Kingborough

COUNCIL MEETING AGENDA

NOTICE is hereby given that an Ordinary meeting of the Kingborough Council will be held on

Monday, 25 May 2020 at 5.30pm

Kingborough Councillors 2018 - 2022

Mayor
Councillor Dean Winter

Deputy Mayor
Councillor Jo Westwood

Councillor Sue Bastone

Councillor Gideon Cordover

Councillor Flora Fox

Councillor David Grace

Councillor Amanda Midgley

Councillor Christian Street

Councillor Steve Wass

Councillor Paula Wriedt

QUALIFIED PERSONS

In accordance with Section 65 of the *Local Government Act 1993*, I confirm that the reports contained in Council Meeting Agenda No. 9 to be held on Monday, 25 May 2020 contain advice, information and recommendations given by a person who has the qualifications or experience necessary to give such advice, information or recommendations.

Gary Arnold
GENERAL MANAGER

Tuesday, 19 May 2020

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Open Session

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Appendix

GUIDELINES FOR PUBLIC QUESTIONS

Section 31 of the *Local Government (Meeting Procedures) Regulations 2015*

Questions from the public may either be submitted to the General Manager in writing or asked verbally at an Ordinary Council meeting. Any question asked must only relate to the activities of Council [Section 31(2)(b)].

This guideline is provided to assist the public with the requirements of Public Question Time as set out in the *Local Government (Meeting Procedures) Regulations 2015* as well as determinations made by Council. You are reminded that the public question forum is designed to accommodate questions only and neither the questions nor answers will be debated.

Questions on Notice

Written questions on notice must be received at least seven (7) days before an Ordinary Council meeting [Section 31(1)] and must be clearly headed 'Question/s on Notice'. The period of 7 days includes Saturdays, Sundays and statutory holidays but does not include the day on which notice is given or the day of the Ordinary Council meeting [Section 31(8)].

Questions Without Notice

The Chairperson of an Ordinary Council meeting must ensure that, if required, at least 15 minutes is made available for public questions without notice [Section 31(3)]. A question without notice must not relate to any matter that is listed on the agenda for that meeting.

A question by any member of the public and an answer to that question is not to be debated at the meeting [Section 31(4)]. If a response to a question cannot be provided at the meeting, the question will be taken on notice and will be included in the following Ordinary Council meeting agenda, or as soon as practicable, together with the response to that question.

There is to be no discussion, preamble or embellishment of any question asked without notice, and the Chairperson may require that a member of the public immediately put the question.

The Chairperson can determine whether a question without notice will not be accepted but must provide reasons for refusing to accept the said question [Section 31 (6)]. The Chairperson may require a question without notice to be put on notice and in writing.

The Chairperson may rule a question inappropriate, and thus inadmissible if in his or her opinion it has already been asked, is unclear, irrelevant, offensive or relates to any matter which would normally be considered in Closed Session. The Chairperson may require that a member of the public immediately put the question.

AGENDA of an Ordinary Meeting of Council held on Monday, 25 May 2020 at 5.30pm

1 AUDIO RECORDING

The Chairperson will declare the meeting open, welcome all in attendance and advise that Council meetings are recorded and made publically available on its website. In accordance with Council's policy the Chairperson will request confirmation that the audio recording has commenced.

2 ACKNOWLEDGEMENT OF TRADITIONAL CUSTODIANS

The Chairperson will acknowledge the traditional custodians of this land, pay respects to elders past and present, and acknowledge today's Tasmanian Aboriginal community.

3 ATTENDEES

Councillors:

Mayor Councillor D Winter
Deputy Mayor Councillor J Westwood
Councillor S Bastone
Councillor G Cordover
Councillor F Fox
Councillor D Grace
Councillor A Midgley
Councillor C Street
Councillor S Wass
Councillor P Wriedt

4 APOLOGIES

5 CONFIRMATION OF MINUTES

RECOMMENDATION

That the Minutes of the open session of Council Meeting No. 8 held on 11 May 2020 be confirmed as a true record.

6 WORKSHOPS HELD SINCE LAST COUNCIL MEETING

18 May - Planning

7 DECLARATIONS OF INTEREST

In accordance with Regulation 8 of the *Local Government (Meeting Procedures) Regulations 2015* and Council's adopted Code of Conduct, the Mayor requests Councillors to indicate whether they have, or are likely to have, a pecuniary interest (any pecuniary benefits or pecuniary detriment) or conflict of interest in any item on the Agenda.

8 TRANSFER OF AGENDA ITEMS

Are there any items, which the meeting believes, should be transferred from open session to the closed session of this agenda or from closed session to the open session of this agenda, in accordance with the procedures allowed under Section 15 of the *Local Government (Meeting Procedures) Regulations 2015*.

9 QUESTIONS WITHOUT NOTICE FROM THE PUBLIC

10 QUESTIONS ON NOTICE FROM THE PUBLIC

At the time the Agenda was compiled there were no Questions on Notice from the Public.

11 QUESTIONS WITHOUT NOTICE FROM COUNCILLORS

12 QUESTIONS ON NOTICE FROM COUNCILLORS

12.1 Review of By-Laws

Cr Bastone submitted the following question on notice:

Due to the unsightly hoarding of car bodies and other types of metal & building materials on small rural holdings, and some suburban blocks could the council investigate the possibility of developing a by-law that would force land holders to tidy their properties. At the moment land holders can be forced to clear up their area only if it is vermin related.

Officer's Response:

Council is currently reviewing its Health and Environmental Services By-law 2011 and the matter of hoarding of car bodies and other types of metal and building materials can be considered as part of this process.

Daniel Smee, Executive Manager Governance & Community Services

12.2 Workforce Status

Cr Westwood submitted the following question on notice:

1 What percentage of Council's total workforce is female?

2 What percentage of Council's Management Executive team is female?

Officer's Response:

1 44% of Council's workforce is female.

2 20% of the Manex team is female (ie 2 out of 11 Managers).

Pene Hughes, Executive Manager Organisational Development

OPEN SESSION ADJOURNS

PLANNING AUTHORITY IN SESSION

Planning Authority commences at

13 OFFICERS REPORTS TO PLANNING AUTHORITY

13.1 DAS-2019-36- DEVELOPMENT APPLICATION FOR BOUNDARY ADJUSTMENT AT 225 NEBRASKA ROAD, NORTH BRUNY

File Number: **DAS-2019-36**

Author: **Darshini Bangaru, Planning Officer**

Authoriser: **Tasha Tyler-Moore, Manager Development Services**

Applicant:	Lark & Creese Pty Ltd
Owner:	Karwin Holdings Pty Ltd
Subject Site:	225 Nebraska Road, North Bruny (CT 114473/7 and CT 141042/1)
Proposal:	Boundary adjustment
Planning Scheme:	Kingborough Interim Planning Scheme 2015
Zoning:	Rural Resource
Codes:	E1.0 Bushfire-Prone Areas E3.0 Landslide (low hazard) E6.0 Parking and Access E7.0 Stormwater Management E10.0 Biodiversity E11.0 Waterway and Coastal Protection (class 2- 4) E15.0 Inundation Prone Areas Code (high-medium) E14.0 Scenic Landscapes E23.0 On-site Wastewater Management
Discretions:	Clause 25.5.2 Reorganisation of Boundaries Clause E3.8.1 Subdivision (A1) Clause E10.8.1 Subdivision (A1) Clause E15.8.1 Subdivision (A1) Clause E16.8.1 Subdivision (A1) and (A2)
Public Notification:	Public advertising was undertaken between 22 April 2020 and 5 May 2020 in accordance with section 57 of the *Land Use Planning and Approvals Act 1993*
Representations:	Six (6) objections in relation to: - Subdivision – additional lot; - Precedent to further subdivisions; - Contribute to ribbon development; - Increase in traffic and upgrades to road; - Threatens flora and fauna;

	- Urban sprawl, linking Killora settlement and Dennes Point settlement; - Diminishes historical integrity of one of the three heritage farms of North Bruny; - Visual amenity; - Application not advertised adequately.
Recommendation:	Approval subject to conditions

1. PROPOSAL

1.1 Background

An application has been received for a boundary adjustment at 225 Nebraska Road, North Bruny (the subject site). The subject site comprises of two lots including: CT 141042/1 and CT 114473/7. The lots were created under DAS-096136 which was for the subdivision of 4 lots in total.

There is an existing dwelling and outbuildings on CT 141042/1. There was also originally a residential dwelling on CT 114473/7 which is located within the area to be added to CT 141042/1. As multiple dwellings are a prohibited use under the Rural Resource zone, the applicant obtained a permit to change the use of the dwelling on CT 114473/7 to facilitate the subject boundary adjustment. Accordingly a change of use from residential to visitor accommodation was recently approved under DA-2020-135 on CT 114473/7.

1.2 Description of Site

The two lots that make up the subject site at 225 Nebraska Road, North Bruny are legally described as Lot 1 on Plan 141042 and Lot 7 on Plan 114473. The current site area of CT 141042/1 is 68.20ha and that of CT 114473/7 is 125.5ha.

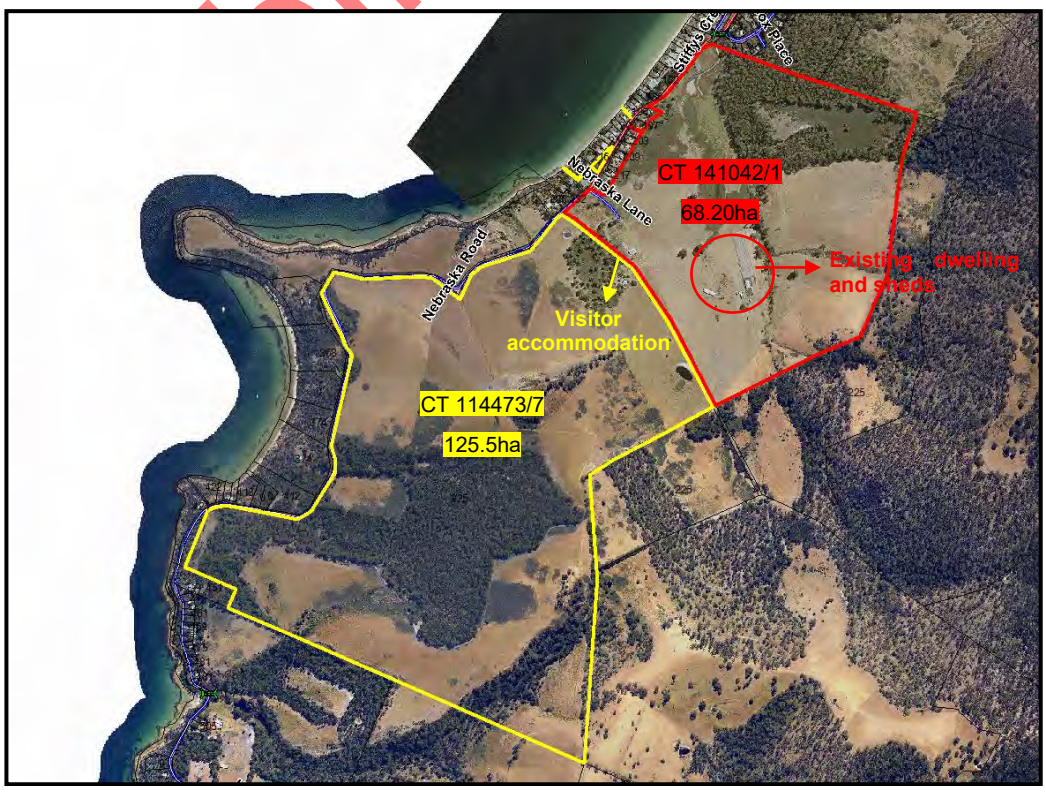


Figure 1: Aerial Image of the subject site within the surrounding context

The two lots are irregular in shape, having a substantial frontage on Nebraska Road. The lots are orientated NW - SE, sloping towards the road from the rear boundary. The two lots have a combination of both cleared areas and densely vegetated areas.

There are number of burdening and benefitting ROW easements on the two titles to facilitate access. An existing shared gravel driveway, Nebraska Lane, over lot CT 141042/1 services both the dwelling and the visitor accommodation on the two lots. There is an existing unauthorised access track towards the SW corner of the site on lot CT 114473/7.

The subject site is zoned Rural Resource under the Kingborough Interim Planning Scheme 2015 (the Scheme). The Bushfire-Prone Areas, Landslide (low hazard), Parking and Access, Stormwater Management, Biodiversity, Waterway and Coastal Protection (classes 2 - 4), Inundation Prone Areas Code (high - medium), Scenic Landscapes and the On-site Wastewater Management Codes apply to the site.

1.3 Description of Proposal

The application is seeking approval for a boundary reorganisation at the subject site. The proposal is that a portion of CT 114473/7 would be adhered to CT 141042/1, resulting in two lots with new boundaries known as Lot 1 and Lot 2 (refer *Figure 2* below). Lot 1 would be a smaller lot to the SW corner of the subject site with an area of 4.3ha. Lot 2 would be the larger lot with an area of 189ha. A 30m x 30m building area is proposed on a cleared portion of Lot 1. Vehicular access to the proposed Lot 1 would be via the existing unauthorised access track. This access track would be upgraded at a later stage during the development of the site in accordance with the relevant standards.

The application is for a boundary reorganisation only, accordingly no new allotments would be created. The easements/covenants that apply to the two lots would not be impacted by the proposed boundary reorganisation.

Figure 2: Proposed boundary reorganisation of the subject site (Source: Lark and Creese)

2. ASSESSMENT

2.1 State Policies and Act Objectives

The proposal is consistent with the outcomes of the State Policies, including those of the Coastal Policy.

The proposal is consistent with the objectives of Schedule 1 of the *Land Use Planning and Approvals Act 1993.*

2.2 Strategic Planning

The relevant strategies associated with the Scheme are as follows:

Zone Purpose Statements of the Rural Resource zone

The relevant zone purpose statements of the Rural Resource zone are to:

26.1.1.1 To provide for the sustainable use or development of resources for agriculture, aquaculture, forestry, mining and other primary industries, including opportunities for resource processing.

26.1.1.2 To provide for other use or development that does not constrain or conflict with resource development uses.

26.1.1.4 To allow for residential and other uses not necessary to support agriculture, aquaculture and other primary industries provided that such uses do not:

(a) fetter existing or potential rural resource use and development on other land;

(b) add to the need to provide services or infrastructure or to upgrade existing infrastructure;

(c) contribute to the incremental loss of productive rural resources.

26.1.1.5 To provide for protection of rural land so future resource development opportunities are no lost.

26.1.1.6 To ensure development respects and protects the natural and landscape values on the land.

The proposed reorganisation of boundaries would not create additional lots. As noted in Figures 1 and 2 above, the subject site has parcels of cleared land which would be suitable for agricultural purposes. The proposed boundary adjustment would provide for a more functional farming parcel on Lot 2, as the 'primary agricultural lot' whilst creating a building allotment in an unviable area on Lot 1. It would enable a large portion of the agricultural land to be contained and managed within Lot 2. The new vacant Lot 1, which would comprise the land surplus to the primary agricultural Lot 2, consists of predominantly bushland unsuitable for agricultural practices. Given there are a number of smaller lots on Nebraska Road adjacent to the proposed Lot 1, the size and shape of the lot would not be out of character in the locality. The proposed building area on Lot 1 would have adequate vegetation buffer to the adjoining lots and the agricultural activities on Lot 2. Therefore the proposed boundary adjustment is consistent with the Zone Purpose statements.

Clause 26.1.2 – Local Area Objectives and Desired Future Character Statements

There are no Local Area Objectives or Desired Future Character Statements for the North Bruny area.

2.3 Statutory Planning

The application is for a Reorganisation of Boundaries under the Rural Resource zone. Given the nature of the use of the site, it requires discretionary assessment under the Scheme.

Council's assessment of this proposal should also consider the issues raised in the representations, the outcomes of any relevant State Policies and the objectives of Schedule 1 of the *Land Use Planning and Approvals Act 1993*.

2.4 Subdivision Standards

The proposal satisfies the relevant Acceptable Solutions of the Scheme (see checklist in Attachment 1), with the exception of the following:

Rural Resource ZoneClause 26.5.2 Reorganisation of Boundaries

Acceptable Solution
A1 A lot is for public open space, a riparian or littoral reserve or utilities.
Performance Criteria
P1 The reorganisation of boundaries must satisfy all of the following: (a) all existing lots are adjoining or separated only by a road; (b) no existing lot was formally a crown reserved road or other reserved land; (c) provide for the sustainable commercial operation of the land by either: (i) encompassing all or most of the agricultural land and key agricultural infrastructure (including the primary dwelling) in one lot, the 'primary agricultural lot', as demonstrated by a whole farm management plan, (ii) encompassing an existing or proposed non-agricultural rural resource use in one lot; (d) if a lot contains an existing dwelling, setbacks to new boundaries satisfy clause 26.4.2; (e) if containing a dwelling, other than the primary dwelling, the dwelling is surplus to rural resource requirements of the primary agricultural lot; (f) a new vacant lot must: (i) contain land surplus to rural resource requirements of the primary agricultural lot; (ii) contain a building area capable of accommodating residential development satisfying clauses 26.4.2 and 26.4.3. (iii) not result in a significant increase in demand for public infrastructure or services; (g) all new lots must comply the following: (i) be no less than 1ha in size; (ii) have a frontage of no less than 6m; (iii) be serviced by safe vehicular access arrangements;

(h) be consistent with any Local Area Objectives or Desired Future Character Statements provided for the area. (i) be capable of containing a building area clear of all hazards and environmental values.
Proposal
The proposal does not comply with the Acceptable Solution as the lots would not be used for one of the above stated purposes.

The proposed variation can be supported pursuant to this Performance Criteria of the Zone for the following reasons:

- The subject lots are adjoined.
- No existing lot was formally a crown reserved road or other reserved land.
- An Agricultural Report (Ag Assist, September 2019) submitted with the application is considered to constitute a whole farm management plan. This report demonstrates the proposal would provide for the sustainable commercial operation of the land by encompassing most of the agricultural land and all of the key agricultural infrastructure (including the primary dwelling, sheds, yards, dams and other agricultural infrastructure) in one lot (Lot 2), the 'primary agricultural lot'.
- There would be an existing single primary dwelling, outbuildings and a visitor accommodation on the proposed Lot 2. There is a single existing driveway that services all these buildings on the lot.
- The Acceptable Solutions under Clause 26.4.2 of the zone require a minimum of 20m setback from the frontage and 50m from side and rear boundaries. The setbacks of the dwelling and the other buildings located on the proposed Lot 2 would be much greater than this.
- The new vacant Lot 1 would comprise the land surplus to the primary agricultural Lot 2. The proposed building area on Lot 1 would be capable of accommodating residential development which would satisfy the relevant standards under Clauses 26.4.2 and 26.4.3 of the Scheme. Given the zoning and the size of the proposed building area, the future development on Lot 1 would not result in a significant increase in demand for public infrastructure or services.
- The proposed Lots 1 and 2 would be greater than 1ha, have frontage greater than 6m and be serviced by safe vehicular access arrangements.
- Pursuant to Clauses 26.1.2 and 26.1.3 of the Scheme, there are no Local Area Objectives or Desired Future Character Statements for the locality.
- The proposed vacant lot (Lot 1) contains land surplus to rural resource requirements of the primary agricultural lot and is capable of containing a building area clear of all hazards and environmental values, subject to implementation of the subdivision Bushfire Hazard Management Plan.

Council's Environmental Planner has recommended the inclusion of conditions of approval in any permit issued specifying that approval of the subdivision does not authorise any vegetation removal.

E3.0 Landslide Code
Clause E3.8.1 Subdivision

Acceptable Solution
A1 No acceptable solution.
Performance Criteria
P1 Subdivision of a lot, all or part of which is within a Landslide Hazard Area must be for the purpose of one of the following: (a) separation of existing dwellings; (b) creation of a lot for the purposes of public open space, public reserve or utilities; (c) creation of a lot in which the building area, access and services are outside the High Landslide Hazard Area and the landslide risk associated with the subdivision is either: (i) acceptable risk, or (ii)capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk.
Proposal
As there is no acceptable solution for A1, the proposal must be assessed against the performance criteria P1.

The application was referred to Council's Environmental Planner who has advised that the proposed subdivision complies with Performance Criteria P1(c) as all existing and proposed building areas, accesses and services are outside all landslide risk areas. Therefore the level of risk is considered acceptable.

E10.0 Biodiversity Code
Clause E10.8.1 Subdivision

Acceptable Solution
A1 Subdivision of a lot, all or part of which is within a Biodiversity Protection Area, must comply with one or more of the following: (a) be for the purposes of separating existing dwellings; (b) be for the creation of a lot for public open space, public reserve or utility; (c) no works, other than boundary fencing works, are within the Biodiversity Protection Area; (d) the building area, bushfire hazard management area, services and vehicular access driveway are outside the Biodiversity Protection Area.
Performance Criteria
P1 Clearance and conversion or disturbance must satisfy the following: (b) if moderate priority biodiversity values: (i) subdivision works are designed and located to minimise impacts, having regard to constraints such as topography or land hazard and the particular requirements of the subdivision;

(ii) impacts resulting from future bushfire hazard management measures are minimised as far as reasonably practicable through appropriate siting of any building area;

(iii) moderate priority biodiversity values outside the area impacted by subdivision works, the building area and the area likely impacted by future bushfire hazard management measures are retained and protected by appropriate mechanisms on the land title;

(iv) residual adverse impacts on moderate priority biodiversity values not able to be avoided or satisfactorily mitigated are offset in accordance with the Guidelines for the Use of Biodiversity Offsets in the Local Planning Approval Process, Southern Tasmanian Councils Authority 2013 and Council Policy 6.10.

(c) if high priority biodiversity values:

(i) subdivision works are designed and located to minimise impacts, having regard to constraints such as topography or land hazard and the particular requirements of the subdivision;

(ii) impacts resulting from future bushfire hazard management measures are minimised as far as reasonably practicable through appropriate siting of any building area;

(iii) high priority biodiversity values outside the area impacted by subdivision works, the building area and the area likely impacted by future bushfire hazard management measures are retained and protected by appropriate mechanisms on the land title;

(iv) special circumstances exist;

(v) residual adverse impacts on high priority biodiversity values not able to be avoided or satisfactorily mitigated are offset in accordance with the Guidelines for the Use of Biodiversity Offsets in the Local Planning Approval Process, Southern Tasmanian Councils Authority 2013 and Council Policy 6.10.

(vi) clearance and conversion or disturbance will not substantially detract from the conservation status of the biodiversity value(s) in the vicinity of the development.

Proposal

The proposal cannot comply with the acceptable solution as the vehicular access on Lot 1 would encroach into the Biodiversity Protection Area and the subdivision is not for the purpose of separating existing dwellings or the creation of a lot for public open space, public reserve or utility. Therefore the proposal must be assessed against P1 (b) and (c).

A Natural Values Assessment Report and an Assessment Report of the Impact on Threatened Species and Priority Biodiversity Values was submitted with the application. Council's Environmental Planner has advised that the proposed variation can be supported pursuant to this Performance Criteria of the Zone for the following reasons:

- The subdivision works have been designed and located to minimise impacts on priority biodiversity values through locating the building area and associated on-site wastewater and bushfire hazard management within an existing cleared area and utilising the existing access alignment.

- While the alignment and impact of services to the site have not been assessed, the only mains services potentially required include electricity and telecommunications. Additional impacts arising from these services can be avoided through inclusion of a condition in any permit issued requiring any services to the site to be located entirely within the existing access and not result

in any negative impacts on native vegetation, including individual Eucalypt trees and grass trees (Xanthorrhoea australis).

- Impacts from future bushfire hazard management measures will not rely upon ongoing management or removal of priority biodiversity values.

- The extent of impact is limited to clearing and disturbance undertaken without authorisation and pruning and encroachment into the tree root zone of individual trees. These impacts are able to be mitigated through rehabilitation of the unauthorised access on Lot 1, protection of the remaining values under a Part 5 Agreement and access construction in accordance with the Arborist assessment;

- Remaining moderate and high priority biodiversity values on Lot 1 are proposed to be retained and protected under a Part 5 Agreement.

- Special circumstances exist as the extent of impacts is limited relative to what is being retained.

- The impacts on moderate and high priority values will not substantially detract from the conservation status of the biodiversity values in the vicinity of the development and no offsets are considered necessary providing all mitigation measures are satisfactorily implemented.

Conditions should be included in any permit issued limiting clearing, requiring implementation of vegetation protection measures during subdivision works, requiring rehabilitation of the unauthorised access and requiring mechanisms on the title to ensure the natural values on Lot 1 are protected, future development is contained within the cleared area, access construction is undertaken in accordance with the Arborist assessment, installation of services do not result in any additional impacts and ensuring rehabilitation of the unauthorised access is maintained.

E15.0 Inundation Prone Areas Code
Clause E15.8.1 Subdivision within Medium and High Inundation Areas

Acceptable Solution
A1 No Acceptable Solution.
Performance Criteria
P1 Subdivision of a lot, all or part of which is within a Medium or High Inundation Hazard Area must be for the purpose of one or more of the following: (a) separation of existing dwellings; (b) creation of a lot for the purposes of public open space, public reserve or utilities; (c) creation of a lot in which the building area, access and services are outside the hazard area, with the exception of stormwater.
Proposal
As the proposal involves subdivision of a lot, all or part of which is within a High and Medium Inundation Hazard Area, the proposal requires assessment against the performance criteria.

The application was referred to Council's Environmental Planner who has advised that the proposal complies with Performance Criteria (P1)(c) as the proposed subdivision creates a lot in which the building area, access and services are outside the hazard area.

E16.0 Coastal Erosion Hazard Code
Clause E16.8.1 Subdivision in Coastal Erosion Hazard Areas

Acceptable Solution
A1 No Acceptable Solution.
Performance Criteria
P1 Subdivision of a lot, all or part of which is within an Coastal Erosion Hazard Area must be for the purpose of one or more of the following: (a) separation of existing dwellings; (b) creation of a lot for the purposes of public open space, public reserve or utilities; (c) creation of a lot in which the building area, access and services are outside the Coastal Erosion Hazard Area.
Proposal
As a portion of the land is subject to the Coastal Erosion Hazard Area, the proposal requires assessment against the performance criteria.

The application was referred to Council's Environmental Planner who has advised that the proposal complies with Performance Criteria (P1)(c) as the building areas, access and services for all lots are located entirely outside the Coastal Erosion Hazard Area.

E16.0 Coastal Erosion Hazard Code
Clause E16.8.1 Subdivision in Coastal Erosion Hazard Areas

Acceptable Solution
A2 No Acceptable Solution.
Performance Criteria
P2 Subdivision must satisfy all of the following: (a) not increase risk to adjoining or nearby property; (b) any increased reliance on public infrastructure must not result in a unacceptable level of risk; (c) need for future remediation works is minimised; (d) access to the lot will not be lost or substantially compromised by coastal hazards on or off-site; (e) no building area is located within the Coastal Erosion Hazard Area; (f) provision of a developer contribution for required mitigation works consistent with any adopted Council Policy, prior to commencement of works; (g) not be prohibited by the relevant zone standards.

Proposal
As a portion of the land is subject to the Coastal Erosion Hazard Area, the proposal requires assessment against the performance criteria.

The application was referred to Council's Environmental Planner who has advised that the proposed variation can be supported pursuant to this Performance Criteria of the Zone for the following reasons:

- The building areas are located outside the erosion hazard area.
- The extent of potential erosion is minimal and will not result increase reliance on public infrastructure.
- Future remediation would not be necessary.
- Access to lots is not affected by erosion hazard.
- No building areas would be located within the coastal erosion hazard area.
- No developer contributions are required.
- The proposal is not prohibited by the zone requirements.

2.5 Public Consultation and Representations

The application was advertised in accordance with the requirements of s.57 of the Land Use Planning and Approvals Act 1993 (from 22 April 2020 to 5 May 2020). Six (6) representations were received during the public exhibition period. The following issues were raised by the representors:

2.5.1 Precedent for further subdivisions, there are numerous existing unbuilt blocks in the locality

The proposal is for a boundary adjustment only. There are no new additional lots being created. The proposed boundary reorganisation meets the relevant requirements under the Scheme. Lot 1 is proposed on land with less viability for agricultural practices, thus enhancing the agricultural potential for proposed Lot 2 area. It would be located to the SW corner of the site, and would be immediately adjoined by existing smaller lots at Killora along Nebraska Road. Given the zoning of the subject site, any future subdivisions of the subject site or the surrounding land would have to meet the minimum standards of the zone.

2.5.2 Contribution to ribbon development

There is existing ribbon development in close proximity to the subject site along Nebraska Road. However, the vacant Lot 1 would be a result of the subject boundary adjustment with no new lots being created. Any future subdivision of Lot 2 would need to meet the minimum standards and the zone purpose statements of the Rural Resource zone. Given the zoning, it is unlikely that the subject site would contribute to ribbon development.

2.5.3 *Not a boundary adjustment – two lot sizes are disproportionate*

Although the proposed site areas for Lot 1 and 2 vary significantly, the proposed boundary reorganisation meets the minimum requirements under

Clause 26.5.2 of the Scheme having adequate site area, frontage and capable of accommodating an appropriate building area. It is worthy to note that the subject application is not assessed under the minor boundary adjustment provisions of the Scheme. The application is assessed under the provisions of Clause 26.5.2 of the Scheme, which provides for a reorganisation of boundaries on lands zoned Rural Resource. The proposal would result in a more functional 'primary agricultural' Lot 2 meeting the requirements of Clause 26.5.2 and the Rural Resource Zone Purpose Statements.

2.5.4 Increase in Traffic which would require upgrades to Nebraska Road

Concerns were received in relation to the standard of Nebraska Road and development placing increasing pressure for road upgrades. Council's Development Engineer has advised that the majority of the representations referred to the application as a subdivision, however this is not the case and no new lots are created as a result of the application. As a result, the issue of any increase in traffic or upgrades to Nebraska Road is not applicable to this application.

2.5.5 Threatens native flora and fauna

One representation raised concerns about the sensitivity of the site, the need for a detailed environmental impact assessment of the proposed subdivision and the impacts of the subdivision on uninterrupted bushland containing critical habitat between 451 Killora Road to the open paddocks opposite Langford's Beach.

Detailed environmental impact assessments of the site were undertaken, including by an ecologist, bird specialist and arborist. These assessments confirmed that no native vegetation requires removal for the proposed development, including future development of the Lot 1.

Council's Environmental Planner has advised, subject to the recommended mitigation measures being implemented, the proposed subdivision will result in a greater level of protection for the significant natural values on proposed Lot 1 under a Part 5 Agreement. The Part 5 Agreement, required by Clause E10.8.1(P1), will also ensure the uninterrupted bushland is maintained and protected within proposed Lot 1. The remaining native vegetation between 451 Killora Road and the open paddocks opposite Langford's Beach does not require a Part 5 Agreement under Clause E10.8.1, as no works other than boundary fencing are proposed for this lot.

2.5.6 Link the Killora Settlement to Langford's Beach and Dennes Point settlements in the north and destroying the Bruny Coastline

The representors raised concerns that there currently is a clear separation between the Killora settlement to the south of the subject site, Langford's Beach settlement to the west and Dennes Point to the north of the site. They were concerned that the proposal would bridge these settlements and create an urban sprawl from Killora to Dennes Point, destroying the sense of village, separation and the natural values along the coastline.

The proposal is for a reorganisation of boundaries only. As such, the existing two lots at 225 Nebraska Road seeking a boundary adjustment, in their current form, are connecting the Killora Settlement to the southern boundary of Dennes Point through Langford's Beach. The proposed boundary reorganisation would not further alter this or give rise to urban sprawl. The

proposed vacant lot (Lot 1) contains land surplus to rural resource requirements of the primary agricultural lot (Lot 2) and is capable of containing a building area clear of all hazards and environmental values. As discussed previously, the natural values on Lot 1 would be further protected as a result of this boundary reorganisation. Given there are currently two lots separating the aforementioned settlements (CT 141042/1 and CT 114473/7) and there would be the same two lots separating these settlements but with different boundaries (proposed Lots 1 and 2), the current scenario would not change significantly. Therefore the proposal would not result in urban sprawl nor destroy the natural values along the coastline.

2.5.7 *Visual disjunction between Killora and Langford's Beach settlements is bridged and destroyed by the proposal*

The current southern lot CT 114473/7 (part of the subject site), in its present form, separates the Killora settlement to the east of Nebraska Road from the Langford's Beach settlement to the west of Nebraska Road along the coast. The proposed Lot 1 would still serve as a separation between these two settlements.

2.5.8 *Diminishes the historical integrity of one of the three major historic farms on North Bruny. These should be maintained as whole entities not slowly vivisected by subdivisions that beget further subdivision*

The subject site is not listed as a heritage place of state or local significance. Accordingly, there are no relevant planning controls to maintain any heritage values of the site. Furthermore, the proposed reorganisation of boundaries would enhance the agricultural potential of Lot 2. It would enable the farm land to be managed and maintained under a single ownership in contrary to the two smaller current lots which have the potential to compromise the agricultural integrity of the land if they were to be held in separate ownership.

2.5.9 *Visual Amenity*

Any future development on Lot 1 would be completely screened and separated from the surrounding lots by the existing thick vegetation. Therefore there would be no significant visual impacts when viewed from Nebraska Road or the adjoining lots.

2.5.10 *Tourism accommodation on new lot would place burden on the existing infrastructure of the locality*

There is no visitor accommodation proposed under the subject application. Any future development on Lot 1 seeking approval would have to meet the relevant zone standards.

2.5.11 *Application not advertised accurately and neighbour notification insufficient*

The application was advertised in accordance with section 57 of the *Land Use Planning* and *Approvals Act 1993 between 22 April 2020 and 5 May 2020*. Two site notices were placed along Nebraska Road adjacent to the proposed Lot 1 and the access point at Nebraska Lane (access to proposed Lot 2) on the frontage. All the adjoining neighbours were notified. The requirements of the Act were met.

2.6 Other Matters

Environmental Planning

There is the risk of bird strike arising from future development of the lots. To minimise this risk, a Part 5 Agreement is recommended requiring future development to fit into the surrounding landscape and incorporate design and elements and strategies in accordance with the document "Minimising the swift parrot collision threat - Guidelines and recommendations for parrot-safe building design".

Given the sensitive and significant natural values on the site, a condition is also recommended for inclusion in any permit requiring landscaping to be with predominantly native species.

In accordance with clause 8.11.3(b), a condition should be included in the permit requiring implementation of best practice hygiene measures.

Aboriginal Heritage

A desktop Aboriginal Heritage Property Search has indicated that Aboriginal relics may be located at the site. An advice clause is recommended in any permit issued advising the applicant to contact Aboriginal Heritage Tasmania should any development occur on the subject site.

3. CONCLUSION

The application seeks approval for a reorganisation of boundaries at 225 Nebraska Road, North Bruny. No new additional lots would be created. The proposal satisfies the relevant Acceptable Solutions and Performance Criteria of the Scheme. It is therefore recommended a planning permit granted subject to conditions.

4. RECOMMENDATION

That the Planning Authority resolves that the development application for boundary adjustment at 225 Nebraska Road, North Bruny for Lark & Creese Pty Ltd be approved subject to the following conditions:

1. Except as otherwise required by this Permit, use and development of the land must be substantially in accordance with Development Application No. DAS-2019-36 and Council Plan Reference No. P3 submitted on 02 April 2020. This Permit relates to the use of land or buildings irrespective of the applicant or subsequent occupants, and whoever acts on it must comply with all conditions in this Permit. Any amendment, variation or extension of this Permit requires further planning consent of Council.

2. Prior to the permit coming in to effect the landowner must enter into a Part 5 Agreement under the Land Use Planning and Approvals Act 1993 with and to the satisfaction of Kingborough Council to retain and protect the environmental values on Lot 1, outside those areas required for a building area and bushfire protection measures, and ensure future development is located to minimise impacts on environmental values. This Part 5 Agreement must:

   (a) verify the extent of the conservation zone, which is to encompass all native vegetation outside the bushfire hazard management area and access alignment as shown in the certified subdivision Bushfire Hazard Report (Lark & Creese, dated 6 May 2020, reference number 19231 – 06) and associated Bushfire Hazard Management Plan (BHMP) (Lark & Creese, dated 12 May 2020, reference number 19231 – 06);

(b) provide for the protection and management of all native vegetation and habitat values within the conservation zone;

(c) include a Conservation Management Plan including but not limited to fencing of the conservation zone, prohibition of vegetation removal for boundary fencing, the weed management plan as required under Condition 5, the rehabilitation plan for Access Track B as required under Condition 6 and monitoring and reporting. These management prescriptions must be drafted by a suitably qualified environmental consultant and include timeframes and details for each management prescription for a minimum of 5 years;

(d) include the following prescriptions for future development of the lot:

(i) buildings and structures must not pose an unacceptable risk of bird collision by incorporating design elements and strategies in accordance with the document "Minimising the swift parrot collision threat – Guidelines and recommendations for parrot-safe building design".

Buildings and structures will be deemed to pose such a risk unless they comply with any one of the following:

- the glazed surface of the window does not have a total surface area of greater than 2m2 and does not result in a sight line through the building from one window to another, such as corner windows;
- the glazed surface of a window is treated to include visual markers or muted reflections, the purpose of which is to give them the appearance of an impenetrable surface. Such surfaces may include any one of the following types of treatments: the use of low-reflectivity glass (0-10%); films; coatings; fritted glass; or screens; or
- the glazed surface of a window is installed at a minimum of 20 degrees from vertical, angled in at its base to reflect the ground.

(ii) access and services to Lot 1, including associated works, must be located along the alignment of the existing Access Track A and be designed and constructed to avoid deleterious impacts on native vegetation and individual trees in accordance with the Development Impact Assessment (Element Tree Services, 21 February 2020), and ensure retention of individual trees, including Trees 1-7 inclusive and Xanthorrhoea australis plants as shown in Figure 14 of the Natural Values Report (Lark & Creese, dated March 2020, reference number 19234-06);

(iii) the prior written consent of Council prior to felling, lopping, ringbarking or otherwise injuring or destroying of eucalypt trees with a diameter >25 cm at 1.5m from natural ground level taking place.

Council will only approve impacts on these trees where it can be demonstrated that, based on the advice of a suitably qualified and independent arborist, the trees are unable to be retained because the health and viability of the trees is such that they represent an unacceptable risk to an approved use or development;

(iv) future development of the lot must be limited to a single dwelling and associated infrastructure;

(v) future development of the lot must be in accordance with the certified subdivision Bushfire Hazard Report (Lark & Creese, dated 6 May 2020, reference number 19231 – 06) and associated Bushfire Hazard Management Plan (BHMP) (Lark & Creese, dated 12 May 2020, reference number 19231 – 06), unless superseded by an alternative BHMP certified by an accredited person or TFS, and only if this alternative BHMP demonstrates that the hazard management area:

- is contained within the lot boundary; and
- does not encroach upon: (i) individual native trees with a diameter >25cm at 1.5m from natural ground level; and/or (ii) vegetation communities meeting the descriptions in Kitchener, A. and Harris, S. (revised January 2016) From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation. Edition 2. Department of Primary Industries, Water and Environment, excluding those vegetation communities within the categories of modified land or other natural environments.

(vi) any landscaping of the site will incorporate native species (preferably Tasmanian endemic species) and will not include non-declared priority weeds listed in the Kingborough Weed Management Strategy;

(e) be drafted using Council's template Part 5 Agreement for subdivision;

(f) be to the satisfaction of the Manager Development Services;

(g) be signed and sealed prior to commencement of works; and

(h) be submitted to the Land Titles Office for registration with the final plan of survey.

All costs associated with drafting and registering the Part 5 Agreement on the title are to be borne by the developer. All terms of this Agreement must be complied with once executed.

Ongoing management of the site must be in accordance with the Part 5 Agreement.

Please note, planning permits containing a requirement for a Part 5 Agreement are not valid until such time as the Agreement is executed, as specified in the Land Use Planning and Approvals Act 1993. Therefore the above Agreement must be executed prior to commencement of works and registered on each title. The template, and a checklist for the process of drafting and lodging such an Agreement, may be obtained from Council's planning team.

3. Prior to the commencement of any on site works, a Vegetation Protection Plan must be submitted to Council for endorsement. This Plan must be prepared by a suitable qualified person and:

(a) identify all native vegetation and individual native trees with a diameter >25cm at 1.5m from natural ground level relative to the subdivision works;

(b) demonstrate subdivision works are designed, located and constructed to avoid deleterious impacts on native vegetation and individual trees in accordance with the Development Impact Assessment (Element Tree Services, 21 February 2020) and ensure retention of individual trees, including Trees 1-7 inclusive and

Xanthorrhoea australis trees as shown in Figure 14 of the Natural Values Report (Lark & Creese, dated March 2020, reference number 19234-06); and

(c) detail the mitigation and vegetation protection measures to be implemented before, during and after construction in accordance with Australian Standard 4970-2009 for the protection of trees on development sites, including incorporation of the recommendations in the Development Impact Assessment (Element Tree Services, 21 February 2020).

When endorsed, this Plan will form part of the Permit.

The Vegetation Protection Plan must be implemented to the satisfaction of the Manager Development Services prior to the commencement of any on site works.

4. All native vegetation, including individual trees and native vegetation identified for retention in the endorsed Vegetation Protection Plan, must be retained and appropriately protected during and after construction to ensure that no damage is inflicted that may impact upon the health of the trees or cause them to die. This includes establishing and maintaining mitigation and tree protection measures identified in the endorsed Vegetation Plan prior to the commencement of any on-site works in accordance with AS 4970-2009 to exclude:

(a) Storing of building materials;

(b) Vehicular traffic;

(c) Placement of fill; and

(d) Excavation works.

Evidence of satisfactory installation of these measures must be provided to Council prior to the commencement of any on-site works.

In addition, the following tree protection measures must be adhered to following construction for all areas within the Tree Root Protection Zone but outside the footprint of the approved works unless otherwise approved by Council:

(i) the existing soil level must not be altered around the Tree Root Protection Zone of the trees (including the disposal of fill, placement of materials or the scalping of the soil); and

(ii) the Tree Root Protection Zone must be free from the storage of fill, contaminates or other materials; and

(iii) machinery and vehicles are not permitted to access the Tree Root Protection Zone.

5. Prior to the commencement of on-site works, a Weed Management Plan. This Plan must:

(a) include a site plan identifying and locating all declared and environmental weeds on the subject land;

(b) detail timeframes and methods of primary and follow up treatment for all declared and environmental weeds on site;

(c) specify weed hygiene measures required to ensure the risk of the spread of weeds from the site during clearing and construction is minimised;

(d) include a fully costed implementation, monitoring and reporting plan for a minimum of five years (including actions and timeframes);

(e) be prepared by a suitably qualified person; and

(f) be to the satisfaction the Manager Development Services.

When endorsed, this Plan will form part of the Permit.

In addition, prior to the sealing of the Final Plan of Survey primary treatment of all weeds is required in accordance with this Plan and to the satisfaction of the Manager Development Services.

Ongoing management of the site must be in accordance with this Plan unless otherwise approved in writing by Council.

6. Prior to the commencement of on-site works and within three (3) months of the date of this permit, a Rehabilitation Plan must be submitted for endorsement to Council. This rehabilitation plan must:

(a) identify the area to be rehabilitated, which must include the full extent of vegetation disturbance and removal associated with Access Track B as identified in Figure 14 of the Natural Values Report (Lark & Creese, dated March 2020, reference number 19234-06);

(b) detail how this area will be regenerated, including facilitation of natural regeneration and replanting with a mix of local provenance species, site preparation, weed management, protection of plantings and ongoing maintenance;

(c) specify appropriate timeframes for all recommended measures;

(d) exclude the following activities within the rehabilitation area:

(i) vehicular access;

(ii) stockpiling or placement of fill;

(iii) excavation works;

(iv) storing of materials, contaminants or other material;

(v) grazing by domestic animals; and

(vi) slashing;

(e) include a fully costed implementation, monitoring and reporting plan for a minimum of five years (including actions and timeframes);

(f) be prepared by a suitably qualified person; and

(g) be to the satisfaction of the Manager Development Services.

When endorsed, this Plan will form part of the Permit.

Primary actions in the Rehabilitation Plan must be implemented to the satisfaction of the Manager Development Services prior to the Sealing of the Final Plan of Survey.

Ongoing management of the site must be in accordance with this Plan unless otherwise approved in writing by Council.

7. A "start works" notice must be lodged with Council fourteen (14) days prior to the commencement of any on-site works and works must not commence until this notice has been approved by the Manager Development Services.

8. No felling, lopping, ringbarking or otherwise injuring or destroying of native vegetation or individual trees is approved as part of this planning permit.

9. The vehicular access must be constructed in accordance with the Tasmanian Standard Drawings (TSD-RO3, TSD-RO4, TSD-E01 and TSD-RF01). A permit to carry out works within a Council road reservation must be obtained prior to any works commencing within the Council road reservation.

10. No approval is given via this Permit for the construction of internal access to potential building sites on Lot 1.

11. Erosion/siltation infiltration control measures must be applied during construction works to the satisfaction of the Executive Manager – Engineering Services.

12. The existing building on CT 114473/7 which was approved as a visitor accommodation under DA-2020-135 must not be used as a residential dwelling unless otherwise approved in writing by Council.

13. Prior to the sealing of the Final Plan of Survey, a bond must be paid to Council for the cost of five years of monitoring and implementation of the Part 5 Agreement required under condition 2, excluding any initial actions already undertaken. Reporting to Council on compliance with and implementation of the Agreement must be undertaken by a suitably qualified consultant and not less than once annually for a minimum period of 5 years. The bond will be repaid to the payer in stages on an annual basis once each annual report is received and satisfactory implementation of works demonstrated, in accordance with the cost schedule identified in the Agreement.

14. The Final Plan of Survey must incorporate a designated building area for Lot 1, to be shown as a "Building Area" on the plan. This building areas must be generally consistent with the proposed development envelope as shown in Council Plan Reference P3 and dated 2 April 2020, but modified to exclude any individual Xanthorrhoea australis plants and any native trees with a diameter >25cm at 1.5m from natural ground level.

    The final "Building Area" must be to the satisfaction of the Manager Development Services.

    The Schedule of Easements must include a covenant requiring that all buildings, structures, on-site wastewater and bushfire hazard management areas must be contained entirely within the Building Area.

ADVICE

A. A Final Plan of Survey must be submitted to Council for sealing, together with a Schedule of Easements, a copy of the survey notes, and a copy of the balance plan (where applicable). Payment of Council's fee for sealing the Final Plan of Survey and Schedule of Easements must be made upon submission of plans.

B. In accordance with section 53(5) of the Land Use Planning and Approvals Act 1993 this permit lapses after a period of two years from the date on which it is granted if the use or development in respect of which it is granted is not substantially commenced within that period.

C. The Developer should not allocate any property address numbers for the proposed lots.

New property addresses have been allocated as follows:

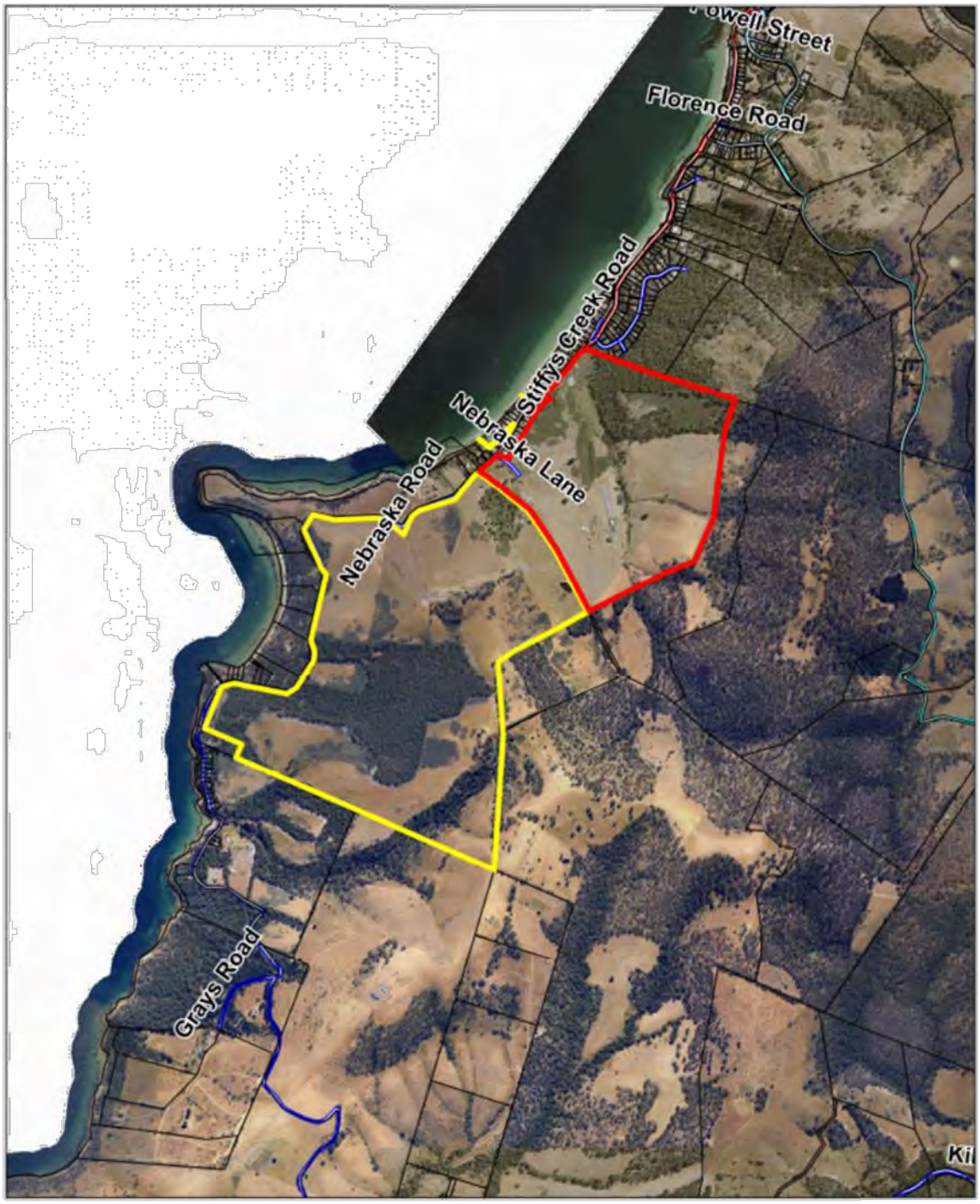
Lot No.	Allocated Property Address
1	411 Nebraska Road, North Bruny
2	225 Nebraska Road, North Bruny

D. An Aboriginal Heritage Property Search has indicated that Aboriginal relics may be located at the site. It is recommended contacting Aboriginal Heritage Tasmania should any development occur on the subject site.

ATTACHMENTS

1. **Location Plan**
2. **Proposal Plans**
3. **Assessment Checklist**

Location Plan - 225 Nebraska Road, North Bruny (CT 141042/1 and CT 114473/7)



LARK & CREESE Pty Ltd
Land & Engineering Surveyors

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Development Application: DAS-2019-36
Plan Reference no.: P3
Date Received: 02-04-2020
Date placed on Public Exhibition: 22-04-2020

DEVELOPMENT APPLICATION
-BOUNDARY REORGANISATION-

Owner: Karwin Holdings Pty Ltd		
Location: 225 Nebraska Rd North Bruny		
Title Reference: C.T.141042/1, C.T.114473/7	PID: 2961737	
Scale: 1:9000	Date: 1st April 2020	Surveyors Ref: 18359-04

Note: This plan has been prepared for the sole purpose of application to Council for development approval and is not to be reproduced, copied or used for any other purpose without the express permission of Lark & Creese Pty Ltd.

All boundaries and dimensions are approximate only and are subject to Council approval and final survey.

LARK & CREESE Pty Ltd
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DEVELOPMENT APPLICATION
-BOUNDARY REORGANISATION-

Owner: Karwin Holdings Pty Ltd	Note: This plan has been prepared for the sole purpose of application to Council for development approval and is not to be reproduced, copied or used for any other purpose without the express permission of Lark & Creese Pty Ltd.
Location: 225 Nebraska Rd North Bruny	
Title Reference: C.T.141042/1, C.T.114473/7 | PID: 2961737	All boundaries and dimensions are approximate only and are subject to Council approval and final survey.
Scale: 1:9000 | Date: 1st April 2020 | Surveyors Ref: 18359-04	

ATTACHMENT 3 – ASSESSMENT CHECKLIST

ZONE PROVISIONS – RURAL RESOURCE

Issue	Complies?			Compliance/Comments
	Y	N	N/A	
Reorganisation of boundaries (Cl. 26.5.2) A1 - A lot is for public open space, a riparian or littoral reserve or utilities.		A1		The proposed reorganisation of boundaries would be for private land.

CODE PROVISIONS

Issue	Complies?			Compliance/Comments
	Y	N	N/A	
E1.0 Bushfire-Prone Areas Code				
Subdivision: Provision of hazard management areas (Cl.E1.6.1.1) A1 – Subdivision capable of containing fire hazard management areas	A1			The application is accompanied by a Certificate under s51(2)(d) of the *Land Use Planning and Approvals Act 1993* certified by an accredited bushfire practitioner which demonstrates that the proposed subdivision meets Clause E1.6.1(A1)(b) in that it provides hazard management areas equal to or greater than the separation distances required for BAL 19 for both lots and existing habitable buildings on Lot 2. A bushfire hazard management plan was also submitted with the application demonstrating that the proposal complies with A1(b) as follows: the plan shows all lots that are located within a bushfire prone area; the plan identifies a compliant building area for each lot; the bushfire hazard management area for each lot is equal to or greater than the separation distances required for BAL-19; the application is accompanied by a bushfire hazard management plan certified by an accredited person and showing hazard management areas equal to or greater than the separation distances required for BAL 19.

				To ensure the bushfire hazard management requirements are satisfied, a condition should be included in the permit requiring the measures contained within the plan to be implemented in relation to any future development on Lot 1, unless superseded by an alternative BHMP certified by an accredited person or TFS, and only if this alternative BHMP demonstrates that the hazard management areas are contained within the designated development areas shown on the title. To ensure future lot owners are aware of these requirements, a Part 5 Agreement should also be included on the title of Lot1 to this effect.
Subdivision: Public Access (Cl.E1.6.1.2) A1 – Certified signoff provided or subdivision plan demonstrating required layout A2 – Construction of roads meets the requirements of the table, where the development standards in the zone do not require a higher standard	A1		A2	The proposed boundary adjustment complies with A1 (b) as the proposed plan of subdivision shows the layout of property access to the building areas and demonstrates they are capable of complying with Table E2 and the plan has been certified by an accredited person.
Subdivision: Provision of water supply for fire fighting purposes (Cl.E1.6.3) A1 – Certified signoff provided or supply demonstrated A2 – Unserviced areas – certified signoff provided, BHMP certified or supply demonstrated	A2		A1	The subdivision would comply with A2 (b) as the proposed plan of subdivision demonstrates that a static water supply, dedicated to fire fighting, will be provided and located compliant with Table E5 and this plan has been approved by an accredited person as being compliant with Table E5.
E3.0 Landslide Code				
The application was referred to Council's Environmental Planner who has advised that while the subdivision creates no more than two lots, a small area of proposed Lot 1 is within a Medium Landslide Hazard Area. Therefore the proposed subdivision requires assessment against Clause E3.8.1 of the Scheme.				
Subdivision (Cl. E3.8.1) A1 – No acceptable solution		A1		There is no acceptable solution for A1, the proposal must be assessed against the performance criteria P1.

A2 – Subdivision is not prohibited by the relevant zone standards	A2			Subdivision is not prohibited under the zone standards.
E6.0 Parking and Access Code				
The application was referred to Council's Development Engineer who has advised that there are no subdivision standards under Code E6.0, therefore the Code does not apply.				
E7.0 Stormwater Management Code				
The application was referred to Council's Development Engineer who has advised that there are no subdivision standards under Code E7.0, therefore the Code does not apply.				
E10.0 Biodiversity Code				
The application was referred to Council's Environmental Planner who has advised that the proposed Lot 1 contains medium-high priority biodiversity values including a potential quoll denning site, potential habitat for the eastern-barred bandicoot and significant habitat for the forty-spotted pardalote, with observations of this species utilising the vegetation around the proposed access. There are also grass trees (*Xanthorrhoea australis*) adjacent to the access. This species is considered a priority species and is therefore a moderate priority biodiversity value under the Biodiversity Code. No native vegetation removal is relied upon for future development of the proposed vacant lot, with habitable buildings and associated on-site wastewater and bushfire hazard management capable of being contained within the existing cleared land. However, there are impacts on priority biodiversity values from unauthorised works, with approximately 450-500m^2 of high priority vegetation removed to create a second access. These impacts include the removal of two (2) eucalypts and damage to one (1) *Eucalyptus viminalis* tree which provides habitat for the forty-spotted pardalote. As upgrading the unauthorised second access will have a greater impact than upgrading the existing historic access, it is proposed to rehabilitate the second access. An Arborist assessment (Element Tree Services, 21 February 2020) confirms upgrading the existing access track can be undertaken without requiring any tree removal. Notwithstanding, upgrading the existing access does require pruning of three (3) *Eucalyptus amygdalina* trees and access works will encroach into the tree root protection zone of six (6) individual trees adjacent to the access, including one (1) high conservation value *E. viminalis* tree. The Arborist assessment concludes that, provided the pruning is undertaken by a qualified Arborist and the access upgrade is achieved with placement of 40mm aggregate over the existing surface, there is not expected to be any negative impact on trees growing adjacent to the access.				
Subdivision (Cl. E10.8.1) A1 - Subdivision of a lot, all or part of which is within a Biodiversity Protection Area, must comply with one or more of the following: (a) be for the purposes of separating existing dwellings; (b) be for the creation of a lot for public open space, public reserve or utility; (c) no works, other than boundary fencing works, are		A1		The proposal cannot comply with the acceptable solution as the vehicular access encroaches into the Biodiversity Protection Area and the subdivision is not for the purpose of separating existing dwellings or the creation of a lot for public open space, public reserve or utility. Therefore the proposal must be assessed against P1 (b) and (c).

within the Biodiversity Protection Area; (d) the building area, bushfire hazard management area, services and vehicular access driveway are outside the Biodiversity Protection Area. A2 - Subdivision is not prohibited by the relevant zone standards.	 A2			 Subdivision is not prohibited under the zone standards.
E11.0 Waterway and Coastal Protection Code				
Buildings and works (Cl.E11.7.1) A1 - Buildings and works within a building area on subdivision plan approved under this Scheme A2 – Coastal refugia area A3 – Potable water supply area A4 – Development does not involve new stormwater point discharge into watercourse, wetland or lake			 A1 A2 A3 A4	While the Waterway and Coastal Protection Area occurs on part of the site, no buildings or works encroach into this area. Therefore this Clause is not applicable.
Subdivision (Cl.E11.8.1) A1 - Subdivision of a lot, all or part of which is within a Waterway and Coastal Protection Area, Future Coastal Refugia Area or Potable Water Supply Area must comply with one or more of the following: (a) be for the purpose of separation of existing dwellings; (b) be for the creation of a lot for public open space, public reserve or utility; (c) no works, other than boundary fencing works, are within a Waterway and Coastal Protection Area, Future Coastal Refugia Area or Potable Water Supply Area; (d) the building area, bushfire hazard management	 A1			The proposal meets (c) and (d) as no works are required within the Waterway and Coastal Protection Area and all building areas, bushfire hazard management areas, services and vehicular access driveway are located outside the Waterway and Coastal Protection Area.

area, services and vehicular access driveway are outside the Waterway and Coastal Protection Area, Future Coastal Refugia Area or Potable Water Supply Area. A2 – Subdivision is not prohibited by the relevant zone standards.	 A2			 Subdivision is not prohibited under the zone standards.
E14.0 Scenic Landscapes Code				
Removal of bushland within scenic landscape areas (Cl.E14.7.1) A1 – Removal or disturbance of bushland complies with (a) & (b)	 A1			There will be no removal of bushland within a Scenic Landscape Area.
Appearance of buildings and works within scenic landscape areas (Cl.E14.7.2) A1 – Building visibility complies with (a) or (b) A2 – Works not visible from public spaces			 A1 A2	 No buildings are proposed under the subject application. No works are being proposed under the subject application. The access to the site would be upgraded at a later stage during the development of a habitable building.
E15.0 Inundation Prone Areas Code				
Subdivision within Medium and High Inundation Areas (Cl.E15.8.1) A1 – No acceptable solution A2 - Subdivision is not prohibited by the relevant zone standards.	 A2	A1		As the proposal involves subdivision of a lot, all or part of which is within a High and Medium Inundation Hazard Area, the proposal requires assessment against the performance criteria. Subdivision is not prohibited under the zone standards.
E16.0 Coastal Erosion Hazard Code				
Subdivision (Cl.E16.8.1) A1 – No acceptable solution A2 – No acceptable solution		A1 A2		As a portion of the land is subject to the Coastal Erosion Hazard Area, the proposal requires assessment against the performance criteria. As a portion of the land is subject to the Coastal Erosion Hazard Area, the proposal requires assessment against the performance criteria.

E23.0 On-Site Wastewater Management Code				
Development standards for new boundaries (Cl. E23.9.2) A1 - A new boundary must have a separation distance from an existing land application area that complies with E.23.10.1 A3.	A1			The proposed new boundary would not be located in close proximity to the existing buildings on Lot 2. Therefore complies.

Note: All other codes were reviewed and are not applicable to the proposed use/development.

PLANNING AUTHORITY SESSION ADJOURNS

OPEN SESSION RESUMES

Open session resumes at

14 NOTICES OF MOTION

14.1 COVID-19 Budget Response

The following Notice of Motion was submitted by **Cr Westwood:**

RECOMMENDATION

That Council directs the General Manager to implement a 2.8 per cent COVID-19 efficiency dividend across the organisation for all non-salary expenditure in 2020-21, excluding the pass-through of external funding from other sources which does not impact Council's underlying result.

Background

Council's draft 2020-21 Budget shows an underlying loss of almost $4 million, or almost 10 per cent of estimated revenue. If no action is taken to minimise this deficit, this will be the largest underlying loss in Kingborough's history.

Council's Long Term Financial Plan is based on a 2.8 per cent rate rise in 2020-21. Given Council has elected to forgo any revenue from the indexation of rates 2020-21, it now needs to find savings to partly offset this.

Estimated spending within the 2020-21 draft Budget has not substantially changed from the 2019-20 Budget, in fact it has increased. This motion directs the General Manager to find appropriate savings in expenditure across the 2020-21 Budget, through a 2.8 per cent COVID-19 efficiency dividend. This equates to $2.80 in every $100 of non-salary Council expenditure and aims to limit losses during the COVID-19 pandemic and constrain long-term debt.

Efficiency dividends are commonly used within public sector organisations to ensure the most efficient use of public money, especially during times of financial stress, and have been successfully implemented within the Tasmanian public service.

A COVID-19 efficiency dividend aims to achieve a balance between providing services to the community and a commitment to strong, responsible financial management.

Officer's Response

Council's draft budgeted operational expenditure for 2020/21 is $31.73 million excluding depreciation. If you exclude employee costs and externally funded expenditure, the figure reduces to $13.55 million. A 2.8% efficiency dividend would amount to $380,000. This is the amount of savings that would need to be found by improving operational efficiencies throughout 2020/21.

Gary Arnold, General Manager

14.2 Elected Member Allowances 2020-21: Response to COVID-19

The following Notice of Motion was submitted by **Cr Winter:**

RECOMMENDATION

That due to the financial impact of COVID-19 on Tasmanian Local Government, Kingborough Council:

(i) advocates to the Tasmanian Government for a deferral of consideration of any increase in elected member allowances for the 2020-21 financial year; and

(ii) provides guidance for elected members on a process to not accept any personal increase in allowance should it not be directed at a statewide level.

Background

In normal circumstances, annual allowance increases are indexed annually. Councillor allowances are paid by ratepayers.

Given the current environment, any increase in allowances paid to elected representatives is not considered appropriate. Many in the community have lost their jobs or are struggling with reduced incomes due to the COVID-19 pandemic.

The Local Government Association of Tasmania has asked for this matter not to be taken to its General Meeting.

Officer's Response

Council decision required.

John Breen, Chief Financial Officer

14.3 Howden Public Open Space

The following Notice of Motion was submitted by **Cr Midgley**

RECOMMENDATION

That Council investigate the purchase of a parcel of land (currently for sale) at Bonnie Vale Estate, Howden for public open space and a report on the outcome of this investigation be provided back to Council at the Council meeting on 25 June 2020.

Background

The matter of community Public Open space and a community playground in Howden has been on the Howden Progress Association agenda for decades.

The Community of Howden is growing and new estates such as Bonnie Vale have an increasing amount of residences with young families. Howden is fortunate to have local reserves and walking trails close by. However, there is no community public open space locally for families to gather. The subdivision in Bonnie Vale would have been a suitable opportunity for Council to acquire Public Open Space for this growing area, however it was not given a priority for Council when the subdivision was put to Council.

Currently, children gather on the streets in Bonnie Vale to play or utilise the current vacant land. To exercise locally families, drive to local trails and reserves as the increasing cars on the roads is a safety concern for many families and prohibits many from walking or riding to the local trail and reserve areas.

The Department Health and Human Services Tasmania recommends that children have up to 3 hours of physical activity per day. A community public open space would assist to provide this for children. It also provides a place for local families to connect in a community space and as kids grow and become independent, a place they can meet with their local friends to play.

As stated in the Kingborough Playspace and Playground Strategy, local government is a key provider of play and recreational opportunities, through purpose- built playgrounds, play spaces, parklands and open spaces held in trust and managed on behalf of the community. Kingborough Council has an important role in providing safe and stimulating environments for outdoor recreation and play that provide positive community health and well-being outcomes for our residents.

Open Space in Howden has been identified as a Medium priority level. On page 50 of the Public Open Space Strategy it states that for Howden: Identify a suitable park parcel of land in the Brightwater Road area of Howden to provide the residents a local play, recreational and social space close to their homes.

A parcel of land in the immediate vicinity would meet the aim in the Public Open Space Strategy for Howden.

Council is currently at a time of major budget constraints. However, this is an opportunity that should not be missed as there are plans for increased subdivision in the area of Howden and to my understanding no further provision of community public open space has been identified.

Officer's Response

A report can be provided in relation to this matter.

Daniel Smee, Executive Manager Governance & Community Services

14.4 Huntingfield Development

The following Notice of Motion was submitted by **Cr Midgley:**

RECOMMENDATION

That Council write to the Minister for Planning, the Hon Roger Jaensch MP on behalf of the Kingborough community, requesting the Tasmanian Government:

i. expand its consultation to include a series of community workshops to present the Huntingfield Master Plan (draft) to residents; and

ii. extend the time frame for receipt of community submissions to allow these workshops to be held in person, following the gradual lifting of social distancing requirements

Background

Council recognises that it is critical for the community to have meaningful input to the Huntingfield Master Plan (draft).

Council recognises it is a significant and important development to meet demands of Tasmania's housing crisis.

Council Officers often meet face to face with development applicants and those putting in a submission to explain the development process. Council recognises that not all community members have access to a computer or internet so this face to face service is critical.

Council recognises that restrictions are in place due to COVID-19, however from June 15, these restrictions are lifting and therefore it could be possible to have small numbers of 20 people attending community workshops.

In 2019 the Hon Roger Jaensch MP did state that he would commit to holding community workshops for the Draft Huntingfield Master Plan.

Community workshops would provide an opportunity for community members to understand the Draft Master Plan, to ask questions, receive explanations and understand the development.

It is important that we get this significant development right, that it is accessible for all the community to have a say to ask questions and to make an informed submission.

Officer's Response

The public consultation is being delivered by the Department of Communities Tasmania by way of an interactive web-based tool called Social Pinpoint. A fact sheet is also available. The proposed Master Plan is shown as a map on Social Pinpoint where comments can be provided against different development components. The Minister's correspondence indicates that this method was chosen because the Covid-19 restrictions prevent the face-to-face information sessions from being held. The consultation period closes on 26 June 2020. Any extension to this consultation would be at the Minister's discretion.

Tony Ferrier, Deputy General Manager

14.5 Use of Non-Expended Funds

The following Notice of Motion was submitted by **Cr Midgley**

RECOMMENDATION

That Council utilise non-expended funds from its Community Waste Education budget for 2019/20 to support the purchase of a Community Waste Recycling Worm farm in Taroona.

Background

With the absence of one of Council's Community Development Officers for the last 12 months the Budget allocation for the Community Waste Education has not been expended. The 2019/20 operational budget allocation has $5k allocated for Community Waste Education, for which the most recent financial statement shows almost no expenditure to date.

The purpose of the Community Waste Education budget is to work with the community to provide initiatives related to waste and education. Every second year the budget is utilised for the Salvaged Art exhibition program. Given that there are funds available, it would seem an appropriate opportunity for Council to support the request from the Taroona Neighbourhood Garden.

The Taroona Neighbourhood Garden Inc. has been operating a double-bay worm farm for 12 years. Members and many local residents regularly deposit kitchen waste in the worm farm,

and TNG members have also added vegetable waste from the garden. The worm farm has been managed by TNG volunteers to provide worm castings for vegetable growing.

TNG has seen an increase in local people making deposits of food and kitchen waste into the TNG worm farm in recent years. The Neighbourhood Garden is experiencing increased visitation from non- members and is gaining a higher profile and visibility in the community. Many visitors ask about home vegetable growing, composting and other organic gardening topics.

The TNG is a successful community program and well placed to educate and inform the local community about responsible recycling of food waste, and to meet the requirements of the many families who already wish to reduce their waste going to landfill.

TNG's existing worm farm is difficult to manage, with heavy top-mounted lids, and no easy way to remove castings or collect liquid. Use is at capacity – it cannot handle increasing deposits. The structure is at the end of its life, with rotting wood and it is no longer vermin-proof.

The installation of a large-scale worm farm at TNG would solve the problem of the increasing amount of food waste and provide benefits for decreasing the amount of food waste in land fill.

The worm farm TNG propose to purchase is the Worm Habitat Grande Platinum from Worms Downunder (https://wormsdownunder.com.au/). This model can process up to 20 litres of waste per day and is designed for use in schools and community gardens. They propose to locate it on a solid concrete pad to provide clean and easy accessibility.

The membership of TNG would contribute full ongoing management of the facility and undertake community education to increase use of the worm farm and thereby reduce waste in the roadside collection. This project has great potential to become a trial and demonstration of community based organic waste recycling in Kingborough.

TNG would contribute the following to the project:

- Day to day management of the facility (checking moisture levels, managing inputs and additives as needed)
- Removal of worm castings to vegetable plots to keep the farm functioning
- Community education and engagement through signage and personal communication, and possibly community workshops
- Labour and materials or installation of platform and worm farm
- Artwork for signage
- Reports as required to KWS/Kingborough Council on operation and outcomes.

Project costs

Worm Habitat Grande Platinum: $3,245 (inc GST)

Freight including tail-lift at delivery: $675 (As per quote from Worms Downunder)

Total for unit and delivery: $3920

Contribution from TNG membership

Worms, 3kg from Tasmanian Worm Farm at Meander: $240 and those bred from our existing farm

Concrete pavers for base platform 1800x1800mm: 9 pavers at $9.45 each = $175

Signage: Approx $400

In Kind contribution

Preparation of concrete pad, Installation and maintenance of worm farm, design of signage, community publicity and education.

Officer's Response

The request for funding from the Taroona Neighbourhood Garden for a worm farm is a project that would typically be considered as part of Council's Community Grant Program. In this regard, there are some concerns around the equity of funding a project that has not been through a competitive bid process with merit based assessment criteria (including the requirement for an applicant contribution of 50%). However, it is acknowledged that the project was submitted by the Taroona Community Association following a request for budget items at the Kingborough Community Consultative Forum but was unable to be considered as a capital bid.

The worm farm project aligns well with the intent of the Community Waste Wise Education budget and whilst staff had intentions of purchasing additional infrastructure to support waste education, there will be savings in this line item that could accommodate the request this financial year.

Daniel Smee, Executive Manager Governance & Community Services

15 PETITIONS STILL BEING ACTIONED

There are no petitions still being actioned.

16 PETITIONS RECEIVED IN LAST PERIOD

At the time the Agenda was compiled no Petitions had been received.

17 OFFICERS REPORTS TO COUNCIL

17.1 HOBART CITY DEAL AND KINGSTON CONGESTION PACKAGE

File Number: **13.189**

Author: **Tony Ferrier, Deputy General Manager**

Authoriser: **Gary Arnold, General Manager**

Strategic Plan Reference

Key Priority Area:	2	Deliver quality infrastructure and services.
Strategic Outcome:	2.2	Infrastructure development and service delivery are underpinned by strategic planning to cater for the needs of a growing population.

1. PURPOSE

1.1 The purpose of this report is to consider the future expenditure of City Deal funds allocated to the Kingston Congestion Package.

2. BACKGROUND

2.1 The Hobart City Deal was signed on 24 February 2019. The City Deal is a shared 10 year vision between the Australian and Tasmanian Governments and the Clarence, Glenorchy, Hobart and Kingborough councils to "guide and encourage investment to leverage Hobart's natural amenity and build on its position as a vibrant, liveable and connected global city". The relevant councils have also signed the Hobart City Deal Implementation Plan, which was publicly released on 3 October 2019.

2.2 One of the key focus areas within the City Deal is the implementation of the Greater Hobart Transport Vision. This aims to deliver an integrated and collaborative approach to transport management. The southern access into Hobart is one of the three main access corridors and funding is provided to address congestion issues in Macquarie and Davey streets, on the Southern Outlet (by way of a fifth lane) and at Kingston. The Hobart City Deal states that:

> *the Tasmanian Government will invest an additional $20 million on the better utilisation of transport infrastructure to address congestion affecting the Kingborough municipal area*.

2.3 The 'Kingston congestion package' is part of the Greater Hobart Transport Vision and, in addition to the abovementioned $20 million, includes an additional $800K to fund a new bus interchange within central Kingston. This is matched by Council's own contribution of $4.5 million over the next three years that is being provided to encourage active transport. This includes all of the upcoming capital works projects associated with cycleways, pedestrian refuges, Kingston Park pedestrian links and improved footpaths as part of road reconstruction projects.

2.4 The Hobart City Deal Implementation Plan states that the funds within this Kingston Congestion Package are:

> *to improve road access and connections to the Channel Highway and Southern Outlet*

and that

park-and-ride locations will also be short-listed in 2019 through regular engagement between the Tasmanian Government and Kingborough Council as part of the $20.8 million Kingston congestion package, which will also support the redevelopment of the bus transit centre in central Kingston.

The key transport measure of success that has been agreed for achievement over the 10 year term of the Hobart City Deal is that congestion will have been reduced through targeted capital investment and smart technology solutions, and the percentage of journeys to work that are made by car will be reduced.

2.5 The Key Performance Indicators for the Greater Hobart Transport Vision are:

- *Reduce the number of single occupant drivers on the regular commute to work*.
- *Increase the percentage of people using public transport on their regular commute to work*.

2.6 The goal is to reduce congestion and to encourage people to use public transport throughout Greater Hobart. In the case of the Kingston Congestion Package, people may be commuting to work in Hobart, Kingston or elsewhere. As stated in the City Deal agreement, the funding is to address "congestion affecting the Kingborough municipal area".

2.7 It has been agreed that Council will have early access to some of the City Deal funding ($100,000). This was to commission PlaceScore consultants to identify the important urban design values within central Kingston for public infrastructure – particularly in regard to streetscapes, public spaces and the proposed bus interchange.

2.8 Staff from both the Department of State Growth (DSG) and Council have held two meetings of the Kingston Congestion Working Group (on 4 February and 16 April 2020). This Group is to act as a forum to discuss and make recommendations on the use of the Kingston congestion funding and to oversee the implementation of the subsequent transport related projects. This report reviews the various projects that are being proposed for inclusion within the Kingston Congestion Package.

3. STATUTORY REQUIREMENTS

3.1 There are no statutory requirements to consider at this stage.

4. DISCUSSION

Kingston Congestion Working Group

4.1 Terms of Reference for the Working Group have been prepared. It states that its roles and responsibilities will be to:

- provide a forum to discuss transport-related activity being undertaken by both organisations to support integration in planning and information sharing;
- prepare a co-designed proposed approach for the use of the $20.8million Kingston Congestion funding allocated in the Hobart City Deal, in keeping with the scope of work and principles identified in the City Deal;
- provide updates to the Transport and Housing Project Steering Committee; and
- provide advice on, and where appropriate, lead stakeholder engagement. This may include the establishment of a reference group or groups.

4.2 The Working Group will not have direct responsibility for the delivery or approval of individual projects. It will only be a forum for consultative and integrated planning. Members of the Group only consist of representatives of DSG and Council. At the second meeting of the Kingston Congestion Working Group, the DSG representatives presented the following proposal:

(1) Park and Ride – Stage 1, being the identification of suitable sites, workshops with Council and development of detailed designs by the DSG consultant; and Stage 2, being the construction of the new park-and-ride facilities at both Huntingfield and Firthside. Total funds for this component = $6,750,000.

(2) Place Strategy development – This supports the appointment of a consultant (PlaceScore) to work with Council to develop a Place Strategy for the Kingston central business district. Total funds for this component = $100,000.

(3) Kingston interchange improvements – This entails the redevelopment of the Kingston bus transit centre and is to be implemented by DSG. Consideration is to be given for Council to provide additional infrastructure including end of trip facilities for cycling, supporting streetscaping, safe pedestrian crossings, nearby bus driver amenities and bus layover capacity at park-and-ride facilities. Total funds for this component = $800,000.

(4) Improvements to existing bus stops – All bus stops in Kingborough will be reviewed to develop a prioritised list for investment to ensure Disability Discrimination Act compliance, plus some targeted investment for priority sites for other infrastructure such as shelters. Total funds for the component = $2,650,000.

(5) Expansion of bus services – An expansion of the existing bus services to meet the growing demand will be explored within a network extension plan that supports the needs of the Huntingfield park-and-ride, plus the roll-out of a trial service of additional services. Total funds for this component = $3,500,000.

(6) Complementary Council initiatives – The remaining funds are provided to assist Council projects that will improve traffic flow, plus cycling and pedestrian movements in the area. This work will be led by Council with funding provided via a Grant Deed. Total funds for this component = $7,000,000.

4.3 The following sections summarise what is being proposed for each of the listed Kingston Congestion Package projects in 4.2 above.

Park and Ride

4.4 In 2019, DSG commissioned a report that identified potential park-and-ride sites in the Kingston area that are within reasonable proximity to the Southern Outlet. The six sites that were identified for assessment were:

(1) Huntingfield Terminus

(2) 202 Channel Highway or part thereof (opposite Antarctic Centre and Bunnings)

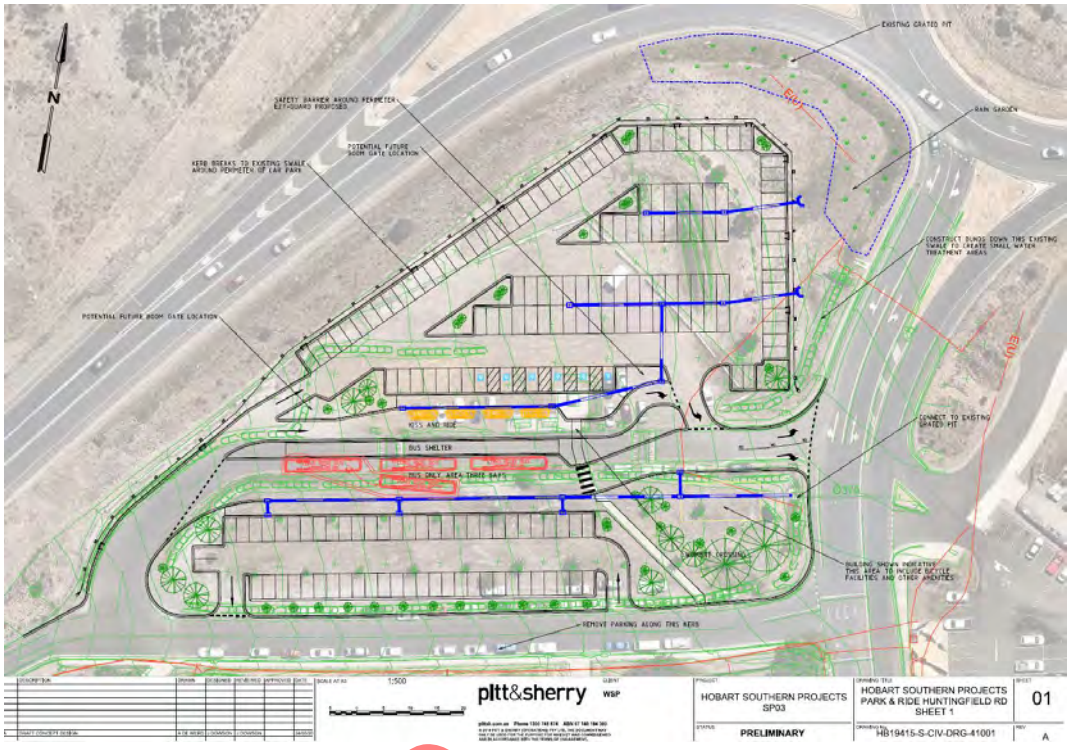
(3) 182 Channel Highway (Council Depot)

(4) Kingston View Drive (Kingborough Sports Centre)

(5) Channel Highway, opposite Browns Road (Kingston Beach Golf Club)

(6) Browns Road, Kingston (general location)

4.5 Each of these opportunities were assessed and it was found that the only feasible site (under current circumstances) is that located at Huntingfield alongside the Algona roundabout. This site is already being used for park-and-ride purposes and it is proposed that a major upgrade occur. DSG has commissioned some initial concept design drawings – as shown below.



4.6 The proposed development provides 183 parking spaces and space for three buses and a shelter that is large enough to service all of them. The area will be sealed, line marked, landscaped and lit. There will be a drop-off and pick-up lane (for "kiss-and-ride") and a new building containing bicycle storage and other public amenities.

4.7 This park-and ride is on land owned by DSG and has no major constraints. It is regarded as the most viable park-and-ride option within Kingborough and this will be further enhanced by an express bus service straight into central Hobart. It would mainly cater for commuters from the Channel and Blackmans Bay areas.

4.8 Once this parking is provided, there should be no need to provide free all-day parking for commuters within the centre of Kingston. This was something that Council considered at its meeting held on 13 January 2020, as a consequence of a report presented on paid parking in Kingston. In that regard, it was resolved that Council would:

(a) endorse the proposal to introduce a paid parking regime at the new temporary parking area within Kingston Park, from when formal park and ride facilities are opened;

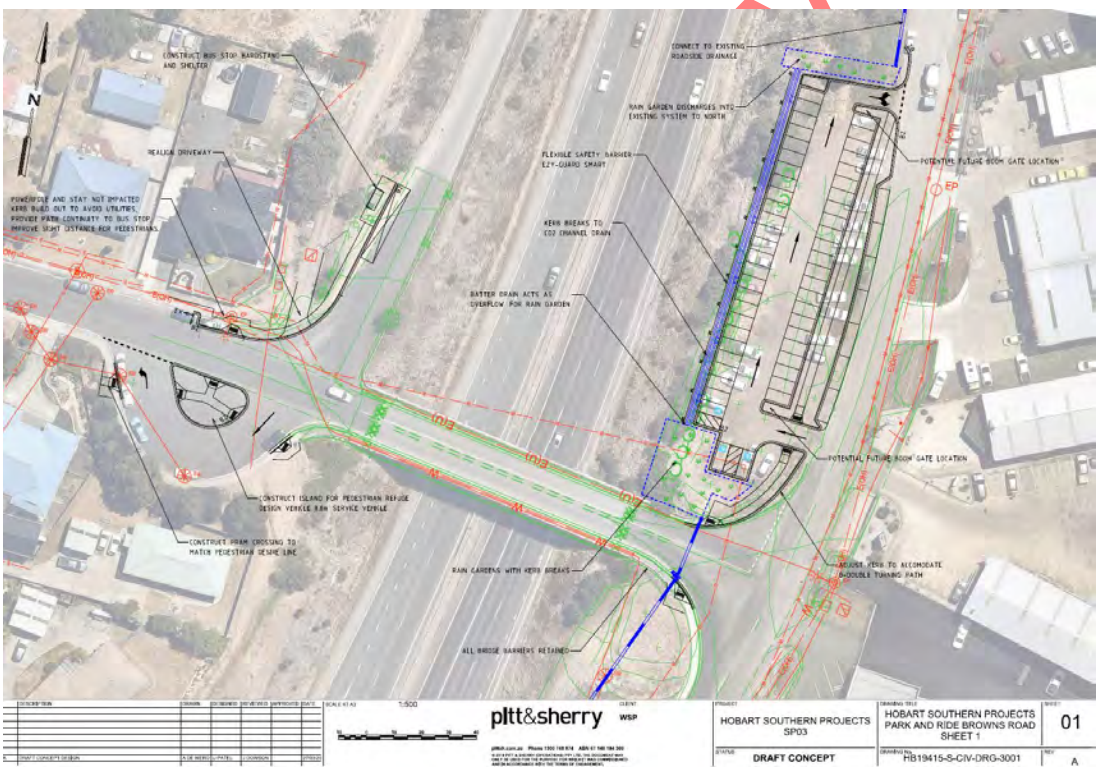
(b) approve that a payment of $5 will be required for any parking within this facility for stays longer than three hours; and

(c) will provide public information on the reasons why this decision has been taken and outline the options for people who wish to park all day in the vicinity of the central Kingston area.

4.9 There is therefore some urgency in developing this Huntingfield park-and-ride facility and DSG have indicated that it will be expedited as soon as possible. Once it is in place Council can relieve the pressure for public parking within the central Kingston area.

4.10 Park-and-ride opportunities were assessed in the general area in the vicinity of the Browns Road industrial area at Firthside and a potential site has been identified where there is currently a small informal parking area on the northern side of the Groningen Road overpass. This is an attractive site because all of the buses that currently travel from Kingston to Hobart pass by here, plus it is the most northerly location within Kingborough (no more stops before Hobart and first stop on the return trip).

4.11 This site, if developed, has the capacity to accommodate about 50 parked cars. It is already being used by existing employees within the industrial area (because of limited public parking in this area) and by some Hobart commuters. It is a good opportunity for a new park-and-ride use if upgraded/expanded to be a more formalised parking area. Like Huntingfield, DSG has commissioned some initial concept design drawings – as shown below.



4.12 This parking area would be supported by a new bus stop and shelter on the access lane onto the Outlet, together with some connecting footpath upgrades for commuters going into Hobart. To the south on Browns Road (not shown on the plan above), there would be a new connecting footpath of about 300 metres to the bus stop for commuters returning from Hobart.

4.13 DSG is now completing the feasibility and costs associated with these two park-and-ride locations at Huntingfield and Firthside. Other traffic impact and planning reports are still forthcoming. At this stage, these two facilities do appear to be the two most viable park-and-ride locations for Hobart based commuters in the short to medium term.

4.14 It is acknowledged that each of these facilities will have some limitations. The Huntingfield facility is located on the southern edge of Kingston and so it will be patronised by commuters from down the Channel (Margate and further south) and

from those that travel up Algona Road from Blackmans Bay. Most Kingston commuters are unlikely to drive south before they catch a bus that goes north again. The Firthside facility has a limited number of spaces and some will be taken up by employees from the adjoining industrial area. A boom-gate arrangement has been provided for each site, but it is not yet clear if they will be necessary.

4.15 It is understood that DSG will be responsible for the construction and ongoing maintenance of both facilities. A total amount of $6,750,000 has been set aside for the preplanning, design, approval and construction costs for both the Huntingfield and Firthside facilities. DSG will manage the tendering process and has offered a place for a Council representative to be on the tender assessment panel.

4.16 There also are existing parking areas at Denison Street and alongside the Kingston Wetlands, that are both used for park-and-ride and this will continue in the future. Additional sites could also be located further afield (eg Margate) and these other opportunities could also be considered. An obvious pre-requisite for any park-and-ride to be successful is that there will need to be frequent bus services that support their use.

Kingston Place Strategy

4.17 Council has commissioned a report from PlaceScore consultants to guide how future public infrastructure can enhance the general amenity and liveability of central Kingston. This Kingston Place Strategy has now been completed and its vision for the town centre is that it be "a green, walkable and engaging place to stay – not to drive through". It expands on this by saying:

Our vision for central Kingston sees it transition into a unified and legible regional Town Centre where everything is well connected by walking and cycling links and public transport. Uniquely walkable with lush green and engaging streets attractive to a range of retail, commercial and residential land uses – Kingston will achieve what others have failed to do.

4.18 At the Council meeting held on 11 May 2020, it was resolved (Minute C282/8-2020 refers) that Council:

(a) endorse the Kingston Place Strategy 2020-2050;

(b) consider future implementation of the Strategy recommendations by way of normal annual budgeting processes; and

(c) actively seek external funding over the life of the Strategy to support its implementation and the transformation of the central Kingston precinct.

4.19 The Council report notes that it is a long term Strategy and will provide the necessary guidance to assist future decisions in delivering public infrastructure within central Kingston. It provides a vision for the future and a basis for all subsequent work. It also notes that there will be unexpected changes and new opportunities that will occur over the 30 year life of the Strategy and that there may in future need to be some deviations or interim solutions to particular matters.

4.20 The Strategy focuses on what needs to be done to greatly improve the amenity and convenience of pedestrians within central Kingston. This is most relevant to the Kingston Congestion Package where it includes recommendations on how the Channel Highway should be redesigned. This will have a direct impact on traffic flow and the redesign of the existing bus interchange.

