cost planning	4.11.1	Benchmark data and cost plan information collection
		4.11.2	Lessons learned
		4.11.3	Implementation of improvements
		4.11.4	Data archiving and records for future cost planning

CONTRACT DOCUMENTATION AND PROCUREMENT

Contract documentation and procurement involves the various processes by which a construction contract is achieved including the use of the appropriate project delivery system and standard form of contract, the method of tendering and contractor selection, the provision of bills of quantities and the subsequent acceptance of a tender.

ADDITIONAL RANGE INDICATORS

- Strategies for gathering data and carrying out research on project delivery systems, contractor selection and forms of contract
- Analysis of data including financial implications of various options
- Use of appropriate analysis and evaluation techniques in reporting to Client
- Methods of construction and analysis of constructability
- Appropriate recording and documentation of information including registration of interest/expression of interest, preparation of bills/schedules of quantities, work breakdown structure and cost breakdown structures
- Dispute resolution procedures.

COMPETENCY STANDARD UNIT 5 - GENERAL PROCUREMENT ADVICE (CORE UNIT)

ELEMENT		PERFORMANCE CRITERIA	
5.1	Collect information required to specify procurement requirements	5.1.1	Clients objectives established and confirmed
		5.1.2	Objectives of process specified
		5.1.3	Market conditions evaluated, and options reviewed
		5.1.4	Market engagement
5.2	Evaluate project delivery systems	5.2.1	Project delivery systems reviewed
		5.2.2	Forms of contract reviewed
		5.2.3	Types of procurement reviewed i.e., construct only, design and construct, managing contractor, alliance, and Public private partnership (PPP)
5.3	Undertake constructability analyses	5.3.1	Forms of construction analysed
		5.3.2	Forms of construction costed and optimised
		5.3.3	Constructability recommendations made
5.4	Provide input into the development of the project brief	5.4.1	Relevant data collected
		5.4.2	Input into project brief provided

CONTRACT DOCUMENTATION AND PROCUREMENT

COMPETENCY STANDARD UNIT 6 – QUANTIFICATION, MEASUREMENT AND DOCUMENTATION

ELEMENT		PERFORMANCE CRITERIA	
6.1	Establish Client requirements and advise on alternative contract document types	6.1.1	Client objectives, risk acceptance and other factors assessed
		6.1.2	Alternative contract document types explained to Client
		6.1.3	Client agreement on selected contract document obtained
6.2	Recommend and agree method of measurement and input document requirements	6.2.1	Alternative method of measurement types explained to Client i.e. CESSM4
		6.2.2	Expected quality and timing of input documents assessed
		6.2.3	Client agreement on method of measurement obtained
		6.2.4	Input documents scheduled, time-tabled and prioritised
6.3	Develop management plan for resources and other requirements	6.3.1	Trade/element or other document breakdown determined
		6.3.2	Appropriate resource levels quantified and allocated
6.4	Access and distribute input documents	6.4.1	Input documents validated and registered
		6.4.2	Input documents distributed to quantity surveying team

6.5	Prepare Bill/Schedule of Quantities	6.5.1	Measurement (software) system established and set up
		6.5.2	Items described, measured, signposted, and quantified
		6.5.3	Items sorted in appropriate sequence
		6.5.4	Preliminaries, trade or other sections and subsection headings added
		6.5.5	'Rates to include' and other pricing and measurement preamble clauses added
		6.5.6	Item reference added
		6.5.7	Elemental or other analysis codes added
6.7	Undertake quantity and other checks	6.7.1	Input document discrepancies and/or omissions noted and queried during measurement
		6.7.2	'To take' lists prepared during measurement
		6.7.3	Final input documents checked for Bill/Schedule completeness
		6.7.4	Final output document checked for spelling, omissions, etc.
		6.7.5	Cost significant items and quantities 'bulk' checked
		6.7.6	Verification of quantities
6.8	Prepare addenda as required	6.8.1	Final Bill/Schedule adjusted for corrections to input documents and errors and/or omissions

CONTRACT DOCUMENTATION AND PROCUREMENT COMPETENCY STANDARD UNIT 7 – TENDER PROCESS

ELEMENT		PERFORMANCE CRITERIA	
7.1	Manage tendering process	7.1.1	Tender and contract documents prepared
		7.1.2	Trends evaluated and analysed
		7.1.3	Contracts negotiated
		7.1.4	Changes evaluated and negotiated
		7.1.5	Results of tendering process communicated to Client
7.2	Prepare documentation inputs to the tender	7.2.1	Advice on appropriate tender documentation provided
		7.2.2	Bills/Schedule of Quantities or work breakdown structures/cost breakdown structure to aid tendering process prepared
7.3	Initiate tenderer selection process	7.3.1	Tenderer selection criteria determined
		7.3.2	Tenderer data accessed
		7.3.3	Documentation for registration of tenderer interest prepared and placed in appropriate publications
7.4	Advise on the selection of tenderers	7.4.1	Tenderers' proposals and credentials analysed against criteria
		7.4.2	Possible tenderers listed, and validity confirmed
		7.4.3	Short list prepared
		7.4.4	Client advised
7.5	Evaluate and award of tenders	7.5.1	Data gathered using appropriate structures and procedures
		7.5.2	Project objectives and parameters established
		7.5.3	Tenders evaluated and negotiated
		7.5.4	Project implementation and procurement plan identified
		7.5.5	Apply the ethics of professional practice
		7.5.6	Analysis of financial and non-financial returns made

CONTRACT DOCUMENTATION AND PROCUREMENT COMPETENCY STANDARD UNIT 8 – COMMERCIAL MANAGEMENT

Historically, commercial arrangements predominately have been arrangements between a client and contractor with a number of allocations in relation to other parties such as design consultants and architects. With the arrival of megaprojects and an increasing preference for State and Federal governments to include private capital and seek investment return as part of public sector programmes, more complex contract models have emerged.

This competency covers the role of the quantity surveying professionals in the aspects that the quantity surveying professional will encounter in more complex arrangements such joint ventures, PPP arrangements and alliances

where additional contractual agreements are required, creation of trading entities and employment of equity/debt finance.

This unit is not intended to be exhaustive in nature given the variety of arrangements being considered. However, the quantity surveying professional will have to appreciate the additional effect these arrangements can have on their work.

ELEMENT		PERFORMANCE CRITERIA	
8.1	Understand commonly used contract models	8.1.1	Understand the principles of key contract models, including: <ul style="list-style-type: none"> • PPP • management contract • collaborative arrangements (such as alliances) • design and contract (D&C) • franchise Agreements (operation and maintenance) • construct only • professional service contracts • incentivised target cost (ITC) models • design, build, operate and maintain (DBOM)
		8.1.2	Advise on quantity surveying considerations for a given contract model
		8.1.3	Identify extra considerations that are required for quantifying and costing for a given contract model, including risk allocation
8.2	Use legal advice on contract documentation	8.2.1	Understand and apply legal advice in commercial context
		8.2.2	Provide feedback to legal representative on commercial positions
		8.2.3	Understand market norms for critical contract conditions in a given sector
		8.2.4	Understand key contract clauses and time related obligations
8.3	Prepare commercial analysis	8.3.1	Prepare and recommend commercial positions to the client
		8.3.2	Assessment of commercial positions including generating any scenario analysis and/or risk assessment
		8.3.3	Conduct negotiation in a professional manner to achieve recommended commercial positions
		8.3.4	Prepare/review public sector comparator
		8.3.5	Understand timing of procurement of work packages and design interfaces between the design phases of the works packages
		8.3.6	Prepare Progress Schedules in line with Contract Sum breakdown and funding agreements
8.4	Address joint venture requirements	8.4.1	Understanding joint venture (JV) requirements
		8.4.2	Review and contribute to JV/teaming agreement development
8.5	Address consortium arrangement requirements	8.5.1	Understand consortium requirements
		8.5.2	Review and contribute to consortium agreement development
8.6	Use financial information	8.6.1	Understand and apply financial advice in commercial context
		8.6.2	Understand the role of equity and debt arrangements where required for a contractual arrangement
		8.6.3	Assess past financial performance and provide advice on course of action

8.7 Other items	8.7.1 Understand the impact on program and cost of other issues, including: <ul style="list-style-type: none">• third party agreements• complex stakeholder arrangements (i.e., Federal, State & Local Governments)• other third-party authority approvals, including regulator, Fire Brigade, etc• interface deeds• access requirements• adjoining property owners• non-contestable utility providers• novation of contracts or suppliers• warranties• insurances, bonds• bank guarantees
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CONTRACT ADMINISTRATION

Contract administration involves effective cost management of the project during the construction phase including preparation of cost management documents, management of cashflow including progress payments and rise and fall calculations, negotiation of claims and scope changes, dispute resolution and progressive reporting to the Client.

ADDITIONAL RANGE INDICATORS

- Analysis of the financial implications of construction process, rise and fall calculations and outcomes of negotiations on variations and claims
- Application of principles of contract administration
- Strategies for gathering data and carrying out research on current trends in contract administration
- Analysis of data relating to contract performance and cashflows
- A thorough understanding of dispute resolution procedures.

COMPETENCY STANDARD UNIT 9 - ACCOUNT MANAGEMENT (CORE UNIT)

ELEMENT		PERFORMANCE CRITERIA	
9.1	Prepare construction cost management document	9.1.1	Cost management document prepared (priced bill/schedule of quantities or priced work breakdown structure)
		9.1.2	Cost management document approved by contracting parties
9.2	Manage cash flow during construction	9.2.1	Parameters relating to cash flow established
		9.2.2	Data accessed, processed, and evaluated
		9.2.3	Cash flow forecast progressively updated in light of current information
		9.2.4	Outcomes communicated to Client and management team
		9.2.5	Information transferred to project report
9.3	Recommend progress payments during construction phase	9.3.1	Procedures for handling progress payments developed and implemented
		9.3.2	Reports from specialist consultants obtained and evaluated
		9.3.3	Negotiations with contractors conducted and compliance with contract ensured
		9.3.4	Value of work in progress certified and information transferred to project report
		9.3.5	Security of Payment Act followed
9.4	Clarify the extent of rise and fall costs (escalation) and access data	9.4.1	Sound data gathering techniques employed
		9.4.2	All required data accessed
		9.4.3	All data analysed and evaluated using appropriate process and following accepted professional practice
9.5	Record outcomes of data gathering and analysis process	9.5.1	Information transferred to project report
		9.5.2	Status confirmed
9.6	Conduct negotiations on adjustment of rise and fall (escalation) costs	9.6.1	Negotiation carried out based on sound preparation and accurate data
		9.6.2	Negotiation conducted in a professional manner to achieve acceptable outcomes
9.7	Prepare progressive financial reports during construction phase	9.7.1	Format for progressive financial reports developed
		9.7.2	Required financial information accessed and analysed
		9.7.3	Report compiled and results conveyed to relevant personnel and Client
9.8	Arrange settlement of accounts during construction phase	9.8.1	Relevant data collected, analysed, and evaluated
		9.8.2	Report compiled and negotiation undertaken
		9.8.3	Information transferred to the project report
		9.8.4	Penalties/bonuses assessed
		9.8.5	Relevant personnel kept informed at all stages of process
9.9	Communicate with Client	9.9.1	Client kept informed at all stages
		9.9.2	Technically sound and factually accurate advice provided to Client
		9.9.3	Client briefed on process and outcomes
		9.9.4	Final outcome and rationale for outcome presented to Client

