

AusNet Electricity Services Pty Ltd

Electricity Distribution Price Review 2022-26

Appendix 9A: Project Cost Estimating Methodology

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Project Cost Estimating Methodology

Electricity Distribution Price Review

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1 INTRODUCTION

The purpose of this document is to describe the principles, methodologies and procedures AusNet Services follow to prepare cost estimates for major capital projects developed for the Electricity Distribution Price Review (EDPR) submission for the regulatory period 2022-26.

1.1 Background

AusNet Services follows a standardised approach to developing, managing and reporting on projects and programs of works. The Portfolio Framework shown in Figure 1 outlines the four phases: Idea, Plan, Build, Close.

The Idea phase encompasses documenting the high-level information of a specific project.

The Plan phase encompasses the core planning activities that need to be undertaken once a project or program is endorsed and selected into the project pipeline. This phase incorporates Business Case development, approval and completion of detailed designs and control estimates.

The Build phase encompasses the activities required to build, construct and implement a project.

The Close phase provides a point at which acceptance for the project is confirmed.

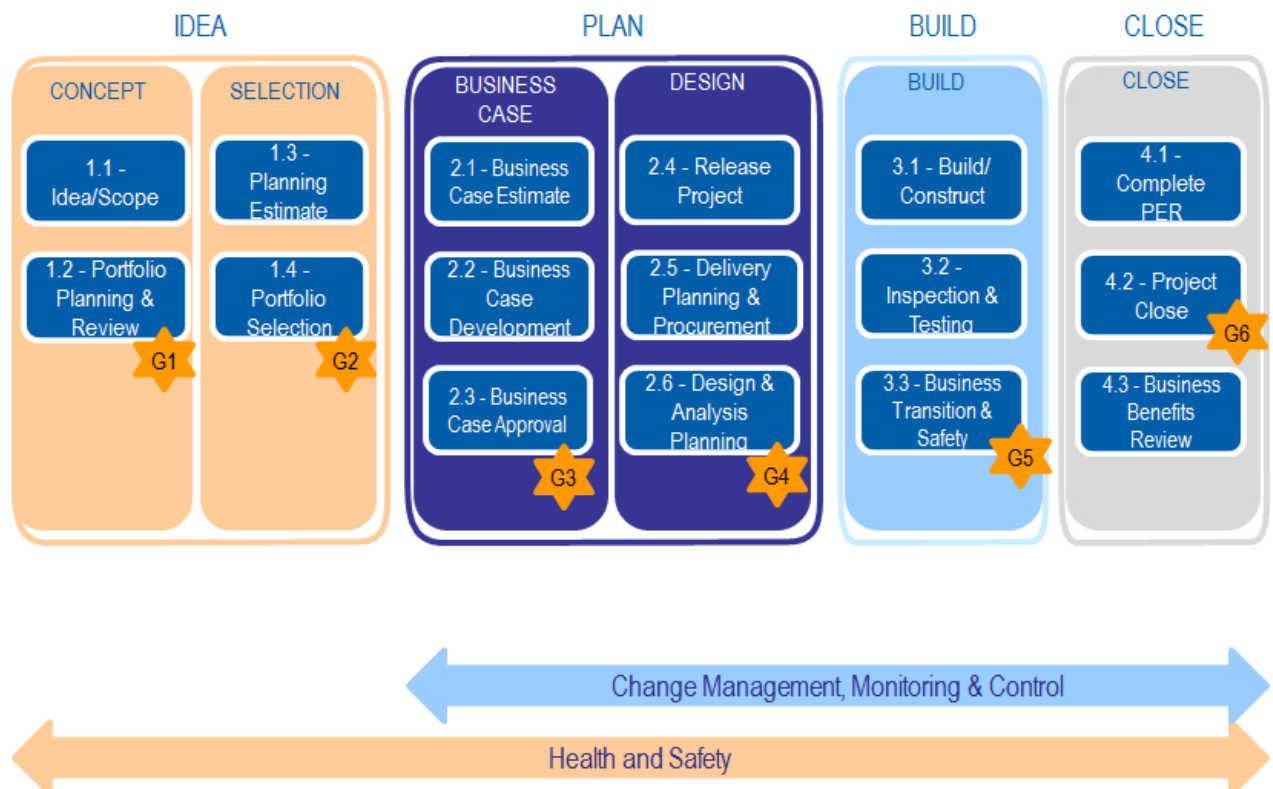


Figure 1 - Overview of portfolio framework.

