
Cost Estimation Manual (SM014)

Transport Services

Second Edition – Amendment 1 | Effective from March 2023



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This document is available on the Waka Kotahi NZ Transport Agency's [website](#).

DOCUMENT MANAGEMENT PLAN

Purpose

This is the Manual Management Plan which details updates, amendments, and contact points for the *Cost Estimation Manual* (SM014).

This Manual is the property of Waka Kotahi, and its issue is controlled. No part of it may be communicated to any person outside the organisation without written authority. Any copy released outside Waka Kotahi is not a controlled copy and will not be updated.

Document Information

This document has the status of a standard as defined in the Waka Kotahi *Register of network standards and guidelines manual*.

The objectives of this manual are to set out the standards for cost estimation for the Waka Kotahi business in a best practice manner that meets Waka Kotahi goals.

The content is based on the Waka Kotahi current best business practices and those developed in the past.

While all care has been taken in compiling this document, Waka Kotahi accepts no responsibility for failure in any way related to the application of this standard or any reference noted in it.

DOCUMENT NAME	Cost estimation manual
MANUAL NUMBER	SM014
MANUAL OWNER	Transport Services - Commercial
MANUAL SPONSOR	Senior Manager - Procurement

Amendment and Review Strategy

This document is subject to review and amendment from time-to-time. Document revisions will be noted in an accompanying Summary of Amendments detailing the changes and section(s) affected.

All Corrective Action/Improvement Requests (CAIRs) suggesting changes will be acknowledged by Manual Owner.

A summary of amendments for each publication is available for viewing on the Waka Kotahi [website](#).

	COMMENTS	FREQUENCY
Amendments (of a minor nature)	Incorporate in Annual Review may require coordinating with Waka Kotahi Board meetings	Annual: January – March Quarter
Review (major changes)	Amendments fundamentally changing the content or structure of the manual will be incorporated as soon as practicable.	As required

Notification	All users that have signed up to receive manual updates will be advised by email of amendments and updates	Annually or as required
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Other Information (at Manual Owner's discretion)

There will be occasions, depending on the subject matter, when amendments will need to be worked through by subject matter experts under the direction of the Manual Owner before the amendment is actioned. This may cause some variation to the above noted timeframes.

Feedback

If you have any comments with regard to this manual, please email sm014@nzta.govt.nz with the subject line of "**Feedback for SM014**". Your request will be forwarded to the Steering Group for review.

Distribution

The Manual Management Plan is included in the manual and sent to the Waka Kotahi Information Management team.

RECORD OF AMENDMENT

This document is a controlled document is therefore subject to review and amendment from time to time. Amendments will be recorded on this Amendment Control Sheet.

All individuals seeking to rely on, or implement, the Cost Estimation Manual, or any other manual referred to in this document, have a duty to ensure that they are familiar with the most recent amendments.

AMENDMENT NUMBER	DESCRIPTION OF CHANGE	EFFECTIVE DATE	UPDATED BY
0	Issue 3 of the Highways and Network Operations Cost Estimation Manual is amended to become the first edition of the Waka Kotahi Cost estimation manual (SM014), including minor amendments.	November 2010	Bill Hewitt
1	Issued to incorporate the Business Case Approach and includes other minor amendments.	May 2015	Craig Turner
Second Edition	Substantive updates.	August 2021	Ralph Smith
Second Edition Amendment 1	Amendments to introduce use of Waka Kotahi inflation forecasts to calculate escalation. Significant changes to Form 6 Appendix D, 'Base Date' definition updated plus minor consequential changes throughout the manual.	March 2023	Bernard Cuttance

FOREWORD

The content of this manual incorporates the best available estimation practices and techniques employed by both Industry and Waka Kotahi New Zealand Transport Agency. The manual is evergreen and will continue to evolve, as improved estimation practices and techniques are incorporated.

The Owner of this manual shall be advised of any proposed amendments, to ensure continuous improvement in best practice.

While all care has been taken in formulating this manual, the Transport Agency's Board accepts no responsibility for failure in any way related to the application of this manual, or any reference documents noted in it. There is a need to apply judgement to each particular set of circumstances.

This amendment of SM014 incorporates changes to revise the branding and update the content to reflect updates and improvements in estimation practices and techniques since the last review

This manual is not intended to teach the user how to do estimates (be a cookbook), but rather to provide guidance to suitably qualified and experienced estimation practitioners, that will assist them in preparing robust estimates that meet the requirements of Waka Kotahi.

The use of this manual is mandated when preparing estimates for Waka Kotahi New Zealand Transport Agency.

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 The purpose of this manual is to outline the minimum requirements in preparing project cost estimates for Waka Kotahi NZ Transport Agency (Waka Kotahi).

1.2 Objective

- 1.2.1 The primary objective of this manual is to ensure the consistent application of estimating procedures on Waka Kotahi projects.

1.3 Manual status

- 1.3.1 This manual has the status of a “standard” as defined in the Waka Kotahi Register of network standards and guidelines. The authority to amend or vary the manual has been delegated to the sponsor of this manual. This manual is a controlled document in accordance with the Waka Kotahi Corporate services manual (FCS/Man/1).

1.4 Intended manual users

- 1.4.1 This manual is intended to be used by anyone preparing estimates for Waka Kotahi, inclusive of internal staff, professional services consultants and contractors developing Target Outturn Costs (TOCs) for negotiated ECI's and Alliances.

1.5 Manual background

- 1.5.1 The Waka Kotahi *Cost estimation manual* (SM014) has been produced jointly by Waka Kotahi and Association of Consulting Engineers New Zealand (ACE NZ). These organisations have an interest in the accuracy of cost estimates for Waka Kotahi projects and have agreed a set of policies that are the basis of this manual's guidelines.
- 1.5.2 ACE NZ is the professional body representing consulting engineers in New Zealand. Members of ACE NZ are frequently engaged to provide cost estimates for Waka Kotahi projects.
- 1.5.3 Waka Kotahi owns and manages this manual. Every person producing, reviewing, or submitting estimates for a Waka Kotahi project must do so with reference to this manual.
- 1.5.4 The manual is intended to be a concise, hands-on, user-friendly, and non-prescriptive resource, containing sufficient guidance to produce a reliable estimate. It provides guidance on the types and use of project cost estimates and includes example estimate templates. The guidance can apply to all Waka Kotahi projects, whether maintenance or capital, delivered under any delivery model and applies to the whole project lifecycle.
- 1.5.5 The principles of estimating can be applied to all Waka Kotahi project work, irrespective of the delivery model.

- 1.5.6 Internal and external peer reviews and independent parallel estimates conducted by experienced practitioners are a vital element of the estimation process. This manual also provides guidance as to the timing and requirements of these processes.

1.6 Communication and amendment control

- 1.6.1 Manual users may communicate via email at the address given on the amendment control sheet. All amendments to this manual will be documented in the record of amendments table at the start of this manual.

1.7 Manual review process

- 1.7.1 The manual owner is responsible for the review and update of this manual. The review will be carried out in conjunction with the Waka Kotahi Collateral Administration and Management Process. The purpose of reviews is to update the procedures to ensure the manual remains current and represents best practice.
- 1.7.2 All comments relating to amendments to this manual shall be made via email to the address given on the record of amendments sheet provided at the start of this manual.
- 1.7.3 The manual will undergo regular review. In some instances, a change to a fundamental part of the manual may require the manual to be reissued outside the programmed review cycle. If this occurs the Waka Kotahi consultants will be informed of the change and a new manual will be published.

1.8 Interrelationships with other manuals

- 1.8.1 This manual contains procedures for preparing cost estimates. In addition, consultants shall refer to other Waka Kotahi manuals, standards and guidelines including, but not limited to the following:
- *Project management manual (SM011)*
 - *Contract procedures manual (SM021)*
 - *State highway professional services contract proforma manual (SM030)*
 - *State highway construction contract proforma manual (SM031)*
 - *Minimum Standard Z44: Risk management*
 - *Monetised benefits and costs manual (MBCM)*
 - *Non-monetised benefits manual.*

1.9 Document availability

- 1.9.1 This manual is available as a PDF on the Waka Kotahi [website](#).
- 1.9.2 The following documents are referred to in this manual and are also available on the Waka Kotahi website:

- The forms are available as electronic Microsoft Excel or Word documents (original copies are held on the Waka Kotahi National Office server).
- The elemental cost database.

1.9.3 This manual is available to road controlling authorities (RCAs). RCAs should contact, in writing, the manual owner at the Waka Kotahi National Office (a cost may apply).

2. TERMINOLOGY AND ABBREVIATIONS

2.1 Terminology

DESCRIPTION	
Base Date	The Base Date is the financial quarter ended immediately prior to the date the estimate was prepared. Escalation is calculated (refer Section 7. Escalation) from the Base Date quarter. Escalation calculations are therefore based on the assumption that the rates / prices used to prepare the estimate were current during the Base Date quarter.
Base Estimate	The Base Estimate is an assessment of the total sum of all of the elements that make up the estimate. This value includes Provisional Sums, Provisional Quantities, and the Cost of Treatment (as applicable) <u>for all known scope</u> but excludes all Contingencies and Escalation. This is particularly important when considering a priced schedule, for example, a Provisional Sum for pavement undercut would be part of the Base Estimate, but a Provisional Sum for dayworks that are only there to establish benchmark rates are considered to be contingency and would not form part of the Base Estimate.
Consultant(s)	A specialist person or organisation who gives expert advice or information. Consultant(s) are normally external to Waka Kotahi but may also include internal parties.
Consultancy Fees	The total sum of all costs incurred by a Consultant to compensate for their professional services at each phase of a project inclusive of all fees and investigations.
Contingency	A financial provision added to the Base Estimate to provide for uncertainty in relation to the estimate inputs and specific project related threats and opportunities with a cost impact to derive the Expected Estimate. The Contingency represents the statistical mean and shall be calculated in accordance with Minimum Standard Z/44 - Risk Management and Section 9 of this manual.
Cost of Treatment	Costs associated with the treatment of a project threat or opportunity with a cost impact established following a cost/benefit analysis of the proposed treatment actions. The Cost of Treatment is to be included in the Base Estimate and the residual risk only must be taken into account when deriving Contingency and Funding Risk Contingency.

Cost Fluctuations	Cost resulting when changes occur to the price of specific goods or services over a period of time. This is calculated in accordance with the methodology specified in the contract documents.
Elemental Cost Estimating	Estimates of project out-turn costs prepared using composite estimated rates for major components (elements) of a project.
Escalation	A financial provision to cover for cost fluctuation due to inflation throughout the project life cycle. Escalation is excluded from project estimates as noted on the Project Estimate forms included in Appendix C but is required for phase funding applications in Appendix D. Note: Market shift of property costs is included within the Total Property Cost, not as Escalation.
Estimate	A document recording the assessment of the cost of a project with a defined level of confidence, including Expected and 95th Percentile Estimates.
Estimate Types	<p>Programme Business Case Estimate (PBE) – Prepared normally as part of a Programme Business Case. This estimate is used to provide budgets for forward works programming.</p> <p>Indicative Business Case Estimate (IBE) – Prepared as part of an Indicative Business Case, for each proposed solution. These estimates are used for comparing project options.</p> <p>Detailed Business Case Estimate (DBE) – Prepared as part of a Detailed Business Case. This estimate is based on the preferred solution that will be included in the Detailed Business Case / AEE. The DBE must be used to support any Notice of Requirement (NOR).</p> <p>Pre-Implementation Estimate 1 (PE1) – Prepared during the Pre-Implementation phase prior to detailed design. It is an estimate of the approved project solution, updated to include any hearing or Environment Court conditions (e.g. Notice of Requirement/ Resource Consent).</p> <p>Pre-Implementation Estimate 2 (PE2) – Prepared during the Pre-Implementation phase once the design has been completed, the PE2 is an estimate for the Implementation phase with both the Project Development and Pre-implementation phase costs set to nil.</p> <p>Engineer's Estimate – An Engineer's Estimate for each physical works contract is derived from the PE2, prior to issuing the tender documents. The Engineer's Estimate is to reflect the expected tender price and will be used for making comparisons during the tender evaluation period.</p> <p>Implementation Estimate (IE) – The IE is an Implementation phase cost estimate based on the preferred physical works tender(s) with</p>

	both the Project Development and Pre-implementation phase costs set to nil. The IE includes Escalation and allowance for any information received during the physical works tender process.
Expected Estimate (50 th percentile)	<p>The Base Estimate plus an allowance for Contingency calculated according to <i>Minimum Standard Z/44 - Risk Management</i> and Section 9 of this manual. This estimate represents the 50th Percentile Estimate.</p> <p>Funding allocation is sought at the value of the Expected Estimate including escalation as applicable.</p>
Funding Risk Contingency	An additional financial provision to provide for uncertainty in relation to the estimate inputs and project related threats and opportunities with a cost impact which represents the difference between the Expected Estimate and the 95th Percentile estimate. The Funding Risk Contingency provides for the difference between the statistical mean and the statistical 95th percentile value and shall be calculated in accordance with <i>Minimum Standard Z/44</i> and Section 9 of this manual.
Out-turn cost	The out-turn cost includes all actual costs. The only exclusions are GST and any Waka Kotahi corporate administration and overhead costs. Project specific Waka Kotahi Managed Costs, as defined below, are to be included in the out-turn cost.
Project	All activity related to improvement programmes emanating from a business case.
Sunk Costs	Costs irrevocably committed which have no salvage value or realisable value (for example investigation, research and design costs already incurred). Sunk Costs are not included in Estimates, other than in relation to property.
95th Percentile Estimate	The Expected Estimate plus an allowance for Funding Risk Contingency. This estimate represents the statistical 95th Percentile value with a 95% level of confidence that the final project out-turn cost will not exceed this value.
Single-Stage Business Case	The Single-Stage Business Case is a combination of the indicative business case and the detailed business case, so includes the development of both IBE Estimate (all options) and DBE Estimate (preferred option only).

Waka Kotahi Managed Costs	<p>Includes all project costs incurred by Waka Kotahi that are not managed by the consultant.</p> <p>The Waka Kotahi project manager shall provide an assessment of these costs for inclusion in the Estimate.</p>
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2.2 Abbreviations

DESCRIPTION	
ACE NZ	Association of Consulting Engineers New Zealand
AEE	Assessment of Effects on the Environment
BCR	Benefit Cost Ratio
IE	Implementation Estimate
CPM	Waka Kotahi <i>Contract Procedures Manual</i> (SM021)
DBC	Detailed Business Case
DBE	Detailed Business case Estimate
FWCP	Forward Capital Works Programme (now 10 Year Forecast)
IBC	Indicative Business Case
IBE	Indicative Business case Estimate
LTPP	Waka Kotahi Long Term Procurement Plan
MBCM	Waka Kotahi Monetised Benefits and Cost Manual
NLTP	National Land Transport Programme
NOR	Notice of Requirement for Designation
NZUP	New Zealand Upgrade Programme

PBC	Programme Business Case
PBE	Programme Business case Estimate
PE1	Pre-implementation Estimate 1
PE2	Pre-implementation Estimate 2
PPPM	Waka Kotahi Planning, Programme and Funding Manual
SAP	Systems, Applications and Products in data processing (Waka Kotahi's business information system)
SEP	Schedule of Elemental Prices
SSBC	Single Stage Business Case

3. PROJECT PHASE AND ESTIMATE TYPES

3.1 Business cases and estimate terminology

3.1.1 Most projects are developed in accordance with the Business Case Approach (BCA). There will normally be six types of cost estimate produced within the project development and delivery phases, as follows:

1. Programme Business Case Estimate (PBE)
2. Indicative Business Case Estimate (IBE)
3. Detailed Business Case Estimate (DBE)
4. Pre-implementation phase Estimate 1 (PE1)
5. Pre-implementation phase Estimate 2 (PE2)
6. Implementation Estimate (IE)

3.1.2 The following table shows the project phases from inception to completion and the corresponding estimate types

PROJECT PHASE	ACTIVITY	ESTIMATE TYPE
Project Development	Point of Entry	
	Strategic Case	
	Programme Business Case	PBE
	Indicative Business Case	IBE
	Detailed Business Case	DBE
	Single-Stage Business Case	IBE (short-listed options) DBE (preferred option)
Project Delivery	Pre-Implementation	PE1 PE2
	Implementation (Construction, MSQA)	IE

3.2 Project activities and estimate types

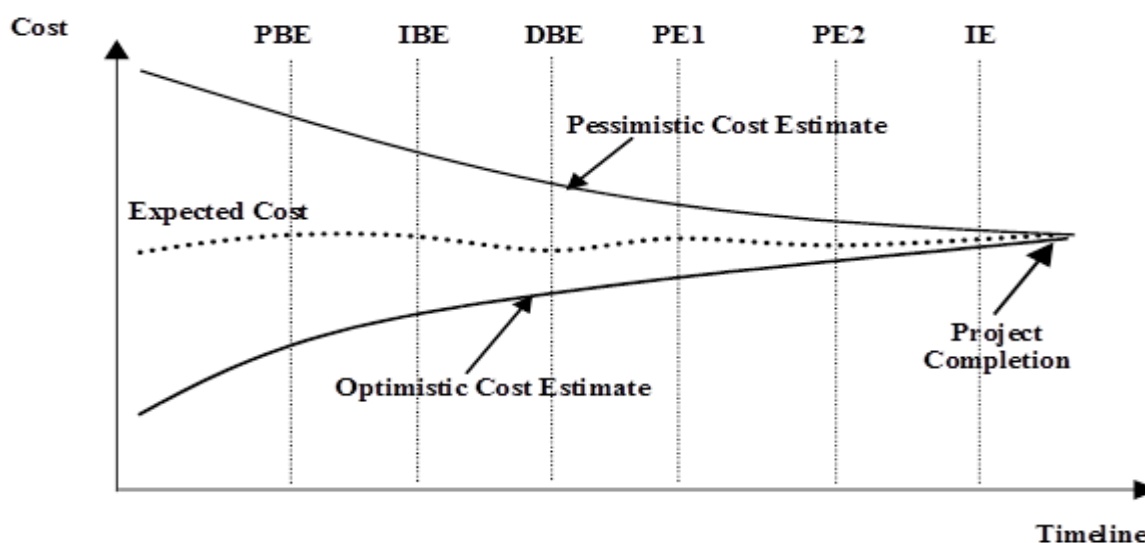
Programme Business Case	The Programme Business Case includes the production of a PBE. Usually the PBE is based on limited knowledge of the project. However, to produce more reliable estimates, further investigation beyond a traditional feasibility study approach may be undertaken in the Programme Business Case. If several potential solutions have been identified during this phase then there may be a matching PBE for each solution.
Indicative Business Case	The Indicative Business Case includes the development of IBE Estimates for each option. Usually based on a preliminary brief, limited site information and general information about the type of construction, scope of work and possible alignment. However, they must be sufficiently detailed to inform the option shortlisting process.
Detailed Business Case	The Detailed Business Case includes the development of a DBE Estimate for the preferred option.
Single-Stage Business Case	The Single-Stage Business Case is a combination of the indicative business case and the detailed business case, so includes the development of both IBE Estimate (all options) and DBE Estimate (preferred option only).
Pre-Implementation 1	The project estimate has to be recalculated generally once the designation is confirmed and all of the conditions are fully understood. The PE1 is the estimate that Waka Kotahi will use as the basis to secure funding for design and construct and Alliance contracts.
Pre-Implementation 2	The Implementation phase requires a PE2 Estimate prior to tendering. This estimate is based on detailed design documentation (including drawings, specifications, schedule of prices, NOR and all consent conditions) and prepared prior to seeking construction funding and tendering of the physical works. For traditional contracts, the Engineer's Estimate is derived from the PE2.
Implementation	After receipt of tenders and before the contract is awarded, the Estimate will be revised to an IE. It is used to confirm that implementation funding allocations are sufficient.

3.3 Project hold points

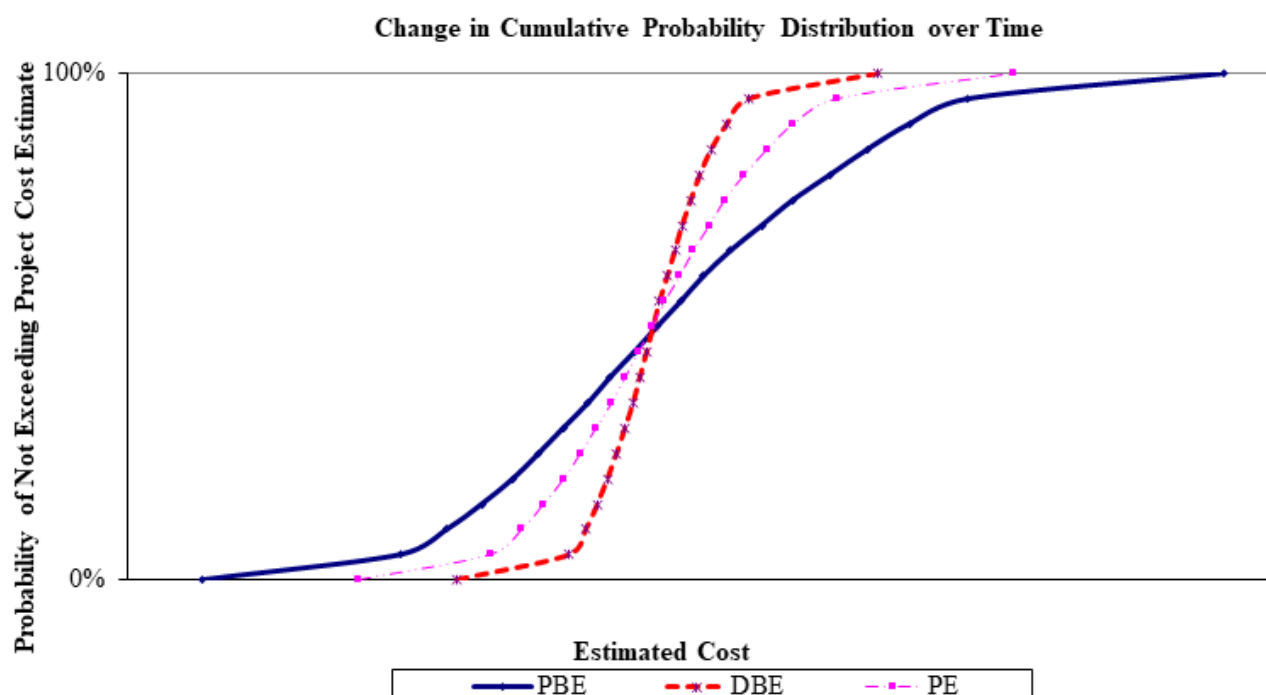
- 3.3.1 Waka Kotahi applies hold points at various stages of a project, typically at the end of each Business Case. For the success of the project, reliable cost estimates are required for each Business Case.

3.4 Estimate lifecycle

- 3.4.1 The estimate life cycle of a project is illustrated below, together with the perceived amount of risk at each stage.



- 3.4.2 It is Waka Kotahi expectation that, with the ongoing development of the design, increasing knowledge of the site conditions and the application of appropriate risk management techniques at all stages, the Contingency and Funding Risk Contingency will reduce as the project progresses through its life cycle.



4. ROLES AND RESPONSIBILITIES

4.1 Management structure

4.1.1 Each project shall have the following management structure.

4.1.2 The **Waka Kotahi project manager** is responsible for:

- advising the Consultant of any programme-specific requirements for cost estimates eg from NZ Upgrade Programme;
- checking that the estimate has been produced according to the guidance given in this manual;
- implementing external peer reviews and parallel estimates at appropriate times, including consideration of a review of (high value) quantities;
- providing cost information for the Waka Kotahi Managed Costs;
- benchmarking estimates against elemental cost data; and
- ensuring that outturn cost information is provided for the Elemental Cost Database

4.1.3 The **consultant team leader** is responsible for:

- establishing the scope of work in consultation with the Waka Kotahi project manager;
- collating estimate elements;

- preparing and checking estimates;
- checking the estimate is consistent with the scope of works, guidance given in this manual and any programme-specific requirements;
- internal peer review of estimates;
- reconciling differences with external peer reviewer or independent estimator;
- reporting and explaining any significant differences between an estimate and its equivalent from the previous phase;
- submitting all cost estimate reports to sm014@nzta.govt.nz;
- actively monitoring and managing scope control (particularly during design development) including maintenance of the Project Cost Control Schedule; and
- providing a breakdown of the actual out-turn cost for input into the Elemental Cost Database.
- Note: The Consultant may be different for different phases. The Consultant may also be part of an Alliance.

4.1.4 The **Waka Kotahi property acquisition agent** is responsible for:

- preparing estimates for property costs and property compensation costs according to the guidance given in this manual;
- discussing the scope of accommodation works with the consultant to agree who should complete the estimate and where it should be included in the cost estimate (refer s.8.3.19).

4.2 Estimate ownership

- 4.2.1 The Consultant is responsible for the estimates prepared during the phase(s) for which it is commissioned. Where an Estimate has been prepared by a different Consultant as part of a previous phase, the in-coming Consultant is required to review, update if required and take over ownership of the Estimate.
- 4.2.2 The entire project team is responsible for preparing reliable base estimates for the elemental sections of an estimate. However, the Consultant is responsible for the overall compilation, completeness and accuracy of the estimate.
- 4.2.3 Irrespective of the above management structure, roles and responsibilities, the entire project team must take ownership of the estimate and 'buy-in' to the estimate.

4.3 Consultant performance

- 4.3.1 ACE NZ and Waka Kotahi have agreed that Waka Kotahi will assess the performance of consultants based on their track record in estimating costs. Waka Kotahi will therefore monitor cost estimates against subsequent estimates and final out-turn costs.
- 4.3.2 The indicators of estimating performance will be the IE at out-turn compared with the PE2 and the PE2 compared with the DBE.

- 4.3.3 Waka Kotahi will also measure the out-turn cost against the PBE although this will not be a performance measure. While it is inherently recognised the PBE is based on an 'educated guess' particularly for larger transportation problems, the industry needs to note the PBE is used to allocate funds for the next stage of project development.

