BUILDING QUEENSLAND

BEERBURRUM TO NAMBOUR RAIL UPGRADE DETAILED BUSINESS CASE 2016

BUSINESS CASE SUMMARY

D17/5216

Purpose of this document	This document provides an overview of the Beerburrum to Nambour Rail Upgrade Detailed Business Case 2016. The primary objectives of this document are to outline the key aspects of the project and provide transparency for how the business case was developed and how the project may be implemented.
Status	This summary was prepared based on the contents of the detailed business case that was presented to the Building Queensland Board in Q4 2016. The information presented may be subject to change as the proposal progresses through future stages of development, delivery and operations.

Publication date: January 2018

CONTENTS

1 Summary information

Project name	Beerburrum to Nambour Rail Upgrade Project (B2N project)	
Location	The 39-kilometre section of the North Coast rail line between Beerburrum and Nambour stations, to the north of Brisbane in South East Queensland.	
Proposal owner	Department of Transport and Main Roads	
Proposed delivery agency	Queensland Rail	
Capital cost of proposal[1] (P90)	$784 million (nominal)	$706 million (real)
Incremental ongoing cost of proposal[2] (P90)	$243 million (nominal)	$123 million (real)
Net present value (NPV)	$262 million (P50 costs)	$207 million (P90 costs)
Benefit cost ratio (BCR)	1.48 (P50)	1.35 (P90)

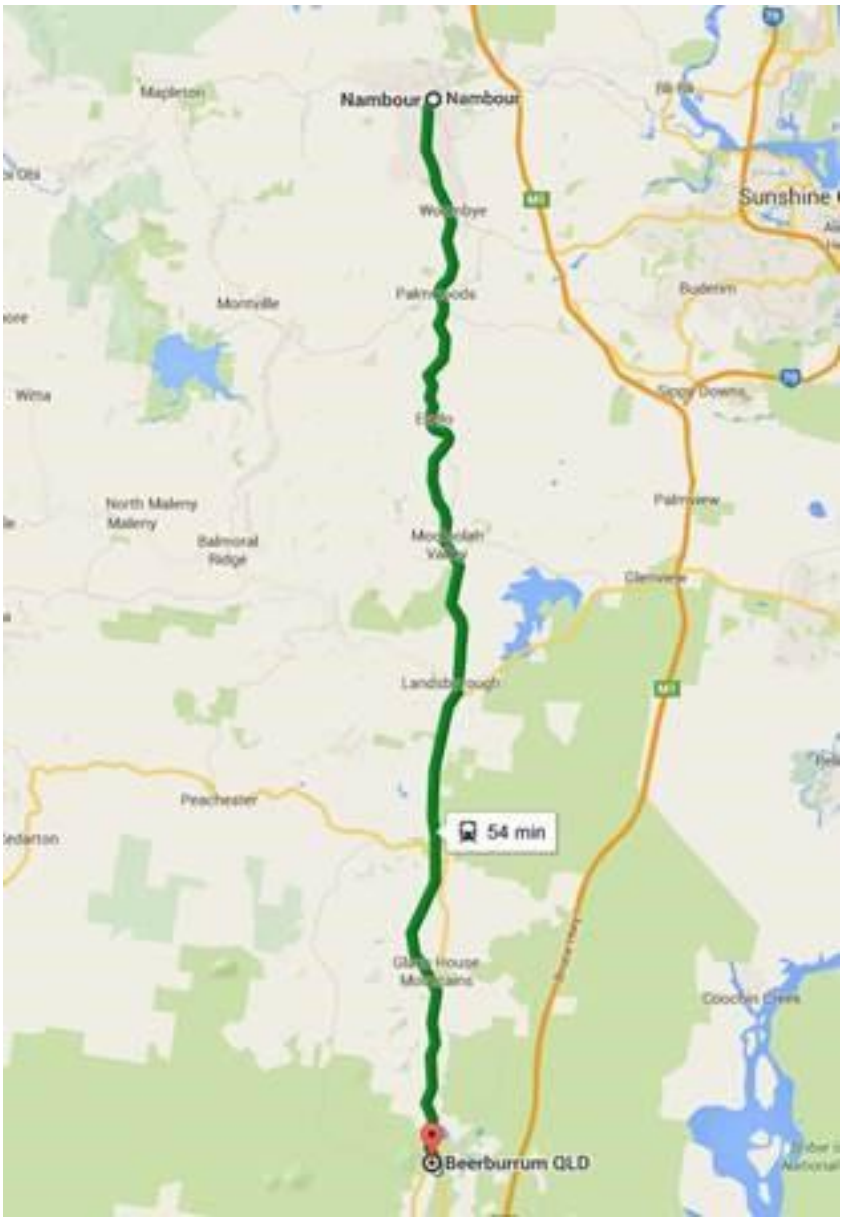
[1] Nominal capital cost estimates are undiscounted 2016 dollars and rounded to the nearest million.
[2] Nominal ongoing operating and maintenance costs, undiscounted 2016 dollars and rounded to the nearest million.