Project Cost Estimating Methodology

The Engineering Standards and Consulting group within Network Engineering work with the Major Projects team within Operations and Services to produce:

- Project estimates for the Idea phase of projects, used for initial cost/benefit analysis, optimisation and prioritisation;
- Planning estimates for the Plan phase of projects, used for the development and approval of a Business Case;
- Project cost analysis for the Close phase of projects to compare the cost estimate with the actual cost for continual development and maintenance of the estimation database; and
- Project estimates called 'Control estimates' for the Plan phase of projects, prior to Build phase to be used along with design release for validation of a Business Case and cost control purposes;
- Regular reviews of estimation systems and the estimation database in order to facilitate continuous improvement.

1.2 Scope

The scope of this document is limited to the preparation of project estimates during the Idea and Plan phases of projects. These are commonly referred to as:

- P(50) Project estimate (G1 in Figure 1) (Indicative Estimate)
- P(75) Planning estimate (1.3 in Figure 1)
- P(90) Control estimate (G4 in Figure 1)

The scope excludes discussion of other tools currently used to support the project creation, development, execution, monitoring and reporting such as EPPM (Enterprise Program Project Management), NPV (Net Present Value) Model, Business Case Documentation / Templates, Oracle, Corporate Risk Framework, and the Project Execution Manual. For a detailed explanation of the estimating tools used, refer to the Project Estimating Manual.

2 ESTIMATING OUTCOME

2.1 EDPR Estimates

The Project estimates used to develop the EDPR capital expenditure forecast for bulk projects and complex projects are based on P(50) estimates. These unit rates and estimates do not include overheads, finance charges or the Management Reserve derived for a project. A project's Management Reserve allowance is used to cover "uncertainty" in the project and is released to the Project Manager (PM) through a change management process.

2.2 Estimating Principles

AusNet Services' estimates are founded on five key principles, they are:

- All projects are to be project managed in accordance with the AusNet Services project execution procedures & practices
- For Business Case approval and implementation, P(90) estimates provide confidence in processes of project priority, affordability and strategic fit
- Estimates are subject to reviews and a sign-off process based on consistent clear lines of responsibility and accountability that will ensure costing standards and controls are applied to any budget information that is to be released
- Regular system reviews are conducted to encourage and facilitate continuous improvements
- Project learnings will be shared to increase corporate knowledge.

2.3 Estimating Rationale

AusNet Services recognises that cost management, including cost estimating, must be exercised in the broader context of project management. Estimating is an integral part of a system of interdependent core inputs of scope, time, cost, quality and uncertainty. The project budget results from approval of the Business Case equivalent estimate at the beginning of the Plan Phase. The Project estimate (Uncertainty Adjusted Planning Estimate), which is based on a sound definition of the scope of the preferred option from the options analysis, is of critical importance in the economic justification (cost/benefit) of the project.

The projects developed for and information provided in the EDPR submission are based on AusNet Services' need to address asset condition, safety, and regulatory obligations in its distribution network. Identification and funding of the highest priority works to meet these needs, and delivering them through an efficient program, is underpinned by sound project cost estimation.

Project Cost Estimating Methodology

Estimating in the current market environment requires a conservative but realistic view of the project scope together with the associated Project Components and Project External Uncertainties, particularly in the early project stages when detailed design is yet to be produced. Estimators must make provision for items that are considered likely to be required, having regard to such inputs as environmental determinants and community input on the final project scope. Such items are included as Provisional Items and not through an increase in Management Reserve.

The challenge for the estimator is to arrive at a realistic (that is, not overly conservative) view of the project scope and associated Project Uncertainties, and assign appropriate quantities for Project Uncertainties and Contingency in order to produce a meaningful estimate within the P(90). All estimates must include a detailed consideration of project costs, including project definition, engineering and management. These costs may be estimated using typical values or estimated on a first principles basis, taking into account the expected personnel required for the project and their costs. Estimates are applicable only to a particular project scope, or range of scopes or program of works, which are defined as part of the estimating process.

Each estimate is presented in a standard Business Case format, and incorporates a report that defines the scope, uncertainty and assumptions on which the estimate has been based.

3 ESTIMATING PROCESS OVERVIEW

3.1 Bulk Replacement Project Estimates

Project estimates for bulk replacement projects, consisting of high volume, low value assets, are calculated by multiplying a nominated volume of replacement by a unit rate. Unit rates are calculated based on actual costs of previous projects and updated periodically. This calculation, based on the average cost of replacing a unit, forms a P(50) estimate. Overheads, Finance Charges and Management reserve are then added to develop a P(90) estimate. These estimates do not require the use of estimating tools used for complex projects or major capital projects.

