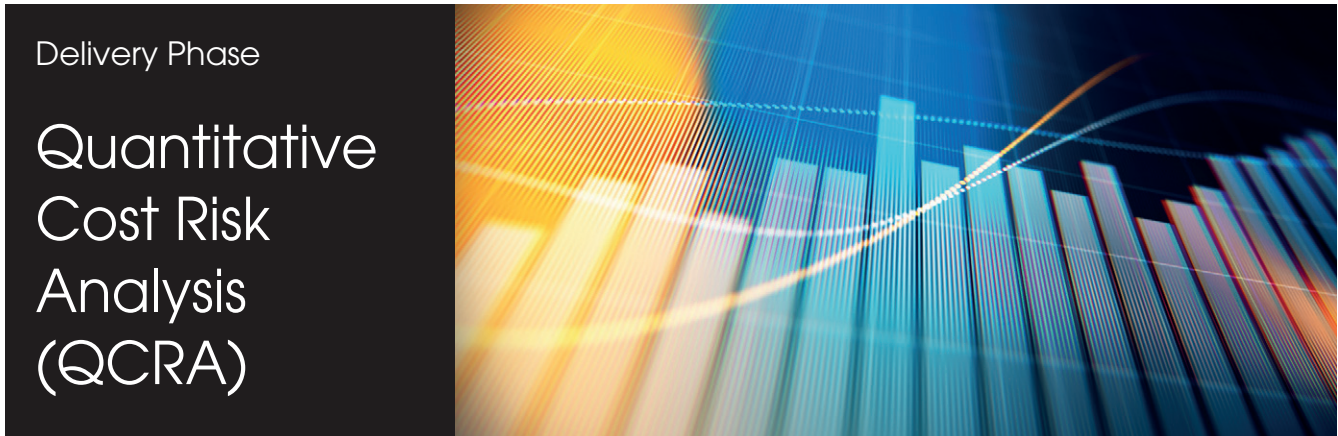


PROGRAMME LIFECYCLE							
STRATEGIC PHASE				DELIVERY PHASE			
INITIATION STAGE	DEFINITION STAGE	ESTABLISHMENT STAGE	MANAGEMENT STAGE	DELIVERY STAGE			CLOSE
PROGRAMME OBJECTIVES	PROGRAMME SCOPING	PROGRAMME PRIORITISATION	PROGRAMME OPTIMISATION	FEASIBILITY	DESIGN	IMPLEMENTATION	CLOSEOUT STAGE
Risk Reporting							



Understanding the risk contingency requirements

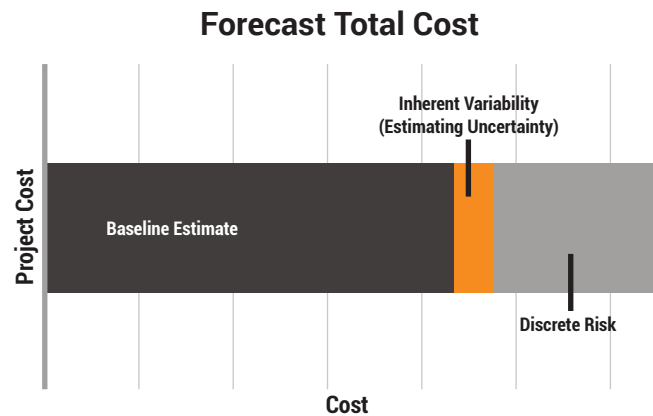
What is QCRA?

Quantitative Cost Risk Analysis (QCRA) is a technique designed to assess cost certainty and provide a 'realistic' appraisal of potential cost out turn.

A QCRA utilises an asset owners baseline estimate and adds discrete risks and inherent variability (estimating uncertainty) to create a risk loaded appraisal of the potential costs. Estimating uncertainty will typically be high at the early stages of the project, reducing as the project advances and more information is available.

A QCRA is performed within risk software and provides outcomes at various confidence intervals (0-100%), as well as a sensitivity analysis highlighting the key risks that drive the project cost. The results can be presented as per the asset owner request.

This enables the asset owner to make informed decisions on budgets and contingency requirements for the project / programme, which can be beneficial if there are any questions about affordability or feasibility.



We're active members of the **communities** we serve. That's why at Stantec, we always design with community in mind.



Why do we need QCRA?

It is well known that around two thirds of projects exceed budget and in some instances this overspend can be considerable. QCRA enables a realistic appraisal of the estimate, by calculating the contingency requirement for estimating uncertainty and risk. This provides our clients with confidence in relation to the projects exposure and the validity of the business case.

