HOBART AIRPORT INTERCHANGE

Submission to the Parliamentary Standing Committee on Public Works

Version: 1 Date: October 2017

Transport Infrastructure Services
Department of State Growth

Tasmanian Government

Document Development History

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Amendments in this Release

Section Title	Section Number	Amendment Summary

Distribution

Copy No	Version	Issue Date	Issued To

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Appendices

Authorisation

	Name	Signature	Date
Authorised by:	Frank Giana		

1 Introduction

1.1 Background

Currently the Tasman Highway is a dual carriageway to just west of Holyman Avenue. The existing Holyman Avenue roundabout is operating at near-capacity, and it is predicted that future traffic growth will significantly increase queuing and delay time for vehicles, particularly during peak periods.

Significant growth is also predicted for Hobart International Airport (HIAPL) through increased passenger numbers, increased freight task and commercial development within the airport precinct. The predicted growth for HIAPL is discussed extensively in the 2015 Hobart Airport Master Plan.

Upgrading of the Holyman Avenue intersection was identified as part of a submission to the Nation Building 2 (NB2) Program in 2012. It became an election commitment at the July 2016 Australian Government election and has now been confirmed as a priority upgrade project for commencement of construction in 2017/18.

This PSCPW Report provides information regarding upgrade works.

1.2 Project Objectives

The objectives of the project are:

- To develop a four lane grade separated interchange which provides safe, efficient and reliable access along the Tasman Highway, Holyman Avenue and Kennedy Drive for current and future predicted traffic growth;
- To construct the project within the existing Crown Land footprint;
- To provide a connection from the Tasman Highway to Holyman Avenue; and
- To provide an effective connection to Cranston Parade.

1.3 Project Location

The project is located on the Tasman Highway approximately 17 km east of Hobart at the entrance to Hobart Airport. Figure 1 is a locality plan.

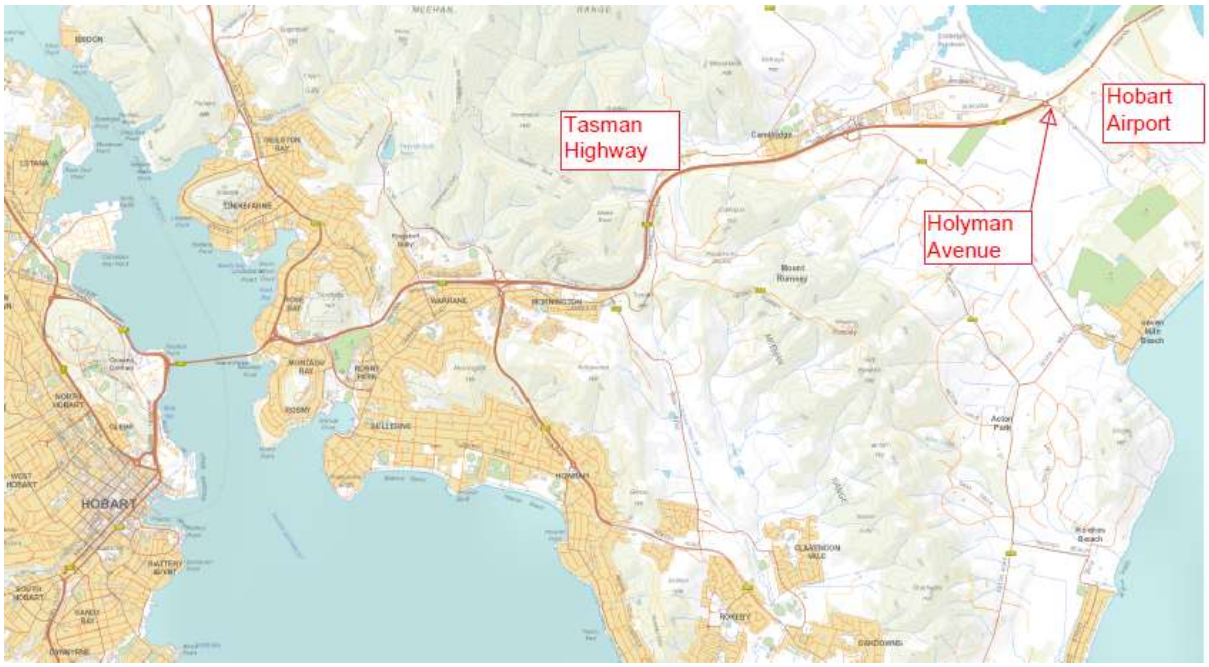


Figure 1 Locality Plan

1.4 Strategic Context of the Project

1.4.1 Alignment with Approved Strategies

Upgrading of the Holyman Avenue intersection was identified as part of a submission to the Nation Building 2 (NB2) Program in 2012 and has now been confirmed as a priority upgrade project for commencement of construction in 2017/18. The NB2 Concept Development Report examined road safety performance, transport efficiency, special values impacts and cost and identified 4 potential options for development with the preferred option being a diamond interchange.

The Southern Integrated Transport Plan (SITP) is a collaborative initiative between the Tasmanian Government, Southern Tasmanian Councils Authority, and twelve member councils. It provides a coordinated and strategic framework to recognise and address transport issues within the Southern Region over the next twenty years. Consistent with the broader objectives of the Plan, the upgrade of the Holyman Avenue intersection on the Tasman Highway provides improvements to a known infrastructure weakness at a location with high freight and passenger vehicle volumes, and is integrated with future development in the area.

Specifically, the project will deliver the following outcomes, which are aligned with the SITP:

- Provide efficient intermodal connections for freight and passengers to the Hobart International Airport
- Support future economic growth by facilitating access to future development at Hobart International Airport and continued growth in the Cambridge Industrial Estate.

1.4.2 Alignment with Planning Policies and Themes

The Department of State Growth has identified several key industry sectors where Tasmania has a competitive advantage and there is growth potential. These sectors include Antarctic and Southern Ocean, Cultural and Tourism Industry, Food and Agribusiness, and International Education, all of which rely on Hobart Airport as a vital gateway. Improved access to the airport and removal of congestion will provide key support to these sectors.

The existing Holyman Avenue roundabout is operating at near-capacity, and it is predicted that future traffic growth will significantly increase queuing and delay time for vehicles, particularly during peak periods. Significant growth is also predicted for Hobart International Airport (HIAPL) through increased passenger numbers, increased freight task and commercial development within the airport precinct. The predicted growth for HIAPL is discussed extensively in the 2015 Hobart Airport Master Plan.

The Hobart International Airport Master Plan predicts that vehicle traffic volumes using the airport will increase from the current figure of approximately 10,000 vehicles per day to 27,000 vehicles per day within 20 years. The Master Plan identifies efficient and reliable ground transport to and from the airport as an essential component of the predicted growth.

2 Project Details

2.1 Proposed Works

The Hobart Airport Interchange project works include:

- Reconstruction and upgrading of 1.6 km of the Tasman Highway including extension of the dual carriageway approximately 1 kilometre further east;
- Grade separation of the Tasman Highway and Holyman Avenue/Kennedy Drive with Holyman Avenue/Kennedy Drive passing over the Tasman Highway;
- Realignment of approximately 0.8 kilometres of Holyman Avenue and Kennedy Drive;
- Diamond interchange ramps with signalised ramp terminals; and
- Realignment of local access roads.

The concept design retains the existing horizontal alignment of the Tasman Highway for the section west of Holyman Avenue. At Holyman Avenue the existing median is 8 metres wide and heading east the design gradually transitions this median down to a width of 2.1 metres with a flexible road safety barrier.

The new interchange retains the Tasman highway at existing levels and requires lifting Holyman Avenue to pass over the Tasman Highway by approximately 8 meters. Approximately 140,000 cubic metres of imported fill will be required to construct the elevated Holyman Avenue and connecting on and off ramps onto the Tasman Highway. Preliminary geotechnical investigation indicates that the underlying ground will be subject to settlement and ground improvement may be required to ensure that foundations for the new embankments are satisfactory.

The new bridge taking Holyman Avenue over the Tasman Highway will be a forty metre long reinforced concrete structure four lanes wide with a design life of 100 years. Road pavements will be crushed rock with bituminous surfacing and a design life of 25 years. At the end of 25 years the pavements can be rehabilitated to extend their life.

Concept design drawings are provided in Attachment A.

2.2 Design Speed

A design speed of 110 km/h has been adopted for the Tasman Highway and for connections of the on and off ramps to the Tasman Highway.

A design speed of 60 km/h has been adopted for Holyman Avenue, Kennedy Drive and Cranston Parade.

2.3 Road Cross Section

The typical cross section for the Tasman Highway is:

- 3.5m lanes
- 2.0m outside shoulders
- 1.0m inside shoulders
- 8.0m wide median at Holyman Avenue narrowing to 2.1 metres with a flexible safety barrier east of Holyman Avenue

The typical cross section for Holyman Avenue/Kennedy Drive is:

- 3.5m lanes
- 1.0m outside shoulders
- 2.1m median in 4 lane sections

The typical cross section for Holyman Avenue/Kennedy Drive is:

- 3.0m lanes
- 1.0m shoulders

2.4 Drainage

A high level assessment of drainage through the Holyman Avenue Intersection site has been conducted for the concept design. The assessment includes a capacity check of existing conditions and the implications of the new road design on stormwater flows. The catchment delineation was based on Lidar information available for the area around Hobart airport.

With the proposed road design, several additional culverts will be required.

It is possible to detain the additional flow created by the extra road surface in major storm events. This can be achieved by using the basins created by the banks of the overpass. An overview of the proposed new system to deal with overland flow is provided in the Drawings in Appendix A.

The increased flow on the northern side of the interchange can be mitigated by appropriate sizing and location of pipes under Kennedy drive to allow detention north of the east bound on ramp.

The increase in flow on the southern side is insignificant at the location of the airport runway as the catchment is already large with significant paved areas and the additional flow from the increased road area is very small (<1%) in comparison.

2.5 Services

The following public utilities and services are located within the project footprint:

- Underground and overhead electricity owned by TasNetworks;
- Underground telecommunication cables, owned by TasNetworks;
- Underground telecommunication cables, owned by Telstra;
- Underground telecommunication cables, owned by NBN Co.;
- Streetlighting owned by the Department of State Growth;
- Water mains, owned by TasWater; and
- Sewer mains, owned by TasWater.

Confirmation of the road upgrade impacts on public utilities has being undertaken. The information on overhead power, telecommunication cables and sewer and water in the following sections is based on Dial Before You Dig information supplied by the public utility owners and field location investigations using a vacuum truck to pothole services at critical locations.

2.5.1 Overhead Power

An overhead electricity line follows Cranston Parade and is located parallel to the Highway. A second line runs from the southern side of Holyman Avenue northwards across the Tasman Highway. After following the highway for a short distance it crosses the highway and continues in an easterly direction. Relocation of these overhead lines will required. Consultation has been initiated with TasNetworks regarding the relocation works.

2.5.2 Underground Power

Underground power feeds the streetlighting around the Tasman Highway Holyman Avenue roundabout and along Holyman Avenue.

The airport's power supply is via underground cables which generally follow Kennedy Drive on its southern side then cross the highway run along the western side of Holyman Avenue.

2.5.3 Telecommunications Cables

Fibre optic cables follow the airport underground power supply. There is also some fibre optic cable in the vicinity of the western corner of the BP service station site. Sections of these cable may require relocation to accommodate the new work.

Another Fibre optic cable is located on the northern side of the Highway and generally heads eastwards. It is not anticipated that this cable will require relocation.

A further fibre optic cable which cross the highway at Back Road and extends northwards along the highway will require relocation.

Major telecommunications cross the highway on the eastern side of the roundabout and run parallel to the highway in an easterly direction on the southern side. A large telecommunications pit is located beneath the proposed eastbound off ramp. Th preferred solution will be to relocate this pit.

Telecommunications cables that run generally parallel with Kennedy Drive on its southern side cross the highway under the roundabout and head in an easterly direction. Sections of these cable may require relocation and pits will need to be raised.

2.5.4 Sewer and Water

A sewer main, recycled water main and water main are located on the northern side of Kennedy Drive and cross the highway on the eastern side of the roundabout and continue along Holyman Avenue. These utilities then cross Holyman Avenue fronting the BP service Station before continuing along Holyman Avenue.

Consultation with TasWater regarding the relocation or protection of their assets where required has begun. Relocation and protection designs will be prepared and provided to TasWater for approval.

3 Social, Environmental Impacts and Stakeholder Engagement

3.1 Property Acquisition

The concept design does not require any land acquisition from either private property or airport land including land leased by Sultan Holdings.

Relocation of approximately 200 m of Holyman Avenue is required to match the new interchange. This work will be done as part of the interchange works and will be transferred to HIAPL on completion.

3.2 Local Road Access

3.2.1 Kennedy Drive and Holyman Avenue

The new overpass will be located approximately 160 metres to the west of the existing Holyman Avenue roundabout and realignment of approximately 400 metres of Kennedy Drive will be required. This realignment will also necessitate changes to the accesses to several industrial properties on the northern side of Kennedy Drive including Lewis Marine, Bradford Insulation and Roberts. Where these three properties connect to Kennedy drive the new road will be approximately 1.4 metres higher than the existing. Whilst these accesses can be reconstructed to cater for the vehicles that currently use them, including B- Doubles, gradients of around 5% may apply whereas the existing accesses are near level.

3.2.2 Cranston Parade

Cranston Parade provides access to three properties to the west of the existing roundabout. The first of these which is owned by Greg Casimaty is currently the site of a licensed landfill and has recently had two commercial developments approved. The land is zoned light industrial and has further development potential.

The Department intends to provide connections from the westbound on ramp to Cranston Parade that will allow left turn in and left turn out movements only. Therefore to travel to the airport or further east from Cranston Parade a vehicle would be required to exit onto the Tasman Highway and travel to the west to turn around at the Action Road Interchange.

This proposal is opposed by Greg Casimaty as he is concerned about the impact on his property of less direct access to the Tasman Highway than he currently enjoys. It is understood that Casimaty is seeking a connection onto Holyman Avenue through airport land, however this is considered to be outside the responsibility of the Department of Sate Growth. Changes to access, including restriction to left turn in and left turn out, is a common outcome when highways are converted from single carriageway to dual carriageway and has occurred in a number of situations where the Department has installed wire rope safety barrier to separate opposing streams of traffic.