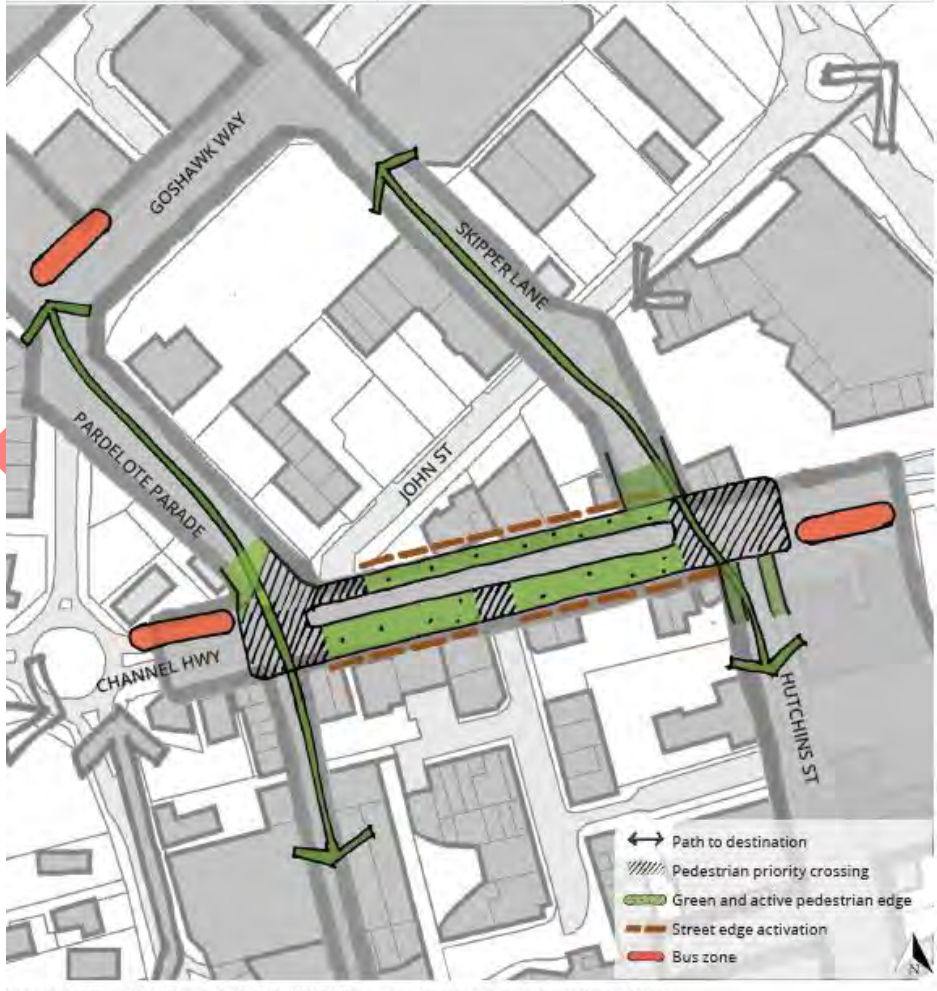
4.21 Council will now need to develop an implementation plan and associated community engagement strategy. In the short term, there will be a need to better understand the traffic implications of reducing the through traffic along the Channel Highway, how this might inform the proposed road and intersection designs and what transitional works are required that are still consistent with the long term Place Strategy vision.

Kingston Bus Interchange Improvements

4.22 The City Deal has allocated $800,000 to fund the provision of a new bus interchange within central Kingston and, to date, it has been envisaged that this will be installed as part of a major redevelopment of the section of the Channel Highway between Hutchins Street and John Street.

4.23 One of the major investment priorities within the Place Strategy is to "transform the Channel Highway into Kingston's main street". This "main street" should be "a pedestrian focussed, green and activated main street that will change central Kingston's identity as a place to stay rather than move through". Below is the relevant figure from the report.

GREAT PATHS	ENGAGING EDGES	PEOPLE PLACES	MORE GREEN	BUSINESS FRIENDLY
YES - central pedestrian spine connects destinations	YES - with planning, supports facade activation	YES - links public spaces and civic assets	YES - creates space for significant tree planting	YES - improves trading conditions



Channel Highway transformed into a pedestrian-focussed green and retail-activated main street

4.24 This shows the future bus zones at either end of this main street and at Goshawk Way. Removing the bus interchange from the main street would "change spatial priority from cars and buses to people, trees and shops – staying versus moving".

4.25 The Kingston Place Strategy has recommended that the bus interchange consist of two bus zones at either end, and outside of, an upgraded section of the Channel Highway. A passenger waiting area is proposed to be in Pardalote Parade. It is acknowledged that this will present some challenges – such as, the distance between the two bus stops (and their ability to function as an "interchange"; that only very short stretches of road are available; the impact on private property access; the need to further widen the road at the Civic Centre; and the additional costs if done in the short term.

4.26 An alternative bus interchange could be located on Goshawk Way within the Kingston Park precinct. This would currently be premature as there will still be a great deal of construction occurring within Kingston Park for a number of years yet. It would be isolated from the main town centre activity area and Metro and DSG have also signalled their strong view that the new bus interchange should be on the Channel Highway in order to maintain the existing quicker and safer bus routes.

4.27 It therefore appears that the most suitable solution is to consider how the bus interchange will be included in the impending redesign of main street and how this fits in with the abovementioned Implementation plan for the Kingston Place Strategy. A staged transitional approach may be necessary and this will need to be worked through with all stakeholders. It is important that people be given every encouragement to travel into Kingston by bus, whether to work or to shop. The needs of both bus travellers and pedestrians within this central area will both need to be met.

4.28 The next step will be to carry out the further investigations into the different design options that balance these various needs, while ensuring that the suitable improvements are both affordable and timely. The new bus interchange is required to support the new park-and-ride facilities and the proposed improved local bus services (see below).

4.29 These initial design options for this much-anticipated upgrade of the Kingston main street (and Pardalote Parade) can be used for further public consultation, negotiations with adjoining landowners and liaison with DSG (on the design of the bus interchange in particular). In regard to the latter, it will be necessary to consider how the buses will schedule their services in future, the likelihood of multiple buses being in the main street at once and how remote bus layovers can be accommodated. As well as the necessary safe pedestrian crossings and supportive streetscaping, DSG has indicated that it would be desirable to include end-of-trip cycling facilities and to consider bus layover capacity at the park-and-ride facilities and nearby bus driver amenities.

4.30 Council now needs to commence the road and bus interchange design program in order to move this part of the Kingston Congestion Package forward.

Improvements to Existing Bus Stops

4.31 DSG is to conduct an audit of all bus stops within Kingborough in order to ensure Disability Discrimination Act compliance and to identify where other targeted investment is necessary for such additional infrastructure as bus shelters.

4.32 As part of the incentive to get people to travel by bus, it is proposed to significantly improve the amenity and convenience of key bus stops throughout the municipality. It will be necessary to consider the opportunities for many improvements that can be

made at each site – such as providing a level surface, safe bus pull-overs and adequate footpaths leading up to the bus stops, plus lighting, timetable information, shelter, seating and possibly additional features like secure bicycle storage.

4.33 New bus stops may need to be provided where new or altered bus services are to be provided. There are many bus stops that are in a relatively poor condition or there are improvements that need to be made to the surrounding access.

4.34 It is proposed that a significant amount of the Kingston Congestion Package funding be allocated for this purpose in order that substantial changes are made to as many bus stops as possible. The results of the abovementioned audit and prioritisation will dictate how these funds are spent. The audit is proposed to cost $150,000 and $2,500,000 has been allocated for the bus stop upgrades.

Expansion of Bus Services

4.35 In order to get people out of their cars when commuting into Hobart or Kingston or in their other travels, it will be necessary to improve the existing bus services within Kingborough. As identified in the Key Performance Indicators for the Greater Hobart Transport Vision, it will be necessary to "increase the percentage of people using public transport". This can only be achieved if there are more frequent, convenient and affordable services available.

4.36 The expansion of the existing bus services to meet the growing demand and growth within Kingborough will be explored by DSG through the development of a network extension plan that will support the park-and-ride facilities – particularly at Huntingfield. This will identify what additional services are necessary and then it is proposed to conduct a 12 month or more trial of these in order that it can be established what services can best meet the needs of commuters.

4.37 The DSG proposal is that the network service analysis and bus trial will cost $3,500,000. It is understood that the trial costs are predominantly related to hiring of additional buses. For example, an additional 7 buses could be used to activate the park-and ride and provide for express routes into Hobart from Huntingfield. Electric buses may be a possibility. The park-and-ride facilities will help in encouraging more people to use public transport, but only if they are supported by regular bus services that take commuters to their destination as quickly and efficiently as possible.

4.38 The use of the Kingston Congestion Package funds for this purpose enables the trial to be conducted soon rather than having to wait a number of years before Metro budgets are possibly increased. It brings forward the opportunity to develop integrated bus network solutions that can significantly improve local services at the same time as the park-and-ride facilities become available and an improved bus interchange is provided within central Kingston.

4.39 It will also be necessary as part of this network review to consider other specific needs, such as bus storage during off-peak times during the day and the location of amenities for bus drivers – both may be incorporated within the Huntingfield park-and-ride. An important objective is to reduce bus travel times, so there may also be some local opportunities to give priority to buses (bus or transit lanes and intelligent systems that expedite bus movements through signalised intersections). The ultimate planning of infrastructure improvements across the whole bus network will need to be a cooperative effort involving Metro, DSG and Council.

4.40 Changes to scheduling, increased services and fare restructuring, will all be necessary if people are to change existing habits and shift from car travel to bus travel – whether this be in relation to commuting to Hobart or in travelling into Kingston for

work, shopping or business. For Kingston, a reduced need for parking will result in less congestion and a more attractive central area in accordance with the Kingston Place Strategy.

4.41 A significant expansion of bus services will be required in order to make a tangible difference. This will require increased investment at a State Government level, and Council can continue to advocate for this, as well as providing the complementary public infrastructure with the assistance of the Kingston Congestion Package funds.

4.42 While public transport is a critical component in reducing traffic congestion, it is only ever likely to carry a limited number of commuters and other travellers. Many people live in rural or semi-rural areas that have no bus services, or at least a very limited service. These residents rely on their private vehicle for all their transport needs and will continue to travel into Kingston in this way. They may however use park-and-ride facilities for commuting into Hobart if it is convenient and makes their daily journey more affordable.

Complementary Council Initiatives

4.43 As indicated above, the current proposal is that $7 million would be allocated to "complementary council initiatives". These are not yet defined and remain open for Council to consider further. They will need to meet the KPIs and "measure of success" objectives within the City Deal documents.

4.44 In this regard, Council has considered such road construction projects as the extension of Spring Farm Road in that it would reduce traffic congestion on local roads and provide a more convenient access from the Channel Highway to the Sports Centre and Kingston High School and Huon Highway. As well as this, there are opportunities to improve off-road cycling and walking trails, such as connecting the existing Whitewater Creek trail to the new Spring Farm residential developments or improving the cycleways within the existing road network.

4.45 Council has endorsed a proposal from the Kingborough Bicycle Advisory Committee to access $20,000 of City Deal funding for the development of a Kingborough Bike Plan (Minute C286/8-2020 refers). It is anticipated that this Plan would identify the opportunities throughout Kingston to provide safe cycling routes and to promote the greater uptake of cycling as a means of local transportation.

4.46 It is now appropriate for Council to review what it considers to be the highest priority initiatives that can be funded from the Kingston Congestion Package. It is proposed that this be the subject of a councillor workshop where various options will be presented.

Other Congestion Projects

4.47 While the projects advocated within the Kingston Congestion Package will assist in reducing future congestion, it will also be necessary to consider some other important infrastructure works, particularly in relation to the State road network. This includes the current work that DSG is doing in progressing the prioritisation of buses on Macquarie and Davey Streets and the early investigations into the fifth lane on the Southern Outlet.

4.48 The other infrastructure improvements that are likely to be needed in future include the future upgrade of the Algona Road roundabout, the recommendations of DSG's Channel Highway Corridor Study (between Margate and Huntingfield), and the results of the Central Kingston Traffic Plan (2019) as they apply to an upgrade of the Channel Highway roundabout near Westside Circle.

4.49 If the Huntingfield park-and-ride facility is to be well used then it will also be necessary to deal with the increased congestion problems on the adjoining Algona Road roundabout. This has already exceeded its capacity during peak traffic periods. When this roundabout was originally constructed, sufficient land was acquired for its expansion to cope with increased traffic levels. This expansion will now need to be scheduled to occur in the near future (it was identified as a high priority in the final draft of the Channel Highway Corridor Study).

5. FINANCE

5.1 The City Deal has provided a financial contribution of $20.8M for the Kingston Congestion Package and these funds will be spent within the Kingborough municipality. In the main, these State Government funds will be retained and managed by DSG. A summary of how DSG propose that these funds will be spent is provided in 4.2 above. Mention is also made in 2.3 above of Council's financial contribution to the City Deal.

5.2 A full program for the future expenditure of all of the $20.8M is yet to be finally determined and what is put forward here represents what has been proposed by DSG so that Council may consider it further. Council will also need to consider how the proposed $7M for "complementary Council initiatives" should be allocated. Further discussions about such matters will continue to occur within the Kingston Congestion Working Group.

5.3 Any City Deal funds that are to be spent by Council will be subject to a Grant Deed from DSG that stipulates what must be delivered and how it meets the criteria set within the City Deal Implementation Plan.

6. ENVIRONMENT

6.1 There are no specific environmental issues to be considered at this stage, other than the fact that a greater use of public transport and reduced car travel is more environmentally sustainable than the alternative. There also are significant public health benefits in encouraging more people to walk or cycle to their destinations.

7. COMMUNICATION AND CONSULTATION

7.1 There have been a number of relevant Council workshops held recently. DSG representatives have briefed Council on proposed transport initiatives. Councillor workshops have been conducted on the Greater Hobart Transport Vision and Southern Outlet (29/7/19 and 30/9/19), a consultant's report into park-and-ride opportunities (16/9/19) and investigations into infrastructure improvements along the Channel Highway between Margate and Huntingfield (4/11/19). A workshop was also held on the parking strategy for central Kingston (21/10/19) and this included a discussion on park-and-ride opportunities and the City Deal funding. Most recently (2/3/20), Council has held a workshop on the City Deal that involved a briefing on the current situation and a general discussion on the related issues.

7.2 In the first instance it will be necessary for Council to continue to engage with DSG within the Kingston Congestion Working Group. Close collaboration will be required in regard to the timing of the works and their roll-out by either DSG or Council, plus any other projects that the State Government will be managing within the municipality.

7.3 These types of activities will be of great interest to the Kingborough community and a public communications strategy will need to be developed once the overall program is confirmed. Local residents will be directly affected by the proposals and it will be important that they be kept well informed.

7.4 It is expected that Council will have an ongoing role in lobbying for improved bus services to be provided within Kingborough. Council will also have a role in promoting to the general public the availability of these services and the benefits of both active transport (walking or cycling) and traveling by bus rather than by car.

8. RISK

8.1 There are potentially many risks in trying to deliver new public transport services and infrastructure in an effort to reduce congestion. Motorists may resist the incentives being offered and put up with more congestion that might normally be considered reasonable. Changes in bus networking may not be as successful as hoped for (although the opposite may also occur as well). Some of the basic assumptions that relate to getting people out of their cars and using public transport and/or active transport may not be correct – noting that car dependence is high where residential densities are low and there is a limited available public transport alternative (as is often the case within Kingborough).

8.2 There are other risks in regard to any infrastructure construction project where costs may exceed expectations. The delivery of projects can be hampered by technical difficulties, the weather and contractor or staff availability. Initial design and approval risks may occur due to site constraints, neighbour objections and disruptions during construction. For these types of projects it is common for there to be delays and expected timetables are not met. There have been some considerable delays in getting to this stage and other factors such as the coronavirus pandemic are likely to exacerbate this.

8.3 There is also a risk that the establishment of a new park-and-ride facility will attract commuters that have already been catching the bus closer to home. They would come to the new facility because of the high frequency of buses and the quicker travel times – but this then reduces the viability of the existing local suburban or remote services. It is therefore important to encourage a much more significant change in behaviour and get more of those who are currently driving to catch the bus. This can only be achieved through improvements in all of the bus services within the local areas.

9. CONCLUSION

9.1 Kingborough is a developing community and most of this recent development pressure has been occurring within and to the south of Kingston. This is the area that generates the most local traffic congestion and this will continue to increase in the future as further development occurs on fringe areas and as urban infill. In response to this, it is proposed that there be three main responses to the congestion issues in Kingston – encourage an increased use of public transport (both into Kingston and Hobart), plus other forms of active transport; build or upgrade the critical link roads and intersections to accommodate the increased traffic; and thirdly, to reduce the need to travel into Hobart in the first place.

9.2 This last response to the congestion issue has only been alluded to in this report as it is outside the scope of the Kingston Congestion Package. However, it is an important complementary objective that also supports the development of longer-term sustainable outcomes. Council is seeking to improve the conditions for more local employment, services, shops and entertainment (through such projects as Kingston Park). It is worth considering how this objective supports other important aspects of the Hobart City Deal (such as affordable housing, urban renewal, a smart, liveable and investment ready city and the intended strategic collaboration of all city partners).

9.3 The Kingston Congestion Package now needs to focus on the first two of these responses as described within this report (and as summarised in 4.6). These actions will need to be initiated as soon as possible in order to address both the immediate and longer-term congestion problems – as well as improving the amenity and lifestyle of Kingborough residents.

9.4 The funding for the Kingston Congestion Package is held by the Department of State Growth and the proposals within this report are consistent with those put forward by the Department. Further liaison will now be necessary within the Kingston Congestion Working Group to confirm the details of each component and to prepare a delivery timetable and overall project plan for implementation.

9.5 Kingborough's population will continue to increase and, unless the above measures are undertaken, traffic congestion will continue to worsen and become unbearable. Upgrading roads and public transport services will not, in themselves, be enough. There will need to be significant behavioural change and a great deal more work will be required in promoting this within the community.

9.6 This report only canvasses what is most relevant to the Kingston Congestion Package. It will provide the funds for a range of individual actions that focus on improving public transport services and some specific local transport infrastructure components. This still needs to be considered within a broader context and a comprehensive and coordinated program should also now be developed in conjunction with DSG. Considerable effort will need to be expended on developing this more holistic response to the significant land use and transportation issues that specifically relate to Kingborough.

10. RECOMMENDATION

That:

(a) Council endorse the proposed Kingston Congestion Package program of projects as described within this report for the purpose of ongoing negotiation; and

(b) Staff progress a coordinated response with the Department of State Growth and to then submit a comprehensive report on the proposed program of works for Council's approval.

ATTACHMENTS

Nil

17.2 SNUG RIVER AND ADVENTURE BAY FLOOD STUDIES

File Number: **2.214 & 2.217**

Author: **Alexander Aronsson, Stormwater Engineer**

Authoriser: **David Reeve, Executive Manager Engineering Services**

Strategic Plan Reference

Key Priority Area:	1	Encourage and support a safe, healthy and connected community.
Strategic Outcome:	1.3	A resilient community with the capacity to flourish.
	1.4	A Council that acknowledges the existence of a climate change and biodiversity emergency and has in place strategies to respond.
Key Priority Area:	3	Sustaining the natural environment whilst facilitating development for our future.
Strategic Outcome:	3.4	Best practice land use planning systems are in place to manage the current and future impacts of development.

1. PURPOSE

1.1 The purpose of this report is to summarise the results of two flood risk studies undertaken by Council; Snug River Flood Study and Adventure Bay Flood Study (Captain Cook Creek). This report also seeks Council's endorsement for a number of recommendations made in the studies.

2. BACKGROUND

2.1 Kingborough Council has funded two flood risk studies, the Snug River Flood Study (undertaken in house) and Adventure Bay Flood Study (outsourced to a consultant, Entura). The studies provide a comprehensive assessment of the flood risk from both coastal and fluvial sources including predicted climate change impacts.

2.2 The outcomes of these studies will provide information to facilitate better management of the potential flood impacts for existing and future conditions, to investigate potential mitigation strategies and priorities for emergency management as part of future studies, and land use planning and flood management. The results will be used to update and extend the flood knowledge in the Snug and Adventure Bay area for planning, emergency management and climate change adaptation purposes.

3. STATUTORY REQUIREMENTS

3.1 Under *Land Use & Approvals Act (LUPAA) 1993*, planning and development within the Kingborough local government area is governed by the Kingborough Interim Planning Scheme 2015. A number of objectives of the Planning Scheme require responses to climate change, such as: that use and development in coastal areas is to be responsive to the effects of climate change including sea level rise, coastal inundation and shoreline recession (3.0.6); and the Council must facilitate sustainable development of the coast in response to the impacts of climate change (E15.1).

3.2 Under the *Urban Drainage Act 2013* Council is required to identify the level of risk from flooding for each urban stormwater catchment in the public stormwater system.

3.3 In Tasmania, powers and authorities for emergency management are provided in the *Emergency Management Act 2006*.

3.4 At a municipal level, councils have a central role in coordinating and facilitating a range of emergency management activities for all hazards, as well as resourcing specific council responsibilities for emergency management.

4. DISCUSSION

4.1 The purpose of these flood studies has been to undertake a detailed flood assessment of the Snug River catchment and Captain Cook Creek catchment through the establishment of appropriate hydrological and hydraulic models for accurate flood level prediction.

4.2 **Terminology:** AEP stands for Annual Exceedance Probability. and a 63% storm event is likely to occur once every year.

4.3 In completing the flood studies, the following activities were undertaken:

4.3.1 Collection and compilation of available historical and recent climate change data and flood data related to the study areas;

4.3.2 Development of flood models through a comprehensive computer model using available data;

4.3.3 Simple validation of the models using current best available data and sensitivity tests; and

4.3.4 Production of a range of design flood maps for Snug River (peak flood level, depth, velocity and hazard) for 1%, 5% and 20% AEP storm events for the catchment, including allowances for climate change and the effects of storm surge from the sea. For Adventure Bay, only 1% AEP storm event was mapped including impacts from climate change and storm surge.

4.4 Catchment flooding and oceanic inundation can occur due to the same storm cell and therefore design flood levels in a lower coastal waterway will be influenced by a combination of these sources. If oceanic inundation or catchment flooding is examined in isolation the resultant estimated flood risk is unlikely to be fit for purpose.

4.5 The size of a storm event is measured in terms of the Annual Exceedance Probability (AEP). This is a term used to describe the intensity of a storm event, and the associated flood that it causes. It is used in flood studies to model the effects of different types of storm events. For example a 1% AEP storm event has a 1% chance of occurring in any given year, replacing the old terminology of a 1 in 100-year storm event, a 5% AEP storm event has a 5% chance of occurring in any given year and is likely to occur once every 20 years and a 20% AEP storm event is likely to occur once every 5 years

4.6 The Snug River Flood Study followed Queensland and NSW State Government guidelines that provide guidance on simplified methods to allow for coincident flooding. Current practice typically includes an analysis of several scenarios to obtain the 1% AEP flood level, where the highest resulting flood level will be adopted to be conservative. The following scenarios were analysed:

- estimated 1% AEP ocean flooding with 5% AEP catchment flooding with coincident peaks
- estimated 5% AEP ocean flooding with 1% AEP catchment flooding with coincident peaks

- Mean High Water Spring (MHWS) tide with 1% AEP catchment flooding with coincident peaks.

- estimated 20% AEP ocean flooding with 20% AEP catchment flooding with coincident peaks

4.7 The Adventure Bay Flood Study used a different approach due to the narrow and sandbar protected Captain Cook Creek entrance to the ocean, the storage capacity within the lagoon and the general disconnect between the riverine flooding and oceanic flooding. The following scenarios were analysed:

- 2020 1% AEP with 1m AHD tailwater (approx. 63% AEP for 2020);

- 2050 1% AEP with 2m AHD tailwater (approx. 5% AEP for 2050); and

- 2100 1% AEP with 3m tailwater (approx. 1% AEP for 2100).

4.8 The results for Snug River indicate that:

4.8.1 The low-lying parts of the Snug Township are subject to approx. 2.5m AHD water levels during the peak 1% AEP coincident flood in the Year 2100. The resultant flood hazard is generally classified as "*H3 – unsafe for vehicles, children and the elderly*", with some "*H4 – unsafe for people and* vehicles" areas closer to the river.

4.8.2 The results further indicate that for the existing conditions the influence of catchment flooding is the dominant factor affecting flood risk in Snug, compared to storm surge. Conversely, the dominance of the catchment flood is expected to reduce as sea level rise is projected to increasesthroughout the 21st century.

4.8.3 The Snug River catchment consists of predominantly undeveloped areas to the west and minor urban land uses to the east. Current zoning indicates that the undeveloped natural areas within the catchment will remain in their current state. It is therefore likely that future development will occur to the already urbanised areas to the east as there are potential of existing land parcels for subdivision and/or more intensive infill development within the Snug area. As such, projected climate change impacts to both rainfall intensity and sea level rise are the principle factor causing an increased flood risk in Snug Township throughout the 21st century.

4.9 The results for Adventure Bay indicate that:

4.9.1 The peak 1% AEP coincidental flood in the Year 2100 results in 3.1m AHD flood levels near the Adventure Bay Road bridge and 3.2m AHD in the lagoon. The resulting flood hazard in the built-up area is generally classified as "*H4 – Unsafe for vehicles and people*".

4.9.2 The results further indicated that the narrow Captain Cook Creek and the detention effect of the lagoon provide a hydraulic disconnect between the ocean and the creek such that no coincidental occurrence of flooding is present. Therefore, the 1% AEP riverine flooding combined with the 1% AEP storm surge is considered to be an overall 1% AEP storm event.

4.10 Actions KCA1.1.2 and KCA1.1.3 in the Kingborough Climate Change Action Plan indicate that Council will implement climate change risk and adaptation planning projects for Snug and Adventure Bay. To this end the flood mapping that has been produced is an important component of these studies along with research into asset

vulnerability, groundwater modelling, wastewater systems and potable water supply susceptibility.

5. FINANCE

5.1 Some of the recommendations arising from the flood studies will require both capital and operational expenditure in the future. Any expenditure unable to be accommodated within existing budget allocations will be the subject of future Council reports specific to each recommendation.

6. ENVIRONMENT

6.1 Natural values potentially at risk from extreme weather events and climate change within the Snug River catchment and Captain Cook Creek catchment have not been addressed as part of these studies.

7. COMMUNICATION AND CONSULTATION

7.1 Community engagement to date has been facilitated via distribution of a flooding information questionnaire to the residents of Snug Township. The questionnaire was also made available online. The questionnaire, and a summary of the result, is presented in the Snug River Flood Study report. Further, a community survey and workshop was undertaken in 2012 as part of a response to coastal hazard in Snug.

7.2 Community engagement in Adventure Bay was held on 5 March 2016 in conjunction with a Coastal Hazard Study. There has been no specific community engagement for Captain Cook Creek to date.

7.3 It is recommended that Council undertake community engagement within the respective communities to communicate what the results from these studies mean for the local community, how the flood risk may impact them today and in the future and what plans Council have moving forward addressing the identified flood risks.

8. RISK

8.1 The principal purpose of the flood risk studies is to classify the flood risk profile in Snug Township and large areas of Adventure Bay during extreme weather events.

9. CONCLUSION

9.1 This report has provided a summary of the extensive flood risk studies for Snug Township and Adventure Bay resulting in a number of recommendations as outlined below.

10. RECOMMENDATION

For Snug River Flood Study (as attached)

That Council:

(a) undertake community engagement to communicate the results of this study;

(b) further enhance the modelling tools developed for this study, primarily to include local catchments inflows and associated stormwater drainage infrastructure in Snug;

(c) collects flood data during and immediately following future flood events to assist with recalibration and/or on-going validation of the modelling tools;

(d) develop a long-term strategy for the management of flood risk in the low-lying areas of Snug;

(e) investigates an entrance management plan for the mouth of the Snug River with the aim of minimising the constriction that currently exists at the river mouth;

(f) notes the flood mapping developed for this study (the 1% AEP Year 2100) will be incorporated into the Kingborough Interim Planning Scheme as a flood overlay for the area; and

(g) establishes and promotes a community education program in conjunction with the SES to provide information on what to do before, during and after a flood event, and to facilitate the communication of existing flood risks at flood-prone properties.

For Adventure Bay Flood Study (as attached)

That Council:

(a) adopt the 1% AEP flood extent map for 2100 with 0.3m freeboard for the use of future planning and development of the township;

(b) engage with the community about the results of this study;

(c) undertake mitigation studies to reduce the risk and undertake emergency planning for any residual risk. This work should consider the impacts of coastal erosion and sea level rise; and

(d) Council investigate the benefit of undertaking flood studies on the other creeks around Adventure Bay: unnamed creek at the northern end of Adventure Bay, Blighs Creek and Dorloff Creek. These studies to be combined in an overall flood map and for planning approach.

ATTACHMENTS

1. **Snug River Flood Study**
2. **Appendix A - Design Flood Mapping (set 1)**
3. **Appendix A - Design Flood Mapping (set 2)**
4. **Appendix B - Climate Change 2050**
5. **Appendix C - Climate Change 2100**
6. **Appendix D - Questionnaire**
7. **Adventure Bay Flood Study**

SNUG RIVER FLOOD STUDY

KINGBOROUGH COUNCIL

December 2019

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EXECUTIVE SUMMARY

The Snug River Flood study has been prepared by Kingborough Council. The key objective of the study was to define the flood behaviour under existing and future potential climate conditions in the Snug River catchment for a range of coincident design catchment floods and coastal floods. Outcomes from this study will be used by Council to inform future land use planning, emergency management and capital expenditure planning. Assessment of flood risk has been undertaken for Snug River flooding only and does not explicitly consider flooding from stormwater within the Snug Township.

Methodology

The analysis for this study has relied on the development of numerical computer models to simulate the hydrological and hydraulic processes in the Snug River catchment, with the adopted methodology following the guidelines in ARR2016. This has been achieved by developing hydrological and hydraulic models using the XPSWMM® software, comprising the following activities:

- Collection and compilation of available data considered relevant for understanding and describing the Snug River catchment and flooding characteristics;
- Engagement with the local community via distribution of a questionnaire, aimed at raising general awareness of the study and to garner flood intelligence;
- Development of a hydrological model of the Snug River catchment using XPSWMM®, deriving inflows for the hydraulic extent of the Snug River (only riverine flooding was considered, flooding from local stormwater catchments were excluded);
- Development of a hydraulic flood model of the lower Snug River using XPSWMM®;
- Calibration of the hydrological model using historic rainfall and gauged flow data, with additional determination of model parameters using a flood frequency analysis for the Snug River streamflow gauging station;
- Analysis of a range of design flood events, with preparation of flood mapping;
- Sensitivity tests of the hydrological and hydraulic model for a range of model parameters; and
- Climate change analysis, applying predicted increases in rainfall intensities and sea levels for the years 2050 and 2100.

Results

The results of the hydraulic modelling of design flood events indicate the flooding behaviour summarised in the following table:

Table 1 General flooding behaviour from hydraulic modelling of design flood events

Floodplain location	Changes in flooding behaviour
Upstream of the Channel Highway	Flooding is generally contained within the defined river channel and floodplain. This results from a combination of: • High ground on both sides of the river channel; • Relatively few obstructions to flow along the river and floodplain corridor; • A predicted hydraulic grade of less than 1 in 50 (2%)
Downstream of the Channel Highway	Where the river widens out to the estuary in the lower reaches, flooding is affected by the combination of tide level and constriction at the river mouth, in addition to the magnitude of fluvial event in the river

The sensitivity tests undertaken for this study indicate that the various model parameters adopted for design event modelling are appropriate for use in this study. Regarding debris blockage at the Channel Highway bridges, both historic data and sensitivity modelling indicate that flooding may be exacerbated by the accumulation of debris (typically large woody debris) at the Channel Highway bridges. This indicates the need to maintain the bridges as blockage-free to minimise impacts of flooding due to debris blockage.

Modelling of the climate change scenarios indicates that the increase in rainfall intensity and sea level rise associated with each scenario results in both increased peak flood levels and extents of flooding. The increases in peak water levels upstream of and in the general vicinity of the Channel Highway bridges are generally caused by the increased rainfall intensities (fluvial events), while the peak water level increases in the wider part of the estuary are the result of both increased rainfall intensities and sea level rise. It is likely that sea level rise is the major factor affecting the peak water level increases in the lower reach of the estuary.

Recommendations

The following recommendations have been prepared to address both future uses of the tools developed in preparing the study and the study outcomes.

Table 2 Recommendations for further works

Recommendations	
1	That Council further enhance the modelling tools developed for this study, primarily to include local catchments inflows and associated stormwater drainage infrastructure in Snug.
2	That Council collects flood data during and immediately following future flood events to assist with recalibration and/or on-going validation of the modelling tools.
3	That Council develop a long-term strategy for the management of flood risk in the low-lying areas of Snug.
4	That Council investigates an entrance management plan for the mouth of the Snug River with the aim of minimising the constriction that currently exists at the river mouth.
5	That the flood mapping for the 1% AEP, year 2100, developed for this study be endorsed by Council and incorporated into the Kingborough Interim Planning Scheme as a flood overlay for the area (noting that stormwater flooding has not been addressed in this study).
6	That Council establishes and promotes a community education program in conjunction with the SES to provide information on what to do before, during and after a flood event, and to facilitate the communication of existing flood risks at flood-prone properties.

1 INTRODUCTION

1.1 THE STUDY AREA LOCATION

Snug is a small coastal township located approximately 15km south of Kingston via the Channel Highway, as shown in Figure 1 and Figure 2. The majority of the catchment is forested with the main area of development centred around the township of Snug at the downstream extent of the catchment. The vicinity of the residential area, Snug beach and Caravan Park are low and flat, with elevations of approximately 1m to 3m above the Australian Height Datum (AHD). Thus, it is highly vulnerable to flooding from heavy rainfall and storm surge.

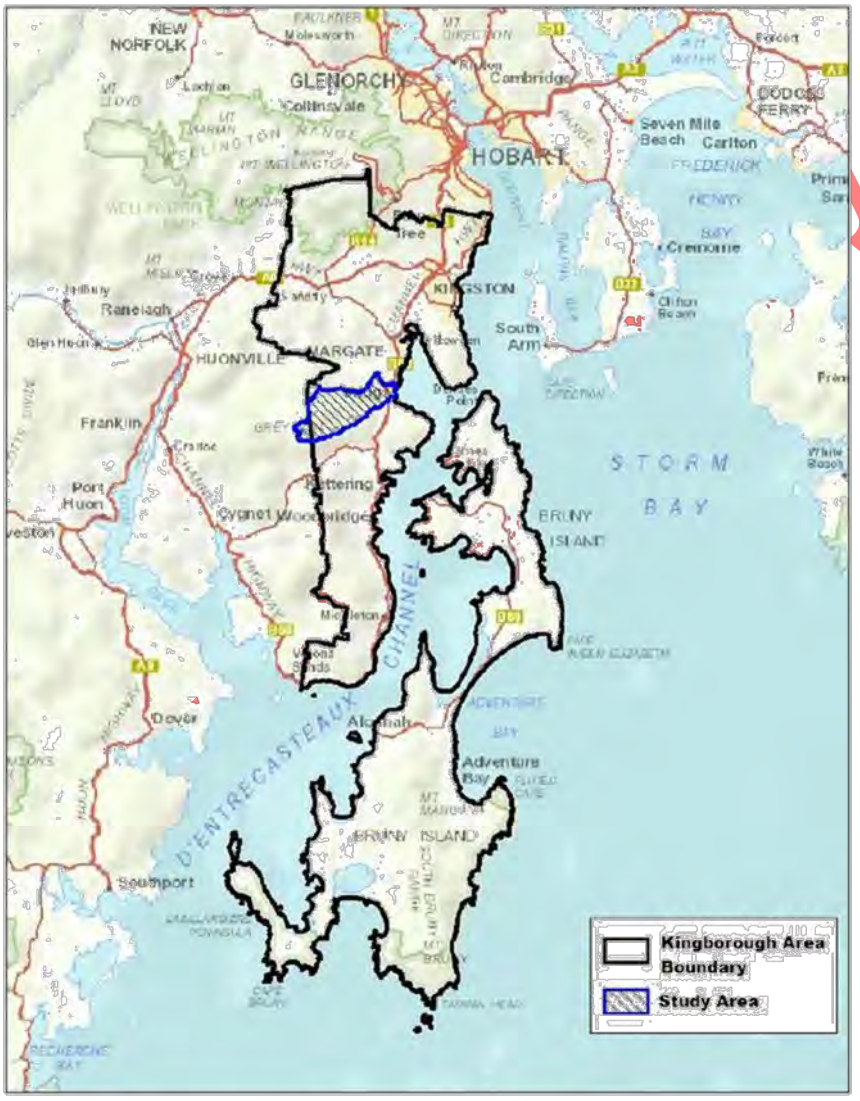

Figure 1: Snug River catchment location within the context of the Kingborough Municipality

Figure 2: Aerial photograph of the Snug River Catchment.

1.2 CONTEXT AND SCOPE

This project is funded and undertaken by Kingborough Council. This report summarises the flood risk study undertaken for the Snug River, providing a comprehensive assessment of the existing flood risk from both coastal and fluvial sources, including predicted climate change impacts.

Assessment of flood risk has been undertaken for Snug River flooding only and does not explicitly consider flooding from stormwater within the Snug Township.

1.3 STUDY OBJECTIVES

The key objective of this flood study is to define the flood behaviour under existing and future potential climate conditions in the Snug River catchment for a range of coincident design catchment floods and coastal floods. This study provides information on flood levels, flood depths, flood velocities, and provisional flood hazard categories.

The objectives of the Snug River Flood Study are as follows:

i. To assess the existing and future flood risk of Snug River;
ii. To investigate the level of severity of the flood events and its impact on the community;
iii. To provide information to facilitate better management of the potential flood impacts for existing and future conditions, including identification of potential future mitigation strategies and priorities for emergency management, land use planning and flood management;
iv. To update and extend the flood knowledge in the Snug area for planning, development assessment and emergency management purposes; and
v. To produce robust hydrology and hydraulic modelling tools according to current best practice procedures which are able to estimate the flood characteristics and behaviour of the Snug River catchment.

1.4 SNUG RIVER FLOOD HISTORY

There have been a number of previous flood events affecting the Snug River, albeit with limited details relating to flood levels, extents of flooding or flood affected properties. Examples of key flood risk factors derived from the details of known past flood events for the Snug River include:

- June 1872: Intense rainfall event, resulting in the loss of two bridges ('KINGBOROUGH.' 1872)
- November 1881: Landslip, deposition of material and subsequent pseudo-dam failure following heavy rainfall ('THE MERCURY' 1881);
- June 1954: Flooding resulting in road damage ('KINGBOROUGH "WORST SUFFERER" IN FLOODS' 1954); and
- May 1973: Flooding resulting in debris accumulation at the highway (refer to images in Figure 3 to Figure 7).

These records indicate that significant flooding of the Snug River has previously occurred, where the degree of flooding can be exacerbated by other associated factors, specifically, debris flow and blockage due to landslip. Further discussion on data relating to historical events is provided in Section 3.3.

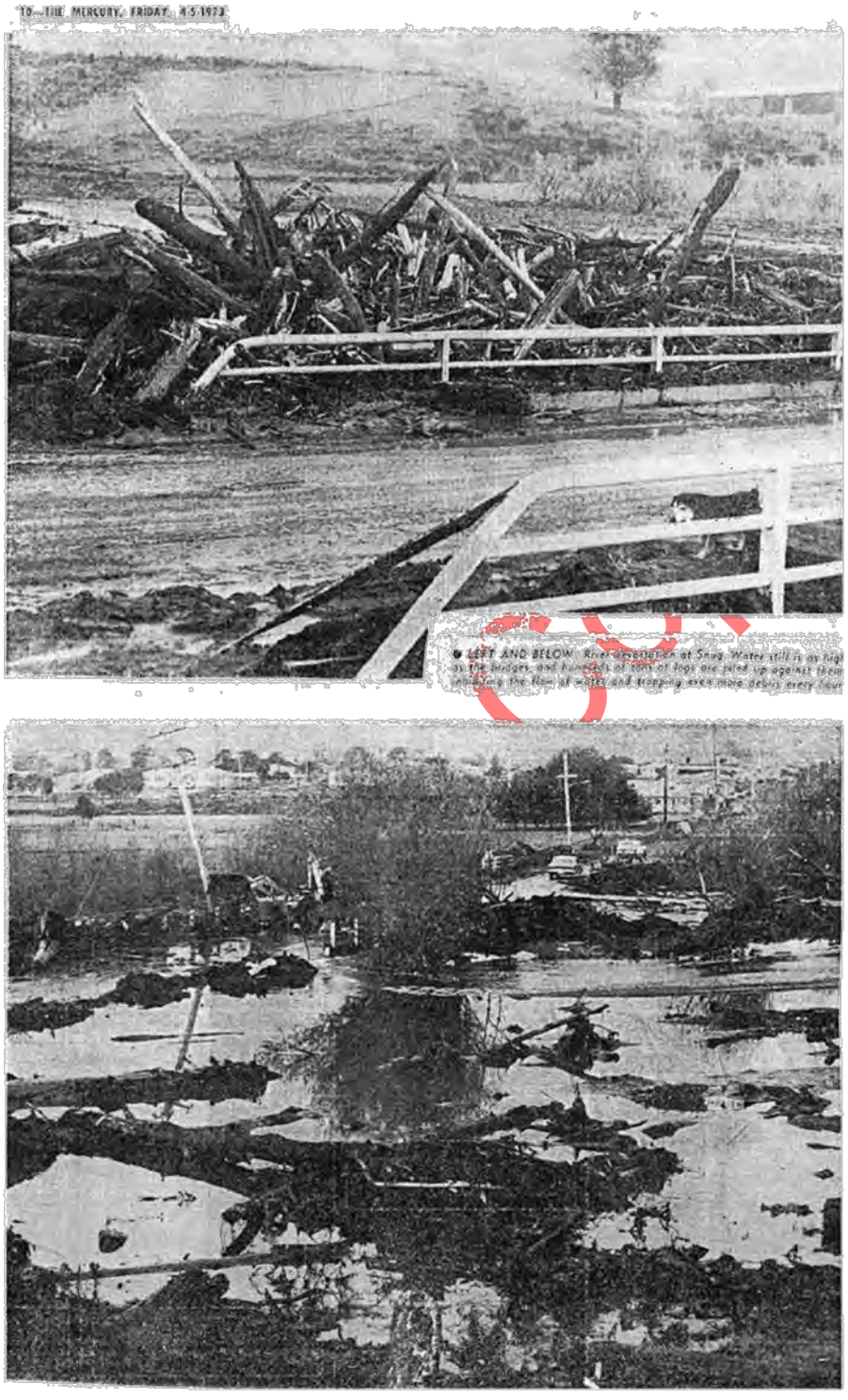

Figure 3: May 1973 flood event

Figure 4: Debris accumulation at the highway, May 1973

Figure 5: Debris accumulation adjacent to the school (unspecified date but likely to be May 1973)

Figure 6: Debris accumulation along the Snug River channel (unspecified date but likely to be May 1973)

Figure 7: Workmen clearing debris (unspecified date but likely to be May 1973)

2 THE STUDY CATCHMENT

2.1 CATCHMENT DESCRIPTION

The Snug River catchment study area has a total area of approximately 2,192 hectares consisting of predominantly undeveloped natural area at the upper catchment and residential development, light industrial, school, commercial area and caravan park at the bottom of the catchment near the river outlet. The study area discharges to the North West Bay via Snug River and into the D'Entrecasteaux Channel.

The topography within the study area varies along the catchment from nearly flat surface at the river outlet to steeper surface slopes with average of 20% at the middle catchment and less than 10% at the top of the catchment. The topography of the Snug River catchment is shown in Figure 8.

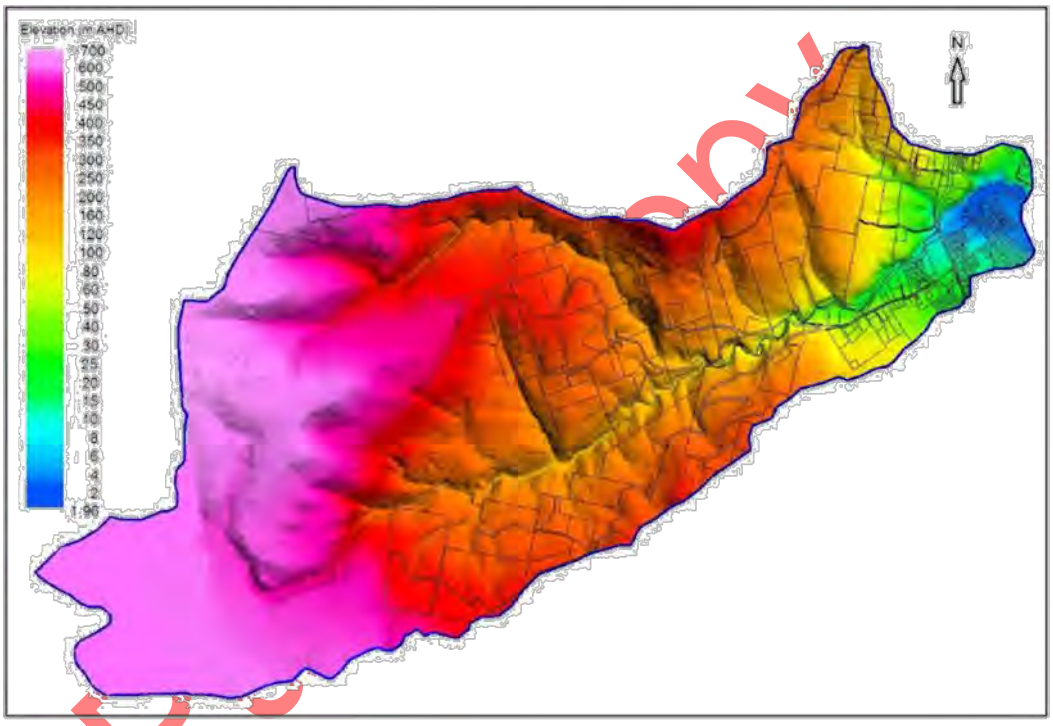

Figure 8: The elevation of Snug Catchment.

The upper catchment is characterised by the vegetated slopes on Snug Tiers Nature Recreation Area, with the reserve rising to an elevation of approximately 700m AHD. The reserve occupies approximately 46% of the total catchment, approximately 12% of the total catchment is developed and the rest is classified as Environmental Living Zoning (Figure 9). The portion of the catchment comprising the Snug Tiers Nature Recreation Area has restrictions on development and is therefore likely to remain in an undeveloped state in the future, noting that certain changes in landuse may be permitted (e.g. mining). Rural residential development extends along Snug Falls Road and Snug Tiers Road. There are some areas of open space at the top of the catchment where logging has occurred historically.

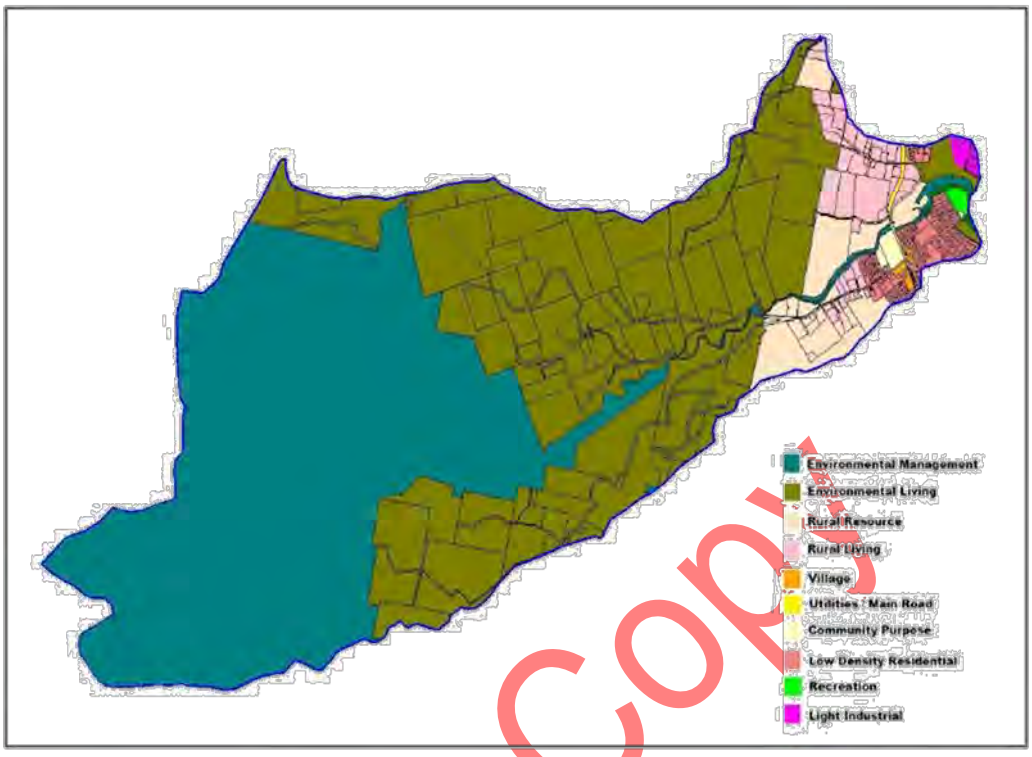

Figure 9: Snug River Catchment Ultimate Landuse (KIPS, 2014)

2.2 TIDAL CONDITION

The tide level can affect the degree of inundation in the study area, especially at the low-lying area such as the residential area behind the sandy beach. In the event of concurrent heavy rainfall and high tide, the capacity of the stormwater drainage network discharging to the estuary is reduced, generally resulting in broader flood inundation extents and longer times of inundation. During extreme tidal conditions (which includes storm surge), water levels in the lower reaches of the river will be higher due to the elevated tide level.

2.3 DEVELOPMENT TRENDS

The Snug River catchment study area comprises predominantly undeveloped natural areas to the west and urban land-uses to the east. Current zoning indicates that the undeveloped natural areas within the study area will remain in their current state. It is therefore likely that future development mainly will occur to the east as there are potential of existing land parcels for subdivision and/or more intensive infill development within the Snug area.

2.4 CLIMATE AND IMPACTS OF CLIMATE CHANGE

Future climate change, characterised by increased rainfall intensities and sea level rise, is likely to affect flooding in the Snug River catchment. A climate change analysis has been undertaken as part of this study to assess flooding impacts as a result of predicted climate change.

2.5 CLIMATE AND IMPACTS OF CLIMATE CHANGE

Characteristics of the riverine and geology across the study area have been derived and reported in the Snug Rivercare Action Plan (Telfer, 2001).

According to the study, although some dolerite outcrops occur in the headwaters, the majority of the Snug plateau is formed of Quaternary alluvium, sourced from erosion of the plateau surface over a very long period (<2 million years before present). The alluvial surface is shallow and overlies very old sandstones (Triassic 220-180 million years ago) which occurs at this elevation due to faulting and uplift that occurred back in the Tertiary era (60-40 million years ago). The sandstones are relatively flat and uniform and underlies most of the flat plateau like surfaces that occur in the middle to upper areas of the catchment. Heath typically grows on the shallow soils on top of the sandstones.

3 REVIEW OF AVAILABLE DATA

3.1 INTRODUCTION

The information and data used in the preparation of this study have been obtained from various qualified experts and organisations. The available data have been reviewed and numerous site inspections have been undertaken to gain a better understanding of the catchment and drainage features across the study area.

3.2 PREVIOUS STUDIES

No comprehensive catchment-wide hydrological and hydraulic assessment has previously been completed for the Snug River study area. Related studies and reports include:

- The *Snug River Hydraulic Analysis* was completed by Pitt & Sherry for Kingborough Council in 2008, where the study was prepared to assess whether the 100-year ARI flood level will encroach over the property boundary of 9 residential lots located adjacent to the river on the downstream side of the Channel Highway. Unfortunately, neither Council nor Pitt & Sherry were able to retrieve a copy of this report for use in this current study.
- *Snug Rivercare Action Plan* study about the future management needs of the Snug River. The characteristics of the catchment and the stream are contained in the report.

3.3 HISTORICAL ARTICLES AND PHOTOGRAPHS

Historical newspaper articles and photographs of flooding of the Snug River have been obtained from available data sources. Including the photographs provided in Section 1.4, the historical data sources include:

- Archives and records of the Channel Highway Museum;
- Digitised newspaper articles, as provided by the National Library of Australia[1]; and
- Register of flooding complaints as maintained by Council, noting that the majority of these records generally relate to stormwater flooding which is not explicitly addressed by this study.

3.4 HYDROMETRIC DATA

3.4.1 RAINFALL DATA

There are no continuous (pluviograph) rainfall stations located within the Snug River catchment. However, there is a daily rainfall station near the top of the catchment. There is also an extensive network of rainfall gauges across Kingborough, Huon Valley and greater Hobart area, with many of these gauges operated by the Bureau of Meteorology. The selected pluviograph rainfall stations close to the study area are:

- Hobart (Ellerslie Road) which has a long period of record, commencing in 1893;
- Grove (Research Station); and
- Leslie Vale.

The rainfall stations located in close proximity to the study area and considered suitable for defining historic rainfall for specific rainfall and flood events within the study area are summarised in Table 3. The locations of these rainfall stations are shown in Figure 10. The combination of daily rainfall stations and pluviometer

[1] https://trove.nla.gov.au/

stations to define the temporal pattern of rainfall for historic events presents a reasonable rainfall data set for use in this study.

Table 3: Rainfall Stations in the vicinity of the study area (as at January 2018)

Station No.	Station	Data Type	Record Period
94029	HOBART (ELLERSLIE ROAD)	Continuous	1893 - 2018*
94030	HOBART BOTANICAL GARDENS	Daily	1885 - 2018*
94031	HOBART (WATERWORKS RESERVE)	Daily	1897 - 2018*
94040	LYMINGTON (FATTYS LANE)	Daily	1920 - 2018*
94043	MIDDLETON POST OFFICE	Daily	1910 - 2018*
94068	WOODBRIDGE	Daily	1927 - 2018*
94085	SNUG PLAINS (CATARACT FALLS)	Daily	1961 - 2018*
94089	HUONVILLE (TUTTON AVENUE)	Daily	1962 - 2018*
94098	MOUNT NELSON (RIALANNAH ROAD)	Daily	1998 - 2018*
94111	TAROONA (TAROONA CRESCENT)	Daily	1961 - 2018*
94125	MARGATE (SUNNYSIDE)	Daily	1968 - 2018*
94139	FERN TREE (GRAYS ROAD)	Daily	1967 - 2018*
94151	LONGLEY (TELOPEA)	Daily	1976 - 2018*
94163	BLACKMANS BAY TREATMENT PLANT	Daily	1982 - 2018*
94166	BULL BAY (LAURISTON)	Daily	1983 - 2018*
94175	LUCASTON (BAKERS CREEK ROAD)	Daily	1978 - 2018*
94179	JUDBURY (HUON RIVER)	Daily	1990 - 2018*
94185	NIERINNA (CUTHBERTS ROAD)	Daily	1992 - 2018*
94219	CYGNET (SYNOTTS ROAD)	Daily	2001 - 2018*
94220	GROVE (RESEARCH STATION)	Continuous	2006 - 2018*
94222	KINGSTON (GREENHILL DRIVE)	Daily	2002 - 2018*
94223	BONNET HILL	Daily	2002 - 2018*
94231	LONGLEY (RIVER BEND ROAD)	Daily	2005 - 2018*
94239	LESLIE VALE	Continuous	2006 - 2018*
94247	TINDERBOX (TINDERBOX ROAD)	Daily	2011 - 2018*
94261	FRANKLIN (SOUTH)	Daily	2013 - 2018*
94263	ABELS BAY (SANDREEF ROAD)	Daily	2013 - 2018*
94255	DENNES POINT	Daily	2012 - 2018*
94104	GLAZIERS BAY	Daily	1998 - 2016
94025	SNUG (ESPLANADE)	Daily	2002 - 2013
94200	LOWER LONGLEY (LOMATIA VALE)	Daily	1995 - 2011
94025	GLENORCHY (RESERVOIR)	Daily	1950 - 2018*
94087	KUNANYI (PINNACLE)	Daily	1961 - 2018*
94210	ROKEBY (GRANGE RD EAST)	Daily	1998 - 2016
94211	BELLERIVE (YORK STREET)	Daily	1998 - 2016

Figure 10: Rainfall Station Locations

3.4.2 STREAMFLOW GAUGING DATA

A stream gauge within the Snug River catchment is located approximately 2.8km upstream of the river mouth, with a record covering a period of approximately 40 years (1976-2018). The highest peak flow recorded at this gauging station is 30.71m^3/s in 2011.

The real-time Snug stream gauge data is available through the Water Information Tasmania Web Portal (https://portal.wrt.tas.gov.au/) which is administered by the Department of Primary Industries, Parks, Water and Environmental (DPIPWE).

3.4.3 REVIEW OF AVAILABLE HYDROMETRIC DATA

The available hydrometric data indicates that:

- There is an extensive network of daily rainfall stations and a number of continuous (pluviograph) rainfall stations in the vicinity of the Snug River catchment; and
- The streamflow gauging site on the Snug River is suitable for use in this study for the purpose of undertaking event calibration.

3.5 WATER LEVEL DATA

The tailwater level at Snug River catchment is controlled by tide levels (including anomaly tide such as storm surge). Table 4 shows the tide levels for Hobart (DPIPWE 2019).

Table 4: Tide Levels for the port of Hobart

Tide	Tidal Level (m AHD)
Highest Astronomical Tide (HAT)	0.86
Mean Sea Level (MSL)	0.05
Lowest Astronomical Tide (LAT)	-0.83

Note: 1) Australian Height Datum (AHD) is approximately present mean seal level.

3.6 COUNCIL GIS DATA

Most of the Council's information data is available on Council's Digital Geographical Information Systems (GIS). All GIS data used in this study has been derived from Kingborough Council's MapInfo GIS database, including the location and details of waterways, roads, drainage network system (noting that the drainage network has not been modelled as part of this study), cadastre, up-to-date planning land use zones, background images, contours, property information and the Digital Elevation Model (DEM).

3.7 TOPOGRAPHIC DATA

Council's own aerial topographic survey, referred to as LiDAR (Light Detection And Ranging), covering the hydraulic study area has been used in this study. The LiDAR data sets provided have a stated vertical accuracy of +/- 0.15m with 68% confidence and horizontal accuracy of +/- 0.55m with 68% confidence.

The LiDAR data set has been filtered by Geoscience Australia, where the filtering routine applied to the raw data removes non-ground features such as buildings and vegetation. The resulting filtered data set provides a representation of the ground surface. The LiDAR data provided by Council has a horizontal resolution of 1m.

Kingborough Council has also engaged a contractor to carry out topographical and aerial survey using Unmanned Aerial Vehicle (UAV), commonly known as a drone. The survey data along the river channel, obtained via UAV, has been merged with the LiDAR data for use in the hydraulic modelling exercise.

3.8 SITE INSPECTION

Several inspections of key areas within Snug River were undertaken by Council officers over the period of the study. The purpose of the site inspections includes:

- Inspection of known locations where flooding problems exist;
- Verification of major river channel, including levels and dimensions;
- Inspection of the general nature of the study area catchment and floodplain;
- Inspection of local hydraulic controls such as bridges;
- Inspection of the manning roughness and characteristics of the river-banks; and
- Verification that vegetation in some regions are the same as on GIS aerial photographs.

The information and understanding gained during these site inspections have been used to assist with model development.

4 COMMUNITY ENGAGEMENT

4.1 COMMUNITY FLOOD AWARENESS AND THE FLOODPLAIN MANAGEMENT PROCESS

It is critical that the flood-prone communities of the Municipality of Kingborough be identified and made aware, and to remain aware, of their role in the overall floodplain management strategy for the municipality. This includes awareness of the existing level of protection of their community as well as their personal evacuation during future flood events. Sustaining an appropriate level of flood awareness involves continuous effort by Council and the emergency services but it can in turn significantly increase the community's resilience to future flood events.

There can be widespread variation in flood awareness in a community which may result in a degree of variation in flood damage assessment and flood risk management. As time passes between significant events, awareness of previous events reduces and may be absent in residents new to the area. Council can enhance flood awareness through, for example, regular public education programs via newspaper, videos, pamphlets, meetings and other media outlets. Community awareness brochures have been widely adopted in more flood-prone areas of the State, for example, Launceston City Council provides a good example of actively promoting flood risk awareness for their communities in Invermay via the use of the communication measures given above. For the township of Snug, provision of flood awareness brochures could include material specific to the local region and provide the following information:

- What floods are and the history of flooding in Snug;
- Known flood behaviour in Snug;
- Flood and/or storm warnings;
- What to do before, during and after a flood; and
- Preparation of a household emergency plan.

It is recommended that Council establishes and promotes a community education program in conjunction with the SES to provide information on what to do before, during and after a flood event, and to facilitate the communication of existing flood risks at flood-prone properties.

4.2 FLOODING INFORMATION QUESTIONNAIRE

To assist with calibration/validation of the hydrologic and hydraulic models and initiate the community awareness process, a community engagement campaign was undertaken via distribution of a questionnaire (a copy of the questionnaire is provided in Appendix D). This questionnaire sought to elicit any information and history from residents in Snug relating to previous flood events and was distributed to residents in the Snug area (refer to Figure 11) and was also made available on Council's website. A summary of the responses received from the community is provided in Table 5.

The responses received indicate there have been past flood events occur in the Snug River, although there is insufficient data for use in the calibration or validation of the models. However, the information received does assist with a qualitative assessment of flooding in certain areas of the Snug River and floodplain.

Figure 11: Extent of distribution of questionnaire

Table 5: Summary of responses from questionnaire

Period of residence	Flood details / responses	Photos
5 years	Approx. 2014, there was flooding in the bush track at the end of the road in front of the Sea Scouts Hall.	N/A
Unknown	Live on the banks of the Snug river and my land is prone to flooding	
2.5years 18 Pybus St	Water at the West end of the river, near the stormwater outlet, occurs regularly when heavy rain + high tide occur together	
38 years	Yes, 1996	
1 year	no	
37 years	Snug River, opposite Esp North, and upriver to the bridge – both banks have been inundated on several occasions following heavy rainfall	
2.5years	Rain and tide in 2016- couldn't walk closest to the Snug Beach reserve.	
20 years	No	
4.5 years	No	
10years	Their neighbour who passed away last year were longtime residents of Snug and lived in Torpy Avenue. They had seen flooding over the bridge which cut access to Kingston. Also where the new houses are built (snow gum etc) have been under water – don't know what year	
3 years	46 Snug Tiers Road, no	

5 HYDROLOGIC AND HYDRAULIC MODEL DEVELOPMENT

5.1 MODELLING APPROACH

A hydrological model has been developed that covers the entire Snug River catchment to its outlet at the Snug foreshore. The extent of the catchment is shown in Figure 12. The hydrological model has been used to estimate the discharge from the Snug River catchment for a range of flood events, where the discharge hydrographs are used as inputs to the hydraulic model.

A 2D hydraulic model has been developed for the lower reaches and the floodplain of the Snug River, with the extent modelled shown in shown in Figure 12 and Figure 13.

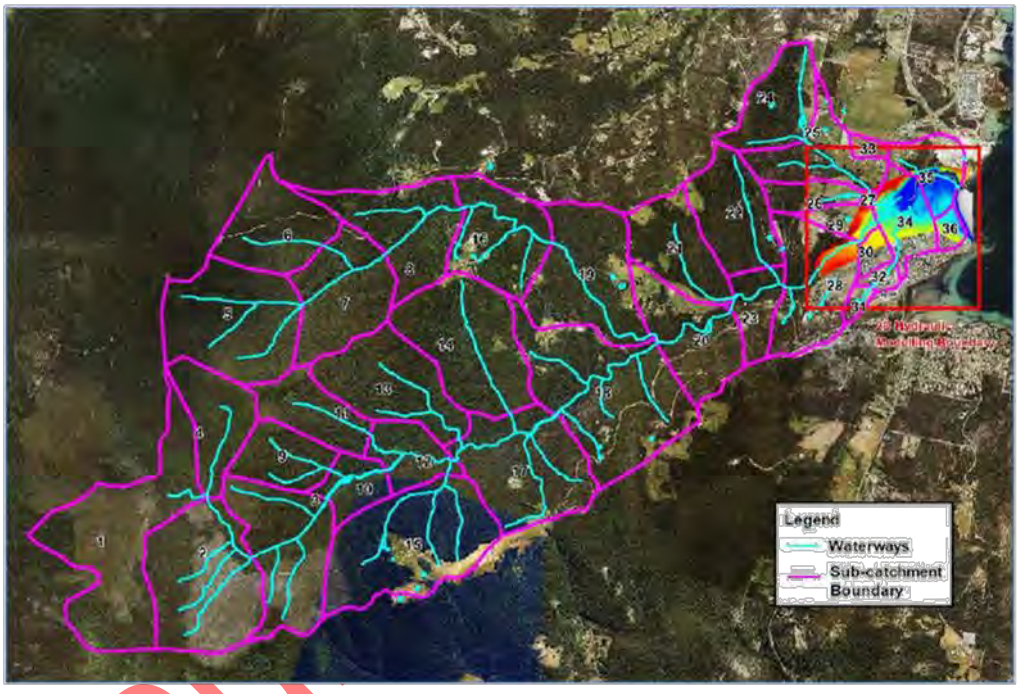

Figure 12: Hydrologic and Hydraulic Model Extents

5.2 SOFTWARE OVERVIEW

All GIS data used in this study has been derived from Council's MapInfo Pro GIS database, including the location and details of rivers, cadastre, planning zones, background images and the Digital Elevation Model (DEM).

XP Solution's Stormwater & Wastewater Management Model (XPSWMM®) has been used to assess the hydrology and hydraulics for the existing catchment and floodplain condition and ultimate development condition (derived from land use zoning and applied for 2050 and 2100 climate scenarios) to determine the flood risk in the catchment. It is a dynamic modelling tool that is the combination of one-dimensional (1D) calculations for the channel flow and two-dimensional (2D) calculations for the surface runoff modelling. It is software that easily examines the flow condition in the channel and also the surfaces.

5.3 HYDROLOGICAL MODEL

5.3.1 INTRODUCTION

The overall catchment and its constituent sub-catchments have been delineated based on Council's contour data set which has been derived from the LIDAR data. The sub-catchment delineation provides for generation of flow hydrographs at key confluences or inflow points to the hydraulic model.

5.3.2 CATCHMENT DELINEATION

The catchment covers approximately 2,190 ha and drains to the North-West Bay which is at the northern extent of the D'Entrecasteaux Channel. A total of 36 sub-catchments have been delineated to represent the total catchment. Each sub-catchment has been assigned appropriate parameters for use in the XPSWMM® model (i.e. catchment size, impervious area, catchment roughness and slope), based on topography and aerial imagery. Relevant hydrological parameters for each sub-catchment area summarised in Table 6.

5.3.3 RAINFALL DATA

Rainfall data applied in the hydrological model has been derived from recorded rainfall at daily and continuous recording rainfall stations (refer to Section 6.1) and design rainfall data (refer to Section 6.4).

5.3.4 RAINFALL LOSSES

In this model, the initial loss – constant continuing loss model has been adopted for the hydrological modelling. Initial-continuing loss models have been adopted for many Australian catchments, yet no single model has been demonstrated to be uniformly superior across all catchments (Phillips et al., 2014). Initial losses often vary across a given catchment. This type of loss occurs early in a storm prior to the soil becoming saturated and before surface runoff commences. The constant continuing loss is the average infiltration loss into the ground throughout the rest of the storm event (i.e. after surface runoff commences). Rainfall losses depend on the soil type, rainfall intensity, vegetation and catchment size. The values adopted for the losses for design event modelling are discussed in Section 6.3.4.

Table 6: Hydrological model sub-catchment properties

Sub-catchment ID	Area (ha)	Fraction impervious c2015	Fraction impervious c2100	Slope
1	148.15	0.0%	0.0%	9.7%
2	118.93	0.0%	0.0%	10.2%
3	94.36	0.0%	0.0%	16.0%
4	54.95	0.0%	0.0%	7.1%
5	112.25	0.0%	0.0%	17.3%
6	68.06	0.0%	2.1%	21.5%
7	79.63	0.0%	0.2%	19.3%
8	78.92	0.0%	3.7%	19.9%

Sub-catchment ID	Area (ha)	Fraction impervious c2015	Fraction impervious c2100	Slope
9	42.46	0.0%	0.0%	27.0%
10	28.40	0.0%	1.2%	31.8%
11	47.02	0.0%	0.0%	28.0%
12	36.28	0.0%	1.7%	20.5%
13	83.13	0.0%	0.0%	23.7%
14	106.97	0.0%	2.4%	17.5%
15	128.37	0.0%	3.9%	16.3%
16	72.86	0.0%	4.8%	14.4%
17	102.69	0.0%	3.0%	14.9%
18	146.77	0.0%	4.3%	14.1%
19	99.98	0.0%	4.8%	16.6%
20	69.59	0.0%	4.7%	19.9%
21	59.24	0.0%	4.8%	26.0%
22	65.34	0.0%	0.0%	20.7%
23	30.29	0.0%	4.5%	19.0%
24	53.30	0.0%	5.3%	19.2%
25	51.46	0.0%	8.1%	13.4%
26	20.45	0.0%	7.1%	20.8%
27	1.74	0.0%	16.0%	6.7%
28	74.44	4.7%	6.6%	10.6%
29	15.51	0.0%	0.0%	12.0%
30	9.29	16.7%	30.1%	4.5%
31	5.92	0.0%	5.8%	7.5%
32	6.77	9.1%	34.1%	3.9%
33	5.74	0.0%	11.8%	9.0%
34	35.13	16.7%	24.4%	2.6%
35	31.51	23.9%	23.9%	4.4%
36	7.82	23.1%	23.1%	3.0%

5.4 HYDRAULIC MODEL

5.4.1 INTRODUCTION

The development of the Snug River hydraulic model has considered the following elements:

- Topographical data, including coverage and resolution (e.g. LiDAR);
- Physical characteristics of the watercourse and floodplain (e.g. hydraulic roughness);
- Location of any hydraulic controls (e.g. bridges, embankments, river mouth constriction); and
- Computational limitations.

For this project, the 1D/2D hydraulic model was developed from just downstream of the mouth of the Snug River to upstream of the floodplain area (i.e. upstream of the Channel Highway). The reach of the Snug River with a relatively small channel has been modelled in 1D, while the remainder of the channel and all the floodplain has been modelled in 2D, as shown in Figure 13. The model includes representations of the existing bridges at the Channel Highway.

Figure 13: Hydraulic Model Extents

5.4.2 MODEL TOPOGRAPHY

The ground elevations applied in the hydraulic model have been derived from the following sources:

- LiDAR digital elevation model (DEM) obtained from Geoscience Australia
  - The DEM represents the true ground surface and has been filtered to remove features such as buildings and vegetation

- DEM of the channel bed derived from a UAV (drone) survey commissioned by Council.

The topography of the study area (combined LiDAR and UAV data sets) is shown in Figure 14.

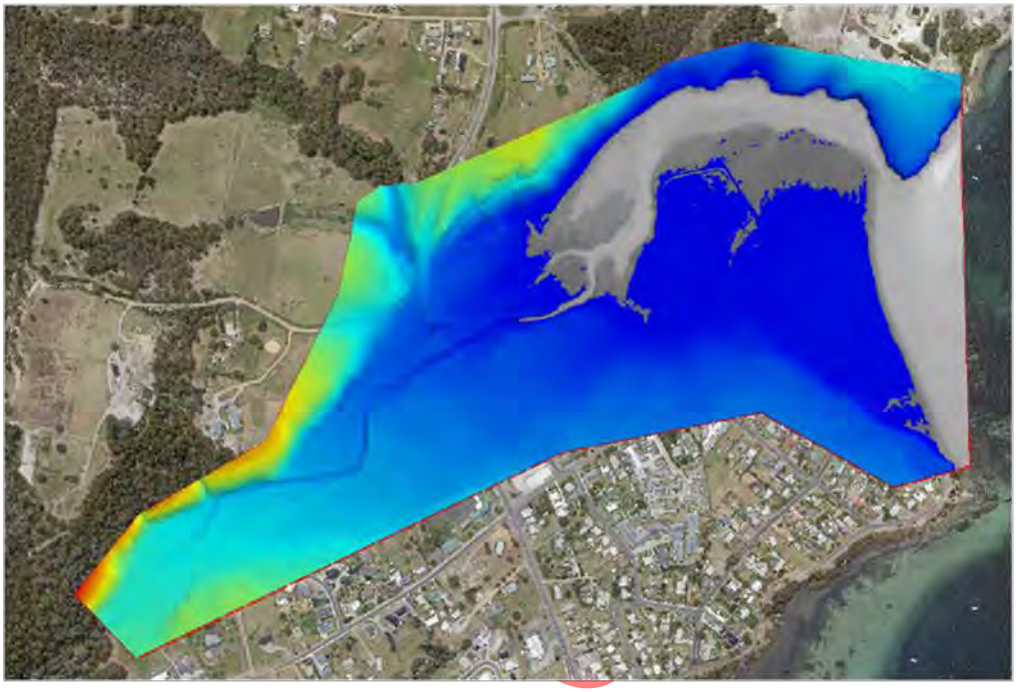

Figure 14: Hydraulic Model Topography

5.4.3 HYDRAULIC ROUGHNESS

The value for hydraulic roughness has been assigned different values according to the different land use types across the hydraulic model, resulting in spatial variation of hydraulic roughness. Land use types have been delineation from aerial photography, planning zones and cadastral data. Table 7 shows the Manning's roughness value applied for the different land use types applied in the model, with the spatial distribution of land use types shown in Figure 15.

Table 7: Manning's 'n' Roughness Values applied in the hydraulic model

Land Use	Manning's 'n' Value
1D Channel	0.035
Estuary	0.025
High-roughness channel	0.080
Paved area	0.016
Buildings	0.500
Vegetation	0.080
Maintained Open space	0.030
Open space	0.060

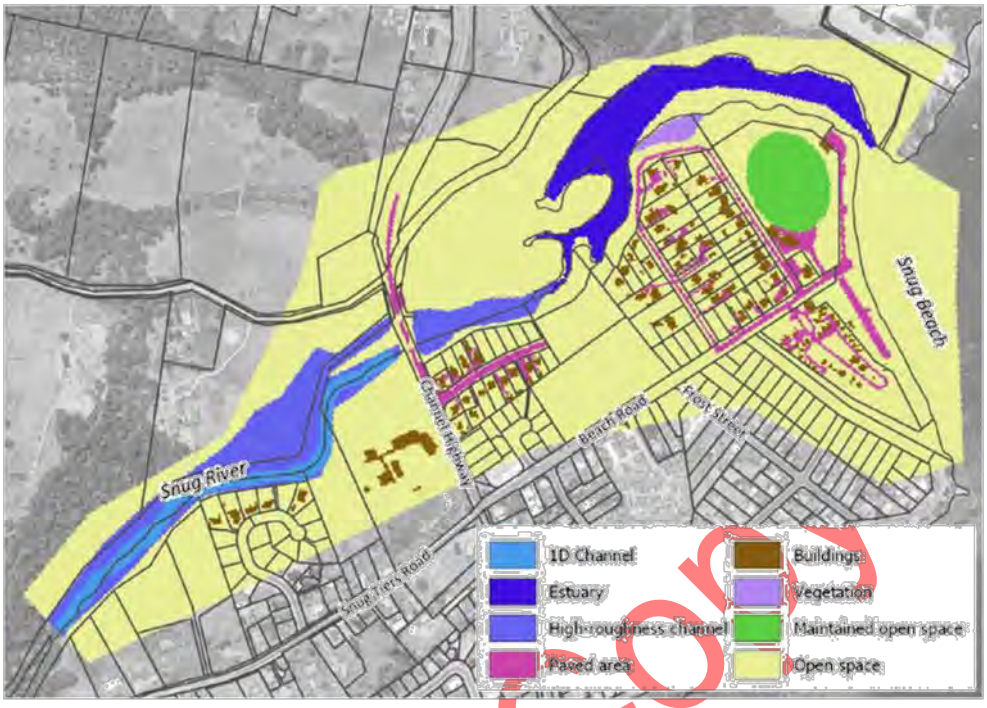

Figure 15: Hydraulic Model Land Use

5.4.4 BOUNDARY CONDITIONS

Ocean tide levels for the North-West Bay have been used as the downstream water level boundary for the hydraulic model. Council engaged Water Research Laboratory (WRL) to undertake an assessment of these water levels for the current conditions, year 2050 and year 2100, where the future water levels account for projected sea level rise. Table 8 shows a summary of the adopted water levels as applied in the design event modelling for this study. The downstream water level boundary has been included in the Snug River hydraulic model as a fixed water level, i.e. the hydraulic model does not explicitly model the tidal signal.

Table 8: Summary of Adopted Tide Levels

Year	ARI	Sea Level Rise (m)	Tide at Peak (m AHD)	Anomaly at Peak (m)	Wave Setup at Peak (m) (Shoreline)	Peak Nearshore Water Level (m AHD)
Present Day	1	0	0.53	0.44	0.1	1.07
	10		0.53	0.68	0.16	1.37
	20		0.53	0.75	0.19	1.47
	50		0.53	0.84	0.13	1.5
	100		0.53	0.91	0.13	1.57
2050	1	0.3	0.53	0.44	0.1	1.37
	10		0.53	0.68	0.16	1.67
	20		0.43	0.75	0.19	1.77
	50		0.53	0.84	0.13	1.8
	100		0.53	0.91	0.13	1.87
2100	1	1	0.53	0.44	0.1	2.07
	10		0.53	0.68	0.16	2.37
	20		0.53	0.75	0.19	2.47
	50		0.53	0.84	0.13	2.5
	100		0.53	0.91	0.13	2.57

Inflows to the hydraulic model have been derived with the hydrological model discussed in Section 5.3.

5.4.5 CELL SIZE / MODEL RESOLUTION

The hydraulic model utilises a grid of square cells to represent the topography and hydraulic controls across the catchment. Each square grid cell contains information on ground elevation and surface resistance to flow (Manning's 'n' value). For the Snug River Flood Study, a 3-metre square grid has been adopted which is considered to provide sufficient accuracy to adequately represent the key features and variations in catchment/floodplain topography and land use.

6 HYDROLOGIC MODELLING

6.1 INTRODUCTION

The hydrological model developed for the Snug River catchment (as described in Section 5) has been used to simulate historic rainfall events to facilitate calibration of the hydrological model (refer to Section 6.2), with subsequent design event modelling (refer to Section 6.4).

6.2 HYDROLOGIC MODEL CALIBRATION

Three historic events have been selected for calibration and validation of the hydrological model, where these events occurred in April 2011, January 2015 and June 2016.

Spatial patterns of rainfall have been derived based on the recorded daily rainfall totals in and around the Snug River catchment, then comparing those totals with data at the pluviograph sites at Grove (Research Centre), Leslie Vale and Hobart (Ellerslie Road). For the purpose of undertaking hydrological modelling, the pluviograph data has been used to define a temporal pattern for each calibration event which has then been applied to the Snug River catchment based on the daily rainfall total at the Snug Plains (Cataract Falls) rainfall station. It follows that the spatial patterns developed for each calibration event may not accurately represent the spatial variation in rainfall characteristics that actually occurred during the calibration events, as there is no means to verify the that the timing or magnitude of rainfall bursts that occurred in each 24-hour period (i.e. as derived from the pluviograph data) was representative of the rainfall on the Snug River catchment. To assess the effect of the varying pluviograph-derived temporal patterns on flows in the Snug River, separate simulations have been undertaken for each temporal pattern derived from the pluviography data.

6.2.1 APRIL 2011 EVENT

Heavy rain fell in the southeast of Tasmania from the afternoon of 12 April 2011 until the morning of 13 April 2011. Several rainfall stations in the vicinity of the Snug River catchment (including Leslie Vale and Kingston) recorded in excess of 100mm in one day. Daily rainfall totals at the Snug Plains (Cataract Falls) rainfall station are provided in Figure 16 (source: Bureau of Meteorology[2])

[2] http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_display_type=dataDGraph&p_stn_num=094085&p_nccObsCode=136&p_month=04&p_startYear=2011

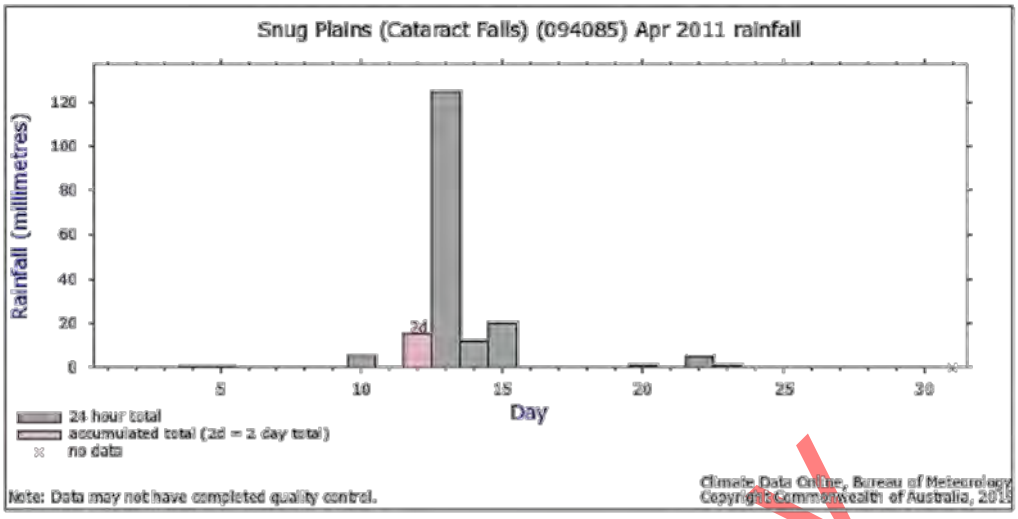

Figure 16: Daily Rainfall Totals at Snug Plains (Cataract Falls) – April 2011

Isohyets of total rainfall for the 24-hour period to 9am on 13 April 2011 are shown in Figure 17. This shows the spatial distribution of rainfall in the vicinity of the Snug River catchment, indicating that there were significant variations in total rainfall across the region, with the highest 24-hour total recorded in the Snug River catchment itself. This suggests that the temporal distribution of rainfall in the Snug River catchment may have varied from the nearby pluviograph records.

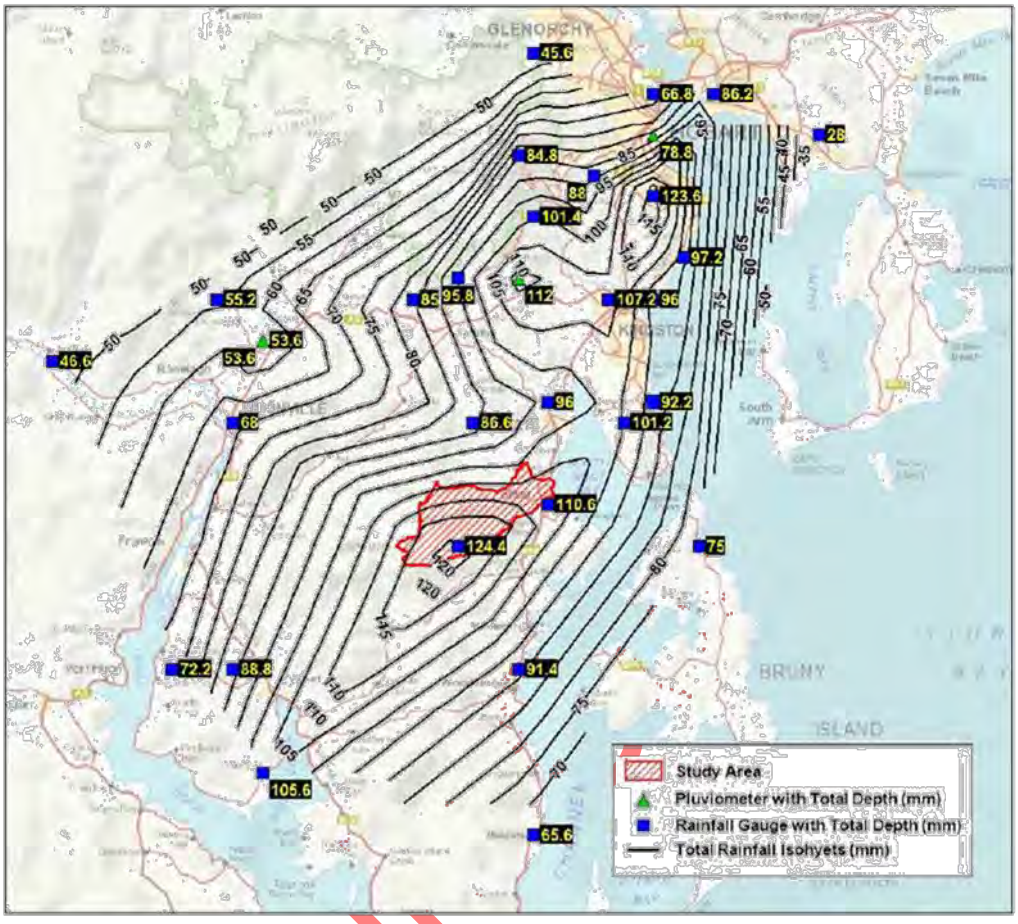

Figure 17: Rainfall Distribution for 13 April 2011

The recorded rainfall hyetographs from the Leslie Vale (LV), Hobart (Ellerslie Road) (HE) and Grove Research Station (GRS) pluviometers are shown in Figure 18. The hyetographs indicate that whilst there were different rainfall totals measured at each site, the accumulations of rainfall for the main burst associated with this event correlate well, exhibiting similar start and finish times for the main rainfall burst. The daily rainfall totals from the Snug Plains (Cataract Falls) rainfall station have also been included in Figure 18. This indicates that whilst the total rainfall for Snug Plains (Cataract Falls) is similar to the accumulated total for Leslie Vale, the total rainfall during the main burst was much higher than at the three pluviograph sites, suggesting that there may be differences between the temporal patterns at the pluviograph sites and what actually fell in the Snug River catchment.

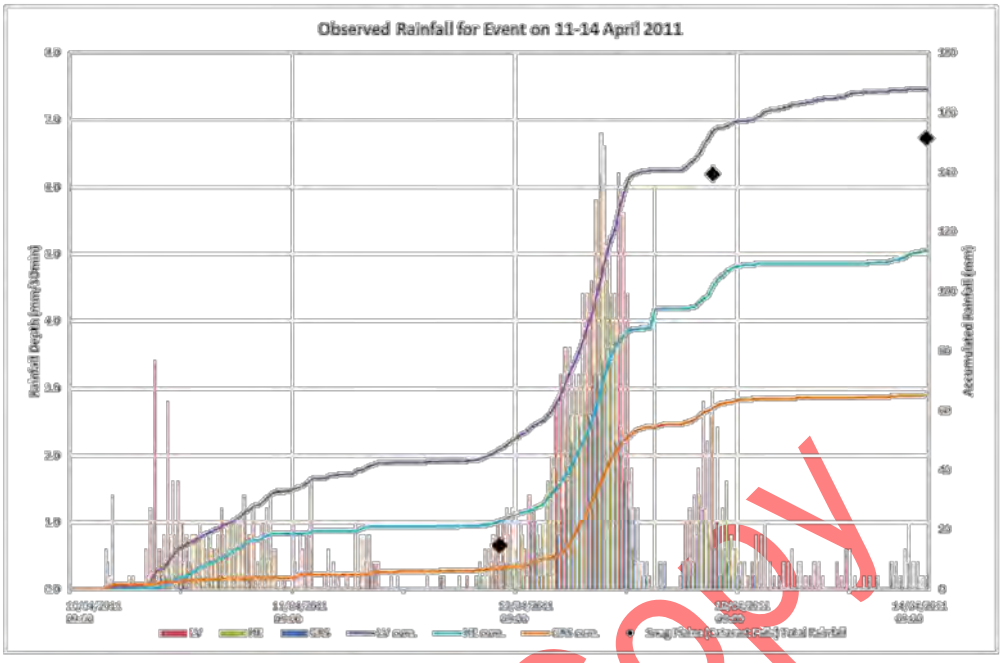

Figure 18: Recorded Rainfall – April 2011 Event

Results from the hydrological modelling of the three pluviograph-derived temporal patterns are shown in Figure 19. The predicted flow hydrographs for the three temporal patterns exhibit reasonable correlation with the gauged flow at the Snug River gauging station.

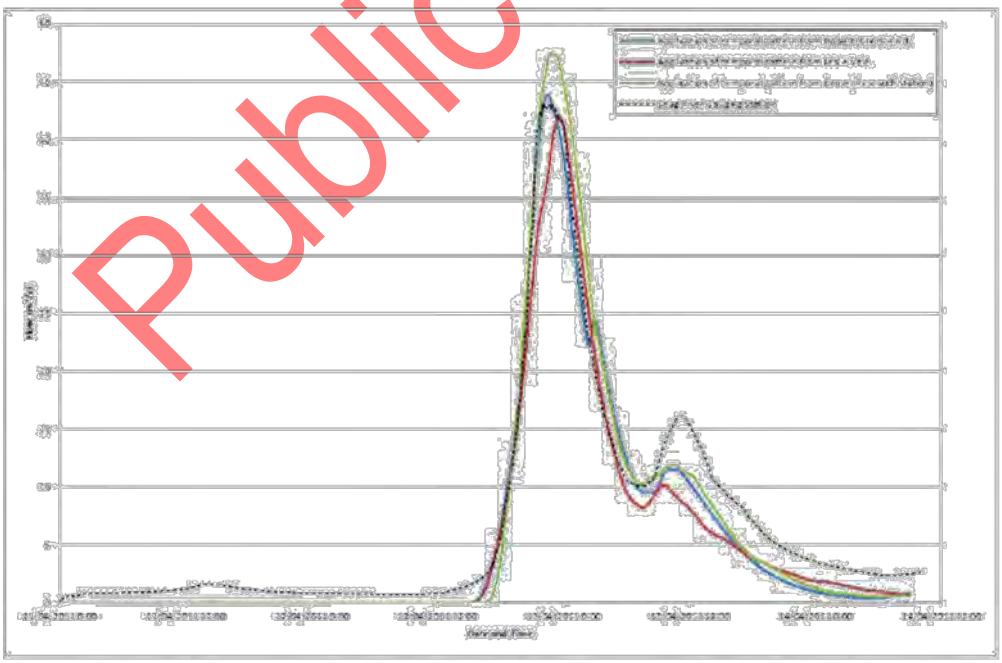

Figure 19: April 2011 Event Hydrographs at the streamflow gauging station

6.2.2 JANUARY 2015 EVENT

There was a significant rainfall event on 13 and 14 January 2015 resulting from a complex low-pressure system bringing tropical moisture to Tasmania. The highest daily rainfall was 153.4mm at Mt Wellington on 14 January. Daily rainfall totals at the Snug Plains (Cataract Falls) rainfall station are provided in Figure 20 (source: Bureau of Meteorology[3])

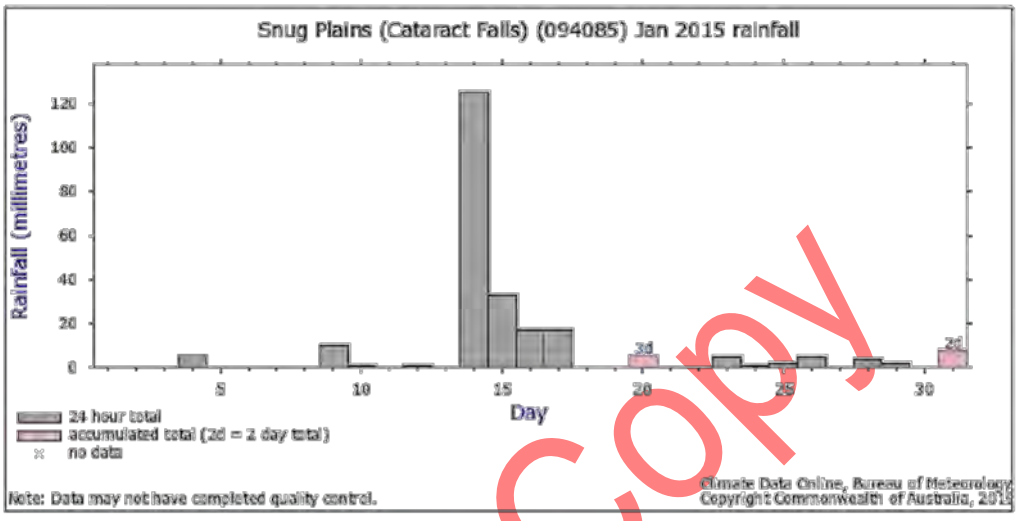

Figure 20: Daily Rainfall Totals at Snug Plains (Cataract Falls) – January 2015

Isohyets of total rainfall for the 24-hour period to 9am on 14 January 2015 are shown in Figure 21. This shows the spatial distribution of rainfall in the vicinity of the Snug River catchment, indicating that there were variations in total rainfall across the region, with the rainfall totals decreasing to the south and west of the Snug River catchment. This suggests that the temporal distribution of rainfall in the Snug River catchment may have varied from the nearby pluviograph records.