3.2 Options Analysis and Indicative Estimate

Other than bulk replacement projects, large scale replacement projects often involved site or project specific scopes and designs. For example, a partial rebuild of a zone substation will require designs specific to the stations existing and required configuration of equipment and connections. This therefore requires a more complicated and intricate estimating process.

An Options Analysis and Indicative Estimate is prepared to assist in developing a project from the conceptual scope provided by the project initiator. Often the information in the conceptual scope is preliminary and high level in nature with broad functional requirements. The indicative estimation process provides approximate costs for determination of project feasibility, options analysis and selection. This type of estimate is used in economic evaluations.

The estimation process requires consultation with various stakeholders to determine the best approach to achieving the functional requirements in the most effective manner. An Indicative Estimate is often undertaken as a desktop estimate with allowances allocated to loosely defined scope items and appropriate quantities of Project Uncertainties allocated for unknowns.

Inputs:

- Conceptual scope (Mandatory)
- Risk assessment (Preferred)
- Single line diagram (SLD) (Preferred, where applicable)
- Implementation methodology (Desirable if available)
- Project schedule (Desirable if available)

Outputs:

- Scope of Works and Indicative Estimate based on the standard MS Word template generally including multiple options with estimated (top down) costs to determine project feasibility and enable option selection.
- Sign-off

Process:

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- Requests are initiated from internal or external customers. Customer solutions or the asset owner generates the requirement for an estimate. Parties liaise on the minimum requirements for the requested estimate and an initial risk assessment is undertaken.
- The estimate is allocated to an Estimator.
- Basic SLDs and layouts are developed to provide options and desired outcomes to the Project Sponsor for their consideration for further development.
- Consultation with the Project Sponsor identifies the options to be further developed. The number of options should be limited to approximately three with the possibility of development of other options should some of the original options be determined as infeasible.
- The estimate is developed jointly with staging SLDs and layouts as required. A standard Excel template for Distribution projects is used to develop the top down estimate. This detailed spreadsheet contains sensitive information and could be misused if the basis of costs is not understood. It should therefore remain confidential with only summaries distributed to a wider audience.
- A standard report template is used to present the indicative estimate. This includes a listing of all input documentation, general description, outline of options, scope of work, scope clarification and exceptions, scope by others, price and time to complete. Additional sections may be added including project staging and sequencing, outage plans, detailed project timeline and detailed cost breakdowns.
- The PM consults with the relevant project initiator to determine if a formal technical review is required. This may result in a revision to the scope and subsequently a revision to the estimate.
- The estimate is handed over and accepted.

The development of top-down indicative estimates requires the development of a scope of work including sketches of SLD's and an Excel Workbook template-based estimate. The scope of work and estimate is developed as an iterative process which follows the project development process outlined in Figure 1 and detailed above. The tool used for the Indicative estimate is an Excel Workbook template that aligns with the Scope of Works and Indicative Estimate template.

The Excel Workbook template comprises of multiple worksheets. The individual worksheets can be used as separate "stages" within a project or completely independent "options", chosen on the summary sheet. Overheads and Interest During Construction (IDC) are calculated automatically with the user required to provide a cash flow on the "IDC Worksheet". Excel Workbook resources are updated periodically in conjunction with period order contracts.

The Excel Workbook template includes the provision of "standard bays" and equipment units generally in use across the AusNet Services Distribution System. The standard bays include all typical costs associated with the installation of a bay. Alternatively, the bays can be built up with the individual components using the drop-down options.

Project indirect labour costs for the lifecycle of the project, including Project Management, design management, site management and Health, Safety and Environment management, are determined as a percentage of the total direct costs of the project based on historical out-turn costs of similar projects. Design costs are determined as a percentage of the total direct costs of the project based on historical quotations or out-turn costs of similar projects.

The Contractor Indirect Costs are determined as a percentage of the total direct costs of the project based on historical quotations or out-turn costs of similar projects. These costs include the non-direct labour and materials costs of the installation service provider (ISP) such as:

- Inductions

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- Site and shift allowances
- Living Away from Home costs
- Contractor project management and supervision costs
- Contractor Occupation Health & Safety and quality costs
- Contractor procurement and administration costs
- Contractor, support equipment including computers, faxes, phones, refrigerators, portable water, etc. for the contractor to perform their work on site
- Contractor vehicles.
- Contractor site establishment and maintenance costs including huts, site clean-up etc.
- Contractor provision of huts and Amenities for AusNet Services personnel
- Contractor overheads and off-site support costs.