COMPETENCY STANDARD UNIT 10 - CONSTRUCTION CHANGE MANAGEMENT (CORE UNIT)

ELEMENT		PERFORMANCE CRITERIA	
10.1	Establish extent of proposed and actual scope changes	10.1.1	Proposed and actual scope change clarified
		10.1.2	Parameters and objectives clarified
		10.1.3	Contract status confirmed
10.2	Collect all data relevant to scope changes	10.2.1	Data gathering structure and schedules established
		10.2.2	Data evaluated following accepted professional principles and practice
10.3	Conduct negotiation on scope changes	10.3.1	Negotiation carried out based on adequate preparation and following sound principles
		10.3.2	Negotiation conducted in a professional manner to achieve acceptable outcomes
10.4	Manage cost claims during construction	10.4.1	Procedures for handling cost claims developed and implemented
		10.4.2	Status confirmed
		10.4.3	Relevant data collected and evaluated
		10.4.4	Negotiations on cost claims undertaken based on data collected
10.5	Communicate with Client	10.5.1	Client kept informed at all stages
		10.5.2	Technically sound and factually accurate advice provided to Client
		10.5.3	Client briefed on process and outcomes
		10.5.4	Final outcome and rationale for outcome explained to Client

COMPETENCY STANDARD UNIT 11 - CLAIMS AND DISPUTE RESOLUTION (SPECIALIST UNIT)

ELEMENT		PERFORMANCE CRITERIA	
11.1	Establish background and collect all data relevant to claim	11.1.1	Relevant data collected, analysed, and evaluated
		11.1.2	Status report compiled
		11.1.3	Best/worst case scenario assessed
		11.1.4	Obtain brief from Client
11.2	Conduct negotiation on claim settlement	11.2.1	Key issues for each party identified
		11.2.2	Best/worst case scenarios for each party identified
		11.2.3	Separate and combined meeting of parties conducted
		11.2.4	Most beneficial result negotiated for Client
11.3	Prepare claim and resolution status report for Client	11.3.1	Client kept informed at all stages
		11.3.2	Client briefed on best/worst case scenarios
		11.3.3	Final results and rationale for outcome presented to Client

FINANCIAL AUDIT

Financial audit involves an independent assessment that risk is being effectively managed to the satisfaction of the Client or their financier.

The audit service provides a level of confidence for the Client/financier in terms of the containment of risk from both financial and management aspects.

Generally, the fields encompassed within the financial audit are:

- design documentation control
- compliance issues incorporation
- project delivery control
- time control
- financial control.

ADDITIONAL RANGE INDICATORS

- strategies for gathering data and carrying out research on legal and financial issues
- analysis of data including risk implications
- use of appropriate analysis and evaluation techniques in reporting to Client.

COMPETENCY STANDARD UNIT 12 - FINANCIAL AUDIT (SPECIALIST UNIT)

ELEMENT	PERFORMANCE CRITERIA
12.1 Establish project objectives and parameters	12.1.1 Project objectives clarified in discussion with Client or their financier 12.1.2 Project parameters and constraints identified and verified including: <ul style="list-style-type: none">• design documentation control• compliance issues incorporation• project delivery control• timing issues controlled• financial control established
12.2 Access available data and information	12.2.1 Availability of data established, and requirements needed to meet the brief confirmed
12.3 Confirm interface with consultants, contractors, and other relevant data providers	12.3.1 Formal arrangements for interface with others arranged
12.4 Establish reporting details	12.4.1 Reporting format confirmed with the Client including level of supporting documentation
12.5 Implement financial audit	12.5.1 Initial financial audit completed in relation to design documentation, compliance issues and project delivery 12.5.2 Monthly financial audit carried out with all risk factors monitored

RESOURCE ANALYSIS

Resource analysis involves carrying out various studies in construction resource management including associated productivity estimates/forecasts and subsequent monitoring of performance.

ADDITIONAL RANGE INDICATORS

- strategies for gathering data and carrying out research on resource factors
- analysis of data including financial implications
- use of appropriate analysis and evaluation techniques in reporting to Client

COMPETENCY STANDARD UNIT 13 - RESOURCE ANALYSIS (SPECIALIST UNIT)

ELEMENT		PERFORMANCE CRITERIA	
13.1	Undertake resource management and productivity studies including appropriate estimates and forecasts	13.1.1	Resource requirements identified
		13.1.2	Productivity estimates prepared
13.2	Develop appropriate performance monitoring procedures	13.2.1	Appropriate performance monitoring procedures developed
		13.2.2	Responsibility schedules prepared, and tasks assigned
13.3	Prepare resource and productivity usage reports	13.3.1	Resource usage reports prepared
		13.3.2	Productivity reports prepared
13.4	Prepare material order lists	13.4.1	Material requirements identified
		13.4.2	Material order lists prepared
13.5	Develop and implement appropriate procedure for data gathering	13.5.1	Procedures for data gathering developed
		13.5.2	Data gathering implemented

SUPPORT COMPETENCIES

Support competencies involve numerous skills that are necessary to be acquired in order to effectively practice the various services of a quantity surveying professional, including measuring techniques, design and construction methodologies, environmental issues identification, quasi legal matters, general business management, service back up in computer software and hardware, research and development and an effective cost database.

ADDITIONAL RANGE INDICATORS

Competence in support competencies will be demonstrated in the execution of typical work undertaken as a quantity surveying professional. The work in question will call for the application of extensive knowledge appropriate to the discipline. Such knowledge will normally be acquired through a structured program of education to degree level incorporating training and work experience.

This activity would be based on a clear understanding of the processes involved in the carrying out of associated competencies including:

- strategies for acquiring knowledge relating to regulations and legal requirements, research and data gathering
- analysis of associated data
- methods of measurement
- business management techniques
- use of appropriate analysis and evaluation techniques.

COMPETENCY STANDARD UNIT 14 - COMPUTER SERVICES (CORE UNIT)

ELEMENT		PERFORMANCE CRITERIA	
14.1	Use computers to input and access information relating to the full range of quantity surveying applications	14.1.1	General skills in the use and care of computing hardware and software demonstrated
		14.1.2	Computers used to access, enter, and process information
		14.1.3	Data exchange between participants in construction activities promoted
14.2	Use standard application packages in the management and presentation of information relating to construction cost activities	14.2.1	Word processing programs used to produce professional quality reports
		14.2.2	Electronic spreadsheets used to prepare schedules.
		14.2.3	Statistical packages use to manage and process statistical data
14.3	Use computer packages for specific construction cost applications	14.3.1	Computer software for cost planning and cost management used to achieve the most beneficial and professional outcomes for the Client

COMPETENCY STANDARD UNIT 15 - CONSTRUCTION TECHNOLOGY (CORE UNIT)

ELEMENT		PERFORMANCE CRITERIA	
15.1	Acquire knowledge of construction processes, technologies, and associated construction materials	15.1.1	Knowledge of construction processes and technologies as applied to construction activities and sequencing of activities acquired
		15.1.2	Knowledge of source and use of construction materials applied in construction activities acquired include testing and assessing techniques
		15.1.3	Knowledge of design and installation of mechanical and electrical services acquired
15.2	Acquire knowledge of the principles of the science of construction	15.2.1	Knowledge of principles of construction science demonstrated, in respect of acoustic, etc
		15.2.2	Knowledge of principles of construction science in relation to structures demonstrated including analysis, design, and stability

15.3	Acquire knowledge of the principles of construction	15.3.1	Knowledge of principles of construction demonstrated including demolition methods, formwork design, erection techniques, plant and equipment and site surveys
15.4	Interpret construction documentation	15.4.1	Construction plans, specifications, construction codes and regulations interpreted

COMPETENCY STANDARD UNIT 16 - GOVERNMENT REGULATION AND LAW (CORE UNIT)

ELEMENT		PERFORMANCE CRITERIA	
16.1	Acquire knowledge of appropriate Government legislation, standards and codes relating to a business practice	16.1.1	Knowledge of appropriate forms of business associations acquired
		16.1.2	Knowledge of legislation relating to employment and professional liability acquired
		16.1.3	Knowledge of law relating to Workplace Health and Safety (WH&S) acquired
		16.1.4	Knowledge of legislation for conserving the environment acquired
		16.1.5	Relevant Australian Standards understood
16.2	Acquire knowledge of law relating to construction practice	16.2.1	Knowledge of contract law relevant to construction industry acquired
		16.2.2	Knowledge of various forms of construction contracts acquired

COMPETENCY STANDARD UNIT 17 - ARBITRATION (SPECIALIST UNIT)

ELEMENT		PERFORMANCE CRITERIA	
17.1	Understand legal principles involved in arbitration proceedings	17.1.1	Knowledge of previous arbitration case histories demonstrated
		17.1.2	Successful previous arbitration history or participation under supervision in previous successful arbitration demonstrated
17.2	Manage the preliminary conference based on knowledge of arbitration process and legal principles	17.2.1	Agreement to refer the dispute to arbitration documented
		17.2.2	Nature of proceedings and running costs negotiated
		17.2.3	Legal representation of parties decided
		17.2.4	Procedures to streamline the hearing agreed
		17.2.5	Venue and date of the hearing determined
17.3	Prepare material for the hearing	17.3.1	Timetable for hearing of dispute prepared
		17.3.2	Points of claim and defence listed
		17.3.3	Details of claim and counter claim identified
		17.3.4	Documents pertaining to the dispute discovered and inspected
17.4	Conduct the hearing	17.4.1	Proceedings of the hearing conducted in accordance with legal principles and knowledge of the arbitration process
		17.4.2	Arguments of both parties heard and recorded in accordance with the rules of evidence
		17.4.3	Effective channels of communication with all parties maintained
		17.4.4	Technically correct and factually sound advice provided
17.5	Achieve agreement on processes for viewing	17.5.1	Agreement of parties to inspections negotiated
		17.5.2	Purpose and rules of viewing defined
17.6	Prepare award	17.6.1	Award written in accordance with accepted principles based on the stated case
		17.6.2	Comprehensive details of the argument and reasons for award included
		17.6.3	Time-scale for the award determined
17.7	Determine costs	17.7.1	Costs determined based on knowledge of contracting methods and business finance
		17.7.2	Acceptance of determination of costs by all parties achieved

