STORMWATER SYSTEM MANAGEMENT PLAN

City of Hobart 2024

City of HOBART

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V1.10	November 2024	Stormwater Asset Management Plan 2024	Anna Wilson		

Contents

1.0 EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

The purpose of this Stormwater System Management Plan (SSMP) is to meet the requirements of section 10 of the *Urban Drainage Act 2013* and identify the current state of the City of Hobart's stormwater system and future concerns and directions.

1.2 The *Urban Drainage Act 2013*

The *Urban Drainage Act 2013* (UDA 2013) requires that Council develop a SSMP as per the below requirements:

> *(2) A stormwater system management plan is to specify –*
>
> *a) plans for the management of any assets used for the delivery of a stormwater service; and*
> *b) the level of risk from flooding for each urban stormwater catchment in the public stormwater system; and*
> c) *any other matters prescribed in the regulations or that the council considers appropriate*
>
> (The State of Tasmania (The Department of Premier and Cabinet), 2024)

The City of Hobart maintains maps of the stormwater network as required under Section 12 of the UDA 2013, which are publicly available via the website.

1.3 Recommendations

This plan identifies 14 actions that will be undertaken by the following processes:

- Business as usual
  - Maintenance and asset planning
  - Renewals
- The Flood Hazard Project
  - Project being undertaken to update flood modelling and identify
    - Flood risk areas current and under climate change
    - possible mitigation options
    - underserviced area identification
    - Level of service standards under climate change scenarios
    - Investigate community flood action plans
- Future work on how best to preserve overland flow paths under the Tasmanian Planning Scheme
- Current project to install a gross pollutant trap between the McRobies Gully tip site and the Hobart Rivulet outfall.
- Current Willow removal project and future Rivulet and catchment planning.

1.4 Area of application

This SSMP applies to all urban catchments within the CoH municipality. The City of Hobart has defined "urban" by land use: any catchment with general, inner or low density residential zoned areas, or any Business or Commercial zoned areas. Areas zoned Rural Living, Open Space or Recreation have been excluded from the definition.

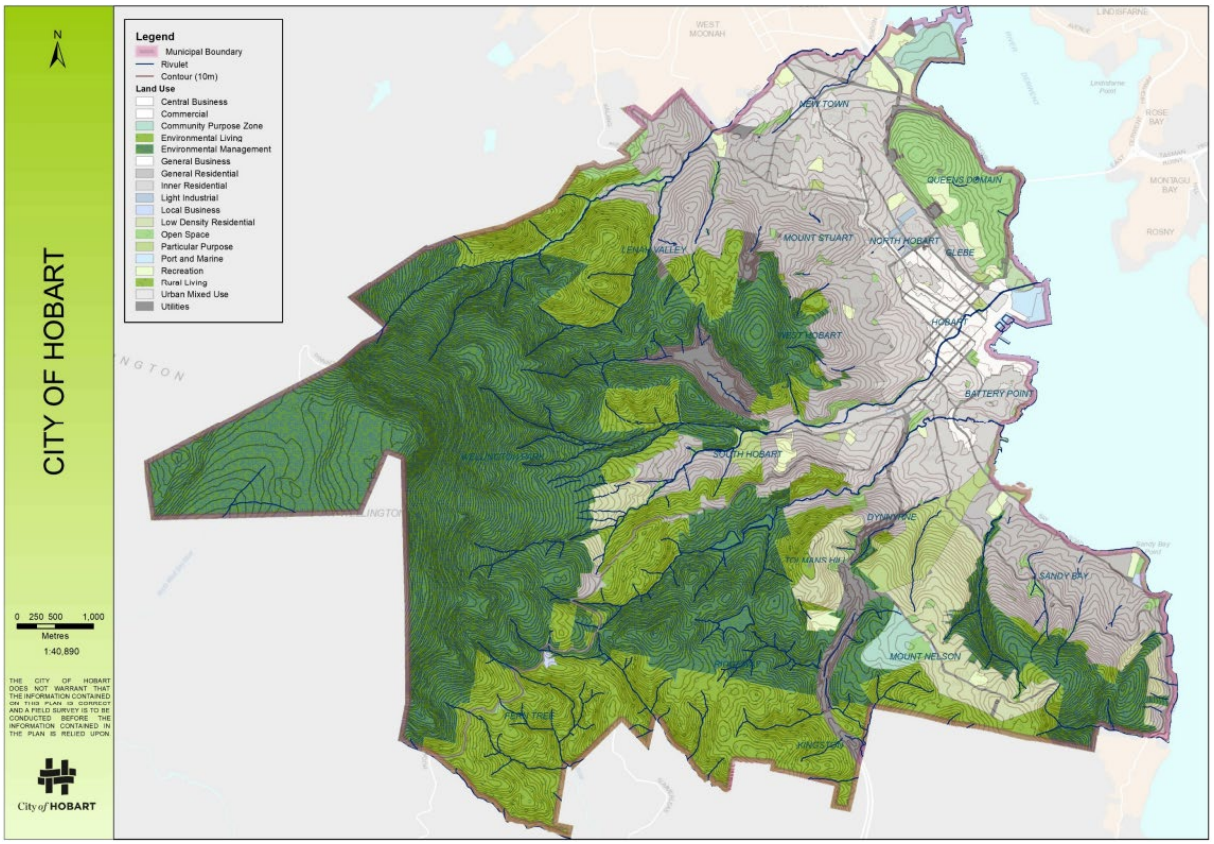


Figure 1 Municipality Overview: Major drainage lines and land use.

1.5 Associated Documents

- **City of Hobart Flood Risk Mapping.** City of Hobart Potential Inundation Hazard Areas – Modelled 2100 1% AEP Flood Area is a publicly available flood map created from a combination of Council catchment specific flood maps. It is available at City of Hobart: Potential Inundation Hazard Areas – Modelled 2100 1% AEP Flood Areas (arcgis.com)

  Note that this mapping will be updated as updated endorsed model datasets are released.

- **Asset Management Plan, City of Hobart, Stormwater 202 AMP V1.4 July 2021**. Appendix 1 – Asset Management Plan. This plan covers the infrastructure assets that provide stormwater services and meets the requirements of the *Urban Drainage Act 2013* section 10.2.a – *plans for the management of any assets used for the delivery of a stormwater service*.

  Note the Stormwater Asset Management Plan will be updated in the 2024- 2025 financial year which will update asset values.

1.6 Summary of recommendations

No.	Recommendation
1.	Update flood modelling to assess climate change impacts
2.	Create management plan for overland flow paths and Rivulets to manage flood risk
3.	Finalise review and update of the stormwater asset management plan by December 2025
4.	Include an analysis of unserviced areas in the asset management plan
5.	Preserve existing overland flow paths
6.	Extend stormwater network to unserviced properties and improve network connectivity
7.	Assess service standards from the network and future expected service standards under climate change scenarios and against community expectations
8.	Proactively manage critical assets
9.	Investigate flood mitigation improvements for properties affected by flood zones
10.	Assist community with developing private flood action plans
11.	Protect Hobart Rivulet from polluted runoff from the landfill site
12.	Investigate mitigating flood risk for Hobart CBD
13.	Improve ecological value of Rivulets and the Derwent
14.	Investigate ownership issues and ensure compliance with Acts

2.0 Recommended Actions

Table 1 Great Hobart (Providence, Warwick and Park Street Goals, Controls and Strategic Alignment)

No.	Recommendation	Purpose	Resilient to Climate Change & Natural Disasters	Infrastructure & Services managed for community well being	Natural environment preserved, secure and flourishing	Priority	Controls	Timeframe
1	**Update flood modelling to assess climate change impacts**	Understand the implications of how future climate scenarios will impact the community	✓	✓		HIGH	• Non-structural controls o Create updated flood model as part of DRF funded risk management project. o Include climate change analysis in flood modelling	2027
2	**Create management plan for overland flow paths and Rivulets to manage flood risk**	Identify areas where flood risk to the community needs to be mitigated through dedicated spaces and identify how these spaces are best managed for the community.	✓	✓	✓	HIGH	• Non-structural controls o Identify overland flow paths and associated level of risk as part of the risk management project, o Investigate areas that maybe should not be impacted by future development and investigate how best to protect the risk zones from development.	2027
3	**Finalise review and update of the stormwater asset management plan**	Ensure we have adequate and up to date understanding of our assets.		✓		HIGH	• Non-structural controls o Update asset management plan	Dec 2025
4	**Include an analysis of unserviced areas in the asset management plan.**	Identify areas that are likely to require servicing infrastructure and investment in the future.	✓	✓		HIGH	• Non-structural controls o Update asset management plan to include an analysis of unserviced areas.	Dec 2025
5	**Preserve existing overland flow paths**	To prevent further development being placed in flood paths. To preserve flow paths for environmental and flood mitigation purposes.	✓	✓	✓	HIGH	• Non-structural controls o Exercise powers under *Urban Drainage Act 2013* and *Building Act 2016* to prevent development encroaching into overland flow paths	Ongoing
6	**Extend stormwater network to unserviced properties and improve network connectivity.**	Unconnected properties increase risk of nuisance runoff and limit development potential. Connections to sewer lines increase the load on the sewer system and should be relocated into SW lines where possible.	✓	✓		HIGH	• Non-structural controls o Investigate current servicing arrangements and flag potential works. Prioritise based on flooding and nuisance reports and development pressures. Additional priority based on current SW connections to sewer. • Structural Controls o Extend network to unserviced properties	Ongoing

No.	Recommendation	Purpose	Resilient to Climate Change & Natural Disasters	Infrastructure & Services managed for community well being	Natural environment preserved, secure and flourishing	Priority	• Controls	Timeframe

7	**Assess service standards from the network and future expected service standards under climate change scenarios and against community expectations.**	The current service standards are likely to require incredibly significant investment to maintain the network under climate change scenarios.	✓	✓		MEDIUM	• Structural controls
							  • Improve inlet capacity and undertake local network upgrades (subject to further investigation)
							  • Identify underserviced areas and future capital works to appropriately drain these areas.
							• Non-structural controls
							  ○ Further modelling of the network capacity
								Mid-term
								(5-10 yrs)
								
								Immediate (1-5 years)

8	**Proactively manage critical assets**	To ensure network remains functioning and identify and manage future maintenance and renewal budget.	✓	✓		HIGH	• Non-structural controls
							  ○ Routine CCTV inspection of critical pipes and boxed culverts, and proactive renewal
							  ○ Exercise powers under *Urban Drainage Act 2013* and *Building Act 2016* to prevent development occurring on top of stormwater assets
							• Operations and Maintenance Controls
							  ○ Routine jetting of critical pipes and clearing of critical inlet pits and headwalls pre rainfall events
								Ongoing

9	**Investigate flood mitigation improvements for properties affected by flood zones.**	Some properties are within flood zones or affected by flooding. Assessment of the risk and potential mitigation measures will be part of the flood hazard project	✓	✓		HIGH	• No structural controls ○ Investigate flow diversion and flood mitigation options for this area as part of DRF modelling project. •	Immediate (1-5 years)
10	**Assist community with developing private flood action plans**	Similar to fire actions plans, flood actions plans would increase community resilience by providing advice and knowledge on what to do in a flood situation to minimise risk to people and property.				MED	• Non-structural controls ○ Support community by providing data and professional advice regarding flood action plans and personal mitigation measures, including communication plan with residents in aftermath of any event	Post DRF project and updated modelling.

Goal	Goal Description	Goal Justification	Resilient to Climate Change & Natural Disasters	Infrastructure & Services managed for community well being	Natural environment preserved, secure and flourishing	Priority	Controls	Timeframe

11	**Protect Hobart Rivulet from polluted runoff from the landfill site**	Hobart Rivulet has high community and environmental values and can be heavily impacted from pollutants from the McRobies Gully Waste Centre. Pollutant capture to minimise the load on the Rivulet will increase community and environmental values and decrease environmental risk and clean up costs.		✓	✓	HIGH	• Operations and Maintenance Controls
							  ○ Regular maintenance of existing treatment measures
							• Structural Controls
							  ○ Install improved GPT prior to the McRobies outfall
							• Investigate improvements to the litter management devices in the McRobies Gully tip area.
								Immediate (1-5 years)

12	**Investigate mitigating flood risk for Hobart CBD**	Hobart CBD acts as a small basin in large flow events and is impacted by flood events. This impact is likely to increase under climate change scenarios.	✓			HIGH	• Non-structural controls ○ Require detention systems for new developments discharging to the Rivulet aimed at reducing peak flood flows in large events • Investigate flood mitigation options as part of DRF flood hazard study. Create mitigations strategy and actions.	Subject to modelling project results and recommendations.

13	**Improve ecological value of Rivulets and the Derwent**	The Rivulets and bays are ecologically valuable in their own right and are valued by communities. Improvements can be made to increase biodiversity and environmental resilience within these systems.			✓	HIGH	• Non-structural controls
							  ○ Create Rivulet and stormwater strategy to guide future works in the Rivulets and take into account flood management, environmental improvements, community safety and amenity etc.
							  ○ Exercise powers under the planning scheme and *Urban Drainage Act 2015* to prevent further alterations to the creeks
							• Operations and Maintenance Controls
							  ○ Enhance riparian zone through planting of natives, weed and willow removal, and small scale management to promote ponding in conjunction with CoH Open Space Unit
							• Continue Derwent Estuary Program support and partnership
								Immediate (1-5 years)
								
								Ongoing

14	**Investigate ownership issues and ensure compliance with Acts.**	There are several areas including the Sandy Bay Utas campus and many privately drained areas where ongoing management needs to be considered against the requirements of the *Urban Drainage Act 2013*. Many of these systems area at end of life and becoming	✓	✓		MEDIUM	• Non-structural controls ○ Consider the management of private stormwater systems including the UTas Sandy Bay system and create a policy direction for these systems.	Mid-term (3-7 yrs)

		problematic as they fail and ownership is in question.						

2.1 Action implementation.

These 14 actions will be accomplished by a combination of:

- Business as usual (Action 8)
    - Maintenance and asset planning
    - Renewals
- The Flood Hazard Project (Actions 1, 2, 4, 7, 9, 10, 12, 14)
    - Project being undertaken to update flood modelling and identify
        - Flood risk areas current and under climate change
        - possible mitigation options
        - underserviced area identification
        - Level of service standards under climate change scenarios
        - Investigate community flood action plans
- Future work on how best to preserve overland flow paths under the *Tasmanian Planning Scheme* (Action 5)
- Current project to install a gross pollutant trap between the McRobies Gully tip site and the Hobart Rivulet outfall. (Action 11)
- Current Willow removal project and future Rivulet and catchment planning (Action 13)

PART 1: CURRENT ISSUES

3.0 Introduction

3.1 Context

Worldwide, stormwater best management practice has evolved into integrated water management. This means consideration of water management around geographically coherent water systems, including surface and ground water, riverbeds and banks, and technical infrastructure; and where water management is integrated with land use planning.

This best practice management requires strategic analysis of the urban area, the stormwater networks and Rivulets and how we strategically manage both these given the pressures of development and climate change into the future for the good of the community and the environment.

3.2 Purpose

3.2.1 Stormwater management

The mission of Council is to ***"work together to make Hobart a better pace for the community",*** Outcomes of the 2.4 of the City of Hobart Capital City Strategic Plan 2023 that are relevant to the SSMP include:

Outcome 2.4 *Hobart communities are safe and resilient, ensuring people can support one another and flourish in times of hardship.*

Outcome 6.3 is that *Hobart is a city supported by ecologically sustainable waste and water systems* and

Outcome 7.3 in *Infrastructure and services are planned, managed and maintained to provide for community wellbeing.*

3.2.2 Stormwater system objectives

The specific purpose of the stormwater system elements are:

Minor System – to ***manage nuisance flows*** as per the Australian Rainfall and Runoff guidelines. The minor system may also be used in the future to utilise stormwater as a resource where possible. Note that the minor system allows the urban area to function effectively on a day to day basis – people are not getting bogged accessing around the city, everyday flows are not entering houses, everyday rainfall is not causing community functions to be affected.

Major System – The purpose of the major system is to ***mitigate the risk of flood and disaster to the community***. The major system manages larger events and consists of a combination of the minor system, the trunk system and the overland flow network including roads and rivulets. Flood events may be contained din the major system but may on occasion exceed the capacity of this system.

Trunk Drainage – Trunk drainage includes large transmission pipes that carry greater capacity than required for the minor system and may form part of both the minor and major systems.

Detention Systems – detention systems act to slow down the flow of water into the minor or major system to mitigate peak flow rates downstream.

Stormwater Quality Infrastructure – stormwater quality infrastructure includes green and grey infrastructure installations for the purpose of removing pollutants from the stormwater system and improving environmental outcomes.

4.0 Climate change

Climate change is having a large impact on stormwater events, flooding events, stormwater design and network capacity.

Australian Rainfall and Runoff, in conjunction with the Bureau of Meteorology updated climate change guidelines for use with stormwater design and management.

> *Because our climate is changing, unadjusted historical observations are no longer a suitable basis for design flood estimation: they must be adjusted to reflect the impacts of rising global temperatures.* (Ball, et al., 2019)

> *As highlighted in Wasko et al. (2024), extreme rainfall is likely to change at a different rate to annual average rainfall. Similarly short-duration extremes (sub-daily rainfall) and longer-duration extremes (multi-day accumulations) are likely to be experiencing differing rates of change in both frequency and intensity, leading to complex changes in the temporal patterns of rainfall. There may also be changes to the seasonality of heavy rainfall events, and to the sequencing of wet and dry periods*. (Ball, et al., 2019)

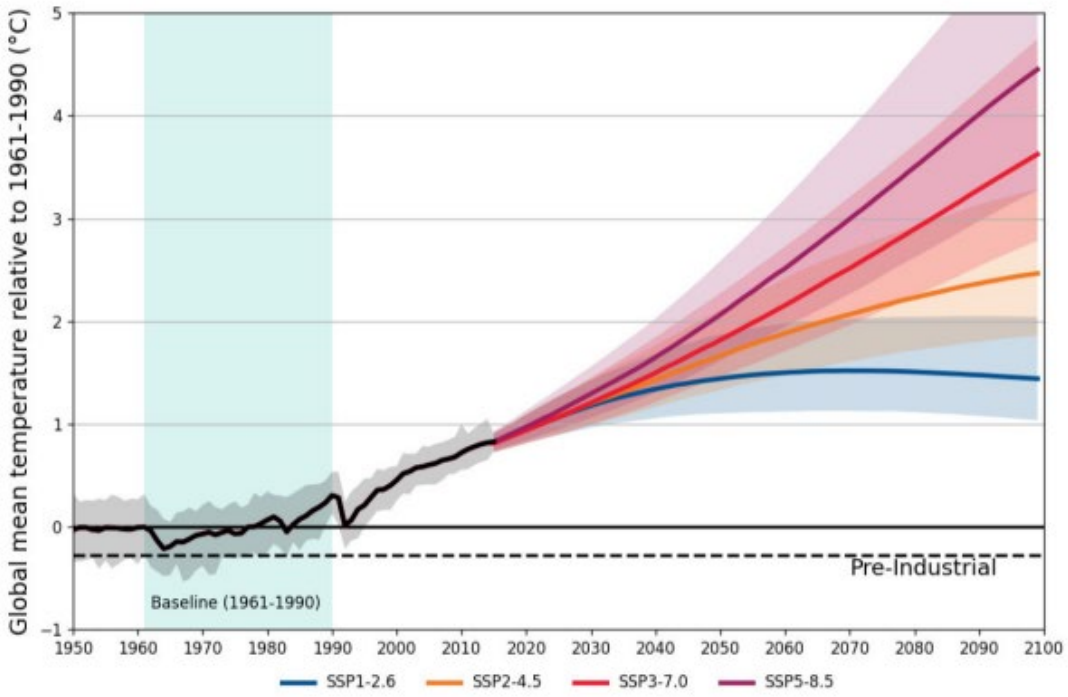


Figure 2 Project temperature increases associated with AR6 socioeconomic pathways relative to 1961 - 1990 and their associated uncertainty. (Ball, et al., 2019)

[

Climate Scenario	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP5-8.5
Current and near-term (2021-2040) (°C)	1.2 (0.9-1.5)	1.2 (0.9-1.5)	1.2 (0.9-1.5)	1.3 (1.0-1.6)
Medium-term (2041-2060) (°C)	1.4 (1.0-1.9)	1.7 (1.3-2.2)	1.8 (1.4-2.3)	2.1 (1.6-2.7)
Long-term (2081-2100) (°C)	1.5 (1.0-2.1)	2.4 (1.8-3.2)	3.3 (2.5-4.3)	4.1 (3.0-5.4)

Figure 3 Global mean surface temperature projections (ΔT) for four socio-economic pathways relative to 1961 - 1990. The 90% uncertainty interval is provided in parentheses. (Ball, et al., 2019)

Factors have been recommended for use to take into account these affects on rainfall. It is acknowledged that there is a level of uncertainty in the current projections and there is likely to be future changes to these recommendations. This uncertainty should be taken into account in management considerations. An example of this may mean adopting the SSP2 – 4.5 scenario for design but providing space for the major system to be expanded in the future if required.

Climate change rainfall factors - SSP 2 – 4.5 Moderate scenario and SSP 3 – 7.0 high warming scenarios for Hobart. Highlighted the most likely used factors for Hobart stormwater infrastructure.

Australian Rainfall and Runoff – Data Hub_ Time Accessed 11 September 2024 12:00PM Version 2024_v1

Note Updated climate change factors for IFD Initial loss and continuing loss based on IPCC AR6 temperature increases from the updated Climate Change Considerations (Book 1: Chapter 6) in ARR (Version 4.2). ARR recommends the use of Current and near-term (2030 midpoint). Medium-term (2050 midpoint) and Long-term (2090 midpoint)

SSP2-4.5

Table 2 SSP 2-4.5 Updated Climate change factors

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.18	1.17	1.16	1.14	1.13	1.12	1.12	1.11	1.1	1.1
2040	1.22	1.2	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.12
2050	1.27	1.24	1.23	1.21	1.19	1.18	1.17	1.16	1.15	1.14
2060	1.3	1.27	1.25	1.23	1.21	1.2	1.19	1.18	1.16	1.16
2070	1.33	1.3	1.28	1.26	1.24	1.22	1.21	1.19	1.18	1.17
2080	1.37	1.33	1.31	1.28	1.26	1.24	1.22	1.21	1.2	1.19
2090	1.4	1.36	1.34	1.31	1.28	1.26	1.24	1.23	1.21	1.2
2100	1.41	1.37	1.35	1.32	1.29	1.27	1.25	1.24	1.22	1.21

SSP3-7.0

Table 3 SSP 3 - 7.0 Updated Climate Change Factors

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.18	1.17	1.16	1.14	1.13	1.12	1.12	1.11	1.1	1.1
2040	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2050	1.29	1.26	1.24	1.22	1.2	1.19	1.18	1.17	1.16	1.15
2060	1.35	1.32	1.3	1.27	1.25	1.23	1.22	1.2	1.19	1.18
2070	1.42	1.38	1.35	1.32	1.29	1.28	1.26	1.24	1.22	1.21
2080	1.5	1.45	1.42	1.38	1.35	1.33	1.3	1.28	1.26	1.25
2090	1.59	1.53	1.49	1.44	1.4	1.38	1.35	1.33	1.3	1.29
2100	1.66	1.59	1.55	1.5	1.45	1.42	1.39	1.37	1.34	1.32

SSP5-8.5

Table 4 SSP 5 - 8.5 Updated Climate Change Factors

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2100	1.86	1.77	1.71	1.64	1.58	1.54	1.5	1.47	1.43	1.41

From these data sets it can be seen that if we choose to adopt a medium level scenario the projected increase in rainfall will range from a **27% to 41% increase**, under a high socioeconomic pathway the increase likely to impact Hobart will be from **42% to 66% increase** in rainfall during events. **Note that this does not imply that Hobart will receive more rainfall throughout the year only that individual rainfall events will be more intense and discharge higher amounts of rain during the event.**

Given these recent updates to projections work needs to be done on how City of Hobart implements the ramifications of these changes. It is possible that changes to our base service levels will be required, modelling will need to be updated to assess the impacts on our communities and a management plan for the distribution of additional overland flows will need to be developed.

4.1 Climate change recommendations

4.1.1 Update flood modelling to assess climate change impacts

4.1.2 Create management plan for overland flow paths and Rivulets to manage flood risk

5.0 Levels of Service

City of Hobarts stormwater services levels are currently set by the *Hobart Interim Planning Scheme 2015* which requires:

E7.7.1 Stormwater Drainage and Disposal

A3 _ a minor stormwater drainage system must be designed to comply with all of the following:

(a) Be able to accommodate a storm with and ARI of 20 years in the case of non- industrial zoned land and an ARI of 50 years in the case of industrial zoned land, when the land serviced by the system is fully developed;
(b) stormwater runoff will be no greater than pre-existing runoff or any increase can be accommodated within existing or upgraded public stormwater infrastructure.

A4_ a major stormwater drainage system must be designed to accommodate a storm with and ARI of 100 years. (Tasmanian State Planning Office, 2024)

When Hobart adopts the *Tasmanian Planning Scheme* (TPS) these levels of service will not be required under the TPS. Other Councils have adopted policies to specify their levels of service with service levels for the minor system in particular varying across the state. The simplest snapshot to compare service level is the Tasmanian Subdivision guidelines and their associated departures which state:

13. 2. A drainage system of sufficient capacity to drain the road and all land draining on to the road is to be designed in accordance with the following:-

(i) The requirements of the current edition of 'Australian Rainfall and Runoff' produced by Engineers Australia
(ii) Unless specified otherwise in Appendix 2 the design annual recurrence interval shall be:-
- *Residential (lot < 2 ha) - 5 years.*
- *Rural and Residential (lot > 2 ha) - 2 years with the approval of the Council.*
- *Business, Commercial and Industrial areas - 20 years and 80 percent impervious surface.*
- *Central Business District - 50 years.*

(iii) Provision shall be made to allow stormwater flow up to a 100-Year ARI storm, to flow overland without undue inundation of any properties. Flow paths are to be shown on the submitted engineering drawings.

Departures:

Table 5 Stormwater levels of service as defined in the Tasmanian Subdivision Guideline departures

Council	Departure
Brighton	In accordance with Council's Guidelines for Stormwater Design, the drainage system shall be designed to manage an annual recurrence interval of 20 years

Central Coast	Rural and residential (lots > 4000m2) - 5 year ARI Residential (lots < 4000m2) - 10 year ARI Commercial - 20 year ARI and 80% impervious surface Industrial - 20 ARI and 80% impervious surface
Devonport	Storm return periods specified in Council's Stormwater Strategy are to be applied.
Dorset	Residential (lot < 2ha) - 10 years. Rural and Residential (lot > 2ha) - Council will specify.
Launceston	The design principles and pipe velocities shall comply with LCC 'Hydraulic Design Guidelines'. The pipe velocity range shall be 0.7m/s to 6.0m/s for RCP & FRC or 10.0m/s for other pipe types.
Northern Midlands	Residential (lot <2Ha) – 10 years Rural and Residential (lot>2ha) – 5years
West Tamar	Residential (lot < 2ha) - 10 years. Rural and Residential (lot > 2 ha) - 5 years Provision shall be made to allow stormwater flow up to 100-year ARI storm, to flow overland without undue inundation of any properties.

Table 6 Minor system level of service use in Tasmania summary, CoH's specified service level highlighted. (Wilson, et al., 2024)

ARI Minor – Residential	AEP	ARI Minor Rural & Residential >2ha	AEP	ARI Minor – CBD	AEP	ARI Minor – Business, Commercial and Industrial	AEP
1 in 5	20%	1 in 2	50%	1 in 50	2%	1 in 20	5%
1 in 10	10%	1 in 5	20%	1 in 20	5%	1 in 50 - Industrial	2%
1 in 20	5%	1 in 20	5%				

This demonstrates that there is not a consistently applied level of service for stormwater management within Tasmania and that the current level of service provided by City of Hobart is amongst the highest in Tasmania.

5.1 Level of Service recommendations

5.1.1 Investigate appropriate level of service levels under climate change scenarios.

6.0 City of Hobart Asset Management Plan Stormwater

6.1 Stormwater Asset Management Plan _ City of Hobart 2020

The City of Hobart has an asset management plan for stormwater assets which has been attached in appendix 1.

The stormwater asset management plan (AMP) details information about infrastructure assets with actions required to provide an acceptable level of service in the most cost-effective manner while outlining associated risks.

The plan defines the services to be provided, how the services are provided and what funds are required to provide over the 20 year planning period. The AM Plan will link to a Long-Term Financial Plan which typically considers a 10 year planning period.

This plan covers the infrastructure assets (including stormwater pipes, structures and treatment systems) that serve the City's obligation under the *Urban Drainage Act 2013*. These assets largely sit under and comprise the bulk of Classes 71, 72 and 73 in the City's Asset Management System. (Flanagan, 2021)

This plan was finalised in 2021 and is due for review and update. The plan is currently under review and a review of our assets is currently being completed. It is expected that a new asset management plan will be complete by the end of 2025.

6.2 Asset Management Plan Review Issues

Due to historic development of the City Hobart has many urban lots that are not serviced by stormwater. The stormwater for these lots may be infiltrated into ground or connected to sewer. Neither of these options are optimum for urban areas with increasing densification. An analysis of these locations and the infrastructure required to service them should be incorporated into the updated Asset Management Plan (AMP).

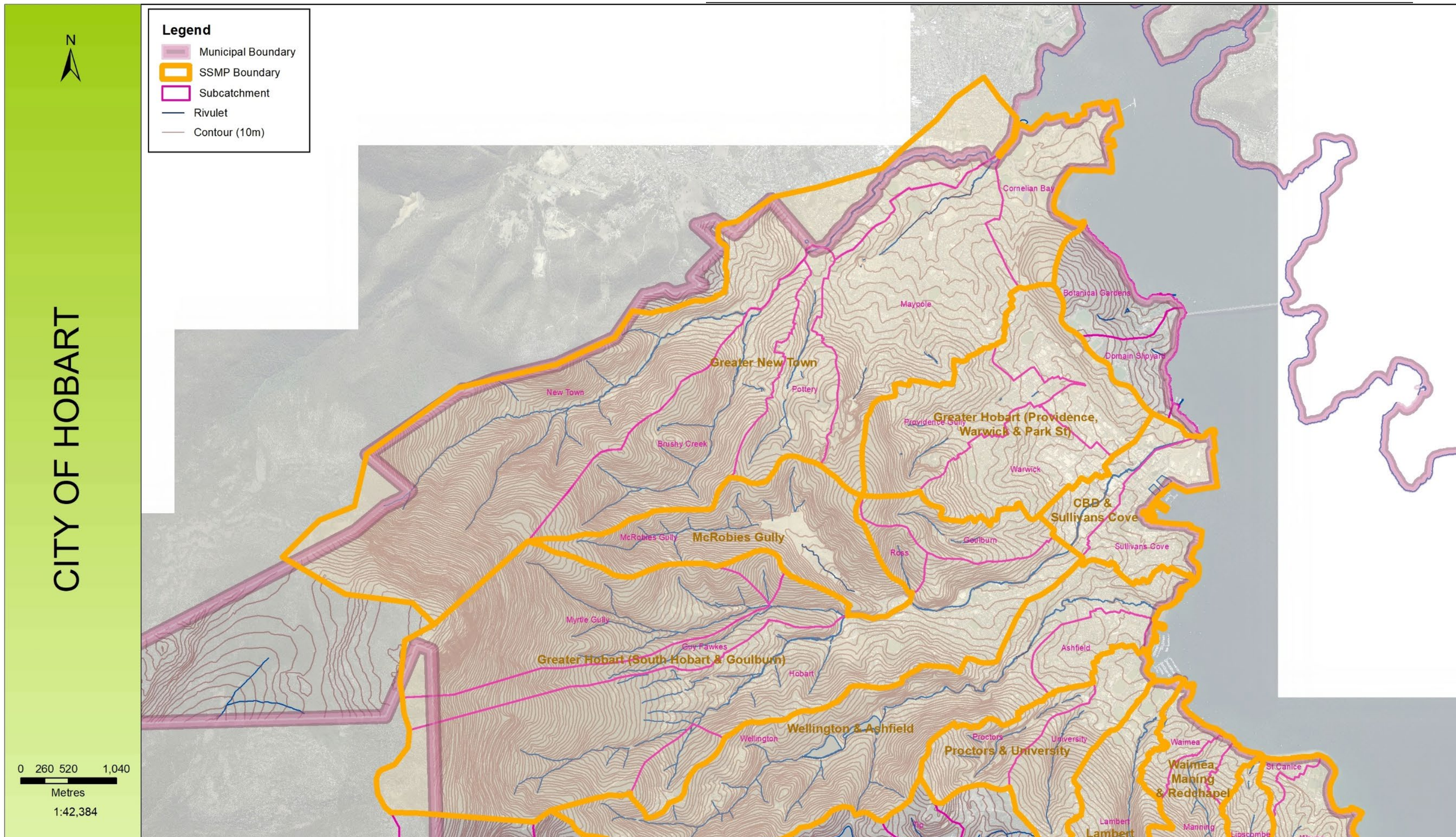
Overland flow paths (OFP's) are not captured in the existing AMP. Many overland flow paths form part of other infrastructure including roads and it would not be appropriate to revalue or double up on their value. Any OFP's that are not identified as other infrastructure should be included in the valuation and asset management planning.

Stormwater treatment devices, particularly devices that include green infrastructure may be poorly understood within the existing AMP. It is possible that maintenance regimes for these assets are incorrectly applied and should be reviewed. It should also be ensured that we are collecting all treatment infrastructure into the AMP.

6.3 Asset Management Plan Recommendations

6.3.1 Finalise review and update of the stormwater asset management plan by December 2025.

6.3.2 Include an analysis of unserviced areas in the asset management plan.


N
Legend
Municipal Boundary
SSMP Boundary
Subcatchment
Rivulet
Contour (10m)
CITY OF HOBART
0 260 520 1,040
Metres
1:42,384
Cornelian Bay
Botanical Gardens
Maypole
Domain Shipyard
Greater New Town
New Town
Pottery
Providence Gully
Greater Hobart (Providence, Warwick & Park St)
Brushy Creek
Warwick
CBD & Sullivans Cove
McRobies Gully
McRobies Gully
Goulburn
Sullivans Cove
Ross
Myrtle Gully
Guy Fawkes
Ashfield
Greater Hobart (South Hobart & Goulburn)
Hobart
Wellington & Ashfield
Wellington
Proctors
University
Proctors & University
Waimea
Waimea, Maning & Reddhapel
St Canice
Lambert
Manning
Lipscombe

7.0 Catchments

The SSMP requirements are for Council to identify ***the level of risk from flooding for each urban stormwater catchment in the public stormwater system;*** (The State of Tasmania (The Department of Premier and Cabinet), 2024)

City of Hobart has undertaken catchment mapping and flood analysis for all of its urban catchments. Results from this mapping are publicly available on the City of Hobart website.

The flood models that provide this data were developed between 2012 and 2022 and all models are currently being updated to include the recently updated ARR climate data and a general service update to ensure inclusion of appropriate Council infrastructure.

All urban catchment areas are included in the current update of flood modelling being undertaken as part of the Integrated Hazard Vulnerability Assessment which is due for completion in 2027. The flood model portion of this project is expected to be complete in 2026.

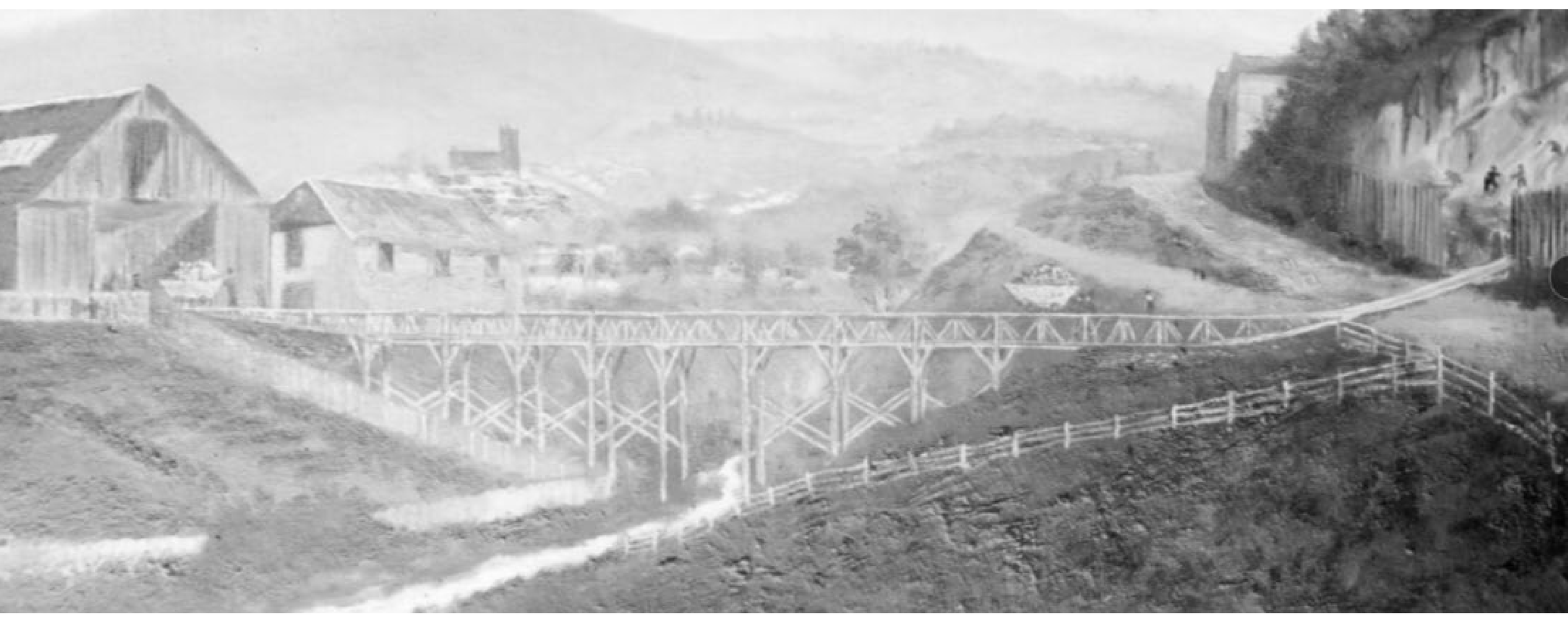
The core components of the asset management strategies are to:

- exercise planning controls to prevent further encroachment on underground assets from new developments

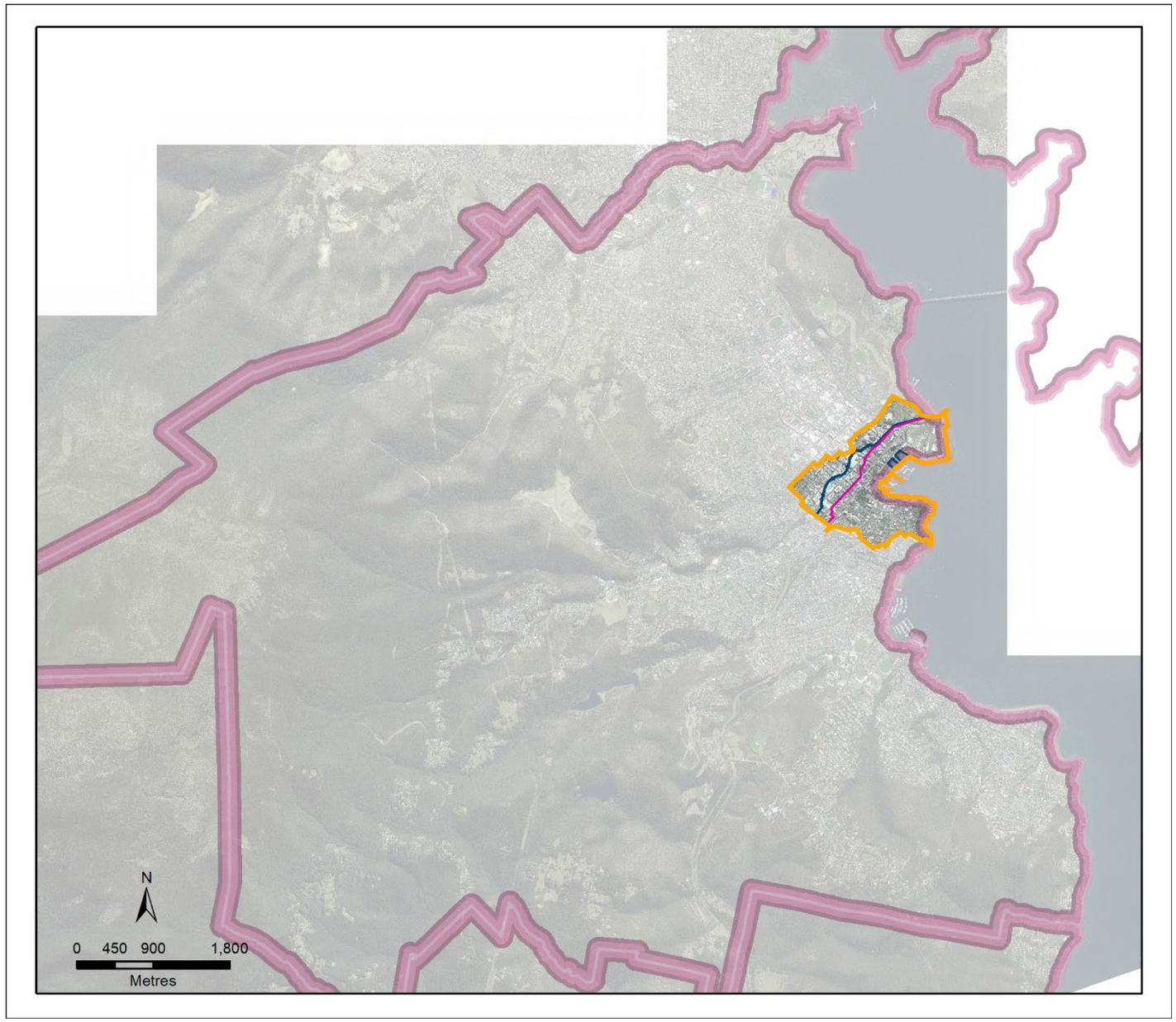
This section follows the same format for each group of catchments:

1. Summary of catchment description, risk and issues
2. MAP Catchment Overview
3. MAP Overview of Assets
4. MAP Natural Hazards
5. MAP Flood Risk
6. TABLE Management of Assets within the Catchment

Table 7 Historic image of Providence Rivulet looking upstream adjacent to the Domain (currently under the Brooker highway). Note this valley has been filled and replaced with an 1800 mm dia pipe.



8.0 GREATER HOBART (CBD AND SULLIVANS COVE)



Part 2: Greater Hobart (CBD and Sullivans Cove)

8.1 Greater Hobart (CBD and Sullivans Cove)

This section covers the central business district of Hobart, and the adjacent Sullivans Cove Catchment (including part of Battery Point). Hobart was established on the banks of the Hobart Rivulet, which has since been almost completely built over by the city. The area is at the bottom of a large catchment that extends to the summit of kunanyi/Mt Wellington, and is fully urbanised. Hobart CBD is dominated by low to medium height commercial properties. Battery Point is characterised by what were historically small workers' cottages, and are now high value, inner city medium to high density residential properties in a largely heritage protected neighbourhood.

8.2 Stormwater Network

The Hobart Rivulet runs directly under the centre of Hobart Central Business District. The enclosed channel varies in construction along its length. Some sections are purpose built concrete box culvert, and others are still the walls of the original brick or sandstone buildings adjacent to the rivulet. The natural course of the rivulet was formerly down the street now known as Market Place, and this is still the overland flow path when the rivulet capacity is exceeded. The rivulet now follows a diversion tunnel through the Domain Hill and discharges at Macquarie Point.

The pipes in the Hobart CBD are generally some of the oldest in the network, and include 100+ year old mains constructed of brick. The stormwater network in the adjoining historic suburb of Battery Point is also generally old, undersized and does not extend to all properties. There are numerous outfalls to the Derwent River, most of them under the dock area and completely inaccessible.

8.3 Catchment Specific Issues and Opportunities

The enclosed section of the Hobart Rivulet is a multifaceted asset that raises a number of issues (legal, accountability, constructability, etc) that complicate the ability to renew and/or upgrade this asset. The ownership and legal rights to and over the various segments of the Hobart Rivulet is mixed and frequently unknown or contested. A number of studies have looked at increasing the capacity of the Hobart Rivulet without identifying a feasible option for doing so. Structural failure of the Hobart Rivulet would have a catastrophic impact on the city.

The land around the waterfront is generally reclaimed land. Much of it, including the historic area of Salamanca Place is not able to drain freely at high tide. This, along with the land use and practises in the area, contribute to odour problems.

The current boom of development in Hobart CBD is increasingly encroaching on overland flow paths, as developers seek to maximise the building envelope of their properties, including by building over underground infrastructure.

Development within Battery Point is limited to infill development, with house extensions, second units, and paved outdoor areas, all of which contribute pressure on the limited drainage network.

Many of the inlet pits within the area covered by this plan have been fitted with litter baskets, which are both effective at capturing human and leaf litter, and subject to clogging and causing odours. The outlet to Hobart Rivulet is fitted with a floating litter trap.

8.4 Flood Risk

Hobart CBD is highly susceptible to flooding from the Hobart Rivulet breaking out of its enclosure at a number of sites (first adjacent to the Hobart Hospital on Collins Street, and then at Barrack Street). The onset of flooding is rapid and fast moving. City Hall – one of the city's emergency evacuation locations – is located within the flood zone, and the Royal Hobart Hospital is located adjacent to the flood zone.

Flooding within the CBD is exacerbated by a lack of clear overland drainage paths to the docks. The original creek line path was reclaimed higher than the natural drainage line causing water to pool in the CBD area prior to discharging into the docks area.

The flat reclaimed land around Salamanca Place is also flood prone, particularly at high tide. Flood risk within the residential suburb of Battery Point is generally localised and caused by inappropriately controlled stormwater runoff from individual properties.

