

KEY FINDINGS FROM THE BUSINESS CASE JULY 2017

# MURPHY ROAD AND ELLISON ROAD INTERSECTION UPGRADE



*Dedicated to a better Brisbane*

## Contents

<b>OVERVIEW</b>	<b>1</b>
Map	1
<b>TIMING AND NEED</b>	<b>2</b>
Project timing	2
Why an upgrade is needed	2
<b>WHY NOW?</b>	<b>4</b>
Why this project is needed now	4
<b>BENEFITS</b>	<b>5</b>
<b>OPTIONS ANALYSIS</b>	<b>6</b>

Following previous studies, Brisbane City Council completed a business case in 2017. The business case recommended the replacement of the roundabout at the Murphy Road and Ellison Road intersection with traffic signals, providing a four-lane carriageway between Kittyhawk Drive and Butt Street with an additional southbound lane on Murphy Road at the intersection, and traffic signals at the Murphy Road and Butt Street intersection.

This summary provides a brief outline of the key findings of the business case, including:

- » why an upgrade is required for the Murphy Road and Ellison Road intersection and the Murphy Road corridor between Kittyhawk Drive and Butt Street
- » timeline of key milestones
- » why the project is needed now
- » the benefits of delivering the project
- » summary of the options analysis.

# OVERVIEW

Murphy Road is a suburban road within the north Brisbane road network and joins Handford Road and Lemke Road providing a significant north-south link between Gympie Road and Depot Road, which are both classified as arterial roads. Due to its linkages, the Murphy Road corridor is classed as a Local Road of Regional Significance (LRRS) by the Queensland Government. The southern end of Murphy Road provides direct access to the Cherside Principal Regional Activity Centre.

Depot Road is an extension of the Telegraph Road corridor, which is a major east-west arterial route providing connections to the Gympie Arterial and the Gateway Motorway. Current traffic capacity upgrades to Telegraph Road and the Gateway Motorway are likely to increase the attractiveness of Murphy Road, Handford Road and Lemke Road as connections to Depot Road and its interchange with the Gateway Motorway.