[3] http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_display_type=dataDGraph&p_stn_num=094085&p_nccObsCode=136&p_month=01&p_startYear=2015

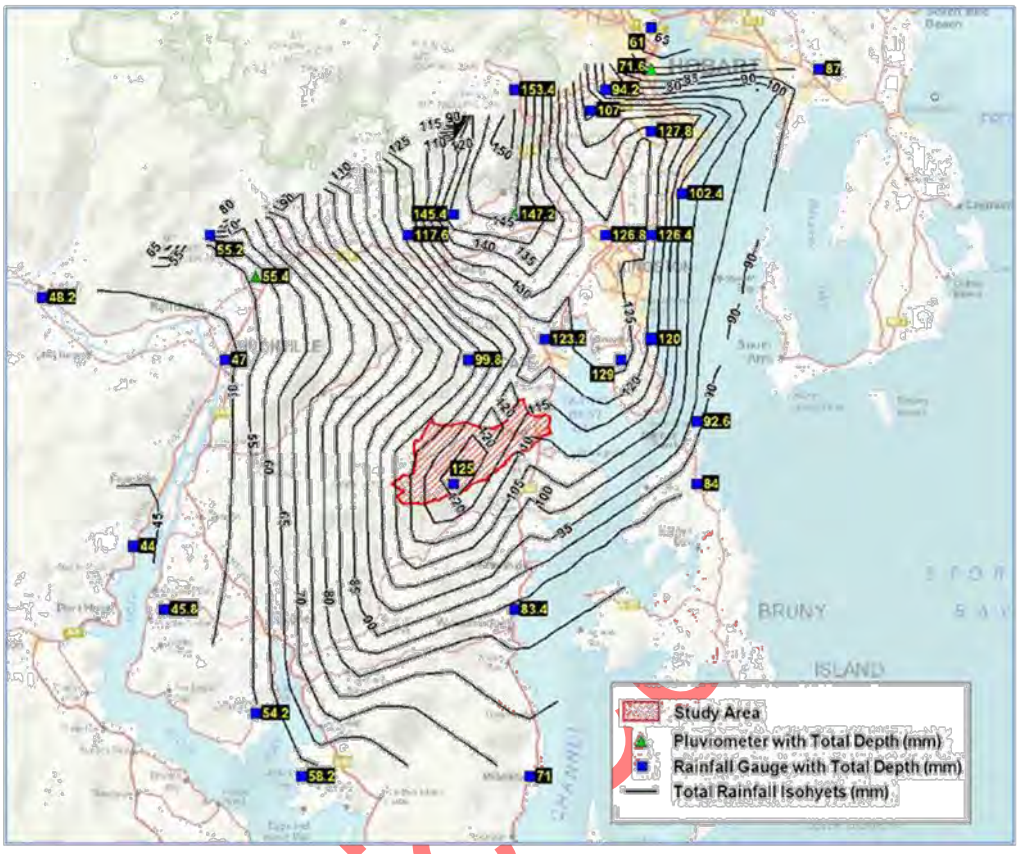

Figure 21: Rainfall Distribution for 14 January 2015

The recorded rainfall hyetographs from the Leslie Vale (LV), Hobart (Ellerslie Road) (HE) and Grove Research Station (GRS) pluviometers are shown in Figure 22. This indicates that whilst there were different rainfall totals measured at each site, the accumulations of rainfall for the main burst associated with this event correlate well, exhibiting similar start and finish times for the main rainfall burst. The daily rainfall totals from the Snug Plains (Cataract Falls) rainfall station have also been included in Figure 22. This indicates that the total rainfall for Snug Plains (Cataract Falls) is similar to the accumulated total for Leslie Vale.

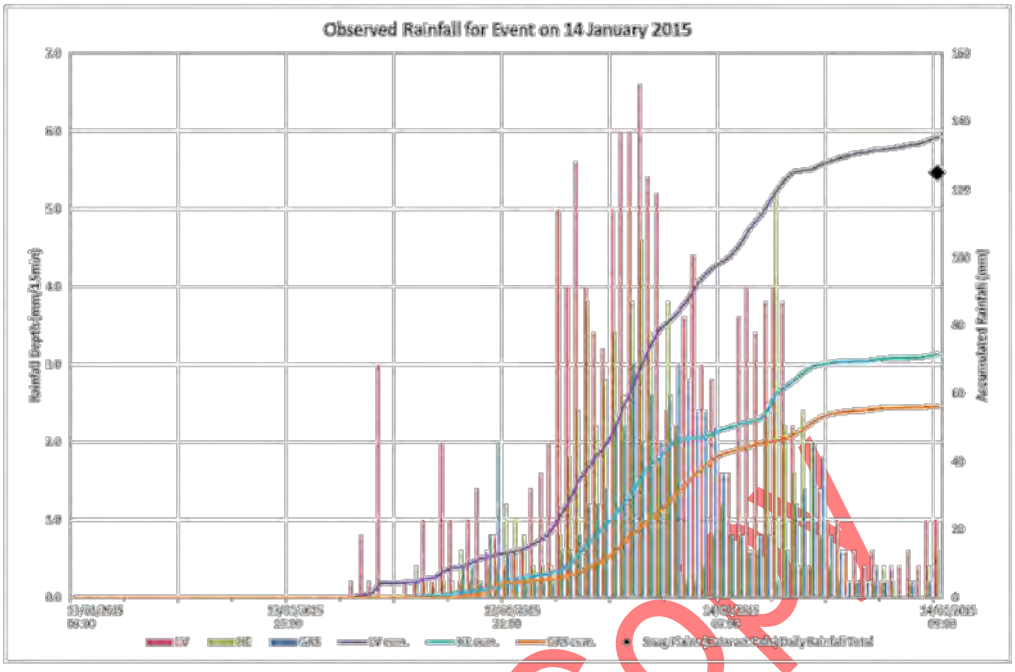

Figure 22: Recorded Rainfall – January 2015 Event

Results from the hydrological modelling of the three pluviograph-derived temporal patterns are shown in Figure 23.

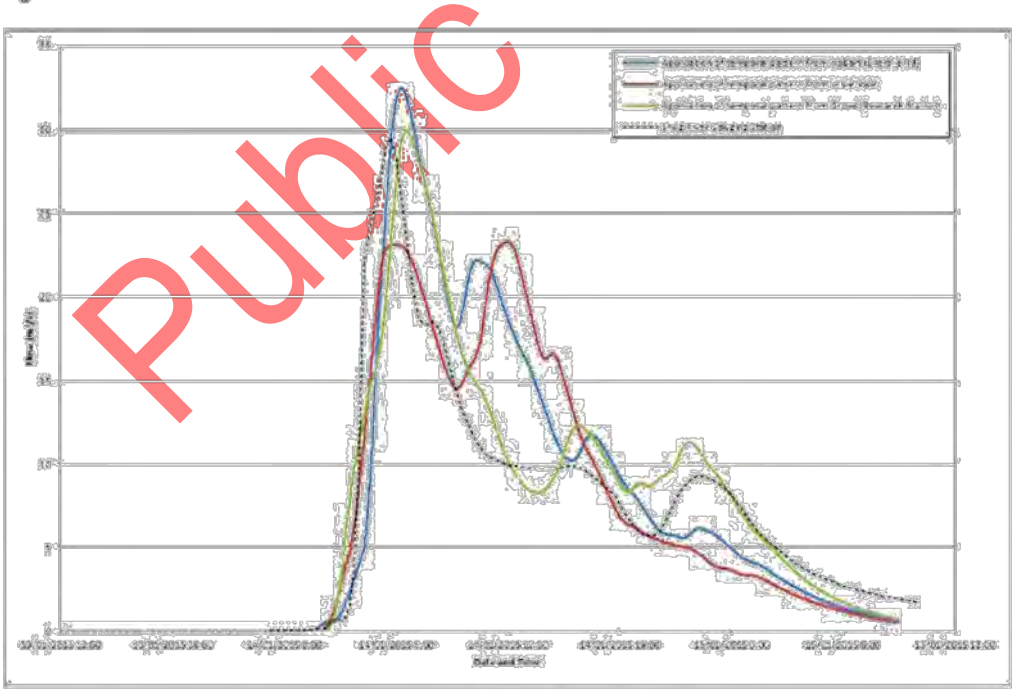

Figure 23: January 2015 Event Hydrographs at the streamflow gauging station

The predicted flow hydrographs for the three temporal patterns indicate the following:

- It is likely that there was significant spatial variation in the rainfall temporal pattern during this event, where this inference is based on the different hydrograph shapes for the three temporal patterns;
- The second peak derived from the Hobart (Ellerslie Road) and Leslie Vale pluviography-derived temporal patterns was not recorded at the Snug River gauging station, indicating that the temporal pattern for rainfall in the Snug River catchment was different from these two pluviograph sites; and
- The peak of the Snug River gauging station occurs slightly earlier than the result derived using the Grove Research Station temporal pattern. However, this particular temporal pattern reproduces the two minor peaks on the trailing limb of the hydrograph.

6.2.3 JUNE 2016 EVENT

There was a significant rainfall event from 5 June to 7 June 2016 that affected the north of Tasmania, resulting in flooding across the north of the state. The rainfall shifted to the southeast of the state, although rainfall totals were much less than in the north. Daily rainfall totals at the Snug Plains (Cataract Falls) rainfall station are provided in Figure 24 (source: Bureau of Meteorology[4])

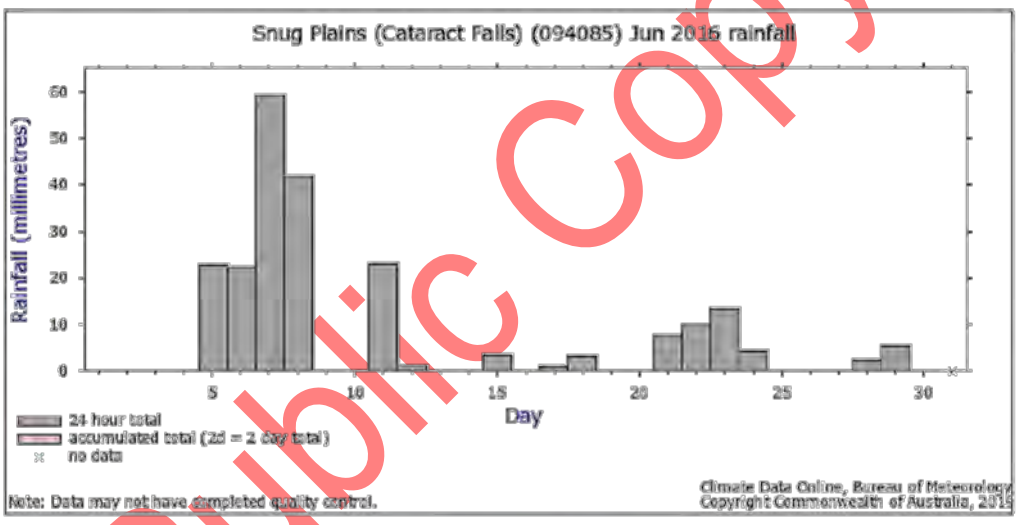

Figure 24: Daily Rainfall Totals at Snug Plains (Cataract Falls) – June 2016

Isohyets of total rainfall for the 24-hour period to 9am on 7 June 2016 are shown in Figure 25. This shows the spatial distribution of rainfall in the vicinity of the Snug River catchment, indicating the variations in total rainfall across the region.

4 http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_display_type=dataDGraph&p_stn_num=094085&p_nccObsCode=136&p_month=01&p_startYear=2015

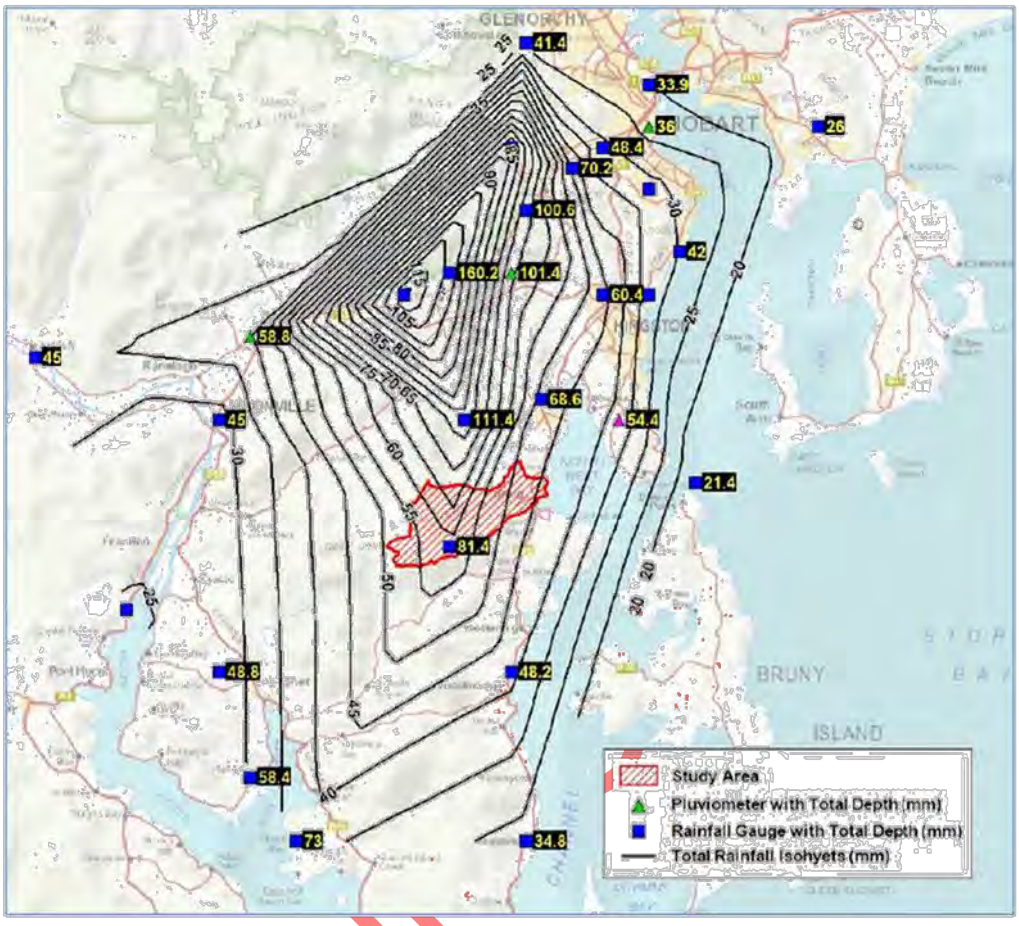

Figure 25: Rainfall Distribution for 7 June 2016

The recorded rainfall hyetographs from the Leslie Vale (LV), Hobart (Ellerslie Road) (HE) and Grove Research Station (GRS) pluviometers are shown in Figure 26. This indicates that there were multiple rainfall bursts over this 24-hour period. The daily rainfall totals from the Snug Plains (Cataract Falls) rainfall station have also been included in Figure 26. This indicates that the total rainfall for Snug Plains (Cataract Falls) is similar to the accumulated total for Leslie Vale.

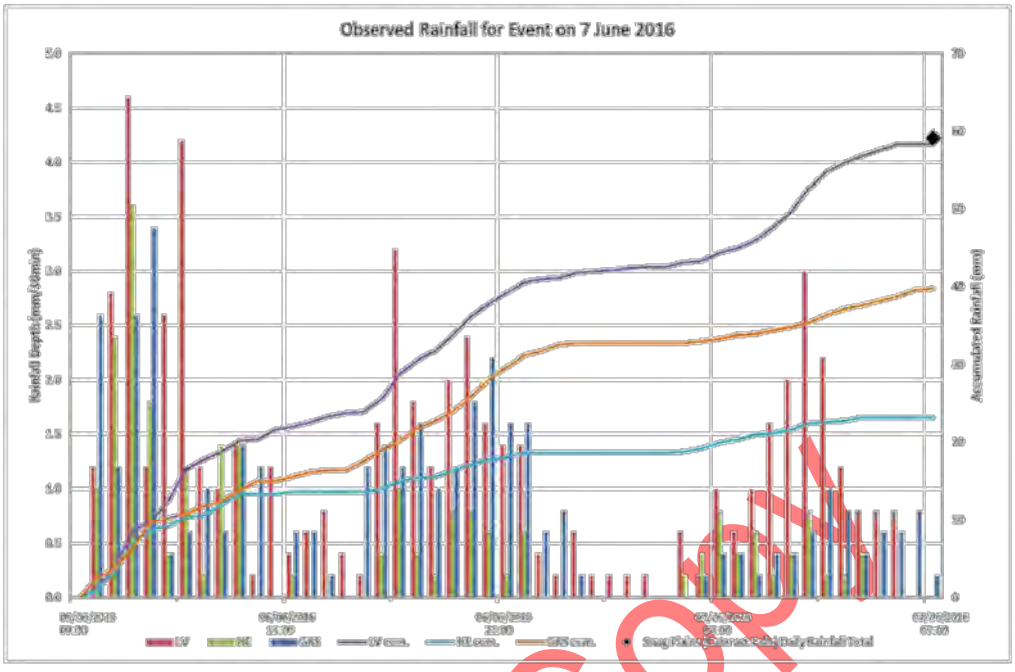

Figure 26: Recorded Rainfall – June 2016 Event

Results from the hydrological modelling of the three pluviograph-derived temporal patterns are shown in Figure 27.

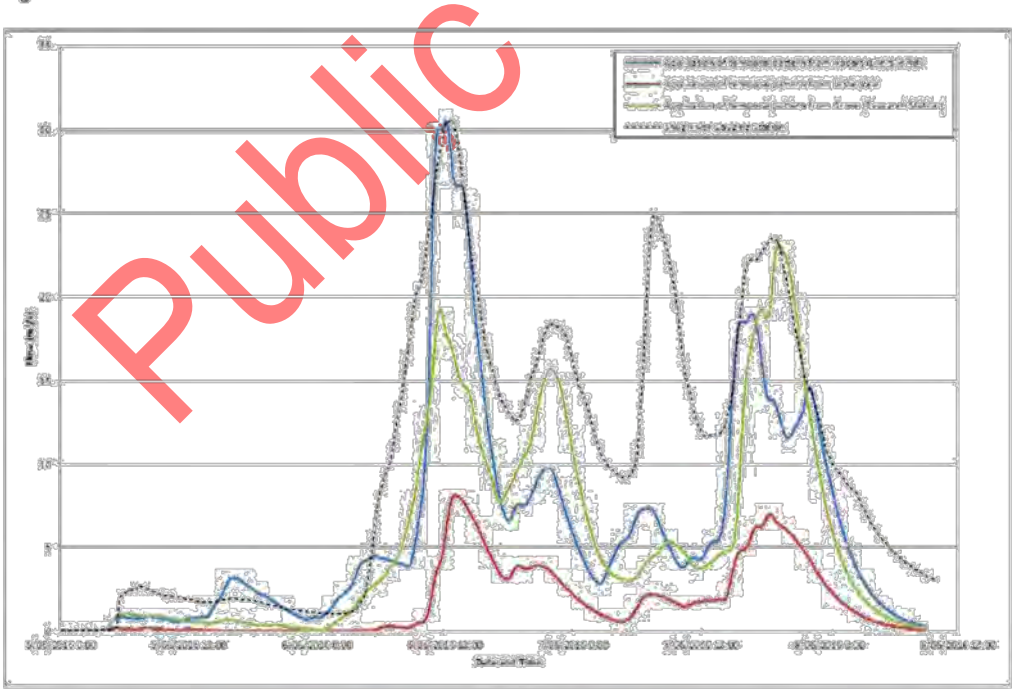

Figure 27: June 2016 Event Hydrographs at the streamflow gauging station

The predicted flow hydrographs for the three temporal patterns indicate the following:

- It is likely that there was significant spatial variation in the rainfall temporal pattern during this event, where this inference is based on the relative magnitudes of the different peaks over the modelled period. It must be noted that the third peak observed at the Snug River gauging station is the second-highest peak which is not being replicated through use of the three temporal patterns;
- The timing of the recorded peaks at the gauging station correlates well with the peaks derived from the temporal patterns; and
- It does not appear possible to utilise any single pluviograph site to represent the rainfall that occurred in the Snug River catchment during the June 2016 event.

6.2.4 EVENT CALIBRATION SUMMARY

Hydrologic modelling of the selected calibration events has shown that the XPSWMM® model adequately replicates the Snug River catchment response.

However, the available data indicates that for any given rainfall event, there is often significant variation in rainfall across the region, with no single pluviograph station considered to be wholly representative of rainfall in the Snug River catchment. The calibration process has therefore relied on assessment of multiple temporal patterns for all three calibration events. The values for model parameters applied in the event calibration process are summarised in Table 9. The adopted values for the XPSWMM® Storage Coefficient Multiplication Factor (BX) and catchment roughness are also provided in Table 6. The Storage Coefficient Multiplication Factor uniformly modifies all subcatchment Storage Delay Time Coefficient values in the Storage Discharge relationship applied in the hydrological model (refer to the xpswwm/xpstorm Resource Center; Innovyze n.d.) The final values for initial and continuing losses applied in the design event modelling have been determined through further model calibration against the flood frequency distribution for the Snug River gauging station, as discussed in Section 6.3. The adopted parameters are described in Section 6.4.4.

Table 9: Summary of Adopted Model Parameters from Event Calibration

Event	XPSWMM® parameter BX	Catchment Roughness	Initial Loss (mm)	Continuing Loss (mm/hr)	Peak Flow (cms)	
					Observed	Modelled#
April 2011	2	0.2	32	3.2	43.1	43.9 (HE)
Jan 2015	2.9	0.1	80	3.2	29.5	29.9 (GRS)
June 2016	2.3	0.1	20	3.2	30.5	30.5 (HE)
Adopted	*2.9*	*0.1*				

Peak flow has been derived from the hydrograph giving what is considered to be the best fit vs observed data, where HE= Hobart (Ellerslie Rd), LV= Leslie Vale, GRS = Grove (Research Station)

6.3 FLOOD FREQUENCY ANALYSIS

Flood frequency analysis methods have been used to estimate peak flows at the Snug River streamflow gauging station for a range of design event magnitudes (i.e. annual exceedance probabilities, or AEP). The annual maxima series (AMS) extracted from the gauging record was fitted with a Log-Pearson-III (LP3) and a Generalised Extreme Value (GEV) distribution.

The flood frequency curves resulting from this analysis are shown in Figure 28, which also includes the flood frequency curve provided by the Bureau of Meteorology[5]. These results indicate there is good correlation between the different data sets, with some deviation in the values for the upper bounds of the 90% confidence limits.

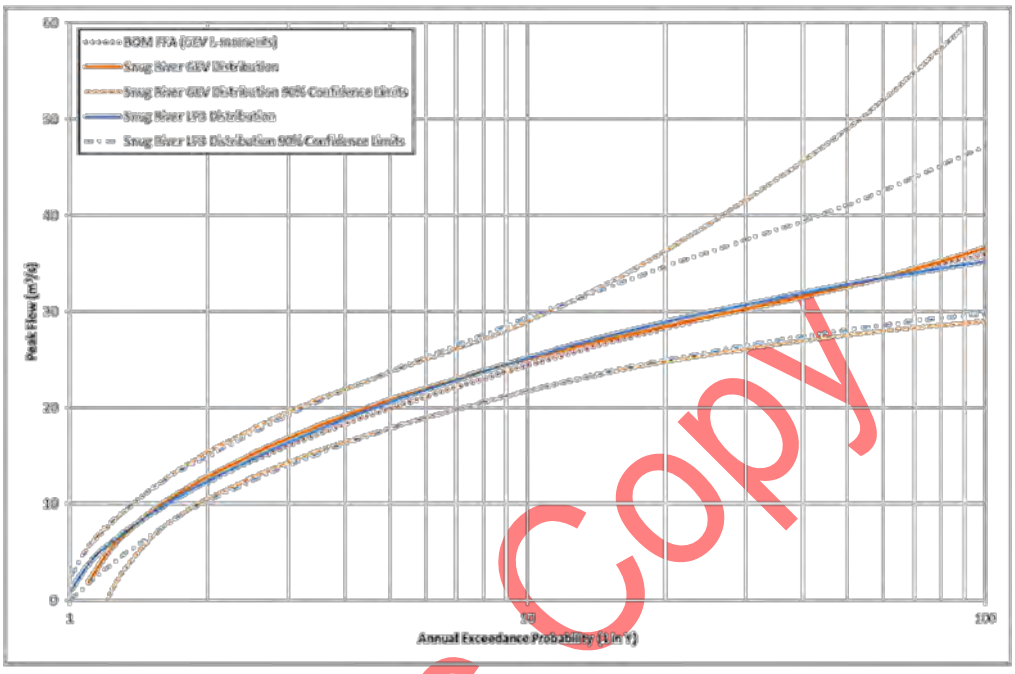

Figure 28: Snug River Flood Frequency Curves

6.4 DESIGN FLOOD EVENTS

6.4.1 INTRODUCTION

Design floods are hypothetical floods used for planning and floodplain management investigations. They are described as having a probability of occurrence, typically specified as Annual Exceedance Probability (AEP), where this is a measure of the rarity of a rainfall/flood event. This report expresses the design event magnitudes as a percentage AEP, which is described further in Table 10.

Table 10: Design Flood Terminology

Annual Exceedance Probability (AEP)	Description
1% AEP	A hypothetical flood or combination of floods likely to occur with a 1% probability of occurring in any given year
5% AEP	A hypothetical flood or combination of floods likely to occur with a 5% probability of occurring in any given year
20% AEP	A hypothetical flood or combination of floods likely to occur with a 20% probability of occurring in any given year

[5] http://www.bom.gov.au/waterdata/

6.4.2 DESIGN RAINFALL

The design rainfall events have bene modelled by applying representative design rainfall depths for a range of storm durations and design storm frequencies. The Bureau of Meteorology provides design intensity-frequency-duration (IFD) data which have been used to derive the rainfall depths applied in this study. The adopted design rainfall depths are summarised in Table 11.

Table 11: Design Rainfall Depths in mm (AR&R 2016, Lat: -43.07, Long: 147.24)

		Annual Exceedance Probability (AEP)						
Duration	Duration (min)	63.20%	50%	20%	10%	5%	2%	1%
1 hour	60	11.1	12.7	17.6	21.2	24.8	29.7	33.7
1.5 hours	90	13.6	15.5	21.6	25.8	29.9	35.5	39.9
2 hours	120	15.8	18.1	25.1	29.9	34.6	40.9	45.7
3 hours	180	19.7	22.5	31.4	37.4	43.2	50.8	56.5
4.5 hours	270	24.6	28.3	39.7	47.4	54.7	64.3	71.5
6 hours	360	28.7	33.2	47	56.1	64.9	76.5	85.3
9 hours	540	35.6	41.3	59.2	71.1	82.6	98	110
12 hours	720	41.1	47.8	69	83.3	97.2	116	131
18 hours	1080	49.4	57.6	83.9	102	120	144	163
24 hours	1440	55.4	64.7	94.4	115	136	165	187
30 hours	1800	60	69.9	102	125	148	180	205

6.4.3 DESIGN TEMPORAL PATTERNS

AR&R 2016 guidelines provide an ensemble of 10 temporal patterns for each design storm to provide a set of temporal patterns to represent the variability of different storms and the respective catchment response. The methodology provided in the AR&R 2016 guidelines indicate that the representative design storm at a given location is to be derived from the temporal pattern of the ensemble which corresponds to the median peak flow, noting that different temporal pattern ensembles are applied for each design storm duration.

A summary of the critical storm duration (i.e. duration that produces the median peak flow) and corresponding temporal pattern from the ensemble is provided in Table 12.

Table 12: Summary of Critical Durations and Selected Ensemble Temporal Patterns

Event	Peak Duration (hour)	Temporal Pattern
1% AEP	9	6
5% AEP	9	4
20% AEP	9	5

6.4.4 DESIGN PEAK FLOWS AND FINAL ADOPTED MODEL PARAMETERS

Design flood events have been modelled using the rainfall data described in the preceding report sections. The hydrological modelling parameters listed in Table 9 in Section 6.2.4 have been utilised, with values for initial

loss and continuing loss determined via an iterative process to achieve a correlation of modelled design flows versus results of the flood frequency analysis.

This analysis has yielded an initial loss value of 10mm and continuing loss value of 3.2mm. The resulting comparison against the flood frequency analysis is provided in Figure 29 (noting that the GEV distribution has been adopted). This indicates that the results from the hydrological model generally falls within the confidence limits of the flood frequency analysis, albeit with higher estimates of peak flows for design events with magnitude greater than 10% AEP (1 in 10 AEP). On the basis of these results, the derived design flood events are considered to be appropriate for use in modelling design floods in the Snug River.

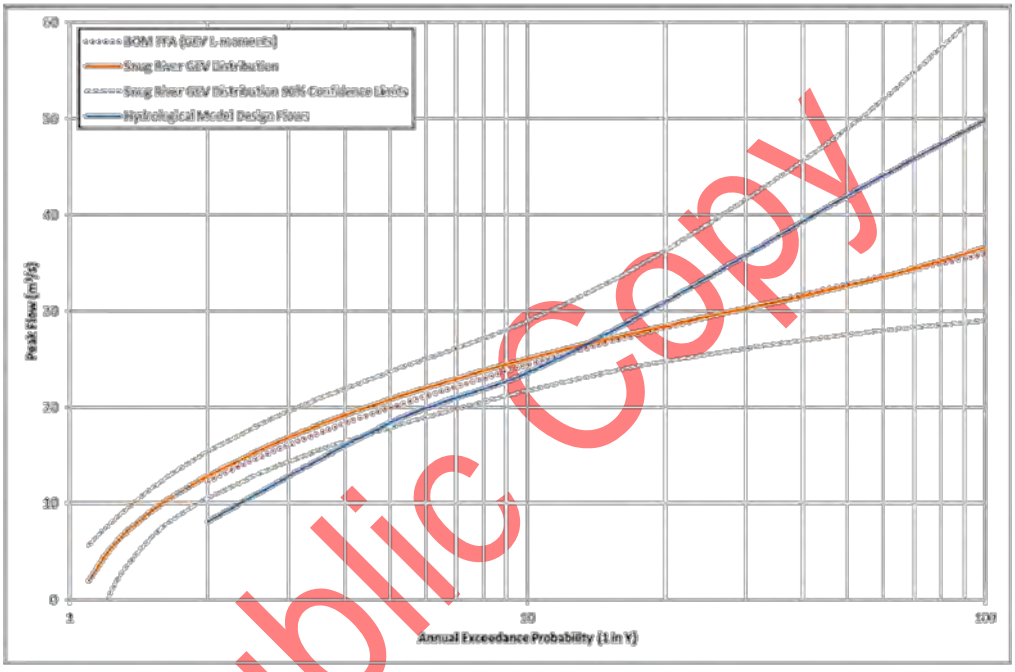

Figure 29: Adopted Flood Frequency compared with Modelled Peak Flows

6.4.5 COINCIDENT FLOODING

Catchment flooding and oceanic inundation can occur due to the same storm cell and therefore design flood levels in an estuary will be influenced by a combination of these sources. If oceanic inundation or catchment flooding is examined in isolation the resultant estimated flood risk is unlikely to be fit for purpose.

The Queensland Government guidelines *Coincident Flooding in Queensland: Joint Probability & Dependence Methodologies* (QLD Government, Oct 2012), direct that the choice of the combination of probability of catchment and coastal flood reflects an assumed level of independence between the variables: assuming independence between the variables could underestimate the likely flooding and result in higher risk to the coastal community. Similarly, an assumption of total dependence would be too conservative.

In NSW the Government allows for general and detailed approaches for joint probability analysis of flood level assessment of interaction of catchment and coastal flooding (NSW, 2010). A series of assumptions provide an envelope of peak levels and velocities that can be used to estimate the 1% AEP flood effects in a tidal system:

- estimated 1% AEP ocean flooding with 5% AEP catchment flooding with coincident peaks
- estimated 5% AEP ocean flooding with 1% AEP catchment flooding with coincident peaks
- neap tide cycle with 1% AEP catchment flooding with coincident peaks.

Teakle et al. (2005), in a joint probability analysis of water levels in estuary flood modelling in southeast Queensland, state that current practice typically includes an analysis of two boundary cases to obtain the 1% AEP flood level, which might typically combine:

- 1% AEP river discharge with a downstream (tidal) level at mean high sea level
- 5% AEP freshwater inflow with a 1% AEP downstream (tidal) level.

For this study, both catchment and ocean derived flood events and the impact of future climate change on flooding in Kingston Beach were considered. Table 13 summarised all the adopted design runs in this study.

Table 13: Summary of Adopted Design Runs at Different Scenarios

Year	Catchment Flood Scenario	Coastal Flood Scenario (Water Level Boundary)
Existing	1% AEP	MHWS (0.6 m AHD)
Existing	1% AEP	5% AEP (1.47 m AHD)
Existing	5% AEP	1% AEP (1.57 m AHD)
Existing	20% AEP	20% AEP (1.20 m AHD)
2050	1% AEP	MHWS (0.6 m AHD)
2050	1% AEP	5% AEP (1.47 m AHD)
2050	5% AEP	1% AEP (1.57 m AHD)
2050	20% AEP	20% AEP (1.20 m AHD)
2100	1% AEP	MHWS (0.6 m AHD)
2100	1% AEP	5% AEP (1.47 m AHD)
2100	5% AEP	1% AEP (1.57 m AHD)
2100	20% AEP	20% AEP (1.20 m AHD)

7 HYDRAULIC MODELLING

7.1 INTRODUCTION

The hydraulic model developed for the Snug River catchment (as described in Section 5) has been used to simulate design flood events for both existing conditions and future scenarios including climate change parameters. The resulting flood maps are presented in Appendix A, Appendix B and Appendix C.

7.2 HYDRAULIC MODEL CALIBRATION AND VALIDATION

For the Snug River catchment, there are insufficient quantitative historical flood data records and limited qualitative data for historical events. This paucity of data does not permit a conventional calibration of the hydraulic model parameters.

Therefore, for the Snug River hydraulic model, the model parameters have been based on values considered to be suitable for the subject catchment with verification of the model results against the available qualitative flooding observations.

Sensitivity testing of the model parameters has been undertaken, as outlined in Section 8.

7.3 DESIGN FLOOD MODELLING RESULTS – EXISTING CONDITIONS

7.3.1 FLOOD MAPPING

Hydraulic modelling of a range of design flood events (20% AEP, 5% AEP and 1% AEP) has been undertaken using inflow hydrographs generated with the hydrological model. For each of these events, flood mapping has been prepared which is provided in Appendix A, with the maps listed in Table 14.

Table 14: Design Flood Mapping Index – Existing Conditions

Figure No.	Timeframe	Map Type	Catchment Flood Event	Coastal Flood Condition (Water Level Boundary)
A-01	Existing	Water Levels	1% AEP	MHWS (0.6 m AHD)
A-02	Existing	Water Levels	1% AEP	5% AEP (1.47 m AHD)
A-03	Existing	Water Levels	5% AEP	1% AEP (1.57 m AHD)
A-04	Existing	Water Levels	20% AEP	20% AEP (1.20 m AHD)
A-05	Existing	Depths	1% AEP	MHWS (0.6 m AHD)
A-06	Existing	Depths	1% AEP	5% AEP (1.47 m AHD)
A-07	Existing	Depths	5% AEP	1% AEP (1.57 m AHD)
A-08	Existing	Depths	20% AEP	20% AEP (1.20 m AHD)
A-09	Existing	Velocities	1% AEP	MHWS (0.6 m AHD)
A-10	Existing	Velocities	1% AEP	5% AEP (1.47 m AHD)
A-11	Existing	Velocities	5% AEP	1% AEP (1.57 m AHD)
A-12	Existing	Velocities	20% AEP	20% AEP (1.20 m AHD)

7.3.2 FLOOD HAZARD

Flood hazard is a measure of potential harm or a situation with potential to result in loss of property or life under flood conditions. There are numerous factors that can be used to assess flood hazard, but typically it is determined as a measure of flow depth and flow velocity.

Australian Rainfall and Runoff (Ball et al., 2016) provides a set of flood hazard classification curves that relate to the vulnerability of the community when interacting with floodwaters, which has been reproduced in Figure 30. These curves are divided into flood hazard classifications that relate to specific vulnerability thresholds, with the descriptions of the classifications given in Table 15.

Flood hazard for the Snug River study area has been calculated using the hazard classification determined directly in the XPSWMM® model which is calculated based on the depth and velocity values in the model. The 2D solver in XPSWMM® calculates the flood hazard at every simulation timestep, ensuring the true peak flood hazard values are output. The peak flood hazard maps are provided in Appendix A, with the maps listed in Table 16.

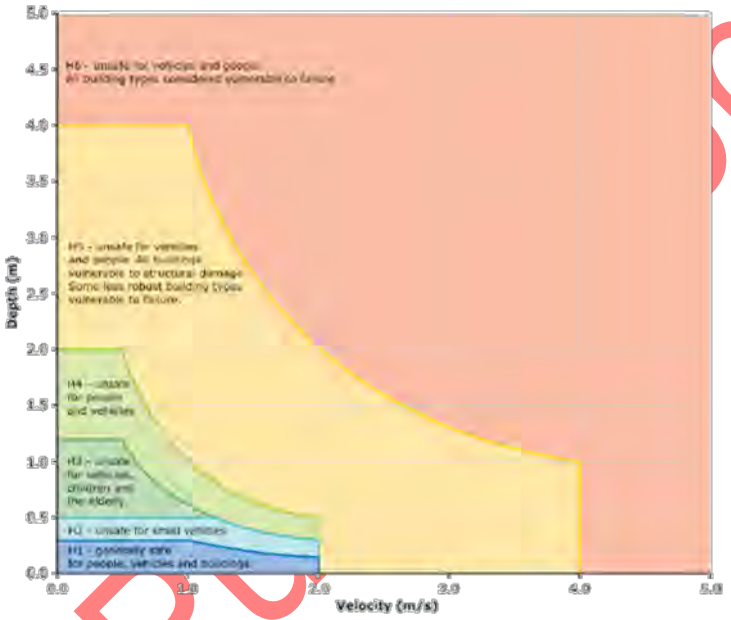

Figure 30: Combined Flood Hazard Curves (Ball et al., 2016)

Table 15: Combined Flood Hazard Curves – Vulnerability Classification (Ball et al., 2016)

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings
H2	Unsafe for small vehicles
H3	Unsafe for vehicles, children and the elderly
H4	Unsafe for vehicles and people
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Table 16: Design Flood Mapping Index for Flood Hazard Categories – Existing Conditions

Figure No.	Timeframe	Map Type	Catchment Flood Event	Coastal Flood Condition (Water Level Boundary)
A-13	Existing	Flood Hazard Category	1% AEP	MHWS (0.6 m AHD)
A-14	Existing	Flood Hazard Category	1% AEP	5% AEP (1.47 m AHD)
A-15	Existing	Flood Hazard Category	5% AEP	1% AEP (1.57 m AHD)
A-16	Existing	Flood Hazard Category	20% AEP	20% AEP (1.20 m AHD)

7.4 DISCUSSION

Upstream of the Channel Highway, flooding is generally contained within the defined river channel and floodplain. This results from a combination of:

- High ground on both sides of the river channel;
- Relatively few obstructions to flow along the river and floodplain corridor; and
- A predicted hydraulic grade of less than 1 in 50 (2%).

Downstream of the Channel Highway where the river widens out to the estuary in the lower reaches, flooding is affected by the combination of tide level and constriction at the river mouth, in addition to the magnitude of fluvial event in the river. There is the potential for flooding to be alleviated in the lower reaches of the Snug River with a wider opening at the mouth of the River. It is therefore recommended that Council considers undertaking further analysis to investigate an entrance management plan for the mouth of the Snug River with the aim of minimising the constriction that currently exists at the river mouth.

8 SENSITIVITY ANALYSIS

The hydrologic and hydraulic models have been used to undertake a range of sensitivity tests to assess the relative significance of the different hydrologic and hydraulic parameters.

Sensitivity tests have been assessed for the 1% AEP design event with a tailwater condition equivalent to mean high water springs (MHWS= 0.60 m AHD). The predicted changes in flooding behaviour are described herein.

8.1 RAINFALL LOSSES

The rainfall losses for design event applied in the hydrologic model have been determined through both event calibration and calibration to flood frequency analysis at the stream gauging station in the Snug River. Sensitivity tests have been undertaken for a 20% decrease and a 20% increase in the initial loss and continuing loss values applied in the hydrologic model. The changes in flooding behaviour are summarised in Table 17.

Table 17: Summary of changes in flooding behaviour – rainfall losses sensitivity tests

Sensitivity test	Changes in flooding behaviour
Decreased rainfall losses	• Peak flood level increases in the channel and floodplain upstream of the highway of up to 0.04m • Peak flood level increases in the channel and floodplain downstream of the highway of up to 0.12m, transitioning to 0.05m increase in the wider part of the estuary • Negligible change to the extent of flooding upstream of the highway • Minor increase in extent of flooding downstream of the highway
Increased rainfall losses	• Peak flood level reductions in the channel and floodplain upstream of the highway of up to 0.03m • Peak flood level reductions in the channel and floodplain downstream of the highway of up to 0.20m, transitioning to 0.07m reduction in the wider part of the estuary • Negligible change to the extent of flooding upstream of the highway • Minor decrease in extent of flooding downstream of the highway

These changes in flooding behaviour are as expected and indicate there may be some variation in peak flood levels with different rainfall loss values. However, in lieu of suitable calibration data for the hydraulic model, the rainfall loss values adopted for design event modelling are considered to be appropriate for this study.

8.2 HYDRAULIC ROUGHNESS

The Manning's roughness values applied in the hydraulic model are considered to be within typical ranges for the land-use types across the Snug River model. However, there is a degree of uncertainty associated with the delineation of land-use types and associated roughness values, particularly in the absence of extensive calibration data.

Sensitivity tests have been undertaken for a 20% decrease and a 20% increase in the hydraulic roughness values applied in the 2D model domain. The changes in flooding behaviour are summarised in Table 18.

Table 18: Summary of changes in flooding behaviour – hydraulic roughness sensitivity tests

Sensitivity test	Changes in flooding behaviour
Decreased hydraulic roughness	• Peak flood level reductions in the channel and floodplain upstream of the highway of up to 0.03m • Peak flood level reductions in the channel and floodplain downstream of the highway of up to 0.18 • Negligible change to the extent of flooding upstream of the highway • Minor decrease in extent of flooding downstream of the highway
Increased hydraulic roughness	• Peak flood level increases in the channel and floodplain upstream of the highway of up to 0.03m • Peak flood level increase in the channel and floodplain downstream of the highway of up to 0.20m, transitioning to 0.07m increase in the wider part of the estuary • Negligible change to the extent of flooding upstream of the highway • Minor increase in extent of flooding downstream of the highway

These changes in flooding behaviour are as expected and indicate there may be some variation in peak flood levels with different hydraulic roughness value. However, in lieu of suitable calibration data, the hydraulic roughness values adopted for design event modelling are considered to be appropriate for this study.

8.3 BLOCKAGE AT BRIDGES

There are anecdotal records that indicate debris blockage at the highway bridges has occurred in previous flood events. This blockage has the potential to alter flooding behaviour, leading to an increase in peak flood levels and extents of flooding.

A sensitivity test has been undertaken to represent 100% blockage at the bridges while also applying blockage to 1.5m above the bridge deck level. The changes in flooding behaviour are summarised in Table 19.

Table 19: Summary of changes in flooding behaviour – blockage at bridges sensitivity test

Sensitivity test	Changes in flooding behaviour
Fully blocked bridges	• Peak flood level increases immediately upstream of the highway of up to 2.10m for the southern bridge (main channel) and 2.90m for the northern bridge (overflow channel); these significant increases reduce to zero within 100m upstream of the highway • Peak flood level decreases downstream of the highway of up to 0.60m, transitioning to 0.06m decrease in the wider part of the estuary • Increased extents of flooding both upstream and downstream of the highway; upstream of the highway, the changes in extents of flooding generally only affects the floodplain area and open space, whilst downstream of the highway, the changes in flood extents affects properties on both sides of the river channel and floodplain, with up to 55m increase in the extent of flooding on the southern side of the channel and 30m increase on the northern side of the channel

These changes in flooding behaviour are in line with expectations for this sensitivity test and indicate the need to maintain a clear waterway area at the highway bridges.

8.4 DOWNSTREAM WATER LEVEL

Modelling of design flood events that does not include tidal surge levels has applied a downstream water level equivalent to a mean high water springs (MHWS) tide level of 0.60 m AHD. Sensitivity tests have been undertaken for a change in the assumed tidal boundary (excluding surge) by assessing both a highest astronomical tide (HAT) of 0.80m AHD and lowest astronomical tide (LAT) of -0.90 m AHD. The changes in flooding behaviour are summarised in Table 20.

Table 20: Summary of changes in flooding behaviour – downstream water level sensitivity tests

Sensitivity test	Changes in flooding behaviour
Increased tide level (HAT=0.80 m AHD)	Peak flood level increases do not propagate further upstream than the mouth of the Snug River due to the constricted channel at this location
Decreased tide level (LAT=-0.90 m AHD)	Peak flood level decreases do not propagate further upstream than the mouth of the Snug River due to the constricted channel at this location

These changes in flooding behaviour indicate that the tide level (excluding tidal surge) applied in conjunction with fluvial runoff events has negligible effect on flooding characteristics of the Snug River. Therefore, the tidal condition adopted for design event modelling is considered to be appropriate for this study.

8.5 AR&R RAINFALL PARAMETERS

As discussed in Section 6.4, the design rainfall estimates and temporal patterns have been derived using the methodology described in Australian Rainfall and Runoff 2016 (Ball et al., 2016). A sensitivity test has been undertaken using the design event modelling methodology described in Australian Rainfall and Runoff 1987 (Pilgrim, 1987).

The changes in flooding behaviour are summarised in Table 21.

Table 21: Summary of changes in flooding behaviour – downstream water level sensitivity tests

Sensitivity test	Changes in flooding behaviour
ARR1987 Rainfall Parameters	• Peak flood level increases upstream of the highway of up to 0.15m • Peak flood level increases downstream of the highway of up to 0.16m, transitioning to a 0.12m increase in the wider part of the estuary • Minor increases in the extents of flooding both upstream and downstream of the highway

These changes in flooding behaviour indicate that the application of design rainfall parameters from ARR2016 yields less conservative flood levels and flooding behaviour compared with ARR1987. This indicates the need for calibration and validation of the model for future rainfall and flood events (requiring data to be collected at the time of any future event), and for application of freeboard to the predicted flood levels for the purpose of setting design levels for future development.

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9 CLIMATE CHANGE ANALYSIS

9.1 ADOPTED CLIMATE CHANGE PARAMTERS

The potential impacts of predicted climate change have been considered for future flood events in the years 2050 and 2100. Climate Futures for Tasmania modelling (White et al., 2010) indicates that the 24-hour 1% AEP event rainfall intensities may increase by 10% to 30% in south-eastern Tasmania. Potential changes in rainfall intensity may vary for different duration events.

Sea level rise due to climate change has been derived from the 2015 report *Sea-Level Rise Planning Allowances for Kingston Beach, Tasmania* (Hunter, 2015). This report advocates the following sea level rise allowances summarised in Table 22.

Table 22: Sea Level Rise Allowances for Years 2050 and 2100 (Hunter, 2015)

Source of storm tide data	Year 2010 - 2050	Year 2010 – 2100
Storm-tide model	0.24 m	0.99 m
Hobart tide gauge	0.23 m	0.94 m

Based on the above predictions for increased rainfall intensities and sea level rise, the climate change analysis for this study has been undertaken by applying the following:

Table 23: Rainfall intensities and sea level rise for climate change scenarios

Year	Change in rainfall/sea level rise
2050	• 10% increase in rainfall intensities • 0.30 m sea level rise
2100	• 30% increase in rainfall intensities • 1.00 m sea level rise

9.2 FLOOD MAPPING AND DISCUSSION OF RESULTS

Flood mapping for these climate change scenarios has been prepared, as provided in Appendix B for year 2050 and Appendix C for year 2100. Flood maps have been prepared for each climate change scenario, with separate maps for peak water levels, depths, velocities and flood hazard categories. Additional mapping has been prepared showing the differences in peak water levels compared with the equivalent existing climate model results.

Table 24 provides an index of the flood mapping for the year 2050 (Appendix B), whilst Table 25 provides an index of the flood mapping for the year 2100 (Appendix C).

Table 24: Climate Change Analysis Flood Mapping Index – Year 2050

Figure No.	Map Type	Catchment Flood Event	Coastal Flood Condition (Water Level Boundary)
B-01	Water Levels	1% AEP + 10% rainfall intensity	MHWS +0.3m SLR (0.90 m AHD)
B-02	Water Levels	1% AEP + 10% rainfall intensity	5% AEP +0.3m SLR (1.77 m AHD)
B-03	Water Levels	5% AEP + 10% rainfall intensity	1% AEP +0.3m SLR (1.87 m AHD)
B-04	Water Levels	20% AEP + 10% rainfall intensity	20% AEP +0.3m SLR (1.50 m AHD)
B-05	Depths	1% AEP + 10% rainfall intensity	MHWS +0.3m SLR (0.90 m AHD)
B-06	Depths	1% AEP + 10% rainfall intensity	5% AEP +0.3m SLR (1.77 m AHD)
B-07	Depths	5% AEP + 10% rainfall intensity	1% AEP +0.3m SLR (1.87 m AHD)
B-08	Depths	20% AEP + 10% rainfall intensity	20% AEP +0.3m SLR (1.50 m AHD)
B-09	Velocities	1% AEP + 10% rainfall intensity	MHWS +0.3m SLR (0.90 m AHD)
B-10	Velocities	1% AEP + 10% rainfall intensity	5% AEP +0.3m SLR (1.77 m AHD)
B-11	Velocities	5% AEP + 10% rainfall intensity	1% AEP +0.3m SLR (1.87 m AHD)
B-12	Velocities	20% AEP + 10% rainfall intensity	20% AEP +0.3m SLR (1.50 m AHD)
B-13	Hazard	1% AEP + 10% rainfall intensity	MHWS +0.3m SLR (0.90 m AHD)
B-14	Hazard	1% AEP + 10% rainfall intensity	5% AEP +0.3m SLR (1.77 m AHD)
B-15	Hazard	5% AEP + 10% rainfall intensity	1% AEP +0.3m SLR (1.87 m AHD)
B-16	Hazard	20% AEP + 10% rainfall intensity	20% AEP +0.3m SLR (1.50 m AHD)
B-17	Differences	1% AEP + 10% rainfall intensity	MHWS +0.3m SLR (0.90 m AHD)
B-18	Differences	1% AEP + 10% rainfall intensity	5% AEP +0.3m SLR (1.77 m AHD)
B-19	Differences	5% AEP + 10% rainfall intensity	1% AEP +0.3m SLR (1.87 m AHD)
B-20	Differences	20% AEP + 10% rainfall intensity	20% AEP +0.3m SLR (1.50 m AHD)

Table 25: Climate Change Analysis Flood Mapping Index – Year 2100

Figure No.	Map Type	Catchment Flood Event	Coastal Flood Condition (Water Level Boundary)
C-01	Water Levels	1% AEP + 30% rainfall intensity	MHWS +1.0m SLR (1.60 m AHD)
C-02	Water Levels	1% AEP + 30% rainfall intensity	5% AEP +1.0m SLR (2.47 m AHD)
C-03	Water Levels	5% AEP + 30% rainfall intensity	1% AEP +1.0m SLR (2.57 m AHD)
C-04	Water Levels	20% AEP + 30% rainfall intensity	20% AEP +1.0m SLR (2.20 m AHD)
C-05	Depths	1% AEP + 30% rainfall intensity	MHWS +1.0m SLR (1.60 m AHD)
C-06	Depths	1% AEP + 30% rainfall intensity	5% AEP +1.0m SLR (2.47 m AHD)
C-07	Depths	5% AEP + 30% rainfall intensity	1% AEP +1.0m SLR (2.57 m AHD)
C-08	Depths	20% AEP + 30% rainfall intensity	20% AEP +1.0m SLR (2.20 m AHD)

Figure No.	Map Type	Catchment Flood Event	Coastal Flood Condition (Water Level Boundary)
C-09	Velocities	1% AEP + 30% rainfall intensity	MHWS +1.0m SLR (1.60 m AHD)
C-10	Velocities	1% AEP + 30% rainfall intensity	5% AEP +1.0m SLR (2.47 m AHD)
C-11	Velocities	5% AEP + 30% rainfall intensity	1% AEP +1.0m SLR (2.57 m AHD)
C-12	Velocities	20% AEP + 30% rainfall intensity	20% AEP +1.0m SLR (2.20 m AHD)
C-13	Hazard	1% AEP + 30% rainfall intensity	MHWS +1.0m SLR (1.60 m AHD)
C-14	Hazard	1% AEP + 30% rainfall intensity	5% AEP +1.0m SLR (2.47 m AHD)
C-15	Hazard	5% AEP + 30% rainfall intensity	1% AEP +1.0m SLR (2.57 m AHD)
C-16	Hazard	20% AEP + 30% rainfall intensity	20% AEP +1.0m SLR (2.20 m AHD)
C-17	Differences	1% AEP + 30% rainfall intensity	MHWS +1.0m SLR (1.60 m AHD)
C-18	Differences	1% AEP + 30% rainfall intensity	5% AEP +1.0m SLR (2.47 m AHD)
C-19	Differences	5% AEP + 30% rainfall intensity	1% AEP +1.0m SLR (2.57 m AHD)
C-20	Differences	20% AEP + 30% rainfall intensity	20% AEP +1.0m SLR (2.20 m AHD)

The changes in flooding behaviour for modelling of the predicted 2050 climate are summarised in Table 26.

Table 26: Changes in flooding behaviour – 2050 climate

Floodplain location	Changes in flooding behaviour
Upstream of the Channel Highway	• Flood levels are predicted to increase by up to 0.10m for a 1% AEP fluvial event (Figure B-17 and Figure B-18) and up to 0.16m for a 20% AEP fluvial event (Figure B-20) • Relatively minor increase in the extents of flooding • Flood levels upstream of the Channel Highway are generally not affected by sea level rise
In the vicinity of the Channel Highway bridges	• Flood level increases of up to 0.13m for all climate change scenarios modelled • Relatively minor increase in the extents of flooding
Downstream of the Channel Highway (i.e. wider reach of the estuary)	• Peak flood levels in the lower reach of the Snug River estuary are significantly affected by the hydraulic control formed by the constriction at the mouth of the river • Flood levels in the wider part of the estuary are predicted to increase by up to o 0.10m for 1% AEP +10% fluvial event with MHWS +0.3m SLR (Figure B-17) o 0.22m for 1% AEP +10% fluvial event with 5% AEP +0.3m SLR (Figure B-18) o 0.28m for 5% AEP +10% fluvial event with 1% AEP +0.3m SLR (Figure B-19) o 0.29m for 20% AEP +10% fluvial event with 20% AEP +0.3m SLR (Figure B-20) o These results indicate that the magnitude of change in flood level is greater for more frequent events • Relatively significant increases in the extent of flooding for all four climate change scenarios, where this is most likely due to the effect of sea level rise

The changes in flooding behaviour for modelling of the predicted 2100 climate are summarised in Table 27.

Table 27: Changes in flooding behaviour – 2100 climate

Floodplain location	Changes in flooding behaviour
Upstream of the Channel Highway	• Flood levels are predicted to increase by up to 0.30m for a 1% AEP fluvial event (Figure C-17 and Figure C-18) and up to 0.43m for a 20% AEP fluvial event (Figure C-20) • Relatively minor increase in the extents of flooding • Flood levels upstream of the Channel Highway are generally not affected by sea level rise
In the vicinity of the Channel Highway bridges	• Flood level increases of up to 0.42m for all climate change scenarios modelled • Relatively minor increase in the extents of flooding
Downstream of the Channel Highway (i.e. wider reach of the estuary)	• Peak flood levels in the lower reach of the Snug River estuary are affected by the hydraulic control formed by the constriction at the mouth of the river, though to a lesser degree compared with 2050 climate • Flood levels in the wider part of the estuary re predicted to increase by up to o 0.40m for 1% AEP +30% fluvial event with MHWS +1.0m SLR (Figure C-17) o 0.82m for 1% AEP +30% fluvial event with 5% AEP +1.0m SLR (Figure C-18) o 0.97m for 5% AEP +30% fluvial event with 1% AEP +1.0m SLR (Figure C-19) o 0.96m for 20% AEP +30% fluvial event with 20% AEP +1.0m SLR (Figure C-20) o These results indicate that the magnitude of change in flood level is greater for more frequent events • Relatively significant increases in the extent of flooding for all four climate change scenarios, where this is most likely due to the effect of sea level rise

9.3 SUMMARY OF CLIMATE CHANGE ANALYSIS

The predicted changes in flooding behaviour due to climate change indicate that increases in peak water levels and flood extents are likely to occur. The increases in peak water levels upstream of and in the general vicinity of the Channel Highway bridges are generally caused by the increased rainfall intensities (fluvial events), while the peak water level increases in the wider part of the estuary are the result of both increased rainfall intensities and sea level rise. It is likely that sea level rise is the major factor affecting the peak water level increases in the lower reach of the estuary.

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

The purpose of this study has been to undertake a detailed flooding assessment of the lower Snug River through the establishment of appropriate hydrological and hydraulic models. The key activities undertaken in preparing this study are as follows:

- Collection and compilation of available data considered relevant for understanding and describing the Snug River catchment and flooding characteristics;
- Engagement with the local community was undertaken via distribution of a questionnaire, aimed at raising general awareness of the study and to garner flood intelligence;
- Development of a hydrological model of the Snug River catchment using XPSWMM®, deriving inflows for the Snug River only (i.e. excluding local stormwater catchments);
- Development of a hydraulic flood model of the lower Snug River using XPSWMM®;
- Calibration of the hydrological model using historic rainfall and gauged flow data, with additional determination of model parameters using a flood frequency analysis for the Snug River streamflow gauging station;
- Analysis of a range of design flood events, with preparation of flood mapping;
- Sensitivity tests for a range of model parameters; and
- Climate change analysis, applying predicted increases in rainfall intensities and sea levels for the years 2050 and 2100.

The results of the hydraulic modelling of design flood events indicate the flooding behaviour summarised in Table 28.

Table 28: Summary of general flooding behaviour in the lower Snug River

Floodplain location	Changes in flooding behaviour
Upstream of the Channel Highway	Flooding is generally contained within the defined river channel and floodplain. This results from a combination of: • High ground on both sides of the river channel; • Relatively few obstructions to flow along the river and floodplain corridor; • A predicted hydraulic grade of less than 1 in 50 (2%)
Downstream of the Channel Highway	Where the river widens out to the estuary in the lower reaches, flooding is affected by the combination of tide level and constriction at the river mouth, in addition to the magnitude of fluvial event in the river

The sensitivity tests undertaken for this study indicate that the various model parameters adopted for design event modelling are appropriate for use in this study. Regarding debris blockage at the Channel Highway bridges, both historic data and sensitivity modelling indicate that flooding may be exacerbated by the accumulation of debris (typically large woody debris) at the Channel Highway bridges. This indicates the need to maintain the bridges as blockage-free to minimise impacts of flooding due to debris blockage.

Modelling of the climate change scenarios indicates that increased peak flood levels and extents of flooding are likely due to increased rainfall intensities and sea level rise. The increases in peak water levels upstream of and in the general vicinity of the Channel Highway bridges are generally caused by the increased rainfall intensities (fluvial events), while the peak water level increases in the wider part of the estuary are the result of both increased rainfall intensities and sea level rise. It is likely that sea level rise is the major factor affecting the peak water level increases in the lower reach of the estuary.

10.2 RECOMMENDATIONS

The recommendations provided in Table 29 have been prepared to address both future uses of the tools developed in preparing the study and the study outcomes.

Table 29: Recommendations for future management of flood risk in the Snug River

Recommendations	
1	That Council further enhance the modelling tools developed for this study, primarily to include local catchments inflows and associated stormwater drainage infrastructure in Snug.
2	That Council collects flood data during and immediately following future flood events to assist with recalibration and/or on-going validation of the modelling tools.
3	That Council develop a long-term strategy for the management of flood risk in the low-lying areas of Snug.
4	That Council investigates an entrance management plan for the mouth of the Snug River with the aim of minimising the constriction that currently exists at the river mouth.
5	That the flood mapping for the 1% AEP, year 2100, developed for this study be endorsed by Council and incorporated into the Kingborough Interim Planning Scheme as a flood overlay for the area (noting that stormwater flooding has not been addressed in this study).
6	That Council establishes and promotes a community education program in conjunction with the SES to provide information on what to do before, during and after a flood event, and to facilitate the communication of existing flood risks at flood-prone properties.

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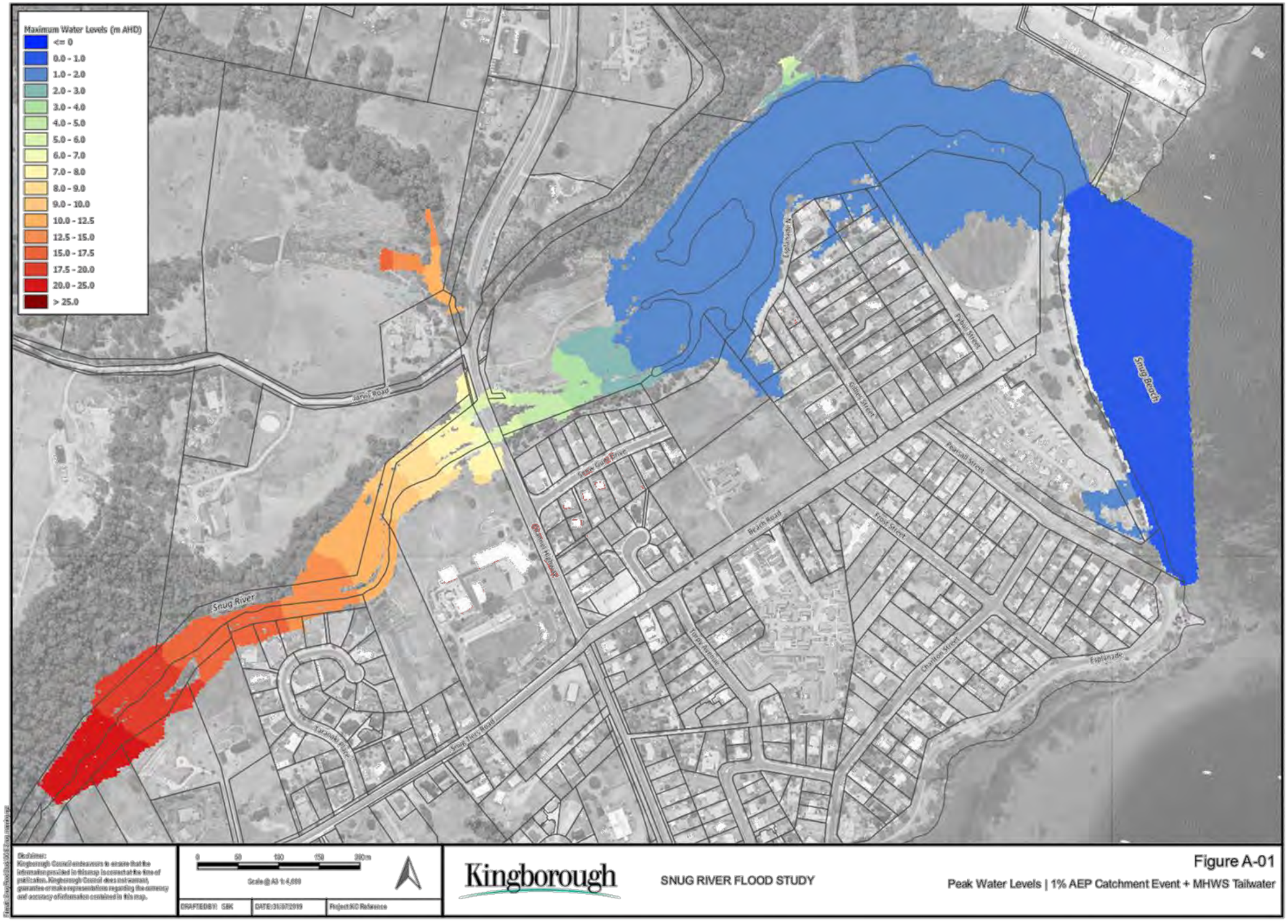
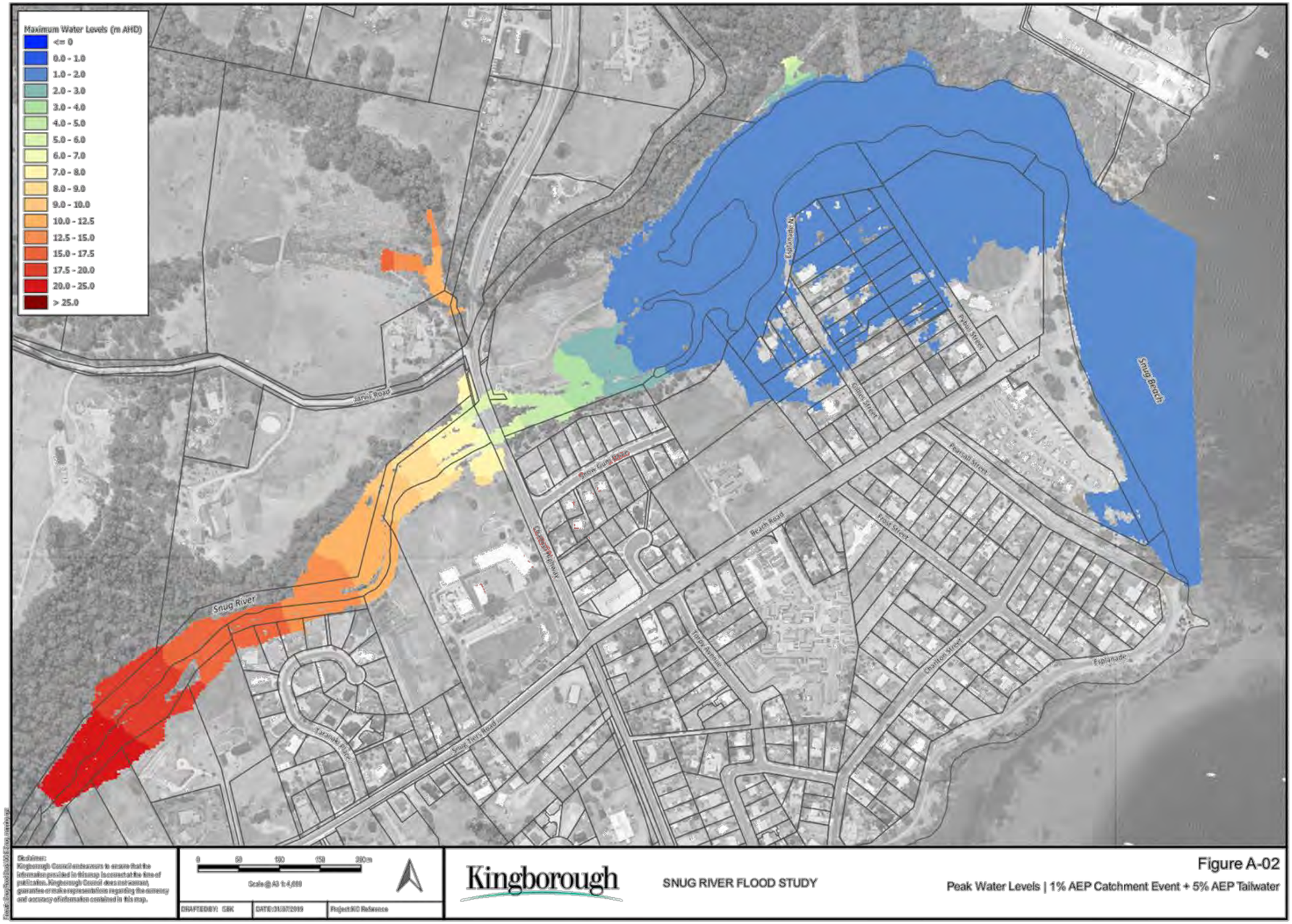
APPENDIX A: Design Flood Mapping Existing Conditions

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6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Zarvos Road
Snug River
Arrow Grove Estate
Clarence Highway
Beach Road
Front Street
Charlton Street
Esplanade
Tasman Avenue
Snug Tiers Road
Taranaki Place
Pebble Street
Gibbins Street
Pearsall Street
Snug Beach
Alexander Dr
Disclaimer:
Kingborough Council endeavours to ensure that the information provided in this map is correct at the time of publication. Kingborough Council does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.
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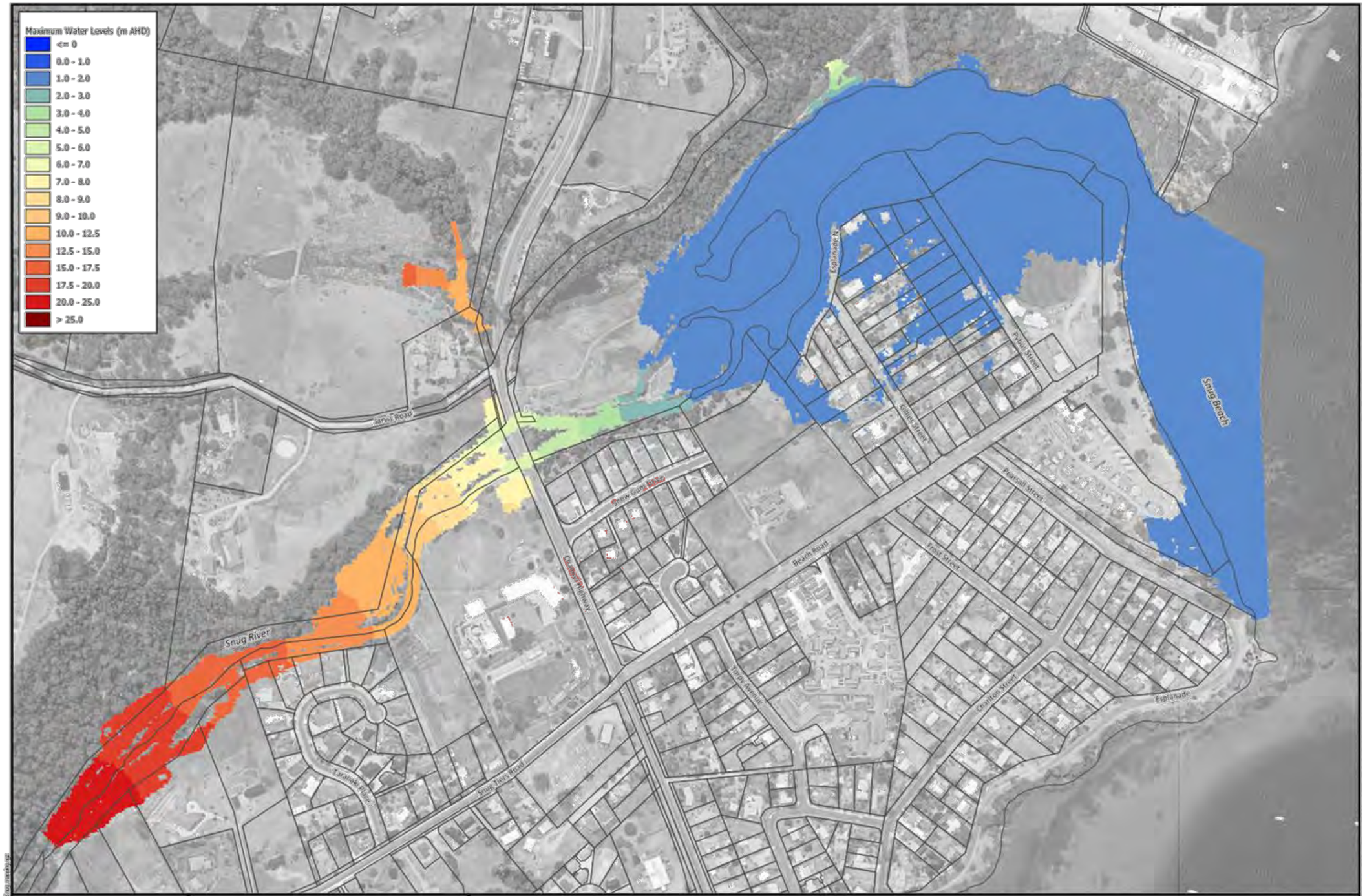
Scale @ A3 1:4,000
DRAFTED BY: GBK
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-02
Peak Water Levels | 1% AEP Catchment Event + 5% AEP Tailwater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17.5 - 20.0
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> 25.0
Snug River
Snug Beach
Beach Road
Esplanade
Snug Tiers Road
Charlton Street
Pebble Street
Pearsall Street
Frost Street
Tasman Highway
Tarany Road
Taranaki Place
Torpy Avenue
Gibbins Street
Alexander St
Disclaimer:
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DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-03
Peak Water Levels | 5% AEP Catchment Event + 1% AEP Tailwater


Maximum Water Levels (m AHD)
<= 0
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1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Snug River
Snug Beach
Beach Road
Esplanade
Snug Tiers Road
Channel Highway
Gillies Street
Pybus Street
Pearsall Street
Frost Street
Charlton Street
Tarah Avenue
Taranaki Place
Snow Gum Place
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DRAFTED BY: SBK
DATE: 31/07/2019
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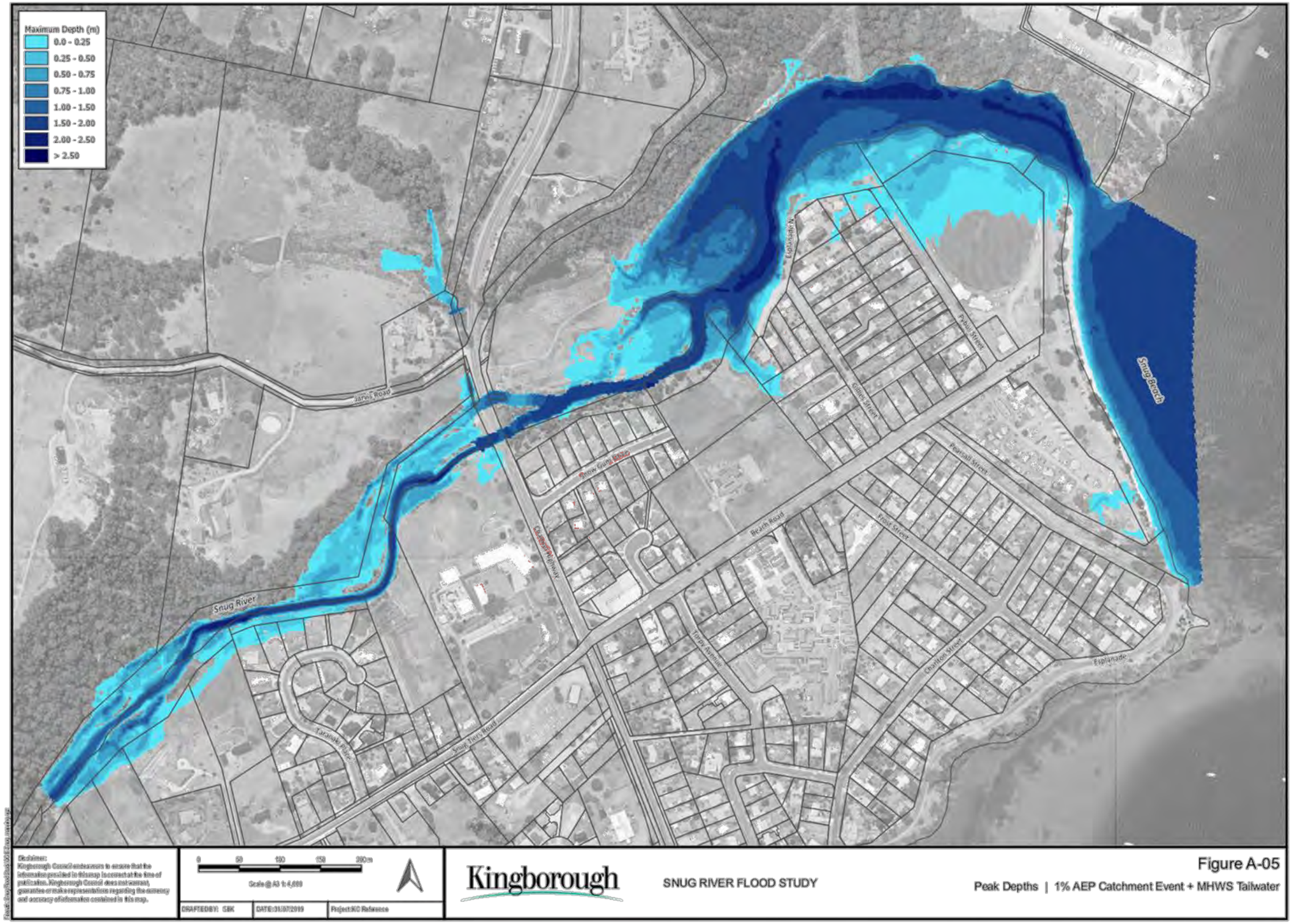
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-04
Peak Water Levels | 20% AEP Catchment Event + 20% AEP Tailwater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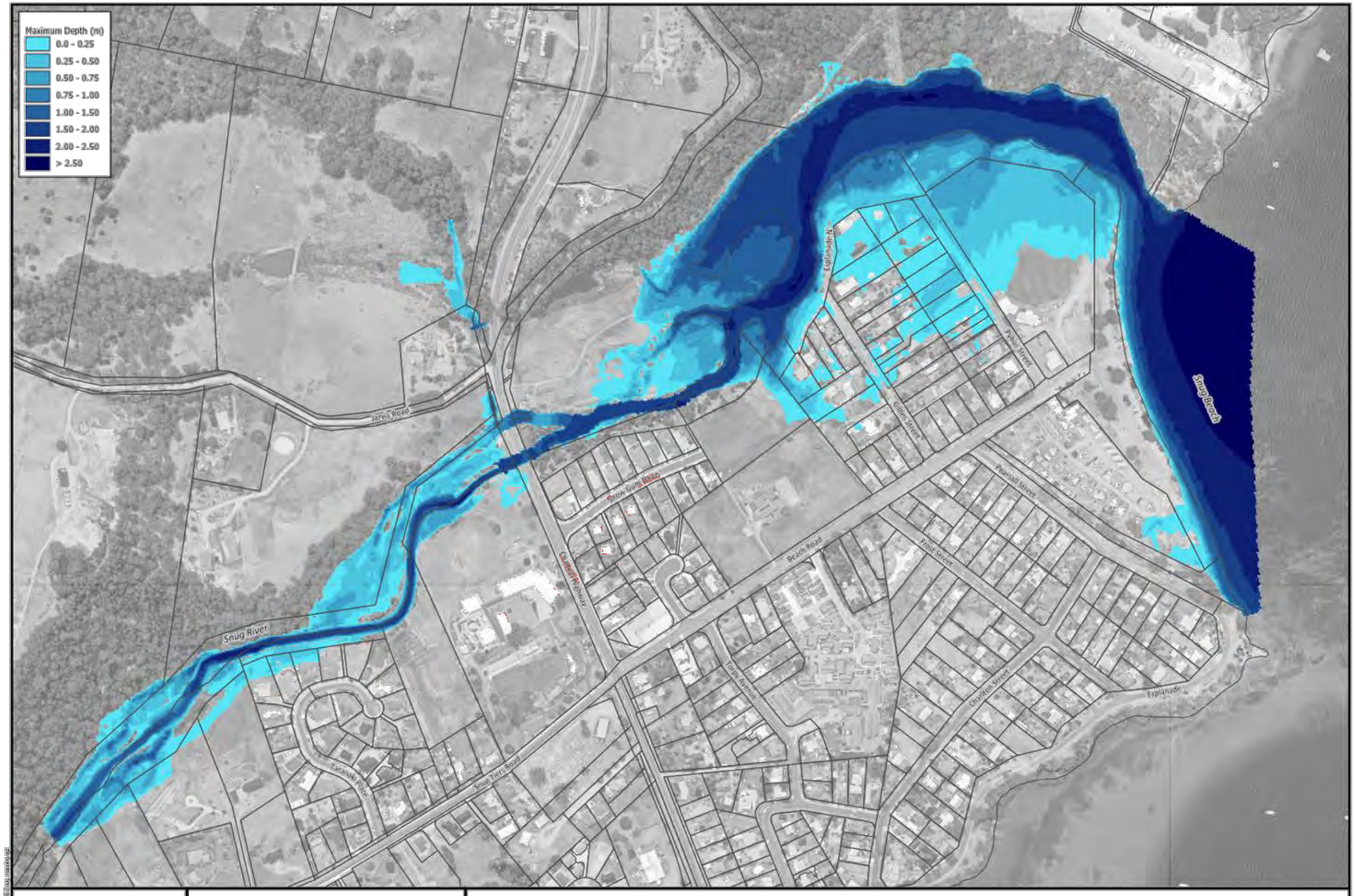
> 2.50
Snug River
Snug Beach
Esplanade
Charlton Street
Front Street
Beach Road
Pearsall Street
Gibbs Street
Penna Street
Snug Tiers Road
Tasman Highway
Taranaki Place
Jarvis Road
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-05
Peak Depths | 1% AEP Catchment Event + MHWS Tailwater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2.00 - 2.50
> 2.50
Snug River
Snug Tiers Road
Beach Road
Esplanade
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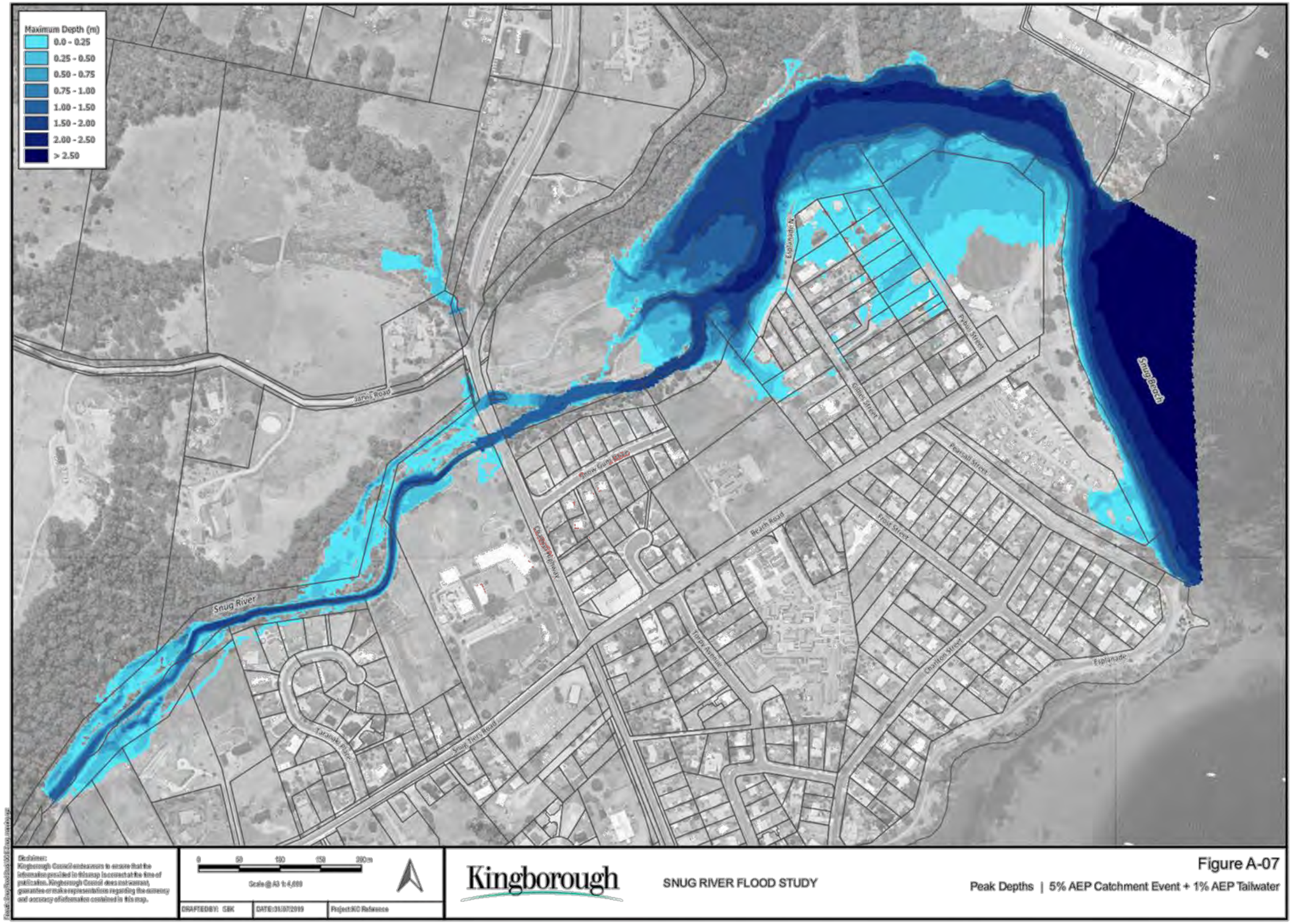
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-06
Peak Depths | 1% AEP Catchment Event + 5% AEP Tailwater


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Esplanade
Beach Road
Front Street
Charlton Street
Gillies Street
Pybus Street
Peatmill Street
Tasman Highway
Snug Tiers Road
Tarana Place
Tasman Avenue
Disclaimer:
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0 50 100 150 200 m
Scale @ A3 1:4,000
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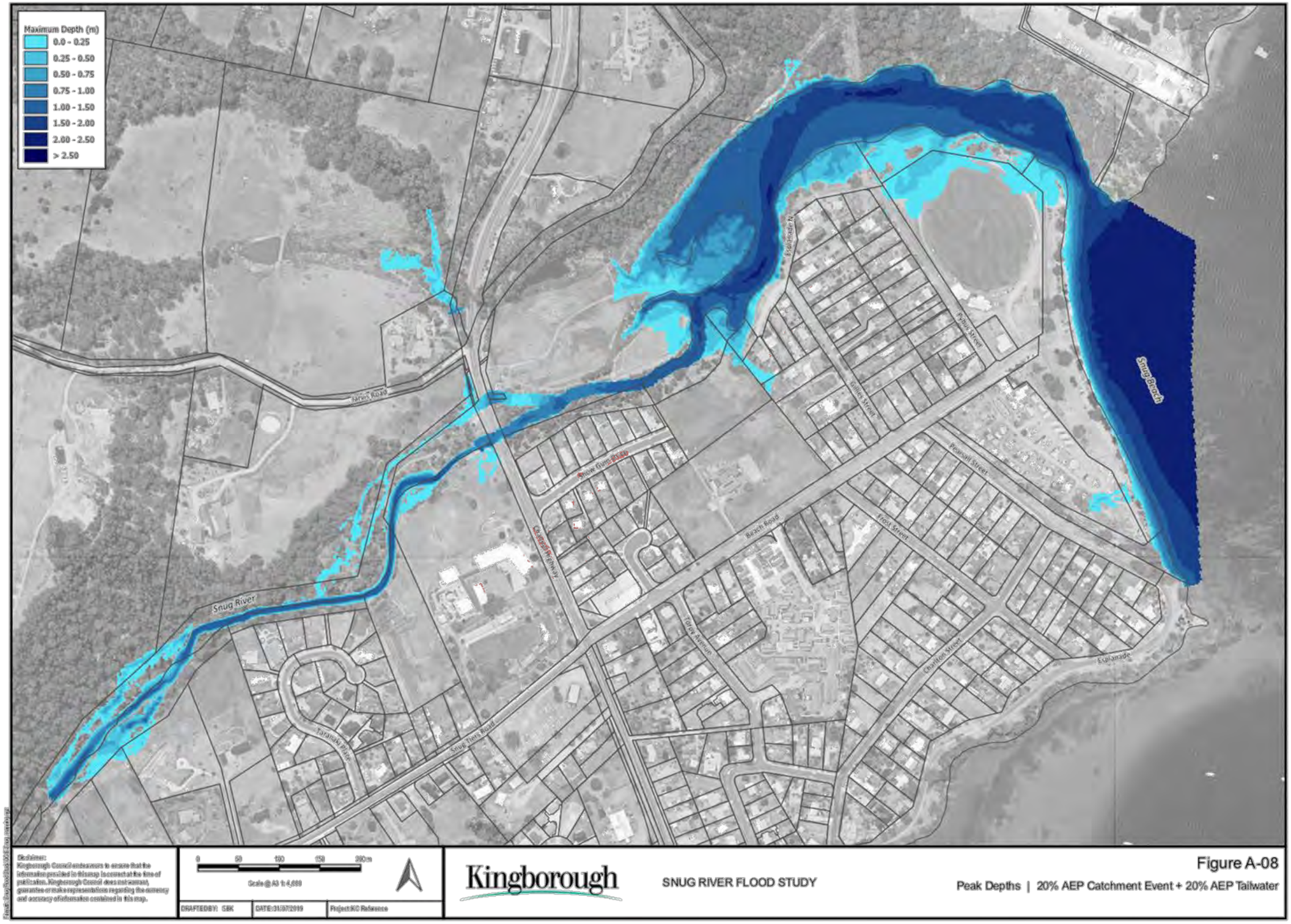
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-07
Peak Depths | 5% AEP Catchment Event + 1% AEP Tailwater