Other options for the location of Cranston Parade that have been investigated include:

- Direct connection to Holyman Avenue opposite Llanherne Drive at the existing roundabout within the airport road network approximately 280 metres from the Tasman Highway. This proposal would impact a much greater area of the threatened grassland and advice from the Federal Department of the Environment and Energy was that it would not support such a proposal. Hobart International Airport (HIAPL) has alos rejected this proposal

- Diversion to the west and onto Acton Road. This option has been discussed with Clarence City Council who were very negative about Cranston Parade connecting to Acton Road. They believed that the current zoning would not support this connection. The majority of the land serviced by Cranston Parade is zoned “light industrial” with some “rural resource”. Any diversion of Cranston Parade to the west would need to cross land zoned as rural living and Council viewed this as incompatible with the planning scheme

- Direct connection to Holyman Avenue between the southern ramp terminals and Llanherne Drive roundabout. This location is not favoured because the distance between the ramp terminals and Llanherne Drive is only 300 metres and the Cranston Parade junction would be in close proximity to the proposed access for the existing BP service station and proposed slip lane for Hobart bound vehicles entering the westbound on ramp. If a junction were introduced at this location there would then be three junctions/intersections to be negotiated by eastbound traffic entering the airport before reaching the Llanherne Drive roundabout. Whilst the two signalised ramp terminal intersections will operate efficiently introduction of a third junction at this location is likely to reduce that efficiency and introduce additional conflict points

- Direct connection to the westbound on ramp. This proposal would require the first 250 metres of the westbound off ramp to be a two way road and introduce a junction onto the on ramp. Such a situation, whilst not unprecedented, is not good practice and the presence of slow moving Cranston Parade traffic entering and leaving the on ramp mixed with vehicles accelerating to enter the 110 km/h Tasman Highway is highly undesirable and may create safety issues. The junction would need to be signalised and also would act to limit free flow of traffic leaving the airport. The proposal has also been reviewed by an independent Road Safety Auditor who concluded that "The proposal is an unconventional arrangement which appears to have a high risk of crashes."

3.3 Noise

The *Tasmanian Traffic Noise Management Guidelines 2015* provides guidance regarding traffic noise mitigation decisions by firstly defining 'eligible scenarios', which are scenarios where noise mitigation will be considered, and then defines 'eligible buildings', which are buildings within a scenario for which mitigation will be considered.

The Guidelines also explicitly identify scenarios, such as safety upgrades, where mitigation will not be considered. This project is defined as carriageway addition to an existing road within an existing road corridor with the aim to increase traffic volume capacity; as such the project is deemed eligible and mitigation is being considered. However, the presence of the airport means that the target limits in the Guidelines cannot be directly applied. Project-specific noise targets are required for this unique situation.

At the Tourist Park, airport noise will be equivalent to a traffic noise level of L10(18 hour) 68 dB(A) and would dominate traffic noise if the latter is 65 dB(A) or below. Mitigating road traffic noise to below 65 dB(A) would consequently be of no benefit, and L10(18 hour) 65 dB(A) is therefore the appropriate mitigation target.

In contrast, at the Travelodge Airport Hotel traffic noise will dominate airport noise and the Noise Guideline target of 68 dB(A) for the Hotel is appropriate.

Two mitigation options for noise mitigation to achieve these targets were assessed. Model 1 used 14 mm chip seal throughout but introduced a noise wall. The required wall would be prohibitively long (304 m) and high (maximum 5.6 m) and could still not achieve the Tourist Park targets at the front buildings due to the need to have a gap in the wall at the park entrance. Model 2 avoids a wall but replaces the 14 mm chip seal with dense graded asphalt on the eastern half of the project. Model 2 achieves an overall better mitigation outcome, with noise levels generally 1 to 2 dB(A) lower than Model 1.

It is therefore proposed to install dense graded asphalt on the eastern half of the project including Holyman Avenue.

3.4 Flora

3.4.1 Vegetation

The following native vegetation types are found within the survey area:

- Saline sedgeland/rushland (ARS) – 0.25 ha
- *Eucalyptus viminalis – E. globulus* coastal forest and woodland (DVC) – 1.64 ha
- Lowland grassland complex (GCL) – 1.19 ha
- Lowland Poa labillardierei grassland (GPL) – 13.62 ha
- Bursaria – Acacia woodland and scrub (NBA) – 8.42 ha

The *Eucalyptus viminalis – E. globulus* coastal forest and woodland is a threatened community under the Tasmanian Nature Conservation Act 2002 (NCA).

The ARS on site corresponds to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBCA) vulnerable 'subtropical and temperate coastal saltmarsh' ecological community.

Around 13.5 ha of the GPL and GCL qualifies as the EPBCA critically endangered 'lowland grasslands of Tasmania'.

Direct impacts on these communities of native vegetation are relatively minor, with the most important loss being 0.91 ha of the lowland grasslands of Tasmania. This is the smallest possible direct impact to this community, as a result of redesign to reduce impacts. To compensate for this unavoidable loss and to avoid significant impacts upon the grassland system as a whole, the Department of State Growth will place a remaining patch of c. 3.7 ha of this community on their land into a formal management agreement for perpetuity, with a focus on maintaining threatened flora, controlling weeds and suppressing woody plant invasion.

An EBPC referral has been submitted for approval.

3.4.2 Threatened Flora

Seven species listed as rare under the Tasmanian Threatened Species Protection Act 1995 (TSPA) have been recorded from the site.

Any impact on threatened plant species listed under the TSPA will require a 'permit to take' from the Policy and Conservation Assessments Branch at the Department of Primary Industries, Parks, Wildlife and the Environment. Thus, with the concept design, the proposal will require a permit to take:

- *Austrostipa scabra*
- *Calocephalus citreus*
- *Haloragis heterophylla*
- *Juncus amabilis*
- *Ranunculus pumilio var. pumilio*
- *Senecio squarrosus*

Large numbers of TSPA rare flora will be impacted by the proposal, but in the context of species ecology and statewide populations, the impacts to Calocephalus citreus are considered to be the greatest and will be offset by an appropriate mechanism as specified by DPIPWE within a permit condition.

A permit to take has been submitted for approval.

3.4.3 Weeds

A survey of weeds within the road reservation was included in the flora and fauna habitat survey. Nine of the declared weeds are classed as Zone B species in the Clarence Council, with the other treated as a Zone A. In addition, adjacent properties are known to support the declared species crow garlic (*Allium vineale*), which is a Zone A weed for Clarence Council and a category 2 eradication species under the Department of State Growth State Roadside Weed Management Strategy. There are ten varieties of declared weeds within the project extents including:

- slender thistle (*Carduus pycnocephalus*)
- boneseed (*Chrysanthemoides monilifera ssp. Monilifera*)
- English broom (*Cytisus scoparius*)
- Spanish heath (*Erica lusitanica*)

- fennel (*Foeniculum vulgare*)
- canary broom (*Genista monspessulana*)
- hoary cress/white weed (*Lepidium draba*)
- African boxthorn (*Lycium ferocissimum*)
- Horehound (*Marrubium vulgare*)
- Blackberry (*Rubus fruticosus*)

It is intended to treat weeds through the incorporation of appropriate weed management clauses into the construction specification.

3.5 Fauna

No threatened fauna has been recorded within the impact area, despite a targeted survey for the TSPA vulnerable tussock skink (*Pseudemoia pagenstecheri*). The site is not considered to contain any critical habitat elements that are likely to impact the persistence of threatened fauna species within the local area. Species such as the eastern barred bandicoot (*Perameles gunnii*) and Latham's snipe (*Gallinago hardwickii*) may utilise the site, but the potential for their presence is unlikely to be significantly impacted by the proposal nor to trigger any legislation. Nonetheless, some mitigation is recommended for the potential loss of bandicoot shelter sites, in the form of creating piles of native plant debris within the remaining vegetation following clearance elsewhere.

3.6 Aboriginal Heritage

Aboriginal cultural heritage surveys were conducted by Hobart International Airport in 1981 and 2008. These surveys have identified scattered artefacts as being present near the site of the Holyman Avenue roundabout. Subsequently an Aboriginal Heritage survey was conducted for the Holyman Avenue project footprint in 2016. The report and survey was undertaken by CHMA. According to AHT, there were three known sites on file. However only one known site was actually identified during the survey. The extent of this site falls outside the area impacted by the project. The site will be barricaded during construction to ensure that it is not impacted.

Consultation with Indigenous stakeholders was undertaken by AHT via the Aboriginal Heritage Officer (AHO) involved in the 2016 Aboriginal Heritage Survey. The AHO contacted the various local indigenous groups, informing them of the results of the survey. Where impacts are expected, community opinion was incorporated into the management recommendations.

Advice from AHT is that works should proceed under the conditions of an Unanticipated Discovery Plan.

3.7 Historic Heritage Assessment

Australia's National Heritage List was consulted to determine whether there were any Commonwealth Heritage Places were contained within the project area. No federally listed heritage values were identified within the project area. A search of the Tasmanian Heritage Management System, managed by Heritage Tasmania, was also consulted and no state listed European heritage values were identified in the project area.

3.8 Landscape and Visual Impacts

There are numerous interchanges on the Tasman Highway the two closest are Cambridge Road/Action Road interchange and the Flagstaff Gully Link/South Arm Highway interchange. The proposed interchange will be similar to these and other existing interchanges in Tasmania.

The works will include landscaping and revegetation of earthworks batters. Therefore these works will have low landscape and visual impacts on the surrounding area.

3.9 Stakeholder Engagement

The primary stakeholders with respect to advancing the design development and approval processes are listed in the table below with a summary of the issues that have been discussed with those stakeholders.

Table 1 Stakeholder Issues

Stakeholder	Critical Issues
HIAPL	Resolving the location of Cranston Parade Managing the objections raised by Sultan Holdings concerning perceived impacts on business operation and amenity of the Airport Hotel and service station Obtaining sign off for the current preferred option Arrangements for transfer of realigned Holyman Avenue to HIAPL
Australian Government, Department of Infrastructure (Aviation)	Arrangements for transfer of realigned Holyman Avenue to HIAPL
Australian Government, Department of Environment and Energy	EPBC referral for flora species
Sultan Holdings	Explanation and discussion of overall concept Business impacts as a result of the new interchange layout and during construction
Greg Casimaty (Cranston Parade)	Resolving the location of Cranston Parade
Marinova Pty. Ltd (Cranston Parade)	Explanation and discussion of overall concept
Stirling Hookway (Cranston Parade)	Explanation and discussion of overall concept
Robert Thornbury (Cranston Parade)	Explanation and discussion of overall concept
Eye Spy Signs (Kennedy Drive)	Explanation and discussion of overall concept
Lewis Marine (Kennedy Drive)	Explanation and discussion of overall concept
Roberts Ltd (Kennedy Drive)	Explanation and discussion of overall concept
Cambridge Aerodrome & Par Avion (Shannon Wells)	Explanation and discussion of overall concept
Threatened Species Unit of DPIPWE	Permit to Take for flora species
Clarence City Council	Submission and approval of Planning Permit

A detailed public information campaign is proposed prior to submission of the Development Application. This includes

- A Public Display at the Cambridge Hall planned for November 2017.
- A media release planned for October 2017
- Ministerial announcement planned for October 2017
- Notification of the project through Social Pinpoint, on Department of State Growth web site and social media (Airport and Clarence City Council Facebook sites)

The software package, Consultation Manager, is being used throughout the design phase to ensure that there is an accurate record of discussions with the project's stakeholders. Consultation with

stakeholders, particularly those affected by land acquisition and modifications to property accesses will continue in parallel with refinement of the design.

3.10 Development Approvals

A Development Application is required to be submitted under the Clarence Interim Planning Scheme 2015. This application is currently being prepared and is programmed for lodgement in November 2017.

In order to carry out the realignment of Holyman Avenue on Airport land a Major Development Plan (MDP) is required. This is a requirement under the Airports Act. The MDP is currently being prepared and, following notifications to relevant parties and stakeholder consultation , it is planned to submit the MDP for approval by the Federal Minister early in 2018.

4 Project Program and Costs

4.1 Project Program

The key activates and their commencement and completion dates are outlined in Table 2.

Table 2 Project Program

Activity	Commencement	Completion
Scoping PPR Approval	September 2017	October 2017
PSCPW approval	September 2017	November 2017
Major Development Plan	September 2017	February 2018
Development Application approval	October 2017	January 2018
Preliminary Design	October 2017	December 2017
Detailed Design and Preparation of Tender Documents	December 2017	April 2018
Tender Process	April 2018	May 2018
Award of Construction Contract	May 2018	June 2018
Construction	June 2018	October 2020

4.2 Costs

A cost estimate has been prepared based on the concept design presented in this report. Quantities have been taken from the current design model and rates estimated from similar jobs and past experience. The Department's standard procedure of preparing P50 and P90 cost estimates has been adopted. The P50 estimate has a probability of 50% that the cost will not be exceeded and the P90 has a 90% probability that the cost will not be exceeded. The inherent risks and contingent risks used to calculate the P50 and P90 cost estimates are taken from similar jobs and past experience.

