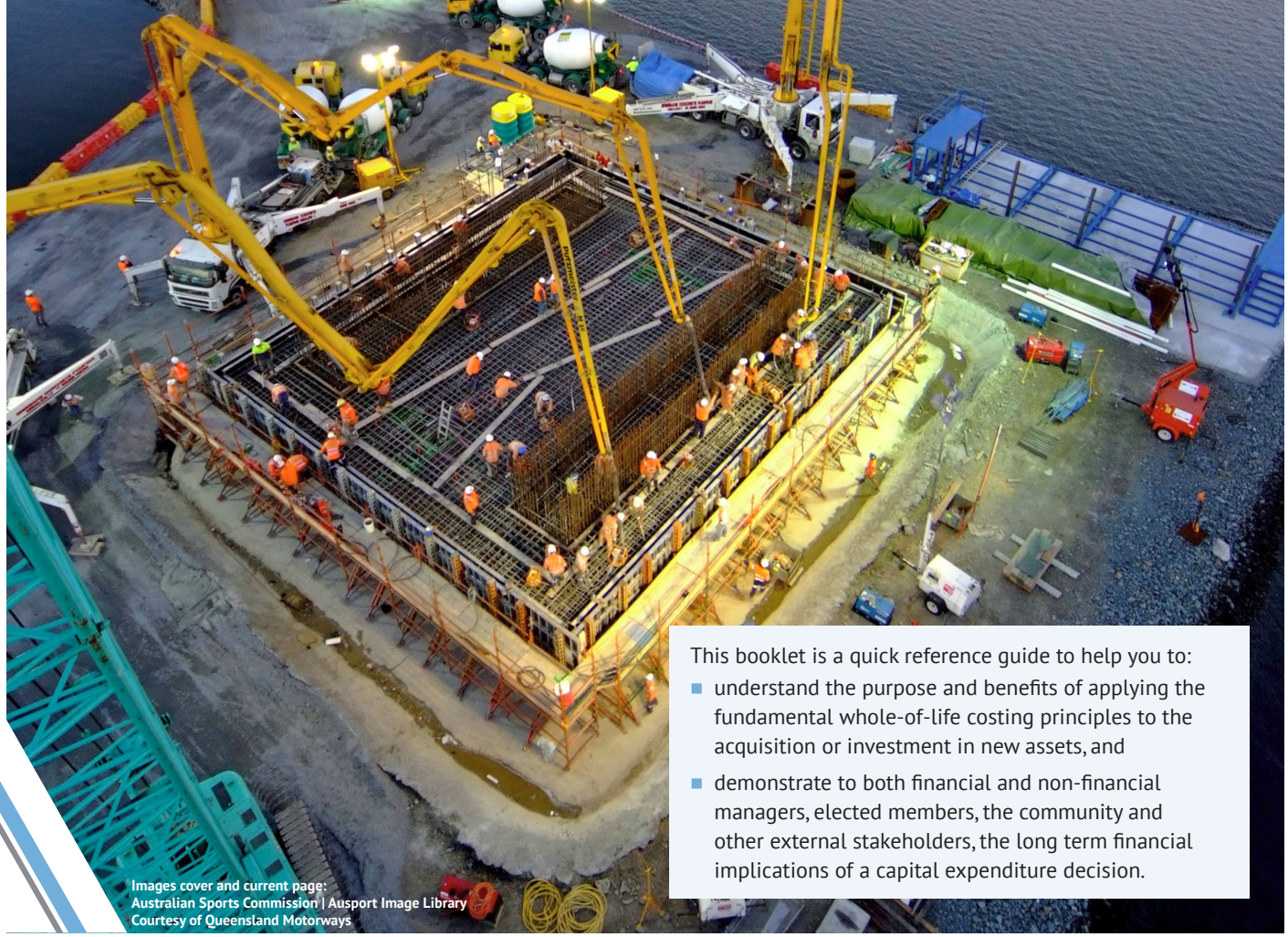
A QUICK REFERENCE GUIDE FOR ELECTED OFFICIALS AND STAFF

WHOLE-OF-LIFE COSTING

AUDAX AT FIDELIS

QUEENSLAND TREASURY CORPORATION



This booklet is a quick reference guide to help you to:

- understand the purpose and benefits of applying the fundamental whole-of-life costing principles to the acquisition or investment in new assets, and
- demonstrate to both financial and non-financial managers, elected members, the community and other external stakeholders, the long term financial implications of a capital expenditure decision.