8.4.1 Asset Management

The core components of the asset management strategies are to:

- exercise planning controls to prevent further encroachment on underground assets from new developments
- develop a Management Plan for the enclosed section of the Hobart Rivulet, that incorporates inspection, maintenance, renewal, future required setbacks for adjacent development, policy and legal considerations
- Routine inspections by CCTV of critical pipes and planned renewals of poor condition critical pipes
- Investigate options for detaining and slowing water (e.g cascading check dams) in the upstream half of the catchment (refer to SSMP for Greater Hobart (Goulburn and South Hobart)
- Manage Salamanca odour issues through regular pit clearing, and working with business owners, and TasPorts to manage discharges to the stormwater network

8.5 Catchment Modelling

This SSMP has been developed based on flood modelling done by Cardno, in consultation with internal Council officers, note that an update of this modelling is being undertaken.

8.6 Asset Summary

Table 8 Asset Summary - Greater Hobart (CBD & Sullivans Cove Area)

Catchment Name	Greater Hobart (CBD & Sullivans Cove Area)
Catchment Size (hectares)	191.2
Catchment Land Use	Urban
Value of Assets	$31.5m
Length of Piped Assets (km)	31.6
Length of Open Waterways (km)	0.9
Forecast CAPEX spend over 5 years	$2m - $2.5m
Overall Flood Risk	HIGH

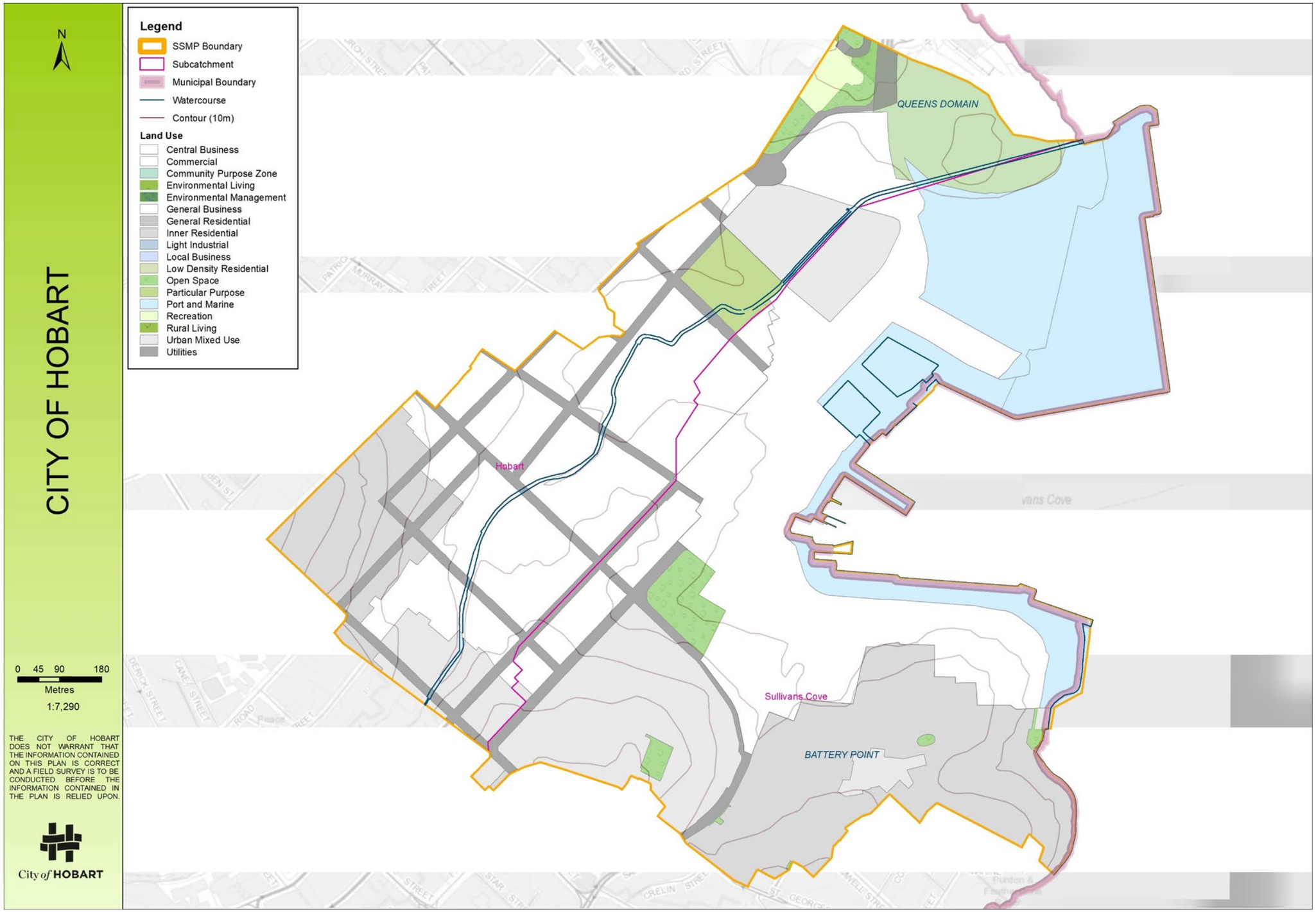


Figure 4 Map_ Greater Hobart Overview

Part 2: Greater Hobart (CBD and Sullivans Cove)

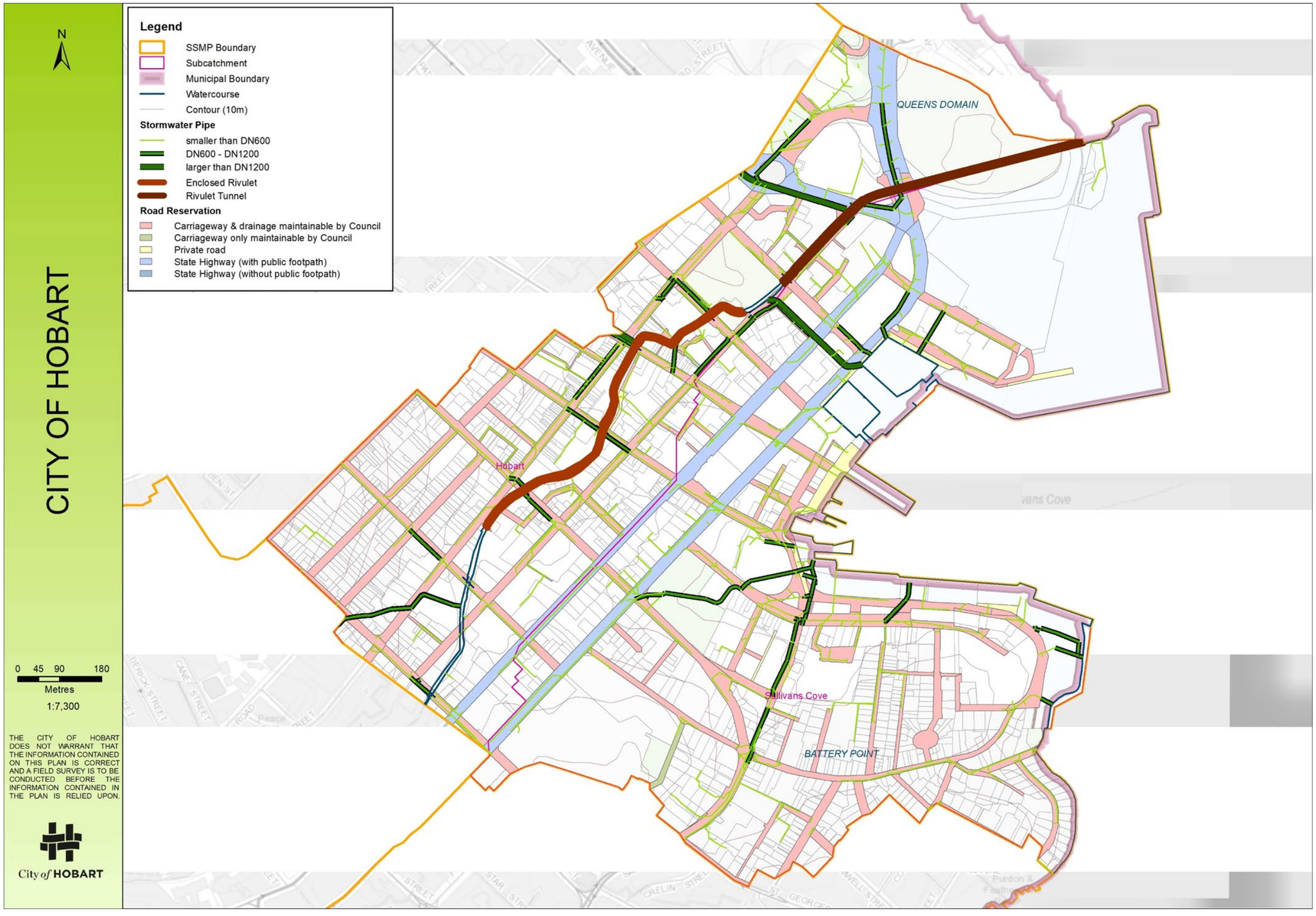


Figure 5 Map _ Greater Hobart Asset Plan

Part 2: Greater Hobart (CBD and Sullivans Cove)

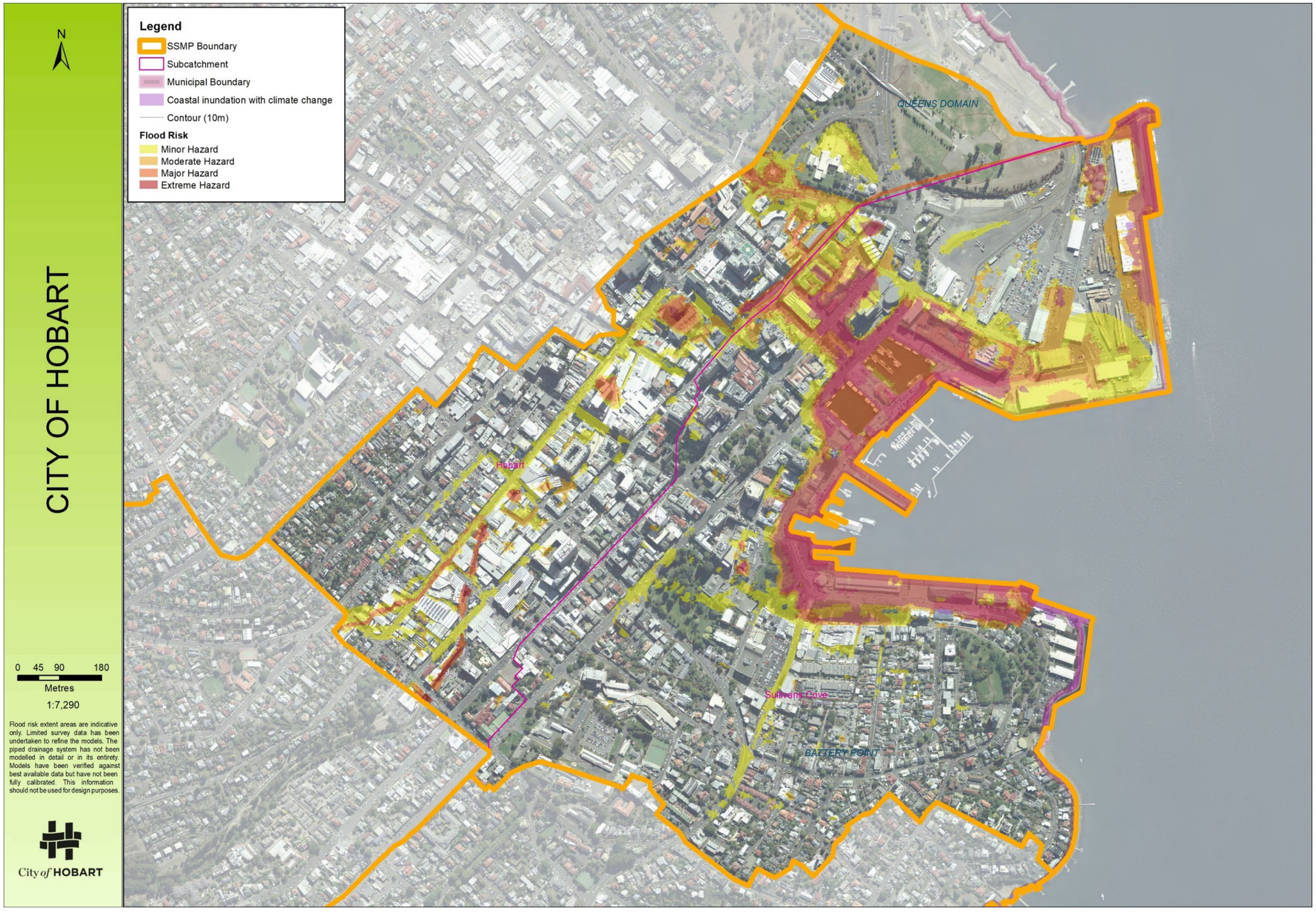
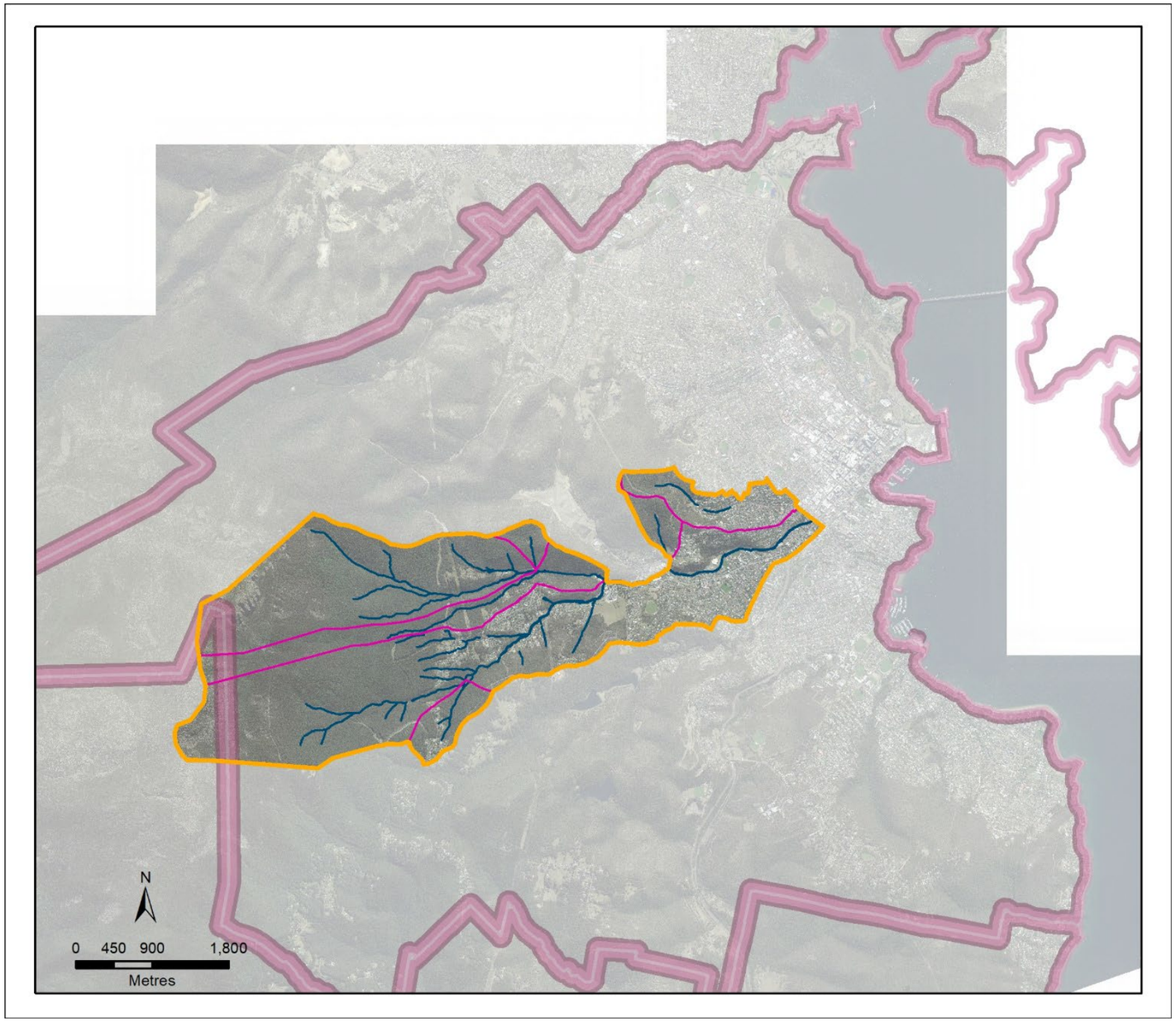


Figure 6 Map_ Greater Hobart Flood Risk

Part 2: Greater Hobart (CBD and Sullivans Cove)

9.0 GREATER HOBART (GOULBURN AND SOUTH HOBART)



Part 2: Greater Hobart (Goulburn and South Hobart)

9.1 Greater Hobart (Goulburn and South Hobart)

The catchments of Goulburn and South Hobart are all subcatchments of the Greater Hobart Catchment. The top of the catchment extends to the summit of kunanyi/Mount Wellington which is characterised by the steep, natural bushland of Wellington Park. Further down the catchment were historically large residential parcels that over time have been subdivided. Still further down is medium to high density residential suburbs, including a number of old, heritage properties, and a mix of commercial and other land uses.

9.2 Stormwater Network

The subcatchments eventually drain into the enclosed section of the Hobart Rivulet which runs under the central business district of the city.

Goulburn Street Rivulet drains the southern side of Knocklofty Park. In its upper reaches it is steep and frequently dry. Once it reaches the urban area it is piped for most of its remaining length. The drainage network is generally sparse with poor road drainage higher in the catchment and unserviced residential properties in many of the older areas.

Hobart Rivulet is generally open upstream of the CBD, with high natural values in the upper reaches of the rivulet. There are many tributaries to the Hobart Rivulet, including Myrtle Gully Rivulet, Guy Fawkes Rivulet, and Featherstone Creek Rivulet, as well as many other un-named and informally defined drainage lines.

Infrastructure upgrades have generally not kept pace with development in the upper half of the catchment (e.g South Hobart, Ferntree), with many areas serviced by a disjointed collection of table drains and road culverts. In the established suburb of lower South Hobart (east of Hillborough Road), a number of drainage lines cut across private residential properties, and there are a number of properties that drain to shared private systems before connecting to the public system, or are serviced only by private on site systems.

9.3 Catchment Specific Issues and Opportunities

There is a large low hazard landslip zone in the lower third of the catchment, and sporadic medium to high hazard zones in the upper catchments. If a landslip is caused by or occurs during a high rainfall event there is a risk of debris flow along the path of the rivulet. The width of a debris flow event may be in excess of a standard flood width.

There are a large number of onsite stormwater disposal systems in areas where there is poor infrastructure.

The Hobart Rivulet is a beautiful and celebrated section of Rivulet and Public Open Space. There has been significant community engagement in this area particularly around the platypus in this section of Rivulet and the Rivulet and linear access have high utilisation rates and appreciation amongst the greater Hobart community.

There are a number of large, undeveloped lots on the urban fringe and increasing housing densities as you extend towards the city.

Opportunities to enhance the ecological conditions of Hobart Rivulet while providing flood mitigation measures exist in locations where Council owns land in the corridors around the rivulet (or third party land such as owned by the Cascade Brewery), specifically cascading check dams or similar.

9.4 Flood Risk

Several residential properties in South Hobart, and South Hobart Primary School, are at risk of flooding, including the area between Syme St and the Hobart Rivulet which experienced flooding in the 2018 event. Residential properties in this area are in the lowest drainage line through this section. Nuisance flooding occurs at a number of properties where stormwater is discharged in inappropriate locations or the drainage system is undersized or prone to blockages.

Some residential lots are impacted by flooding however the community is generally protected from flooding of the Rivulet by the Hobart Rivulet linear park. The park allows the Rivulet to accept high flows without unduly impacting the community.

9.5 Asset Management

The core components of the asset management strategies are to:

- improve the network connectivity in the upper catchment
- exercise planning controls to prevent further encroachment from new developments on underground assets, overland flow paths and the rivulet flood plain
- investigate upper catchment rivulet improvement options aimed at reducing peak flows and flood velocities and improving ecological outcomes
- routine condition inspections by CCTV of critical pipes
- develop a Management Plan for the Hobart Boulder Trap

9.6 Catchment Modelling

This SSMP has been developed based on flood modelling done by Cardno, in consultation with internal Council officers, note that an update of this modelling is being undertaken

9.7 Asset Summary - Hobart (Goulburn & South Hobart)

Table 9 Greater Hobart (Goulburn and South Hobart) Asset Summary

Catchment Name	Hobart (Goulburn & South Hobart)
Catchment Size (hectares)	1415
Catchment Land Use	Mixed Bushland and Urban
Value of Assets	$30.6m
Length of Piped Assets (km)	37.8
Length of Open Waterways (km)	13.0
Forecast CAPEX spend over 5 years	**$2.5m - $3m**
Overall Flood Risk	MEDIUM

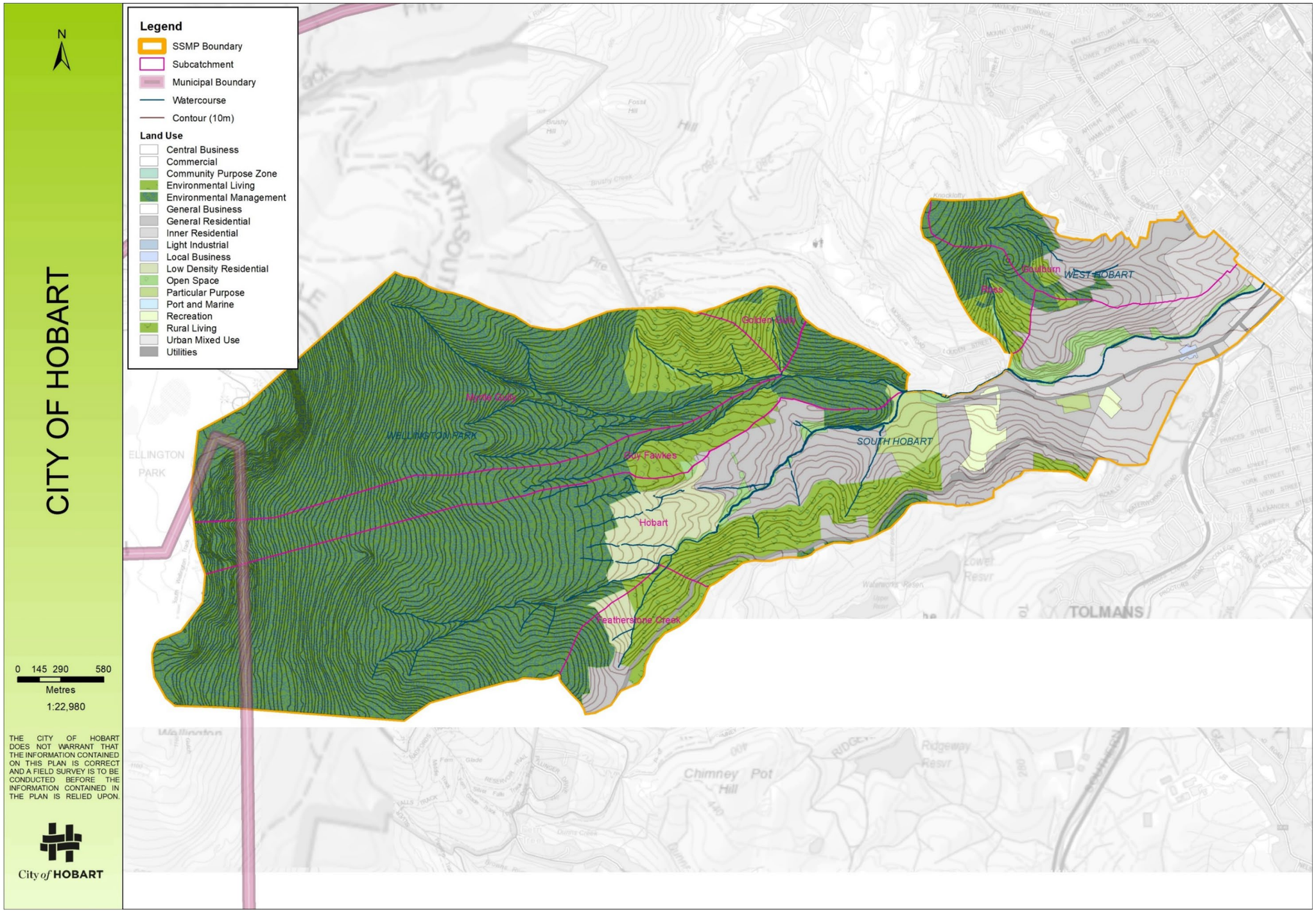


Figure 7 Map_South Hobart Catchment Overview

Part 2: Greater Hobart (Goulburn and South Hobart)

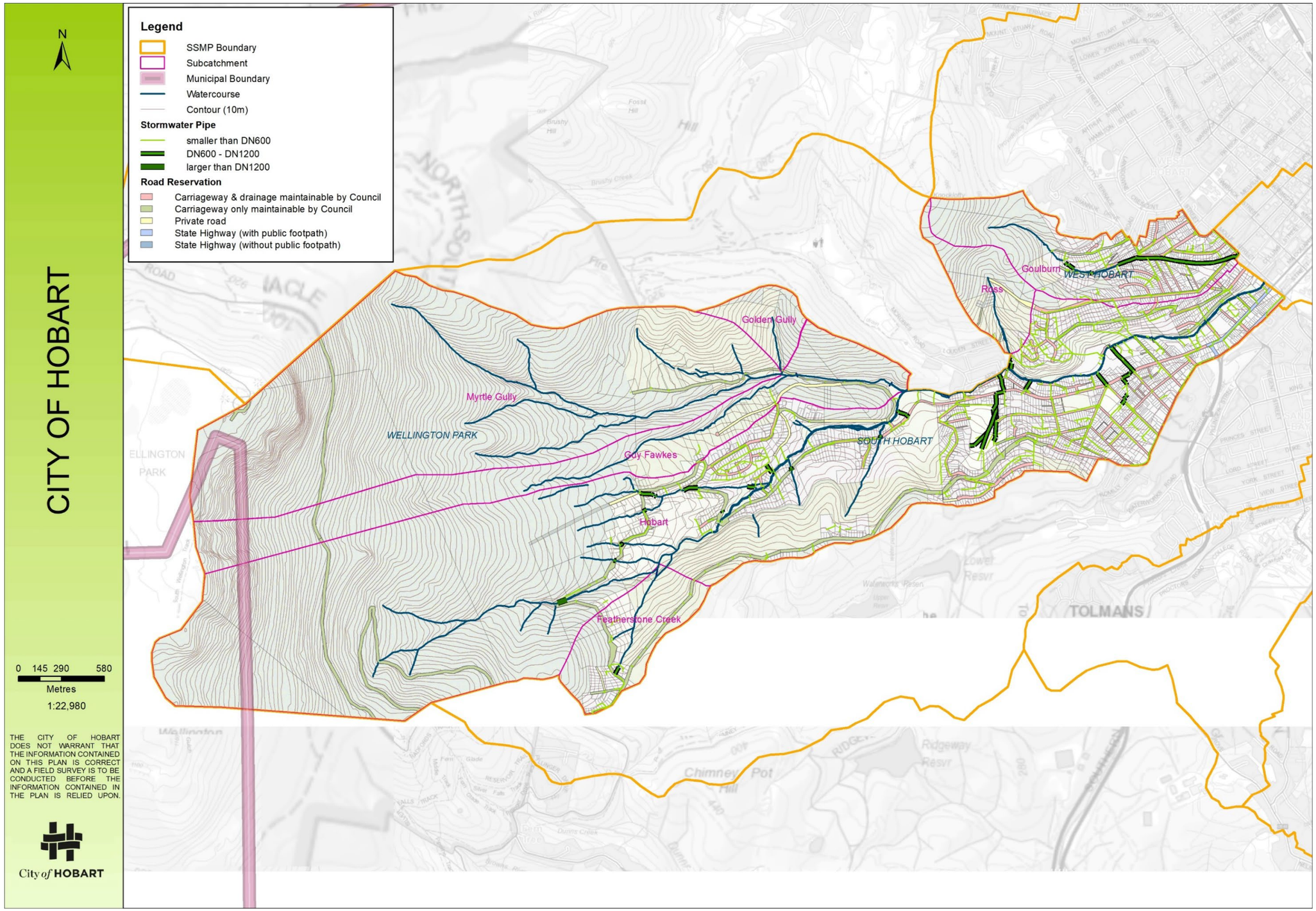


Figure 8 Map _Greater Hobart (South Hobart) Overview of Assets

Part 2: Greater Hobart (Goulburn and South Hobart)

CITY OF HOBART

N

Legend

- SSMP Boundary
- Subcatchment
- Municipal Boundary
- Building
- Road Reservation
- Watercourse
- Contour (10m)

Coastal Inundation Risk

- Existing risk extent
- Risk extent with climate change

Landslide Hazard

- Low
- Medium
- Medium-active

Other Hazards

- Potentially contaminated site
- Coastal erosion hazard area

0 145 290 580

Metres

1:22,980

THE CITY OF HOBART DOES NOT WARRANT THAT THE INFORMATION CONTAINED ON THIS PLAN IS CORRECT AND A FIELD SURVEY IS TO BE CONDUCTED BEFORE THE INFORMATION CONTAINED IN THE PLAN IS RELIED UPON.

City of HOBART

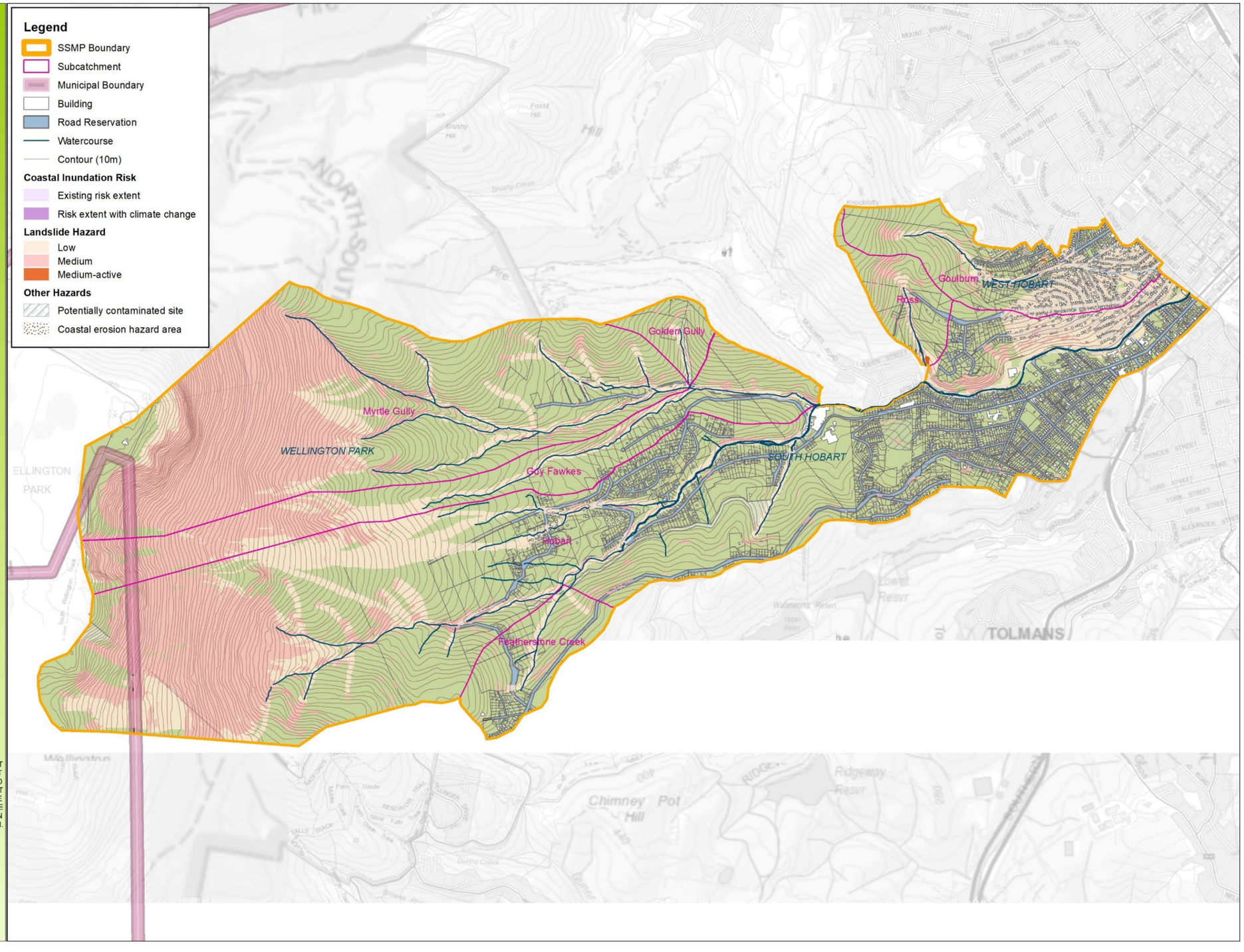


Figure 9 Map_ Greater Hobart (South Hobart) Natural Hazards

Part 2: Greater Hobart (Goulburn and South Hobart)

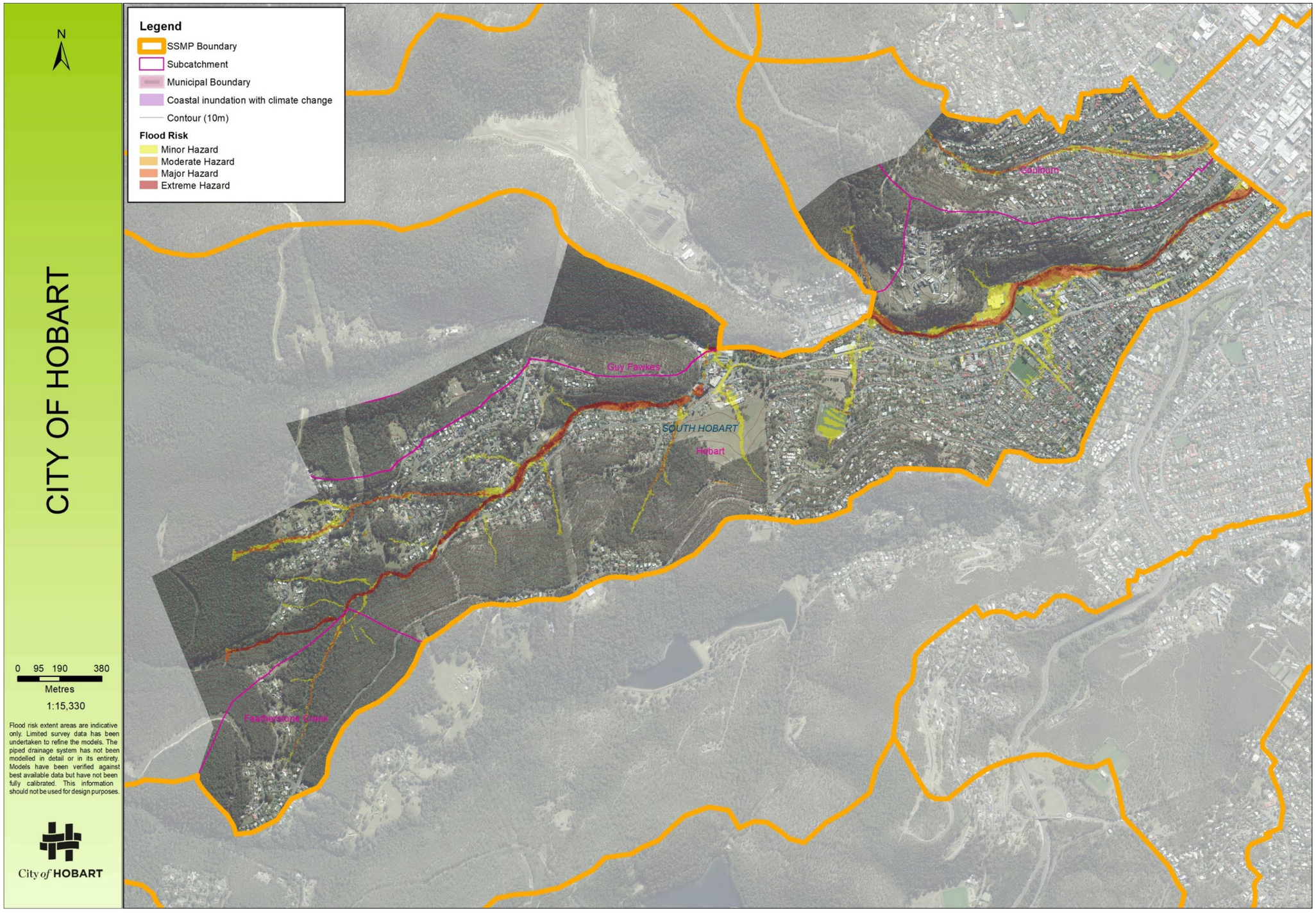
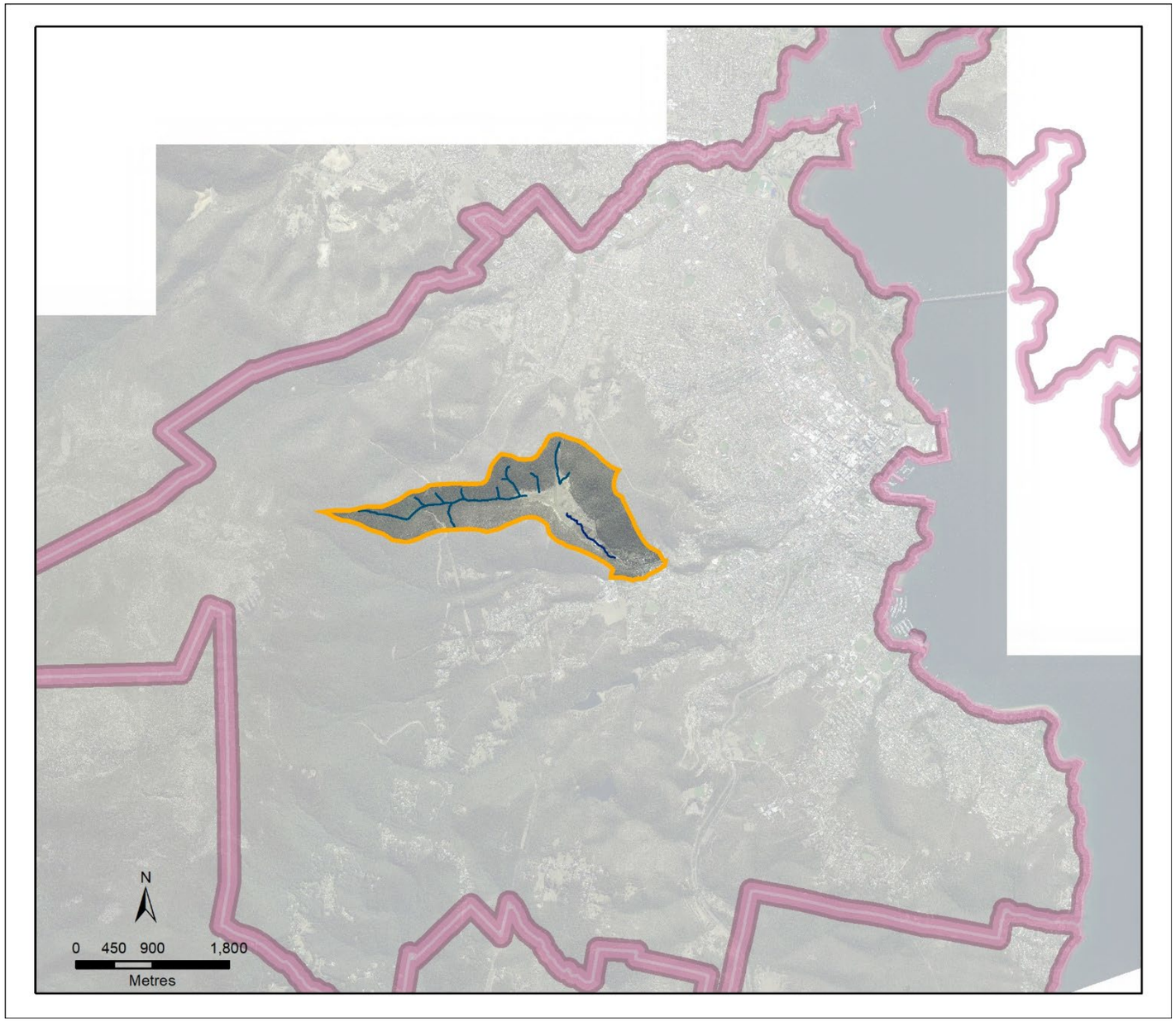


Figure 10 Map_Greater Hobart (South Hobart) Flood Risk

Part 2: Greater Hobart (Goulburn and South Hobart)

10.0 MCROBIES GULLY



Part 2: McRobies Gully

McRobies Gully

McRobies Catchment is located to the west of Hobart CBD. The catchment is predominantly steep bushland, with a small urban area at the lowest point of the catchment. The urban area comprises mostly residential properties, including a number of heritage properties, as well as the Hobart Women's Prison Historical Site and a couple of commercial and industrial properties. At the centre of the catchment is the Hobart City Council landfill and Waste Transfer Station.

10.1 Stormwater Network

A number of minor tributaries meet within the landfill site to form McRobies Gully Rivulet. A series of underground pipes and open channels, convey the rivulet under McRobies Road and to the Hobart Rivulet which forms the downstream boundary of the catchment. The Ross Rivulet (a small, non-urban catchment) runs to the east of the urban area, joining the Hobart Rivulet some 300 metres downstream of McRobies Gully Rivulet. Otherwise there is limited infrastructure within the catchment.

There is extensive stormwater management infrastructure within the landfill site to divert external Rivulets and flow paths around the landfill site and manage internal drainage to stormwater where appropriate and to sewerage where it is contaminated.

10.2 Catchment Specific Issues and Opportunities

The Syme Street area is subject to flooding as there are a number of dwellings in the low points on this catchment.

The catchment is more flood prone than expected due to the landfill site acting as a large impervious area due to the required clay capping and infiltration minimisation associated with the landfill requirements.

There is a significant risk to water quality from runoff from the Landfill site. This can deposit sediment, weeds, contaminated soil, nutrient loads and litter into the Hobart Rivulet. This is currently managed through a series of existing pollution control measures subject to routine cyclical maintenance. The landfill site has maintenance and storm event actions that are undertaken to reduce this risk. Council will be installing a large CDS style GPT in the lower portion of the catchment in 2025.

10.3 Flood Risk

The urban area is bounded by rivulets on three sides and is highly flood prone. The cause of the flooding is water coming from the catchment to the north, via the McRobies Gully Rivulet and to a lesser extent Ross Rivulet. The Hobart Rivulet is generally contained within its banks at this location and does not usually contribute to the flooding in this catchment.

The brunt of the flood damage is borne by the houses in Degraves Street and the lower side of Symes Street, as well as the industrial property off Degraves Lane.

Mitigation options have been explored in this catchment and it has been found that it is not feasible to provide full flood immunity to these properties. Extensive, high risk and high cost capital works may partially reduce the flood risk but will not remove it.

The flood risk to these properties during small events may be partially mitigated through local improvement of the surface drainage.

10.4 Asset Management

The core components of the asset management strategies are to:

- Manage the critical assets through the Landfill site and between the Landfill site and the Hobart Rivulet through routine maintenance (CCTV inspections, pipe jetting)
- Investigate mitigation options for the flood risk to residential properties of small, frequent rainfall events.
- Reduce the risk of litter and sediments from the Landfill site entering the Hobart Rivulet through the existing series of leachate ponds, sediment basins, and gross pollutant traps
- Engage with the community to promote private flood action plans and appropriate insurance levels

10.5 Catchment Modelling

This SSMP has been developed based on flood modelling and analysis done by GHD, in consultation with Council officers. The Flood Risk mapping is using a simplified model built by Cardno and is for illustrative purposes only.