A nominal project uncertainties value P(50) between 5-10% of the total direct costs including internal Ausnet Services costs, design and sub-contractor indirect is generally added at the options analysis stage of the process. This item is refined once the quantitative assessment of project uncertainties is undertaken and the outcomes of project Uncertainty and Management Reserve are derived through Monte Carlo simulation.

3.3 Planning Estimate

A Planning Cost Estimate is developed when the project initiator has chosen a preferred solution / option to proceed which now requires further scoping and costing. Information is specific and a conceptual scope may have been produced by the project initiator. The Planning estimate process provides further development of options and utilises a top down model to develop costs for options analysis and selection.

The main differences between the Indicative and Planning estimates are the certainty of the scope of works from the project initiator, the amount of detail in the scope of work and the provision of built-up and standard pricings rather than allowances.

Once the final option has been chosen by the project initiator, the Planning estimate is then adjusted with Project Uncertainties. This estimate is used for Business Case (Financial) approval.

The estimate process requires consultation and facilitation of various stakeholders to determine the best approach to achieving the functional requirements in the most effective manner.

Inputs:

- Conceptual scope (Mandatory)
- Preferred option chosen (Mandatory)
- Risk assessment (Preferred)
- SLD (Preferred, if applicable)
- Implementation methodology (Desirable if available)
- Project schedule (Desirable if available)

Outputs:

- Planning Scope and Uncertainly Adjusted Estimate based on the standard MS Word template for the preferred option only with project uncertainty adjusted top down costs model to provide information for financial approval of the project.

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- Summary and IDC work sheets from the template
- Sign-off

Process:

- Requests are initiated from internal or external customers. Customer solutions or the asset owner generates the requirement for an estimate. Parties liaise on the minimum requirements for the requested estimate and an initial risk assessment is undertaken.
- The estimate is allocated to an Estimator.
- Basic SLDs and layouts are developed to provide options and likely outcomes to the Project Sponsor for their consideration for further development.
- Consultation with the Project Sponsor identifies the options to be further developed. The number of options should be limited to approximately three with the possibility of development of other options should some of the original option be determined as infeasible.
- The estimate is developed jointly with staging SLDs and layouts as required. Expert Estimator is used to develop the top down estimate. This detailed spreadsheet contains sensitive information and could be misused if the basis of costs is not understood. It should therefore remain confidential with only summaries distributed to a wider audience.
- A standard report template is used to present the indicative estimate. This includes a listing of all input documentation, general description, outline of options, scope of work, scope clarification and exceptions, scope by others, price and time to complete. Additional sections may be added including project staging and sequencing, outage plans, detailed project timeline and detailed cost breakdowns.
- During this process the project initiator should consult with relevant specialists to determine the best or preferred solution.
- A technical review is conducted in consultation with relevant engineers and Project Delivery representatives. This may result in a revision to the scope and subsequently a revision to the estimate.
- An estimate handover meeting is conducted utilising the estimate checklist as an agenda.
- The Project Sponsor and / or customer select the preferred option. This may require modifications to the options and estimate to obtain a suitable alternative.
- If required, a risk assessment is undertaken in accordance with the Risk Management Process.
- The Planning estimate is updated with the information from the risk assessment and approved at a Formal Estimate Approval Meeting, once again using the estimate checklist as an agenda.

The development of top-down Planning estimates requires the development of a scope of work including sketches of SLDs, site layout and protection and control schematics. The estimate is prepared using a database tool called Expert Estimator (EE).

The scope of work and estimate is developed as an iterative process which follows the project development process outlined in Figure 1 and detailed above.

The tool used for the estimation of the Planning estimate is a Database Workbook template that aligns with the Planning Scope and Uncertainty Adjusted Estimate template.

Expert Estimator is a database consisting of resources such as labour, materials, mobile plant and group resources. The database is built up from first principles in accordance with the

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current standards and drawings. In addition, the estimate build-up consists of resources with appropriate cost codes and Work Breakdown Structure (WBS).

Numerous output reports can be created ranging from a project summary to individual components. These reports can be imported into Excel formats to produce Business Case costing formats. Expert Estimator resources are updated periodically in conjunction with period order contracts.