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Whole-of-life costing and your council

Local governments are responsible for providing a range of services to the community. These services include water and sewerage, waste collection, roads and even airports. Local government services all bear similar characteristics: they are capital-intensive, have a significant fixed cost component and can incur significant ongoing maintenance and operating costs.

Given the importance of financial sustainability in local government, considering of whole-of-life costs is critical when deciding on a new service or investment. As council leaders it is imperative that the financial implications of projects are assessed not only on the upfront capital cost today but also from a whole-of-life perspective. Whole-of-life costs can include ongoing operating and maintenance, refurbishments, rehabilitation and disposal costs.

It is noted that during the 2013 financial year, the local government sector delivered capital works in excess of four billion dollars. As such it is critical that decision makers follow a well-developed project decision framework and build a robust business case prior to making investment decisions.

To support financial sustainability, local government should understand the whole-of-life costs so it can:

- engage in an informed discussion with the community about the cost versus quality of service delivery
- improve the quality of business cases
- improve long term financial forecasting
- consider the pricing of utility charges in order to promote regional growth and assess the ratepayers' ability to pay
- provide services at a cost the community is willing and able to bear, and
- make responsible decisions with the knowledge of how best to use available funds.

DEBUNKING THE MYTH

The process of evaluating a project's whole-of-life cost is often presumed to be over complicated and perplexing—in actual fact, it is quite simple! And, having a robust asset management framework in place makes the process even easier.

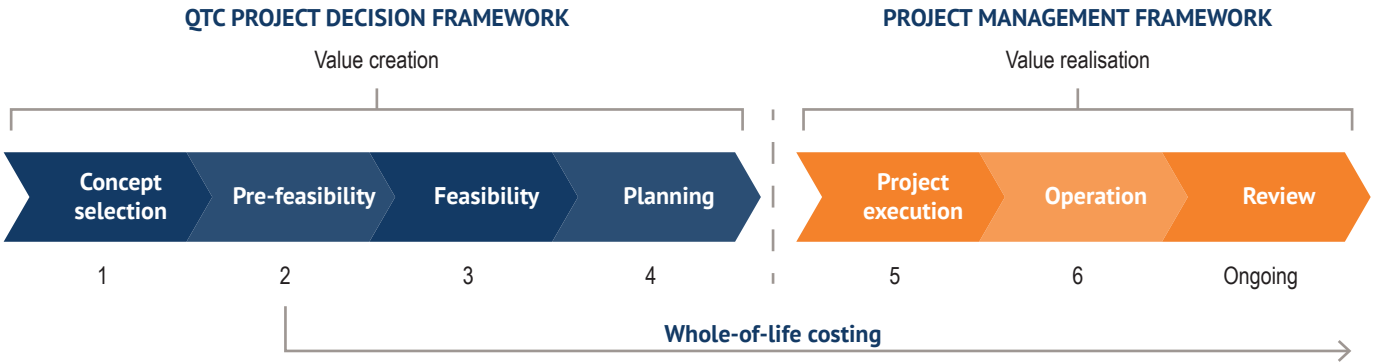
To help you along, QTC has developed a simple tool to help provide a high level indicative whole-of-life cost for a range of different assets that are often encountered in local government. Just contact your QTC Client Account Manager and ask about the Whole-of-life Costing Tool.

Role of whole-of-life costing in local government

A whole-of-life cost analysis should be an integral part of a local government's project decision framework and will generally be included in a feasibility analysis. It is fundamental to making sound investment decisions; ensuring council achieves an optimal balance between the financial capacity to provide service continuity and meeting the community's expectations in relation to the level of service.