10.6 Asset Summary

Table 10 McRobies Gully Asset Summary

Catchment Name	McRobies
Catchment Size (hectares)	288.1
Catchment Land Use	Mixed urban and bushland
Value of Assets	$9.7m
Length of Piped Assets (km)	7.8
Length of Open Waterways (km)	12.9
Forecast CAPEX spend over 5 years	$1m - $1.5m
Overall Flood Risk	HIGH

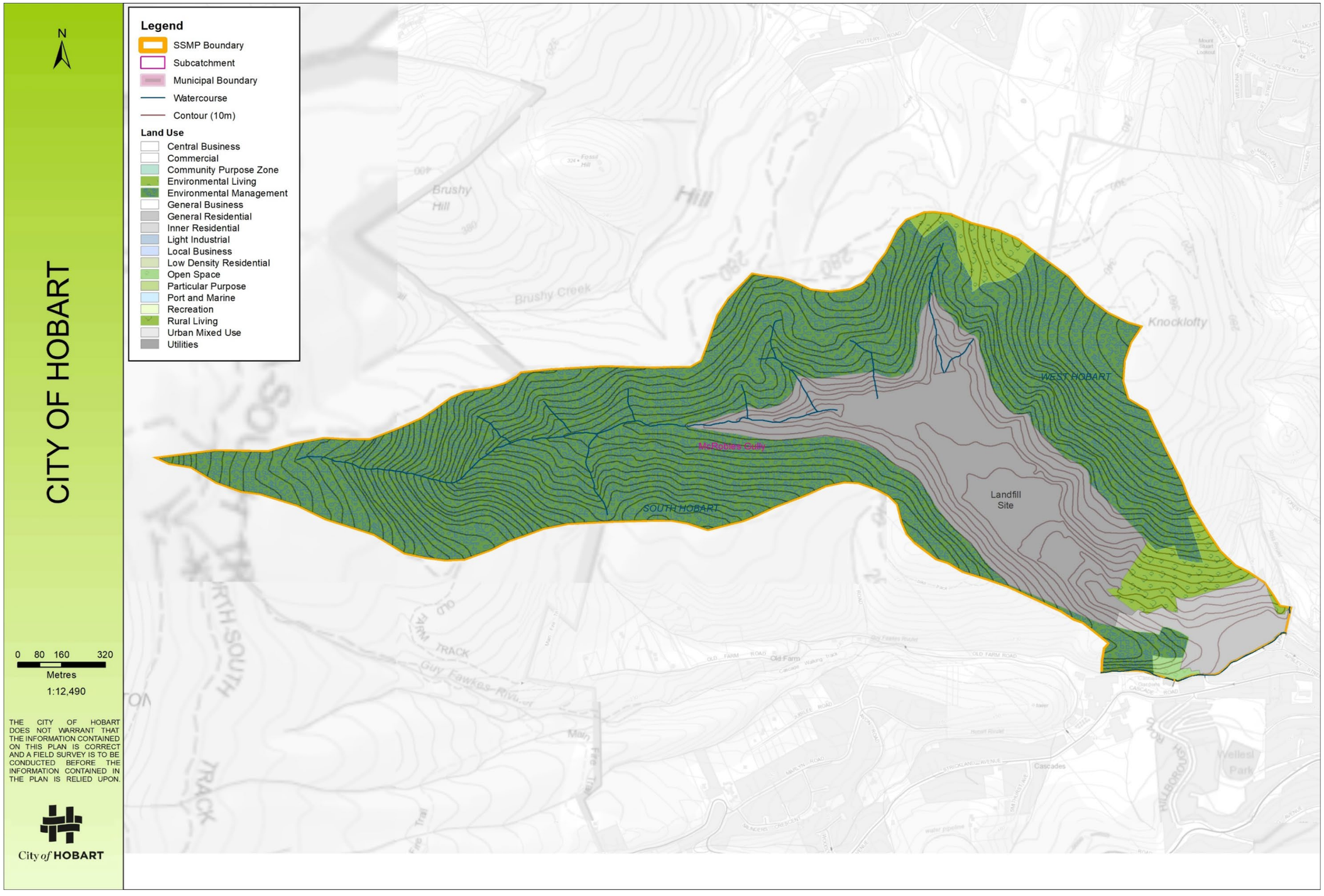


Figure 11 Map_ McRobies Gully Catchment Overview

Part 2: McRobies Gully

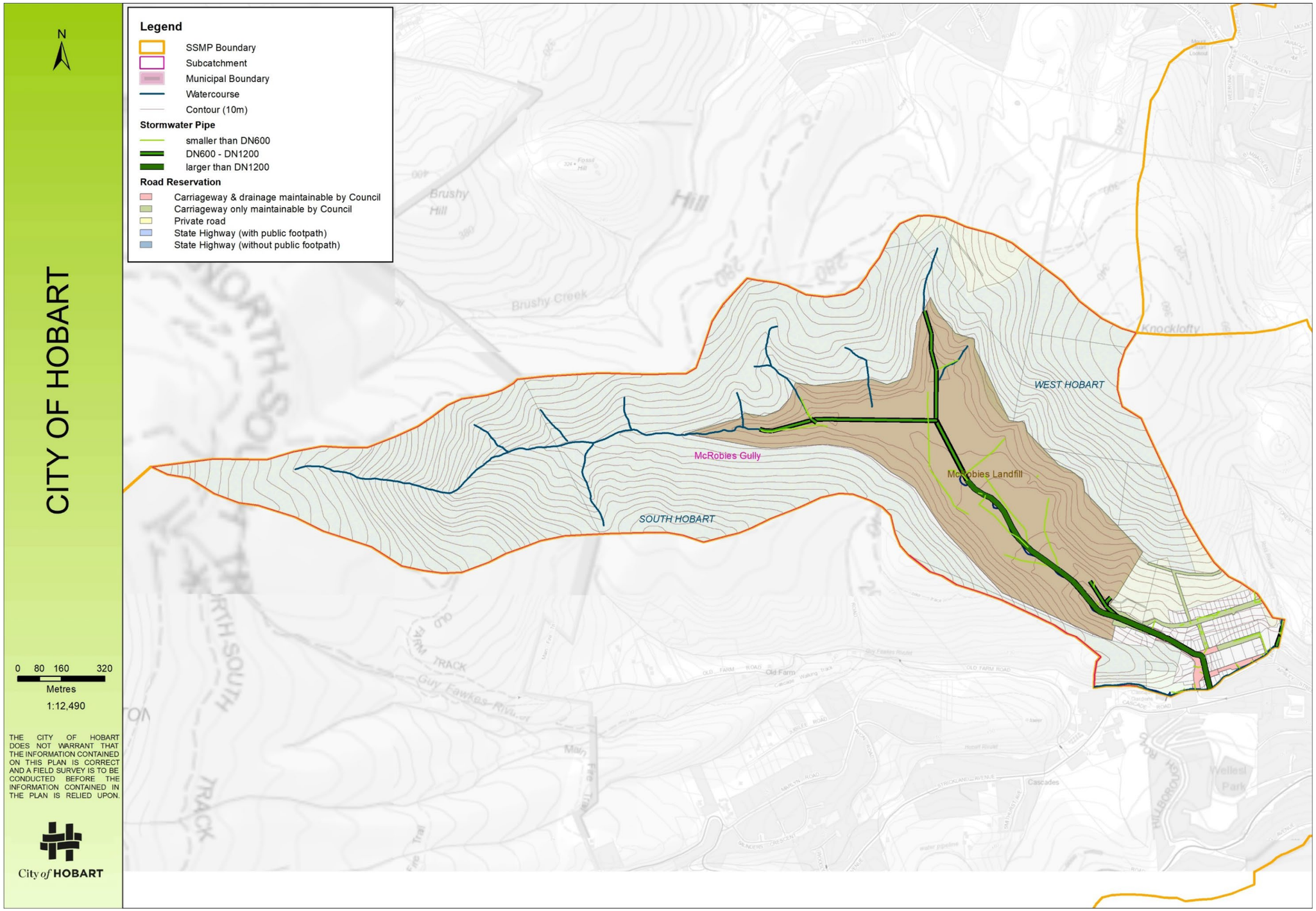


Figure 12 Map_ McRobies Gully Overview of Assets

Part 2: McRobies Gully

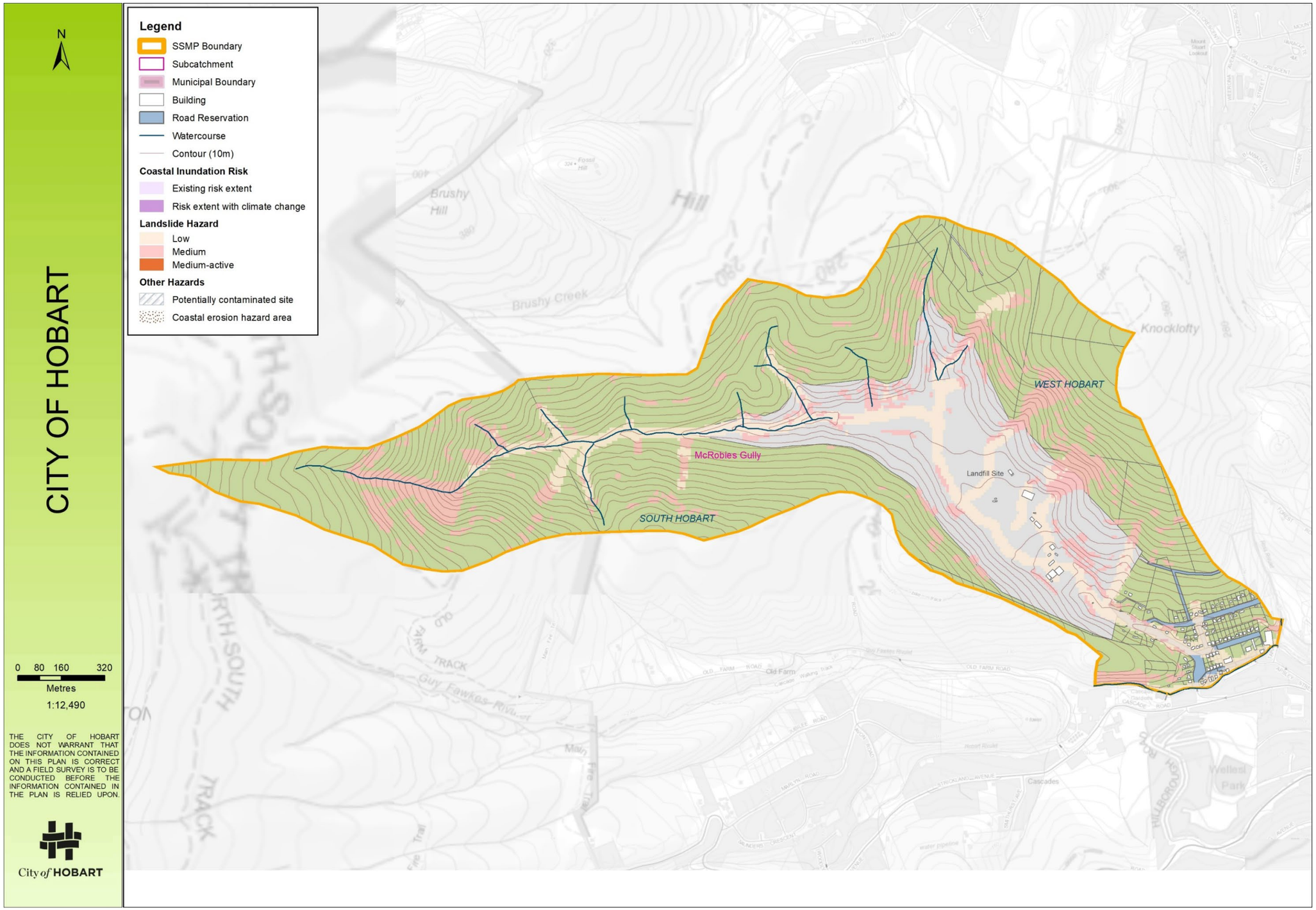


Figure 13 Map_McRobies Gully Natural Hazards

Part 2: McRobies Gully

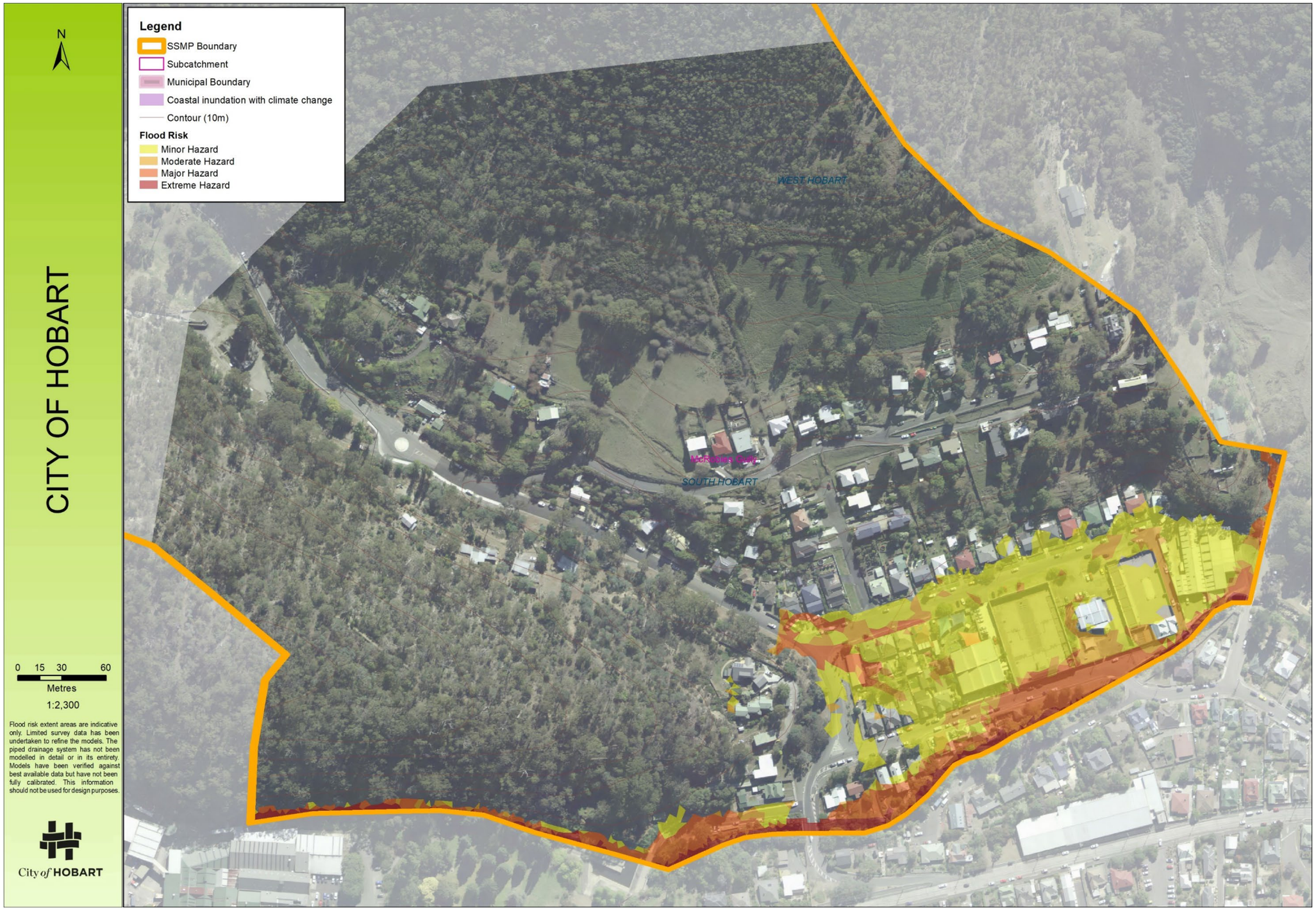
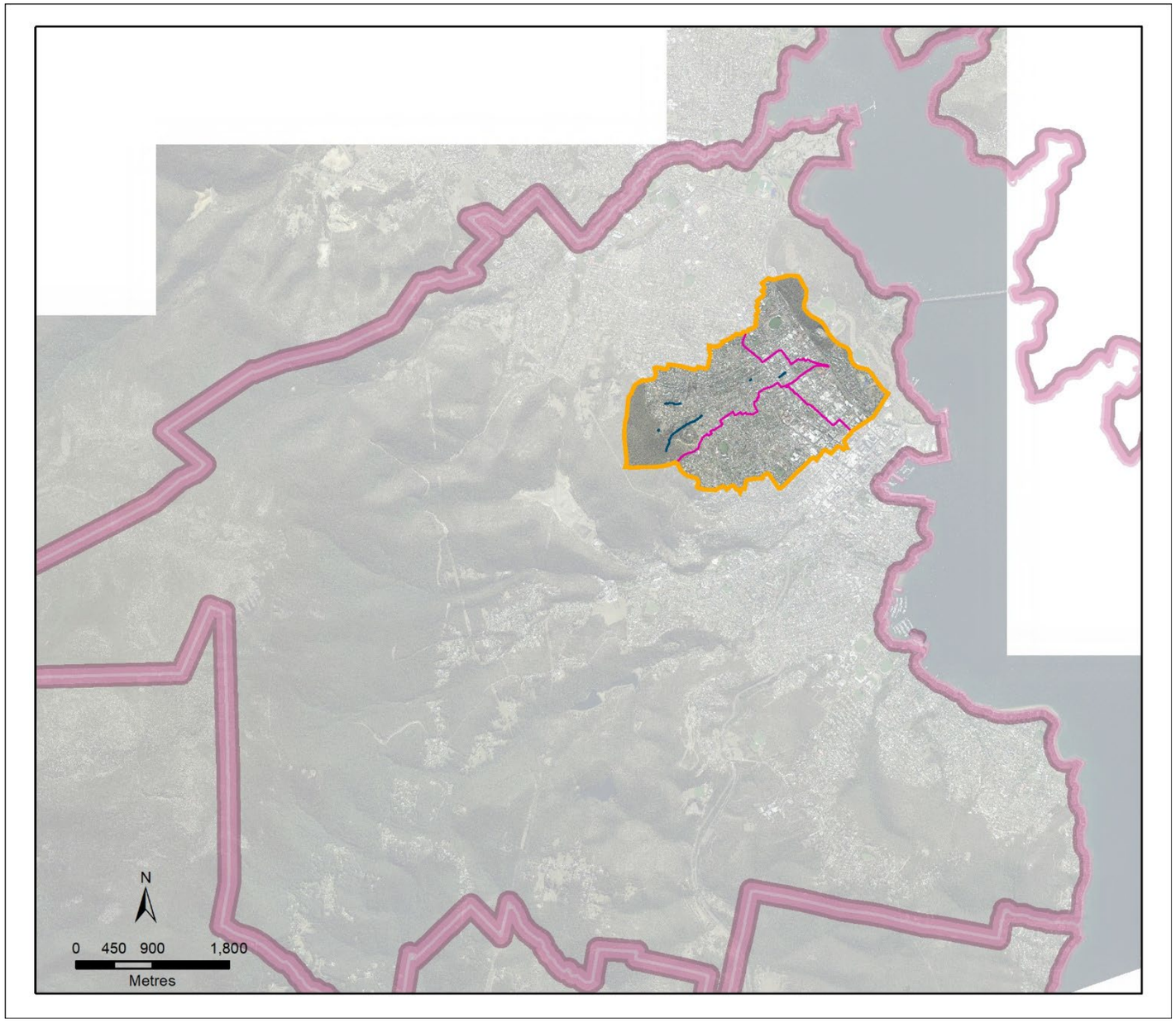


Figure 14 Map_McRobies Gully Flood Risk

Part 2: McRobies Gully

11.0 GREATER HOBART (PROVIDENCE, WARWICK AND PARK STREET)



Part 2: Greater Hobart (Providence, Warwick and Park Street)

11.1 Greater Hobart (Providence, Warwick and Park Street) Summary

The catchments of Providence Gully, Warwick Street and Park Street (North Hobart) are all subcatchments of the Greater Hobart Catchment. The majority of the combined catchments are inner city, medium density residential, including some commercial and light industrial properties. The top of Providence and Warwick Street back onto the bushland reserve of Knocklofty Park. These catchments both get progressively steeper as they get higher. The Park Street subcatchment is generally flat and covers the former swampland between the Domain hill and Mt Stuart and West Hobart hills.

11.2 Stormwater Network

The three valleys that contained these historic rivulets have been filled over time and the flow paths are nearly indistinguishable in the landscape. Whilst each of these catchments has significant trunk main to carry much of the flow the disappearance of the overland flow paths through these areas has caused the overland flow routes to be built over for many of these areas. These subcatchments all eventually drain into the enclosed section of the Hobart Rivulet.

Park Street Rivulet is piped for its full length in a mix of brick arch, concrete pipe and sandstone box culvert. It joins the Hobart Rivulet under the Fountain Roundabout on the Brooker Highway.

The Providence Gully Rivulet joins the Park Street Rivulet at Campbell Street Primary School. A piped diversion along Elizabeth Street intercepts the northern most part of the catchment and directs water away from the top end of the Park Street Catchment. Providence Gully Rivulet has a few short uncovered sections, but is piped for most of its length in the urban area. The two main tributaries (from below Valley Street and below Summerhill Road) meet behind the residential properties on Newdegate Street.

The Warwick Street Rivulet is piped for its full length. Downstream of the Warwick-Murray Street junction, the original piped watercourse runs down the middle of the city blocks and has been largely built over. A newer diversion has been constructed down Murray Street following the road. The two rejoin at Melville Street and connect to the Hobart Rivulet at the Elizabeth Street Bridge.

Overland flows cross the designated catchment boundaries at a number of locations.

11.3 Catchment Specific Issues and Opportunities

This part of the city and hence the network is relatively old. There are a number of properties that drain to shared private systems before connecting to the public system, and some lots that do or are likely to drain into the sewerage system.

The steep upper urban boundary of Providence Catchment is highly landslip prone. Concentrated runoff from a number of sources exacerbates this issue.

Opportunities for water quality treatment are limited within the combined catchments. Soundy Park provides one possibility although the site is subject to contaminated soil.

There are a number of large, albeit very steep, undeveloped lots on the urban fringe. Further down in the catchment, there is a lot of infill development and pressure for increased infill development in these areas is increasing.

11.4 Flood Risk

The residential properties bisected by the piped rivulets are susceptible to flooding when the capacity of the piped network is exceeded. Flood behaviour is difficult to predict due to the convoluted and/or obstructed overland flow paths through highly developed residential areas. Fences, buildings and other structures create temporary dams, and/or may redirect flood waters in hazardous or dangerous ways.

Properties at the fringes of the residential areas may be subject to overland runoff from Knocklofty Reserve.

11.5 Asset Management

The core components of the asset management strategies are to:

- exercise planning controls to prevent further encroachment from new developments on underground assets and overland flow paths
- undertake detailed modelling of the piped network capacity in areas identified as high risk
- capital works upgrades to mitigate flood risk (Newdegate Street area, Letitia Street area, and potentially Lansdowne/Warwick Street area)
- Routine condition inspections by CCTV of critical pipes

11.6 Catchment Modelling

This SSMP has been developed based on flood modelling done by Cardno, in consultation with internal Council officers.

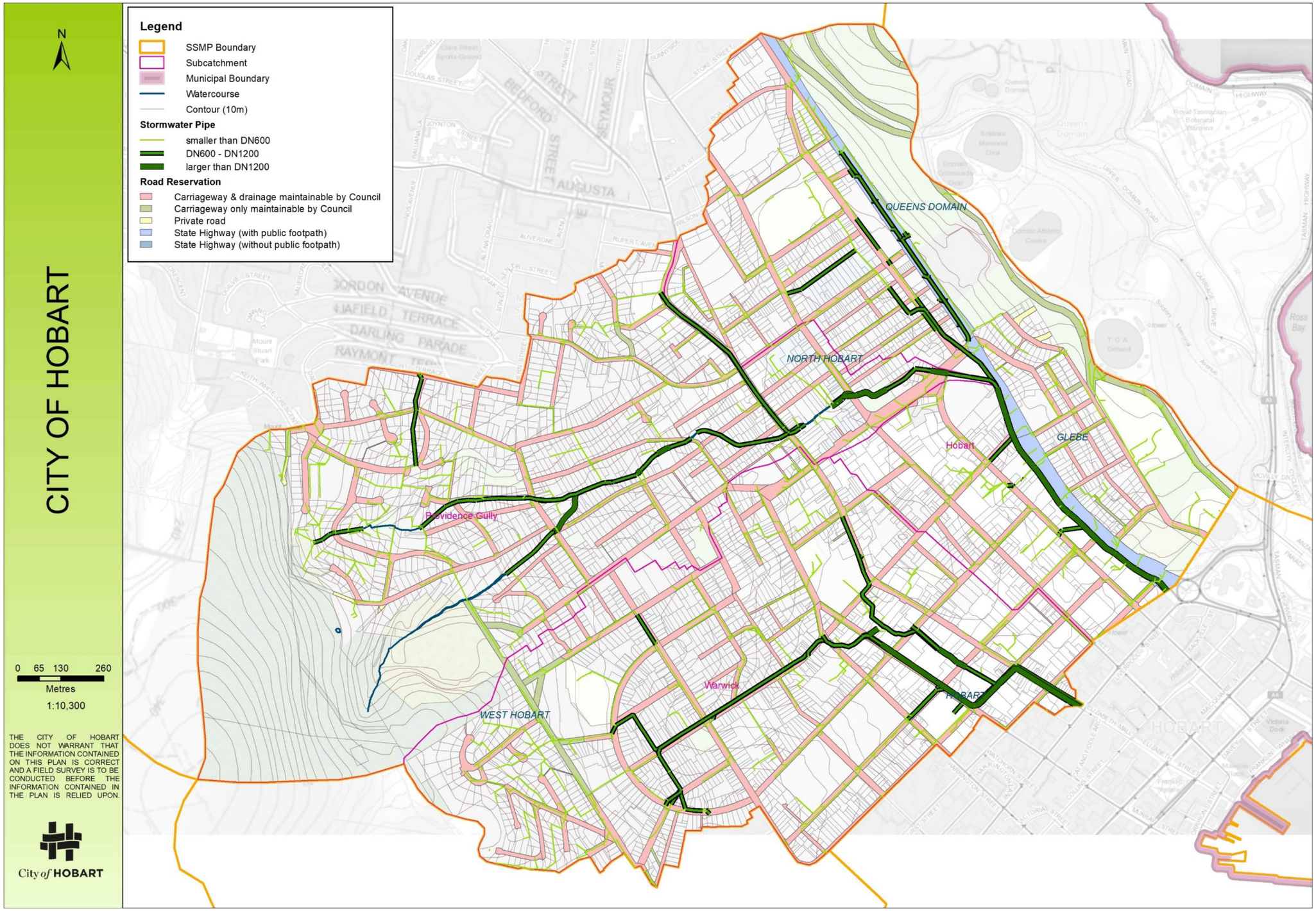
Asset Summary Greater Hobart (Providence, Warwick and Park Street

Table 11 Greater Hobart (Providence, Warwick and Park Streets) Asset Summary

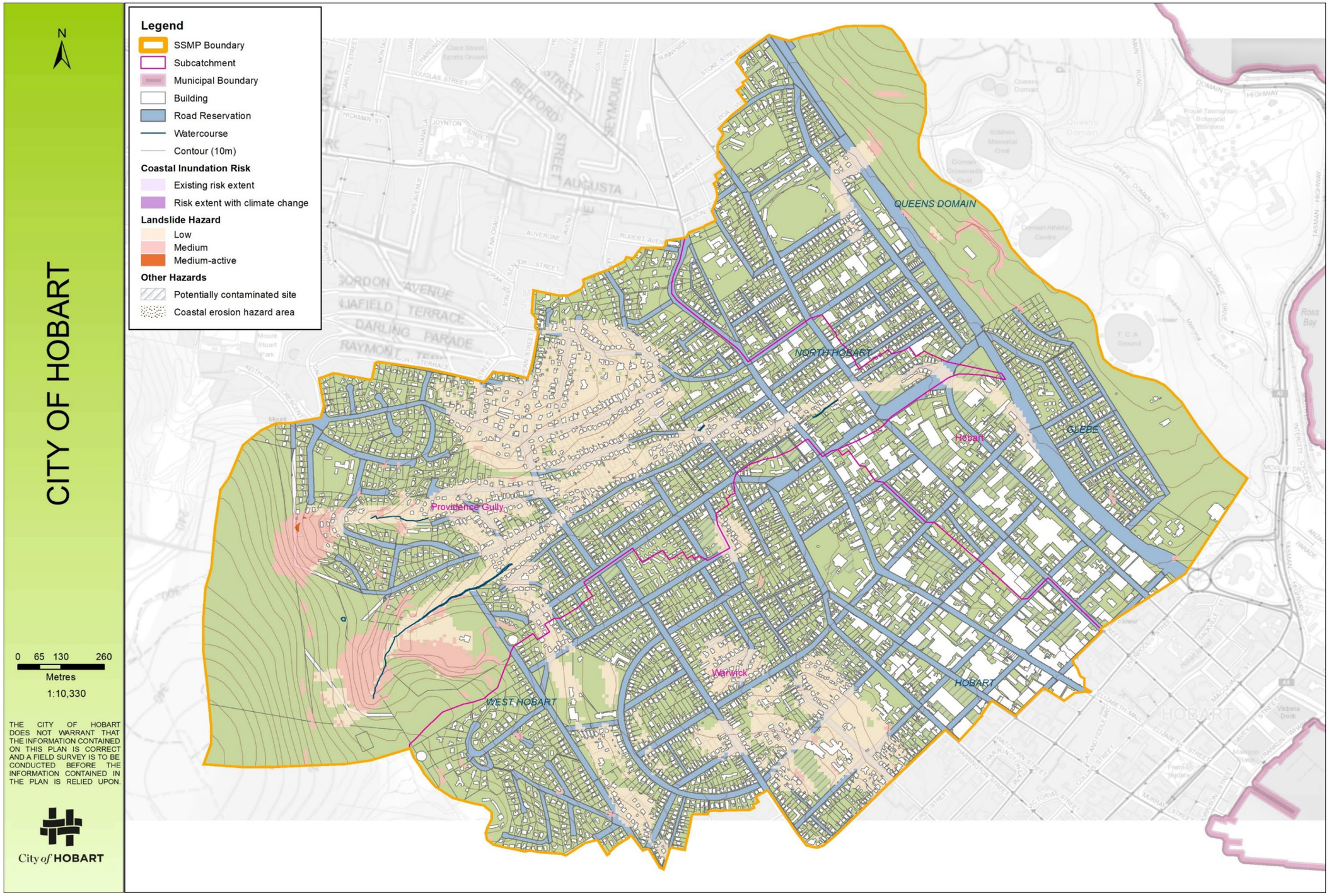
Catchment Name	Hobart (Providence, Warwick & Park)
Catchment Size (hectares)	466.3
Catchment Land Use	Urban
Value of Assets	$13.4m
Length of Piped Assets (km)	58.1
Length of Open Waterways (km)	1.0
Forecast CAPEX spend over 5 years	**$3 million**
Overall Flood Risk	HIGH

Map 2.1(4) Catchment Overview

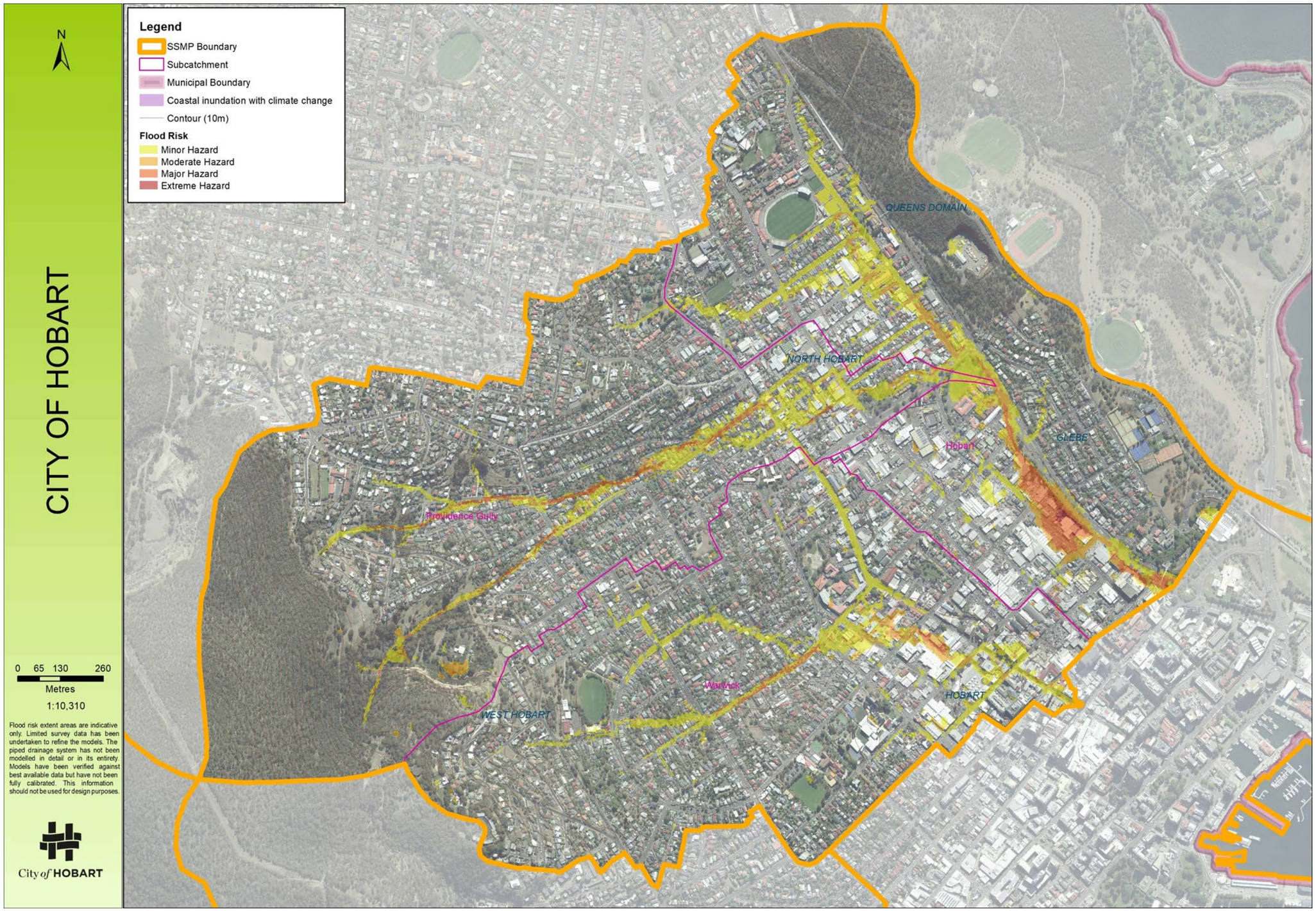
Map 2.2(4) Overview of Assets



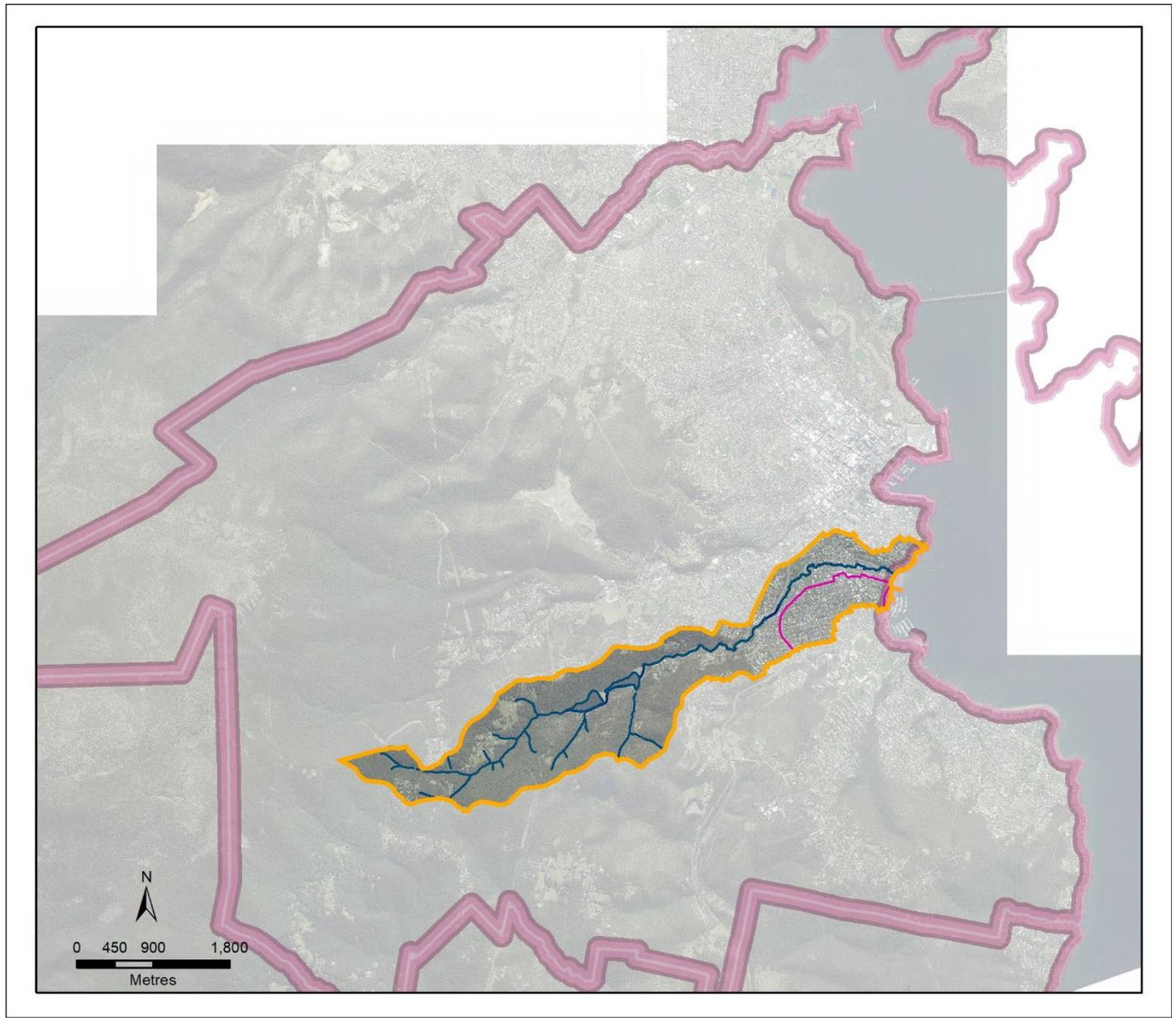
Map 2.3(4): Natural Hazards



Map 2.4(4): Flood Risk



12.0 Wellington and Ashfield



Part 2: Wellington and Ashfield

12.1 Wellington and Ashfield Summary

Wellington and Ashfield Catchments are located to the south of Hobart CBD. The top of Wellington Catchment is the steep upper reaches of kunanyi/Mt Wellington. It includes the water catchment area feeding the two drinking water reservoirs in the Waterworks Reserve. The Catchment is bisected by the major arterial routes of the Southern Outlet, Regent Street and Sandy Bay Road. Ashfield Catchment is bounded by the Southern Outlet at its top, and is entirely urban with a mix of residential and commercial properties.

12.2 Stormwater Network

Wellington Catchment drains to Sandy Bay Rivulet, which flows in an open channel for almost its entire length. Most of the land bordering the rivulet is privately owned, and the lower section has been heavily channelised with both public and privately owned walls. The drainage lines in Ashfield Catchment are fully piped, including a piped diversion from Duke Street following the road, to twin outlets at the Yacht Club.

12.3 Catchment Specific Issues and Opportunities

Management of Sandy Bay Rivulet is complicated by the number of adjoining private properties. The nature of title boundaries varies with some being the centreline of the creek, others being the top of bank, and others more permanently defined.

The lower part of the catchments are highly developed, and natural drainage lines within Ashfield have been largely built over. Despite this there is still ongoing infill development which encroaches further onto both assets and overland flow paths. In the middle part of the catchment opportunities for further development exist from large undeveloped privately owned parcels. A number of large (ten plus lot) subdivisions have been sealed in the last ten years, all on very steep, shallow soiled land.

Properties in the lower part of both catchments are generally old, and the level of servicing varies, with a number of properties either draining to shared private systems, or through suspended or charged systems to the kerb and gutter. Some properties may drain to the sewer network.

The land adjoining Waterworks Road is prone to land slip in a number of places. The risk may be exacerbated by poorly designed private stormwater outlets within private properties.

12.4 Flood Risk

A number of properties adjoining Sandy Bay Rivulet are at high risk of riverine flooding. At the outlet to the rivulet, the properties in the flat area around Marieville Esplanade are at risk of coincident riverine flooding and coastal inundation from storm surge.

Properties in the path of the natural drainage lines in Ashfield Catchment are at risk of overland flooding when the capacity of the drainage system is exceeded.

12.5 Asset Management

The core components of the asset management strategies are to:

- exercise planning controls to prevent further encroachment from new developments on underground assets, overland flow paths and the rivulet flood plain
- Work within the Southern Tasmanian Council Authority Coastal Hazard Mitigation Strategy for the approach to the Nutgrove and Long Beach properties at risk of coincident flooding
- investigate upper catchment rivulet improvement options aimed at improving ecological outcomes
- routine condition inspections by CCTV of critical pipes

12.6 Catchment Modelling

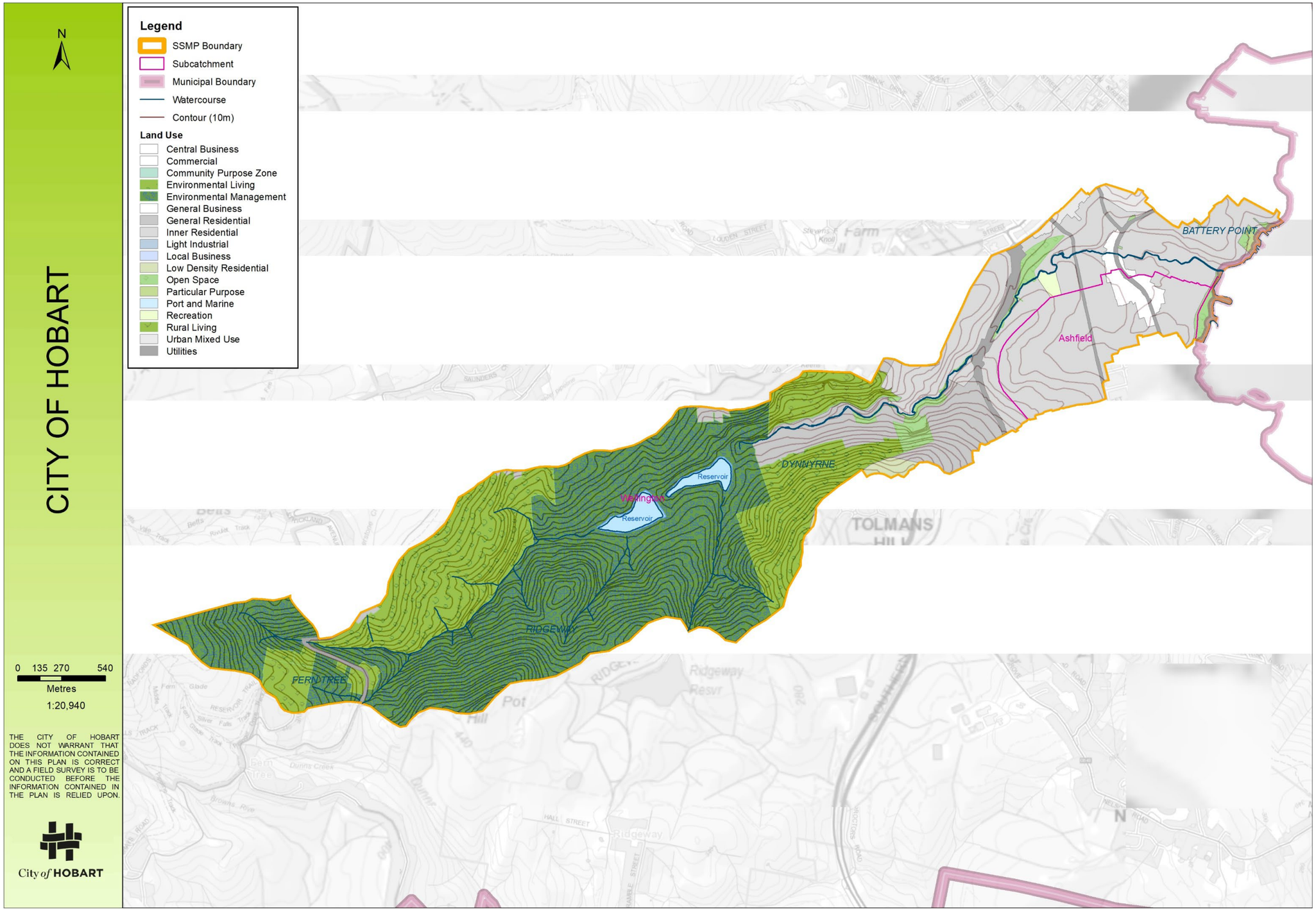
This SSMP has been developed based on internal flood modelling.