COMPETENCY STANDARD UNIT 18 - EXPERT WITNESS / EVIDENCE (SPECIALIST UNIT)

ELEMENT		PERFORMANCE CRITERIA	
18.1	Demonstrate knowledge of business and commercial law	18.1.1	Professional activities based on knowledge and understanding of business and commercial law
18.2	Prepare to give evidence	18.2.1	Basis of claim researched
		18.2.2	Documentation necessary to prepare evidence identified and obtained
		18.2.3	Information evaluated
		18.2.4	Evidence and supporting documentation prepared
		18.2.5	Possible weaknesses, discrepancies, ambiguities, and errors identified
		18.2.6	Proof of evidence verified
		18.2.7	Clients advised on strength of case
		18.2.8	Curriculum vitae prepared for presentation to court
18.3	Brief counsel and solicitors	18.3.1	Basis of evidence and methodology explained
		18.3.2	Technical terms clarified
		18.3.3	Full understanding of implications and technical compilation of evidence verified
		18.3.4	Additional documentation provided where necessary
18.4	Give evidence	18.4.1	Concise and clear presentation given, based on complete and thorough knowledge of the matter
		18.4.2	Time to prepare answers to questions which go beyond existing evidence requested if necessary
		18.4.3	Information provided only within the parameters of expertise

COMPETENCY STANDARD UNIT 19 - BUSINESS MANAGEMENT (SPECIALIST UNIT)

A. COMMUNICATION

ELEMENT		PERFORMANCE CRITERIA	
19A.1	Communicate effectively with colleagues, Clients, suppliers, and contractors	19A.1.1	Technical information clearly and accurately communicated
		19A.1.2	Appropriate means of communication selected for a variety of situations, instructions given and received accurately
19A.2	Access, organise and analyse information to provide the basis for written reports and presentations	19A.2.1	Research undertaken to access information of a technical and financial nature
		19A.2.2	Information for reports and presentations organised in a coherent and logical way for oral or written presentation
		19A.2.3	Information analysed for appropriateness and evaluated for quality and relevance
19A.3	Give presentations to Clients, arbitration hearings and in litigation	19A.3.1	Professional presentations given to Clients
		19A.3.2	Evidence presented in a professional manner in hearings and litigation
		19A.3.3	Technically sound and correct information presented
19A.4	Write reports	19A.4.1	Material logically organised for inclusion in a report
		19A.4.2	Reports written on technical material relating to the profession
19A.5	Take part in formal and informal meetings	19A.5.1	Formal meeting procedure adhered to when appropriate
		19A.5.2	Opinions clearly and logically stated
		19A.5.3	Active listening undertaken to elicit others' opinions (Clients, suppliers, contractors, others)
		19A.5.4	Contribution made to effective outcomes
19A.6	Negotiate with a range of people (Clients, suppliers, colleagues, and construction and property industry personnel generally)	19A.6.1	Purpose of negotiation clarified
		19A.6.2	Negotiation prepared for, and relevant information collected
		19A.6.3	Active listening techniques used to clarify positions
		19A.6.4	Outcomes of negotiation summarised

B. INFORMATION MANAGEMENT

ELEMENT	PERFORMANCE CRITERIA
19B.1 Establish and maintain information systems	19B.1.1 Data collected from empirical observations, other bodies, technical and scientific literature and existing buildings for storage and retrieval 19B.1.2 Information used for business competitive advantage 19B.1.3 Future requirements determined from knowledge of current and planned position 19B.1.4 Software systems continually evaluated

C. ETHICS AND STANDARDS

ELEMENT	PERFORMANCE CRITERIA
19C.1 Implement accepted professional ethics and principles	19C.1.1 AIQS's Code of Conduct applied 19C.1.2 Duties not performed outside or beyond the scope of qualifications or experience
19C.2 Recognise trade practice issues	19C.2.1 Government policy requirements identified 19C.2.2 Professional construction industry issues identified
19C.3 Assume professional responsibility for own actions	19C.3.1 Potential professional risks and liabilities recognised

D. HUMAN RESOURCES

ELEMENT	PERFORMANCE CRITERIA
19D.1 Manage human resources effectively	19D.1.1 Performance appraisal systems implemented 19D.1.2 Principle of equal opportunity applied 19D.1.3 Workplace Health and Safety standards recognised and applied
19D.2 Plan and implement training programs	19D.2.1 Training needs of staff determined 19D.2.2 Training manual produced and regularly updated
19D.3 Understand and apply principle of industrial law and industrial relations	19D.3.1 Principle of law of employee / employer relationship understood and applied 19D.3.2 Effective resolution of staff disputes carried out

E. MARKETING

ELEMENT	PERFORMANCE CRITERIA
19E.1 Prepare marketing plan and implement effectively	19E.1.1 Marketing needs assessed, and marketing strategy reviewed 19E.1.2 Marketing plan prepared in association with business plan 19E.1.3 Future earning capacity established, and cash flow budget determined

F. ACCOUNTING

ELEMENT	PERFORMANCE CRITERIA
19F.1 Understand principles of accounting including taxation	19F.1.1 Terminology used in accounting understood 19F.1.2 Procedures used to classify and process accounting transactions understood 19F.1.3 Accounting publications and reports assessed and absorbed 19F.1.4 Principles of job costing understood 19F.1.5 Accounting techniques understood sufficient to make both long- and short-term business decisions 19F.1.6 Taxation implications identified and understood
19F.2 Understand sources of finance	19F.2.1 Source of finance identified and understood

G. OFFICE MANAGEMENT

ELEMENT	PERFORMANCE CRITERIA
19G.1 Manage self	<p>19G.1.1 Stable performance maintained under pressure</p> <p>19G.1.2 Difficult situations concluded positively</p> <p>19G.1.3 Effectiveness maintained in varying environments</p> <p>19G.1.4 Mental and physical fitness sustained at a level which enable work performance requirements to be met</p>
19G.2 Negotiate, plan and organise personal work priorities	<p>19G.2.1 Competing demands assessed and organised to achieve individual team and organisation priorities</p> <p>19G.2.2 Events managed to accomplish individual, team and organisation's goals and objectives and project requirements</p> <p>19G.2.3 Technology used to improve efficiency and effectiveness in managing work priorities and commitments</p>
19G.3 Develop and maintain personal competence	<p>19G.3.1 Personal strengths and weaknesses assessed to determine personal development priorities</p> <p>19G.3.2 Feedback on performance used to identify and develop ways to improve knowledge and skills</p> <p>19G.3.3 Professional competence assessed against performance plans, job responsibilities and career options</p> <p>19G.3.4 Continuing professional development (CPD) undertaken</p>
19G.4 Access and share relevant information	<p>19G.4.1 Sources of data identified and accessed to ensure that relevant information is available to work groups</p> <p>19G.4.2 Legislation, codes of practice and organisational policies and practices assessed to identify the provisions relevant to the workplace</p> <p>19G.4.3 Consultative processes used to upgrade and re-evaluate the work environment</p> <p>19G.4.4 Implications of an unsafe and unfair work environment understood</p>
19G.5 Plan and introduce processes to implement workplace requirement	<p>19G.5.1 Requirements and guidelines discussed with colleagues to establish procedures appropriate to the work group</p> <p>19G.5.2 Responsibilities of individuals and work groups in developing a safe and fair workplace agreed and understood</p> <p>19G.5.3 Support provided to colleagues to ensure that they understand and implement their rights and responsibilities</p> <p>19G.5.4 Rehabilitation options identified assessed and used to assist employees</p>
19G.6 Understand employment law and statutory industrial issues	<p>19G.6.1 Legislation, codes of practice and organisational policies and practices assessed to identify the provisions relevant to the workplace</p>
19G.7 Promote continuous improvement	<p>19G.7.1 Responsibilities of individuals and work groups in developing a safe and fair workplace understood</p>
19G.8 Monitor and adjust performance	<p>19G.8.1 Work performed in a safe and fair environment</p> <p>19G.8.2 Potential and actual problems identified and rectified promptly and decisively</p> <p>19G.8.3 Hazards managed so that their presence is minimised</p> <p>19G.8.4 Recommendations to achieve compliance with and improve standard procedures and practices submitted to designated persons /groups</p> <p>19G.8.5 Systems, records and reporting procedures maintained as required by legislation and by the organisation</p>
19G.9 Investigate non conformance	<p>19G.9.1 Accidents and incidents investigated and dealt with according to agreed procedures and processes</p> <p>19G.9.2 Coaching and mentoring support provided to ensure that colleagues develop competencies to prevent the recurrence of accidents and incidents</p> <p>19G.9.3 Procedures and practices reviewed to assess whether they need to be updated to ensure conformance to workplace requirements</p>

H. PUBLIC RELATIONS

ELEMENT	PERFORMANCE CRITERIA
19H.1 Convey and receive information and ideas	19H.1.1 Ideas presented and expressed in individual and group situations, using appropriate communication techniques 19H.1.2 Communication demonstrated knowledge of, and sensitivity to, social and cultural diversity 19H.1.3 Client requirements identified and negotiated to achieve agreed outcomes /outputs 19H.1.4 Input sought and valued in developing and refining proposals and approaches
19H.2 Develop trust and confidence	19H.2.1 People treated with integrity, respect, and empathy 19H.2.2 High personal, ethical, and organisational standards demonstrated and promoted 19H.2.3 Dealings with others conducted with integrity 19H.2.4 Trust and confidence of Clients gained and maintained through competent performance
19H.3 Project a professional image	19H.3.1 High personal, ethical, and organisational standards demonstrated and promoted
19H.4 Build and maintain networks and relationships	19H.4.1 Networking used in internal and external environments to identify and build relationships 19H.4.2 Networking and other work relationships maintained and used to provide identifiable benefits for the team, organisation, and Client
19H.5 Negotiate positive outcomes to rectify difficulties	19H.5.1 Problems identified and analysed, and action taken to rectify the situation with minimal disruption to performance 19H.5.2 Industrial relations issues handled within the organisations processes and procedures 19H.5.3 Conflict addressed and resolved constructively 19H.5.4 Difficult situations negotiated with integrity to achieve results which are acceptable to the participants, and which meet organisation and legislative requirements

I. EDUCATION AND TRAINING

ELEMENT	PERFORMANCE CRITERIA
19I.1 Assist in development of education and training programs	19I.1.1 Education and training needs determined 19I.1.2 Support and assistance given to the development of curriculum and support material for education programs 19I.1.3 Study, research, practice, or other activities made to the development of education and training programs in specific areas of construction economics
19I.2 Participate in the development of practical experience programs	19I.2.1 Practical experience programs planned 19I.2.2 Assistance given in the organising of practical experience activities 19I.2.3 Practical experience programs evaluated

COMPETENCY STANDARD UNIT 20 - RESEARCH AND DEVELOPMENT (SPECIALIST UNIT)