The Project Development Engineer compiles the estimate by entering the quantities for the relevant group work resource into the database. Project labour costs are developed using a bottom-up approach based on individual project team roles and duration of the project. Design costs are determined as total direct costs of the project based on out-turn costs of similar projects.

Contract indirect costs are developed based on the project schedule using a bottom-up approach. Once the estimate is completed, the individual work group items are exported into an Excel based workbook template. This enables the data to be presented in the form suitable for Business Case approval.

Project P(50) and P(90) uncertainty values are developed by compiling the Project Components Uncertainty and Project External Uncertainty then using @Risk® Simulation to compute these values.

3.4 Control Estimate

A Control estimate is developed from a Detailed Engineering Scope using a standard bottom-up template in the Expert Estimation Estimating Package after the Business Case has been developed. The Control estimate is used to provide a detailed analysis of all costs on the project to the Project Delivery Team. The Control estimate may be used as a basis to revise the Project Budget.

The Control estimate is risk adjusted in accordance with the Risk Management Process.

Inputs:

- Detailed engineering scope (Mandatory)
- Detailed design (Mandatory)
- PO's for long lead items and ISP
- Addendum to Scope of Work
- High level scope

Outputs:

- Direct cost summary report
- Detailed cost estimate report
- Cost codes report
- Handover checklist
- Risk results
- IDC work sheets
- Sign-off

Process:

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- A PM is allocated to the project during the Idea phase and continues to be a stakeholder until the Close phase.
- The PM engages internal or external resources to develop a high-level Business Case or engineering scope.
- Business Case estimate is developed based on the high-level Business Case or engineering scope.
- Business Case documents including Business Case estimate and Business Case, or engineering scope is handed to the Project Sponsor to prepare the Business Case for approval.
- Detailed scope of work is reviewed by the PM. Upon Business Case approval the PM engages internal or external resources to develop a detailed scope and detailed design.
- The PM decides if a Constructability Review is required. If required, the review is conducted with all of the relevant stakeholders.
- If major modifications to the scope of work are required, the scope of work is returned to the PM for revision.
- If the information provided is suitable and no modifications are required, the project is assigned to the nominated Estimator to develop the Control estimate.
- The Estimator compiles the Control estimate and provides a summary to the PM for review.
- The PM requests a formal review by relevant stakeholders.
- The Estimator completes the Handover checklist and issues or prepares documentation for issue.
- At the formal Handover meeting, the PM determines if the Control estimate is suitable.
- If suitable, the Estimator completes the estimate checklist using the proforma.
- If major modifications are required, the estimate and scope of work are returned to the relevant stage for revision.
- If no or minor modifications are required, the Estimator updates all documents to new revisions and attaches estimate documents and checklist for sign-off.

4 RISK ALLOWANCE

4.1 General

AusNet Services applies a risk-based approach toward estimating through the implementation of a Qualitative and Quantitative risk assessment framework. The framework involves the joint collaboration of AusNet Services stakeholders to assess risks from the Initiation to Finalisation phases. The estimating team facilitates the Initiation phase of the framework and administers the quantitative risk assessment.

4.2 Qualitative Risk Assessment

The first step in quantifying the cost impact is to assess the risks and risk management measures that exist on each individual project or program. This is called the Qualitative Risk Assessment. The Qualitative Risk Assessment is performed by the Project Sponsor / Owner after the development of the high-level functional scope is complete.

The Qualitative Risk Assessment is documented using the standard format of the Risk Register Template and using the Risk Assessment Tables in the Risk Management Framework. The first stage involves the risk identification, its causes and the possible impacts. Next is the risk treatment, what are the current controls in place to minimise or to eliminate the risk. From this the Risk Control Effectiveness (RCE) is ascertained and any future treatment actions to be implemented are identified. Using the standard Risk Matrix of Consequence and Likelihood, the Residual Risk Rating is determined, and a cost applied for the Project Financial Exposure.

Following the Qualitative Risk Assessment, the outputs of this risk assessment become the inputs into the quantitative process.

4.3 Quantitative Risk Assessment

The objective of the Quantitative Risk Assessment is to primarily identify the inherent and contingent risks.

The Inherent Risks are the planned or known risks and opportunities which represent the uncertainty in the pricing of the known scope of work. Inherent Risks occur especially when assumptions have been made in regard to the scope, i.e. the size or type of material required for the Project. Inherent risks can include but are not restricted to:

- The uncertainty in the scope of work.
- The uncertainty, or potential variations, in quantities and unit rates proposed in the reference estimate.
- Variations in construction methods used.