2 Proposal overview

The North Coast rail line is approximately 1,680 kilometres in length, spanning from Brisbane (within the South East Queensland passenger rail network) to Cairns in Far North Queensland. It forms part of the Australian Government's National Land Transport Network. The North Coast line caters for a mix of passenger transport and essential freight movements including high speed passenger tilt trains, containerised freight services and cattle trains.

The Beerburrum to Nambour Rail Upgrade Detailed Business Case (B2N project) evaluated proposed upgrades to address the reliability, safety and capacity of the North Coast line between Beerburrum and Nambour, as shown in Figure 1. The upgrades include rail duplication between Beerburrum and Landsborough and other infrastructure upgrades, such as station upgrades and additional passing loops between Landsborough and Nambour.

Figure 1: B2N project location



The B2N project contributes to the objectives of the Australian Infrastructure Plan, including greater productivity and connectivity, through the capacity improvements generated by the rail duplication and improved operational efficiency from the construction of additional platforms and passing loops. The project is identified as a near-term (within five years) 'priority initiative' on Infrastructure Australia's Infrastructure Priority List as well as the State Infrastructure Plan (2016). Building Queensland's Infrastructure Pipeline Report (December 2016) recognised it as a priority for investment consideration.

The B2N project is a critical part of a strategic plan to improve the overall efficiency of the North Coast line. There are a number of projects being undertaken by other areas within the Queensland Government, in line with the priorities identified in the Department of Transport and Main Road's Moving Freight Strategy (2013). Duplication of the Beerburrum to Nambour section of the North Coast line is explicitly mentioned in this strategy as a key transport investment priority and is expected to contribute to achieving the objective of expanding the use of rail freight through improving the efficiency, availability and capacity of the freight paths on the North Coast line.