12.7 Asset Summary

Table 12 Wellington and Ashfield Asset Summary

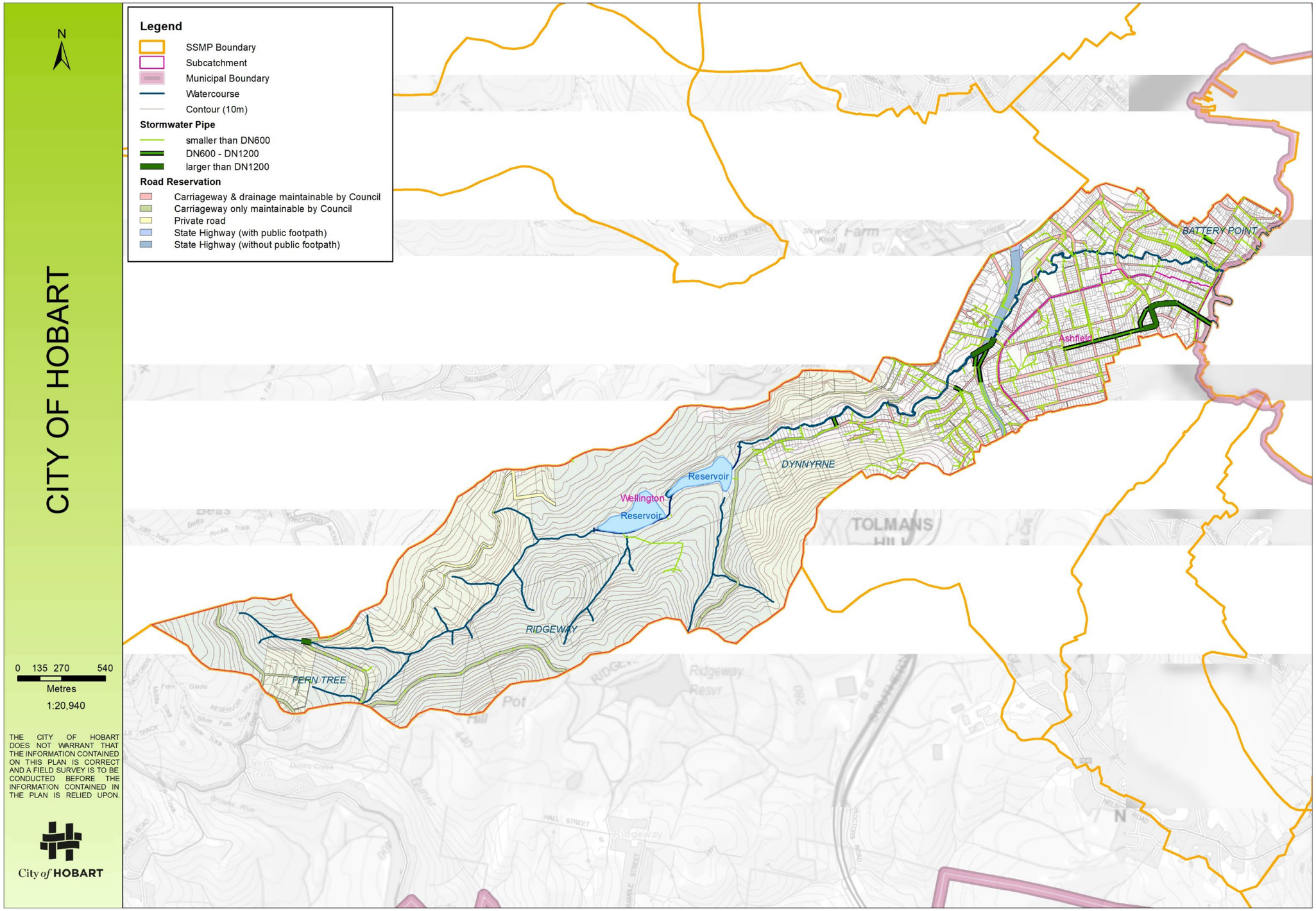
Catchment Name	Wellington and Ashfield
Catchment Size (hectares)	642.3
Catchment Land Use	Mixed urban and bushland
Value of Assets	$27.2m
Length of Piped Assets (km)	31.8
Length of Open Waterways (km)	10.3
Forecast CAPEX spend over 5 years	$1.5m - $2m
Overall Flood Risk	HIGH

Table 13 Map - Wellington and Ashfield Catchment Overview



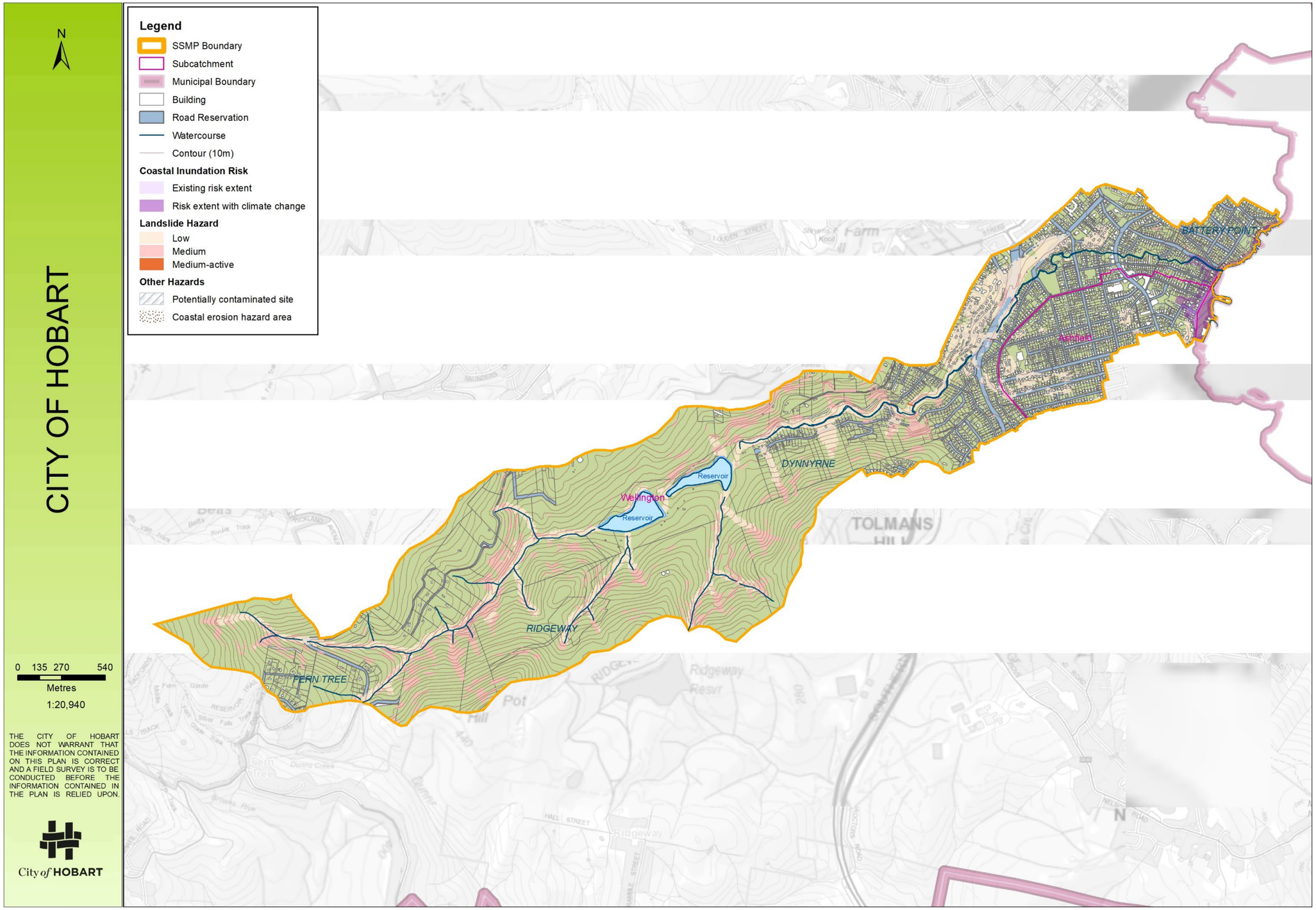
Part 2: Wellington and Ashfield

Table 14 Map - Wellington and Ashfield Asset Overview



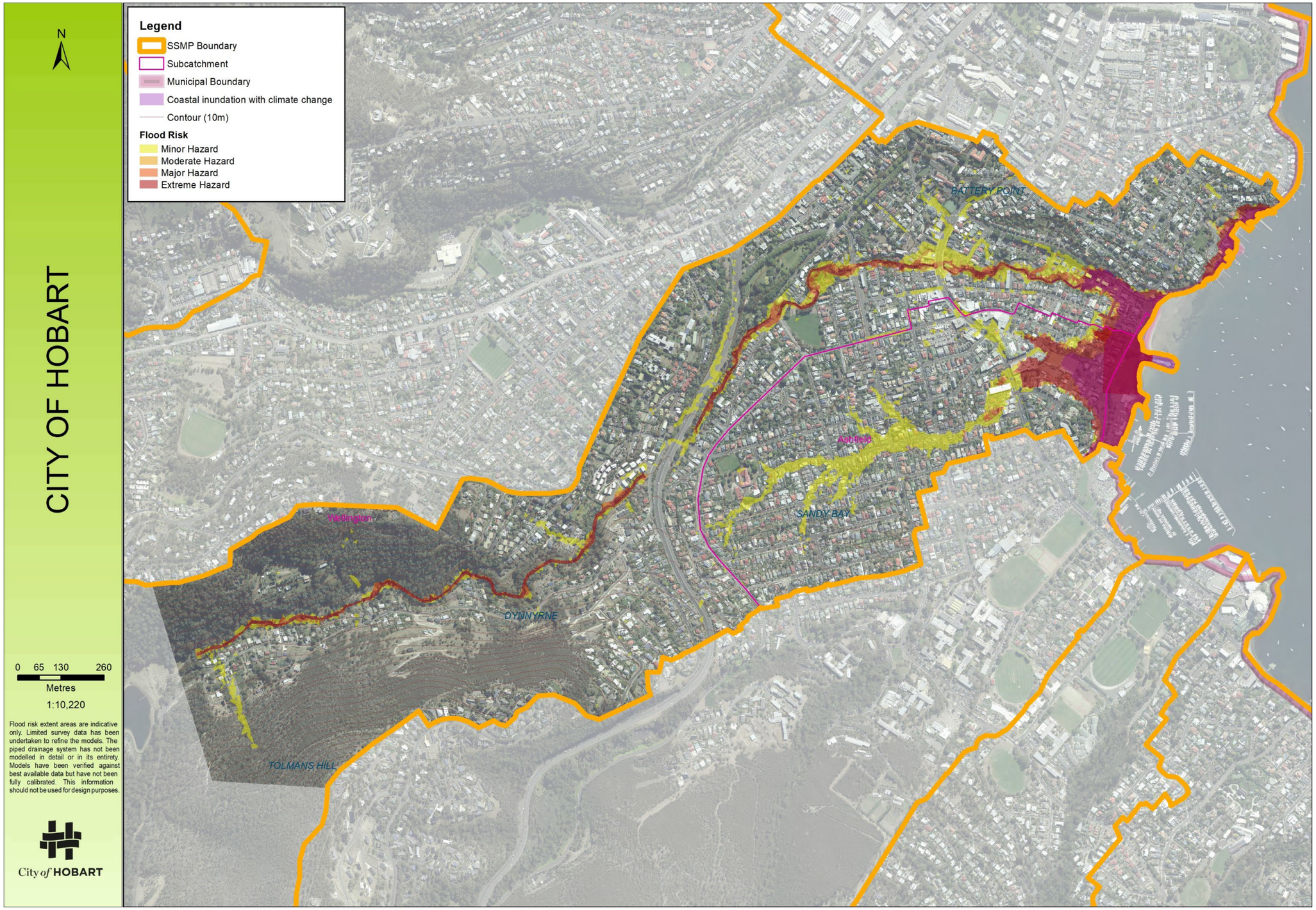
Part 2: Wellington and Ashfield

Table 15 Map - Wellington and Ashfield Natural Hazards



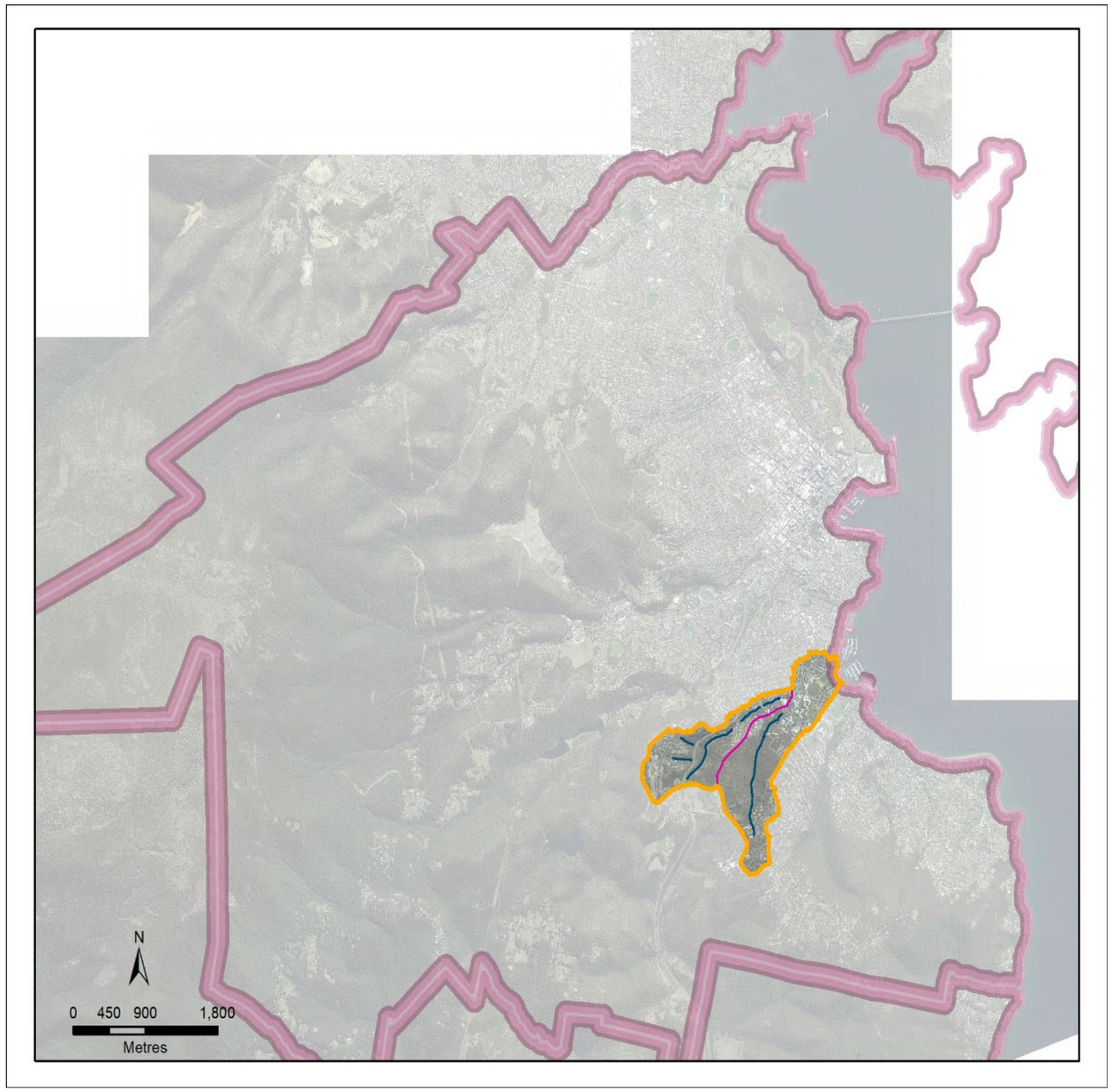
Part 2: Wellington and Ashfield

Table 16 Map - Wellington and Ashfield Flood Risk



Part 2: Wellington and Ashfield

Part 2: Wellington and Ashfield


N
0 450 900 1,800
Metres

13.1 Proctors and University Summary

Proctors Rivulet Catchment contains the new subdivision of Tolman's Hill, a 37 hectare development that replaced natural bushland with hundreds of residential lots. The catchment is bisected by the Southern Outlet. The University Catchment includes a fringe of the Mt Nelson residential area and a couple of streets of Sandy Bay, but is predominantly comprised of land belonging to the University of Tasmania. Much of the University Land is natural bushland, which gives way to the built campus and sportsgrounds at the lowest end of the catchment.

13.2 Stormwater Network

The infrastructure in Tolman's Hill subdivision, while new, is generally undersized. It discharges to a number of steep vegetated gullies on the top side of the Southern Outlet. Below the Southern Outlet, Proctors Rivulet runs in a steep, densely overgrown and largely inaccessible channel, until it reaches the French Street Reserve. From there it is piped through the University, meeting the piped Rifle Range Creek under the University Engineering Building. Rifle Range Creek runs in an open natural state until just uphill of Churchill Avenue where it becomes piped. A second drainage line also runs down the south eastern border of the University Campus, joining the others under the sports fields.

13.3 Catchment Specific Issues and Opportunities

There is a complex history to the ownership of assets within the catchments. The pipes within the University Land, including the drainage connections for the lower end of View Street and the piped sections of the three creeks, are all under the ownership of the University of Tasmania. The University has constructed buildings directly over the piped creeks, obstructing both access to the assets, and the natural overland flow paths. Council's burden of responsibility is unclear, given public infrastructure uphill discharges into the University owned infrastructure. The University is planning to relocate its campus into the city centre and the future of the Sandy Bay campus and the assets underneath it, is unresolved.

Tolman's Hill subdivision discharges via a number of headwalls onto open ground, some of it in private land, and some of it onto landslip prone land.

TasWater own a reservoir at the top of Tolman's Hill, and use the drainage system, including some open channels to scour the reservoir, which has resulted in runoff escaping the channels into private land.

Development pressures within the catchment include the final stages of Tolman's Hill, as well as a recent subdivision at the end of Oberon Court.

13.4 Flood Risk

The very steep, rocky terrain of Tolman's Hill results in very fast, shallow, sheet flooding. Further down, Proctors Road is prone to overtopping where the creek passes underneath.

The University Campus is at high risk of flooding and experienced significant flooding in the 2018 STEWE flood event.

13.5 Asset Management

The core components of the asset management strategies are to:

- Manage the risk of pluvial flooding within Tolmans Hill
- Proactively manage critical assets
- Preserve overland flow paths
- Maintain or improve the natural amenity of the open sections of creek
- Develop and formalise a policy position on the assets through the University of Tasmania campus

13.6 Catchment Modelling

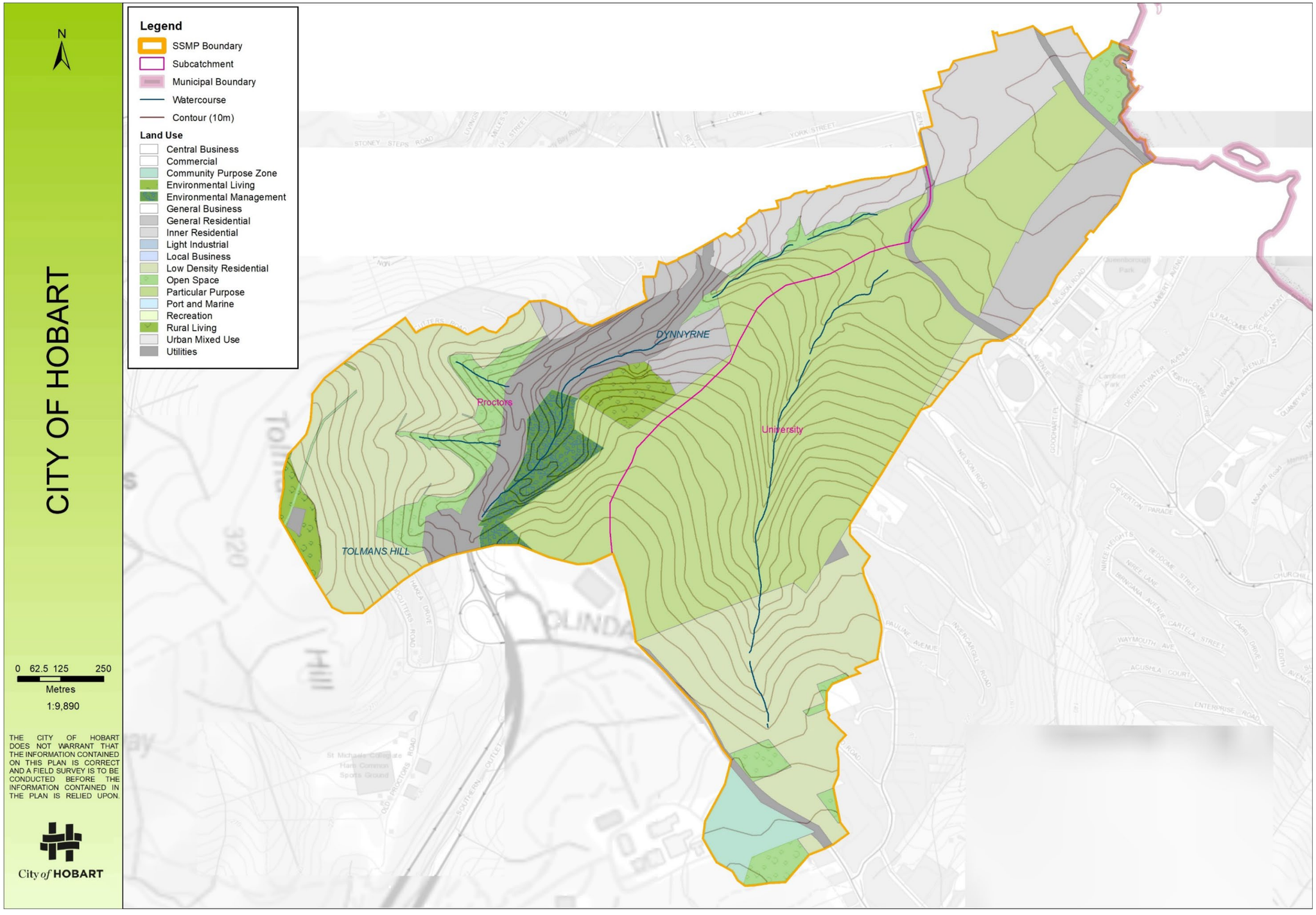
This SSMP has been developed based on flood modelling done internally by Council officers.

13.7 Asset Summary Proctors and University

Table 1(6) Catchment Summary

Catchment Name	University and Proctors
Catchment Size (hectares)	240.6
Catchment Land Use	Mixed urban and bushland
Value of Assets	$55.6m
Length of Piped Assets (km)	14.3
Length of Open Waterways (km)	2.9
Forecast CAPEX spend over 5 years	$1m - $1.5
Overall Flood Risk	MEDIUM

Figure 15 Map_ Proctors and University Catchment Overview



Part 2: Proctors and University

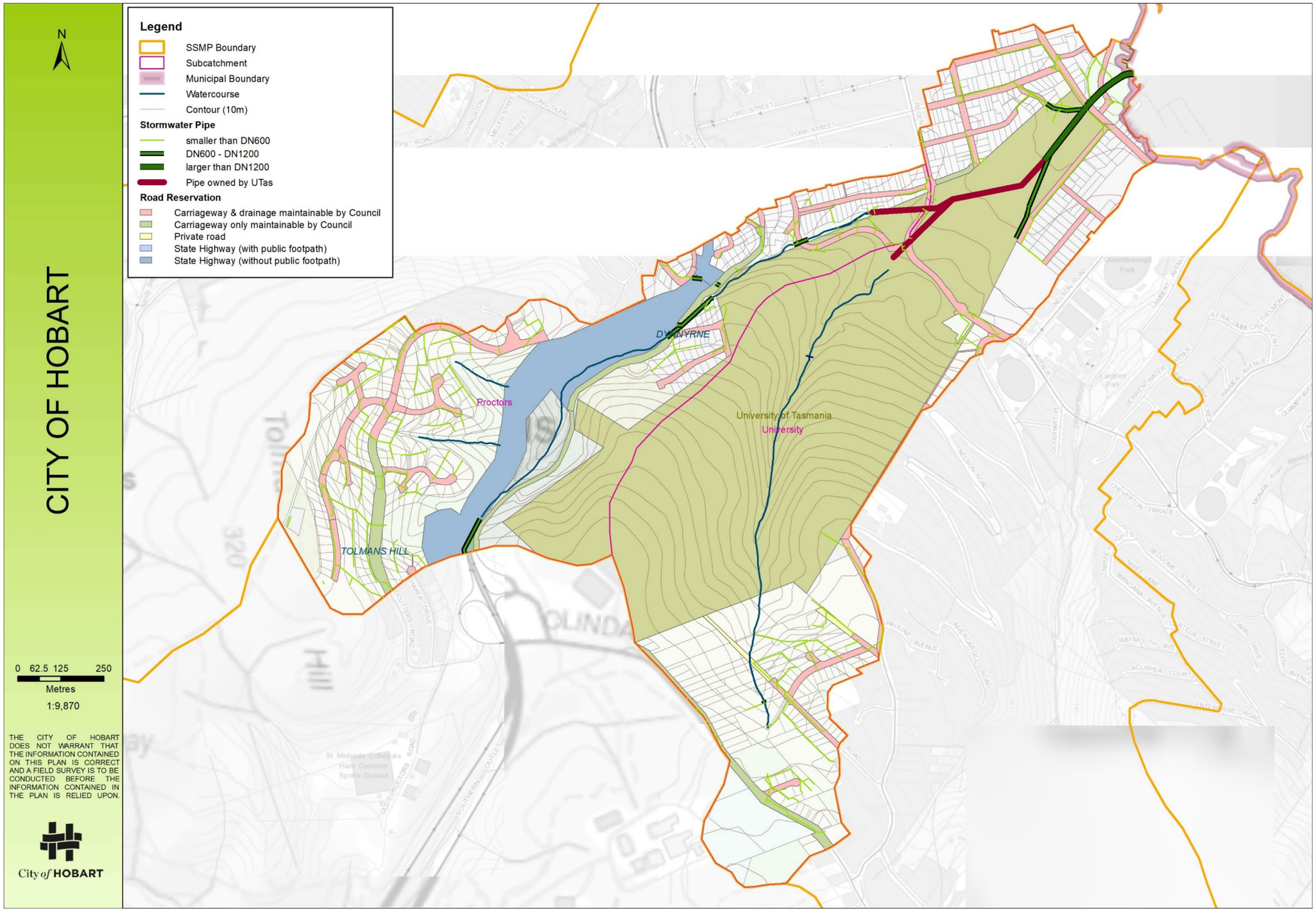


Figure 16 Map_ Proctors and University Asset Overview

Part 2: Proctors and University

Figure 17 Map_ Proctors and University Hazard Overview

Part 2: Proctors and University

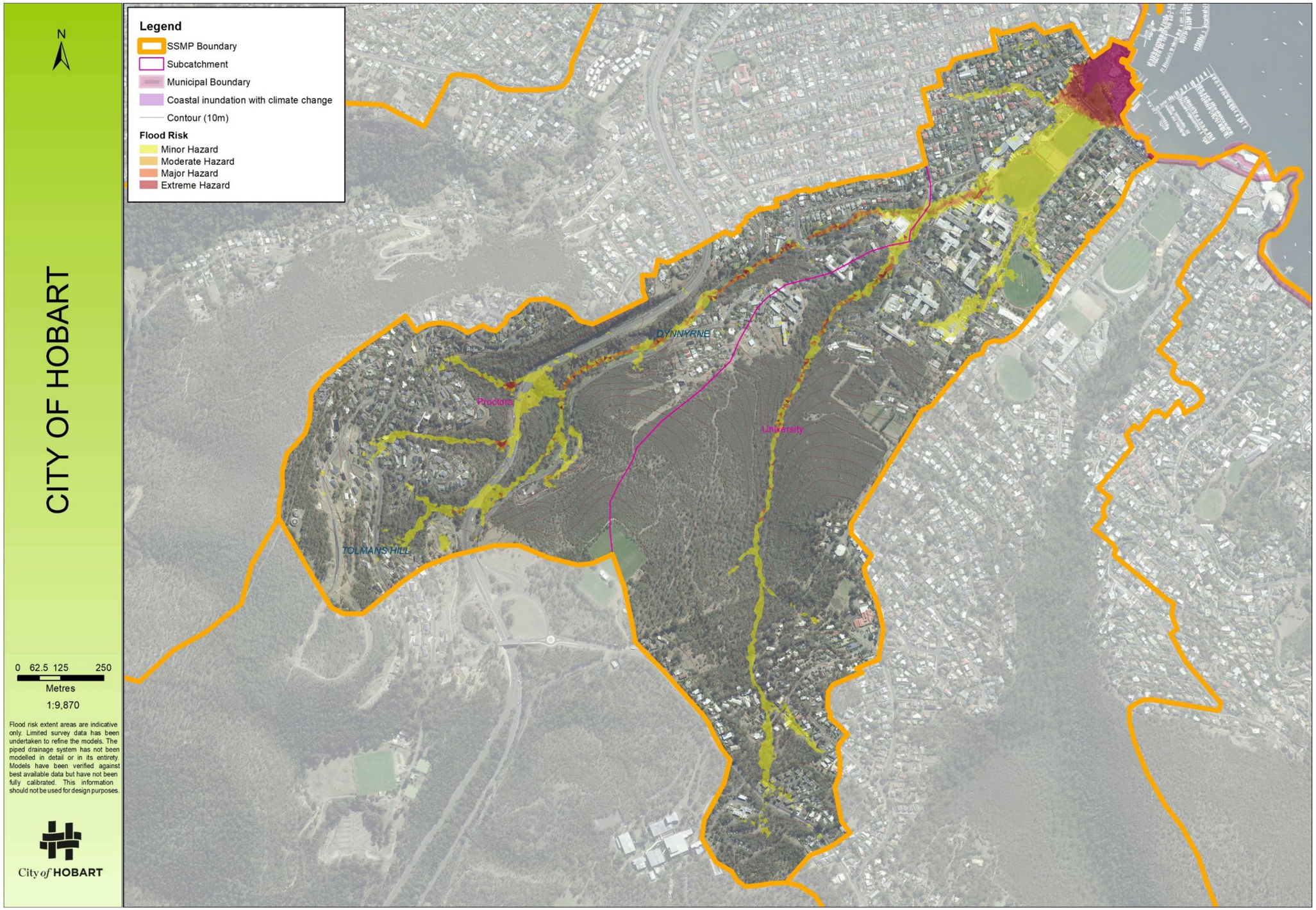
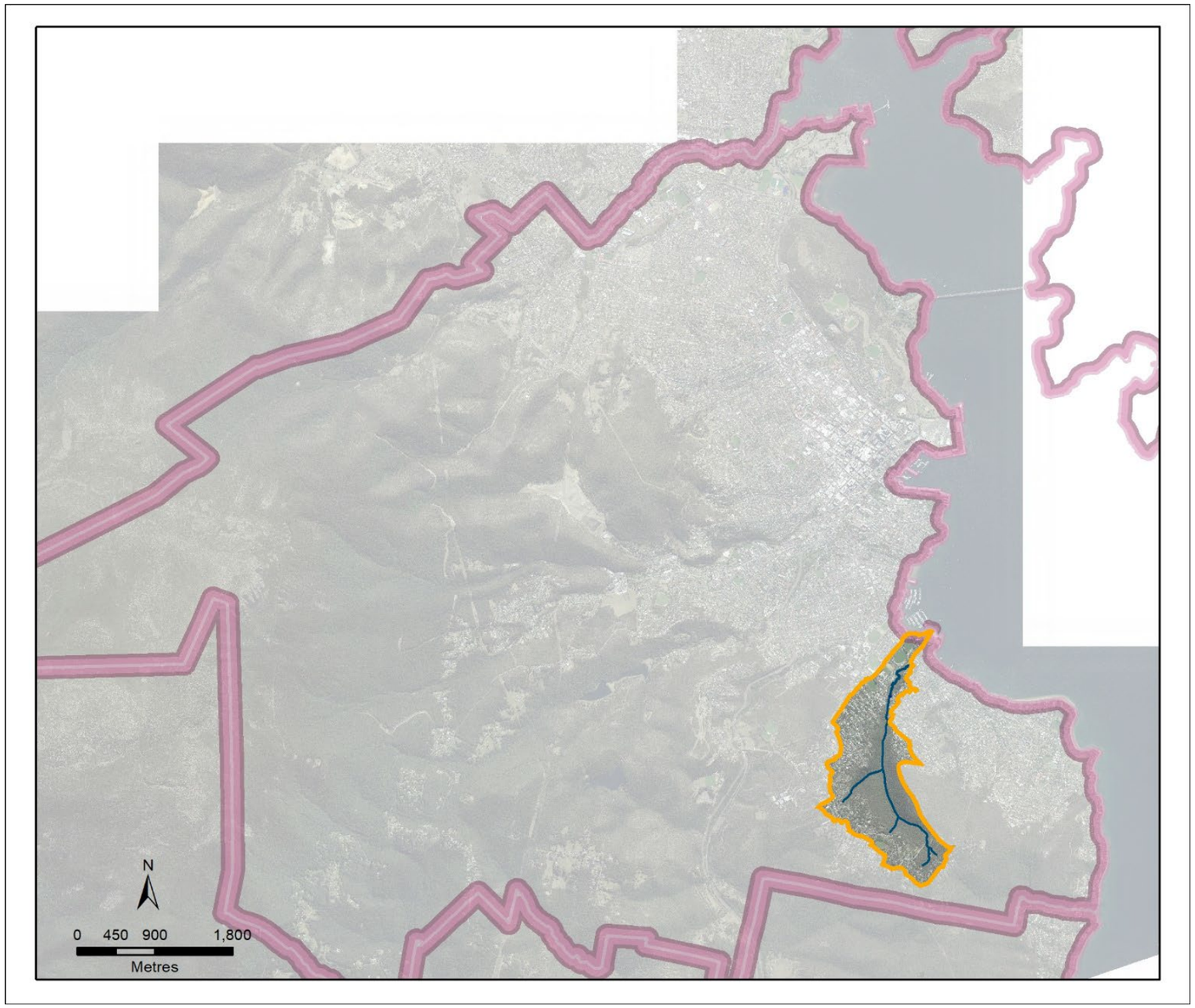


Figure 18 Map_ Proctors and University Flood Risk

Part 2: Proctors and University

14.0 Lambert



Part 2: Lambert

14.1 Summary - Lambert

Lambert Catchment is located to the south of Hobart CBD. The catchment is dominated by its steep upper reaches, which incorporate the residential suburb of Mt Nelson and a long zig-zagging rural style road to the summit of the catchment known as the 'Mt Nelson bends'. The lower portion of the catchment is mixed land use, incorporating residential, schools and sports fields, a small number of commercial properties on Sandy Bay Road, and the Wrest Point Casino. The suburb of Mt Nelson which extends over the top of the hill as well as up the side, is characterised by a lot of native bush vegetation. Bicentennial Park, a large tract of publicly owned natural bushland, covers much of the gully of the catchment and extends down into the lower reaches.

14.2 Stormwater Network

Lambert Rivulet flows through bushland in its natural state for much of its length. The final 400 metres are piped to the outfall adjacent to the Wrest Point Casino. The catchment drains to Lambert Rivulet through a series of undefined formal and informal drainage lines. The piped network generally does not extend to the Rivulet, and there are a large number of outlets discharging to open ground in both private land and in Bicentennial Park. A significant number of residential properties in Mt Nelson are not serviced by the public stormwater network.

14.3 Catchment Specific Issues and Opportunities

Mt Nelson Road was constructed many decades ago as a rural road, hence it is narrow and lacks kerbs and gutters. However the development around Mt Nelson is medium density residential and is unsuited to the standard of the road. Runoff from Mt Nelson Road into private properties is problematic and has been the subject of numerous residential complaints. Action by residents included a petition to the Supreme Court to upgrade the status of Mt Nelson Road from a road for which Council is **not** responsible for the drainage to a road for which Council **is** responsible for the drainage. The steepness of the site, the shallow depth to bedrock, and the gradient of driveway accesses are all exacerbating factors in providing adequate control measures for road runoff.

Provision of servicing to existing unserviced properties is very expensive, due to steepness, depth of rock, and lack of suitable receiving infrastructure.

Bicentennial Park is a great natural asset with an active bushcare group committed to its flourishment. The numerous stormwater outlets that discharge into the park have created artificial wet areas that have contributed to the spread of weeds in the park.

Development opportunities exist within the catchment from a number of large vacant or under developed blocks in the upper parts of the catchment. Some of these are subject to servicing constraints and therefore may require the right economic conditions in order for development to occur.

14.4 Flood Risk

Flooding within most of the catchment is generally characterised by very shallow, high velocity overland sheet nuisance flows rather than flooding from the rivulet overtopping. The flooding is exacerbated by shallow soils with absorption capacity, the limited underground infrastructure, and the high volume of leaf litter that causes blockages of existing infrastructure and driveway culverts.

At the lower end of the catchment, a large grated headwall inlet is generally effective in channelling the rivulet into the piped network and preventing flooding of the sports fields.

14.5 Asset Management

The core components of the asset management strategies are to:

- improve the control of overland sheet flow in the Mt Nelson bends through installation of asphalt bunds (where site conditions allow), improved inlet capacity of existing infrastructure, designating and formalising overland flow paths through properties, investigate the potential for network extensions
- regular clearing of pits and headwalls prone to frequent blockage from leaf litter
- engage with the community to encourage personal responsibility for clearing of driveway culverts
- mitigate the impacts of the concentrated runoff onto private property and Bicentennial Park through formalising drainage channels, and implementing drainage easements on private land, or extensions to the pipe network

14.6 Catchment Modelling

This SSMP has been developed based on internal flood modelling.

14.7 Lambert Asset Summary

Table 17 Lambert Asset Summary

Catchment Name	Lambert
Catchment Size (hectares)	226.3
Catchment Land Use	Mixed urban and bushland
Value of Assets	$15.7m
Length of Piped Assets (km)	17.9
Length of Open Waterways (km)	3.3
Forecast CAPEX spend over 5 years	**$1m - $1.5m**
Overall Flood Risk	LOW

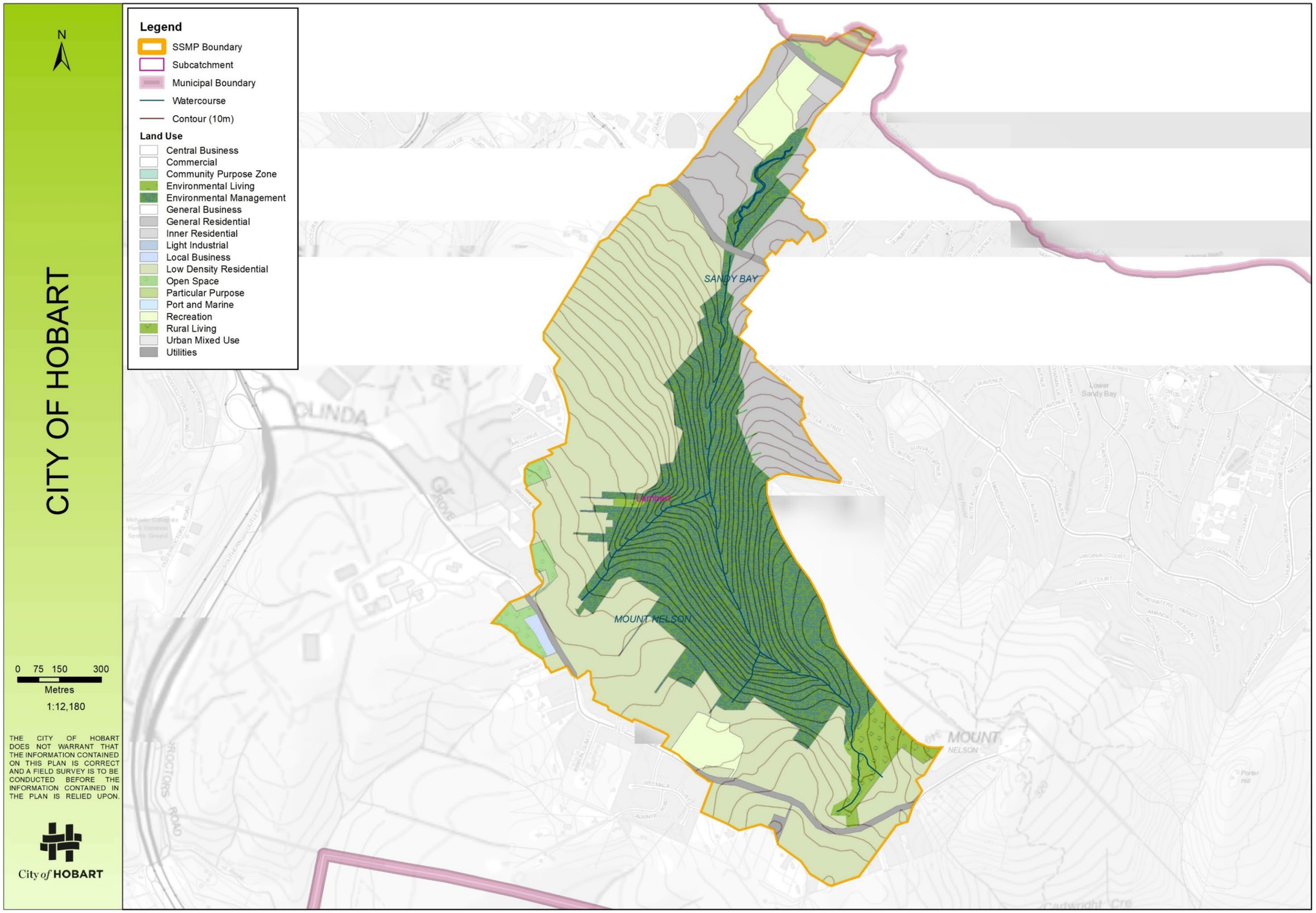


Figure 19 Map_ Lambert Catchment Overview

Part 2: Lambert

CITY OF HOBART

N

Legend

- SSMP Boundary
- Subcatchment
- Municipal Boundary
- Watercourse
- Contour (10m)

Stormwater Pipe

- smaller than DN600
- DN600 - DN1200
- larger than DN1200

Road Reservation

- Carriageway & drainage maintainable by Council
- Carriageway only maintainable by Council
- Private road
- State Highway (with public footpath)
- State Highway (without public footpath)

SANDY BAY

Lambert

MOUNT NELSON

0 75 150 300

Metres

1:12,140

THE CITY OF HOBART DOES NOT WARRANT THAT THE INFORMATION CONTAINED ON THIS PLAN IS CORRECT AND A FIELD SURVEY IS TO BE CONDUCTED BEFORE THE INFORMATION CONTAINED IN THE PLAN IS RELIED UPON.

City of HOBART

Figure 20 Map_ Lambert Asset Overview

Part 2: Lambert

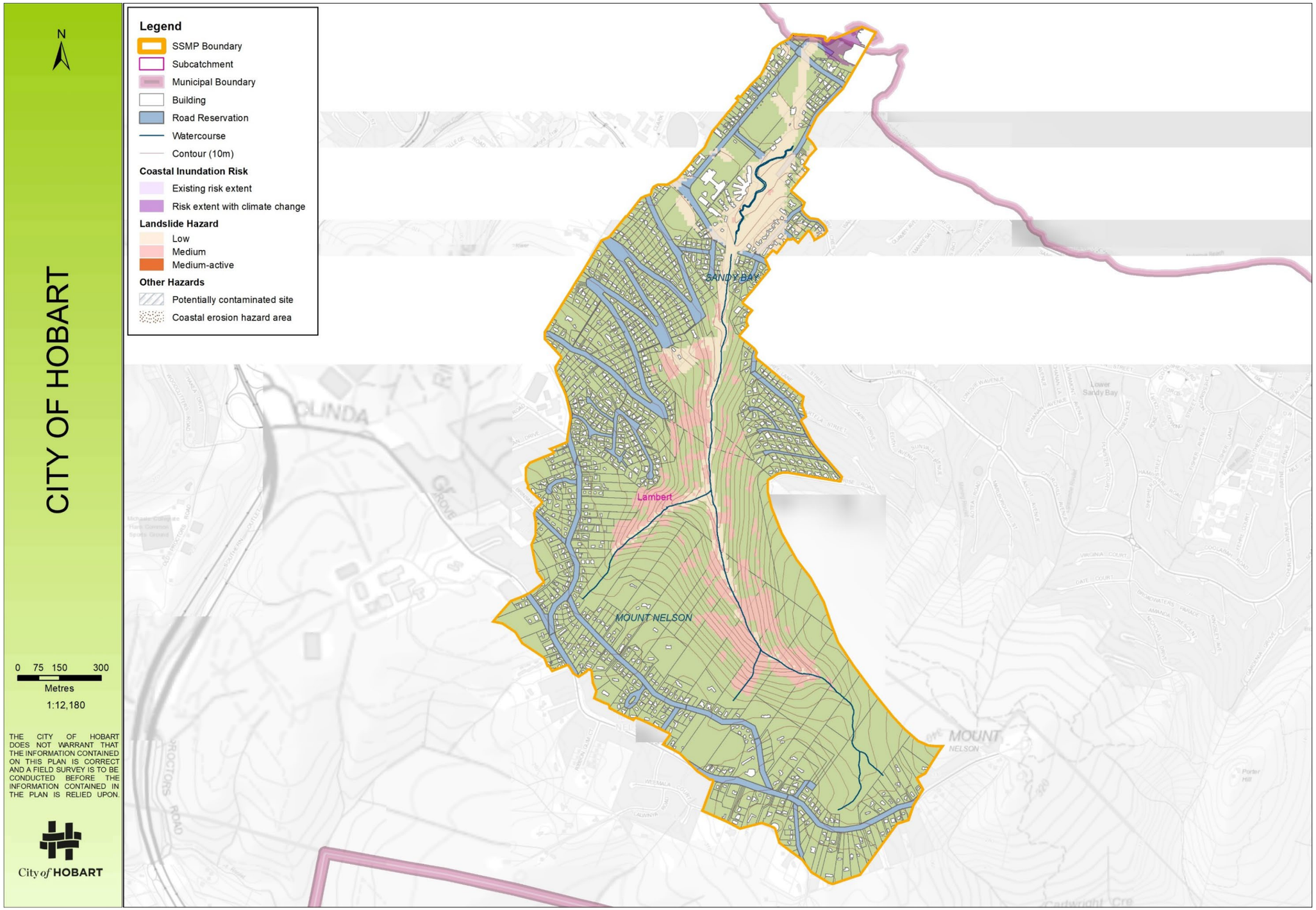


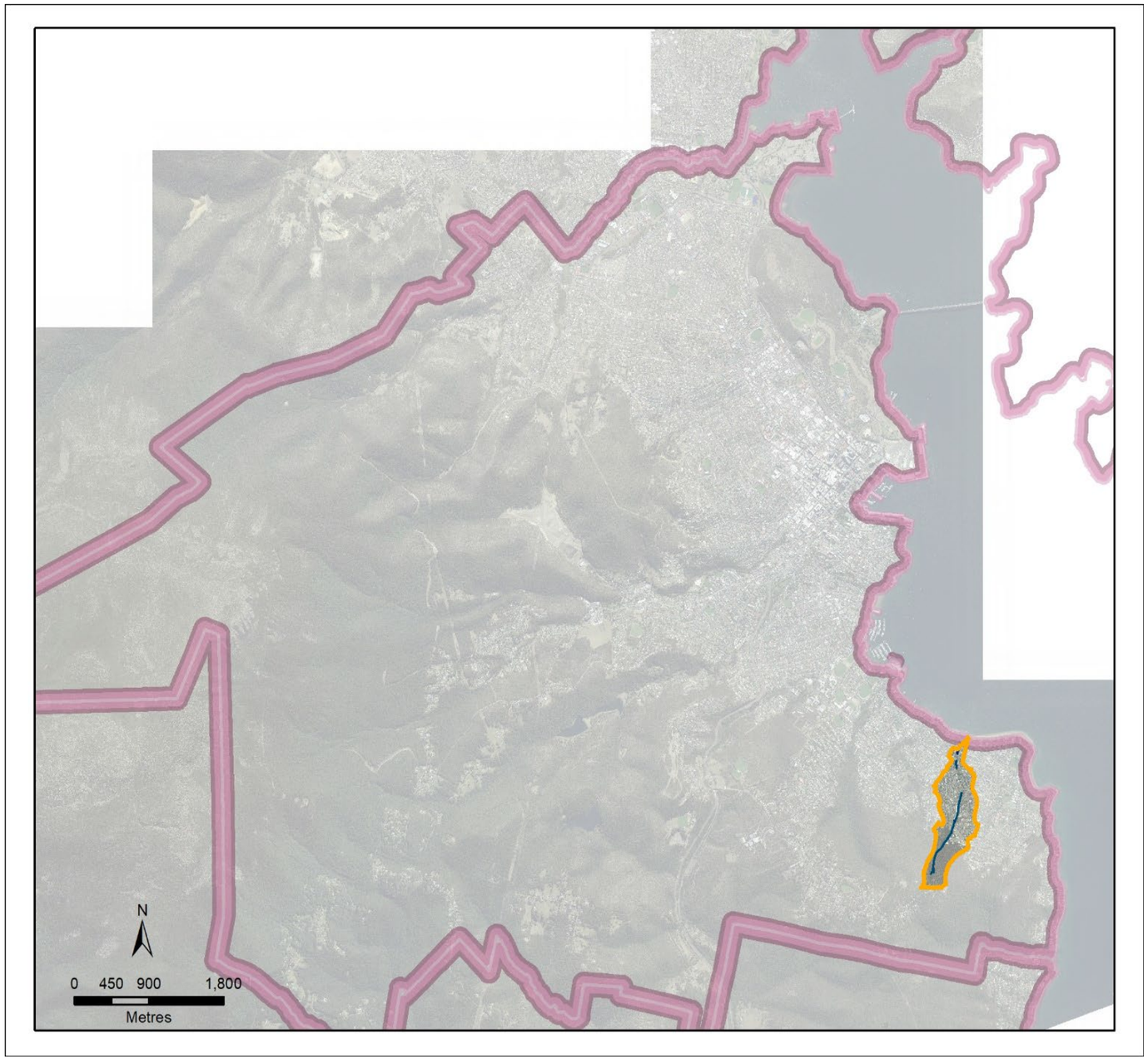
Figure 21 Map_ Lambert Natural Hazards

Part 2: Lambert

Figure 22 Map_ Lambert Catchment Flood Risk

Part 2: Lambert

15.0 Lipscombe



Part 2: Lipscombe

15.2 Summary - Lipscombe

Lipscombe Catchment is located to the south of Hobart CBD. The steep upper reaches of the catchment are bushland and the lower two thirds of the catchment are urban residential. The urban area is predominantly a wealthy one, characterised by large houses with established gardens in the older parts of the suburb, and large houses on smaller but extensively developed plots in the newer parts of the suburb. There is little commercial development.