The Contingent Risks are risk events that may occur during the life of the Project that may differ from what has been assumed in the reference estimate. Contingent Risks can include:

- The occurrence of an unplanned or unforeseen event such as a natural event or a major safety incident.
- The change to planned assumptions.
- Stakeholder issues (outage restrictions, community).
- The availability of resources or materials.

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- Delayed access to site.
- Industrial Relations issues external to the Project / Program.
- Contractual issues or claims.

The inputs to the Quantitative Risk Assessment are determined through an estimate review / interrogation performed by the appropriate parties. These parties will include the Project Sponsor, Owner and relevant stakeholders from Asset Engineering, Project Engineering, Program Delivery, Operations & field personnel.

The inherent risk analysis is applied to the reference estimate addressing issues relevant to each individual project. The individual items or lines of the reference estimate are interrogated, and a distribution applied based on individual experience and knowledge gained from previous projects. From the analysis, a percentage value is applied to the reference estimate item or line based on a spread of Minimum, Most Likely and Maximum value of that item/line.

The contingent risk analysis is also applied to the reference estimate and involves the thorough review of the project to identify site specific and generic issues which potentially could impact on the overall project costs and timings. The potential risk can be associated to but are not limited to – Scope, Inadequate Planning, Project Delays, Project Cost Over-runs, Health and Safety Events etc. and as defined in the Qualitative Risk assessment. Using the standard contingent risk template, the risk, its description and the consequences applicable to the risk are entered. For each individual risk identified the cost associated with the event should it actually occur is determined. The consequences not only detail the outcomes but also it is the basis for how the cost was arrived at. For future project review and as a learning function it is critical that the consequences clearly detail the reasoning as to why the cost was applied. After the cost estimate for each occurrence is determined, a percentage for the likelihood of it occurring is reviewed and entered. From this, a distribution percentage for the Minimum, Most Likely and Maximum cost impact of this particular event occurring is added.

The distributions determined in the Inherent and Contingent Risk assessment then become the basis for the @Risk simulation. The @Risk simulation performs a Monte Carlo probability calculation on the Reference Estimate to determine the total Inherent and Contingent risk costs. The Monte Carlo method is a technique that involves using random numbers and probability to iteratively evaluate complex, nonlinear problems. In general, 5,000 iterations will be used when running the @Risk simulation.

The results of the @Risk simulation determine the P(50) and P(90) values inclusive of Inherent and Contingent risk costs. The P(50) and P(90) reflect a 50% and 90% confidence level respectively that the estimate will not be exceeded at the completion of the project. These P(50) and P(90) values are used as the basis of the following:

- Project Direct Expenditure P(50): This is the difference between the Reference Estimate and the P(50) which is inclusive of Inherent and Contingent Risks.
- Project Direct Expenditure Plus Risk P(90): This is Project Direct Expenditure P(50) plus the difference between the P(50) Inherent and Contingent risks and the P(90) Inherent and Contingent risks.

5 REVIEW AND UPDATE OF ESTIMATES

5.1 Documentation

The documentation used in the review of each type of scope of works and estimate produced is detailed below.

Indicative Estimate

- Single document detailing bases of estimate, scope of estimate, scope of estimate, scope clarifications / assumptions, options and indicative costs
- Estimate summary
- Sign-off

Uncertainty Adjusted Planning Estimate

- Single document detailing basis of estimate, scope of estimate, scope clarifications, and the cost to implement the preferred option. Two figures are supplied, the Project Direct Expenditure P(50) and Project Direct Expenditure plus Management Reserve P(90).
- Project Uncertainty Register
- Project schedule
- Business Case Summary
- The internal finance charge or IDC worksheet
- Sign-off

5.2 Scope of Works and Estimate Review Sign-off

Upon completion of the scope of works and estimate, a review is performed by the Project Development team members and other relevant parties if required. Depending on the type of project these can include the project initiator, Project Development Lead and members of the Engineering team.

Depending on the type of Scope of works and estimate, the associated documentation and content / integrity of each estimate is reviewed. Any issues identified during the review that require further action are documented and assigned to the relevant person. Upon completion of the technical review and if required comments and / or actions, the final review and sign-off is completed by the manager of the Project Development Team.