3 Service need and problem statement

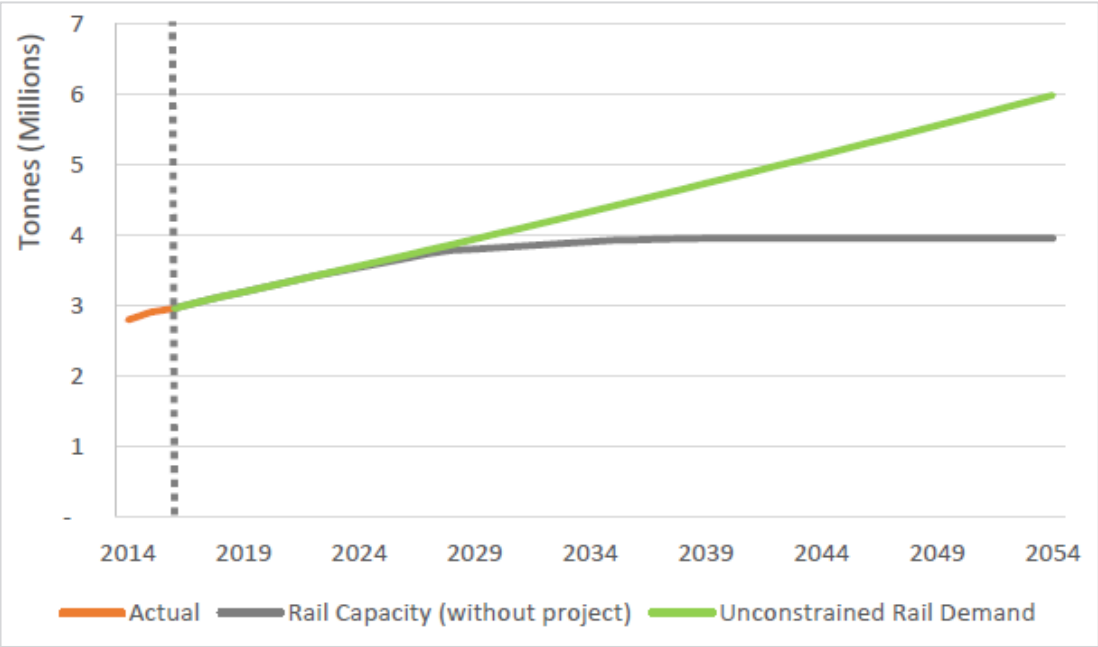
The current rail line between Beerburrum and Nambour consists of a single bi-directional line, with passing loops at stations only. The existing infrastructure restricts operating speeds due to poor horizontal and vertical track alignment and the presence of numerous level crossings. The lack of functional crossing loops also restricts the ability to pass a freight train with another train causing conflicts between freight and passenger services. Poor track alignment and level crossings increase the operational and maintenance costs of the line and decrease the competitiveness of rail as a reliable and efficient mode of transport for both freight and passenger movements. Furthermore, there is a curfew placed on freight operations during the weekday morning and afternoon passenger peak periods, leading to decreased commercial path availability to freight operators.

Several studies over the last 15 years have determined that the ability of the North Coast line to effectively meet current and future passenger and freight transport demand is hindered by constraints in the 39-kilometre bi-directional segment of the North Coast line between Beerburrum and Nambour. This segment of the rail line is already operating at 86 per cent track utilisation—this is in excess of the Australian Rail Track Corporation's 65 per cent threshold for a single-track line. The current operational capacity leaves little ability to respond to even minimal disruptions to planning service, causing significant delays.

Freight demand

By 2023, currently available operator-preferred freight paths on the North Coast line will be at capacity and from this point onwards, additional freight will have to travel via road, given the insufficient availability of train paths between Beerburrum and Nambour. Figure 2 illustrates the capacity of existing rail infrastructure to cater for freight against forecast future demand.