ELEMENT	PERFORMANCE CRITERIA
20.1 Participate in research	20.1.1 Requirements for research and development identified 20.1.2 Fundamental and applied research activities supported and facilitated 20.1.3 Application of innovative techniques and strategies supported and facilitated

20.2	Formulate concepts for development	20.2.1	Promising concepts examined and evaluated
		20.2.2	Requirements for development identified
		20.2.3	Funds for development sought by a variety of methods and from a variety of sources
20.3	Commercialise research outcomes	20.3.1	Economic evaluation of outcomes of research undertaken
		20.3.2	Mechanisms for marketing of services developed

COMPETENCY STANDARD UNIT 21 - COST INFORMATION DATABASE (SPECIALIST UNIT)

ELEMENT		PERFORMANCE CRITERIA	
21.1	Clarify requirements of a cost information data base	21.1.1	Relevant experts and literature consulted
		21.1.2	Scope of information to be included in database specified and validated
		21.1.3	Existing database technologies and methodologies evaluated
		21.1.4	Strategy for information input and retrieval established
21.2	Access relevant information	21.2.1	Sources of relevant information identified
		21.2.2	Information accessed and evaluated
21.3	Set up database	21.3.1	Database selected to satisfy cost information requirements
		21.3.2	Database customised to satisfy cost information requirements, where relevant
		21.3.3	Information formatted and entered into database
21.4	Maintain database	21.4.1	Currency of database monitored
		21.4.2	Information up-dated as required
		21.4.3	Policy for database maintenance developed and implemented

ASSET FINANCIAL MANAGEMENT COMPETENCIES

Asset financial management involves independent advice on the cost of ownership of assets particularly in the areas of feasibility, tax, audits, life cycle cost analysis and technical due diligence.

COMPETENCY STANDARD UNIT 22 – FEASIBILITY STUDIES (SPECIALIST UNIT)

Feasibility studies assess the viability of a project over its expected life and are a necessary prerequisite to any effective decision-making process including obtaining finance.

ADDITIONAL RANGE INDICATORS

- research and data gathering strategies related to the collection of predictive information
- analysis of data on asset cycles
- the use of appropriate methodologies to analyse supply and demand statistics
- use of appropriate analysis and evaluation techniques including discounted cash flows and sensitivity analyses
- appropriate recording and documentation practice particularly in relation to compilation of data on completed projects

ELEMENT	PERFORMANCE CRITERIA
22.1 Access information required for feasibility study	22.1.1 Project objectives and parameters established based on communication with Client 22.1.2 Data required for study accessed 22.1.3 Documentation inputs prepared including compilation of database of completed projects 22.1.4 Relevant information entered into database
22.2 Undertake analysis for feasibility study	22.2.1 Data evaluated and analysed 22.2.2 Implementation and procurement plan identified 22.2.3 Project stages and outcomes of each stage defined 22.2.4 Financial and non-financial returns analysed
22.3 Show understanding of property economic issues	22.3.1 Property market cycles analysed 22.3.2 Supply and demand statistics analysed 22.3.3 Inflation projections made and analysed 22.3.4 Interest rate projections made and analysed
22.4 Communicate outcomes of study to Client	22.4.1 Client given accurate information and advice leading to acceptable functional and financial outcomes

COMPETENCY STANDARD UNIT 23 – LIFE CYCLE COST ANALYSIS (SPECIALIST UNIT)

Life Cycle Cost Analysis involves various considerations of the total cost of ownership over the whole life of an asset.

ADDITIONAL RANGE INDICATORS

- strategies for accessing data relating to life cycle and cost in use information and research
- analysis of data for preparation of life cycle costs
- use of appropriate analysis and evaluation techniques.

ELEMENT	PERFORMANCE CRITERIA
23.1 Establish project objectives and parameters	23.1.1 Project objectives clarified in discussion with Client and other consultants 23.1.2 Project parameters and constraints identified and verified
23.2 Confirm data elements	23.2.1 Data elements affecting life cycle costs determined
23.3 Establish data projection information	23.3.1 Escalation and discounting factors established, and financial projections confirmed
23.4 Establish time aspect over which analysis process is to be considered	23.4.1 Time aspect confirmed including importance or otherwise of short, medium, and long term projections

23.5	Establish data sources and collection and confirmation process	23.5.1	Data sources and validity of data clarified
23.6	Confirm reporting format layout and presentation	23.6.1	Reporting requirements confirmed with the Client
23.7	Complete life cycle cost analysis	23.7.1	Life cycle cost analysis completed

COMPETENCY STANDARD UNIT 24 - TAX DEPRECIATION (SPECIALIST UNIT)

Tax Depreciation involves the calculation of appropriate tax depreciation write offs of all eligible items.

ADDITIONAL RANGE INDICATORS

- research and data gathering strategies and structures as applied to information relating to tax depreciation including latest government tax rulings
- analysis of data and financial implications
- use of appropriate analysis and evaluation techniques in preparation of estimates of value of items and construction costs including appropriate fees, site charges, sales tax, import duties etc.
- the construction and financial practices of the industry.

ELEMENT		PERFORMANCE CRITERIA	
24.1	Extract depreciable items and non-depreciable items	24.1.1	Depreciable items estimated or extracted from bill of quantities where available
		24.1.2	Non depreciable items estimated or extracted from bill of quantities where available
		24.1.3	Building write-off allowances calculated
24.2	Identify and estimate depreciable items and non-depreciable items in the case of depreciation for subsequent owners	24.2.1	Estimate of construction costs prepared including appropriate allowances for contractor's overheads and preliminaries
		24.2.2	Value for depreciable and non-depreciable items calculated
		24.2.3	Asset write-off allowances calculated
24.3	Develop schedule and prepare report	24.3.1	Preliminaries and consultants' fees apportioned
		24.3.2	Relevant dates ascertained
		24.3.3	Client's requirements for inclusion of other costs in the schedule determined
		24.3.4	Schedule and report prepared in accordance with accepted professional practice
		24.3.5	Schedule and report submitted to Client and/or relevant parties

SPECIAL ASSESSMENTS

Quantity surveying professionals are involved in a number of special assessments including calculation of taxes, stamp duties, rates and charges associated with assets as well as replacement cost estimates for insurance purposes and tenancy reinstatement estimates.

- Sales tax assessments involve calculation of the appropriate tax on the sale value of goods manufactured in Australia including flow on of appropriate exemption benefits
- Stamp duty assessments involve calculation of the appropriate State imposed duty on the transfer of interest in land
- Land tax assessments involve calculation of the appropriate State imposed tax based upon the unimproved value of all land owned by taxpayers including lodgement of objections to the relevant State body
- Capital gains tax assessments involve calculation of the appropriate tax on capital gains on property assets acquired after September 1985

- Local authority rate assessments involve calculation of the appropriate rates on property assets as levied by appropriate local governments based upon valuations established by the Valuer General in accordance with the relevant State Act
- Body corporate charge assessments involve calculation of the appropriate charge common to all unit holders as defined by the Body Corporate under the relevant State Act
- Replacement cost estimates involve calculation of the appropriate asset cost for insurance or valuation purposes including any specific exclusions and allowances for time related impacts
- Tenancy reinstatement assessments involve estimating the approximate cost of reinstatement of premises on cessation of a lease in accordance with the terms of the lease including clearly defining work outside the scope of the lease.

ADDITIONAL RANGE INDICATORS

Competencies in various special assessments will be demonstrated in the execution of typical work undertaken as a quantity surveying professional. The work in question will call for the application of extensive knowledge appropriate to the discipline. Such knowledge will normally be acquired through a structured program of education to degree level incorporating training and work experience.

This activity would be based on a clear understanding of the processes involved in the carrying out of specialised assessments including:

- strategies for accessing data relating to regulations and legal requirements, research and data gathering
- analysis of data for preparation of estimates for tax and insurance purposes
- use of appropriate analysis and evaluation techniques
- the financial, insurance and tax practices of the industry.

COMPETENCY STANDARD UNIT 25 – SPECIAL ASSESSMENTS (SPECIALIST UNIT)

A. SALES TAX ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25A.1 Confirm the service objectives and strategy	25A.1.1 Service objectives clarified in discussion with the Client and other appropriate personnel 25A.1.2 Sales tax exemption number from Tax Office confirmed 25A.1.3 Strategy to derive assessments identified and verified 25A.1.4 Contract documents considered as to whether they can include relevant documents which allow tenderers to include exemption benefits
25A.2 Confirm interface with contractor and sub-contractors	25A.2.1 Arrangements between Client and Contractors established and confirmed
25A.3 Establish reporting format	25A.3.1 Reporting format confirmed in line with Client's brief
25A.4 Complete sales tax assessment	25A.4.1 Sales tax assessment completed

B. STAMP DUTY ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25B.1 Confirm the service objectives	25B.1.1 Service objectives determined with the Client and advisers
25B.2 Confirm purchases arrangements	25B.2.1 Land purchases, or land with improvements or existing company structure including property confirmed 25B.2.2 Potential to achieve stamp duty savings under the proposed purchase arrangement confirmed
25B.3 Establish reporting format	25B.3.1 Reporting format confirmed with the Client
25B.4 Complete stamp duty assessment	25B.4.1 Stamp duty assessment completed

C. LAND TAX ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25C.1 Confirm the service objectives and strategy	25C.1.1 Service objectives determined with the Client and advisers 25C.1.2 Objection to the Authorities assessment lodged 25C.1.3 Comparison made with greenfield sites, and comparable properties or unique aspects that unfairly disadvantage the site in terms of the tax assessment identified 25C.1.4 Strategy to derive assessments identified and verified
25C.2 Confirm interface with other professional consultants	25C.2.1 Limitations of the service to be provided clearly defined including the interface with any conjunctional services to be provided by others
25C.3 Establish reporting details	25C.3.1 Reporting format confirmed in line with Client's brief
25C.4 Complete land tax assessment	25C.4.1 Land tax assessment completed

D. CAPITAL GAINS TAX ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25D.1 Confirm the service objectives	25D.1.1 Service objectives determined with the Client and advisers
25D.2 Confirm the cost base of assets	25D.2.1 Cost base of assets confirmed based on purchase established at a given point in time, including all eligible purchasing costs such as stamp duty charges, legal costs, real estate costs and similar
25D.3 Confirm capital gains index	25D.3.1 Australian Bureau of Statistics indices to be adopted confirmed as forming the basis for their potential application to the assets to be assessed
25D.4 Confirm interface with other professional consultants	25D.4.1 Impact on the service provisions of any interface requirement confirmed with other professional consultants
25D.5 Establish reporting details	25D.5.1 Reporting format confirmed in line with Clients' brief
25D.6 Complete capital gains tax assessment	25D.6.1 Capital gains tax assessment completed