Whole-of-life costing should be used to:

- develop a business case to assess the expected revenues, costs and risks associated with the investment
- compare the intrinsic values of project options that have different costs and useful lives
- understand the primary drivers of the asset's ongoing costs
- evaluate different operating models to find the optimal business solution on a cost basis
- prepare budgets and estimate future resource requirements, and
- evaluate the total costs when comparing replace versus refurbish scenarios.



EXAMPLE

A local government is considering a $10 million outlay to build a new community sporting complex due to growth in the region and expressions of interest from the community. Over its 50 year useful life the facility would require ongoing operating and maintenance costs as well as renovations every 10 years. The whole-of-life cost analysis of the sporting complex indicates:

- **Whole-of-life nominal cost:** $80 Million
- **Multiple-of-capital expenditure:** 8X

If the council understands these whole-of-life costs necessary to deliver, operate and maintain the complex, it will be able to more effectively discuss the issues/options with its ratepayers.

Understanding whole-of-life costing

The Strand Water Playground, Townsville. Courtesy of Tourism Queensland.

Total cost of ownership, total asset costing, life-cycle costing, net present cost; these are just a few of the terms you may have heard that refer to the financial cost of building and operating assets. Assessing a project's whole-of-life cost involves identifying not only the upfront capital cost but also the ongoing costs of ownership necessary to ensure service continuity. Such costs may include those associated with design, acquisition, construction, maintenance, operations and decommissioning or rehabilitation.

The future costs associated with owning, operating and maintaining an asset are usually significantly greater than the initial capital cost. Consideration of all of these components when assessing a range of options will allow for enhanced decision making and better financial outcomes.

When considering the investment in a community service or project it is also important to consider the external benefits that will be generated. While these may not flow through in monetary form, if two options are similar in terms of cost, it may be in the community's best interest to opt for the one that will provide the greatest social value. These factors should also be considered when presenting the business case.

Some terms you may hear

Capital expenditure: the initial cost of acquiring the asset. These costs include research, design, procurement, planning, construction, delivery, training and installation of the asset.

Useful life: the period over which an asset is expected to be available for use by an entity.

Residual value: this is an estimate of the value of the asset on disposal or at the end of its useful life—often only scrap value.

Maintenance costs: the ongoing costs required to keep the asset at the desired condition level. This includes costs such as periodic inspections, adjustments, services, cleaning, unscheduled repairs and replacement parts. The annual maintenance cost is often expressed as a percentage of the capital expenditure.

Operating costs: the ongoing costs required to keep the asset in operation. This includes costs such as consumables, energy or fuel, labour costs, licences, insurance and any third party support providers. The annual operating cost is often expressed as a percentage of the capital expenditure.

Disposal cost: costs associated with decommissioning, disposing or rehabilitating the asset. This includes costs relating to restoration and rehabilitation, tendering, administration, relocation and handover.

Discount rate: the expected cost of funding the project over its useful life (also known as cost of capital).

Nominal cost: the money that is expected to be paid when a cost falls due ('dollars of the day'). This includes price adjustments due to forecast changes to the price of inputs and efficiency gains through technological advancements.

Real cost: is a cost that has no consideration for the variances in growth and therefore removes the effects of inflation.

Discounted cost: is the value when the nominal or real cost is discounted by the appropriate discount rate. It represents the cost equivalent in today's (present value) dollars.

Capex multiple: the total cost of owning and operating the asset as a multiple of the initial capital cost.

Calculating whole-of-life cost: example one

Let's first consider a simple example where council wants to assess the total costs of owning a new vehicle added to its existing fleet.