Table 3 Cost Estimate

Client Costs	
Scoping Phase	$350,000
Development Phase	$1,498,725
Delivery Phase	$2,216,186
Total Client's Costs	$4,064,911
Construction Costs	
Contractor Direct Costs	$17,603,264
Client Supplied Materials or Services	$886,000
Total Construction Cost	$18,489,264
Project Cost	
Base Estimate	$22,554,175
P50 Project Estimate (Total contingency 16%)	$28,126,984
P90 Project Estimate (Total contingency 24%)	$29,962,043

5 Conclusion

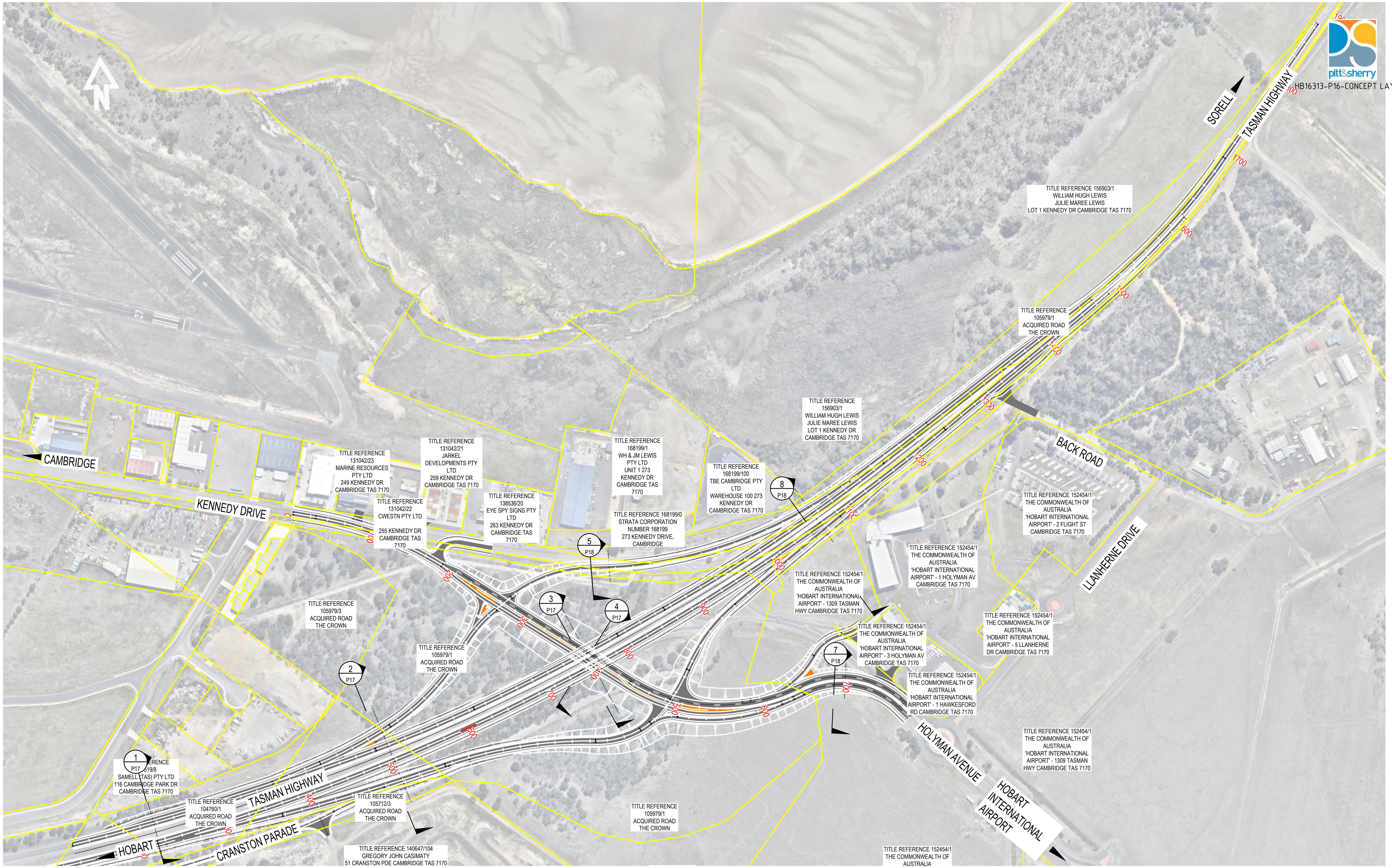
The existing intersection is not operating at a satisfactory Level of Service (LOS) during peak periods. This is indicated by the Degree of Saturation (DOS) of more than 1.00 in three peak hours which suggests there is more traffic attempting to travel through the intersection than the intersection capacity.

In addition, vehicles in the afternoon peak hours are experiencing large delays resulting in LOS F which indicates unacceptable delays. There is significant growth predicted for Hobart Airport and the Sorell Municipality, which is the closest regional centre to the east of the airport, is growing at an annual rate of 2.8%. The Tasman Highway is the single arterial road connector to the Sorell Municipality. Recognising that significant traffic growth is expected, the intersection will continue to operate at poorer levels of service with increasing delays. The modelling suggests that traffic volumes in 2038 will be three times the capacity of the existing roundabout.

The works will:

- Improve safety and transport efficiency at the Holyman Avenue Intersection through grade separation and reduction of queue lengths and delays
- Provide a long-term solution for access to Holyman Avenue and the adjoining Kennedy Drive
- Improve reliability of access to Hobart International Airport

Appendix A. Drawings



TASMAN HIGHWAY / HOLYMAN AVENUE INTERSECTION UPGRADE

CONCEPT LAYOUT (DRAWING 1 OF 2)

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HB16313-P16-CONCEPT LAYOUT 2 OF 2

CAMBRIDGE

KENNEDY DRIVE

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TITLE REFERENCE 131042/21 JARKEL DEVELOPMENTS PTY LTD 259 KENNEDY DR CAMBRIDGE TAS 7170

TITLE REFERENCE 131042/22 CWESTN PTY LTD 255 KENNEDY DR CAMBRIDGE TAS 7170

TITLE REFERENCE 138536/20 EYE SPY SIGNS PTY LTD 263 KENNEDY DR CAMBRIDGE TAS 7170

TITLE REFERENCE 168199/1 WH & JM LEWIS PTY LTD UNIT 1 273 KENNEDY DR CAMBRIDGE TAS 7170

TITLE REFERENCE 168199/100 TBE CAMBRIDGE PTY LTD WAREHOUSE 100 273 KENNEDY DR CAMBRIDGE TAS 7170

TITLE REFERENCE 168199/0 STRATA CORPORATION NUMBER 168199 273 KENNEDY DRIVE, CAMBRIDGE

TITLE REFERE 156903/1 WILLIAM HUGH I JULIE MAREE L LOT 1 KENNED CAMBRIDGE TAS

TITLE REFERENCE 105979/3 ACQUIRED ROAD THE CROWN

TITLE REFERENCE 105979/1 ACQUIRED ROAD THE CROWN

TITLE REFERENCE 1 THE COMMONWEA AUSTRALIA 'HOBART INTERNAT AIRPORT' - 1309 TA HWY CAMBRIDGE TA

SORELL

TASMAN HIGHWAY

HOBART INTERNATIONAL AIRPORT

1 P17

2 P17

3 P17

4 P17

5 P18

7 P18

TITLE REFERENCE 167519/8 SAMELL (TAS) PTY LTD 116 CAMBRIDGE PARK DR CAMBRIDGE TAS 7170

TITLE REFERENCE 104760/1 ACQUIRED ROAD THE CROWN

TITLE REFERENCE 105712/3 ACQUIRED ROAD THE CROWN

CRANSTON PARADE

TITLE REFERENCE 140647/104 GREGORY JOHN CASIMATY 51 CRANSTON PDE CAMBRIDGE TAS 7170

TITLE REFERENCE 105979/1 ACQUIRED ROAD THE CROWN

TITLE REFERENCE 108418/1 ACQUIRED ROAD THE CROWN

TITLE REFERENCE 107856/2 ROBERT JAMES THORNBURY 1047 ACTON RD CAMBRIDGE TAS 7170

HOBART

TASMAN HIGHWAY

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TASMAN HIGHWAY / HOLYMAN AVENUE INTERSECTION UPGRADE
CONCEPT LAYOUT (DRAWING 2 OF 2)

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SCALE IN METRES - 1:4000

Tasmanian Government

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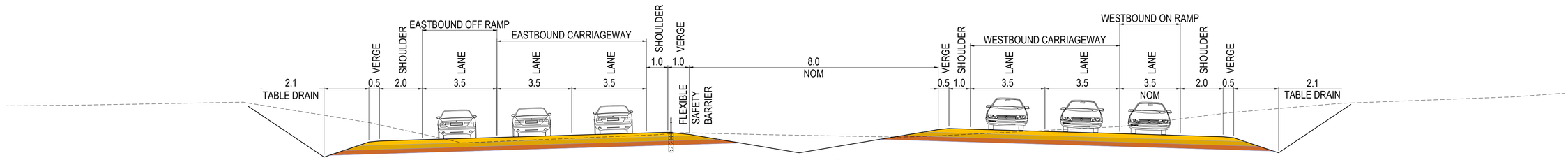

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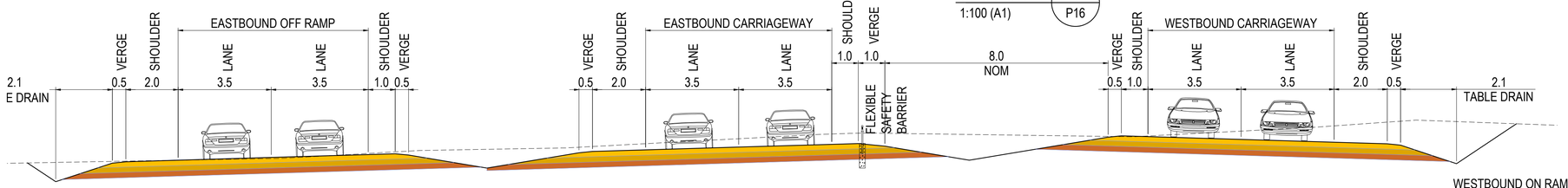

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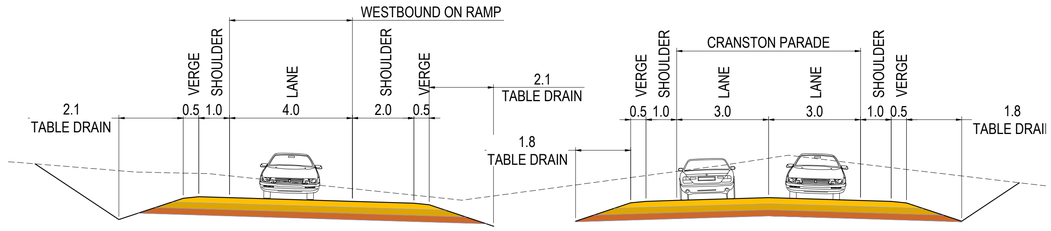

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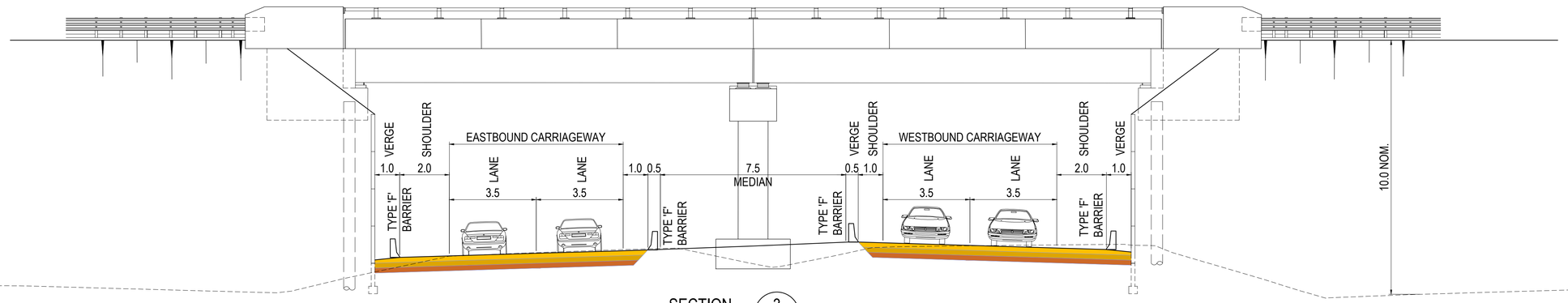

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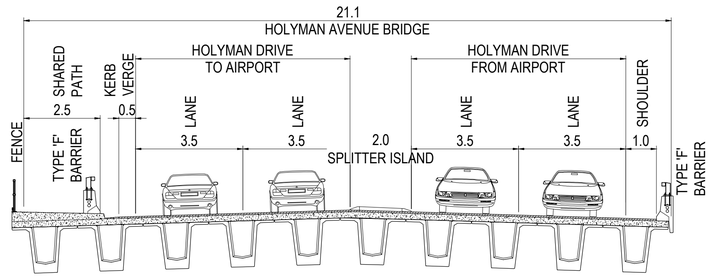

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TYPICAL CROSS SECTIONS

2 0 2 4 6 8
SCALE IN METRES - 1:100

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PAS FORM REP A1 REV1
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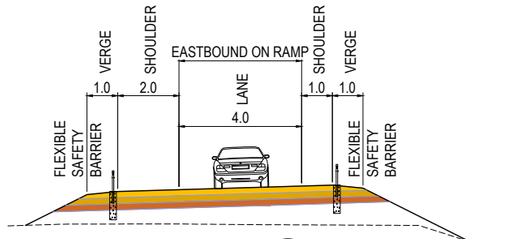
HB16313-P18



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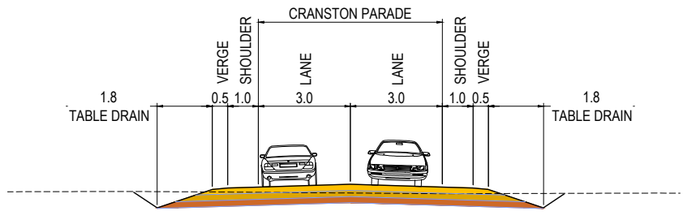

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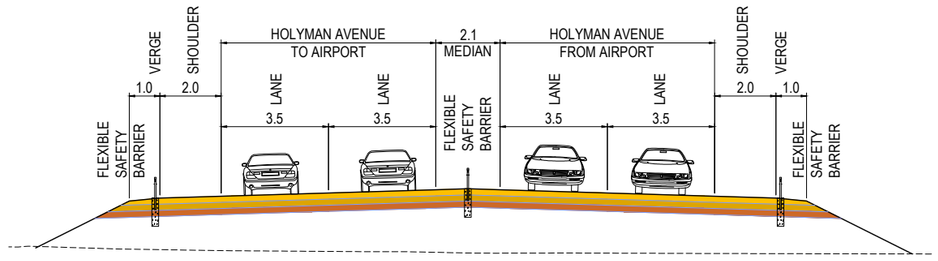