Figure 2. Forecast demand for freight

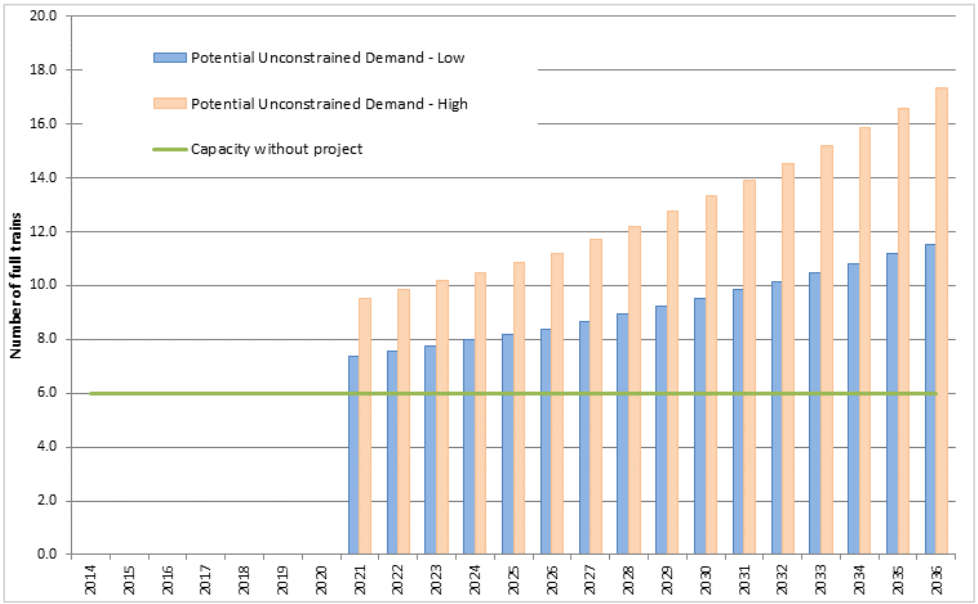


Passenger demand

The South East Queensland population is forecast to grow by over 1.6 million between 2014 and 2036. The forecast growth and increasing dislocation of employment centres from residential areas is expected to increase passenger demand on the Beerburrum to Nambour section of the North Coast line by approximately 3–4 per cent per annum on a compounding basis.

Existing infrastructure is already at capacity in the morning peak period and by 2036, unconstrained demand is expected to exceed available capacity by at least 90 per cent (low forecast) based on existing infrastructure. Figure 3 illustrates the forecast unconstrained potential demand to 2036 during the two-hour morning peak period.

Figure 3. Forecast potential 2-hour morning peak inbound rail demand



4 Options assessment

The preliminary evaluation considered the outcomes of the project's strategic assessment of service requirement and the South East Queensland Capacity Improvement (SEQCI) Project to address the issues facing the 39-kilometre section of the North Coast line between Beerburrum and Nambour, and prioritised them in accordance with the options hierarchy outlined in the State Infrastructure Plan (2016). The following options were considered:

- non-infrastructure, including improving corridor service and the use of peak spreading. The preliminary evaluation found these options are unable to materially contribute to improvement in the strategic outcomes sought by the Department of Transport and Main Roads and the service requirements of the corridor
- upgrades to existing infrastructure, including duplication from Beerburrum to Landsborough on the current alignment
- new infrastructure.

A range of new infrastructure related options were tested through the preliminary evaluation review:

- Option 1—Duplication from Beerburrum to Landsborough on the current alignment (existing corridor): the assessment found it unfeasible to duplicate the track from Beerburrum to Glass House Mountains on the current alignment, due to speed restrictions for rail services on the current alignment, the inability to future-proof for any additional tracks and environmental, property and topographic constraints.
- Option 2—Duplication from Beerburrum to Landsborough on a new alignment (protected corridor): the assessment found Option 2 a preferred solution to progress through for further assessment due to land requirements accommodating up to four tracks.
- Option 3—Duplication from Beerburrum to Glass House Mountains on a new alignment and duplication from Glass House Mountains to Landsborough, predominantly within the existing rail corridor.

The preliminary evaluation recommended Option 3 plus sub-options as the preferred option to progress to the detailed business case stage. The sub-options comprised grade separation of the Caloundra Street level crossing in Landsborough and of the Barrs Road level crossing near Glass House Mountains, stations upgrades and platform duplications from Landsborough to Nambour and an extension of passing loops at optimal locations between Landsborough and Nambour.

Option 3 plus sub-options provided better value for money as it provided the same rail capacity and operational benefits, with lower property and road reconstruction impact, and at significantly lower cost than Option 2. Option 3 presented lower capital, whole-of-life and out-turn costs and a higher benefit cost ratio than Option 2.

Option 3 was taken forward in the detailed business case as the reference project.

5 Proposal scope

The reference project is defined as a scenario where the B2N project is delivered. The reference project excludes any unfunded projects in the future network. At a high level, the reference design includes the duplication of the North Coast line between Beerburrum and Landsborough and a range of other infrastructure improvements between Landsborough and Nambour to enhance the benefits of the duplication. The reference design also incorporated feedback from the community during stakeholder consultation undertaken throughout the detailed business case stage.