15.3 Stormwater Network

The catchment drains to Lipscombe Rivulet. The Rivulet flows in an open channel for much of its length, mostly through residential backyards. The lowest 700m of the creek is piped, with a piped high flow diversion following Lipscombe Avenue to just south of Sandy Bay Road, while the natural creekline continues through private properties. The catchment drains into the Derwent River via a 1050mm diameter piped outfall through private properties below Sandy Bay Road.

15.4 Catchment Specific Issues and Opportunities

A number of private dwellings as well as private outbuildings, fences, and landscaping features have been constructed in close proximity to both the piped and open sections of creek.

Development opportunities exist within the catchment from a number of large vacant blocks in the upper parts of the catchment, as well as infill development in properties with large backyards.

The catchment is enhanced by a well maintained strip of public open space along the rivulet behind Plaister Court, and the natural bushland at the top of the catchment. Opportunities for water quality improvements are limited to management of stream beds to prevent erosion and protect natural habitat. The car park of the Lipscombe Larder could be a potential site for an underground gross pollutant trap (subject to owner consent and feasibility).

15.5 Flood Risk

The topography of the catchment is such that flood waters are generally contained within the natural drainage lines. However the obstructions introduced by the erection of boundary fences and the intrusion of dwellings into the riparian zone, has historically resulted in flood damage to private property. Flood risk may be exacerbated by bushland debris being swept into the creek, blocking culverts and further damaging flood affected sites.

15.6 Asset Management

The core components of the asset management strategies are to:

- improve the functionality of the overland flow paths through restricting development and encouraging the removal of privately owned obstructions
- Proactively manage critical assets within the catchment via cyclical clearing of key culverts and headwalls, and routine CCTV inspection of critical pipes

15.7 Catchment Modelling

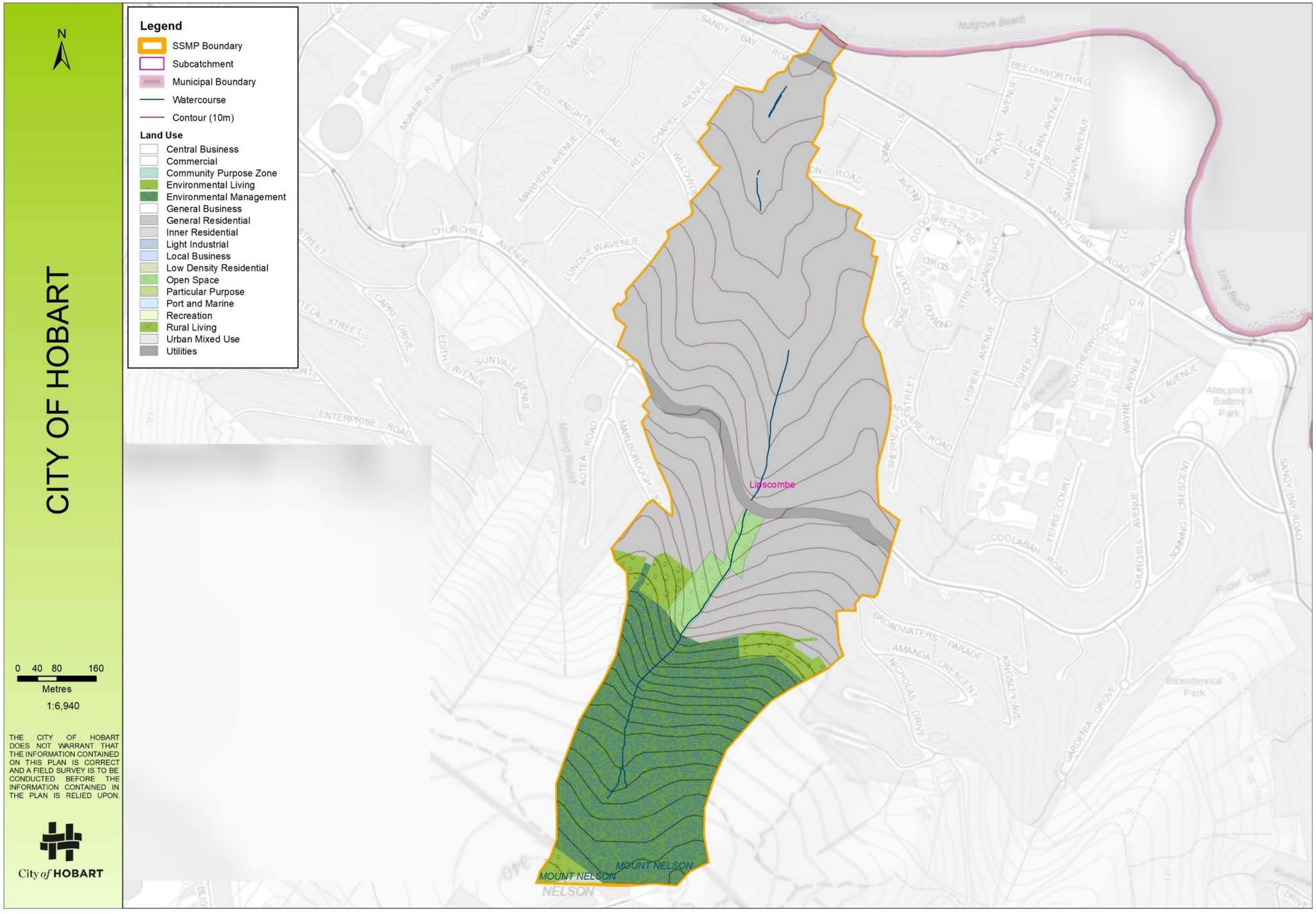
This SSMP has been developed based on flood modelling done by an external consultant, and consultation with internal Council officers.

15.8 Asset Summary

Table 18 Lipscombe Asset Summary

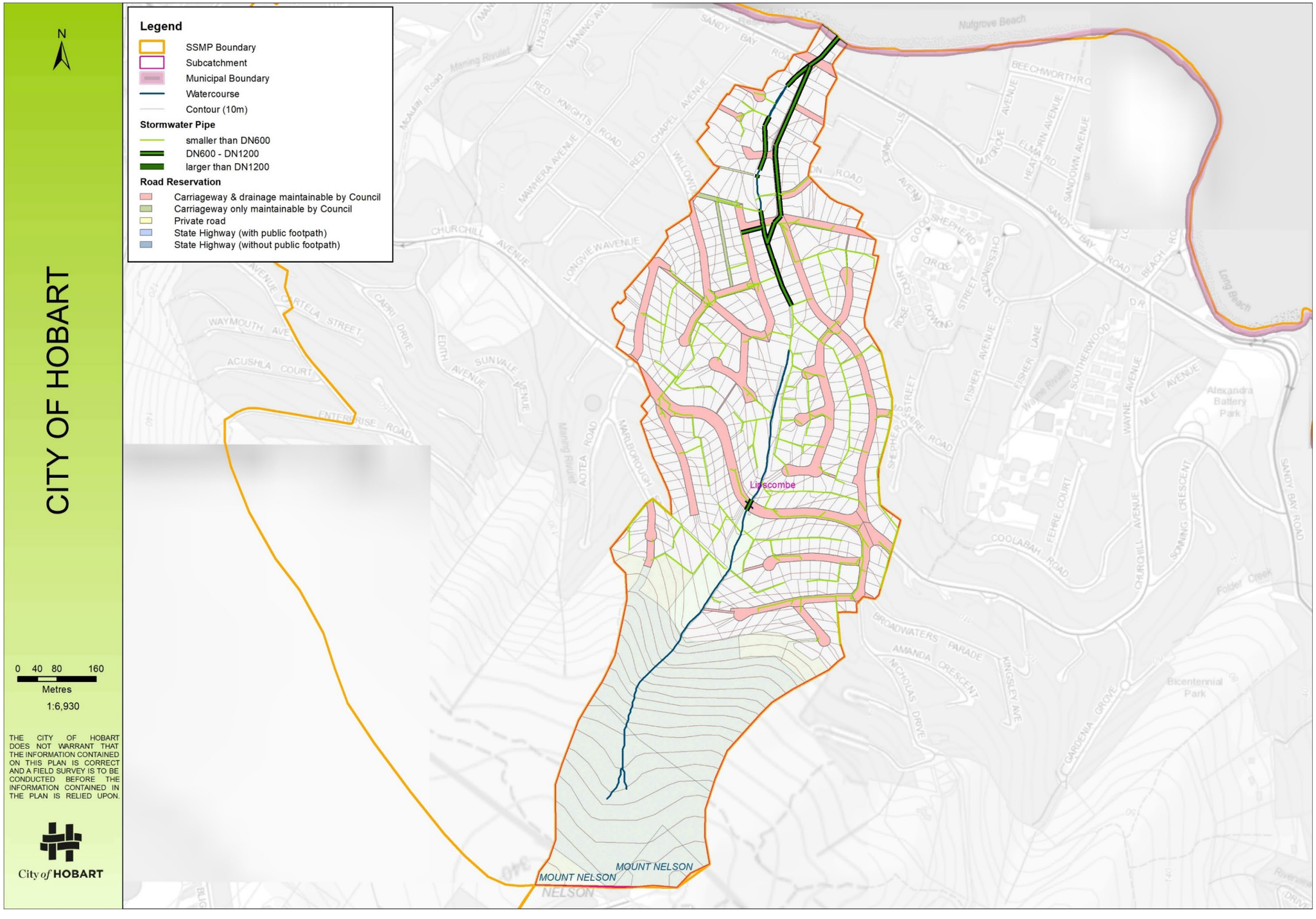
Catchment Name	Lipscombe
Catchment Size (hectares)	67.5
Catchment Land Use	Mixed urban and bushland
Value of Assets	$8.3m
Length of Piped Assets (km)	9.0
Length of Open Waterways (km)	1.2
Forecast CAPEX spend over 5 years	$1m - $1.5m
Overall Flood Risk	LOW

Table 19 Map_Lipscombe Catchment Overview



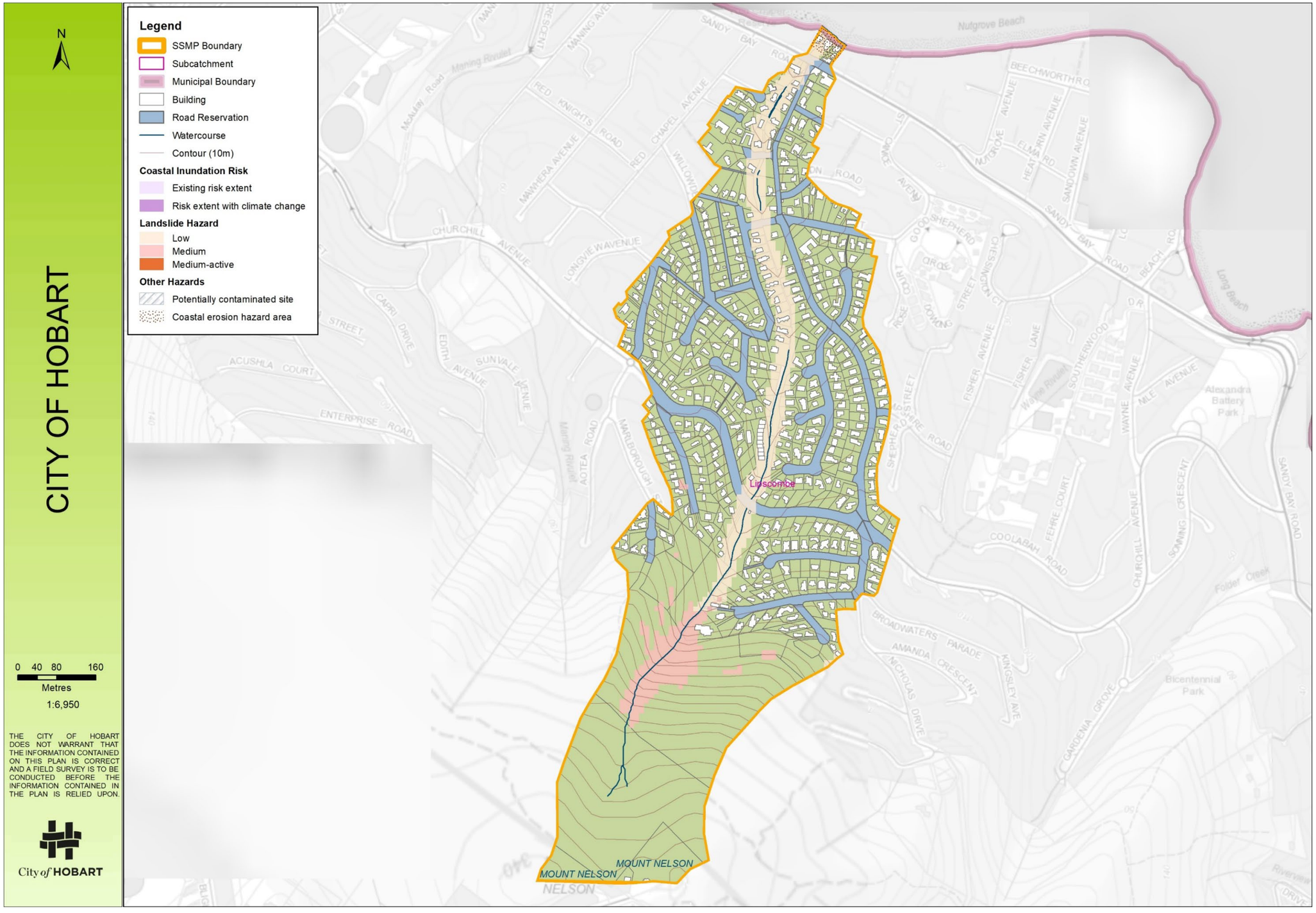
Part 2: Lipscombe

Table 20 Map_Lipscombe Asset Overview



Part 2: Lipscombe

Table 21 Map_Lipscombe Natural Hazards



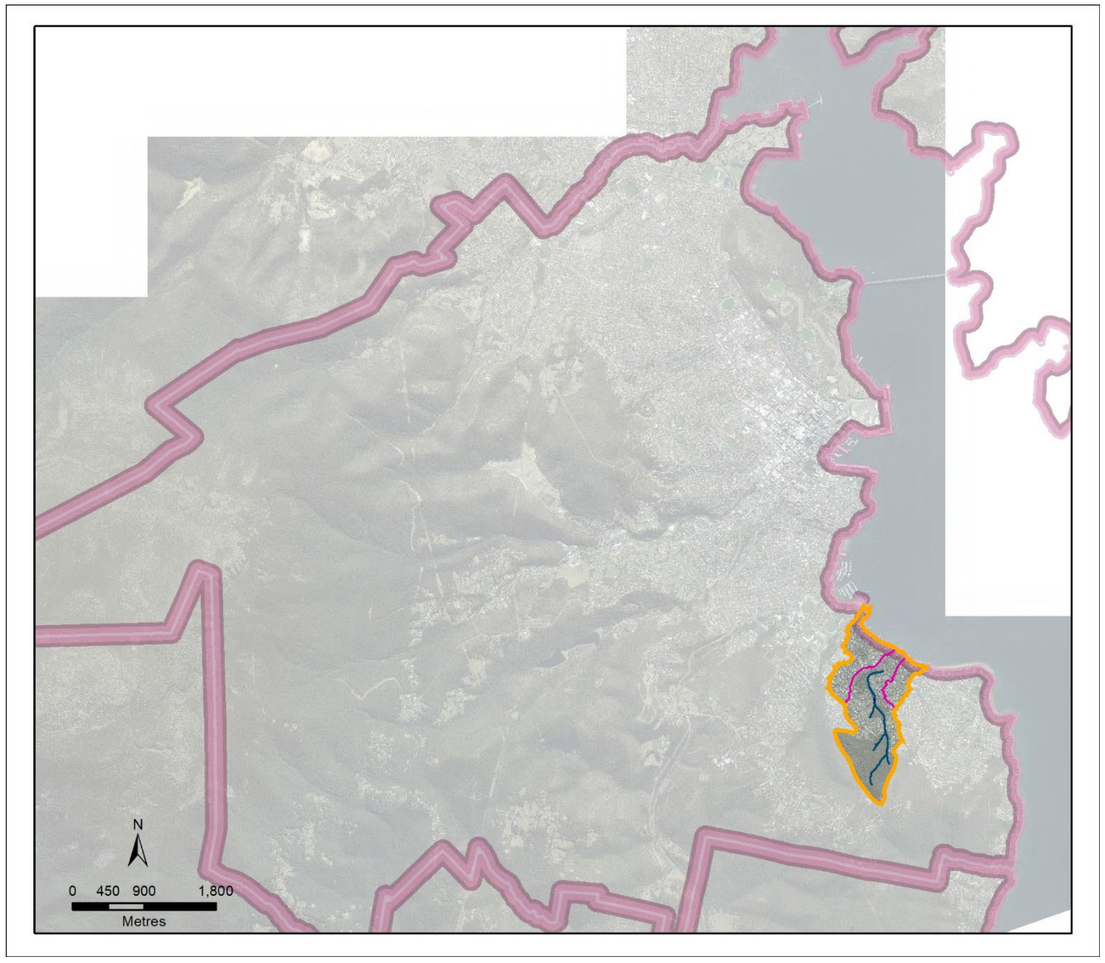
Part 2: Lipscombe

Table 22 Map_Lipscombe Flood Risk

Part 2: Lipscombe

Part 2: Waimea, Maning and Red Chapel

Waimea, Maning and Red Chapel



Part 2: Waimea, Maning and Red Chapel

Waimea, Maning and Red Chapel Summary

The Waimea, Maning and Red Chapel Catchments are located to the south east of Hobart CBD, and include the part of Sandy Bay immediately south of the Wrest Point Casino. The catchments all drain directly to the Derwent River. The urban area is entirely residential (with one primary school), with the lower half characterised by large single dwellings on large established blocks, and the upper half by large single dwellings on small steep blocks. Waimea and Red Chapel catchments are entirely developed while the top third of Maning Catchment is still natural bushland. A public reserve dissects Maning Catchment.

15.9 Stormwater Network

Waimea Catchment has a number of minor piped outfalls to the Derwent. The main rivulet follows the alignment of Waimea Avenue and has been piped for its entire length. Similarly the main drainage line in Red Chapel Catchment follows Red Chapel Avenue. There is a treatment device on the pipe near the outfall.

Maning Rivulet is in its natural state for much of its length. At Norfolk Crescent the creek becomes piped, and there is a diversion that was constructed in the mid eighties that follows Maning Avenue to the outfall.

15.10 Catchment Specific Issues and Opportunities

Much of the land in Waimea and Maning Catchments is at low risk of landslip, with a number of pockets of medium risk. This is most common in the lower half of the catchments.

There are a large number of older properties particularly in the lower half of the residential area that are not serviced directly by public infrastructure.

There are a couple of undeveloped privately owned lots at the top of the existing residential area in Maning Catchment (although development is somewhat restricted by water service limits), including at least one 20 lot approved subdivision. Otherwise development is comprised of infill development. Infill development in the form of second houses, larger driveways, and paved outdoor areas is common.

A number of residential properties in the lower, older, reaches of the catchment may not be serviced by public infrastructure.

15.11 Flood Risk

Flood risk exists where properties have been developed across natural drainage lines.

The construction of Sandy Bay Road creates a dam effect in a number of places, including where poor network connectivity results in a lot of properties draining overland to the kerb and gutter rather than underground.

The outlets to the River are constrained by the tide at a number of locations. This will be exacerbated further by future sea level rise.

15.12 Asset Management

The core components of the asset management strategies are to:

- Investigate options for increasing the inlet capacity and/or minor upgrades of the reticulated system at known flooding locations
- Planned routine inspections of critical assets
- Preservation of the remaining sections of open creek in a natural state
- Preservation of overland flow paths

15.13 Catchment Modelling

This SSMP has been developed based on flood modelling done internally by Council officers.

15.14 Asset Summary

Table 23 Waimea, Maning and Red Chapel Asset summary

Catchment Name	Waimea, Maning and Red Chapel
Catchment Size (hectares)	159.9
Catchment Land Use	Mixed urban and bushland
Value of Assets	$13m
Length of Piped Assets (km)	15.0
Length of Open Waterways (km)	1.8
Forecast CAPEX spend over 5 years	**$1.5m - $2m**
Overall Flood Risk	MEDIUM

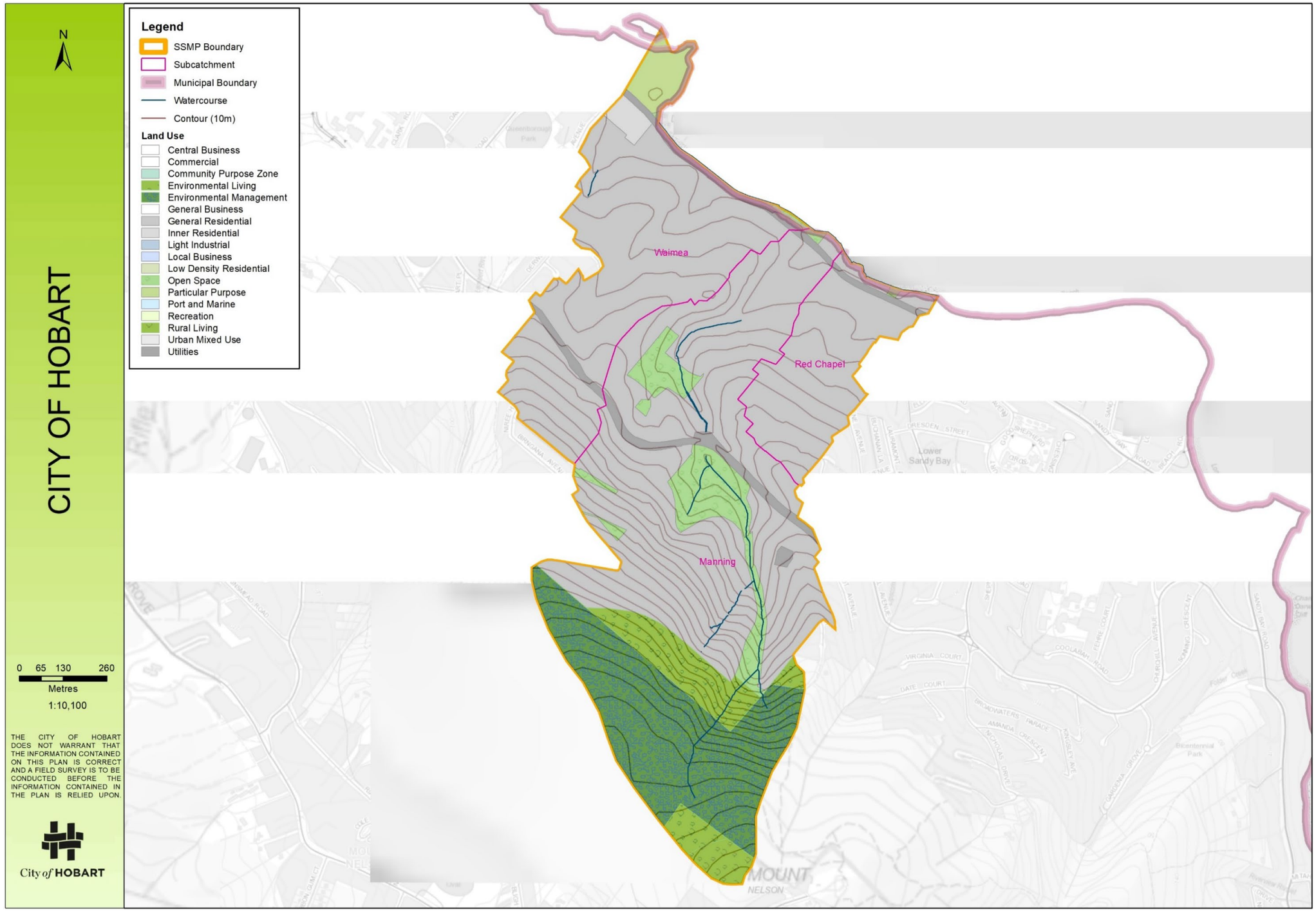


Figure 23 Map_Waimea, Maning and Red Chapel Catchment Overview

Part 2: Waimea, Maning and Red Chapel

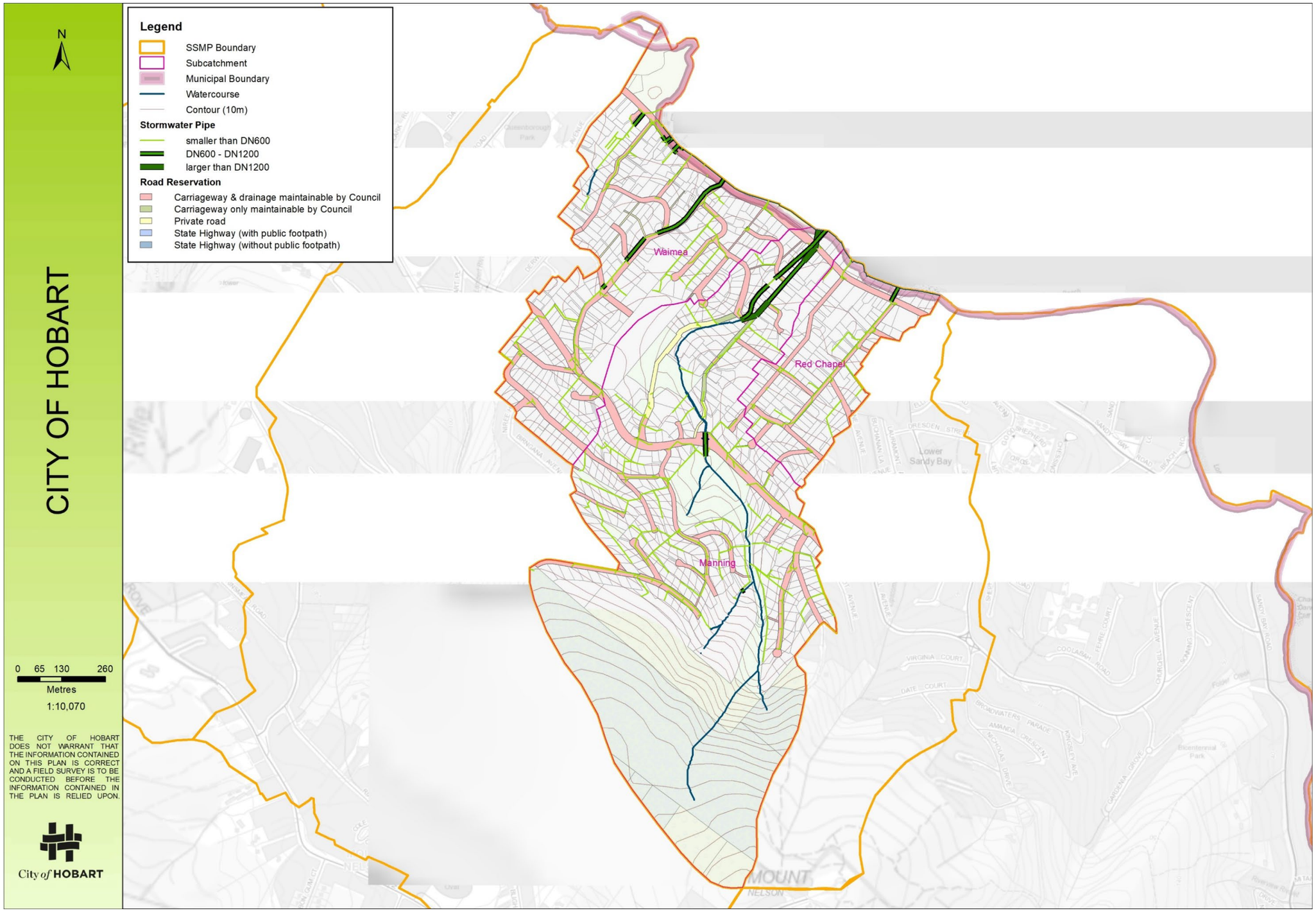


Figure 24 Map_Waimea, Maning and Red Chapel Asset Overview

Part 2: Waimea, Maning and Red Chapel

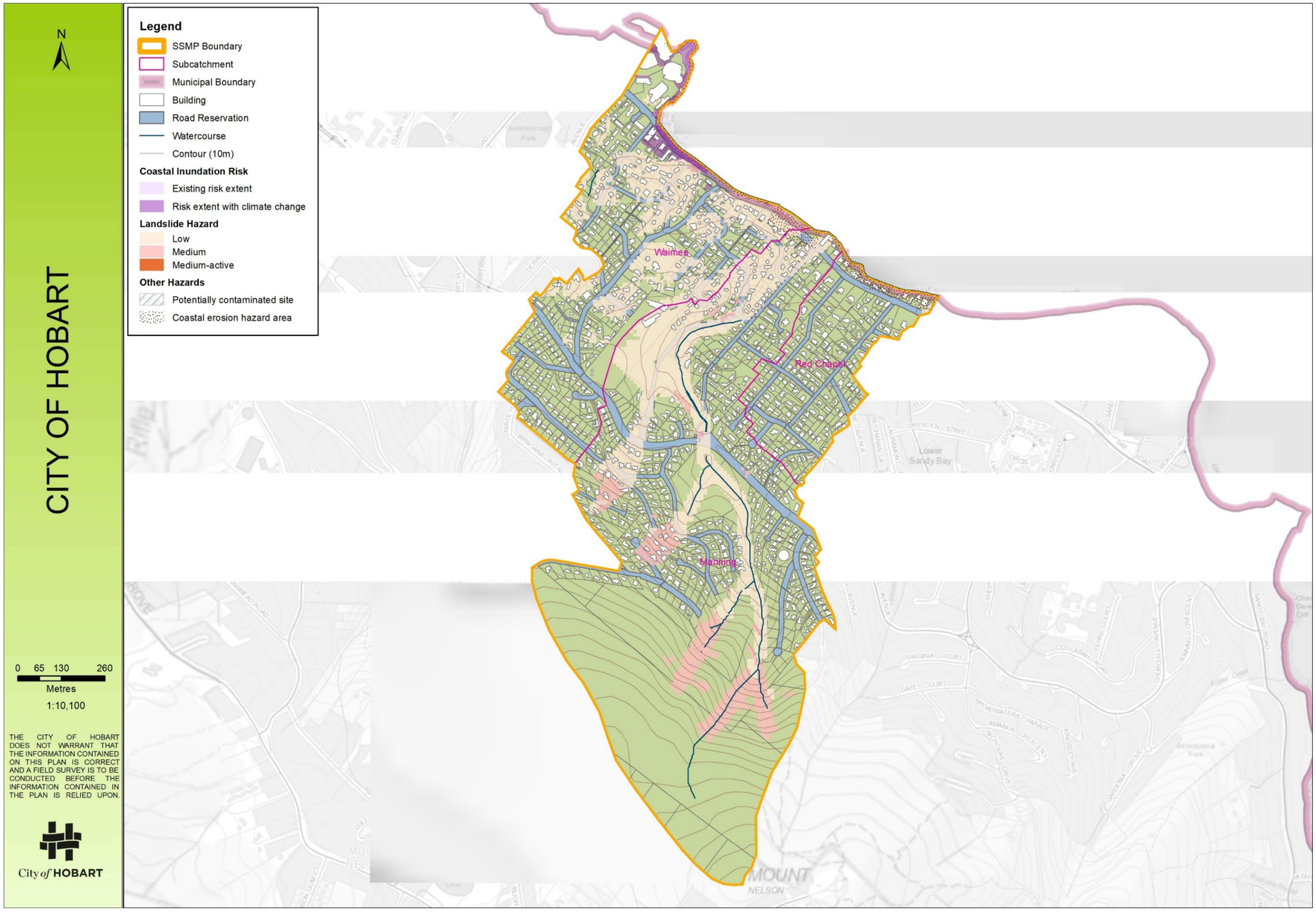


Figure 25 Map_Waimea, Maning and Red Chapel Hazard Overview

Part 2: Waimea, Maning and Red Chapel

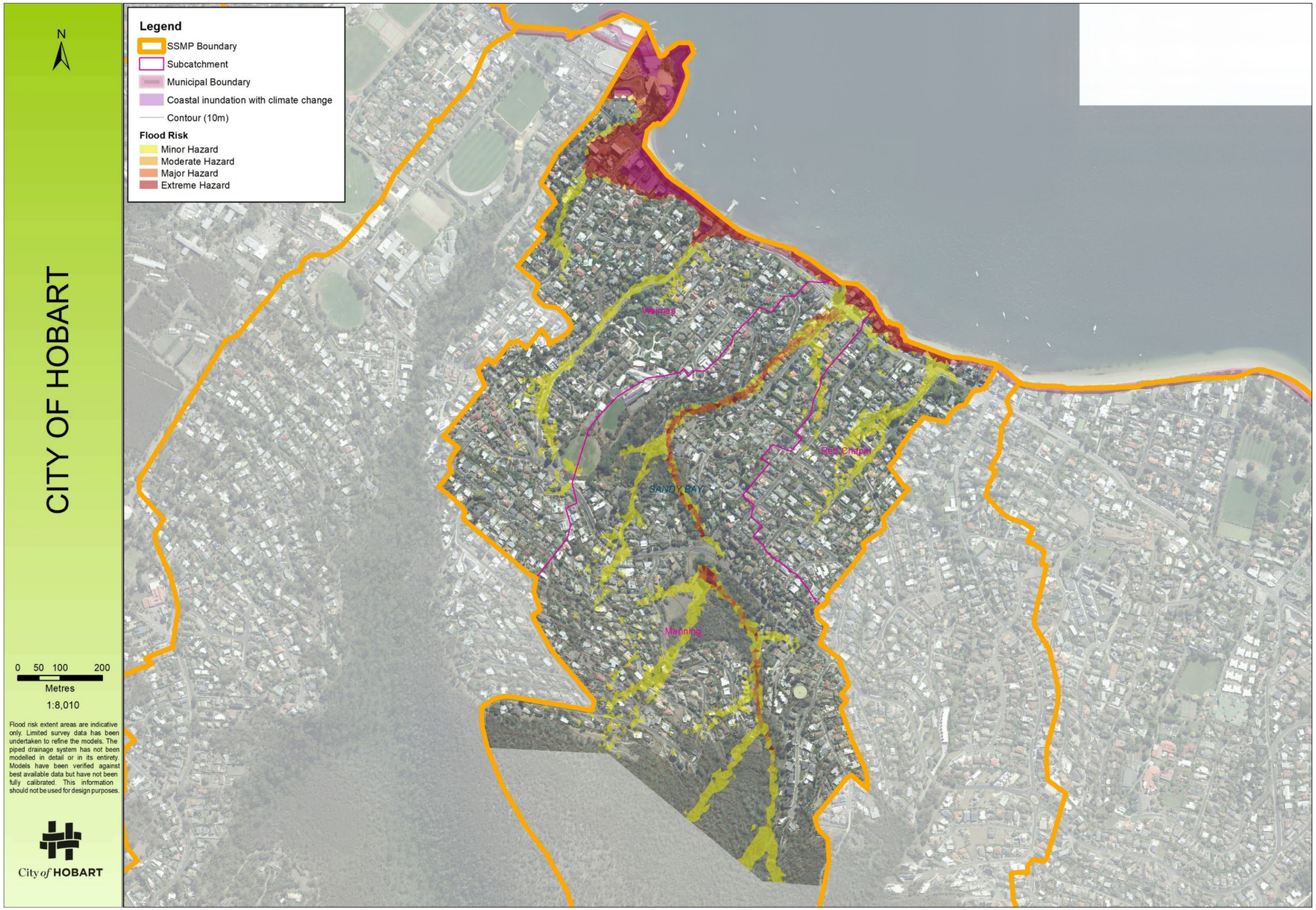
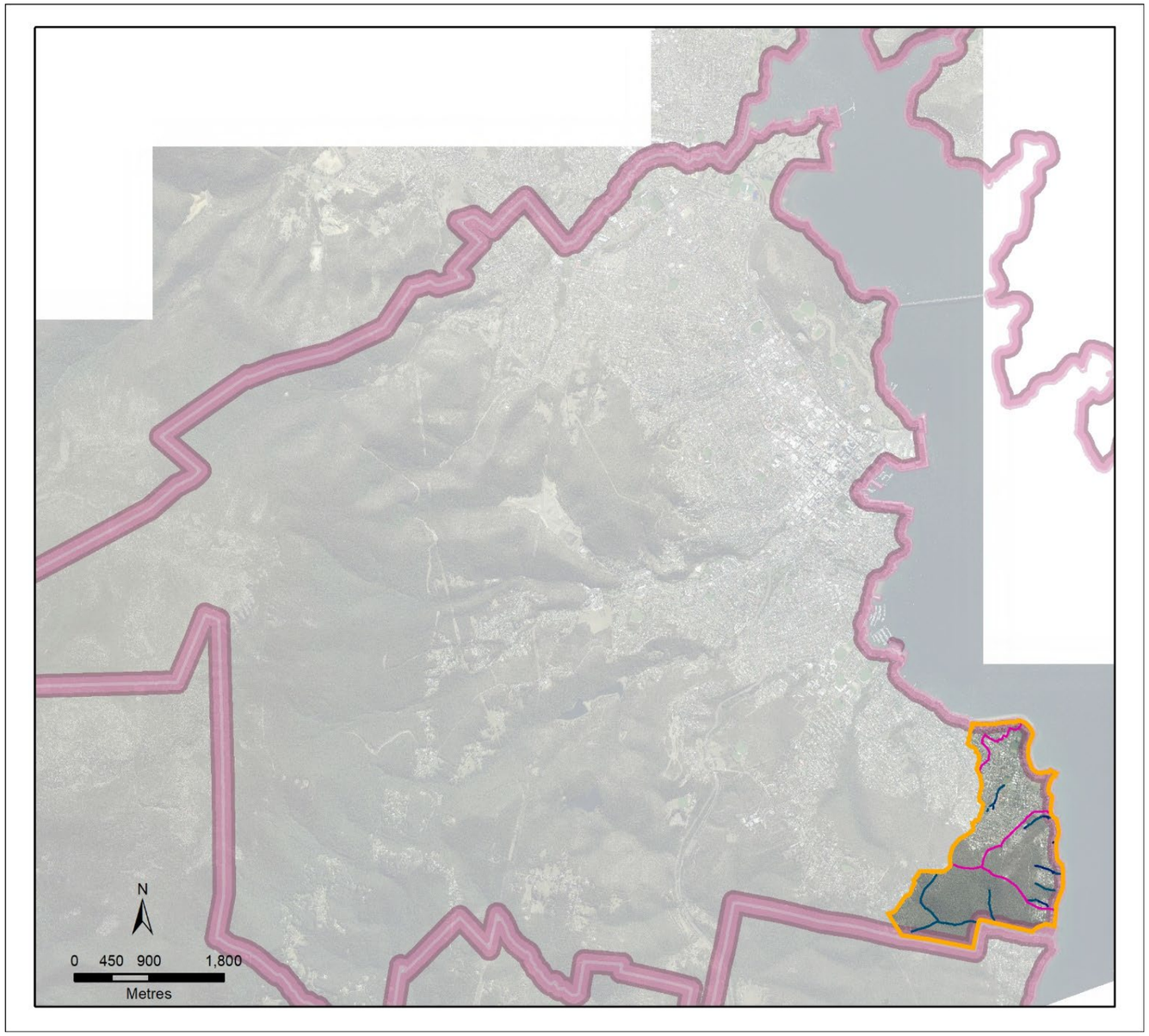


Figure 26 Map_Waimea, Maning and Red Chapel Flood Risk

Part 2: Waimea, Maning and Red Chapel

16.0 St Canice, Wayne, Folder Creek and Cartwright



Part 2: St Canice, Wayne, Folder Creek and Cartwright

16.1 St Canice, Wayne, Folder Creek and Cartwright Summary

The St Canice, Wayne, Folder Creek and Cartwright Creek Catchments are located to the south east of Hobart CBD, and comprise the most southern part of the Hobart Municipality. The headland bounded by Nutgrove Beach, Long Beach, and Sandy Bay Road is relatively flat, but the remainder of the area is steep hillside. The catchments all fall directly to the Derwent River. The urban area comprises mostly residential properties, a handful of commercial properties, some schools and some public open space.

16.2 Stormwater Network

There are a large number of outfalls, both piped and open, giving out to the Derwent River.

Many of the drainage lines have been piped, including all of St Canice Catchment, and most of Wayne Catchment. The last natural section of Wayne Rivulet (through Fahan School) was channelized in 2019 in response to political pressure.

To the south of the Municipality, the thin strip of residential properties along Sandy Bay Road on the way to Taroona, are serviced by disjointed sections of pipes and a number of natural or partially channelized creeks. Many properties bordering the Derwent River discharge directly into the river.

The heavily modified coastline around Long Beach includes a number of non-standard stormwater assets, including a pump and submerged outfall out into the River, large underground gross pollutant traps, and some ‘soakage pits’ that are designed to remove surface water but are disconnected from any downstream network.

16.3 Catchment Specific Issues and Opportunities

Much of the land along the creeks and drainage lines is at risk of landslip. The steep banks bordering the Derwent River are also highly unstable. The risk is frequently exacerbated by private stormwater outlets discharging onto the cliff tops.

The low lying areas behind Long Beach and Nutgrove Beach are predicted to be at risk from coastal inundation storm surge and sea level rise. Both Long Beach and Nutgrove Beach are popular swimming spots, and Nutgrove in particular tends to have poor water quality. The source of this is under investigation but may include dogs, or leakage from the sewer system.

A number of residential properties in the lower, older, reaches of the catchment may not be serviced by public infrastructure and may have SW connections to the sewer system. .

There are a number of large privately owned lots at the edges of the existing built up area that have the potential for subdivision. Infill development in the form of second houses, larger driveways, and paved outdoor areas is common.

16.4 Flood Risk

The flat area of the Nutgrove/Long Beach headland is at high risk of flooding due to the low grade of the terrain and low height above sea level. The urban areas at risk of coastal inundation are at risk of simultaneous overland inundation. These properties have the intention to become uninsurable in the future. There are very few feasible engineering solutions to protect these properties.

The properties below Sandy Bay Road experience flooding from sheet flow coming off the hill above, including some poorly controlled private runoff, that is not intercepted by the drainage system in Sandy Bay Road, and that is further concentrated by private driveways.

Development has generally not been sensitive to the natural drainage lines of the land, and a large number of private houses are located in close proximity or over the natural drainage lines, relying on piped diversions for flood protection.

There are a number of customer reports within the area of capacity constraints within the network.

16.5 Asset Management

The core components of the asset management strategies are to:

- Work within the Southern Tasmanian Council Authority Coastal Hazard Mitigation Strategy for the approach to the Nutgrove and Long Beach properties at risk of coincident flooding
- Work with the Derwent Estuary Program to identify treatment solutions to improve the swimmability of Nutgrove and Long Beaches.
- Investigate options for increasing the inlet capacity and/or minor upgrades of the reticulated system at known flooding locations
- Investigate mitigation options for at risk properties on Folder Creek, including purchasing of certain properties
- Planned routine inspections of critical assets
- Preservation of the remaining sections of open creek in a natural state

16.6 Catchment Modelling

This SSMP has been developed based on flood modelling undertaken internally by Council officers.