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Arthurs Road
Arrow Glass Drive
Gillies Street
Python Street
Roanall Street
Beach Road
Frost Street
Charlton Street
Esplanade
Tarleton Place
Snug Tiers Road
Tolosa Avenue
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0 50 100 150 200 m
Scale @ A3 1:4,000
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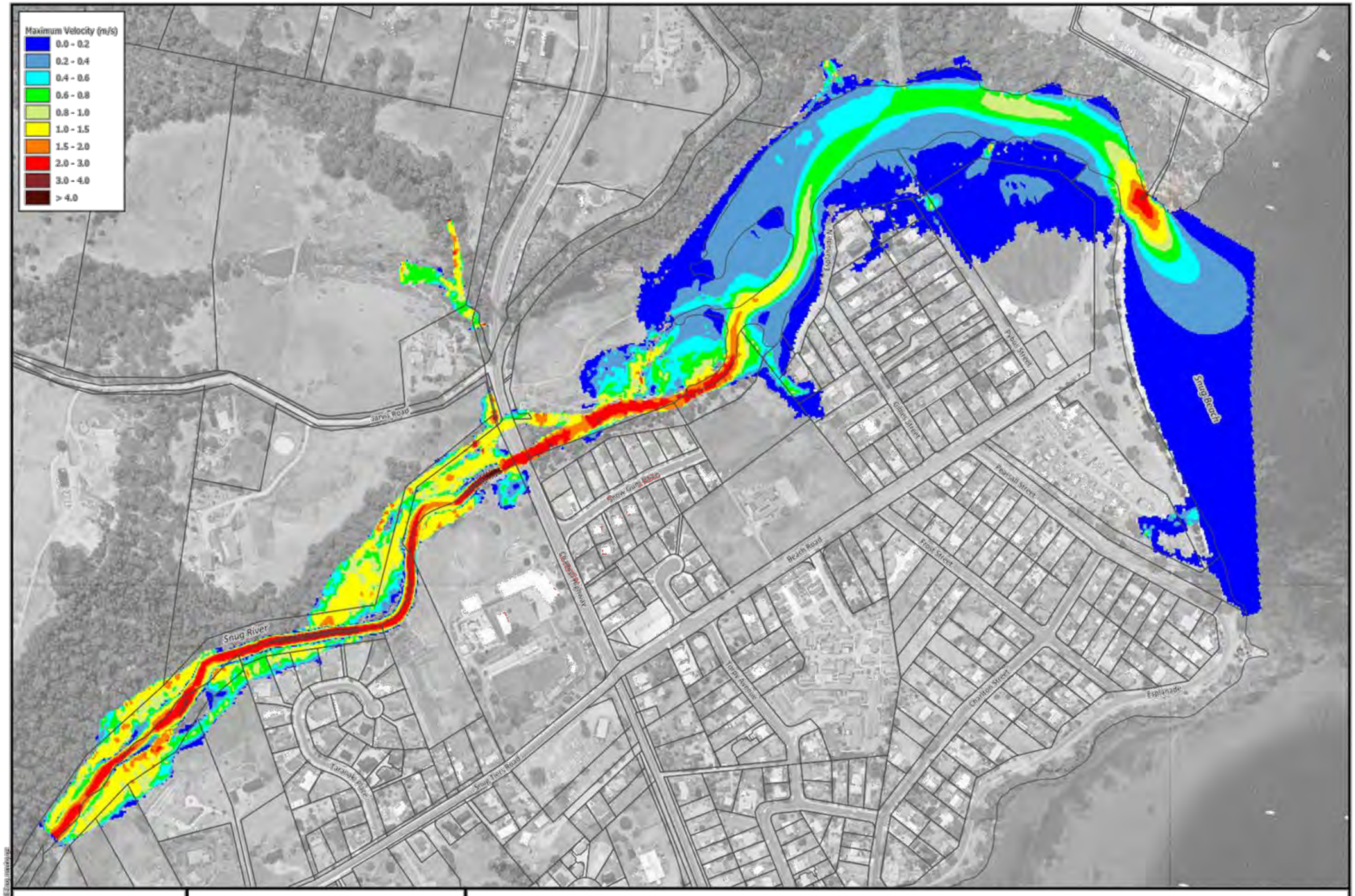
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-08
Peak Depths | 20% AEP Catchment Event + 20% AEP Tailwater


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Pybus Street
Gillies Street
Pearsall Street
Ross Street
Clarkton Street
Torpy Avenue
Snug Beach
Disclaimer:
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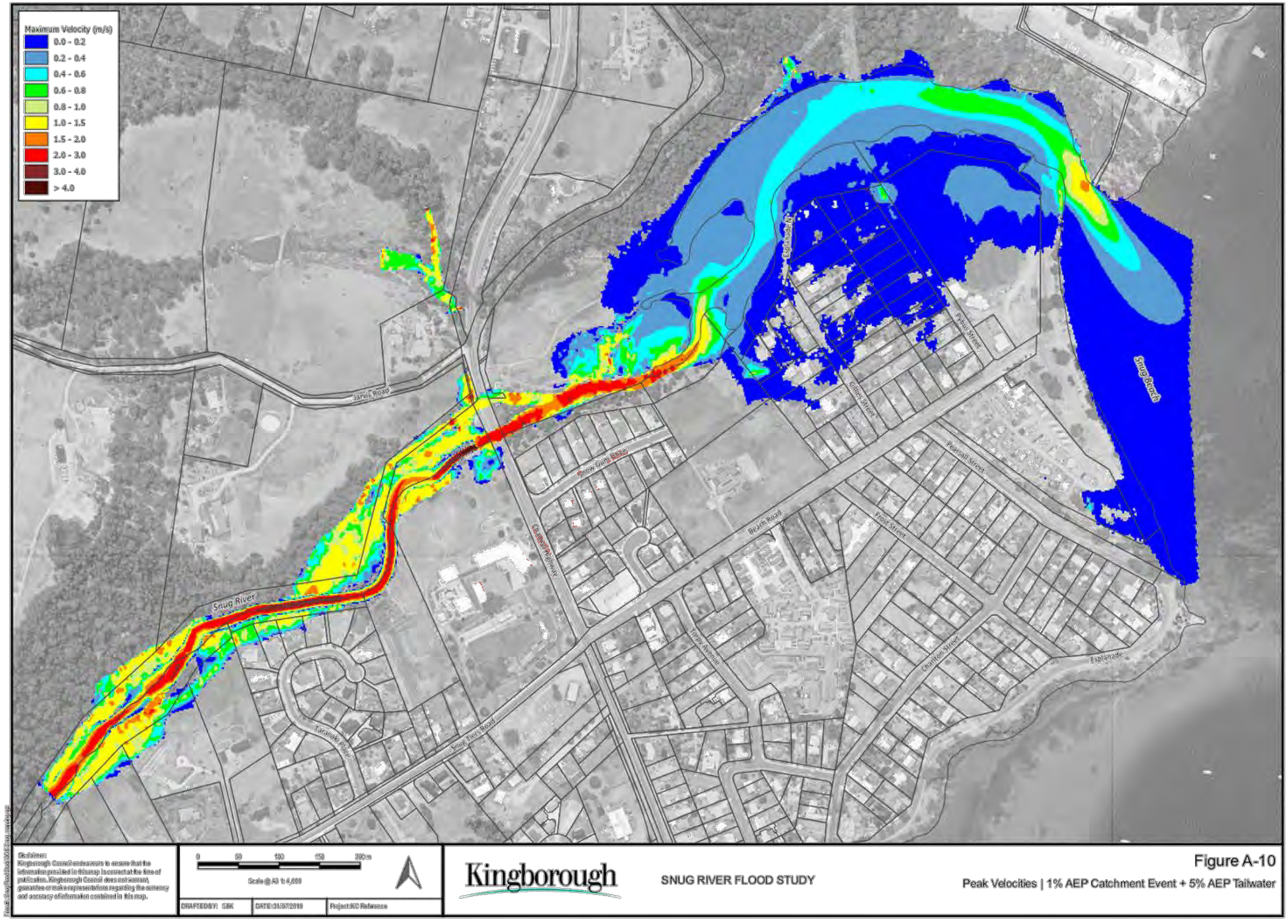
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/07/2019
Project NO Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-09
Peak Velocities | 1% AEP Catchment Event + MHWS Tailwater


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Charlton Street
Frost Street
Pearsall Street
Pybus Street
Gillies Street
Spring Beach
Disclaimer:
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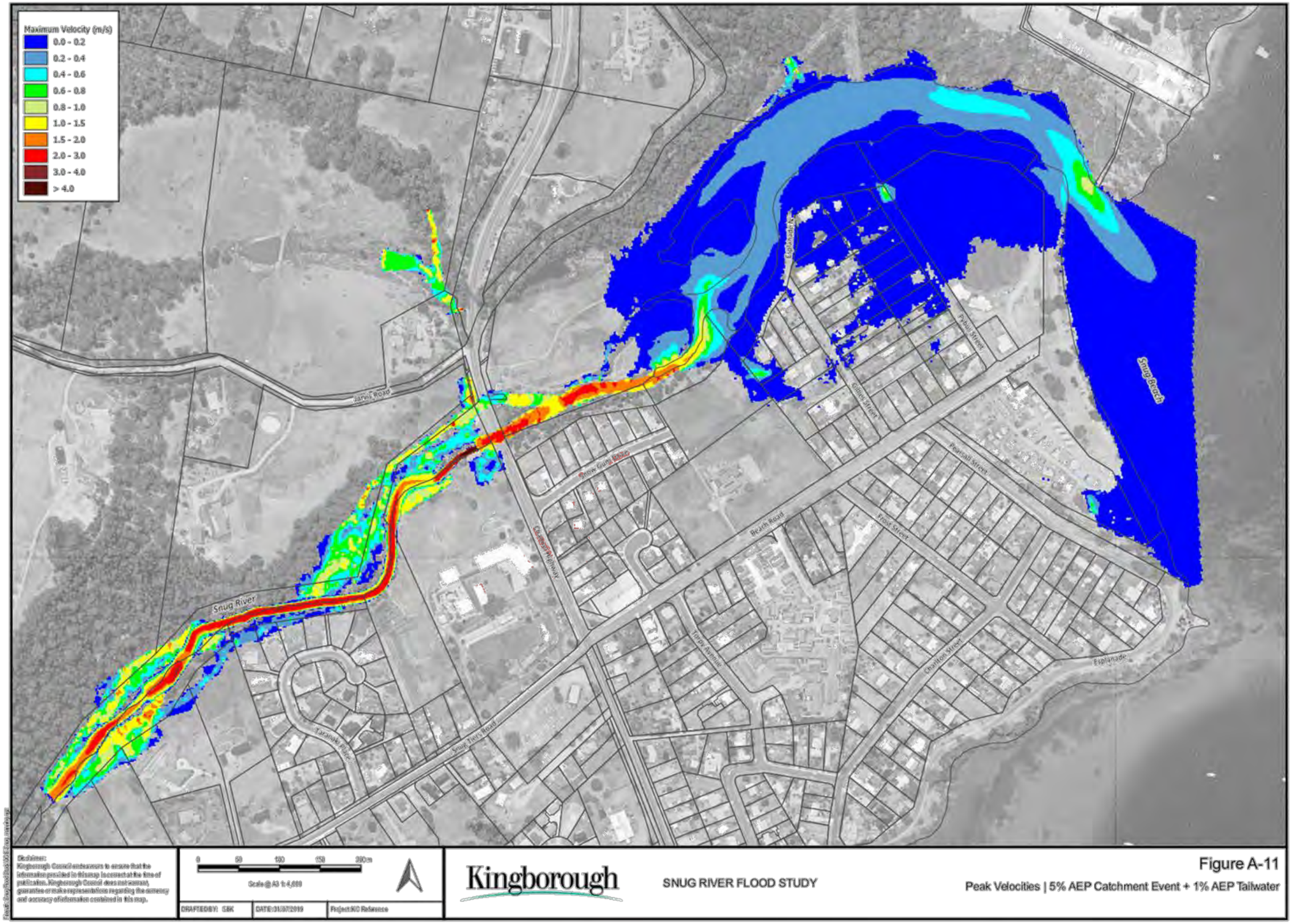
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-10
Peak Velocities | 1% AEP Catchment Event + 5% AEP Tailwater


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Pearsall Street
Frost Street
Charlton Street
Esplanade
Snug Beach
Disclaimer:
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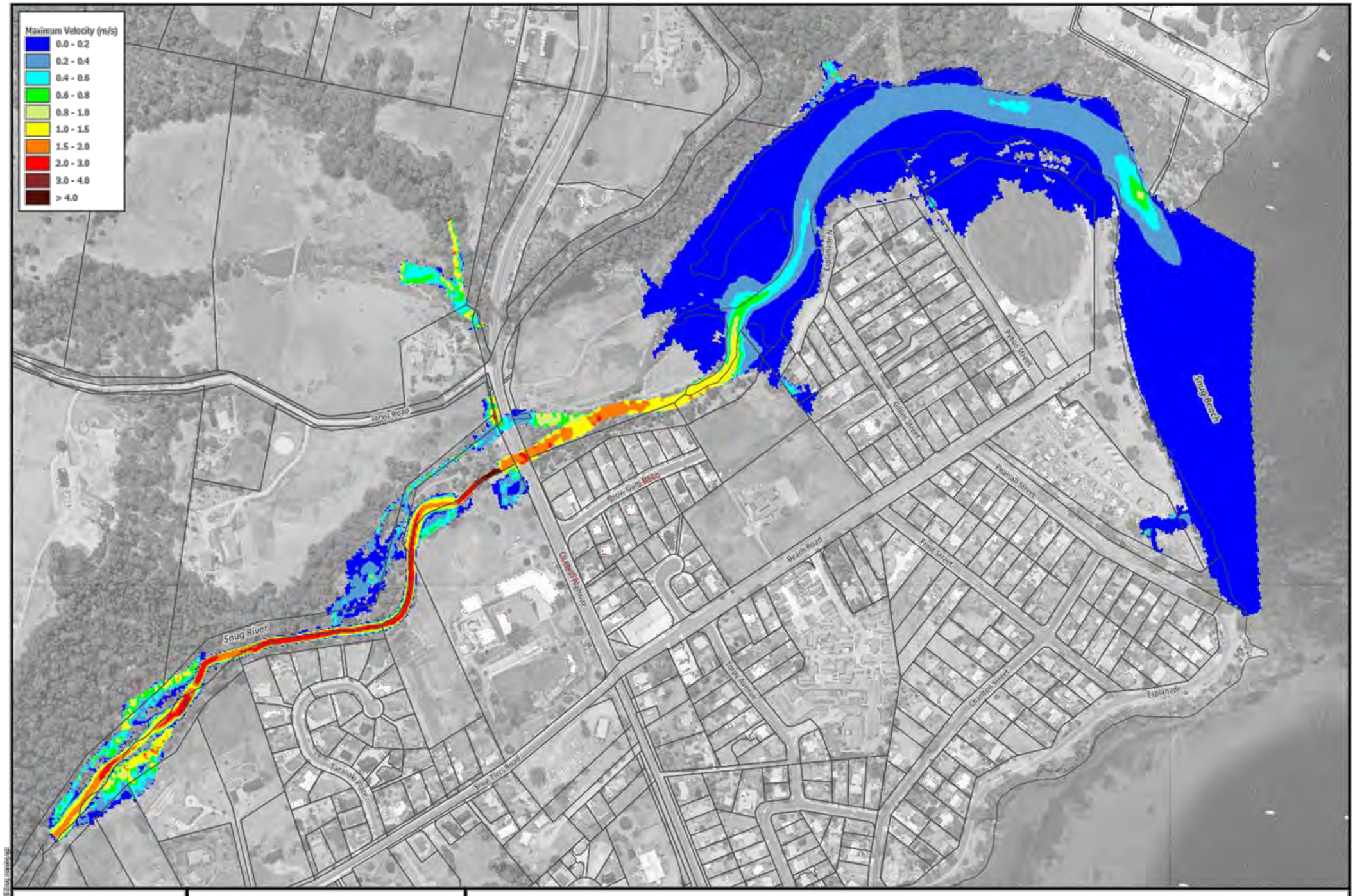
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-11
Peak Velocities | 5% AEP Catchment Event + 1% AEP Tailwater


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Disclaimer:
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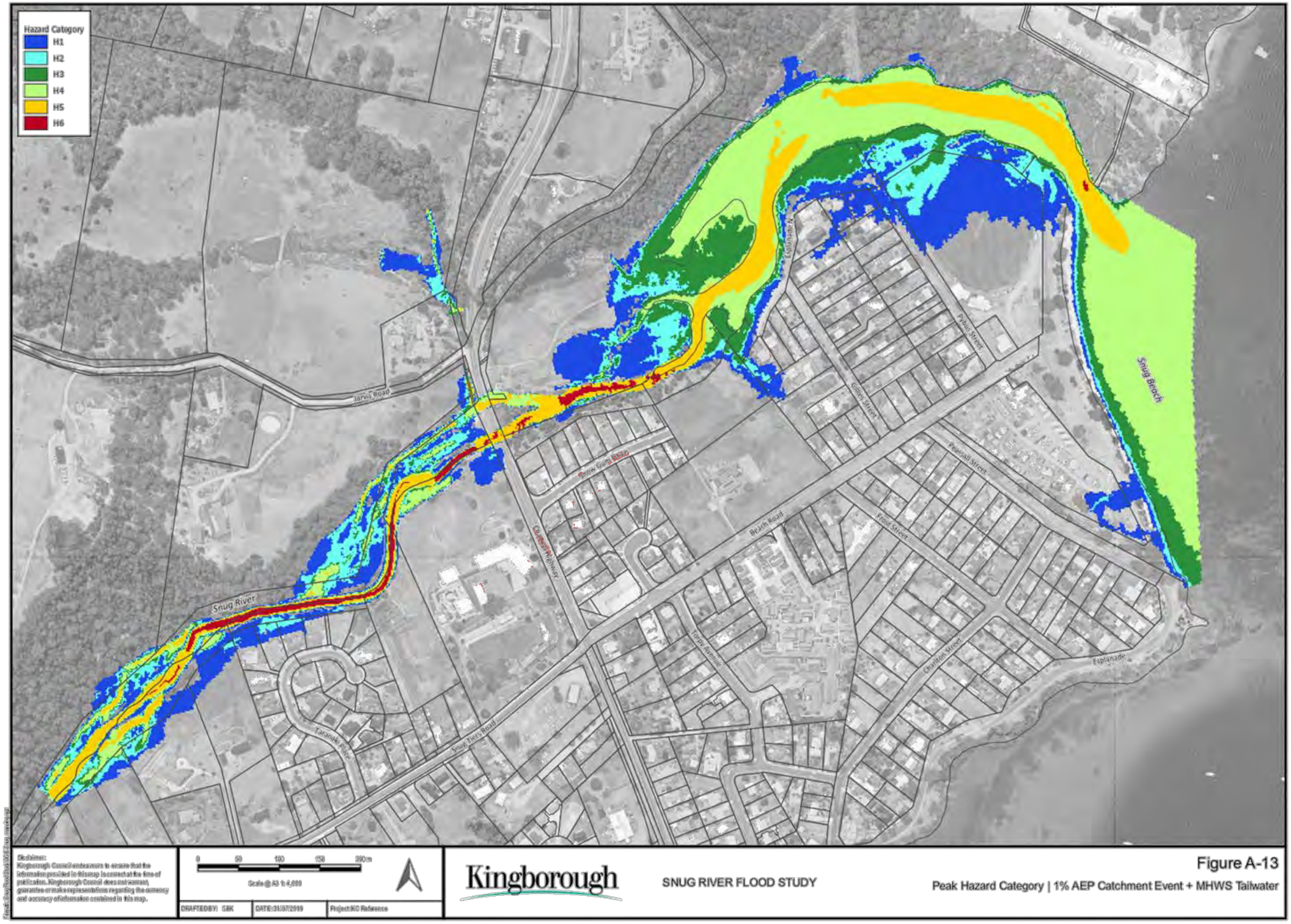
DATE: 31/07/2019
Project NO Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-12
Peak Velocities | 20% AEP Catchment Event + 20% AEP Tailwater


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Esplanade
Charlton Street
Front Street
Pearsall Street
Beach Road
Snug Tiers Road
Tarawhai Place
Tasman Highway
Disclaimer:
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0 50 100 150 200m
Scale @ A3 1:4,000
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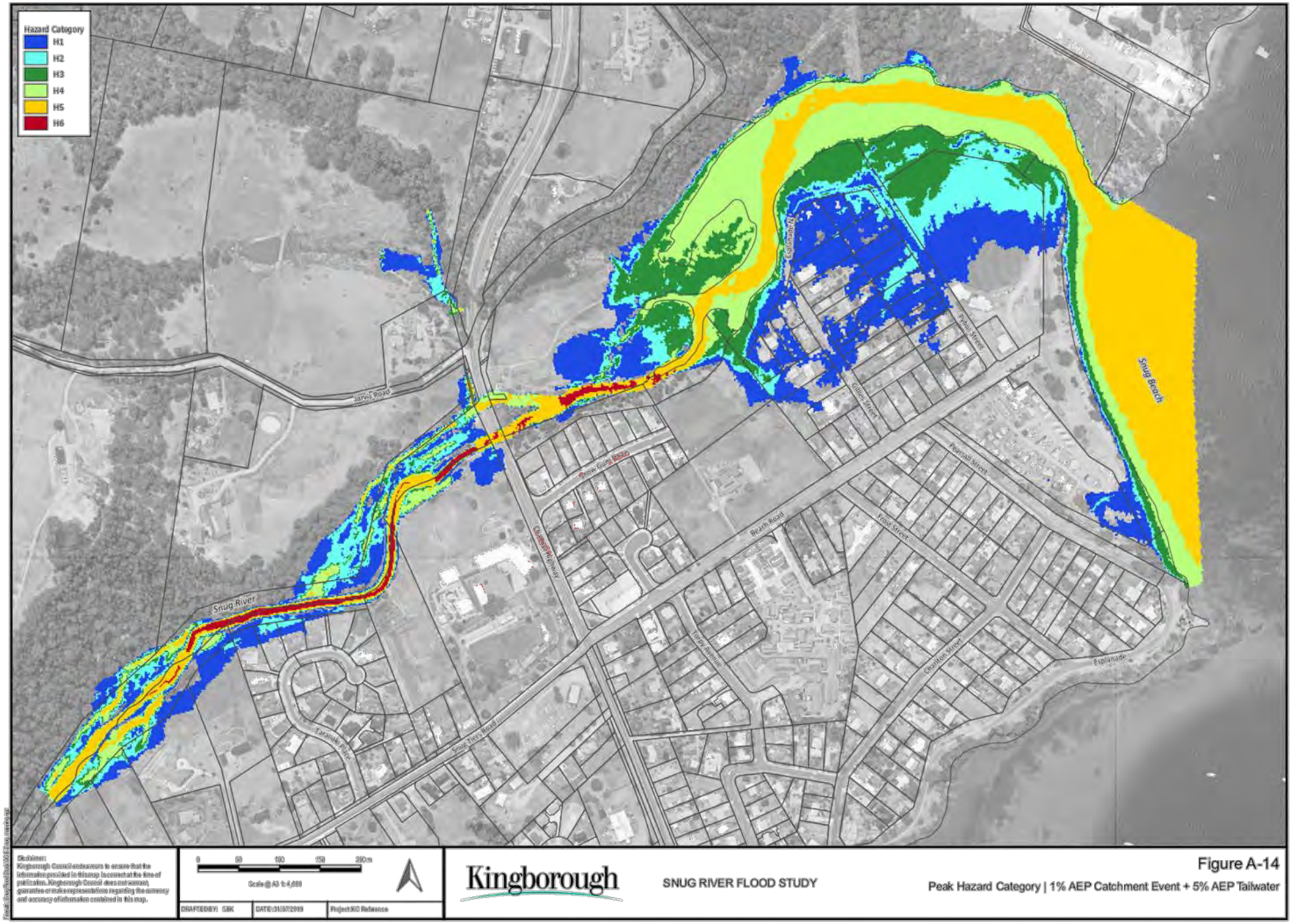
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-13
Peak Hazard Category | 1% AEP Catchment Event + MHWS Tailwater


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Beach Road
Front Street
Pearsall Street
Esplanade
Clarkson Street
Tyler Avenue
Snug Tiers Road
Arve Road
Disclaimer:
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0 50 100 150 200m
Scale @ A3 1:4,000
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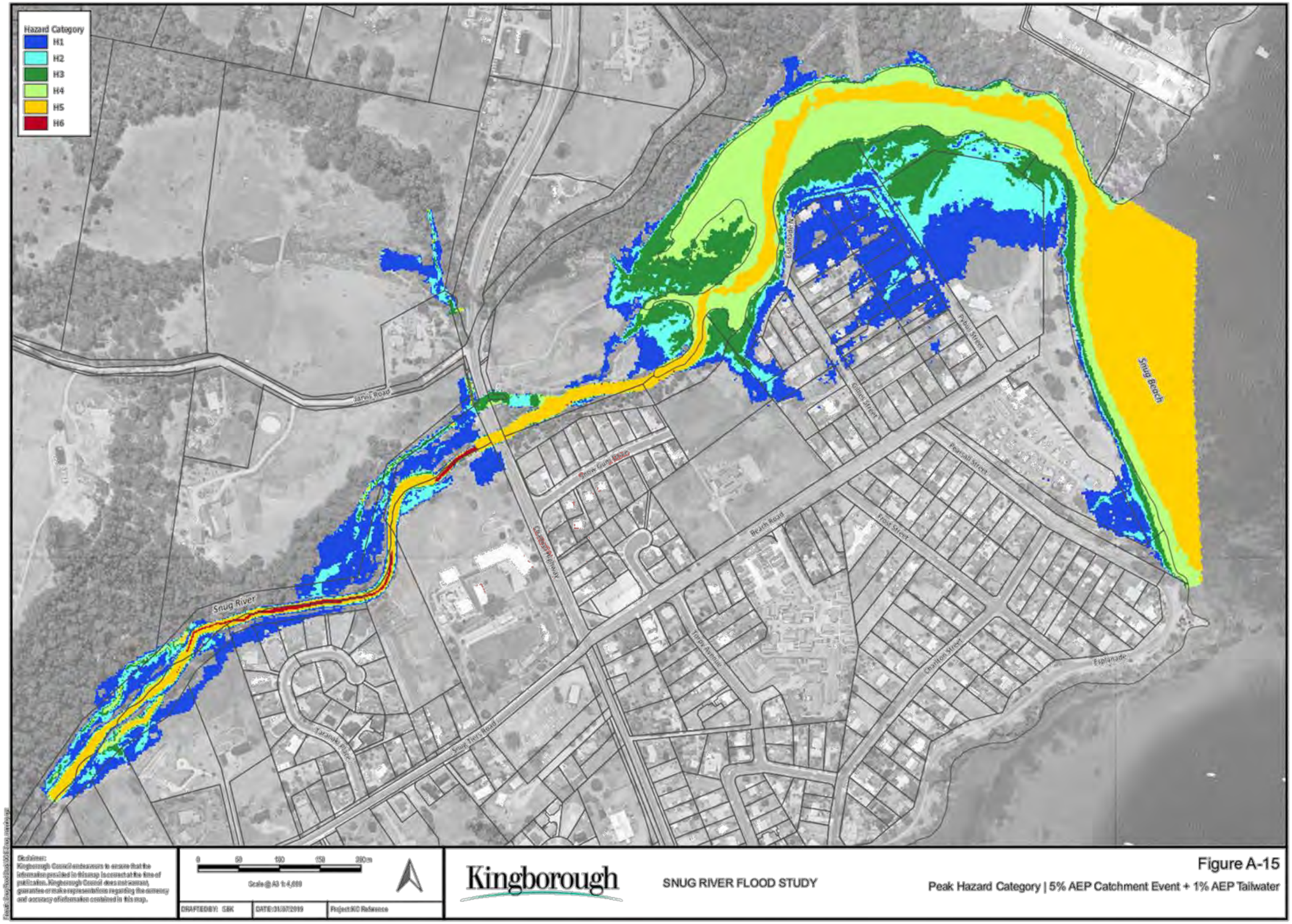
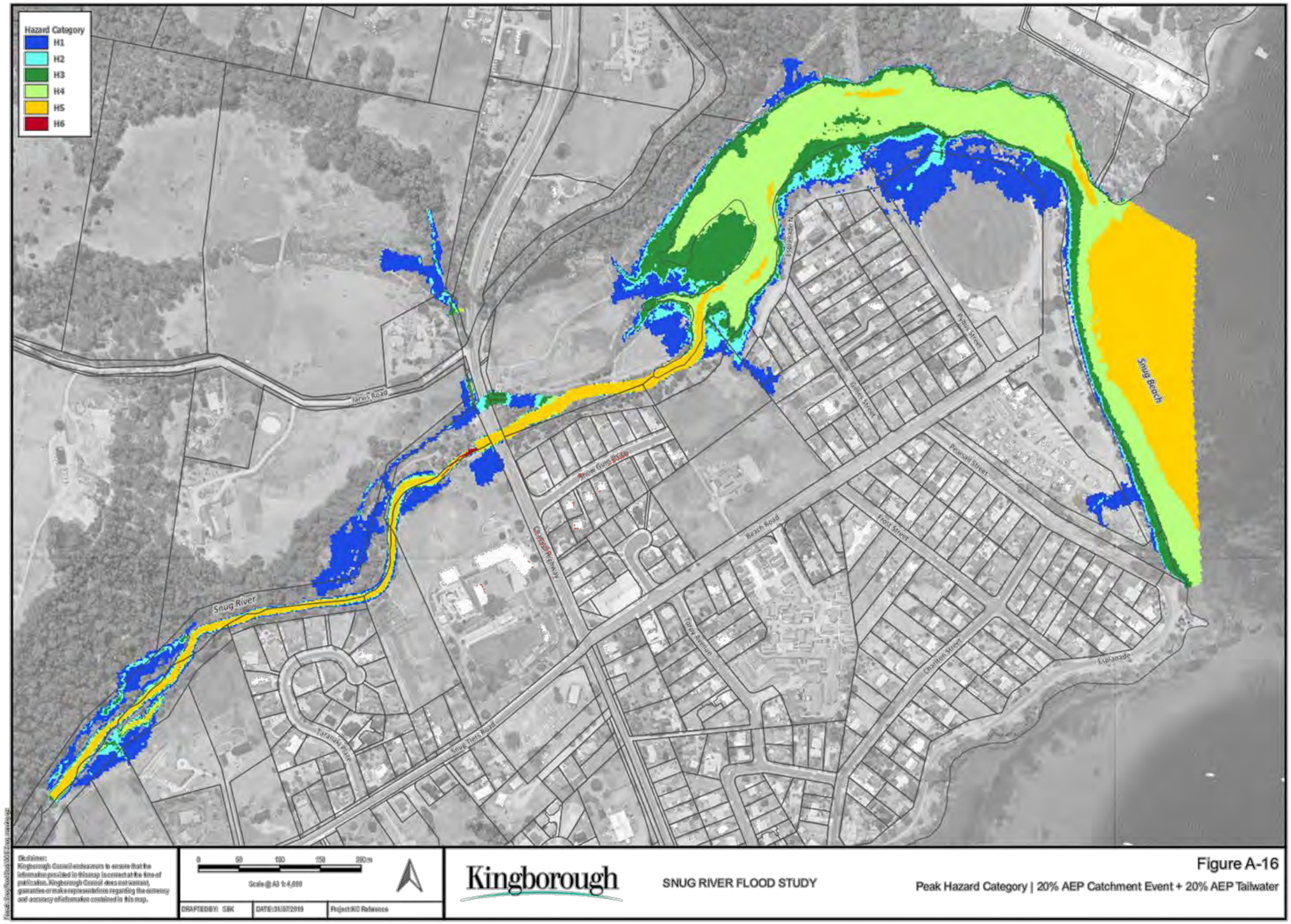
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-14
Peak Hazard Category | 1% AEP Catchment Event + 5% AEP Tailwater


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Beach Road
Front Street
Pearnall Street
Esplanade
Clarence Highway
Snug Tiers Road
Tarandah Place
Torrex Avenue
Crafton Street
Snow Gum Place
Gibbins Street
Lighthouse Rd
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-15
Peak Hazard Category | 5% AEP Catchment Event + 1% AEP Tailwater


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Beach Road
Snug Falls Road
Tarrana Drive
Clarence Parkway
Frost Street
Kanoni Street
Clarion Street
Esplanade
Tobey Avenue
Pybus Street
Gillies Street
Kanoni Avenue
Arthurs Road
Snow Gum Bridge
Disclaimer:
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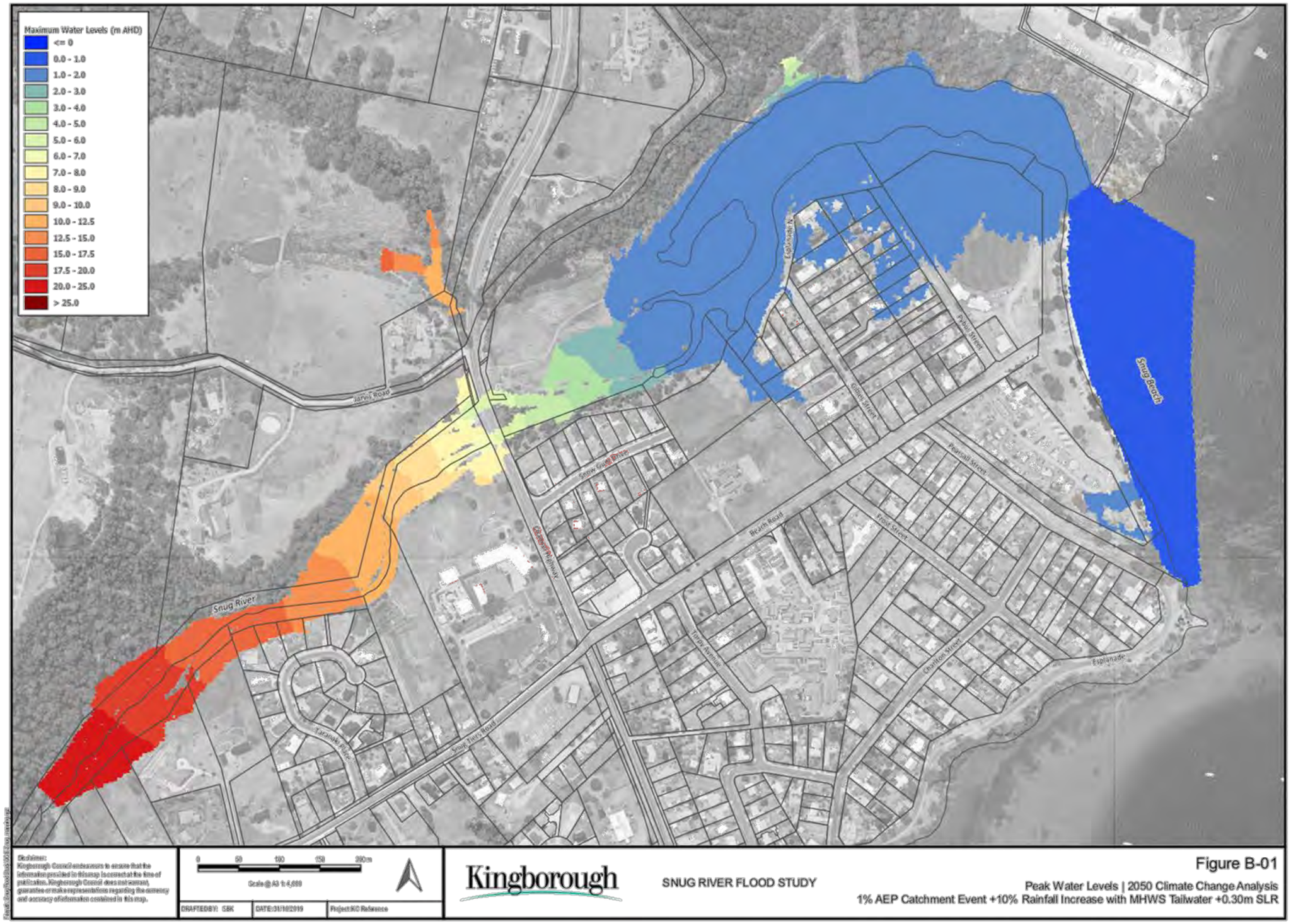
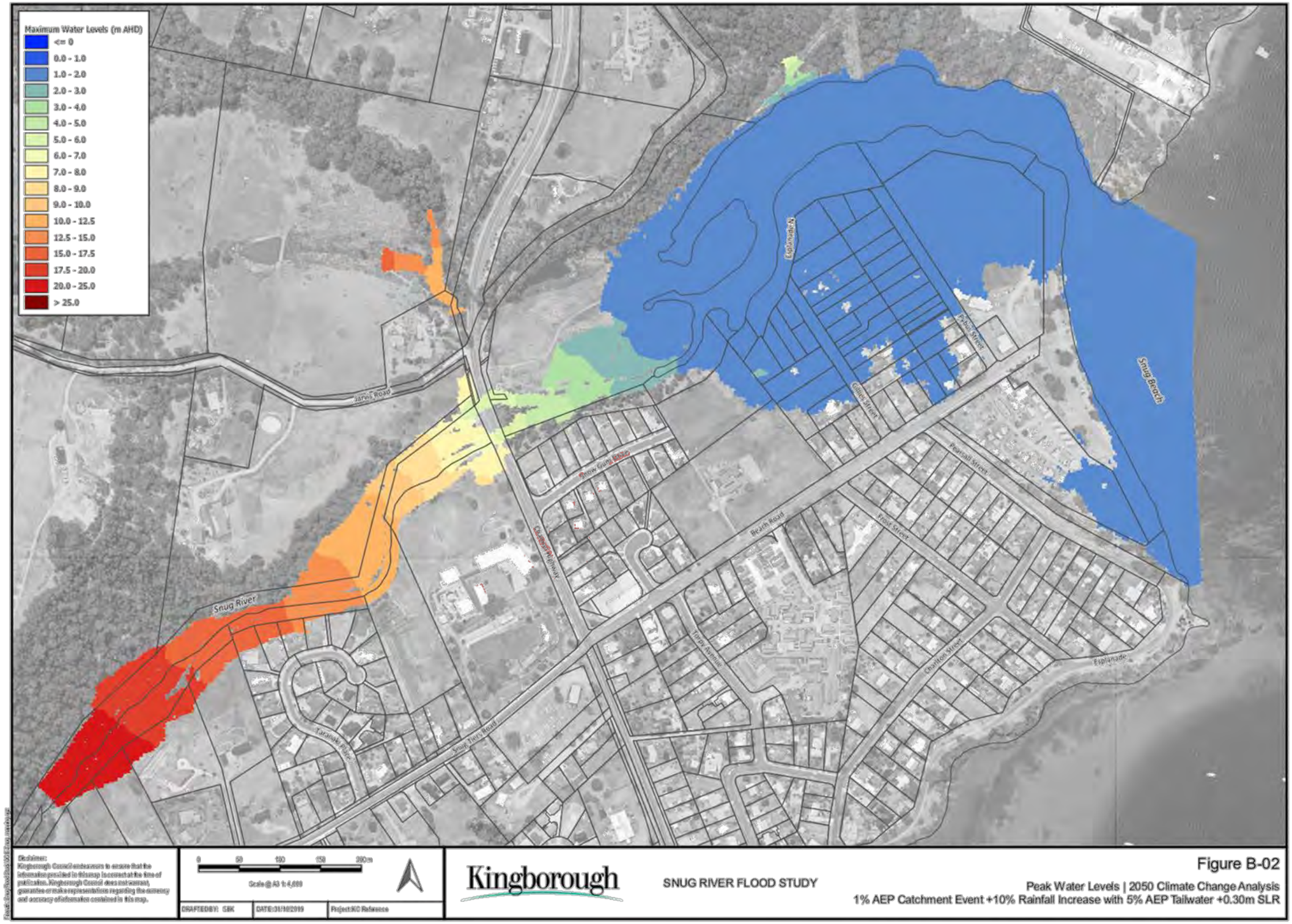
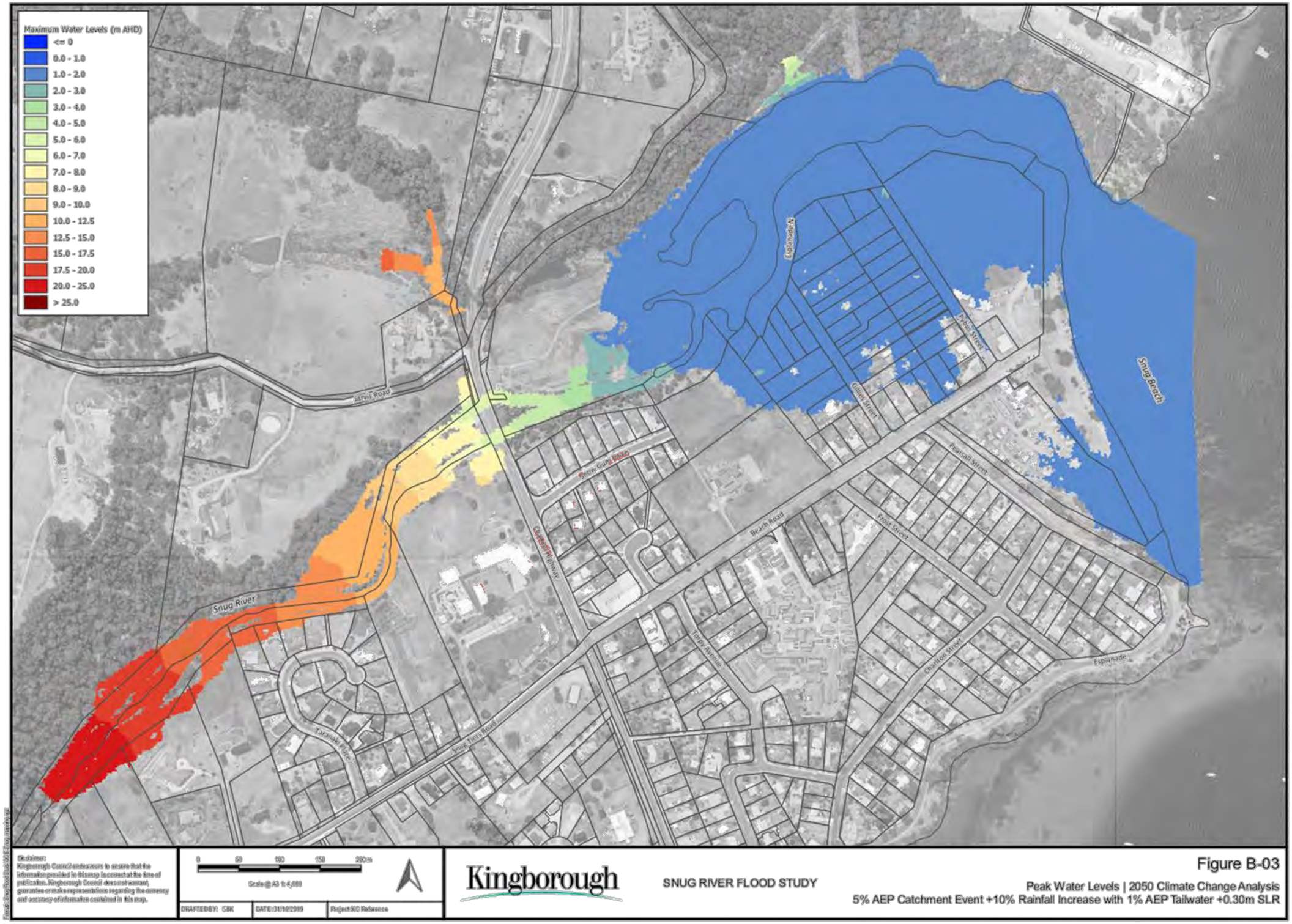
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/07/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure A-16
Peak Hazard Category | 20% AEP Catchment Event + 20% AEP Tailwater

APPENDIX B: Climate Change Analysis Flood Mapping Year 2050




Maximum Water Levels (m AHD)
<= 0
0.0 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Zarvos Road
Snug River
Charlton Highway
Snug Tiers Road
Tarapaka Place
Tiyarra Avenue
Beards Road
Frost Street
Charlton Street
Esplanade
Pearsall Street
Gillies Street
Pybus Street
Leplanader
Snug Beach
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-02
Peak Water Levels | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with 5% AEP Tailwater +0.30m SLR


Maximum Water Levels (m AHD)
<= 0
0.0 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Zarvos Road
Snug River
Snug Beach
Legislator N
Pybus Street
Gillies Street
Pearsall Street
Bruny Gully Road
Channel Highway
Beach Road
Frost Street
Tinpot Avenue
Charlton Street
Esplanade
Snug Tiers Road
Taranaki Place
Disclaimer:
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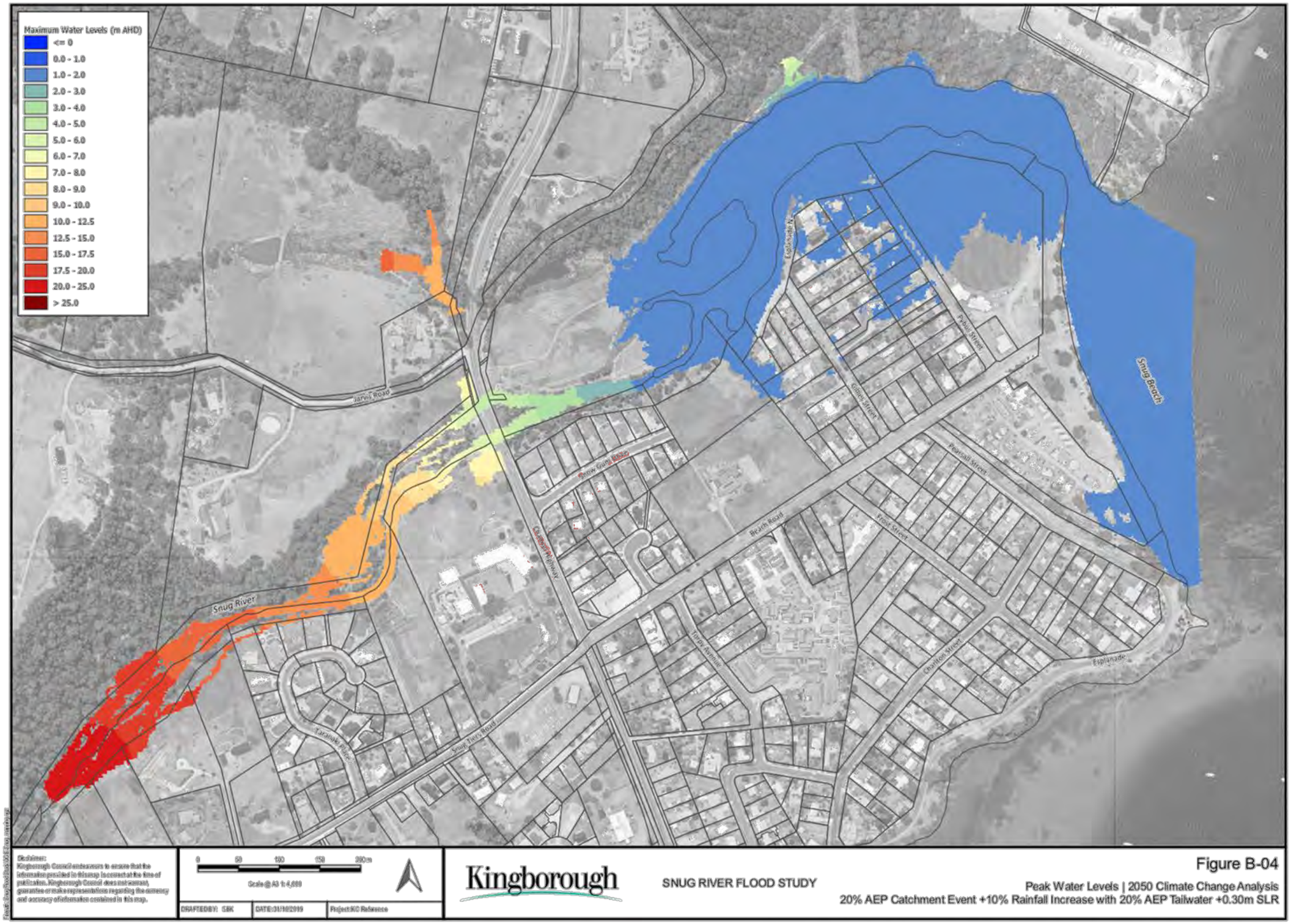
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: GBK
DATE: 31/10/2019
Project/KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-03
Peak Water Levels | 2050 Climate Change Analysis
5% AEP Catchment Event +10% Rainfall Increase with 1% AEP Tailwater +0.30m SLR


Maximum Water Levels (m AHD)
<= 0
0.0 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Snug Beach
Disclaimer:
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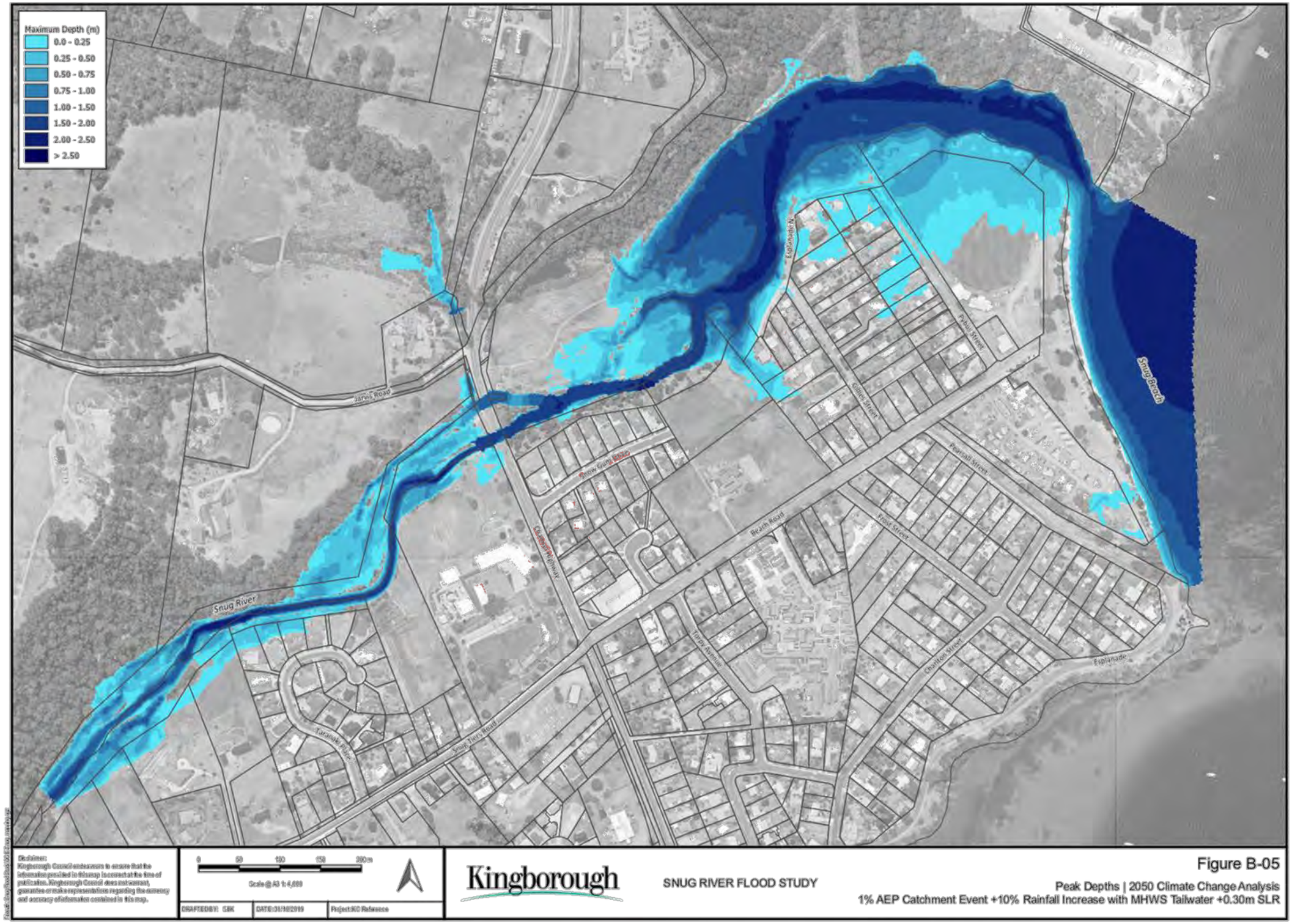
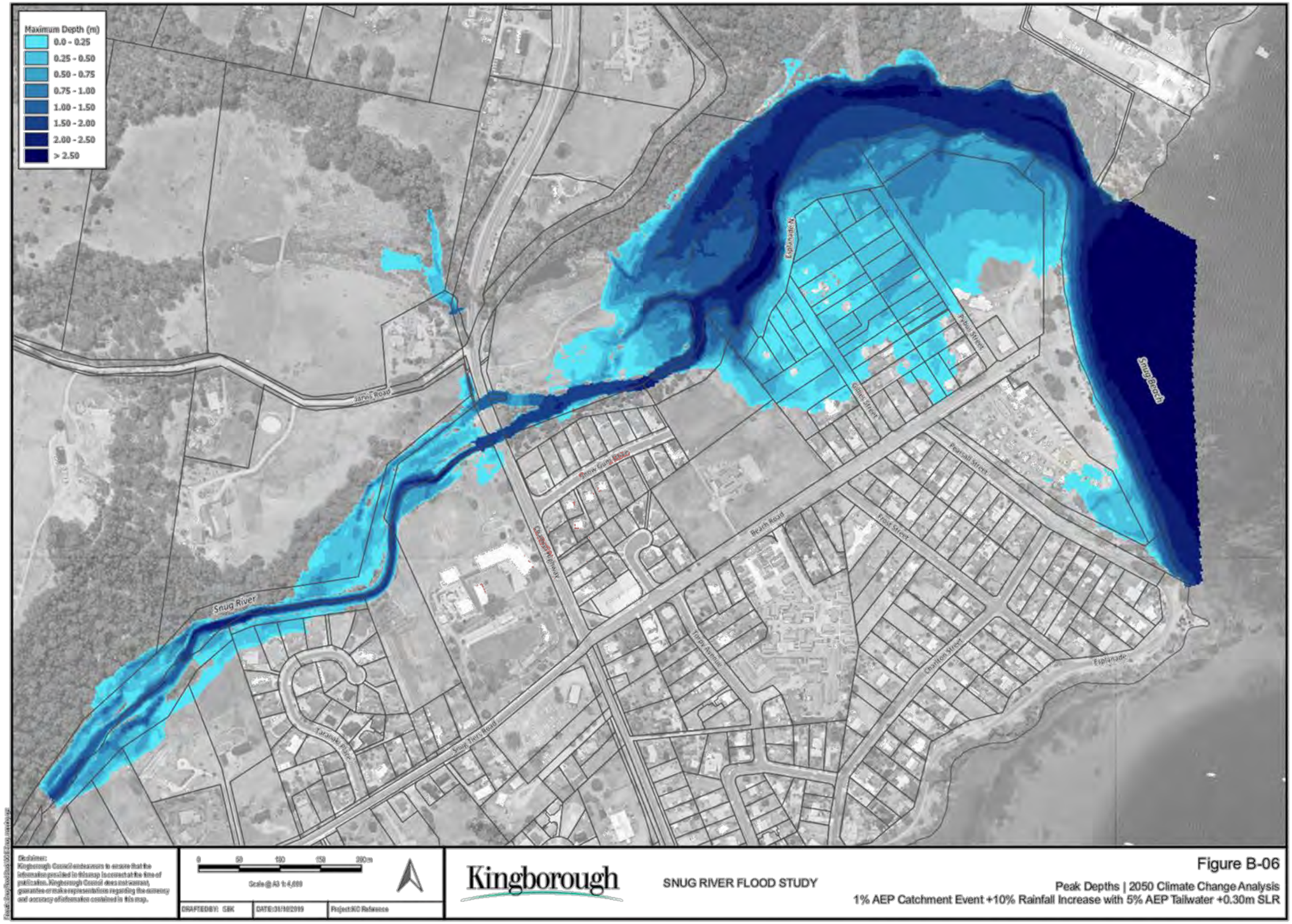
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-04
Peak Water Levels | 2050 Climate Change Analysis
20% AEP Catchment Event +10% Rainfall Increase with 20% AEP Tailwater +0.30m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Esplanade
Charlton Street
Front Street
Beach Road
Pearsall Street
Gibbs Street
Pybus Street
Alexander Dr
Tasman Highway
Snug Tiers Road
Taranaki Place
Tinpenny Avenue
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-05
Peak Depths | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with MHWS Tailwater +0.30m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Esplanade N
Gibbs Street
Pybus Street
Pownall Street
Beach Road
Front Street
Charles Street
Tasman Avenue
Charlton Street
Esplanade
Snug Tiers Road
Taranaki Place
Disclaimer:
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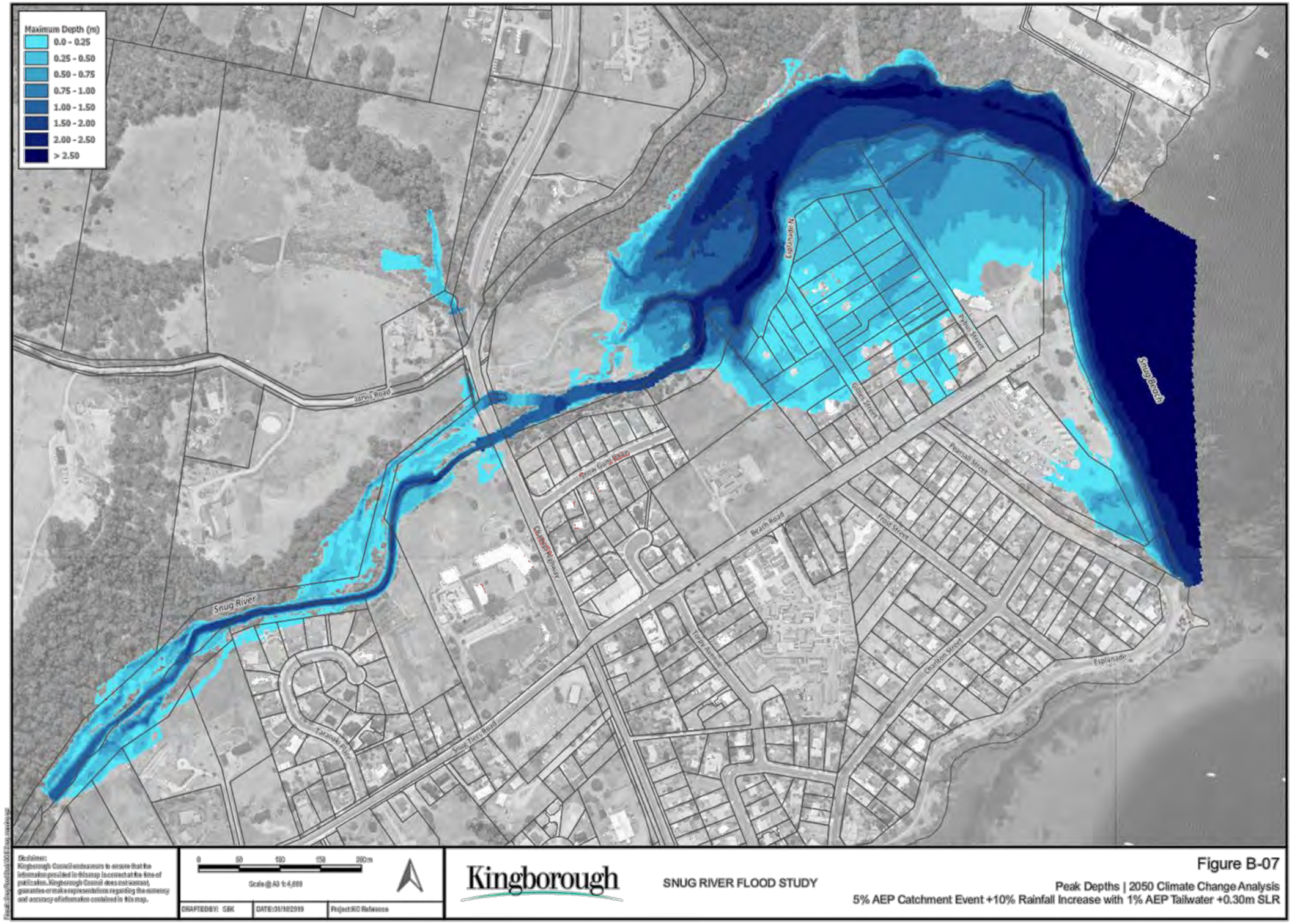
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: GBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-06
Peak Depths | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with 5% AEP Tailwater +0.30m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Esplanade
Charlton Street
Front Street
Beach Road
Pearsall Street
Pybus Street
Gibbs Street
Tasman Highway
Snug Tiers Road
Taranaki Place
Jarvis Road
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0 50 100 150 200 m
Scale @ A3 1:4,000
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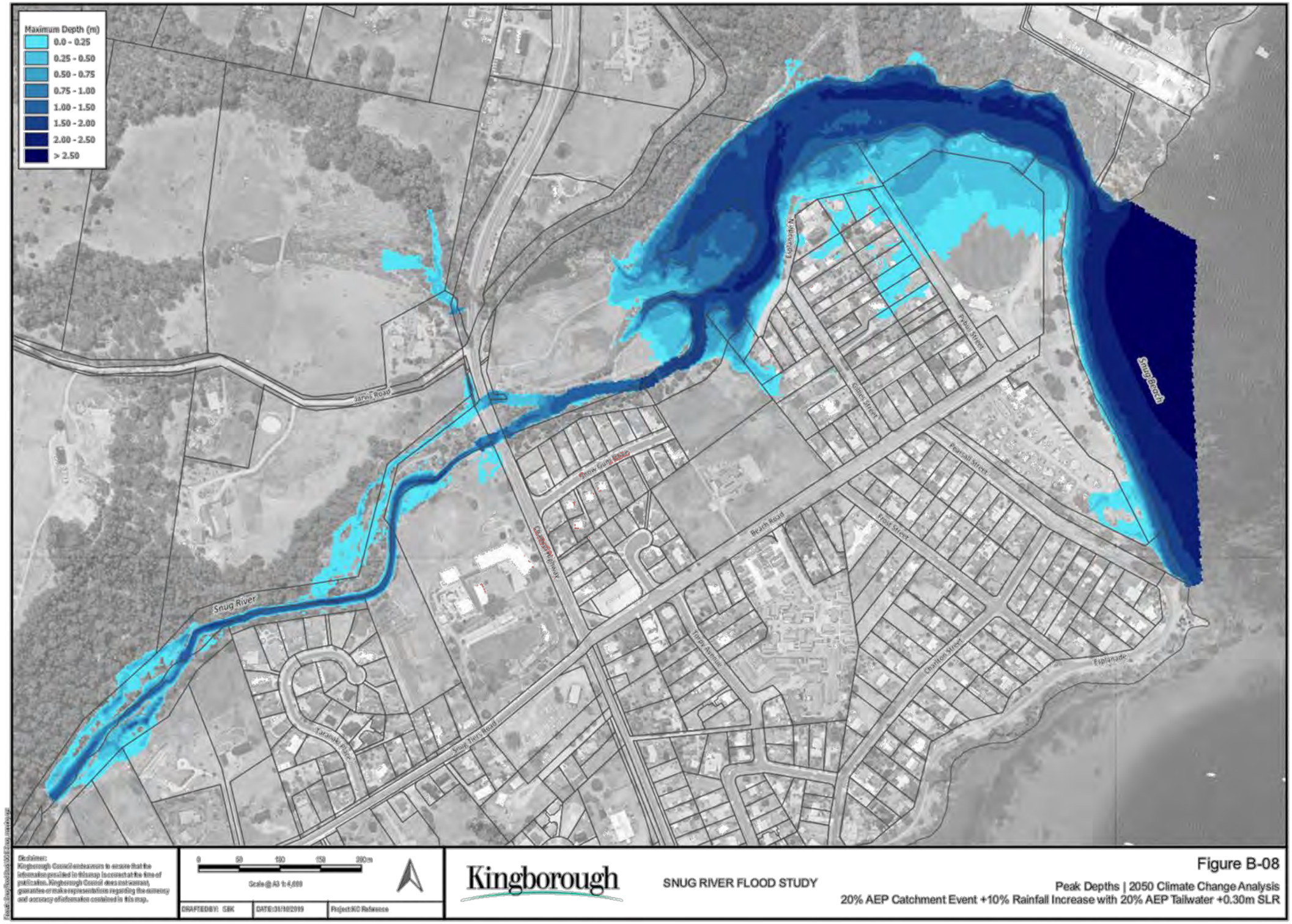
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-07
Peak Depths | 2050 Climate Change Analysis
5% AEP Catchment Event +10% Rainfall Increase with 1% AEP Tailwater +0.30m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Esplanade
Beach Road
Front Street
Charlton Street
Gibbins Street
Pybus Street
Pearsall Street
Tasman Highway
Snug Tiers Road
Tarana Place
Tasman Avenue
Eastlander Dr
Arrow Grove Place
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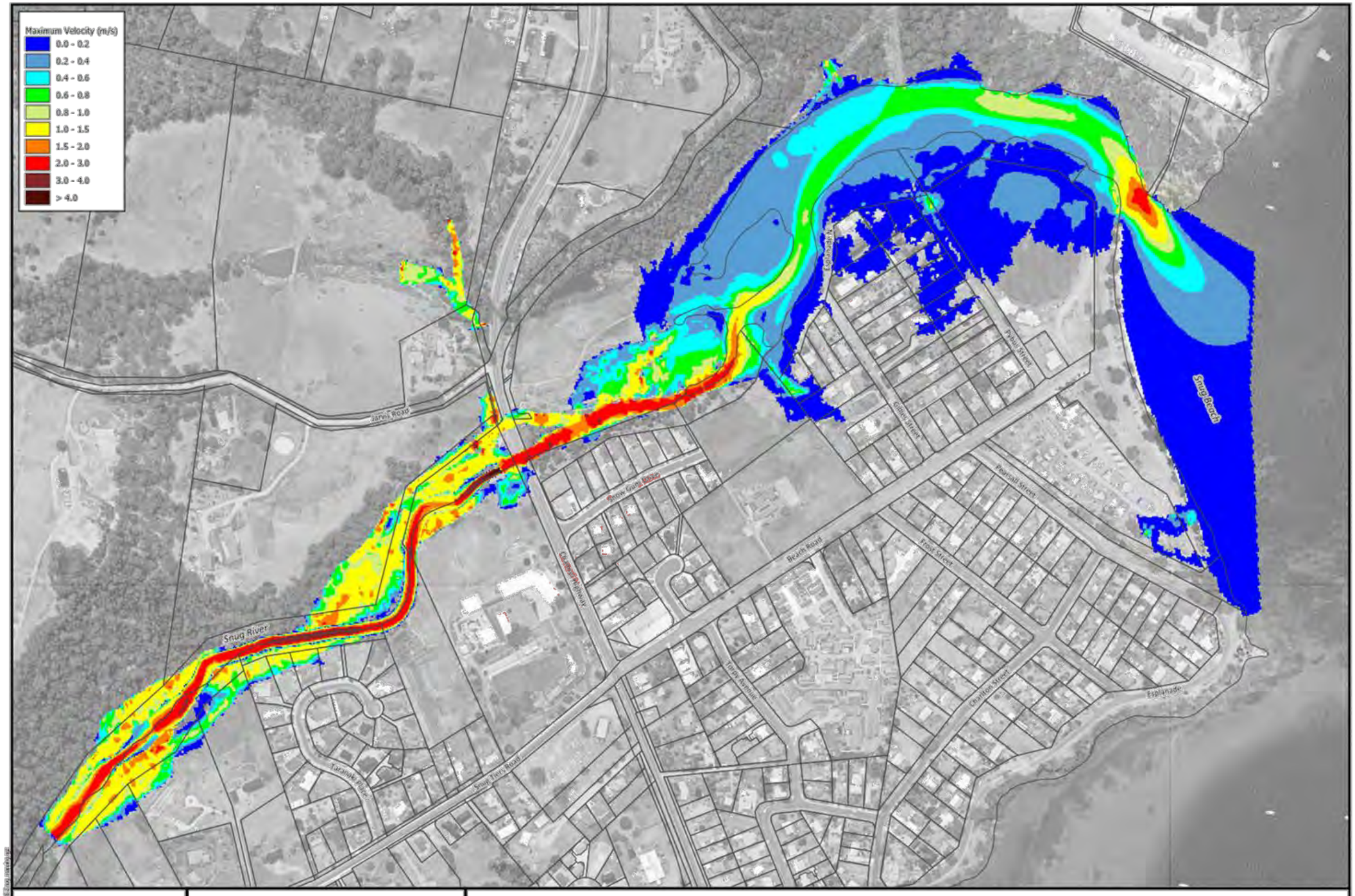
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: GBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-08
Peak Depths | 2050 Climate Change Analysis
20% AEP Catchment Event +10% Rainfall Increase with 20% AEP Tailwater +0.30m SLR


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Pybus Street
Gillies Street
Pearsall Street
Ross Street
Clarence Highway
Torpy Avenue
Clarkton Street
Tasman Place
Snug Beach
Disclaimer:
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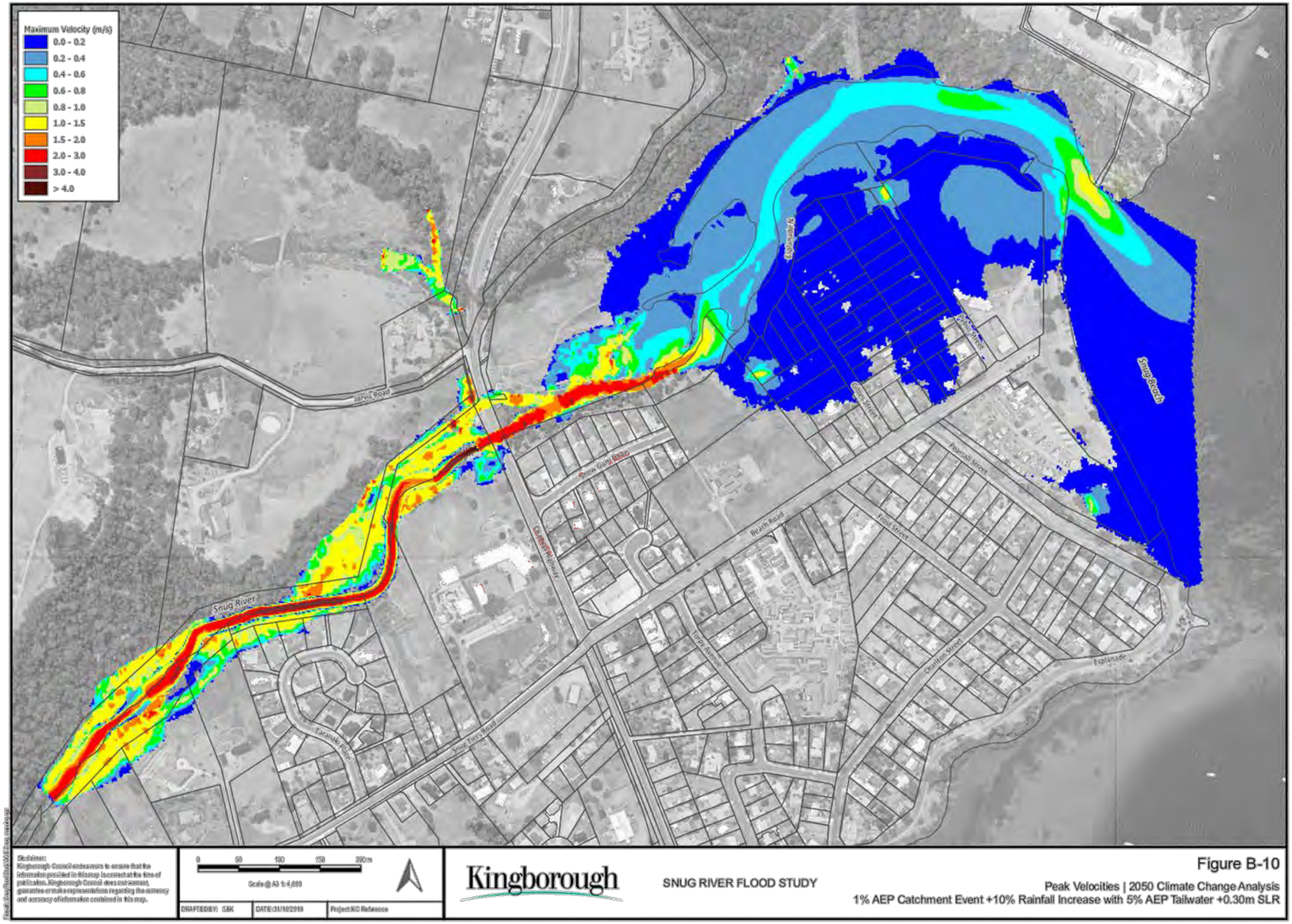
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project NO Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-09
Peak Velocities | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with MHWS Tailwater +0.30m SLR


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiery Road
Beach Road
Frost Street
Charlton Street
Esplanade
Snug Beach
Disclaimer:
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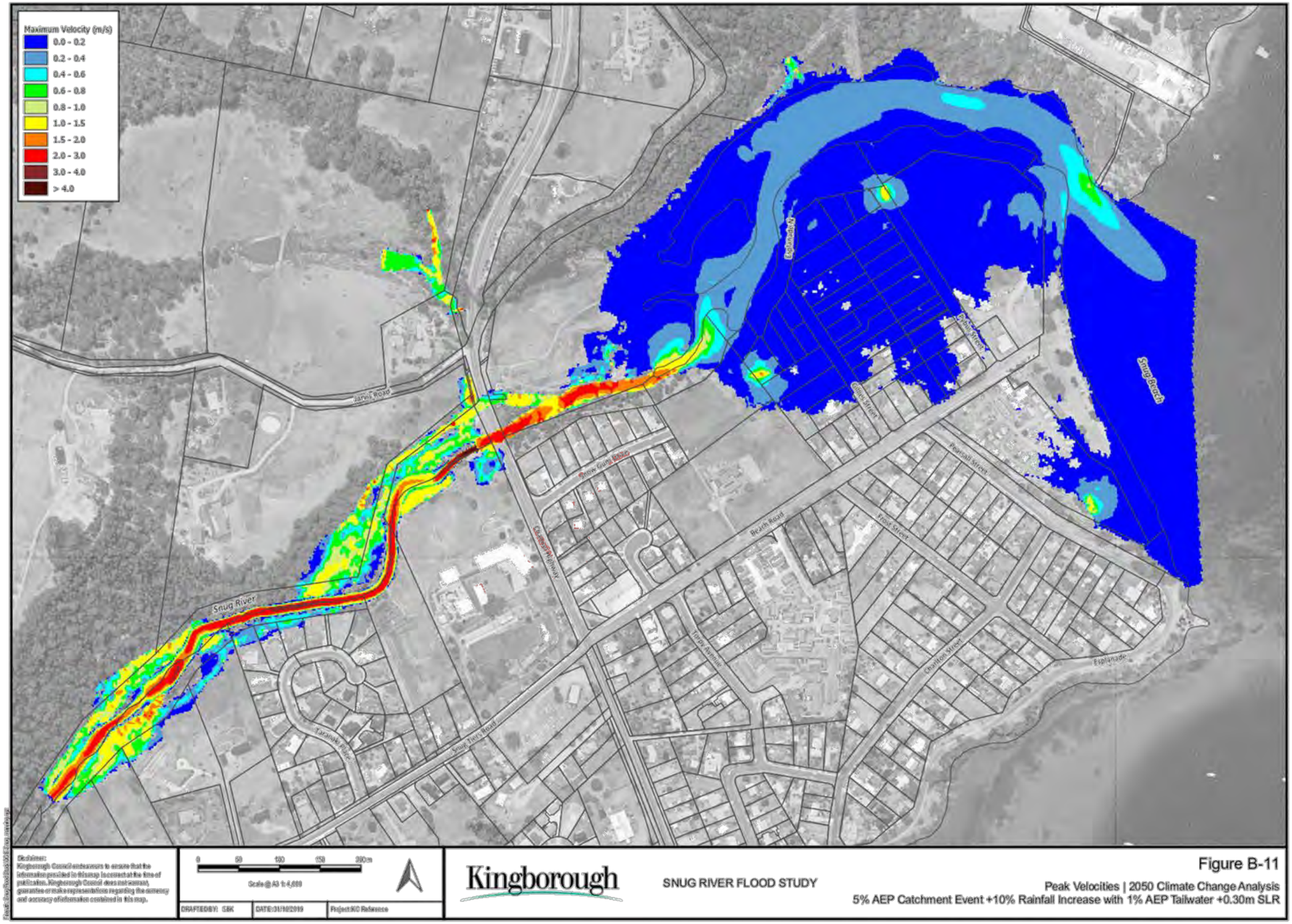
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-10
Peak Velocities | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with 5% AEP Tailwater +0.30m SLR


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiery Road
Beach Road
Esplanade
Charlton Street
Frost Street
Pearsall Street
Snug Beach
Disclaimer:
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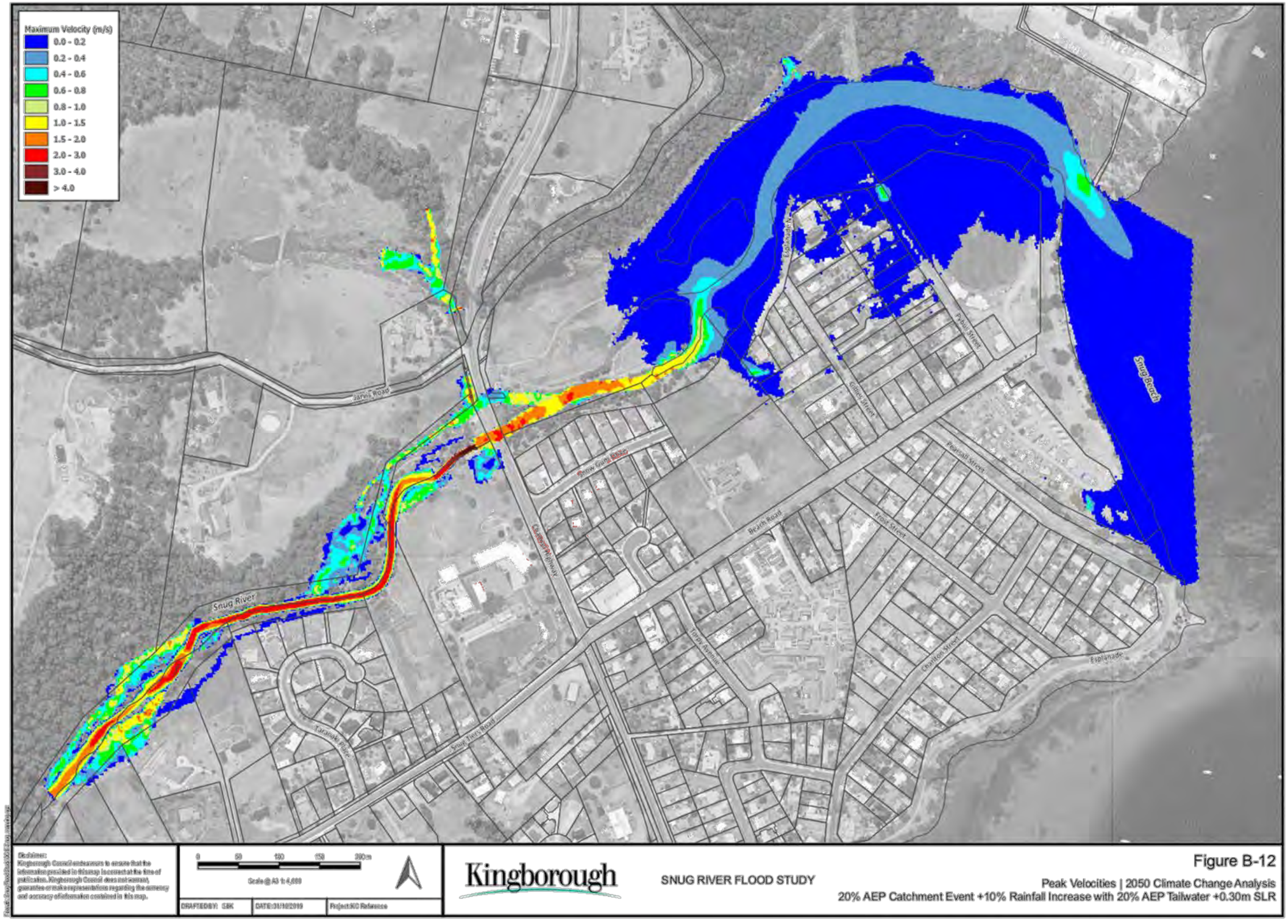
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-11
Peak Velocities | 2050 Climate Change Analysis
5% AEP Catchment Event +10% Rainfall Increase with 1% AEP Tailwater +0.30m SLR


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug River Road
Snug Tiers Road
Beach Road
Esplanade
Charlton Street
Fenton Street
Pybus Street
Gibbon Street
Pearsall Street
Tasman Avenue
Tarawa Place
Snug Beach
Disclaimer:
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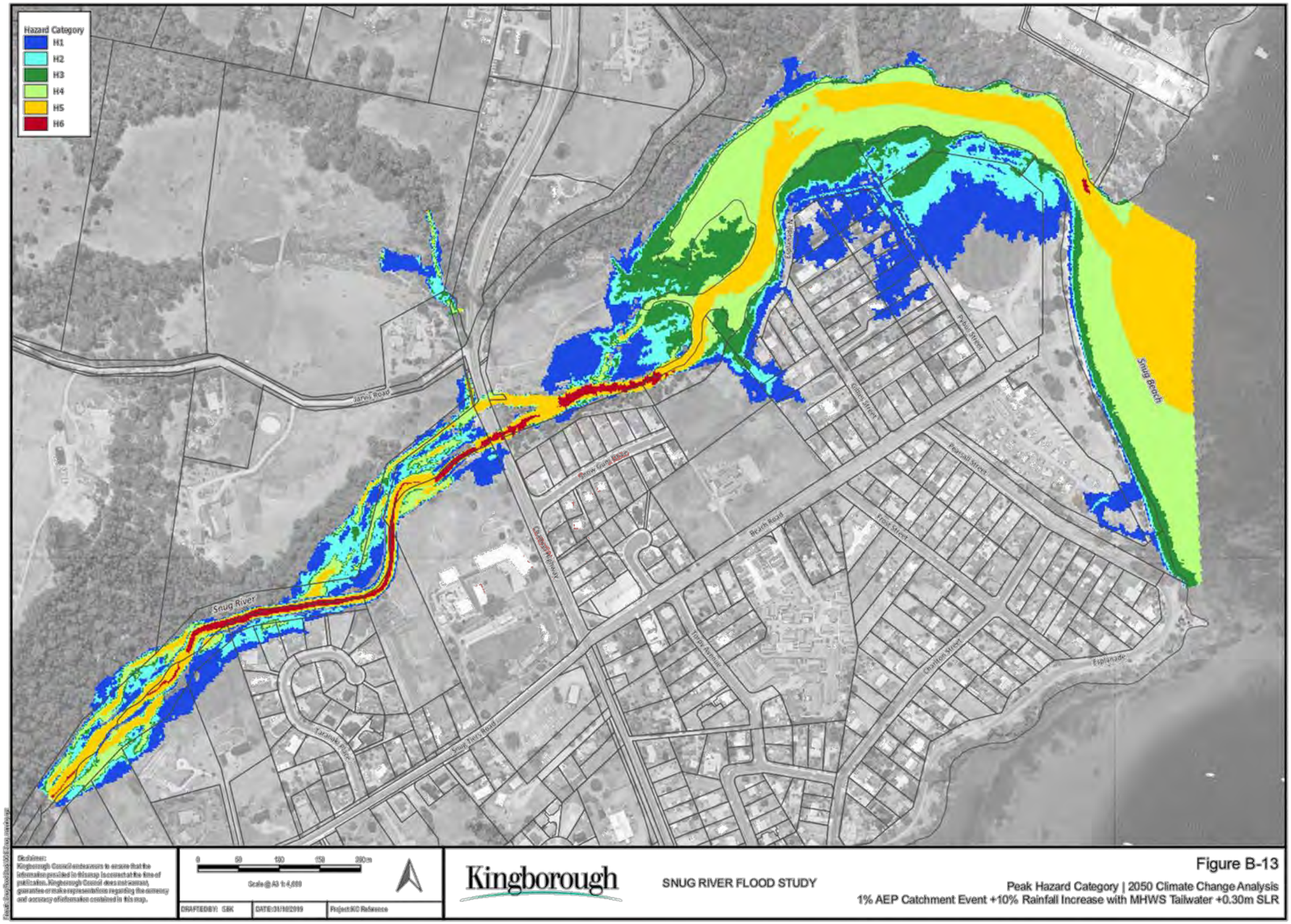
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project:KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-12
Peak Velocities | 2050 Climate Change Analysis
20% AEP Catchment Event +10% Rainfall Increase with 20% AEP Tailwater +0.30m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Beach Road
Esplanade
Snug Tiers Road
Disclaimer:
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Scale @ A3 1:4,000
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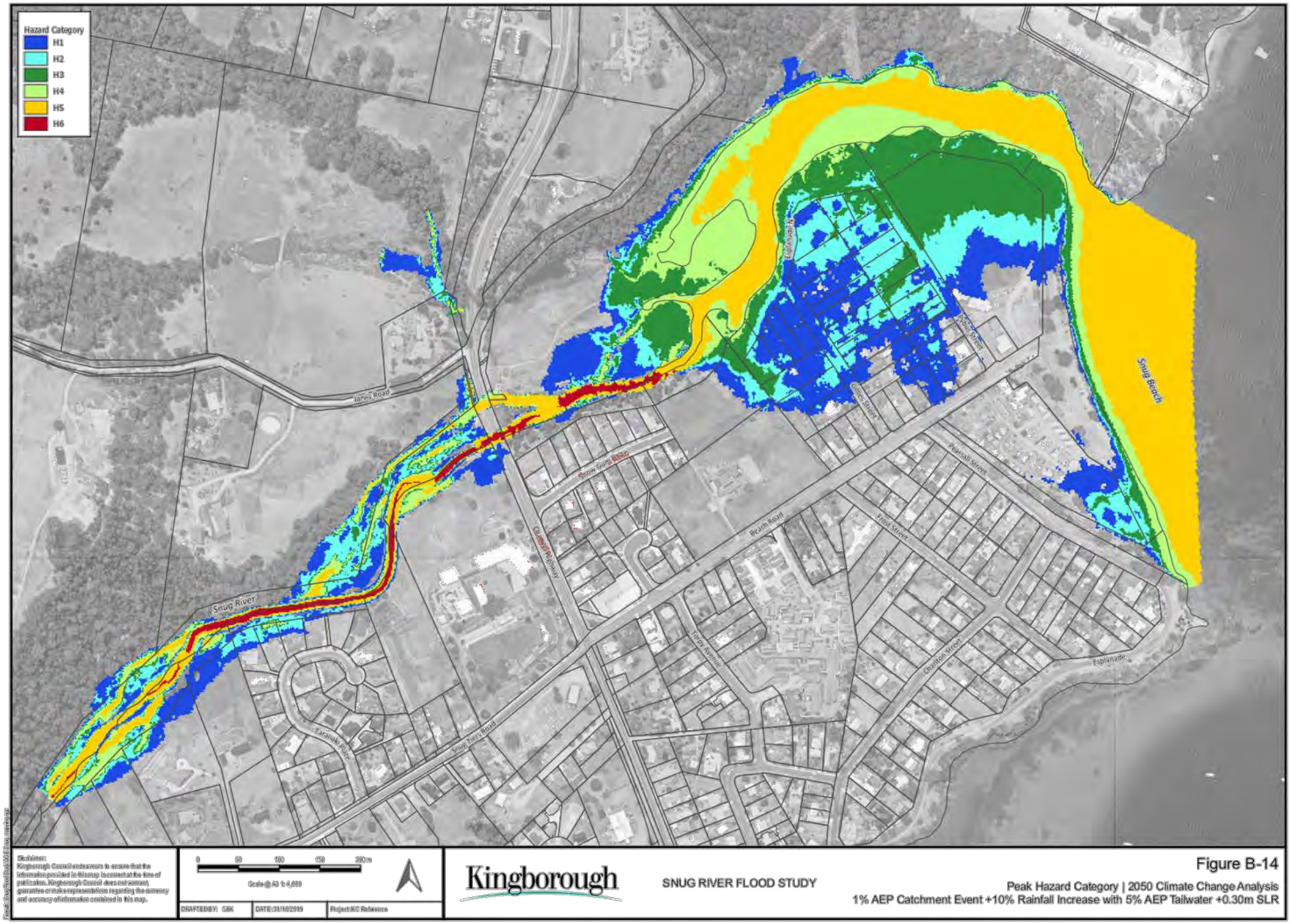
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-13
Peak Hazard Category | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with MHWS Tailwater +0.30m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Beach Road
Esplanade
Snug Tiers Road
Disclaimer:
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Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-14
Peak Hazard Category | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with 5% AEP Tailwater +0.30m SLR