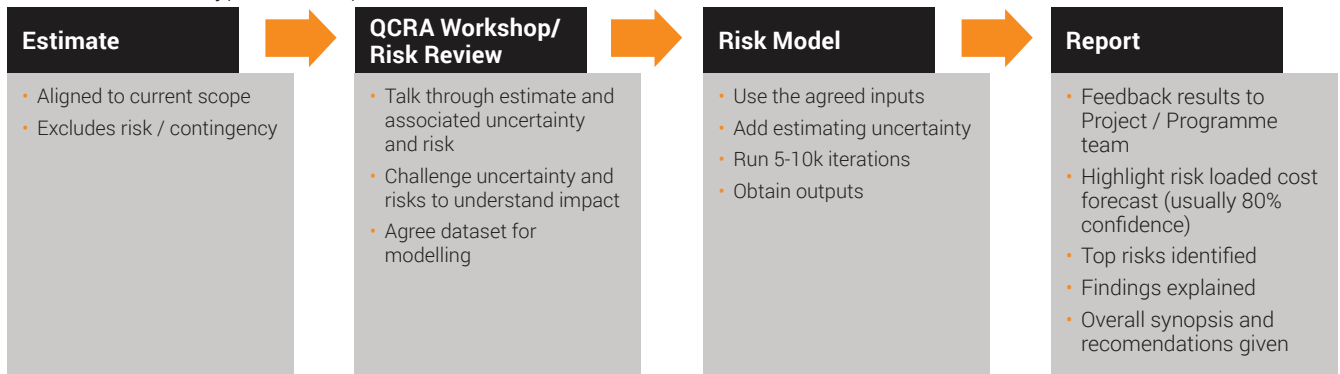
With this knowledge, informed decisions can be made, based on the realistic view of overall costs can be taken and appropriate contingency allocations set.

Where QCRA identifies an outcome that is not tolerable to the asset owner, the information from the QCRA can pinpoint key focus areas and action can be taken to recover the costs. Risk Mature organisations routinely utilise QCRA to monitor cost performance and contingency allocation and tailor response actions to suit any emerging issues.

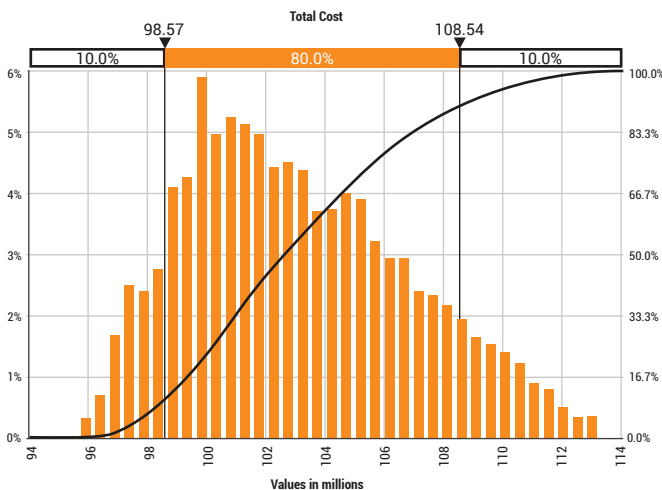
QCRA's are a powerful tool and help to avoid surprises, and fundamentally stress tests the baseline estimate, which all decisions are based on. We work with asset owners to understand their budgetary requirements and assist in interpreting and highlighting the results to ensure they achieve their desired outcomes.

QCRA Schematic

An overview of the typical QCRA process is detailed below:



QCRA output reliability links directly to input data quality and Stantec will provide appropriate challenge to ensure data robustness.



How does QCRA Work?

QCRA involves utilising the baseline estimate and identifies potential impact of uncertainty, in the form of discrete risk as well as inherent variability in estimated costs (estimating uncertainty).

A standard model typically analyses:

- Estimating Uncertainty (inherent variability in planned costs on a +/- of the estimated cost basis).
- Risk (Threats or Opportunities that could impact outputs / outcomes).

Care should be taken to ensure risks relate to the agreed scope and would have material impact on the project. This is the assurance and challenge that risk professionals offer within this analysis.

The outcome of a QCRA is achieved by modelling multiple iterations of the potential scenarios, based on the inputted data, and collating the results to produce a range of possible outcomes between 1-99% confidence. In addition to this, QCRA also assesses sensitivity so you can identify the risks that are driving the end results and target response actions to address.

Example QCRA Outputs A

S-Curve

The most common QCRA output is a cumulative frequency graph, known as an S-Curve.

This details the range of possible completion costs, at each confidence level (1-99%). It highlights the probability of achieving the estimated cost from the baseline estimate.

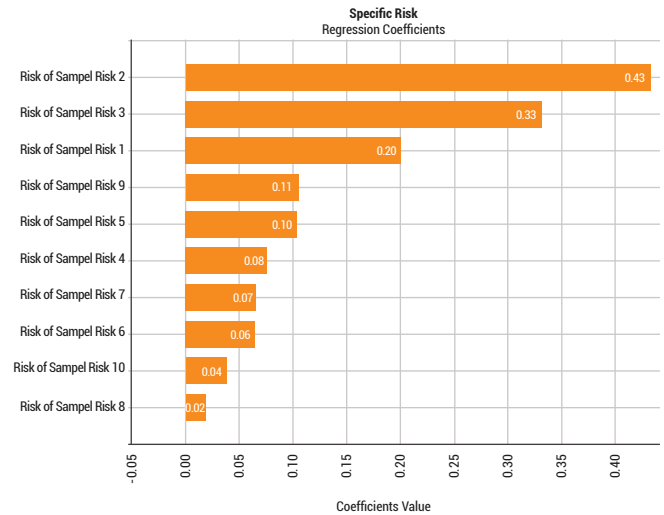
Example QCRA Outputs B

Tornado Graph

Another typical QCRA output is a tornado graph.