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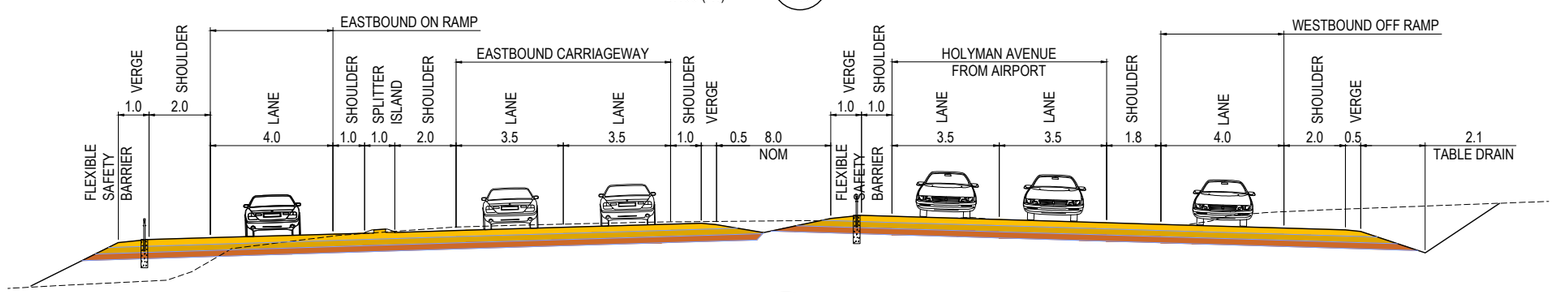

SECTION 8
1:100 (A1) P16

TYPICAL CROSS SECTIONS

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SCALE IN METRES - 1:100

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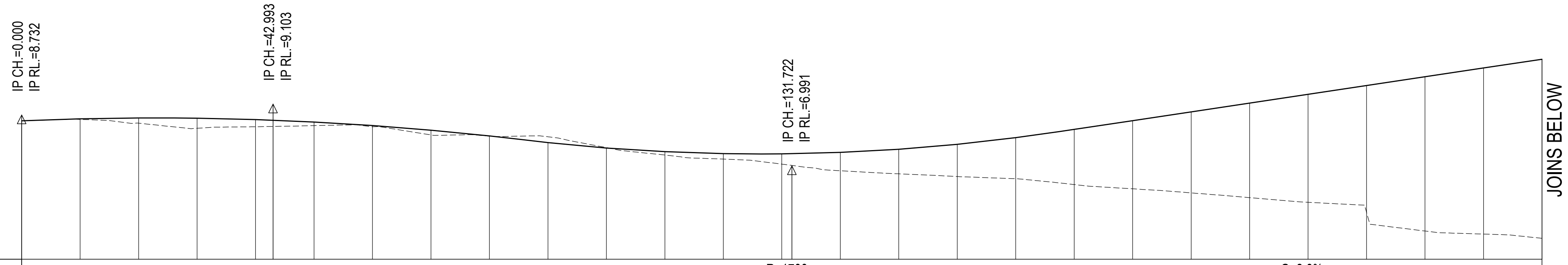
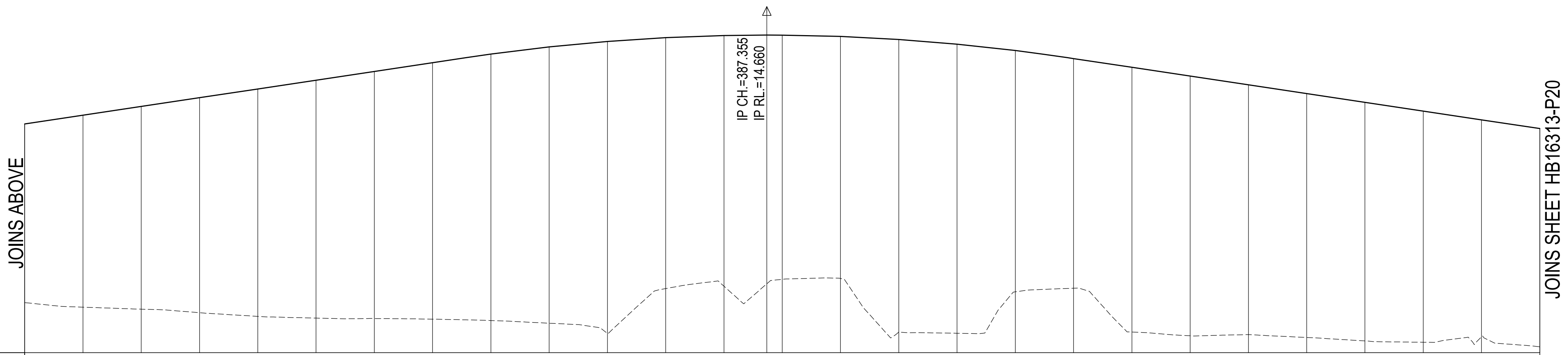


DATUM 4.000

VERTICAL GEOMETRY					L=86m R=-2650m									R=1700m L=91m									G=3.0% L=158m				
HORIZONTAL GEOMETRY		L=26m									R=400m L=155m												L=254m				
LEVEL DIFFERENCE DESIGN TO EXISTING	0.000	0.019	0.177	0.344	0.245	0.122	0.043	0.162	0.006	-0.199	-0.015	0.114	0.185	0.350	0.625	0.840	1.100	1.403	1.886	2.331	2.771	3.233	3.693	4.335	5.275	5.679	6.124
INTERPOLATED GROUND LEVELS	8.732	8.781	8.652	8.478	8.531	8.570	8.529	8.251	8.210	8.189	7.818	7.564	7.425	7.252	7.027	6.921	6.828	6.753	6.554	6.408	6.269	6.106	5.946	5.605	4.965	4.860	4.715
DESIGN LEVELS	8.732	8.799	8.829	8.821	8.776	8.692	8.571	8.412	8.216	7.989	7.804	7.678	7.610	7.602	7.652	7.761	7.929	8.156	8.439	8.739	9.039	9.339	9.639	9.939	10.239	10.539	10.839
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260

GEOMETRY DATA
IS ROUNDED

LONGITUDINAL SECTION (MC30)
KENNEDY DRIVE TO HOLYMAN AVENUE



DATUM 3.000

VERTICAL GEOMETRY					G=3.0% L=158m									L=103m R=-1720m									L=297m G=-3.0%				
HORIZONTAL GEOMETRY										L=254m													R=-200m L=205m				
LEVEL DIFFERENCE DESIGN TO EXISTING	6.124	6.581	6.949	7.371	7.797	8.156	8.470	8.793	9.134	9.473	10.011	8.603	8.593	8.372	8.297	10.034	9.912	8.273	7.871	9.076	8.903	8.563	8.360	8.180	7.924	7.439	7.482
INTERPOLATED GROUND LEVELS	4.715	4.559	4.490	4.368	4.243	4.184	4.169	4.147	4.100	4.008	3.657	5.196	5.277	5.512	5.543	3.702	3.665	5.084	5.209	3.705	3.577	3.618	3.520	3.401	3.356	3.541	3.199
DESIGN LEVELS	10.839	11.139	11.439	11.739	12.039	12.339	12.639	12.939	13.234	13.480	13.668	13.798	13.870	13.884	13.840	13.737	13.576	13.357	13.081	12.781	12.481	12.181	11.881	11.581	11.281	10.981	10.681
CHAINAGE	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520

GEOMETRY DATA
IS ROUNDED

LONGITUDINAL SECTION (MC30)
KENNEDY DRIVE TO HOLYMAN AVENUE

LONGITUDINAL SECTIONS (MC30)
KENNEDY DRIVE DRG 1 OF 2

20 0 20 40 60 80
SCALE IN METRES - 1:1000

Tasmanian Government

P&S FORM REP_A1 REV 1
Sep. 5, 17 - 15:24:33 DWG Name: HB16313-P19.dwg DWG Updated By: Ivan Brito

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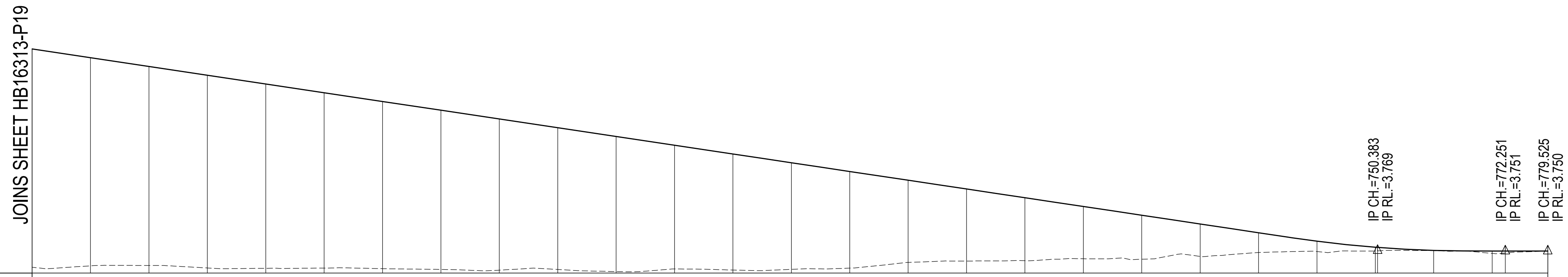
HB16313-P20



VERTICAL GEOMETRY: L=297m G=-3.0% ; R=æ L=29m ; R=21956m L=15m

HORIZONTAL GEOMETRY: R=-200m L=205m ; R=100m L=124m ; L=16m

CHAINAGE	LEVEL DIFFERENCE DESIGN TO EXISTING	INTERPOLATED GROUND LEVELS	DESIGN LEVELS
520	7.482	3.199	10.681
530	7.135	3.246	10.381
540	6.823	3.257	10.081
550	6.609	3.172	9.781
560	6.319	3.161	9.481
570	6.011	3.169	9.181
580	5.732	3.148	8.881
590	5.459	3.121	8.581
600	5.183	3.097	8.281
610	4.860	3.121	7.981
620	4.632	3.048	7.681
630	4.243	3.137	7.381
640	3.979	3.101	7.081
650	3.655	3.125	6.781
660	3.314	3.167	6.481
670	2.819	3.361	6.181
680	2.470	3.410	5.881
690	2.159	3.422	5.581
700	1.792	3.488	5.281
710	1.510	3.471	4.981
720	1.114	3.567	4.681
730	0.678	3.702	4.381
740	0.353	3.736	4.090
750	0.127	3.754	3.882
760	0.005	3.768	3.774
770	0.081	3.673	3.754
780		3.750	3.750

GEOMETRY DATA
IS ROUNDED

LONGITUDINAL SECTION (MC30)
KENNEDY DRIVE TO HOLYMAN AVENUE

LONGITUDINAL SECTIONS (MC30)
KENNEDY DRIVE DRG 2 OF 2

20 0 20 40 60 80
SCALE IN METRES - 1:1000

Tasmanian Government

P&S FORM REP_A1 REV 1
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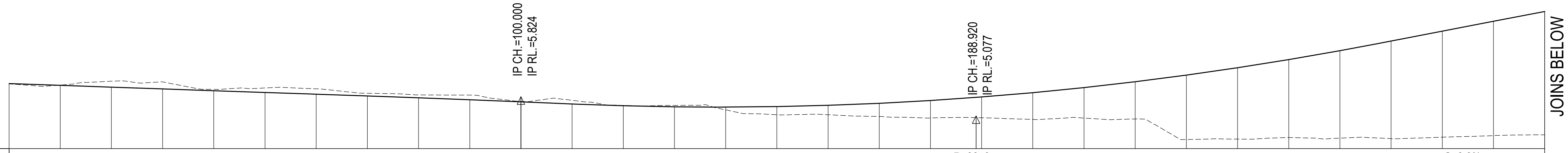
HB16313-P21



DATUM 4.000

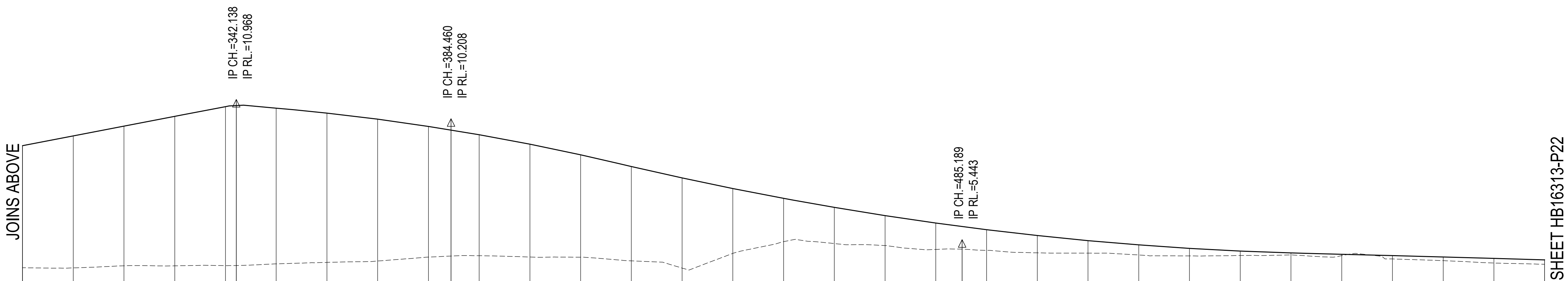
CHAINAGE	DESIGN LEVELS	INTERPOLATED GROUND LEVELS	LEVEL DIFFERENCE DESIGN TO EXISTING
0	6.536	6.522	0.015
10	6.465	6.477	-0.011
20	6.395	6.626	-0.231
30	6.326	6.600	-0.274
40	6.257	6.308	-0.052
50	6.189	6.364	-0.175
60	6.122	6.332	-0.211
70	6.053	6.157	-0.105
80	5.980	6.094	-0.114
90	5.904	6.086	-0.183
100	5.824	5.843	-0.019
110	5.740	5.882	-0.142
120	5.670	5.683	-0.014
130	5.629	5.685	-0.055
140	5.618	5.509	0.109
150	5.637	5.319	0.319
160	5.686	5.319	0.367
170	5.765	5.252	0.513
180	5.874	5.193	0.681
190	6.013	5.202	0.810
200	6.181	5.136	1.044
210	6.379	5.190	1.190
220	6.607	5.155	1.452
230	6.865	4.353	2.513
240	7.153	4.370	2.782
250	7.471	4.433	3.038
260	7.818	4.408	3.411
270	8.194	4.388	3.807
280	8.579	4.444	4.134
290	8.963	4.506	4.458
300	9.348	4.538	4.810