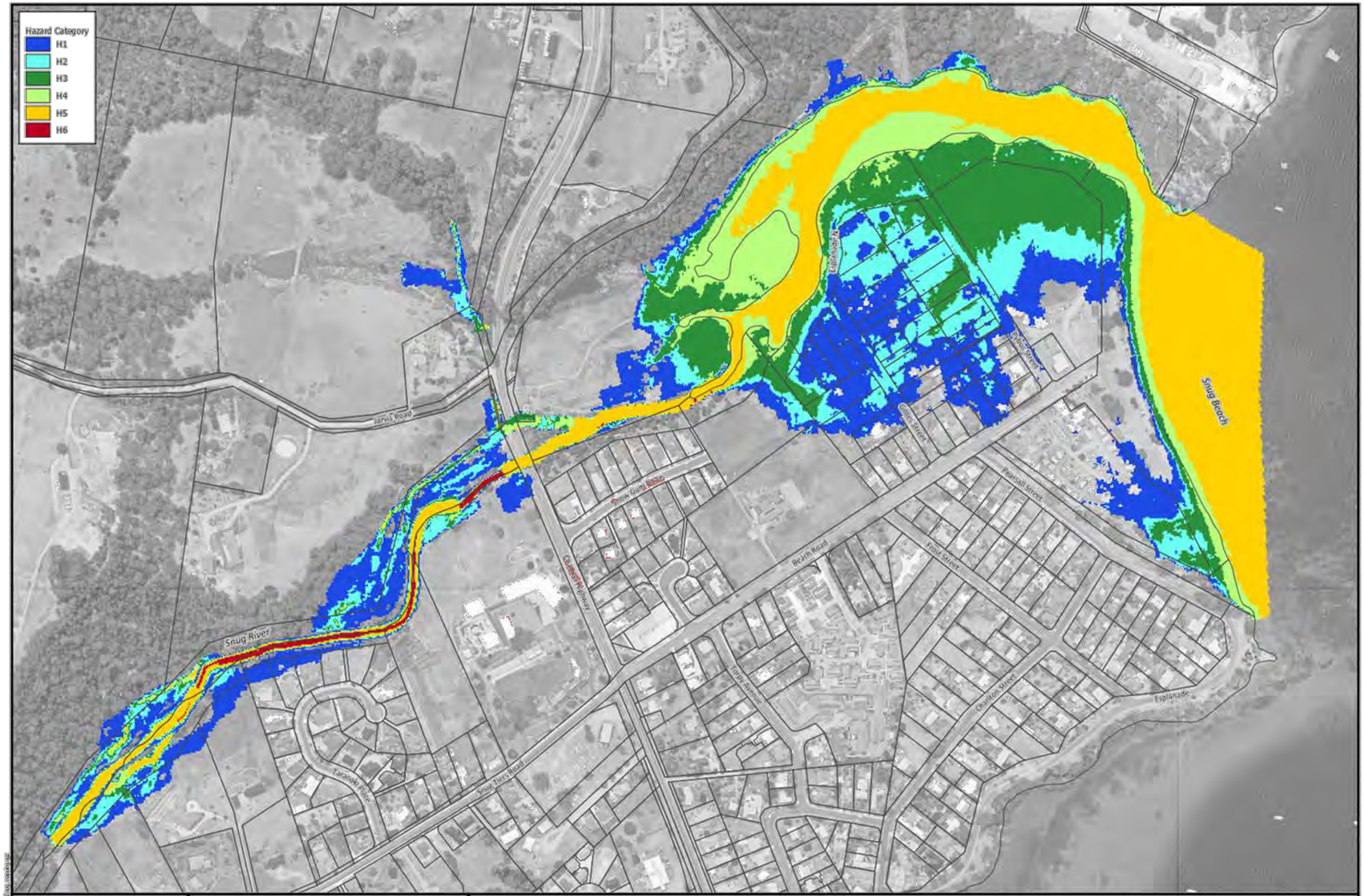
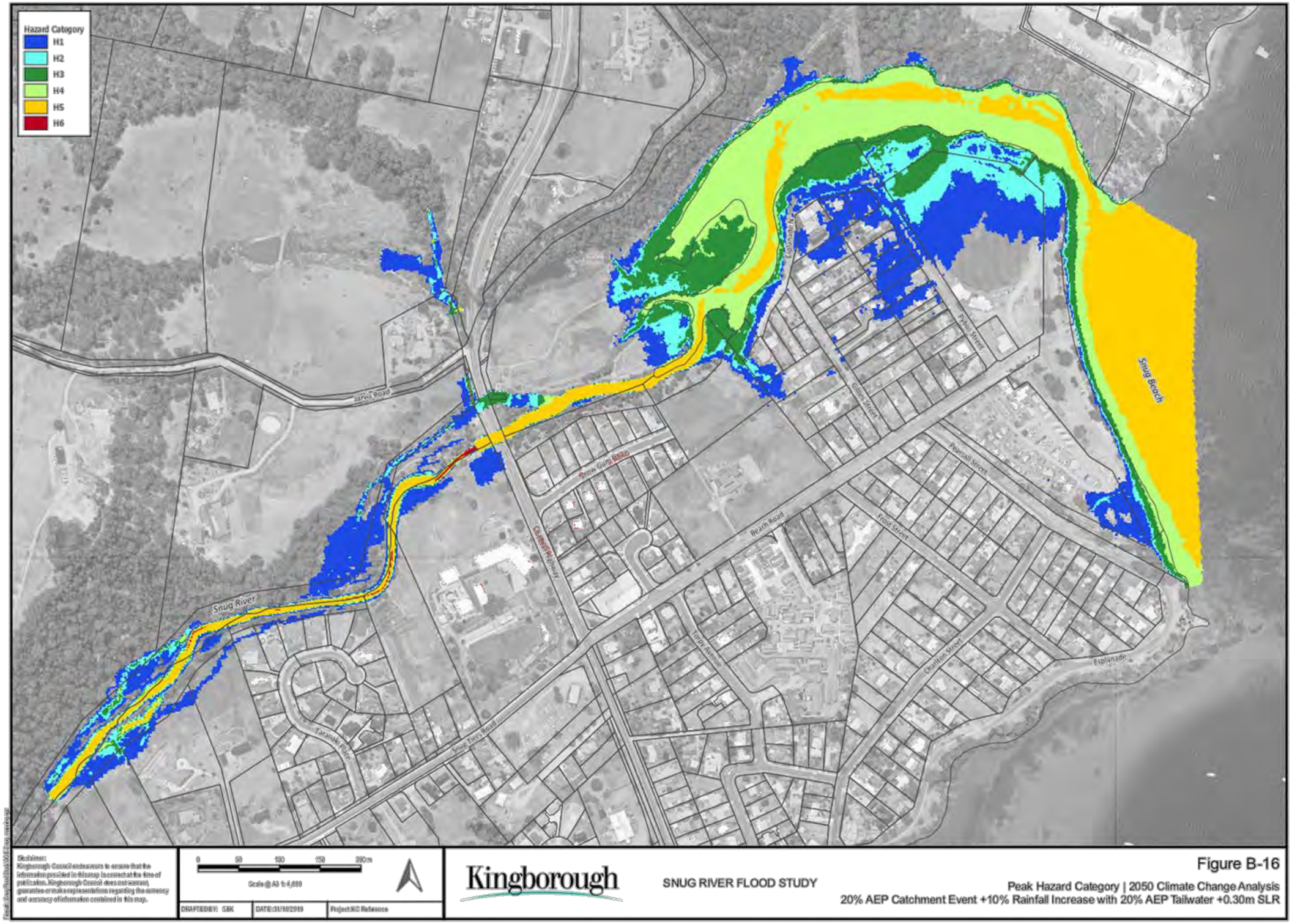


Figure B-15
Peak Hazard Category | 2050 Climate Change Analysis
5% AEP Catchment Event +10% Rainfall Increase with 1% AEP Tailwater +0.30m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Beach Road
Esplanade
Snug Tiers Road
Clarence Highway
Front Street
Pearnall Street
Gibbons Street
Charlton Street
Torrax Avenue
Tarandah Place
Snow Gum Place
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-16
Peak Hazard Category | 2050 Climate Change Analysis
20% AEP Catchment Event +10% Rainfall Increase with 20% AEP Tailwater +0.30m SLR

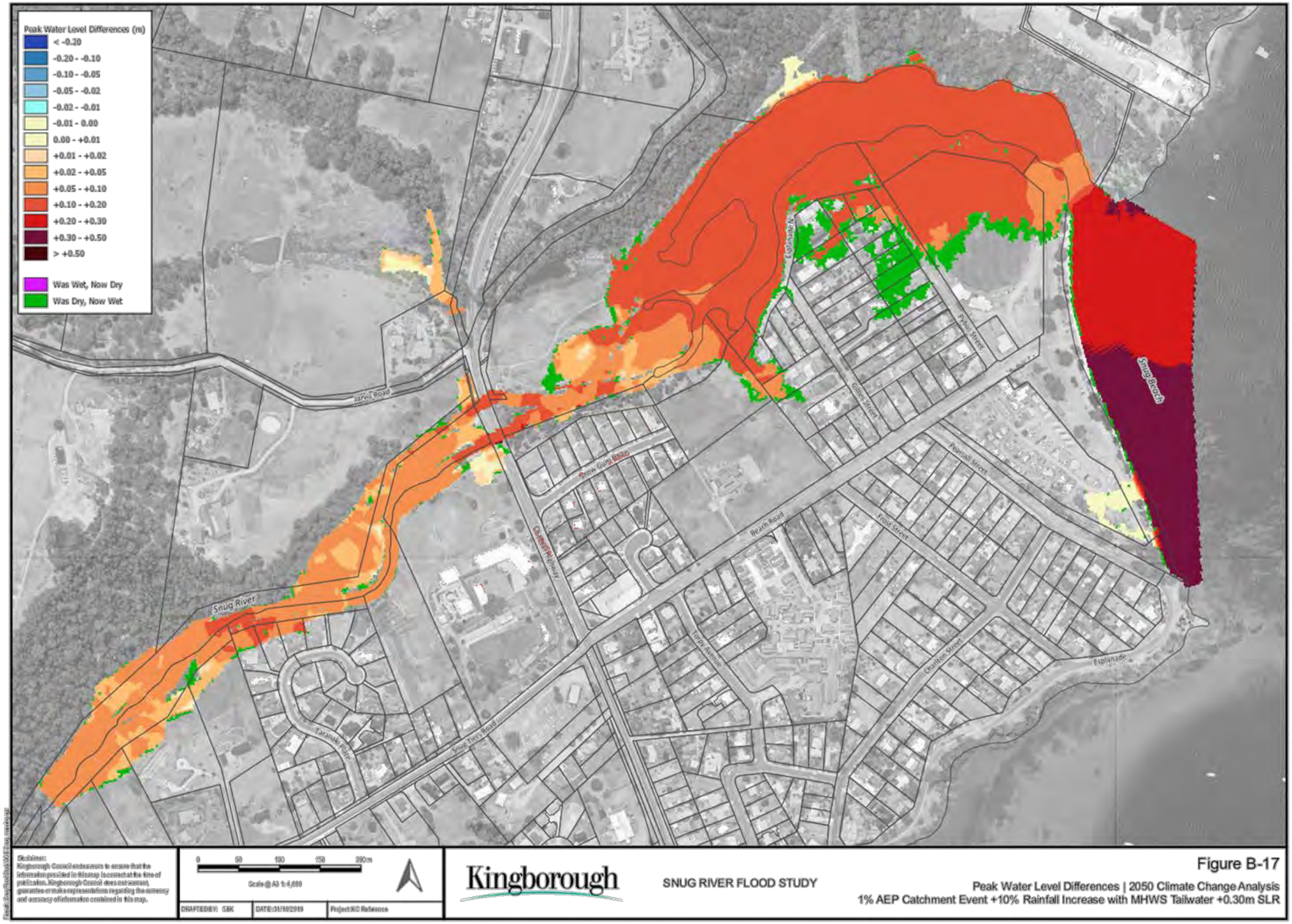


Figure B-17
Peak Water Level Differences | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with MHWS Tailwater +0.30m SLR

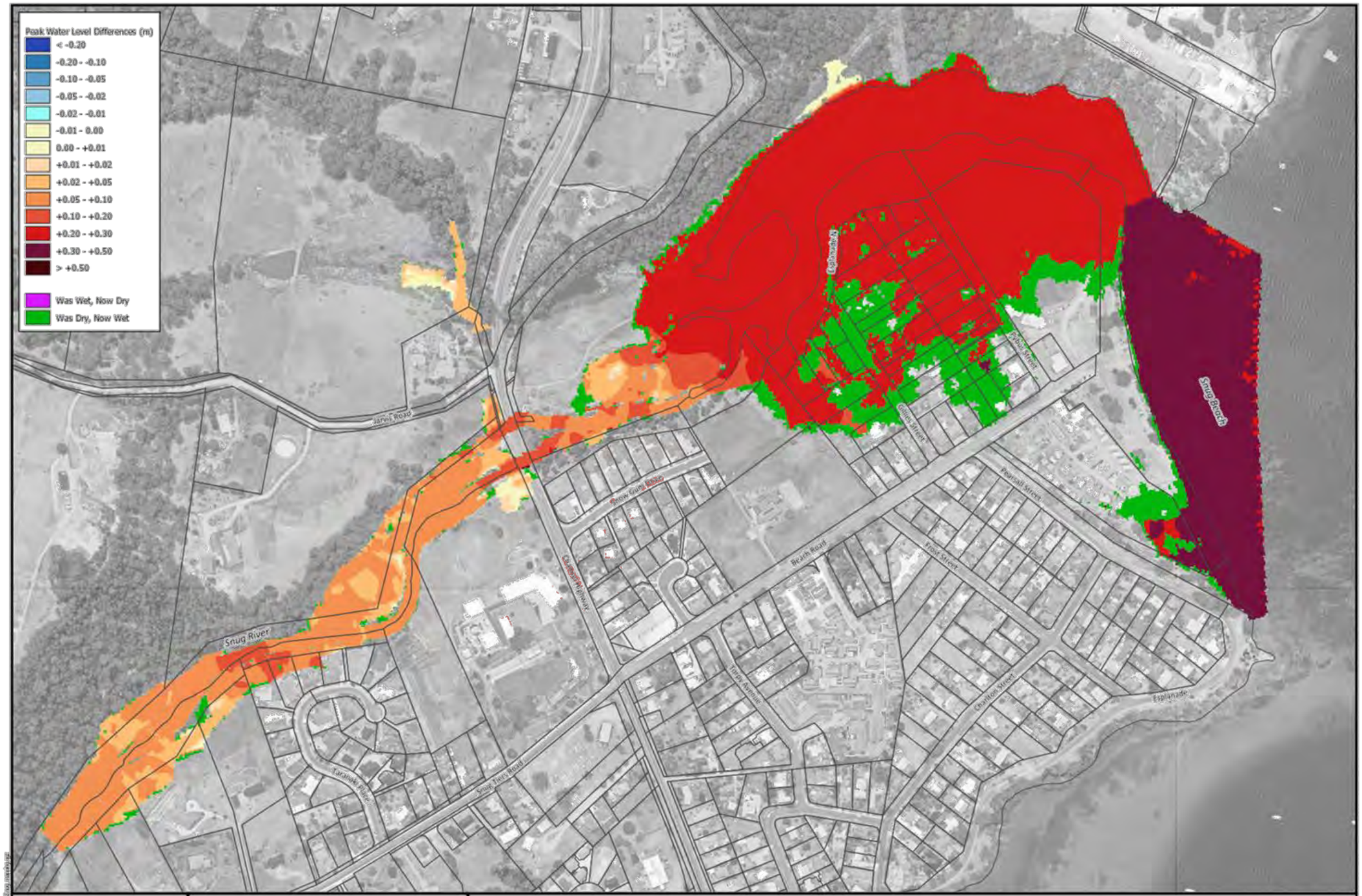
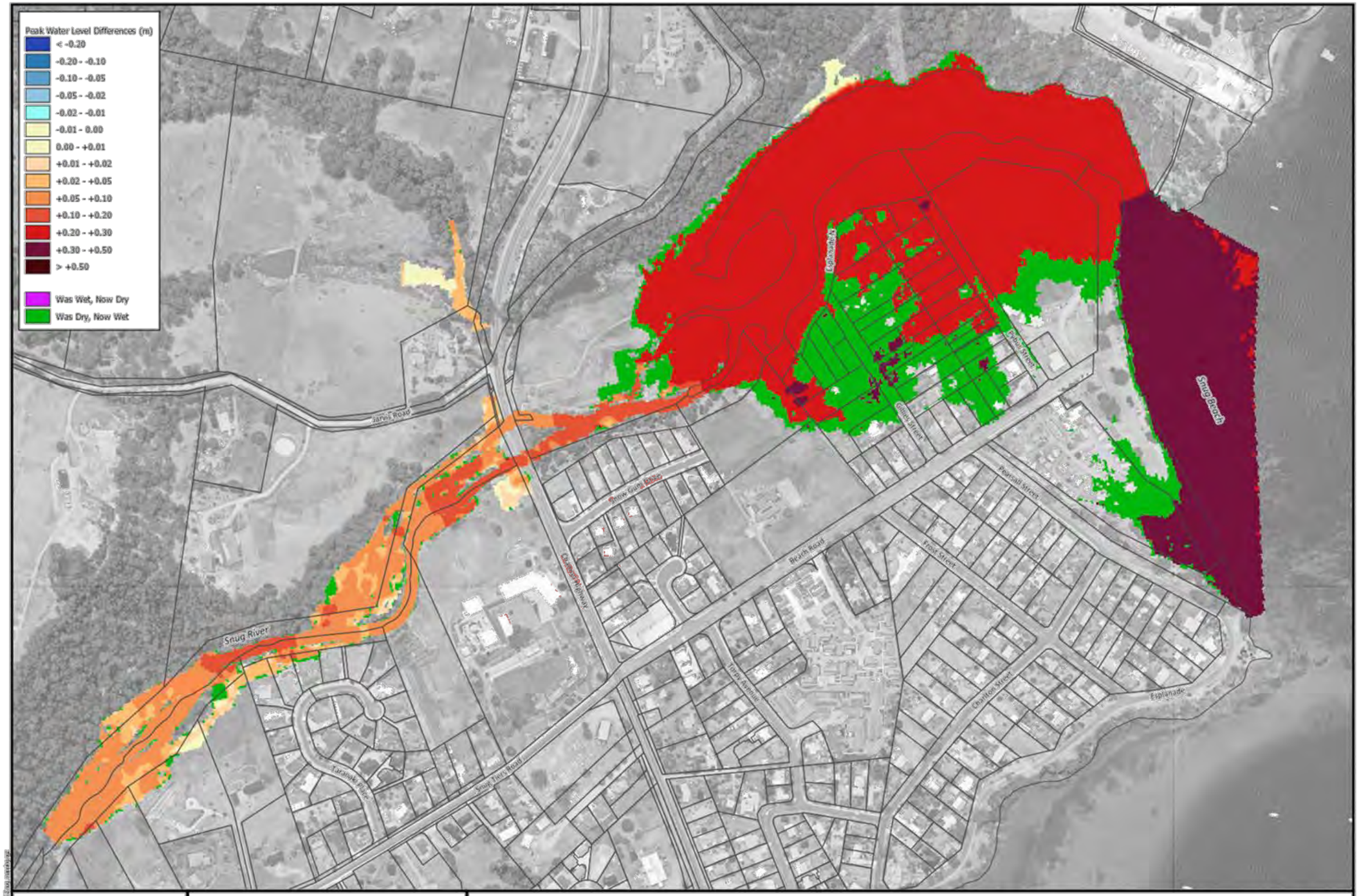


Figure B-18
Peak Water Level Differences | 2050 Climate Change Analysis
1% AEP Catchment Event +10% Rainfall Increase with 5% AEP Tailwater +0.30m SLR


Peak Water Level Differences (m)
< -0.20
-0.20 - -0.10
-0.10 - -0.05
-0.05 - -0.02
-0.02 - -0.01
-0.01 - 0.00
0.00 - +0.01
+0.01 - +0.02
+0.02 - +0.05
+0.05 - +0.10
+0.10 - +0.20
+0.20 - +0.30
+0.30 - +0.50
> +0.50
Was Wet, Now Dry
Was Dry, Now Wet
Snug River
Snug Beach
Beach Road
Frost Street
Esplanade
Charlton Street
Snug Tiers Road
Channel Highway
Gillies Street
Pelham Street
Pearsall Street
Lebrumbert
Tarana Place
Trophy Avenue
Snow Gum Place
Disclaimer:
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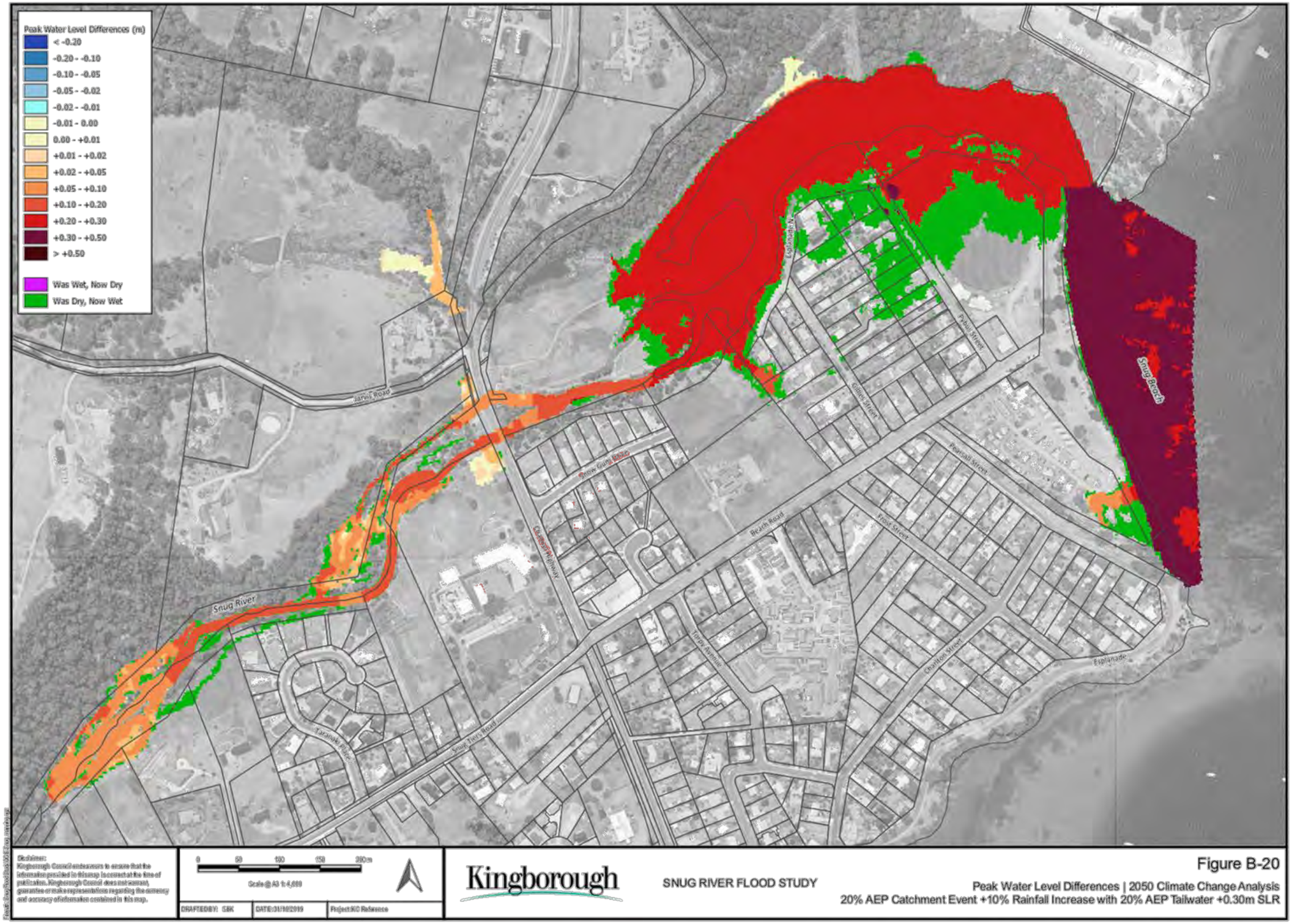
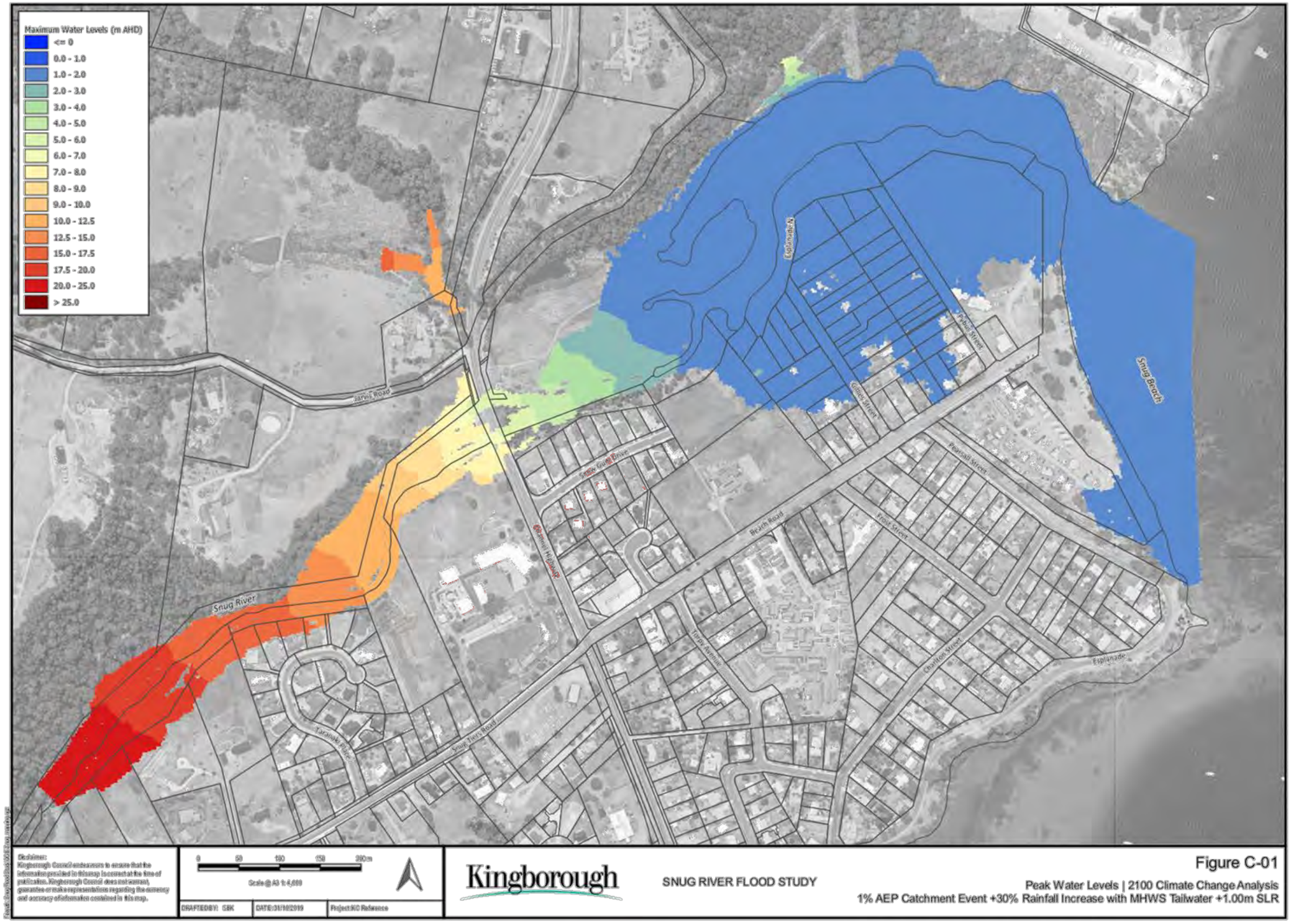
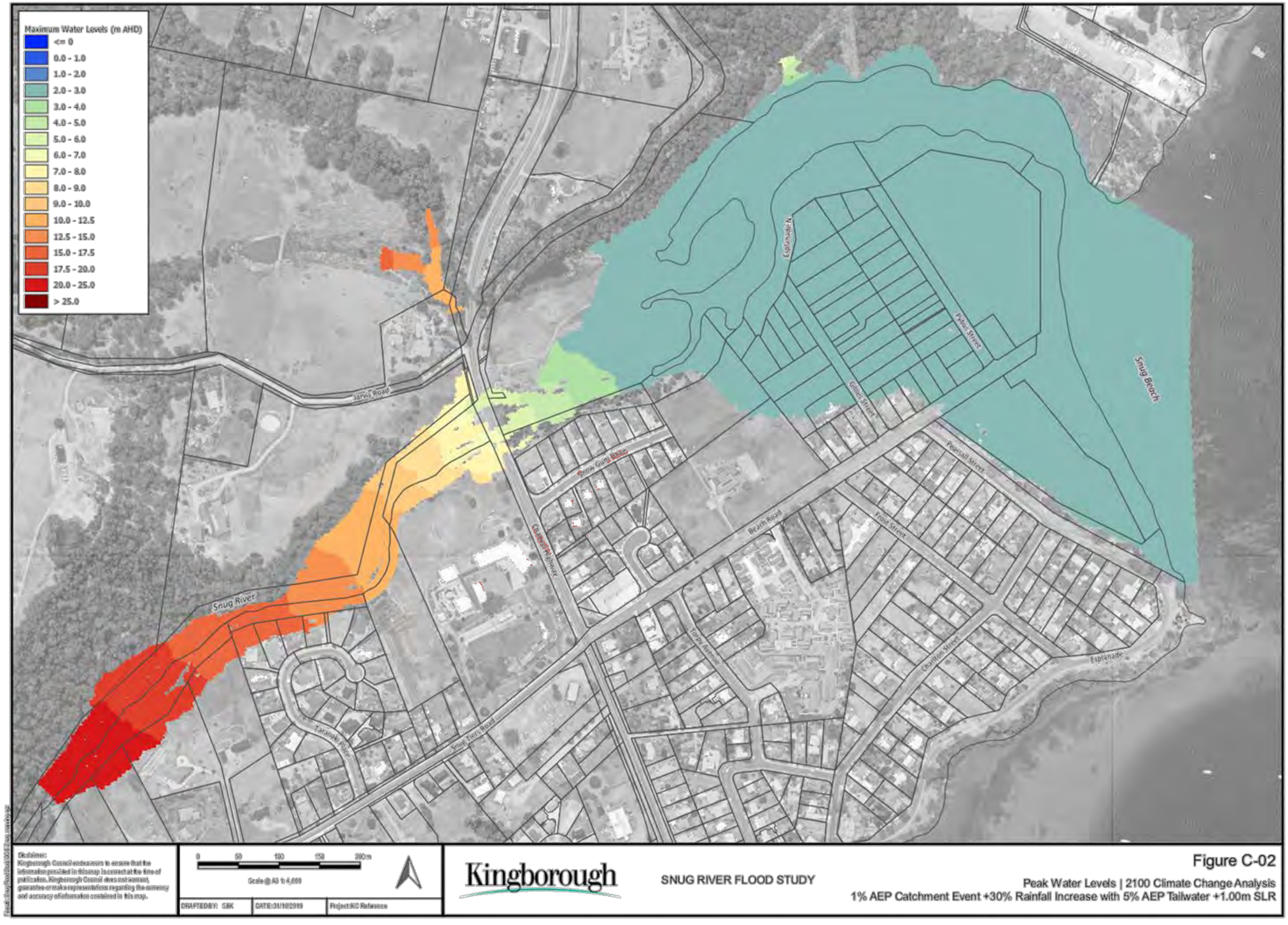
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: GBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-19
Peak Water Level Differences | 2050 Climate Change Analysis
5% AEP Catchment Event +10% Rainfall Increase with 1% AEP Tailwater +0.30m SLR


Peak Water Level Differences (m)
< -0.20
-0.20 - -0.10
-0.10 - -0.05
-0.05 - -0.02
-0.02 - -0.01
-0.01 - 0.00
0.00 - +0.01
+0.01 - +0.02
+0.02 - +0.05
+0.05 - +0.10
+0.10 - +0.20
+0.20 - +0.30
+0.30 - +0.50
> +0.50
Was Wet, Now Dry
Was Dry, Now Wet
Snug River
Snug Beach
Beach Road
Front Street
Esplanade
Charlton Street
Penrose Street
Gibbet Street
Snug Tiers Road
Taranaki Place
Tasman Highway
Kingborough
SNUG RIVER FLOOD STUDY
Figure B-20
Peak Water Level Differences | 2050 Climate Change Analysis
20% AEP Catchment Event +10% Rainfall Increase with 20% AEP Tailwater +0.30m SLR

APPENDIX C: Climate Change Analysis Flood Mapping Year 2100




Maximum Water Levels (m AHD)
<= 0
0.0 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Jarvis Road
Snug River
Snug Tiers Road
Tarawa Place
Tiarna Avenue
Charlton Street
Beach Road
Esplanade
Pybus Street
Gillon Street
Pearsall Street
Snug Beach
Disclaimer:
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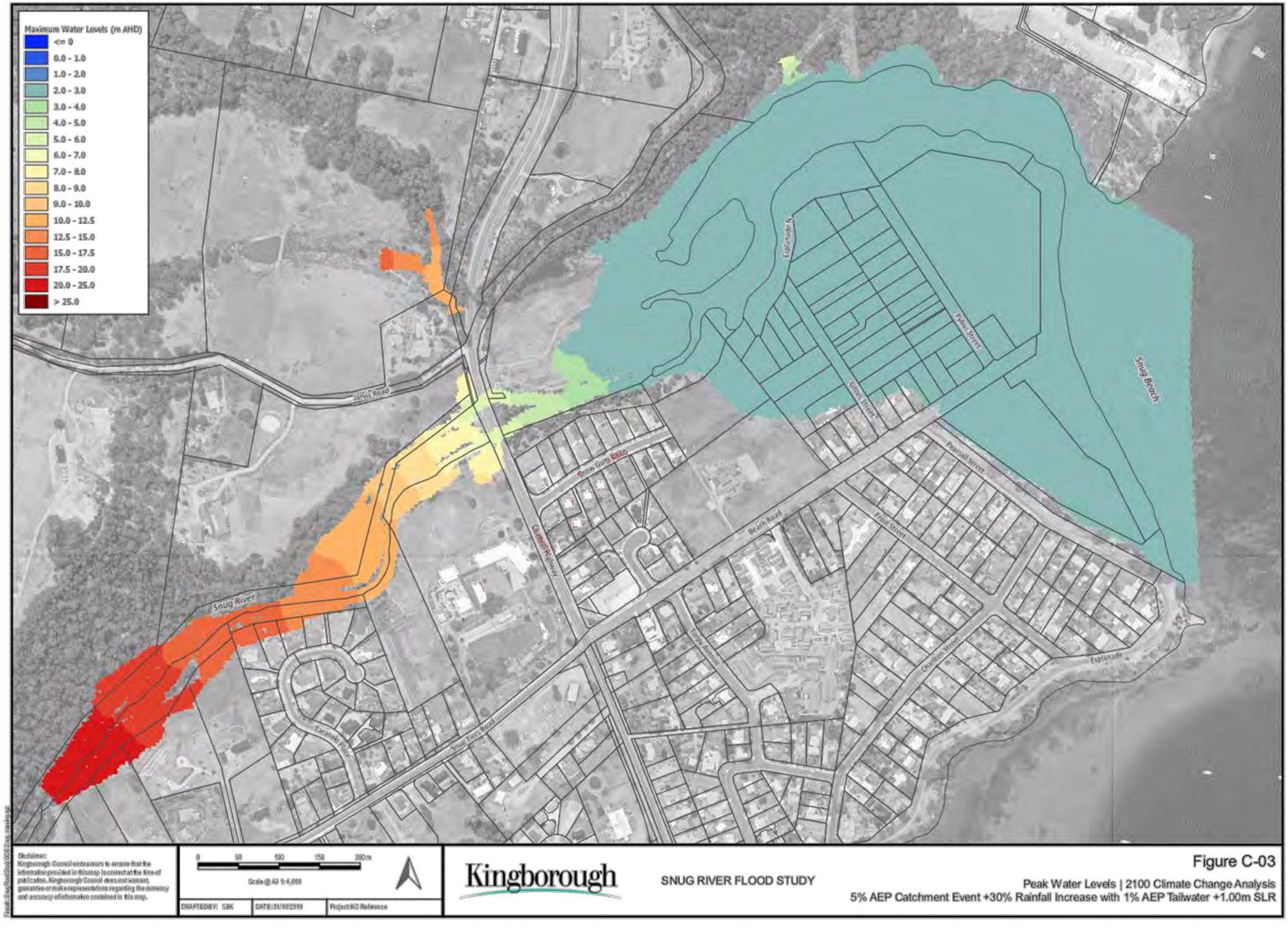
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-02
Peak Water Levels | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with 5% AEP Tailwater +1.00m SLR


Maximum Water Levels (m AHD)
<= 0
0.0 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Esplanade N
Pybus Street
Snug Beach
Gillies Street
Pearsall Street
Snow Gum Place
Bearth Road
Frost Street
Charlton Street
Esplanade
Tarryn Avenue
Snug River
Snug Tiers Road
Tarawa Place
Clarence Highway
Disclaimer:
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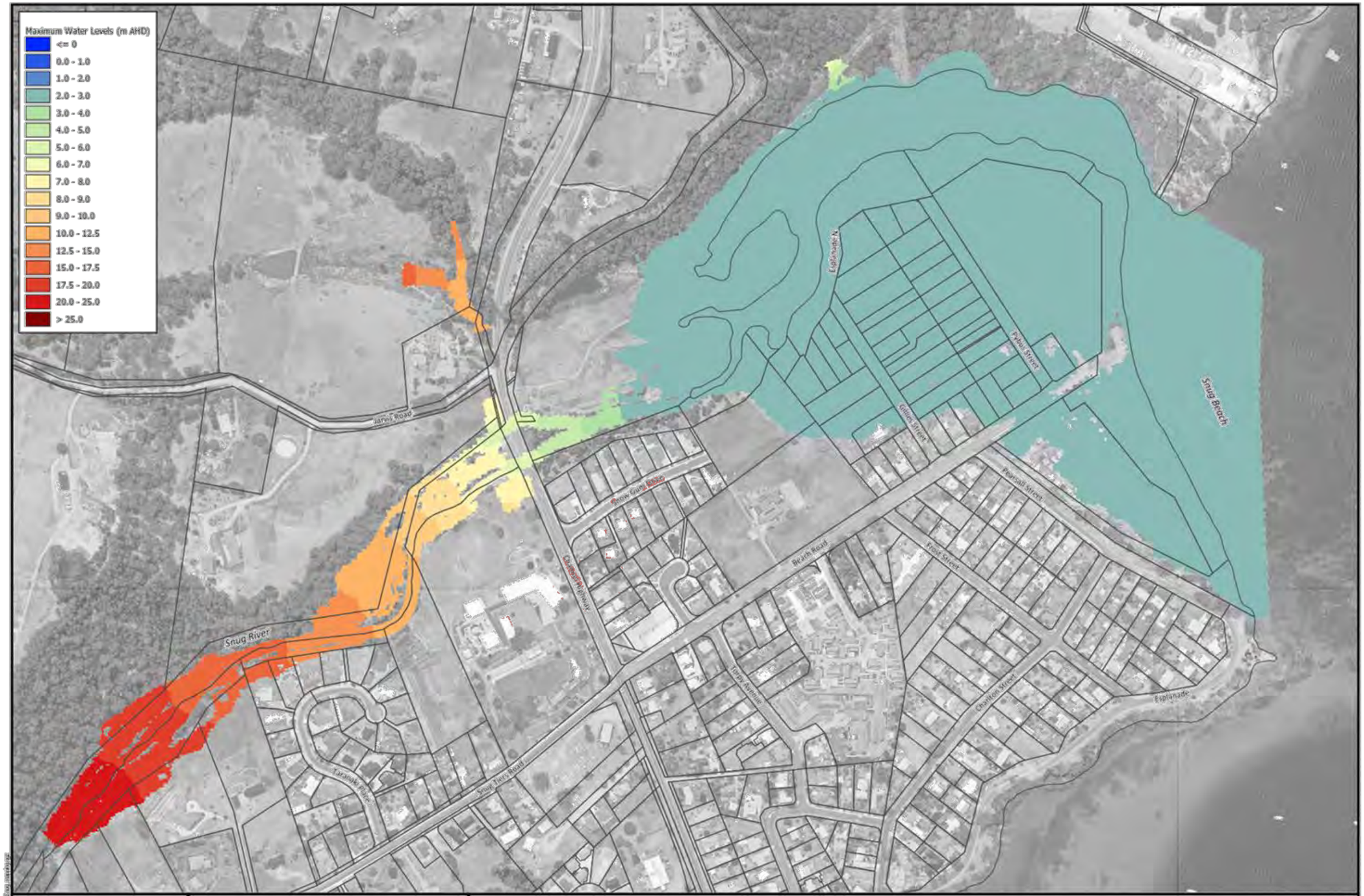
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project:KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-03
Peak Water Levels | 2100 Climate Change Analysis
5% AEP Catchment Event +30% Rainfall Increase with 1% AEP Tailwater +1.00m SLR


Maximum Water Levels (m AHD)
<= 0
0.0 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 12.5
12.5 - 15.0
15.0 - 17.5
17.5 - 20.0
20.0 - 25.0
> 25.0
Jarvis Road
Snug River
Tasmania Pacific
Snug Tiers Road
Cascade Highway
Beach Road
Pearsall Street
Front Street
Clarkson Street
Esplanade
Tasman Avenue
Gillons Street
Pybus Street
Eaglehawk N
Snug Branch
Disclaimer:
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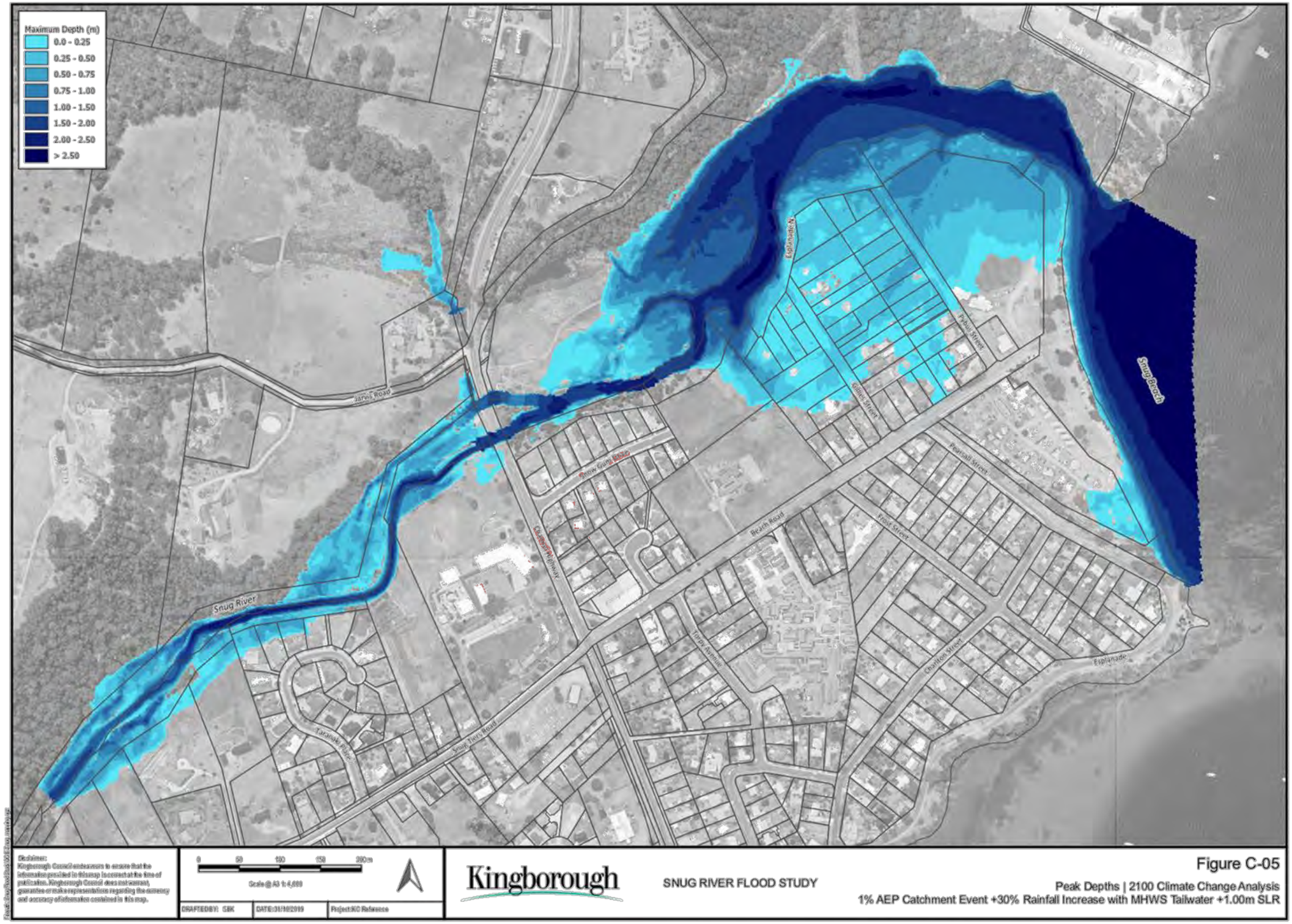
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-04
Peak Water Levels | 2100 Climate Change Analysis
20% AEP Catchment Event +30% Rainfall Increase with 20% AEP Tailwater +1.00m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Beach
Esplanade
Fisher Street
Gillies Street
Pearsall Street
Beach Road
Front Street
Charlton Street
Tasman Avenue
Snug Tiers Road
Arawata Place
Disclaimer:
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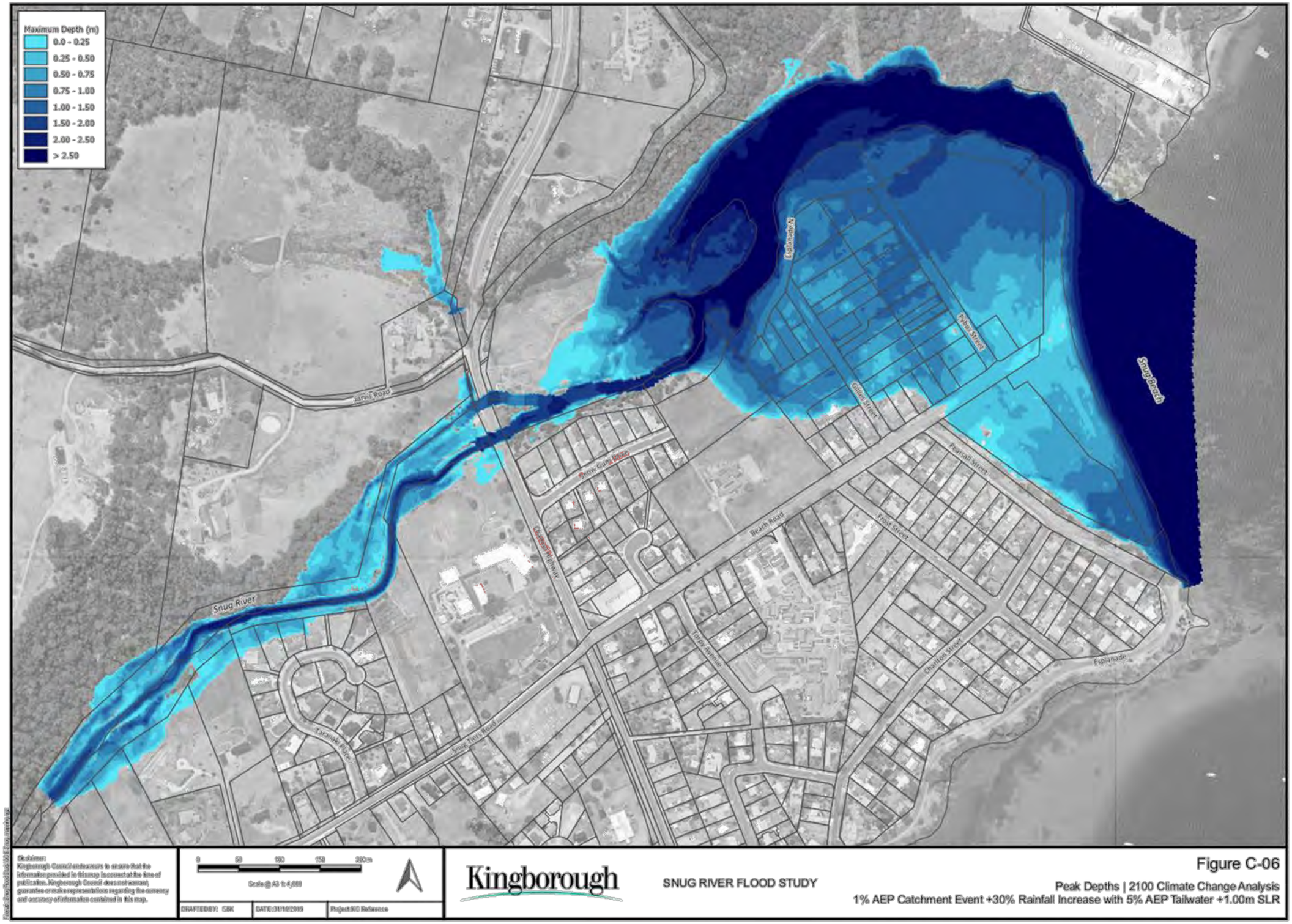
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: GBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-05
Peak Depths | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with MHWS Tailwater +1.00m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Tarrant Road
Snug Tiers Road
Beach Road
Front Street
Pearsall Street
Esplanade
Clarion Street
Torrax Avenue
Grillers Street
Leyhanden N
Pybus Street
Snug Beach
Snug River Bridge
Clarence Highway
Disclaimer:
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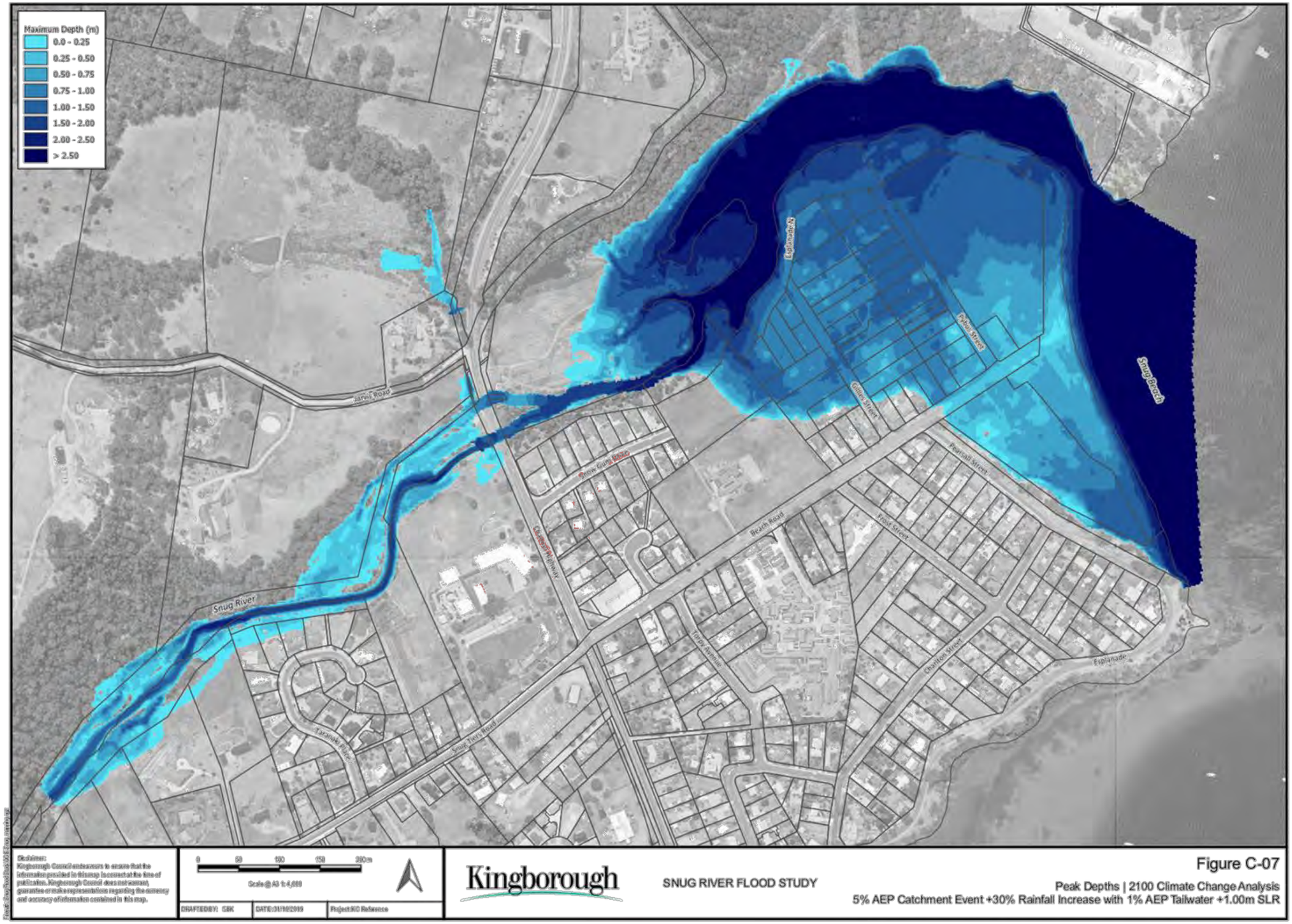
0 50 100 150 200 m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-06
Peak Depths | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with 5% AEP Tailwater +1.00m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Tiers Road
Beach Road
Esplanade
Pearsall Street
Reid Street
Clarkton Street
Tasman Avenue
Tasmanian Place
Snug Beach
Disclaimer:
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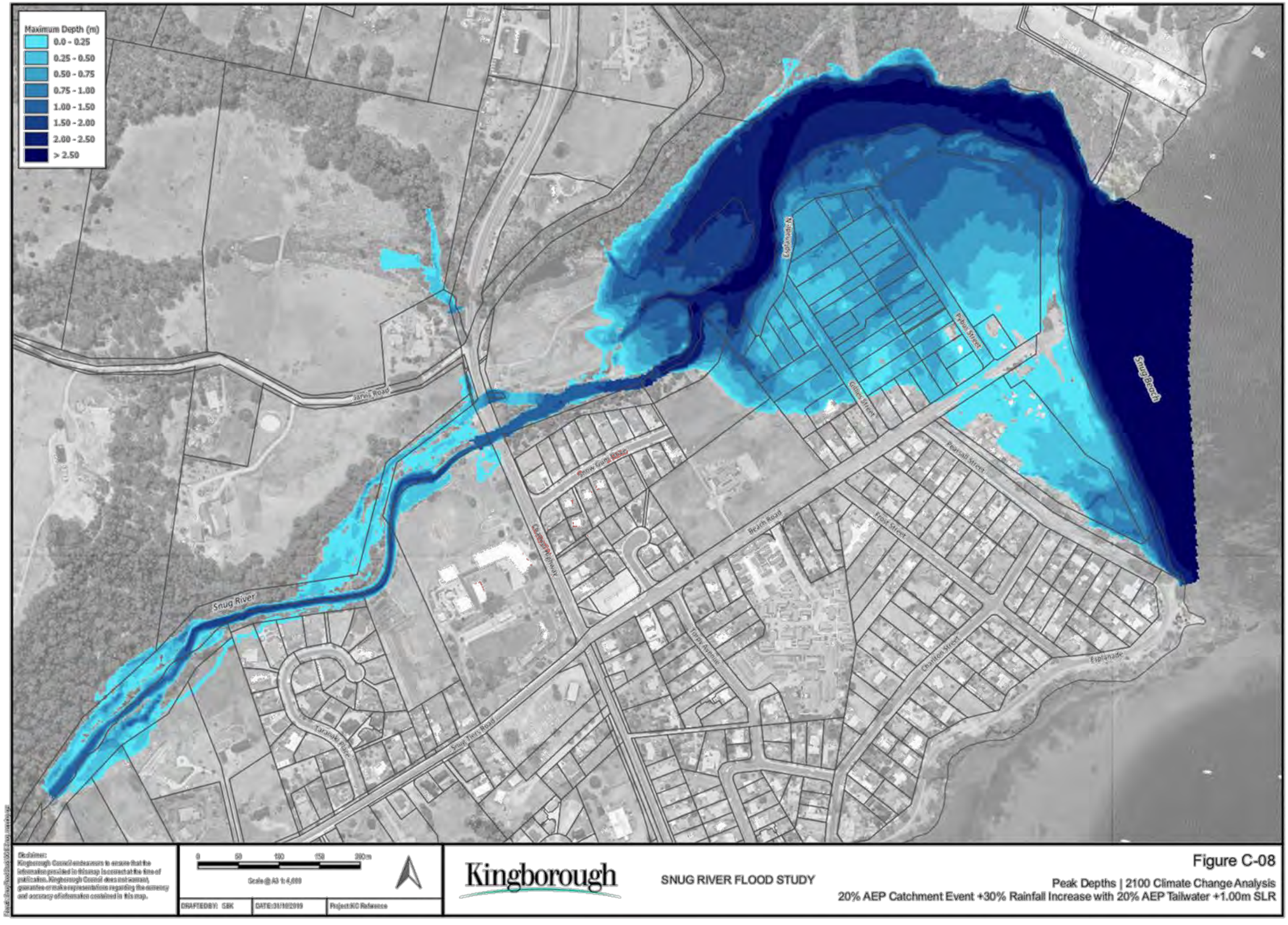
0 50 100 150 200m
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-07
Peak Depths | 2100 Climate Change Analysis
5% AEP Catchment Event +30% Rainfall Increase with 1% AEP Tailwater +1.00m SLR


Maximum Depth (m)
0.0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
> 2.50
Snug River
Snug Tiers Road
Beach Road
Charlton Street
Esplanade
Gillies Street
Pebble Street
Pearsall Street
Frost Street
Snug Beach
Disclaimer:
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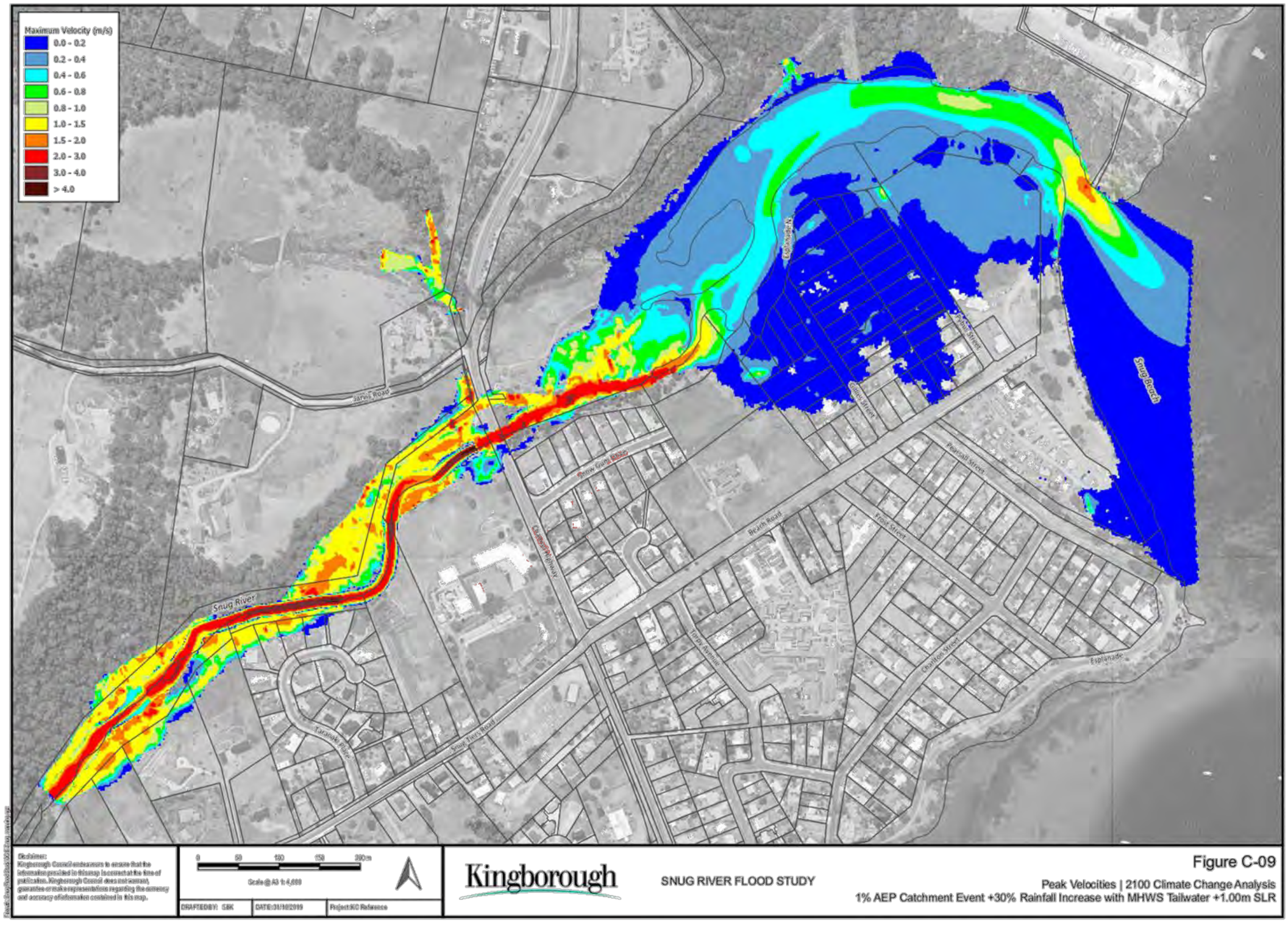
Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-08
Peak Depths | 2100 Climate Change Analysis
20% AEP Catchment Event +30% Rainfall Increase with 20% AEP Tailwater +1.00m SLR


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Charlton Street
Frost Street
Pearsall Street
Tasman Avenue
Tarawhai Place
Snug Beach
Disclaimer:
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Scale @ A3 1:4,000
DRAFTED BY: SBK
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-09
Peak Velocities | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with MHWS Tailwater +1.00m SLR

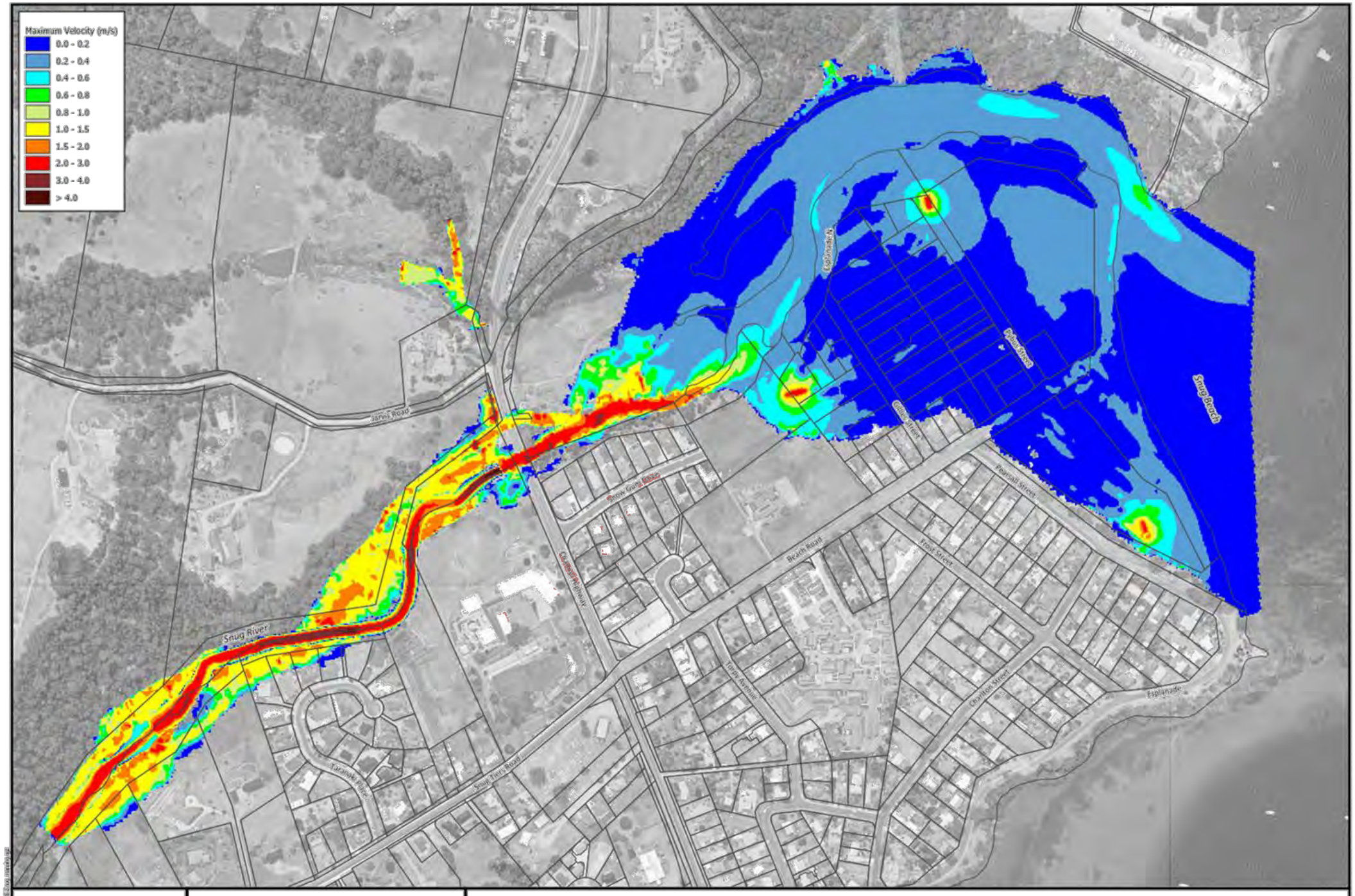
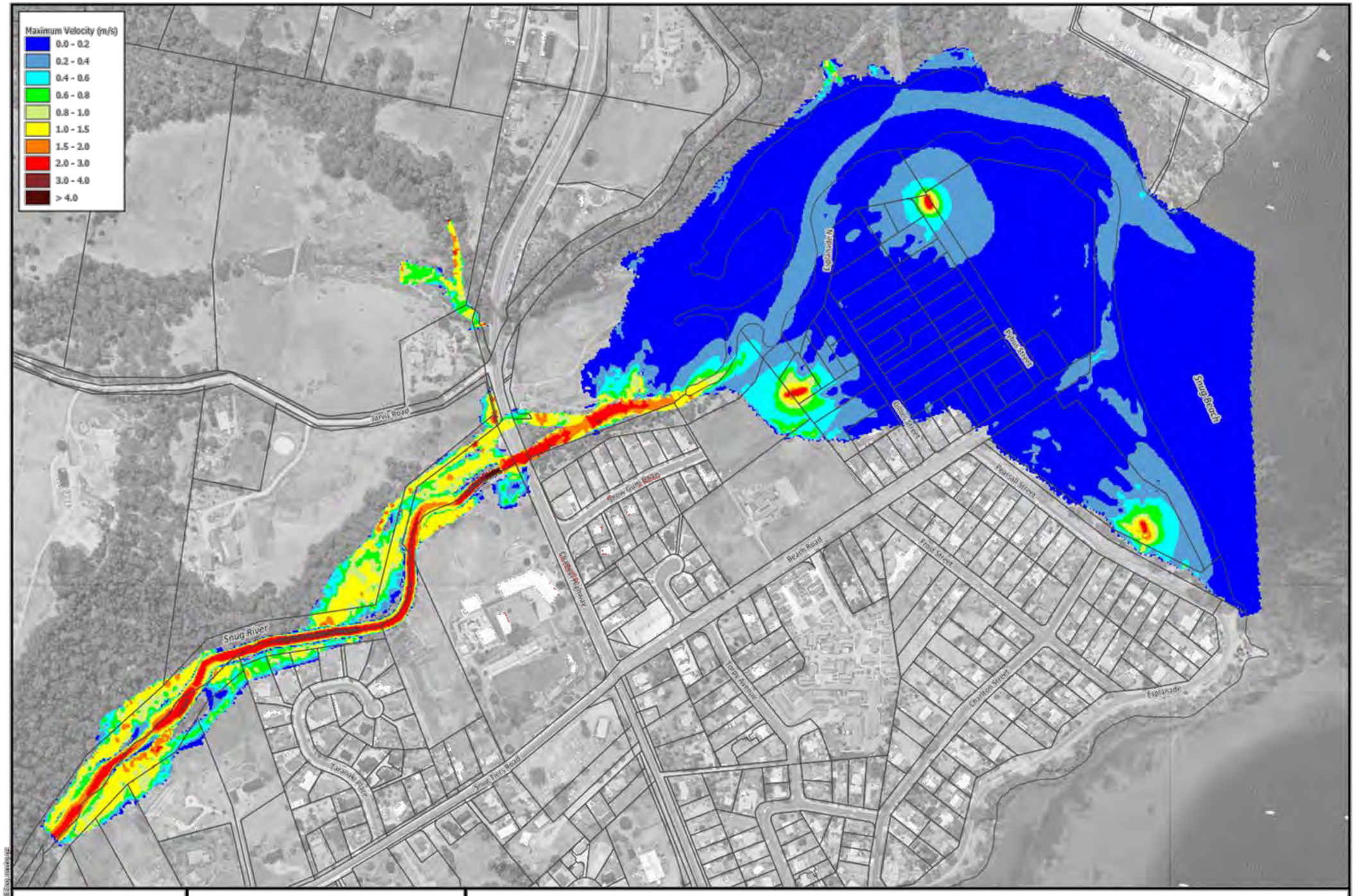


Figure C-10
Peak Velocities | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with 5% AEP Tailwater +1.00m SLR


Maximum Velocity (m/s)
0.0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 3.0
3.0 - 4.0
> 4.0
Snug River
Snug Tiers Road
Beach Road
Esplanade
Disclaimer:
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Scale @ A3 1:4,000
DRAFTED BY: SBK
Project NO Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-11
Peak Velocities | 2100 Climate Change Analysis
5% AEP Catchment Event +30% Rainfall Increase with 1% AEP Tailwater +1.00m SLR

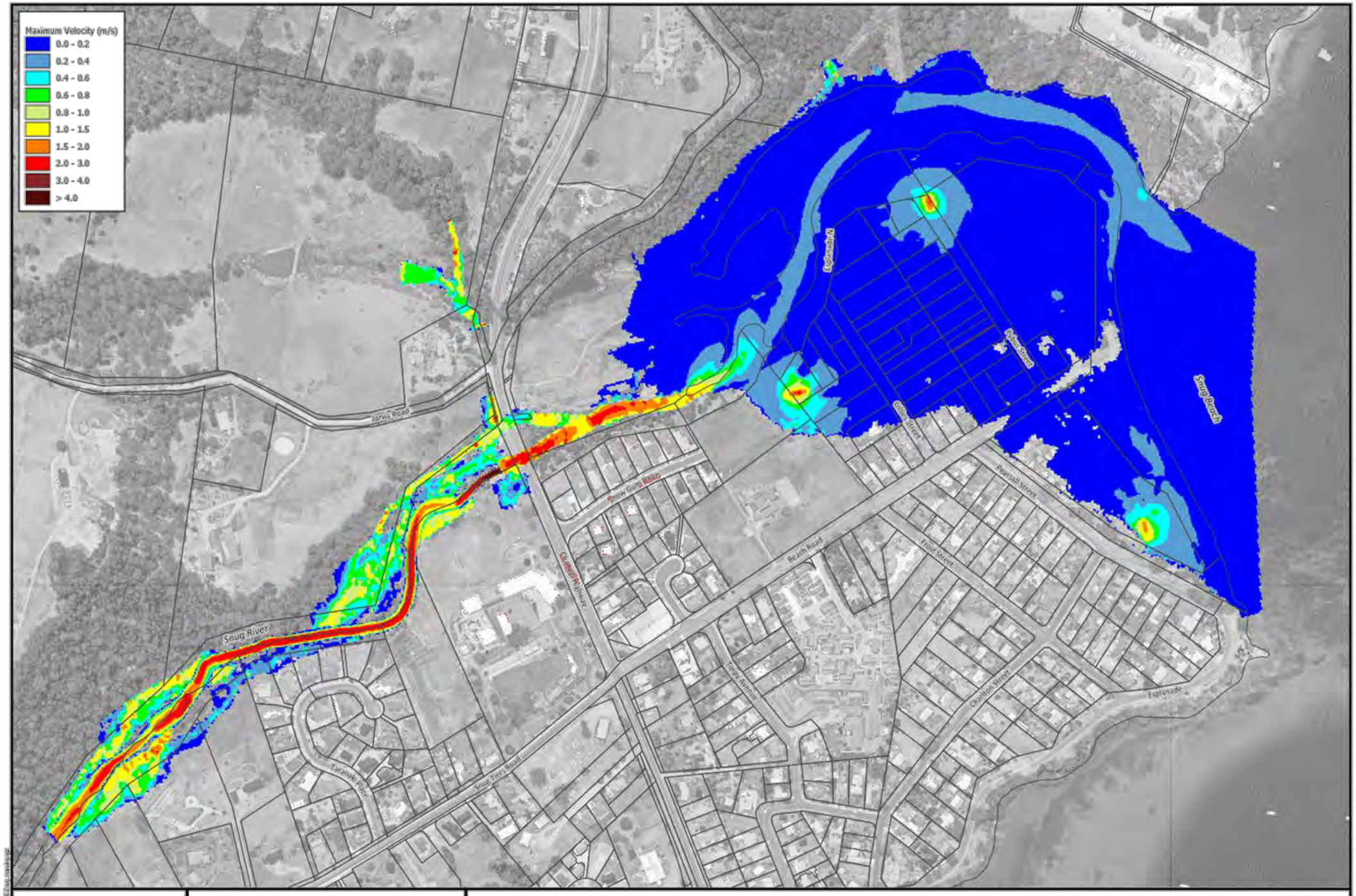
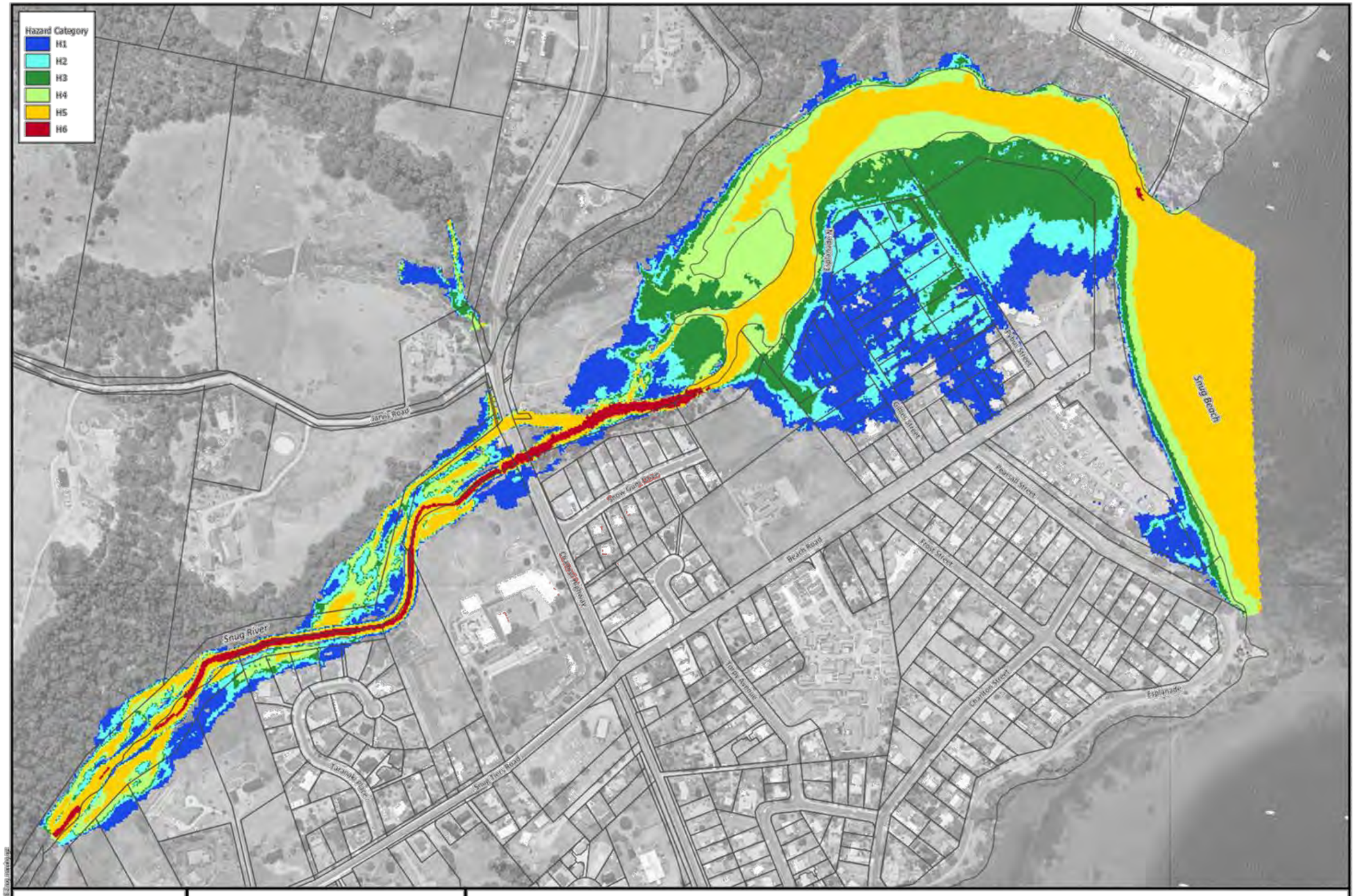
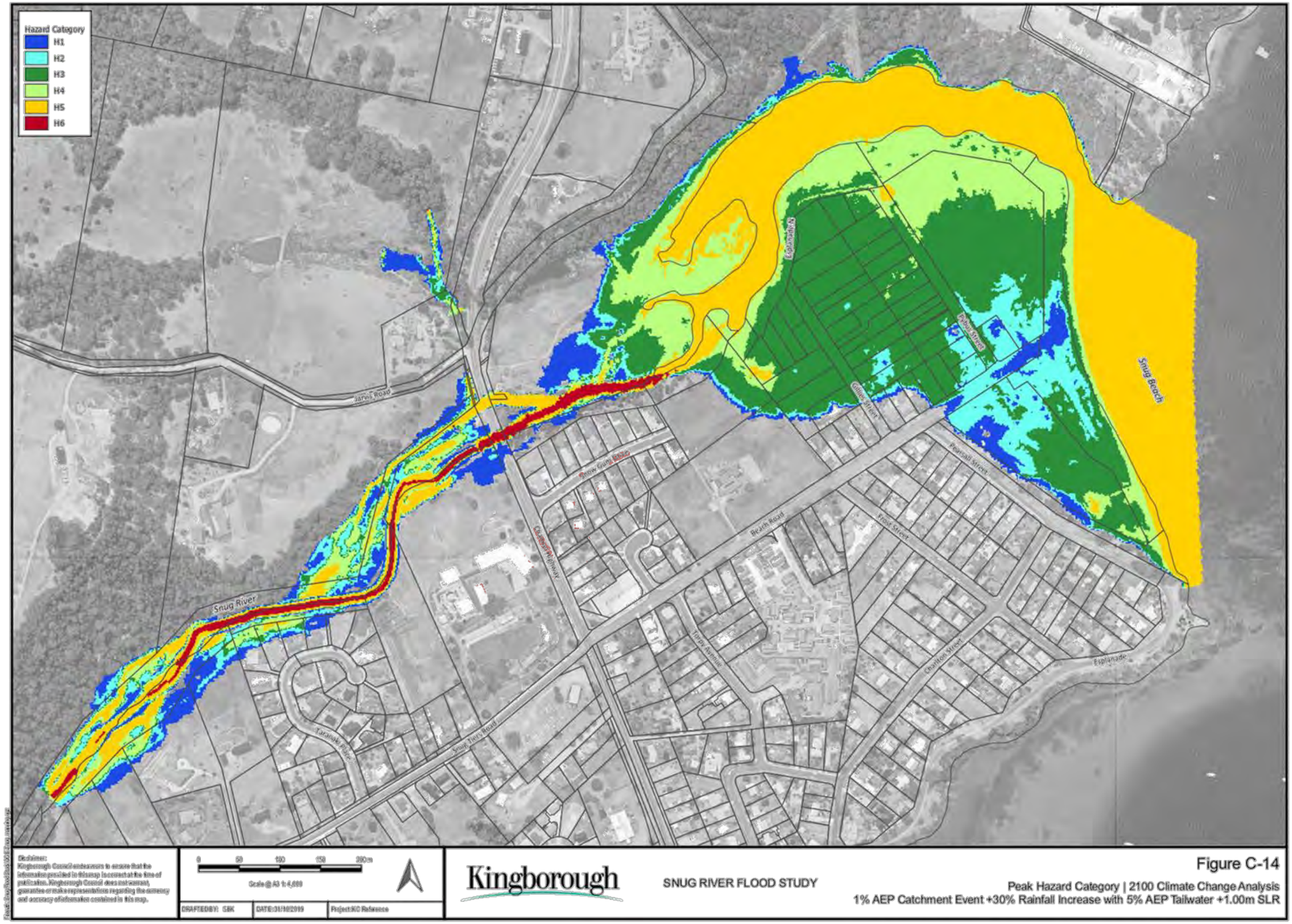
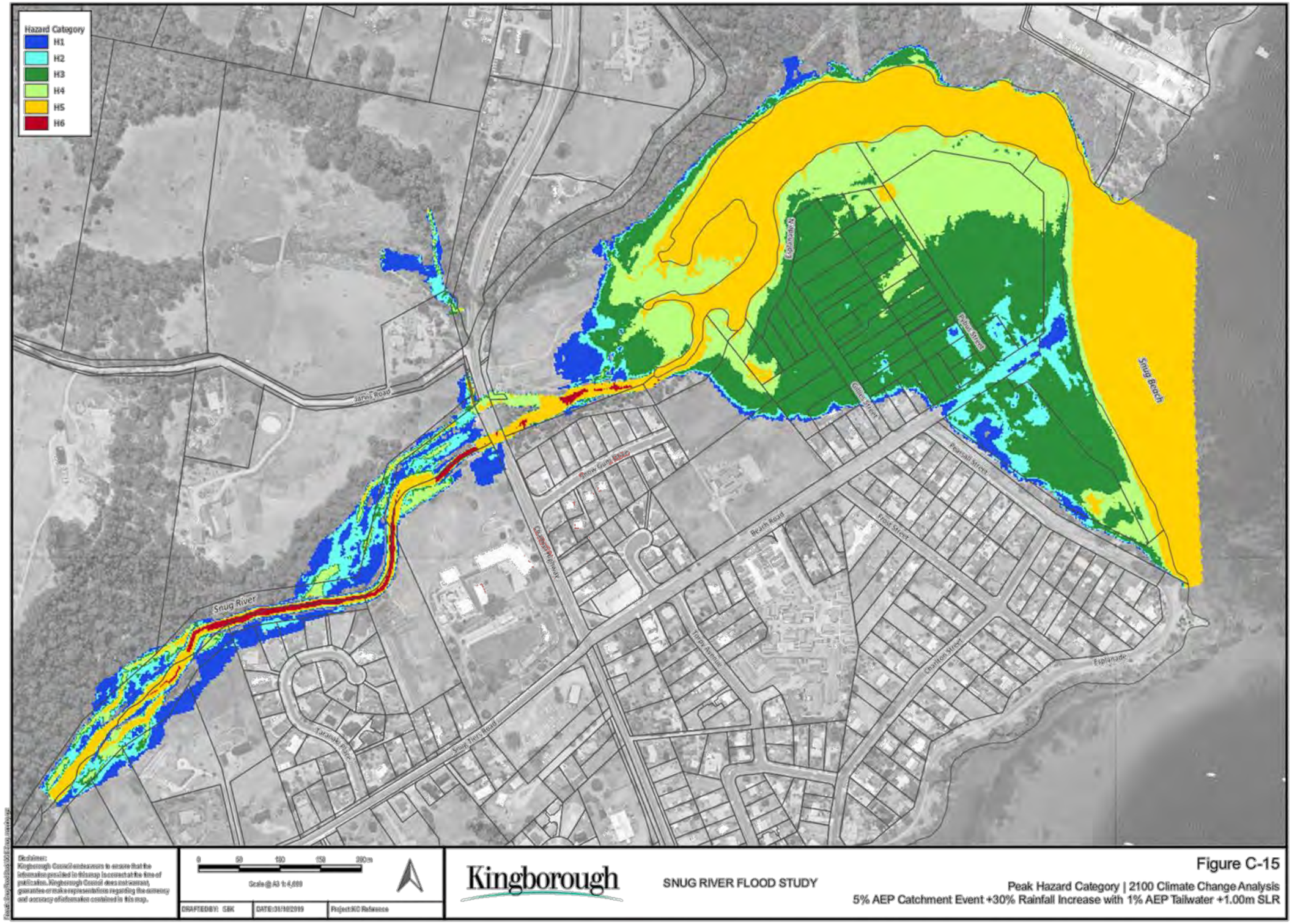


Figure C-12
Peak Velocities | 2100 Climate Change Analysis
20% AEP Catchment Event +30% Rainfall Increase with 20% AEP Tailwater +1.00m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Zarvos Road
Snug River
Snug Beach
Beach Road
Esplanade
Snug Tiers Road
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-13
Peak Hazard Category | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with MHWS Tailwater +1.00m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Esplanade
Charlton Street
Beach Road
Front Street
Pearsall Street
Gillies Street
Tarana Avenue
Snug Tiers Road
Charles Riviway
Tarana Place
Arthur Highway
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-14
Peak Hazard Category | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with 5% AEP Tailwater +1.00m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Snug Tiers Road
Beach Road
Front Street
Esplanade
Charlton Street
Pearsall Street
Gillies Street
Pybus Street
Leighlands
Jarvis Road
Arrow Grove Estate
Charlotte Highway
Tarana Place
Tarpey Avenue
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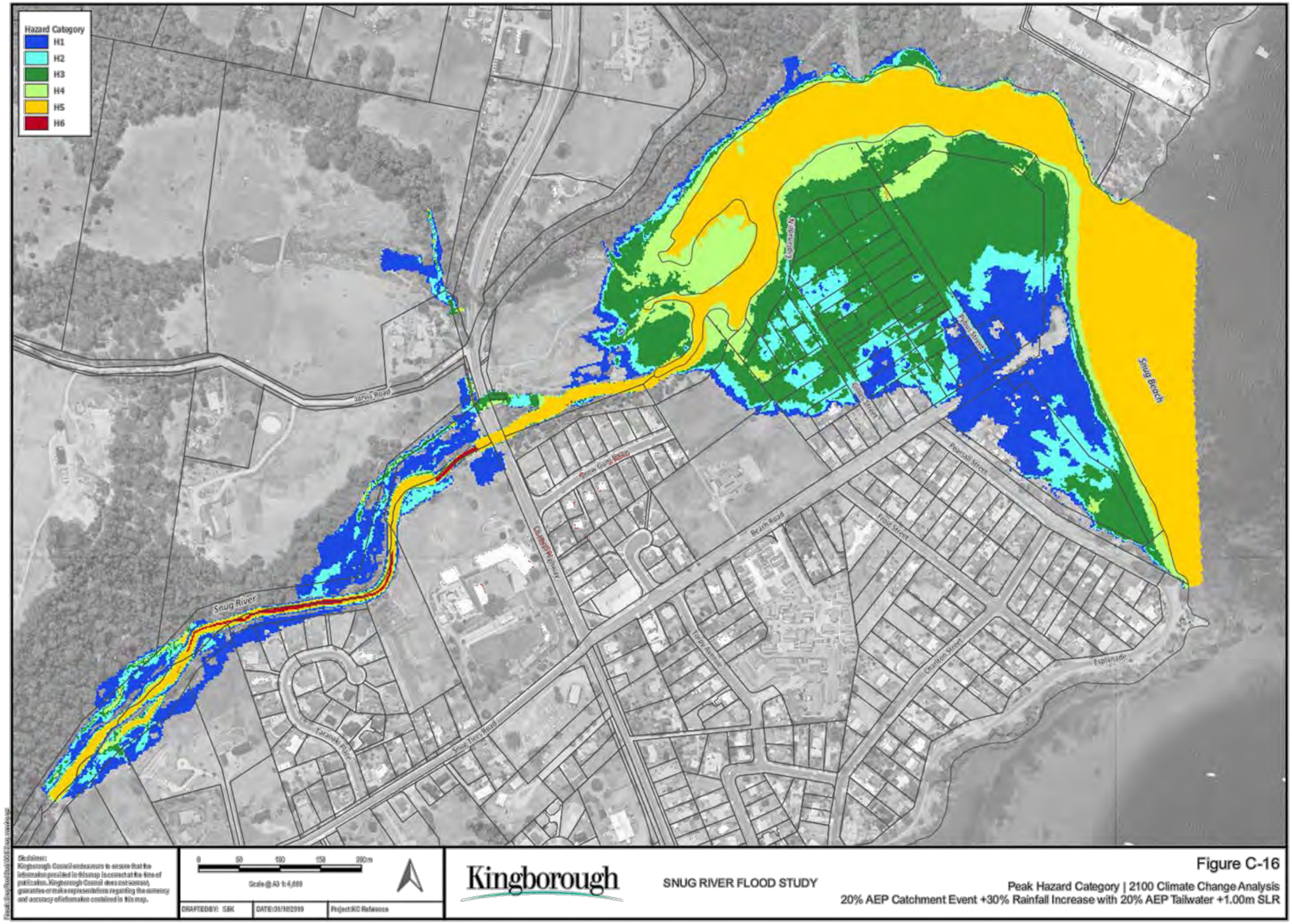
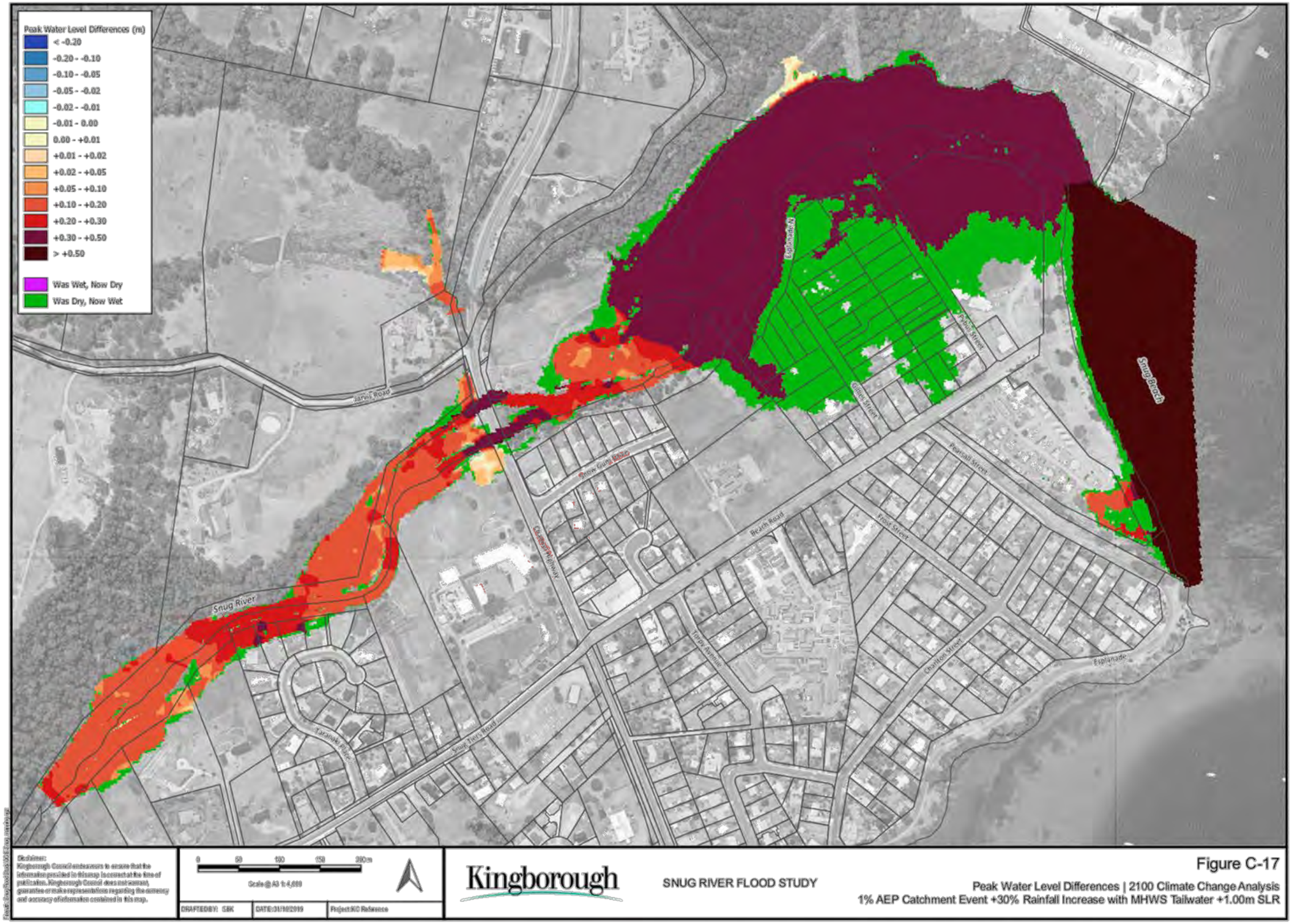
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-15
Peak Hazard Category | 2100 Climate Change Analysis
5% AEP Catchment Event +30% Rainfall Increase with 1% AEP Tailwater +1.00m SLR