5. PURPOSE OF COST ESTIMATES

5.1 Cost estimates

5.1.1 Cost estimates are required for:

- financial planning;
- programming;
- option selection;
- project specification;
- funding approval;
- committing contracts;
- cost control;
- portfolio management.

5.1.2 **Financial Planning:** Waka Kotahi requires cost estimates of all projects in the Waka Kotahi long-term programme to help with financial planning. Waka Kotahi requires expenditure forecasts so they can advise Government of long-term revenue requirements and for Waka Kotahi to arrange alternative funding where appropriate.

5.1.3 Once a particular project is identified (Strategic Case) and a Programme Business Case completed, the project is programmed according to its priority. Waka Kotahi manages a 10 Year Forecast using its SAP portfolio and project management system (PPM). The 10 Year Forecast is continually updated as more information on individual projects is gained and as project priorities change. Any changes to a project estimate are reflected in a change to the 10 Year Forecast. Each phase of each project is included in the 10 Year Forecast so reliable estimates of each phase are therefore required. The Expected Estimate will be used in the 10 Year Forecast and for long-term financial planning.

5.1.4 **Programming:** As the Crown agency responsible for planning, developing, and operating the state highway network, Waka Kotahi works to achieve government priorities. It is necessary to use funding prioritisation processes based on the Waka Kotahi allocation process which has a number of criteria. One of these is efficiency, which is largely based on BCR. This helps to determine the optimum timing of a project. Waka Kotahi use of the BCR requires reliable estimates of cost throughout the development of projects so that they can be developed and delivered at the optimum time.

5.1.5 The Expected Estimate shall be used for economic analysis. The consultant shall undertake sensitivity testing of the BCR using the 95th Percentile Estimate.

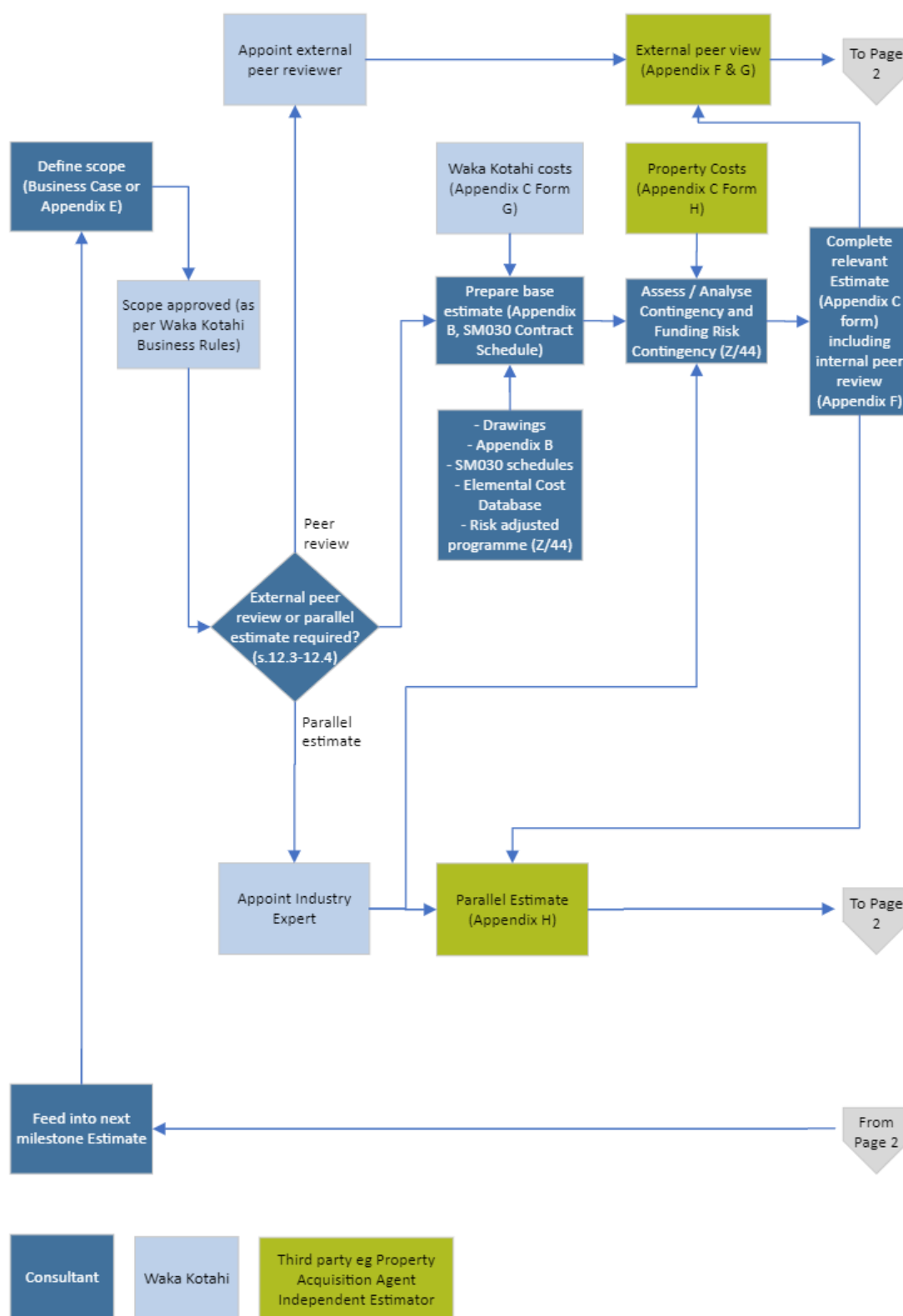
5.1.6 **Option Selection:** The cost estimates of options (or solutions) are used to select the preferred option for the development of each project. In particular, reliable estimates are required for the differences in option costs to compare with the differences in option benefits. Estimates of the costs of options are generally developed in an Indicative Business Case or Single Stage Business Case where options are being short-listed, and in the Detailed Business Case where the preferred option is being selected.

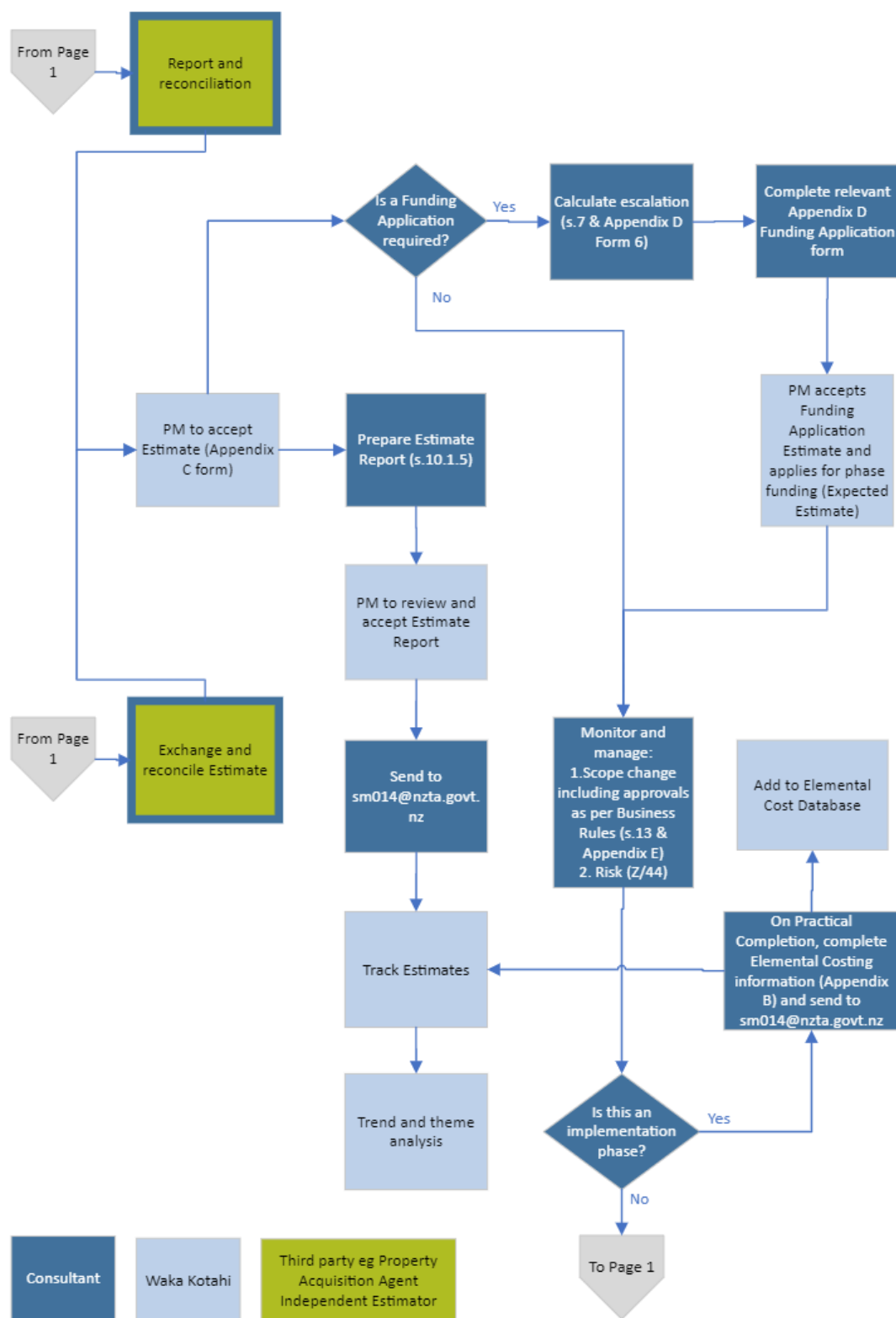
- 5.1.7 **Project Specification:** Waka Kotahi uses cost estimates to help determine appropriate standards and mitigation measures to be adopted for each project. Care must be exercised to ensure that standards are not changed without adequate consideration of the potential cost impact (direct and indirect) and that this is managed using the scope control forms in Appendix E.
- 5.1.8 **Funding Approval:** Waka Kotahi requires reliable cost estimates in order to seek funding approval for these project development and delivery stages:
- Indicative Business Case;
 - Detailed Business Case;
 - Single Stage Business Case;
 - Pre-implementation;
 - Implementation.
- 5.1.9 The funding allocation for each stage is based on the Expected Estimate including future escalation. The cashflow forecasts are based on the Expected Estimate of expenditure in each year. Each funding application must also advise the 95th Percentile estimate including future escalation.
- 5.1.10 **Committing Contracts:** The cost estimate is updated once tenders are received and evaluated. By this time, any pricing risk has been closed out and some risks may have changed as a consequence of tender offers. Cost estimates need to be updated following selection of preferred tenders to adjust funding allocations, if necessary, and make appropriate contingency provisions.
- 5.1.11 **Cost Control:** To maintain optimal programme performance, cost estimates including annual cashflows need to be continually updated during project development and delivery, in addition to use of the scope control forms in Appendix E.
- 5.1.12 **Portfolio management:** Consistent use of SM014 cost estimation procedures assists Waka Kotahi with the financial management of its portfolio of projects.
- 5.1.13 On average, across the State Highway Programme, for about half of the projects the out-turn cost should come in under the Expected Estimate and about half of the time the Expected Estimate should be exceeded. For about 1 project in 20 the 95th Percentile Estimate will be exceeded.

6. ESTIMATING PROCEDURES

6.1 General

The estimate development process is illustrated in the diagram below.





6.2 Project scope and functionality

- 6.2.1 The starting point for any estimate is definition of the project scope and functionality. Scope and function definition requires an understanding of the project objectives and the means by which those objectives will be delivered.
- 6.2.2 Definition of project scope, assumptions and exclusions and functionality is an important aspect of producing a reliable estimate. The amount of information available and hence the degree of scope and function definition achievable, varies depending on the project development and delivery phase. It is essential that from the Indicative Business Case onwards, the project scope, assumptions and exclusions and functionality is known and understood in sufficient detail to allow the production of a meaningful estimate. Any changes in scope or functionality need to be recorded and agreed in order to provide an audit trail through the life cycle of the project estimate (refer s.13 and Appendix E).
- 6.2.3 One key element of this is the programme, particularly for the Implementation phase. All time related costs must take account of the Risk Adjusted Programme (RAP) for the project. *Minimum Standard Z/44 – Risk Management* describes the process for developing RAPs.
- 6.2.4 Cost estimates are not expected to include provision for change in functionality, scope, or design standards. Consultants must include a scope statement with project estimates so that Waka Kotahi can fully understand the limitations of the current scope of works and therefore the project estimate.

6.3 Resource input for estimates

- 6.3.1 The estimate is critical to the successful development and delivery of a project. When planning or pricing consultancy services, the Waka Kotahi Project Manager and the consultant must allow sufficient time and resources to reflect the importance of the estimate.

6.4 Updating of estimates

- 6.4.1 If an up-to-date estimate is requested before the consultant has prepared the phase estimate(s), the consultant is to provide the previous estimate, having updated it to include any cost index¹ movement, changes in scope and assumptions.
- 6.4.2 The Waka Kotahi project manager will provide all actual cost information from the previous project phase(s). These will be recorded in future estimates. Commercially sensitive information, such as professional fees, shall be provided as a total element cost instead of a full breakdown.

6.5 Inputs and outputs

- 6.5.1 The following table provides a summary of the type and purpose of each estimate, along with the required confidence levels and input / output documentation.

¹ Use the most appropriate index published by Waka Kotahi for the purposes of contract price adjustment for cost fluctuation.

6.6 Rounding

Reporting of estimated costs should be rounded to an appropriate level to reflect the accuracy of the input data.

PROJECT PHASE	EST. TYPE	PURPOSE OF COST ESTIMATE	CONFIDENCE LEVEL	INPUT / OUTPUT DOCUMENTATION
Project Development	PBE	Long term financial planning Determine likely scope of project Determine possible options for investigation Obtain funding for IBC / SSBC	Expected Estimate and 95th percentile Estimate Contingency and funding risk assessed	Inputs: Risk management process commenced Outputs: Programme Business Case Funding application for IBC
	IBE	Shortlisting of options Obtain funding for DBC	Expected Estimate and 95th percentile Estimate Contingency and funding risk assessed	Inputs: Programme Business Case Risk management process continued Preliminary site investigation Preliminary design Outputs: Report(s) detailing differences between PBE and IBE Indicative / Single Stage Business Case Funding application for DBC
	DBE	Confirm strategy Project definition (including scope and functionality) Optimising timing of project development	Expected Estimate and 95th percentile Estimate Contingency and funding risk assessed	Inputs: Programme / Indicative Business Case Risk management process continued Site investigation Preliminary design

PROJECT PHASE	EST. TYPE	PURPOSE OF COST ESTIMATE	CONFIDENCE LEVEL	INPUT / OUTPUT DOCUMENTATION
		Selection of preferred option Obtain funding for design and property		Outputs: Report(s) detailing differences between IBE and DBE Detailed / Single Stage Business Case Funding Applications for Pre-implementation and Property phases
Pre-Implementation	PE1	Confirm project Determine when to design and construct	Expected Estimate and 95th percentile Estimate Contingency and funding risk assessed	Inputs: Detailed Business Case Risk management process continued Designation and resource consent conditions Documentation for construction (D&C/ECI/Alliance) Outputs: Report detailing differences between DBE and PE1 Funding Application for Implementation (D&C/ECI/Alliance)
	PE2	Confirm project Project specification Obtain funding for construction Determine when to construct Committing contracts	Expected Estimate and 95th percentile Estimate Contingency and funding risk assessed	Inputs: Risk management process continued Value engineering Detailed design Documentation for construction Outputs: Report detailing differences between PE1 and PE2

PROJECT PHASE	EST. TYPE	PURPOSE OF COST ESTIMATE	CONFIDENCE LEVEL	INPUT / OUTPUT DOCUMENTATION
				Funding Application for Implementation
Implementation	IE	Reassessment of contingency and risks Reviewing allocation	No pricing risk remaining in base physical works estimate (based on tender price) Expected Estimate and 95th percentile Estimate Contingency and funding risk assessed	Inputs: Risk management process continued Tender and tendered prices Outputs: IE Estimate

7. ESCALATION

7.1 Escalation calculation

- 7.1.1 The Base Estimate uses prices that are current at the Base Date. Funding applications and Implementation Estimates (IE) are required to contain an additional allowance for escalating costs.
- 7.1.2 Escalation is calculated cumulatively for the balance of the predicted project life cycle in accordance with the expected contract provisions. Consultants need to assess the possible future escalation for project cashflow and project delivery timing. Escalation shall be applied from the Base Date, through to the expected completion of the project.
- 7.1.3 In calculating escalation for a funding application, the consultant shall consider the following:
- the amount of escalation occurring between the Base Date and close of tenders;
 - any transference of escalation risk to the supplier post-tender close;
 - the retention of escalation risk by Waka Kotahi post-tender close, provided under the cost fluctuation provisions in SM030 and SM031.
- 7.1.4 Expected Estimates **with** the addition of future escalation shall be used in compiling funding applications for both professional services and Implementation.
- 7.1.5 Appendix D contains funding application forms and an escalation calculation form.
- 7.1.6 Expected Estimates, **without** the addition of future escalation, shall be used for long term programming purposes. Waka Kotahi will escalate expected estimates to common base dates for portfolio analyses and update them. It is therefore essential that each estimate shall be based on pricing inputs effective at the Base Date.
- 7.1.7 To be consistent with the Monetised Benefits and Cost Manual, escalation is excluded from any estimate used in economic analyses (BCR calculation).
- 7.1.8 The Total Property Cost estimate includes provision for property market appreciation (inflation) from the date the estimate was prepared through to the mid-point of the active acquisition phase for the project. This means that escalation should not be applied to the Total Property Cost estimate as well as this would essentially be 'double counting' and over-estimate the Total Property costs.

8. LAND AND PROPERTY

8.1 Property interest purchase

- 8.1.1 Property is an important enabler for Transport projects. It is an important project consideration both in terms of programme and cost. The estimation of the property cost contains many variables and each of those variables needs to be reflected in the build-up of a Total Property Cost both at a P50 and P95 level. This section provides reference to those variables and provides examples to follow (Appendix A Section 5). If in doubt, please contact the Transport Property Acquisition team.
- 8.1.2 **All** property purchases are undertaken, and costs estimated through the Transport Property team. Estimation **shall not** be undertaken without the direct input and approval of the Transport Property team.
- 8.1.3 The estimation process here is to be used through the different project stages. At the different project stages a different risk profile and cost detail will apply. This should be considered in conjunction with the cost estimation model. Access to the model is available from the local Waka Kotahi property acquisition manager.

8.2 Total Property Cost

General

- 8.2.1 To reflect the property costs within the overall project estimate, Waka Kotahi includes property costs within the Property phase for each project. The Property phase contains the Total property cost estimate at a project level built up from the aggregation of individual property cost assessments. This includes property owner accommodation works to be undertaken as part of the project physical works contract during the Implementation phase (these types of costs are noted in the examples in Appendix J).
- 8.2.2 At the outset of a project, the Project or Programme (e.g. NZUP) will need to understand the amount of funding necessary to purchase the property required for the project. This will be the allocation for the Property phase and for programming purposes. This property cost estimation data is entered into the Waka Kotahi SAP system and allows Waka Kotahi to collectively consider all of the projects competing for funding and make decisions on when individual property interests should be purchased.
- 8.2.3 The total property cost for inclusion in project estimates comprises the total of the following:
 - a) Property interest purchase costs;
 - b) Property Consultancy fees (including subcontractors e.g. surveyors);
 - c) Property compensation costs;
 - d) Property owner accommodation works costs;
 - e) Contingency and Funding Risk Contingency costs;
 - f) Base estimate = sum of a to d above;
 - g) The sum of 'a' to 'e' above = the Total Property Cost
- 8.2.4 As the project develops, an increasing level of risk assessment and cost detail will be provided for the project estimates. At an IBC stage all the components of s.8.2.3 shall be included in the estimate subject to the level of design and programme information provided to the

Acquisition Manager. Final land requirements are not generally known at this stage, nor the final programme. As a result, only a preliminary assessment of property can be undertaken (e.g. no landowner contact will have occurred) and broader assumptions will be included around matters such as partial property purchases and business impacts for commercial properties, and owner accommodation works. The result being that the Total Property Cost for the IBE will be relatively high level, reflected by a higher Contingency and Funding Risk Contingency cost. All assumptions relating to the cost estimate need to be clearly articulated by the Property Acquisition Manager.

- 8.2.5 The Total Property Cost estimate for the DBE will be based on preliminary land requirement plans. Landowner engagement and a detailed assessment of each property will have progressed to a stage where the property risk is better understood, and cost estimation can be completed to ensure that both property cost and the acquisition programme can be clearly articulated by the Property Acquisition Manager. The Base estimate costs will be detailed on a property-by-property basis, and contingency levels should be reduced from the IBC stage. All items in 8.2.3 shall be assessed and presented as final costs with a property-by-property risk assessment that is reflected in the Contingency and Funding Risk Contingency costs.
- 8.2.6 It is not always possible to purchase only the portions of property required for a proposed new road corridor. In some instances, it is necessary to buy entire properties to secure the road corridor required. In these cases, the property not required for the project will at some stage be declared surplus and sold. The realisable value of any surplus property **is not** credited to the Property phase of the specific project but goes directly to the NLTF as required under the Land Transport Management Act 2003. The sales proceeds may not be received until several years after the property is declared surplus, and this may not take place until after the project is complete. **The main point here is that projects cannot rely on disposal income to offset project costs.**
- 8.2.7 Details of the steps required to accurately assess the total property cost components outlined under section 8.2.3 above can be found in Appendix J Property Cost Estimates.

Contingency and Funding Risk Contingency

- 8.2.8 An appropriate assessment of risk relating to the property interests required needs to be included in the Total Property Cost.
- 8.2.9 Risk considerations include:
- Valuation differences – likely to be a difference in compensation assessments of Crown & landowner valuers;
 - Partial purchase of a property – will that area change or not, will full purchase of the property be required;
 - The type of property – specialist (e.g. churches) & commercial/industrial carry greater risk and complexity compared to a residential property;
 - Property market movement – this may be greater than allowed for in the base estimate;
 - Additional interests – there may be other interests (e.g. unregistered leases, easements etc.) that need to be considered / compensated;
 - What is on the property – single occupant or multiple tenants;

- g) Business loss / relocation – little clarity as to extent of likely cost at business case stage given extent of engagement with occupants at that stage;
- h) Ownership structure – is it Unit titled?;
- i) Is the land Maori land or land returned as part of a Treaty of Waitangi claim settlement – the Maori Land Court approval of any acquisition may be required in these circumstances.
- j) Compensation for disturbance to interests resulting from construction contracts.

8.3 Reporting of property costs

- 8.3.1 The project manager shall obtain the estimated Total Property Costs from the Transport Property team, following development of the property acquisition strategy. The Total Property Cost spreadsheet is included as Form H in Appendix C. The Total Property Cost included in each milestone estimate is the remaining cost ie excludes costs already paid.

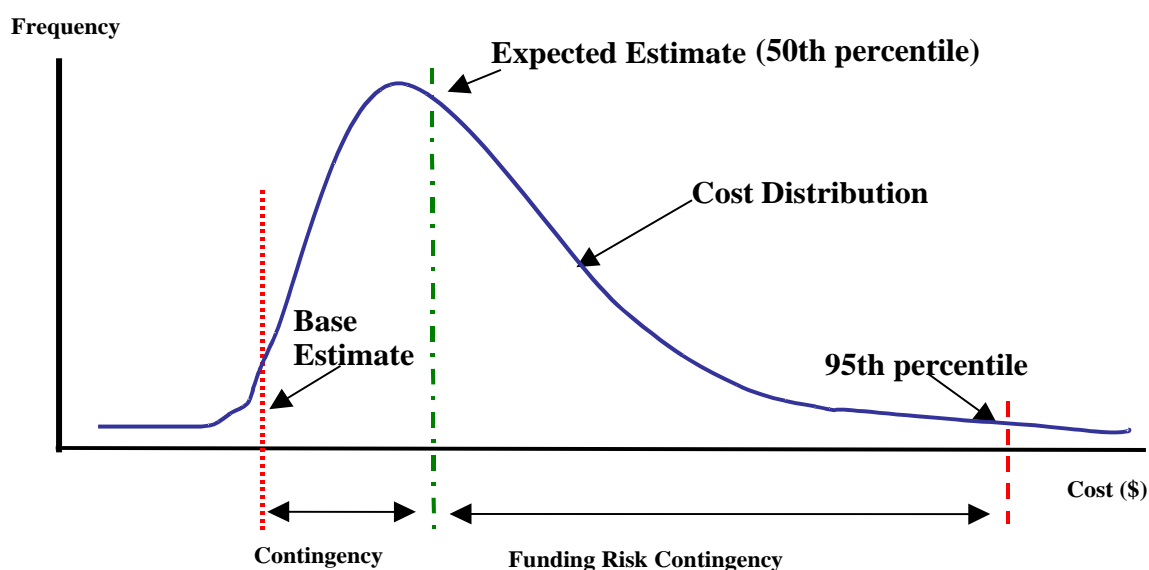
9. RISK AND CONTINGENCY CALCULATION

9.1 General

- 9.1.1 This section of the Cost Estimation Manual is supplementary to the Waka Kotahi *Minimum Standard Z/44 - Risk Management* which describes the risk management process to be followed for Waka Kotahi projects. Consultants must familiarise themselves with the requirements of Z/44 when preparing cost estimates for Waka Kotahi projects.
- 9.1.2 For cost estimation purposes, 'risk' is defined as the effect should a risk occur, that will have either a beneficial impact (opportunity) or a detrimental impact (threat) on the cost of a project.
- 9.1.3 When establishing Contingency and Funding Risk Contingency values the Consultant shall consider not only the interpretation of risk data derived from semi-quantitative assessment or statistical risk analysis, but also the level of design development, reliability of the cost data, the knowledge and capability of data providers, optimism bias, limitations in the risk analysis and potential influence of unpredictable events.
- 9.1.4 The Cost of Treatment (mitigation) which takes account of all costs associated with the treatment of risks shall be included in the Base Estimate. Only the residual risk cost exposure should be included in a risk analysis when determining Contingency and Funding Risk Contingency values.