VERTICAL GEOMETRY: L=10m G; R=3350m L=157m; G=3.8% L=73m

HORIZONTAL GEOMETRY: R=-3387m L=59m; R=-550m L=90m; R=-250m L=122m; R=150m L=60m

GEOMETRY DATA IS ROUNDED

EASTBOUND ON/OFF RAMP



DATUM 4.000

CHAINAGE	DESIGN LEVELS	INTERPOLATED GROUND LEVELS	LEVEL DIFFERENCE DESIGN TO EXISTING
300	9.348	4.538	4.810
310	9.732	4.533	5.200
320	10.117	4.616	5.501
330	10.501	4.613	5.889
340	10.886	4.621	6.265
350	10.827	4.690	6.136
360	10.631	4.750	5.881
370	10.391	4.803	5.588
380	10.107	4.957	5.150
390	9.778	5.013	4.766
400	9.405	4.961	4.444
410	8.987	4.952	4.035
420	8.528	4.810	3.717
430	8.078	4.523	3.556
440	7.660	5.105	2.555
450	7.273	5.567	1.706
460	6.917	5.490	1.426
470	6.592	5.411	1.181
480	6.299	5.260	1.040
490	6.037	5.225	0.813
500	5.806	5.125	0.682
510	5.607	5.114	0.492
520	5.438	5.041	0.397
530	5.301	5.003	0.298
540	5.196	5.020	0.176
550	5.121	5.041	0.079
560	5.069	5.015	0.054
570	5.017	4.883	0.133
580	4.963	4.818	0.145
590	4.906	4.725	0.182
600	4.848	4.672	0.176

VERTICAL GEOMETRY: G=3.8% L=73m; L R; L=8m G; L=66m R=-2250m; R=3200m L=135m; L=165m R=-50000m

HORIZONTAL GEOMETRY: R=150m L=60m; L=22m; R=150m L=98m; R=-500m L=318m

GEOMETRY DATA IS ROUNDED

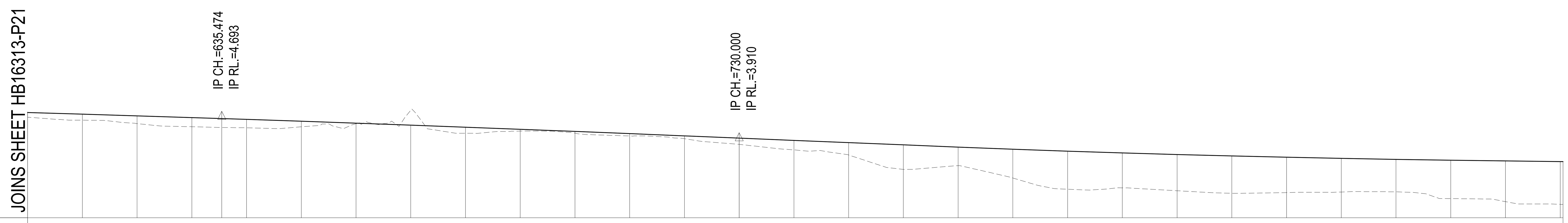
EASTBOUND ON/OFF RAMP

Tasmanian Government

EASTBOUND ON/OFF RAMP - DRG 1 OF 2

20 0 20 40 60 80
SCALE IN METRES - 1:1000

HB16313-P22



DATUM 1.000

VERTICAL GEOMETRY: L=165m R=-50000m; L=12m G=-0.8%

HORIZONTAL GEOMETRY: R=-500m L=318m; L=110m

CHAINAGE	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740
LEVEL DIFFERENCE DESIGN TO EXISTING	0.176	0.221	0.285	0.334	0.306	0.202	0.022	-0.546	0.220	0.066	0.064	0.087	0.102	0.230	0.347
INTERPOLATED GROUND LEVELS	4.672	4.566	4.441	4.327	4.289	4.324	4.435	4.930	4.090	4.167	4.091	3.989	3.890	3.681	3.480
DESIGN LEVELS	4.848	4.788	4.726	4.661	4.595	4.527	4.457	4.384	4.310	4.234	4.155	4.075	3.993	3.910	3.827

CHAINAGE	750	760	770	780	790	800	810	820	830	840	850	860	870	880
LEVEL DIFFERENCE DESIGN TO EXISTING	0.452	0.894	0.681	1.052	1.391	1.276	1.325	1.366	1.293	1.230	1.188	1.404	1.487	1.565
INTERPOLATED GROUND LEVELS	3.293	2.769	2.901	2.452	2.043	2.092	1.986	1.892	1.919	1.940	1.945	1.698	1.588	1.489
DESIGN LEVELS	3.745	3.663	3.582	3.504	3.433	3.368	3.310	3.258	3.212	3.170	3.133	3.101	3.075	3.053

GEOMETRY DATA
IS ROUNDED

EASTBOUND ON/OFF RAMP

EASTBOUND ON/OFF RAMP - DRG 2 OF 2

20 0 20 40 60 80
SCALE IN METRES - 1:1000

Tasmanian Government

P&S FORM REP_A1 REV 1
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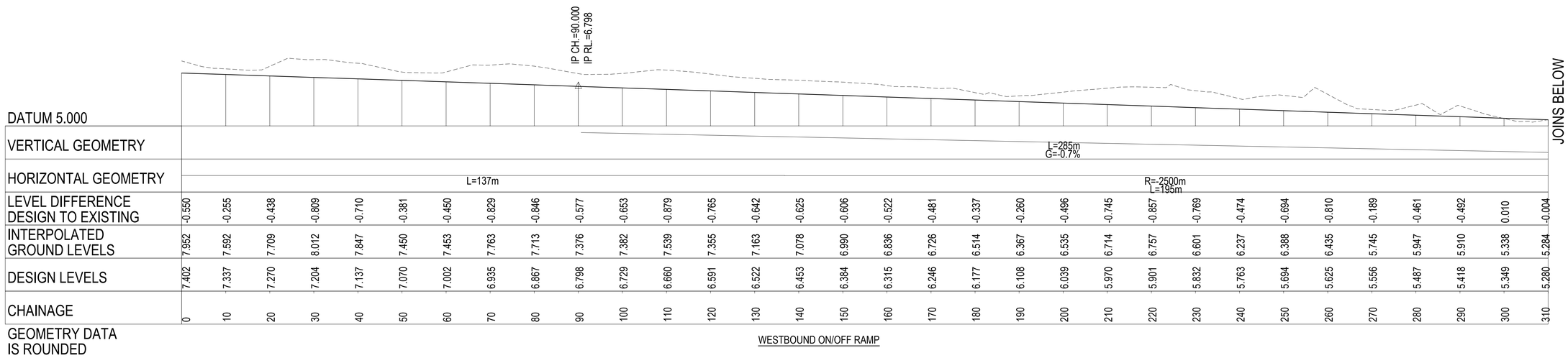
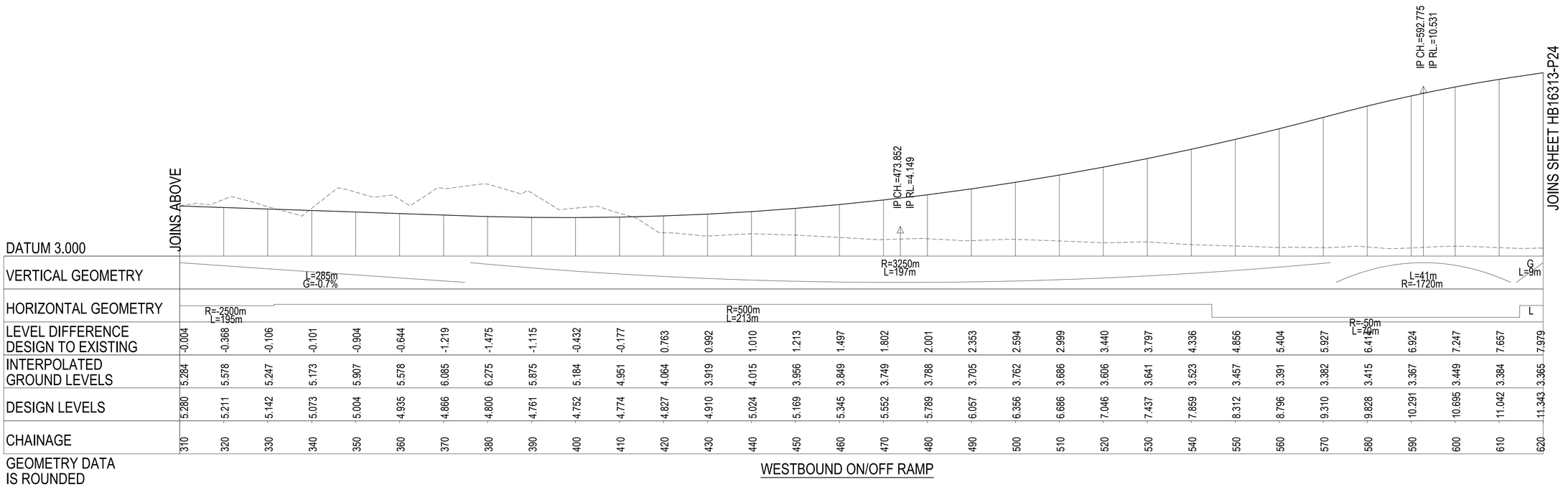
HB16313-P23





WESTBOUND ON/OFF RAMP - DRG 1 OF 2

20 0 20 40 60 80
SCALE IN METRES - 1:1000

Tasmanian Government

PAS FORM REP A1 REV.1
Sep. 5, 17 - 15:29:57 DWG Name: HB16313-P23.dwg DWG Updated By: Ivan Brito

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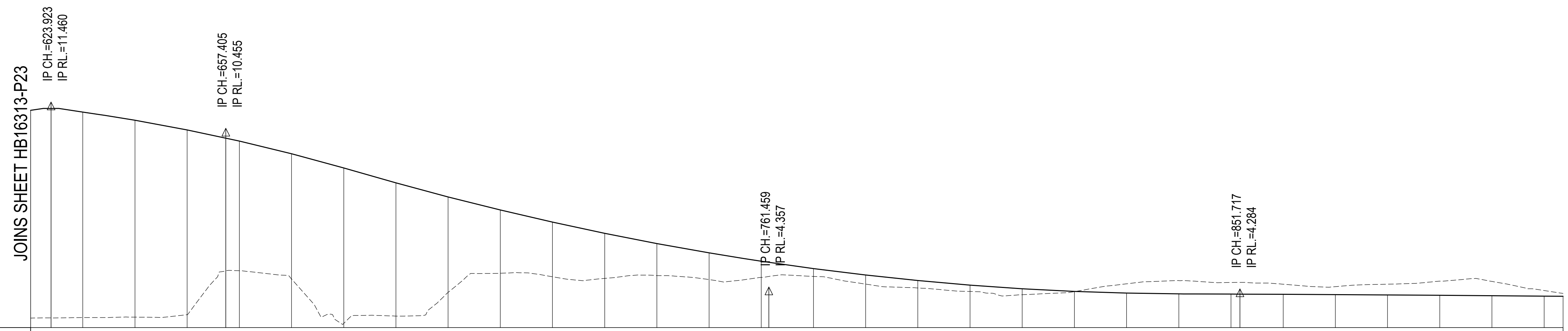
HB16313-P24



VERTICAL GEOMETRY: G L | L R | L=7m G | L=49m R=-1720m | R=2750m L=159m | L=11m G

HORIZONTAL GEOMETRY: L=20m | R=200m L=122m | L=157m

CHAINAGE	DESIGN LEVELS	INTERPOLATED GROUND LEVELS	LEVEL DIFFERENCE DESIGN TO EXISTING
620	11.343	3.365	7.979
630	11.278	3.384	7.894
640	10.963	3.401	7.561
650	10.592	3.495	7.097
660	10.163	5.183	4.980
670	9.675	4.864	4.812
680	9.130	3.159	5.970
690	8.557	3.442	5.115
700	8.018	4.352	3.666
710	7.516	5.086	2.429
720	7.050	4.950	2.099
730	6.620	4.890	1.730
740	6.227	4.997	1.229
750	5.870	4.844	1.026
760	5.549	4.927	0.622
770	5.265	4.964	0.301
780	5.017	4.669	0.349
790	4.806	4.521	0.284
800	4.630	4.386	0.244
810	4.492	4.261	0.231
820	4.389	4.380	0.009
830	4.323	4.680	-0.357
840	4.294	4.803	-0.509
850	4.285	4.730	-0.445
860	4.276	4.665	-0.388
870	4.265	4.570	-0.305
880	4.253	4.665	-0.413
890	4.239	4.783	-0.545
900	4.223	4.772	-0.548
910	4.207	4.422	-0.215
914	4.200	4.310	