16.7 Asset Summary

Table 24 16.1 St Canice, Wayne, Folder Creek and Cartwright Asset Summary

Catchment Name(s)	St Canice, Wayne, Folder and Cartwright Creek
Catchment Size (hectares)	315.3
Catchment Land Use	Mixed urban and bushland
Value of Assets	$17.9m
Length of Piped Assets (km)	21.8
Length of Open Waterways (km)	1.9
Forecast CAPEX spend over 5 years	$2m - $2.5m
Overall Flood Risk	HIGH

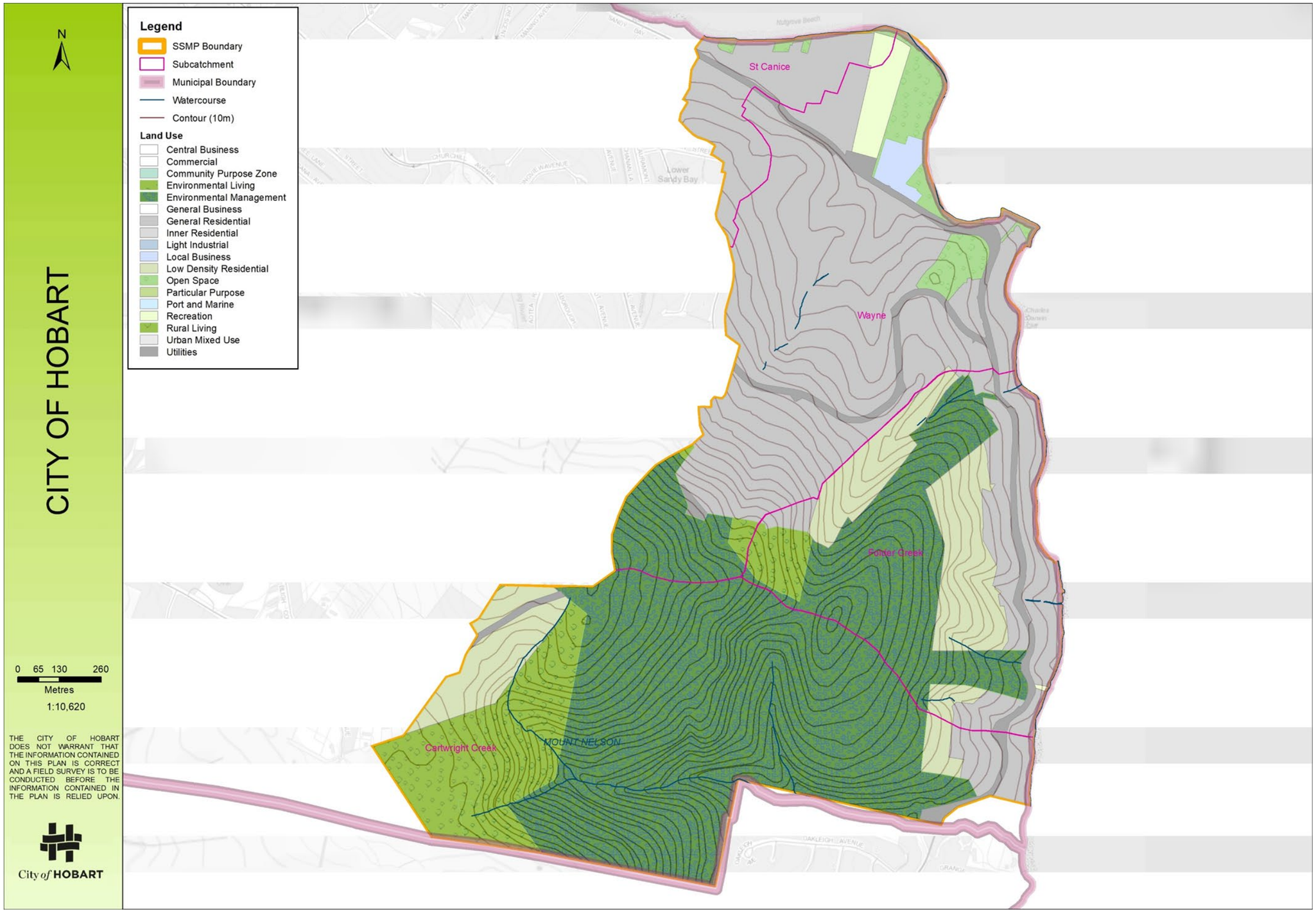


Figure 27 Map_St Canice, Wayne, Folder Creek and Cartwright Catchment Overview

Part 2: St Canice, Wayne, Folder Creek and Cartwright

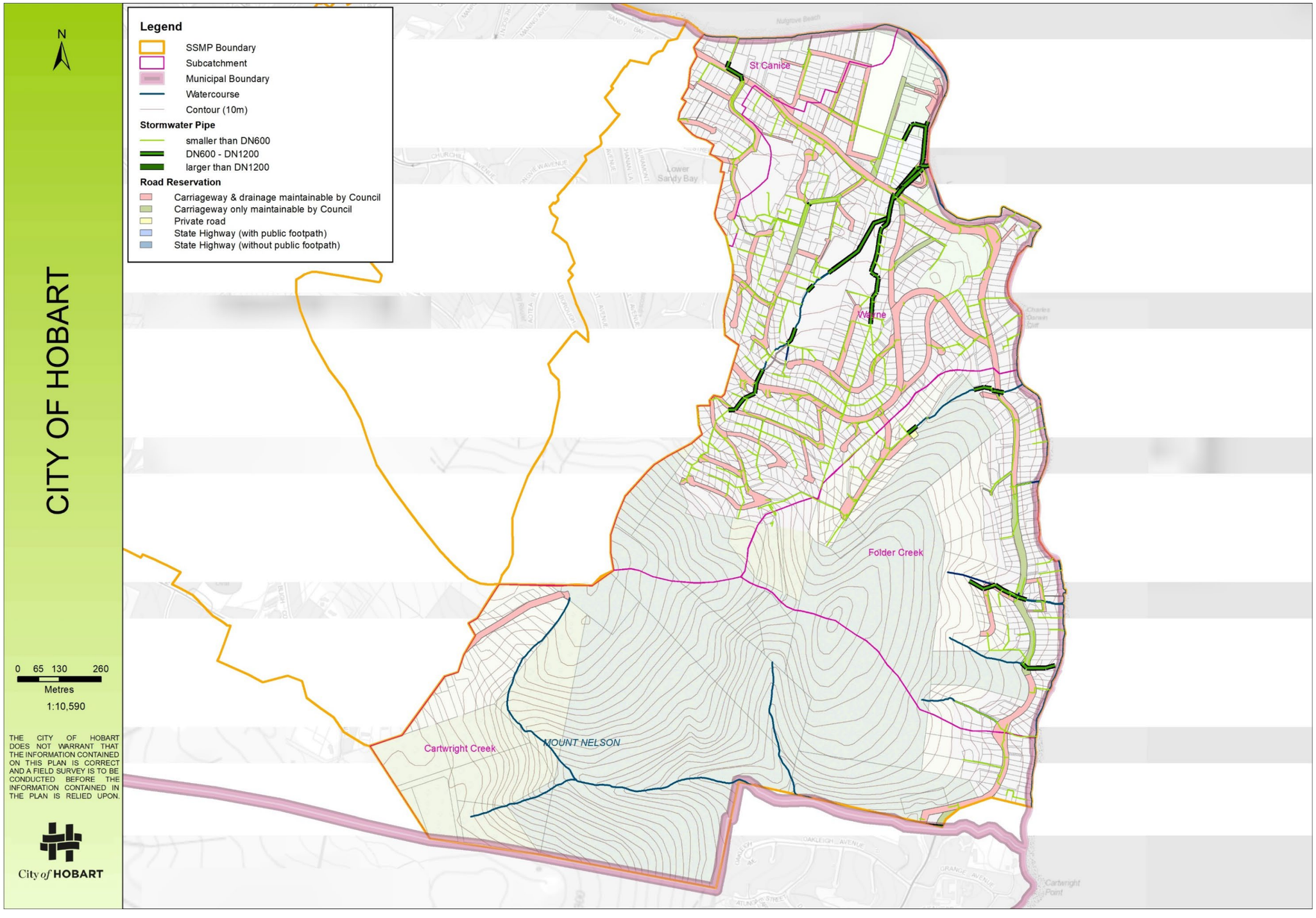


Figure 28 Map_St Canice, Wayne, Folder Creek and Cartwright Asset Overview

Part 2: St Canice, Wayne, Folder Creek and Cartwright

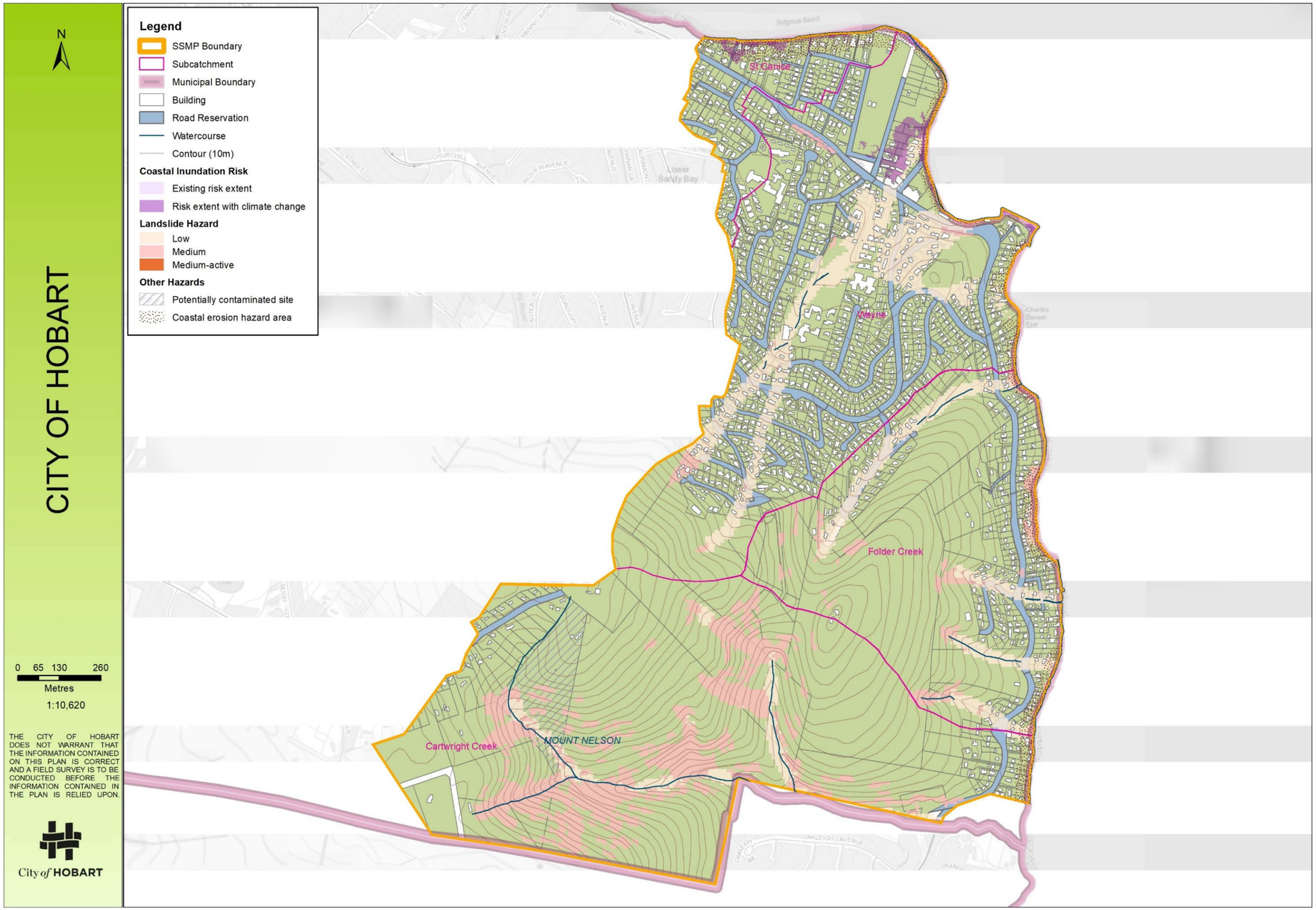


Figure 29 Map_St Canice, Wayne, Folder Creek and Cartwright Hazard Overview

Part 2: St Canice, Wayne, Folder Creek and Cartwright

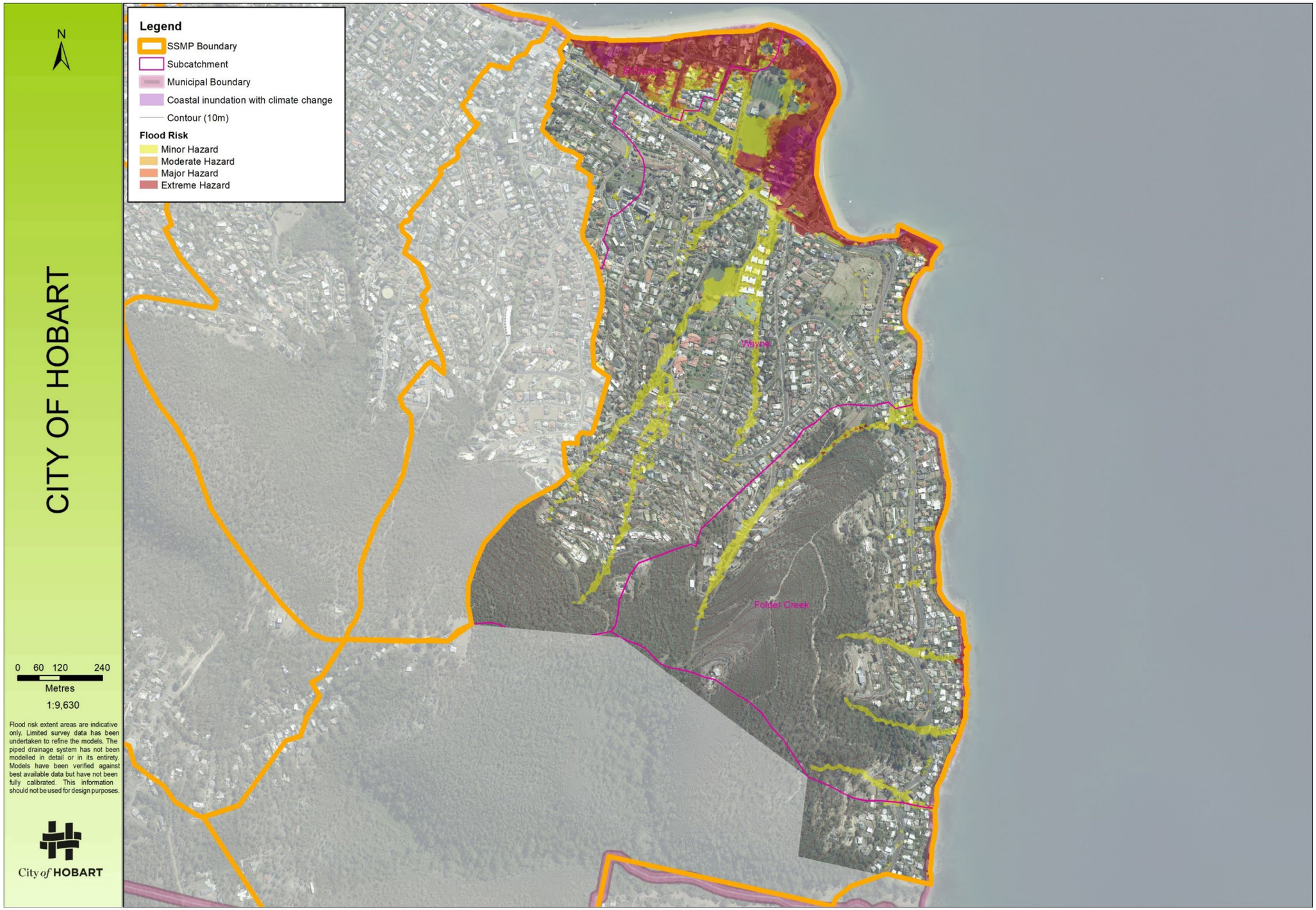
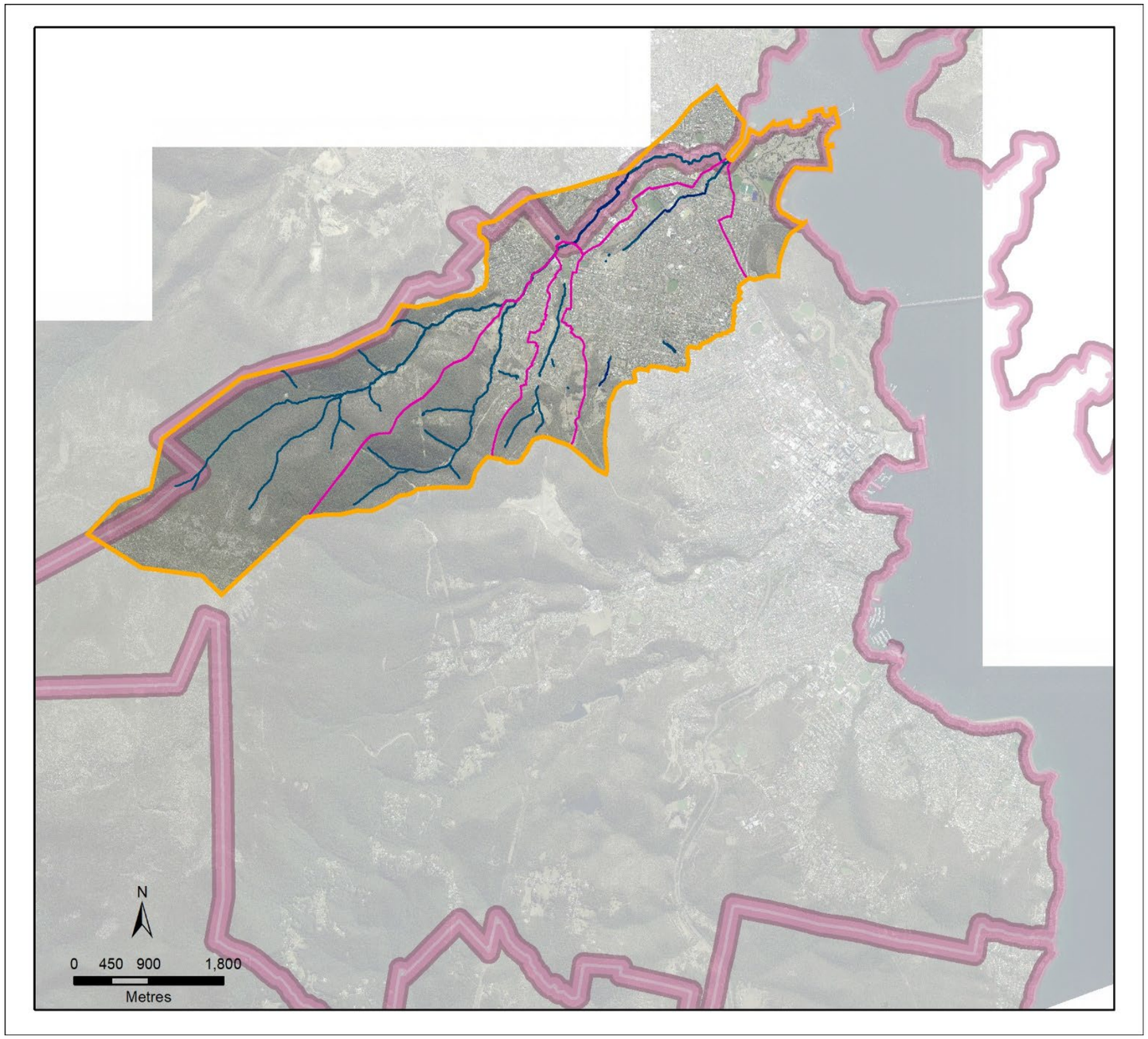


Figure 30 Map_St Canice, Wayne, Folder Creek and Cartwright Flood Risk

Part 2: St Canice, Wayne, Folder Creek and Cartwright

17.0 Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks



Part 2: Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)

17.2 Summary Greater New Town

Greater New Town Catchment is located to the north of Hobart CBD and comprises the catchments of New Town Rivulet, Maypole Rivulet, Cornelian Bay, Brushy Creek and Pottery Creek. The top half of the Catchment is steep, natural bushland and extends to the summit of Mount Wellington. The lower half of the catchment is well developed mixed urban use, including sportsgrounds and residential, commercial and industrial properties.

17.3 Stormwater Network

New Town Rivulet, and its tributaries of Brushy Creek and Pottery Creek flow in open, mostly natural, channels to the Derwent River. The outfall of New Town Rivulet, and the surrounding coastline is highly modified with retaining walls and reclaimed land.

Maypole catchment has been almost fully taken over by urban development. Development has not been sensitive to natural drainage lines, with most drainage lines criss-crossing standard residential properties. The rivulet has been piped and built over for much of its length. The un-piped sections are conveyed in formed concrete channels.

17.4 Catchment Specific Issues and Opportunities

The upper reaches of New Town Rivulet is a great natural asset with high intrinsic value.

Development pressures are high within the catchment. The majority of the recent large, green-field subdivisions within the municipality have been located in this catchment. There are still a significant number of large, undeveloped privately owned land parcels on the fringes of the existing urban area. The growth is occurring in an ad-hoc, lot by lot approach, with minimal opportunities for catchment wide planning.

Parts of the residential suburb of New Town is subject to ground water issues.

The outfall from New Town Rivulet is controlled by a sediment weir. The concrete lining of the embankment is also cracked and undermined in a number of places. The outfall will be restored in a more natural manner in 2024 - 25

17.5 Flood Risk

Flood risk within the catchment is caused by both riverine flooding, where the creeks overtop their banks; and by constricted overland flow paths, where development has encroached onto and over piped creeks. The riverine flooding is particularly significant at the confluence of the various creeks (i.e where Brushy and Pottery meet New Town, and where Maypole meets New Town).

17.6 Asset Management

The core components of the asset management strategies are to:

- exercise planning controls to preserve existing drainage lines through the strategically targeted adoption of public open space for new subdivisions
- exercise planning controls to prevent further encroachment on natural drainage lines from infill development within existing properties
- investigate capital works upgrade options for the lower reaches of Maypole Rivulet, and selected reaches of New Town Rivulet
- develop a Management Plan for the New Town Rivulet outfall site
- clearing of critical culverts and bridges pre large rainfall events, and investigate options for debris irons
- cyclical maintenance of open creek sections between piped sections for debris and sediment removal
- exercise enforcement controls for Soil & Water Management Plans for new developments
- investigate upper catchment rivulet management options for reducing peak flows and velocities and enhancing ecological values

17.7 SSMP Development

This SSMP has been developed based on flood modelling done by Cardno, in consultation with internal Council officers.

17.8 Asset Summary

Table 25 Greater New Town Asset Overview

Catchment Name	Greater New Town
Catchment Size (hectares)	1901.1
Catchment Land Use	Mixed urban and bushland
Value of Assets	$75.7m
Length of Piped Assets (km)	88.1
Length of Open Waterways (km)	21.3
Forecast CAPEX spend over 5 years	**$2.5m - $3m**
Overall Flood Risk	HIGH

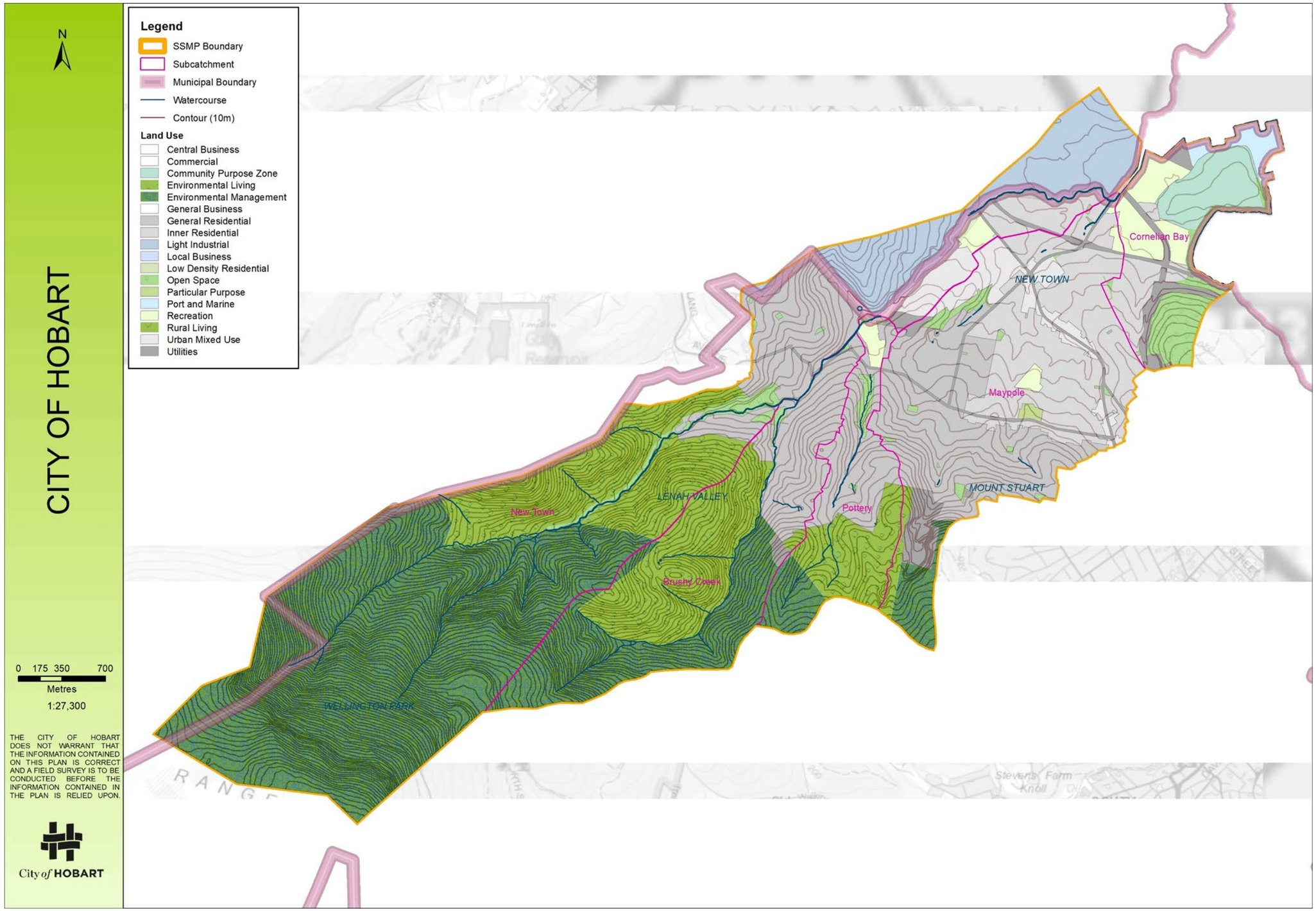


Figure 31Map_Greater New Town Catchment Overview

Part 2: Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)

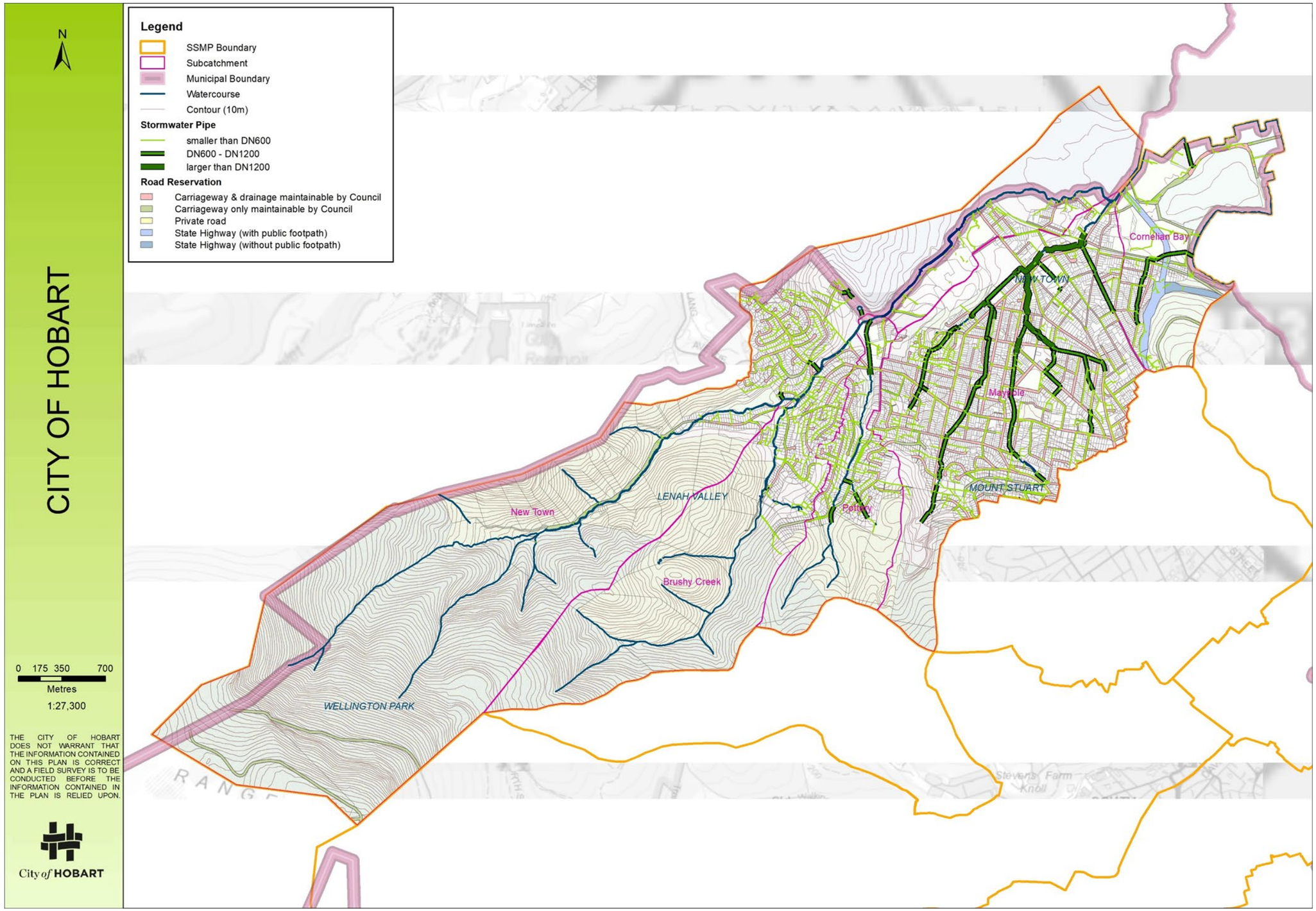


Figure 32 Map_Greater New Town Asset Overview

Part 2: Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)

Figure 33 Map_Greater New Town Hazard Overview

Part 2: Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)

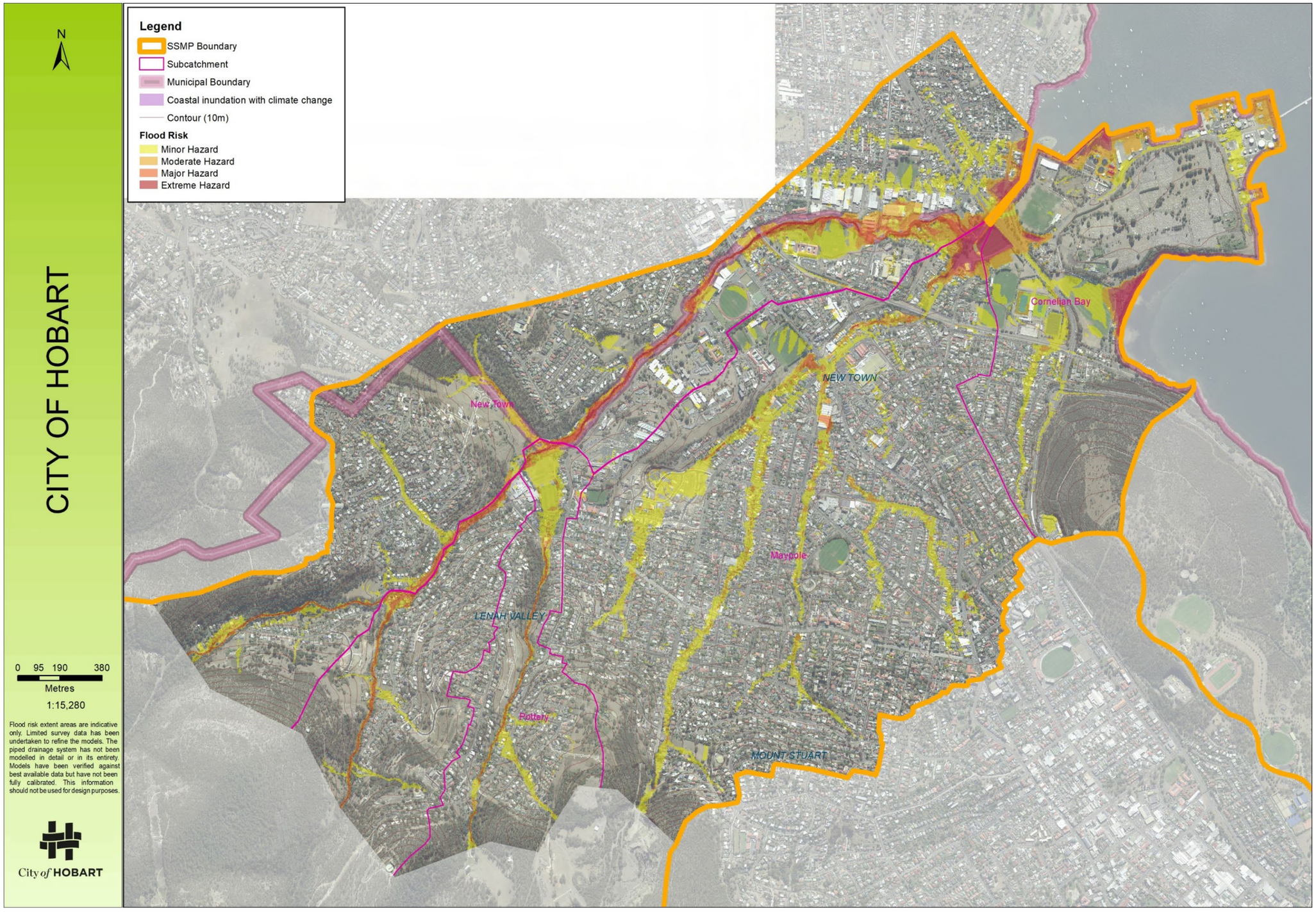


Figure 34 Map_Greater New Town Flood Risk

Part 2: Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)

18.0 Related Documents

The following reports outline the technical details of the catchment modelling:

- F22/55451 Flood Modelling Methodology – Sandy Bay Area – City of Hobart 2020 – *covers the catchments of Wellington & Ashfield; Proctors & University; Lambert; Waimea, Maning & Red Chapel; St Canice, Wayne, Folder & Cartwright*
- F22/55466 Greater Hobart Flood Hazard Study – Cardno 2019 – *covers the catchments of CBD & Sullivans Cove; Goulburn & South Hobart; Providence, Warwick and Park*
- F22/55469 Greater New Town Catchment Flood Hazard Study – Cardno 2019 – *covers the catchments of Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)*
- F22/55472 Lipscombe Rivulet Flood Hazard Study – Flussig 2019 – *covers the catchment of Lipscombe*
- F22/55478 McRobies Gully Flood Management Plan – GHD 2019 – *covers the catchment of McRobies Gully*

Other relevant reports:

- F22/55481 Asset Management Plan Stormwater 2020 – City of Hobart
- IR4157 Stormwater Strategy 2012 – 2

19.0 Recommended Actions

Table 26 Great Hobart (Providence, Warwick and Park Street Goals, Controls and Strategic Alignment)

No.	Recommendation	Purpose	Resilient to Climate Change & Natural Disasters	Infrastructure & Services managed for community well being	Natural environment preserved, secure and flourishing	Priority	Controls	Timeframe
1	**Update flood modelling to assess climate change impacts**	Understand the implications of how future climate scenarios will impact the community	✓	✓		HIGH	• Non-structural controls o Create updated flood model as part of DRF funded risk management project. o Include climate change analysis in flood modelling	2027
2	**Create management plan for overland flow paths and Rivulets to manage flood risk**	Identify areas where flood risk to the community needs to be mitigated through dedicated spaces and identify how these spaces are best managed for the community.	✓	✓	✓	HIGH	• Non-structural controls o Identify overland flow paths and associated level of risk as part of the risk management project, o Investigate areas that maybe should not be impacted by future development and investigate how best to protect the risk zones from development.	2027
3	**Finalise review and update of the stormwater asset management plan**	Ensure we have adequate and up to date understanding of our assets.		✓		HIGH	• Non-structural controls o Update asset management plan	Dec 2025
4	**Include an analysis of unserviced areas in the asset management plan.**	Identify areas that are likely to require servicing infrastructure and investment in the future.	✓	✓		HIGH	• Non-structural controls o Update asset management plan to include an analysis of unserviced areas.	Dec 2025
5	**Preserve existing overland flow paths**	To prevent further development being placed in flood paths. To preserve flow paths for environmental and flood mitigation purposes.	✓	✓	✓	HIGH	• Non-structural controls o Exercise powers under *Urban Drainage Act 2013* and *Building Act 2016* to prevent development encroaching into overland flow paths	Ongoing
6	**Extend stormwater network to unserviced properties and improve network connectivity.**	Unconnected properties increase risk of nuisance runoff and limit development potential. Connections to sewer lines increase the load on the sewer system and should be relocated into SW lines where possible.	✓	✓		HIGH	• Non-structural controls o Investigate current servicing arrangements and flag potential works. Prioritise based on flooding and nuisance reports and development pressures. Additional priority based on current SW connections to sewer. • Structural Controls o Extend network to unserviced properties	Ongoing

No.	Recommendation	Purpose	Resilient to Climate Change & Natural Disasters	Infrastructure & Services managed for community well being	Natural environment preserved, secure and flourishing	Priority	• Controls	Timeframe

7	**Assess service standards from the network and future expected service standards under climate change scenarios and against community expectations.**	The current service standards are likely to require incredibly significant investment to maintain the network under climate change scenarios.	✓	✓		MEDIUM	• Structural controls
							  • Improve inlet capacity and undertake local network upgrades (subject to further investigation)
							  • Identify underserviced areas and future capital works to appropriately drain these areas.
							• Non-structural controls
							  ○ Further modelling of the network capacity
								Mid-term
								(5-10 yrs)
								
								Immediate
								(1-5 years)

8	**Proactively manage critical assets**	To ensure network remains functioning and identify and manage future maintenance and renewal budget.	✓	✓		HIGH	• Non-structural controls
							  ○ Routine CCTV inspection of critical pipes and boxed culverts, and proactive renewal
							  ○ Exercise powers under *Urban Drainage Act 2013* and *Building Act 2016* to prevent development occurring on top of stormwater assets
							• Operations and Maintenance Controls
							  ○ Routine jetting of critical pipes and clearing of critical inlet pits and headwalls pre rainfall events
								Ongoing

9	**Investigate flood mitigation improvements for properties affected by flood zones.**	Some properties are within flood zones or affected by flooding. Assessment of the risk and potential mitigation measures will be part of the flood hazard project	✓	✓		HIGH	• No structural controls ○ Investigate flow diversion and flood mitigation options for this area as part of DRF modelling project. •	Immediate (1-5 years)
10	**Assist community with developing private flood action plans**	Similar to fire actions plans, flood actions plans would increase community resilience by providing advice and knowledge on what to do in a flood situation to minimise risk to people and property.				MED	• Non-structural controls ○ Support community by providing data and professional advice regarding flood action plans and personal mitigation measures, including communication plan with residents in aftermath of any event •	Post DRF project and updated modelling.

Goal	Goal Description	Goal Justification	Resilient to Climate Change & Natural Disasters	Infrastructure & Services managed for community well being	Natural environment preserved, secure and flourishing	Priority	Controls	Timeframe

11	**Protect Hobart Rivulet from polluted runoff from the landfill site**	Hobart Rivulet has high community and environmental values and can be heavily impacted from pollutants from the McRobies Gully Waste Centre. Pollutant capture to minimise the load on the Rivulet will increase community and environmental values and decrease environmental risk and clean up costs.		✓	✓	HIGH	• Operations and Maintenance Controls
							  ○ Regular maintenance of existing treatment measures
							• Structural Controls
							  ○ Install improved GPT prior to the McRobies outfall
							• Investigate improvements to the litter management devices in the McRobies Gully tip area.
								Immediate (1-5 years)

12	**Investigate mitigating flood risk for Hobart CBD**	Hobart CBD acts as a small basin in large flow events and is impacted by flood events. This impact is likely to increase under climate change scenarios.	✓			HIGH	• Non-structural controls ○ Require detention systems for new developments discharging to the Rivulet aimed at reducing peak flood flows in large events • Investigate flood mitigation options as part of DRF flood hazard study. Create mitigations strategy and actions.	**Subject to modelling project results and recommendations.**

13	**Improve ecological value of Rivulets and the Derwent**	The Rivulets and bays are ecologically valuable in their own right and are valued by communities. Improvements can be made to increase biodiversity and environmental resilience within these systems.			✓	HIGH	• Non-structural controls
							  ○ Create Rivulet and stormwater strategy to guide future works in the Rivulets and take into account flood management, environmental improvements, community safety and amenity etc.
							  ○ Exercise powers under the planning scheme and *Urban Drainage Act 2015* to prevent further alterations to the creeks
							• Operations and Maintenance Controls
							  ○ Enhance riparian zone through planting of natives, weed and willow removal, and small scale management to promote ponding in conjunction with CoH Open Space Unit
							• Continue Derwent Estuary Program support and partnership
								Immediate (1-5 years)
								
								Ongoing

14	**Investigate ownership issues and ensure compliance with Acts.**	There are several areas including the Sandy Bay Utas campus and many privately drained areas where ongoing management needs to be considered against the requirements of the *Urban Drainage Act 2013*. Many of these systems area at end of life and becoming	✓	✓		MEDIUM	• Non-structural controls ○ Consider the management of private stormwater systems including the UTas Sandy Bay system and create a policy direction for these systems.	Mid-term (3-7 yrs)

Part 2: Greater New Town (New Town, Maypole, Cornelian Bay, Brushy and Pottery Creeks)

		problematic as they fail and ownership is in question.						

19.1 Action implementation.

These 14 actions will be accomplished by a combination of:

- Business as usual (Action 8)
    - Maintenance and asset planning
    - Renewals
- The Flood Hazard Project (Actions 1,2,4,7, 9, 10,12, 14)
    - Project being undertaken to update flood modelling and identify
        - Flood risk areas current and under climate change
        - possible mitigation options
        - underserviced area identification
        - Level of service standards under climate change scenarios
        - Investigate community flood action plans
- Future work on how best to preserve overland flow paths under the *Tasmanian Planning Scheme* (Action 5)
- Current project to install a gross pollutant trap between the McRobies Gully tip site and the Hobart Rivulet outfall. (Action 11)
- Current Willow removal project and future Rivulet and catchment planning (Action 13)

20.0 Bibliography

2021 *Asset Management Plan, City of Hobart, Stormwater 2020 AMP V1.4* City of Hobart

2019 *Australian Rainfall and Runoff:A Guide to Flood Estimation, Version 4.2* Commonwealth of Australia (Geoscience Australia)

Tasmania Stormwater Policy Guidance and Standards for Development

Tasmanian State Planning Office *Hobart Interim Planning Scheme 2015*

The State of Tasmania (The Department of Premier and Cabinet) *Urban Drainage Act 2013 (2024 Ver 6.0.67 Rev 1437)*

ASSET MANAGEMENT PLAN

City of Hobart

Stormwater 2020 AMP

Document Control	Asset Management Plan				
Document ID :					
Rev No	**Date**	**Revision Details**	**Author**	**Reviewer**	**Approver**
V1.10	Dec 2020	Stormwater Asset Management Plan 2020	Jennifer Flanagan	Aaron Smith	Ali Rizvi
V1.2	March 2021	Stormwater Asset Management Plan 2020	Jennifer Flanagan	Aaron Smith	Glenn Doyle
V1.3	June 2021	Stormwater Asset Management Plan 2020	Jennifer Flanagan	Aaron Smith	Ali Rizvi
V1.4	July 2021	Stormwater Asset Management Plan 2020	Jennifer Flanagan	Aaron Smith	Glenn Doyle

This Asset Management Plan may be used as a supporting document to inform an overarching Strategic Asset Management Plan.

Contents

1.0 EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

Stormwater assets provide the drainage service to the City of Hobart. To deliver these services, council manages a portfolio of stormwater infrastructure assets including an underground pipe network providing flood protection to road users, people and property during rainfall events, and a series of watercourses providing public and environmental amenity as well as drainage.

This Asset Management Plan (AM Plan) details information about infrastructure assets with actions required to provide an acceptable level of service in the most cost-effective manner while outlining associated risks.

The plan defines the services to be provided, how the services are provided and what funds are required to provide over the 20 year planning period. The AM Plan will link to a Long-Term Financial Plan which typically considers a 10 year planning period.

This plan covers the infrastructure assets (including stormwater pipes, structures and treatment systems) that serve the City's obligation under the Urban Drainage Act 2013. These assets largely sit under and comprise the bulk of Classes 71, 72 and 73 in the City's Asset Management System.

1.2 Asset Description

This plan covers the infrastructure assets that provide stormwater services.

The stormwater network comprises:

- Concrete pipes
- PVC and other material pipes
- Debris and pollutant capture device
- Property connections
- Other reticulation infrastructure (including access chambers and headwalls, but excluding road drainage inlet pits – although these will be transferred from the Roads Portfolio to the Stormwater Portfolio in future iterations of this plan)
- Natural rivulets
- Lined rivulets (rivulet retaining walls and base linings)
- Enclosed rivulets

The above infrastructure assets have a replacement value estimated at $298,560,530.