Motor Vehicle (Cost Estimation)

- Capital expenditure: the vehicle's purchase price of $50,000
- Useful life: the vehicle will be used for four years
- Residual value: trade-in value at the end of its useful life will be $10,000 (20 per cent of the initial purchase price)
- Annual maintenance cost: the maintenance cost will be $1,500 per annum in today's dollars (3 per cent of the purchase price)
- Annual operational cost: the operating cost will be $5,000 per annum in today's dollars (10 per cent of the purchase price)
- Other cost: due to the nature of the vehicle's usage it will require a new suspension system in year two with an estimated cost today of $2,500
- Disposal cost: the cost to dispose the asset at the end of its useful life will be $300
- Discount rate: the discount rate to be used in this example is 5.5 per cent
- CPI: inflation over the life of the asset is estimated to be 2 per cent per annum

HOW IT IS CALCULATED

Whole-of-life Cost = Capital Expenditure + Total Maintenance Costs + Total Operating Costs + Other Costs + Disposal Costs – Residual Value

The following calculation, over the life of the asset, provides an estimate of the vehicle's whole-of-life cost

	Purchase Date	Year1	Year2	Year 3	Year4
Asset purchase (capital expenditure)	$50,000				
Maintenance cost (3% p.a. at 2% CPI)		$1,530	$1,561	$1,592	$1,624
Operating cost (10% p.a. at 2% CPI)		$5,100	$5,202	$5,306	$5,412
Other cost (new suspension)			$2,601		
Disposal cost					$325
Residual value					$10,000
Total cash flow (nominal)	**$50,000**	**$6,630**	**$9,364**	**$6,898**	**$2,639**
Discounted cash flow*	$50,000	$6,455	$8,641	$6,034	$2,188
Nominal whole-of-life cost	**$70,252**	The total costs that will be paid over the asset's useful life			
Discounted whole-of-life cost	**$68,941**	The total cost of owning the asset in today's (present value) dollars			
Capex multiple (nominal)	**1.4X**	The total cost of owning the asset will be 1.4 times the initial cost of acquisition			

*Assuming mid-period discounting

POINT TO NOTE

Nominal costs include the effects of real growth and inflation and are generally used in budgeting and forecasting. They represent the actual payment that is expected to be made at the time it will occur.

Discounting the nominal costs is generally performed in order to reach a net present cost (the equivalent cost in today's dollars), and can be used as a basis for comparing options.

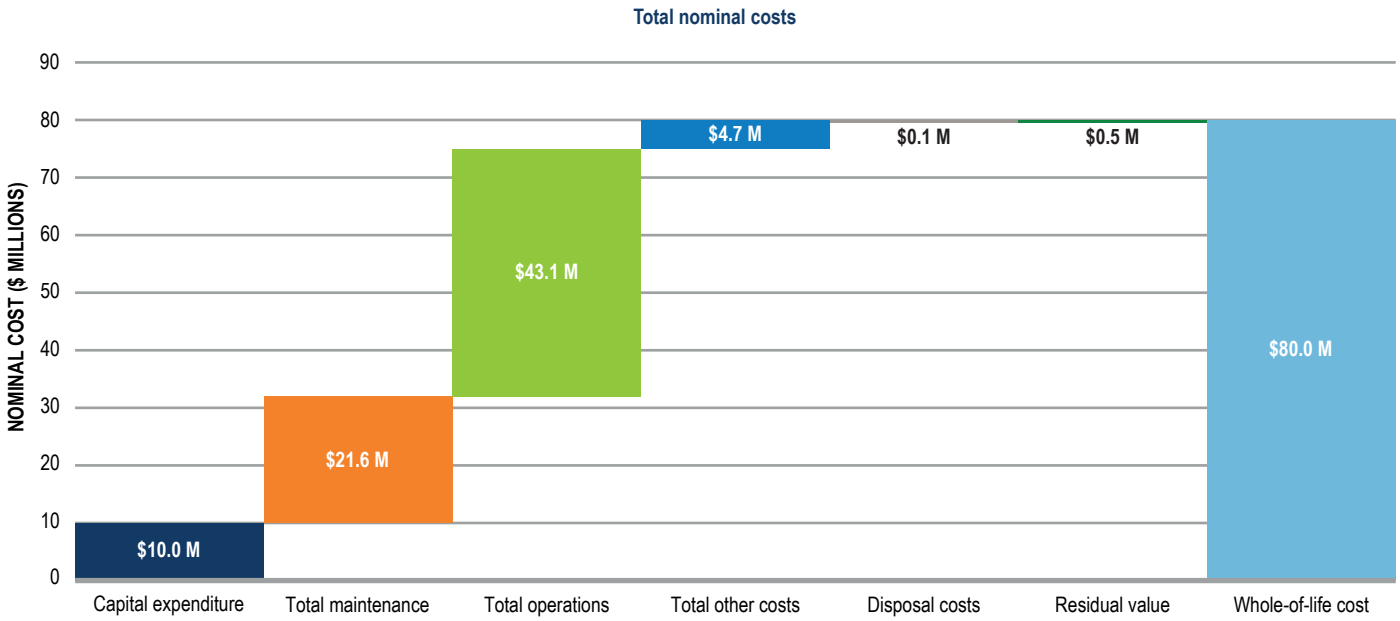
Calculating whole-of-life cost: example two

