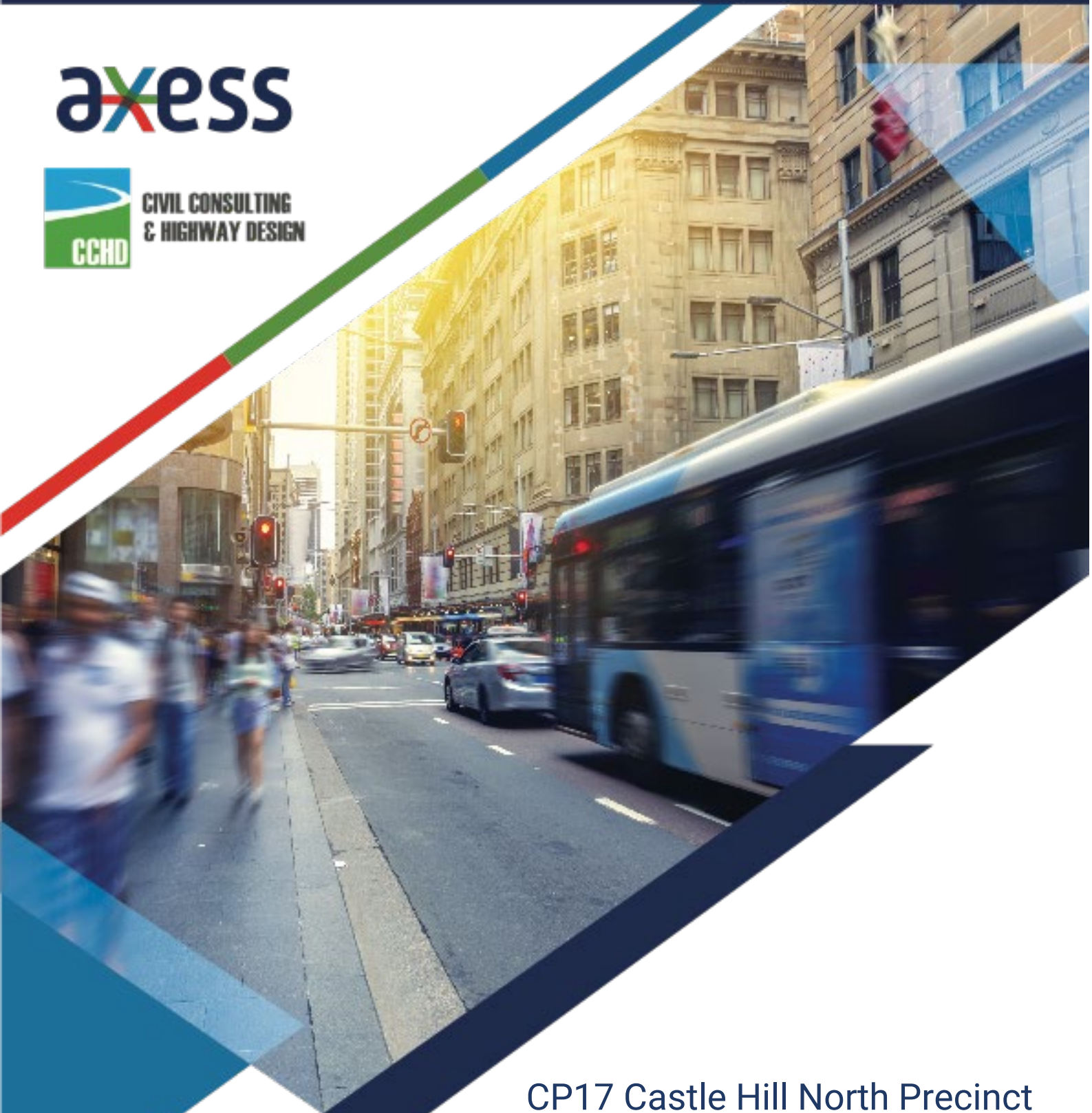


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**CIVIL CONSULTING
& HIGHWAY DESIGN**



CP17 Castle Hill North Precinct TRANSPORT INFRASTRUCTURE COST REVIEW (FINAL)

21 August 2019

Independent Pricing and Regulatory Tribunal



CP17 Castle Hill North Precinct TRANSPORT INFRASTRUCTURE COST REVIEW (FINAL)

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EXECUTIVE SUMMARY

The purpose of this report is to review the reasonableness of the transport infrastructure costs proposed by the Hills Shire Council for the Castle Hill North Precinct-Contribution Plan (CP17).

The transport infrastructure items under cost review include:

- Four roundabouts (three leg, single lane approach);
- Signalised intersection;
- Two pedestrian bridges; and
- Three road upgrades.

The Hills Shire Council has generally approached base cost estimates on a site specific basis with on-cost provisions on a generic percentage based approach. This independent review has undertaken a site specific approach to assessing base costs and on-cost provisions. This assessment finds overall the Hill Shire Council cost estimates for transport infrastructure to be reasonable, however notes the following key findings:

Roundabouts

The roundabout cost estimates appear to be slightly under-provisioned due to greenfield assumptions and use of IPART benchmark rates that do not reflect the existing brownfield site conditions. Our cost estimate for the four roundabouts including project management, design and contingency is \$2,450,712. The Hill Shire Council estimate for the four roundabouts including on-cost provisions is \$2,174,395.