E. LOCAL AUTHORITY RATES ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25E.1 Confirm the service objectives and strategy	25E.1.1 Service objectives determined with the Client and advisers 25E.1.2 Lodgement of objection to the Authorities rating assessment confirmed including the grounds for objection e.g., NAV based on market rents of comparable properties does not align with Clients market research or NAV should be reduced by the sinking fund effect as determined based on the depreciation of plant and equipment for tax depreciation purposes 25E.1.3 Strategy to derive assessments identified and verified
25E.2 Confirm interface with other professional consultants	25E.2.1 Limitations of the service to be provided clearly defined including interface with any conjunctional service to be provided by others
25E.3 Establish reporting details	25E.3.1 Reporting format confirmed in line with Client's brief
25E.4 Complete local authority rates assessment	25E.4.1 Local authority rates assessment completed

F. BODY CORPORATE CHARGE ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25F.1 Confirm the service objectives	25F.1.1 Service objectives clarified with the Client
25F.2 Define common areas to be assessed	25F.2.1 Charges for operating and maintaining discreetly different common areas of the asset defined, e.g., exterior of buildings, external common areas, external services, carparking, entry foyer, lobby areas, plant rooms and similar
25F.3 Define common charges to be assessed	25F.3.1 Charges for operating and maintaining the common areas defined, e.g., insurance, painting, cleaning, servicing, heating, cooling, lighting, sharing of installation costs and similar
25F.4 Establish reporting format	25F.4.1 Reporting format confirmed with the Client including level of detail required
25F.5 Complete body corporate charge assessment	25F.5.1 Body corporate charge assessment completed

G. REPLACEMENT COST ESTIMATES

ELEMENT	PERFORMANCE CRITERIA
25G.1 Establish service objectives	25G.1.1 Service objectives clarified with the Client including any diversification from standard practice
25G.2 Confirm extent of service	25G.2.1 Extent of service confirmed including demolition of existing assets, re-design documentation, re-construction including or excluding tenancy fit-outs. Note: Where assets of historical significance are involved replacement with a contemporary equivalent may be proposed
25G.3 Confirm time frames	25G.3.1 Time frames relative to reporting confirmed with the Client
25G.4 Establish reporting format	25G.4.1 Reporting format confirmed with Client including level of required supporting documentation
25G.5 Complete replacement cost estimate	25G.5.1 Replacement cost estimate completed

H. TENANCY REINSTATEMENT ASSESSMENTS

ELEMENT	PERFORMANCE CRITERIA
25H.1 Establish service objectives and scope of work	25H.1.1 Service objectives clarified with the Client including any interface with other consultants or advisers and scope of work established
25H.2 Confirm lease terms and requirements	25H.2.1 Implications of lease terms confirmed in respect to tenancy reinstatement, e.g., reinstate to same condition as start of lease with part wear and tear, or no arrangement in lease
25H.3 Confirm extent of brief including defining work by others	25H.3.1 Confirm scope of works to be carried out by tenant, i.e., remove furniture, business equipment etc. 25H.3.2 Confirm extent of works to be assessed, e.g., replace floor coverings, repaint walls, repaint ceilings, relocate light fittings, sprinkler heads, air diffusers, remove partitions, compactus units, reception desks or similar
25H.4 Confirm appropriate investigation requirements	25H.4.1 Investigative requirements established including availability of relevant documentation
25H.5 Establish reporting format	25H.5.1 Reporting format confirmed with the Client including level of supporting documentation
25H.6 Complete tenancy reinstatement assessment	25H.6.1 Tenancy reinstatement assessment completed

COMPETENCY STANDARD UNIT 26 – AUDITS (SPECIALIST UNIT)

Audits involve assessment of the current status of a number of assets including:

- providing a detailed condition statement on an asset from which future management and financial directions may be determined, taking into account potential environmental and life cycle considerations
- identifying appropriate energy usage and maintenance characteristics of an asset to assist future directions and strategies and minimise maintenance costs and energy usage.
- providing a defined listing of the component plant, equipment and general fabric that make up a property asset for use in various tax, maintenance management, stocktaking and general ownership decisions.

ADDITIONAL RANGE INDICATORS

- strategies for accessing data relating to regulations and legal requirements, research and data gathering
- analysis of data for preparation of audits
- use of appropriate analysis and evaluation techniques
- financial, insurance and tax practices of the industry.

A. PREMISES AUDIT

ELEMENT	PERFORMANCE CRITERIA
26A.1 Establish project objectives and parameters	26A.1.1 Project objectives clarified and discussed with Client and other consultants 26A.1.2 Project parameters and constraints identified and verified
26A.2 Confirm the basis and level of reporting	26A.2.1 Reporting level defined on either an overview or detailed basis and implications of the reports confirmed
26A.3 Co-ordinate the functions of the various consultants	26A.3.1 Functions of various consultants confirmed
26A.4 Confirm reporting format, layout presentation and level of detail required	26A.4.1 Reporting detail confirmed with the Client and consultant team
26A.5 Complete asset audit	26A.5.1 Asset audit completed

B. ENERGY AND MAINTENANCE AUDIT

ELEMENT	PERFORMANCE CRITERIA
26B.1 Establish project objectives and parameters	26B.1.1 Service objectives determined with the Client 26B.1.2 Energy usage and characteristics considered and reviewed. 26B.1.3 Maintenance characteristics considered and reviewed
26B.2 Access available data and information	26B.2.1 Availability of data established including its relevance and requirements to meet the brief
26B.3 Confirm audit timing	26B.3.1 Initial audit program established including timing of subsequent audits e.g., annually, or other
26B.4 Establish reporting details	26B.4.1 Reporting format confirmed in line with Client's brief. Reports should confirm that property is being maintained in accordance with the adopted program. Reports should highlight potential for minimising future maintenance or energy cost

C. ASSET REGISTERS

ELEMENT	PERFORMANCE CRITERIA
26C.1 Confirm the service objectives	26C.1.1 Service objectives determined with the Client 26C.1.2 Client's perspective use of the asset registers short term and long term confirmed 26C.1.3 Level of detail required confirmed, e.g., quantities to be included, bar coding required
26C.2 Confirm interface with other professional consultants	26C.2.1 Interface with Client's business manager, accountants or legal advisers confirmed 26C.2.2 Compliance in reporting determined with requirements of other professional consultants
26C.3 Establish reporting details	26C.3.1 Reporting format with the Client confirmed
26C.4 Complete asset register report	26C.4.1 Asset register completed

COMPETENCY STANDARD UNIT 27 - TECHNICAL DUE DILIGENCE (SPECIALIST UNIT)

Technical Due Diligence involves reporting on the existing condition of a property highlighting any adverse factors from which future management and financial directions in relation to purchase or sale may be determined. Legal issues are normally the subject of a separate report carried out by professionals trained in law.

Generally, the fields encompassed within the Technical Due Diligence Report are:

- Financial Implications and Projections of Technical Reports
- Workplace Health & Safety
- Compliance Reports:
 - Building Regulations
 - Disability Discrimination Act
- Environmental Reports:
 - Asbestos and other Hazardous Building Materials
 - Site Contamination
- Condition Statement Reports
 - Structure
 - Facade
 - Mechanical & Electrical Services
- Asset Replacement Costs of Insurance Purposes
- Tax Depreciation Assessment
- Site and Area Assessment
 - Site Identification Survey
- Planning Issues

ADDITIONAL RANGE INDICATORS

Competencies in technical due diligence will be demonstrated in the execution of typical work undertaken as a quantity surveying professional. The work in question will call for the application of extensive knowledge appropriate to the discipline. Such knowledge will normally be acquired through a structured program of education to degree level incorporating training and work experience.

This activity would be based on a clear understanding of the processes involved in the carrying out of technical due diligence including:

- strategies for accessing data relating to regulations and legal requirements, research and data gathering
- analysis of data for preparation of technical due diligence reports
- use of appropriate analysis and evaluation techniques
- the financial, insurance and tax practices of the industry.

COMPETENCY STANDARD UNIT 27 - TECHNICAL DUE DILIGENCE (SPECIALIST UNIT)

ELEMENT		PERFORMANCE CRITERIA	
27.1	Establish project objectives and parameters and format of Report	27.1.1	Project objectives clarified in discussion with Client, colleagues, and other appropriate personnel
		27.1.2	Project parameters and constraints identified and verified
27.2	Access available data and information	27.2.1	Appropriate data gathering structures and relevant schedules developed
27.3	Activate consultant team	27.3.1	Consultant team instructed according to the Client's requirements
27.4	Carry out appropriate investigation and prepare initial condition statement including any adverse factors	27.4.1	Client's requirements reflected in brief
27.5	Provide advice to Clients which outlines potential cost of ownership after analysis of results	27.5.1	Advice provided to Client based on analysis of data to determine future direction in line with short, medium, and long-term management strategies
		27.5.2	Advice given which is timely, appropriately evidenced, and relevant
		27.5.3	Timelines and deadlines met

COMPETENCY STANDARD UNIT 28 - COMPLIANCE ISSUES (SPECIALIST UNIT)

As part of overall asset financial management certain legislated compliance issues must be addressed.

ADDITIONAL RANGE INDICATORS

Competencies in compliance issues will be demonstrated in the execution of typical work undertaken as a quantity surveying professional. The work in question will call for the application of extensive knowledge appropriate to the discipline. Such knowledge will normally be acquired through a structured program of education to degree level incorporating training and work experience.

This activity would be based on a clear understanding of the processes involved in current government compliance issues:

- strategies for accessing data relating to regulations and legal requirements, research and data gathering
- analysis of appropriate data
- use of appropriate analysis and evaluation techniques.

ELEMENT		PERFORMANCE CRITERIA	
28.1	Ensure compliance of project with legislative requirements including environmental issues	28.1.1	Legislative requirements of relevant level(s) of government identified
		28.1.2	Compliance with legislative requirements ensured
28.2	Ensure compliance of project with planning approval requirements, Environmental Impact Statement (EIS), etc	28.2.1	Planning approval requirements identified
		28.2.2	Compliance with planning requirements ensured

SPECIALISED MANAGEMENT COMPETENCIES

PROJECT VALUE MANAGEMENT

Project value management involves the identification of best value design solutions having regard to the Client's project objectives. Project value management includes life cycle cost analysis techniques as well as proactive participation in workgroup focus sessions.

ADDITIONAL RANGE INDICATORS

- strategies for identification of project objectives in terms of cost, time, and quality
- use of cost planning techniques to establish realistic capital costs and identification of project component costs
- participation in value management focus groups
- techniques that manage outcomes from focus groups.