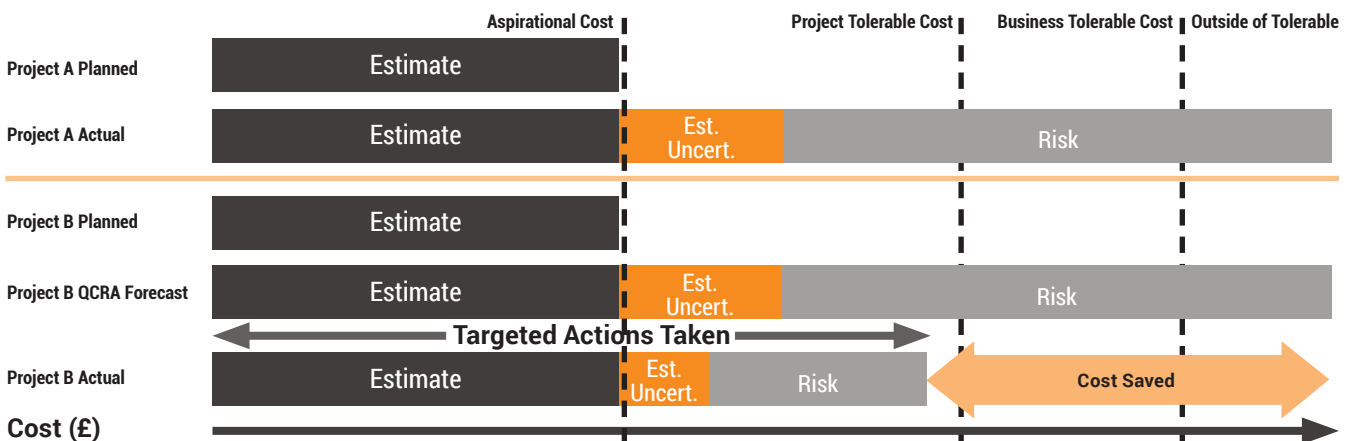
This chart identifies the risks that have most impact on the overall cost. These may, or may not, be the highest scoring risks in the register, hence is useful as it highlights areas of most concern.

This information can then be used to prioritise response actions and inform decisions.



Benefits of QCRA

- During optioneering contributes to a risk based option selection process
- Stress tests the current thinking of Anticipated Final Cost (AFC)
- Provides confidence in delivering against the actual and forecast budget
- Provides opportunity to undertake risk mitigation measures to maintain objectives prior to the risk occurring
- Empowers the Project/Programme with knowledge and information to increase chances of success
- Identifies the 'potential' costs posed, once risk has been loaded into the estimate
- Identifies key risks to budget to allow targeted actions to be prioritised



QCRA Lessons Shared

There are some common misnomers around QCRA and here at Stantec we have specialists that understand these and some of the common pitfalls.

"Completing a Quantitative Cost Risk Analysis (QRA) means that the project is ok and budget is secure"

- Remember that it's the quality of input data that drives the modelled QCRA output. A QCRA model running poor data will give an equally poor output. At Stantec, we ensure that robust Risk Management activities take place to ensure good data quality to give confidence in asset owner decision making.

"I know the project and what could go wrong and we are managing it, we don't need a QCRA"

- This may well be true but QCRA can offer a deeper dive to support your thinking. It might be that the QCRA highlights a different set of 'Top Risks', meaning you can now reprioritise your actions. In many cases, QCRA can support your existing thinking and provide assurance that the existing approach is appropriate.

"I cant run a QCRA as I don't have a detailed scope or estimate"

- You can run a QCRA on any level of detail available but inputs and results should be taken in the context of that level of detail. If you use a very high level estimate then the uncertainty and risk need to be considered at a very high level also. This means that during development stages you can test the cost outturn and key risks and make informed decisions based on the high level outcomes. You can run a more detailed QCRA once more detail is known and tailor your actions as a result.



Expert Team

All projects are different and Stantec has a team of Risk Management experts with vast experience across multiple sectors, at all levels of seniority.

Stantec Experts have:

- Worked on civil engineering mega-projects like TfL, HS2 & Crossrail.
- Delivered Quantitative Risk Analysis for some of the biggest infrastructure projects in the UK.
- Formed policy and procedure for some of the industry's leading organisations.
- Are recognised as experts in their field.
- A deep understanding of industry best practice.

Key Benefits

Stantec will:

- Work with our clients to establish a suitable level of detail for QCRA.
- Assist with preparing for analysis (if required).
- Highlight the confidence in delivering within budget as well as the risks likely to impact upon success.
- Recommend areas to focus management actions to achieve or improve upon desired outcomes.
- Take a back-to-basics approach.
- Ensure that the outputs are understood by the wider Project community, not just Risk Managers.
- Deliver a world class service that puts our clients firmly in control of their future.



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Stantec have produced this leaflet in the aim of improving project & programme management, the values and ranges within it do not represent other companies and sectors etc