9.2 Terminology

9.2.1 The figure below shows the terminology to be used by consultants when preparing risk adjusted cost estimates.



9.3 The risk management approach for calculating contingency and funding risk contingency

Selecting a risk management approach

9.3.1 The following table details the risk management approach that shall be used to calculate Contingency and Funding Risk Contingency values at the various stages of the project life cycle

ESTIMATED IMPLEMENTATION PHASE COST			
ESTIMATE TYPE	<\$20M	>\$20M - \$50M	>\$50M
PBE	General	General	General
IBE	General	General or Advanced	General or Advanced
DBE	General	General or Advanced	Advanced
PE1 AND PE2	General or Advanced	Advanced	Advanced
IE	General or Advanced	Advanced	Advanced

Note: Segment values are the total Implementation phase costs of the Expected Estimate, irrespective of any funding cost share with another organisation.

- 9.3.2 Where General or Advanced is detailed as the applicable approach, the Waka Kotahi Project Manager shall determine the more appropriate of the two approaches.
- 9.3.3 For the PBE and IBE stage estimates, and often at the DBE stage, project definition is low, and consequently, the level of understanding of project threats and opportunities is also low. There is a risk when knowledge of the project is low, that both the General method and the Advanced method of risk management from Z/44 could significantly under-estimate the contingencies. This may necessitate a high-level assessment based on experience and the application of judgement rather than relying on the output from analysis of an incomplete risk register.

General approach

- 9.3.4 The General Approach is to be used for Waka Kotahi projects where guided in accordance with the requirements of Z/44 as shown in above. This approach is based on specialist interpretation of semi-quantitative data. It is targeted at achieving the appropriate management of opportunities and threats, through the systematic application of generalised risk management processes and semi-quantitative tools.
- 9.3.5 Where the General Approach is used to calculate contingency and funding risk contingency values, it is the responsibility of the Consultant to derive an appropriate contingency based on specialist interpretation of risk data at each stage of a project's life cycle. The method selected must ensure that both threats and opportunities are identified, assessed and evaluated particularly in relation to their cost and time cost impacts in accordance with the requirements of Z/44.
- 9.3.6 The semi-quantitative methodology selected can be based on percentages or lumps sums following the Consultant's specialist interpretation of the risk data available to them. As the project progresses through its life cycle and there is more complete risk data available, the Consultant should consider the use of more sophisticated semi-quantitative methods to calculate appropriate Contingency and Funding Risk Contingency values.

Advanced approach

- 9.3.7 The Advanced Approach shall be used where guided for Waka Kotahi projects in accordance with the requirements of Z/44 as shown in Figure 6 above.
- 9.3.8 It is based on computer modelling of quantitative cost data associated with uncertainties in the estimating process and individual threats and opportunities with a cost and/or time cost impact. The Consultant is to analyse and evaluate this cost data using software according to the requirements of the Advanced Approach specified in Z/44 to provide greater levels of certainty and confidence.
- 9.3.9 The output of the quantitative risk analysis is a probabilistic distribution of potential project cost scenarios on a percentile basis providing a defined confidence level. This information is used as a data source for establishing Contingency and Funding Risk Contingency values.
- 9.3.10 The Advanced Approach should also be used where the General Approach reports a significant risk. The existence of one "extreme" risk or five "high" risks above the project Risk Threshold as agreed with the Waka Kotahi project team indicates a significant risk.

9.4 Addressing likelihood and consequence

- 9.4.1 The Waka Kotahi *Minimum Standard Z/44 - Risk Management* details the processes required to provide contingency and risk funding contingency amounts within cost estimates for each of the above approaches and contains the Waka Kotahi standard tables for rating likelihoods and consequences.

9.5 Sensitivity analysis

- 9.5.1 The consultant is required to undertake a sensitivity analysis of the outcome to identify the risks that have the greatest impact on the Expected Estimate. The consultant must undertake the sensitivity analysis and use the outcomes to rank the risks in terms of largest financial risk to the Expected Estimate ie to identify risk “outliers”. The report must include the sensitivity analysis and comments on the results, including treatment and treatment actions for large financial and programme risk items.
- 9.5.2 The consultant is required to show all results in tabular or graph form. These need to include outputs for each phase in the project’s life cycle.

9.6 Commercial review of contingency and funding risk contingency

- 9.6.1 A commercial review of contingency and funding risk is required as detailed in the following paragraphs.
- 9.6.2 Waka Kotahi’s commercial team shall undertake a review of the contingency and funding risk contingency if the DBE Expected Estimate is greater than \$50M.
- 9.6.3 Additional reviews may be requested if:
- there are significant risks, and the Waka Kotahi project manager considers the project would benefit from a review; or
 - the Waka Kotahi project sponsor considers the project would benefit from a review.
- 9.6.4 These reviews do not remove responsibility or accountability from the consultant who prepared the project estimate.

10. REPORTING ESTIMATES

10.1 General

- 10.1.1 Cost estimates shall be prepared and presented using the Estimate Summary Reporting Forms A to I in [Appendix C](#). This is essential to improve understanding of estimates and to reduce the possibility of items being left out of presented costs.
- 10.1.2 Note: for the purposes of consistency, it is important that the items listed under each element are included within the element as shown. For example, lime stabilisation of cut and/or fills is included in the Earthworks element, not in the Ground Improvement element.
- 10.1.3 Consultants are to use the forms included in the appendices for:
- Elemental Breakdown ([Appendix B1](#) and [Appendix B2](#))
 - Estimate Summary Reporting ([Appendix C](#))
 - Funding Applications ([Appendix D](#))
 - Cost Reporting and Control ([Appendix E1](#), [Appendix E2](#) and [Appendix E3](#))
- 10.1.4 For projects incorporating a number of contracts, the consultant shall present each contract separately and then include all of these on a summary form. This provides a ready reference from which an overall understanding of the cost for a project can be gained.
- 10.1.5 All milestone cost estimates shall be accompanied by an [Estimate report](#) that as a minimum shall include:
- scope and functionality statement and assumptions;
 - key assumptions and exclusions;
 - the detailed build-up of the Base Estimate (Waka Kotahi costs, property costs, consultancy fees and physical works);
 - the risk register prepared in accordance with Z/44;
 - the Risk Adjusted Programme;
 - the cost and schedule inputs and assessment / analysis to determine the Contingency and Funding Risk Contingency;
 - the outcome of the sensitivity analysis to identify the risks (cost and schedule) that have the greatest impact on the Expected Estimate;
 - Estimate Summary Forms ([Appendix C](#)) with Expected and 95th Percentile Estimates;
 - Explanation if there is a significant difference between the estimate and the corresponding estimate from the previous project phase;
 - Peer review or parallel estimate inclusive of any associated reconciliation process and outcome in accordance with Section 12.

10.1.6 All cost estimate reports shall be submitted to sm014@nzta.govt.nz.

10.2 Reporting PBE and IBE

10.2.1 It is important that the potential range of costs for a project is reported accurately from the conception of the project. During the period from Point of Entry to the selection of a preferred option, it is important that the project's Base Estimate, Contingency and Funding Risk Contingency are reported for all potential solutions.

10.3 Elemental breakdown reporting

10.3.1 The elemental breakdown form in Appendix B ([Appendix B1](#)) is designed to be consistent with the elemental cost information that Waka Kotahi holds at a national level for each element.

10.3.2 The consultant is required to use an elemental breakdown form to prepare an estimate and to supply it to the peer reviewer and the Waka Kotahi project manager so they can understand what is included in the cost estimate.

10.4 Summary estimate reporting

10.4.1 The consultant must use the appropriate form for reporting the summary of estimated costs at each stage of the project lifecycle. [Appendix C](#) contains the forms for the following project estimates:

- Programme Business Case Estimate (PBE)- Use Form A
- Indicative Business Case Estimate (IBE) – Use Form B
- Detailed Business Case Estimate (DBE) – Use Form C
- Pre-Implementation Estimate 1 (PE1) – Use Form D
- Pre-Implementation Estimate 2 (PE2) – Use Form E
- Implementation Estimate (IE) – Use Form F.
- Waka Kotahi Managed Costs – Use Form G.
- Total Property Costs – Use Form H.
- Consultancy Fees – Use Form I.

10.4.2 The Consultancy Fees and Waka Kotahi Managed Costs are to be rolled up and summarised as single line items for each stage. Consultancy Fees and Waka Kotahi Managed Costs are removed from the project estimate as and when they become sunk costs.

10.4.3 Physical works must be broken down into the 13 element headings on the summary forms.

10.4.4 Estimates reported on these forms are as at the Base Date and include no allowance for escalation (other than the market shift allowance for property as discussed in s.7.1.9).

10.5 Reporting of estimates for funding applications

- 10.5.1 When seeking a funding allocation for any phase, the Forms in [Appendix D](#) are used depending on the stage of the project being contracted. The Waka Kotahi Project Manager's Base Contract Estimate (for Professional Services) or the Consultant's Base Contract Estimate (for Physical Works) are used to complete the assessment of the funding allocation required.
- 10.5.2 Once funding has been approved, evaluation of the tenders completed and a preferred tenderer's price available, these forms are updated by inserting the tender price in Box A, replacing the previous Base Contract Estimate. The Waka Kotahi project manager (for Professional Services) and the consultant (for physical works) shall reassess the adequacy of the previously assessed Contingency and Funding Risk Contingency and confirm the Expected Estimates. These reassessed estimates are included within Tender Evaluation Report 2.
- 10.5.3 Funding application forms are included in the [Appendix D](#) for the following funding submissions:
- Project Development (submitted with Programme or Indicative Business Case);
 - Pre-implementation (submitted with Detailed or Single Stage Business Case);
 - Implementation (submitted prior to tendering Implementation);
 - Property (submitted with Detailed or Single Stage Business Case).
- 10.5.4 For the majority of projects, there will only be one main contract per phase. However, for more complex projects requiring the services of more than one contract, each contract for a phase shall be identified separately on the appropriate Funding Application form. This will enable the Base Estimate for each contract to be able to be transferred directly to the RFT and relevant Contract Procedures Manual forms, for tender evaluation and comparison purposes.
- 10.5.5 Where elements of the project Base Estimate are not included in a contract (for example, utility services costs invoiced directly to Waka Kotahi) the Consultant shall take care to ensure that such costs are not omitted from the funding application.

10.6 Waka Kotahi elemental cost database

- 10.6.1 Waka Kotahi maintains an Elemental Cost Database which records out-turn costs against the elements listed in Appendix B ([Appendix B1](#)). The database supports the production of elemental estimates, which create a consistent and standardised framework for all consultants.
- 10.6.2 As a tool for the preparation of estimates early in a project's lifecycle, the database provides comparisons between projects at an elemental level, and comparisons between tendered and out-turn costs. Early estimates will then be developed through the project's lifecycle following the elemental format.
- 10.6.3 To facilitate the collection of input data, the consultant (or nominated person in an Alliance) shall complete the Questionnaire in Appendix B ([Appendix B2](#)) at the end of each project including all supporting information and forward to the Waka Kotahi Project Manager and sm014@nzta.govt.nz. It is important that this be completed as soon as possible, before consultant personnel move away from the project and the information/data becomes more

difficult to compile or is sent to archive. From the information supplied in the Questionnaire Waka Kotahi will update its Elemental Cost Database.

- 10.6.4 The Elemental Cost Database is available on the Waka Kotahi website for use by consultants (for example, to provide a check against the estimated cost of potential solutions at the Programme Business Case stage).

11. ESTIMATE AUDIT TRAIL

11.1 General

- 11.1.1 The project estimate changes during the project life cycle to reflect the development of a defined scope of works.
- 11.1.2 Any changes must be recorded and presented in a manner that allows an audit trail to be implemented (refer [Appendix E1](#), [Appendix E2](#) and [Appendix E3](#)) and the project manager to coordinate sign-off of any revised value.
- 11.1.3 Management of the estimating process, recording and documenting the basis of the estimate, and regular monitoring and review of the design documents including the source of data used, help to minimise significant cost over-runs.

11.2 Estimate updates

Estimate stage updates

- 11.2.1 The consultant is to prepare and update a formal [Estimate report](#) at each of the project hold points throughout the project life cycle in accordance with s.10.1.5.
- 11.2.2 The consultant and the Waka Kotahi project manager must sign off on the consultant's estimate before the project proceeds to the next stage.

Other updates

- 11.2.3 The consultant is required to update the estimate at any other point in the project life cycle, where necessary. For example, if the risk profile significantly changes or if a significant change in scope is required. The update must include an [Estimate report](#) as in s.10.1.5.

11.3 Estimate Tracking

- 11.3.1 Estimate stage updates will be added into the estimate tracking register. This forms the basis of the Consultant performance assessment discussed in s.4.3.
- 11.3.2 This information will also be used to identify themes and inform trend analysis which will be fed back into subsequent updates of this Manual and the development of future training modules.

12. PEER REVIEWS AND PARALLEL ESTIMATES

12.1 General

- 12.1.1 All cost estimates shall be internally peer reviewed (by the consultant preparing the cost estimate). In addition, depending on the quantum of the implementation phase estimate and the risk profile, the project manager may request an external peer review or independent parallel estimating process.
- 12.1.2 Independent peer reviewers and independent parallel estimators must be selected from those registered with Waka Kotahi on the Independent Professional Advisors' panel on the web site.

12.2 Internal peer reviews

- 12.2.1 The consultant managing the estimate is to obtain an internal peer review of the estimate at each update. The peer reviewer may be a person from within the consultant's own organisation or an independent person, nominated by the consultant and agreed by the Waka Kotahi project manager. The reviewer must be able to demonstrate independence from the consultant's project development team.
- 12.2.2 The peer review is required to provide Waka Kotahi with assurance that good practice has been followed both in terms of this manual and any internal requirements the consultant may have in place.
- 12.2.3 The reviewer is required to address and report on the following aspects as a minimum:
- gain a satisfactory understanding of the project to permit the peer review to proceed;
 - undertake a site visit with the consultant's project development team, if relevant;
 - review the estimate scope for adequacy and completeness;
 - check that a bulk quantity check has been carried out by a suitably experienced person;
 - review the appropriateness of the rates and prices used;
 - review the appropriateness of the lump sum and provisional sum items;
 - review all external price enquiries that may have been incorporated in the estimate to confirm their scope, price, and appropriateness for inclusion;
 - check that an arithmetic check has been undertaken;
 - benchmark key rates, prices and allowances used in the estimate against actual outcomes on other similar projects;
 - confirm that the estimate has been compiled in accordance with SM014;
 - review the scope definition statements, drawings, etc. to confirm they are commensurate with the type of estimate and estimate deliverable;
 - review the estimate inclusions and exclusions;

- review the appropriateness of the Contingency and Funding Risk Contingency allowances in light of the extent of project and design development.

12.2.4 A sample peer review form is provided in Appendix F.

12.3 External peer reviews

12.3.1 External peer reviews are required as detailed in the following paragraphs. The Waka Kotahi project manager has discretion to commission additional reviews.

12.3.2 The Waka Kotahi project manager shall obtain external peer reviews of DBE project estimates where:

- the Expected Estimate of the implementation phase is greater than \$5.0M and less than \$20M; or
- the project has a number of risks, complexities or items of material effect that could substantially influence the estimate (eg significant traffic volumes, environmental issues, large number of directly affected parties).

12.3.3 The Waka Kotahi project manager shall obtain external peer reviews of cost / fee estimates prior to any funding request if:

- there are serious discrepancies between the estimate and the elemental cost data; or
- the Expected Consultancy Fees contract estimate is greater than \$2M and less than \$10M; or
- the implementation phase of the Expected Estimate is greater than \$5.0M and less than \$20M; or
- the implementation phase of the Expected Estimate is less than \$5.0M and either the internal peer reviewer or the Waka Kotahi project manager considers there are risks, complexities or items of material effect that could substantially influence the estimate.

12.3.4 These reviews do not remove responsibility or accountability from the consultant who prepared the estimate.

12.3.5 In addition to the items identified in 12.2 above, the external peer reviewer is to concentrate on:

- methodology used to prepare the estimate;
- methodology used to calculate Contingency and Funding Risk Contingency;
- the appropriateness of the output results.

12.3.6 The consultant shall provide the external peer reviewer with their risk analysis input data and the Summary Risk Analysis Report submitted to the client in support of the Contingency and Funding Risk Contingency for the estimate under peer review.

12.3.7 The external peer reviewer is to supply a copy of the peer review report to the consultant so they can reconcile any differences. If the reviewer and consultant cannot reach agreement, the consultant must report clearly the areas of disagreement to the Waka Kotahi project manager with a full explanation of why they disagree.

12.3.8 A sample peer review form is provided in Appendix F and the Waka Kotahi cost estimation external peer review methodology in Appendix G.

12.4 Parallel estimates

12.4.1 Parallel estimates are required as detailed in the following paragraphs.

12.4.2 The Waka Kotahi project manager shall commission a parallel estimate for comparison with the Consultant's DBE if:

- the implementation phase of the DBE Expected Estimate is likely to be greater than \$20M; or
- the Waka Kotahi project manager considers the project would benefit from a parallel estimate being prepared (e.g. complexities or items of material effect that could substantially influence the estimate; significant traffic volumes; environmental issues; large number of directly affected parties; items that are particularly susceptible to changes in quantity or rate).

12.4.3 These parallel estimates do not remove responsibility or accountability from the consultant who prepared the project estimate.

12.4.4 Parallel estimates are to be at least as descriptive and detailed as the DBE prepared by the consultant.

12.4.5 Additional parallel estimates beyond that required at the DBE stage will only be requested if:

- the project has undergone a significant scope change; or
- the Waka Kotahi project sponsor considers the project would benefit from a further parallel estimate being prepared.

12.4.6 The Waka Kotahi project manager shall obtain a parallel estimate of the professional services fee prior to any funding request if the Expected Consultancy Fees contract estimate is greater than \$10M.

12.4.7 A copy of the parallel estimate shall be provided to the consultant. The consultant is then required to reconcile any differences they may have with the parallel estimator. If the estimator and consultant cannot reach agreement, the consultant must clearly report the areas of disagreement to the Waka Kotahi project manager with a full explanation of why they disagree.

12.4.8 The Waka Kotahi parallel estimate methodology is provided in Appendix H.

13. SCOPE AND COST CONTROL PROCESS

13.1 General

- 13.1.1 This process is focussed on the Development and Pre-Implementation phases of the project lifecycle. It has two main goals:
- To ensure functionality, scope and design standard changes are identified, scrutinised, agreed and costed at the appropriate time;
 - To ensure that there is always a robust updated project cost estimate available.
- 13.1.2 During the Implementation phase the Engineer's Representative or Principal's Agent should set up a system with the Contractor to record cost changes so there is a robust current project out-turn cost. In an Alliance, this would be the Owner Interface Manager.
- 13.1.3 Where proposed changes have not been allowed for in the funding allocation, the Project Manager should reassess and consider seeking a Price Level Adjustment.
- 13.1.4 In the context of cost control prior to commencement of construction, scope change can be identified as eg:
- Lengthening/shortening/widening;
 - Adding/subtracting the number of structures, shared user path;
 - Change in standard, legislation, manuals;
 - Programme disruption;
 - Consent or property requirements.

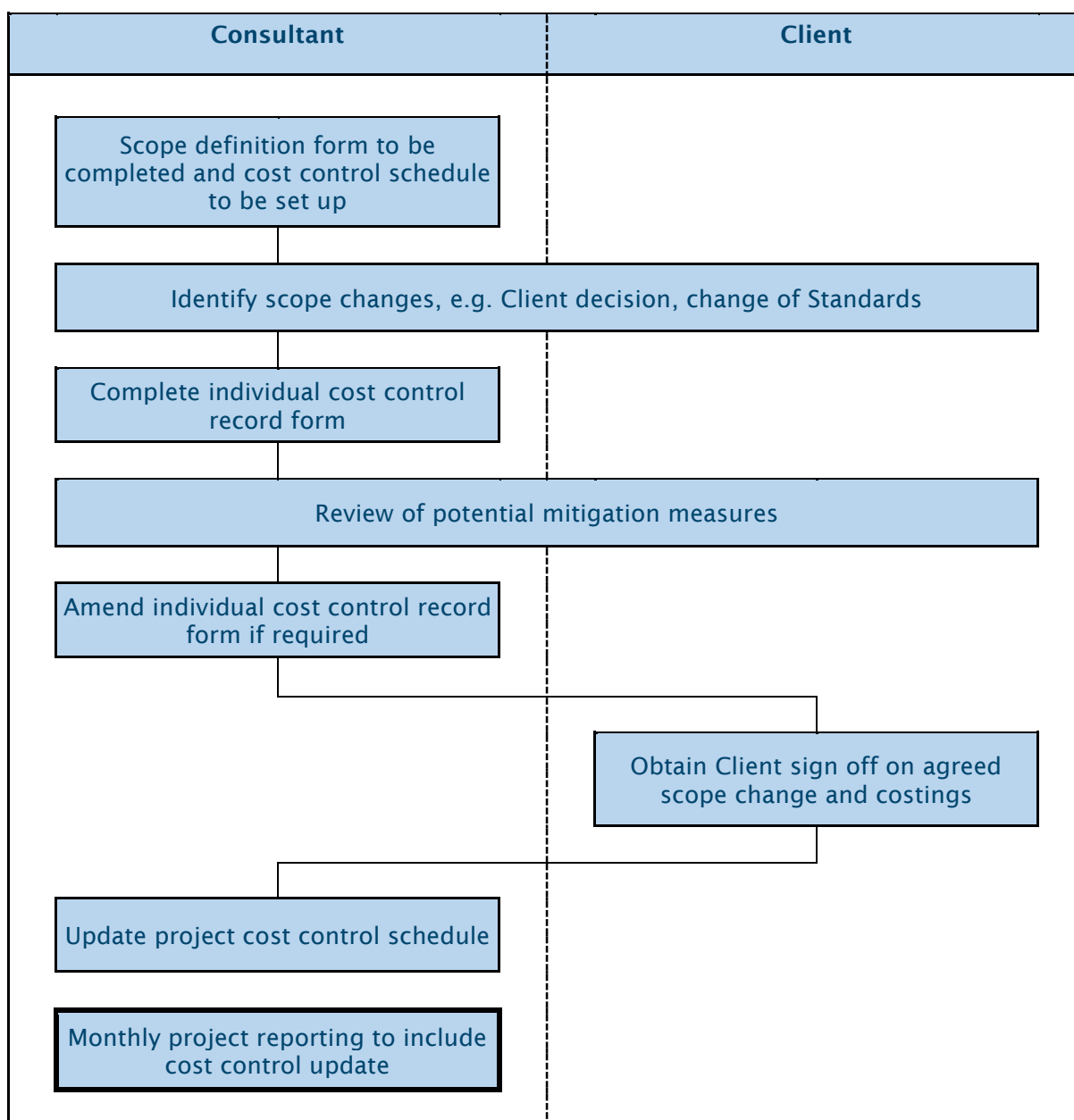
13.2 Recording forms

- 13.2.1 Appendix E contains three templates for development and use in all projects throughout the Project Development, Pre-implementation and Implementation phases (up to establishment of the IE):
- Project Scope Definition – This form should be used to record the agreed project scope at the start of each phase;
 - Project Cost Control Schedule – A new schedule should be set up for each phase of the project. This schedule is used to record scope changes and the updated project cost estimate;
 - Cost Control Record Form – This form is used to record in detail each individual scope change.

13.3 Process flowchart

13.3.1 The following flowchart details the process and those responsible for the individual actions required.

Cost Control Process - Project Development and Pre-Implementation Phases



14. ESTIMATING GUIDELINES

The following information provides guidance on good estimating practice.

14.1 Schedules of prices

14.1.1 Schedules of prices are to be detailed appropriately for the stage of the project based on the scope of the works agreed with the Waka Kotahi Project Manager.

14.1.2 When preparing physical works schedules of prices the consultant must:

- Use the SEP format and adhere to the definitions of elemental costs in Appendix B;
- measure all quantities accurately from the drawings and specifications for the project;
- keep lump sum items to a minimum and only use lump sums where the works cannot be suitably quantified.

14.1.3 For all DBE and later Project Estimates, the consultancy fees Base Estimate is to be prepared using Appendix C Form I (based on the Contract Pricing Schedule in SM030). For Project Development, Pre-implementation, and Implementation funding applications, the SM030 Contract Pricing Schedule must be used. The Elemental Cost Database may be used to “reality check” the non-construction costs in PBE and IBE Project Estimates.

14.2 Use and application of historic rates

14.2.1 The following factors must be considered in deciding whether it is appropriate for a historical rate or price to be applied to a new estimate:

- the inclusion of on-site overheads (indirect costs);
- the inclusion of off-site overheads and profit;
- market conditions;
- age of data;
- geographical location;
- similarity of work items;
- changes in technology, methodology, materials, plant and machinery.