COMPETENCY STANDARD UNIT 29 - PROJECT VALUE MANAGEMENT (CORE UNIT)

ELEMENT	PERFORMANCE CRITERIA
29.1 Identify project objectives	29.1.1 Scope of works and life cycle clearly identified 29.1.2 Client cost, quality and time targets clearly identified 29.1.3 Risk allocation objectives clearly identified
29.2 Prepare cost plan and breakdown costs	29.2.1 Cost planning techniques used to establish total cost 29.2.2 Detailed costs broken down to assist value management 29.2.3 End costs for major components established
29.3 Carry out life cycle cost analysis of alternatives	29.3.1 Alternative solutions to project components identified 29.3.2 Life cycle costing of each alternative carried out 29.3.3 Techniques in expressing the costing and communicating results to Client and team members carried out
29.4 Instigate value management focus sessions	29.4.1 Proactive participation in value management focus sessions carried out 29.4.2 Proposed alternatives with appropriate costings carried out
29.5 Adopt value management session outcomes	29.5.1 Techniques in consolidating selected alternatives and expressing resultant adjustments to project cost, time and quality carried out 29.5.2 Design development and documentation for concurrence with adopted outcomes monitored

COMPETENCY STANDARD UNIT 30 - PROJECT MANAGEMENT (SPECIALIST UNIT)

Quantity surveying professionals, as with many of the professionals in the construction industry, are capable of carrying out the role of Project Manager. However, project management is a separate profession and reference should be made to appropriate competency standards including the National Competency Standards for Project Management.

COMPETENCY STANDARD UNIT 31 - PROJECT RISK MANAGEMENT (SPECIALIST UNIT)

Project risk management involves a structured approach to the identification, analysis and treatment of events that might have an adverse impact on achieving a project's objectives.

Project risk management involves:

- analysis of a project's objectives and its relationship to the strategic objectives of the Client organisation
- determination of a structure by which project risks can be analysed
- identification of events (risks) that might adversely affect the project
- quantification of risks using appropriate methods to enable the prioritisation of those risks
- identification and implementation of strategies to effectively manage those risks
- ongoing monitoring of changing risk situations and reviewing the effectiveness of risk management strategies.

ADDITIONAL RANGE INDICATORS

- development of appropriate structures for a project risk management study
- strategies for accessing data relating to regulations and legal requirements, research and data gathering
- use of appropriate techniques for identification of project risks
- analysis of appropriate data
- use of appropriate risk analysis and evaluation techniques i.e., @Risk
- establishing project contingency (P50 & P90)
- use of appropriate techniques for controlling and minimising project risks
- the financial, insurance and tax practices of the industry.

ELEMENT	PERFORMANCE CRITERIA
31.1 Risk management approach	31.1.1 Project objectives identified and listed 31.1.2 Project risk management study structure developed 31.1.3 Identify and record risks and uncertainty inherent risks, contingent risks (threats and opportunities) and schedule risks. 31.1.4 Undertake quantitative cost risk assessment (QCRA) to calculate the cost of risk exposure (threat + opportunities + estimating uncertainty) and determine an appropriate contingency value 31.1.5 Manage risk exposure and contingencies
31.2 Software and tools	31.2.1 Understanding basic use of various industry software tools
31.3 Selection of a facilitator for the QCRA	31.3.1 The selection of a suitable Risk Analyst (DRA) to facilitate the QCRA 31.3.2 Identifying suitable individuals to facilitate the QCRA
31.4 Identifying the characteristics of the project and life cycle stage	31.4.1 Identify life cycle stage to match the level of detail in the QCRA 31.4.2 Nominate between qualitative or quantitative approach 31.4.3 Insurance must be taken into account when assessing the financial impact of risk 31.4.4 Identifying type of contract the project is expecting to use
31.5 Preparation for the QCRA	31.5.1 Clarity of the scope of works 31.5.2 Development of the risk register 31.5.3 Identifying participants for an effective QCRA 31.5.4 Preparing an agenda for the workshop
31.6 Running the QCRA Workshop	31.6.1 Identify any assumptions being made about the project 31.6.2 Recording of exclusions in the QCRA 31.6.3 Capturing risks (threat or opportunity) in three typical distributions, triangular, uniform, single point 31.6.4 The use of an independent expert assists in counteracting optimism bias 31.6.5 Calculating the exposure profile (dates)
31.7 Validating the risk data	31.7.1 "Unapproved" classification for inclusion in the analysis and exposure range 31.7.2 Correlation and dependencies when the impact of one risk has a direct impact on another 31.7.3 Estimating uncertainty (EU) as a percentage increase/decrease on the point estimate with a 100% probability of occurrence 31.7.4 The review and testing of all provisional sums to ensure that they are not already accounted for within the risk allowance 31.7.5 Current vs target risk assessment
31.8 Modelling the risks	31.8.1 Monte Carlo Simulation for the analysis and production of an assessment of the overall project cost risk exposure in terms of a distribution

31.9 Reporting the QCRA outputs	31.9.1 Executive Summary 31.9.2 Methodology, tools and techniques used in the Workshop 31.9.3 Assumptions and Exclusions made 31.9.4 Register (with issue number and review date) of risks incorporated into the Cost Model (Monte Carlo) 31.9.5 Results from the cost modelling including the cumulative probability distribution (S-curve), the mean and P90/P50 confidence levels 31.9.6 Statement that compares the QCRA result against the typical benchmark for the Asset Type 31.9.7 Follow up actions with action owners and specific dates for delivery of the actions
31.10 Recording and managing the outputs	31.10.1 Correlated projects and correlated risks in a contingency model are suited to consolidating to a Program and Portfolio contingency value of P90

COMPETENCY STANDARD UNIT 32 - QUALITY ASSURANCE (SPECIALIST UNIT)

In addition to the traditional Quality Assurance to undertaking services the quantity surveying professional also needs to understand the Assurance required on a project to ensure that it meets requirements, including that of regulators. This will include Fire, Life and Safety. The quantity surveying professional needs to understand this as it affects both client and contractor costs.

This competency is therefore divided into:

- quality assurance to undertaking services
- project assurance to ensure that it meets requirements, particularly regulators.

Quality Assurance to undertaking services

Quality assurance involves the systematic approach to carrying out services by the quantity surveying professional to ensure their outcomes meet the expectation of the Client. Quality assurance includes establishment of clear procedures, work instructions and quality records that quantifiably demonstrate correctness and compliance with the Client's and qs service objectives.

ADDITIONAL RANGE INDICATORS

- establishment of a corporate quality policy and its structure and content that complies with Australian or International Standards
- establishment of procedures that clearly describe required processes, outcomes, and verification requirements
- undertaking of internal audits of the application of these procedures
- continuous identification of improvements to procedures, outcomes and verification techniques that increase quality, efficiency, and certainty
- provision of verification evidence to Clients
- to demonstrate the assurance of service quality.

Practitioners would demonstrate a thorough understanding of:

- requirements of ISO 9000 series and AS 9000 series of standards
- quantity surveying professional's practices and procedures
- auditing techniques.

Project Assurance to ensure that it meets requirements

The Office of the National Rail Safety Regulator (ONRSR) is an independent body corporate established under the Rail Safety National Law (South Australia) Act 2012. The primary objectives of ONRSR are to encourage and enforce safe railway operations. promote and improve national rail safety.

ELEMENT	PERFORMANCE CRITERIA
32.1 Develop corporate quality policy	32.1.1 Corporate objectives in relation to quality of service and service outcomes established 32.1.2 Practice policies established 32.1.3 Service policies established
32.2 Develop procedures	32.2.1 Appropriate procedures for each relevant service established 32.2.2 Verification criteria formulated 32.2.3 Standard forms and control documentation developed
32.3 Undertake internal audits	32.3.1 Audit program established 32.3.2 Internal audit carried out 32.3.3 Correction of non-conformance ensured 32.3.4 Procedure inadequacies identified
32.4 Continuously improve	32.4.1 Changes required to procedures identified to reflect changing requirements 32.4.2 Changes to improve efficiency or better assure outcomes identified 32.4.3 Policy and procedure documentation regularly amended
32.5 Ensure application of quality assurance	32.5.1 Techniques of procedure outcomes to provide tangible evidence of compliance ensured 32.5.2 Techniques directed at areas of service that have high impact ensured 32.5.3 Techniques of achievement of quality in service outcomes communicated to Client

Project Assurance to ensure that it meets requirements

32.6 Ensure an understanding of project assurance requirements is obtained	32.6.1 Obtain an understanding of the project assurance requirements for the project 32.6.2 Obtain an understanding of the assurance road and principles and check that there is agreement between the parties 32.6.3 Check that project assurance requirements are included in the contract packages 32.6.4 Obtain an understanding of the interfaces between the contract packages and any third parties 32.6.5 Obtain an understanding of the operation and maintenance requirements 32.6.6 Obtain an understanding of project level safety requirements 32.6.7 Obtain any understanding of lessons learnt from other projects and any benchmarks 32.6.8 Ensure that client cost and project estimates are sufficient to incorporate project assurance requirements 32.6.9 Ensure that an adequate contingency is calculated and included
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COMPETENCY STANDARD UNIT 33 – SUSTAINABILITY (SPECIALIST UNIT)

This competency covers the role of the quantity surveying professional in dealing with the impact of social, environmental, and economic sustainability ensuring that sustainability innovations are incorporated into the cost estimates and that the tender documentation and contract sets clear expectations for benefits in social, environmental, and economic sustainability.

ADDITIONAL RANGE INDICATORS

Although the quantity surveying professional will probably not be responsible for sustainability management it will be necessary to:

- understand the applicable approvals required
- understand any planning constraints i.e., hours of work
- understand the potential impact on program of planning milestones not being achieved i.e., project completion delay

- understand the risk of complex planning and similar approvals being required
- ensuring that sustainability initiatives are included in the cost estimates
- verifying that procedures are in place to carry sustainability initiatives into the tender and contract
- during the post-contract phase understanding targets and compliance.

Practitioners would demonstrate a thorough understanding of:

- Commonwealth, State, and other relevant planning approvals
- sustainability management
- sustainability innovations.

ELEMENT		PERFORMANCE CRITERIA	
33.1	Planning Approval Strategy	33.1.1	Understanding of Commonwealth approvals that apply to the project
		33.1.2	Understanding of State approvals that apply to the project
		33.1.3	Understanding any specific approvals i.e., working on Commonwealth airport land
33.2	Planning approvals program	33.2.1	How Commonwealth and State legislation and regulations relating to sustainability affect a project.
		33.2.2	Understanding the planning approvals program and effect on project program and cost
		33.2.3	Understanding the scheduled planning approval milestones and status at time of preparing cost estimates
33.3	Sustainability management	33.3.1	Understand the environmental and sustainability policy commitments
		33.3.2	Understand the sustainability principles
		33.3.3	Understand project-wide sustainability objectives, targets, and initiatives
		33.3.4	If more than one delivery package then understand targets and initiatives for each delivery package
		33.3.5	Understand contract requirements for each delivery package
		33.3.6	Understand sustainability management plans for each delivery package
		33.3.6	Understand client sustainability plan, documents including ISCA (Infrastructure Sustainability Council of Australia) and project specifications
		33.3.7	In addition to understanding pre-tender approvals for the cost estimate, understand construction and operational phase performance, compliance, and reporting
33.4	Sustainability innovations	33.4.1	Understanding of sustainability targets including, green infrastructure targets i.e., to reduce stormwater and pollution runoff
		33.4.2	Establishing cost impacts of sustainability innovations, including: <ul style="list-style-type: none"> • client specific initiatives • recycling of construction and demolition waste • re-use of clean spoil • construction water from non-potable sources • sustainable site facilities i.e., use of solar
		33.4.3	Participation in sustainable design workshops and opportunities to reduce costs
		33.4.4	In addition to capital cost undertake life cycle costs

COMPETENCY STANDARD UNIT 34 – BIM (SPECIALIST UNIT)

When BIM was first envisaged, the perception was that software would compile and output Bills of Quantities at the push of a computer button. In Infrastructure, BIM is often referred to as Digital Engineering. Overtime this perception is becoming unrealistic, at least in the short to medium term, and BIM is presenting the quantity surveying professional with new and traditional opportunities. What is becoming clear is that BIM models require oversight of their costing systems, and the quantity surveying professional is well placed to offer the expert oversight.

