BUILDING QUEENSLAND

ETCS – INNER CITY PROJECT BUSINESS CASE

COST BENEFIT ANALYSIS SUMMARY

May 2016

PROJECT NAME	ETCS – INNER CITY
Location	Brisbane inner city rail network
Project Owner	Department of Transport and Main Roads
Delivery Agency	Queensland Rail
BCR	2.9
Estimated Cost of Delivery	$634m
NPV	$1.01b
Productivity Benefits	$265m

1.1 The ETCS – Inner City Project

In February 2016, the Queensland Government requested that Building Queensland lead the development of a Business Case for the European Train Control System (ETCS) – Inner City project, in conjunction with the Department of Transport and Main Roads and Queensland Rail.

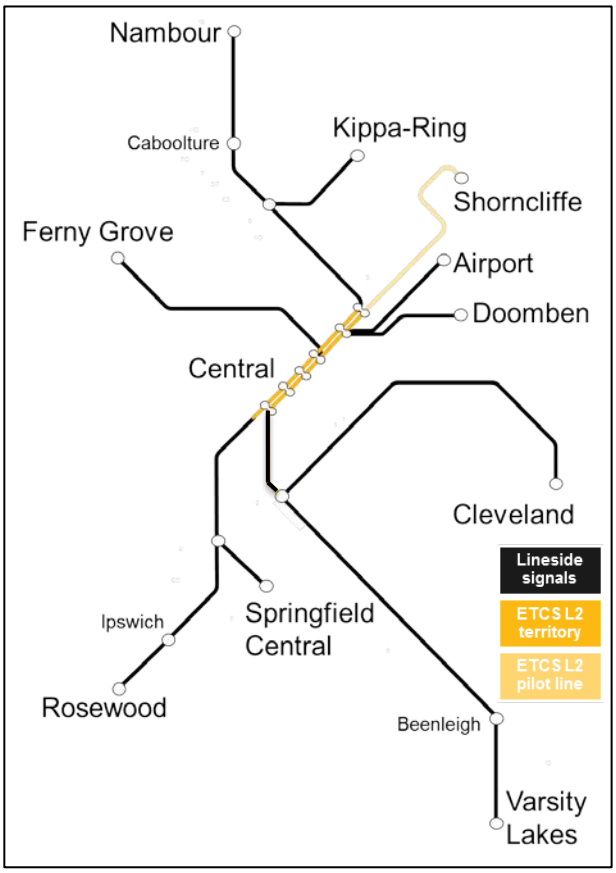
The ETCS – Inner City Project delivers a complete overhaul of the inner-city rail signalling and communications system with new, state-of-the-art equipment.

ETCS Level 2 is a new generation of train protection and control for the rail network in SEQ, providing automated train protection and communications-based signalling.

Geographically, the scope of the project has been identified as the area of the network between Northgate and Milton stations. This area encompasses the key area of the network through which all trains must pass, and includes Roma Street, Central, Fortitude Valley and Bowen Hills stations.

Lineside signals would be progressively removed from the network as they would no longer be required. To support ETCS L2, the project replaces and upgrades a number of existing signalling and telecommunications systems that are nearing end-of-life and are due for replacement. The major capital elements are:

- ETCS L2 Equipment – equipment specific to the ETCS L2 system such as on-board train equipment, balises on track and Radio Block Centres.
- Data radio – the wireless telecommunications network to facilitate communications between the trains and the signalling infrastructure.
- Fixed Telecommunications Network – the wired



Geographic Scope of the ETCS – Inner City Project

telecommunications network to facilitate communications between the various components of the system.

- Trackside Infrastructure – the equipment associated with existing lineside signalling and ETCS L2 signalling which ensure that routes proposed by the Network Controller are safe to set.
- Traffic Management System – the interface provided to the Network Controller to control and monitor the state of the network.
- Interoperability – the process and associated systems to enable non-commuter trains to operate within the ETCS – Inner City network.

1.2 The Business Case

The ETCS – Inner City business case was developed utilising the Building Queensland Detailed Business Case – Template and Guide.

The business case assessed the feasibility of introducing ETCS Level 2 to the inner city rail network, to enable a higher frequency of train services and improve reliability on the most constrained part of the network.

Key benefits identified in the business case include:

- increasing capacity of the northern and western main lines to cater for growth in passenger demand
- reducing the risk of overspeed and signals passed at danger (SPADs) on the inner-city network.

A detailed economic appraisal was undertaken for the Project as part of the business case. It was developed to inform the type and magnitude of project beneficiaries and costs.

Section 17(1)(a) of the *Building Queensland Act 2015* (the Act) requires that Building Queensland publish a summary, as approved by the Board of Building Queensland, of each Cost Benefits Analysis (CBA) undertaken as part of the development of any business cases that Building Queensland leads.

1.3 CBA Methodology

Section 14(3) of the Act requires the CBA to be prepared using a method, approved by Building Queensland that enables any infrastructure proposal to be compared.

A detailed CBA was undertaken as part of the business case to test the project's economic viability. CBA is universally applied to investment decision making for infrastructure in Australia. Its principles are accepted as the most appropriate tool to measure the direct contribution to economic and social objectives. It measures the direct impacts of public sector investment relative to whole-of-life costs.