Signalised Intersection

The McMullen Avenue and Brisbane Road signalised intersection cost estimate appears to be adequately provisioned albeit slightly high. Our cost review finds that the traffic management and utilities provisions does not appear adequate and there is no cost provision for adjustments to the signals at Old Castle Hill Road. It is noted however that contingency costs were accounted for in the base costs and have been double counted. Our cost estimate for the McMullen Avenue and Brisbane Road signalised intersection with project management, design and contingency is \$7,073,570. The Hills Shire Council non-apportioned cost estimate including on-cost provisions is \$7,117,603.

Pedestrian Bridges

The pedestrian bridge cost estimates appear to be under-provisioned, however there is insufficient information available on the pedestrian bridges to undertake an independent assessment. It is noted that the pedestrian bridge cost estimates are based on the detailed design estimates which are approximately \$1,000,000 to \$1,500,000 (per pedestrian bridge) below the final construction costs for similar projects identified by the Hills Shire Council. It is recommended that further work is undertaken to inform an independent cost assessment of the pedestrian bridge estimates.

Road Upgrades

The road upgrade cost estimates appear reasonable with the exception of Old Castle Hill Road which appears to be over-provisioned. Our cost review finds that site establishment and traffic management provisions appear low across the road upgrades. This is off-set by stormwater drainage provisions which appear to be over-provisioned across the road upgrades. It is noted that for Old Castle Hill Road upgrade the Telstra service relocations appear to be over-provisioned. Our total cost estimate for the road upgrades including project management, design and contingency is \$36,252,234. The Hills Shire Council cost estimate for the road upgrades including on-cost provisions is \$40,913,863.

1 INTRODUCTION

The Independent Pricing and Regulatory Tribunal (IPART) engaged Axess Advisory and Civil Consulting & Highway Design (CCHD) to perform an independent cost review for transport infrastructure in Contributions Plan No. 17 – Castle Hill North Precinct (CP17).

This report describes the approach and findings of the independent cost assessment and addresses the primary purpose of the engagement to determine:

- Whether the proposed bill of quantities, including unit rates, used to estimate the costs are reasonable; and
- Where the proposed bill of quantities, including unit rates, are not reasonable, recommend the alternative reasonable quantities and/or unit rates.

1.1 Background

The Hills Shire Council has submitted CP17 Castle Hill North Precinct to IPART for assessment. The transport infrastructure in CP17 under assessment includes:

Roundabouts

- RT1 – Old Castle Hill Road and Gilham Road roundabout;
- RT2 – Castle Street and Carramar Road roundabout;
- RT3 – Gilham Road and Carramar Road roundabout; and
- RT4 – Garthowen Crescent and Old Castle Hill Road roundabout.

Traffic Management

- RT5 – Traffic management for 4 roundabouts.

Signalised Intersection

- RT6 – McMullen Avenue and Brisbane Road signalised intersection.

Pedestrian Bridges

- RT8 – Northern pedestrian bridge; and
- RT9 – Southern pedestrian bridge.

Road Upgrades

- RT10 – Old Castle Hill Road upgrade;
- RT11 – Castle Street upgrade; and
- OSE4 – Holland Road Reserve – road upgrade with open space.

1.2 Approach

Axess and CCHD have undertaken the following approach to the independent cost review:

- Reviewed technical report, drawings, assumptions and cost schedules;
- Clarified information gaps with Hills Shire Council;
- Independently built up quantities based on reports and technical drawings supplied by IPART and Hill Shire Council to verify accuracy of the bill of quantities;
- Reviewed line by line provisions that make up the cost schedule;
- Benchmarked rates provided by Hills Shire Council against current market rates; and
- Reviewed calculations within the cost schedule.

1.3 Input Documentation

This independent cost assessment has been based on information provided by IPART and the Hills Shire Council. This assessment assumes that where technical drawings have been provided, that these drawings are accurate and correct. This assessment does not include any design verification and is solely focused on the cost schedule and provisions within the cost schedule alone.

The information received for this assessment includes:

- The Hills Shire Council, Contributions Plan No. 17 Castle Hill North, Post Exhibition – March 2019
- CP17 Infrastructure Cost Support – Holland & Glenhaven Rd Upgrades tab, Tab 3 – Roundabout, Signal, Tab 4 – Pedestrian Bridges, Tab 5 – Old Castle Hill Rd, Tab 6 – Castle Street
- CP17 Works Schedule
- Diversi Consulting, Estimate of Cost for Civil Infrastructure Works, June 2015
- Gennaoui Consulting, Capacity of Proposed Intersection of Old Northern Road with McMullen Avenue and Brisbane Road, October 2010
- Diversi Consulting, Concept Intersection Design, McMullen Avenue and Castle Hill Road, Castle Hill, 1 June 2015 (Sheets 1 and 2)
- BECA, Pedestrian Bridge over Windsor Road, 5 Apr 2017 (Sheets 1 to 51)
- BECA, Pedestrian Bridge over Memorial Avenue, 23 Nov 2018 (Sheets 1 to 63)
- IPART, Local Infrastructure Benchmark Costs, Final Report, April 2014

2 COST REVIEW FINDINGS

2.1 Roundabouts

The cost estimate for the roundabouts is based on a generic IPART benchmark for greenfield roundabouts. This considers a four-leg roundabout with two approach lanes, 6m trafficable concrete roundabout, kerb ramps, typical signage and raised triangular medians. This approach has been applied to the following roundabouts in the cost schedule:

- RT1 – Old Castle Hill Road and Gilham Road roundabout;
- RT2 – Castle Street and Carramar Road roundabout;
- RT3 – Gilham Road and Carramar Road roundabout; and
- RT4 – Garthowen Crescent and Old Castle Hill Road roundabout.