Hazard Category
H1
H2
H3
H4
H5
H6
Snug River
Snug Beach
Snug Tiers Road
Beach Road
Front Street
Esplanade
Charlton Street
Pearsall Street
Grille Street
Flinders Street
Tasman Highway
Tarana Drive
Tarana Place
Snug River Bridge
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-16
Peak Hazard Category | 2100 Climate Change Analysis
20% AEP Catchment Event +30% Rainfall Increase with 20% AEP Tailwater +1.00m SLR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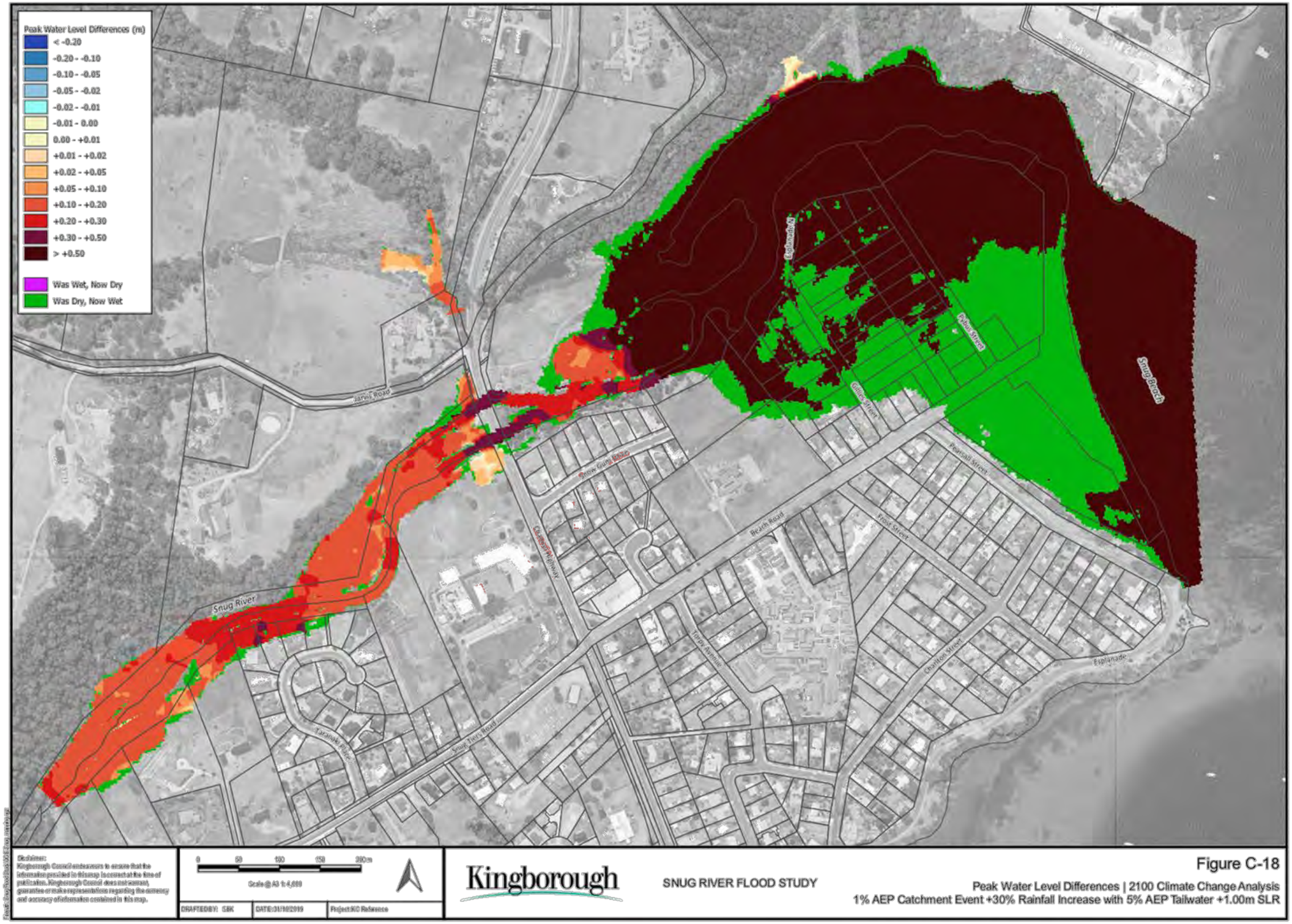
-0.20 - -0.10
-0.10 - -0.05
-0.05 - -0.02
-0.02 - -0.01
-0.01 - 0.00
0.00 - +0.01
+0.01 - +0.02
+0.02 - +0.05
+0.05 - +0.10
+0.10 - +0.20
+0.20 - +0.30
+0.30 - +0.50
> +0.50
Was Wet, Now Dry
Was Dry, Now Wet
Snug River
Snug Tiers Road
Beach Road
Front Street
Pearnall Street
Esplanade
Clarkton Street
Torrax Avenue
Snug Beach
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-17
Peak Water Level Differences | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with MHWS Tailwater +1.00m SLR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-0.10 - -0.05
-0.05 - -0.02
-0.02 - -0.01
-0.01 - 0.00
0.00 - +0.01
+0.01 - +0.02
+0.02 - +0.05
+0.05 - +0.10
+0.10 - +0.20
+0.20 - +0.30
+0.30 - +0.50
> +0.50
Was Wet, Now Dry
Was Dry, Now Wet
Zarnes Road
Snug River
Snug Tiers Road
Clarence Highway
Beach Road
Front Street
Tasman Avenue
Charlton Street
Esplanade
Pearsall Street
Snug Beach
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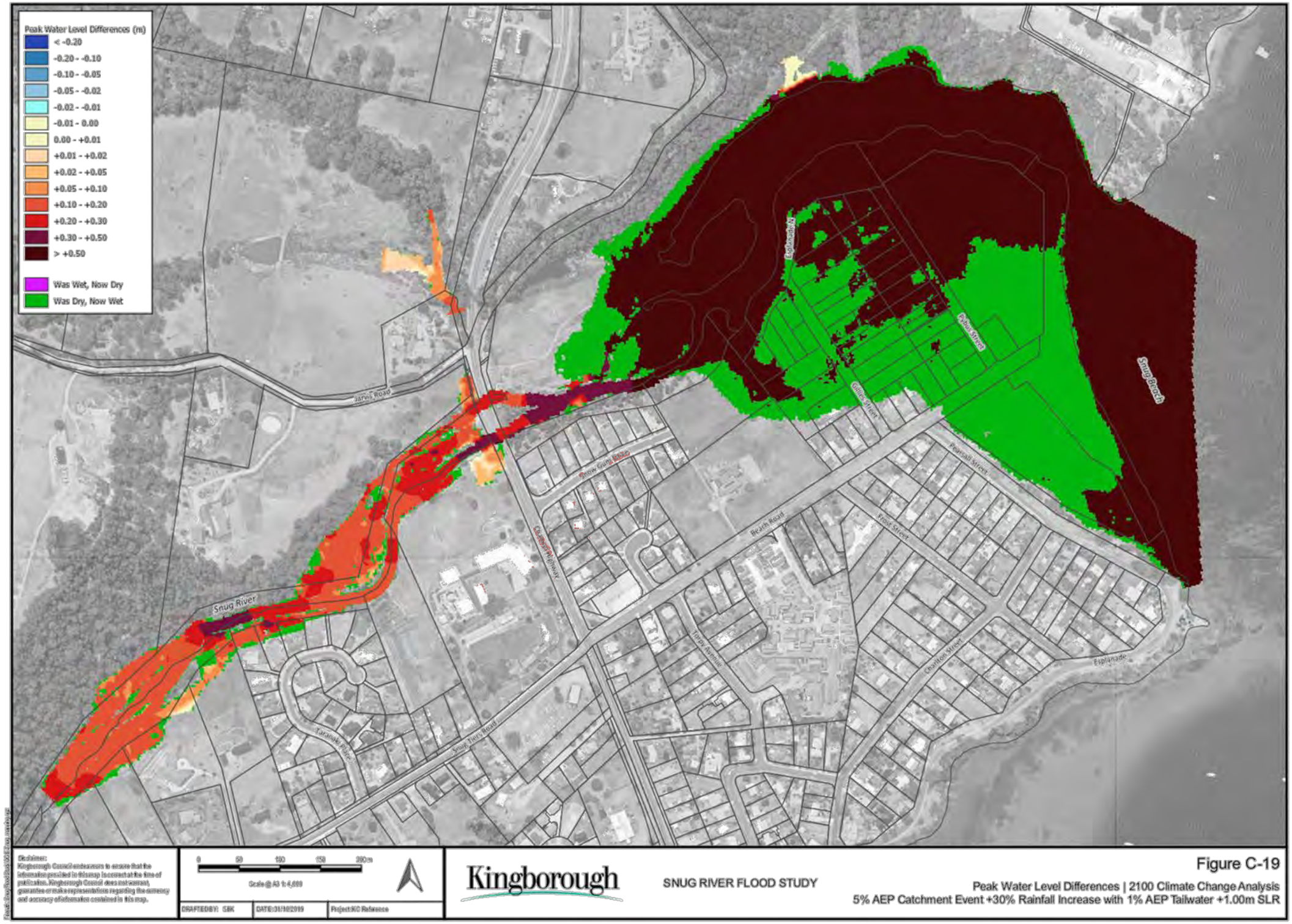
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-18
Peak Water Level Differences | 2100 Climate Change Analysis
1% AEP Catchment Event +30% Rainfall Increase with 5% AEP Tailwater +1.00m SLR


Peak Water Level Differences (m)
< -0.20
-0.20 - -0.10
-0.10 - -0.05
-0.05 - -0.02
-0.02 - -0.01
-0.01 - 0.00
0.00 - +0.01
+0.01 - +0.02
+0.02 - +0.05
+0.05 - +0.10
+0.10 - +0.20
+0.20 - +0.30
+0.30 - +0.50
> +0.50
Was Wet, Now Dry
Was Dry, Now Wet
Jarvis Road
Snug River
Snug Tiers Road
Beach Road
Front Street
Charlton Street
Esplanade
Pearsall Street
Snug Beach
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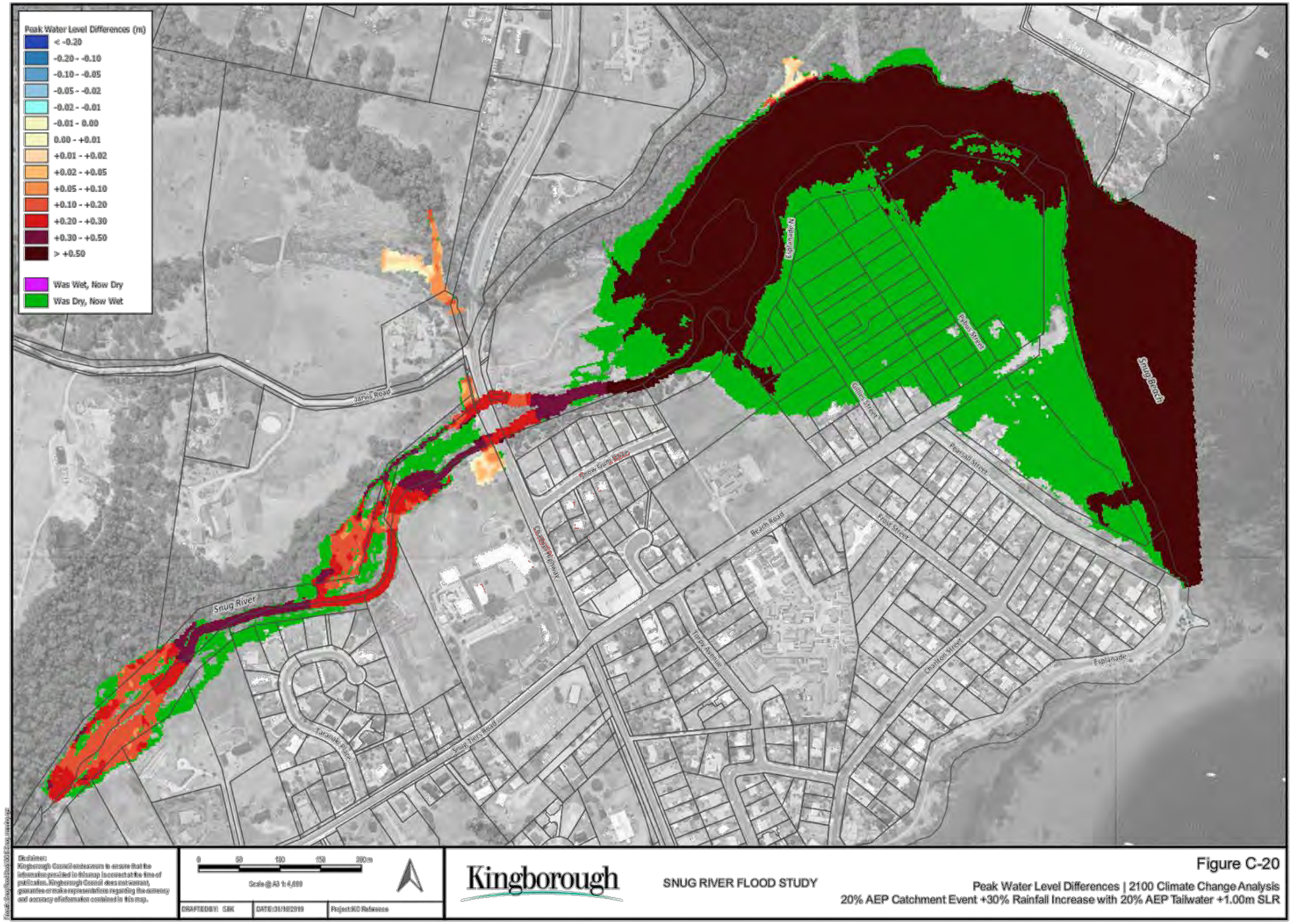
DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-19
Peak Water Level Differences | 2100 Climate Change Analysis
5% AEP Catchment Event +30% Rainfall Increase with 1% AEP Tailwater +1.00m SLR


Peak Water Level Differences (m)
< -0.20
-0.20 - -0.10
-0.10 - -0.05
-0.05 - -0.02
-0.02 - -0.01
-0.01 - 0.00
0.00 - +0.01
+0.01 - +0.02
+0.02 - +0.05
+0.05 - +0.10
+0.10 - +0.20
+0.20 - +0.30
+0.30 - +0.50
> +0.50
Was Wet, Now Dry
Was Dry, Now Wet
Snug River
Snug Tiers Road
Beach Road
Esplanade
Charlton Street
Front Street
Pearsall Street
Gillies Street
Leighlander's
Snug Beach
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DATE: 31/10/2019
Project KC Reference
Kingborough
SNUG RIVER FLOOD STUDY
Figure C-20
Peak Water Level Differences | 2100 Climate Change Analysis
20% AEP Catchment Event +30% Rainfall Increase with 20% AEP Tailwater +1.00m SLR

APPENDIX D: Community Questionnaire

Snug River Flood Study Questionnaire

Dear Resident,

Council is currently undertaking a flood study for the Snug River catchment. Local knowledge of past flooding events is important for us to better understand potential future flooding and how we will be able to manage flood risk.

If you have any comments, photos or information of previous flooding, please complete Council's online survey on Council's website (*https://www.kingborough.tas.gov.au/2018/04/snug-river-flood-survey/*) or send a hard copy of the attached questionnaire to the Civic Centre of Kingborough Council, 15 Channel Highway, Kingston 7050.

1. **Do you, or have you lived in the study area indicated on the map?**

2. **If yes, how long have you lived/did you live there?**

3. **If you haven't lived there, what is your experience of the area?**
   For example, did you know others who have lived there, or have you worked, played or gone to school there?

4. **Have you seen any flooding there and in which years?**
   If yes, please describe the flooding. Please include when it was, what happened and what the impacts were.

5. **Let us know if you have any photos of past flooding events in the area and if you would be happy to share them for this study.**

6. **Would you like Council to organise an information session at the Snug Community Hall to further discuss flooding knowledge and impacts?**

Figure 1: Snug River Catchment Study Area.

The survey will **close on 21 May 2018**.

If you have any queries regarding this survey, please contact Audrey Lau, Council's Stormwater and Waterways Engineer on 6211 8239 or email alau@kingborough.tas.gov.au.

Thank you for your participation and valuable contribution.

entura

ADVENTURE BAY FLOOD STUDY

Inundation Risk Modelling and Mapping

17 February 2020

Prepared by Hydro-Electric Corporation
ABN48 072 377 158

t/a Entura 89 Cambridge Park Drive,
Cambridge TAS 7170 Australia

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Document information

Document title	Adventure Bay Flood Study Inundation Risk Modelling and Mapping
Client organisation	Kingborough council
Client contact	Alan H Walker
ConsultDM number	ENTURA-12E116
Project Manager	Colin Terry
Project number	E307686 - P515370

Revision history

Revision 1.2

Revision description			
Prepared by	Aleksandar Jokanovic/Colin Terry	Final	11/02/2020
Reviewed by	Colin Terry		
Approved by	David Fuller		
	(name)	(signature)	(date)
Distributed to	Alan H Walker (name)	Kingborough council (organisation)	(date)

Executive summary

Entura was engaged by Kingborough Council to conduct a flood risk assessment of Captain Cook Creek at Adventure Bay for a range of land and sea-based storms. The assessment incorporated climate change scenarios for years 2050 and 2100, with the current catchment and infrastructure level of development.

The study involved hydrological and hydraulic flood modelling, and inundation extent and hazard mapping. The modelling was based on the latest Australian Rainfall and Runoff (ARR) guidelines (Ball, et al., 2019).

An integrated hydrological and hydraulic 1D/2D XPSWMM (version 2019.1) software package was used for modelling. The software allows hydrological and hydraulic calculations to be conducted within the same model.

Hydrological modelling of the Captain Cook Creek catchment was performed by splitting catchment into several smaller sub-catchments and using Laurenson Runoff Routing procedure. Thehydrological model was used to select one design temporal pattern for 2D model inflows in order to reduce modelling time. The hydraulic modelling had a 2D domain covering part of Adventure Bay, the Adventure Bay township, and further upstream to cover most of the Environmental Living Planning Zone. The shape of the ground in the 2D domain was defined using a combination of LIDAR and bathymetric survey of the lower reaches of Captain Cook Creek.

A sensitivity analysis was conducted in order to better understand the impact of the sandbar on flood levels around the creek lagoon. The sandbar raised upstream flood levels 0.1 – 0.15 m when there was 1 m AHD tailwater during 1% AEP river storm.

Flood extents maps and flood hazard maps are provided in Appendix E. The recommended scenario to be adopted for the 1% AEP flood extent is 1% AEP river flood with 2100 rainfall combined with the 3 m tailwater.

This study did not investigate mitigation of the existing flood extents, other than to note the sensitivity of the flood levels on sandbar during the current climate highest astronomical tide scenario. Community engagement will be a key component of moving forward with solutions to risk the flood risk.

The results of the flood study show there are existing properties and houses within the 1% AEP flood extent. The critical storm which causes the highest inundation will last in the order of 9 hours (from the river flooding component) to 48 hours (from the sea storm component). Further modelling work as part of flood evacuation planning is recommended to refine the inundation duration.

It is recommended that Council adopt the 1% AEP flood extent mapping with 0.3 m freeboard for use in their planning processes, engage with the community with these results and consider the benefit of extending the use of the flood model that has been developed for this project for mitigation and emergency planning studies.

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Appendices

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List of tables

1. Introduction

Entura was engaged by Kingborough Council to conduct a flood risk assessment of Captain Cook Creek at Adventure Bay.

The project aims to better understand and demonstrate flood risks posed to the Adventure Bay population and produced mapping to demonstrate flood extents in 2020, 2050 and 2100 incorporating the climate change impacts.

Captain Cook Creek starts below Mount Midway on Bruny Island at an elevation of 437 m AHD and flows into Adventure Bay, which is adjacent to the Tasman Sea. The creek is 8.3 km long and its catchment area covers approximately 20 km2. Captain Cook Creek catchment is presented in Figure 1.1.

Entura's assessment included:

- Information and data review from sources available or relevant to Adventure Bay Flood Study.
- Field survey of Captain Cook Creek bathymetry from coast to caravan park.
- Development of flood modelling and mapping methodology by considering approaches undertaken by Kingborough Council for Kingston Beach and Snug Flood Studies.
- Development and running of relevant hydrological and hydraulic models.
- Preparation of flood extent and hazard maps for 1% annual exceedance probability (AEP) event.

Entura issued project notes on 21 May 2019 which described document review and project methodology. The proposed methodology was discussed and accepted by Council represented by Alan Walker during the meeting on 22 May 2019.

This report is based on the projects notes and documents the major findings of the study.

The project was conducted without site inspections, except for a field survey.

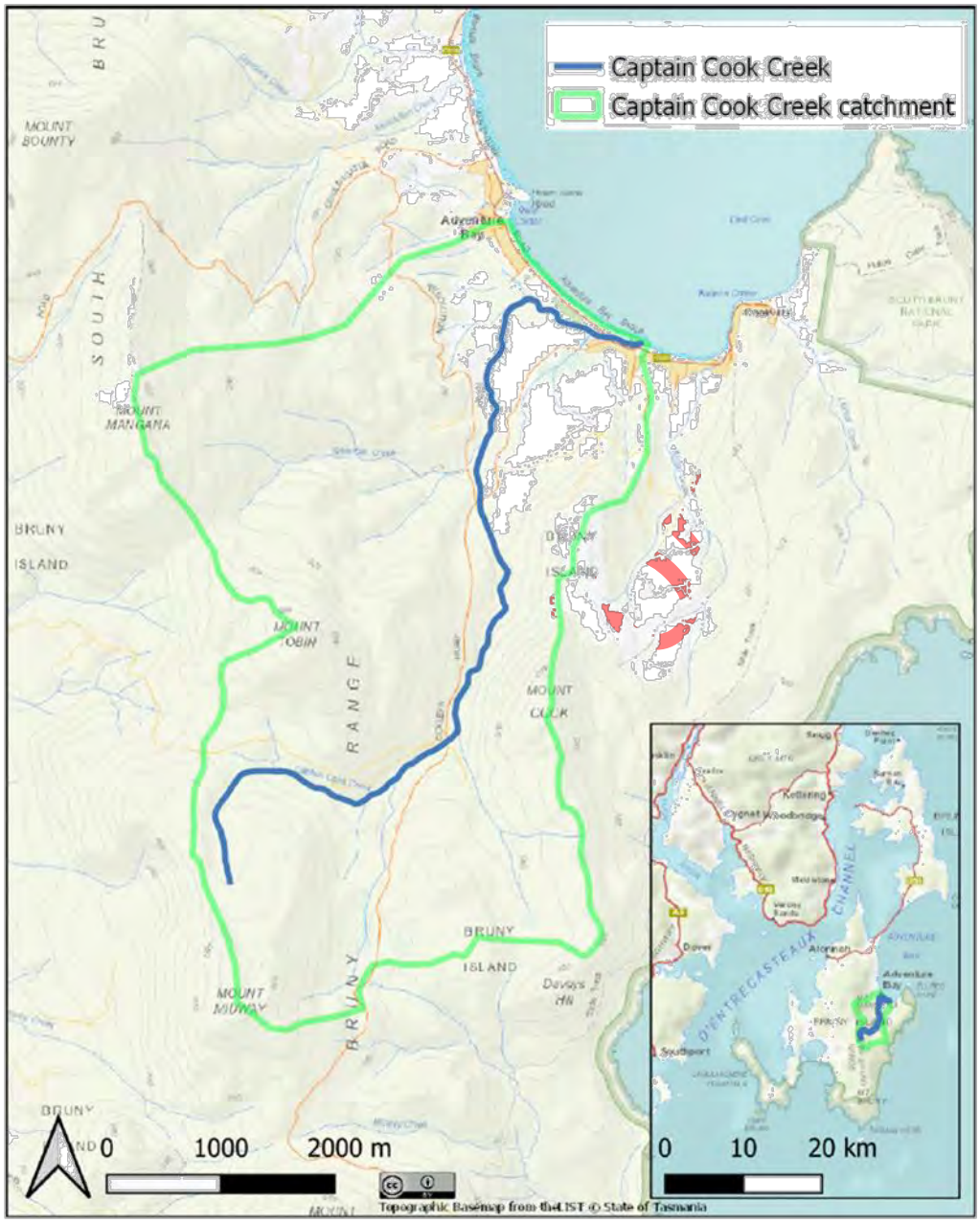

Figure 1.1: Captain Cook Creek location on Bruny Island

2. Data review

2.1 Reports

The following reports have been received from Kingborough Council and reviewed for their applicability for the study:

1. Adventure Bay - Local Area Report for Communities and Coastal Hazards project (AECOM, 2016)
2. A first pass coastal hazard assessment for Kingborough Local Government Area, Tasmania (Sharples & Donaldson, 2014)
3. Groundwater Monitoring, Adventure Bay, Bruny Island. Kingborough (Cromer, 2015)
4. Kingston Beach Flood Study (Kingborough Council, 2016)
5. Snug Flood Study (early draft) (Kingborough Council, 2019)
6. Adventure Bay Dynamic Tailwater Levels (UNSW Water Research Laboratory, 2017)
7. Captain Cook Bridge Replacement Design Drawings (SKM, 2000)

Kingston Beach Flood study (Kingborough Council, 2016) and Snug Flood Study (Kingborough Council, 2019) served to develop a methodology and parameters for Captain Cook Creek flood study. Snug Flood Study report did not have the hydraulic and hydrological chapters at the time of writing. Kingston Beach Flood Study was complete and used as the primary guide for this study.

The Adventure Bay Dynamic Tailwater Levels Report (UNSW Water Research Laboratory, 2017) used for tailwater levels.

Captain Cook Bridge Design Drawings (SKM, 2000) were used to understand the bridge structure, with a field survey used for elevations used in the model.

Although AECOM (2014) and Sharples & Donaldson (2014) raised concerned about the coastal hazards including erosion, sea-level rise and coastal inundation, the coastal geometry was considered to be static in the study. Further, Entura assessed the removal of the Captain Cook Creek sandbar from the beach as part of a sensitivity analysis.

Sea level rise was covered in the UNSW Water Research Laboratory (2017) report and Kingston Beach Flood Study (Kingborough Council, 2016). These two documents were key inputs to establishing the sea level boundary condition scenarios for this project.

Cromer (2015) report monitored the groundwater at the coast and which is not significant for a riverine flood study compared to other factors, such as sea and tide levels, and this report wasn't directlyed used.

2.2 Topographic data

The following Digital Elevation Models (DEM) are available for the study:

- The Department of Premier and Cabinet (DPAC) based on the LiDAR dataset collected in 2014.
- Mineral Resources Tasmania (MRT), which is formed from the combination of DPAC and Forestry Tasmania LiDAR datasets.

DPAC LIDAR dataset covers several Tasmanian coastal towns not included in the previous Climate Futures or Geoscience Australia LiDAR projects.

The Forestry Tasmania LiDAR dataset was collected between 2010 and 2015 over several areas within Tasmania and covers approximately 26,500 square kilometres of land over the state. Forestry Tasmania LIDAR is unavailable.

DEM assessment indicated that DPAC DEM is of better quality as MRT DEM has "noise" due to the fact it was combined datasets from two flights. However, DPAC has a higher ground level in the creek channel which may be due to different water level at the time of the survey.

Consequently, Entura agreed with the Council to:

1. Use DPAC DEM where available. DPAC DEM coverage is shown in Appendix A.
2. Use MRT DEM in the remaining areas (ie. upstream of the DPAC coverage).
3. Conduct a bathymetric survey of the Cook Creek channel over approximately 1.4 km length from the estuary. This bathymetric survey was combined with the DPAC DEM.
4. Sandbar from the beach was not removed, but a sensitivity analysis was conducted to assess sandbar being washed away.
5. Use SeaMap Tasmania Bathymetric Data for ocean bathymetry.

2.3 Bathymetric survey

Entura conducted a bathymetric survey of Captain Cook Creek in June 2019. The survey covered 1.4 km of the creek channel from the creek mouth. Survey outputs were incorporated into the DEM.

2.4 Streamflow gauges

Streamflow gauges were not available.

2.5 Land use data

Aerial photos were used as a guide for land use. Land use is required as an input to both hydraulic and hydrological model. The current level of development was assumed in the models. Under the current planning zones, the land use with the greatest potential for changing the runoff characteristics of the catchment is from forestry activities.

3. Model development

3.1 Approach

Modelling methodology was developed using Entura's standard modelling procedures and Kingston Beach Flood Study (Kingborough Council, 2016).

An integrated hydrological and hydraulic 1D/2D XPSWMM (version 2019.1) software package was used for modelling. The software allows hydrological and hydraulic modelling to be conducted within the same model.

3.2 Model extents and layout

The extent of the hydraulic model is shown in the flood maps in Appendix E. Two-dimensional (2D) hydraulic model domain covers the nearshore coastal area, township and extends further upstream to cover most of the Environmental Living Planning Zone. This ensured the model results cover nearly all areas that can potentially be developed with the current planning scheme.

The hydrological model covered the entire catchment area. The total catchment area was delineated into 20 sub-catchments[1], as shown in Appendix B.

3.3 Hydrological model

3.3.1 Hydrologic model set-up

The hydrological model was developed using the latest Australian Rainfall and Runoff (ARR) (Ball, et al., 2019) recommendations and new design rainfall intensity-frequency-duration (IFD) estimates (BOM, 2016) and temporal patterns (ARR, 2019a).

This approach is different to the Kingston Beach Flood Study which used the 1987 ARR method. The 2016 ARR (Ball, et al., 2019) approach requires ten (10) times more model runs for each modelled scenarios, as it uses 10 temporal patterns for each rainfall duration, whereas, the 1987 ARR method used one temporal pattern for each duration.

Therefore, in order to reduce the number of model runs, Entura adopted the following methodology:

- Develop a hydrological model using 1D hydraulic links between sub-catchment nodes.
- Each hydraulic link is a cross-section at node location. Essentially, one cross-section is a representative cross-section between two nodes. Link length and slope were automatically

[1] Initial catchment delineation included two (2) small sub-catchments that drain into the bay north of Captain Cooks Creek. Hence, total number of delineated catchments was twenty two (22), of which twenty (20) belong to Captain Cooks Creek which were modelled in the 2D floodplain model.

calculated from the map and cross-section invert levels. Manning's coefficient (n) between 0.05 and 0.06 was used for the creeks.

- Captain Cook Creek lagoon storage was modelled as two links with wide cross-sections. Cross-section and link length contained sufficient storage volume and therefore, storage node was not used to represent the storage volume curve.
- Ten (10) temporal patterns were run for twelve (12) durations in the hydrological model for 1% AEP: 1 h, 1.5 h, 2 h, 3 h, 4.5 h, 6 h, 9 h, 12 h, 18 h, 24 h, 30 h and 36 h.
- The model was set-up and run for current climate (2020), 2050 and 2100 future climate scenarios. Rainfall depths were increased by 10% and 30% for 2050 and 2100 climate, respectively, in consistent with (Kingborough Council, 2016).
- The hydrological model results were used to select the critical rainfall duration and one (1) temporal pattern, as discussed in Section 4.

Single rainfall depth was assumed across the entire catchment with an appropriate aerial reduction factor supplied by ARR Data Hub (ARR, 2019). ARR (Ball, et al., 2019) recommends to adopt a uniform spatial pattern for catchments smaller than 20 km^2. However, the catchment area for this project (20 km^2) and at any event the gridded spatial data from BOM only contains just over one grid cell limiting the ability to calculate a spatial pattern accurately.

3.3.2 Catchment delineation and parameters

Captain Cook Creek was delineated into twenty (20) sub-catchments[2] based on LIDAR generated contours and preliminary rain-on-grid model developed in HEC-RAS.

An assessment of catchment imperviousness concluded that less than 0.1% of the catchment area was impervious and therefore catchment was assumed 100% pervious in the model.

Manning's n in the hydrological model was adopted as 0.03 for every sub-catchment which represents a mixture of forested hillsides and rough creek. It should be noted Manning's n in the hydrological model represents storage delay time coefficient modifier and is not the same as hydraulic roughness. Default value was used as the model was not calibrated.

Geometric sub-catchment data, such as area, slope and the longest flow path length, were extracted from the DEM.

3.3.3 Rainfall losses

There are no local stream gauges to calibrate to, so generic values are used that are releavent for this area. An initial loss of 28 mm and continuing loss of 3.2 mm/h were adopted, as recommended by ARR data hub (ARR, 2019a).

[2] Initial catchment delineation included two (2) small sub-catchments that drain into the bay north of Captain Cooks Creek catchment. Hence, total number of delineated catchments was twenty two (22), of which twenty (20) belong to Captain Cooks Creek which were modelled in the 2D floodplain model.

3.3.4 Runoff routing procedure

Laurenson Runoff Routing procedure, also known as the RAFTS model was applied in the XPSWMM hydrological model. RAFTS model was used in the Kingston Beach Flood Study (Kingborough Council, 2016). The inputs for this routing procedure included catchment area, imperviousness, catchment slope and catchment roughness.

3.3.5 Peak flow estimation

A typical flood frequency analysis was not conducted to estimate the peak flows in the Captain Cook Creek catchment as there was no observed data.

The peak flow was estimated using ARR regional flood frequency estimation model (ARR, 2019b) as presented in Table 3.1 below. Peak flow estimates were used to validate outputs from the hydrological model.

Table 3.1: Peak flow estimatation using regional flood frequency estimation model (ARR, 2019b)

AEP (%)	Discharge (m^3/s)	Lower Confidence Limit (5%) (m^3/s)	Upper Confidence Limit (95%) (m^3/s)
50	12.4	5.83	27.0
20	21.8	10.1	47.4
10	29.7	11.8	73.5
5	38.6	12.8	111
2	52.3	13.8	182
1	64.3	14.4	257

3.4 2D hydraulic floodplain model

3.4.1 DEM and computational grid

A 4 m gridwas used for the 2D model domain using the DEM as described in Section 0. This grid size was chosen for the purpose of maximising the accuracy of the model, while respecting the resolution of the input data, model size and computation time. The width of the creek channel was between 10 m and 40 m in the area of interest. Therefore, 3–10 cells were used to cover channel width which was appropriate for the expected lower velocities.

3.4.2 Hydraulic structures

Captain Cook Creek Bridge was modelled as a 1D bridge structure and was linked to the 2D domain using SX links (ie. sourced from an external model). The the bridge data was obtained from the design drawings (SKM, 2000) and the bathymetric survey (Section 2.3).

There is an allowance for wave run up in the 2 m AHD and 3 m AHD scenarios. Wave run-up is dynamic, oscillating with short wave period, but for this modelling the tailwater to the model is held constant. For the purposes of flood risk up within Captain Cook Creek, the oscillations from wind waves are expected to moderate as the wave energy enters Captain Cook Creek. While relationships for wave run-up on a beach exist, the complex interaction between the wave and Captain Cook Creek has not been analysed in this study. Instead, a judgment has been made to adopt a constant tailwater level.

The 1 m AHD scenario represents the highest astronomical tide in the current climate plus wave set up from a wind storm that has the probability of 1 exceedance per year (EY)[3] and no allowance for wave run-up. That is 0.8 m AHD tide plus 0.2 m wave setup = 1 m AHD.

The 2 m AHD scenario represents a range of events. Either small storms and a 2050 sea level rise (0.3 m), or major storms and current climate.

The 3 m AHD scenario represents a 1% AEP sea storm (1.44 m AHD), wave setup from a 1% AEP wind storm (0.48 m) and an allowance for wave run up if this was represented by a constant water level (0.08 m), and 1 m sea level rise. That is 1.44 m AHD + 0.48 m + 0.08 m + 1 m = 3 m AHD.

As a comparison to the 2100 1% AEP sea storm, the 2100 5% AEP sea storm (Table 3.4) is 0.16 m lower. That is the impacts of sea level rise and normal tide variation make up a much larger proportion of tailwater level than the storm rarity (for rarer events).

It should be noted that there could be variation around the statistical description of the tailwater, and there was no assessments conducted forrare events such as tsunamis. Also, the timing of sea level rise due to climate change is uncertain and the values used are based on the best available science. There are a range of political and social factors that will alter the timing of sea level rise that are outside the scope of this study. The estimates for sea level rise by the International Panel for Climate Change and local translations of this data should be monitored as they are updated. If this boundary condition significantly changes, model and maps should be updated to reflect the changes.

Table 3.3: Recommended tide levels

Scenario	Level	Rationale
Low	1 m AHD	1 EY (ie. 63% AEP) for current climate
Medium	2 m AHD	5% AEP for 2050 climate
High	3 m AHD	1% AEP for 2100 climate

Levels are Peak Nearshore Water Levels from the Adventure Bay Dynamic Tailwater Levels Report (UNSW Water Research Laboratory, 2017) plus an allowance for the effect of sea wave run-up.

[3] 1 EY corresponds to 63% AEP according to the new ARR (Ball, et al., 2019) probability terminology. ARR advises the events that are more frequent than those with a 50% AEP to be expressed as X Exceedances per Year (EY).

Table 3.4: Adventure Bay sea levels (UNSW Water Research Laboratory, 2017)

Year	ARI	Sea Level Rise (m)	Tide at Peak (m AHD)	Anomaly at Peak (m)	Local Wind Setup at Peak (m)	Wave Setup at Peak (m) (Shoreline)	Peak Nearshore Water Level (m AHD)
Present Day	1	0	0.53	0.44	0	0.21	1.18
	10		0.53	0.68	0	0.36	1.57
	20		0.53	0.75	0	0.48	1.76
	50		0.53	0.84	0	0.46	1.83
	100		0.53	0.91	0	0.48	1.92
2050	1	0.3	0.53	0.44	0	0.21	1.48
	10		0.53	0.68	0	0.36	1.87
	20		0.43	0.75	0	0.48	1.96
	50		0.53	0.84	0	0.46	2.13
	100		0.53	0.91	0	0.48	2.22
2100	1	1	0.53	0.44	0	0.21	2.18
	10		0.53	0.68	0	0.36	2.57
	20		0.53	0.75	0	0.48	2.76
	50		0.53	0.84	0	0.46	2.83
	100		0.53	0.91	0	0.48	2.92

3.4.6 Other parameters

Other critical parameters for the XPSWMM model are provided below:

- Calculation time-step: 1 second
- Flooding and drying depth: 0.002
- Eddy viscosity: Smagorinsky formula with default coefficients.

3.5 Model calibration

No flood calibration data was available, so the hydraulic model was not calibrated. The accuracy of the flood inundation mapping was therefore reliant on the accuracy of the topographical information and drawings provided.

4. Design storm modelling

4.1 Hydrological model

A hydrological model with simple hydraulic links, as described in Section 3.3, was used to select the design temporal patterns for 2D model inflows. The hydrological model was run with three (3) downstream model boundaries defined in Table 3.3.

4.1.1 Critical storm duration

Critical rainfall durations and temporal patterns were observed from the results at two key locations: at the main creek inflow to the 2D model and at the lagoon. The average maximum flow for twelve (12) durations at the main creek inflow is presented in Appendix C1 and the average maximum flows and levels at the lagoon for twelve (12) durations and three (3) tide levels are presented in Appendix C2.

For the main creek inflow to the 2D domain, 6 h duration produced the highest average maximum discharge of 45 m^3/s for the current climate and was designated as the critical river duration. For the lagoon, 18 h rainfall duration produced the highest depths and was selected as the critical lagoon duration.

Maximum average water levels in the lagoon are 1.8 m AHD, 2.2 m AHD and 3.1 m AHD for tide levels of 1 m AHD, 2 m AHD and 3 m AHD respectively. These maximum average levels correspond to a range of flows between 71 m^3/s in and 79 m^3/s in the lagoon, depending on the tide level. This flow rate is 10% higher than the estimated peak flow using Regional Flood Frequency Estimation Model (ARR, 2019b). This difference is an acceptable range considering uncertainties within hydrological models, and validates the hydrological model.

4.1.2 Design temporal pattern selection for 2D model

Detailed result interrogation showed that temporal pattern number 9 for 18 hours duration produces levels and flows marginally higher than the maximum average levels and flows in the lagoon for 18 hours duration. The same pattern produces 46 m^3/s flow at the main Captain Cook Creek inflow to the 2D domain, which was close to the aforementioned 45 m^3/s for critical river duration.

Consequently, pattern number 9 for 18 h rainfall duration was selected to be run in the 2D hydraulic model as it is a good representative of average maximum flows for study area.

4.1.3 Preliminary conclusions

Hydrological model results indicated that the water levels in the lagoon were significantly influenced by tide, especially for higher tide levels. At 2 m AHD elevation, lagoon floodplain covers an area of approximately 50 ha, which can retain a significant volume of water. For example, for 2 m tide level, 1% AEP is expected to increase levels by 0.25 m in the lagoon.

4.2 2D floodplain model runs

Entura ran the following nine (9) scenarios in the 2D floodplain model:

1. 2020 1% AEP river flood + 1 m AHD tailwater level
2. 2020 1% AEP river flood + 2 m AHD tailwater level
3. 2020 1% AEP river flood + 3 m AHD tailwater level
4. 2050 climate (1% AEP + 10% Rainfall increase) river flood + 1 m AHD tailwater level
5. 2050 climate (1% AEP + 10% Rainfall increase) river flood + 2 m AHD tailwater level
6. 2050 climate (1% AEP + 10% Rainfall increase) river flood + 3 m AHD tailwater level
7. 2100 climate (1% AEP + 30% Rainfall Increase) river flood + 1 m AHD tailwater level
8. 2100 climate (1% AEP + 30% Rainfall Increase) river flood + 2 m AHD tailwater level
9. 2100 climate (1% AEP + 30% Rainfall Increase) river flood + 3 m AHD tailwater level

The purpose of these model runs was to assess and delineate tailwater and riverine influences on flooding. Rainfall depth increases for climate change scenarios were adopted from Kingston Beach Flood Study (Kingborough Council, 2016) and agreed with Council representative.

Table 4.1 below presents the model results as water levels at three locations for the above scenarios. Selected reporting locations are downstream of the bridge, upstream of the bridge and at the lagoon, as shown in Figure 4.1.

Figure 4.1: Water surface levels reporting points

Table 4.1 Water surface levels for 9 scenarios at 3 locations

		Water surface (m AHD)		
Tide (m AHD)	Climate (year)	Downstream of the bridge	Upstream of the bridge	Lagoon
1m	2020	2.1	2.3	2.5
1m	2050	2.3	2.4	2.6
1m	2100	2.4	2.6	2.7
2m	2020	2.3	2.5	2.6
2m	2050	2.3	2.5	2.6
2m	2100	2.4	2.6	2.8
3m	2020	3.0	3.1	3.1
3m	2050	3.1	3.1	3.1
3m	2100	3.1	3.1	3.2

There is approximately 0.8 m difference in flood depth upstream of the bridge for most extreme scenarios (Scenarios 1 and 9).

The results also show that flood levels in the lagoon and around the bridge are sensitive to riverine flooding for tide levels between 1 m AHD and 2 m AHD. For the tide level of 3 m AHD, the water levels in the lagoon raised only up to 0.1 m due to riverine flooding.

A joint probability assessment was required when the flood levels upstream of the bridge were sensitive to combining both extreme river flooding and sea storm tailwaters. However in this case the impact of the narrow Captain Cook Creek and detention effect of the lagoon, have provided enough hydraulic disconnection that simplified the assessment.

4.3 Sensitivity analysis to sandbar removal

A sensitivity analysis was conducted in order to better understand the impact of the sandbar on flood levels around the creek lagoon. The currently surveyed sandbar has a minimum ground level of approximately 1.1 m AHD. The analysis was carried out by removing the sandbar for three tide level scenarios and 1% AEP 2100 storm event. The results showed that the sandbar raised flood levels upstream of the bridge by 0.1–0.15 m when there was 1 m AHD sea during a 1% AEP river storm or 0.05-0.1 m when there was 2 m AHD sea level. For 3 m AHD sea level, removal of sandbar reduces flood levels by 0.01 m, which was less than the modelling accuracy.

Based on the analysis of the results and terrain, the sandbar was expected to meaningfully influence water levels downstream of the bridge for tailwater levels up to 1.6 m AHD. This was clear from water surface longitudinal profiles described in the following section. Water levels can be increased by 0.3 m downstream of the bridge for tide levels below 1.6 m AHD due to presence of sandbar.

Typically the sensivity of model output to roughness and grid size are tested for flood models, more often with faster flowing water and conveyance resistricted models. In this case the grid size used is resonabley fine and the critical flooding areas are controlled by the tailwater level (rather than

conveyance in a river), so other checks are not required. Tailwater level is a key model scenario input.

4.4 Longitudinal profile

A water level longitudinal profiles for nine (9) scenarios described in Section 4.2 are shown in Appendix D. The profile was developed for 1.8 km from the sea outlet to upstream of the outlet. Tailwater levels end influencing water levels at 1.8 km upstream of the sea outlet.

The profiles showed that the riverine flood and sandbar had an insignificant impact on the water levels in the lagoon for extreme tide levels of 3 m AHD.

4.5 Flooding mechanism

Narrow Captain Cook Creek channel outlet restricts the flow just upstream of the beach. This restriction is encircled in red in Figure 4.2. The result of these restrictions is that the water levels upstream of the bridge are not directly controlled by the tailwater level.

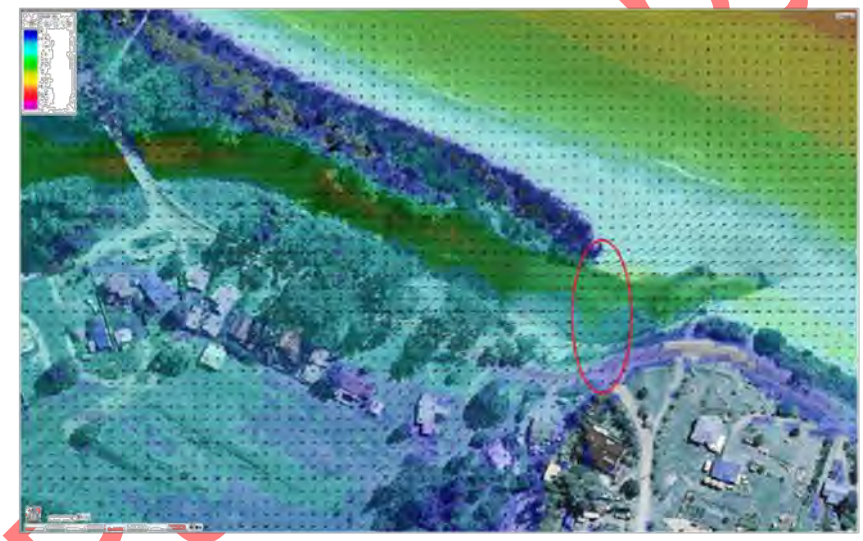

Figure 4.2: Captain Cook Creek channel outlet narrow section

The shape of the land just upstream of the bridge show a creek and flat overbank flood plain. There are several properties and buildings in the flood plain which are expected to be inundated during major storms (Figure 4.3).

There were no scenarios modelled with major changes to the opening up of the connection between Captain Cook Creek and Adventure Bay, or erosion of the land between Adventure Bay and Captain Cook Creek at the lagoon.

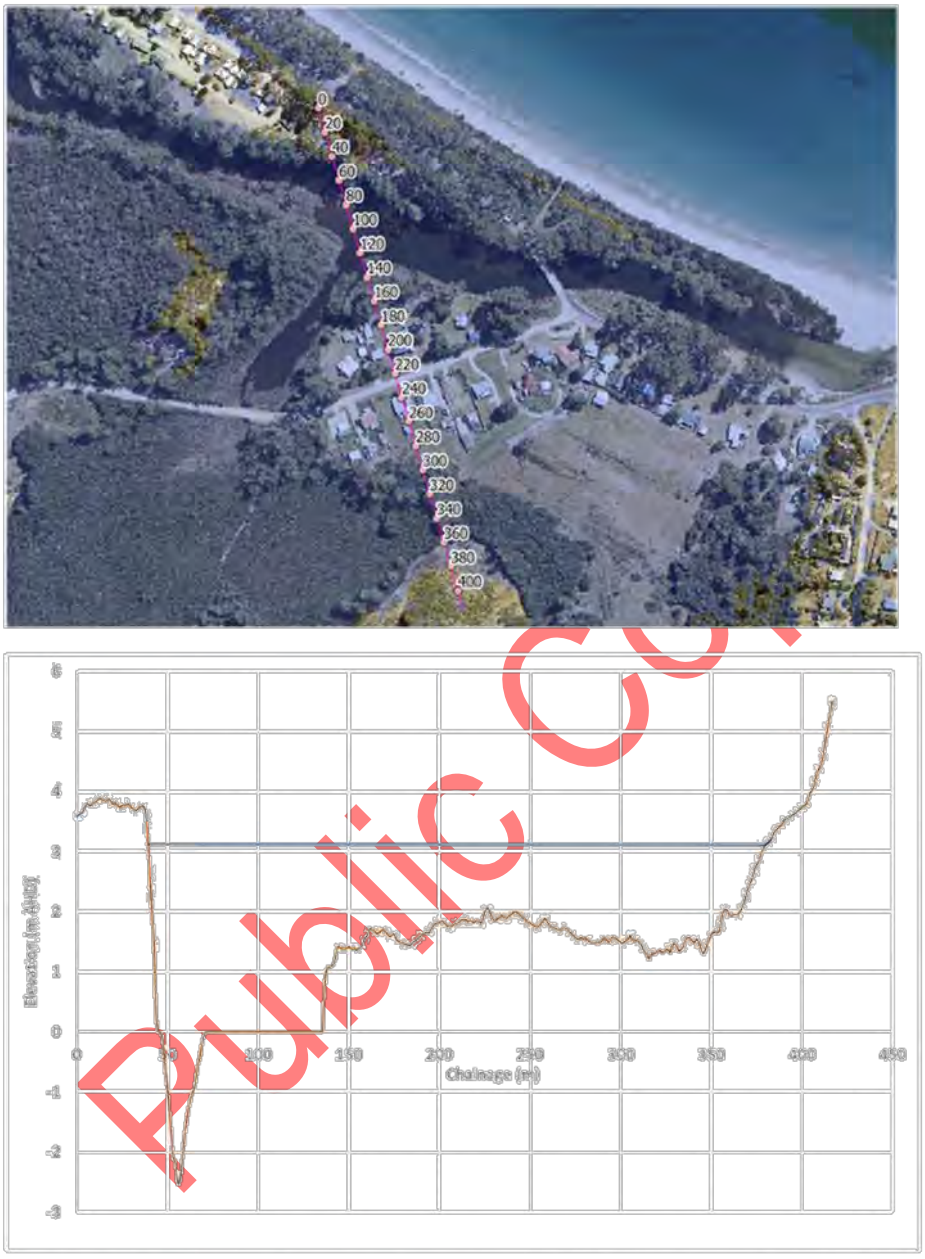

Figure 4.3: Typical flood plain cross-section upstream of the bridge (3 m sea, 2100 1% AEP river flood)

4.6 Rarity of the flood extent mapping

The recommended 1% AEP scenario was used for the flood extent has 1% AEP river flooding and a 3 m AHD tailwater. The 3 m tailwater scenario represented a 1% AEP sea storm anomaly at its high tide, the 1 m sea level rise expected by 2100, wave set up from a 1% AEP wind wave, and an allowance of wave run-up.

Amonth the different components of the scenario, the 3 m AHD tailwater has the most impact on existing houses. The sea storm and wind were considered dependant on each other (UNSW Water Research Laboratory, 2017).

Adopted combination of various land, sea and wind events may look as if the scenario is rarer than 1% AEP. However, for this particular situation, where tide level has dominant influence and with the current level of analysis, a 1% AEP can be considered the rarity of the recommended scenario. The expected raise in water levels in the lagoon is 0.1 m due to riverine flooding.

As a comparison the Kingston Beach flood study (Kingborough Council, 2016) used scenarios with a 1% AEP riverine flood with a 5% AEP sea storm, and another scenario with 5% AEP riverine flood with a 1% AEP sea storm. For Captain Cooks Creek, if the 2100 1% AEP sea storm tide boundary (3 m AHD) was reduced to a 2100 5% AEP sea storm (a reduction of 0.16 m at the sea boundary), the expected impacts[4] with an approximation (using linear proportions) are a 64 mm reduction in levels within the lagoon. This small amount is within the modelling and DEM accuracy. That is, adopting a 1% AEP sea storm combined with a 1% AEP riverine flood for Adventure Bay is slightly more conservative than using 1% AEP sea storm combined with a 5% AEP riverine flood, but this difference is within the accuracy of the modelling would not make any material impact on the flood maps.

It is noted that while the 1% AEP storm scenario was adopted for calculationg the flood extents in the maps, there are rarer events which may cause a greater flood extent, including rainfall up to the probable maximum precipitation, rarer sea storms and higher levels of sea-level rise.

4.7 Scenarios

Flood extents, flood depth and flood hazard maps for the recommended scenario are provided in Appendix E. These cover a range of tailwater and climate combinations.

The criteria for hazard mapping is based on the latest Australian Rainfall and Runoff (Ball, et al., 2019) hazard curves shown in Figure 4.4.

[4] calculated as a linear proportion (0.16 m out of the 1 m difference between 3 m tide and 2 m tide) of the resultant difference between the lagoon levels from the 3 and 2 m tides (3.2 m minus 2.8 m from Table 4.1) = 0.16 m x 0.4 m = 64 mm

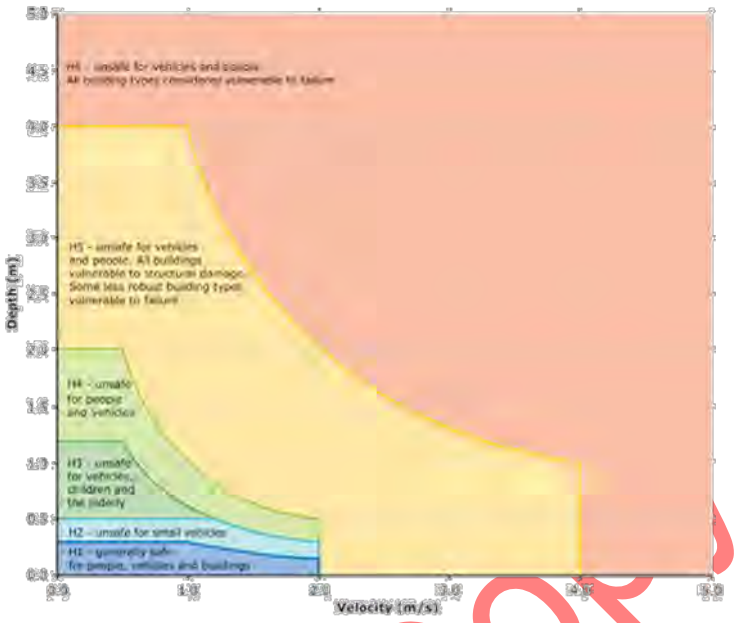

Figure 4.4: Flood hazard curves (Smith, et al., 2014)

4.8 Limitations

It should be noted that the flood inundation maps cannot show inundation patterns of actual historic floods. Actual inundation patterns vary from one flood to another due to blockage of structures, changes in floodplain topography, the state of vegetation cover and other factors.

The flood extents shown on the maps are not the boundary between flood-prone and flood-free land. Larger floods could inundate areas outside the limits shown. The inundation patterns relate to a prediction of land affected, for the specific level of risk, and not necessarily to the buildings located on that land.

The work has been undertaken using current best practice and it is acknowledged that there are uncertainties associated with the digital terrain and flood models which can affect the estimation of the floods. Variations in the flood information can be expected by the incorporation of additional and accuratedata, developments in the flood modelling approches, land development and/or changes in catchment conditions.

The modelling assumes no erosion or deposition of eroded material within Captain Cook Creek or within the floodplain.

The hydraulic modelling includes the impact of wind-wave run-up of tailwater. There are phenomena not included in the flood model which can increase the flood levels and therefore, should be accounted by a freeboard of 0.3 m in the designs. These phenomena include local hydraulic disturbances such as standing waves, waves in the lagoon, bow waves from vehicles and boats driving through floodwaters, debris floating or blocking the flow.

5. Conclusions

Entura has undertaken an investigation into flooding from Captain Cook Creek in Adventure Bay township on Bruny Island. The objectives of the study were to:

- Review existing information, including reports and topographic data
- Conduct a bathymetric survey along Creek estuary (ie. lagoon).
- Develop coupled hydrologic and hydraulic XPSWMM® model for the study area
- Determine the flood levels and the extent of flooding within the catchment in its current state of development for 1% AEP with an overview of the potential impact of climate change.
- Prepare flood extents and hazard maps for selected scenarios (a combination of 1% AEP riverine flood event and tide level)

Floodplain modelling showed:

1. Tailwater/sea level has a stronger influence on floodwater levels for the properties impacted than riverine flows.
2. Impacts of tailwater changes on water levels in the lagoon in major storms are reduced by the narrow entry to Captain Cook Creek (eg. 1 m difference in tide level can correspond to less than 0.5 m water level difference in water level in the lagoon during storm events).
3. The impact of the sandbar is not significant in major storms with tide levels above 1.6 m AHD.
4. The flood plains near Captain Cook Creek are impacted by major storms, and once the water rises above the creek banks there are several properties impacted.
5. There is little difference in the horizontal extent of flooding for 1, 2 and 3 m AHD tailwater scenarios, and there is some impact on flood depth between these scenarios to few properties near the confluence of Captain Cook Creek and the beach.

The recommended scenario for use as the designated flood zone and levels are the results from the 3 m AHD tailwater with the 1% AEP riverine flooding for year 2100 (Appendix E). This scenario included high tide, 1 m sea level rise, 1% AEP sea storm anomaly, 1% AEP storm wind-wave set up, minimal local wave run-up, and 30% increase in rainfall from climate change impacting on river flooding. A freeboard of 0.3 m was added to the flood levels in the maps for setting floor levels.

1% AEP event at the 2100 has an insignificant impact on the water levels in the lagoon by riverine flooding. For such extreme tide levels, tide had major influence on flood extents in the lagoon and lower reaches of the creek (ie. the area of interest).

6. Recommendations

It is recommended that Council

- Adopt the 1% AEP flood extent map for 2100 with 0.3 m freeboard for the use of future planning and development of the township.
- Engage with the community about the results of this study.
- With the community undertake mitigation studies to reduce the risk and undertake emergency planning for any risual risk, noting river based storms have a critical duration of around 9 hours and sea storms have 48 hour duration. This work should consider the impacts of coastal erosion and sea level rise.
- Undertake flood studies on the other creeks around Adventure Bay: unnamed creek at the northern end of Adventure Bay, Blighs Creek and Dorloff Creek. Combining these in an overall flood map and planning approach.

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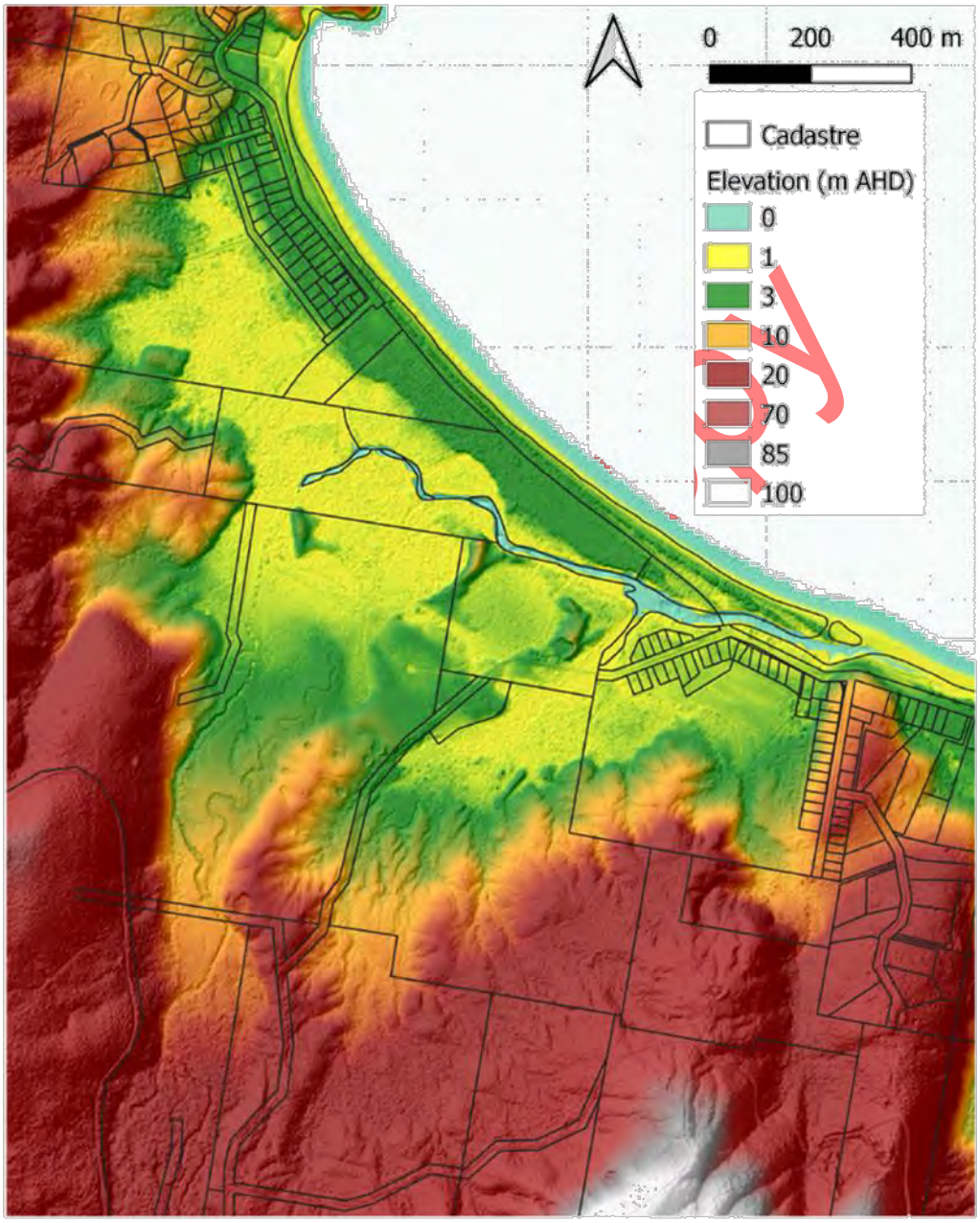
Appendices

A. Digital elevation model (DEM)
B. Hydrological model sub-catchments
C. Hydrological model results
D. Water surface levels longitudinal profiles
E. Flood maps

A Digital elevation model (DEM)



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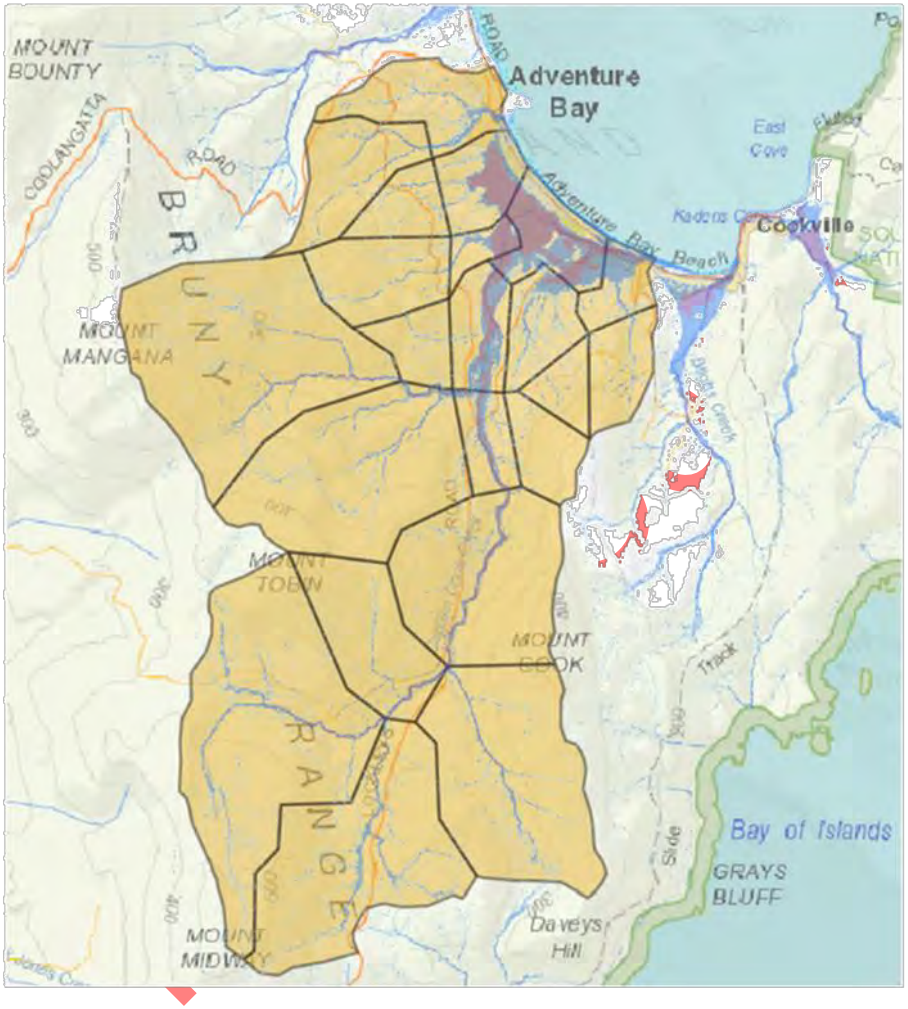
B Hydrological model sub-catchments



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C Hydrological model results

C.1 Maximum average flows at the main creek inflow to the 2D model

Note: Row highlighted in yellow is the critical duration.

	Average of Maximum flows (m3/s)		
Duration (h)	*Current (2020) climate*	*2050 climate*	*2100 Climate*
1	*0*	*1*	*13*
1.5	*5*	*12*	*30*
2	*15*	*23*	*42*
3	*31*	*39*	*54*
4.5	*41*	*51*	*70*
6	*45*	*52*	*66*
9	*44*	*51*	*65*
12	*39*	*44*	*54*
18	*44*	*50*	*61*
24	*32*	*37*	*47*
30	*32*	*37*	*46*
36	*28*	*32*	*40*

C.2 Maximum average levels and flows in the lagoon (upstream of the Captain Cook Bridge)

Note: Row highlighted in yellow is the critical duration.

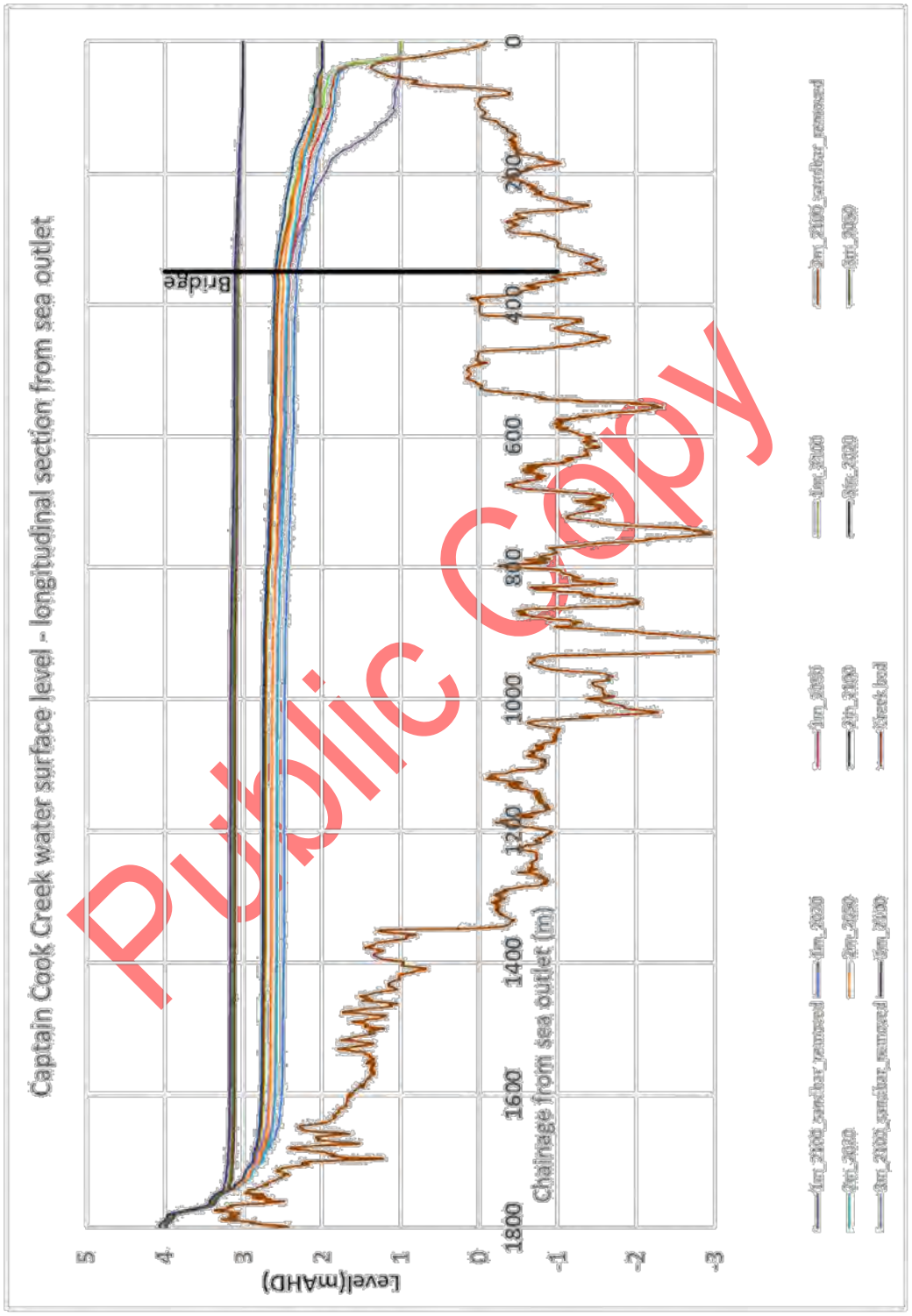
		Average of maximum levels (mAHD)			Average of maximum flow (m^3/s)		
Tidel level	Rainfall duration (h)	Current (2020) climate	2050 climate	2100 Climate	Current (2020) climate	2050 climate	2100 Climate
Tide 1m	1	1.00	1.03	1.36	0	1	13
Tide 1m	1.5	1.21	1.35	1.56	5	13	35
Tide 1m	2	1.39	1.51	1.70	15	27	54
Tide 1m	3	1.62	1.71	1.84	40	52	77
Tide 1m	4.5	1.74	1.81	1.93	57	71	100
Tide 1m	6	1.81	1.86	1.96	67	78	100
Tide 1m	9	1.81	1.87	1.99	67	78	101
Tide 1m	12	1.80	1.84	1.95	62	71	89
Tide 1m	**18**	**1.84**	**1.89**	**1.99**	**71**	**80**	**99**
Tide 1m	24	1.76	1.81	1.89	54	62	78
Tide 1m	30	1.77	1.82	1.92	55	63	79
Tide 1m	36	1.73	1.78	1.87	49	56	69
Tide 2m	1	2.00	2.00	2.06	0	3	-7
Tide 2m	1.5	2.04	2.03	2.11	-9	22	18
Tide 2m	2	2.05	2.08	2.17	20	22	49
Tide 2m	3	2.12	2.17	2.25	49	61	84
Tide 2m	4.5	2.18	2.23	2.32	64	62	105
Tide 2m	6	2.21	2.24	2.32	57	81	102
Tide 2m	9	2.21	2.26	2.34	55	62	103
Tide 2m	12	2.19	2.23	2.30	63	58	72
Tide 2m	**18**	**2.23**	**2.26**	**2.33**	**73**	**68**	**87**
Tide 2m	24	2.16	2.19	2.26	55	62	64
Tide 2m	30	2.17	2.21	2.28	57	64	67
Tide 2m	36	2.15	2.18	2.24	50	57	71
Tide 3m	1	3.00	3.00	3.01	0	-2	29
Tide 3m	1.5	3.01	3.01	3.03	1	28	58
Tide 3m	2	3.01	3.02	3.04	30	46	76
Tide 3m	3	3.03	3.04	3.07	58	71	96
Tide 3m	4.5	3.04	3.06	3.10	76	92	122
Tide 3m	6	3.05	3.07	3.10	80	92	114
Tide 3m	9	3.05	3.06	3.09	78	90	113
Tide 3m	12	3.04	3.05	3.07	70	79	97
Tide 3m	**18**	**3.06**	**3.07**	**3.10**	**79**	**89**	**108**
Tide 3m	24	3.03	3.04	3.06	58	67	85
Tide 3m	30	3.03	3.04	3.06	59	67	83
Tide 3m	36	3.02	3.03	3.04	52	59	73

D Water surface levels longitudinal profiles

D.1 Plan view with chainages

See over for longitundinal sections.

D.2 Longitudinal profile with 12 analysed scenarios



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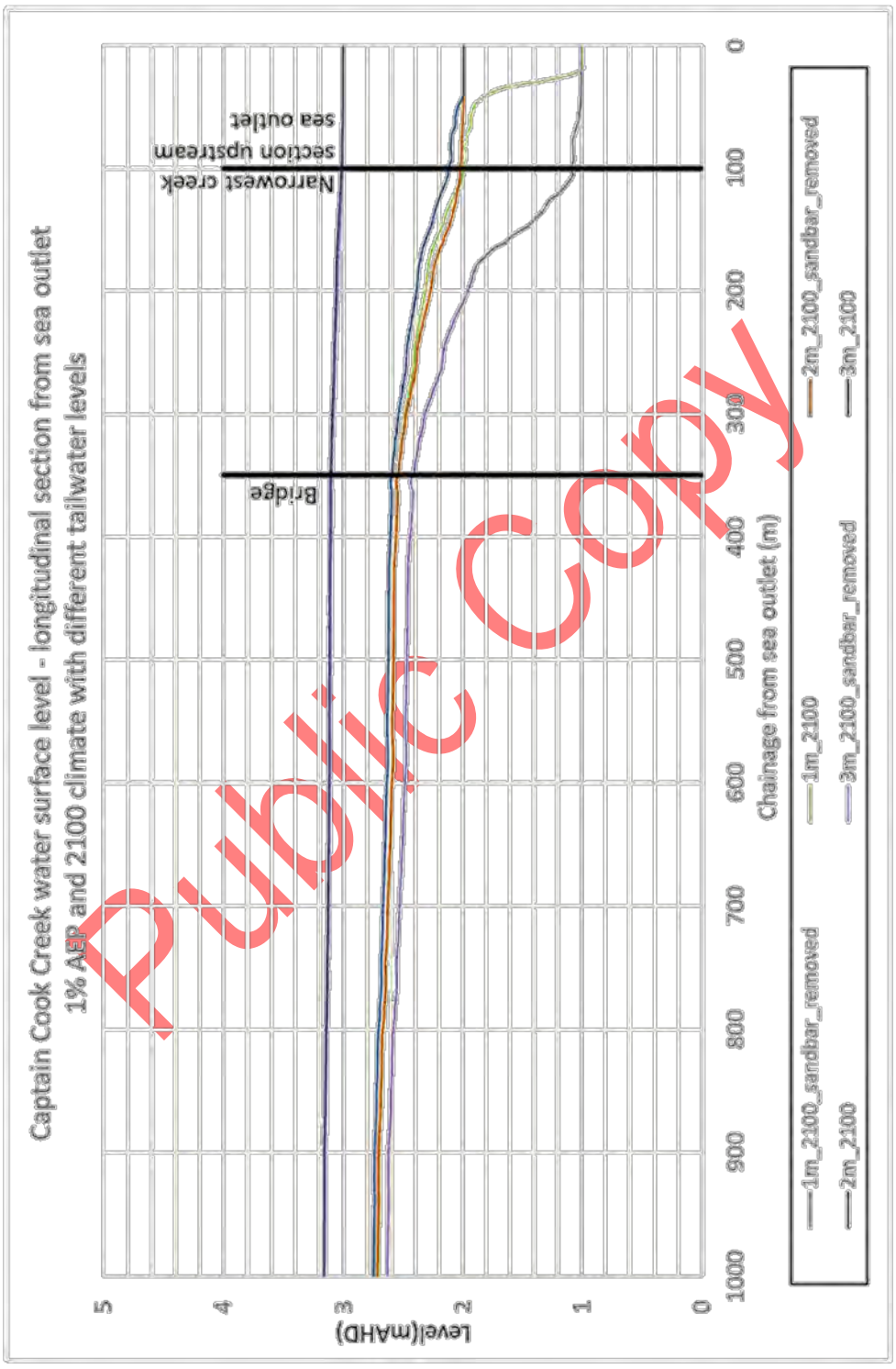
D.3 Profile for 1% AEP and 2100 climate scenarios (including sandbar removals)



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E Flood maps

Figure 1. Flood extents

- 2020 1% AEP with 1 m AHD tailwater
- 2100 1% AEP with 1 m AHD tailwater
- 2100 1% AEP with 2 m AHD tailwater
- 2100 1% AEP with 3 m AHD tailwater

Figure 2. Flood depth for 2020 1% AEP with 1 m AHD tailwater

Figure 3. Flood level for 2020 1% AEP with 1 m AHD tailwater

Figure 4. Flood hazard for 2020 1% AEP with 1 m AHD tailwater

Figure 5. Flood depth for 2050 1% AEP with 2 m AHD tailwater

Figure 6. Flood level for 2050 1% AEP with 2 m AHD tailwater

Figure 7. Flood hazard for 2050 1% AEP with 2 m AHD tailwater

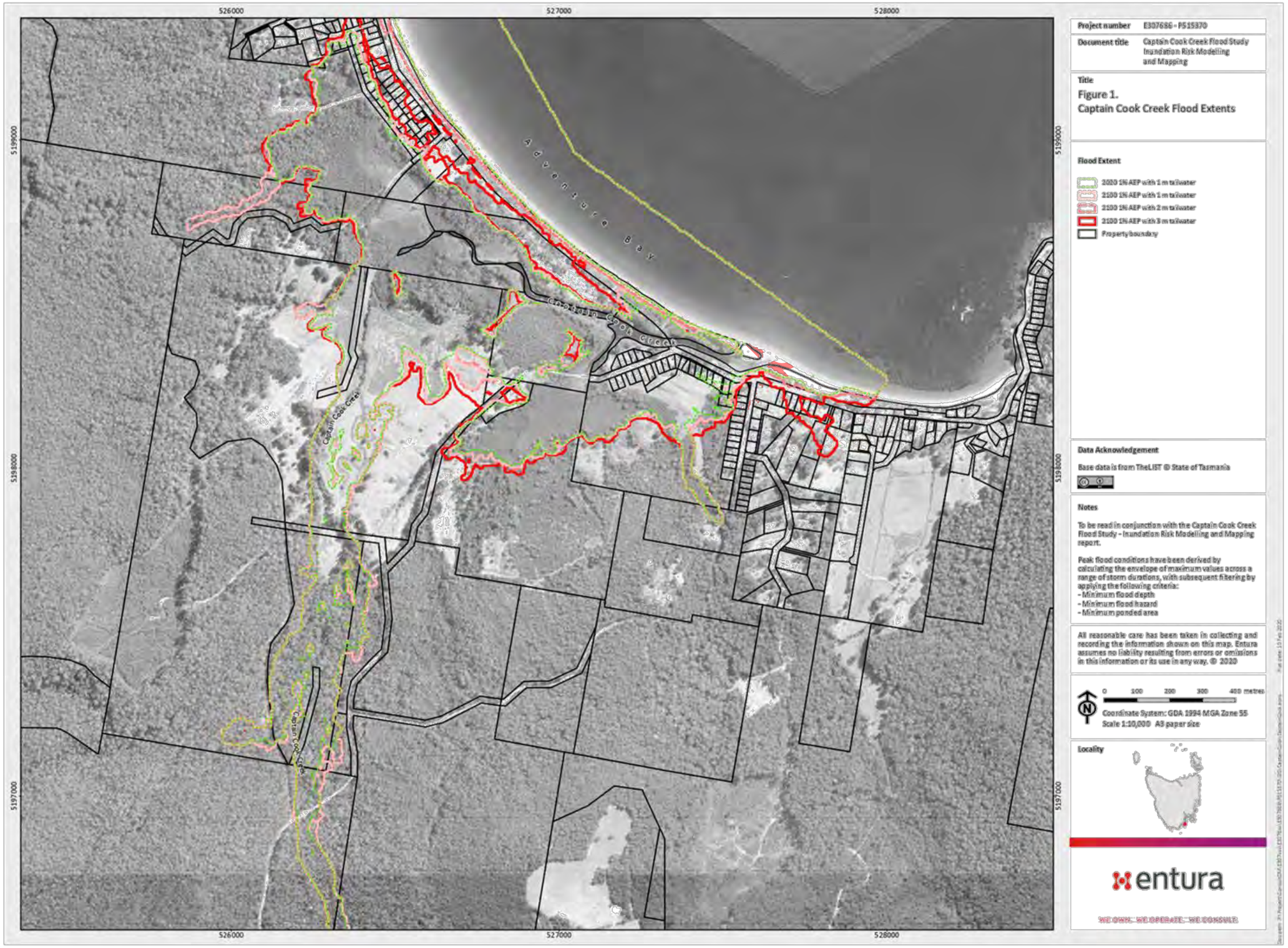
Figure 8. Flood depth for 2100 1% AEP with 3 m AHD tailwater