In this regard, CBA provides a common and consistent way of evaluating investment cases where the tools are applied uniformly across projects. CBA seeks to demonstrate the efficiency and productivity gains to be generated from investing in infrastructure by quantifying the net impacts to society at large.

The CBA framework used to develop the economic appraisal for the ETCS – Inner City Project follows guidance set out and contained within industry accepted economic appraisal guidelines, adapted to project specific parameters. These guidelines include:

- The National Guidelines for Transport System Management (NGTSM), 2015. These guidelines are currently being updated from earlier revisions in 2006. Guidance contained within the NGTSM (2015) has been utilised as the preferred source of contemporary economic values.
- Cost Benefit Analysis Guide: Supporting Business Case Development, Building Queensland, April 2016.

- **Infrastructure Australia, 2013.** Reform and Investment Framework. While these guidelines do not provide specific monetary unit values and parameters for use in the economic appraisal, the economic appraisal has been developed in accordance with the principles identified in the framework (including, for example, the discount rate and sensitivity analysis).
- **Austroads, 2012. Guide to Project Evaluation: Parts 1-8.** The Austroads' suite of evaluation guidelines sets the foundation for transport appraisal in Australia. Principles adopted from these guidelines have been used where they are not covered in the NGTSM.

The CBA valued the economic benefit of increased rail network capacity and reliability, compared to the capital, operational and rollingstock costs.

1.4 Assumptions

The key assumptions used in the Cost Benefit Analysis include:

ETCS – INNER CITY ECONOMIC APPRAISAL ASSUMPTIONS		
PARAMETER	**ASSUMPTION**	**SOURCE**
Discount rate	A central rate of 7% real Sensitivities provided at 4% and 10%	Infrastructure Australia
Price year	December 2015	Adopted from cost estimates developed by the ETCS – Inner City Project Cost and Risk Advisor
Evaluation period	30 years of benefits post construction	NGTSM (2015)
Indexation	Unit costs and parameter values indexed from the price year by the Consumer Price Index (including sub-categories as appropriate) and Producer Price Index.	Australian Bureau of Statistics (2016)
Unit costs	Adopted from NGTSM and related sources	NGTSM (2015)

Conventional transport user benefits are calculated through estimates of consumer surplus and generalised costs, in this instance, calculated within the transport model.

1.5 CBA Results

The CBA demonstrated that there are significant discounted economic benefits in excess of the discounted costs, with the ETCS – Inner City Project returning a Benefit Cost Ratio (BCR) of 2.9.

The Net Present Value (NPV) of the ETCS – Inner City Project is $1.01 billion.

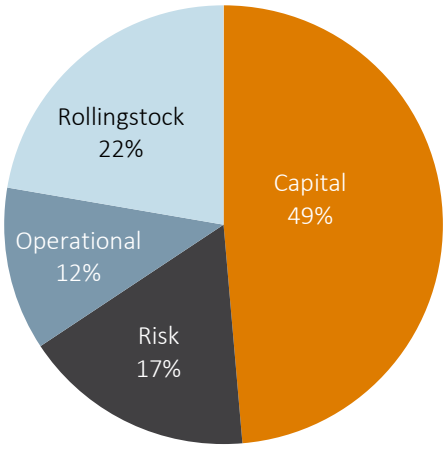
A number of sensitivities were modelled as part of the CBA to test the robustness of the calculation.

Rail operations and transport modelling shows that implementing the ETCS – Inner City Project would provide significant benefits to the rail network in terms of improved capacity and reliability.

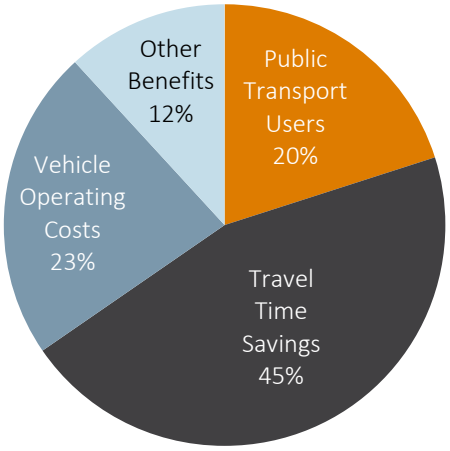
The CBA establishes that the ETCS – Inner City Project delivers benefits to public transport, road users and the wider community.

The relative proportions of the elements of project benefits and costs are illustrated in the following charts.

ETCS - Inner City Project Costs



ETCS - Inner City Project Benefits



1.6 Productivity Gains

Consistent with the requirements of s14(2) of the Act, the business case identifies the productivity gains that are anticipated from the project.

Well-targeted transport investment results in significant, long term productivity benefits for local, regional and national economies. Productivity is the efficiency of transforming inputs (including capital and labour) into outputs (goods and services).

Reduced transport costs result in a reduction in costs of doing business, lowering the costs of production and increasing the efficiency of business interactions.

Productivity gains for ETCS – Inner City have been derived by identifying work related benefits as a sub-set of the benefits identified in the CBA in the order of $265 million (in net present value terms).