ELEMENT	PERFORMANCE CRITERIA
34.1 BIM principles	34.1.1 Have a basic understanding of the principles of BIM and how the systems and software work
34.2 Input	34.2.1 Understand the input techniques and be able to advise on the likely outputs as a result
34.3 Output	34.3.1 Interpret the output and advise whether it meets the objective output 34.3.2 Interpret the accuracy of the BIM cost module 34.3.3 Verify the correct application of the scope of work
34.4 Supplement	34.4.1 The ability to translate BIM model cost outputs into pricing tables 34.4.2 The ability to add any missing information to the BIM model cost output
34.5 Change Management	34.5.1 Understand the principles of how to effect change management within BIM models

COMPETENCY STANDARD UNIT 35 – EARNED VALUE (SPECIALIST UNIT)

Earned Value is a management system that quickly highlights whether a project is at risk from budget or time overruns or underruns.

ELEMENT	PERFORMANCE CRITERIA
35.1 Understanding	35.1.1 Understands AS4817:2019 35.1.2 Understands and can calculate the key element of planned value (PV) 35.1.3 Understands and can calculate the key element of earned value (EV) 35.1.4 Understands and can calculate the key element of actual cost (AC) 35.1.5 Understands and can calculate the key element of cost variance (CV) 35.1.6 Understands and can calculate the key element of cost performance index (CPI) 35.1.7 Understands and can calculate the key element of scheduled variance (SV) 35.1.8 Understands and can calculate the key element of schedule performance index (SPI) 35.1.9 Understands and can calculate the key element of estimate to complete (ETC) 35.1.10 Understands and can calculate the key element of estimate at completion (EAC)
35.2 Preparation	35.2.1 Has input into the Work Breakdown Structure and method of measuring progress
35.3 Interpretation	35.3.1 Can interpretate the results of cost variance and schedule variance 35.3.2 Advise on cost variance and schedule variance

COMPETENCY STANDARD UNIT 36 – COST ENGINEERING (SPECIALIST UNIT)

This competency covers the field of cost engineering. Cost engineering has its roots in the USA and has grown significantly since the 1950s particularly in recent years. Two of the key areas of cost engineering are cost estimating and cost control and these are the subject of this competency.

Cost engineering is common in the petrochemical industry and quantity surveying professionals working in this sector and countries including USA, China and parts of Europe are often referred to as cost engineers. For consistency, the term cost engineer will be used throughout this competency.

As its name suggests cost engineering (cost estimating and cost control) is considered to be an area of engineering practice and require a strong engineering or quantity surveying background in order to implement a successful cost-engineering program.

As the principles used by the cost engineer in cost estimating on say a petrochemical project can be different to a rail or road project this competency is based more on a petrochemical type of project. Although the processes and terminology used in this competency can be applied to any infrastructure project they are primarily based on the oil and gas industry.

COMPETENCIES

For the purposes of this competency, it is assumed that the cost engineer will be involved in all aspects of cost engineering i.e., cost estimating and cost control rather than just cost control to prepare cost estimates and undertake cost control it will be necessary to:

- define project budget and establish the plan
- understand scope of contract
- implement control tools for budget control and collection of actual costs
- collect actual costs
- analyse and report actual costs
- implement corrective actions.

ELEMENT		PERFORMANCE CRITERIA	
36.1	Estimating: prepare estimates	36.1.1	Prepare screening estimates
		36.1.2	Prepare budget estimates
		36.1.3	Prepare definitive estimates
36.2	Estimating: labour productivity	36.2.1	Establish base productivity for an area
		36.2.2	Establish variables that can affect base productivity
		36.2.3	Establish labour productivity for given project
36.3	Estimating: indirect costs	36.3.1	Contractor's on-site supervision, temporary construction, and consumables
		36.3.2	Contractor's offsite administrative overhead and profit
		36.3.3	Design and drafting
		36.3.4	Owner's costs
36.4	Cost data: unit rates	36.4.1	Pricing equipment (vessels, pumps, etc.)
		36.4.2	Pricing bulk materials (piping, concrete, structural steel, etc.)
		36.4.3	Pricing Direct or Subcontractor labour
		36.4.4	Pricing Contractor distributable, TEM Facilities, Misc. Services
		36.4.5	Pricing subcontracts
		36.4.6	Cost indexes for location of project
36.5	Estimate coding/Work Breakdown Structure	36.5.1	WBS: System/Facility/Area: objective - to break the project into units with well-defined interfaces that can be managed as a smaller project
		36.5.2	Code of accounts and estimate coding
36.6	Escalation	36.6.1	Escalation indices researched
		36.6.2	Labour escalation established
		36.6.3	Material and subcontract escalation established
36.7	Contingency	36.7.1	Basis of establishing contingency defined
		36.7.2	Quality of the basis of the estimate established
		36.7.3	Estimate method used considered
		36.7.4	Contingency prepared
		36.7.5	Contingency drawn
36.8	Estimate documentation	36.8.1	Documentation of estimate basis, assumptions, exclusions, etc.
36.9	Budget	36.9.1	Define project budget CBS/CoA
		36.9.2	Establish the plan
		36.9.3	Project estimate
		36.9.4	Management adjustments
		36.9.5	Negotiation period
		36.9.6	Contract award
		36.9.7	Vendors
		36.9.8	Original budget

36.10 Cost control	36.10.1 Provide information needed to control costs 36.10.2 Point out areas of cost overrun 36.10.3 Investigate and recommend corrective action 36.10.4 Forecast costs on a monthly basis 36.10.5 Monitor costs between months and advise any significant cost impact 36.10.6 Keep a record of changes to the project 36.10.7 Provide cost estimates for design alternatives 36.10.8 Keep cost information in central file for use in future estimates
36.11 Trending and change control	36.11.1 Identification of potential trends with or without cost impact 36.11.2 Pricing and approval of trends 36.11.3 Recording of trend estimates and adjustment of current forecast
36.12 Field manual labour job hour and cost control	36.12.1 Measurement against established cost and schedule budgets 36.12.2 Analysis of labour performance and progress 36.12.3 Trend forecasting of installation job hours, quantities, and costs/wage rates
36.13 Quantity installation analysis	36.13.1 Quantity reporting 36.13.2 Quantity and unit rate report 36.13.3 Labour cost analysis 36.13.3 Unit rate and performance calculations
36.14 Monitoring and forecasting	36.14.1 Defining forecasts scope 36.14.2 Forecast plan 36.14.3 Project scope and quantities 36.14.4 Forecast project cost 36.14.5 Forecast project schedule 36.14.6 Reconciling the forecast 36.14.7 Forecast reviews and approval
36.15 Reporting and analysis	36.15.1 Trend report 36.15.2 Monthly project progress performance report 36.15.3 Monthly project cost report 36.15.4 Engineering progress and performance report 36.15.5 Construction cost and schedule reports 36.15.6 Government/Client reports 36.15.7 Project financial status report (PFSR)
36.16 Change authorisation paper	36.16.1 Capturing the change/change request 36.16.2 Approving or rejecting the change 36.16.4 Incorporating change 36.16.5 Change approval paper
36.17 Cost analysis	36.17.1 Process of developing and analysing cost data 36.17.2 A variance analysis of the difference between expenditure to date and the budget
36.18 Quantitative Risk Analysis (QRA) and Contingency Analysis	36.18.1 Identifying risks 36.18.2 Ranging contingent and inherent risks 36.18.3 Pricing of contingent risks 36.18.3 Contingency recording and reporting
36.19 Systems and tools	36.19.1 Understanding common systems and tool required to achieve accurate cost management reporting

COMPETENCY STANDARD UNIT 37 – PROJECT CONTROLS (SPECIALIST UNIT)

This competency covers the field of project controls.

Project Controls has its roots in the USA and has grown significantly since the 1950s particularly in recent years. The key areas of Project Controls are Cost, Time, Risk and Scope and these are the subject of this competency. These are all essential interfaces of the Cost Engineer.

Project Controls is common in the petrochemical industry and quantity surveying professionals working in this sector and countries including USA, China and parts of Europe are often referred to as cost engineers. The Project Controls Unit 37 should be read together with the following Units:

- 3 Cost Estimating
- 4 Cost Planning
- 30 Project Risk Management
- 35 Earned Value
- 36 Cost Engineering

COMPETENCIES

For the purposes of this competency, it is assumed that the cost engineer will be involved in all aspects of Project Controls (PC) i.e., cost estimating and cost control rather than just cost control to prepare cost estimates and undertake cost control it will be necessary to identify and address variances from the project baseline.

The steps and elements (inputs, outputs, attributes) of the process are:

- develop Baseline — the project baseline consists of the scope, schedule, budget, contract terms and conditions, project controls plan (PCP).
- measure progress and performance - PC monitors and measures progress performance against the baseline via its array of cost and schedule monitoring tools, updated at the optimum frequency as procedurally defined.
- identify variances - actual and potential variance to project execution plan, scope, cost, and schedule are identified through progress and performance measurement. Timely identification is key, as well as the assessment of magnitude and criticality. Change to any part of the execution plan, scope, cost, or schedule is assessed for impact upon the others, and for potential impact to project risk, customer satisfaction, quality, and safety
- validate impact - actual and potential variance, once identified, is validated through verification of data and/or interview of the supervisor responsible for the work. Supplemental monitoring and tools may be used to confirm the variance.
- identify cause - the cause of the variance is investigated, and the impact may be further quantified. Quantification is performed with a time vs. accuracy perspective. Timeliness in addressing the cause is more important than exact detailed Quantification, as the goal is to positively adjust the quantification with corrective action.
- recommend solutions - PC in conjunction with the project team assesses the options available and their associated impacts to scope, cost, schedule and/or change to risk.
- facilitate decision making - options are presented at the appropriate management level for decision
- approve and implement.