Table 1.2: Assets covered by this Plan

Asset Category	Dimension	Replacement Value
Pipe - Concrete DN300 and smaller	168km	$71,006,900
Pipe - Concrete DN450 - DN900	71km	$56,631,446
Pipe - Concrete DN1050 and larger	14km	$36,838,021
Pipe - PVC/Other	77km	$16,434,303
Rivulet - Enclosed (Hobart CBD)[1]	2km	$14,504,906
Rivulet - Lined	0.9km	$26,696,653
Rivulet - Natural	68km[2]	$-

Rivulet - Retaining Wall	3.9km[3]	$24,196,445
Property Connections	7003 items	$12,056,823
Debris & Pollutant Capture Devices	561 items	$3,029,686
Other	8,135 items	$407,462

NOTE: Pipe materials and lengths are extracted from the GIS. Discrepancies exist between GIS and Conquest data
[1]The valuation of the enclosed section of Hobart Rivulet has not been undertaken in any detail. The current valuation is based on the same unit rates as open sections of channel
[2]Declared asset length variable depending on the extent of minor tributaries included
[3]Sandy Bay, Hobart and New Town Rivulets only, excludes minor rivulets, and includes potentially private walls

Stormwater assets are generally long life assets. By their nature they are mostly hidden and are infrequently used – providing service during heavy rainfall only. Because of this there is limited performance data on the assets, other than via computer simulations. Historically very little condition data has been collected on stormwater assets and due to inconsistent practises, where it exists it is frequently unreliable. Asset value unit rates have historically been very low. After the most recent adjustment, asset renewal projects still frequently exceed the corresponding asset value unit rates.

The enclosed section of Hobart Rivulet runs under the Central Business District of Hobart. The valuation of this asset is currently based on the unit rates for open sections of rivulet. In reality, this asset has significant additional constraints associated with confined space entry, substantial fully developed properties above ground, unknown structural loading from third parties, and both identified and unidentified third party infrastructure (sewer, gas, power, etc) within and impacting on the asset. The condition of the asset is mixed but has not yet been assessed in detail (there is a project to begin this process in 2021). Compounding the technical issues associated with the asset are complex legal questions around ownership and responsibilities of the various components of the rivulet, and mixed ownership of the air rights above the rivulet. It is expected that a detailed valuation of this asset will result in a significant increase in its asset value.

1.3 Levels of Service

The allocation in the planned budget is sufficient to continue providing existing services at current levels for the planning period.

The City of Hobart provides the following stormwater services, noting that the level of service experienced by customers is inconsistent across the municipality and service activities need to be prioritised by the asset manager:

- Provision of underground drainage infrastructure to manage urban stormwater flows
- Facilitation of stormwater connection for the discharge of private drainage
- Planning and mitigation of flood events
- Environmental actions to support water ecological elements and reduce pollutant transfer
- Management and protection of urban waterways and open drainage channels

1.4 Future Demand

The factors influencing future demand and the impacts they have on service delivery are created by:

- Demographic changes
- Legislative changes
- Economic climate

- Customer expectations
- Climate change

Meeting these demands will involve managing existing assets, upgrading existing assets, and providing new assets. Demand management practices may also include a combination of non-asset solutions:

- Existing and new planning controls
- Council policies
- Improved scopes, contracts and project management systems
- Community engagement
- System analysis and infrastructure planning
- Insuring against risks and managing failures

1.5 Lifecycle Management Plan

1.5.1 What does it Cost?

The forecast lifecycle costs necessary to provide the services covered by this AM Plan includes operation, maintenance, renewal, acquisition, and disposal of assets. Although the AM Plan may be prepared for a range of time periods, it typically informs a Long-Term Financial Planning period of 10 years. Therefore, a summary output from the AM Plan is the forecast of 10 year total outlays, which for the Stormwater Portfolio is estimated as $43,453,404 or $4,345,341 on average per year. This is based on the existing 5 year capital work plan, known developer contributions to the system, itemised operation and maintenance costs, and long term renewals based on asset age. It does not include CPI or forecast asset value inflation, estimated at 4.5% per annum.

1.6 Financial Summary

1.6.1 What we will do

Estimated available funding for the 10 year period is $30,218,792 or $3,021,879 on average per year as per the Long-Term Financial plan or Planned Budget. This is 69.54% of the cost to sustain the current level of service at the lowest lifecycle cost, however this figure must be taken in the context of poor quality asset data.

The Planned Budget from 2023 onwards in this document is based on the Stormwater Levy charged through customer rates notices, assuming that this rate stays constant. In reality Council has the power to adjust this rate to properly reflect the costs of managing the stormwater assets, once the uncertainty around the data quality has been reduced.

The infrastructure reality is that only what is funded in the long-term financial plan can be provided. The Informed decision making depends on the AM Plan emphasising the consequences of Planned Budgets on the service levels provided and risks.

The anticipated Planned Budget for the Stormwater Portfolio leaves a shortfall of -$1,323,461 on average per year of the forecast lifecycle costs required to provide services in the AM Plan compared with the Planned Budget currently included in the Long-Term Financial Plan. This is shown in the figure below.

Works and services that can be provided with the current funding are:

- Renewal and repair of some existing assets
- Clearing of debris from rivulet debris irons and emptying of gross pollutant traps
- Clearing of blockages from the pipe network at the request of customers or in emergencies
- Localised network upgrades at discrete locations

Forecast Lifecycle Costs and Planned Budgets

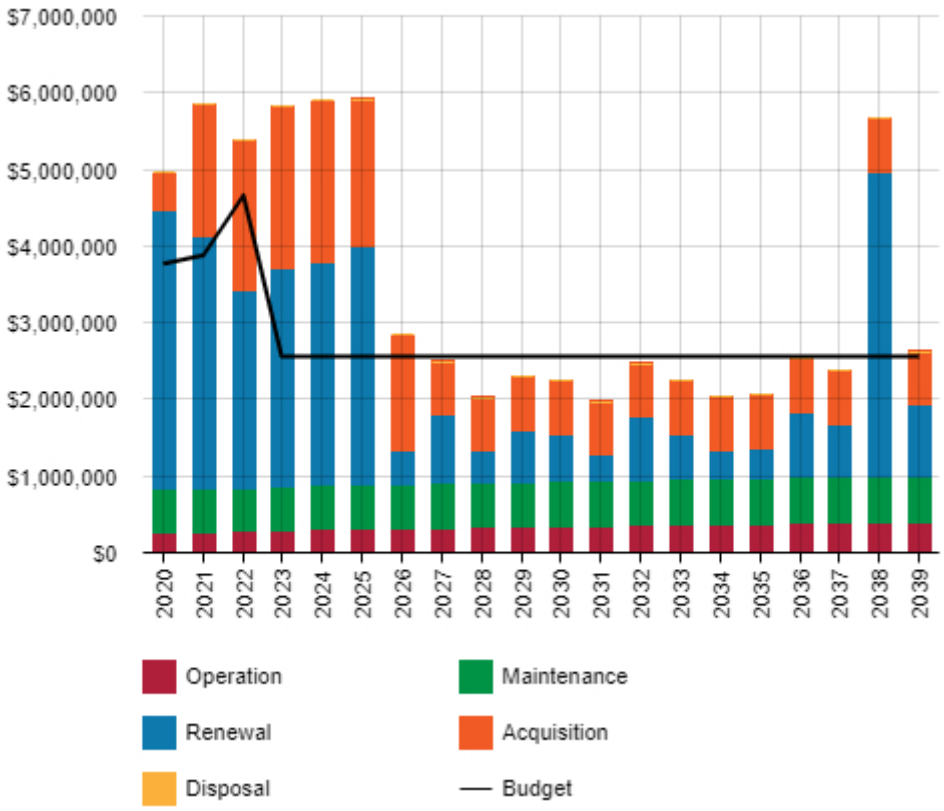


Figure Values are in current dollars.

We plan to provide services for the following:

- Operation, maintenance, renewal and acquisition of stormwater assets to meet service levels set by the City of Hobart annual budgets.

1.6.2 What we cannot do

We currently do not allocate enough budget to **both** sustain these services at the proposed standard **and also** to provide all new services being sought. New works and services that cannot be provided under present funding levels yet are demanded by the community are:

- Expand the stormwater network to urban areas that are not adequately drained and/or un-serviced customers
- Improve the level of flood protection to customers at risk of flooding in extreme rainfall events
- Provide a consistent level of flood protection from nuisance flows in small rainfall events
- Upgrade our network to cater for increased loads on the system due to incremental development and climate change
- Assess the condition of assets, other than the most critical ones, or do planned preventative maintenance
- Rehabilitate and sustain the ecological function of our urban waterways or expand existing measures to mitigate the impact of urban runoff on receiving waters
- Improve the visual and social amenity of urban waterways
- Maintain road drainage infrastructure (such as culverts and table drains) outside the urban area

1.6.3 Managing the Risks

Our present budget levels are sufficient to continue to manage risks for the planning period.

The main risk consequences are:

- Potential asset failure and increase likelihood of inundation damage and/or disruption to city services
- Increased liability to Council for failing to meet its obligations under the Urban Drainage Act 2013 to effectively drain the urban area
- Inconsistent levels of service and damage to the City's reputation as service levels do not improve
- Increased future maintenance and operational costs

We will endeavour to manage these risks within available funding by:

- Improved processes to apply and enforce planning controls to protect existing assets
- Implementation of a Stormwater Strategy and Stormwater System Management Plans that clearly define and prioritise risks
- Improved asset inspections, data and criticality ranking systems
- Better alignment of this plan with Council's Strategic Plan 2019 – 2029
- Improving the City's position around acquired assets, including acceptable standards and condition to reduce long term maintenance burdens
- Investigate the application of new and emerging technologies
- Seek to extend asset life and repair in-situ were possible

1.7 Asset Management Planning Practices

Key assumptions made in this AM Plan are:

- Asset data is based on Conquest asset data (unless otherwise stated)
- Asset values are based on FAIR Panel review costs from 19/20
- All values are based on current dollar values
- Based on financial assets only (i.e assumes assets such as natural rivulet banks have no renewal value)
- Capital works are based on the current 5 year capital works plan
- Operation and maintenance costs are projections based on existing budgets with an increased allowance for predicted acquired assets.

Assets requiring renewal are identified from either the asset register or an alternative method.

- The timing of capital renewals based on the asset register is applied by adding the useful life to the year of acquisition or year of last renewal,
- Alternatively, an estimate of renewal lifecycle costs is projected from external condition modelling systems and may be supplemented with, or based on, expert knowledge.

The Alternative Method using the five year capital works plan was used to forecast the first five years of this AM plan, and the Asset Register was used to forecast the renewal lifecycle costs for the remainder of this AM Plan.

This AM Plan is based on an **uncertain** level of confidence information. The uncertainty arises from the lack of credible condition data for most assets, optimistic asset lives, and low asset values.

1.8 Monitoring and Improvement Program

The next steps resulting from this AM Plan to improve asset management practices are:

- Reassessment of asset renewal rates (FAIR panel review scheduled to occur in 21/22)
- Finalisation of asset risk ranking and prioritization to improve decision making
- Improve asset data, particularly poorly documented asset types and the condition data for critical assets
- Increase standard designs and City policies to improve the quality of future acquired assets
- Improve the link between the Asset Management System and the GIS to improve and streamline management and field work practices and consolidate asset data into one source of truth
- Improve planned and reactive maintenance reporting to increase efficiency in operating, maintaining, renewing and replacing existing assets to optimise lifecycle costs
- Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure

2.0 Introduction

2.1 Background

This AM Plan communicates the requirements for the sustainable delivery of services through management of assets, compliance with regulatory requirements, and required funding to provide the appropriate levels of service over the planning period.

The AM Plan is to be read with the City of Hobart planning documents. This should include the Asset Management Policy and Asset Management Strategy, where developed, along with other key planning documents:

- City of Hobart Strategic Plan 2019 – 2029
- Long Term Financial Management Plan
- Hobart Corporate Climate Change Adaptation Plan
- Hobart Interim Planning Scheme and proposed Tasmanian Planning Scheme
- City of Hobart Climate Change Strategy

The infrastructure assets covered by this AM Plan include stormwater pipes, rivulets, and associated infrastructure. For a detailed summary of the assets covered in this AM Plan refer to Table 1.2.

The infrastructure assets included in this plan have a total replacement value of $298,560,530.

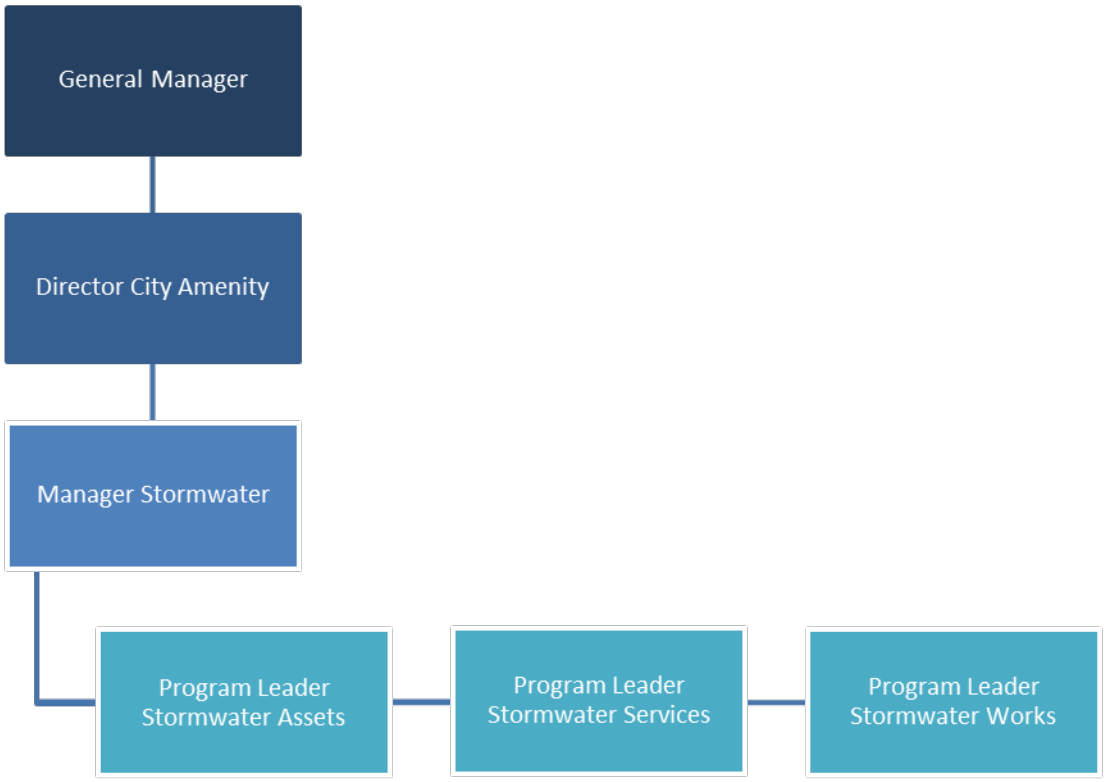
Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 2.1.

Table 2.1: Key Stakeholders in the AM Plan

Key Stakeholder	Role in Asset Management Plan
Elected Members	■ Represent needs of community/shareholders, ■ Allocate resources to meet planning objectives in providing services while managing risks, ■ Ensure service sustainable.
General Manager & Executive Leadership Team	■ Ensure that asset management policies and strategies are being implemented. ■ Ensure the long-term financial sustainability of the City. ▪ Ensure the Council's strategic plan is delivered in-line with community expectations
Rate payers/local community	■ Users of the facilities ■ Provide in-put into the City's Strategic Plan
Council Officers	■ Responsible for the delivery of services to the community and the City ■ Responsible for the management of the assets. ■ Ensure that risk management practices are undertaken for the services and assets. ■ Provide accurate and timely financial information to enable sound management of the services and assets.

Key Stakeholder	Role in Asset Management Plan
Insurance Provider	■ Enable mitigation of risks for assets.
State and Federal Government Departments	■ Provide the statutory and regulatory framework for the management of the assets ■ Enable the provision of grant funding to assist with the provision of building assets.
State Emergency Services (SES)	■ Stakeholder and key role in managing service failure of the assets

The City of Hobart organisational structure for the delivery of stormwater services is detailed below:



2.2 Goals and Objectives of Asset Ownership

Our goal for managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance,
- Managing the impact of growth through demand management and infrastructure investment,
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service,
- Identifying, assessing and appropriately controlling risks, and
- Linking to a Long-Term Financial Plan which identifies required, affordable forecast costs and how it will be allocated.

Key elements of the planning framework are

- Levels of service – specifies the services and levels of service to be provided,
- Risk Management – the method of assessing and prioritizing works
- Future demand – how this will impact on future service delivery and how this is to be met,
- Lifecycle management – how to manage its existing and future assets to provide defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices – how we manage provision of the services,
- Monitoring – how the plan will be monitored to ensure objectives are met,
- Asset management improvement plan – how we increase asset management maturity.

Other references to the benefits, fundamentals principles and objectives of asset management are:

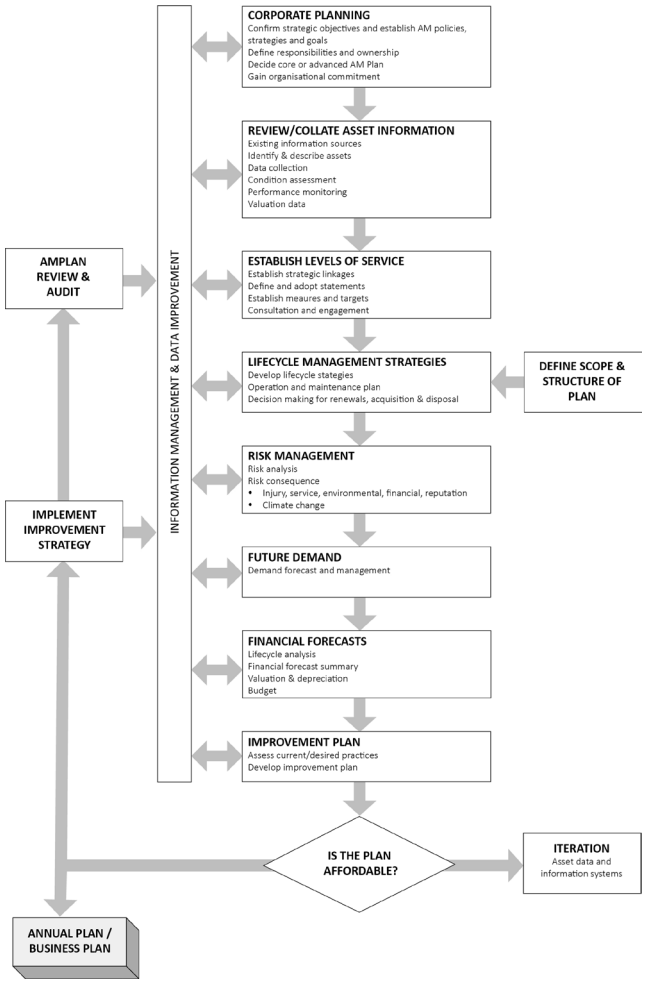
- International Infrastructure Management Manual 2015[1]
- ISO 55000[2]

[1] Based on IPWEA 2015 IIMM, Sec 2.1.3, p 2| 13

[2] ISO 55000 Overview, principles and terminology

A road map for preparing an AM Plan is shown below.

Road Map for preparing an Asset Management Plan
Source: IPWEA, 2006, IIMM, Fig 1.5.1, p 1.11



3.0 LEVELS OF SERVICE

3.1 Customer Research and Expectations

We currently have no research on customer expectations. This will be investigated for future updates of the AM Plan.

3.2 Strategic and Corporate Goals

This AM Plan is prepared under the direction of the City of Hobart vision, mission, goals and objectives.

Our vision is:

Hobart breathes.
Connections between nature, history, culture, businesses and each other are the heart of our city.
We are brave and caring.
We resist mediocrity and sameness.
As we grow, we remember what makes this place special.
We walk in the fresh air between all the best things in life.

Our mission is:

Working together to make Hobart a better place for the community.

Our values are:

The diagram below shows how the Asset Management Strategy fits into the City of Hobart's planning and reporting framework, including its relationship with the Capital City Strategic Plan 2019-2029 and other strategies and annual planning.

Strategic goals have been set by the City of Hobart. The relevant goals and objectives and how these are addressed in this AM Plan are summarised in Table 3.2.

Table 3.2: Goals and how these are addressed in this Plan

Goal	Objective	Strategy	How Goal and Objectives are addressed in the AM Plan
Pillar 1 Sense of Place	1.3 In City decision-making we consider how different aspects of Hobart life connect and contribute to sense of place.	1.3.1 Ensure that social and economic outcomes, climate change, biodiversity and green infrastructure are factored into city design. 1.3.2 Ensure a cross-disciplinary organisational culture that provides for integrated, strategic decision-making and diverse input into major projects. 1.3.3 Measure, manage and support the effective use of city facilities, infrastructure and open spaces.	• Identified proposed Stormwater projects through the Capital Works Program for the reporting period. • Develop and implement system to take developer contributions for developments that impact on the capacity or ecological value of assets
Pillar 6 Natural Environment	6.1 The natural environment is part of the city and biodiversity is preserved, secure and flourishing	6.1.3 Protect and enhance Hobart habitats and ecosystems, in partnership with stakeholders, including wildlife corridors and waterways. 6.1.4 Protect and enhance Hobart's biodiversity and manage invasive species 6.1.6 Regulate, measure and manage potentially polluting activities prioritising air and water quality	• Develop and fund a waterways maintenance program, including the reduction of erosion and harmful invasive vegetation • Develop Strategic Water Quality Improvement Plan and associated capital works plan. • Develop system for linking and funding maintenance for soft/non-financial assets • Routine and investigative Rivulet Water Sampling

Goal	Objective	Strategy	How Goal and Objectives are addressed in the AM Plan
Pillar 6 Natural Environment	6.3 Hobart is a city with renewable and ecologically sustainable energy, waste and water systems	6.3.5 Improve water quality in Hobart's waterways and identify water catchment activities that are contributing to stormwater pollution. 6.3.6 Continue to provide leadership in water-sensitive design and maintenance throughout Hobart. 6.3.7 Manage and maintain the City's stormwater assets using best practice asset management principles	• Review and improve Soil & Water Management operational practices on CoH rivulet jobs • Improve asset data (location, condition, function, ownership and maintenance responsibilities) for WSUD assets and rivulet retaining wall assets • Improve technical data collected on all assets • Develop CCTV condition inspection process for critical pipes • Update asset valuations in line with actual renewal costs • Consolidate asset data into single point of truth • Improve planned and reactive maintenance reporting • Develop Risk Framework to prioritise maintenance and capital works programs
Pillar 6 Natural Environment	6.4 Hobart is responsive and resilient to climate change and natural disasters.	6.4.7 Map, monitor and manage flood risks and impacts 6.4.8 Develop and implement resilient infrastructure to deal with extreme weather events 6.4.9 Incorporate disclosure of climate change risk into the City's planning, operations, finances and risk management.	• Incorporate climate change parameters into design standards and development standards, and into inputs to long term financial plan.

Goal	Objective	Strategy	How Goal and Objectives are addressed in the AM Plan
Pillar 7 Built Environment	7.3 Infrastructure and services are planned, managed and maintained to provide for community wellbeing	7.3.1 Ensure infrastructure supports affordable, sustainable living, and access to services for all 7.3.2 Enhance asset management practices to ensure assets meet future needs and respond to the impacts of climate change 7.3.3 Ensure Council owned assets and public spaces are presented to a high quality to meet community and visitor requirements	• Identify and fund extension of stormwater networks to unserviced properties • Develop asset criticality/ranking system and incorporate it into the Asset Management System to guide inspection and renewal programs • Ensure works crews have the right tools for the job and responsibilities are clearly defined within units

3.3 Legislative Requirements

There are many legislative requirements relating to the management of assets. Legislative requirements that impact the delivery of the stormwater service are outlined in Table 3.3.

Table 3.3: Legislative Requirements

Legislation	Requirement
Local Government Act 1993	This Act provides for Local Governments to plan for, develop and manage municipal areas in the interests of their communities. Council is required to determine and monitor the application of policies, plans and programs for the efficient and effective management of assets. Sections 70B, 70C and 70D on the Local Government Act 1993 set the requirement for local governments to develop a Strategic Asset Management Plan, asset management policies and an asset management strategy.
Land Use Planning & Approvals Act 1993	This Act provides the legislative framework for the assessment of developments which may include new stormwater infrastructure or works impacting on the existing stormwater infrastructure
Urban Drainage Act 2013	This Act provides for the management of stormwater assets to protect people and property by minimising the risk of urban flooding due to stormwater flows; and to provide for the provision of stormwater services in accordance with the objectives of the resource management and planning system.
Hobart Interim Planning Scheme 2015	The Hobart Interim Planning Scheme provides the parameters for assessing new developments that are connecting into the stormwater system, creating new stormwater assets or are in inundation prone areas.

Tasmanian Planning Scheme (TBA)	The Tasmanian Planning Scheme (not in effect at time of writing) will provide the parameters for assessing new developments in inundation prone areas.
Local Government (Building & Miscellaneous Provisions) Act	Sets out guidelines around acceptable subdivisions, including servicing and flood prone land.
Building Act 2016	Requires developers to seek approval from Council when building near stormwater assets.
Environmental Management & Pollution Control Act 1994	This Act provides the framework around minimising environmental harm to receiving waterways

3.4 Customer Values

Service levels are defined in three ways, customer values, customer levels of service and technical levels of service.

Customer Values indicate:

- what aspects of the service is important to the customer,
- whether they see value in what is currently provided and
- the likely trend over time based on the current budget provision

Customer values that relate to the stormwater service are:

- Safety of people and property
- Quality of the environment (the City's waterways and the River Derwent)

The perception of value in what is currently provided is likely to be mixed as the service level across the City is highly variable. There is unlikely to be any significant change in customer perceptions based on the current budget provision.

3.5 Customer Levels of Service

The Customer Levels of Service are considered in terms of:

Condition How good is the service … what is the condition or quality of the service?

Function Is it suitable for its intended purpose …. Is it the right service?

Capacity/Use Is the service over or under used … do we need more or less of these assets?

In Table 3.5 under each of the service measures types (Condition, Function, Capacity/Use) there is a summary of the performance measure being used, the current performance, and the expected performance based on the current budget allocation.

These are measures of fact related to the service delivery outcome (e.g. number of occasions when service is not available or proportion of replacement value by condition %'s) to provide a balance in comparison to the customer perception that may be more subjective.

Table 3.5: Customer Level of Service Measures

Type of Measure	Level of Service	Performance Measure	Current Performance	Expected Trend Based on Planned Budget
Condition	Does the stormwater system meet community expectations regarding ecological function, safety and aesthetics?	Safe water quality, biodiverse flora and fauna, minimal invasive weed species in urban waterways.	Poor: water quality varies from secondary quality at mid catchment level to fail quality at outfall level (all catchments). Patches of reasonable ecological value, but widespread invasive weed populations.	Level of service may plateau or improve, particularly with increased internal resourcing for planning, greater collaboration between units, and the potential to utilise volunteer groups for waterway rehabilitation work.
	Confidence levels		Medium (Professional judgement supported by data sampling	Medium (Professional judgement supported by data sampling, including improved indicators and better assessing and mapping of condition data)
Function	Does the greater stormwater system (including roads, public open space and overland flow paths) allow for the safe passage of flood waters in an extreme event?	Availability of unconstricted overland flow paths in public land	Poor: there are many areas where overland flow paths cross private property, some impacting dwellings. Particularly in the inner city, overland flow paths are heavily encroached upon.	Unlikely to change significantly. Overland flow paths should be preserved where possible, but the ability to recover lost historical overland flow paths is minimal.
	Confidence levels		Medium (Professional judgement supported by data sampling)	Medium (Professional judgement supported by data sampling – data can only be verified by flood events so relying on computer modelling for assessment)
Capacity	Does the piped stormwater network have adequate capacity to manage the urban stormwater without causing nuisance flows in small rainfall events?	Pipe capacity as determined by hydraulic modelling, and indicated by customer complaints	Medium: the network in the inner city is largely under capacity, although capacity in other suburbs is often okay. The infrastructure on the city fringes has not kept pace with the increasing urbanisation of the rural living areas and the level of service here is low	Increased infill development is likely to put pressure on the existing network. Capital upgrades will improve service in areas, but not consistently across the city.
	Confidence levels		Medium (Professional judgement supported by data sampling	High (Professional Judgement supported by extensive data – long term project to fully model the city's piped network)

3.6 Technical Levels of Service

Technical Levels of Service – To deliver the customer values, and impact the achieved Customer Levels of Service, are operational or technical measures of performance. These technical measures relate to the activities and allocation of resources to best achieve the desired customer outcomes and demonstrate effective performance.

Technical service measures are linked to the activities and annual budgets covering:

- **Acquisition** – the activities to provide a higher level of service (e.g. widening a road, sealing an unsealed road, replacing a pipeline with a larger size) or a new service that did not exist previously (e.g. a new library).
- **Operation** – the regular activities to provide services (e.g. opening hours, cleansing, mowing grass, energy, inspections, etc.
- **Maintenance** – the activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life (e.g. road patching, unsealed road grading, building and structure repairs),
- **Renewal** – the activities that return the service capability of an asset up to that which it had originally provided (e.g. road resurfacing and pavement reconstruction, pipeline replacement and building component replacement),

Service and asset managers plan, implement and control technical service levels to influence the service outcomes.[3]

Table 3.6 shows the activities expected to be provided under the current 10 year Planned Budget allocation, and the Forecast activity requirements being recommended in this AM Plan.

Table 3.6: Technical Levels of Service

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance*	Recommended Performance **
TECHNICAL LEVELS OF SERVICE				
Acquisition	To ensure that we are consistently delivering new assets to the community to provide the greatest benefit	Public and community satisfaction with our service. Deliver assets with greatest impact	Current program is not supported by adequate prioritization system	Ensure a 10 year forward works program is in place based on improved and informed decision making
	Acquisition of stormwater assets constructed by developers	Assets accepted meet City standards around operation design life and construction standards	Council standards are often compromised or not enforced during design and construction. Poor asset handover process	Improved documentation of standards to support negotiations with developers, improved asset inspections, to increase quality of acquired assets
		Budget	$267,862	$1,390,762
Operation	Stormwater assets are kept clear of blockages	Maintain service within operation budgets	Activities are often reactive and rarely documented	Operational activities tracked, accounted for by asset, and aligned to strategic objectives.

[3] IPWEA, 2015, IIMM, p 2|28.

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance*	Recommended Performance **
		Budget	$257,229	$301,824
Maintenance	Stormwater assets are kept in functional condition	Maintain asset function within maintenance budgets	Maintenance work largely reactive based on customer complaints	Improve ratio of planned to reactive maintenance and ensure maintenance resources are focused on critical assets.
		Budget	$567,650	$576,497
Renewal	Assets in need of renewal are identified prior to failure and replacement is optimised for lifecycle cost.	Condition inspection data compiled for critical and ageing assets	Condition data not collected in systematic way based on asset criticality. Risk based priority structure in development but not implemented	Delivery of a well-funded asset inspection program based on risk based priority structure
		Budget	$1,929,139	$2,076,257
Disposal	Ensure we can keep up to date asset list of items that need to be maintained	Review and assessing if the asset is required moving into the future	The removal of assets no longer required or do not provided any significant purpose	Ensure appropriate assessments are completed to ensure the asset in no longer required. This process to be undertaken during condition assessment process
		Budget	$0	$0

Notes: *Current activities related to Planned Budget.
**Expected performance related to forecast lifecycle costs.

It is important to monitor the service levels regularly as circumstances can and do change. Current performance is based on existing resource provision and work efficiencies. It is acknowledged changing circumstances such as technology and customer priorities will change over time.

4.0 FUTURE DEMAND

4.1 Demand Drivers

Drivers affecting demand include things such as population change, regulations, changes in demographics, seasonal factors, vehicle ownership rates, consumer preferences and expectations, technological changes, economic factors, agricultural practices, environmental awareness, etc.

4.2 Demand Forecasts

The present position and projections for demand drivers that may impact future service delivery and use of assets have been identified and documented.

4.3 Demand Impact and Demand Management Plan

The impact of demand drivers that may affect future service delivery and use of assets are shown in Table 4.3.

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices can include non-asset solutions, insuring against risks and managing failures.

Opportunities identified to date for demand management are shown in Table 4.3. Further opportunities will be developed in future revisions of this AM Plan.

Table 4.3: Demand Management Plan

Demand driver	Projection	Impact on services	Demand Management Plan
Demographic Changes	Aging, wealthy demographic, general population increase	Increased incremental urban development increasing impermeable surfaces. Aging, wealthy population – investing in their properties (extensions, decks, larger driveways). Less value placed on backyards and more on indoor space, and 'low maintenance' decks and patios (impermeable) Increased impermeable surfaces increase runoff. Development encroaches on waterways, overland flow paths, and piped assets Lower tolerance for informal flood paths through private land	Management of incremental development through Planning Scheme, UDA s13 Determination, Tasmanian Policy for Stormwater in New Developments
Legislative Change	Introduction of new Tasmanian Planning Scheme; changes to interpretation of existing act(s)	Lack of a Stormwater Code in the Tasmanian Planning Scheme will reduce the ability to mitigate the impact of third party works on the system. Legal interpretation potentially resulting in a change to asset ownership and/or responsibility	Greater reliance on Council Policies to support planning decisions, including UDA s13 Determination, and Tasmanian Policy for Stormwater in New Developments
Economic Climate	Increased development, increasing property prices	Pressure on existing assets, suboptimal new assets – harder to maintain & renew - when development occurs on previously unviable land (very steep, rocky,	Management of incremental development through Planning Scheme, UDA s13 Determination, Tasmanian

		landslip or flood prone). Reliance on engineered solutions such as flood walls and piped diversions for flood protection. Subdivision and urban intensification of large lots. Increased load on downstream network. Demand for air rights over Hobart Rivulet.	Policy for Stormwater in New Developments
Economic Climate	Increased market rates for contractors	Increased project costs	Improved scopes, contracts and PPM system
Customer Expectations	Increasingly politically savvy customer base with increasing service expectations	Customer expectation for engineering to solve flooding problems caused by historical inappropriate land development, or natural conditions such as the movement of waterway banks	Management of customer expectations through communication strategies and policy positions

4.4 Asset Programs to meet Demand

The new assets required to meet demand may be acquired, donated or constructed. Additional assets are discussed in Section 5.4.

Acquiring new assets will commit the City of Hobart to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operations, maintenance and renewal costs for inclusion in the long-term financial plan (Refer to Section 5).

4.5 Climate Change Adaptation

The impacts of climate change may have a significant impact on the assets we manage and the services they provide. In the context of the Asset Management Planning process climate change can be considered as both a future demand and a risk.

How climate change impacts on assets will vary depending on the location and the type of services provided, as will the way in which we respond and manage those impacts.[4]

As a minimum we consider how to manage our existing assets given potential climate change impacts for our region, and then also how to create resilience to climate change in any new works or acquisitions.

Risk and opportunities identified to date are shown in Table 4.5.1

[4] IPWEA Practice Note 12.1 Climate Change Impacts on the Useful Life of Infrastructure

Table 4.5.1 Managing the Impact of Climate Change on Assets and Services

Climate Change Description	Projected Change	Potential Impact on Assets and Services	Management
Rainfall	Increased occurrence of extreme rainfall and increased intensity of rainfall during extreme events	Increased hydraulic load on assets, increased damage to assets (such as rivulet banks and walls), interruption to City services, pressure on emergency response staff, impact on flood prone properties (damage, rising insurance premiums, social/emotional, etc) Reduction in asset life or sudden failure due to overwhelming weather conditions.	Assess the resilience of critical infrastructure (such as Hobart Rivulet) to forecast changes in rainfall, including whether current condition can withstand extreme weather events. Inform/engage with the community on flood risk through published mapping. Protect overland flow paths from encroaching development.
Sea level rise	Increase of 0.85m+[5]	Higher sea levels will limit the downstream capacity of the stormwater system (an increase in the number and duration of catchments that will not be able to drain freely at high tide)	Management strategy to be determined.

Additionally, the way in which we construct new assets should recognise that there is opportunity to build in resilience to climate change impacts. Building resilience can have the following benefits:

- Assets will withstand the impacts of climate change;
- Services can be sustained; and
- Assets that can endure may potentially lower the lifecycle cost and reduce their carbon footprint

The impact of climate change on assets is a new and complex discussion and further opportunities will be developed in future revisions of this AM Plan.

[5] Based on sea level rise planning allowances provided by Department of Premier and Cabinet for Tasmanian Local Councils: http://www.dpac.tas.gov.au/divisions/climatechange/climate_change_in_tasmania/impacts_of_climate_change/coastal_impacts

5.0 LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the City of Hobart plans to manage and operate the assets at the agreed levels of service (Refer to Section 3) while managing life cycle costs.

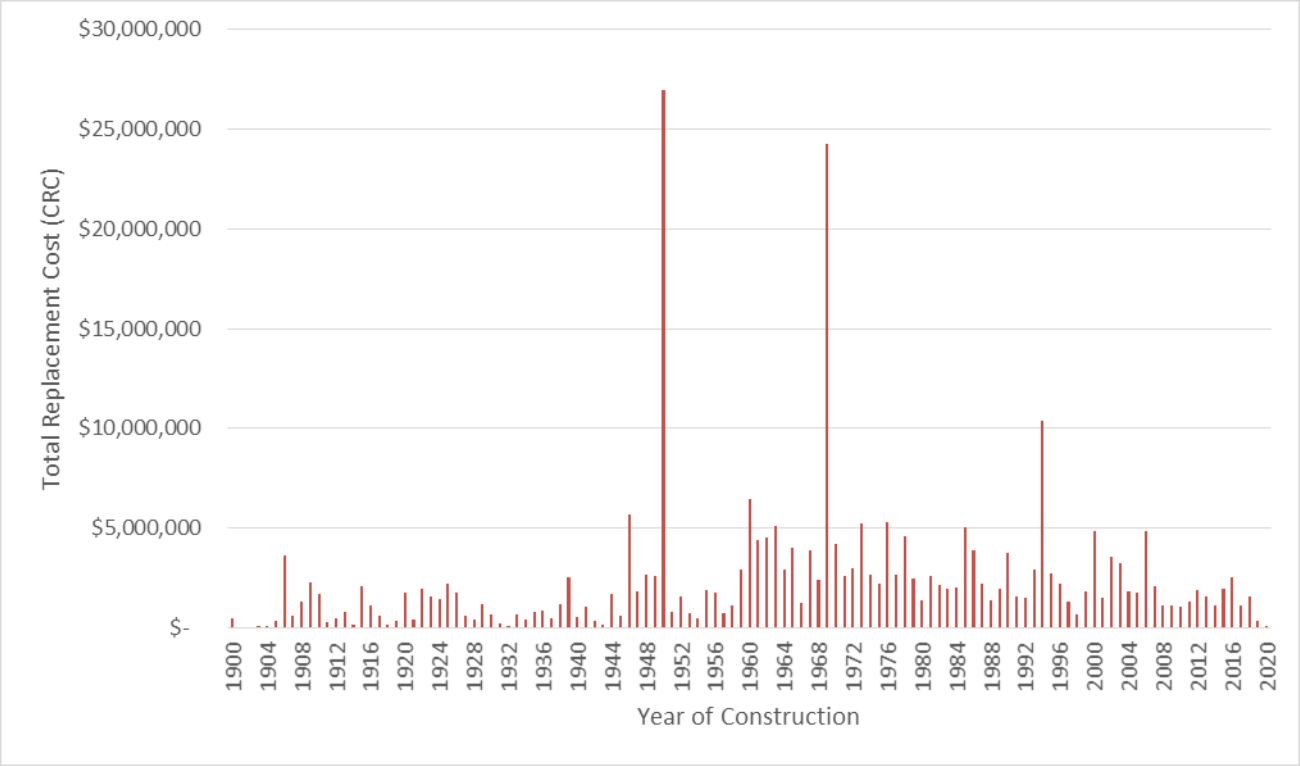
5.1 Background Data

5.1.1 Physical parameters

The assets covered by this AM Plan are shown in Table 1.2.

The age profile of the assets included in this AM Plan are shown in Figure 5.1.1.

Figure 5.1.1: Asset Age Profile



All figure values are shown in current day dollars.

The original parts of the stormwater network were constructed at the beginning of last century, with a large peak of construction from the late 1940s to the late 1960s, and a smaller spike in the mid 1990s. Most of the stormwater asset value is in the pipes which have very long asset lives of 132 years for concrete pipes. The effects of these construction peaks will therefore not be felt for another 50 years, although the oldest pipes in the network will start to come up for renewal towards the end of the life of this asset management plan.

5.1.2 Asset capacity and performance

Assets are generally provided to meet design standards where these are available. However, there is insufficient resources to address all known deficiencies. Locations where deficiencies in service performance are known are detailed in Table 5.1.2.

Table 5.1.2: Known Service Performance Deficiencies

Location	Service Deficiency
Older parts of the city	Many properties un-serviced, or not fully serviced (e.g roofs can drain but not land); pipe network may be undersized or incomplete. Many properties serviced by shared private systems. Overland flow paths generally not considered at time of development so frequently cross private property. Competition with other services.
Steeper parts of the city	Excessive gradients causing high velocity flows in pipes – increased wear on pipes and impact on receiving network. Runoff may be too fast for inlet points.
Low lying parts of the city	Constricted overland flow paths, and overland flow paths through private property. Pressure on assets from expanding urban fringe upstream.
Many waterways	Degraded environments from weed infestations, sediment and nutrient build up, scouring from non-natural peak flows, segments of constructed infrastructure interrupting fish passage and riverine habitat.

Service deficiencies were identified from catchment specific Stormwater System Management Plans.

5.1.3 Asset condition

The existing condition data is highly unreliable.

Condition is currently monitored only sporadically, usually as a result of either customer complaints or development applications. From 2021/2022, funding has been requested for a dedicated condition assessment program based on high risk assets.

Condition is measured using a 1 – 5 grading system[6] as detailed in Table 5.1.3. It is important that a consistent approach is used in reporting asset performance enabling effective decision support. A finer grading system may be used at a more specific level, however, for reporting in the AM plan results are translated to a 1 – 5 grading scale for ease of communication.

Table 5.1.3: Condition Grading System

Condition Grading	Description of Condition
1	**Very Good**: free of defects, only planned and/or routine maintenance required
2	**Good**: minor defects, increasing maintenance required plus planned maintenance
3	**Fair**: defects requiring regular and/or significant maintenance to reinstate service
4	**Poor**: significant defects, higher order cost intervention likely
5	**Very Poor**: physically unsound and/or beyond rehabilitation, immediate action required

The condition profile of our assets is shown in Figure 5.1.3.

[6] IPWEA, 2015, IIMM, Sec 2.5.4, p 2|80.

Figure 5.1.3.1: Asset Condition Profile - Consolidated

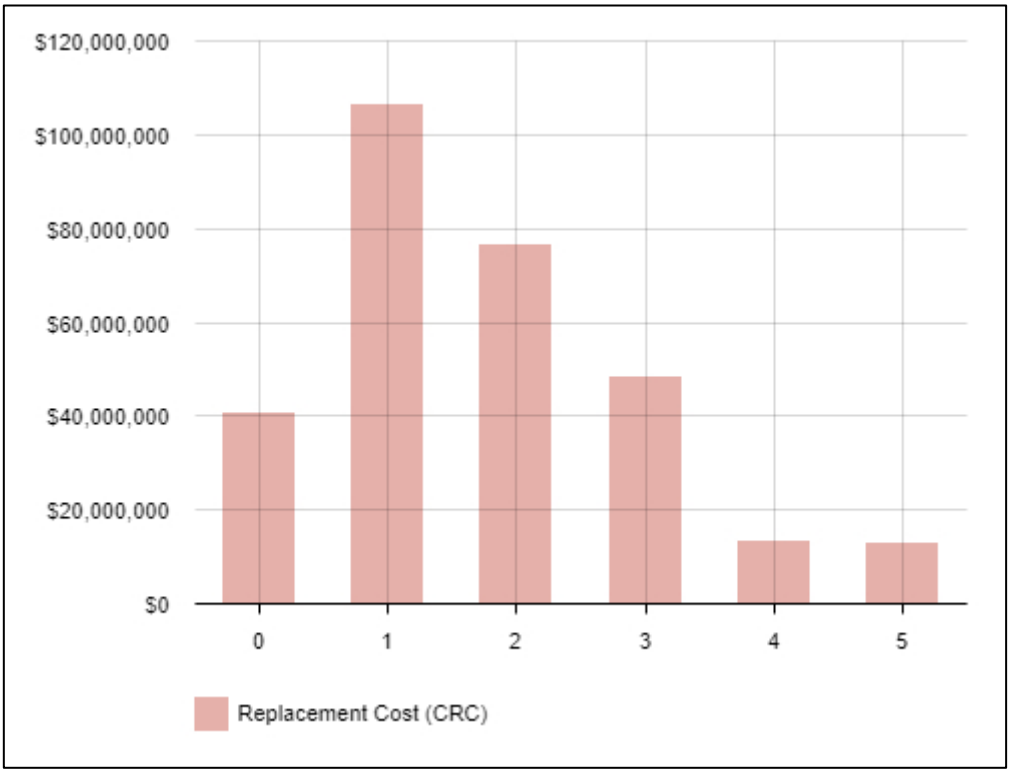
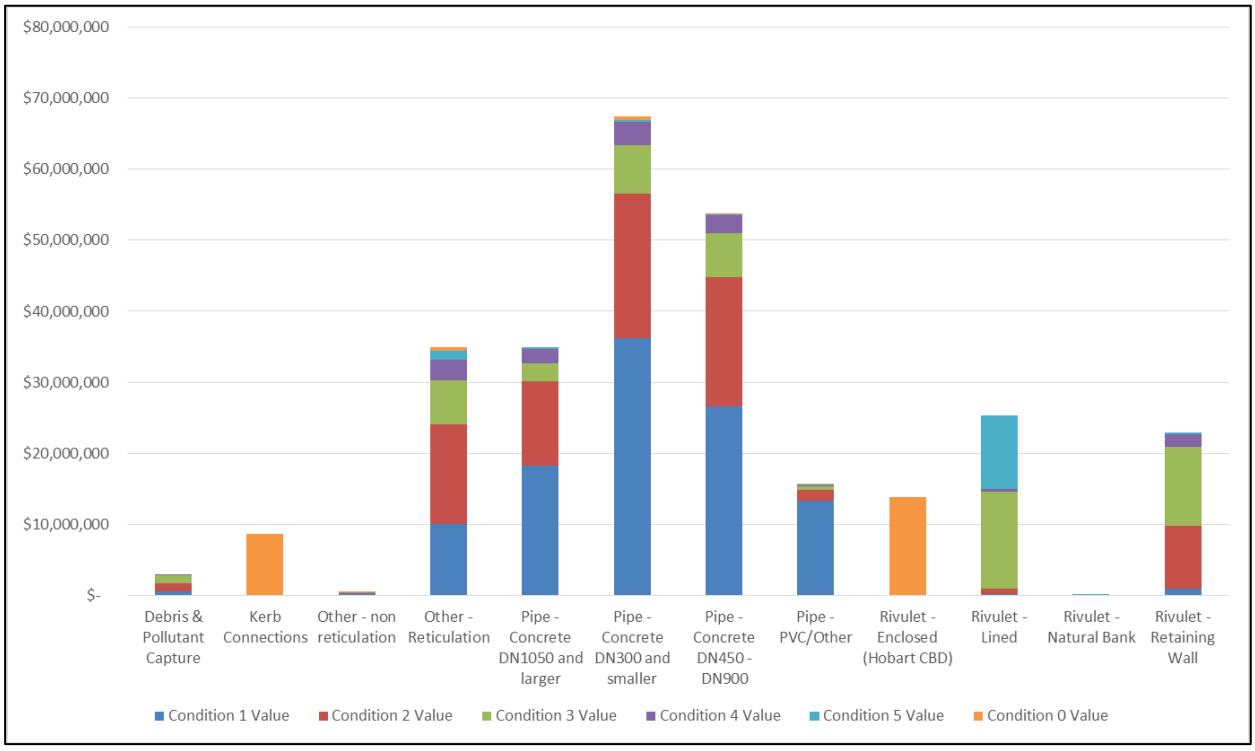


Figure 5.1.3.2: Asset Condition Profile – by asset type



Condition data for stormwater assets is highly unreliable. It is not currently collected and managed in a coherent system.