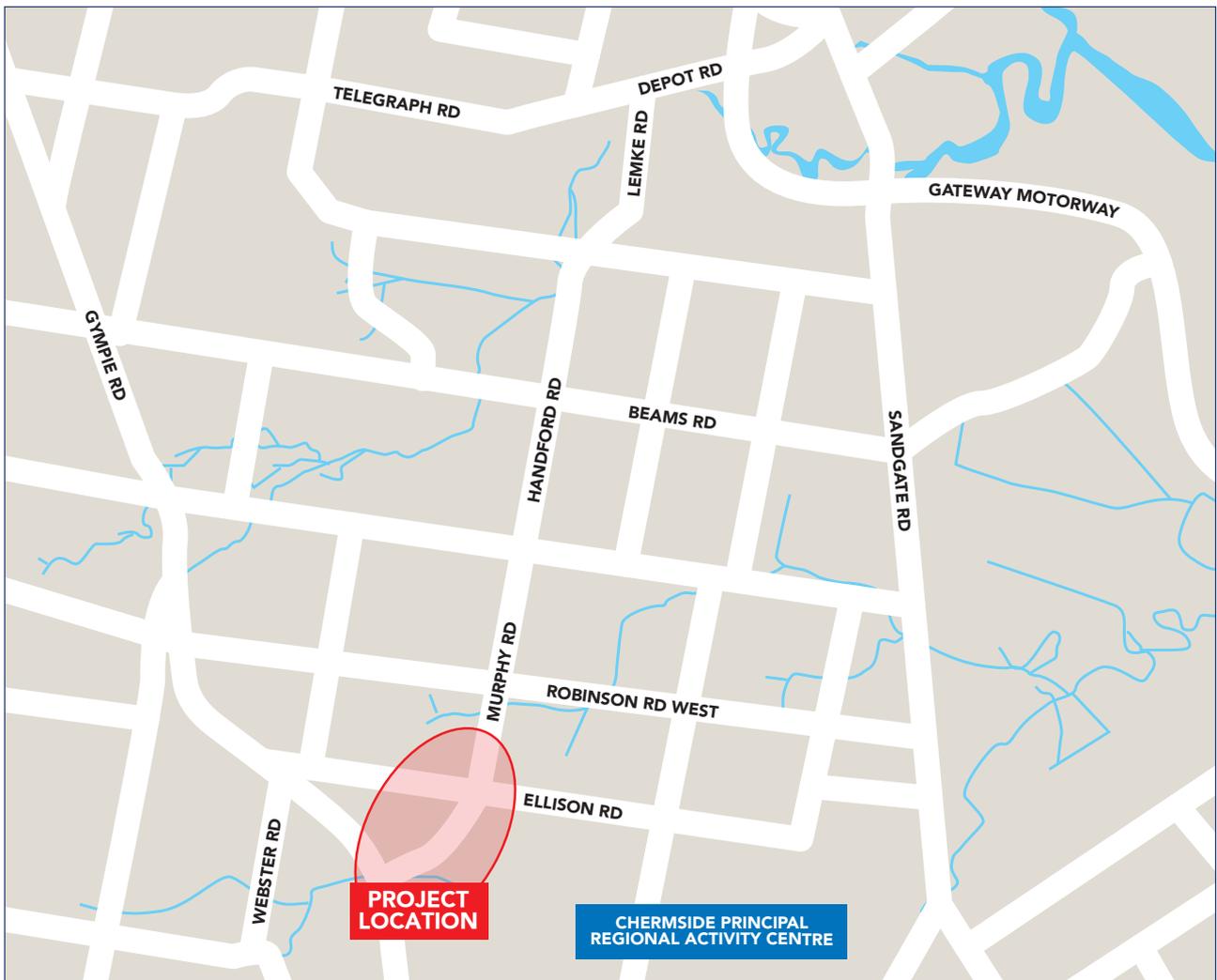


Figure 1 - Project location

A corridor planning study undertaken in 2012 identified that the Murphy Road and Ellison Road roundabout exhibited the highest congestion along the Murphy Road, Handford Road and Lemke Road route with traffic volumes exceeding capacity in the morning and afternoon peak periods.

The Murphy Road and Ellison Road intersection upgrade project replaces the existing roundabout and also upgrades Murphy Road between Kittyhawk Drive and Butt Street.

# TIMING AND NEED

## Project timing

Timing		Milestone
December 2016	June 2017	Finalisation of business case
July 2016	April 2017	Finalisation of concept design
April 2017	October 2017	Initial consultation
May 2017	March 2018	Detailed planning, design and consultation
July 2017	July 2018	Land acquisition
May 2018	June 2018	Call tenders
October 2018	October 2018	Award contract
December 2018	February 2019	Public utility plant relocation and early demolition works
October 2018	December 2019	Road and civil construction

## Why an upgrade is needed



### Congestion

- » Existing traffic volumes exceed the practical capacity of the Murphy Road and Ellison Road roundabout during weekday peak periods with northbound Murphy Road approach average queue lengths of over 300 metres. By 2021 queue lengths are predicted to increase to over 1.0 km with associated delays exceeding five minutes.
- » If an upgrade to the intersection is not undertaken, anticipated traffic growth on Murphy Road between 2016 and 2021 will lead to a significant deterioration in the network performance resulting in queues over 1.0 km in both directions on Murphy Road.
- » Murphy Road between Kittyhawk Drive and Butt Street is a typically two-lane road with peak-direction volumes of approximately 1000 vehicles per hour in the morning and afternoon peak periods. Similar volumes are experienced along Ellison Road. These volumes are at or close to capacity for the mid-block sections of both routes.
- » The Murphy Road and Kittyhawk Drive intersection will experience significant congestion during the morning peak in 2031 with queues exceeding 1.6 km and average delays over 10 minutes.
- » Murphy Road carries 24,000 and 19,000 vehicles per day north and south of Ellison Road respectively. Heavy vehicles make up approximately 4% of the traffic volume.



### Bus services

- » Murphy Road is a significant public transport route within northern Brisbane, with approximately 15 to 20 buses per hour during the morning and afternoon peak periods in the peak direction.
- » Congestion issues at the roundabout and adjacent Murphy Road sections of the corridor affect bus travel times and travel time reliability.
- » BUZ routes 300, P331 and P332 run along the entire length of Murphy Road, Handford Road and Lemke Road between Gympie Road and Depot Road. These routes connect the adjacent catchments to the Chermide Principal Regional Activity Centre and the Brisbane CBD.

## Safety

- » Over the five year period from 2011 to 2015 a total of 11 crashes were recorded at the Murphy Road and Ellison Road intersection, five crashes at the Murphy Road and Kittyhawk Drive intersection and two crashes at the Murphy Road and Butt Street intersection.
- » Safety at the Murphy Road and Butt Street intersection is of concern to the community based on feedback received during initial consultation for the project. At present, drivers on the Butt Street approach experience poor sight distances due to the vertical curve on Murphy Road. Growing traffic volumes increase the risk of potential conflict.
- » The lack of controlled pedestrian crossing points creates a significant safety issue for those required to cross the road in order to access public transport services and parkland facilities.