The project comprises the following key features:

- full rail duplication (two new tracks) of the section between Beerburrum and Glass House Mountains within the protected corridor on an improved alignment
- duplication of the section between Glass House Mountains and Landsborough primarily within the existing rail corridor
- extension of existing passing loops at Landsborough, Eudlo and Woombye stations
- road realignments to accommodate the new rail corridor and track infrastructure
- new structures (rail bridges, road bridges, drainage structures and retaining walls) to accommodate the new track infrastructure
- replacing the Barrs Road level crossing near Glass House Mountains with a new connection to Coonowrin Road in Glass House Mountains
- replacing the Caloundra Street level crossing in Landsborough with a road over rail solution (grade separation)
- expansion of park and ride facilities at Beerburrum, Landsborough, Palmwoods and Nambour stations to meet the 2036 passenger demand projections
- duplication of station platforms at Mooloolah, Eudlo, Palmwoods and Woombye to accommodate the proposed operational improvements.

6 Proposal costs

Estimated capital costs for the B2N project are detailed in Table 4. The costs include elements such as design, enabling works, road works, station works, rail corridor works and project delivery costs.

In addition to capital costs, incremental train and bus operating costs were also identified and estimated at $243 million (P90, nominal). The incremental increase in operating and maintenance costs can be attributed to the fact the B2N project will allow more frequent services that will in turn require additional feeder bus services, bringing passengers to and from Sunshine Coast destinations.

Table 1 B2N project capital cost estimate

Items	Capital cost ($ million, nominal, rounded)
Final out-turn cost (P90)	784

7 Proposal benefits

The B2N project benefits can be broadly categorised into benefits to the transport system and benefits to freight as highlighted in Table 2. These are directly based on addressing the problems of operational inefficiency and insufficient capacity facing the track between Beerburrum and Nambour.

Table 2 B2N proposal benefits

BENEFIT/COST	DESCRIPTION
Transport system	
	Doubling of rail passengers from north of Caboolture inbound to Brisbane during the morning peak Improved journey times with an average transit time saving between Nambour and Caboolture of 3 minutes Improved reliability Increased number of services offered at peak times Station improvements including replacement of existing substandard platforms with new dual high level straight platforms, station access points, station facilities and expansion of park and ride capacity
	Improved journey times—new alignment will allow passenger trains to travel at faster speeds
	Improved journey times through reduction in congestion on the road network, particularly on highly congested sections of the Bruce Highway. These benefits are quantified through: ▪ reduced vehicle operating costs ▪ reduction in the costs associated with crashes ▪ level crossing elimination (cost savings).
	Change in externalities (e.g. air pollution, greenhouse gas emissions)
Freight	
	Reduction in freight transport costs as the B2N project is excepted to almost double the freight path capacity between Beerburrum and Nambour Average reduction in transit times for freight trains of 46 minutes Reduced rail operating costs Avoided vehicle accident (crash costs—i.e. captured through a reduction in freight vehicles on the road as a result of the B2N project) Avoided environmental externalities (i.e. freight that has to travel via road in the base case resulting in more trucks on the road e.g. Bruce Highway)
Other	
	Incremental fare revenue (captured through induced demand attributed to the project) Residual value of the asset Increases in GSP (captured through increased government taxation) Improvements in employment (both during construction and in the long term as a result of productivity increases)

A summary of the transport system benefits is shown in Table 3. Currently, the freight capacity of the North Coast line between Beerburrum to Nambour is 88 paths or trips (44 each way) per week. The B2N project is expected to almost double the freight path capacity on this segment. The B2N project will reduce freight travel times by 46 minutes on average.

Table 3 Transport system and government benefits

Transport system network	Present value ($million, rounded, 7% discount rate)	% of benefits
Public transport network		
Time travel savings	110	24
Performance reliability	35	8
Station amenity	0.3	0
Long distance passengers	8	2
Incremental farebox	27	6
Sub-total—public transport	180	40
Road network		
Travel time savings	267	58
Vehicle operating costs	16	3
Crashes	(3)	(1)
Level crossings	(3)	(1)
Sub-total—road	277	60
Non-users		
Freight		Reduction in freight transport costs between the base and project cases
Other		
Externalities	(3)	(1)
Residual value	6	1
Sub-total—non-users	3	1
Total transport system	459	100

A summary of the freight benefits is shown in Table 4. The majority of benefits relate to freight transport cost savings.