Old Castle Hill Road, Gilham Road, Castle Street and Garthowen Crescent are existing roads within built up residential areas. At the location of each of the proposed roundabouts is an existing single lane T-intersections. It is proposed that these single lane T-intersections are upgraded to three-leg roundabouts with single approach lane.

The site-specific independent cost review provided in Section 3.1 considers the brownfield environment of the proposed works.

2.2 Traffic Management

The cost estimate for traffic management of four roundabout is based on an adapted IPART benchmark rate. The site-specific cost estimate for traffic management provided in Section 3.2 is based on a percentage of the site-specific costs of the four roundabouts.

2.3 Signalised Intersections

RT6 – McMullen Avenue and Brisbane Road Signalised Intersection

A review of the cost schedule revealed the following key findings:

- a. Quantities contained within the cost schedule appear reasonable;
- b. The site establishment provision of \$50,000 appears low. It is recommended that a provision of \$100,000 be allowed;
- c. The traffic management provision of \$50,000 for this intersection appears low. Based on the volume of traffic though McMullen Avenue and Old Northern Road it is recommended for traffic management to represent approximately 8% of the total cost;
- d. The cost schedule allows for the asphaltic concrete wearing course to be placed in a single 100mm layer (AC14) at a rate of \$100 per square metre. It is likely that this will be applied in two layers, a 60mm layer followed by a 40mm layer at a rate of \$116 per square metre;

- e. The rate for footpath berms and batters of \$50 per square metre appears high. We recommend a rate of \$25 per square metre;
- f. The rate for concrete footpath of \$55 per linear metre appears low. We recommend a rate of \$120 per linear metre;
- g. There is no provision within the cost schedule for the adjustment to the signals at Old Castle Hill Road.

2.4 Pedestrian Bridges

There were no site-specific costs or concept drawings for the RT8 Northern and RT9 Southern Pedestrian bridges. A proposed location for each pedestrian overbridge was noted as follows:

- 1. RT8 Northern Pedestrian Bridge – located at the intersection of Pennant Street and Castle Hill Road; and
- 2. RT9 Southern Pedestrian Bridge – located at the intersection of Pennant Street and Castle Street.

The Hills Shire Council have provided an estimate for the pedestrian bridges based on the detailed design cost schedule of similar structures at Windsor Road and Memorial Avenue. It is noted that the detailed design cost schedule is significantly lower than the construction cost for both Windsor Road and Memorial Avenue Pedestrian bridges.

2.5 Road Upgrades

RT10 – Old Castle Hill Road Upgrade

A review of the cost schedule revealed the following key findings:

- a. Quantities contained within the cost schedule appear reasonable;
- b. The site establishment provision of \$15,000 appears low. It is recommended that a site establishment provision of \$100,000 be applied;
- c. The traffic management provision of \$300,000 appears low. It is recommended for traffic management to represent approximately 6% of the total cost;
- d. The service relocation for Telstra services of \$5,000,000 appears high. Assuming long runs of optic fibre it is recommended that a provision of \$2,500,000 be applied;
- e. The pavement rate for asphaltic concrete 150mm thick (AC20) of \$400 per tonne appears high. It is recommended a rate of \$325 per tonne be applied;
- f. The road base rate for 150mm DGB20 and DGB40 of \$400 per cubic metre appears high. It is recommended that the following rates are applied:
 - i. 150mm DGB20: \$340 per cubic metre; and
 - ii. 150mm DGB40: \$310 per cubic metre.

- g. The rate for driveways of \$100 per square metre appears low. It is recommended that a rate of \$400 per square metre be applied;
- h. The kerb and gutter rate of \$120 per linear metre appears high. It is recommended that a rate of \$100 per linear metre be applied;
- i. The rate for 100mm thick reinforced with 1xF72 mesh 3m wide concrete footpath of \$135 per cubic metre appears high. It is recommended that a rate of \$118 per cubic metre be applied;
- j. The rate for a concrete block retaining wall including geofabric, 100mm diameter AG drain, filter material and design of \$435 per square metre appears low. It is recommended that a rate of \$500 per square metre be applied;
- k. The rate for construction of a reinforced concrete slab for a bus shelter of \$180 per square metre appears low. It is recommended that a rate of \$300 per square metre be applied;
- l. The cost provision for the supply and installation of a bus shelter of \$15,000 per item appears low. It is recommended that a provision of \$30,000 per item be applied;
- m. The stormwater pits and kerb inlet pit provision of \$2,000 for each item appears low. It is recommended that a provision of \$4,050 for the installation of each stormwater pit and \$2,900 for the installation of each kerb inlet pit be applied; and
- n. The rates for the supply and installation of stormwater class 3 375mm diameter and 450mm diameter pipe of \$700 per linear metre and \$900 per linear metre appears high. It is recommended that rates for stormwater class 3 375mm diameter pipe of \$450 per linear metre and class 3 450mm diameter pipe of \$510 per linear metre be applied.