The competencies cover both Contractor and Client organisations.

ELEMENT	PERFORMANCE CRITERIA
37.1 Prepare estimates	37.1.1 Prepare screening estimates 37.1.2 Prepare budget estimates 37.1.3 Prepare definitive estimates
37.2 Budgeting	37.2.1 Define project budget CBS/CoA 37.2.2 Establish the Plan 37.2.3 Project estimate 37.2.4 Management adjustments 37.2.5 Negotiation Period 37.2.6 Contract award 37.2.7 Vendors 37.2.8 Original budget

37.3 Cost forecasting	<p>37.3.1 Defining forecasts scope</p> <p>37.3.2 Forecast plan</p> <p>37.3.3 Project scope and quantities</p> <p>37.3.4 Forecast project cost</p> <p>37.3.5 Forecast project schedule</p> <p>37.3.6 Reconciling the forecast</p> <p>37.3.7 Forecast reviews and approval</p>
37.4 Cost controlling	<p>37.4.1 Provide information needed to control costs</p> <p>37.4.2 Point out areas of cost overrun</p> <p>37.4.3 Investigate and recommend corrective action</p> <p>37.4.4 Forecast costs on a monthly basis</p> <p>37.4.5 Monitor costs between months and advise any significant cost impact</p> <p>37.4.6 Keep a record of changes to the project</p> <p>37.4.7 Provide cost estimates for design alternatives</p> <p>37.4.8 Keep cost information in central file for use in future estimates</p>
37.5 Key performance indicators	<p>37.5.1 The measurement of production trends</p> <p>37.5.2 The measurement of budget variances</p> <p>37.5.3 The measurement of estimation accuracy</p> <p>37.5.4 The measurement of forecast variances</p>
37.6 Cost management and reporting systems	<p>37.6.1 The knowledge and use of software and application used to capture cost information and provide reporting from the market</p> <p>37.6.2 Enterprise resource planning (ERP) systems, PM Web and SAP</p> <p>37.6.3 Knowledge of systems</p>
37.7 Funding	<p>37.7.1 Initiating Funding Request</p> <p>37.7.2 Funding Approval</p> <p>37.7.3 Fund release and allocation</p>
37.8 Cost and commitments	<p>37.8.1 Recognising and handling actual cost, invoices received from suppliers and service providers etc.</p> <p>37.8.2 Handling of accrued or incurred cost</p> <p>37.8.3 Administering committed cost: value of any work done (claimed or accrued) against a commitment. A Commitment arises from purchase orders or contracts.</p>
37.9 Scheduling	<p>37.9.1 Use of the cost loaded schedule to derive schedule performance index (SPI):</p> <p>37.9.2 Use of the cost loaded schedule to derive schedule variance (SV):</p> <p>37.9.3 Use of the cost loaded schedule to derive the cost performance index (CPI)</p> <p>37.9.4 Use of the cost loaded schedule to derive the cost variance (CV)</p>
37.10 Scheduling systems	<p>37.10.1 Knowledge of systems for cost loaded schedule to derive schedule performance</p>
37.11 Schedule reporting	<p>37.11.1 Identify potential or real impacts to contractual schedule milestones</p> <p>37.11.2 Evaluate magnitude and assess responsibility</p> <p>37.11.3 Expediting project team response, and provide a checklist of actions and progress against them</p>
37.12 Scope risk	<p>37.12.1 Risk assessment (identification, analysis, and evaluation)</p> <p>37.12.2 Managing risks, workshops, and reviews</p> <p>37.12.4 Applied risk management quantitative and probabilistic methods</p> <p>37.12.6 Quantitative risk analysis Monte Carlo Analysis</p> <p>37.12.7 Contingency allocation P50/P90</p> <p>37.12.8 Contingency drawdown and forecasting</p>
37.13 Scope integrated cost benefit analysis	<p>37.13.1 Identifying desired outcome (e.g., Below budget, minimum impact to risk, and positive impact on customer satisfaction)</p> <p>37.13.2 Analysing to identify what execution factors can be adjusted to achieve the desired outcome</p> <p>37.13.3 Collate the options into a summary presentation of the above including costs and benefits</p> <p>37.13.4 Analysing to determine recommended option and present for decision making</p>

37.14 Scope change	37.14.1 Capturing the change/change request 37.14.2 Approving or rejecting the change 37.14.4 Incorporating change 37.14.5 Change approval paper
37.15 Project controls reporting	37.15.1 Trend report 37.15.2 Schedule impact report 37.15.3 Monthly project progress performance report 37.15.4 Monthly project cost report 37.15.5 Engineering progress and performance report 37.15.6 Construction cost and schedule reports 37.15.7 Government/Client Reports 37.15.8 Project financial status report

COMPETENCY STANDARD UNIT 38 – PLANNING & PROGRAMMING (SPECIALIST UNIT)

This competency covers the field of Planning/Programming. Planning is the overall approach and Programming is the detailed activities.

Planning determines what and how much needs to be done while programming defines who and when the operations will be performed. Although they are different processes, they come together to develop the project program.

Definitions:

- Planning
 - the act of creating “a detailed formulation of a program of action” (a plan) for how something will be achieved. That is, planning describes the intention to do something, coupled with a proposal or strategy for getting it done.
- Programming
 - the act of deciding when something will be done and allocating the time for it.
 - So, programming can be considered a subset of planning, because most good plans include a timeline/schedule for when each step of the plan will be achieved. But planning also includes many things outside of programming (such as deciding who to work with, tools that will be used, etc).
 - Programming is also referred to as scheduling. For the purpose of this competency, the term programming/program is used.

Construction planning is essential in managing and executing construction projects as it involves selecting the technology, defining the work tasks, estimating the required resources and the extent of individual tasks, and identifying possible interactions and workflows among different activities.

An efficient construction plan is fundamental in setting the budget and program for the entire work needed. Creating and developing the construction plan is a highly challenging and critical task in construction management.

COMPETENCIES

For the purposes of this competency, it is assumed that the member will be involved in all aspects of cost engineering i.e., cost estimating and cost control rather than just cost control.

A member would prepare a plan/program or analyse; or interpret the plan/program to establish preliminaries, staging costs, escalation, cash flow, etc; or both.

The typical life cycle of a project and major Planning and Programming categories include:

- Project Planning
 - Establishing acceptable actions to execute a project in an effective manner through the review of project scope and objectives
- Program Development

- Defining the activities, durations, logic relationships to implement the plan and monitor, update and communicate the program.
- Program Management/Control
 - Providing the management team with the expertise to deliver the project in the most effective manner

A. PROJECT PLANNING

ELEMENT	PERFORMANCE CRITERIA
38A.1 Input to planning	38A.1.1 Stakeholders – identify and what are the expectations 38A.1.2 Historical data – what is being used in the program 38A.1.3 Contract/program specifications – understand the pros/cons of each contract, delivery method, risk allocation and impact of supply chain on procurement 38A.1.4 Value improvement practices – how is the project to be constructed and connection with the supply chain on Design for Manufacturing Assembly (DFMA)? 38A.1.5 Planning considerations – stakeholders/resources/project variables and value management
38A.2 Planning process	38A.2.1 Scope development – describe the scope of works to be delivered 38A.2.2 Execution strategy 38A.2.3 Work breakdown structure (WBS) – describe how the work is to be delivered 38A.2.4 Organisation chart – describe how the project is to be staffed 38A.2.5 Establishing milestones 38A.2.6 Activities definition 38A.2.7 Determine logical sequence 38A.2.8 Activity duration – estimate the duration 38A.2.9 Resource allocation 38A.2.10 Risk management 38A.2.11 Program contingency
38A.3 Planning output/deliverables	38A.3.1 Project plan – describe how the site is being set up, and how it's being executed 38A.3.2 Project goals/execution strategy 38A.3.3 Scope development – describe the scope of works to be delivered 38A.3.4 Work Breakdown Structure (WBS) – describe how the work is to be delivered 38A.3.5 Organisation Chart – describe how the project is to be staffed 38A.3.6 Milestones 38A.3.7 Activities definition 38A.3.8 Determine logical sequence 38A.3.9 Activity duration – estimate the duration 38A.3.10 Resource allocation 38A.3.11 Program contingency 38A.3.12 Cash flow – discuss the effects on planning when cash flow is limited
38A.4 Planning and program development transition	38A.4.1 Describe the transition between project planning and program development. How is the project plan 'transferred' and the project program is developed during the program development phase? The project planning output provides input/data for program development.

B. PROJECT DEVELOPMENT

ELEMENT	PERFORMANCE CRITERIA
38B.1 Program models and methods	38B.1.1 Identify critical points 38B.1.2 Precedence diagram method – identify relations with lags and critical paths 38B.1.3 Bar/Gantt chart- explain the difference between this and a logic diagram 38B.1.4 PERT – describe method and use 38B.1.5 Line of balance 38B.1.6 Linear scheduling 38B.1.7 Critical chain 38B.1.8 CPM schedule algorithm – identify float
38B.2 Program input	38B.2.1 Milestone and key events 38B.2.2 Activities definition 38B.2.3 Activity logic and logic diagram 38B.2.4 Describe the process for developing realistic activity duration 38B.2.5 Describe constraints imposed on a schedule 38B.2.6 Project calendar, five-day, six-day, or other 38B.2.7 Describe the use of coding for sorting/selection of activities 38B.2.8 Describe resource allocation/availability/constraints 38B.2.9 Describe the critical path 38B.2.10 Describe the total and free float
38B.3 Program development output/deliverables	38B.3.1 Describe baseline program 38B.3.2 Describe the typical content of program basis documentation 38B.3.3 Milestone and key events 38B.3.4 Work breakdown structure 38B.3.5 Describe constraints imposed on a schedule 38B.3.6 Project calendar, five-day, six-day, or other 38B.3.7 Describe the use of coding for sorting/selection of activities 38B.3.8 Describe resource allocation/availability/constraints 38B.3.9 Describe the critical path 38B.3.10 Describe the total and free float
38B.4 Other program development concepts	38B.4.1 Program quality analysis including specification compliance, integrity, and validation 38B.4.2 Program strategy 38B.4.3 Project control baseline 38B.4.4 Program hierarchy 38B.4.5 Code of accounts 38B.4.6 Explain the importance of the contract in regard to the program

C. PROGRAM MANAGEMENT AND CONTROL

ELEMENT	PERFORMANCE CRITERIA
38C.1 Project implementation and control plan	38C.1.1 Describe the typical stages in project planning and funding 38C.1.2 Project information scope statement 38C.1.3 Control accounts 38C.1.4 Project control plan and basis 38C.1.5 Program contingency management
38C.2 Program performance and control plan	38C.2.1 Program progress and status procedures 38C.2.2 Program performance assessment 38C.2.3 Forecasting 38C.2.4 Program change management 38C.2.5 Contract claims and disputes 38C.2.6 Project closeout