Let's now consider a second more complex example. Due to community demand a council is considering the construction of a new community sporting complex with an expected initial outlay of $10 million. If the council understands the whole-of-life costs to deliver, maintain and operate this asset it will be able to more effectively discuss the issues and options with the community.

Community Sporting Complex (Cost Estimation)

- Capital Expenditure: the sporting complex has design, planning and construction costs estimated to be $10 million
- Useful life: the facility will have a useful life of 50 years
- Residual value: it will have a residual value of $500,000 (nominal) at the end of its useful life
- Annual maintenance cost: the maintenance cost will be $250,000 per annum in today's dollars (2.5 per cent of the purchase price)
- Annual operational cost: the operating cost will be $500,000 per annum in today's dollars (5 per cent of the purchase price)
- Other costs: it is likely the complex will require renovations every 10 years (years 10, 20, 30 and 40) at a cost of $700,000 in today's dollars for each renovation
- Disposal cost: the cost to dispose the asset at the end of its useful life will be $35,000
- Discount rate: the discount rate to be used in this example is 5.5 per cent
- CPI: inflation over the life of the asset is estimated to be 2 per cent per annum

Skilled Park, Gold Coast. Image courtesy of Stadiums Queensland



	Capital expenditure	Whole-of-life cost	Capex multiple	
Total nominal costs (budgeting)	$10 million	$80 million	8.0X	Over the life of the asset, Council would expect to incur $80 million in outgoing cash payments, representing eight times the upfront capital cost
Total discounted costs (decision-making)	$10 million	$30 million	3.0X	The total cost of owning the asset in today's dollars is $30 million, representing three times the upfront capital cost

Calculating whole-of-life cost: example three

State Library

REPLACE VERSUS REFURBISH

Councils are often faced with the decision to replace an asset with a new one or refurbish the existing one. This example steps through a business case where a council is looking to either refurbish its existing library or construct a new one. The costs listed in the tables below are presented as the expected costs today.

Example 3 – Replace versus refurbish community library

	Option 1 – replace	Option 2 – refurbish
Initial capital expenditure	$3 million	$1.7 million

Given the two options above to replace or refurbish the library, at first glance it would appear that the option to refurbish appears the most cost effective. Considering only the upfront capital expenditure in decision-making is something that can easily occur but can have a long term financial impact. Although refurbishing may appear to be the most financially appropriate option, council cannot be certain until a complete assessment has been made from a whole-of-life cost perspective. After further evaluation the following schedule was put together by the council.

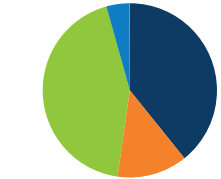
	Option 1 – replace	Option 2 – refurbish
Initial capital expenditure	$3 million	$1.7 million
Useful life (years)	40	40
Residual value	$300,000	$220,000
Annual maintenance cost	$45,000 (1.5% p.a.)	$68,000 (4% p.a.)
Annual operating cost	$150,000 (5% p.a.)	$187,000 (11% p.a.)
Other cost (renovations)	$200,000 (years 10, 20 and 30)	$350,000 (years 10, 20 and 30)
Disposal cost	$15,000	$15,000
Discount rate (% p.a.)	5.5%	5.5%
CPI (%p.a.)	2.0%	2.0%

When choosing between two mutually exclusive investment options the generally accepted method is to compare the discounted (today's dollar) costs. The lower the cost (the less negative the whole of life cost), the better the investment option. By comparing the whole of life costs to construct, operate and maintain the new library centre used in this example, versus the costs to refurbish the existing facility, the whole of life cost suggests that the best financial outcome would be to replace the asset given its lower discounted cost.