Figure 9. Flood level for 2100 1% AEP with 3 m AHD tailwater

Figure 10. Flood hazard for 2100 1% AEP with 3 m AHD tailwater

Note

1. Maps have been filtered for clarity as the direct rainfall used as part of the hydrology produces a small amount of water depth everywhere. The filtering method includes
   (a) Clipping extents so there is a minimum of 0.15 m water depth, minimum depth times velocity of 0.2 m^2/s and a minimum contiguous ponded area of 10,000 m^2.
   (b) Buffering out the clipped area by 5 m to account for the reduction in extent from 0.15 m minimum depth clipping, and removal of internal holes where there are islands of higher ground within the flood extent.
2. Model results are sensitive to the climate, land and infrastructure geometry and land-use. Should there be changes to the assumptions used for this report then the flood extents may change, and maps may need to be updated.
3. Results are shown for a particular rarity flood event (1% AEP) and there are rarer events that will have a greater flood extent. Being outside the 1% AEP flood extent line does not mean this area is safe from any flooding.
4. A freeboard of 0.3 m should be added to flood levels to set floor levels, which accounts for phenomena not accounted for in the hydraulic model. In some flatter areas, this could extend the flood extents.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Project number E307686 - P515370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 1.
Captain Cook Creek Flood Extents
Flood Extent
2020 1% AEP with 1 m tailwater
2100 1% AEP with 1 m tailwater
2100 1% AEP with 2 m tailwater
2100 1% AEP with 3 m tailwater
Property boundary
Data Acknowledgement
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Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
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- Minimum flood depth
- Minimum flood hazard
- Minimum ponded area
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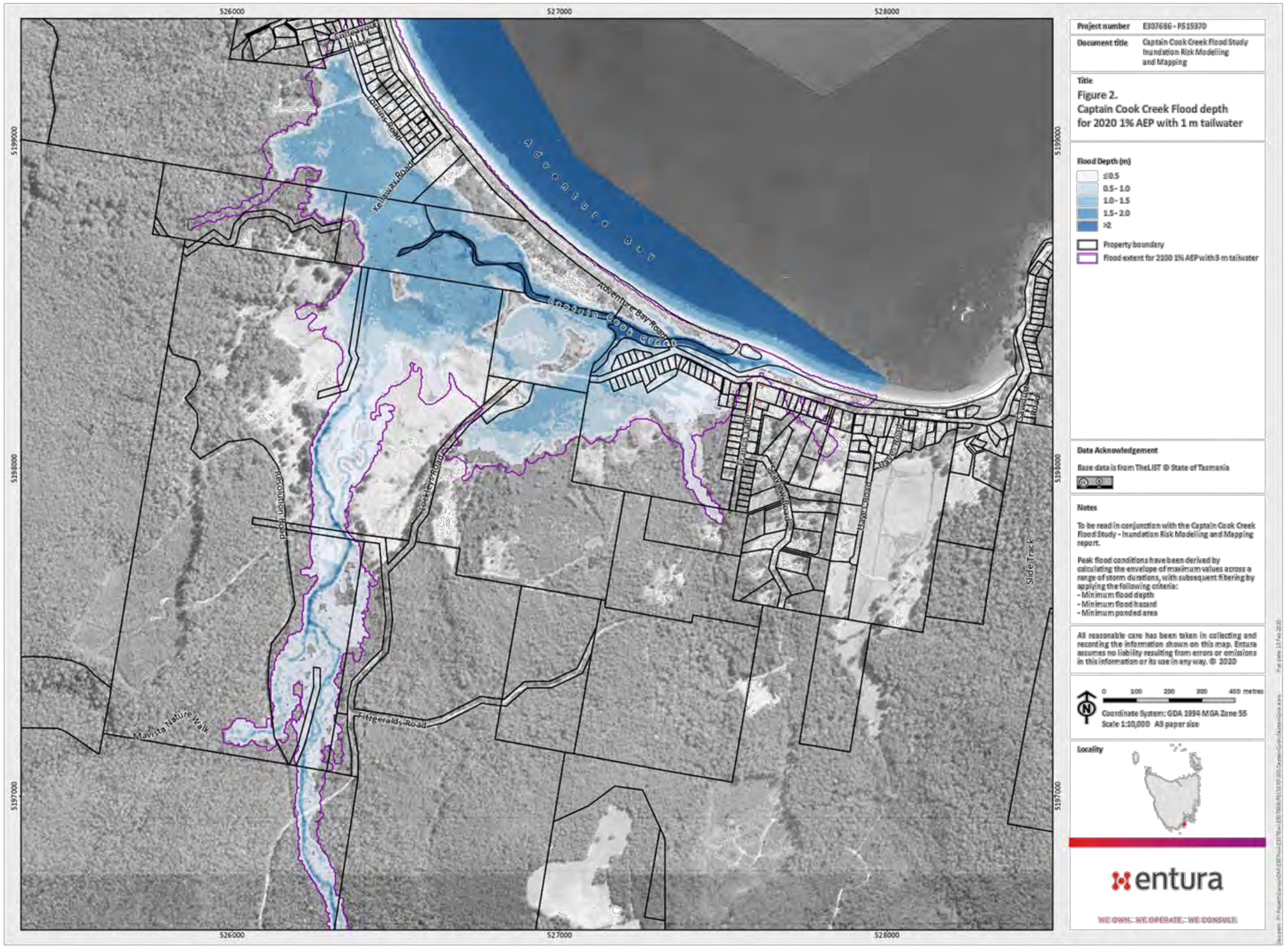
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Captain Cook Creek
Resolution Road
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Mavista Nature Walk
Side Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 2.
Captain Cook Creek Flood depth for 2020 1% AEP with 1 m tailwater
Flood Depth (m)
≤0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
>2
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
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- Minimum ponded area
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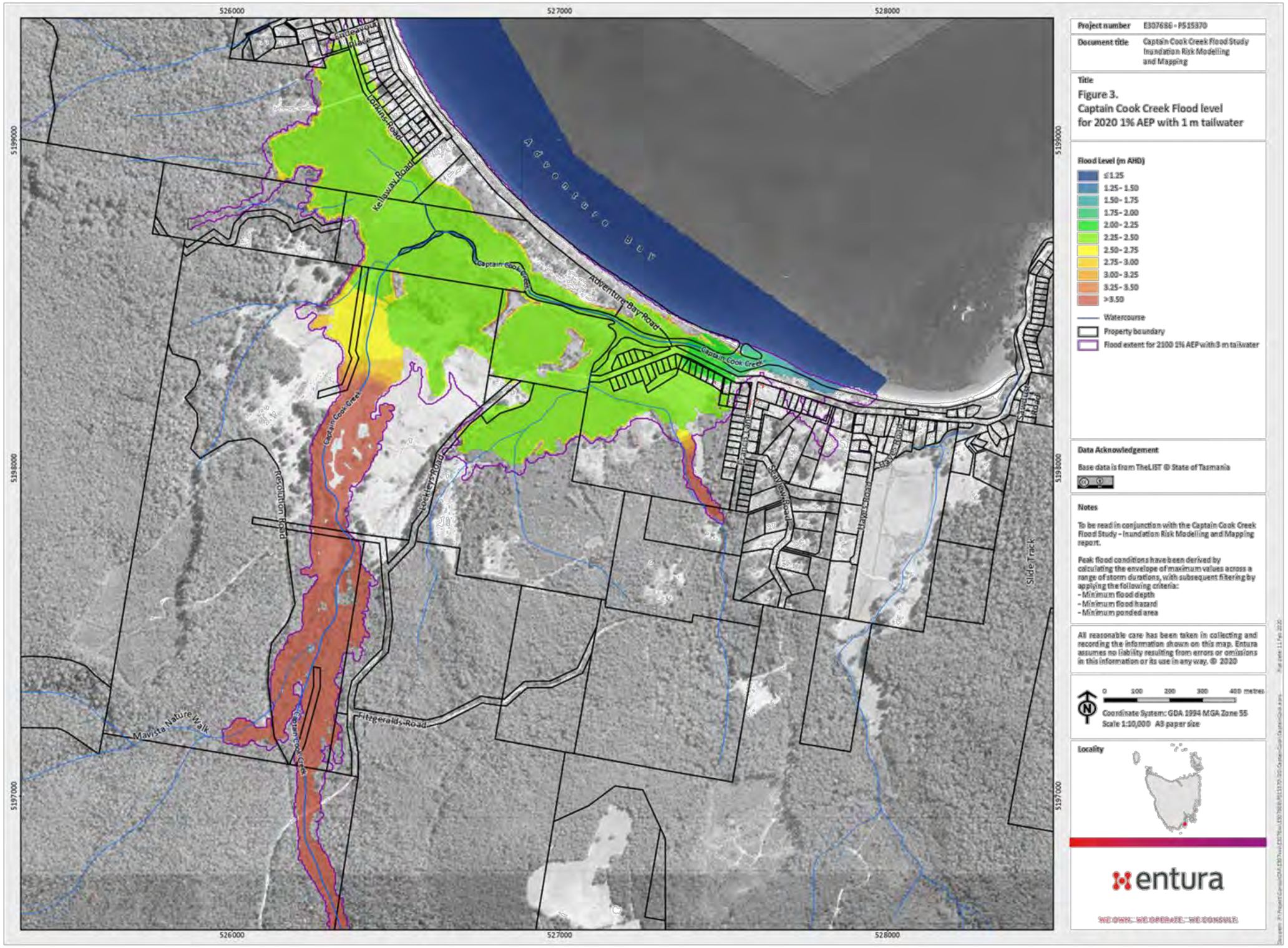
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Adventure Bay
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Kellaway Road
Captain Cook Creek
Adventure Bay Road
Resolution Road
Lockleys Road
Fitzgeralds Road
Mavista Nature Walk
Slide Track
Project number E307686 - P515370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 3.
Captain Cook Creek Flood level for 2020 1% AEP with 1 m tailwater
Flood Level (m AHD)
≤1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
2.00 - 2.25
2.25 - 2.50
2.50 - 2.75
2.75 - 3.00
3.00 - 3.25
3.25 - 3.50
>3.50
Watercourse
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
Peak flood conditions have been derived by calculating the envelope of maximum values across a range of storm durations, with subsequent filtering by applying the following criteria:
- Minimum flood depth
- Minimum flood hazard
- Minimum ponded area
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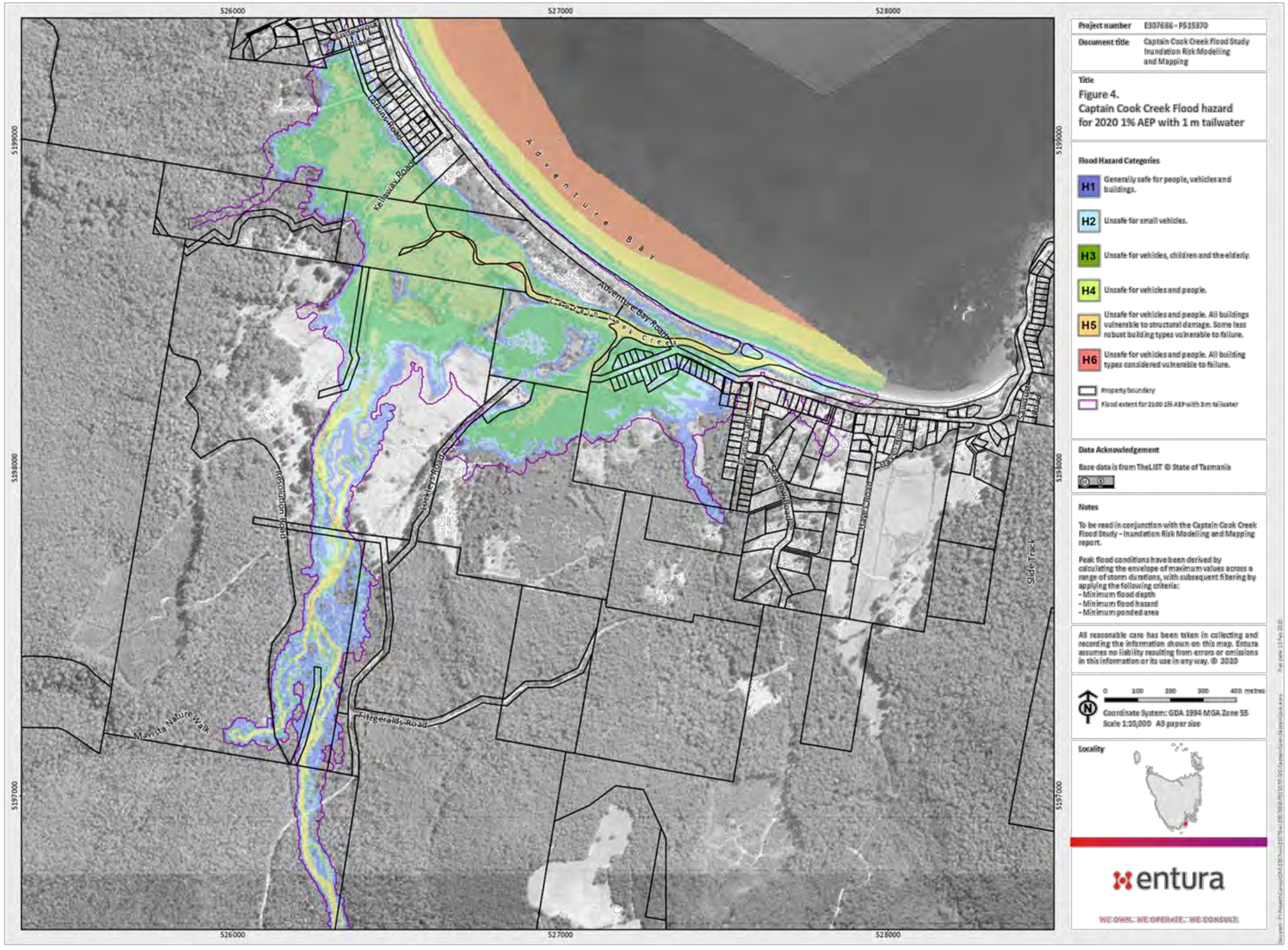
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Kellaway Road
Adventure Bay Road
Lockleys Road
Resolution Road
Fitzgeralds Road
Mavista Nature Walk
Slide Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 4.
Captain Cook Creek Flood hazard for 2020 1% AEP with 1 m tailwater
Flood Hazard Categories
H1 Generally safe for people, vehicles and buildings.
H2 Unsafe for small vehicles.
H3 Unsafe for vehicles, children and the elderly.
H4 Unsafe for vehicles and people.
H5 Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.
H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.
Property boundary
Flood extent for 2100 1% AEP with 1m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
Peak flood conditions have been derived by calculating the envelope of maximum values across a range of storm durations, with subsequent filtering by applying the following criteria:
- Minimum flood depth
- Minimum flood hazard
- Minimum ponded area
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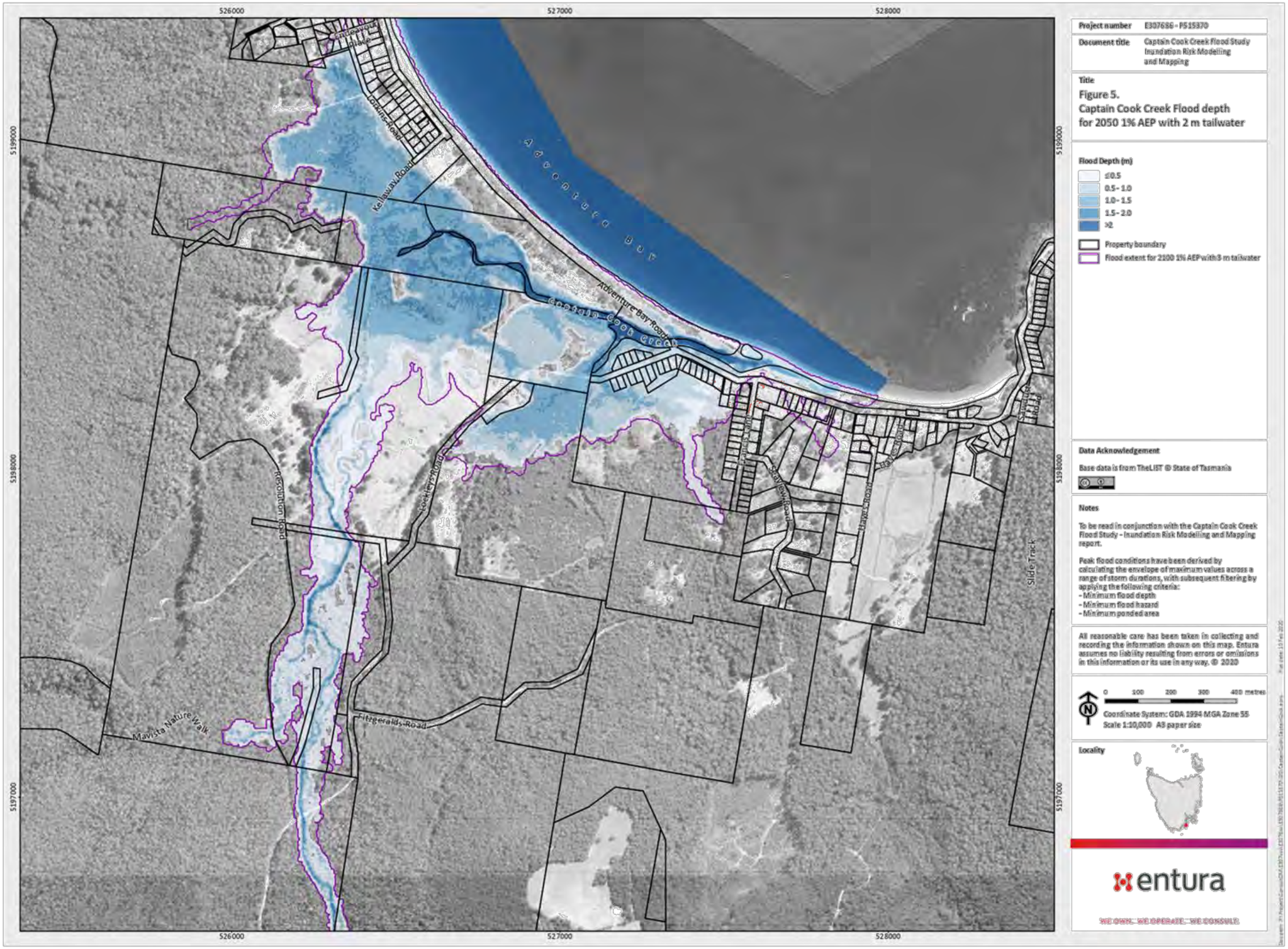
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Kellaway Road
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Adventure Bay Road
Captain Cook Circuit
Resolution Road
Lockleys Road
Fitzgeralds Road
Mavista Nature Walk
Glenview Road
Side Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 5.
Captain Cook Creek Flood depth for 2050 1% AEP with 2 m tailwater
Flood Depth (m)
≤0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
>2
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
Peak flood conditions have been derived by calculating the envelope of maximum values across a range of storm durations, with subsequent filtering by applying the following criteria:
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- Minimum flood hazard
- Minimum ponded area
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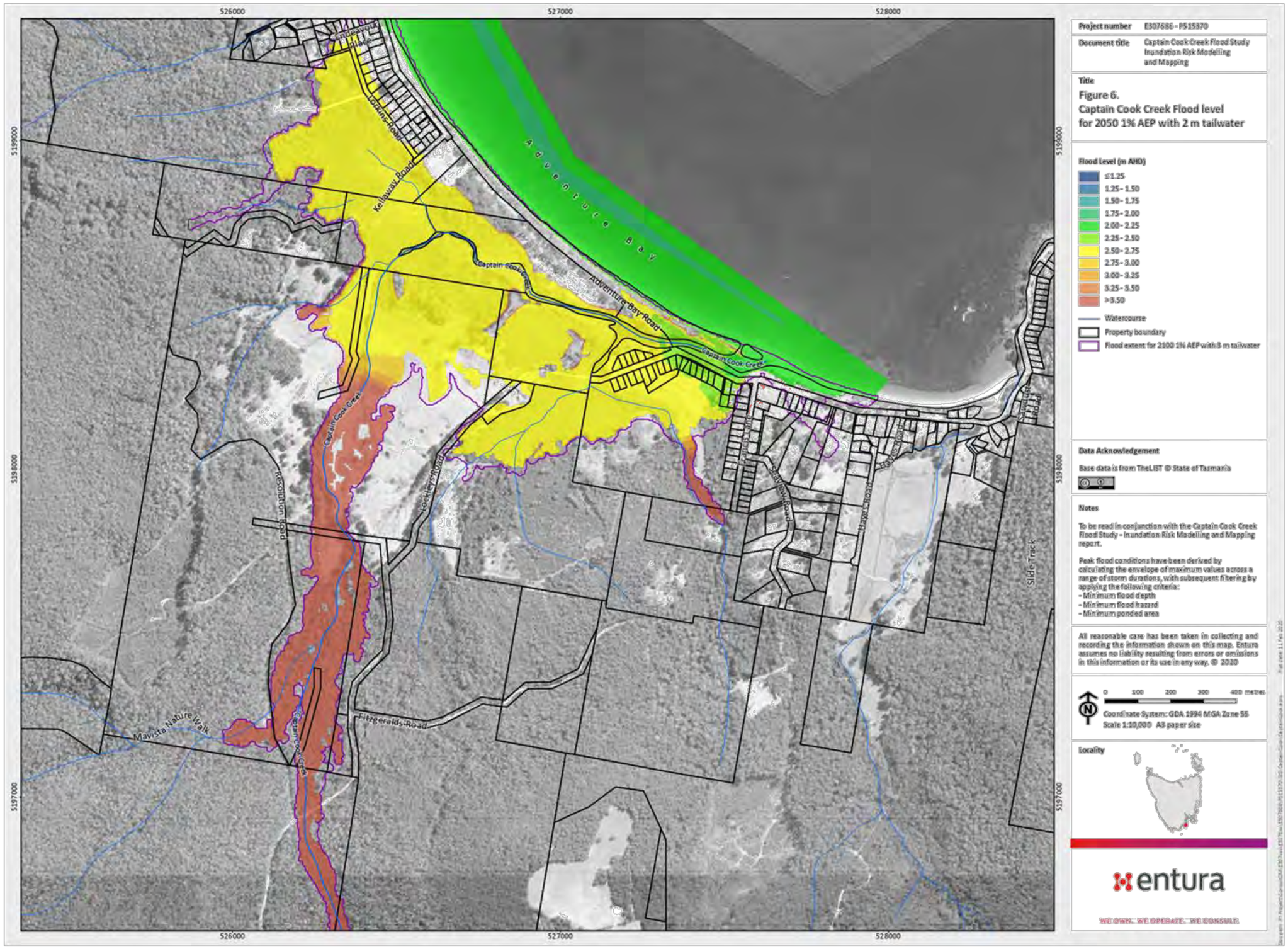
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Fitzgeralds Road
Mavista Nature Walk
Side Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 6.
Captain Cook Creek Flood level for 2050 1% AEP with 2 m tailwater
Flood Level (m AHD)
≤1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
2.00 - 2.25
2.25 - 2.50
2.50 - 2.75
2.75 - 3.00
3.00 - 3.25
3.25 - 3.50
>3.50
Watercourse
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
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Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
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- Minimum flood hazard
- Minimum ponded area
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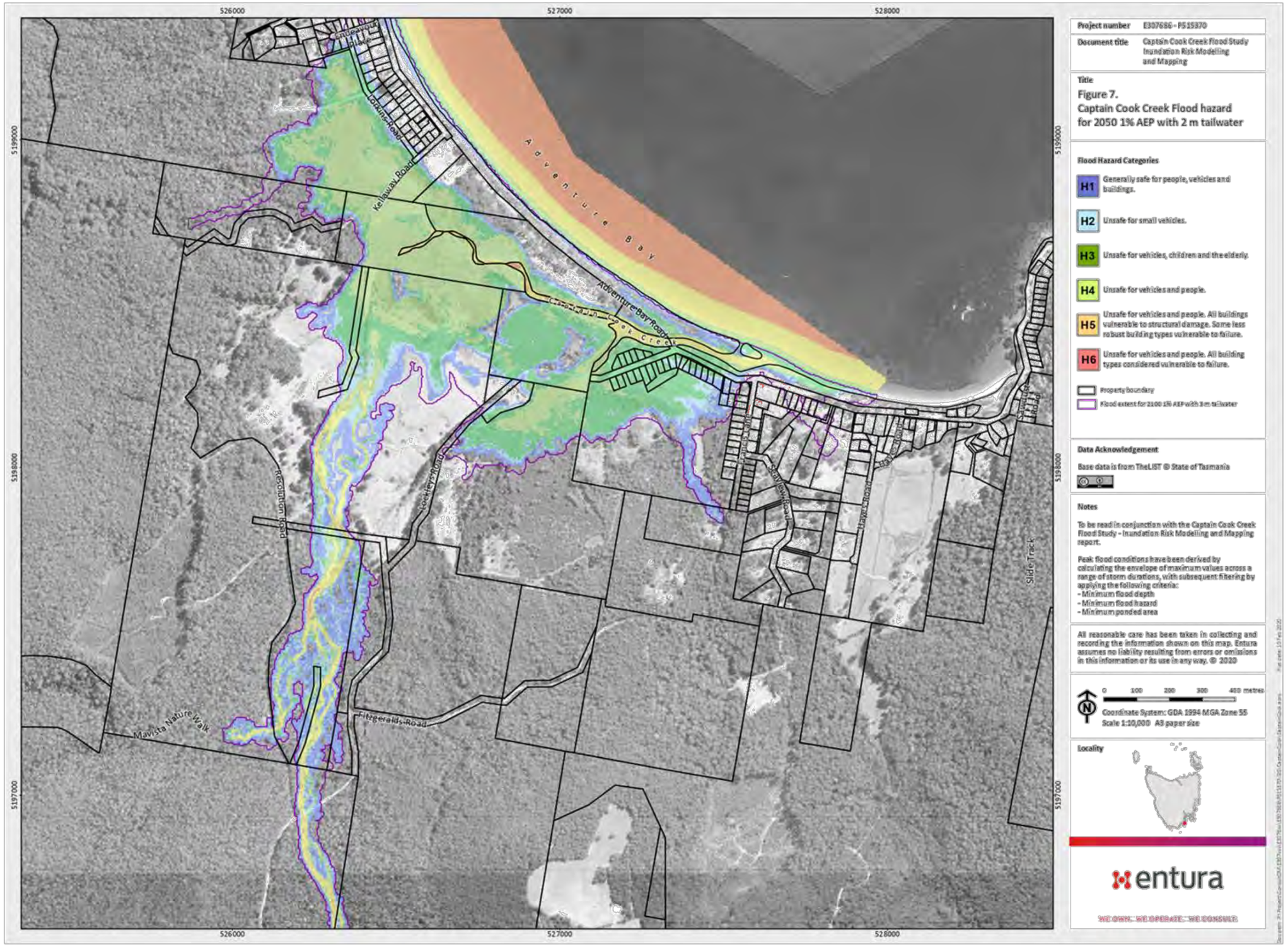
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Adventure Bay Road
Cascade Creek
Resolution Road
Rockers Road
Fitzgeralds Road
Mavista Nature Walk
Slide Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 7.
Captain Cook Creek Flood hazard for 2050 1% AEP with 2 m tailwater
Flood Hazard Categories
H1 Generally safe for people, vehicles and buildings.
H2 Unsafe for small vehicles.
H3 Unsafe for vehicles, children and the elderly.
H4 Unsafe for vehicles and people.
H5 Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.
H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
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- Minimum flood hazard
- Minimum ponded area
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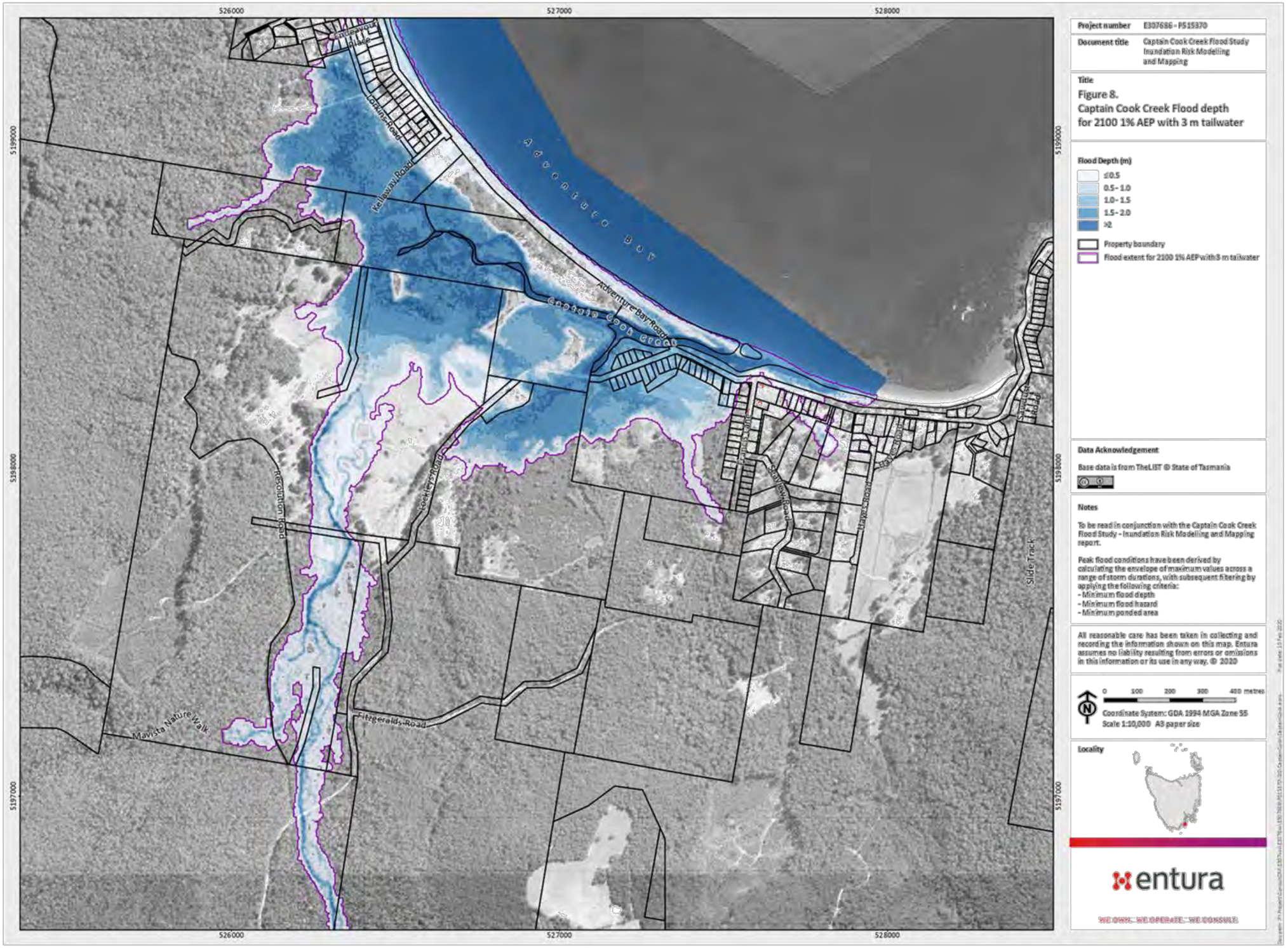
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Adventure Bay Road
Captain Cook Creek
Recreation Road
Fitzgeralds Road
Mavista Nature Walk
Slide Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 8.
Captain Cook Creek Flood depth for 2100 1% AEP with 3 m tailwater
Flood Depth (m)
≤0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
>2
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
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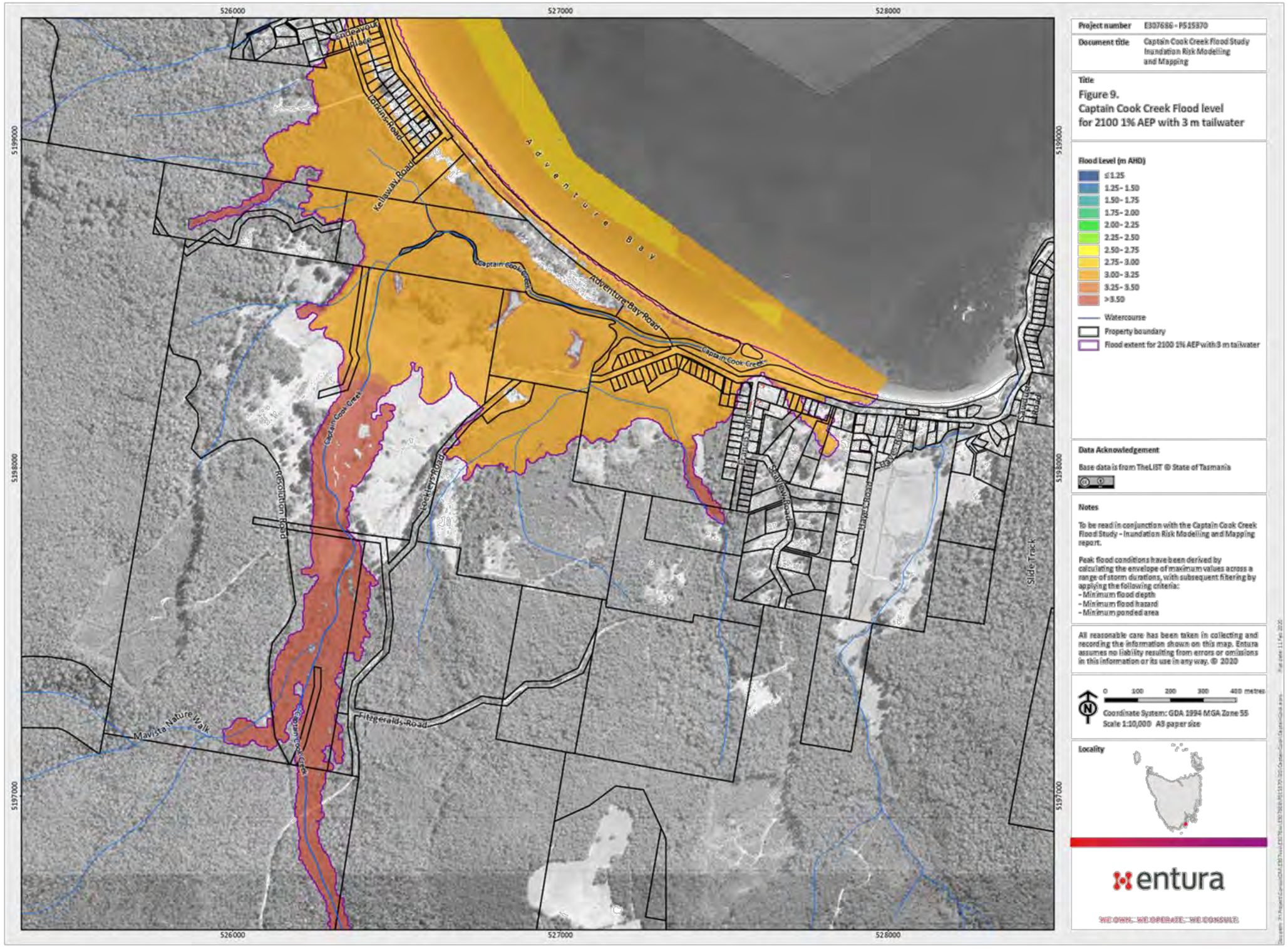
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Captain Cook Creek
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Mavista Nature Walk
Slide Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 9.
Captain Cook Creek Flood level for 2100 1% AEP with 3 m tailwater
Flood Level (m AHD)
≤1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
2.00 - 2.25
2.25 - 2.50
2.50 - 2.75
2.75 - 3.00
3.00 - 3.25
3.25 - 3.50
>3.50
Watercourse
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
Data Acknowledgement
Base data is from TheLIST © State of Tasmania
Notes
To be read in conjunction with the Captain Cook Creek Flood Study - Inundation Risk Modelling and Mapping report.
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- Minimum ponded area
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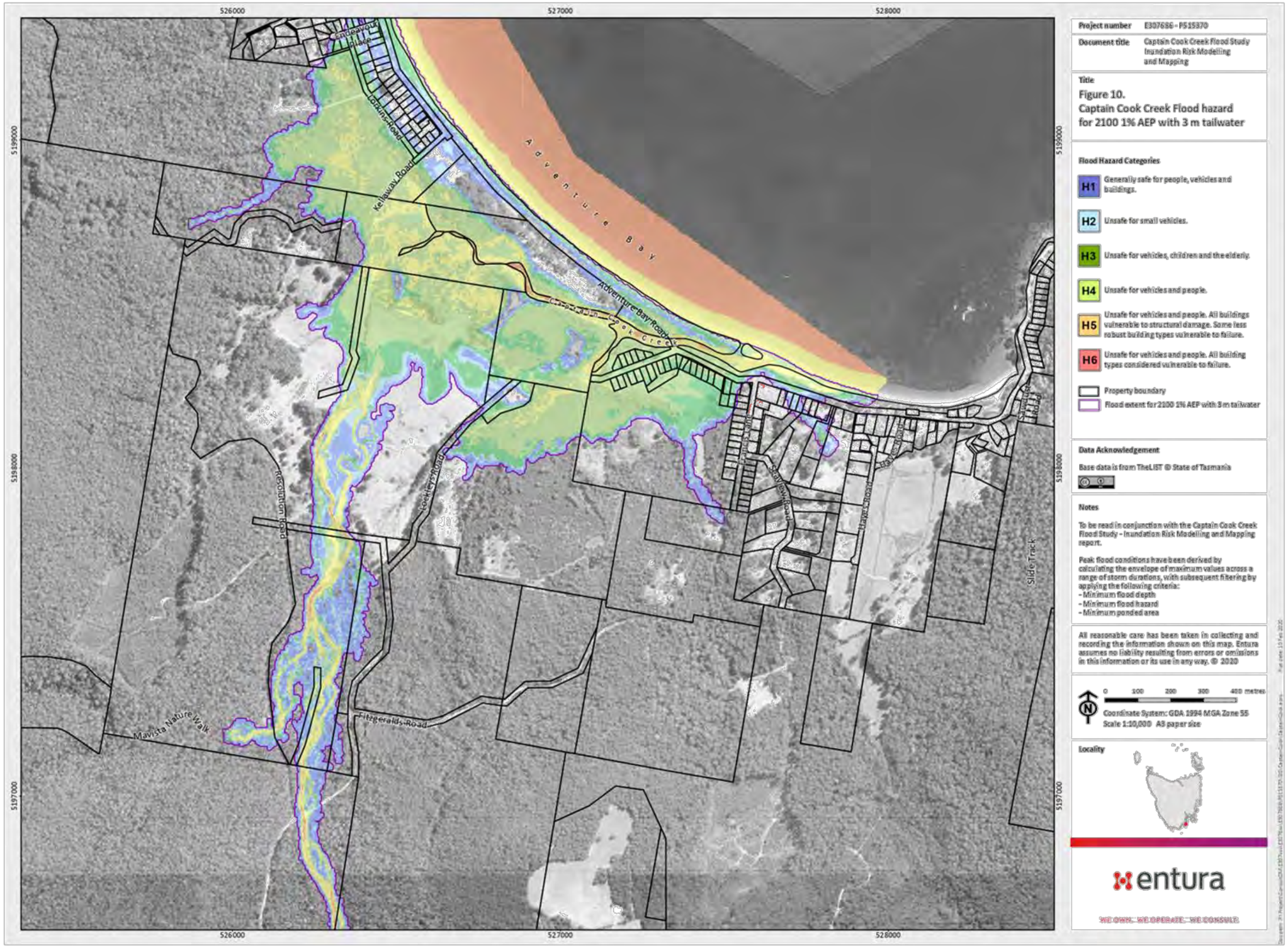
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Fitzgeralds Road
Mavista Nature Walk
Slide Track
Project number E307686 - PS15370
Document title Captain Cook Creek Flood Study Inundation Risk Modelling and Mapping
Title
Figure 10.
Captain Cook Creek Flood hazard for 2100 1% AEP with 3 m tailwater
Flood Hazard Categories
H1 Generally safe for people, vehicles and buildings.
H2 Unsafe for small vehicles.
H3 Unsafe for vehicles, children and the elderly.
H4 Unsafe for vehicles and people.
H5 Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.
H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.
Property boundary
Flood extent for 2100 1% AEP with 3 m tailwater
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17.3 PETITION - CLIMATE CHANGE FUNDING

File Number: 8.182

Author: Jon Doole, Manager Environmental Services

Authoriser: Tony Ferrier, Deputy General Manager

Strategic Plan Reference

Key Priority Area:	1	Encourage and support a safe, healthy and connected community.
Strategic Outcome:	1.4	A Council that acknowledges the existence of a climate change and biodiversity emergency and has in place strategies to respond.

1. PURPOSE

1.1 The purpose of this report is to consider a petition requesting that Council approve a dedicated rate rise to allow funds to be available to address the shortfall for completion of actions in the Kingborough Council Climate Change Plan.

2. BACKGROUND

2.1 An on-line petition with 147 signatures has been received that requested for Council to approve increased funding availability for the implementation of actions in the Kingborough Climate Change Plan. The petitioners statement reads:

"The kingborough council have some very impressive plans and policies when it comes to climate change and adaption measures for us in kingborough as a community. however, these plans and policies were under-resourced by 60% and staff have been unable to fulfil the actions highlighted in such plans. around $300,000pa is required and would allow for:

- *The employment of a dedicated climate change officer to facilitate actions in the climate change plan, as well as improving community climate change communications and projects (approx. $100k); and*
- *The completion of actions identified in the kingborough climate change plan and climate change adaption policy (approx. $200k) relating to:*
  - *energy and greenhouse gas targets and actions*
  - *climate change adaptation planning and community resilience*
  - *coastal hazards management*

Climate change is becoming a fairly sizeable concern, as we start to experience the changes that are close to home, like the May 2018 floods, or last year's southern bushfires, or the current water restrictions."

2.2 The petitioners request is:

"We call on a dedicated rate rise of 1.2% to resource the climate change plan and climate change adaption policy."

2.3 The following discussion outlines the issues and circumstances associated with this request.

3. STATUTORY REQUIREMENTS

3.1 The petition containing 147 signatures meets the requirements of Section 57 of the *Local Government Act* 1993 and Council is therefore required to determine any action to be taken in respect to the request in the petition.

3.2 The petition was commenced on 4th March 2020 and was completed on the 31st March 2020. Nearly all of the signatories provided a Kingborough address.

4. DISCUSSION

4.1 A petition has been received that was aimed at making funds available for increasing expenditure on climate change related actions / programs in accordance with the Kingborough Climate Change Plan and Climate Change Adaptation Policy.

4.2 It was requested that a 1.2% dedicated rate rise be approved as part of the 2020 / 2021 budget estimates process to allow for the employment of a Climate Change Officer and allow sufficient funds to undertake actions specified in the Kingborough Climate Change Plan.

4.3 Unfortunately the premise of a rate rise is no longer available due to the COVID-19 pandemic and a commitment by Council to a zero rate rise in 2020 / 2021.

4.4 The Kingborough Climate Change Plan (2019 to 2024) (Plan) was endorsed by Council in March 2019 through the following motion:

> *"That the Kingborough Council Climate Change Plan (2019 to 2024) be endorsed with resourcing of actions subject to annual budget deliberations."*

The emphasis within the plan was in accordance with the climate change approach undertaken by Kingborough for over 10 years targeting the 3 key categories of action that are essential; these being:

- Climate change strategic management;
- Energy and greenhouse gas management; and
- Climate Change Adaptation.

5. FINANCE

5.1 The tentative commitment to climate change and coastal vulnerability expenditure in the draft 2020 / 2021 budget is:

- Energy and Emissions - $13,500
- Climate Change - $35,000
- Coastal Hazards - $70,000

6. ENVIRONMENT

6.1 Climate change poses a significant threat to Kingborough's biodiversity and ecosystems and this will continue to be progressively exacerbated into the future.

7. COMMUNICATION AND CONSULTATION

7.1 It is proposed (subject to resourcing) to work with Whitsunday Regional Council and the Regional Climate Change Initiative (through the STCA) to develop a climate change communications strategy that aligns with Kingborough's overall communications policy.

8. RISK

8.1 In the current Strategic Risk Register for Kingborough, Climate Change is identified as a "High" unmitigated risk. Mitigation controls are listed as:

- Ongoing studies and investigations carried out into potential local area impacts & expert advice sourced.
- Public will be kept well informed of future risks.

9. CONCLUSION

9.1 Climate change is a significant risk to Kingborough Council operations as well as the community and ecosystems. It is recognised by Council that a meaningful and strategic response to the impacts of climate change must be facilitated currently and into the future.

9.2 Unfortunately the concept of accessing additional funds for climate change action through the imposition of a dedicated rate rise for the 2020 / 2021 financial year cannot be considered due to a commitment to a zero rate rise in response to the financial impacts of the COVID-19 pandemic.

10. RECOMMENDATION

That the organiser of the petition for a dedicated rate rise of 1.2% to resource the climate change plan and climate change adaption policy be advised that:

(a) due to Council's COVID-19 pandemic budgetary commitment to a zero rate rise for the 2020 / 2021 financial year, the request cannot be accommodated; and

(b) Council remains committed to meaningful action on climate change and, as far as practicable, the actions contained within the Kingborough Climate Change Plan will be progressively addressed.

ATTACHMENTS

Nil

17.4 REVISED WASTE WISE EVENTS POLICY

File Number: **12.227**

Author: **Scott Basham, Manager Compliance & Community Development**

Authoriser: **Daniel Smee, Executive Manager Governance & Community Services**

Strategic Plan Reference

Key Priority Area:	1	Encourage and support a safe, healthy and connected community.
Strategic Outcome:	1.5	An active and healthy community, with vibrant, clean local areas that provide social, recreational and economic opportunities.

1. PURPOSE

1.1 The purpose of this report is to present a revised *Waste Wise Events Policy* and associated Guidelines.

2. BACKGROUND

2.1 At the Council meeting on the 14th May 2018 Council adopted the *Waste Wise Events Policy* and associated Guidelines.

2.2 The *Waste Wise Events Policy* and associated Guidelines have been reviewed and a revised Policy and Guidelines is attached for Council endorsement.

3. STATUTORY REQUIREMENTS

3.1 There are no statutory requirements in relation to the introduction and revision of the Policy and Guidelines.

4. DISCUSSION

4.1 The *Waste Wise Events Policy* and associated Guidelines are due for review.

4.2 The Policy and Guidelines have been accepted by event organisers and while non-compliance has been identified, in general, the Policy and Guidelines have assisted with waste reduction and avoidance at events.

4.3 The revised Policy and Guidelines incorporate minor amendments which include updated legislation and the addition of a control mechanism being the use of permit conditions to assist with compliance with the policy.

4.4 A copy of the revised Policy and Guidelines is attached as Annexure one (1) to this report.

4.5 A copy of the 2018 adopted track changed Policy and Guidelines is attached as Annexure two (2) to this report.

5. FINANCE

5.1 Council currently supports the provision of community waste management education through a budget allocation of $5,000 (2019/20 budget).

6. ENVIRONMENT

6.1 Waste minimisation is an essential part of event planning and management. The revised Policy and Guidelines intend to continue the reduction of unnecessary waste that is disposed of in landfill.

7. COMMUNICATION AND CONSULTATION

7.1 Community engagement was undertaken with the development of the 2018 endorsed Policy and Guidelines.

7.2 The revised Policy and Guidelines will be available to the public via Council's website and will be referred to in Council permits, leases, or licenses where appropriate.

8. RISK

8.1 As the Policy and Guidelines have previously been adopted, there is no identified risk in their continued operation.

8.2 If the revised Policy and Guidelines are not adopted, there is a risk that waste reduction and avoidance will not be assessed during the event planning process, resulting is an increase of unnecessary waste.

9. CONCLUSION

9.1 The revised *Waste Wise Events Policy* and associated Guidelines provides an appropriate and community accepted planning tool for reducing and avoiding waste at events.

10. RECOMMENDATION

That Council resolve that the attached revised *Waste Wise Events Policy* and associated Guidelines replace the 2018 adopted *Waste Wise Events Policy and associated Guidelines.*

ATTACHMENTS

1. **Existing Policy with Track Changes**
2. **Updated Policy for Approval**

EXISTING POLICY WITH TRACK CHANGES

Kingborough	**WASTE WISE EVENTS**	(Policy No. 4.14)		
		REVIEW DATE	NEXT REVIEW	MINUTE REF
		~~April~~ May 2018~~9~~	May/~~April~~ 202~~0~~	~~C314/10/18~~

POLICY STATEMENT:	1.1	Council is committed to ensuring that waste avoidance, waste minimisation, resource recovery and sustainable procurement practices are an integral part of the planning and delivery of Council run events, Council supported events and all public events held on Council owned or managed property.
	1.2	Council will educate event organisers to support the minimisation of waste at public events and to reduce the amount of waste sent to landfill.
	1.3	All public events and functions held on Council owned or managed property must adhere to the Kingborough Waste Wise Events policy.
DEFINITIONS:	2.1	**Event** – an organised occurrence held within the Kingborough municipality where people assemble at a given time and location for the purpose of entertainment, recreation, community, ceremonial or promotional purposes, either for free or for the payment of a fee, and includes but is not limited to: • Festivals, fairs and markets • Concerts, shows, film screenings and exhibitions • One-off sporting events • Civic, cultural or commemorative ceremonies or celebrations This is inclusive of Council run events that are organised by Kingborough Council for members of the public or internally for Councillors and staff; Council supported events that are organised by local community groups but have either Council staff involvement or Council funding; and all public events and functions, markets, organised sporting and recreational activities held on land, in buildings or roads owned or managed by Kingborough Council.
	2.2	**Waste** - any substance that is discharged or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment.
	2.3	**Single use plastics** - any disposable plastic and polystyrene items such as straws, balloons, bags, cutlery or food/drink packaging that is only designed to be used once and then discarded e.g. single use sachets for tomato sauce, sugar, salt or sunscreen.
	2.4	**Biodegradable** - sugarcane fiber, bamboo, cornstarch, polyactide (PLA), and cellophane wrap made from cellulose and some other materials that can be broken down into organic matter over a period of time if exposed to the right conditions.
	2.5	**Compostable** - food scraps, paper and some other materials that will break down into organic matter.
	2.6	**Recyclable -** • Aluminium and steel cans • Food and drink cans, including pressure packs and pet food cans; milk and juice cartons • Cardboard, cartons, newspapers and office paper • Glass bottles and jars • Plastic beverage, food and non-food containers with the triangle symbol 1-7 (except polystyrene and styrofoam).
OBJECTIVE:	3.1	The objective of the Kingborough Waste Wise Events Policy is to underpin

	the *Kingborough Waste Management Strategy ~~2018~~*. The strategy has been developed to achieve a planned and collaborative approach to waste management, which is cost effective, supportive of the local community and economy and achieves recycling rates which exceed Tasmania's state wide performance. Kingborough is committed to working with its community to transition to a low carbon lifestyle. Events are a method of raising public awareness about recycling and show casing different ways to avoid and minimise waste.
SCOPE:	4.1 The policy will be applied to all Council run events, Council supported events and all public events held on Council owned or managed property within the Kingborough municipal area. 4.2 The policy is implemented through Kingborough Council's Waste Wise at Events Guidelines, which forms part of Council's event and reserve bookings application and approval process. 4.3 The event holder/organiser will be responsible for the costs of implementing the Waste Wise Events Policy. 4.4 The policy does not apply to private functions or the ongoing or seasonal operation of sports club canteens and other community venues that hold events and functions as part of their normal operations; however, these organisations are encouraged to transition towards the principles of this policy.
PROCEDURE: (POLICY DETAIL)	5.1 The Policy ensures that Waste Wise strategies are utilised in the planning and delivery of public events and functions held on Council owned or managed property. a) Council will provide Waste Wise at Events Guidelines to support Council staff and event organisers to ensure that planning for events includes planning for avoidance, minimisation and recycling of waste. b) Event organisers are required to promote and practice waste avoidance principles by: • minimising of the amount of waste generated; • prohibiting the sale and/or distribution of single-use plastic products and single use sachets, polystyrene, plastic bags, plastic straws, bottles and/or balloons; • minimising the sale/and or distribution of bottled water, except in cases of potential breach of health and safety requirements; • responsibly managing any waste to ensure the cleanliness of the area is maintained during and after the event; • maximising recycling; • promoting and engaging in sustainable procurement practices; • minimising the environmental impact of any products, supplies and promotional materials used at the event. c) If waste is unavoidable due to health or safety requirements, then discarded materials are separated and recycled or disposed of responsibly. d) Council will promote the policy to ensure an emphasis on the use of re-usable, recyclable or compostable/biodegradable products.
GUIDELINES:	6.1 This policy is supported by a set of operational Waste Wise at Events Guidelines.
COMMUNICATION:	7.1 The policy will be applied to all Council run, Council supported events and all public events held on Council owned or managed property within the

	Kingborough municipal area. 7.2 The policy and Waste Wise at Events Guidelines will be made available to the public through Council's website. 7.3 The Waste Wise at Events Guidelines ~~will be~~will be promoted through local media and social media where appropriate. 7.4 Adherence to the Waste Wise at Events Guidelines will be controlled via the issuing of event permits, leases, or licenses. ~~Council staff and community event organisers will be sent a copy of the Waste Wise at Events Policy and Guidelines with notice that a 12 month transition period will be implemented from the approval date of the new policy.~~
LEGISLATION:	• *Plastic Shopping Bags Ban Act 2013* • *Environmental Management and Pollution Control (Waste Management)* *Regulations~~)~~ 202~~0~~10* • *Litter Act Tasmania 2007* • *Environmental Management and Pollution Control Act 1994 EMPCA* • ~~*National Environment Protection Council Act 1994*~~
RELATED DOCUMENTS:	• Kingborough Waste Management Strategy ~~2017~~ • Kingborough Strategic Plan 202~~0~~15-2025 • Tasmanian Waste & Resource Management Strategy 2009 • National Waste Policy 2018~~09~~
AUDIENCE:	Available to the public.

Waste Wise at Events Guidelines

~~April 2018~~May 2020

Why be Waste Wise?

Waste minimisation and environmental considerations are an integral part of every event. Kingborough Council has developed a Waste Wise Policy for Council run and Council supported events and all public events held on Council owned property or public open space.

Most events generate waste, much of which could be avoided or recycled to conserve resources. Waste is a costly issue both financially and environmentally. If we can avoid creating waste, then we also avoid having to dispose of waste to landfill or paying the cost of sorting waste for recycling.

Plastics do not breakdown, particles become smaller and smaller and are absorbed by wildlife. When they are buried in landfill, toxins from plastics enter our waterways. Toxic waste (found in plastics and polystyrenes) can impact human health.

Biodegradable plastics are also problematic, and do not break down. Instead, biodegradable plastic has an additive that makes it break apart faster into smaller and smaller pieces, eventually becoming micro plastic. Biodegradable plastic cannot be recycled.

Many events now stipulate that waste is not acceptable unless it is compostable or recyclable. The aim of this guide is to provide event organisers and Council staff with practical solutions to manage and reduce waste at community events.

What is a Waste Wise event?

The key aspects of a Waste Wise event include:

- Event organisers are committed to responsible waste management and purposefully plan to avoid and minimise waste;
- Event attendees are encouraged to reduce their waste through the provision of information, infrastructure and facilities;
- Event vendors/suppliers use reusable, recyclable (glass or aluminium) or compostable packaging and serving ware (cardboard, paper, certified compostable plastics);
- There is an emphasis on the use of re-usable, recyclable, biodegradable or compostable products;
- All plastic packaging and plastic materials used must be certified as compostable and made from 100% renewable resources;
- There is good signage and placement of bins to enable discarded materials to be separated and recycled, composted or disposed of responsibly.

How to be Waste Wise

Reduction/Avoidance

- Appropriate steps to avoid waste should be taken whenever possible. For example, packaging which is not essential to the use, distribution, retail sale, storage or safety of your products must be avoided.
- There are to be no plastic bags, balloons, straws, polystyrene cups, plastic takeaway food containers, sachets and plastic cutlery used at any Council run or Council supported event.
- Packaging or utensils that are essential must be constructed from 100% renewable resources such as cardboard, paper, or certified compostable plastic containers and cutlery.
- Consider offering discounts to people who bring their own container/cup/utensils or charging a small fee to cover the cost of disposable compostable containers and cutlery. Consider offering reusable items where health and other criteria deem appropriate ~~possible~~ like cups, plates and cutlery which can be borrowed (perhaps for a deposit) and returned to be washed and reused.
- Use event advertising to remind people to bring their own bags, drink bottles, cups, plates and cutlery to the event.
- Provide a water dispenser or water refilling station to minimise purchase of bottled water.
- Divert food scraps from landfill. Hire a composting bin from a waste management provider (eg.Veolia) and collect food scraps, paper, cardboard and compostable plastic packaging from stall holders to be composted at a commercial composting facility (Hobart City Council currently offers this service).
- Where health and other regulations permit, and where practicable, packaging should be designed for re-use. For example:
  - to be re-filled with the same product e.g. water stations;
  - to be returned and re-used e.g. washable crockery and cutlery; or
  - to be re-used by patrons for the same or a similar purpose where possible e.g. use of sauce bottles rather than single serve sauce containers.

Recycling

- Ensure you use only compostable plastic materials.
- For other packaging materials, such as glass and aluminum, take all steps possible to ensure that these materials are collected for recycling and do not end up in landfill:
  - Provide highly visible, clearly labelled landfill, food organics and recycling bins: aluminum, glass, plastic, steel and paper recycling is usually collected via yellow, 240L recycling bins, with labelled lids.
  - Consider a waste-sorting station to collect bins and sort waste at the event. This process can divert food waste and compostable packaging from landfill, and ensure that all recyclable materials get recycled.
- Food organics (food scraps), paper and compostable containers can be disposed of using the green 240L Green organics bin, with labelled lid. These bins can be sourced from Veolia and taken to the Hobart City Council commercial composting facility.

Responsible Disposal

- Empty bins before they are full.
- Arrange bins consistently throughout the site with a recycling and compost bin associated with each waste bin.
- Locate bins near to where food and beverages will be consumed, at entry/exit points, close to toilets and at the intersection of pathways.
- Make bins as visible as possible.
- Use bin monitors to encourage appropriate bin use.
- Donate re-useable items to charity.

Calculating how many bins are required

There are a number of variables for calculating needs for bins (such as catering, formality of event, number of guests, waste strategies, etc); however, a general rule is to expect a minimum of one litre of waste per person per meal. As an example 1,000 people x 2 meal times = 2,000 litres of estimated waste.

Waste Wise Education

- Inform the community that your event is Waste Wise via social media posts and media releases prior to the event. Remind people to bring their own reusable bags, drink bottles, cups, plates and cutlery to the event.
- Public announcements relating to the re-use, recycling and disposal facilities at the event are recommended at hourly intervals (where a public address system is available). Signage should be placed prominently to inform patrons of the correct usage of recycling, organic and waste facilities. It is important that the signage displayed corresponds with the service that is being offered. Refer to sample signage in this document and the Kingborough Council Recycling Guide.
- The use of bin monitors or a waste sorting station is recommended to assist in educating event attendees as to how to use the bin system in place, and to ensure minimal contamination.

AVOID	ALTERNATIVES
Non-essential disposable plastics and packaging	Re-useable items. Where plastic packaging is essential, it must be constructed from 100% renewable resources and must be certified as compostable.
All Polystyrene including clamshells, plates, bowls & cups	Encourage customers to bring their own serving ware, coffee cups and containers. Use cardboard clams, plates, bowls, cups, paper bags. Offer on a serviette.
Aluminum foil trays/plates	Re-useable/washable trays. Cardboard trays.
Pre wrapped or plastic straws	No straws. Use compostable or paper straws.
Balloons	Reusable Bunting or Pinwheels; Tissue Paper Pom Poms; Painted Rocks; Bubbles.
Plastic stirrers or spoons for hot drinks	Provide re-washable spoons for use at stall.
Polystyrene boxes	Ask suppliers for cardboard boxes.
Plastic bags	Ask customers to bring own bag or supply paper bag.
Individual sauce, sugar, salt and pepper sachets	Provide bulk shakers or dispensers.
Coffee Cup Lids	Provide only on request. Offer a discount to customers who bring their own coffee cups.

PACKAGING ALTERNATIVES	
NON BIODEGRADABLE PACKAGING	**COMPOSTABLE ALTERNATIVE**
Plastic plate or takeaway container	Paper or sugarcane plate; palm leaf plate; paper noodle box; cardboard food tray; cornstarch container.
Polystyrene / plastic cup	Paper cup (cold drinks); sugarcane cup (for cold and hot drinks).
Plastic cutlery	Wooden, bamboo or cornstarch cutlery.
Aluminium food bags	Cardboard tray or paper bag.
Cling Wrap	Cellophane wrap (made from cellulose).
Plastic Bags	Cornstarch bags and paper bags.

LOCAL SUPPLIER	CONTACT DETAILS	PRODUCTS
Abel Pakk	71 Lampton Avenue, Derwent Park, TAS Ph: 0409 986 174 www.abelpakk.com.au	Full range of bio-pack packaging and additional products. Catalogue available. www.biopak.com.au
Going Green Solutions	946 Main Rd, Hurstbridge, VIC Ph: (03) 9718 0126 www.goinggreensolutions.com.au	PLA (polylactic acid) catering and packaging ware, sugarcane fibre wares, corn starch cutlery~~, bamboo tableware~~. Distributor of Biopak goods.
Tasmanian Hotel & Catering Supplies	321 Liverpool St, Hobart TAS 7000 Ph: (03) 6231 2055 www.tashotel.com.au	Biodegradable/compostable catering and packaging ware (sugarcane fibre, bamboo, bio wood). www.tashotel.com.au/packaging/biodegradable-plates-cutlery-platters.html?p=1
Veolia	95 Kennedy Drive, Cambridge TAS Ph: (03) 6244 0000 www.veolia.com.au	Recycling and Compost Bins hire, includes drop off of bins and collection of waste.
Ridge Packaging	3/95 Albert Road, Moonah, TAS Ph: (03) 6278 2234 Mobile: 0438 291 237 www.ridgepackaging.com.au	Eco Banana Leaf Plate and Bowl, fish & chip paper, wooden cutlery, cardboard containers.

Sample Bin Signs

Contact

For more information on Waste Wise events, please contact ~~Melissa Staples,~~ Council's Community Services unit ~~Development Officer~~, Kingborough Council on 6211 8200~~28~~ or kc~~mstaples~~@kingborough.tas.gov.au

UPDATED POLICY FOR APPROVAL

Policy No:	4.14	Minute No:	TBA
Approved by Council	25/5/2020	ECM File No:	12.227
New Review Date:	May 2022	Version:	2
Responsible Officer:	Manager Compliance & Community Development		

Waste Wise Events Policy

POLICY STATEMENT	1.1	Council is committed to ensuring that waste avoidance, waste minimisation, resource recovery and sustainable procurement practices are an integral part of the planning and delivery of Council run events, Council supported events and all public events held on Council owned or managed property.
	1.2	Council will educate event organisers to support the minimisation of waste at public events and to reduce the amount of waste sent to landfill.
	1.3	All public events and functions held on Council owned or managed property must adhere to the Kingborough Waste Wise Events policy.
DEFINITIONS	2.1	**Event** – an organised occurrence held within the Kingborough municipality where people assemble at a given time and location for the purpose of entertainment, recreation, community, ceremonial or promotional purposes, either for free or for the payment of a fee, and includes but is not limited to: • Festivals, fairs and markets • Concerts, shows, film screenings and exhibitions • One-off sporting events • Civic, cultural or commemorative ceremonies or celebrations This is inclusive of Council run events that are organised by Kingborough Council for members of the public or internally for Councillors and staff; Council supported events that are organised by local community groups but have either Council staff involvement or Council funding; and all public events and functions, markets, organised sporting and recreational activities held on land, in buildings or roads owned or managed by Kingborough Council.
	2.2	**Waste** - any substance that is discharged or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment.
	2.3	**Single use plastics** - any disposable plastic and polystyrene items such as straws, balloons, bags, cutlery or food/drink packaging that is only designed to be used once and then discarded e.g. single use sachets for tomato sauce, sugar, salt or sunscreen.
	2.4	**Biodegradable** - sugarcane fiber, bamboo, cornstarch, polyactide (PLA), and cellophane wrap made from cellulose and some other materials that can be broken down into organic matter over a period of time if exposed to the right conditions.
	2.5	**Compostable** - food scraps, paper and some other materials that will break down into organic matter.
	2.6	**Recyclable** - • Aluminium and steel cans • Food and drink cans, including pressure packs and pet food cans; milk and juice cartons • Cardboard, cartons, newspapers and office paper • Glass bottles and jars • Plastic beverage, food and non-food containers with the triangle symbol 1-7 (except polystyrene and styrofoam).

OBJECTIVE	3.1 The objective of the Kingborough Waste Wise Events Policy is to underpin the *Kingborough Waste Management Strategy.* The strategy has been developed to achieve a planned and collaborative approach to waste management, which is cost effective, supportive of the local community and economy and achieves recycling rates which exceed Tasmania's state wide performance. Kingborough is committed to working with its community to transition to a low carbon lifestyle. Events are a method of raising public awareness about recycling and show casing different ways to avoid and minimise waste.
SCOPE	4.1 The policy will be applied to all Council run events, Council supported events and all public events held on Council owned or managed property within the Kingborough municipal area. 4.2 The policy is implemented through Kingborough Council's Waste Wise at Events Guidelines, which forms part of Council's event and reserve bookings application and approval process. 4.3 The event holder/organiser will be responsible for the costs of implementing the Waste Wise Events Policy. 4.4 The policy does not apply to private functions or the ongoing or seasonal operation of sports club canteens and other community venues that hold events and functions as part of their normal operations; however, these organisations are encouraged to transition towards the principles of this policy.
PROCEDURE (POLICY DETAIL)	5.1 The Policy ensures that Waste Wise strategies are utilised in the planning and delivery of public events and functions held on Council owned or managed property. a) Council will provide Waste Wise at Events Guidelines to support Council staff and event organisers to ensure that planning for events includes planning for avoidance, minimisation and recycling of waste. b) Event organisers are required to promote and practice waste avoidance principles by: • minimising of the amount of waste generated; • prohibiting the sale and/or distribution of single-use plastic products and single use sachets, polystyrene, plastic bags, plastic straws, bottles and/or balloons; • minimising the sale/and or distribution of bottled water, except in cases of potential breach of health and safety requirements; • responsibly managing any waste to ensure the cleanliness of the area is maintained during and after the event; • maximising recycling; • promoting and engaging in sustainable procurement practices; • minimising the environmental impact of any products, supplies and promotional materials used at the event. c) If waste is unavoidable due to health or safety requirements, then discarded materials are separated and recycled or disposed of responsibly. d) Council will promote the policy to ensure an emphasis on the use of re-usable, recyclable or compostable/biodegradable products.
GUIDELINES	6.1 This policy is supported by a set of operational Waste Wise at Events Guidelines.

COMMUNICATION	7.1	The policy will be applied to all Council run, Council supported events and all public events held on Council owned or managed property within the Kingborough municipal area.
	7.2	The policy and Waste Wise at Events Guidelines will be made available to the public through Council's website.
	7.3	The Waste Wise at Events Guidelines will be promoted through local media and social media where appropriate.
	7.4	Adherence to the Waste Wise at Events Guidelines will be controlled via the issuing of event permits, leases, or licenses.
LEGISLATION	*8.1*	*Plastic Shopping Bags Ban Act 2013*
	8.2	*Environmental Management and Pollution Control (Waste Management) Regulations 2020*
	8.3	*Litter Act Tasmania 2007*
	8.4	*Environmental Management and Pollution Control Act 1994*
RELATED DOCUMENTS	9.1	Kingborough Waste Management Strategy
	9.2	Kingborough Strategic Plan 2020-2025
	9.3	Tasmanian Waste & Resource Management Strategy 2009
	9.4	National Waste Policy 2018
AUDIENCE	10.1	Available to the public.

Waste Wise at Events Guidelines
May 2020

Why be Waste Wise?

Waste minimisation and environmental considerations are an integral part of every event. Kingborough Council has developed a Waste Wise Policy for Council run and Council supported events and all public events held on Council owned property or public open space.

Most events generate waste, much of which could be avoided or recycled to conserve resources. Waste is a costly issue both financially and environmentally. If we can avoid creating waste, then we also avoid having to dispose of waste to landfill or paying the cost of sorting waste for recycling.

Plastics do not breakdown, particles become smaller and smaller and are absorbed by wildlife. When they are buried in landfill, toxins from plastics enter our waterways. Toxic waste (found in plastics and polystyrenes) can impact human health.

Biodegradable plastics are also problematic, and do not break down. Instead, biodegradable plastic has an additive that makes it break apart faster into smaller and smaller pieces, eventually becoming micro plastic. Biodegradable plastic cannot be recycled.

Many events now stipulate that waste is not acceptable unless it is compostable or recyclable. The aim of this guide is to provide event organisers and Council staff with practical solutions to manage and reduce waste at community events.

What is a Waste Wise event?

The key aspects of a Waste Wise event include:

- Event organisers are committed to responsible waste management and purposefully plan to avoid and minimise waste;
- Event attendees are encouraged to reduce their waste through the provision of information, infrastructure and facilities;
- Event vendors/suppliers use reusable, recyclable (glass or aluminium) or compostable packaging and serving ware (cardboard, paper, certified compostable plastics);
- There is an emphasis on the use of re-usable, recyclable, biodegradable or compostable products;
- All plastic packaging and plastic materials used must be certified as compostable and made from 100% renewable resources;
- There is good signage and placement of bins to enable discarded materials to be separated and recycled, composted or disposed of responsibly.

How to be Waste Wise

Reduction/Avoidance

- Appropriate steps to avoid waste should be taken whenever possible. For example, packaging which is not essential to the use, distribution, retail sale, storage or safety of your products must be avoided.
- There are to be no plastic bags, balloons, straws, polystyrene cups, plastic takeaway food containers, sachets and plastic cutlery used at any Council run or Council supported event.
- Packaging or utensils that are essential must be constructed from 100% renewable resources such as cardboard, paper, or certified compostable plastic containers and cutlery.
- Consider offering discounts to people who bring their own container/cup/utensils or charging a small fee to cover the cost of disposable compostable containers and cutlery. Consider offering reusable items where health and other criteria deem appropriate like cups, plates and cutlery which can be borrowed (perhaps for a deposit) and returned to be washed and reused.
- Use event advertising to remind people to bring their own bags, drink bottles, cups, plates and cutlery to the event.
- Provide a water dispenser or water refilling station to minimise purchase of bottled water.
- Divert food scraps from landfill. Hire a composting bin from a waste management provider (eg.Veolia) and collect food scraps, paper, cardboard and compostable plastic packaging from stall holders to be composted at a commercial composting facility (Hobart City Council currently offers this service).
- Where health and other regulations permit, and where practicable, packaging should be designed for re-use. For example:
  - to be re-filled with the same product e.g. water stations;
  - to be returned and re-used e.g. washable crockery and cutlery; or
  - to be re-used by patrons for the same or a similar purpose where possible e.g. use of sauce bottles rather than single serve sauce containers.

Recycling

- Ensure you use only compostable plastic materials.
- For other packaging materials, such as glass and aluminum, take all steps possible to ensure that these materials are collected for recycling and do not end up in landfill:
  - Provide highly visible, clearly labelled landfill, food organics and recycling bins: aluminum, glass, plastic, steel and paper recycling is usually collected via yellow, 240L recycling bins, with labelled lids.
  - Consider a waste-sorting station to collect bins and sort waste at the event. This process can divert food waste and compostable packaging from landfill, and ensure that all recyclable materials get recycled.
- Food organics (food scraps), paper and compostable containers can be disposed of using the green 240L Green organics bin, with labelled lid. These bins can be sourced from Veolia and taken to the Hobart City Council commercial composting facility.

Responsible Disposal

- Empty bins before they are full.
- Arrange bins consistently throughout the site with a recycling and compost bin associated with each waste bin.
- Locate bins near to where food and beverages will be consumed, at entry/exit points, close to toilets and at the intersection of pathways.
- Make bins as visible as possible.
- Use bin monitors to encourage appropriate bin use.
- Donate re-useable items to charity.

Calculating how many bins are required

There are a number of variables for calculating needs for bins (such as catering, formality of event, number of guests, waste strategies, etc); however, a general rule is to expect a minimum of one litre of waste per person per meal. As an example 1,000 people x 2 meal times = 2,000 litres of estimated waste.

Waste Wise Education

- Inform the community that your event is Waste Wise via social media posts and media releases prior to the event. Remind people to bring their own reusable bags, drink bottles, cups, plates and cutlery to the event.
- Public announcements relating to the re-use, recycling and disposal facilities at the event are recommended at hourly intervals (where a public address system is available). Signage should be placed prominently to inform patrons of the correct usage of recycling, organic and waste facilities. It is important that the signage displayed corresponds with the service that is being offered. Refer to sample signage in this document and the Kingborough Council Recycling Guide.
- The use of bin monitors or a waste sorting station is recommended to assist in educating event attendees as to how to use the bin system in place, and to ensure minimal contamination.

•AVOID	•ALTERNATIVES
•Non-essential disposable plastics and packaging	•Re-useable items. Where plastic packaging is essential, it must be constructed from 100% renewable resources and must be certified as compostable.
•All Polystyrene including clamshells, plates, bowls & cups	•Encourage customers to bring their own serving ware, coffee cups and containers. Use cardboard clams, plates, bowls, cups, paper bags. Offer on a serviette.
•Aluminum foil trays/plates	•Re-useable/washable trays. Cardboard trays.
•Pre wrapped or plastic straws	•No straws. Use compostable or paper straws.
•Balloons	•Reusable Bunting or Pinwheels; Tissue Paper Pom Poms; Painted Rocks; Bubbles.
•Plastic stirrers or spoons for hot drinks	•Provide re-washable spoons for use at stall.
•Polystyrene boxes	•Ask suppliers for cardboard boxes.
•Plastic bags	•Ask customers to bring own bag or supply paper bag.
•Individual sauce, sugar, salt and pepper sachets	•Provide bulk shakers or dispensers.
•Coffee Cup Lids	•Provide only on request. Offer a discount to customers who bring their own coffee cups.

•PACKAGING ALTERNATIVES	•
•NON BIODEGRADABLE PACKAGING	•COMPOSTABLE ALTERNATIVE
•Plastic plate or takeaway container	•Paper or sugarcane plate; palm leaf plate; paper noodle box; cardboard food tray; cornstarch container.
•Polystyrene / plastic cup	•Paper cup (cold drinks); sugarcane cup (for cold and hot drinks).
•Plastic cutlery	•Wooden, bamboo or cornstarch cutlery.
•Aluminium food bags	•Cardboard tray or paper bag.
•Cling Wrap	•Cellophane wrap (made from cellulose).
•Plastic Bags	•Cornstarch bags and paper bags.

LOCAL SUPPLIER	CONTACT DETAILS	PRODUCTS
Abel Pakk	71 Lampton Avenue, Derwent Park, TAS Ph: 0409 986 174 www.abelpakk.com.au	Full range of bio-pack packaging and additional products. Catalogue available. www.biopak.com.au
Going Green Solutions	946 Main Rd, Hurstbridge, VIC Ph: (03) 9718 0126 www.goinggreensolutions.com.au	PLA (polylactic acid) catering and packaging ware, sugarcane fibre wares, corn starch cutlery. Distributor of Biopak goods.
Tasmanian Hotel & Catering Supplies	321 Liverpool St, Hobart TAS 7000 Ph: (03) 6231 2055 www.tashotel.com.au	Biodegradable/compostable catering and packaging ware (sugarcane fibre, bamboo, bio wood). www.tashotel.com.au/packaging/biodegradable-plates-cutlery-platters.html?p=1
Veolia	95 Kennedy Drive, Cambridge TAS Ph: (03) 6244 0000 www.veolia.com.au	Recycling and Compost Bins hire, includes drop off of bins and collection of waste.
Ridge Packaging	3/95 Albert Road, Moonah, TAS Ph: (03) 6278 2234 Mobile: 0438 291 237 www.ridgepackaging.com.au	Eco Banana Leaf Plate and Bowl, fish & chip paper, wooden cutlery, cardboard containers.

Sample Bin Signs

Contact

For more information on Waste Wise events, please contact Council's Community Services unit , Kingborough Council on 6211 8200 or kc@kingborough.tas.gov.au

17.5 PETITION - SAFE BICYCLE WAY ALGONA ROAD

File Number: 12.21, 23.153

Author: Renai Clark, Roads & Stormwater Engineer

Authoriser: David Reeve, Executive Manager Engineering Services

Strategic Plan Reference

Key Priority Area:	2	Deliver quality infrastructure and services.
Strategic Outcome:	2.1	Service provision meets the current and future requirements of residents and visitors.

1. PURPOSE

1.1 This report is in response to a petition requesting Council to consider constructing an appropriate and safe cycleway along Algona Road to connect Blackmans Bay and Channel Highway.

2. BACKGROUND

2.1 A petition containing 6 signatures was tabled at the 27 April 2020 Ordinary Council Meeting petitioning Council to consider building an appropriate and safe cycleway along Algona Rd to connect Blackmans Bay (Roslyn Av) and Channel Highway (Mitre 10 etc.). I work for Gov (Parks Australia) and would very much prefer to ride my bike to work and back but the current situation along Algona Rd makes this option extremely dangerous and unappealing – speed limits are 80-90 km/hour and there is not enough room to ride comfortably. The current alternatives are quite hilly and take much longer to arrive at the workplace.

3. STATUTORY REQUIREMENTS

3.1 The petition meets the requirements of Section 57 of the Local Government Act 1993 and Council is therefore required to determine any action to be taken in respect to the subject of the petition.

4. DISCUSSION

4.1 Algona Road is a state highway maintained by the Department of State Growth. It is 3.3km in length between Channel Highway in Kingston and Roslyn Avenue in Blackmans Bay.

4.2 The road carriageway consists of a single 3.5 metre wide travel lane together with a 1.5metre wide sealed shoulder in both directions. Westbound, after the Opal Drive roundabout, there is a short length of overtaking lane to allow passing of slow vehicles where the average gradient is 10%.

4.3 From Channel Highway for a distance of 2.7 kilometres the speed limit is 90 km/h. The final 600 metre section approaching Blackmans Bay the speed limit reduces to 60 km/h.

4.4 The 1.5 metre sealed shoulder allows cyclists to ride clear of passing traffic and motorists are able to maintain the required 1.5 metre clearance to a cyclist without having to cross the centre barrier line.

4.5 There is an existing shared path at the Kingston end of Algona Road which connects from the Whitewater Creek track and travels along Spring Farm Road, then Channel Highway past AAD and through to the Coffee Creek Track via the Algona Road pedestrian underpass. The link joins to the shared path on Huntingfield Avenue and Nautilus Grove to connect with St Aloysius and Tarremah schools. A recently constructed link now also joins the shared path from the underpass to Redwood Road. Figure 1 shows the location of the existing shared paths at the Kingston end connecting Whitewater Creek track to the schools at Huntingfield identified in green dashed line.

4.6 Along the length of Algona Road are a number of tracks on both sides which provide pedestrian access to Scarborough Avenue, Redwood Road, Waratah Street, Ash Drive, Timbertop Drive, Cider Gum Drive, Burwood Drive and the Peter Murrell Reserve Fire Trails. The tracks are suitable for mountain style bicycles but unsuitable for a road style bicycle with narrower wheels and tyres. The tracks are shown on Figure 1 in yellow dashed line.

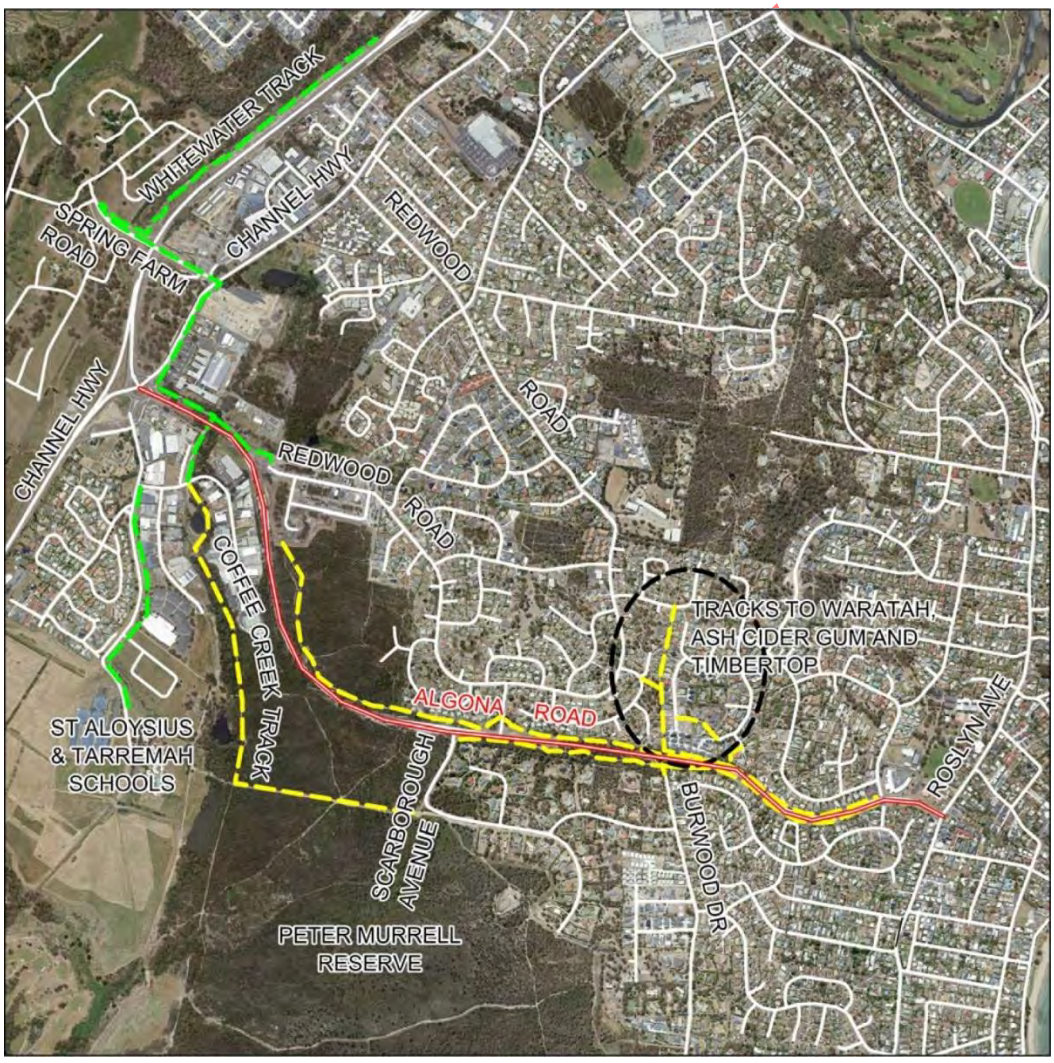


Figure 1 showing existing shared paths and tracks in the Algona Road vicinity

4.7 The road reservation is of sufficient width that could accommodate a cycleway. However, the road reservation is managed by the Department of State Growth and it would be unlikely they would fund a cycleway along Algona Road.

4.8 It is unlikely that use of a cycleway along Algona Road would have very high patronage.

5. FINANCE

5.1 It is estimated that construction of a cycleway along Algona Road would cost in the vicinity of $1.5-$2 million.

6. ENVIRONMENT

6.1 There are no environmental issues to be considered with this matter.

7. COMMUNICATION AND CONSULTATION

7.1 Council will advise the petitioners of the Council decision.

8. RISK

8.1 There are no identified risks in pursuing the recommendation below.

9. CONCLUSION

9.1 The existing 1.5 metre sealed shoulders provide cyclists with the option to ride on Algona Road with passing traffic able to maintain the required 1.5 metre clearance.

9.2 Although indirect, there is an existing alternative access available for cyclists to travel between Blackmans Bay and Huntingfield who do not want to ride on Algona Road.

9.3 Given the high cost of construction and the expected low patronage it is not considered a priority to provide a cycleway along Algona Road.

9.4 Notwithstanding the above, Council's Bicycle Advisory Committee are looking to develop a new bike plan for the municipality, and it would be appropriate to refer this request to them to consider along with all other competing priorities.

10. RECOMMENDATION

That Council refer the request for the development of a cycleway along Algona Road to the Kingborough Bicycle Advisory Committee for consideration within the development of a Bike plan for the Kingborough municipality.

ATTACHMENTS

Nil

18 CONFIRMATION OF ITEMS TO BE DEALT WITH IN CLOSED SESSION

RECOMMENDATION

That in accordance with the *Local Government (Meeting Procedures) Regulations 2015* Council, by absolute majority, move into closed session to consider the following items:

Confirmation of Minutes

Regulation 34(6) *In confirming the minutes of a meeting, debate is allowed only in respect of the accuracy of the minutes.*

Applications for Leave of Absence

Regulation 15(2)(h) *applications by councillors for a leave of absence*

In accordance with the Kingborough Council *Meetings Audio Recording Guidelines Policy,* recording of the open session of the meeting will now cease.

Open Session of Council adjourned at.

OPEN SESSION ADJOURNS

OPEN SESSION RESUMES

Open session resumed at

RECOMMENDATION

The Closed Session of Council having met and dealt with its business resolves to report that it has determined the following:

Item	Decision
Confirmation of Minutes	
Applications for Leave of Absence	

CLOSURE

The Chairperson declared the meeting closed at

APPENDIX

A. Mayor's Communications.

B. Financial Report for the period 1 July 2019 to 30 April 2020.

C. Delegated Authority Report for the period 29 April 2020 to 12 May 2020.

D. Kingborough Environmental Fund - Progress Report.

E. Calendar.

F. Forward Agenda.

A MAYOR'S COMMUNICATIONS

Mayor Winter reported the following meetings and activities:

Date	Place	Meeting/Activity
22 April	Video conference	Meeting with Minister Shelton, LGAT and Councils about COVID-19 response and issues.
27 April	Video Conference	Meeting with Hobart Metro Mayors and General Managers about commercial rating policy.
28 April	Video conference	TasWater Owners information session about future dividends.
4 May	Video Conference	Meeting with Minister Shelton, LGAT and Councils about COVID-19 Local Government Recovery Planning
4 May	Video conference	Meeting with Kingborough Chronicle to discuss approach and campaign to support local business
11 May	Video Conference	Meeting with Kingborough Ratepayers Association to discuss draft budget and consultation.
14 May	Video conference	Copping Refuse Disposal Site Joint Authority meeting.
19 May	Video Conference	Hobart Mayor's Forum meeting

B FINANCIAL REPORT FOR THE PERIOD 1 JULY 2019 TO 30 APRIL 2020

Kingborough

KINGBOROUGH COUNCIL

SUMMARISED FINANCIAL REPORT
FOR THE PERIOD
1ST JULY, 2019
TO
30TH APRIL, 2020

SUBMITTED TO COUNCIL
25TH MAY, 2020

kingborough.tas.gov.au

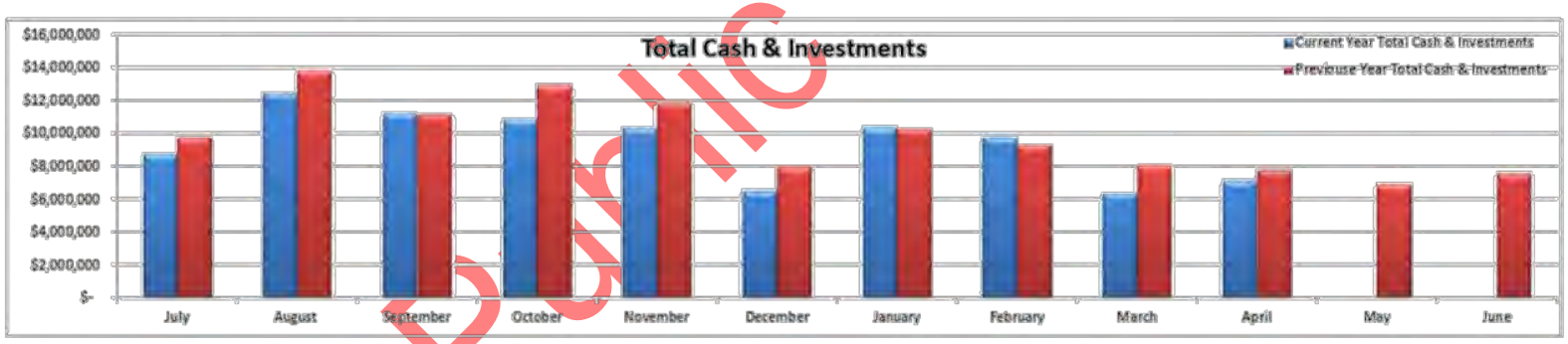
KINGBOROUGH COUNCIL - April 2020

KINGBOROUGH COUNCIL - April 2020

CASH BALANCES

Balance Type	July	August	September	October	November	December	January	February	March	April	May	June
Reserves	$ 2,875,169	$ 2,892,209	$ 2,898,384	$ 2,901,884	$ 2,912,137	$ 3,007,969	$ 3,010,219	$ 3,010,219	$ 3,164,694	$ 3,172,020		
Held in Trust	$ 2,162,973	$ 2,127,648	$ 1,961,746	$ 1,893,562	$ 1,799,569	$ 1,801,822	$ 1,810,524	$ 1,809,581	$ 1,807,186	$ 1,698,698		
Unexpended Capital Works*	$ 485,197	$ 1,049,269	$ 1,727,825	$ 986,402	$ 1,108,429	$ 1,321,761	$ 1,914,933	$ 1,905,688	$ 2,924,000	$ 3,372,372		
Current Year Total Committed Cash	$ 5,523,339	$ 6,069,126	$ 6,587,955	$ 5,781,848	$ 5,820,136	$ 6,131,552	$ 6,735,676	$ 6,725,448	$ 7,895,880	$ 8,243,090	$ -	$ -
Previous Year Total Committed Cash	$ 9,134,340	$ 9,998,524	$ 8,586,241	$ 8,217,525	$ 5,785,460	$ 5,299,572	$ 6,653,953	$ 7,355,124	$ 8,361,890	$ 9,398,511	$ 9,170,650	$ 8,814,470
Uncommitted Funds	$ 3,225,628	$ 6,393,760	$ 4,646,036	$ 5,099,534	$ 4,511,838	$ 339,875	$ 3,627,330	$ 3,047,574	-$ 1,536,373	-$ 1,115,831	$ -	$ -
Current Year Total Cash	$ 8,748,966	$ 12,462,886	$ 11,233,991	$ 10,881,382	$ 10,331,974	$ 6,531,427	$ 10,363,006	$ 9,763,022	$ 6,359,508	$ 7,127,260	$ -	$ -
Previous Year Total Cash	$ 9,743,108	$ 13,808,412	$ 11,167,314	$ 12,921,950	$ 11,883,483	$ 7,961,253	$ 10,253,798	$ 9,279,437	$ 8,099,011	$ 7,751,676	$ 6,898,269	$ 7,587,489

*Unexpended Capital Works excludes Kingston Park expenditure



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KINGBOROUGH COUNCIL - April 2020

CASH, INVESTMENTS & BORROWINGS

CASH ACCOUNTS	Interest Rate	Maturity Date	July	August	September	October	November	December	January	February	March	April	May	June
CBA - Overdraft Account			$2,738,348	$2,170,923	$647,940	$2,651,915	$1,584,536	$1,272,584	$5,697,216	$5,110,627	$538,985	$2,150,750		
CBA - Applications Account			$106,422	$15,947	$149,578	$8,398	$92,938	$2,741	$65,787	$50,746	$122,971	$6,579		
CBA - AR Account			$206,660	$67,986	$224,333	$892	$411,696	$11,216	$364,320	$361,988	$729,960	$2,252		
CBA - Business Online Saver											$1,750,000	$1,750,000		
Total Cash			$ 3,051,431	$ 2,254,856	$ 1,021,852	$ 2,661,205	$ 2,089,170	$ 1,286,540	$ 6,127,323	$ 5,523,361	$ 3,141,916	$ 3,909,581	$ -	$ -
INVESTMENTS														
Bendigo 3	1.45%	28-Jan-20	$1,005,918	$1,005,918	$1,005,918	$1,010,181	$1,010,181	$1,010,181						
Mystate 3	1.65%	23-Jun-20	$1,000,000	$3,006,609	$3,006,609	$3,006,609	$3,022,178	$3,022,178	$3,022,178	$3,022,178	$2,000,000	$2,000,000		
NAB 3	1.52%	23-May-20		$1,000,000	$1,000,000	$1,000,000	$1,004,315	$1,004,315	$1,004,315	$1,008,153	$1,008,153	$1,008,153		
Tascorp HT	0.25%	Managed Trust	$2,107,973	$2,609,804	$2,611,949	$1,613,117	$1,614,111	$114,748	$114,822	$114,891	$114,932	$114,956		
Tascorp Cash Indexed	0.84%	Managed Trust	$1,583,645	$2,585,689	$2,587,664	$1,590,270	$1,592,016	$93,464	$94,368	$94,439	$94,506	$94,570		
Total Investments			$ 5,697,536	$ 10,208,030	$ 10,212,139	$ 8,220,177	$ 8,242,804	$ 5,244,887	$ 4,235,683	$ 4,239,661	$ 3,217,592	$ 3,217,679	$ -	$ -
Current Year Total Cash & Investments			$ 8,748,966	$ 12,462,886	$ 11,233,991	$ 10,881,382	$ 10,331,974	$ 6,531,427	$ 10,363,006	$ 9,763,022	$ 6,359,508	$ 7,127,260	$ -	$ -
Previous Year Cash & Investments			$ 9,743,106	$ 13,808,412	$ 11,167,314	$ 12,921,950	$ 11,883,483	$ 7,961,253	$ 10,253,798	$ 9,279,437	$ 8,099,011	$ 7,751,676	$ 6,898,269	$ 7,587,489
Borrowings														
Tascorp (Grant Funded)	3.43%	22-Jun-23	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$2,700,000	$2,700,000		
Tascorp	3.47%	11-Oct-23	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000		
Tascorp (Grant Funded)	2.15%	27-Jun-24	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000		
Tascorp (Grant Funded)	1.99%	21-Jan-25							$2,100,000	$2,100,000	$2,100,000	$2,100,000		
			$ 7,900,000	$ 7,900,000	$ 7,900,000	$ 7,900,000	$ 7,900,000	$ 7,900,000	$ 10,000,000	$ 10,000,000	$ 10,000,000	$ 10,000,000	$ -	$ -

KINGBOROUGH COUNCIL - April 2020

RESERVES

Accounts	July	August	September	October	November	December	January	February	March	April	May	June
Boronia Hill Reserve	$ 10,733	$ 10,733	$ 10,733	$ 10,733	$ 10,733	$ 10,733	$ 10,733	$ 10,733	$ 10,733	$ 10,733		
Car Parking	$ 46,248	$ 46,248	$ 46,248	$ 46,248	$ 46,248	$ 46,248	$ 46,248	$ 46,248	$ 46,248	$ 46,248		
Hall Equipment Replacement	$ 69,033	$ 69,033	$ 69,033	$ 69,033	$ 69,033	$ 69,033	$ 69,033	$ 69,033	$ 69,033	$ 69,033		
IT Equipment Replacement	$ 130,978	$ 130,978	$ 130,978	$ 130,978	$ 130,978	$ 164,978	$ 164,978	$ 164,978	$ 180,978	$ 180,978		
KSC Equipment Replacement	$ 93,375	$ 93,375	$ 93,375	$ 93,375	$ 93,375	$ 181,375	$ 181,375	$ 181,375	$ 268,375	$ 268,375		
Office Equipment Replacement	$ 72,827	$ 72,827	$ 72,827	$ 72,827	$ 72,827	-$ 4,173	-$ 4,173	-$ 4,173	-$ 132,173	-$ 132,173		
Plant & Equipment Replacement	$ 372,936	$ 372,936	$ 372,936	$ 372,936	$ 372,936	$ 411,936	$ 411,936	$ 411,936	$ 582,936	$ 582,936		
Public Open Space	$ 866,001	$ 881,001	$ 881,001	$ 881,001	$ 890,755	$ 900,712	$ 900,712	$ 900,712	$ 907,812	$ 911,062		
Tree Preservation Reserve	$ 853,213	$ 855,253	$ 861,428	$ 864,928	$ 865,428	$ 867,303	$ 869,553	$ 869,553	$ 870,928	$ 875,004		
Unexpended Grants	$ 359,824	$ 359,824	$ 359,824	$ 359,824	$ 359,824	$ 359,824	$ 359,824	$ 359,824	$ 359,824	$ 359,824		
Current Year Total Reserve	**$ 2,875,169**	**$ 2,892,209**	**$ 2,898,384**	**$ 2,901,884**	**$ 2,912,137**	**$ 3,007,969**	**$ 3,010,219**	**$ 3,010,219**	**$ 3,164,694**	**$ 3,172,020**	**$ -**	**$ -**
Previous Year Total Reserve	**$ 1,883,870**	**$ 1,987,883**	**$ 2,021,293**	**$ 2,851,950**	**$ 2,866,734**	**$ 2,639,884**	**$ 2,639,884**	**$ 2,654,457**	**$ 2,711,817**	**$ 2,723,917**	**$ 2,731,167**	**$ 2,490,662**

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KINGBOROUGH COUNCIL - April 2020

BUDGET NOTES

RECONCILIATION OF ORIGINAL TO FORECAST BUDGET	
BUDGET UNDERLYING RESULT	**(225,105)**
Forecast Changes:	
Rate Income - Waste Management	100,000
Loan Interest - Utilising interest free loans.	150,000
Other Expenses - Corporate Services	(50,000)
Depreciation	(500,000)
Contribution Cash - Reduced POS and Tree contributions	(250,000)
Interest Income - Reduced interest rates	(50,000)
Satutory Fees Planning & Building - reduced volumn	(100,000)
User Fees - closure of KSC	(300,000)
Other Income - reduction in rental income	(200,000)
FORECAST UNDERLYING RESULT	**(1,425,105)**
Adjustments not affecting the Underlying Surplus	
Capital Grants	1,350,000
Net Operting Surplus.	**1,400,895**

KINGBOROUGH COUNCIL - April 2020

COMMENTS ON FINANCIALS

The following items are significantly higher/lower than budget:

OPERATING INCOME

- Rates — Income from Rates is over budget by $279k due to general rate income of $179 over budget, stormwater rate income of $31k over budget and garbage rate income of $69k over budget.
- User Fees — User fees are under budget by $147k due primarily to the closure of KSC and the Community Hub.
- Contributions - Cash — Contributions cash is $242k below budget, due to the receipt of funds for POS and tree peservation being considerable less than expected.
- Other Income — Other Income is $115k over budget due primarily to receiving $68k in carbon credits that were not expected until JUne 2020 and the reeipt of $59k in fuel tax credits resulting from a review of invoices.