RT11 – Castle Street Upgrade

A review of the cost schedule revealed the following key findings:

- a. Quantities contained within the cost schedule appear reasonable;
- b. The site establishment provision of \$15,000 appears to be low. It is recommended that the site establishment provision of \$100,000 be applied;
- c. The traffic management provision of \$400,000 appears low. It is recommended for traffic management to represent approximately 6% of the total cost;
- d. The pavement rate for asphaltic concrete 150mm thick (AC20) appear of \$400 per tonne appears high. It is recommended a rate of \$325 per tonne be applied;
- e. The road base rate for 150mm DGB20 and DGB40 of \$400 per cubic metre appears high. It is recommended that the following rates are applied:
 - i. 150mm DGB20: \$340 per cubic metre; and
 - ii. 150mm DGB40: \$310 per cubic metre.
- f. The rate for driveways of \$700 per square metre appears high. It is recommended that a rate of \$400 per square metre be applied;

- g. The kerb and gutter rate of \$200 per linear metre appears high. It is recommended that a rate of \$100 per linear metre be applied;
- h. The rate for 100mm thick reinforced with 1xF72 mesh 2.55m wide concrete footpath of \$135 per cubic metre appears high. It is recommended that a rate of \$126 per cubic metre be applied;
- i. The rate for a concrete block retaining wall including geofabric, 100mm diameter AG drain, filter material and design of \$435 per square metre appears low. It is recommended that a rate of \$500 per square metre be applied;
- j. The rate for subsoil drainage including excavation, disposal of materials and backfilling of \$300 per linear metre appears high. It is recommended that a rate of \$230 per linear metre be applied;
- k. The stormwater pits and kerb inlet pit provision of \$2,000 for each item appears low. It is recommended that a provision of \$4,050 for the installation of each stormwater pit and \$2,900 for the installation of each kerb inlet pit be applied; and
- l. The rates for the supply and installation of stormwater class 3 375mm diameter and 450mm diameter pipe of \$700 per linear metre and \$900 per linear metre appears high. It is recommended that rates for stormwater class 3 375mm diameter pipe of \$450 per linear metre and class 3 450mm diameter pipe of \$510 per linear metre be applied.

OSE4 – Holland Road Reserve

A review of the cost schedule revealed the following key findings:

- a. Quantities contained within the cost schedule appear reasonable;
- b. The site establishment provision of \$45,000 in total appears to be low. It is recommended that the site establishment provision of \$85,000 be applied;
- c. The traffic management provision of \$80,000 in total appears low. It is recommended that traffic management representing approximately 5% of the total cost be applied;
- d. The cost provision for erosion control of \$10,000 appears low. It is recommended that \$18,000 be applied;
- e. The service relocation for Endeavour Energy assets of \$450,000 in total appears high. It is recommended that a provision of \$340,000 be applied;
- f. The road base rate for 150mm DGB20 and DGB40 of \$400 per cubic metre appears high. It is recommended that the following rates are applied:
 - i. 150mm DGB20: \$340 per cubic metre; and
 - ii. 150mm DGB40: \$310 per cubic metre.
- g. The rate for driveways of \$100 per square metre appears low. It is recommended that a rate of \$400 per square metre be applied;
- h. The kerb and gutter rate of \$200 per linear metre appears high. It is recommended that a rate of \$114 per linear metre be applied;

- i. The stormwater pits and kerb inlet pit provision of \$2,000 for each item appears low. It is recommended that a provision of \$4,050 for the installation of each stormwater pit and \$2,900 for the installation of each kerb inlet pit be applied;
- j. The rate for the supply and installation of stormwater class 3 450mm diameter pipe of \$900 per linear metre appears high. It is recommended that rates for stormwater class 3 450mm diameter pipe of \$510 per linear metre be applied;
- k. The rate for the supply and installation of grass verge on 100mm of topsoil of \$50 per square metre appears high. It is recommended that a rate of \$26 per square metre be applied; and
- l. The rate to backfill behind the new kerb and gutter of \$100 per tonne appears high. It is recommended that a rate of \$28 per tonne be applied.

2.6 Other Provisions

The Hills Shire Council have applied a percentage based approach to transport infrastructure on-costs provisions. This independent review is based on a site specific approach to on-cost provisions for project management, design and contingency. The Hills Shire Council applied the percentage based approach as follows:

- a. Roundabouts – The IPART benchmark for roundabouts includes on-cost provisions in greenfield sites. The on-cost provisions are 7.5 percent for design, 7.5 percent for project management and 30 percent for contingency;
- b. Roundabout Traffic Management – Includes management of live traffic conditions 7.5 percent for design, 7.5 percent for project management and 30 percent for contingency;
- c. McMullen Avenue and Brisbane Road Signalised Intersection – Includes on-cost provisions of 7.5 percent for design and 7.5 percent for project management costs and 30 percent for contingency. It is noted that contingency costs are duplicated as contingency has been considered in the base cost estimate;
- d. Pedestrian Bridges – Includes on-cost provisions of 7.5 percent for design, 7.5 percent for project management and 30 percent for contingency;
- e. Old Castle Hill Road Upgrade – Includes on-cost provisions of 7.5 percent for design, 7.5 percent for project management and 30 percent for contingency;
- f. Castle Street Upgrade – Includes on-cost provisions of 7.5 percent for design, 7.5 percent for project management and 30 percent for contingency; and
- g. Holland Road Reserve Upgrade – Includes on-cost provisions of 7.5 percent for design, 7.5 percent for project management and 30 percent for contingency.