14.2.2 These factors are further discussed in the following table.

Direct Costs	<p>The costs involved in constructing a work item. These costs normally include materials, plant and labour.</p> <p>It is not always apparent from the title of a work item precisely what the rate includes. For example, if an item reads ‘cut to fill’ the rate may include excavation, loading, haulage, spreading, drying and compaction from a ‘cut to a fill’ that is either near at hand or some distance from the source. The rate could include double handling, adjustments for a particularly wet or dry</p>
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	<p>site and an allowance for wastage. In tendering situations, the contractor may or may not have included some proportion of their indirect or offsite overheads and profit costs within the work items.</p> <p>In addition to the above, historical cost data may contain risk or contingency allowances specific to a particular project, or alternatively make no allowance for these.</p>
Onsite Overheads (Indirect Costs)	<p>Includes both the fixed costs associated with establishing the site (e.g. setting up site accommodation and facilities) and time related costs associated with running the site during construction of the project (e.g. site management and supervision, quality control). It also includes other associated project costs such as insurances and bonds.</p> <p>Again, in tendering situations, the contractor may or may not have included some proportion, or all, of their indirect costs within the work items.</p>
Offsite Overheads and Profit	<p>Both direct and indirect costs will be subject to the addition of allowances for the tenderers' offsite (head office) overheads and profit. Depending on the conditions set out in the contract documents, it is not generally possible to identify the amount of such allowances.</p>
Market Conditions	<p>When using historic cost data, the estimator must be aware of the market conditions prevailing at the time of the tender. For example, competitive market conditions lead to a reduction in the allowances for offsite overheads and profit. The estimator must also consider the possibility that the allowances for overheads and profit have not been equally spread over all of the rates.</p>
Age of Data	<p>Costs for the same work varies with the passage of time (inflation) and the older the data, the less reliable it will be. An appropriate allowance for inflation must be made whenever historical cost data is used.</p> <p>Consultants should take care when using estimates and quotes from external parties, as these can change substantially in short periods of time.</p>
Similarity of Work Items	<p>When using historic cost data, the estimator must be aware of the site conditions that impacted on the make-up of rates at that time. For example, a rate for 'cut to fill' will differ if the work is undertaken on an open flat site compared with a confined sloping site with valleys and ridges.</p> <p>When preparing an estimate using historic cost data, the estimator is required to price direct and indirect costs separately. The above factors must be considered when applying historic cost data to ensure the most appropriate rates are used.</p> <p>Offsite overheads and profit can be included in the make-up of a rate or as a percentage added onto the sum of direct and indirect costs.</p>

Changes in technology, methodology, materials, plant and machinery

When preparing an estimate, the estimator shall be mindful to capture any changes in technologies, methodologies, materials, plant and machinery that may affect the scope of the works and influence the estimate. This is essential when there is a significant time gap between the project conception and construction.

14.3 Waka Kotahi managed costs and consultancy fees

14.3.1 Waka Kotahi Managed Costs and Consultancy Fees are likely to be provided as a combined effort by both the Waka Kotahi project manager and the consultant responsible for the project or phase of the project. Whilst difficult to estimate, these costs should not be considered impossible to estimate reliably. Appendix C Forms G and I should be used to estimate these costs for each phase.

14.3.2 Examples of what should be included in Consultancy Fees are identified below:

- Contract management and reporting
- Preparation of each Business Case
- Preparation of statutory applications
- Pre-Implementation phase design and preparation of contract documents
- Implementation phase construction contract management and construction monitoring
- Geotechnical Testing
- Additional Services, e.g. value engineering workshops
- Provisional Sums.

14.3.3 For a more complete list, the estimator should refer to the Contract Pricing Schedule in SM030. When preparing Estimates, Appendix C Form I (based on the Contract Pricing Schedule in SM030) should be used. The schedules in SM030 must be attached to all Funding Applications. Refer to Appendix I for guidance on estimating Consultancy Fees.

14.4 Buildability

14.4.1 Unreliable estimates can result from overlooking buildability issues. Simply measuring the necessary quantities of a structure without recognising the difficulties and other costs associated with its construction may lead to an underestimate of project cost.

14.4.2 Waka Kotahi recommends that:

- a separate buildability assessment be undertaken on all project work;
- staging/sequencing diagrams (including traffic management) or methodology should be prepared, quantified and priced;

- site yards, sediment controls and stockpile areas within the construction area are identified;
- the base estimate includes any buildability items required for the construction of the works. Any buildability items which do not form part of the permanent construction works shall be included in the Temporary Works and Traffic Management section of the cost estimate, or if they are considered risk items then they should be priced accordingly in the analysis of risk impacts.

14.4.3 Fixed and/or variable Temporary Works and Traffic Management costs include:

- implementation of traffic management plans;
- public notification;
- lane changeovers;
- road diversions;
- plant and equipment hire costs (e.g. cones, barriers, vehicle attenuator, etc);
- temporary construction (roads, bailey bridges, footpaths, etc);
- site labour.

14.4.4 Buildability is a critical issue. Where consultants have any doubts, they should discuss these with the Waka Kotahi project manager who may request that the methodology and estimate be reviewed by an experienced practitioner.

14.5 Preliminaries and general

14.5.1 When preparing estimates for Preliminaries and General (P&G) the estimator must take account of:

- the size, nature and location of the project;
- the duration of the project;
- the allowances within individual rates incorporated in the estimate e.g. offsite overheads, profit and manual labour (both plant operators and labour working on the “tools”).

14.5.2 The estimator should clarify separately the items included within the P&G section. The following is a typical (but not comprehensive) list of P&G items:

- Site establishment, operation (e.g. time related costs like site sheds, phones or photocopying), disestablishment and clean-up;
- Site management (non-manual labour);
- Bonds and insurances;
- Consents if not already obtained (e.g. Building Consents);

- The cost of preparing and maintaining quality, health & safety, security, temporary erosion and sediment control, temporary traffic management plans, programming and reporting;
- Public relations costs;
- Any other costs associated with running the construction side of a project.

14.5.3 The P&G section is an important and significant component of any cost estimate as it includes items/costs that are required to run and manage the physical works both fixed and/or time related.

14.5.4 Therefore, P&G costs should be individually assessed for each project and then compared to similar historical projects to gain confidence in the estimated out-turn cost, instead of basing P&G costs on historical data alone.

14.6 Earthworks

14.6.1 When preparing estimates for earthworks the consultant must take account of:

- location of site relative to quarry or dump (haulage distance);
- difficulty of terrain;
- access/egress to site and working space;
- weather and length of season;
- unsuitable material;
- undercut allowances;
- rock excavation;
- slope stability;
- conditioning requirements for the material (e.g. drying);
- land for drying material or locating stockpiles;
- all temporary works required for the earthworks such as haul roads, dust control etc
- proximity and type of neighbours which may influence the methodology, type of plant used, etc
- temporary erosion and sediment control.

14.6.2 In general, better site/geotechnical knowledge will result in more reliable estimates. Investment in site investigation should be made at the earliest possible stage so that estimates can be prepared with a better knowledge of site conditions.

14.6.3 A check that can be applied to historical rates is to use resource-based estimating and haulage diagrams that assess the amount of labour and plant needed to undertake the earthworks in the programmed construction period.

14.7 Utility services

- 14.7.1 Service costs include all adjustments, replacements, relocations, protection and the like, of existing services that are required as a consequence of the project. These costs can relate to services undertaken by the responsible service authority, a contractor engaged by that authority, or by the main contractor (or their subcontractor) of the project. Note: Need to check whether these costs are included within Waka Kotahi managed costs to ensure they are not double counted.
- 14.7.2 Care must be taken to produce a correct scope of works for the services that are contained within the project corridor. Correspondence with the various service providers should be clearly documented and shall be appended to the cost estimate. Consideration also needs to be given to the impact of staging and temporary works on the services (new and existing).
- 14.7.3 It is often difficult to determine the potential costs for works to existing services. For example, problems arise when the service authority estimate does not reflect the actual cost of relocation, or existing location drawings do not contain accurate information. The consultant must consider these risk items when analysing risk impacts.

14.8 Temporary erosion and sediment control (ESC)

- 14.8.1 Protecting the environment is a key consideration in all Waka Kotahi projects. Cost estimates need to include for the preparation (plans), installation, monitoring, maintenance and removal of ESC measures from project conception through to completion. Many factors will influence the allocations for environmental mitigation including:
- type of project (earthworks cut/fill volumes);
 - size of open areas;
 - geographical location;
 - type of terrain;
 - proximity to waterways/sensitive areas;
 - season and construction duration;
 - sensitivity of the project.

14.9 Urban design

- 14.9.1 Waka Kotahi is a signatory to the NZ Urban Design Protocol. Urban design is an important consideration when developing a project. This aspect can be easily overlooked in costing a project in the early development phases. When preparing estimates for urban design, the consultant should take account of:
- location of the site relative to built-up areas;
 - proximity to significant environmental, cultural or heritage areas;
 - consistency with adjacent sections of state highway;

- significance of structural elements (size and form).

14.9.2 If in doubt, discuss potential urban design scope with the Waka Kotahi project manager.

APPENDICES

APPENDIX	TITLE
A	Example of cost estimation manual procedure
B	Elemental breakdown for physical works form and Elemental costing questionnaire
C	Estimate summary reporting forms: Form A Programme Business Case Estimate Form B Indicative Business Case Estimate Form C Detailed Business Case Estimate Form D Pre-implementation Estimate 1 Form E Pre-implementation Estimate 2 Form F Implementation Estimate Form G Waka Kotahi Managed Costs Form H Total Property Costs Form I Consultancy Fees
D	Funding application forms: Form 1 Project Development Form 2 Pre-implementation Form 3 Implementation Form 4 Property Form 5 Summary Sheet (Professional Services) Form 6 Escalation calculation form
E	Cost reporting and control forms: E1 Project scope definition E2 Cost control record form E3 Project cost control schedule
F	Peer review form
G	Cost estimate external peer review methodology
H	Parallel estimate methodology
I	Guidance on estimating consultancy fees
J	Project Property Cost Estimates

APPENDIX A: EXAMPLE OF COST ESTIMATION MANUAL PROCEDURE

Estimate Procedure: Example \$20M >DBE Estimate >\$10M

1 Background information

Determine the phase of the project and the type of estimate required. In this example, the Project Development phase has been completed at a cost of \$107,500, and detailed design is due to commence.

The estimate required will be a Detail Business case Estimate (DBE). The DBE is used to obtain funding for the Pre-implementation and Property phases.

2 Determine which forms are required

Use the following forms to produce the estimate:

- Cost Control forms (Appendix E)
- Elemental Breakdown (Appendix B)
- Total Property Cost (Appendix C) (for Waka Kotahi Property phase)
- Detailed Business case Estimate (DBE) Summary (Appendix C Form C)
- Funding Application for Pre-implementation (Appendix D Form 2)
- Funding Application for Property (Appendix D Form 4)

3 Scope Control

Review the scope for any changes and record outcomes on the Project Scope Definition and Cost Control forms in Appendix E.

4 Elemental Breakdown

Complete an elemental breakdown by calculating the expected quantities from drawings (or other sources of information) and assessing the market rates for each measured item.

The Base Estimate for each summary element of physical works is transferred from the elemental breakdown to the appropriate elemental breakdown line item on the DBE Summary Form.

5 Project Property Costs

5.1 Total Property Costs

All relevant property cost information should be provided by the Waka Kotahi Transport Property team.

In this example, several properties will be affected by a proposed road realignment and property acquisition is necessary. Refer to Appendix J for the detail of the development of the Total property Costs.

Project Name Total Property Costs						
Property Acquisition Reference	Property Requirements	Purchased	Property Purchase Costs (A)	Property Compensation Costs (B)	Property Owner Accommodation Works (C)	Property Cost (A+B+C=D)
A	Residential Lifestyle Block					
	Land and improvements including chattels	No	490,000	0	0	490,000
	Solatum (payable to property owner and residents only)	No	0	2,000	0	2,000
	Disturbance costs including relocation	No	0	2,500	0	2,500
B	Commercial Property					
	Legal costs	No	0	5,000	0	5,000
	Lessor's interest in required road corridor	No	450,000	0	0	450,000
	Lessor's interest in severance land	No	100,000	0	0	100,000
C	Residential Property					
	Lessee's interest in land	No	35,000	0	0	35,000
	Lessee's interest in building	No	565,000	0	0	565,000
	Lessee's interest in relocation expenses	No	0	35,000	0	35,000
Fees	Property Consultancy Fees (D)					
	Land and improvements	No	15,000	0	0	15,000
	Injurious affection	No	0	50,000	0	50,000
	Legal and valuation costs	No	0	10,000	0	10,000
	Disturbance costs	No	0	2,000	0	2,000
	Relocate glasshouse	No	0	0	2,000	2,000
	Install new fence	No	0	0	5,000	5,000
	Construct new driveway	No	0	0	7,000	7,000
	Replace planting	No	0	0	3,000	3,000
Base Estimate of Total Property Costs		(D+E)	1,655,000	106,500	17,000	2,078,500
Contingency						320,000
Expected Estimate of Total Property Costs						2,398,500
Funding Risk Contingency						225,000
95th Percentile Estimate of Total Property Costs						2,623,500

6 Funding application for pre-implementation phase

The funding application form is used to estimate the Base Estimate, Contingency and Funding Risk Contingency for inclusion in the DBE.

Estimate the Pre-implementation phase costs with the assistance of the Waka Kotahi project manager. Each cost element included must be appropriate for the amount of work being performed during the Pre-implementation phase. Remember to include all other consultant's fees, such as specialist consultants, within the estimate. Use Appendix C Form G to calculate the Waka Kotahi managed costs and Appendix C Form I to calculate the Consultancy Fees.

Assess the Contingency and Funding Risk Contingency figures in accordance with the Z/44 General Approach. Transfer the Base Estimate, Contingency and Funding Risk Contingency to the DBE form.

Calculate future escalation on both the Contingency and Funding Risk Contingency. In this case, the pre-implementation phase is expected to take 18 months to complete. Calculate escalation using Appendix D Form 6. Transfer the escalation amounts to the Appendix D Pre-implementation form.

Project Phase Funding Application Assessment Form 2


 Pretender with Base
Contract Estimate

 Post Tender with
Tender Price

 (Tick as
Appropriate)

Pre-implementation
Project Name: ABC Realignment

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1	Consultancy Fees			
1.1	Contract Scope and Contract Management	20,000		
1.2	Geotechnical Investigations	60,000		
1.3	Topographical Survey	30,000		
1.4	Design	440,000		
1.5	Statutory Applications	50,000		
1.6	Property Acquisition Management	10,000		
1.7	Tender Documentation	20,000		
1.8	Geotechnical Testing	25,000		
1.9	Provisional Sums	40,000		
A	Base Consultancy Fees Estimate / Tender Price	585,000		
B	Contingency (Assessed/Analysed) (Consultancy Fees)		70,000	
C	Expected Consultancy Fees Estimate (A+B)		655,000	
D	Waka Kotahi Managed Costs (from Form G)		415,000	
E	Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)		45,000	
F	Expected Estimate (Waka Kotahi Managed Costs) (D+E)		460,000	
G	Escalation (Expected)		32,400	
H	Expected Pre-implementation Phase Estimate (C+F+G)		1,147,400	
I	Expected Pre-implementation Phase Estimate incl. Indirect and Admin costs (H x %)		1,239,192	
J	Funding Risk Contingency (Assessed/Analysed) (Consultancy Fees)			60,000
K	95th percentile Consultancy Fees Contract Estimate (C+J)			715,000
L	Funding Risk Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)			43,000
M	95th percentile Waka Kotahi Managed Costs (F+L)			503,000
N	Escalation (95th percentile)			18,400
O	95th percentile Pre-implementation Phase Estimate (K+M+N)			1,236,400
P	95th percentile Pre-implementation Phase Estimate incl. Indirect and Admin costs (O x %)			1,335,312

Date estimate prepared	Base Date (Qtr-year)
Estimate prepared by	Signed
Estimate internal peer review by	Signed
Estimate external peer review by	Signed
Estimate accepted by Waka Kotahi project manager	Signed

Note: (1) These estimates are exclusive of GST.

(2) Base Contract Estimate (A) is displayed in SM030 Request for Tender. For multiple phase Professional Services contracts, the Base Contract Estimate is the sum of estimates for each phase (Refer Form 5).

(3) Once a tender price is available it is substituted for the Base Contract Estimate and the revised Expected Estimate is included in the tender evaluation report.

7 Funding application for property phase

The funding application form is used to estimate the Base Estimate, Contingency and Funding Risk Contingency for inclusion in the DBE.

Estimate the Total Property Costs with the assistance of the Waka Kotahi project manager.

Assess the Contingency and Funding Risk Contingency figures in accordance with the Z/44 General Approach. Transfer the Base Estimate, Contingency and Funding Risk Contingency to the DBE form.

Calculate future escalation on both the Contingency and Funding Risk Contingency. In this case, the pre-implementation phase is expected to take 18 months to complete. Calculate escalation using Appendix D Form 6. Transfer the escalation amounts to the Appendix D Pre-implementation form. Note that the Total Property Cost estimate includes provision for property market appreciation from the date the estimate was prepared through to the mid-point of the active acquisition phase for the project. This means that escalation should not be applied to the Total Property Cost estimate as this would essentially be 'double counting' and over-estimate those costs.

Note that the Total Property Cost estimate includes provision for property market appreciation from the date the estimate was prepared through to the mid-point of the active acquisition phase for the project. This means that escalation should not be applied to the Total Property Cost estimate as this would essentially be 'double counting' and over-estimate those costs.

Project Phase Funding Application Assessment Form 4

Property

Project Name: ABC Realignment

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1	Property			
1.1	Property interest purchase costs (including market appreciation)	1,655,000		
1.2	Property owner accommodation costs	17,000		
1.3	Property compensation costs	106,500		
1.4	Property consultancy fees	300,000		
A	Base Property Estimate	2,078,500		
B	Contingency (Assessed/Analysed) (Property)		320,000	
C	Expected Property Phase Estimate (A+B)		2,398,500	
D	Expected Implementation Phase Estimate including Indirect and Admin costs (C x %)		2,590,380	
E	Funding Risk Contingency (Assessed/Analysed) (Property)			225,000
F	95th percentile Property Phase Estimate (C+E)			2,623,500
G	95th percentile Property Phase Estimate incl. Indirect and Admin costs (F x %)			2,833,380
Date estimate prepared		Acquisition phase mid-point date		
Estimate prepared by		Signed		
Estimate internal peer review by		Signed		
Estimate external peer review by		Signed		
Estimate accepted by Waka Kotahi property manager		Signed		

Note: (1) These estimates are exclusive of GST.

(2) The Total Property Cost estimate includes provision for property market appreciation from the date the estimate was prepared through to the mid-point of the active acquisition phase for the project. This means that escalation should not be applied to the Total Property Cost estimate as this would essentially be 'double counting' and over-estimate those costs.

8 Contingency and funding risk contingency

Contingency and Funding Risk Contingency calculated using the Z/44 General Approach are also transferred to the DBE form.

9 Detailed Business case Estimate (DBE) summary form

Compile the above estimate, contingency and funding risks, and insert into the DBE form.

- Item A: From the Total Property Costs;
- Item B: Project Development Phase Sunk Costs – Nil;
- Item C: From the Pre-implementation phase Funding Application form, EXCLUDING escalation;
- Item D: From the Elemental Costs;
- Item F: Sum of all the Contingency amounts from above;
- Item H: Sum of all the Funding Risk Contingency amounts from above.

Project Estimate - Form C				
Project Name: ABC Realignment				
Detailed Business Case Estimate				
Item	Description	Base Estimate	Contingency	Funding Risk
A	Property Purchase and Compensation Costs	1,761,500		
	Property Owner Accommodation Works	17,000		
	Property Consultancy Fees	300,000		
	Total Property Cost	2,078,500	320,000	225,000
B	Project Development Phase			
	- Consultancy Fees	Nil	Nil	Nil
	- Waka Kotahi Managed Costs (Form G)	Nil	Nil	Nil
Total Project Development	Nil	Nil	Nil	
C	Pre-implementation Phase			
	- Consultancy Fees	630,000	115,000	103,000
	- Waka Kotahi Managed Costs (Form G)	415,000	60,000	40,000
Total Pre-implementation	1,045,000	175,000	143,000	
D	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees	350,000	80,000	40,000
	- Waka Kotahi Managed Costs (Form G)	100,000	40,000	20,000
	- Alliance IPAA	-	-	-
	Sub Total Base Implementation Fees	450,000	120,000	60,000
	Physical Works			
	1 Environmental Compliance	400,000		
	2 Earthworks	2,600,000		
	3 Ground Improvements	200,000		
	4 Drainage	1,500,000		
	5 Pavement and Surfacing	2,400,000		
	6 Bridges	-		
7 Retaining Walls	-			
8 Traffic Services	300,000			
9 Utility Services	500,000			
10 Landscaping	100,000			
11 Traffic Management	500,000			
12 Preliminary and General	500,000			
12A Contractor's design and construction phase services (D&C, ECI and Alliances only)	-			
13 Extraordinary Construction Costs	-			
Sub Total Base Physical works	9,600,000	830,000	610,000	
Total for Implementation Phase	10,050,000	1,010,000	670,000	
E	Project Base Estimate	13,173,500		
	Project Base Estimate (rounded)	13,200,000		
F	Contingency (Assessed/Analysed)	(A+C+D)	1,505,000	
G	Project Expected Estimate	(E+F)	14,678,500	
	Project Expected Estimate (rounded)		14,700	
	Total Property Cost Expected Estimate		2,398,500	
	Project Development Phase Expected Estimate		Nil	
	Pre-implementation Phase Expected Estimate		1,220,000	
	Implementation Phase Expected Estimate		11,060,000	
H	Funding Risk Contingency (Assessed/Analysed)	(A+C+D)	1,038,000	
I	95th percentile Project Estimate	(G+H)	15,716,500	
	95th percentile Project Estimate (rounded)			
	Total Property Cost 95th percentile Estimate		2,623,500	
	Project Development Phase 95th percentile Estimate		Nil	
	Pre-implementation Phase 95th percentile Estimate		1,363,000	
	Implementation Phase 95th percentile Estimate		11,730,000	
Date estimate prepared		Base Date (Qtr-year)		
Estimate prepared by		Signed		
Estimate internal peer review by		Signed		
Estimate external peer review by		Signed		
Estimate accepted by Waka Kotahi project manager		Signed		

- Note: (1) These estimates are exclusive of escalation and GST.
 (2) Project Development Phase Estimates are set to Nil as these are now sunk costs.
 (3) Include Project Phase Funding Application Assessment Forms 2 and 4 with the DBE.
 (4) Margin for Implementation Phase IPAA & PAA costs is included within the Physical Works item.
 (5) Refer to Section 6.6 for guidance on rounding.

10 Completing the Estimate and Writing the Report

Obtain an internal peer review from an experienced estimator, either from your own company or an external company if that experience is not available. Reconcile any differences that exist.

The external peer reviewer, commissioned by Waka Kotahi, should be provided with all information and assistance to enable them to perform their review. Reconcile any differences that exist between the external peer review and consultant's estimate.

Complete the boxes at the bottom of the DBE form, including:

- Date estimate prepared;
- Base Date (Qtr-year);
- Name and signatures of;
- Estimate preparer;
- Internal peer reviewer;
- External peer reviewer;
- Waka Kotahi project manager.

Provide a report, which at minimum must include:

- Scope and functionality statement and assumptions;
- Key assumptions and exclusions;
- Detailed build-up of the Base Estimate (Waka Kotahi costs, property costs, consultancy fees and physical works);
- Risk register prepared in accordance with Z/44;
- Risk Adjusted Programme;
- Cost and schedule inputs and assessment / analysis to determine the Contingency and Funding Risk Contingency;
- Outcome of the sensitivity analysis to identify the risks (cost and schedule) that have the greatest impact on the Expected Estimate;
- Estimate Summary Forms (Appendix C) with Expected and 95th Percentile Estimates;
- Explanation if there is a significant difference between the estimate and the corresponding estimate from the previous project phase;
- Peer review inclusive of any associated reconciliation process and outcome in accordance with Section 12.

Note: This is a manufactured example and does not cover all possible scenarios. Descriptions and costs are fictitious and bear no resemblance to any actual or expected values.

APPENDIX B: ELEMENTAL COSTINGS

Introduction

An elemental estimate improves the reliability of project estimates by using out-turn costs as an input when preparing an estimate. The elemental estimate also creates a consistent, standardised framework for consultants compiling physical works tender documents. The Schedule of Elemental Prices (SEP) provides a checklist for consultants preparing tender documents and assists tenderers pricing works by structuring pricing schedules in a similar order. Elemental costing enables comparisons of project costs to be made and improves the consistency of data collected. These benefits lead to an improvement in the accuracy of project estimates.

Waka Kotahi has developed guidelines for the calculation and reporting of elemental costs for use in screening new project estimates. These guidelines define a SEP in a standard format.

This Appendix contains the following standard forms:

- Questionnaire for Capital Works contracts;
- The Schedule of Elemental Prices;
- The Schedule of Definitions of Elemental Cost Items;
- The Unit Definitions.

Elemental costings shall be prepared and used in the following manner:

The SEP will be prepared at the end of the physical works contract by the consultant administering the contract, together with the checklist.

A record of estimates at the various stages of a project will also be retained in the same format. This allows changes to be tracked and data to be available to provide an indication of 'risk costs' that arose as the project developed.

Access to the database containing the SEPs (out-turn costs and estimates) is available on the Waka Kotahi website, on the same page as the Cost Estimation Manual, for downloading. The main use of this elemental cost data will be in the preparation of estimates early in the project life cycle, i.e. PBE and IBE. As more detail becomes available during project development, the estimates based on elemental information will be updated and superseded by more detailed estimates that reflect the improved definition of the project.

The standard format and schedule of definitions and unit definitions for the SEPs are mandatory. This format meets the data collection requirements of the elemental costing system.