GEOMETRY DATA IS ROUNDED

WESTBOUND ON/OFF RAMP

Tasmanian Government

WESTBOUND ON/OFF RAMP - DRG 2 OF 2

20 0 20 40 60 80
SCALE IN METRES - 1:1000

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HB17138-P13

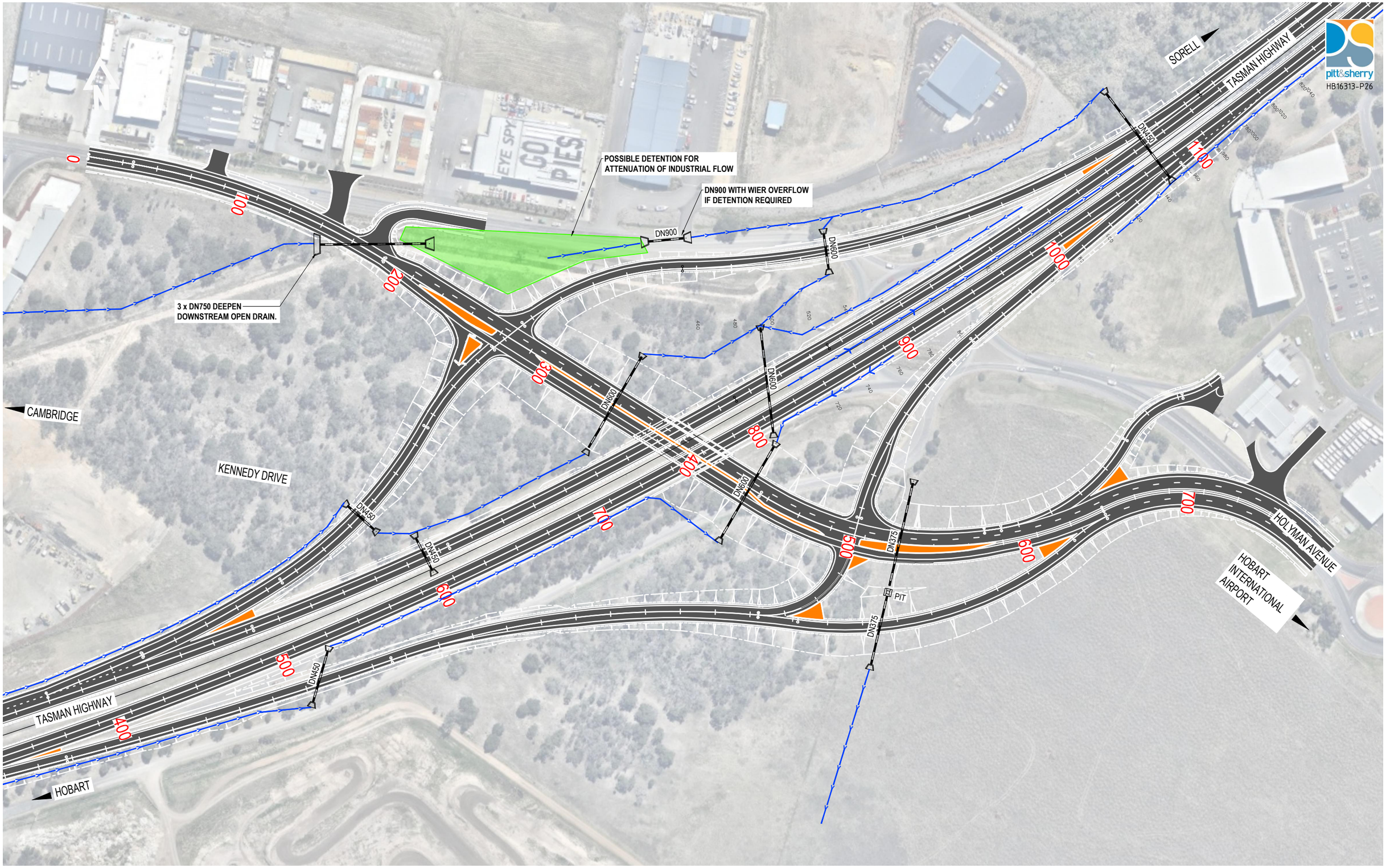
TASMAN HIGHWAY / HOLYMAN AVENUE INTERSECTION UPGRADE
CONCEPT - EXISTING SERVICES

Tasmanian Government

20 0 20 40 60 80
SCALE IN METRES - 1:1000

LEGEND

- EXISTING WATER
- EXISTING WATER - RECYCLED
- EXISTING SEWER
- EXISTING TELSTRA
- EXISTING FIBRE OPTIC
- EXISTING ELECTRICAL - UNDERGROUND
- EXISTING ELECTRICAL - OVERHEAD
- ELECTRICAL - LIGHT POLE
- ELECTRICAL- POWER POLE



TASMAN HIGHWAY / HOLYMAN AVENUE INTERSECTION UPGRADE - CONCEPT - A (DRAINAGE STRATEGY PLAN)

Tasmanian Government

20 0 20 40 60 80
SCALE IN METRES - 1:1000

P&S FORM REP A1 REV 1
Sep 28, 17 - 14:48:31 DWG Name: HB16313-P26.dwg DWG Updated By: Ivan Brito

Appendix B. P50 / P90 Cost Estimates

Tasman Highway
Holyman Avenue Interchange -Concept Design
Contract TBA
Estimate Date Sep-2017
Base Estimate

		unit	qty	Rate	Amount		
1	Scoping Phase						
1a	State Growth Project Management	%	0	$ 350,000	$ -		
1b	Panel Consultants	Item		$ 350,000	$ 350,000		
1c	Consultants Other - [Name]	Item		$ -	$ -		
1d	Acquisitions - Purchase Price	Item		$ -	$ -		
1e	Acquisitions - Valuation and legal	Item		$ -	$ -		
1f	Acquisitions - Other	Item		$ -	$ -		
2	*Subtotal: Scoping Phase*				$ 350,000		
3	Development Phase						
3a	State Growth Project Management	%	0.073	$ 1,380,000	$ 100,740		
3b	Consultants Cashflow (cf actual)	Item		$ -	$ -		
3c	Panel Consultants	Item		$ 1,380,000	$ 1,380,000		
3d	Consultants Other - Department of State Growth Public Consultation	Item		$ 17,985	$ 17,985		
3e	Acquisitions - Purchase Price	Item		$ -	$ -		
3f	Acquisitions - Valuation and legal	Item		$ -	$ -		
3g	Acquisitions - Other	Item		$ -	$ -		
4	*Subtotal: Development Phase*				$ 1,498,725		
5	Total Pre-Construction Costs				$ 1,848,725		
6	Delivery Phase						
6a	State Growth Project Management	%	0.073	$ 19,272,557	$ 1,406,897		
6b	Panel Consultants - Design Issues	Item		$ -	$ -		
6c	Consultants Other - [Name]	Item		$ -	$ -		
6d	Consultant Contract Administration	%	0.04	$ 17,603,264	$ 704,131		
6e	Insurance	%	0.0045	$ 17,603,264	$ 79,162		
6f	Other - Advertising, Ext Audit	Item		$ -	$ -		
6g	Acquisitions - Purchase Price	Item		$ -	$ -		
6h	Acquisitions - Valuation and legal	Item			$ -		
6i	Advertising and Legal	Item		$ 25,996	$ 25,996		
6	*Subtotal: Delivery Phase Client Costs*				$ 2,216,186		
7	Total Client's Costs				$ 4,064,911		
9	Construction Contractor's Direct Costs					PCB ALLOCATION	
9a	Bulk Earthworks	Item		$4,885,235	$4,885,235	Environmental	$214,950
9b	Drainage	Item		$1,287,500	$1,287,500	Traffic Management	$721,324
9c	Pavements	Item		$3,179,770	$3,179,770	Public Utilities Adjustment	$711,250
9d	Bitumious Surfacing	Item		$1,478,750	$1,478,750	Bulk earthworks	$4,885,235
9e	Traffic Facilities	Item		$1,298,700	$1,298,700	Drainage	$1,187,500
9f	Landscaping	Item		$381,785	$381,785	Bridges	$3,544,000
9g	Miscellaneous	Item		$1,547,524	$1,547,524	Pavements	$4,658,520
9h	Structures	Item		$3,544,000	$3,544,000	Finishing works	$1,230,485
9i	Contractors Design Costs (D&C Fee)	Item		$876,396	$0	Traffic signage and control	$450,000
9j		Item				Design by Contractor	$0
9k		Item					
9l		Item					
9m		Item					
10	Total Contractor's Direct Costs				$ 17,603,264		$17,603,264
11	Client Supplied Materials or Services						
11a	Environmental (Offset Planting)	Item		$ 100,000	$ 100,000		
11b	Nominated Subbies	Item					
11c	Accommodation - Trees removal	Item					
11d	Accommodation - New Fence &/or remove old	Item					
11e	Service Authorities - Power	Item	22.00	$ 13,000	$ 286,000		
11f	Service Authorities - NBN	Item					
11g	Service Authorities - Communications	Item		$ 500,000	$ 500,000		
11h	Service Authorities - Reticulated Water	Item			$ -		
11i	Service Authorities - Irrigation	Item					
11j	Service Authority - Gas	Item					
11k	Traffic - Workshop Materials	Item					
11l	CONTRACTOR BONUS FOR ROUGHNESS (Allow 2% of Base A and Sprayed Seal Costs)	Item					
11m	FINAL LINEMARKING	Item					
11n	FINAL SEAL	Item					
12	*Total: Client Supplied Material or Services*				$ 886,000		
13	Total Construction Cost (TCC)				$ 18,489,264		
14	Contractor + Delivery Costs				$ 19,819,450		
15	Total Construction + Delivery Costs				$ 20,705,450		
16	Base Estimate (Total Construction Cost + Client Costs)				$ 22,554,175		
						P50	P90
17	Contingency - inherent risks					$2,172,625	$3,448,925
18	Contingency - contingent risks					$1,525,056	$1,956,691
19	Total Contingency					$3,697,681	$5,405,616
20	Total Contingency as percentage of Base Estimate					16%	24%
21	Project Estimate					$26,251,856	$27,959,791
	Cashflow: Start Construction July 2017, Finish Construction May 2019						
22	Escalation (applied to Project Estimate)					$1,875,127	$2,002,252
	% escalation (compared to base estimate + contingency)					7.1%	7.2%
23	Total Outturn Cost					$28,126,984	$29,962,043

Tasman Highway
Estimate : Concept Design
Estimate Date Sep-2017

Lane km		**13.2**					
ment Area		**62205** sq.m					
PART	**DESCRIPTION**	**UNIT**	**Q'TY**	**RATE**	**AMOUNT**	**SUBTOTAL**	**COMMENTS TO JUSTIFY CONTINGENCY LEVELS**
Earthwork	Clearing and grubbing	Item	106140	1	$106,140		
	Excavation in all materials	cu.m	36014	15	$540,210		
	Embankment	cu.m	132193	20.57	$2,719,210		
	Groiund improvement - Geogrid	sq.m	40000	10	$400,000		
	Ground improvement - rock blanket	sq.m	20000	25	$500,000		
	Ground improvement - wick drains	m	80000	5	$400,000		20000 no. 2 m grid @ 4 m long
	Topsoil	sq.m	43935	5	$219,675		
						$4,885,235	
Drainage	Kerbs	m	2200	70	$154,000		
	Open drains	m	5000	20	$100,000		
	Pits	m	30	6000	$180,000		
	Pipe <600 dia	m	500	500	$250,000		
	Pipe >600 dia	m	100	1000	$100,000		
	Endwall <600 dia	No	30	2000	$60,000		
	Endwall> 600 dia	No	6	10000	$60,000		
	Detention	Item	1	50000	$50,000		
	Subsoil drains	m	2500	60	$150,000		
	Batter drain	m	95	900	$85,500		
	Remove old pipes	Item	1	10000	$10,000		
	WSUD	Item	1	88000	$88,000		
						$1,287,500	
Pavement	Sub-Base Material 1	cu.m	13190	80	$1,055,200		
	Sub-Base Material 2	cu.m	14614	75	$1,096,050		
	Base Material	cu.m	11428	90	$1,028,520		
						$3,179,770	
Bituminou	Primerseal	sq.m	46205	6	$277,230		Halve asphalt and apply 14 mm seal, reseal only west of
	Final seal	sq.m	31110	7	$217,770		
	Asphalt to highway	tonnes	3235	250	$808,750		$1,026,520
	Asphalt to turn areas	tonnes	700	250	$175,000		7000 m2
						$1,478,750	
Traffic Fac	Road Safety Barrier	m	4680	90	$421,200		
	End Terminals	No.	8	4500	$36,000		
	Signalised Junctions	No.	2	175000	$350,000		Allow $150,000 ea plus 600 m of conduit @ $80
	Guide Posts	No.	300	40	$12,000		
	Large Direction Signs or Similar	No.	12	5000	$60,000		Assume 4 >1800 slip base post signs
	Signs other	No.	40	1000	$40,000		
	Pavement Marking	m	15000	5	$75,000		
	RRPMs	No.	375	12	$4,500		
	Street lighting	Item	1	300000	$300,000		
						$1,298,700	
Landscapi	Hydromulching	sq.m	43935	1	$43,935		
	Fencing	m	1340	40	$53,600		
	Construction of paved traffic islands including kerbing and all infill materials	sq.m	1282	125	$160,250		
	Landscaping	Item	124000	1	$124,000		
						$381,785	
Miscellane	Accesses	No.			$0	$0	Services
	Inspection of buildings	No.	9	550	$4,950	$4,950	$1,431,250
	DN375 MSCL water main	m	935	500	$467,500	$467,500	
	DN200 uPVC water main	m	325	250	$81,250	$81,250	
	DN200 uPVC Sewer Rising Main	m	325	250	$81,250	$81,250	
	DN200 uPVC Recycled Water Main	m	325	250	$81,250	$81,250	
							70m P100; 300m 3/P100; As estimated by Telstra Direct cost to Principal
	Telstra	Item		500000	$500,000	$0	
	Aurora Poles	No.		13000	$0	$0	Direct cost to Principal
	Environmental Completion Audit	Item	1		$0	$0	
	Environmental Management	Item	1	100000	$0	$100,000	
	Traffic Management	Item	1	721324	$721,324	$721,324	Assume 3%
	Audit Surveys	PS	1	10000	$10,000	$10,000	
	Cranston Parade - incl	m		460	$0	$0	
						$1,547,524	
Structures	Bridge	sq.m	886	4000	$3,544,000		
	Sound Walls	sq.m	0	455	$0		Contingencey based on increase from timber to Hebel
	Retaining Walls	sq.m		900	$0		
						$3,544,000	
					SUB TOTAL	**$17,603,264**	
	Contractors Design Cost	Item	1	0%		**$0**	
	CONTRACTOR TOTAL					**$17,603,264**	

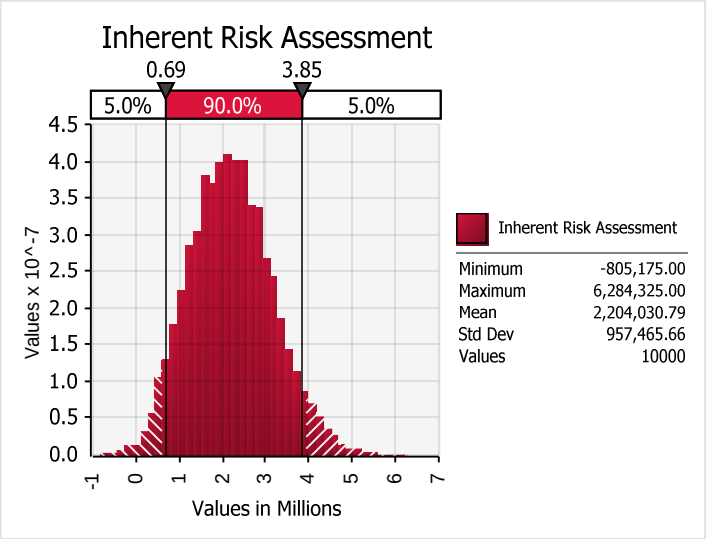
Tasman Highway
Holyman Avenue Interchange -Concept D
Contract TBA
Estimate Date Sep-2017
Inherent Risk Assessment