3 SUMMARY OF COST DIFFERENCES

3.1 Roundabouts

The Hills Shire Council cost estimate is based on roundabouts in a greenfield environment. The proposed roundabouts are located on existing roads within a residential area. As such the proposed roundabout locations are within a brownfield site. As part of the independent cost review a site-specific cost estimate was prepared for each roundabout within a brownfield setting. The independent cost review findings for each roundabout is summarised in Table 1 below:

Table 1: Roundabout Base Cost Differences

Description	Hills Shire Council Cost Estimate (2018 Rates)	Independent Cost Review (2018 Rates)
RT1 – Old Castle Hill Road and Gilham Road roundabout	\$363,611	\$385,168
RT2 – Castle Street and Carramar Road roundabout	\$363,611	\$465,818
RT3 – Gilham Road and Carramar Road roundabout	\$363,611	\$430,418
RT4 – Garthowen Crescent and Old Castle Hill Road roundabout	\$363,611	\$409,308

The Hills Shire Council cost estimate for each of the roundabouts is considered low due to greenfield setting assumption. Our independent cost review has allowed for three-leg roundabouts, with single approach lanes, 6m trafficable concrete roundabout, splitter islands, pram/kerb ramps and sub soil drainage under the kerb and gutter with in a brownfield setting. Other site-specific costs for each roundabout is highlighted below:

RT2 – Castle Street and Carramar Road roundabout

- Clearing and grubbing provision for the removal of two trees on Carramar Road;
- Stormwater infrastructure provisions such as drainage inlets, pits and drainage pipes; and
- Utility relocations for street lights, water mains and telecommunications.

RT3 – Gilham Road and Carramar Road roundabout

- Stormwater infrastructure provisions such as drainage inlets, pits and drainage pipes; and
- Utility relocations for street lights, water mains and telecommunications.

RT4 – Garthowen Crescent and Old Castle Hill Road roundabout

- Construction of a low retaining wall; and
- Utility relocations for street lights, water mains, telecommunications and adjustments to sewer access chambers.

3.2 Traffic Management

The Hills Shire Council cost estimate for traffic management of four roundabouts is based on an adapted IPART benchmark rate. The independent cost estimate is based on a percentage of the site-specific costs of the four roundabouts of 12%.

Table 2: Traffic Management Base Cost Differences

Description	Hills Shire Council Cost Estimate (2018 Rates)	Independent Cost Review (2018 Rates)
RT5 – Traffic management for 4 roundabouts.	\$289,439	\$202,885

3.3 Signalised Intersections

The Hills Shire Council cost estimate for the McMullen Avenue and Brisbane Road signalised intersection is a site-specific. The independent cost review found that the quantities contained within the cost schedule appeared reasonable. The key difference between the Hills Shire Council cost estimate and our independent cost review can be attributed to individual cost provisions and rates.

Table 3: Signalised Intersection Base Cost Differences

Description	Hills Shire Council Cost Estimate (2018 Rates)	Independent Cost Review (2018 Rates)
RT6 – McMullen Avenue and Brisbane Road Signalised Intersection	\$4,760,939 (inc contingency) \$3,730,998 (ex contingency)	\$4,473,757

RT6 – McMullen Avenue and Brisbane Road Signalised Intersection

The key differences between Hills Shire Council and our cost estimate can be summarized as follows:

- a. The site establishment provision of \$50,000 appears to be low. It is recommended that the site establishment provision be increased by \$50,000 to a total of \$100,000;
- b. The traffic management provision of \$50,000 for this intersection appears low. Based on the volume of traffic though McMullen Avenue and Old Northern Road it is recommended that traffic management be increased by \$420,000 to allow for a provision of \$470,000;
- c. The cost schedule allows for the asphaltic concrete wearing course to be placed in a single 100mm layer (AC14). It is likely that this will be applied in two layers, a 60mm layer followed by a 40mm layer. This approach will add approximately \$150,000 to this cost item;
- d. The Hills Shire Council cost estimate includes approximately \$900,000 of contingency in the base cost. This results in double counting of the contingency provision; and
- e. There is no provision within the cost schedule for the adjustment to the signals at Old Castle Hill Road. We recommend a provision of \$190,000 be allowed.

3.4 Pedestrian Bridges

The Hills Shire Council have provided an estimate for the pedestrian bridges based on the detailed design cost schedule of similar structures at Windsor Road and Memorial Avenue. It is noted that the detailed design cost schedule is significantly lower than the construction cost for both Windsor Road and Memorial Avenue pedestrian bridges.

Whilst currently there is insufficient information to undertake an independent cost review of the northern and southern pedestrian bridges it is noted that there is a significant cost difference between the detailed design and construction values of Windsor Road and Memorial Avenue pedestrian bridge as follows:

1. Windsor Road pedestrian bridge construction value - \$2,741,874; and
2. Memorial Avenue pedestrian bridge construction value - \$3,663,284.

It is recommended that the Hills Shire Council undertake further work to refine the pedestrian bridge cost estimate.

Table 4: Pedestrian Bridges Base Costs

Description	Hills Shire Council Cost Estimate (2018 Rates)	Independent Cost Review (2018 Rates)
RT8 – Northern Pedestrian Bridge	\$1,815,282 (detailed design estimate)	Not assessed
RT9 – Southern Pedestrian Bridge	\$1,815,282 (detailed design estimate)	Not assessed

3.5 Road Upgrades

The Hills Shire Council cost estimate for the road upgrades are site-specific. The independent cost review found that the quantities contained within the cost schedules appeared reasonable. The key difference between the Hills Shire Council cost estimate and our independent cost review can be attributed to individual cost provisions and rates.