Questionnaire (to be completed by the Consultant)

For completed capital works projects the Consultant shall complete the following questionnaire. Example answers are included for guidance on the level of detail required. Blank forms in Word format are available - <https://www.nzta.govt.nz/assets/resources/cost-estimation-manual/docs/sm014-appendix-b2-elemental-cost-questionnaire.dotx>

Item	Description	Response
1	Project Name	SH5 Tapapa Curves
2	Waka Kotahi Project Manager name and contact details	<<Name>> <<Ph >> <<email address>>
3	Engineering consultant's name and contact details	<<Name>> <<Ph >> <<email address>>
4	Contractor's name & Project Manager contact details	<<Contractor>> <<Name>> <<Ph >> <<email address>>
5	Procurement method for physical works (e.g. M&V, LS, D&C, Alliance)	Measure and Value
6	Start & finish dates of Project Development phase	Start Finish
7	Start & finish dates of Pre-implementation phase	Start Finish September 2003
8	Start & finish dates of Implementation phase	Start October 2003 Finish June 2006
9	Cost of Project Development	\$40,000
10	Cost of Pre-implementation	\$90,000
11	Cost of Implementation	\$350,000
12	Type of project (e.g. four lane motorway, rural realignment, four laning, bridge replacement, or bypass)	Rural realignment
13	More detailed description of project - such as could be found in a design report, resource consent application, tender document overview.	Major realignment to the south of the existing SH5 alignment to remove all substandard curves, a new bridge across the Waimakariri Stream, extending SH28 by 790m and providing a 1.1km passing lane to the east of the SH28 intersection.

14	Copies of general arrangement and other key drawings (e.g. for major structures). Enough to measure bridge deck area, exposed area of retaining walls, seal area and earthworks volume, if these measurements have not been provided elsewhere (such as in the payment schedule).	Refer payment schedule
15	Project length overall (excluding side roads and accommodation works)	4100m
16	Total lane length	9300m
17	Terrain description (e.g. urban or rural, topography – coastal, hilly flat, river crossings)	Rural, hilly, one river crossing (Waimakariri Stream)
18	Physical works contract programme details – contractual start & completion dates, key milestones, extensions of time granted, actual completion date.	Contractual start date: November 2003 Contractual finish date: July 2005 Actual start date: January 2004 Practical completion: March 2006 Extensions granted due to wet weather and scope changes
19	Ground conditions / nature of materials description.	Sensitive material in main fill (approx. 300,000m ³).
20	Quantities for bulk excavation in each of the following categories: Other Than Rock, R1, R2 and greater than R2.	Other Than Rock: 345,000 m ³
21	Brief description of construction methodology in relation to earthworks (e.g. motor scrapers for bulk cut to fill, D8 dozer to rip rock, dried with discs, no lime added)	Motor scrapers, excavators and moxy dump trucks for earthworks. Compacted at natural water content. Cement stabilised subgrade.
22	Brief description of unusual construction methodology for any significant part of the works	n/a
23	Describe all major bridges (e.g. piling, foundations, span, type of superstructure, deck area, barriers, construction method).	35m single span, concrete pile foundations, 35m precast concrete I-beams, deck area 350m ² , guardrail and terminals test level 3
24	Describe all major retaining walls (e.g. type, exposed surface area, piling, aesthetic features).	Bridge: concrete crib retaining walls, 170m ²

25	Describe all major culverts (e.g. length, diameter, depth, type, special backfill).	Class X culverts: 375mm: 1406m 450mm: 350m 525mm: 145m 750mm Class 1.25Z with HS2 bedding: 78m
26	Describe any other major structures	n/a
27	Describe pavement details (make-up of pavement by type and total area receiving paving)	150mm TNZ M/4 AP40 basecourse, 150mm GAP65 subbase, 400mm cement stabilised subgrade improvement layer, total pavement area 48,440m ² chipseal (Grade 2/4), 1,400m ² SMA
28	Describe the traffic management extent and requirements	Comprehensive and varied traffic management from hazard warnings for trucks working adjacent to the road, to road closure with detours in place.
29	Describe any other special requirements (e.g. urban design, archaeological, environmental)	Comprehensive environmental management plan to protect 'pristine' Waimakariri Stream; extensive sedimentation pond system and in-stream suspended solids monitoring
30	Provide copy of accepted tender priced schedule (preferably in Microsoft Excel format)	Attached
31	Provide copy of final payment certificate and payment schedule (preferably in Microsoft Excel format)	Attached
32	Describe reasons for major differences between tender price and actual cost (e.g. Waka Kotahi induced work scope creep, Schedule of Quantities adjustments, other variations)	Combination of scope creep, quantity adjustments and other variations.
33	Provide outline of any major variations (e.g. major utility relocation, major unforeseen ground conditions)	Increase in quantity >\$300,000 for cement stabilisation of unsuitable subgrade Increase in traffic management >\$100,000 No other variations >\$100,000

34	Describe the risks identified pre-construction that did occur	n/a
35	Did contractor share an unusual proportion of the risk eg associated with delivery model (PPP, Alliance risk allocation, D&C) or specific risk allocation. If so, explain.	n/a
36	Details of any extraordinary costs (significant non-roading expenses, e.g. rock avalanche cover, rail bridges, tunnels, level crossings)	n/a
37	The above information was supplied by (name & date)	<<Name>> <<Date>>

Schedule of Elemental Prices (SEP)

Item	Description	Quantity	Unit	Composite Rate	Amount
1	Development (non-construction costs) ²				
1	Project Development		%		
2	Pre-implementation		%		
3	Implementation		%		
Development Total					
4	Physical Works				
4.1	Environmental compliance		km		
4.2	Earthworks		m ³		
4.3	Ground improvements		m ²		
4.4	Drainage		km		
4.5	Pavement and surfacing		m ²		
4.6.	Bridge(s) / structure (s)		m2		
4.7	Retaining walls		m2		
4.8	Traffic services		km		
4.9	Utility services		km		
4.10	Landscaping		km		
4.11	Traffic management		km		
Construction subtotal (excluding P&G)					
4.12	Preliminaries and general		%		
Construction Total (Including P&G)					
5	Extraordinary project costs				
5.1	Extraordinary costs (to be detailed in full)		%		
Extraordinary Project Costs					

² Development costs exclude land purchase. This information shall be obtained from the Waka Kotahi Transport Property team.

Unit Definitions

1	Development (Non-Construction Costs)	
1.1	<p>Project Development:</p> <p>Percentage of implementation total including Preliminaries and General.</p> <p>The amount entered in the quantity column shall be the Implementation Total, including Preliminaries and General Items and including Extraordinary Project Costs.</p>	%
1.2	<p>Pre-implementation:</p> <p>Percentage of implementation total including Preliminaries and General.</p> <p>The amount entered in the quantity column shall be the Implementation Total, including Preliminaries and General Items and including Extraordinary Project Costs.</p>	%
1.3	<p>Implementation:</p> <p>Percentage of implementation total including Preliminaries and General.</p> <p>The amount entered in the quantity column shall be the Implementation Total, including Preliminaries and General Items and including Extraordinary Project Costs.</p>	%
2	Construction	
2.1	<p>Environmental compliance:</p> <p>Project length excluding side roads and accommodation works.</p>	km
2.2	<p>Earthworks:</p> <p>The greater of either a) or b):</p> <p>a) Total M3 of cut material + borrow material + imported material</p> <p>b) Total M3 of fill material + cut to waste</p> <p><i>Note: The volume of cut and borrow material shall be measured in the cut. The volume of fill and imported material shall be measured in the fill. Quantity excludes multiple handling. Any material that is double handled, for example, preloading shall only be included once in the quantity measured.</i></p>	m ³
2.3	<p>Ground improvements:</p> <p>Square metre area of ground being treated. In the case of dewatering boreholes an assessment shall be made of the area being treated.</p>	m ²
2.4	<p>Drainage:</p> <p>Project length excluding side roads and accommodation works.</p> <p><i>Note: For multi-laned projects the total lane km shall also be recorded separately.</i></p>	km
2.5	<p>Pavement and surfacing:</p> <p>Total m² of surfaced quantity width, for example width of seal or A/C multiplied by length (centre line of carriageway).</p>	m ²
2.6	<p>Bridge(s):</p> <p>Area calculation: length between abutment expansion joints, multiplied by width between inner faces of edge protection, or joint with existing structure, if widening.</p>	m ²
2.7	<p>Retaining walls:</p> <p>Total m² of exposed retaining wall surface area.</p>	m ²
2.8	<p>Traffic services:</p> <p>Project length excluding side roads and accommodation works.</p> <p><i>Note: For multi-laned projects the total lane km shall also be recorded separately.</i></p>	km

2.9	Service relocations/protection: Project length excluding side roads and accommodation works. <i>Note: For multi-laned projects the total lane km shall also be recorded separately.</i>	km
2.10	Landscaping: Project length excluding side roads and accommodation works. <i>Note: For multi-laned projects the total lane km shall also be recorded separately.</i>	km
2.11	Traffic management: Project length excluding side roads and accommodation works. <i>For multi-laned projects the total lane km shall also be recorded separately.</i>	km
2.12	Preliminaries and general: Percentage of construction cost excluding Preliminaries and General. The amount entered in the quantity column shall be the Construction Total, excluding development items, excluding Preliminaries and General Items and including Extraordinary Project Costs.	%
3	Extraordinary non construction costs	
Percentage of construction cost including Preliminaries and General. The amount entered in the quantity column shall be the Construction Total, excluding development items, including Preliminaries and General Items.		

Elemental Breakdown for Physical Works Form

Note: Where escalation is required to be included in the tender price, this should be included within the Preliminaries and General item.

Project Name			
Elemental Breakdown of Costs			
Item	Description	Sub-Element Totals	Element Totals
1	Professional Services		
1.1	Project Development Phase Fees		\$
	Waka Kotahi managed costs (refer Appendix C Form G)	\$	
1.1.1	- Reviews	\$	
1.1.2	- Investigations	\$	
1.1.3	- Third party physical works	\$	
1.1.4	- Communications and engagement	\$	
1.1.5	- Third party professional services	\$	
1.1.6	- Consenting	\$	
1.1.7	- Waka Kotahi internal costs	\$	
1.1.8	- Post construction (monitoring) costs	\$	
1.1.9	- Miscellaneous	\$	
1.2	Consultancy Fees (refer Appendix C Form I)	\$	
1.2.1	- Contract Scope and Contract Management	\$	
1.2.2	- Business Case	\$	
2	Pre- implementation Phase Fees		\$
2.1	Waka Kotahi managed costs (refer Appendix C Form G)	\$	
2.1.1	- Reviews	\$	
2.1.2	- Investigations	\$	
2.1.3	- Third party physical works	\$	
2.1.4	- Communications and engagement	\$	
2.1.5	- Third party professional services	\$	
2.1.6	- Consenting	\$	
2.1.7	- Post construction (monitoring) costs	\$	
2.1.8	- Miscellaneous	\$	
2.2	Consultancy Fees (refer Appendix C Form I)	\$	
2.2.1	- Contract Scope and Contract Management	\$	
2.2.2	- Communications and engagement	\$	
2.2.3	- Geotech including investigations and testing	\$	
2.2.4	- Survey	\$	
2.2.5	- Design	\$	
2.2.6	- Statutory applications	\$	
2.2.7	- Property acquisition management	\$	
2.2.8	- Tender documentation	\$	
3	Implementation Phase fees		\$
3.1	Waka Kotahi managed costs (refer Appendix C Form G)	\$	
3.1.1	- Reviews	\$	
3.1.2	- Investigations	\$	
3.1.3	- Third party physical works	\$	
3.1.4	- Communications and engagement	\$	
3.1.5	- Third party professional services	\$	
3.1.6	- Consenting	\$	
3.1.7	- Waka Kotahi internal costs	\$	
3.1.8	- Post construction (monitoring) costs	\$	
3.1.9	- Miscellaneous	\$	

3.2	Consultancy Fees (refer Appendix C Form I)		\$	
3.2.1	- Contract scope and Contract management	\$		
3.2.2	- Tender administration and evaluation	\$		
3.2.3	- Management and surveillance of the physical works	\$		
3.2.4	- Random verification testing	\$		
4	Physical Works			
4.1	Environmental Compliance			\$
4.1.1	Management of environmental compliance requirements		\$	
4.1.2	Preparation and management of compliance managements plans		\$	
4.1.3	Construct permanent erosion and sediment control measures, maintenance and monitoring		\$	
4.1.4	Noise attenuation		\$	
4.1.5	Stormwater treatment		\$	
4.1.6	Bunds		\$	
4.2	Earthworks			\$
4.2.1	Site clearance - greenfield such as small trees, shrubs, hedging etc.		\$	
4.2.2	Demolition - building demolition, structures, fences, retaining walls, utility services, stormwater pipe, manholes, cesspits, surfacing, kerbs, lights, signs, temporary works etc.		\$	
4.2.3	Temporary fencing		\$	
4.2.4	Topsoil stripping,		\$	
4.2.5	Cut to fill,		\$	
4.2.6	Cut to waste,		\$	
4.2.7	Borrow to fill		\$	
4.2.8	Imported fill		\$	
4.2.9	Undercutting soft spots		\$	
4.2.10	Excavation in rock (state types)		\$	
4.2.11	Conditioning of cut and/or fill materials		\$	
4.2.12	Preloading, additional preload materials, settlement monitoring and removal of preload materials		\$	
4.2.13	Respreading topsoil		\$	
4.2.14	Imported topsoil		\$	
4.2.15	Reclamation works		\$	
4.2.16	Foreshore works		\$	
4.2.17	Temporary earthworks		\$	
4.2.18	Temporary haul roads		\$	
4.2.19	Construct, maintain & remove temporary sediment control measures, temporary sediment control ponds, including temporary hydroseeding, rock check dams, silt fencing		\$	
4.2.20	Dust control including water supply		\$	
4.2.21	Archaeological treatment/mitigation works		\$	
4.3	Ground Improvements			\$
4.3.1	Site decontamination (removal/treatment of managed, contaminated, hazardous materials etc.)		\$	
4.3.2	Ground improvement (e.g. drainage blankets, wick drains geotextiles, stone columns, deep soil mixing)		\$	
4.3.3	Geotechnical monitoring (inclinometers, piezometers)		\$	
4.3.4	Dewatering bores, buttress drains		\$	
4.3.5	Temporary works associated with ground improvements		\$	
4.4	Drainage			\$
4.4.1	Network stormwater drainage		\$	
4.4.2	Stream works including temporary stream diversions		\$	
4.4.3	Culverts including headwalls, chambers and rip- rap		\$	
4.2	Subsoil and pavement drains		\$	
4.3	Surface water channel		\$	
4.4	Erosion control		\$	
4.5	Flumes		\$	
4.6	Rain gardens		\$	
4.7	Permanent ponds		\$	
4.8	Wetlands		\$	
4.9	Grassed swales		\$	
4.10	Treatment devices		\$	

4.5	Pavement and Surfacing		\$
4.5.1	Subgrade stabilisation/improvement (aggregate, lime or cement)	\$	
4.5.2	Subgrade preparation and testing	\$	
4.5.3	Sub- basecourse including improvement (lime, cement)	\$	
4.5.3	Base course including improvement (lime, cement)	\$	
4.5.4	Kerbing/edge strip	\$	
4.5.5	Concrete pavements	\$	
4.5.6	Surfacing (chip seal, asphaltic concrete, Stone Mastic Asphalt, deep lift asphalt, OGPA)	\$	
4.5.7	Upgrade existing carriageway(s)	\$	
4.5.8	Saw cutting	\$	
4.5.9	Joints	\$	
4.5.10	Scarifying	\$	
4.5.11	Ancillary roadworks	\$	
4.6	Bridges		\$
4.6.1	Substructure (includes piling, foundations, piers, abutments and bearings)	\$	
4.6.2	Superstructure, (includes beams, finishing, tensioning, waterproofing, expansion joints, edge protection and graffiti guard)	\$	
4.6.3	Temporary works in association with bridge construction (launching gantry, access platform)	\$	
4.6.4	Underpasses	\$	
4.6.5	Rip- rap scour protection to abutments	\$	
4.7	Retaining Walls		\$
4.7.1	Soldier pile walls (timber, steel, concrete piles)	\$	
4.7.2	Tied back walls, including ground anchors, tiebacks	\$	
4.7.3	Gravity walls (gabion, crib, mass block)	\$	
4.7.4	Mechanically stabilised earth (MSE) walling	\$	
4.7.5	Backfill behind retaining walls where the estimator is to consider the provisions included in the earthworks element and allow extra for special materials and/or placement requirements behind retaining walls).	\$	
4.7.6	Diaphragm walling	\$	
4.7.7	Precast concrete facing panels	\$	
4.7.8	Drainage in association with retaining walls	\$	
4.7.9	Temporary works associated with retaining walls.	\$	
4.8	Traffic Services		\$
4.8.1	Barrier (wire/concrete median barrier and verge barrier)	\$	
4.8.2	Pavement markings, pavement markers	\$	
4.8.3	Road signs, gantries	\$	
4.8.4	Traffic signals	\$	
4.8.5	Marker posts	\$	
4.8.6	Lighting	\$	
4.8.7	Emergency cross- overs and phones	\$	
4.8.8	Variable Message Signs	\$	
4.8.9	Intelligent Traffic Signals/ATMS.	\$	
4.8.10	Bus/cycleway green paint marking	\$	
4.8.11	Guardrails	\$	
4.8.12	Leading and trailing end terminals	\$	
4.8.13	Crash cushions	\$	
4.9	Utility Services		\$
4.9.1	Waka Kotahi cost of all local authority and utility companies (after cost share) and contractors on costs	\$	
4.9.2	Civil works associated with utility services such as trenching, duct installation	\$	
4.9.3	Temporary works associated with utility services	\$	

4.10	Landscaping & Urban design		\$
4.10.1	Landscaping (aesthetic and environmental)	\$	
4.10.2	Grassing, hydroseeding, planting, revegetation, mulch	\$	
4.10.3	Architecture	\$	
4.10.4	Fencing	\$	
4.10.5	Streetscaping	\$	
4.10.6	Land accommodation costs (also refer to project property cost funding)	\$	
4.10.7	Footpaths and cycleway	\$	
4.10.8	Building relocations	\$	
4.10.9	Traffic islands	\$	
4.10.10	Pram crossings with kerb and tactile pavers	\$	
4.10.11	Urban design features to bridges, structures, barriers, retaining walls etc.	\$	
4.11	Traffic Management		\$
4.11.1	Temporary traffic diversions	\$	
4.11.2	Traffic management physical works costs	\$	
4.11.3	Temporary roads	\$	
4.12	Preliminary and General		\$
4.12.1	Establishment, temporary accommodation, clean up, disestablishment and other site operating costs	\$	
4.12.2	Contractor's supervision, on site staffing, prescribed specialists and other time related costs.	\$	
4.12.3	Contractor insurances, bonds, warranties/guarantees, as-built requirement plans and other non time-related costs.	\$	
4.12.4	Temporary works design and traffic management planning	\$	
4.12.5	Project plans, including quality assurance, traffic management plans, environmental management plans, programming and reporting, consent fees, stakeholder management, health and safety, security management, contractor's escrow tender documents	\$	
4.12.6	Contractor costs associated with stakeholder and public engagement		
4.12.7	Network maintenance	\$	
4.12.8	QA systems	\$	
4.12.9	Testing		
5	Extraordinary Construction Costs		\$
5.1	Extraordinary costs may include special items such as rock avalanche cover, tunnels, rail bridges, rail level crossings, mine hazard mitigation i.e. this item is for significant non-roading expenses. <i>Note: This is not for miscellaneous items</i>	\$	
Base Estimate			\$

Date estimate prepared	Base Date (Qtr-year)
Estimate prepared by	Signed
Estimate internal peer review by	Signed
Estimate external peer review by	Signed
Estimate accepted by Waka Kotahi project manager	Signed

Note: These costs are exclusive of GST.

APPENDIX C: ESTIMATE SUMMARY REPORTING FORMS

Project Estimate - Form A				
Project Name:		PBE		
Programme Business Case Estimate				
Item	Description	Base Estimate	Contingency	Funding Risk Contingency
A	Total Property Cost			
	Project Development Phase			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
B	Total Project Development			
	Pre-implementation Phase			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
C	Total Pre-implementation			
	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
	Sub Total Base Implementation Fees			
	Physical Works			
1	Environmental Compliance			
2	Earthworks			
3	Ground Improvements			
4	Drainage			
5	Pavement and Surfacing			
6	Bridges			
7	Retaining Walls			
8	Traffic Services			
9	Utility Services			
10	Landscaping			
11	Traffic Management			
12	Preliminary and General			
13	Extraordinary Construction Costs			
	SubTotal Base Physical Works			
D	Total for Implementation Phase			
E	Project Base Estimate (A+B)			
	Project Base Estimate (rounded)			
F	Contingency (Assessed/Analysed) (A+B+C+D)			
G	Project Expected Estimate (E+F)			
	Project Expected Estimate (rounded)			
	Total Property Cost Expected Estimate			
	Project Development Phase Expected Estimate			
	Pre-implementation Phase Expected Estimate			
	Implementation Phase Expected Estimate			
H	Funding Risk Contingency (Assessed/Analysed) (A+B+C+D)			
I	95th percentile Project Estimate (G+H)			
	95th percentile Project Estimate (rounded)			
	Total Property Cost 95th percentile Estimate			
	Project Development Phase 95th percentile Estimate			
	Pre-implementation Phase 95th percentile Estimate			
	Implementation Phase 95th percentile Estimate			

Date estimate prepared	Base Date (Qtr-year)
Estimate prepared by	Signed
Estimate internal peer review by	Signed
Estimate external peer review by	Signed
Estimate accepted by Waka Kotahi project manager	Signed

Note: (1) These estimates are exclusive of escalation and GST.
 (2) Refer to Section 6.6 for guidance on rounding.

Project Estimate - Form B				
Project Name:		Indicative Business Case Estimate		
Item	Description	Base Estimate	Contingency	Funding Risk Contingency
A	Total Property Cost			
	Project Development Phase			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
B	Total Project Development			
	Pre-Implementation Phase			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
C	Total Pre-implementation			
	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
	Sub Total Base Implementation Fees			
	Physical Works			
1	Environmental Compliance			
2	Earthworks			
3	Ground Improvements			
4	Drainage			
5	Pavement and Surfacing			
6	Bridges			
7	Retaining Walls			
8	Traffic Services			
9	Utility Services			
10	Landscaping			
11	Traffic Management			
12	Preliminary and General			
13	Extraordinary Construction Costs			
	Sub Total Base Physical Works			
D	Total for Implementation Phase			
E	Project Base Estimate (A+B+C)			
	Project Base Estimate (rounded)			
F	Contingency (Assessed/Analysed) (A+B+C+D)			
G	Project Expected Estimate (E+F)			
	Project Expected Estimate (rounded)			
	Total Property Cost Expected Estimate			
	Project Development Phase Expected Estimate			
	Pre-implementation phase Expected Estimate			
	Implementation Phase Expected Estimate			
H	Funding Risk Contingency (Assessed/Analysed) (A+B+C+D)			
I	95th percentile Project Estimate (G+H)			
	95th percentile Project Estimate (rounded)			
	Total Property Cost 95th percentile Estimate			
	Project Development Phase 95th percentile Estimate			
	Pre-implementation Phase 95th percentile Estimate			
	Implementation Phase 95th percentile Estimate			

Date estimate prepared	Base Date (Qtr-year)
Estimate prepared by	Signed
Estimate internal peer review by	Signed
Estimate external peer review by	Signed
Estimate accepted by Waka Kotahi project manager	Signed

Note: (1) These estimates are exclusive of escalation and GST.
 (2) Refer to Section 6.6 for guidance on rounding.

Project Estimate - Form C				DBE	
Project Name:				Detailed Business Case Estimate	
Item	Description	Base Estimate	Contingency	Funding Risk Contingency	
A	Property Purchase and Compensation Costs				
	Property Owner Accommodation Works				
	Property Consultancy Fees				
	Total Property Cost				
B	Project Development Phase				
	- Consultancy Fees	Nil	Nil	Nil	
	- Waka Kotahi Managed Costs	Nil	Nil	Nil	
	Total Project Development	Nil	Nil	Nil	
C	Pre-implementation Phase				
	- Consultancy Fees				
	- Waka Kotahi Managed Costs (Form G)				
	Total Pre-implementation				
D	Implementation Phase				
	Implementation Fees				
	- Consultancy Fees				
	- Waka Kotahi Managed Costs (Form G)				
	- Alliance IPAA				
	Sub Total Base Implementation Fees				
	Physical Works				
	1 Environmental Compliance				
	2 Earthworks				
	3 Ground Improvements				
	4 Drainage				
	5 Pavement and Surfacing				
	6 Bridges				
	7 Retaining Walls				
	8 Traffic Services				
	9 Utility Services				
	10 Landscaping				
	11 Traffic Management				
	12 Preliminary and General Contractor's design and construction phase services (U&L, L&I and Alliances only)				
	13 Extraordinary Construction Costs				
Sub Total Base Physical works					
Total for Implementation Phase					
E	Project Base Estimate				
	Project Base Estimate (rounded)				
F	Contingency (Assessed/Analysed)	(A+C+D)			
G	Project Expected Estimate	(E+F)			
	Project Expected Estimate (rounded)				
	Total Property Cost Expected Estimate				
	Project Development Phase Expected Estimate		Nil		
	Pre-implementation Phase Expected Estimate				
	Implementation Phase Expected Estimate				
H	Funding Risk Contingency (Assessed/Analysed)	(A+C+D)			
I	95th percentile Project Estimate	(G+H)			
	95th percentile Project Estimate (rounded)				
	Total Property Cost 95th percentile Estimate				
	Project Development Phase 95th percentile Estimate		Nil		
	Pre-implementation Phase 95th percentile Estimate				
	Implementation Phase 95th percentile Estimate				
Date estimate prepared		Base Date (Qtr-year)			
Estimate prepared by		Signed			
Estimate internal peer review by		Signed			
Estimate external peer review by		Signed			
Estimate accepted by Waka Kotahi project manager		Signed			

- Note:**
- (1) These estimates are exclusive of escalation and GST.
 - (2) Project Development Phase Estimates are set to Nil as these are now sunk costs.
 - (3) Include Project Phase Funding Application Assessment Forms 2 and 4 with the DBE.
 - (4) Margin for Implementation Phase IPAA & PAA costs is included within the Physical Works item.
 - (5) Refer to Section 6.6 for guidance on rounding.