OPERATING EXPENSES

- Employee Costs — Employee costs are $215k over budget primarily due to Infrastructure Services costs of $243k over budget resulting from an overestimation of employee costs allocated to capital projects in the budget. Also due to the Easter break, April saw significant costs allocated to overheads.
- Loan Interest — Loan interest is $123k under budget due to the use of interest free loans to fund the majority of the Kingston Park projects.
- Depreciation — Depreciation is $421k over budget due to the impacts of the revaluation and componentisation of Council's building assets at 01 July 2019.

OTHER NON-OPERATING INCOME/EXPENSES

- Grants Capital — Capital grant income is $1.78m over budget due to the early receipt of $596k in roads to recovery grant funds, the receipt of $250k for the Bruny Visitors Road Package $15k for the Kingborough evacuation centre, $27k for the Bruny cat facility from the Ten Lives Cat Centre,$75k for CCTV Cameras, $280k as the final payment for the Community Hub building and $200k for the Taroona Football Club changerooms.

KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement All

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	28,530,803	28,252,000	278,803	28,252,000	28,352,000	100,000
Income Levies	1,669,801	1,630,000	39,801	1,630,000	1,630,000	0
Statutory Fees & Fines	2,001,363	2,028,000	(26,637)	2,486,400	2,386,400	(100,000)
User Fees	920,789	1,067,400	(146,611)	1,280,954	980,954	(300,000)
Grants Recurrent	996,000	990,000	6,000	2,410,000	2,410,000	0
Contributions - Cash	118,186	359,900	(241,714)	432,000	182,000	(250,000)
Reimbursements	1,125,576	1,110,000	15,576	1,130,000	1,130,000	0
Other Income	708,751	593,900	114,851	1,323,600	1,123,600	(200,000)
Internal Charges Income	183,330	183,300	30	220,000	220,000	0
Total Income	**36,254,598**	**36,214,500**	**40,098**	**39,164,954**	**38,414,954**	**(750,000)**
Expenses						
Employee Costs	13,223,129	13,007,804	(215,325)	14,940,658	14,940,658	0
Expenses Levies	1,249,319	1,222,500	(26,819)	1,630,000	1,630,000	0
Loan Interest	80,922	204,200	123,278	245,000	95,000	150,000
Materials and Services	7,862,943	7,928,270	65,327	9,408,922	9,408,922	0
Other Expenses	3,457,109	3,477,500	20,391	3,776,980	3,826,980	(50,000)
Internal Charges Expense	183,330	183,300	(30)	220,000	220,000	0
Total Expenses	**26,056,752**	**26,023,574**	**(33,178)**	**30,221,559**	**30,121,559**	**100,000**
Net Operating Surplus/(Deficit) before:	**10,197,846**	**10,190,926**	**6,920**	**8,943,395**	**8,293,395**	**(650,000)**
Depreciation	9,049,024	8,628,000	(421,024)	10,353,500	10,853,500	(500,000)
Loss/(Profit) on Disposal of Assets	(23,634)	0	23,634	500,000	500,000	0
Net Operating Surplus/(Deficit) before:	**1,172,456**	**1,562,926**	**(390,470)**	**(1,910,105)**	**(3,060,105)**	**(1,150,000)**
Interest	96,343	162,500	(66,157)	195,000	145,000	(50,000)
Dividends	930,000	1,033,000	(103,000)	1,240,000	1,240,000	0
Share of Profits/(Losses) of Invest. in Assoc	0	0	0	100,000	100,000	0
Investment Copping	0	0	0	150,000	150,000	0
NET OPERATING SURPLUS/(DEFICIT)	**2,198,799**	**2,758,426**	**(559,627)**	**(225,105)**	**(1,425,105)**	**(1,200,000)**
Grants Capital	1,775,860	238,000	1,537,860	476,000	1,826,000	1,350,000
Contributions - Non Monetory Assets	0	0	0	1,000,000	1,000,000	0
NET SUPRPLUS/(DEFICIT)	**3,974,659**	**2,996,426**	**978,233**	**1,250,895**	**1,400,895**	**150,000**
Underlying Result						
Grant Received in Advance	0	0	0	0	0	0
UNDERLYING RESULT	**2,198,799**	**2,758,426**	**(559,627)**	**(225,105)**	**(1,425,105)**	**(1,200,000)**
TOTAL CASH GENERATED	**(6,850,225)**	**(5,869,574)**	**(980,651)**	**10,128,395**	**9,428,395**	**700,000**

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KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Governance

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	24,208,614	24,030,000	178,614	24,030,000	24,030,000	0
Income Levies	1,669,801	1,630,000	39,801	1,630,000	1,630,000	0
Statutory Fees & Fines	0	0	0	0	0	0
User Fees	61,803	66,700	(4,897)	80,000	80,000	0
Grants Recurrent	872,600	870,000	2,600	2,290,000	2,290,000	0
Contributions - Cash	84,656	208,300	(123,644)	250,000	150,000	(100,000)
Reimbursements	1,125,576	1,110,000	15,576	1,130,000	1,130,000	0
Other Income	61,886	55,000	6,886	273,000	273,000	0
Internal Charges Income	0	0	0	0	0	0
Total Income	**28,084,936**	**27,970,000**	**114,936**	**29,683,000**	**29,583,000**	**(100,000)**
Expenses						
Employee Costs	598,125	601,350	3,225	711,235	711,235	0
Expenses Levies	1,249,319	1,222,500	(26,819)	1,630,000	1,630,000	0
Loan Interest	0	0	0	0	0	0
Materials and Services	459,956	390,200	(69,756)	425,200	425,200	0
Other Expenses	1,976,241	2,083,300	107,059	2,188,800	2,188,800	0
Internal Charges Expense	0	0	0	0	0	0
Total Expenses	**4,347,451**	**4,297,350**	**(50,101)**	**4,955,235**	**4,955,235**	**0**
Net Operating Surplus/(Deficit) before:	**23,737,486**	**23,672,650**	**64,836**	**24,727,765**	**24,627,765**	**(100,000)**
Depreciation	86,386	70,800	(15,586)	85,000	85,000	0
Loss/(Profit) on Disposal of Assets	(23,634)	0	23,634	500,000	500,000	0
Net Operating Surplus/(Deficit) before:	**23,674,733**	**23,601,850**	**72,883**	**24,142,765**	**24,042,765**	**(100,000)**
Interest	0	0	0	0	0	0
Dividends	930,000	1,033,000	(103,000)	1,240,000	1,240,000	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	100,000	100,000	0
Investment Copping	0	0	0	150,000	150,000	0
NET OPERATING SURPLUS/(DEFICIT)	**24,604,733**	**24,634,850**	**(30,117)**	**25,632,765**	**25,532,765**	**(100,000)**
Grants Capital	1,775,860	238,000	1,537,860	476,000	1,826,000	1,350,000
Contributions - Non Monetory Assets	0	0	0	1,000,000	1,000,000	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**26,380,593**	**24,872,850**	**1,507,743**	**27,108,765**	**28,358,765**	**1,250,000**
TOTAL CASH GENERATED	**24,518,347**	**24,564,050**	**(45,703)**	**25,547,765**	**25,447,765**	**100,000**

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KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Corporate Services

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	0	0	0	0	0	0
Income Levies	0	0	0	0	0	0
Statutory Fees & Fines	261,130	252,800	8,330	303,400	303,400	0
User Fees	0	0	0	0	0	0
Grants Recurrent	0	0	0	0	0	0
Contributions - Cash	0	0	0	0	0	0
Reimbursements	0	0	0	0	0	0
Other Income	101,868	109,000	(7,132)	130,800	130,800	0
Internal Charges Income	125,000	125,000	0	150,000	150,000	0
Total Income	**487,998**	**486,800**	**1,198**	**584,200**	**584,200**	**0**
Expenses						
Employee Costs	2,334,317	2,395,817	61,500	2,831,153	2,831,153	0
Expenses Levies	0	0	0	0	0	0
Loan Interest	80,922	204,200	123,278	245,000	95,000	150,000
Materials and Services	618,535	615,680	(2,855)	712,015	712,015	0
Other Expenses	858,292	786,800	(71,492)	879,600	879,600	0
Internal Charges Expense	0	0	0	0	0	0
Total Expenses	**3,892,562**	**4,002,497**	**109,935**	**4,667,768**	**4,517,768**	**150,000**
Net Operating Surplus/(Deficit) before:	**(3,404,564)**	**(3,515,697)**	**111,133**	**(4,083,568)**	**(3,933,568)**	**150,000**
Depreciation	61,754	144,500	82,746	173,400	173,400	0
Loss/(Profit) on Disposal of Assets	0	0	0	0	0	0
Net Operating Surplus/(Deficit) before:	**(3,466,318)**	**(3,660,197)**	**193,879**	**(4,256,968)**	**(4,106,968)**	**150,000**
Interest	96,343	162,500	(66,157)	195,000	195,000	0
Dividends	0	0	0	0	0	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	0	0	0
Investment Copping	0	0	0	0	0	0
NET OPERATING SURPLUS/(DEFICIT)	**(3,369,974)**	**(3,497,697)**	**127,723**	**(4,061,968)**	**(3,911,968)**	**150,000**
Grants Capital	0	0	0	0	0	0
Contributions - Non Monetory Assets	0	0	0	0	0	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**(3,369,974)**	**(3,497,697)**	**127,723**	**(4,061,968)**	**(3,911,968)**	**150,000**
TOTAL CASH GENERATED	**(3,308,220)**	**(3,353,197)**	**44,977**	**(3,888,568)**	**(3,738,568)**	**150,000**

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KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Governance & Property Services

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	0	0	0	0	0	0
Income Levies	0	0	0	0	0	0
Statutory Fees & Fines	364,877	326,000	38,877	444,000	494,000	50,000
User Fees	170,492	148,800	21,692	178,784	178,784	0
Grants Recurrent	0	0	0	0	0	0
Contributions - Cash	2,866	0	2,866	0	0	0
Reimbursements	0	0	0	0	0	0
Other Income	12,109	6,900	5,209	8,300	8,300	0
Internal Charges Income	0	0	0	0	0	0
Total Income	**550,344**	**481,700**	**68,644**	**631,084**	**681,084**	**50,000**
Expenses						
Employee Costs	1,471,861	1,311,952	(159,909)	1,513,427	1,513,427	0
Expenses Levies	0	0	0	0	0	0
Loan Interest	0	0	0	0	0	0
Materials and Services	464,462	394,630	(69,832)	456,255	456,255	0
Other Expenses	141,422	109,100	(32,322)	127,000	127,000	0
Internal Charges Expense	0	0	0	0	0	0
Total Expenses	**2,077,745**	**1,815,682**	**(262,063)**	**2,096,682**	**2,096,682**	**0**
Net Operating Surplus/(Deficit) before:	**(1,527,401)**	**(1,333,982)**	**(193,419)**	**(1,465,598)**	**(1,415,598)**	**50,000**
Depreciation	875	1,000	125	1,200	1,200	0
Loss/(Profit) on Disposal of Assets	0	0	0	0	0	0
Net Operating Surplus/(Deficit) before:	**(1,528,276)**	**(1,334,982)**	**(193,294)**	**(1,466,798)**	**(1,416,798)**	**50,000**
Interest	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	0	0	0
Investment Copping	0	0	0	0	0	0
NET OPERATING SURPLUS/(DEFICIT)	**(1,528,276)**	**(1,334,982)**	**(193,294)**	**(1,466,798)**	**(1,416,798)**	**50,000**
Grants Capital	0	0	0	0	0	0
Contributions - Non Monetory Assets	0	0	0	0	0	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**(1,528,276)**	**(1,334,982)**	**(193,294)**	**(1,466,798)**	**(1,416,798)**	**50,000**
TOTAL CASH GENERATED	**(1,527,401)**	**(1,333,982)**	**(193,169)**	**(1,465,598)**	**(1,415,598)**	**50,000**

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KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Community Services

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	0	0	0	0	0	0
Income Levies	0	0	0	0	0	0
Statutory Fees & Fines	0	0	0	0	0	0
User Fees	651,014	821,900	(170,886)	986,170	986,170	0
Grants Recurrent	3,400	0	3,400	0	0	0
Contributions - Cash	0	0	0	0	0	0
Reimbursements	0	0	0	0	0	0
Other Income	56,889	90,600	(33,711)	108,700	108,700	0
Internal Charges Income	0	0	0	0	0	0
Total Income	**711,303**	**912,500**	**(201,197)**	**1,094,870**	**1,094,870**	**0**
Expenses						
Employee Costs	1,209,236	1,300,214	90,978	1,536,998	1,536,998	0
Expenses Levies	0	0	0	0	0	0
Loan Interest	0	0	0	0	0	0
Materials and Services	274,428	394,500	120,072	469,600	469,600	0
Other Expenses	132,846	153,800	20,954	178,000	178,000	0
Internal Charges Expense	0	0	0	0	0	0
Total Expenses	**1,616,509**	**1,848,514**	**232,005**	**2,184,598**	**2,184,598**	**0**
Net Operating Surplus/(Deficit) before:	**(905,206)**	**(936,014)**	**30,808**	**(1,089,728)**	**(1,089,728)**	**0**
Depreciation	271,606	220,900	(50,706)	265,000	265,000	0
Loss/(Profit) on Disposal of Assets	0	0	0	0	0	0
Net Operating Surplus/(Deficit) before:	**(1,176,813)**	**(1,156,914)**	**(19,899)**	**(1,354,728)**	**(1,354,728)**	**0**
Interest	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	0	0	0
Investment Copping	0	0	0	0	0	0
NET OPERATING SURPLUS/(DEFICIT)	**(1,176,813)**	**(1,156,914)**	**(19,899)**	**(1,354,728)**	**(1,354,728)**	**0**
Grants Capital	0	0	0	0	0	0
Contributions - Non Monetory Assets	0	0	0	0	0	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**(1,176,813)**	**(1,156,914)**	**(19,899)**	**(1,354,728)**	**(1,354,728)**	**0**
TOTAL CASH GENERATED	**(905,206)**	**(936,014)**	**30,808**	**(1,089,728)**	**(1,089,728)**	**0**

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KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Development Services

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	0	0	0	0	0	0
Income Levies	0	0	0	0	0	0
Statutory Fees & Fines	1,310,524	1,373,300	(62,776)	1,648,000	1,698,000	50,000
User Fees	863	0	863	0	0	0
Grants Recurrent	0	0	0	0	0	0
Contributions - Cash	0	0	0	0	0	0
Reimbursements	0	0	0	0	0	0
Other Income	0	0	0	0	0	0
Internal Charges Income	0	0	0	0	0	0
Total Income	**1,311,387**	**1,373,300**	**(61,913)**	**1,648,000**	**1,698,000**	**50,000**
Expenses						
Employee Costs	1,967,167	2,064,710	97,543	2,439,841	2,339,841	100,000
Expenses Levies	0	0	0	0	0	0
Loan Interest	0	0	0	0	0	0
Materials and Services	155,368	180,700	25,332	216,800	216,800	0
Other Expenses	150,029	157,900	7,871	189,500	189,500	0
Internal Charges Expense	0	0	0	0	0	0
Total Expenses	**2,272,564**	**2,403,310**	**130,746**	**2,846,141**	**2,746,141**	**100,000**
Net Operating Surplus/(Deficit) before:	**(961,177)**	**(1,030,010)**	**68,833**	**(1,198,141)**	**(1,048,141)**	**150,000**
Depreciation	5,338	6,600	1,262	7,900	7,900	0
Loss/(Profit) on Disposal of Assets	0	0	0	0	0	0
Net Operating Surplus/(Deficit) before:	**(966,515)**	**(1,036,610)**	**70,095**	**(1,206,041)**	**(1,056,041)**	**150,000**
Interest	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	0	0	0
Investment Copping	0	0	0	0	0	0
NET OPERATING SURPLUS/(DEFICIT)	**(966,515)**	**(1,036,610)**	**70,095**	**(1,206,041)**	**(1,056,041)**	**150,000**
Grants Capital	0	0	0	0	0	0
Contributions - Non Monetory Assets	0	0	0	0	0	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**(966,515)**	**(1,036,610)**	**70,095**	**(1,206,041)**	**(1,056,041)**	**150,000**
TOTAL CASH GENERATED	**(961,177)**	**(1,030,010)**	**68,833**	**(1,198,141)**	**(1,048,141)**	**150,000**

KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Environmental Services

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	0	0	0	0	0	0
Income Levies	0	0	0	0	0	0
Statutory Fees & Fines	64,206	75,900	(11,694)	91,000	91,000	0
User Fees	0	0	0	0	0	0
Grants Recurrent	120,000	120,000	0	120,000	120,000	0
Contributions - Cash	30,664	143,300	(112,636)	172,000	22,000	(150,000)
Reimbursements	0	0	0	0	0	0
Other Income	431	10,700	(10,269)	12,800	12,800	0
Internal Charges Income	0	0	0	0	0	0
Total Income	**215,301**	**349,900**	**(134,599)**	**395,800**	**245,800**	**(150,000)**
Expenses						
Employee Costs	1,071,346	1,006,481	(64,865)	1,189,214	1,189,214	0
Expenses Levies	0	0	0	0	0	0
Loan Interest	0	0	0	0	0	0
Materials and Services	241,065	420,300	179,235	504,124	504,124	0
Other Expenses	112,777	58,100	(54,677)	70,000	70,000	0
Internal Charges Expense	0	0	0	0	0	0
Total Expenses	**1,451,229**	**1,484,881**	**33,652**	**1,763,338**	**1,763,338**	**0**
Net Operating Surplus/(Deficit) before:	**(1,235,929)**	**(1,134,981)**	**(100,948)**	**(1,367,538)**	**(1,517,538)**	**(150,000)**
Depreciation	2,284	2,500	216	3,000	3,000	0
Loss/(Profit) on Disposal of Assets	0	0	0	0	0	0
Net Operating Surplus/(Deficit) before:	**(1,238,212)**	**(1,137,481)**	**(100,731)**	**(1,370,538)**	**(1,520,538)**	**(150,000)**
Interest	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	0	0	0
Investment Copping	0	0	0	0	0	0
NET OPERATING SURPLUS/(DEFICIT)	**(1,238,212)**	**(1,137,481)**	**(100,731)**	**(1,370,538)**	**(1,520,538)**	**(150,000)**
Grants Capital	0	0	0	0	0	0
Contributions - Non Monetory Assets	0	0	0	0	0	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**(1,238,212)**	**(1,137,481)**	**(100,731)**	**(1,370,538)**	**(1,520,538)**	**(150,000)**
TOTAL CASH GENERATED	**(1,235,929)**	**(1,134,981)**	**(100,948)**	**(1,367,538)**	**(1,517,538)**	**(150,000)**

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KINGBOROUGH COUNCIL - April 2020

Summary Operating Statement Infrastructure Services

	YTD Actuals	YTD Budget	YTD Variance	Annual Budget	Forecast Budget	Forecast Variance
Income						
Rates	4,322,189	4,222,000	100,189	4,222,000	4,322,000	100,000
Income Levies	0	0	0	0	0	0
Statutory Fees & Fines	625	0	625	0	0	0
User Fees	36,617	30,000	6,617	36,000	36,000	0
Grants Recurrent	0	0	0	0	0	0
Contributions - Cash	0	8,300	(8,300)	10,000	10,000	0
Reimbursements	0	0	0	0	0	0
Other Income	475,568	321,700	153,868	491,100	491,100	0
Internal Charges Income	58,330	58,300	30	70,000	70,000	0
Total Income	**4,893,329**	**4,640,300**	**253,029**	**4,829,100**	**4,929,100**	**100,000**
Expenses						
Employee Costs	4,571,077	4,327,280	(243,797)	4,418,770	4,418,770	0
Expenses Levies	0	0	0	0	0	0
Loan Interest	0	0	0	0	0	0
Materials and Services	5,649,128	5,532,260	(116,868)	6,625,108	6,625,108	0
Other Expenses	85,503	128,500	42,997	144,080	144,080	0
Internal Charges Expense	183,330	183,300	(30)	220,000	220,000	0
Total Expenses	**10,489,038**	**10,171,340**	**(317,698)**	**11,407,957**	**11,407,957**	**0**
Net Operating Surplus/(Deficit) before:	**(5,595,709)**	**(5,531,040)**	**(64,669)**	**(6,578,857)**	**(6,478,857)**	**100,000**
Depreciation	8,620,781	8,181,700	(439,081)	9,818,000	10,318,000	(500,000)
Loss/(Profit) on Disposal of Assets	0	0	0	0	0	0
Net Operating Surplus/(Deficit) before:	**(14,216,490)**	**(13,712,740)**	**(503,750)**	**(16,396,857)**	**(16,796,857)**	**(400,000)**
Interest	0	0	0	0	0	0
Dividends	0	0	0	0	0	0
Share of Profits/(Losses) of Invest. In Assoc	0	0	0	0	0	0
Investment Copping	0	0	0	0	0	0
NET OPERATING SURPLUS/(DEFICIT)	**(14,216,490)**	**(13,712,740)**	**(503,750)**	**(16,396,857)**	**(16,796,857)**	**(400,000)**
Grants Capital	0	0	0	0	0	0
Contributions - Non Monetory Assets	0	0	0	0	0	0
Initial Recognition of Infrastructure Assets	0	0	0	0	0	0
NET SUPRPLUS/(DEFICIT)	**(14,216,490)**	**(13,712,740)**	**(503,750)**	**(16,396,857)**	**(16,796,857)**	**(400,000)**
TOTAL CASH GENERATED	**(22,837,270)**	**(21,894,440)**	**(942,830)**	**(6,578,857)**	**(6,478,857)**	**100,000**

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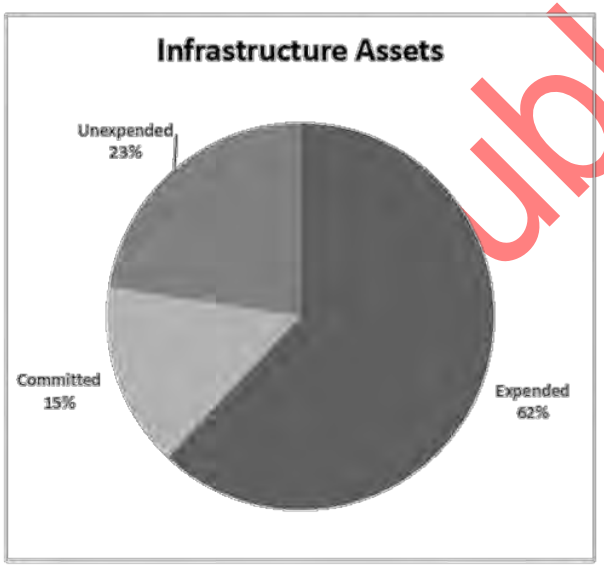
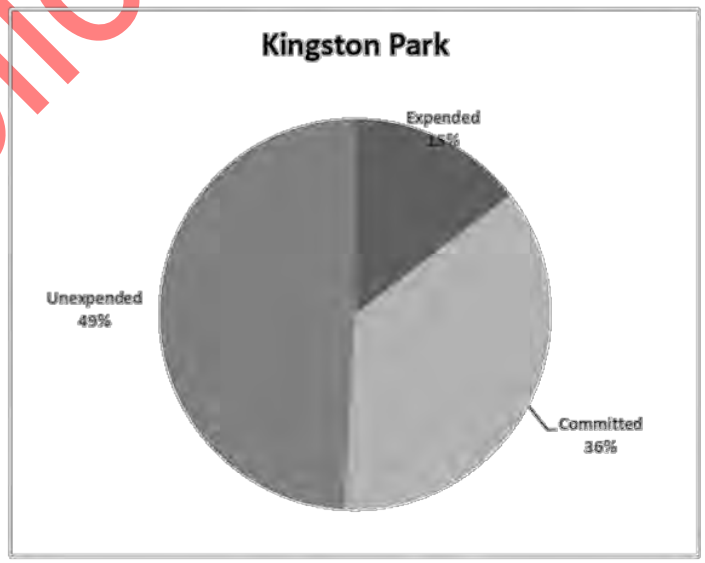
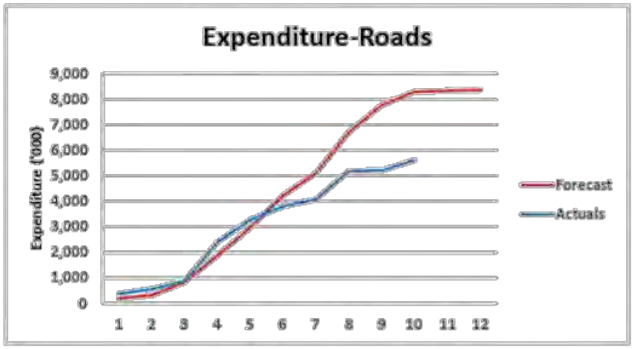
KINGBOROUGH COUNCIL
CAPITAL EXPENDITURE TO 30/04/2020

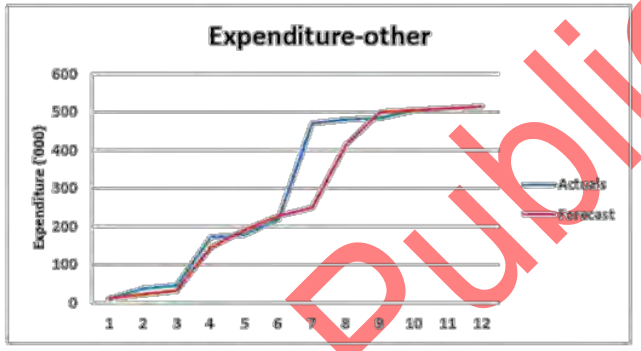
	Budget					Actual			
	Carry Forward	2018/19	Grants Received	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
EXPENDITURE BY ASSET TYPE									
Roads	1,949,355	5,942,500	1,673,734	(262,650)	9,302,939	5,620,603	1,727,635	7,348,238	1,954,701
Stormwater	355,355	1,462,500	-	320,000	2,137,855	870,270	55,898	926,168	1,211,687
Property	1,158,732	1,568,500	628,452	98,366	3,454,050	2,834,611	608,147	3,442,758	11,292
Other	979,037	-	124,000	(155,716)	947,321	503,948	41,487	545,435	401,886
Sub total	4,442,479	8,973,500	2,426,186	-	15,842,165	9,829,432	2,433,166	12,262,598	3,579,567
Kingston Park	2,271,780	7,000,000	2,900,000	-	12,171,780	1,778,985	4,404,902	6,183,887	5,987,893
Bruny Island Tourism			1,500,000	-	1,500,000	45,661	-	45,661	1,454,339
Storm Damage Repair	122,549				122,549	222,853	7,804	230,656	(108,107)
Grand Total	6,836,808	15,973,500	6,826,186	-	29,636,494	11,876,931	6,845,872	18,722,803	10,913,691

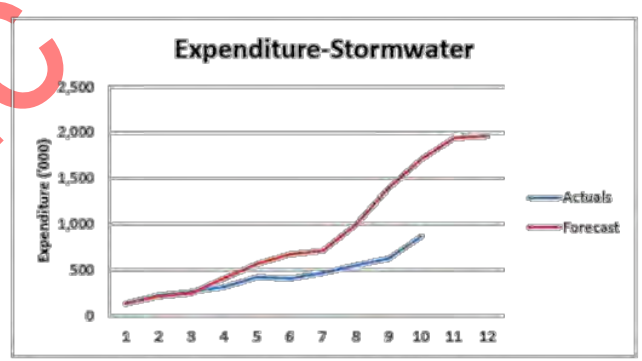




CUMULATIVE EXPENDITURE BY YTD CATEGORY
COMPARED TO BUDGET
CAPITAL EXPENDITURE TO 30/04/2020







KINGBOROUGH COUNCIL
CAPITAL EXPENDITURE TO 30/04/2020

	Closed	Capital Project No.	Description	Department	Renewal, Upgrade, or New	Budget						Actual			
						Carry Forward	2019/20	Grants Rec., POS Funding Council decision	On costs allocated	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
			KINGSTON PARK												
1			Overall Project budget	Kingston Park	New	-	7,000,000			(7,000,000)	-	-	-	-	-
2	Open	C00688	KP Boulevard Construction	Kingston Park	New	(1,426)	-		-	1,426	-	-	-	-	-
3	Open	C00689	KP Pardalote Parade Design & Construction	Kingston Park	New	2,931	-		-	50,000	52,931	6,809	-	6,809	46,122
4	Closed	C00690	KP Community Hub Design	Kingston Park	New	52,343	-		-		52,343	-	196	196	52,147
5	Open	C00691	KP Open Space Design (Playstreet)	Kingston Park	New	109,581	-		-	150,000	259,581	204,721	-	204,721	54,860
6	Closed	C01606	KP Parking Strategy	Kingston Park	New	(400)	-		-	400	-	2,000	-	2,000	(2,000)
7	Open	C03179	KP Temporary Car Park	Kingston Park	New	500,000	-		-		500,000	385,147	156,343	541,490	(41,490)
8	Open	C01618	Boulevard Construction Stage 1A	Kingston Park	New	350,531	-		-		350,531	29,218	419,340	448,558	(98,027)
9	Open	C01627	KP Site - Land Release Strategy	Kingston Park	New	(3,605)	-		-	100,000	96,395	35,828	-	35,828	60,567
10	Open	C01628	KP Site - General Expenditure	Kingston Park	New	232,347	-		-	150,000	382,347	149,168	1,549	150,717	231,630
11	Open	C03068	Kingston Park Operational Expenditure	Kingston Park	New	6,489	-		-		6,489	(1,246)	32	(1,214)	7,703
12	Open	C03069	KP Community Hub Construction	Kingston Park	New	152,167	-		-	150,000	302,167	136,666	182,643	319,309	(17,142)
13	Open	C03175	KP Community Hub Plant & Equipment	Kingston Park	New	(12,359)	-		-	100,000	87,641	6,925	10,344	17,269	70,372
14	Open	C03173	KP Public Open Space - Playground	Kingston Park	New	853,027	-	2,900,000	-	1,246,973	5,000,000	813,045	3,634,456	4,447,501	552,499
15	Open	C03277	KP Public Open Space - Stage 2	Kingston Park	New	-	-		-	2,600,000	2,600,000	-	-	-	2,600,000
16	Open	C03293	Pardalote Parade Northern Section (TIP)	Kingston Park	New		-		-	350,000	350,000	7,826	-	7,826	342,175
17	Open	C03278	KP Perimeter shared footpath	Kingston Park	New		-		-	-	-	-	-	-	-
18	Open	C03174	KP Public Open Space - Hub link to Playground	Kingston Park	New	30,154	-		-		30,154	-	-	-	30,154
19	Open	C03279	KP Boulevard Construction Stage 1B	Kingston Park	New		-		-	1,400,000	1,400,000	-	-	-	1,400,000
20	Open	C03306	KP Road F design and construct	Kingston Park	New	-	-		-	200,000	200,000	449	-	449	199,551
21	Open	C03280	KP Stormwater wetlands	Kingston Park	New	-	-		-	501,201	501,201	2,430	-	2,430	498,771
22											-	-	-	-	-
23						2,271,780	7,000,000	2,900,000	-	-	12,171,780	1,778,985	4,404,902	6,183,887	5,987,893
24															
25			**BRUNY ISLAND TOURISM GRANT**												
26															
27			Bruny Island Tourism Grant	Bruny Tourism	New			1,500,000		(1,350,000)	150,000	-	-	-	150,000
28	Open	C03282	Alonnah footpath - BI Tourism Grant	Bruny Tourism	New					500,000	500,000	24,522	-	24,522	475,478
29	Open	C03283	Dennes Point public toilets - BI Tourism Grant	Bruny Tourism	New					100,000	100,000	-	-	-	100,000
30	Open	C03284	Adventure Bay Road road safety measures - BI Tourism Grant	Bruny Tourism	New					120,000	120,000	1,235	-	1,235	118,765
31	Open	C03285	Waste disposal sites - BI Tourism Grant	Bruny Tourism	New					110,000	110,000	-	-	-	110,000
32	Open	C03286	Visitor information - BI Tourism Grant	Bruny Tourism	New					150,000	150,000	19,540	-	19,540	130,460
33	Open	C03287	Mavista Falls Track and picnic area - BI Tourism Grant	Bruny Tourism	New					300,000	300,000	-	-	-	300,000
34	Open	C03288	Nebraska Road road safety measures - BI Tourism Grant	Bruny Tourism	New					70,000	70,000	364	-	364	69,636
35															
36						-	-	1,500,000	-	-	1,500,000	45,661	-	45,661	1,454,339
37															
38			**STORM DAMAGE REPAIR**												
39															
40	Closed	C03181	Old Huon Highway landslip remediation	Storm Damage	New	-	-		3	-	3	66	-	66	(63)
41	Open	C03182	Whitewater Creek embankment armouring	Storm Damage	New	114,745	-		-	-	114,745	77,790	-	77,790	36,956
42	Open	C03183	Redwood Village Dam repairs	Storm Damage	New	7,803	-		-	-	7,803	190	7,804	7,993	(190)
43	Closed	C03295	Whitewater Creek Stabilisation	Storm Damage	New	-	-		6,902	-	6,902	144,807	-	144,807	(137,905)
44															
45						122,549	-	-	6,905	-	129,454	222,853	7,804	230,656	(101,202)

KINGBOROUGH COUNCIL
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						Budget						Actual			
	Closed	Capital Project No.	Description	Department	Renewal, Upgrade, or New	Carry Forward	2019/20	Grants Rec., POS Funding Council decision	On costs allocated	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
46															
47	Open	C01608	Osborne Esplanade toilet block replacement	Property	Renewal	375,499	-		-	26,500	401,999	399,024	13,110	412,134	(10,135)
48	Open	C03005	Conningham Toilet Block Replacement	Property	Renewal	128,236	-		-	-	128,236	24,333	100,500	124,833	3,403
49	Open	C03077	Maddocks Road land acquisition	Property	New	-	-	68,750	-	-	68,750	74,677	-	74,677	(5,927)
50	Open	C03099	Depot entrance stage 2	Property	Renewal	141,120	165,000		-	-	306,120	205,874	9,352	215,226	90,894
51	Open	C03111	Kelvedon Park Changerooms/Clubrooms	Property	Renewal	142,888	-	260,000	-	-	402,888	694,599	195,200	889,799	(486,911)
52	Open	C03164	Alonnah Hall upgrade	Property	Upgrade	101,362	-		-	-	101,362	28,604	46,061	74,665	26,697
53	Closed	C03188	KSC Stadium Scoreboard Replacement	Property	Renewal	17,640	-		-	-	17,640	14,940	-	14,940	2,700
54	Open	C03192	Lunawanna Public Toilet Replacement	Property	Renewal	73,415	80,000	70,000	-	-	223,415	211,019	32,050	243,069	(19,654)
55	Open	C03194	CCTV Cameras in Kingston	Property	New	98,572	-		-	-	98,572	96,488	1,886	98,374	198
56	Open	C03195	Land acquisition for Margate Snug Shared Path	Property	Renewal	80,000	-		-	-	80,000	61,656	-	61,656	18,344
57	Open	C03217	Margate hall Roof replacment	Property	Renewal	-	60,000		-	-	60,000	-	51,500	51,500	8,500
58	Open	C03218	Barretta Vehicle Washdown Facility	Property	New	-	81,000		-	-	81,000	10,944	1,124	12,068	68,932
59	Open	C03219	Barretta Pump Station	Property	New	-	169,000		-	-	169,000	46,061	-	46,061	122,939
60	Open	C03220	Replace Kerb -KWS	Property	Renewal	-	40,000		-	-	40,000	1,942	-	1,942	38,058
61	Closed	C03221	Kingborough Sports Centre water services upgrade-stage 3	Property	New	-	91,000		4,944	-	95,944	103,830	(80)	103,750	(7,806)
62	Open	C03222	Wash down facility for twin ovals workshop	Property	New	-	40,000		205	-	40,205	5,044	9,039	14,083	26,122
63	Open	C03223	Glensyn units -Septic system	Property	Renewal	-	28,000		-	15,000	43,000	4,514	-	4,514	38,486
64	Open	C03224	Middleton Hall-Septic system	Property	Renewal	-	25,000		-	14,000	39,000	50,166	-	50,166	(11,166)
65	Open	C03225	Trial Bay-Septic system	Property	Renewal	-	25,000		-	14,000	39,000	21,185	-	21,185	17,815
66	Closed	C03226	Alonnah Cricket Nets	Property	Renewal	-	7,500		325	-	7,825	6,825	-	6,825	1,000
67	Open	C03227	Kettering Reserve Dog Exercise Area Fencing	Property	New	-	7,000	(7,000)	-	-	-	-	-	-	-
68	Open	C03228	LightWood Park 3 Upgrade	Property	Upgrade	-	295,000	25,000	-	-	320,000	324,487	-	324,487	(4,487)
69	Open	C03229	Margate Oval Drainage	Property	Upgrade	-	112,000	127,952	-	-	239,952	232,043	-	232,043	7,909
70	Closed	C03230	Margate Oval Fencing	Property	Upgrade	-	9,000		390	-	9,390	8,190	-	8,190	1,200
71	Closed	C03231	Twin Ovals Upper Pavilion Carpet	Property	Renewal	-	20,000		639	-	20,639	13,412	-	13,412	7,227
72	Open	C03232	Alum Cliffs Track Shot Tower Step Improvments	Property	Upgrade	-	89,000		-	-	89,000	44,500	44,500	89,000	-
73	Closed	C03233	Kingston Mountain Bike Park Stage 3	Property	Upgrade	-	10,000		472	-	10,472	9,912	(560)	9,352	1,120
74	Open	C03234	Building redevelopment on level 3 at the Kingborough Sports	Property	Upgrade	-	150,000		-	-	150,000	95,286	-	95,286	54,714
75	Closed	C03257	LED lighting for High Performance Cricket Centre	Property	Upgrade	-	-		220	-	220	4,620	-	4,620	(4,400)
76	Open	C03265	Cat holding facility Bruny Island fit out	Property	Upgrade	-	-	26,750	-	-	26,750	14,237	9,619	23,855	2,895
77		C02373	Kettering Hall Disability Access	Property	Upgrade	-	-	7,000	-	-	7,000	-	-	-	7,000
78	Open	C03275	Land Acquisition Blackmans Bay Blowhole Reserve	Property	New	-	-	POS Reserve	-	-	-	6,144	-	6,144	(6,144)
79	Closed	C90010	Playground Renewal	Property	Renewal	-	50,000		-	-	50,000	-	-	-	50,000
80	Closed	C90011	Street Furniture Replacement	Property	Renewal	-	15,000		-	(15,000)	-	-	-	-	-
81	Open	C03274	Street Furniture Replacement - Blackmans Bay	Property	Renewal	-	-		-	15,000	15,000	16,737	-	16,737	(1,737)
82	Open	C03291	Bruny Island Boat Club Coastal Protection	Property	Renewal	-	-		-	-	-	152	15,250	15,402	(15,402)
83	Open	C03294	Dog Pound Waste Water Management	Property	Renewal	-	-		-	14,500	14,500	-	6,560	6,560	7,940
84	Open	C03304	Blowhole Coastal Fence Replacement	Property	Upgrade	-	-	50,000	-	-	50,000	3,166	73,037	76,202	(26,202)
85	Open	C03308	Barretta Walking Floor Big Safety Upgrade	Property	New	-	-		-	14,366	14,366	-	-	-	14,366
86											-	-	-	-	-
87						1,158,732	1,568,500	628,452	7,195	98,366	3,461,245	2,834,611	608,147	3,442,758	18,487
88															
89	Open	C03130	Multi-function devices - CC, Depot, KSC etc	IT	New	66,720	-		-	-	66,720	-	-	-	66,720
90	Open	C00613	Purchase IT Equipment	IT	New	-	-		-	-	-	23,196	5,737	28,934	(28,934)
91	Open	C00672	Digital Local Government Program	IT	New	67,518	-		-	-	67,518	-	-	-	67,518
92	Open	C01602	Financial Systems Replacement	IT	Renewal	186,712	-		-	-	186,712	1,125	-	1,125	185,587
93	Open	C03070	Desktop PC Replacement	IT	Renewal	244,166	-		-	-	244,166	218,894	30,657	249,551	(5,385)
94											-	-	-	-	-
95						565,116	-	-	-	-	565,116	243,215	36,394	279,610	285,506
96															

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						Budget						Actual			
	Closed	Capital Project No.	Description	Department	Renewal, Upgrade, or New	Carry Forward	2019/20	Grants Rec., POS Funding Council decision	On costs allocated	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
97	Closed	C90003	Design/survey for future works	Design	50% N / 50% R	-	-		-	19,000	19,000	-	-	-	19,000
98	Open	C03091	Gormley Drive to Twin Ovals Road upgrade	Design	New				-	-	-	15,315	-	15,315	(15,315)
99	Open	C03097	Whitewater Creek, Kingston Footpath Design	Design	New				-	-	-	491	-	491	(491)
100	Open	C03172	Whitewater Creek - pathway design	Design	50% N / 50% R				-	-	-	3,692	-	3,692	(3,692)
101	Open	C03193	Barnes Bay Jetty Rehabilition	Design	Renewal				-	-	-	20,540	-	20,540	(20,540)
102	Open	C03292	Future Capital Projects - Investigation	Design					-	-	-	7,317	-	7,317	(7,317)
102	Open	C03309	Snug Foreshore Boat Ramp Amenity	Design					-	15,000	15,000	4,420	-	4,420	10,580
103				Design							-	-	-	-	-
104						-	-	-	-	34,000	34,000	51,775	-	51,775	(17,775)
105															
106	Closed	C03098	Snug Oval Play Space Development	Reserves	New	86,698	-		4,159	-	90,857	87,331	-	87,331	3,526
107	Closed	C03082	Kingston Beach Oval Cricket Net replacement	Reserves	Renewal	-	-		327	-	327	6,865	-	6,865	(6,538)
108											-	-	-	-	-
109						86,698	-	-	4,486	-	91,184	94,196	-	94,196	(3,012)
110															
111	Closed	C03012	Tinderbox Reserve carpark upgrades	Roads	50% R / 50% U	65,909	-		2,641	-	68,550	55,605	-	55,605	12,946
112	Closed	C03019	Brightwater Road renewal and stormwater (stage 1)	Roads	80% R / 20% U	449,884	-		26,627	75,000	551,511	559,192	-	559,192	(7,681)
113	Open	C03187	Brightwater Road stage 2	Roads	70% N / 30% R	-	-		-	351,000	351,000	35,741	15,354	51,095	299,905
114	Closed	C03020	Great Bay Boatramp Upgrade and Improvements	Bridges	Upgrade	12,518	-		600	-	13,118	12,600	-	12,600	518
115	Closed	C03063	Parish Lane Upgrade	Roads	Upgrade	124,644	-		6,801	11,500	142,945	142,818	-	142,818	127
116	Open	C03064	John Street Kingston - Reconstruction	Roads	Renewal	1,158,624	-		-	290,000	1,448,624	1,235,920	45,697	1,281,617	167,007
117	Open	C03066	Talone Road Construction	Roads	70% R / 30% U	-	1,350,000	253,734	-	250,000	1,853,734	187,491	1,452,553	1,640,044	213,690
118	Open	C03090	Gormley Drive Extension /Spring Farm link road masterplan de	Roads	Upgrade	69,494	-		-	-	69,494	96,146	-	96,146	(26,652)
119	Closed	C03105	Barnes Bay Missionary Road Retaining Wall Reconstruction	Roads	Upgrade	15,040	-		842	-	15,882	17,682	-	17,682	(1,800)
120	Closed	C03106	Pelverata Road	Roads	Upgrade	-	-		-	-	-	-	-	-	-
121	Open	C03107	Channel Highway John St to Hutchins St	Roads	Renewal	53,242	1,300,000	120,000	-	(1,320,000)	153,242	128,343	-	128,343	24,899
122	Open	C03196	Channel Highway bicycle lane improvements	Roads	Upgrade	-	25,000		-	-	25,000	509	-	509	24,491
123	Open	C03197	Footpath connection mountain view drive	Roads	New	-	15,000		-	-	15,000	-	12,000	12,000	3,000
124	Open	C03198	Footpath connection Summerleas Road	Roads	New	-	70,000		-	-	70,000	65,679	273	65,952	4,048
125	Open	C03199	Snug Tiers reconstruction -Design	Roads	Renewal	-	25,000		-	-	25,000	17,911	-	17,911	7,089
126	Open	C03200	Track extension Redwood Road to Algona Road	Roads	New	-	22,000		-	-	22,000	22,306	162	22,468	(468)
127	Open	C03201	Tower Court reconstruction-Design	Roads	Renewal	-	25,000		-	-	25,000	1,263	-	1,263	23,737
128	Open	C03096	Adventure Bay Road upgrades	Roads	Upgrade	-	150,000		-	-	150,000	66,707	3,900	70,607	79,393
129	Open	C03203	Batchelor Way kerb and footpath replacement-Taroona Hall to	Roads	Renewal	-	55,000		-	-	55,000	218	48,600	48,818	6,182
130	Open	C03204	Dru Point Jetty fender replacement	Roads	Upgrade	-	20,000		-	-	20,000	12,608	180	12,788	7,212
131	Open	C03205	Leslie Road widening	Roads	Upgrade	-	55,000		-	-	55,000	146	-	146	54,854
132	Open	C03206	Grange Avenue footpath replacement	Roads	Renewal	-	26,000		-	-	26,000	30,297	-	30,297	(4,297)
133	Open	C03207	Alfred Gardens traffic islands	Roads	New	-	15,000		-	-	15,000	73	4,000	4,073	10,927
134	Open	C03208	Incana Road traffic islands	Roads	New	-	15,000		-	-	15,000	146	12,000	12,146	2,854
135	Open	C03209	Proctors Road seal approaches to bridge	Roads	New	-	25,000		-	-	25,000	13,807	1	13,808	11,192
136	Open	C03210	Summerleas Road seal approaches to bridge	Roads	New	-	90,000		-	-	90,000	62,811	635	63,446	26,554
137	Open	C03211	Tingara Road fire access	Roads	New	-	33,500		-	-	33,500	25,486	-	25,486	8,014
138	Open	C03212	Pelverata Road	Roads	50% R / 50% U	-	250,000		-	-	250,000	139,961	5,985	145,946	104,054
139	Open	C03213	Access Projects	Roads	Upgrade	-	20,000		-	-	20,000	-	14,500	14,500	5,500
140	Open	C03214	Obriens Road extension	Roads	New	-	40,000		-	-	40,000	28,475	1,628	30,103	9,897
141	Open	C03215	Works Neccesitated by development-Roads	Roads	50% R / 50% U	-	30,000		-	-	30,000	-	-	-	30,000
142	Open	C03216	Hinsby Road Pedestrian Improvements	Roads	50% R / 50% U	-	36,000		-	-	36,000	5,363	-	5,363	30,637
143	Open	C03276	Upgrade Street Lighting to LED	Roads	Upgrade	-	-	1,200,000	-	-	1,200,000	479,290	52,360	531,650	668,350
144	Open	C03281	Taroona Crescent Footpath upgrade	Roads	Upgrade	-	-	100,000	-	-	100,000	100,734	-	100,734	(734)
145	Open	C03289	Snug Bus stop improvement	Roads	Upgrade	-	-		-	15,850	15,850	18,780	-	18,780	(2,930)
146	Open	C03307	Tinderbox Jetty repairs	Bridges		-	-		-	30,000	30,000	-	-	-	30,000

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						Budget						Actual			
	Closed	Capital Project No.	Description	Department	Renewal, Upgrade, or New	Carry Forward	2019/20	Grants Rec., POS Funding Council decision	On costs allocated	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
147				Roads		-	-		-	-	-	-	-	-	-
148															
149	Closed	C90006	Access ramps	Roads	New	-	-		-	-	-	-	-	-	-
150												-			
151	Closed	C90002	2019/20 Resheeting Program	Roads	Renewal	-	1,050,000		-	(1,026,000)	24,000	-	-	-	24,000
152	Closed	C03142	Wolfes Road	Roads	Renewal	-	-		-	-	-	3,450	-	3,450	(3,450)
153	Open	C03266	Slatterys Road	Roads	Renewal	-	-		-	97,000	97,000	-	-	-	97,000
154	Open	C03267	Hickmans Road	Roads	Renewal	-	-		-	97,000	97,000	17,918	16,950	34,868	62,132
155	Open	C03268	Cripps Road	Roads	Renewal	-	-		-	138,000	138,000	125,371	15,642	141,013	(3,013)
156	Open	C03269	Simpsons Bay Road	Roads	Renewal	-	-		-	268,000	268,000	246,990	-	246,990	21,010
157	Open	C03270	Apollo Bay	Roads	Renewal	-	-		-	203,000	203,000	208,651	2,963	211,613	(8,613)
158	Open	C03271	Devlyns Road	Roads	Renewal	-	-		-	111,000	111,000	123,393	4,926	128,319	(17,319)
158	Open	C03272	Umfrevilles Road	Roads	Renewal	-	-		-	112,000	112,000	109,018	10,453	119,471	(7,471)
159	Closed	C02101	Tinderbox Road	Roads	Renewal	-	-		110	-	110	2,310	-	2,310	(2,200)
160											-	-			
161	Closed	C90001	2019/20 Resealing Program	Roads	Renewal	-	1,200,000			(1,200,000)	-	-	-	-	-
162	Closed	C03156	Wandella Avenue	Roads	Renewal	-	-		3,498	73,000	76,498	73,458	-	73,458	3,040
163	Closed	C03157	Baynton Street	Roads	Renewal	-	-		6,219	100,000	106,219	130,602	-	130,602	(24,383)
164	Closed	C03158	Lucas Street	Roads	Renewal	-	-		3,118	68,000	71,118	65,473	-	65,473	5,645
165	Closed	C03258	Harris Court	Roads	Renewal	-	-		312	6,000	6,312	6,543	-	6,543	(231)
166	Closed	C03259	Aldinga Street	Roads	Renewal	-	-		4,583	77,000	81,583	96,250	-	96,250	(14,667)
167	Closed	C03260	Cleburne StreeT	Roads	Renewal	-	-		3,489	72,000	75,489	73,278	-	73,278	2,211
168	Closed	C03261	Endeavour Avenue	Roads	Renewal	-	-		1,307	23,000	24,307	27,445	-	27,445	(3,138)
169	Closed	C03262	Tarana Road	Roads	Renewal	-	-		3,697	99,000	102,697	77,629	-	77,629	25,068
170	Closed	C03263	Tinderbox Road	Roads	Renewal	-	-		21,331	248,000	269,331	238,842	2,980	241,823	27,508
171	Open	C03140	Howden Road	Roads	Renewal	-	-		-	184,000	184,000	230,084	3,892	233,976	(49,976)
172	Open	C03296	Crystal Downs reseal prep	Roads	Renewal	-	-		-	35,000	35,000	15,245	-	15,245	19,755
173	Open	C03297	Murlali Court reseal prep	Roads	Renewal	-	-		-	28,000	28,000	14,705	-	14,705	13,295
174	Open	C03298	Howden Road reseal prep	Roads	Renewal	-	-		-	50,000	50,000	40,562	-	40,562	9,438
175	Open	C03299	Redwood Road reseal prep	Roads	Renewal	-	-		-	40,000	40,000	14,705	-	14,705	25,295
176	Open	C03300	Baringa Road reseal prep	Roads	Renewal	-	-		-	15,000	15,000	-	-	-	15,000
177	Open	C03301	Roslyn Ave reseal prep	Roads	Renewal	-	-		-	15,000	15,000	-	-	-	15,000
178	Open	C03302	Conningham Rd reseal prep (Hopwood to Albert Rd)	Roads	Renewal	-	-		-	25,000	25,000	22,020	-	22,020	2,980
179	Open	C03303	Conningham Rd reseal prep (vic Old Station Rd int)	Roads	Renewal	-	-		-	15,000	15,000	11,894	-	11,894	3,106
180	Open	C03305	Van Morey Rd reseal prepwork	Roads	Renewal	-	-		-	27,000	27,000	28,889	-	28,889	(1,889)
181															
182						1,949,355	5,942,500	1,673,734	85,175	(296,650)	9,354,114	5,568,829	1,727,635	7,296,464	2,057,650
183															
184	Closed	C01609	Barretta Landfill Gas Extraction Ext	Solid Waste	new	(6,436)	-	124,000	5,049	-	122,613	106,036	-	106,036	16,577
185	Open	C03094	Barretta Green Waste facility	Other	New	58,420	-		-	-	58,420	60,500	5,093	65,593	(7,173)
186	Open	C03161	Community Road Safety Grant - Driving Simulator	Other	Renewal	9,602	-		-	-	9,602	-	-	-	9,602
187											-	-	-	-	-
188						61,586	-	124,000	5,049	-	190,635	166,536	5,093	171,629	19,006

KINGBOROUGH COUNCIL
CAPITAL EXPENDITURE TO 30/04/2020

						Budget						Actual			
	Closed	Capital Project No.	Description	Department	Renewal, Upgrade, or New	Carry Forward	2019/20	Grants Rec., POS Funding Council decision	On costs allocated	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
189															
190	Closed	C00590	Flood Gauge	Stormwater	New	-	-		-	-	-	-	6,937	6,937	(6,937)
191	Open	C00598	Snug Flood Study	Stormwater	New	-	-		-	-	-	7,500	-	7,500	(7,500)
192	Open	C03022	Coffee Creek Channel Stabilisation - Stage 2	Stormwater	New	5,087	-		-	-	5,087	3,500	-	3,500	1,587
193	Open	C03023	Tyndall Beach Erosion Stabilisation	Stormwater	New	70,202	-		-	-	70,202	58,102	8,334	66,436	3,766
194	Open	C03026	Algona Road Stage 1 SW Upgrade	Stormwater	50% R / 50% U	-	640,000		-	-	640,000	5,559	-	5,559	634,441
195	Open	C03041	Drysdale Creek Channel Stabilisation	Stormwater	New	12,500	-		-	-	12,500	16,138	6,250	22,388	(9,888)
196	Open	C03093	Garnett Street, Blackmans Bay SW Upgrade Design	Stormwater	Upgrade	-	-		-	-	-	12,829	-	12,829	(12,829)
197	Open	C03117	Beach Road Kingston Stormwater Upgrade	Stormwater	Upgrade	23,219	-		-	-	23,219	28,158	-	28,158	(4,939)
198	Closed	C03119	Hinsby Road (vic 35) Taroona	Stormwater	Upgrade	42,992	-		2,438	-	45,430	51,192	-	51,192	(5,762)
199	Open	C03120	Ritchie Street (vic 43-45) Alonnah	Stormwater	Upgrade	160	-		410	-	570	8,997	160	9,157	(8,587)
200	Open	C03121	Kingston Wetlands GPT Replacement	Stormwater	Renewal	15,000	-		-	-	15,000	148	-	148	14,852
201	Open	C03122	Taronga Road Stormwater Upgrade	Stormwater	New	74,905	-		-	-	74,905	64,147	-	64,147	10,758
202	Open	C03125	Beach Road Middleton Stormwater Upgrade	Stormwater	Upgrade	4,758	-		-	-	4,758	479	(294)	185	4,573
203	Closed	C03126	Bundalla Road Culvert Renewal	Stormwater	Upgrade	325	-		-	-	325	-	-	-	325
204	Open	C03129	Blackmans Bay stormwater low flow diversion	Stormwater	New	50,000	-		-	200,000	250,000	138,030	3,528	141,558	108,442
205	Open	C03163	Stormwater Regional Flood Gauge Network	Stormwater	New	56,207	-		-	-	56,207	40,484	21,025	61,509	(5,302)
206	Closed	C03178	Whitewater Creek Summerleas Rd Culvert Repairs	Stormwater	Renewal	-	-	Disaster funding	-	-	-	-	-	-	-
207	Open	C03235	Pit replacement 2019-20	Stormwater	Renewal	-	30,000		-	-	30,000	25,585	-	25,585	4,415
208	Open	C03236	Milford Road stormwater upgrade	Stormwater	50% N / 50% R	-	33,000		-	-	33,000	3,154	-	3,154	29,846
209	Open	C03237	Manuka Road stormwater upgrade	Stormwater	50% N / 50% R	-	48,000		-	-	48,000	38,801	719	39,519	8,481
210	Open	C03238	Kingston Heights (vic 37)	Stormwater	Renewal	-	7,500		-	-	7,500	222	-	222	7,278
211	Open	C03239	Taroona cresent stormwater upgrade	Stormwater	50% N / 50% R	-	160,000		-	-	160,000	14,484	-	14,484	145,516
212	Open	C03240	Jindabyne road stormwater improvements	Stormwater	New	-	7,500		-	-	7,500	-	-	-	7,500
213	Open	C03241	Burwood Drive stormwater upgrade	Stormwater	New	-	102,500		-	-	102,500	6,315	-	6,315	96,185
214	Open	C03242	Leslie Road Stormwater Upgrade	Stormwater	New	-	13,000		-	-	13,000	13,212	-	13,212	(212)
215	Open	C03243	Tabors Road Stormwater Upgrade	Stormwater	Upgrade	-	87,000		-	120,000	207,000	186,308	-	186,308	20,692
216	Open	C03244	Van morey Road stormwater upgrade (vic 279)	Stormwater	Renewal	-	21,000		-	-	21,000	21,088	33	21,121	(121)
217	Open	C03245	Allens Rivulet Road Stormwater upgrade	Stormwater	Renewal	-	25,500		-	-	25,500	23,600	4,944	28,543	(3,043)
218	Open	C03246	Leslie Road (vic 645) SW Upgrades	Stormwater	Upgrade	-	30,000		-	-	30,000	2,350	4,139	6,489	23,511
219	Open	C03247	Huon Road (vic 1678) SW Upgrades	Stormwater	Renewal	-	29,000		-	-	29,000	22,622	-	22,622	6,378
220	Open	C03248	22 Ocean Esplanade	Stormwater	Upgrade	-	32,500		-	-	32,500	33,287	-	33,287	(787)
221	Open	C03249	Allens Rivulet Road (vic 279)	Stormwater	50% N / 50% R	-	31,000		-	-	31,000	11,017	123	11,140	19,860
222	Open	C03250	Algona Road Stage 2 SW Upgrade-design only	Stormwater	50% N / 50% R	-	25,000		-	-	25,000	1,082	-	1,082	23,918
223	Open	C03251	Hillside Catchment Investigation	Stormwater	50% N / 50% R	-	25,000		-	-	25,000	9,316	-	9,316	15,684
224	Open	C03252	Willowbend Catchment Investigation	Stormwater	50% N / 50% R	-	18,000		-	-	18,000	-	-	-	18,000
225	Open	C03253	Bundalla Catchment Investigation	Stormwater	50% N / 50% R	-	14,000		-	-	14,000	14,000	-	14,000	-
226	Open	C03254	Suncoast Catchment Investigation	Stormwater	50% N / 50% R	-	7,000		-	-	7,000	7,500	-	7,500	(500)
227	Open	C03255	Mona Catchment Investigation	Stormwater	50% N / 50% R	-	10,000		-	-	10,000	-	-	-	10,000
228	Open	C03256	CBD Catchment Investigation	Stormwater	50% N / 50% R	-	36,000		-	-	36,000	1,066	-	1,066	34,934
229	Closed	C90007	Works necessitated by development	Stormwater	50% N / 50% R	-	30,000		-	-	30,000	-	-	-	30,000
230	Closed	C03162	Eleni Avenue SW Contribution	Stormwater	50% N / 50% R	-	-		-	-	-	-	-	-	-
231											-	-	-	-	-
232						355,355	1,462,500	-	2,848	320,000	2,140,703	870,270	55,898	926,168	1,214,535

KINGBOROUGH COUNCIL
CAPITAL EXPENDITURE TO 30/04/2020

					Budget						Actual			
Closed	Capital Project No.	Description	Department	Renewal, Upgrade, or New	Carry Forward	2019/20	Grants Rec., POS Funding Council decision	On costs allocated	IMG Adjustments	Total	Actual	Commit-ments	Total	Remaining
233	B00000	Capital Balancing Account	Other						(155,716)	(155,716)	-	-	-	(155,716)
234		On costs on capital project			265,637	623,675		(111,658)		777,654				777,654
		TOTAL CAPITAL EXPENDITURE			**6,836,808**	**16,597,175**	**6,826,186**	**-**	**-**	**30,260,169**	**11,876,931**	**6,845,872**	**18,722,803**	**11,537,366**

	Budget	Actual incl Commit-ments
Renewal	9,837,568	7,856,878
Upgrade	4,252,548	2,918,150
New	2,368,815	1,487,572
	16,458,931	12,262,600
Kingston Park New	12,171,780	6,183,889
Bruny Island Tourism grant New	1,500,000	45,661
Storm Damage repair	129,454	230,656
	30,260,165	18,722,806

NOTE: Classification is an estimate at the start of a project and may change on completion of job.

Kingston Park Expenditure 2019/20

		Budget & Carried Forward Expenditure		Actual	Commit-ments	Total	Variance
	Overall Project budget (yet to be allocated)	0					0
C00688	KP Boulevard Construction	0		0	0	0	0
C00689	KP Pardalote Parade Design & Construction	52,931		6,809	0	6,809	46,122
C00690	KP Community Hub Design	52,343		0	196	196	52,147
C00691	KP Open Space Design (Playstreet)	259,581		204,721	0	204,721	54,860
C01606	KP Parking Strategy	0		2,000	0	2,000	(2,000)
C03179	KP Temporary Car Park	500,000		385,147	156,343	541,490	(41,490)
C01618	Boulevard Construction Stage 1A	350,531		29,218	419,340	448,558	(98,027)
C01627	KP Site - Land Release Strategy	96,395		35,828	0	35,828	60,567
C01628	KP Site - General Expenditure	388,836		147,922	1,581	149,503	239,333
C03069	KP Community Hub Construction	302,167		136,666	182,643	319,309	(17,142)
C03175	KP Community Hub Plant & Equipment	87,641		6,925	10,344	17,269	70,372
C03173	KP Public Open Space - Playground	5,000,000		813,045	3,634,456	4,447,501	552,499
C03277	KP Public Open Space - Stage 2	2,600,000		0	0	0	2,600,000
C03293	Pardalote Parade Northern Section (TIP)	350,000		7,826	0	7,826	342,175
C03278	KP Perimeter shared footpath	0		0	0	0	0
C03174	KP Public Open Space - Hub link to Playground	30,154		0	0	0	30,154
C03279	KP Boulevard Construction Stage 1B	1,400,000		0	0	0	1,400,000
C03306	KP Road F design and construct	200,000		449	0	449	199,551
C03280	KP Stormwater wetlands	501,201		2,430	0	2,430	498,771
	Total	**12,171,780**		**1,778,985**	**4,404,902**	**6,183,887**	**5,987,893**

C DELEGATED AUTHORITY REPORT FOR THE PERIOD 29 APRIL 2020 TO 12 MAY 2020

DEVELOPMENT APPLICATIONS FOR PERMITTED DEVELOPMENT/USE		
DA-2020-110	Ndhlovu Investments Australia P/L 702 Adventure Bay Road ADVENTURE BAY	Change of use from residential to visitor accommodation
DEVELOPMENT APPLICATIONS FOR DISCRETIONARY DEVELOPMENT/USE		
DA-2019-246	GHD P/L 'Antarctic Division Headquarter', 203 Channel Highway KINGSTON	Extension to hardstand area to provide safe access and secure storage
DA-2019-478	Attic Building Design 10 Websters Road LESLIE VALE	Dwelling
DA-2020-72	Mr M R Fletcher 261 Redwood Road KINGSTON	Roofed alfresco and retaining walls - Retrospective
DA-2020-75	Another Perspective 21 Leslie Road KINGSTON	Extensions and alterations to dwelling
DA-2020-79	Prime Design 1 Apolline Drive KINGSTON	Dwelling
DA-2020-80	Miss E L Burleigh 10 Maranoa Road KINGSTON	Demolition of existing dwelling and outbuilding (shed) and construction of new dwelling
DA-2020-81	Ms J Binns 53 Harvey Street ALONNAH	Dwelling and visitor accommodation
DA-2020-86	M C A Webb 28 Bloomsbury Lane KETTERING	Existing dwelling and extensions - Retrospective
DA-2020-92	Scout Association of Australia 120 Tinderbox Road BLACKMANS BAY	Sport and Recreation (Scout storage shed)
DA-2020-96	JSA Consulting Engineers P/L 171 Summerleas Road KINGSTON	Five multiple dwellings and demolition of existing dwelling and outbuildings (sheds)
DA-2020-113	Prime Design 42 Apolline Drive KINGSTON	Dwelling
DA-2020-116	Wilson Homes Tasmania P/L 44 Eldridge Drive KINGSTON	Dwelling

DA-2020-125	Mr R Jackson 1381 Channel Highway MARGATE	Extensions to existing dwelling
DA-2020-129	Mr G D Lucas 36 Bullock Drive LESLIE VALE	Dwelling
DA-2020-135	Lark & Creese P/L 225 Nebraska Road NORTH BRUNY	Change of use from residential to visitor accommodation
DA-2020-138	LXN Architecture and Consulting 8 Church Street KINGSTON	Four multiple dwellings, associated works and demolition of existing dwelling
DA-2020-139	Optimus Building Surveyors 101 Thomas Road WOODBRIDGE	Change of use of existing habitable building to visitor accommodation
DEVELOPMENT APPLICATIONS FOR SUBDIVISION / BOUNDARY ADJUSTMENT / STRATA / STAGED DEVELOPMENT SCHEME / ADHESION ORDER / SEALED PLAN AMENDMENT		
STR-2019-32	M P & W A How P/L 12 Auburn Road KINGSTON BEACH	Strata – Units 1 & 2
STR-2019-35	Lark & Creese 19 Lomandra Drive BLACKMANS BAY	Strata – Lots 1, 3 & 4
STR-2020-7	James McEldowney Surveying 136 Roslyn Avenue BLACKMANS BAY	Strata – Units 1,2,3 & 4 STR-2020-8
STR-2020-8	Mr B & Mrs D Richards 6 Perch Court KINGSTON	Strata – units 1 & 2
STG-2020-10	Lark & Creese P/L 19 Lomandra Drive BLACKMANS BAY	4 units in two stages
DEVELOPMENT APPLICATIONS FOR NO PERMIT REQUIRED		
DA-2019-701	Mr D L Travalia 24 Crescent Drive MARGATE	Construction of ancillary dwelling and demolition of existing timber outbuilding
DA-2020-169	Mr B Valentine 2 Selby Road KETTERING	Reroofing and extension (covered deck)
DA-2020-176	P & J Sheds P/L 28 Suncoast Drive BLACKMANS BAY	Outbuilding (garage)
DA-2020-202	Designful 249A Roslyn Avenue BLACKMANS BAY	Outbuilding (shed)

DA-2020-203	Mr E B Willis 391C Brightwater Road HOWDEN	Outbuilding (garage)
DA-2020-204	Mr M & Mrs T Hardie 7A Gillies Street SNUG	Extension to dwelling (deck)

D KINGBOROUGH ENVIRONMENTAL FUND - PROGRESS REPORT

File Number: 36.51

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BACKGROUND

Kingborough is recognised as containing a very high proportion of significant biodiversity values relative to many other local government areas, particularly threatened vegetation communities and threatened species habitat. Of these communities and species, many are listed under State legislation, obligating Council to ensure their conservation wherever possible.

Kingborough Council started using biodiversity offsets in 2003 as an innovative approach to tackling the challenge of balancing development needs whilst conserving biodiversity values. Biodiversity offsets are used in the assessment and determination of proposals (actions) involving the removal or conversion of native vegetation. Offsets come into play where the impact on the values is not unacceptability high and the development will go ahead despite the assessed impact on such values.

Biodiversity offsets are a development enabler in Kingborough as they allow a development to occur within designated urban growth areas where impact on threatened vegetation communities and/or species is unavoidable. However, importantly, Council's offset scheme has triggers to only allow offsets when the conservation status of the species will not be compromised.

Financial offsets, which are the last step in the offsetting hierarchy, have been held by Council in the Kingborough Environmental Fund, enabling contributions to grow to a level that allowed a more strategic application of the funds. Council formalised its approach to offsetting in 2010 by endorsing the *Biodiversity Offset Policy* (Policy 6.10).

The income stream of the Kingborough Environmental Fund (the Fund) to date has been derived from offsets related to development applications through the Planning Scheme, loss of high conservation trees on private land regulated through the *Health and Environmental Services By-law 3* of 2011, and offsets for State projects that have been exempt from planning requirements.

A project officer was employed in 2018 to manage the implementation of the Fund and the Environmental Fund Implementation Plan was endorsed by Council in January 2019. A steering committee of experts and stakeholders in the field of conservation was set up to provide leadership, technical assistance, and advice for the expenditure of the accumulated offset funds.

The design and implementation of Council's Environmental Fund is highly regarded within the industry. The novel approach to offset the loss of biodiversity and deliver the offsets locally through a Fund within a local government setting is unprecedented in Tasmania. The creation of the Fund will result in close to one million dollars being invested in conservation and land management in Kingborough. The majority of which is being invested in permanent nature reserves on private land, a great outcome for our community and the environment.

COMPLETED PROJECTS

The Implementation Plan outlined ten projects to be delivered by the Fund. These were derived by pooling the conservation "streams" which have been established by using the offset targets and development conditions of individual financial offset contributions. The following projects have been completed to date:

1. Survey of *Eucalyptus rubida* (candlebark) in the Kingborough Municipality

This project was developed in response to a financial offset received for the removal of a Eucalyptus *rubida* (candlebark) at Channel Court in 2011 that was valued at $17,404 (Figure 1). The Survey of *Eucalyptus rubida* in the Kingborough Municipality focused on building our knowledge of the local distribution and population of *E. rubida*.

The main objectives of the project were to gain a better understanding of the status of the species, and to identify opportunities to improve conservation outcomes. The survey targeted eight key locations based on previous records and expert advice. *E. rubida* was found in a total of 24 'sites' across six locations. A total of 530 individuals were recorded, with the largest populations recorded at Margate, Leslie Vale, and Snug Falls.

Figure 1. The individual *Eucalyptus rubida* valued at $17,404

The overall health of mature trees was found to be poor, with widespread evidence of dieback. More than 65% of the population were classed as juvenile, including seedlings and resprouters. Only 6% of the population were classed as large trees (>70 cm Diameter Breast Height (DBH)) and most were visibly stressed with recent dieback.

An assessment of the conservation status of *E. rubida* in Kingborough was also undertaken using International Union for the Conservation Nature (IUCN) criteria. In the Kingborough Municipality the species meets the criteria for Endangered (B1a, b, C2a(i)) based on its restricted geographic range, small population size, severe fragmentation, and inferred population decline. These findings were submitted to the Threatened Species Scientific Advisory Committee to assist with an assessment of the species at a State or bioregional level.

2. Tramway Hill Reserve Swift Parrot Revegetation Project

The Tramway Hill Reserve Swift Parrot Revegetation Project focused on the revegetation of a portion of land (shown in the red area in Figure 2) in Tramway Hill Reserve in Margate. The planting was the second and final stage in a State Growth offset funded project aiming to create habitat for swift parrots. The first stage (yellow) was completed in 2015.

The Department were aware of the Kingborough Environmental Fund as they had previously contributed financial offsets for road developments and pursued offsetting the removal of the trees through the fund.

Figure 2. Locations of the two planting sites at Tramway Hill Reserve

Tramway Hill Reserve was considered an appropriate location for the planting as it is within close proximity to the location that the trees were removed and is within an area with swift parrot habitat and recorded sightings (within 1km).

A Threatened Species Day planting event was held at the reserve in September 2019, to which over forty community members attended including Councillors, members of the local Landcare group, Landcare Tasmania, Conservation Volunteers Australia and Threatened Plants Tasmania. Over one thousand plants of over thirty species, including the swift parrot feed trees *Eucalyptus globulus* (blue gum) and *Eucalyptus ovata* (black gum) were planted, creating an additional 1000m^2 of habitat for local threatened species including swift parrots, wedge-tailed eagles, grey goshawks, masked owls, Tasmanian devils, eastern barred bandicoots, eastern quolls and spotted-tailed quolls.

Figure 3. Progress of the planting at Tramway Hill Reserve 5 months later.

3. Snake Signage at The Neck, Bruny Island

The Snake Signage project focused on protecting seabird habitat at The Neck on Bruny Island using signage to deter visitors from walking off-path. Unfortunately, many tourists do not stick to the path at The Neck and can damage the burrows of seabirds including Little Penguins and Short-tailed Shearwaters. A novel approach to discouraging tourists from leaving designated paths is to use signage signifying the presence of snakes. As there are also snakes found at The Neck, this approach is a win-win.

This financial offset was received in response to a development application for the partial road and carpark upgrade at Bruny Island Neck Game Reserve by the Department of State Growth. It was specified as a condition that the (relatively small) offset was to be used for the purpose of conservation and management of seabird habitat in Kingborough.

Prior to installation, the Tasmania Parks and Wildlife Service (PWS) had tourists regularly walking off-path to access the beach. Immediately after the sign's installation, it was noticed they were no new recorded instances of off-track walking in these areas, which PWS believes indicates that visitors are largely being deterred by the signs.

Figure 4. An example of snake signage installed next to seabird burrows at The Neck.

4. Funding for Forty-spotted Pardalote Genetic Study

The Spring Farm development in Kingston resulted in the loss of 0.54 hectares of the high priority vegetation community *Eucalyptus viminalis* (white gum) grassy forest. The offset package included a requirement to restore a section of Whitewater Creek, pay a financial offset for the management and conservation of white gum and forty-spotted pardalote habitat in Kingborough, and pay a contribution specifically for research and surveys in the management of the forty-spotted pardalote.

In May 2019 the Kingborough Environmental Fund contributed $3230 to a study of the population genetics of the Forty-spotted Pardalotes in southeastern Tasmania by PhD candidate Fernanda Alves.

The funding is being used to investigate the genetic diversity of the forty-spotted pardalote across the landscape (Bruny Island, Tinderbox and Southport) and look at how the remaining populations are structured. It is hoped that as a result of the research, scientists will understand if the "mainland" populations are separate populations of their own, or if they are just individuals that have migrated over from Bruny Island. DNA sequencing has been completed and it is expected that the data will be analysed by mid-2020.

5. Wootton Drive Weed Control Project

This project was a result of two financial contributions; one from 2009 that specifically targets the Wootten Drive *Eucalyptus tenuiramis* (Silver peppermint) community, and another from 2014 that specifies the *Eucalyptus tenuiramis* community in the vicinity of Bonnet Hill.

The Wootten Drive Weed Control Project focused on weed management within the private land adjacent to Wootten Drive Reserve (Figure 5).

Figure 5. Aerial map of the project area showing Council land (light green), leased Crown Land (Dark Green), non-responsive landholders (yellow) and responsive properties (red).

It was proposed to use the offset ($1000) to improve the condition of the adjacent vegetated areas on private land and thus help manage Council's reserve in an indirect manner through activities that decrease weed source material entering the Wootten Drive bushland reserves.

Weed treatment occurred in early 2020 and encompassed more than 2 Ha of threatened silver peppermint forest at 54 and 48 Wootten Drive. Weed species that were encountered include Bluebell Creeper, Sweet Pittosporum and Boneseed.

6. Denison Street Reserve Weed Control Project

The Denison Street Reserve Weed Control Project focused on the weed management of the vegetated area adjacent to Denison Street Reserve on Kingston Primary School grounds (shown in Figure 6 in yellow).

Figure 6. Aerial map of the project area (yellow) and the adjacent Council managed Denison Street Reserve (red).

Although the financial contribution of $3000 was specified to target the adjacent reserve, the current condition of the vegetation community in the reserve is acceptable due to management by Council's weed crew. Instead it was proposed to use the funds to improve the condition of the adjacent vegetated area and thus help manage the reserve in an indirect manner through activities that decrease weed source material entering Denison Street Reserve.

The project saw approximately 1 ha of threatened *Eucalyptus amygdalina* (Black peppermint) forest and woodland on sandstone community managed for weeds. A follow-up planting for Schools Tree Day is being planned to help boost native plant cover and diversity in the project area.

7. North West Bay Interpretive Seagrass Signage

This financial offset was provided for the long-term loss of seagrass habitat at Margate for the redevelopment of the Margate Marina Park. Seagrass beds are a vitally important part of the D'Entrecasteaux Channel and one of the most productive ecosystems on the planet. This novel marine biodiversity offset supported local education initiatives and incentives for locals to value and protect seagrass meadows in the Channel.

Interpretive signs focus on local seagrasses and the marine life that relies on them, as well as the threats to their survival and how the local community can help preserve these special areas (Figures 7 and 8). Three sets of the signs have been installed at key locations around North West Bay including Margate Marina, the boat ramp at Dru Point (Figure 9) and the Wingara Road boat ramp in Howden.

Figure 7. Interpretive sign 1.

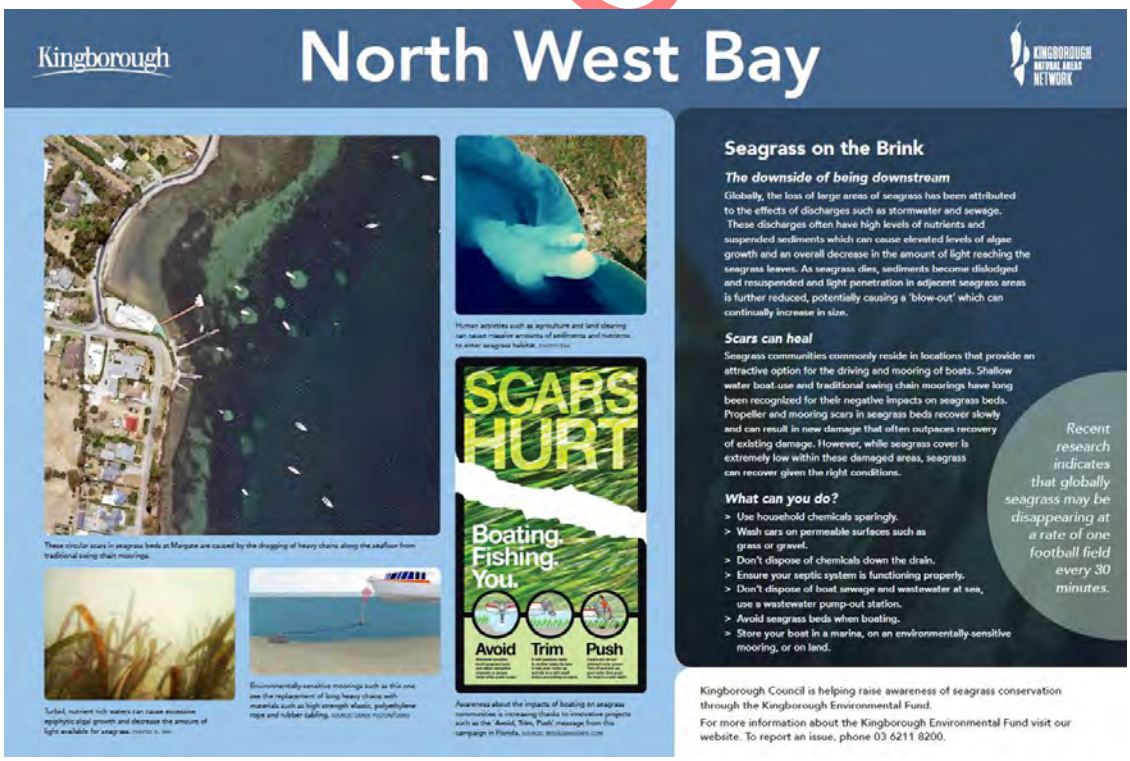

Figure 8. Interpretive sign 2.

Figure 9. The signage installed at Dru Point in Margate.

The second part of the offset paid for the loss of seagrass habitat at Margate Marina, may be used to offer a rebate for those wanting to upgrade their traditional swing-chain mooring to a seagrass-friendly environmentally sensitive (ES) mooring. The project manager recently joined the ES mooring working group being run by the Derwent Estuary Program and CSIRO, who are overseeing the design and development of ES moorings for use in Tasmania, as well as developing Australian Standards for their implementation. Current estimates put a replacement of a traditional mooring with an ES mooring at $2500.

CURRENT PROJECTS

1. Private Land Conservation

The *Guidelines for the Expenditure of the Kingborough Environmental Fund* outline three offset focus areas: private land conservation, revegetation and recovery actions. To deliver the private land conservation projects under the Environmental Fund, it was proposed that a partnership with the Tasmanian Land Conservancy (TLC) be formed. This partnership has involved funding TLC to deliver a range of targeted private land reserves over a period of 12 months as per the Fund Implementation Plan.

The aim of the partnership is to create new conservation reserves on private land that will be protected in perpetuity using Conservation Covenants under the *Nature Conservation Act 2002* or Part 5 Agreements under LUPA Act 1993.

Table 1. Private Land Conservation Budget

Private Land Conservation Project Streams	Budget
Kingborough Epacris virgata Private Land Conservation	$3,683
North Bruny DAS Private Land Conservation	$6,433
Bruny Island Swift Parrot - DOV Private Land Conservation	$8,924
Blackmans Bay Chaostola Skipper - DAS Private Land Conservation	$99,034
Southern Channel Swift Parrot - DGL/WGL Private Land Conservation	$15,284
North West Bay Swift Parrot - DOV Private Land Conservation	$26,873
Kingborough DTO/NAV Private Land Conservation	$10,458
Kingston DAS Private Land Conservation	$151,482

North West Bay DAS Private Land Conservation	$23,315
North Kingborough Swift Parrot Private Land Conservation	$98,891
Kingborough Forty-spotted Pardalote Private Land Conservation	$42,007
Swift Parrot AND Forty-spotted Pardalote Private Land Conservation	$150,718
TOTAL	**$637,102**
TOTAL minus $85,000 TLC Partnership Contribution	**$552,102**

Table 1 shows the different 'streams' for private land conservation. These figures have been calculated by pooling different financial contributions together based on what biodiversity values they impacted and where the impact occurred. These figures translate to a minimum rate of $10,000 per hectare, for example the North Bruny DAS Conservation Project stream will need to result in a minimum of 0.6433 ha protected to offset what was lost.

A covenant processing fee of up to $10,000 per covenant will be applied by the Department of Primary Industries, Parks Water and Environment (DPIPWE) to covenants secured under the fund. The remaining funds will be used to pay any additional processing fee's associated with covenants and Part 5 Agreements; however a larger portion will be used to provide stewardship payments to landholders who have created a new reserve through the fund. Stewardship payments are designed to cover weed control, revegetation and fencing, with an aim of getting the new private land reserves to a level where the landholders can manage the natural values on their own in-perpetuity. Payments will be linked to a reserve stewardship plan.

The first three covenants under the Fund have been approved by DPIPWE and are currently being processed. These covenants are adjacent to one another in Oyster Cove and cover a total area of approximately 48 hectares. The reserves will be vital in the Fund reaching its conservation targets as they will result in the protection of a number of values including forty-spotted pardalote habitat, swift parrot habitat, *Epacris virgata* habitat, *Eucalyptus amygdalina* forest and woodland on sandstone, *Eucalyptus tenuiramis* forest and woodland on sediment, and *Eucalyptus globulus* dry forest and woodland.

Other proposed covenants include sites at North Bruny, South Bruny, Lower Snug and Oyster Cove. The Partnership with TLC will likely see more than 500 hectares of high conservation value bushland protected in perpetuity.

Figure 10. Bushland at Oyster Cove being protected through the Fund.

2. Boddy's Creek Revegetation Project

The Boddys Creek Revegetation Project will focus on the revegetation of a portion of land at Mt Pleasant Trail Reserve in Kingston (Figure 11). The planting is funded by four offset contributions and will restore connectivity along Boddys Creek by planting a minimum of 185 canopy trees. The reserve was acquired as a "Creek Reserve" in 2010 to be "Set apart for Public Recreation". The vegetation on the site is threatened *Eucalyptus globulus* (blue gum) Dry Forest and Woodland (DGL) community and provides foraging habitat for the critically endangered swift parrot. The planting will enhance and build upon the existing blue gum community and swift parrot habitat.

Once a canopy is re-established, the density of weeds will likely be lower and easier to manage. Due to the expected high grazing pressure from wildlife at this site, we have been growing advanced trees in anti-spiral pots that will allow the trees to grow faster, and they will have wire mesh tree guards around every tree. Planting is scheduled for May 2020.

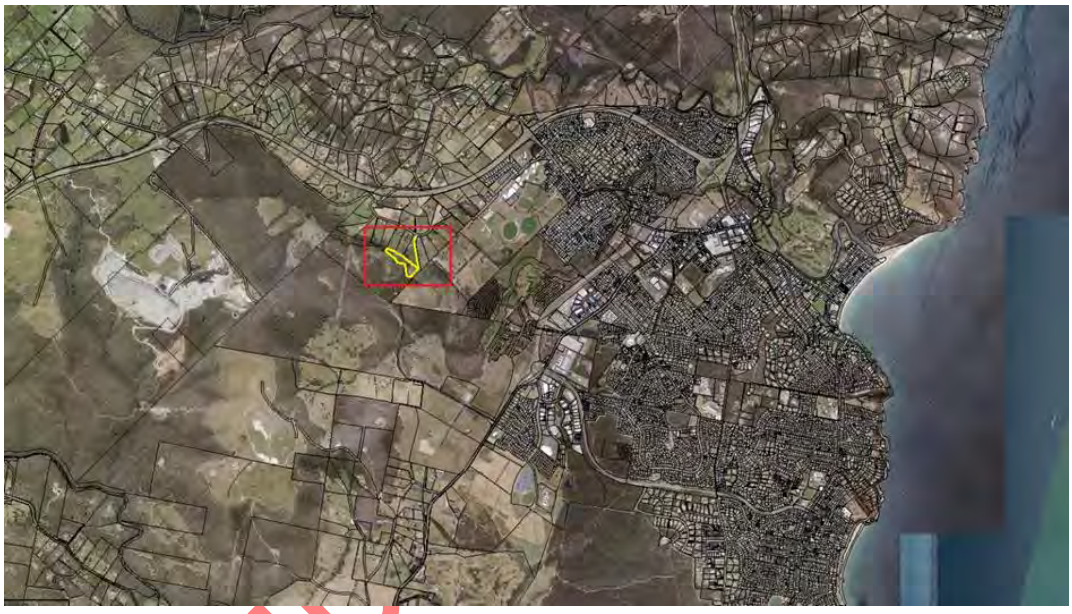

Figure 11. The location of Mt Pleasant Trail Reserve (yellow) near Kingston.

Figure 12. The planting areas (yellow) at Mt Pleasant Trail Reserve.

3. Whitewater Creek Revegetation Project

The proposed Whitewater Creek Revegetation Project will focus on the revegetation of Council land in the Whitewater Creek corridor in Kingston. The planting is for an offset contribution for the removal of eight trees representative of the threatened vegetation community *Eucalyptus ovata* (black gum) forest and will help restore this community within the Whitewater Creek riparian area.

In 2010 a financial offset was received for the removal of eight eucalypts adjacent to the creek reserve which was specified to be used to manage and conserve the local vegetation community in the Whitewater Creek corridor. Forty *Eucalyptus viminalis* (white gum) and *Eucalyptus ovata* (black gum) will be planted in 2020.

Figure 13. The Whitewater Creek corridor in Kingston with the planting area (red)

4. Tramway Hill Reserve *Juncus amabilis* Planting

A small offset of $144 was received in 2019 for the loss of 0.004 hectares of *Juncus amabilis*, which was classified as 'rare' at the time. It was specified that the offset was to be used solely for the management of *Juncus amabilis* in the vicinity of Margate. The steering committee decided a revegetation project would be the most effective way to spend the money. A suitable area on Council land at Tramway Hill Reserve was selected, and a planting of 480 tubestock is scheduled for mid-2020.

FINANCE

With almost two years of the implementation of the Kingborough Environmental Fund complete, 27% of the fund has been spent on offset projects, private land conservation and administration. The Kingborough Environmental Fund Implementation Plan and steering committee will continue to oversee and guide the program for the next three years. By the end of the third year of implementation it is estimated that 79% of the fund will be spent or allocated. The Fund is continuing to receive income through the requirement for financial offsets through the Health and Environmental Services By-law and the Interim Planning Scheme.

BUDGET		
Current Program Budget 2018-2023		**$903,231**
EXPENDITURE		
Project Manager Salary		
18/19 (0.6 FTE)		$46,690.80
19/20 (0.6 FTE)		$47,857.80
20/21 (0.6 FTE)		$49,054.20
21/22 (0.6 FTE)		$50,280.40
22/23 (FTE to be confirmed)		-
Private Reserves		$443 600
Other Fund Projects		
Eucalyptus rubida Project		$14,280
Forty-spotted Pardalote Research		$3,230
Tramway Hill Reserve Swift Parrot Revegetation		$10,518
North West Bay Seagrass Signage		$3200
Snake Signage at The Neck		$180
Wootten Drive Weed Control Project		$1,061
Kingston Primary Weed Control Project		$3,264
Boddys Creek Revegetation Project		$3060
Whitewater Creek Revegetation Project		$3,264
Juncus amabilis Revegetation Project		$144
Unallocated Project Budgets		
Margate Seagrass Offset (E.S Mooring Rebate)		$16,958
Seabird Habitat at The Neck Offset		$554
North Bruny Revegetation Offset		$6243
DAS Revegetation Offset		$8161
FORECAST		
Total Forecast Expenditure		**$711,601**
Estimated Remaining Budget		**$191,630**

CONCLUSION

Over the past two financial years Council has produced a significant number of conservation outcomes as a result of the Kingborough Environmental Fund. These outcomes include specific projects such as eucalypt research, seagrass education, revegetation of threatened species habitat and weed control, as well as a partnership with the Tasmanian Land Conservancy which will help Council meet the targets for private land conservation. These targets will be met by protecting land within seven properties at Oyster Cove, North Bruny and South Bruny, totalling more than 500 hectares of threatened species habitat and threatened vegetation communities.