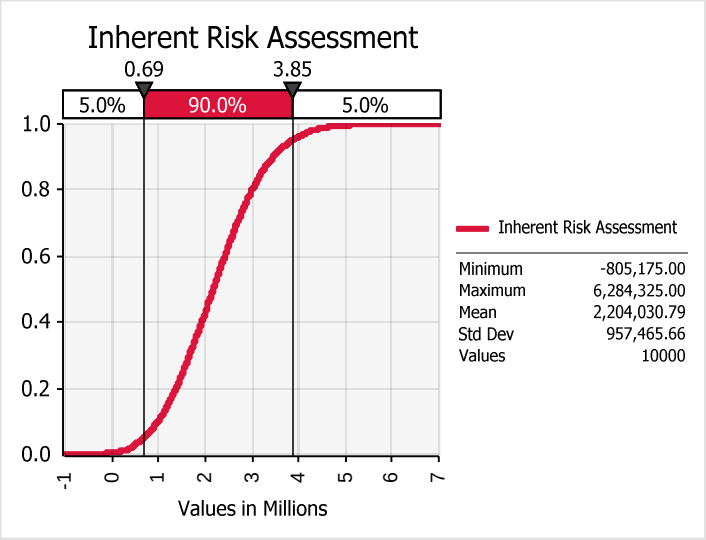
	Risk	Quantity						Rate							Adjusted Amount	Comment
	Description	Unit	Base	Lower Bound	Most Likely	Upper Bound	Adjusted Value	Adjusted Quantity	Base	Lower Bound	Most Likely	Upper Bound	Adjusted Value	Adjusted Rate		
	Scoping Phase															
a	State Growth Project Management	Item	1	1	1	1	1.00	1.00	$ -	0.9	1	1.15	1.0	$ -	$ -	
b	Panel Consultants	Item	1	1	1	1	1.00	1.00	$ 350,000	0.95	1	1.2	1.1	$ 372,329	$ 372,300	
	Development															
c	State Growth Project Management	Item	1	1	1	1.05	1.02	1.02	$ 100,740	0.9	1	1.15	1.0	$ 102,879	$ 105,100	
d	Panel Consultants	Item	1	1	1	1	1.00	1.00	$ 1,380,000	0.95	1	1.2	1.1	$ 1,468,040	$ 1,468,000	
d1	Consultants Other - Department of State Growth	Item	1	1	1	1	1.00	1.00	$ 17,985	0.95	1	1.2	1.1	$ 19,132	$ 19,100	
	Delivery															
e	State Growth Project Management	Item	1	1	1	1	1.00	1.00	$ 1,406,897	0.9	1	1.15	1.0	$ 1,436,766	$ 1,436,800	
f	Consultant Contract Administration	Item	1	1	1	1	1.00	1.00	$ 704,131	0.95	1	1.1	1.02	$ 719,086	$ 719,100	
g	Insurance	Item	1	1	1	1	1.00	1.00	$ 79,162	1	1	1.05	1.02	$ 80,851	$ 80,900	
h	Acquisitions - Purchase Price	Item	1	1	1	1	1.00	1.00	$ -	1	1	1.5	1.21	$ -	$ -	
i	Acquisitions - Valuation and legal	Item	1	1	1	1	1.00	1.00	$ -	1	1	1.5	1.21	$ -	$ -	
	Construction															
j	Bulk Earthworks	Item	1	0.95	1	1.05	1.00	1.00	$ 4,885,235	1	1.1	1.32	1.2	$ 5,622,805	$ 5,622,800	
k	Drainage	Item	1	0.8	1	1	0.91	0.91	$ 1,287,500	0.9	1	1.1	1.0	$ 1,287,500	$ 1,177,600	
l	Pavements	Item	1	0.95	1	1.05	1.00	1.00	$ 3,179,770	0.95	1	1.05	1.0	$ 3,179,770	$ 3,179,800	
m	Bitumious Surfacing	Item	1	0.95	1	1.05	1.00	1.00	$ 1,478,750	0.95	1	1.1	1.0	$ 1,510,156	$ 1,510,200	
n	Traffic Facilities	Item	1	0.9	1	1.5	1.17	1.17	$ 1,298,700	0.95	1	1.1	1.0	$ 1,326,282	$ 1,552,000	
o	Landscaping	Item	1	0.95	1	1.5	1.19	1.19	$ 381,785	1	1	1.01	1.0	$ 383,415	$ 456,900	
p	Miscellaneous	Item	1	0.95	1	1.5	1.19	1.19	$ 1,547,524	0.95	1	1.25	1.1	$ 1,679,220	$ 2,001,200	
q	Structures	Item	1	1	1	1.1	1.04	1.04	$ 3,544,000	0.95	1	1.1	1.0	$ 3,619,268	$ 3,773,800	
r	Contractors Design Costs (D&C Fee)	Item	1	1	1	1	1.00	1.00	$ -	0.85	1	1.2	1.0	$ -	$ -	
s	Environmental (Offset Planting)	Item	1	1	1	1.5	1.21	1.21	$ 100,000	0.95	1	1.5	1.2	$ 119,171	$ 144,600	
t	Service Authorities - Power	Item	1	1	1	1.25	1.11	1.11	$ 286,000	0.95	1	1.3	1.1	$ 316,435	$ 350,200	
u	Service Authorities - Communications	Item	1	1	1	1.6	1.26	1.26	$ 500,000	0.8	1	1.8	1.3	$ 627,594	$ 788,300	
v	Service Authorities - Reticulated Water	Item	1	1	1	1.05	1.02	1.02	$ -	0.95	1	1.1	1.0	$ -	$ -	
														P50 Inherent Risk	$2,172,625	
														P90 Inherent Risk	$3,448,925	

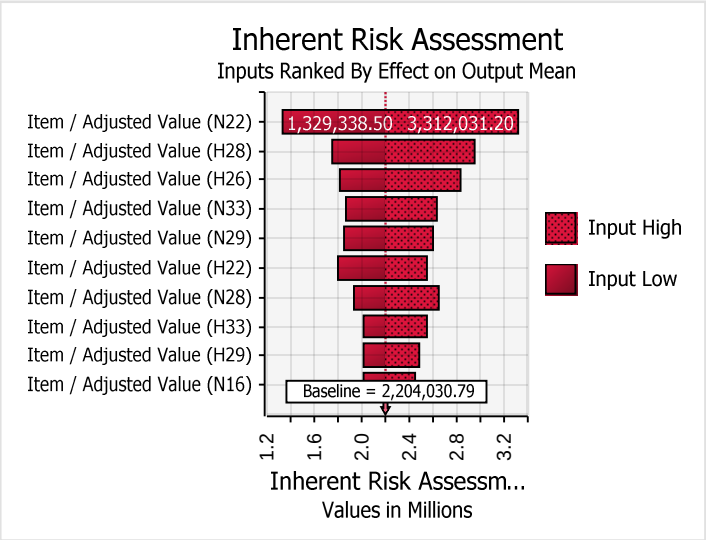
@RISK Output Report for Inherent Risk Assessment P40

Performed By: dconley

Date: Thursday, 14 September 2017 6:04:03 PM







Simulation Summary Information

Workbook Name	HB16313H001 CONCEPT ESTI
Number of Simulations	1
Number of Iterations	10000
Number of Inputs	63
Number of Outputs	3
Sampling Type	Latin Hypercube
Simulation Start Time	14/09/2017 18:56
Simulation Duration	00:00:15
Random # Generator	Mersenne Twister
Random Seed	814129538

Summary Statistics for Inherent Risk Assessment

Statistics		Percentile	
Minimum	- 805,175	5%	685,625
Maximum	6,284,325	10%	998,625
Mean	2,204,031	15%	1,201,625
Std Dev	957,466	20%	1,376,625
Variance	9.1674E+11	25%	1,529,225
Skewness	0.240864202	30%	1,662,625
Kurtosis	2.987420647	35%	1,792,425
Median	2,172,625	40%	1,925,225
Mode	1,606,125	45%	2,048,925
Left X	685,625	50%	2,172,625
Left P	5%	55%	2,298,125
Right X	3,849,225	60%	2,419,325
Right P	95%	65%	2,543,325
Diff X	3,163,600	70%	2,683,825
Diff P	90%	75%	2,837,225
#Errors	0	80%	2,998,625
Filter Min	Off	85%	3,195,625
Filter Max	Off	90%	3,448,925
#Filtered	0	95%	3,849,225

Change in Output Statistic for Inherent Risk Assessr

Rank	Name	Lower	Upper
1	Item / Adjusted Val	1,329,339	3,312,031
2	Item / Adjusted Val	1,754,696	2,957,984
3	Item / Adjusted Val	1,810,524	2,829,272
4	Item / Adjusted Val	1,860,215	2,637,579
5	Item / Adjusted Val	1,855,869	2,601,880
6	Item / Adjusted Val	1,804,579	2,549,485
7	Item / Adjusted Val	1,932,266	2,642,381
8	Item / Adjusted Val	2,022,620	2,549,048
9	Item / Adjusted Val	2,020,348	2,487,841
10	Item / Adjusted Val	2,009,634	2,442,591

Tasman Highway
Holyman Avenue Interchange -Concept Design
Contract TBA
Estimate Date Apr-2017
Contingent Risk

Tasman Highway
Holyman Avenue Interchange -Concept Design
Contract TBA
Estimate Date Feb-2017
Base Estimate

Risk	Consequence	Consequence	Likelihood	Distribution		Principal Value	Values						Risk Formulae		
Risk description	Consequence Description	$	%		Principal affected		%min	Lower Bound	%ML	Most Likely	%Max	Upper Bound	Likelihood	Consequence	Combined Consequence Distribution
Implemenation Risks															
Traffic staging causes traffic delays during construction and impact on all road users, in particular airport traffic	Increased construction cost	$0	5%	PertAlt	Construction + Delivery Cost	$0	1%	$0	5%	$0	10%	$0	0.10	$0	$0
Significant impact on Airport Hotel including increased traffic noise, loss of amenity, proximity of the realigned Tasman Highway to the hotel building leading to compensation	Increased legal costs	$0	10%	PertAlt	Acquisition and legals	$0	1%	$0	25%	$0	200%	$0	1.10	$0	$0
Impact on businesses on northern side of Kennedy Drive	Increased legal costs	$0	2%	PertAlt	Acquisition and legals	$0	1%	$0	7%	$0	15%	$0	0.02	$0	$0
Options analysis takes longer than programmed	NOW RESOLVED	$0	50%	PertAlt	Scoping Design Cost	$0	3%	$0	10%	$0	20%	$0	0.50	$0	$0
Opposition to preferred option	Increased design costs and increased cost escalation	$82,800	5%	PertAlt	Development Design Costs	$1,380,000	3%	$41,400	6%	$82,800	20%	$276,000	0.05	$108,100	$5,405
January 2017 timeframe for award of D&C contract cannot be met	Increased cost escalation	$300,000	50%	PertAlt	Increased cost escalation	$600,000	15%	$90,000	50%	$300,000	200%	$1,200,000	0.50	$415,000	$207,500
Cranston Parade - acceptable solution cannot be found	Increased design costs and increased cost escalation	$250,000	30%	PertAlt	Escalation and Design Costs	$250,000	0%	$0	100%	$250,000	200%	$500,000	0.30	$250,000	$75,000
Scope															
Traffic staging will increase project costs	Increased construction costs	$352,065	30%	PertAlt	Construction	$17,603,264	1%	$176,033	2%	$352,065	3%	$528,098	0.30	$352,065	$105,620
Large volume of imported fill required that could be of the order of 140,000 m^3 - risks are availability and cost	COVERED IN INHERENT RISKS	$0	0%	PertAlt	Bulk Earthworks		0%	$0	30%	$0	160%	$0	0.00	$0	$0
There is a requirement to investigate additional option(s)	Increased design costs	$52,500	50%	PertAlt	Scoping Design Cots	$350,000	10%	$35,000	15%	$52,500	20%	$70,000	0.50	$52,500	$26,250
Contract claim during construction	Increased construction cost	$880,163	100%	PertAlt	Scoping Design Cots	$17,603,264	1%	$176,033	5%	$880,163	10%	$1,760,326	1.00	$909,502	$909,502
Concept estimate exceeds budget															
Communication															
Business interruption during construction															
Proposed closed diamond interchange and likely need for signalisation although a proven solution may not be seen by HIAPL as suitable	Increased project cost	$35,000	10%	PertAlt	Scoping Design Cost	$350,000	3%	$10,500	10%	$35,000	20%	$70,000	0.10	$36,750	$3,675
Inadequate or inappropriate consultation or communication results in stakeholder dissatisfaction.															
Approvals															
Federal environmental approvals not received in timely manner and/or are too costly/complex to implement	Increased cost escalation	$125,000	30%	PertAlt	Increased cost escalation	$250,000	15%	$37,500	50%	$125,000	200%	$500,000	0.30	$172,917	$51,875
State threatened species approvals require offsets and/or other complex approval elements.	Increased costs	$100,000	30%	PertAlt	Offset Costs	$100,000	50%	$50,000	100%	$100,000	200%	$200,000	0.30	$108,333	$32,500
Lengthy acquisition process for Commonwealth Land	Increased cost escalation	$125,000	50%	PertAlt	Increased cost escalation	$250,000	15%	$37,500	50%	$125,000	200%	$500,000	0.50	$172,917	$86,458
Significant Aboriginal heritage approvals required, delaying the project and causing significant stakeholder concern	Increased cost escalation	$0	0%	PertAlt	Increased cost escalation	$0	15%	$0	50%	$0	200%	$0	0.00	$0	$0
Planning approval from Clarence City Council not received in a timely manner	Increased cost escalation	$125,000	15.0%	PertAlt	Increased cost escalation	$250,000	15%	$37,500	50%	$125,000	200%	$500,000	0.15	$172,917	$25,938