Project Estimate - Form D				PE1
Project Name:				Pre-Implementation Estimate 1
Item	Description	Base Estimate	Contingency	Funding Risk Contingency
A	Property Purchase and Compensation Costs			
	Property Owner Accommodation Works			
	Property Consultancy Fees			
	Total Property Cost			
B	Project Development Phase			
	- Consultancy Fees	Nil	Nil	Nil
	- Waka Kotahi Managed Costs	Nil	Nil	Nil
	Total Project Development	Nil	Nil	Nil
C	Pre-implementation Phase			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
	Total Pre-implementation			
D	Implementation			
	Implementation Fees			
	- Consultancy Fees			
	- Waka Kotahi Managed Costs (Form G)			
	- Alliance IPAA			
	Sub Total Base Implementation Fees			
	Physical Works			
	1 Environmental Compliance			
	2 Earthworks			
	3 Ground Improvements			
	4 Drainage			
	5 Pavement and Surfacing			
	6 Bridges			
	7 Retaining Walls			
	8 Traffic Services			
9 Utility Services				
10 Landscaping				
11 Traffic Management				
12 Preliminary and General Contractor's design and construction phase services (U&L, ECI and Alliances only)				
12A				
13 Extraordinary Construction Costs				
	Sub Total Base Physical Works			
	Total for Implementation Phase			
E	Project Base Estimate			
	Project Base Estimate (rounded)			
F	Contingency (Assessed/Analysed)	(A+C+D)		
G	Project Expected Estimate	(E+F)		
	Project Expected Estimate (rounded)			
	Total Property Cost Expected Estimate			
	Project Development Phase Expected Estimate		Nil	
	Pre-implementation Phase Expected Estimate			
	Implementation Phase Expected Estimate			
H	Funding Risk Contingency (Assessed/Analysed)	(A+C+D)		
I	95th percentile Project Estimate	(G+H)		
	95th percentile Project Estimate (rounded)			
	Total Property Cost 95th percentile Estimate			
	Project Development Phase 95th percentile Estimate		Nil	
	Pre-implementation Phase 95th percentile Estimate			
	Implementation Phase 95th percentile Estimate			
Date estimate prepared		Base Date (Qtr-year)		
Estimate prepared by		Signed		
Estimate internal peer review by		Signed		
Estimate external peer review by		Signed		
Estimate accepted by Waka Kotahi project manager		Signed		

Note: (1) These estimates are exclusive of escalation and GST.
 (2) Project Development Phase Estimates are set to Nil as these are now sunk costs.
 (3) Margin for Implementation Phase IPAA & PAA costs is included within the Physical Works item.
 (5) Refer to Section 6.6 for guidance on rounding.

Project Estimate - Form E				PE2	
Project Name:				Pre-implementation Estimate 2	
Item	Description	Base Estimate	Contingency	Funding Risk Contingency	
A	Property Purchase and Compensation Costs				
	Property Owner Accommodation Works				
	Property Consultancy Fees				
	Total Property Cost				
B	Project Development Phase				
	- Consultancy Fees	Nil	Nil	Nil	
	- Waka Kotahi Managed Costs	Nil	Nil	Nil	
	Total Project Development	Nil	Nil	Nil	
C	Pre-implementation Phase				
	- Consultancy Fees	Nil	Nil	Nil	
	- Waka Kotahi Managed Costs	Nil	Nil	Nil	
	Total Pre-implementation	Nil	Nil	Nil	
D	Implementation Phase				
	Implementation Fees				
	- Consultancy Fees				
	- Waka Kotahi Managed Costs (Form G)				
	- Alliance IPAA				
	Sub Total Base Implementation Fees				
	Physical Works				
	1 Environmental Compliance				
	2 Earthworks				
	3 Ground Improvements				
	4 Drainage				
	5 Pavement and Surfacing				
	6 Bridges				
	7 Retaining Walls				
8 Traffic Services					
9 Utility Services					
10 Landscaping					
11 Traffic Management					
12 Preliminary and General					
12A Contractor's design and construction phase services (UR&L, ECI and Alliances only)					
13 Extraordinary Construction Costs					
Sub Total Base Physical Works					
Total for Implementation Phase					
E	Project Base Estimate				
	Project Base Estimate (rounded)				
F	Contingency (Assessed/Analysed)	(A+D)			
G	Project Expected Estimate	(E+F)			
	Project Expected Estimate (rounded)				
	Total Property Cost Expected Estimate				
	Project Development Phase Expected Estimate		Nil		
	Pre-implementation Phase Expected Estimate		Nil		
	Implementation Phase Expected Estimate				
H	Funding Risk Contingency (Assessed/Analysed)	(A+D)			
I	95th percentile Project Estimate	(G+H)			
	95th percentile Project Estimate (rounded)				
	Total Property Cost 95th percentile Estimate				
	Project Development Phase 95th percentile Estimate		Nil		
	Pre-implementation Phase 95th percentile Estimate		Nil		
	Implementation Phase 95th percentile Estimate				
Date estimate prepared		Base Date (Qtr-year)			
Estimate prepared by		Signed			
Estimate internal peer review by		Signed			
Estimate external peer review by		Signed			
Estimate accepted by Waka Kotahi project manager		Signed			

Note: (1) These estimates are exclusive of escalation and GST.
 (2) Project Development and Pre-implementation Phase Estimates are set to Nil as these are now sunk costs.
 (3) Include a Project Phase Funding Application Assessment Form D3 with the PE2.
 (4) Margin for Implementation Phase IPAA & PAA costs is included within the Physical Works item.
 (5) Refer to Section 6.6 for guidance on rounding.

Project Estimate - Form F				IE	
Project Name:				Implementation Estimate	
Item	Description	Base Estimate	Contingency	Funding Risk Contingency	
A	Property Purchase and Compensation Costs				
	Property Owner Accommodation Works				
	Property Consultancy Fees				
	Total Property Cost				
B	Project Development Phase				
	- Consultancy Fees	Nil	Nil	Nil	
	- Waka Kotahi Managed Costs (Form G)	Nil	Nil	Nil	
	Total Project Development	Nil	Nil	Nil	
C	Pre-implementation Phase				
	- Consultancy Fees	Nil	Nil	Nil	
	- Waka Kotahi Managed Costs (Form G)	Nil	Nil	Nil	
	Total Pre-implementation	Nil	Nil	Nil	
D	Implementation Phase				
	Implementation Fees				
	- Consultancy Fees				
	- Waka Kotahi Managed Costs (Form G)				
	- Alliance IPAA				
	Sub Total Base Implementation Fees				
	Physical Works				
	1 Environmental Compliance				
	2 Earthworks				
	3 Ground Improvements				
	4 Drainage				
	5 Pavement and Surfacing				
	6 Bridges				
	7 Retaining Walls				
8 Traffic Services					
9 Utility Services					
10 Landscaping					
11 Traffic Management					
12 Preliminary and General Contractor's design and construction phase services (U&U, E&I and Alliances only)					
12A					
13 Extraordinary Construction Costs					
Sub Total Base Physical Works					
Total for Implementation Phase					
E	Project Base Estimate				
	Project Base Estimate (rounded)				
F	Contingency (Assessed/Analysed)	(A+D)			
G	Escalation				
H	Project Expected Estimate	(E+F+G)			
	Project Expected Estimate (rounded)				
	Total Property Cost Expected Estimate				
	Project Development Phase Expected Estimate		Nil		
	Pre-implementation Phase Expected Estimate		Nil		
	Implementation Phase Expected Estimate				
I	Funding Risk Contingency (Assessed/Analysed)	(A+D)			
J	Escalation				
K	35th percentile Project Estimate	(H+I+J)			
	35th percentile Project Estimate (rounded)				
	Total Property Cost 35th percentile Estimate				
	Project Development Phase 35th percentile Estimate		Nil		
	Pre-implementation Phase 35th percentile Estimate		Nil		
	Implementation Phase 35th percentile Estimate				
Date estimate prepared		Base Date (Qtr-year)			
Estimate prepared by		Signed			
Estimate internal peer review by		Signed			
Estimate external peer review by		Signed			
Estimate accepted by Waka Kotahi project manager		Signed			

Note: (1) This estimate is exclusive of GST.

(2) Project Development and Pre-implementation Phase Estimates are set to Nil as these are now sunk costs.

(3) Margin for Implementation Phase IPAA & PAA costs is included within the Physical Works item.

(4) Refer to Section 6.6 for guidance on rounding.

Waka Kotahi Managed Costs Assessment Form G					Pre-implementation			Implementation		
Project Name: _____					Project Development			Implementation		
Item	Description	Base Estimate	Contingency	Funding Risk Contingency	Base Estimate	Contingency	Funding Risk Contingency	Base Estimate	Contingency	Funding Risk Contingency
1	Review									
1.1	Economic Peer Review Costs									
1.2	Estimate Peer Review / Parallel Estimate									
1.3	Technical Peer Review (if not included in Consultancy Fees)									
1.4	Peer Review - Other (e.g. traffic model, flood model)									
1.5	Cost/benefit Ratio Cost									
1.6	OHM Review by Alliance or Bridge consultant									
1.7	Safety Audit									
1.8	Cultural Alliance Auditor									
2	Investigations (if not covered in Consultancy Fees or construction costs)									
2.1	Geotechnical Investigations									
2.2	Utility location including piling/boring									
2.3	Traffic management associated with investigations									
2.4	Pre-construction condition surveys									
2.5	Land survey (for geotechnical or other investigations)									
3	Third Party Physical Works									
3.1	Utility services (if not included in physical works)									
3.2	KiwiRail or other existing works									
4	Communications and Engagement									
4.1	CNE Disbursements (e.g. travel, accommodation, bus hire for site visits, and learning / opening ceremonies)									
4.2	CNE Call centre / printing costs									
4.3	Iwi Engagement									
4.4	Communications Consultant (project specific)									
5	Third Party Professional Services									
5.1	Procurement Support									
5.2	Pre-qualification advice and support (prior to commencement of acquisition) (following LRP approval)									
5.3	Utility investigations and Design									
5.4	KiwiRail investigations, Design, Peer Review									
5.5	Alliance Coaching									
5.6	Workshop Facilitation									
5.7	Specialist Advice (e.g. iwi, environmental, geotechnical)									
5.8	Legal Review (e.g. MOU, Alliance Agreements)									
5.9	Practical Auditor									
5.10	Independent Governance Representation									
5.11	Iwi Design									
5.12	Cultural Impact Assessments									
5.13	Project Management Support									
5.14	Iwi Construction Monitoring									
5.15	Engineer in Control									
5.16	Quality right									
6	Consulting									
6.1	Consult (Independent and learning fees)									
6.2	Environmental Consult / EPA Costs									
6.3	Legal Advice									
6.4	General Monitoring by Council									
6.5	Building Council Fees									
7	Post-construction Monitoring Costs									
7.1	Water Monitoring									
7.2	Traffic counts and/or speed surveys									
7.3	Other general conditions									
8	Miscellaneous Other Costs									
8.1	ISCA (calling fees if not covered in consultancy fees)									
8.2	MRUP Delivery Improvements (specific initiatives to be identified)									
8.3	Link 3 (Alliance only)									
8.4	Project specific insurance									
8.5	Travel related Project Payment									
8.6	Procurement Disbursements (e.g. travel, accommodation, bus hire for investigations, Alliance workshops)									
8.7	Catering for Meetings (e.g. PSC, workshops)									
8.8	Statutory compliance requirements and/or other credits									
8.9	Research costs									
	<i>Add any other specific items here</i>									
9	Waka Kotahi Internal Costs (including indirect and admin costs which are added in no Funding Application Form)									
9.1	Travel, subsistence and accommodation									
10	Base Estimate Waka Kotahi Managed Costs									
11	Contingency (Roundup/Rolled) Waka Kotahi Managed Costs									
12	Expected Estimate Waka Kotahi Managed Costs [A-D]									
13	Funding Risk Contingency (Roundup/Rolled) Waka Kotahi Managed Costs									
14	55th percentile Waka Kotahi Managed Costs [C-D]									
Date estimate prepared		Base Date [01st year]			Base Date [01st year]			Base Date [01st year]		
Estimate prepared by		Signed			Signed			Signed		
Estimate internal peer review by		Signed			Signed			Signed		
Estimate external peer review by		Signed			Signed			Signed		
Estimate accepted by Waka Kotahi project manager		Signed			Signed			Signed		

Note: [1] This estimate is exclusive of consultation and GST.

[2] These Waka Kotahi costs should be transferred to the relevant Estimate or Funding Application Form.

[3] Items to be considered as part of the contingency assessment are: phase relocation, potential for appeals in surveys, mediation services, additional reviews, additional internal / outsourced staff requirements.

Total Property Costs - Form H

Project Name:

Property Acquisition Reference	Property Requirements	Purchased	Property Interest Purchase Costs (A)	Property Compensation Costs (B)	Property Owner Accommodation Works (C)	Property Cost (A+B+C=D)
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
-	-	-				0
E	Property Consultancy Fees (E)		-	-	-	0
F	Base Estimate of Total Property Costs (D+E)					0
G	Contingency					
H	Expected Estimate of Total Property Costs (F+G)					0
I	Funding Risk Contingency					
J	95th Percentile Estimate of Total Property Costs (H+I)					0
Date estimate prepared			Acquisition phase mid-point date			
Estimate prepared by			Signed			
Estimate internal peer review by			Signed			
Estimate external peer review by			Signed			
Estimate accepted by Waka Kotahi property manager			Signed			

Note: These estimates are exclusive of GST.

Consultancy Fees Assessment Form I

Project Name:

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1.0	Project Development Phase Fees	0		
1.1	- Contract Scope and Contract Management <i>Including general, open days, newsletters, management plans, programmes, monthly meeting, risk management and monthly reporting (as per SMRS Contract Pricing Schedule items 1 and 2)</i>			
1.2	- Business Case <i>Including workbooks, alternative and option assessment, traffic modelling, preliminary technical assessment and business case report (as per SMRS Contract Pricing Schedule items 3, 4 and 11.2)</i>			
2.0	Pre-implementation Phase Fees (for D&C Section Pre-implementation)	0		
2.1	- Contract Scope and Contract Management <i>Including general, open days, newsletters, management plans, programmes, monthly meeting, risk management and monthly reporting (as per SMRS Contract Pricing Schedule items 1 and 2)</i>			
2.2	- Communications and engagement <i>(as per SMRS Contract Pricing Schedule item 11.1 and 11.10)</i>			
2.3	- Geotechnical including investigations and testing <i>(as per SMRS Contract Pricing Schedule items 5.1, 6, 9, 11.3 and 11.4)</i>			
2.4	- Survey <i>(as per SMRS Contract Pricing Schedule item 5.2)</i>			
2.5	- Design <i>Including general, safety in design review, drawing, U&D, design statements and design report (as per SMRS Contract Pricing Schedule items 5.3 and 11.9)</i>			
2.6	- Statutory applications <i>Including preparation of Notice of Requirement and resource consents, assessment of environmental effects, technical assessments, heritage applications, wildlife permits, cultural impact assessment and statutory authority hearing (as per SMRS Contract pricing Schedule item 5.4 and 11.5-11.8)</i>			
2.7	- Property acquisition management <i>(as per SMRS Contract Pricing Schedule item 5.5)</i>			
2.8	- Tender documentation <i>(as per SMRS Contract Pricing Schedule item 5.6)</i>			
3.0	Implementation (scope is either traditional MSQA or Principal's Technical Advisor)	0		
3.1	- Contract scope and Contract management <i>Including general, open days, newsletters, management plans, programmes, monthly meeting, risk management and monthly reporting (as per SMRS Contract Pricing Schedule items 1 and 2)</i>			
3.2	- Tender administration and evaluation <i>(as per SMRS Contract Pricing Schedule item 6.1)</i>			
3.3	- Management and surveillance of the physical works <i>Including general, meeting, as-built drawing, road construction information forms, asset owner's manual, bridge data forms and final construction report (as per SMRS Contract Pricing Schedule item 6.2 and 11.11)</i>			
3.4	- Property requirements <i>(as per SMRS Contract Pricing Schedule item 6.3)</i>			
3.5	- Random verification testing <i>(as per SMRS Contract Pricing Schedule item 6.4)</i>			
A	Base Estimate Consultancy Fees	0		
B	Contingency (Assessed/Analyzed) (Consultancy Fees)		0	
C	Expected Estimate (Consultancy Fees)	(A+B)	0	
D	Funding Risk Contingency (Assessed/Analyzed) (Consultancy Fees)			0
E	95th percentile (Consultancy Fees)		(C+D)	0

Date estimate prepared	Base Date (Qtr-year)
Estimate prepared by	Signed
Estimate internal peer review by	Signed
Estimate external peer review by	Signed
Estimate accepted by Waka Kotahi project manager	Signed

Note: (1) This estimate is exclusive of escalation and GST.

(2) These Consultancy Fees should be transferred to the relevant Estimate or Funding Application Form.

(3) Items to be considered as part of the contingency assessment are: phase elongation, potential for appeal to consents, mediation services, additional review.

APPENDIX D: FUNDING APPLICATION FORMS

Project Phase Funding Application Assessment Form 1

☐

 Pretender with Base
Contract Estimate

☐

 Post Tender with
Tender Price

 (Tick as
Appropriate)

Project Development

Project Name:

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1	Consultancy Fees			
1.1	Contract Scope			
1.2	Contract Management			
1.3	Business Case			
1.4	Geotechnical Testing Schedule			
1.5	Provisional Sums			
A	Base Consultancy Fees Contract Estimate / Tender Price			
B	Contingency (Assessed/Analysed) (Consultancy Fees)			
C	Expected Consultancy Fees Contract Estimate (A+B)			
D	Waka Kotahi Managed Costs (Form G)			
E	Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)			
F	Expected Estimate (Waka Kotahi Managed Costs) (D+E)			
G	Escalation (Expected)			
H	Expected Project Development Phase Estimate (C+F+G)			
I	Expected Project Development Phase Estimate i (H x %)			
J	Funding Risk Contingency (Assessed/Analysed) (Consultancy Fees)			
K	95th percentile Consultancy Fees Contract Estimate (C+J)			
L	Funding Risk Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)			
M	95th percentile Waka Kotahi Managed Costs (F+L)			
N	Escalation (95th percentile)			
O	95th percentile Project Development Phase Estimate (K+M+N)			
P	95th percentile Project Development Phase Estimate incl. Indirect (O x %)			
Date estimate prepared		Base Date (Qtr-year)		
Estimate prepared by		Signed		
Estimate internal peer review by		Signed		
Estimate external peer review by		Signed		
Estimate accepted by Waka Kotahi project manager		Signed		

Note: (1) These estimates are exclusive of GST.

(2) Base Contract Estimate (A) is displayed in SM030 Request for Tender. For multiple phase Professional Services contracts base the Base Contract Estimate is the sum of estimates for each phase (Refer Form 5)

(3) Once a tender price is available it is substituted for the Base Contract Estimate and the revised Expected Estimate is included in the tender evaluation report.

Project Phase Funding Application Assessment Form 2

☐

Pretender with Base Contract Estimate

☐

Post Tender with Tender Price

(Tick as Appropriate)

Pre-implementation

Project Name:

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1	Consultancy Fees			
1.1	Contract Scope and Contract Management			
1.2	Geotechnical Investigations			
1.3	Topographical Survey			
1.4	Design			
1.5	Statutory Applications			
1.6	Property Acquisition Management			
1.7	Tender Documentation			
1.8	Geotechnical Testing			
1.9	Provisional Sums			
A	Base Consultancy Fees Estimate / Tender Price			
B	Contingency (Assessed/Analysed) (Consultancy Fees)			
C	Expected Consultancy Fees Estimate (A+B)			
D	Waka Kotahi Managed Costs (from Form G)			
E	Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)			
F	Expected Estimate (Waka Kotahi Managed Costs) (D+E)			
G	Escalation (Expected)			
H	Expected Pre-implementation Phase Estimate (C+F+G)			
I	Expected Pre-implementation Phase Estimate incl. Indirect and Admin costs (H x %)			
J	Funding Risk Contingency (Assessed/Analysed) (Consultancy Fees)			
K	95th percentile Consultancy Fees Contract Estimate (C+J)			
L	Funding Risk Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)			
M	95th percentile Waka Kotahi Managed Costs (F+L)			
N	Escalation (95th percentile)			
O	95th percentile Pre-implementation Phase Estimate (K+M+N)			
P	95th percentile Pre-implementation Phase Estimate incl. Indirect and Admin costs (O x %)			

Date estimate prepared	Base Date (Qtr-year)
Estimate prepared by	Signed
Estimate internal peer review by	Signed
Estimate external peer review by	Signed
Estimate accepted by Waka Kotahi project manager	Signed

Note: (1) These estimates are exclusive of GST.

(2) Base Contract Estimate (A) is displayed in SM030 Request for Tender. For multiple phase Professional Services contracts, the Base Contract Estimate is the sum of estimates for each phase (Refer Form 5).

(3) Once a tender price is available it is substituted for the Base Contract Estimate and the revised Expected Estimate is included in the tender evaluation report.

Project Phase Funding Application Assessment Form 3


 Pretender with Base
Contract Estimate

 Post Tender with
Tender Price

(Tick as Appropriate)

Implementation
Project Name:

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1	Physical Works Contract			
1.1	Environmental compliance			
1.2	Earthworks			
1.3	Ground improvements			
1.4	Drainage			
1.5	Pavement surfacing			
1.6	Bridges			
1.7	Retaining walls			
1.8	Traffic services			
1.9	Utility Services			
1.10	Landscaping			
1.1	Traffic management			
1.1	Preliminary and general			
1.1	Extraordinary construction costs			
1.1	Alliance IPAA			
1.2	Contractor's design (D&C / ECI / Alliance only)			
A	Base Physical Works Contract Estimate / Tender Price			
B	Contingency (Assessed/Analysed) (Physical Works)			
C	Escalation (Physical Works)			
D	Expected Physical Works Estimate (A+B+C)			
2	Consultancy Fees			
2.1	Contract scope and contract management			
2.2	Tender administration and evaluation			
2.3	Management and surveillance of the physical works			
2.4	Property requirements			
2.5	Provisional Sums			
E	Base Consultancy Fees Contract Estimate / Tender Price			
F	Base Waka Kotahi Managed Costs (Form G)			
G	Base Consultancy Fees, Waka Kotahi Managed Costs (E+F)			
H	Contingency (Assessed/Analysed) (Consultancy Fees)			
I	Contingency (Assessed/Analysed) (Waka Kotahi Managed Costs)			
J	Escalation (Consultancy Fees, Waka Kotahi Managed Costs)			
K	Expected Consultancy Fees and Waka Kotahi Managed Costs Estimate (G+H+I+J)			
L	Expected Implementation Phase Estimate (D+K)			
M	Expected Implementation Phase Estimate incl (L x %)			
N	Funding Risk Contingency (Assessed/Analysed) (Physical Works)			
O	Escalation (Physical Works)			
P	95th percentile Physical Works Contract Estimate (D+N+O)			
Q	Funding Risk Contingency (Assessed/Analysed) (Consultancy Fees, Waka Kotahi Managed Costs)			
R	Escalation (Consultancy Fees, Waka Kotahi Managed Costs)			
S	95th percentile Consultancy Fees, Waka Kotahi Managed Costs (K+Q+R)			
T	95th percentile Implementation Phase Estimate (P+S)			
U	95th percentile Implementation Phase Estimate incl. Indirect and Admin costs (T x %)			
Date estimate prepared		Base Date (Qtr-year)		
Estimate prepared by		Signed		
Estimate internal peer review by		Signed		
Estimate external peer review by		Signed		
Estimate accepted by Waka Kotahi project manager		Signed		

Note: (1) These estimates are exclusive of GST.

(2) Base Contract Estimate (A) is displayed in SM031 Request for Tender.

(3) Base Contract Estimate (E) is displayed in SM030 Request for Tender. For multiple phase Professional Services contracts, the Base Contract Estimate is the sum of estimates for each phase (Refer Form 5).

(3) Once a tender price is available it is substituted for the Base Contract Estimate and the revised Expected Estimate is included in the tender evaluation report.

Project Phase Funding Application Assessment Form 4

Property

Project Name:

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
1	Property			
1.1	Property interest purchase costs (including market appreciation)			
1.2	Property owner accommodation costs			
1.3	Property compensation costs			
1.4	Property consultancy fees			
A	Base Property Estimate			
B	Contingency (Assessed/Analysed) (Property)			
C	Expected Property Phase Estimate (A+B)			
D	Expected Implementation Phase Estimate including Indirect and Admin costs (C x %)			
E	Funding Risk Contingency (Assessed/Analysed) (Property)			
F	95th percentile Property Phase Estimate (C+E)			
G	95th percentile Property Phase Estimate incl. Indirect and Admin costs (F x %)			
Date estimate prepared		Acquisition phase mid-point date		
Estimate prepared by		Signed		
Estimate internal peer review by		Signed		
Estimate external peer review by		Signed		
Estimate accepted by Waka Kotahi property manager		Signed		

Note: (1) These estimates are exclusive of GST.

(2) The Total Property Cost estimate includes provision for property market appreciation from the date the estimate was prepared through to the mid-point of the active acquisition phase for the project. This means that escalation should not be applied to the Total Property Cost estimate as this would essentially be 'double counting' and over-estimate those costs.

Professional Services Contract Estimate Summary Sheet

- Form 5

Project Name:

Tick Project Phases being Contracted:

☐

Project Development

☐

Pre-implementation

☐

Implementation

Phase	Base Contract Estimate	Contingency	Expected Contract Estimate	Funding Risk Contingency	95% Contract Estimate
		Escalation		Escalation	
Proj. Dev.					
Pre- Imp.					
Imp.					
TOTAL	\$ -		\$ -		\$ -

Note 1: Forms 1, 2 and 3 are used to calculate contract estimates and phase estimates for identified project phases. For multiple phase professional services contracts this form is used to summarise the contract estimate.