Table 5: Road Upgrades Base Cost Differences

Description	Hills Shire Council Cost Estimate (2018 Rates)	Independent Cost Review (2018 Rates)
RT10 – Old Castle Hill Road Upgrade	\$12,728,530	\$10,192,185
RT11 – Castle Street Upgrade	\$10,506,092	\$10,379,658
OSE4 – Holland Road Reserve	\$4,132,510	\$3,779,902

The key differences between Hills Shire Council and our cost estimate can be summarized as follows:

RT10 – Old Castle Hill Road Upgrade

- a. The site establishment provision of \$15,000 appears to be low. It is recommended that the site establishment provision be increased by \$85,000 to a total of \$100,000;
- b. The traffic management provision of \$300,000 appears low. It is recommended that traffic management be increased by \$300,000 to allow for a provision of approximately \$600,000;
- c. The service relocation for Telstra services of \$5,000,000 appears high. Assuming long runs of optic fibre it is recommended that the cost provision be reduced by \$2,500,000. It is recommended that a \$2,500,000 for Telstra service relocation be allowed;
- d. The stormwater pits and kerb inlet pit provision of \$2,000 for each item appears low. We recommend a provision of \$4,050 for the installation of each stormwater pit and \$2,900 for the installation of each kerb inlet pit. This requires an increase of approximately \$60,000 for stormwater and kerb inlet pits; and
- e. The rates for the supply and installation of stormwater class 3, 375mm diameter and class 3, 450mm diameter pipe of \$700 per linear metre and \$900 per linear metre appears high. It is recommended that the following rates are applied for class 3 stormwater pipes:
 - i. 375mm diameter pipe: \$450 per linear metre; and
 - ii. 450mm diameter pipe: \$510 per linear metre.

This decreases the cost provision for the supply and installation of stormwater pipes by approximately \$300,000.

RT11 – Castle Street Upgrade

- a. The site establishment provision of \$15,000 appears to be low. It is recommended that the site establishment provision be increased by \$85,000 to a total of \$100,000;
- b. The traffic management provision of \$400,000 appears low. It is recommended that traffic management be increased by \$200,000 to allow for a provision of approximately \$600,000;
- c. The stormwater pits and kerb inlet pit provision of \$2,000 for each item appears low. We recommend a provision of \$4,050 for the installation of each stormwater pit and \$2,900 for the installation of each kerb inlet pit. This increases the cost provision by \$40,000 for stormwater and kerb inlet pits;
- d. The rates for the supply and installation of stormwater class 3 375mm diameter and 450mm diameter pipe of \$700 per linear metre and \$900 per linear metre appears high. It is recommended that the following rates are applied for class 3 stormwater pipes:
 - i. 375mm diameter pipe: \$450 per linear metre; and
 - ii. 450mm diameter pipe: \$510 per linear metre.

This decreases the cost provision for the supply and installation of stormwater pipes by \$160,000;

- e. The rate for subsoil drainage including excavation, disposal of materials and backfilling of \$300 per linear metre appears high. It is recommended that a rate of \$230 per linear metre be applied. This decreases the cost provision of the installation of subsoil drainage by \$50,000;
- f. The pavement rate for asphaltic concrete 150mm thick (AC20) appear of \$400 per tonne appears high. It is recommended a rate of \$325 per tonne be applied. This decreases the pavement cost provision for 150mm AC20 by \$75,000;
- g. The rate for driveways of \$700 per square metre appears high. It is recommended that a rate of \$400 per square metre be applied. This decreases the driveway cost provision by \$70,000; and
- h. The 150mm kerb and gutter rate of \$200 per linear metre appears high. It is recommended that a rate of \$100 per linear metre be applied. This decreases the kerb and gutter provision by \$65,000.

OSE4 – Holland Road Reserve

- a. The site establishment provision of \$45,000 in total appears to be low. It is recommended that the site establishment provision be increased by \$40,000 to a total \$85,000;
- b. The traffic management provision of \$80,000 in total appears low. It is recommended that traffic management be increased to represent approximately 5% of the total cost. This increases the traffic management provisions by \$141,500 to a total cost of \$221,500;
- c. The service relocation for Endeavour Energy assets of \$450,000 in total appears high. It is recommended that this provision be decreased by \$110,000 to \$340,000;
- d. The rates for the supply and installation of stormwater class 3 375mm diameter and 450mm diameter pipe of \$700 per linear metre and \$900 per linear metre appears high. It is recommended that the following rates are applied for class 3 stormwater pipes:
 - i. 375mm diameter pipe: \$450 per linear metre; and
 - ii. 450mm diameter pipe: \$510 per linear metre.

This decreases the cost provision for the supply and installation of stormwater pipes by \$272,000; and

- e. The rate for the supply and installation of grass verge on 100mm of topsoil of \$50 per square metre appears high. This results in a total cost provision of \$85,000 for the supply and installation of a grass verge. It is recommended that a rate of \$26 per square metre be applied. This results in a decrease in the grass verge provision by \$41,000 to \$44,000.

3.6 Other Provisions

This independent assessment has approached the on-cost provisions on a site specific basis with the resulting percentages noted for context only. This is in contrast to the Hill Shire Council generic percentage based approach applied to all transport infrastructure items. The site specific assessment is based on the information and level of design detail available at the time of assessment. It is noted that due to the low level of design detail and in the case of incorrect assumptions with the roundabout provisions, some adjustment to the on-cost provisions have been applied. The adjustments to the on-cost provisions is detailed in the below with the cost summarised in Table 6.