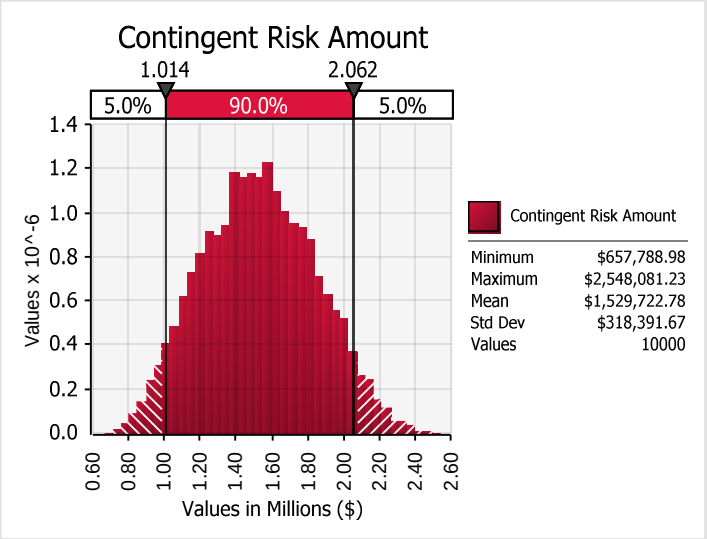
Total Contingent Risk	$1,529,722

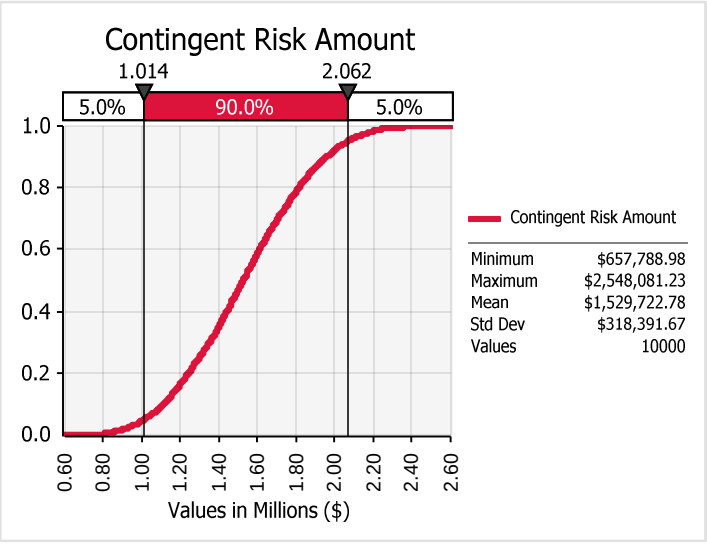
P50 Contingent Risk	$	1,525,056
P90 Contingent Risk	$	1,956,691

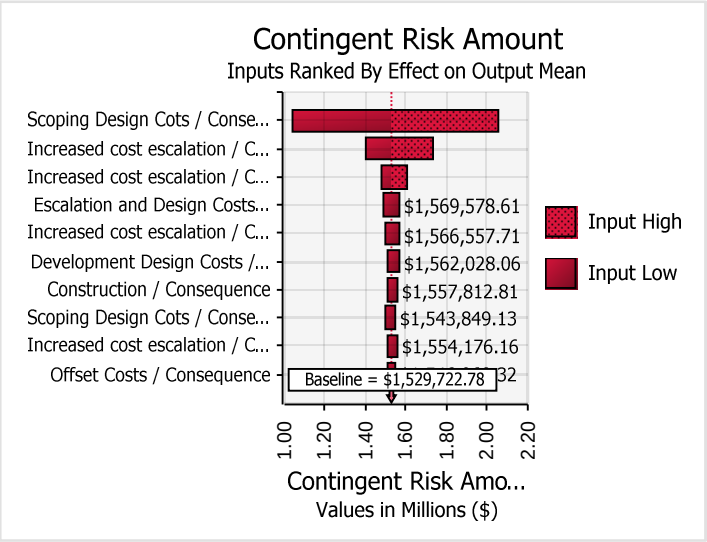
@RISK Output Report for Contingent Risk Amount P34

Performed By: dconley

Date: Thursday, 14 September 2017 6:04:07 PM







Simulation Summary Information	
Workbook Name	HB16313H001 CONCEPT ESTI
Number of Simulations	1
Number of Iterations	10000
Number of Inputs	63
Number of Outputs	3
Sampling Type	Latin Hypercube
Simulation Start Time	14/09/2017 18:56
Simulation Duration	00:00:15
Random # Generator	Mersenne Twister
Random Seed	814129538

Summary Statistics for Contingent Risk Amount			
Statistics		Percentile	
Minimum	$657,789	5%	$1,013,857
Maximum	$2,548,081	10%	$1,112,384
Mean	$1,529,723	15%	$1,180,949
Std Dev	$318,392	20%	$1,241,115
Variance	1.01373E+11	25%	$1,297,733
Skewness	0.093597112	30%	$1,349,481
Kurtosis	2.53776953	35%	$1,396,009
Median	$1,525,056	40%	$1,438,901
Mode	$1,571,919	45%	$1,481,462
Left X	$1,013,857	50%	$1,525,056
Left P	5%	55%	$1,568,524
Right X	$2,061,789	60%	$1,607,813
Right P	95%	65%	$1,654,377
Diff X	$1,047,933	70%	$1,704,264
Diff P	90%	75%	$1,756,892
#Errors	0	80%	$1,812,171
Filter Min	Off	85%	$1,874,150
Filter Max	Off	90%	$1,956,691
#Filtered	0	95%	$2,061,789

Change in Output Statistic for Contingent Risk Amo			
Rank	Name	Lower	Upper
1	Scoping Design Cots	$1,035,784	$2,050,004
2	Increased cost esca	$1,395,834	$1,729,487
3	Increased cost esca	$1,476,163	$1,606,023
4	Escalation and Desi	$1,487,448	$1,569,579
5	Increased cost esca	$1,502,105	$1,566,558
6	Development Desig	$1,505,672	$1,562,028
7	Construction / Cons	$1,505,159	$1,557,813
8	Scoping Design Cots	$1,497,588	$1,543,849
9	Increased cost esca	$1,510,270	$1,554,176
10	Offset Costs / Conse	$1,511,623	$1,546,960

(2) PROJECT DETAILS

(Refer Worksheet "(8) PCB Metrics & Descriptors" for further information)

Project Name	Hobart Airport Roundabout
Project ID (as assigned by the Department)	TBC
Project Description	Grade separation of Holyman Avenue and Tasman Highway with a signalised diamond interchange
General Comments	
Project Phase: (Drop List)	Delivery
State/Territory: (Drop List)	TAS
Procurement Method: (Drop List)	? Early Contractor Involvement
RCOCI Escalation Index used: (Drop List)	? Design and Construct Urban
Reference Class: (Drop List) (Refer to tab "*(8) PCB Metrics & Descriptors* " for definitions)	Class 6 (Urban)

Key Project Dates

Key Project dates

Base Date of Estimate (Date of Costing)	Scoping Phase Start Date	Development Phase Start Date	Delivery Phase Start Date	Date of Contract Award Date	Construction Start Date	Construction Complete Date
10-Feb-17	01-Sep-16	01-Nov-16	31-Jan-18	31-Jan-18	01-May-18	31-Mar-20

Quarter and FY of costing: Mar 2016/17

Key Project Quantities:

Roads

Road Length (Km)	# of Lane Kilometres	Construction Cost per Lane Kilometre*
? 1.70	? 13.20	$5.00

Tunnels

# of Tunnels	# of Tunnel Lane Kilometres	Total Tunnel Length (km)	Construction Cost per Tunnel Lane Kilometre*
?	?	?	$2.00

Bridges

# of Bridges	Bridge - Total Surface Area (sq m)	Construction Cost per sq m of Bridge*
? 1	? 800.00	$1.00

Other

Property Acquisition	Tenderers**		Proportion of Client Management costs to Base Estimate*
Total Acquired Property/Land (sq m)	Number of Tenderers	Winning Tenderer	

Contact Details

Template Populated by (Full Name)	Role or Position, and organisation	Contact Details (Ph/Email)	Template Data Endorsed by	Role or Position, and organisation	Contact Details (Ph/Email)
David Conley	Principal Engineer, Pitt & Sherry	dconley@pittsh.com.au	Ross Mannering		
Date	28-Apr-17		Date	28-Apr-17	

General Comments

1.7 km new dual carriageway, 0.8 km realigned Kennedy Drive/Holyman Avenue, 2.2 km interchange ramps, 0.65 km local roads

*These quantities will be automatically calculated based on user entered data for Delivery or Post Completion phases only. Please provide comments/reasons above if results don't appear correct.

(5) Delivery Phase

The user of this sheet only has to populate the fields highlighted in colour. Green is for estimated costs/comments and blue is for actual costs, ie:
The remainder of the values on this sheet, which are locked to the user, will be automatically calculated based on the user's input.

	Estimated costs or other user input (Text Box or Pulldown Menu or comments)
	Actual costs - where applicable or available

Note that the cells with a dot pattern background are simply an indication as to which phase the cost for that element is most likely to occur in. If costs for that element occur in other phases just populate the appropriate cells.

Table 1: BASE ESTIMATE TABLE: PROJECT COST BREAKDOWN (PCB) - ROAD PROJECT: Hobart Airport Roundabout

SCRATCH PAD

Click button above to show scratch pad area

PCB Level 1	PCB Level 2	PCB Level 3	Elemental Breakdown Unit Cost	Elemental Breakdown Elemental Quantity	PCB Level 3	Breakdown of Property Acquisition elements according to Phases: Scoping	Development	Delivery	PCB Level 2	PCB Level 1
Client Management & Oversight										$3,360,780
	SCOPING								$350,000	
		Project Management-Scoping			$0					
		Design & Investigation-Scoping			$350,000					
	DEVELOPMENT								$1,498,725	
		Project Management-Development			$100,740					
		Design & Investigation-Development			$1,397,985					
	DELIVERY								$1,512,055	
		Project Management-Delivery			$1,406,897					
		Design & Investigation-Delivery			$0					
		Client supplied Insurances, Fees, Levies - Delivery			$105,158					
	PROPERTY ACQUISITION								$0	
		Purchase Price			$0					
		Transactional Cost & Other costs			$0					
		Business Compensation			$0					
		Environmental Offsets			$0					
Construction Cost						Breakdown of Construction elements according to Phases: Scoping	Development	Delivery		$19,193,395
	CONTRACTOR								$17,603,264	
		Environmental Works			$214,950			$214,950		
		Traffic Management and Temporary Works			$721,324			$721,324		
		Public Utilities Adjustments			$711,250			$711,250		
		Bulk Earthworks	$0.00		$4,885,235			$4,885,235		
		Retaining Walls	$0.00		$0			$0		
		Drainage			$1,187,500			$1,187,500		
		Bridges	$0.00		$3,544,000			$3,544,000		
		Tunnels			$0			$0		
		Pavements	$0.00		$4,658,520			$4,658,520		
		Finishing Works			$1,230,485			$1,230,485		
		Traffic Signage, Signals and Controls			$450,000			$450,000		
		Design (if by contractor)			$0			$0		
		Supplementary Items			$0					
	CLIENT								$1,590,131	
		Client supplied Materials and Construction Services - Delivery			$1,590,131			$1,590,131		
TOTALS					$22,554,175				$22,554,175	$22,554,175

Table 2: OVERALL PROJECT SUMMARY TABLE (incl sunk costs)

	P50	P90
BASE ESTIMATE	$22,554,175	$22,554,175
CONTINGENCY	$3,697,681	$5,405,616
PROJECT ESTIMATE	$26,251,856	$27,959,791
ESCALATION (incorporating uplift factor)	$1,875,127	$2,002,252
OUTTURN COST	$28,126,983	$29,962,043

Table 3: PROJECT COST (excl sunk costs)

	P50	P90
BASE ESTIMATE	$22,554,175	$22,554,175
CONTINGENCY	$3,697,681	$5,405,616
PROJECT ESTIMATE	$26,251,856	$27,959,791
ESCALATION (incorporating uplift factor)	$1,875,127	$2,002,252
OUTTURN COST	$28,126,983	$29,962,043

Table 4: FUNDING CONTRIBUTION

	P50	P90
AG Funding Sought	$22,501,586	$23,969,634
Jurisdiction Contribution	$5,625,397	$5,992,409
Total	$28,126,983	$29,962,043
Percentage funding Sought	80.00%	80.00%

Table 5: PROJECT CASHFLOW AND ESCALATION CALCULATION TABLE

	Total Scoping and Development Phase Expenditure	Scoping and Development Phase Expenditure		Project Cashflow 2016/17 onwards										TOTAL Project Costs
		Scoping Phase	Development Phase	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	
				2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	
Base Estimate	$0				$1,761,146	$12,400,000	$8,232,738	$160,291						$22,554,175
P50 Project Estimate	$0	$0.00	$0.00		$2,070,088	$14,836,805	$9,164,963	$180,000						$26,251,856
P90 Project Estimate	$0	$0.00	$0.00		$2,212,949	$15,652,267	$9,890,000	$204,575						$27,959,791
Uplift Factor				0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	
Annual Escalation Rate %				1.13%	4.99%	2.16%	3.26%	2.99%	2.59%	2.98%	2.87%	2.87%	2.87%	
P50 Escalation ($)				0.00	124,893.22	1,228,456.75	1,075,451.63	27,013.41	0.00	0.00	0.00	0.00	0.00	$2,455,815
P50 Outturn Cost ($)	$0	$0.00	$0.00	0.00	2,149,191.11	15,737,073.29	10,037,686.68	203,031.83	0.00	0.00	0.00	0.00	0.00	$28,126,983
P90 Escalation ($)				0.00	133,512.36	1,295,975.32	1,160,530.23	30,701.49	0.00	0.00	0.00	0.00	0.00	$2,620,719
P90 Outturn Cost ($)	$0	$0.00	$0.00	0.00	2,297,511.18	16,602,015.93	10,831,764.54	230,751.31	0.00	0.00	0.00	0.00	0.00	$29,962,043

Please provide details of cost estimation approach used below if required (particularly where a mix of approaches were used):

Additional notes/clarification relating to any aspect of this cost estimate.