Note 2: The Total Base Contract Estimate is declared in the SM030 Request for Tender

Escalation Calculation Form 6

For non-property costs

Project Name:

Form completed by:

Use this form to show anticipated cashflow breakdown – to show estimated costs (expressed in Base Date dollars) expected to be incurred across time – and calculate escalation.

Date estimate prepared: Base Date (Qtr-year): Index used for physical works escalation calculation - see Note 3: Date escalation annual factors were copied from the Escalation annual factors file:

			Year 1 (Base Date year) See Note 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Project
Tag & Calculation Notes															
Project Development	Consultancy Fees - Base Estimate	A.													0
	Consultancy Fees - Contingency	B.													0
	Waka Kotahi - Base Estimate	C													0
	Waka Kotahi - Contingency	D													0
	Escalation (Expected)	E	0	0	0	0	0	0	0	0	0	0	0	0	0
	Consultancy Fees - Funding Risk Contingency	F													0
	Waka Kotahi - Funding Risk Contingency	G													0
	Escalation (95th percentile)	H	0	0	0	0	0	0	0	0	0	0	0	0	0
Expected Project Development Phase (Annual cashflow)			0	0	0	0	0	0	0	0	0	0	0	0	0
Pre-Implementation	Consultancy Fees - Base Estimate	A1.													0
	Consultancy Fees - Contingency	B1.													0
	Waka Kotahi - Base Estimate	C1													0
	Waka Kotahi - Contingency	D1													0
	Escalation (Expected)	E1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Consultancy Fees - Funding Risk Contingency	F1													0
	Waka Kotahi - Funding Risk Contingency	G1													0
	Escalation (95th percentile)	H1	0	0	0	0	0	0	0	0	0	0	0	0	0
Expected Pre-implementation Phase (Annual cashflow)			0	0	0	0	0	0	0	0	0	0	0	0	0
Implementation	Physical Works - Base Estimate	A2.													0
	Physical Works - Contingency	B2.													0
	Physical Works - Escalation (Expected)	C2.	0	0	0	0	0	0	0	0	0	0	0	0	0
	Consultancy Fees - Base Estimate														0
	Consultancy Fees - Contingency														0
	Waka Kotahi - Base Estimate														0
	Waka Kotahi - Contingency														0
	Waka Kotahi + Consultancy - Escalation (Expected)		0	0	0	0	0	0	0	0	0	0	0	0	0
	Physical Works - Funding Risk Contingency														0
	Physical Works - Escalation (95th percentile)		0	0	0	0	0	0	0	0	0	0	0	0	0
	Consultancy Fees - Funding Risk Contingency														0
	Consultancy Fees - Escalation (95th percentile)		0	0	0	0	0	0	0	0	0	0	0	0	0
	Waka Kotahi - Funding Risk Contingency														0
	Waka Kotahi - Escalation (95th percentile)		0	0	0	0	0	0	0	0	0	0	0	0	0
Expected Implementation Phase (Annual cashflow)			0	0	0	0	0	0	0	0	0	0	0	0	0

Escalation annual factors, shown in the two shaded rows below, are applied to the cashflow breakdown figures above to calculate the amount to be added for escalation. Refer further notes below.

Escalation annual factors from this row are applied to all fees costs - See Note 2	0.000	0.020	0.040	0.061	0.082	0.104	0.126	0.149	0.172	0.195	0.219	0.243
Escalation annual factors from this row are applied to physical works costs. Copy factors from the file 'Escalation annual factors' into this row - See Note 3												

The notes referred to in Form 6 are shown on the following page.

Notes to Form 6:

Note 1 - 'Year 1' is the Base Date year – the year ending 30 June in which the Base Date occurs. 'Year 2' is the following year ending 30 June, etc.

Note 2 - Escalation annual factors (shown in this row against 'Year 1', Year 2', etc) are applied to 'Fees', i.e. consultancy fees plus Waka Kotahi costs. The factors are based on an assumed constant inflation rate of 2% per annum

Note 3 - Escalation annual factor values, to be applied to 'Physical Works' costs, need to be added to the 'Year 1', Year 2', etc cells in this 'Escalation ... physical works' row. Annual factors calculated from Waka Kotahi escalation forecasts for physical works contract costs are found in the spreadsheet file 'Escalation annual factors' - refer link below. The Annual factor value for any given year will be taken from the table (the sheet) for the index appropriate to the work type and from the applicable 'Base Date' row. Note that the Escalation annual factors file is regularly updated as Waka Kotahi inflation forecasts are updated.

[Escalation annual factors](#)

Note 4 - The same Escalation annual factors are applied when estimating escalation for the 'Expected' (Base + Contingency) estimate components as the '95th percentile' (Funding Risk Contingency) components. Use of the same escalation annual factors for Expected and 95th percentile costs has been adopted as a simplifying assumption.

APPENDIX E: COST REPORTING AND CONTROL FORMS

Project scope definition

Project title			
Project manager		Project number	
Consultant		Team leader	
Subject			
Project phase			
Scope description			
Scope definition documents			
Scope definition agreement			
	Name	Date	Signature
Consultant team leader			
Waka Kotahi project manager			
Waka Kotahi project sponsor			

Cost Control Record Form

Project title				
Waka Kotahi project manager				
Consultant				
Scope change number		Date		
Reason for change		Change raised by		
Client instruction (C)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Revision of standards (S)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Other (O)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Detailed description of change and its effects				
Does this change affect the project outcomes and/or benefits?				
Mitigation measures considered				
Effects on project risk profile				
Assumptions made in cost estimate				
Estimate total		Estimate Base Date (Qtr-year)		
Estimate at initial estimate Base Date				

Project Cost Control Schedule

Project title	<input type="text"/>	Project number	<input type="text"/>
Project manager	<input type="text"/>	Consultant	<input type="text"/>

Initial estimate type	PBE <input type="checkbox"/>	IBE <input type="checkbox"/>	DBE <input type="checkbox"/>	PE1 <input type="checkbox"/>	PE2 <input type="checkbox"/>	Initial estimate value	<input type="text"/>
Base Date (Qtr-year)	<input type="text"/>						<input type="text"/>

Scope change number	Date raised	Raised by	Description	Reason C/S/O ¹	Waka Kotahi agreement	Date agreed	Cost estimate
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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¹ C = Client instruction; S = Revision of standards; O = Other

APPENDIX F: PEER REVIEW FORM

ESTIMATE PEER REVIEW			
Project Title:			
Project No.:	Waka Kotahi Project Manager:	Consultant Project Manager:	
Estimate Originator:	Verifier:	Internal/External Review	
Peer Review Activities		Verifier's Initials	Date
1	Project Documentation <ul style="list-style-type: none"> receive documentation from project consultant review above documentation 		
2	Defined Scope of Work <ul style="list-style-type: none"> attend peer review briefing with project consultant and Waka Kotahi Project Manager and visit site confirm scope of work is adequately defined confirm scope of work has been fully translated into measured Schedule of Quantities 		
3	Construction Methodology and Programme <ul style="list-style-type: none"> review and comment on the appropriateness of the construction methodology and programme 		
4	Measurement <ul style="list-style-type: none"> confirm that the method of measuring the quantum of work and estimating rates is appropriate for the item of work they apply to confirm internal peer review has verified the measurement of quantities and undertaken arithmetical check carry out sensibility check of the arithmetic and quantities measured for major items 		
5	Estimated Rates/Allowances <ul style="list-style-type: none"> carry out a review of the estimated rates/allowances to confirm that they are reasonable/appropriate for the item of work they apply to comment on the overall appropriateness of the Base Estimate 		
6	Assessment/Analysis of Risk <ul style="list-style-type: none"> participation in risk management workshop (delete if not applicable) review and comment on the appropriateness of workshop attendees and adequacy of the identified risks review and comment on the appropriateness of consequence and likelihood allowances for risk items that may impact on the cost estimate comment on the cost allowances for unknown risks confirm risk assessment/analysis has been prepared in accordance with Cost Estimation manual (SM014) <p>comment on appropriateness of the Contingency and Funding risk allowances</p>		
7	Cost Estimate Outputs <ul style="list-style-type: none"> comment on the overall appropriateness of the Expected Estimate and 95th Percentile Estimate (are they "Fit for Purpose?") 		
8	Peer Review Report (External Peer Review only) <ul style="list-style-type: none"> prepare and send a draft peer review report to the project consultant and send a copy to the Waka Kotahi Project Manager meet with project consultant, discuss peer review report and attempt to reconcile any differences of opinions/issues. Report informally to the Waka Kotahi Project Manager prepare and send a final report to the Waka Kotahi Project Manager copying in the project consultant 		

APPENDIX G: Cost Estimate External Peer Review Methodology

Purpose

The purpose of this Appendix is to establish the role and methodology of the External Peer Reviewer within the context of Waka Kotahi business processes.

Definitions

The External Peer Reviewer is a named individual from the Independent Professional Advisors' Register with a support team who is able, to critically review the risk adjusted out-turn cost of a project at any point, but particularly at the Detailed Business Case Estimate (DBE) stage of its developmental delivery cycle.

If the Peer Reviewer does not have the appropriate experience to review any (or part of a) section of the cost estimate, then they should commission a sub-consultant to undertake that part of the review to enable the whole cost estimate to be reviewed appropriately.

The purpose of a peer review is to confirm that the cost estimate prepared by the project consultant:

- Includes the full scope of work required to deliver the whole project;
- Is a risk-based estimate;
- Has been prepared in accordance with the *Cost Estimation Manual* (SM014); and
- Is "fit for purpose", e.g. Represents a reasonable estimate of the Expected and 95th Percentile Estimates for the whole project.

With these functions in mind, the following methodology has been prepared for use by external consultants commissioned to carry out cost estimate peer reviews for Waka Kotahi.

Project Documentation

1. Receive the following documentation from the project consultant:

- Cost Estimate report in accordance with SM014 (Refer Section 10 of the Manual);
- Risk Register;
- Analysis of Contingency and Funding Risk Contingency including inputs and outputs from the statistical analysis if applicable in sufficient detail to be able to recreate a comparative model;
- Internal peer review of cost estimate (including Internal Peer Review checklist – Refer Appendix I in SM014);
- Detailed Business Case and AEE Reports / Construction Tender Documents / Design Philosophy Statement (dependant on phase of project);
- Proposed Construction Methodology and Programme;
- Any other documentation that may impact on the cost of the project (e.g. Geotechnical report);
- Property Acquisition Strategy highlighting current status of negotiations;
- Designation and Resource Consent Conditions;
- Safety Audits (if issues raised in the audit have not been closed out).

2. Review the above documentation.

Defined Scope of Work

3. Organise and attend a peer review briefing with the project consultant and Waka Kotahi project manager. This briefing shall also include a visit to the site to gain an understanding of the project;
4. Confirm that the scope of work is adequately defined;
5. Confirm that the scope of work has been fully translated into the measured Schedule of Quantities.

Construction Methodology and Programme

6. Review and comment on the appropriateness of the construction methodology and programme e.g.
 - Construction Methodology
 - Earthwork's mass / haul assessment (if the project is predominantly earthworks)
 - Constructability
 - Temporary Works
 - Traffic Management
 - Programme
 - Sensibility check on durations allowed for work items and overall project delivery

Measurement

7. Confirm that the method of measuring the quantum of work and the method of estimating the rates is appropriate for the phase, status of design information and the nature of the works, e.g. At the Detailed Business Case Estimate (DBE) stage.
 - If the project included the construction of a major bridge, the DBE should be broken down into sub-elements, (e.g. piles, piers, abutments, girders, deck, etc) whereas;
 - The DBE for bridges of a standard form on a major motorway project may only be broken down into elements (e.g. Substructure and Superstructure) and presented as a metre square rate based on the bridge deck area.
8. Confirm that the Internal Peer Reviewer has verified the measurement of quantities and undertaken an arithmetical check.
9. Carry out a sensibility check of the arithmetic and quantities measured for major items, e.g. Earthwork's volumes, area of pavement, area of structures, etc.

Estimated Rates / Allowances

10. Carry out a review of the estimated rates / allowances to confirm that they are reasonable / appropriate for the item of work they apply to. This review should consider, at least:
 - inclusion of post construction works items (eg noise monitoring, traffic counts)
 - buildability
 - assumptions
 - exclusions
 - market rates used
 - lump sum and provisional item appropriateness

11. Carry out a review of the estimates for each phase of work to confirm that they are reasonable / appropriate for the project. This review shall apply to the following sections of the Base Estimate:
 - Project Development phase Consultancy Fees and Waka Kotahi Managed Costs;
 - Pre-implementation phase Consultancy Fees and Waka Kotahi Managed Costs; and
 - Implementation phase, including Consultancy Fees, Waka Kotahi Managed Costs and Physical Works.
12. Comment on the overall appropriateness of the Base Estimate for the project.

As part of the exercise confirming that the Base Estimate is “fit for purpose” undertake the following tasks:

- Review and comment on the process / methodology used in estimating rates
- Where rates are based on external contractors’ / suppliers’ estimates, confirm the appropriateness of these estimates and that an appropriate audit trail exists
- Confirm that the Internal Peer Reviewer has verified the rates
- If concerned about the estimated rates for large cost items, then re-estimate these rates from first principles - based on the design documentation received - to confirm their appropriateness

Analysis of Risk

13. If appropriate participate in the project Risk Management Workshop. Participation is considered unnecessary on low cost/low risk projects, but necessary on high risk / high-cost projects, therefore participation at this workshop will depend upon:
 - the nature of the project;
 - the cost of the project; and
 - when the External Peer Reviewer is appointed.
14. Review and comment on the appropriateness of workshop attendees (e.g. on a major earthworks project, was the geotechnical consultant in attendance) and the adequacy of identified risks.
15. Review and comment on the appropriateness of likelihood allowances (in percentage terms) for risk items that may impact on the cost estimate.
16. Review and comment on the appropriateness of consequence allowances (in cost terms) for risk items that may impact on the cost estimate.
17. Comment on the cost allowances included for unknown risks.
18. Confirm the risk assessment/analysis has been prepared in accordance with the *Cost Estimation Manual* (SM014).
19. Comment on the appropriateness of the Contingency and Funding Risk Contingency allowances (include comment on the shape of the probability curve – e.g. large versus small range and/or short versus overly conservative tail).

Cost Estimate Outputs

20. Comment on the appropriateness of the Expected Estimate and 95th Percentile Estimate (Are they “Fit for Purpose?”).

- Project drivers that should be considered when confirming that the Cost Estimate is “Fit for Purpose” are:
 - Has the estimate been reduced / increased to meet a previous estimate (the Waka Kotahi Project Manager shall inform the external peer reviewer of previous estimate)?
 - Has scope been ignored/omitted from the estimate to keep the estimate at the previous estimate?
 - Has the Funding Risk allowance been conservatively calculated to produce an unnecessarily high 95th Percentile Estimate?

Peer Review Report

21. The following has been prepared as a minimum requirement for reporting and the extent of report and the Waka Kotahi Project Manager’s involvement in the peer review process will be confirmed on a case-by-case basis by the Waka Kotahi Project Manager.
 - Prepare and send a draft peer review report to the project consultant and send a copy to the Waka Kotahi Project Manager. This report shall include the following:
 - List of documents reviewed
 - Confirmation that the Peer Review has been undertaken in accordance with this methodology
 - Comments on each review step of the peer review and the appropriateness of the Expected Estimate and 95th Percentile Estimate
 - Any other issues/concerns raised
 - Recommendations to facilitate reconciliation with the project consultant
 - Completed Appendix I Peer Review Form
22. Meet with the Project consultant, discuss the peer review report and attempt to reconcile any differences of opinions/issues. Report informally to the Waka Kotahi Project Manager to keep them informed regarding progress of the reconciliation process.
23. Prepare and send a final report to the Waka Kotahi Project Manager copying in the Project consultant. This report shall include the following:
 - Confirmation that the Peer Review has been undertaken in accordance with this methodology
 - Confirmation that the Cost Estimate has been prepared in accordance with the Cost Estimation Manual.
 - Comment on the appropriateness of the Expected Estimate and 95th Percentile Estimate. Are they “Fit for Purpose?”
 - Any unresolved issues from the reconciliation process.

APPENDIX H: PARALLEL ESTIMATE METHODOLOGY

Purpose

The purpose of this Appendix is to establish the role and methodology of the Industry Expert within the context of Waka Kotahi business processes. It is not intended for use as a parallel estimate process in the development of a Target Outturn Cost for an Alliance.

Mandate

The Industry Experts role is established under the *Cost Estimation Manual* (SM014) which is mandatory across Waka Kotahi business.

Definitions

The Industry Expert is a named individual on the Register with a support team who is able, from first principles, to estimate the risk adjusted out-turn cost of a project at any point, but particularly at the Detailed Business Case Estimate (DBE) stage of its developmental delivery cycle.

Objectives

The overall objective is to establish a high level of confidence in a projects out-turn cost as estimated at the DBE stage through:

- Establishing confidence in the definition of the full extent of the scope;
- Gaining confidence in the schedule of quantities, (item coverage, rates and quantities);
- Establishing confidence in the proposed construction methodology and programme;
- Gaining confidence that the design represents value for money;
- Gaining confidence that the risk register is robust and comprehensive, takes full cognisance of the scope (e.g. design development risks), includes both risks (downside) and opportunities (upside), and that the identified risks are quantified for consequence and likelihood of occurrence; and
- Provide increased confidence that all residual risks are identified, quantified and valued appropriately and subsequently analysed to achieve 95% confidence.

By meeting this objective Waka Kotahi will be able to:

- Undertake optimal 10-year programming; and
- Meet Waka Kotahi performance requirements with respect to out-turn costs against IE, PE2 and DBE's.

To achieve these objectives through the Industry Expert, we will:

- Ensure the Industry Expert is introduced into the cost estimating process at the appropriate time and that the consultant fully understands and accepts the Industry Expert's purpose and role;
- Ensure the Industry Expert works in parallel with the consultants developing estimates but that the consultant retains ownership of the estimate;
- Clearly understand whether or not the consultant has provided the right amount of time and energy into the estimating process; and
- Validate an out-turn estimate (fully all risk inclusive).
- Protocols

An Industry Expert will be appointed for each project by Waka Kotahi to undertake the Parallel Estimate. Parallel Estimates shall be prepared for all Detailed Business Case Estimates (DBE's) prepared during the Project Development phase that have an Implementation phase estimate (excluding escalation, including Consultancy Fees and Waka Kotahi Managed Costs) exceeding \$20million, and at other stages as deemed appropriate by the Waka Kotahi Project Manager in accordance with the procedures set out in SM014.

The Industry Expert will be appointed at the time the preferred scheme is selected. The Industry Expert shall then work in parallel with the consultant until the DBE is prepared.

The Consultant will brief the Industry Expert on an as-required basis to provide an appropriate level of understanding of the project.

The Industry Expert shall interact with the Consultant on the development of the Estimate (as opposed to reviewing the completed Estimate, which would be less efficient and may require costly rework by the Consultant).

The Industry Expert shall report to the Consultant responsible for the contract, and copy to the Waka Kotahi project manager.

The Industry Expert shall attend regular briefings by the Consultant and selected workshops (e.g. design development and review; value engineering; risk identification and assessment) either as observers or participants (as agreed) to gain the necessary level of understanding of key project issues but excluding discussions on project cost related matters other than as specifically established in this methodology.

The Waka Kotahi Project Manager shall be present at the initial briefing of the Industry Expert by the project team and attend price exchanges and reconciliation and generally have an overview of the process.

The Industry Expert shall have access to all relevant construction and contract related material for the purpose of understanding the project.

The Industry Expert shall operate from an office separate from the Consultant.

Industry Expert's Output

The Industry Expert's Expected and 95th Percentile Estimate's for the project shall include:

1. Consultancy Fees and Waka Kotahi Managed Costs for all remaining Project Development and Delivery phases;

2. Implementation costs (including allowance for the contractor's onsite overhead costs (P&G costs) and offsite overhead costs and profit (contractor's margin); and
3. Contingency and Funding Risk Contingency.

Two estimates shall be provided - the Expected Estimate and the 95th Percentile Estimate.

The estimates shall exclude escalation provision unless specifically instructed otherwise by the Waka Kotahi project manager.

Pre-implementation Estimate (PE2)

Generally, the Industry Expert would not undertake a parallel estimate at the PE2 stage unless the scope of the scheme or some aspect changes significantly meaning the DBE no longer remains valid. In such cases the Industry Expert would re-estimate, from first principles, those components, which have changed and then update the balance of the items to current day costs using an appropriate contract price adjustment for cost fluctuation index, as published by Waka Kotahi.

In cases where the PE2 is confirmed via the parallel estimating process of the Industry Expert, the objectives of the process remain unchanged except as noted below:

- a) The level of detail supporting the estimate and the Industry Experts work will be greater, probably resulting in a greater time input by the Industry Expert.
- b) The Industry Expert may be drawn into discussions on buildability where this is deemed appropriate; and
- c) The Industry Expert will be required to complete a fee estimate of their cost and time to undertaking the Industry Expert role.
- d) The Industry Expert may also be engaged to carry out tasks not identified in its parallel estimate methodology but which the Industry Expert and the Waka Kotahi project manager agree are within the ability of the Industry Expert to undertake, such as reviewing any draft tender documents.
- e) The requirement to include any escalation allowance in the PE2 shall be clarified with the Waka Kotahi Project Manager at an initial briefing.

Industry Expert Parallel Estimate Methodology

This Methodology relates specifically to Parallel Estimates prepared in conjunction with DBE's. The methodology for a Parallel Estimate prepared in conjunction with any other project phase (e.g. PE2's) will need to be customised to suit the specific objectives and requirements at that time.

This methodology shall be customised jointly by the Industry Expert and Consultant to suit the specific needs of the project and its acceptance signed off by both parties and the Waka Kotahi Project Manager.

A Parallel Estimate will be undertaken in three phases –

- Preliminary;
- Independent; and
- Reconciliation.

Preliminary Phase

- 1) The Consultant will provide the Industry Expert with information relevant to the parallel estimate process progressively and as soon as it becomes available. This information transfer continues up until a point to be agreed between the Consultant and the Industry Expert at which time it will be 'frozen', and any changes dealt with by adjustment at the reconciliation meeting. Typically it would include:
 - a) Drawings and specifications for the works;
 - b) Schedules of quantities and any build-up of the quantities as would assist the Industry Expert in performing his task without compromising the independence of the process.
 - c) Proposed contractual arrangements such as the form and type of contract, basis of payment, risk sharing arrangements and any proposed special conditions of contract, which would ultimately affect the price of the works.
 - d) Investigation reports such as - environmental, archaeological, traffic, geotechnical (both factual and interpretative), design, utilities reports, timeline-based work programme.
 - e) Outline plans and AEE prepared in conjunction with a resource consent application, and any resource consent conditions if and when available.
 - f) Construction methodology plans and reports including the likes of earthworks mass/hauls; temporary traffic management plans, temporary works planning, and time-line programmes showing the subsequent Pre-implementation phase, tender process, and Implementation phase.
 - g) Market pricing if obtained for specialist or cost critical items such as abnormal pipe supply, specialist technical supply e.g. post-tensioning, soil nailing, wick drains etc
 - h) Budget or indicative pricing obtained from utility companies for utility relocations, protection or replacement, plus any new installations.
 - i) Risk profile/register but excluding any allocation or evaluation of the likelihood of occurrence or the associated consequence. The purpose is to assist the Industry Expert in gaining a sufficient understanding of the project without compromising the independence of the cost estimating process.
 - j) Photos including aerial photos with the project outline overlaid.
- 2) The general structure and basis of establishing the Industry Expert's and Consultant's cost estimates is to be discussed and agreed between the Consultant and Industry Expert to ensure that the estimating methodologies employed are appropriate, and to ensure that the Industry Expert and Consultant's estimates can be directly compared during the reconciliation phase. For example, there needs to be a clear understanding of the composition of the P&G and the inclusions in the direct work cost items; how specific work item contingency and unscheduled provisions (such as quality control testing, temporary traffic management) are to be handled, how and where the contractor's onsite overhead, offsite overhead and profit provisions are to be incorporated in the estimate. The Consultant and Industry Expert may adopt different methodologies for pricing individual work items (rating based on historical rates versus first principles build-up). The estimates shall follow the Elemental Breakdown structure as defined in Appendix B, unless agreed otherwise.
- 3) In general, the project design does not require a peer review as part of the parallel estimating process. There may be situations where in order to establish confidence in the proposed design, key elements shall be peer reviewed. Where it is appropriate, a specialist design consultant shall be engaged for specific and selective tasks. The extent of any designer input into the process and selection of the design consultant will be agreed between the Industry Expert and the Waka Kotahi Project Manager. These could relate to the likes of:

- a) Assisting in assessing and evaluating the risk profile for the works in relation to work scope, design adequacy and detail, scope definition;
 - b) Input into Value Engineering exercises on key components of the works (e.g. a major structure)
 - c) Independent estimate of the quantities
 - d) Estimation of the Implementation phase Consultancy Fees and Waka Kotahi Managed Costs for input into the Industry Expert's Base Estimate.
- 4) The Industry Expert will undertake a thorough review of the proposed timeline programme for the project including detailed design and construction phases. Agreement on the programme is considered to be fundamental to reconciling the DBE and so is to be established as soon as possible. Agreement on the methodologies and management plans is not considered essential and the Industry Expert will base their Parallel Estimate on their own assessments that may or may not correspond with those of the Consultant.
 - 5) The Industry Expert will review the scope of the proposed works and confirm with the Waka Kotahi Project Manager that it fully satisfies their expectations.
 - 6) The Industry Expert must then check that the Elemental Breakdown, or Schedule of Prices (SoP), accurately reflects the intended work scope, and how risks and contingencies are managed within the SoP. Detailed take-offs and worksheets backing up the SoP for the likes of earthworks by material classification, concrete, formwork, re-steel, etc. will be made available to the Industry Expert. A random audit of the quantities for high risk / high cost items should be undertaken, and the method of measurement and basis of payment reviewed and commented on. In addition the composition of the P&G section of the SoP shall be reconciled with the consultant.
 - 7) All scoping documentation, briefs etc issued by the Consultant to utility companies and the corresponding cost estimates received in response will be provided to the Industry Expert. Random verification should be undertaken of key items.
 - 8) Waka Kotahi will provide the Industry Expert the amount to be included in the parallel estimate for Waka Kotahi Managed Costs as defined in SM014.
 - 9) The Consultant shall provide the project risk register to the Industry Expert (excluding risk amounts, and probabilities of occurrence, consequences and valuations).
 - 10) Other than to the extent described above, there is to be no discussion on actual pricing allowances prior to the reconciliation meeting.