	Nominal		Discounted	
	Whole-of-life cost	**Capex multiple**	**Whole-of-life cost**	**Capex multiple**
Replace	$15.6 million	5.2X	$7.6 million	2.5X
Refurbish	$18.8 million	11.1X	$7.9 million	4.6X

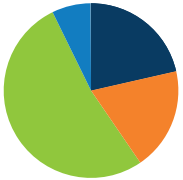
TOTAL DISCOUNTED COSTS

Replace



- Capital expenditure **$3,000,000**
- Total maintenance **$997,645**
- Total operations **$3,325,484**
- Other costs **$325,879**
- Disposal costs **$3,996**

Refurbish

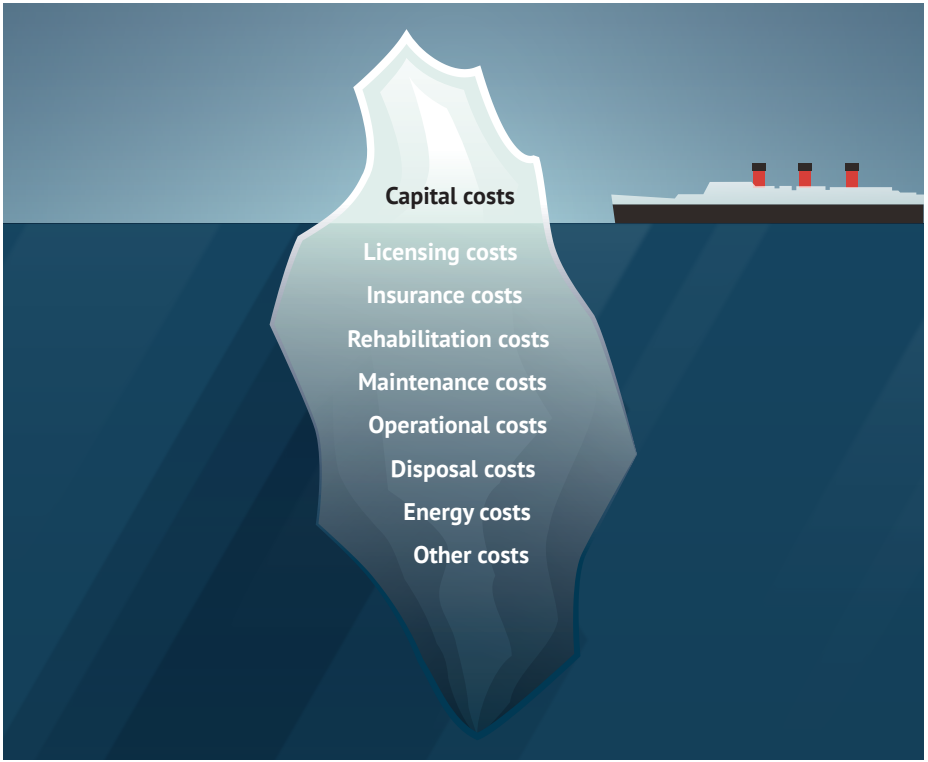


- Capital expenditure **$1,700,000**
- Total maintenance **$1,507,553**
- Total operations **$4,145,770**
- Other costs **$570,288**
- Disposal costs **$3,996**

Risks of not taking a whole-of-life cost perspective

Failure to consider the whole-of-life costs can result in:

- too much focus on the initial capital cost without considering the financial implications of future operating and maintenance expenditures
- making a poor investment decision by failing to consider a better use of funds from a financial perspective
- increased pressure on ratepayers to support any additional debt or costs that were not thoroughly assessed by council
- reduced level of service and insufficient upkeep due to underestimating or poorly assessing the necessary operating and maintenance costs, and
- a suboptimal investment decision such as making an uninformed choice between various options (eg, refurbishing an existing asset or purchasing new).