## Pedestrians and cyclists

- » There are no signalised pedestrian crossings along a 1.4km length of Murphy Road between Kittyhawk Drive and Robinson Road West.
- » There are footpaths on both sides of Murphy and Ellison roads within the project area, except for the eastern side of Murphy Road between Kittyhawk Drive and Ellison Road.
- » Murphy Road is classified as a primary cycle route north of Ellison Road, which forms part of a major cycling route through 7th Brigade Park and links with a primary route along Downfall Creek.
- » Cycling on-road requires cyclists to use general traffic lanes. There are no dedicated on-road bicycle facilities within the project extent except for a bicycle awareness zone on Ellison Road west of Coolah Street and short sections of cycle lanes on each approach at the Murphy Road and Kittyhawk Drive intersection.

# WHY NOW?

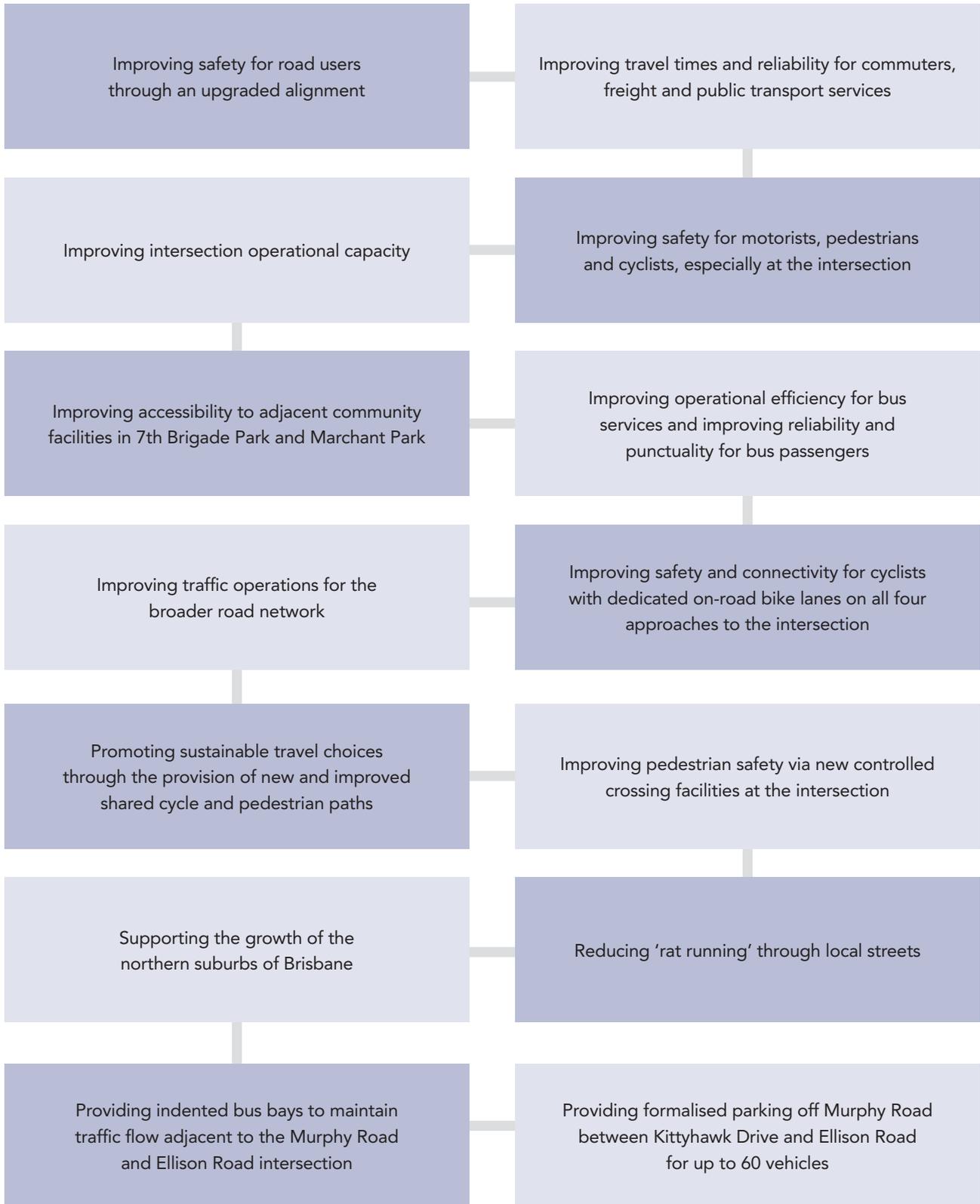
## Why this project is needed now

The intersection is currently experiencing significant congestion issues, especially during morning and evening peak periods. This results in significant travel time delays, unreliable travel times and safety issues.