Roundabouts

The IPART benchmark on-cost provisions for a roundabout in greenfield site not applicable. It is recommended the following provisions be considered for the roundabouts in brownfield sites in lieu of the Council provisions: :

- a. Design Cost – Allow \$60,000 for design costs per roundabout. This equates to approximately 15 percent for design cost in lieu of the 7.5 percent allowed for by Council. This allows for pavement, drainage and utility design;
- b. Project Management Costs – Allow \$50,000 for project management per roundabout. This equates to approximately 12.5 percent for project management in lieu of 7.5 percent allowed for by Council. This allows for a Project Manager for 8 weeks per roundabout; and
- c. Contingency – Allow \$80,000 per roundabout. This equates to approximately 20 percent for contingency in lieu of 30 percent allowed for by Council. The bill of quantities for the roundabouts are for relatively small quantities therefore justifying a smaller contingency.

Traffic Management – Roundabouts

It is recommended that the following on-cost provisions be considered for traffic management of four roundabouts:

- a. Design Cost – Allow \$30,000 for design costs. This equates to approximately 15 percent for design cost in lieu of the 7.5 percent allowed for by Council;
- b. Project Management Costs – Allow \$25,000 for project management. This equates to approximately 12.5 percent for project management in lieu of 7.5 percent allowed for by Council; and
- c. Contingency – Allow \$40,000 per roundabout. This equates to approximately 20 percent for contingency in lieu of 30 percent allowed for by Council.

McMullen Avenue and Brisbane Road Signalised Intersection

The McMullen Avenue and Brisbane Road signalised intersection is a complex two multi-lane intersection. Due to the complexities surrounding this signalised intersection it is recommended the following provisions be considered:

- a. Design Cost – Allow \$700,000 for design costs. This represents approximately 15 percent for design costs in lieu of 7.5 percent allowed for by Council;
- b. Project Management Costs – Allow \$550,000 for project management. This represents approximately 12.5 percent for a project manager/engineer, site supervisor and Council overheads in lieu of the 7.5 percent allowed for by Council; and
- c. Contingency – Allow \$1,135,000 for contingency. This represents a 30 percent contingency which is equal to the provisions allowed for by Council.

Pedestrian Bridges

An independent assessment of the pedestrian bridges was not undertaken however it is noted that there was a significant cost difference between the detailed design estimate and the construction costs of similar projects identified by the Hills Shire Council. The on-cost percentages below assume a pedestrian bridge cost estimate that is between \$2,500,000 and \$3,000,000. This cost estimate represents a range that considers the detailed design and construction costs. Based on this assumption it is recommended the following provisions be considered:

- a. Design Cost – Allow \$350,000 for design costs per pedestrian bridge. This equates to approximately 12.5 percent for design costs in lieu of 7.5 percent proposed by Council;
- b. Project Management Costs – Allow \$350,000 for project management costs per pedestrian bridge. This equates to approximately 12.5 percent for project management costs in lieu of 7.5 percent proposed by Council; and
- c. Contingency – Allow \$300,000 for contingency per pedestrian bridge. This equates to approximately 10 percent for contingency in lieu of 30 percent proposed by Council.

Old Castle Hill Road Upgrade

Due to the large number of adjacent residents the on-cost provisions allow for increased project management provision to allow for community liaison. It is recommended the following provisions be considered:

- a. Design Cost – Allow \$1,200,000 for design costs. This equates to approximately 12 percent for design costs in lieu of 7.5 percent proposed by Council;
- b. Project Management Costs – Allow \$1,400,000 for project management costs. This equates to approximately 14 percent for project management costs in lieu of 7.5 percent proposed by Council; and
- c. Contingency – Allow \$2,500,000 for contingency. This equates to approximately 25 percent for contingency in lieu of 30 percent proposed by Council.

Castle Street Upgrade

Due to the large number of adjacent residents the on-cost provisions allow for increased project management provision to allow for community liaison. It is recommended the following provisions be considered:

- a. Design Cost – Allow \$1,200,000 for design costs. This equates to approximately 12 percent for design costs in lieu of 7.5 percent proposed by Council;
- b. Project Management Costs – Allow \$1,400,000 for project management costs. This equates to approximately 14 percent for project management costs in lieu of 7.5 percent proposed by Council; and
- c. Contingency – Allow \$2,500,000 for contingency. This equates to approximately 25 percent for contingency in lieu of 30 percent proposed by Council.

Holland Road Reserve Upgrade

The Hills Shire Council cost estimate for Holland Road Reserve upgrade does include on-cost provisions for the upgrade of Holland Road Reserve. The Hills Shire Council have allowed 7.5% for design, 7.5% for project Management and 30% contingency. This review finds the percentages acceptable for the level of design. This results in the following on-cost provisions:

- a. Design Cost – \$283,492
- b. Project Management Costs – \$283,492; and
- c. Contingency – \$1,133,970.

Transport Infrastructure Cost Summary

This independent cost review of the Castle Hill North Precinct transport infrastructure is summarised in Table 6. The table provides an overview of the base cost, project management, design and contingency cost for each cost item.