Major challenges for councils

Change in mindset

Making better investment decisions starts with a change in mindset. QTC encourages local government to consider a whole of life perspective rather than just the upfront capital cost.

Robust costing analysis and forecasting

Determining the whole-of-life costs requires a detailed understanding of all the costs of delivering a service, now and into the future. This involves having the data and processes in place to forecast capital expenditure, operating costs, maintenance costs, disposal costs and any other costs that are likely to occur during an asset's useful life. Missing, incomplete or poor quality data can undermine the usefulness of the whole-of-life cost estimates. Forecasts should be updated regularly as better information becomes available.

Consistency with asset management plans

A key element of whole-of-life costing is to ensure its consistency with council's asset management plans. A whole-of-life cost analysis should incorporate all costs identified in the draft asset management plan. A poor or incomplete cost schedule could result in large unexpected costs that create pressure not only to sustain the promised standard of service but also on ratepayers to cover the shortfall.

Historical under-recovery of service delivery costs

For local governments that have historically under-recovered their costs, the consideration of whole-of-life costs during the evaluation phase will also assist in determining the pricing levels necessary to cover the facility's total capital, maintenance and operational costs. This will help determine the practicality of the investment from a pricing perspective, indicating whether the price of the service will be too great an impost for the community. This may require council to consider other options at a different cost benefit trade-off.

Service level changes

A local government may choose to inform the community of the pricing necessary to cover the whole-of-life cost of a service at different service levels. Engaging with the community and having the conversation about expected service delivery standards will enable councils to select the optimal solution based on the level of service the community is willing to pay for.

The way forward

Regardless of the circumstances, it is vital that local governments understand the whole-of-life costs before making investment decisions. When assessing the suitability of projects, council should consider:

- the impact on the community's capacity to pay for the ongoing maintenance and operating costs at the expected level of service
- whether the asset meets the needs and requirements of the council, and
- the impact on council's long-term financial sustainability.

For many local governments, whole-of-life costing may require a significant shift in thinking about project decision-making and how the costs of maintaining and operating long-life infrastructure assets will be covered by the community.

QTC recommends the following road map to facilitate a local government's understanding of the whole-of-life costs for any investment decision:

- ensure asset managers and finance officers work together to harmonise forecasts relating to whole-of-life planning for capital expenditure, asset maintenance, operations and disposal
- develop a schedule of the whole-of-life costs associated with acquiring an asset, supported by robust financial forecasting tools and processes
- compare whole-of-life options: replacement, refurbishment, outsourcing, resource sharing, leasing as well as the build-and-own approach
- assess options for how the whole-of-life costing approach can be spread evenly across user groups and whether the chosen option is practical, and
- evaluate at the idea stage the high level indicative whole-of-life cost of the investment using QTC's whole-of-life costing tool.

Tools at your disposal

In order to help you become the advocate for whole-of-life costing principles at your council, QTC has developed a Whole-of-life Costing Tool—a quick and simple tool that provides a high level guide to both the nominal and discounted whole-of-life costs associated with owning, operating and maintaining an asset.

The tool offers the user two options:

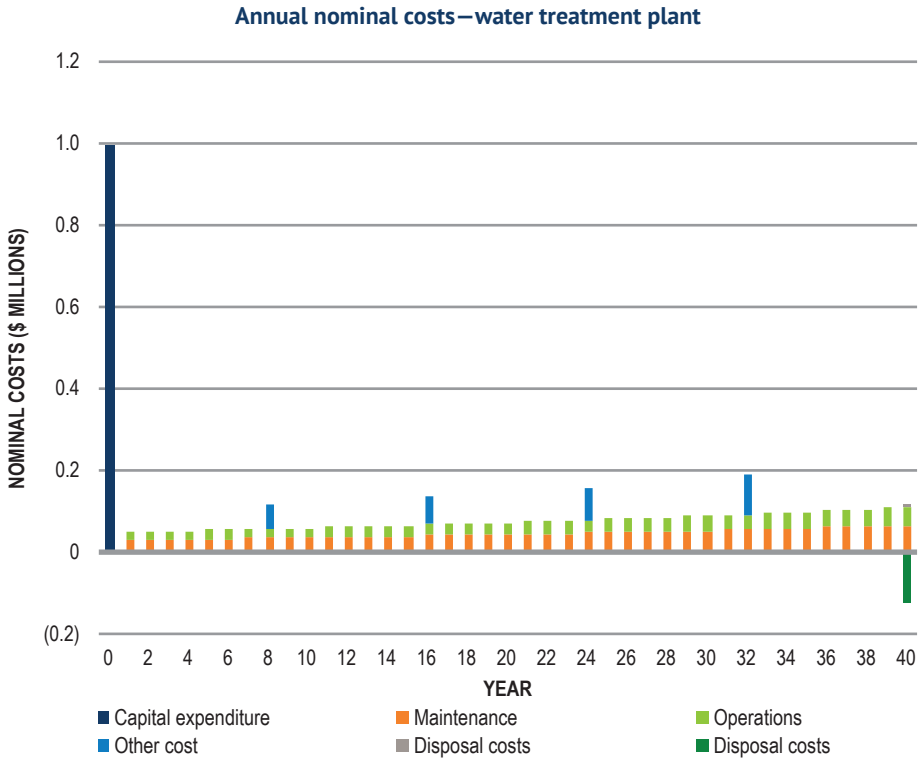
Selection of asset type from a default list:

- This option pre-populates useful life, residual value, annual maintenance and operating expenses with data commonly observed in local government.

Custom input:

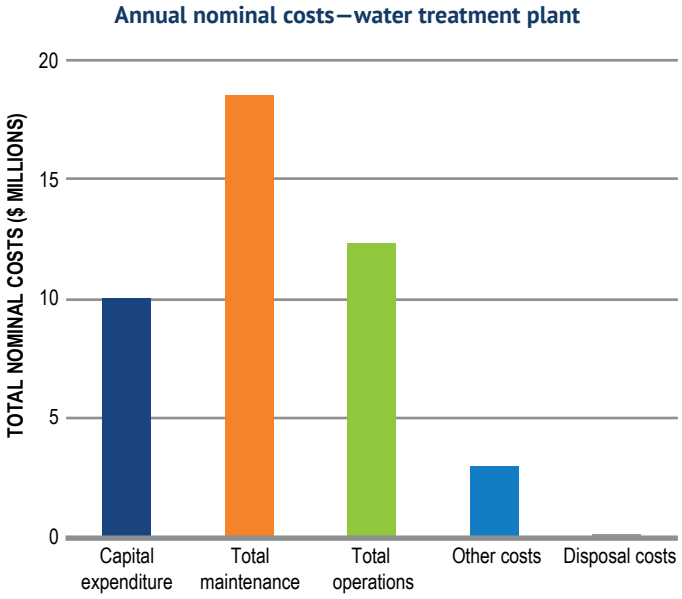
- Provides the user with the option to completely customise all cost inputs, and

Contact your QTC Client Account Manager and request a copy today.



WHOLE-OF-LIFE COST AND CAPEX MULTIPLE

Nominal whole-of-life cost	**$42,701,004**	**4.3X**
Whole-of-life cost without the consideration of time value		
Discounted whole-of-life cost	**$22,043,910**	**2.2X**
Whole-of-life cost on a discounted cash flow basis		



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QTC provides training courses on many aspects of financial management tailored to your council. These courses are facilitated by highly qualified professionals with extensive experience working with local governments and can assist you to take the first step on this important journey.

Councils interested in learning more about QTC's financial management training options can contact QTC on 07 3842 4600 or through your QTC Client Account Manager.

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