Table 4 Freight benefits

Freight	Present value ($million, rounded, 7% discount rate)	% of benefits
Freight transport costs savings	219	63
Reduced rail operating costs (time component)	27	8
Value of freight travel time savings	16	5
Avoided vehicle accident costs	34	10
Avoided environmental externalities	28	8
Road decongestion	21	6
Total freight benefits	345	100

Social benefits

The B2N project will deliver positive social impacts including increased employment opportunities during construction and project management, improved accessibility to health care and medical facilities and improved disability access at upgraded stations. For the community, the project will have positive impacts in helping to eliminate some of the issues currently contributing to rail's inability to provide a viable alternative to road-based travel between the Sunshine Coast and Brisbane.

Financial benefits

Benefits to the transport system include improved journey times and reliability for transport users and improved journey times and level crossing eliminations for road users. The total benefits were estimated at a present value of $803.3 million over the 50 years, using a 7 per cent real discount rate. Benefits included $179.6 million (PV) for public transport, $276.5 million (PV) for road users and $345 million (PV) for freight. More broadly, there are benefits to government in incremental fare revenue and benefits to the greater population from reduced externalities including fewer accidents, better air quality and fewer greenhouse gases.

8 Environmental and sustainability impacts

A review of environmental factors, in accordance with the Department of Transport and Main Roads Environmental Processes Manual (2013), was prepared to inform the detailed business case for the B2N project. It involved identifying key issues requiring consideration in design and environmental management, assessing potential impacts and risks of the B2N project and identifying future work requirements to ensure environmental, social and culture heritage matters are addressed in subsequent phases of delivery.

The corridor between Beerburrum and Landsborough was gazetted and formally preserved as 'Future Railway Land' in 2011. Although the rail upgrade has been designed to minimise changes to the protected corridor, a number of potential impacts have been identified including additional property and land use impacts from the grade separation proposals, station upgrades and car park expansions and alterations to the local landscape from track alignment. Disturbed areas may also face erosion or destabilisation and the risk of contaminants to the project area. Construction of the B2N project is also expected to contribute to exhaust emissions, noise pollution and generation of waste.

The review of environmental factors also outlines mitigation strategies to minimise the environmental impact of the B2N project—for example, identification of opportunities for further design refinements to minimise land impacts, an erosion and sediment control plan and uptake of opportunities to salvage or re-use of resources.

The review of environmental factors found the B2N project area has the potential to contain Aboriginal archaeological material, particularly in those parts where remnant vegetation exists or at creek crossings. Cultural heritage assessments will be required to manage the cultural heritage impacts of the B2N project.