5.3 WBS Structure

The Work Breakdown Structure (WBS) is used to define the separate areas or groups within the project. The structure is required to allow the allocation of funds, materials, labour and to facilitate the accurate reporting of project costs. As defined in the Business Case split spreadsheet, the groups include but are not limited to:

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- Design
- Labour
- Materials
- Plant & equipment
- Contracts
- Metering costs

5.4 Presentation and Handover

Following the scope and estimate review and sign-off by Project Development, the Indicative / Planning scope and estimate is ready for handover to the project initiator.

The Uncertainty Adjusted Planning Scope and Estimate handover checklist is completed by the Project Lead Engineer prior to the handover. At the handover, project costs are reviewed, and all elements of the scope are confirmed. Any amendments or additional works required are documented as action points to be addressed. If there are no further issues or after any other issues have been resolved, the Uncertainty Adjusted Planning Scope and Estimate handover checklist is signed, scanned and attached into EPPM. Following the handover and sign-off of the estimate handover checklist, all relevant documentation is attached into EPPM.

6 GLOSSARY OF TERMS

6.1 Acronyms

AM	Asset Management Group
IDC	Interest During Construction
ISP	Installation Services Provider
NPV	Net Present Value
PM	Project Manager
SLD	Single Line Diagram
WBS	Work Breakdown Structure
@RISK®	Excel Bases Simulation Software

6.2 Definitions

Activity: An element of work performed during the course of a project. An activity normally has an expected duration, cost and resource requirement. Activities can be subdivided into tasks.

Actual Cost: The final out-turn dollar expenditure of a project.

Assumptions: Factors that for planning purposes are considered to be true, real or certain without proof or demonstration.

Bottom-Up Estimation: A method of estimating a component of work. The work is decomposed into more detail and an estimate is prepared of what is needed to meet the requirements of each of the lower, more detailed pieces of work. These estimates are then aggregated into a total quantity for the component of work.

Budget: The approved estimate for the project of any work breakdown structure component or any schedule activity. See Estimate.

Business Case: Document capturing the reasons and objectives for initiating a project and providing approval to proceed for design and implementation. It is often presented in a well-structured written document.

Contingency: An amount of funds, budget, or time needed above the estimate to cover the costs of unforeseen factors related to the delivery of the project objectives, which are not provided for elsewhere in the total job costs. Contingency is to be administered at program level. These can include but are not limited to the occurrence of an unplanned or unforeseen

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event such as a natural event or a major safety incident and the change to planned assumptions, stakeholder issues (outage restrictions, community) and delayed access to site, industrial relations issues external to the Project / Program, and contractual issues or claims. It is the difference between P(90) and P(50) outcomes.

Contract: A mutually binding agreement that obligates the seller to provide the specified product, service or result and obligates the buyer to pay for it.

Contractor Indirect: An allowance that includes the contractor's corporate costs. Indirect costs are those costs that cannot be directly traced to a specific project and therefore will be accumulated and allocated equitably over multiple projects by some approved and documented accounting procedure.

Control Estimate: The budget estimate prepared for the project implementation phase, subsequent to completion of a detailed scope of works and detailed design documentation using a standard Bottom-up Estimating in the Expert Estimator. The control estimate is used to monitor the status of the project to update the project budget and manage changes to the cost baseline.

Cost Budgeting: Allocating the cost estimate to individual project components or WBS.

Cost Codes: Numerical values that identify characteristics of the work or in some way categorise the schedule activities, e.g. 1000 for Project Establishment, 2000 for Project Management. See also Work Breakdown Structure (WBS).

Cost Control: Controlling changes to the project budget.

Cost Estimating: Cost Estimation is the process of developing an approximation of the monetary resources needed to complete project activities.

Deliverable: Any measurable, tangible, verifiable outcome, output, result or item that must be produced to complete a project or part of a project or phase.

Direct Costs: Costs that can be directly attributed to the work being performed or services being received. For construction, it refers to the costs of constructing the physical project activities (resource costs of plant, labour, materials and subcontract).

Estimate: A quantitative assessment of the likely amount or outcome. It is usually preceded by a modifier (i.e. Indicative estimate, Planning estimate, and Control estimate).

Expert Estimator[®]: A resource-based estimating program or software package provided by Vendor Pronamics in the preparation of project estimates used by Project Engineering in AusNet Services.

Project Cost Estimating Methodology

Indicative Estimate: A budget estimate developed for a project from initial concepts. Often the information is very vague with only a single line or broad functional requirement. The indicative estimation process provides approximate costs for the determination of project feasibility, options analysis and selection.