Table 6: Summary of Transport Infrastructure Costs

Description	Hills Shire Base Cost	Hills Shire Project Management	Hills Shire Design	Hills Shire Contingency	Total Cost	Independent Base Estimate	Project Management	Design	Contingency	Total Cost
RT1 – Old Castle Hill Road and Gilham Road roundabout	\$361,611	\$27,270	\$27,270	\$125,445	\$543,598	\$385,168	\$50,000	\$60,000	\$80,000	\$575,168
RT2 – Castle Street and Carramar Road roundabout	\$361,611	\$27,270	\$27,270	\$125,445	\$543,598	\$465,818	\$50,000	\$60,000	\$80,000	\$655,818
RT3 – Gilham Road and Carramar Road roundabout	\$361,611	\$27,270	\$27,270	\$125,445	\$543,598	\$430,418	\$50,000	\$60,000	\$80,000	\$620,418

Description	Hills Shire Base Cost	Hills Shire Project Management	Hills Shire Design	Hills Shire Contingency	Total Cost	Independent Base Estimate	Project Management	Design	Contingency	Total Cost
RT4 – Garthowen Crescent and Old Castle Hill Road roundabout	\$361,611	\$27,270	\$27,270	\$125,445	\$543,598	\$409,308	\$50,000	\$60,000	\$80,000	\$599,308
RT5 - Traffic management for 4 roundabouts.	\$289,439	\$21,707	\$21,707	\$99,856	\$432,711	\$202,885	\$25,000	\$30,000	\$40,000	\$297,885
RT6 – McMullen Avenue and Brisbane Road Signalised Intersection	\$4,760,939 (non-apportioned)	\$357,070 (non-apportioned)	\$357,070 (non-apportioned)	\$1,642,523 (non-apportioned)	\$7,117,603 (non-apportioned)	\$4,473,757 (non-apportioned)	\$550,000 (non-apportioned)	\$700,000 (non-apportioned)	\$1,350,000 (non-apportioned)	\$7,073,570 (non-apportioned)
RT8 – Northern Pedestrian Bridge	\$1,815,282	\$136,146	\$136,146	\$626,272	\$2,713,846	<i>*Not assessed</i>	\$350,000	\$350,000	\$300,000	<i>Not assessed</i>
RT9 – Southern Pedestrian Bridge	\$1,815,282	\$136,146	\$136,146	\$626,272	\$2,713,846	<i>*Not assessed</i>	\$350,000	\$350,000	\$300,000	<i>Not assessed</i>

Description	Hills Shire Base Cost	Hills Shire Project Management	Hills Shire Design	Hills Shire Contingency	Total Cost	Independent Base Estimate	Project Management	Design	Contingency	Total Cost
RT10 – Old Castle Hill Road Upgrade	\$12,728,530	\$954,639	\$954,639	\$4,391,342	\$19,029,152	\$10,192,185	\$1,400,000	\$1,200,000	\$2,500,000	\$15,292,185
RT11 – Castle Street Upgrade	\$10,506,092	\$787,956	\$787,956	\$3,624,601	\$15,706,608	\$10,379,658	\$1,400,000	\$1,200,000	\$2,500,000	\$15,479,658
OSE4 – Holland Road Reserve	\$4,132,520	\$309,938	\$309,938	\$1,425,716	\$6,178,103	\$3,779,902	\$283,492	\$283,492	\$1,133,970	\$5,480,859

4 CONCLUSION

In conclusion, the Hills Shire Council has generally approached the base cost estimates on a site specific basis with on-cost provisions on a generic percentage based approach. This independent review has undertaken a site specific approach to assessing base costs and on- cost provisions. This assessment finds overall the Hill Shire Council cost estimates for transport infrastructure to be reasonable, however notes the following key findings:

Roundabouts

The roundabout cost estimates appear to be slightly under-provisioned due to greenfield assumptions and use of IPART benchmark rates that do not reflect the existing brownfield site conditions. Our cost estimate for the four roundabouts including project management, design and contingency is \$2,450,712. The Hill Shire Council estimate for the four roundabouts including on-cost provisions is \$2,174,395.

Signalised Intersection

The McMullen Avenue and Brisbane Road signalised intersection cost estimate appears to be adequately provisioned, albeit slightly high. Our cost review finds that the traffic management and utilities provisions does not appear adequate and there is no cost provision for adjustments to the signals at Old Castle Hill Road. It is noted however that contingency costs were accounted for in the base costs and have been double counted. Our cost estimate for the McMullen Avenue and Brisbane Road signalised intersection with project management, design and contingency is \$7,073,570. The Hills Shire Council non-apportioned cost estimate including on-cost provisions is \$7,117,603.

Pedestrian Bridges

The pedestrian bridge cost estimates appear to be under-provisioned, however there is insufficient information available on the pedestrian bridges to undertake an independent assessment. It is noted that the pedestrian bridge cost estimates are based on the detailed design estimates which are approximately \$1,000,000 to \$1,500,000 (per pedestrian bridge) below the final construction costs for similar projects identified by the Hills Shire Council. It is recommended that further work is undertaken to inform an independent cost assessment of the pedestrian bridge estimates.

Road Upgrades

The road upgrade cost estimates appear reasonable with the exception of Old Castle Hill Road which appears to be over-provisioned. Our cost review finds that site establishment and traffic management provisions appear low across the road upgrades. This is off-set by stormwater drainage provisions which appear to be over-provisioned across the road upgrades. It is noted that for Old Castle Hill Road upgrade the Telstra service relocations appear to be over-provisioned. Our total cost estimate for the road upgrades including project management, design and contingency is \$36,252,234. The Hills Shire Council cost estimate for the road upgrades including on-cost provisions is \$40,913,863.