9 Project management and delivery

Packaging and delivery model

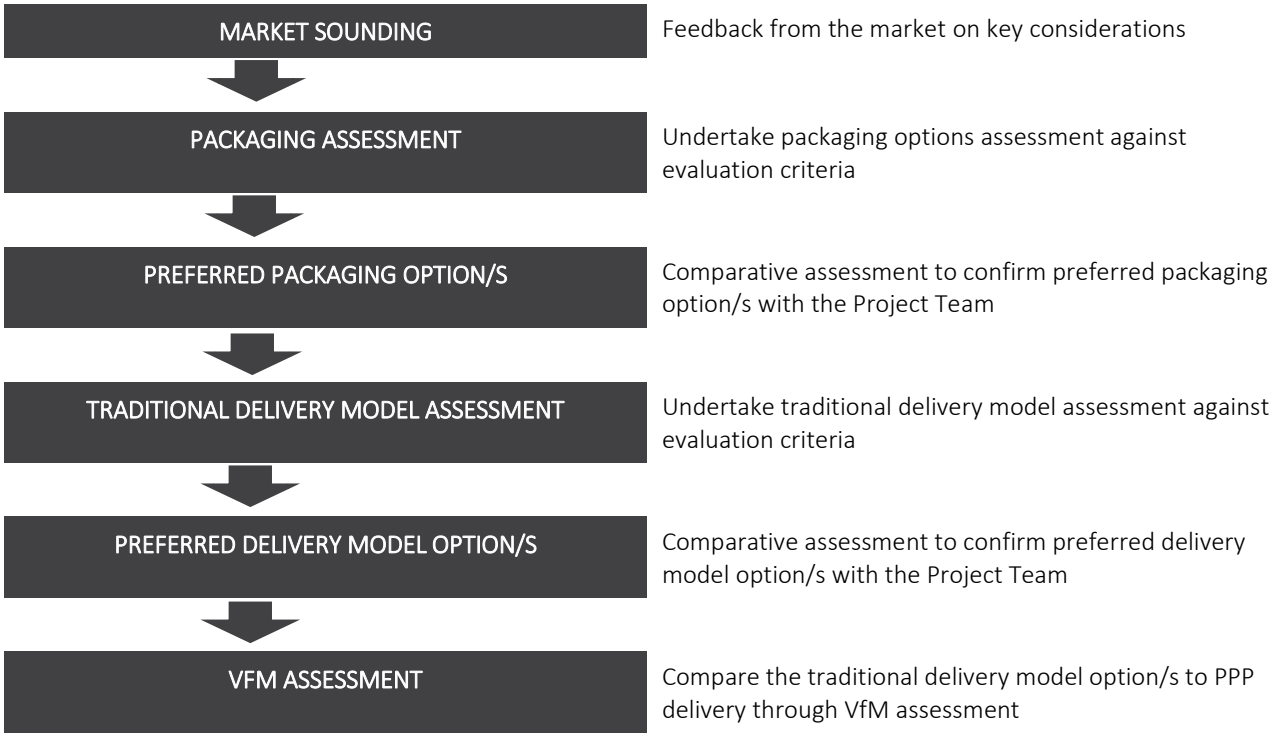
The methodology for assessing the preferred delivery model for the B2N project is based on state and national guidelines, including:

- Building Queensland's Business Case Development Framework
- Queensland Government's Project Assessment Framework
- National PPP Policy and Guidelines.

The methodology utilised for the delivery model analysis for the B2N project is summarised in Figure 4. The packaging assessment component considered a range of potential packaging options including delivering the B2N project as a single package, or as multiple packages consisting of asset, discipline or geographical splits.

The traditional delivery model assessment considered a range of potential delivery models to procure and deliver the B2N project.

Figure 4 B2N project delivery model development



10 Proposed governance model for delivery

The implementation plan for the proposal has been prepared on the basis that the Department of Transport and Main Roads is the project owner and Queensland Rail is the delivery authority.

The governance model will be reviewed and confirmed closer to the implementation of the B2N project.

Governance arrangements will also be reviewed at the commencement of the implementation phase if an Australian Government funding contribution is provided for the B2N project.

11 Legal and regulatory impacts

The existing legal and regulatory regime provides a framework that would allow Queensland Rail to deliver the B2N project, provided that Queensland Rail adopts the various processes required by the regime. Legislative considerations need to be made around environment assessment, land acquisition, native title and Aboriginal cultural heritage for the delivery of the project.

As the native title may continue to exist within parts of the B2N project area, it is necessary to consider whether there are any 'future acts' to be done in association with the carrying out of the B2N project and, if so, what is required to be done in order for such acts to validly affect native title. Further, the *Aboriginal Cultural Heritage Act 2003* (QLD) prescribes a cultural heritage duty of care that will require Queensland Rail

(or its contractor) to take all reasonable and practicable measures to ensure that its activities do not harm Aboriginal cultural heritage.

Eight regulatory approvals and potentially some state environmental approvals will need to be obtained for the construction, delivery and operation of the B2N project. Most approvals are likely to be required to support commencement of construction.

12 Next steps

The detailed business case has been provided to the Queensland Government for consideration.