Independent Phase

- 1) The Industry Expert will independently develop and value the base estimate on the basis set out above.
- 2) The Industry Expert's resource and time constraints will require them to focus on the high-cost and high-risk items. Other items may be priced on an elemental, parametric or historical rate basis using recent contract priced schedule rates made available by Waka Kotahi.
- 3) The Industry Expert shall estimate items within the P&G section from first principles based on the agreed work programme, with each item composition having been agreed between the Industry Expert and Consultant during the Preliminary Phase.
- 4) The Industry Expert will independently estimate the cost of Consultancy Fees and Waka Kotahi Managed Costs for subsequent phases. If required, an independent design consultant

experienced with Waka Kotahi projects may be used to assist with this but shall be subject to prior discussion and approval from the Waka Kotahi project manager.

- 5) The Industry Expert shall independently review the risk register to determine an appropriate level of risk. Using the consultant's risk register as a reference, the Industry Expert shall independently establish a risk profile (register) and evaluate the risk contingency provision to be included in the estimate. The Industry Expert is free to add too or amend the risk schedule provided by the consultant.

Waka Kotahi requires the quantification of two project out-turn costs – the Expected Estimate and the 95th Percentile Estimate. The Monte Carlo software programme may be used for this purpose in conjunction with the Industry Expert's professional judgement to arrive at the contingency and funding risk provisions to be included in the Expected and 95th Percentile Estimates. The analysis must take into account the allocation of the risk (between Waka Kotahi and contractor), and the ability to manage or mitigate the 'downside' risk and/or realise the potential 'upside' opportunities, both of which are significantly influenced by the proposed procurement method and the conditions of contract (including any Special Conditions of Contract).

Reconciliation Phase

- 1) The Industry Expert, Consultant and the Waka Kotahi Project Manager will meet at a predetermined date and time to exchange their summary schedules of the Expected Estimate.
- 2) Waka Kotahi expectation is that the two estimates will be reconciled to reach agreement on allowances for all key items and sections of the estimate. Any problems that arise which prevent reconciliation in the agreed time frame shall be reported to the Waka Kotahi Project Manager.
- 3) The Consultant is responsible for compiling a report to Waka Kotahi setting out the outcomes of the reconciliation process including the agreed Summary Schedule of Prices, any unresolved monetary differences for key items or part of the works, with explanatory comment, conclusions and recommendations.

APPENDIX I: GUIDANCE ON ESTIMATING CONSULTANCY FEES

The Professional Services Firm

Consulting Practices have similar overhead structures. What the large firms gain in respect of say, information technology, is averaged out with other increased overheads such as business development and vice versa. The key contribution to overheads is staff utilisation. The professional services firm leverages off its top professionals with a significant portion of partnership profit derived from hiring lower cost staff and billing out at multiples of that salary.

In engaging a consultant, projects generally fall into three categories (source The Professional Firm by David Maister):

- Brains Projects involving highly skilled staff. Typically, one-off projects with a high ratio of senior to junior staff;
- Grey Hair Projects with highly customised output and a lesser degree of innovation. Usually, firms have done it before and use a lower ratio of senior to middle and junior staff;
- Procedure Projects involving a well-recognised familiar type of problem with some customisation. In some instances the client may even be able to do the work themselves but instead hire a more effective service. They have the highest ratio of junior to senior staff.

Professional Services Rates

Professional firms usually have a scale of rates based on groupings. Typically, the groupings range from 5-10 covering administration through to director level. Most of the work contracted out by Waka Kotahi would involve 5-6 of these groups. These rates are generally applied at a range of 70% - 100% depending on utilisation, market pressure, workload etc.

In normal competitive pricing situations the range of rates is less and more of the variation in pricing of projects arises from interpretation of scope rather than from differences in rates.

Estimating Professional Fees

In estimating professional services fees there are three basic approaches:

- a) Top down, based on cost curves;
- b) Top down, based on comparative projects;
- c) Bottom up, based on inputs.

The three approaches are described in detail below.

It is preferable that the three methods be used to provide an overall guidance of fee level. The consulting firm will spend significantly more effort in preparing the estimate than the estimator and is, in general, likely to understand the scope better. This needs to be taken into account when a reconciliation of price is required.

Top down, based on cost curves: Some decades ago professional engineering firms were selected on quality with reimbursement of fees based on the physical works estimate and a series of curves published by ACE NZ. Legislation subsequently prevented the use of these curves on an anti-competitive basis.

ACE NZ / Engineering NZ produce curves, and these are a good guide for the Pre-implementation and Implementation phases (estimate accuracy say $\pm 25\%$) but are not usually applicable to the Project Development phase.

Top down, based on comparative projects: A similar approach is to select a range from say 3-5 comparative projects that have preferably been recently completed. The more effort put into selection of the projects and the removal of anomalies within the projects, the more accurate the estimate will be.

Escalation would need to be applied to bring them up to equivalent present prices. This can be done by using the Waka Kotahi professional services contract price adjustment for cost fluctuation index. This method may give a higher estimate of the tendered price, but a closer estimate of the out-turn cost which should always be the target. In general terms this is a very useful method and can give accuracy of the order of $\pm 15\%$.

Bottom up, based on inputs: These estimates are prepared based on assessed hours and disbursements against a schedule of quantities. The way the consultant prices the schedule will be at their discretion and may be inconsistent with the estimate on any single item, but overall this method will give the most accurate estimate of professional fees. To best value the quality aspect of the proposal, items that do not influence the choice of consultant should be provisional sums.

It is reasonably straightforward to do a coarse assessment of the total estimate by doing a range of tendered rates in the same way a risk analysis would be carried out in a physical works estimate.

Depending on the level of effort of estimating this will produce estimates with an accuracy of $\pm 10\%$.

The Contract Schedule in SM030 must be used as the basis for the Consultancy Fee component of the Base Estimate in Appendices C and D.

APPENDIX J: PROJECT PROPERTY COST ESTIMATES

1.1 Initial comments/context

THIS SECTION MUST BE READ IN CONJUNCTION WITH SECTION 8 OF THIS MANUAL.

Property is often required in some shape or form for transport projects.

Waka Kotahi purchases property interests, rather than leasing property or properties, so that ownership of the property vests in the Crown fully to allow the continuity of use and so we can ultimately survey the land and legalise as road.

The process to purchase property is often complex and takes time. That complexity and time needs to be reflected in the cost estimate for the purchase of property.

The cost of property does fluctuate over time. It is rare that the property cost will remain static through the lifecycle of a transport project. Therefore, the estimation process must allow for that potential market movement.

The scale of property required for projects fluctuates, and in most cases there are multiple property interests that need be acquired for any given project. Therefore, estimation is required to assess the cost of each individual property interest required for a project.

The nature and scale of the property interests to be purchased can also change from partial or full properties or vice versa, and may include land owned by multiple businesses, agencies, local authorities and Maori. Property requirements may include sub-strata interests, easements, and unit titles. All types of property interest have their own cost and value complexities that need to be considered and reflected individually in the cost estimation modelling.

Property purchase for public works is governed by legislation (in particular the Public Works Act 1981 (PWA)) that protects both Waka Kotahi / the Crown and the landowner. The PWA sets out clear processes for the acquisition or purchase of property. This PWA process is managed through the Transport Property team. There are a number of sections in the PWA that refer to the rights of the landowner to compensation for the acquisition or taking of property for a public work. Further information on the key sections of the PWA process are set out in 8.2.5.

The Transport Property team has an established cost estimation model for all property acquisitions.

Waka Kotahi is funded for property acquisition through the various Transport programmes (e.g. NLTP, NZUP, Speed & Infrastructure) and these may have different funding and budgeting regimes. All Total Property Costs will be prioritised within these programmes based on the project delivery programmes.

1.2 Integration with project programme

The timing of purchase or acquisition is phased across the project programme, so any cost estimate needs to calculate and reflect the differences for each acquisition.

The Total Property Cost is driven off the mid-point of the property acquisition programme so alignment between project and property teams is essential.

1.3 Land Information New Zealand role in Crown land acquisition

Land Information New Zealand (LINZ) acts as the Manager of Crown Land and has the statutory responsibility for administering the PWA through its Minister, the Minister of Lands. All property interests purchased for Waka Kotahi projects are purchased by LINZ on behalf of the Crown. The Crown is therefore the entity which purchases land for our projects. Waka Kotahi does not purchase land in its own name.

Land purchased by the Crown under the PWA affords the landowner certain rights. The PWA also prescribes a process to complete the acquisition which also provides some certainty for the Crown.

Note that the Resource Management Act 1991 (RMA) also provides rights for landowners, and the general public, during the RMA phase/consent phase of projects.

The PWA provides for the acquisition of a wide range of property interests, but Waka Kotahi primarily acquires either freehold or leasehold interests for its projects. Acquisition of these interests and the payment of compensation normally involves costs that need to be included in the project cost estimates. It is important that all relevant sections of the PWA are considered when preparing the cost estimate.

The key sections within the PWA are as follows:

- a) Section 17 – Acquisition of land by agreement. This is typically the start of the acquisition process and commencement of negotiations with the landowner;
- b) Section 18 – Notice of Desire to acquire the land. This notice is served on the landowner, along with a notice under section 110 to allow for survey of the land required (if a partial purchase). A minimum 3-month period of good faith negotiations with the landowner follow. Surveyor costs can also be incurred where there is a partial purchase;
- c) Section 23 - Notice to Intention to take land. This notice is served on the landowner once a minimum 3-months good faith negotiations have taken place without agreement being reached. This is the formal commencement of the compulsory acquisition process and can be objected to by the landowner in the Environment Court.
- d) Section 26 – When Proclamation may issue. This typically follows the issuing of a notice under section 23 and provides for the land to be taken by proclamation. The proclamation needs to be signed by both the Minister of Lands and the Governor-General and then published in the NZ Gazette. This is the final step in the compulsory acquisition process and vests the land in the name of the Crown;
- e) Section 34 – Owner may require severed land to be taken. The landowner can require land severed from the balance of their property as a result of the public work requirement to be acquired under certain circumstances (e.g. it does not have any legal access);
- f) Section 60 – Basic entitlement to compensation. This section outlines who is entitled to compensation.
- g) Section 62 – Assessment of compensation. This section outlines how compensation is to be assessed and at what date.
- h) Section 66 – Disturbance payments. This section provides for reimbursement of reasonable costs incurred by the landowners in relation to the acquisition of their land (e.g. valuation, legal etc.);

- i) Section 68 – Compensation for business loss. The landowner who has a business located on the land acquired may, under certain circumstances, be able to claim for business loss or loss of goodwill;
- j) Section 72 – Additional compensation payable to the landowner. This can range from a minimum of \$250 up to a maximum of \$50,000 where the landowner's primary residence is being acquired and agreement is reached within 6-months of negotiations commencing.

Each of these Sections has an impact on time, and thus costs incurred by the Crown. The Property Strategy, prepared by the Transport Property team, will be completed to provide the programme steps to purchase the properties required. **PLEASE REFER TO THE PROJECT MANAGERS MANUAL FOR AN INDICATIVE PWA PROCESS GANTT CHART. It is imperative that project managers understand the best and worst case project cost and programme impacts from the PWA process.**

Waka Kotahi uses the services of specialists in the PWA to conduct Crown property acquisition negotiations. This ensures that property owners are correctly informed of their rights.

1.4 Total Property Cost Components & Considerations

Property interest purchase costs

Property interest purchase cost is defined as the market value, at the date to be acquired (defined in the acquisition programme), of any property required for a project. This cost is established by taking the current Rating Valuation (RV) and adding market appreciation from the date of the Rating Valuation to the date that the cost estimate is completed and then allowing for further market appreciation into the future to the date of purchase (typically the mid-point of the anticipated active property acquisition programme).

$$\begin{aligned} \text{Current RV} \times \text{market appreciation factor} &= \text{market value at estimation date} \\ \times \text{future market appreciation factor} &= \text{property interest purchase cost at the date to be acquired} \end{aligned}$$

Market appreciation data can be sourced from REINZ or other market evidence sources to ensure any adjustment to the Rating Valuation is based on real data or evidence. The future market appreciation factor will be determined by the Transport Property team based on market trends and date and forecast information provided from market sources.

The property interest purchase cost is included in the Total Property Costs as part of the project estimate and therefore is updated in parallel with successive project estimates.

Where there is a severance, the value of this should be included as part of the property interest purchase cost.

Property consultancy fees (including sub-contractors)

Waka Kotahi uses the services of external specialists in the PWA to conduct Crown property acquisition negotiations. These are LINZ accredited agents and have supply contracts with Waka Kotahi.

The external specialists will sub-contract the survey work to other parties. The cost of the survey work needs to be included in the Property consultancy fees.

LINZ will also charge Waka Kotahi for its work in the acquisition process. This generally comprises processing of the various notices (e.g. section 18 / 23 / 26), review and execution of acquisition agreements with landowners. It can also include any legal advice it needs to obtain from Crown Law.

Waka Kotahi will also incur other costs relating to valuation, planning, or other advice (e.g. specialist business relocation advice, specialist fees for designing and estimating the cost of accommodation works (over and above the project design consultant)).

Allowances need to be made for all of the above costs.

Property compensation costs

In most circumstances the PWA considers landowner losses in addition to the property interest purchase cost of the property taken. This is termed 'property compensation' and may include:

- Permanent depreciation in the value of any remaining property and improvements (injurious affection) caused by the taking of the required property;
- Section 66 costs – that include legal, valuation, property consultancy, early repayment of mortgages (break fees), relocation of goods and chattels, utility fees;
- Costs for repair, replacement or reinstatement following physical damage to land and/or buildings arising from the construction of the public works;
- Loss of actual business profit, possible business buy-out, cost of business relocation and re-establishment elsewhere (these costs will differ per property type and scale);
- Maori land costs that recognise the intrinsic value and cultural significance of the land involved and may include cultural mitigation and land exchanges (at present this is a hard cost to estimate and is managed through the contingency part of the P50 estimate);
- Section 72 additional compensation that can include payment to residential owners where a dwelling is included in the purchase (and it is the owners' primary place of residence) and agreement is reached within 6-months of negotiations commencing;
- Temporary occupation of property outside the corridor permanently required, this may include lease and repair obligations (these arrangements may also be direct from contractor to landowner);

The assessment and agreement to these costs is determined by the Crown (LINZ) as regulators of Crown land.

This list is not exhaustive and expert advice should be sought from the Transport Property team to determine all relevant compensation costs and make suitable allowance in the Total Property Cost.

Property owner accommodation works

During the property acquisition process, the Waka Kotahi project team may agree to carry out works to the property as part of a property purchase or compensation agreement. For instance, an agreement might require Waka Kotahi to erect fencing, construct driveways, gates, planting or relocate buildings on the property before or during construction of the project.

This work may be either a property compensation cost that has been deferred until construction or it could be an extra item agreed in lieu of property or compensation entitlement. Either way it needs to be factored into the Total Property Cost.

The work may be included in a subsequent physical works contract as 'property owner accommodation works' with a due allowance included in the project construction cost estimate. The latter should be off-set by a reduction of the same amount from the Property Phase allocation which is established on the basis of the Total Property Cost (Appendix C form).

The accommodation works are separately identified in the cost estimates.

1.5 Property Cost Calculation Examples

In these examples, several different property types will be affected in different ways by a proposed road realignment and property acquisition is necessary from each property.

Property A

Property A is a residential lifestyle block which includes a dwelling, garage and workshop. The property will be bisected by the proposed realignment and there will be significant severance, including the dwelling. The entire freehold interest of the property is being acquired (i.e. total acquisition), including the severance area outside of the corridor. Normal landowner incurred costs are expected (e.g. valuation, legal, negotiation/advisor), and additional compensation (s72 PWA) is also anticipated. As it is a total acquisition no injurious affection is payable and no property owner accommodation works are necessary. The estimated costs, inclusive of anticipated market appreciation & contingencies, but exclusive of GST, are:

Estimated Current Market Value of Property ³	Land & improvements <u>including</u> chattels	\$875,000	
Plus anticipated / forecast property market appreciation ⁴	5.5% pa compounded for 2.5 years (14.322%) & rounded to nearest \$1,000	\$125,000	
Forecast Market Value		\$1,000,000	\$1,000,000
Crown incurred costs	Valuation	\$5,000	
	Legal	\$2,000	
	Building Inspection	\$2,000	
	Property acquisition agent fees	\$20,000	
	Sub-total	\$29,000	\$29,000
Landowner reimbursable costs	Valuation	\$5,000	
	Legal	\$3,000	
	Negotiation agent fees	\$20,000	
	Relocation costs	\$10,000	
	Sub-total	\$38,000	\$38,000
Additional compensation	S72 PWA (full amount as it is their principal place of residence)		\$50,000
Base Estimate			\$1,117,000

³ If a recent Market Valuation is not available use most recent Rating Valuation & then adjust for property market movement over the intervening period based on market evidence.

⁴ This allowance should be up to the mid-point of the active property acquisition window for the particular project. It should be based on recent local property market appreciation rates for this type of property, or if this not considered sustainable then the long-term property market appreciation rates for this type of property in this locality.

Contingency	Property interest purchase costs only (e.g. 15%) ⁵	\$150,000	
	All other Property costs (e.g. 40%) ⁶	\$26,800	
	Sub-total	\$176,800	\$176,800
Expected Cost (P50)			\$1,293,800
Funding Risk Contingency ⁷	Property interest purchase costs only (e.g. 15%)	\$150,000	
	All other Property costs (e.g. 40%)	\$26,800	
	Sub-total	\$176,800	\$176,800
P95			\$1,460,600

Note - all contingency % to be applied need to be peer reviewed by the Manager Acquisitions to ensure relativity and consistency across property type and known/unknown risk.

Property B

Property B is a commercial property with a high stud warehouse, associated offices & large, sealed yard. The property will be bisected by the proposed realignment, including the warehouse. The freehold interest (lessor's interest) is owned by Company X who wish to sell their total interest in the property, including the severance area outside of the corridor. The leasehold interest (lessee's interest) in the property is owned by Company Y who has 15 years of their 20-year lease remaining. The lessor's & lessee's interests are required to be acquired (i.e. total acquisition). Normal landowner incurred costs are expected (e.g. valuation, legal, negotiation/advisor) for both the lessor & lessee. As it is a total acquisition no injurious affection is payable and no property owner accommodation works are necessary. New premises will need to be located for the lessee & fitted out to a similar standard. The estimated costs, inclusive of anticipated market appreciation & contingencies, but exclusive of GST, are:

Estimated Current Market Value of Property	Land & improvements only	\$3,000,000	
Plus anticipated / forecast property market appreciation	6.0% pa compounded for 2.5 years (15.682%) & rounded to nearest \$10,000	\$470,000	
Forecast Market Value		\$3,470,000	\$3,470,000
Crown incurred costs	Valuation	\$7,000	
	Legal	\$10,000	
	Building Inspection	\$5,000	
	Property acquisition agent fees	\$40,000	
	Quantity Surveyor	\$9,000	
	Sub-total	\$71,000	\$71,000
Lessor reimbursable costs	Valuation	\$7,000	
	Legal	\$5,000	
	Negotiation agent fees	\$25,000	
	Sub-total	\$37,000	\$37,000
Lessee reimbursable costs	Valuation (Rental for new premises)	\$4,000	
	Legal	\$10,000	
	Negotiation agent fees	\$30,000	
	Architect	\$8,000	
	Quantity Surveyor	\$9,000	

⁵ Compensation paid for land acquired and any injurious affection (if applicable).

⁶ Excludes additional compensation under s72 PWA as this is a fixed amount under statute.

⁷ Calculated on Base Estimate amounts.

	Sub-total	\$61,000	\$61,000
Other costs	New premises fit-out for lessee	\$75,000	
	Relocation costs for lessee	\$65,000	
	Sub-total	\$140,000	\$140,000
Additional compensation	S72 PWA (10% of value of land acquired)		\$25,000
Base Estimate			\$3,804,000
Contingency	Property purchase costs only (e.g. 20%)	\$694,000	
	All other costs (e.g. 40%) ⁸	\$123,600	
	Sub-total	\$817,600	\$817,600
Expected Cost (P50)			\$4,621,600
Funding Risk Contingency	Property purchase costs only (e.g. 20%)	\$694,000	
	All other costs (e.g. 40%)	\$123,600	
	Sub-total	\$817,600	\$817,600
P95			\$5,439,200

Note - all contingency % to be applied need to be peer reviewed by the Manager Acquisitions to ensure relativity and consistency across property type and known/unknown risk.

Property C

Property C is a residential property which includes a dwelling and garage. The required land comprises a 3.0-metre-wide strip along the front of the property (75 sqm in total). The dwelling and garage will not be affected as they are set to the rear of the property, but a glasshouse is required to be relocated, a new fence installed, a new driveway constructed, and planting replaced. The freehold interest of part of the property is being acquired (i.e. partial acquisition). Normal landowner incurred costs are expected (e.g. valuation, legal, negotiation/advisor), and additional compensation (s72 PWA) is also anticipated. As it is a partial acquisition injurious affection is expected, and property owner accommodation works will be required. The estimated costs, inclusive of anticipated market appreciation & contingencies, but exclusive of GST, are:

Estimated Current Market Value of Property	Land & improvements <u>excluding</u> chattels	\$525,000	
Plus anticipated / forecast property market appreciation	5.0% pa compounded for 2.5 years (12.973%) & rounded to nearest \$1,000	\$68,000	
Forecast Market Value		\$593,000	\$593,000
Land purchase cost	Value of land & improvements required (75 sqm @ \$250 /m ²)		\$18,750
Value of balance property			\$574,250
Injurious affection	Minimal impact – 10% value of balance property	\$57,425	
Land purchase cost		\$18,750	
Compensation payable		\$76,175	\$76,175
Owner accommodation works	Relocate glasshouse	\$3,000	
	Build new fence	\$8,000	
	Construct new driveway	\$9,000	
	Replace planting	\$3,000	
	Sub-total	\$23,000	\$23,000
Crown incurred costs	Valuation	\$4,000	

⁸ Includes new premises fit-out & relocation costs.

	Legal	\$3,000	
	Property acquisition agent fees	\$25,000	
	Sub-total	\$33,000	\$33,000
Landowner reimbursable costs	Valuation	\$4,000	
	Legal	\$4,000	
	Negotiation agent fees	\$25,000	
	Sub-total	\$33,000	\$33,000
Additional compensation	S72 PWA (10% of value of land acquired up to \$25,000)		\$1,875
Base Estimate			\$167,050
Contingency	Property purchase costs only (e.g. 30%) ⁹	\$22,850	
	All other costs (e.g. 40%) ¹⁰	\$48,800	
	Sub-total	\$71,650	\$71,650
Expected Cost (P50)			\$238,700
Funding Risk Contingency	Property purchase costs only (e.g.20%)	\$15,230	
	All other costs (e.g.40%)	\$48,800	
	Sub-total	\$64,030	\$64,030
P95			\$302,730

Note - all contingency % to be applied need to be peer reviewed by the Manager Acquisitions to ensure relativity and consistency across property type and known/unknown risk.

The estimated property costs are transferred to the Total Property Costs form. The Base Estimate, Contingency and Funding Risk Contingency from the Total Property Costs form (Column F) are transferred to Item A in the PE1 form.

- a) Property interest purchase costs;
- b) Property Consultancy fees (including subcontractors e.g. surveyors);
- c) Property compensation costs;
- d) Property owner accommodation works costs;
- e) Contingency and Funding Risk Contingency costs;
- f) The sum of 'a' to 'e' above = the Total Property Cost

⁹ Includes injurious affection

¹⁰ Excludes owner accommodation works

Total Property Costs – Form H						
Project Name: ABC realignment						
Property Acquisition Reference	Property Requirements	Purchased	Property Interest Purchase Costs (A)	Property Compensation Costs (B)	Property Owner Accommodation Works (C)	Property Cost (A+B+C=D)
A	Residential Lifestyle Block					
	Land and improvements including chattels	No	490,000	0	0	490,000
	Solatium (payable to property owner and residents only)	No	0	2,000	0	2,000
	Disturbance costs including relocation	No	0	2,500	0	2,500
B	Commercial Property					
	Legal costs	No	0	5,000	0	5,000
	Lessor's interest in required road corridor	No	450,000	0	0	450,000
	Lessor's interest in severance land	No	100,000	0	0	100,000
	Lessee's interest in land	No	35,000	0	0	35,000
	Lessee's interest in building	No	565,000	0	0	565,000
	Lessee's interest in relocation expenses	No	0	35,000	0	35,000
	Residential Property					
C	Land and improvements	No	15,000	0	0	15,000
	Injurious affection	No	0	50,000	0	50,000
	Legal and valuation costs	No	0	10,000	0	10,000
	Disturbance costs	No	0	2,000	0	2,000
	Relocate glasshouse	No	0	0	2,000	2,000
	Install new fence	No	0	0	5,000	5,000
	Construct new driveway	No	0	0	7,000	7,000
	Replace planting	No	0	0	3,000	3,000
Fees	Property Consultancy Fees (E)	-	-	-	-	300,000
Base Estimate of Total Property Costs			1,655,000	106,500	17,000	2,078,500
Contingency						320,000
Expected Estimate of Total Property Costs						2,398,500
Funding Risk Contingency						225,000
95th Percentile Estimate of Total Property Costs						2,623,500