Failure to deliver the Murphy Road and Ellison Road intersection upgrade project as soon as possible will result in:

- » increasing traffic congestion and crash risks at the Murphy Road and Ellison Road intersection and approaches
- » decreasing bus travel time reliability along Murphy Road, potentially reducing the use of public transport for peak-period trips between the northern suburbs and Brisbane CBD
- » inhibiting Murphy Road from performing its intended role in the north Brisbane road network, resulting in traffic using other adjacent roads
- » increasing the risk of pedestrian conflicts due to the absence of signalised pedestrian crossings on Murphy Road between Kittyhawk Drive and Robinson Road West
- » increasing the risk of crashes at the Butt Street intersection due to increased traffic volumes and substandard road geometry
- » significant deterioration in capacity on the Murphy Road corridor as a result of the expected increased traffic volumes due to the Telegraph Road upgrade and the Gateway Upgrade North (GUN) project
- » increasing 'rat running' through local streets in an attempt by motorists to avoid traffic delays.

# BENEFITS



# OPTIONS ANALYSIS

## Options developed

The option development process and concept designs have been developed in a number of stages to arrive at the final design options for assessment. The sequence of options, project scope and site extents are cumulative.

Sequence stage	Project scope
1	Original project focus was to upgrade the Murphy Road / Ellison Road roundabout to a four-way signalised intersection. This included a number of intersection layout options.
2 + stage 1	Scope of the project included a corridor upgrade to four lanes to tie into the four lane road from south of Kittyhawk Drive to north of Butt Street. This included assessing land acquisition options for the eastern and western sides of Murphy Road and included an option for land acquisition on both sides.
3 + stages 1 & 2	Upgrade Kittyhawk Drive intersection – this included assessment of a number of intersection layout options.
4 + stages 1, 2, 3	Upgrade Butt Street intersection – this included assessment of a number of intersection layout options.
5 + stages 1, 2, 3 & 4	Upgrade Navarre Street access – this included assessment of a number of layout options.

Table 1: Project Stage / Sequence

A number of improvement upgrade options were developed based on the traffic assessment report findings for each of the stages listed above. The list of shortlisted options that were selected for further investigation is detailed below. The preferred option is in **bold**.

Option	Description
Do nothing	Maintain existing roundabout layout.
1	Signalised intersection with two-lane approaches on all legs.
2	<b>Signalised intersection with a three-lane approach on either the Murphy Road southbound leg or northbound leg, and two-lane approaches on remaining legs.</b>
3	Signalised intersection with three-lane approaches on all legs.
4	Upgrading of roundabout, including the potential for a signalised roundabout.

Table 2: Stage 1 – Initial Murphy Road / Ellison Road intersection options

Option	Description
Do nothing	Maintain existing roundabout layout.
1	Signalised intersection with two-lane approaches on all legs.
2	<b>Signalised intersection with a three-lane approach on the Murphy Road southbound leg, and two-lane approaches on remaining legs.</b>

Table 3: Murphy Road / Ellison Road final intersection traffic assessment options

When Stage 2 was added to the project two options were initially considered as in Table 4.

Option	Description
Do nothing	Maintain existing single lane highway at mid-block locations.
1	<b>Two-lane approaches on all legs.</b>
2	Three-lane approach on all legs.

Table 4: Stage 2 - Mid block Murphy Rd corridor

Option	Description
Do nothing	Maintain existing signalised layout.
1	Maintain the existing intersection layout with an extension of the dedicated left turn lane from Murphy Road into Kittyhawk Drive.
2	Signalised intersection with two through lanes and an additional right-turn lane on the northbound Murphy Road approach.
3	<b>Similar to Option 2, but with two through lanes on the southbound Murphy Road approach.</b>

Table 5: Murphy Road / Kittyhawk Drive intersection options

Option	Description
Do nothing	Maintain existing priority-controlled layout.
1	<b>Signalised intersection with two-lane approaches on both Murphy Road legs and a separate right-turn pocket on the northbound leg.</b>
2	Signalised intersection with two-lane approaches on both Murphy Road legs, but with a shared through and right-turn lane on the northbound leg.
3	Restrict intersection to left-in left-out movements.

Table 6: Murphy Road / Butt Street intersection options

Detailed development was undertaken for each of the options listed in the tables above so that they can be assessed/ compared against each other and the project objectives in a multi criteria analysis (MCA) in order to determine a preferred option.

On the basis of a benefit-cost ratio of 1.5 for the project, and additional non-monetary benefits associated with reducing community and property impacts, it is recommended that the project should proceed with Option 2B. This comprises replacement of the roundabout at the Murphy Road and Ellison Road intersection with traffic signals, providing a four-lane carriageway between Gympie Road and Butt Street with three lanes on the Murphy Road southbound approach/departure to the intersection with Ellison Road, introducing traffic signals at the Murphy Road and Butt Street intersection and upgrade the Murphy Road and Kittyhawk Drive intersection.

An assessment of the option of widening Murphy Road north of Ellison Road to the east was undertaken. The horizontal alignment for this option was poor compared to the preferred option of widening to the west. In addition, the number of houses that would need to be acquired was similar however, widening to the east would involve the demolition of the service station with the associated contaminated land remediation and high acquisition costs.



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