Indirect Costs: Costs those are not directly attributable to work items. For a construction project, these costs include on-site overheads. e.g. administration, site supervision, site facilities, off-site overheads costs etc.

Issue: A point or matter in question or in dispute.

Material: The aggregate of things used in projects, such as equipment, gear, consumable material.

Methodology: A system of practices, techniques, procedures and rules used by Project Engineering in developing project scope, design and estimate.

Monte Carlo Simulation: A process which generates hundreds or thousands of probability performance outcomes based on probability distributions for cost and schedule on individual tasks. The outcomes are then used to generate a probability distribution for the project as whole.

Objective: Something toward which work is to be directed, a strategic position to be attained, or a purpose to be achieved, a result to be obtained, a product to be produced, or service to be performed.

P(50) Estimate: An estimate prepared at any stage of a project which has a 50% confidence factor of not being exceeded by cost at completion.

P(90) Estimate: An estimate prepared at any stage of a project which has a 90% confidence factor of not being exceeded by cost at completion.

Planning Estimate: A budget estimate prepared during Planning Phase. The Planning Estimation process provides the further development of options considered during Initiation Phase for project options analysis and selection. Once a final option has been chosen the Planning estimate is risk adjusted and used for financial / Business Case approval.

Project Components Uncertainty: Project Components Uncertainty is a calculation (or estimate) of the variability that occurs in all projects. This variability arises from uncertainty in pricing or volumes of component activities. The uncertainties are a portion of the difference between the outturn and assumptions in the reference estimate.

Project Components Uncertainties can include but are not restricted to the uncertainty in the scope of work, the uncertainty, or potential variations, in quantities and unit rates proposed in the direct estimate, and variations in construction methods used.

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Project Cost Management: A subset of project management that includes the processes required to ensure that the project is completed within the approved budget. It consists of resource planning, cost estimating, cost budgeting and cost control.

Project Direct Expenditure P(50): This is the estimated P(50) total value. See P(50) Estimate.

Project Direct Expenditure Plus Management Reserve P(90): This is the estimated P(90) total value. See P(90) Estimate.

Project Estimate: The total estimated costs of a project in outturn dollars for all components of a project from the commencement of the initiation phase to the end of the close-out phase.

Project Execution Manual: AusNet Services' framework that provides the direction and guidance for effective management and delivery of projects.

Project External Uncertainty: Project External Uncertainty is a calculation (or estimate) of the variability that arises from external events that typically occur during the life of the Project. The uncertainty is a portion of the difference between the outturn and what has been assumed in the reference estimate.

The occurrence of an unplanned or unforeseen event such as a natural event or a major safety incident, the change to planned assumptions, stakeholder issues (outage restrictions, community), the availability of resources or materials, delayed access to site, industrial relations issues external to the Project / Program, and contractual issues or claims.

Project Life Cycle: The total duration of a project normally dissected into sequential phases (idea, plan, build and close).

Project Uncertainty: Project Uncertainty is the sum of Project Components Uncertainty and Project External Uncertainty.

Provisional Items or Provisional Sums: Items or sums that should be included in an estimate when the designer knows that work is required but cannot quantify it. e.g. planning permit application, rock excavation and soil disposal, exact number of existing drawings to be cancelled without performing a detailed design.

Quantitative Assessment of Project Uncertainty: The objective of the Quantitative Assessment of Project Uncertainty is to identify both the Project Components and Project Specific External Uncertainties.

Reference Estimate: Direct cost build-up of known scope items including provisional items or provisional sums.

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Scope: The sum of the products, services, and results to be provided as a project.

Simulation: A simulation uses a project model that translates the uncertainties specified at a detailed level into their potential impact on objectives that are expressed at the level of the total project. Project simulations use computer models and estimates of uncertainty, usually expressed as a probability distribution of possible costs or durations at a detailed work level and are typically performed using Monte Carlo analysis.

Uncertainty-Adjusted Planning Estimate: An estimate prepared towards the end of a project's Initiation phase after the options analysis, for the purpose of evaluating the project in the Business Case. The estimate, which is based on the preferred option of the functional scope, forms the basis of funding approval. It is expressed in present day dollars.

Unit Rate: A cost for an installed asset assembly and / or functional element.

Work Breakdown Structure: A deliverable oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It defines and groups a project' discrete work elements in a way that helps organise and define the total scope of work of the project.

See also Cost Code