The confidence levels of the existing condition data are shown in Table 5.1.4.

Table 5.1.4: Condition Confidence Levels

Asset Type	Condition Data Confidence	Comments
Pipes	**Very Low**	Pipe condition inspections are done via CCTV so are a complicated exercise, particularly if traffic control is required. The majority of the network has not been inspected via CCTV. Where CCTV data exists, it has frequently come from a developer, but may be stored separately to the Asset Management System.
Rivulet Retaining Walls	**Medium**	Condition data was collected for rivulet retaining walls along Hobart (upstream of Molle Street), New Town, and Sandy Bay Rivulets in 2018. This program will be extended to the minor rivulets in 2021/2022 and re-run in the major rivulets on a cycle.
Debris & Pollutant Capture Devices	**Very Low**	These assets are not condition inspected in a formal way. Structural and functional condition data is being collected on WSUD assets in 2021.
Rivulet - Enclosed	**Low**	This project will have a structural condition assessment done in 2020/2021. The rivulet is inspected informally on a frequent basis.
Rivulet - Natural	**Low**	The last formal condition inspection was done in 2011 for natural banks. The rivulets are inspected informally on a frequent basis.
Property Connections	**Very Low**	The condition of property connections are not monitored in a formal way.

All figure values are shown in current day dollars.

5.2 Operations and Maintenance Plan

Operations include regular activities to provide services. Examples of typical operational activities include clearing blockages and removing rocks and branches from debris irons.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. Examples of typical maintenance activities include patch repairs of pipes and pits, and replacing damaged manhole lids.

The trend in maintenance budgets are shown in Table 5.2.1. It is assumed there will be no increase in the operation and maintenance budget, other than CPI which is not included in this plan.

Table 5.2.1: Operations & Maintenance Budget Trends

Year	Operations & Maintenance Budget $
FY 2020/2021 Budget	$824,879
FY 2021/2022 Estimate	$831,941

Maintenance budget levels are considered to be adequate to meet projected service levels for the stormwater pipe network, which may be less than or equal to current service levels. Where maintenance budget allocations are such that they will result in a lesser level of service, the service consequences and service risks have been identified and are highlighted in this AM Plan and service risks considered in the Infrastructure Risk Management Plan.

Assessment and priority of reactive maintenance is undertaken by staff using experience and judgement.

Asset hierarchy

An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component used for asset planning and financial reporting and service level hierarchy used for service planning and delivery. The service hierarchy is shown is Table 5.2.2.

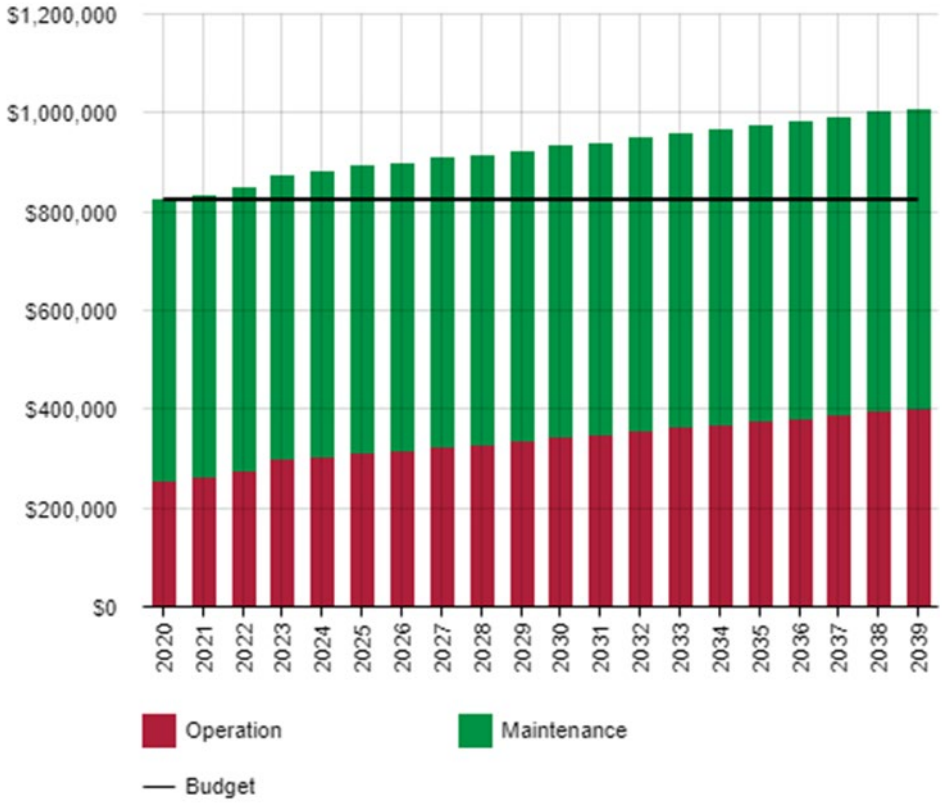
Table 5.2.2: Asset Service Hierarchy

Service	Asset Hierarchy	Service Level Objective
Flood Protection	Overland flow paths	Flows up to a 1% +CC event are safely conveyed: roads, easements, public open space, and natural drainage lines are unobstructed.
Flood Protection	Rivulets	Open waterways are unobstructed by weeds, and deposits of sediment, rocks or debris.
Flood Protection	Debris Irons	Debris irons are operated to retain boulders and branches from inflicting damage on downstream infrastructure
Flood Protection	Trunk mains	Trunk mains are operating at maximum capacity – blockages are minimised, intake is maximised.
Flood Protection	Inlet pits	Pits are less than 50% full of sediment and debris at any point in time. Pits at catchment low points are prioritised for clearing during flood events.
Flood Protection	Minor reticulation network	Nuisance flows associated with “normal” heavy rainfall are contained without surcharge and directed away from private property.
Flood Protection	Property connections	Runoff from “normal” heavy rainfall within private property is safely conveyed to the public drainage system
Environmental Amenity	Rivulets	Open waterways serve as ecological corridors for native flora and fauna. Weeds and pests are minimised.
Environmental Amenity	Gross pollutant traps	Gross pollutant traps and maintained and operated to maximise the interception of litter and sediment from entering receiving waters.

Summary of forecast operations and maintenance costs

Forecast operations and maintenance costs are expected to vary in relation to the total value of the asset stock. If additional assets are acquired, the future operations and maintenance costs are forecast to increase. If assets are disposed of the forecast operation and maintenance costs are expected to decrease. Figure 5.2 shows the forecast operations and maintenance costs relative to the proposed operations and maintenance Planned Budget.

Figure 5.2: Operations and Maintenance Summary



All figure values are shown in current day dollars.

The budget for operations and maintenance has been based on historical budgets, which has historically been indexed but not increased to account for the increased burden of new assets. The operations and maintenance forecasts include a provision for the costs associated with new assets, with the detail given in the appendices.

The operations and maintenance requirements associated with water quality improvement assets (such as gross pollutant traps and water sensitive urban design assets) have not been fully scoped, estimated and funded and are expected to increase as knowledge about these asset types grows. Future Asset Management Plans will be updated with this data once it is compiled.

5.3 Renewal Plan

Renewal is major capital work which does not significantly alter the original service provided by the asset, but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs.

Assets requiring renewal are identified from one of two approaches in the Lifecycle Model.

- The first method uses Asset Register data to project the renewal costs (current replacement cost) and renewal timing (acquisition year plus updated useful life to determine the renewal year), or
- The second method uses an alternative approach to estimate the timing and cost of forecast renewal work (i.e. condition modelling system, staff judgement, average network renewals, or other).

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in Table 5.3. Asset useful lives were last reviewed as part of the FAIR panel review in 2019. The only change of significance was the reduction in the useful life of PVC pipes from 132 years to 85 years to better align with industry standards. During the review it was noted that the useful life of concrete pipes of 132 years is optimistic and generally higher than the industry average of 100 – 120 years.

Table 5.3: Useful Lives of Assets (from Conquest)

Asset (Sub)Category	Useful life
Pipes - Concrete	132 years
Pipes - PVC	85 years
Property Connections	35 years
Rivulet Retaining Walls	100 years
Rivulets – Enclosed (Hobart CBD)	120 years
Rivulets - Lined	120 years
Debris & Pollution Capture Devices	20 years (in-pit litter traps) 40-132 years (gross pollutant traps and other structures)
Access chambers	132 years

The estimates for renewals in this AM Plan were based on the five year capital works plan for the first five years of this plan (the alternative method) and useful lives in the asset register for the remainder of the plan.

5.3.1 Renewal ranking criteria

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g. replacing a bridge that has a 5 t load limit), or
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g. condition of a playground).[7]

It is possible to prioritise renewals by identifying assets that:

- Have a high consequence of failure,
- Have inadequate capacity,
- Have higher than expected operational or maintenance costs,
- Align with other projects, such as road reconstructions and precinct upgrades, and
- Are in poor structural condition

Because pipes are buried, the structural condition is not easily assessed other than via CCTV camera on a remote controlled tractor. It is not feasible to inspect all pipes in this way due to the high set up, traffic and operating costs. The priority for inspecting pipes is based around age (as a proxy for likelihood) and consequence of failure.

[7] IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.

The draft ranking criteria used to determine the consequence of failure **for pipes only** is detailed in Table 5.3.1.

Table 5.3.1: Draft Priority Ranking Criteria for Condition Assessment of Pipes

Criteria	Weighting
Land Use	20%
Road Hierarchy	20%
Under Buildings	10%
Environment	10%
Pipe Size	20%
Flood Risk	20%
Total	**100%**

5.4 Summary of future renewal costs

Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in Figure 5.4.1. A detailed summary of the forecast renewal costs is shown in Appendix D.

Renewal values for 2020 to 2025 include the planned renewal projects in the capital works program.

In the Stormwater Portfolio, most of the asset value is in the stormwater pipes – which have a very long asset life. The oldest pipes in the network were constructed at the beginning of last century, so most pipes in the network are still the original first generation assets. This first generation of assets will start requiring renewal in the late 2030s. Figure 5.4.2 Forecast Renewal Costs (50 years) shows the long term outlook.

The figures assumes all assets last their full 132 year asset life. This is a large assumption given the lack of condition data around pipes. It can be expected that some proportion of pipes will fail earlier and the step change in forecast renewal expenditure beginning in 2038 may begin earlier once the routine condition assessment program is established.

Because the condition assessment program will target the pipes with the greatest consequence of failure (such as pipes with restricted overland flow paths, and pipes under structures or major roads) the renewal costs associated with these projects is likely to be above the average unit renewal rate as these projects will have a high level of complexity in both design and construction.

The renewal budget is based on the stormwater levy Council receives through its rates, minus the non-asset related overheads within the Stormwater Unit (management, assessment of planning applications, investigations of customer enquiries).

Figure 5.4.1: Forecast Renewal Costs (20 years)

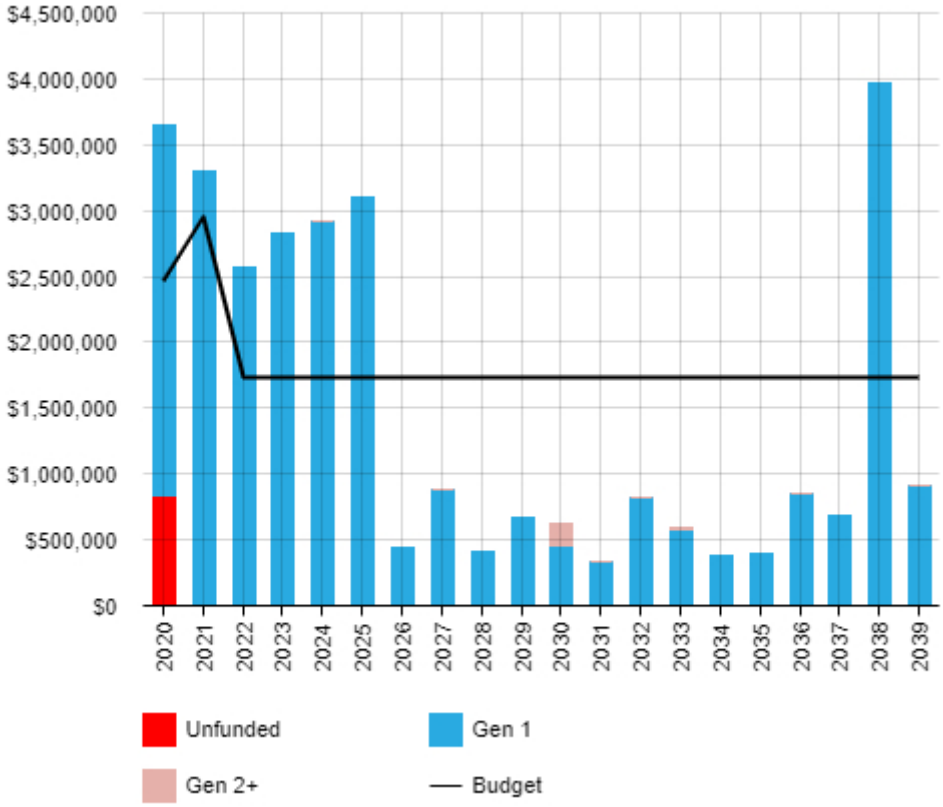
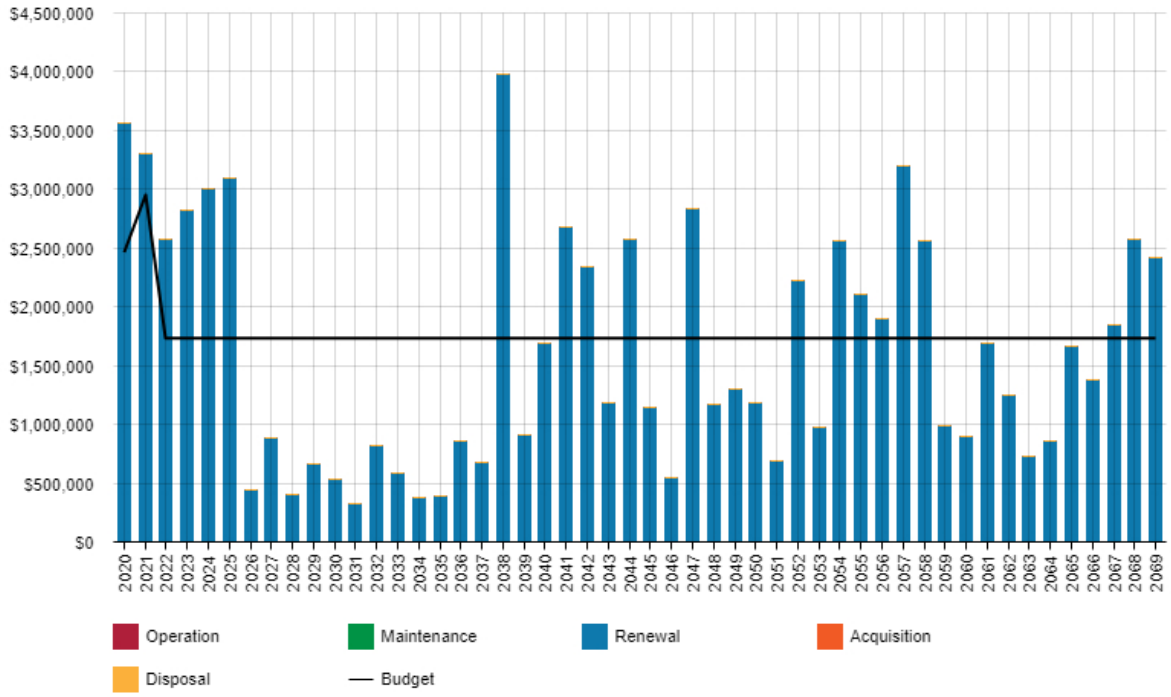


Figure 5.4.2: Forecast Renewal Costs (50 years)



All figure values are shown in current day dollars.

5.5 Acquisition Plan

Acquisition reflects new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its existing capacity. They may result from growth, demand, social or environmental needs. Assets may also be donated to the City of Hobart.

5.5.1 Selection criteria

Proposed acquisition of new assets, and upgrade of existing assets, are identified from various sources such as community requests, proposals identified by strategic plans or partnerships with others. Potential upgrade and new works should be reviewed to verify that they are essential to the Entities needs. Proposed upgrade and new work analysis should also include the development of a preliminary renewal estimate to ensure that the services are sustainable over the longer term. Verified proposals can then be ranked by priority and available funds and scheduled in future works programmes. The priority ranking criteria is detailed in Table 5.4.1.

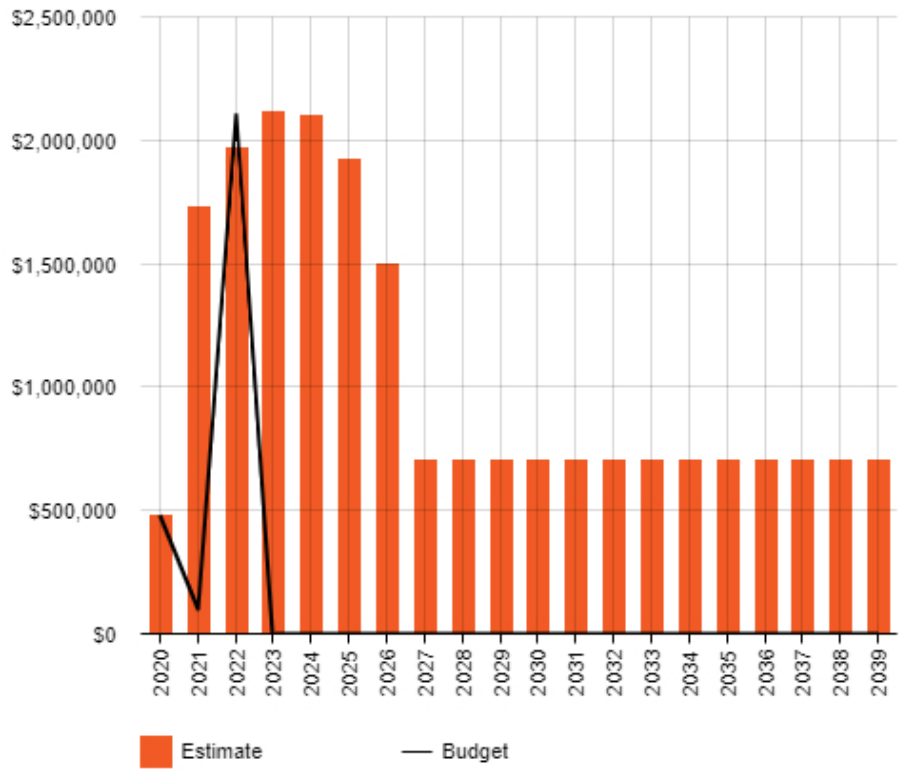
Table 5.5.1: Acquired Assets Priority Ranking Criteria

Criteria	Weighting
Flood mitigation	TBD
Community demand	TBD
Environmental protection/benefit	TBD

Summary of future asset acquisition costs

Forecast acquisition asset costs are summarised / summarized in Figure 5.4.1 and shown relative to the proposed acquisition budget. The forecast acquisition capital works program is shown in Appendix A. The acquisition budget assumes that only the current year's capital works plan is approved and funded.

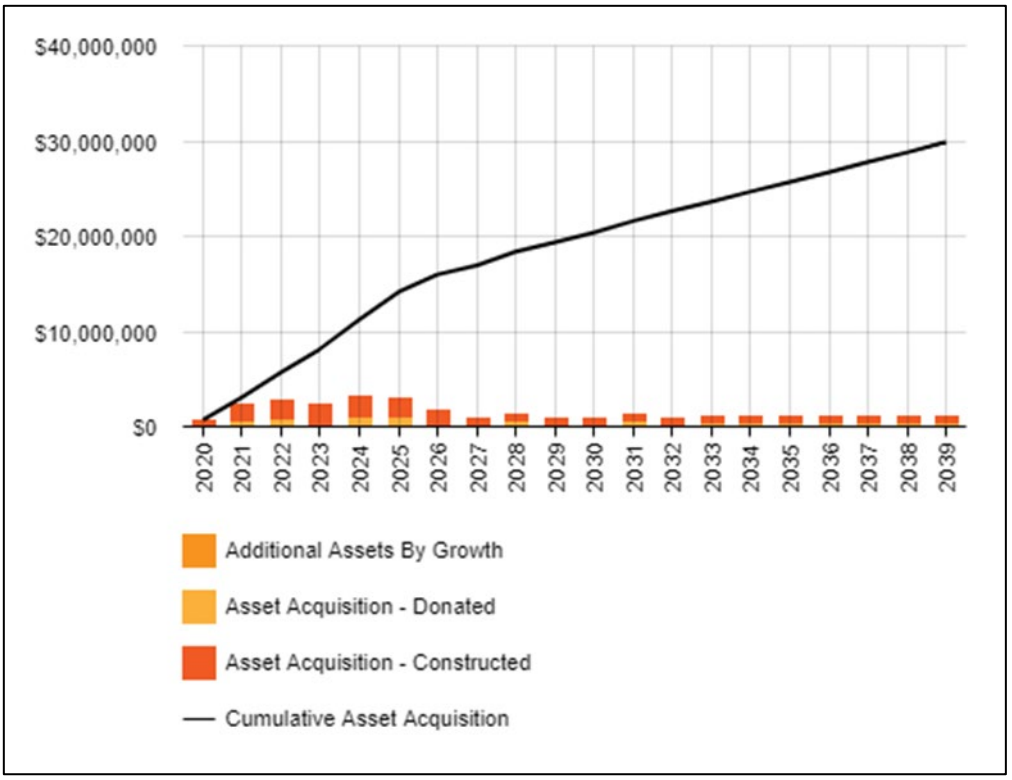
Figure 5.5.1: Acquisition (Constructed) Summary



All figure values are shown in current day dollars.

When the City commits to new assets, either through construction or handover from a third party, they must be prepared to fund future operations, maintenance and renewal costs. They must also account for future depreciation when reviewing long term sustainability. When reviewing the long-term impacts of asset acquisition, it is useful to consider the cumulative value of the acquired assets being taken on by the Entity. The cumulative value of all acquisition work, including assets that are constructed and contributed shown in Figure 5.4.2.

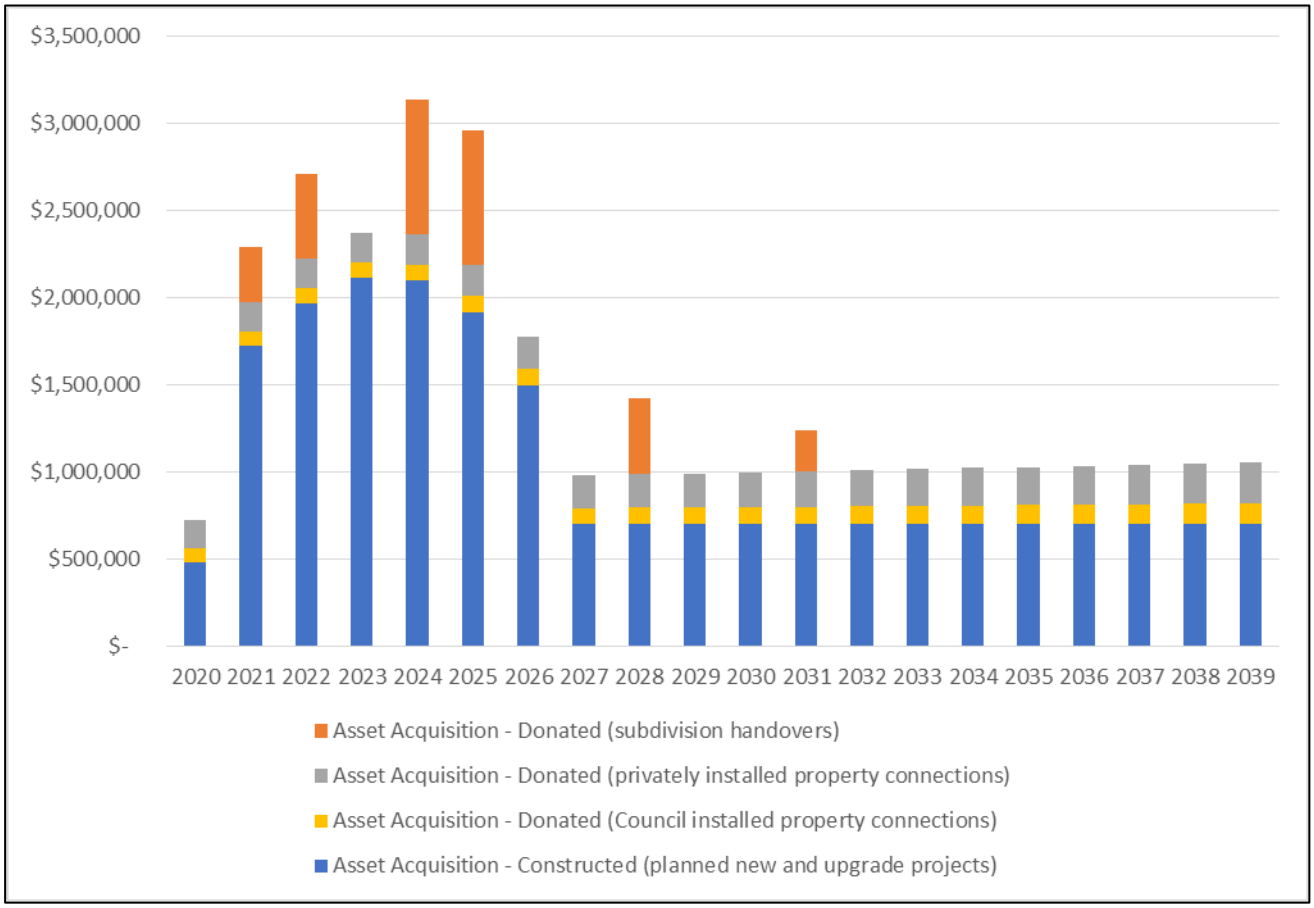
Figure 5.5.2: Cumulative Acquisitions



All figure values are shown in current dollars.

Forecast acquisitions also include stormwater assets to be handed over to the City from subdivisions known at the date of this plan. Expenditure on new assets and services in the capital works program will be accommodated in the long-term financial plan, but only to the extent that there is available funding.

Figure 5.5.2A: Acquisitions by Source



Acquisition of stormwater assets come from three main sources:

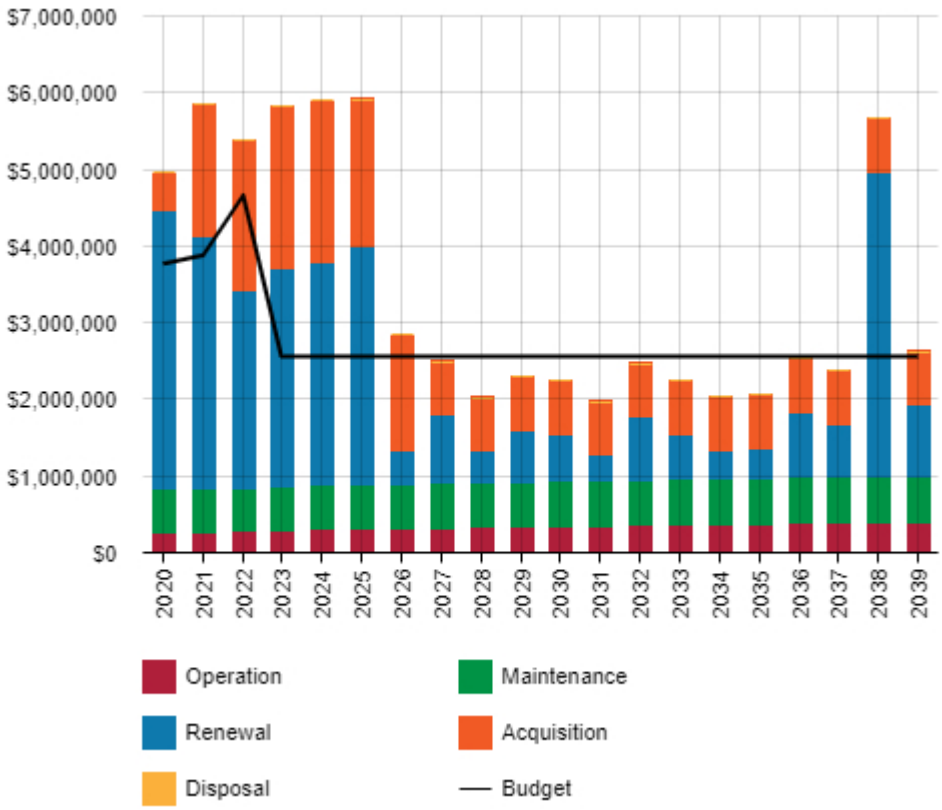
- Assets constructed by Council (network expansions to unserviced areas, upgrades to mitigate flooding, and water quality improvement projects). The demand for constructed acquisitions is expected to continue to ensure compliance with the obligation under the Urban Drainage Act to effectively drain the urban area, and to align with the City's Strategic Objectives around water quality.
- Assets donated by developers (network expansions in new large, greenfield subdivisions and property connections constructed by the private sector). Donated acquisitions from large greenfield subdivisions may peter off over time as the availability of developable land reduces, however property connections associated with infill development are expected to continue at a similar rate.
- Assets driven by growth, considered as the construction of new connections (to service existing unserviced properties, and to service new infill development). New connection acquisitions are expected to continue with increased population, housing density, and infill development. These are charged to the benefiting customer so are expected to be cost neutral for the City.

Summary of asset forecast costs

The financial projections from this asset plan are shown in Figure 5.4.3. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget.

The bars in the graphs represent the forecast costs needed to minimise the life cycle costs associated with the service provision. The proposed budget line indicates the estimate of available funding. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving balance between costs, levels of service and risk to achieve the best value outcome.

Figure 5.5.3: Lifecycle Summary



All figure values are shown in current day dollars.

5.6 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, demolition or relocation. Assets identified for possible decommissioning and disposal are shown in Table 5.6. A summary of the disposal costs and estimated reductions in annual operations and maintenance of disposing of the assets are also outlined in Table 5.6. Any costs or revenue gained from asset disposals is included in the long-term financial plan. The disposal of stormwater assets is very unlikely.

Table 5.6: Assets Identified for Disposal

Asset	Reason for Disposal	Timing	Disposal Costs	Operations & Maintenance Annual Savings
No assets marked for disposal				

6.0 RISK MANAGEMENT PLANNING

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'[8].

An assessment of risks[9] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, and the consequences should the event occur. The risk assessment should also include the development of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable.

6.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarised in Table 6.1. Failure modes may include physical failure, collapse or essential service interruption.

Table 6.1 Critical Assets

Critical Asset(s)	Failure Mode	Impact
Hobart Rivulet (enclosed section through CBD)	Structural failure (intrinsic or caused by third party) Capacity failure (including by encroachments from surrounding properties)	Risk to human life (in the event of sudden catastrophic failure during business hours). Disruption to businesses, traffic, etc. Flood risk.
New Town Rivulet Outlet	Structural failure combined with sedimentation build up impacting pollution capture and potentially the operating conditions	Increased impact to the natural environment. Risk to Council operations staff.
All pipes with high criticality rating (e.g large pipes under arterial roads or buildings)	Structural (cracking, impact load) Root intrusion Blockage Capacity failure	Damage to above land/infrastructure. Council liability for damage to third party property. Flood risk
Debris Irons	Structural damage causing functional failure	Risk of damage to infrastructure (Council and third party) in event of flood
All permanent waterways	Capacity failure (flows exceed capacity) Capacity failure (blockage from debris, vegetation) Ecosystem fails (pollution, weeds, replacement of natural banks with 'hard' solutions Erosion	Flood risk to neighbouring land, including to structures, dwellings and assets Environmental damage Sedimentation of creek, movement of creek banks may encroach on infrastructure
Flood levee walls	Structural	Hazardous flooding to properties. Potential Council liability.

[8] ISO 31000:2009, p 2

[9] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

Critical Asset(s)	Failure Mode	Impact
Gross Pollutant Traps	Blockage Structural damage	Polluted runoff/litter may enter receiving waterway. Environmental damage.
Cascade Boulder Trap	Structural	Legal violation (under current management regime) Risk to public safety (on sunny day) Risk of damage to infrastructure (Council and third party) in event of flood

By identifying critical assets and failure modes an organisation can ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

6.2 Risk Assessment

The risk management process used is shown in Figure 6.2 below.

It is an analysis and problem-solving technique designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

The process is based on the fundamentals of International Standard ISO 31000:2018.

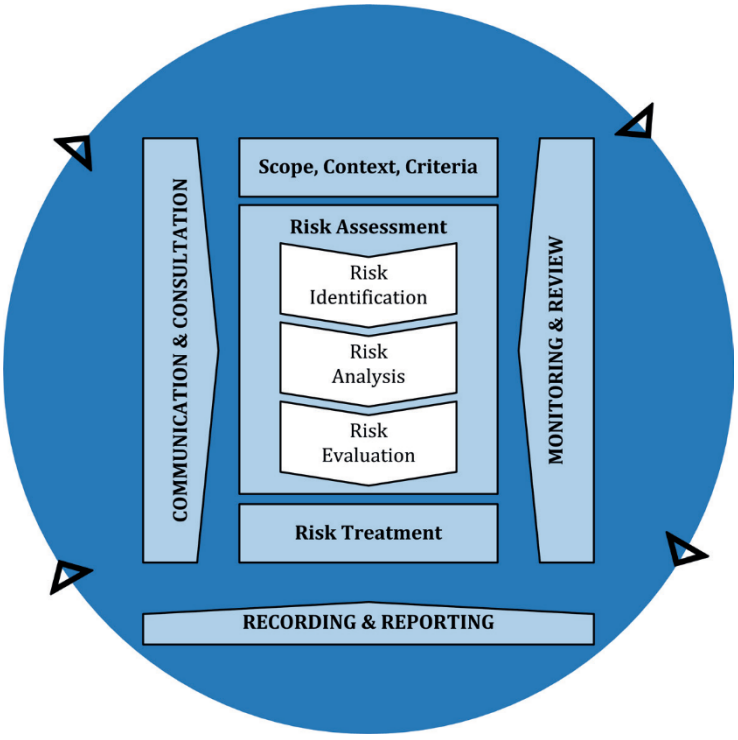


Fig 6.2 Risk Management Process – Abridged
Source: ISO 31000:2018, Figure 1, p9

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks[10] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan is shown in Table 6.2. It is essential that these critical risks and costs are reported to management and the Corporate Risk Management Committee.

Table 6.2: Risks and Treatment Plans

Service or Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan	Residual Risk *	Treatment Costs
Flood Mitigation	Flood event can exceed capacity of infrastructure leading to: Injury or loss of life. Loss/damage to critical infrastructure Damage to property	High	Flood mapping to identify likely flood paths. Enforcement of SWMPs Planning Controls Design guidelines Community engagement Operations and maintenance of key infrastructure (e.g debris irons)	Medium	Staff time
City Services	Flood event can disrupt businesses, events, force road closures, etc.	High	Coordination with SES & Tas Police to manage traffic Emergency response plans (e.g to clear debris irons and system blockages)	Medium	Staff time
Boulder Trap / Dam	Legislative non-compliance	High	Develop Condition Inspection Plan in accordance with Water Management Act	Low	Currently budgeted for.
Waterways	Environmental damage	High	Emergency spill response. Coordination with EPA, TasWater, etc.	Medium	Staff time

Note * The residual risk is the risk remaining after the selected risk treatment plan is implemented.

A complete Risk Register will be developed for stormwater assets using the NAMS+ template in future editions of the Asset Management Plan.

[10] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

6.3 Infrastructure Resilience Approach

The resilience of our critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions we need to understand our capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service.

Resilience recovery planning, financial capacity, climate change risk assessment and crisis leadership.

We do not currently measure our resilience in service delivery. This may be included in future iterations of the AM Plan.

6.4 Service and Risk Trade-Offs

The decisions made in adopting this AM Plan are based on the objective to achieve the optimum benefits from the available resources.

6.4.1 What we cannot do

There are some operations and maintenance activities and capital projects that are unable to be undertaken within the next 10 years. These include:

- Provide every property with consistent and effective flood protection
- Resolve every nuisance flow for every customer
- Clean every pit and headwall inlet before each rainfall
- Provide a consistent level of service throughout the City
- Routine maintenance of road drainage (table drains, culverts) in non-urban areas

6.4.2 Service and risk trade-off

If there is forecast work (operations, maintenance, renewal, acquisition or disposal) that cannot be undertaken due to available resources, then this will result in service consequences for users and/or risk consequences. These service and risk consequences include:

- Some properties will have a poor level of flood protection
- Potential non-compliance with legislative requirements
- Community dissatisfaction

7.0 FINANCIAL SUMMARY

This section contains the financial requirements resulting from the information presented in the previous sections of this AM Plan. The financial projections will be improved as the discussion on desired levels of service and asset performance matures.

7.1 Financial Sustainability and Projections

7.1.1 Sustainability of service delivery

There are two key indicators of sustainable service delivery that are considered in the AM Plan for this service area. The two indicators are the:

- asset renewal funding ratio (proposed renewal budget for the next 10 years / forecast renewal costs for next 10 years), and
- medium term forecast costs/proposed budget (over 10 years of the planning period).

Asset Renewal Funding Ratio

Asset Renewal Funding Ratio[11] 92.91%

The Asset Renewal Funding Ratio is an important indicator and illustrates that over the next 10 years we expect to have 92.91% of the funds required for the optimal renewal of assets.

The forecast renewal work along with the proposed renewal budget, and the cumulative shortfall, is illustrated in Appendix D.

Medium term – 10 year financial planning period

This AM Plan identifies the forecast operations, maintenance and renewal costs required to provide an agreed level of service to the community over a 10 year period. This provides input into 10 year financial and funding plans aimed at providing the required services in a sustainable manner.

This forecast work can be compared to the proposed budget over the first 10 years of the planning period to identify any funding shortfall.

The forecast operations, maintenance and renewal costs over the 10 year planning period is $2,954,579 average per year.

The proposed (budget) operations, maintenance and renewal funding is $2,754,017 on average per year giving a 10 year funding shortfall of $200,561 per year. This indicates that 93.21% of the forecast costs needed to provide the services documented in this AM Plan are accommodated in the proposed budget. Note, these calculations exclude acquired assets.

Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays and financing to achieve a financial indicator of approximately 1.0 for the first years of the AM Plan and ideally over the 10 year life of the Long-Term Financial Plan.

7.1.2 Forecast Costs (outlays) for the long-term financial plan

Table 7.1.3 shows the forecast costs (outlays) required for consideration in the 20 year long-term financial plan. Forecast costs are shown in 2020 dollar values.

Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the long-term financial plan.

A gap between the forecast outlays and the amounts allocated in the financial plan indicates further work is required on reviewing service levels in the AM Plan (including possibly revising the long-term financial plan).

[11] AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9.

We will manage the 'gap' by developing this AM Plan to provide guidance on future service levels and resources required to provide these services in consultation with the community.

Table 7.1.2: Forecast Costs (Outlays) for the Long-Term Financial Plan

Year	Acquisition	Operation	Maintenance	Renewal	Disposal
2020	$ 478,620	$ 257,229	$ 567,650	$ 3,648,236	0
2021	$ 1,725,000	$ 262,829	$ 569,112	$ 3,299,169	0
2022	$ 1,970,000	$ 275,529	$ 570,754	$ 2,575,279	0
2023	$ 2,114,000	$ 298,279	$ 572,754	$ 2,827,057	0
2024	$ 2,100,000	$ 303,879	$ 575,147	$ 2,916,876	0
2025	$ 1,920,000	$ 311,379	$ 578,320	$ 3,355,575	0
2026	$ 1,500,000	$ 316,979	$ 580,221	$ 437,909	0
2027	$ 700,000	$ 324,479	$ 581,974	$ 887,869	0
2028	$ 700,000	$ 330,079	$ 583,640	$ 409,136	0
2029	$ 700,000	$ 337,579	$ 585,402	$ 666,086	0
2030	$ 700,000	$ 343,179	$ 587,132	$ 621,762	0
2031	$ 700,000	$ 350,679	$ 588,895	$ 329,417	0
2032	$ 700,000	$ 356,279	$ 590,728	$ 821,382	0
2033	$ 700,000	$ 363,779	$ 592,560	$ 581,399	0
2034	$ 700,000	$ 369,379	$ 594,428	$ 372,990	0
2035	$ 700,000	$ 376,879	$ 596,331	$ 388,780	0
2036	$ 700,000	$ 382,479	$ 598,272	$ 859,853	0
2037	$ 700,000	$ 389,979	$ 600,250	$ 681,307	0
2038	$ 700,000	$ 395,579	$ 602,267	$ 3,974,305	0
2039	$ 700,000	$ 401,179	$ 604,322	$ 916,143	0

7.2 Funding Strategy

The proposed funding for assets is outlined in the Entity's budget and Long-Term financial plan.

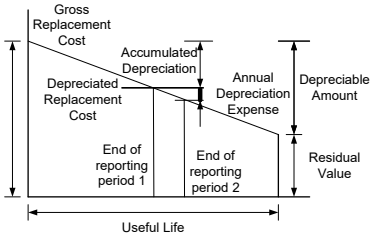
The financial strategy of the entity determines how funding will be provided, whereas the AM Plan communicates how and when this will be spent, along with the service and risk consequences of various service alternatives.

7.3 Valuation Forecasts

7.3.1 Asset valuations

The best available estimate of the value of assets included in this AM Plan are shown below. The assets are valued at the partial FAIR review in 2020, however will be revised again in 2021:

Replacement Cost (Current/Gross)	$298,560,530
Depreciable Amount	$298,560,530
Depreciated Replacement Cost[12]	$161,776,960
Depreciation	$2,793,307



[12] Also reported as Written Down Value, Carrying or Net Book Value.

7.3.2 Valuation forecast

Asset values are forecast to increase as additional assets are added and the scheduled FAIR panel review is completed.

Additional assets will generally add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs due to future renewals. Any additional assets will also add to future depreciation forecasts.

7.4 Key Assumptions Made in Financial Forecasts

In compiling this AM Plan, it was necessary to make some assumptions. This section details the key assumptions made in the development of this AM plan and should provide readers with an understanding of the level of confidence in the data behind the financial forecasts.

Key assumptions made in this AM Plan are:

- The asset life of 132 years for concrete pipes is valid and the condition of the pipe correlates directly to its age.
- Asset ages are accurate
- Replacement rates are accurate
- The planned capital works program will be fully approved for renewals for the next two years and partially approved for new and upgrade projects for the next two years
- The budget in years 2023 and beyond will be based on the stormwater levy (minus relevant overheads)
- No significant change in legislation (other than that identified in this plan) and that there will be no substantial change to the interpretation of the Urban Drainage Act with regards to asset ownership.

7.5 Forecast Reliability and Confidence

The forecast costs, proposed budgets, and valuation projections in this AM Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is classified on a A - E level scale[13] in accordance with Table 7.5.1.

Table 7.5.1: Data Confidence Grading System

Confidence Grade	Description
A. Very High	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%
B. High	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%
C. Medium	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%
D. Low	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete, and most data is estimated or extrapolated. Accuracy ± 40%

[13] IPWEA, 2015, IIMM, Table 2.4.6, p 2|71.

Confidence Grade	Description
E. Very Low	None or very little data held.

The estimated confidence level for and reliability of data used in this AM Plan is shown in Table 7.5.2.

Table 7.5.2: Data Confidence Assessment for Data used in AM Plan

Data	Confidence Assessment	Comment
Demand drivers	C - medium	Data is extrapolated
Growth projections	C - medium	Data is extrapolated
Acquisition forecast	D - low	Data is based on current valuation data, and is extrapolated from current position. Third party gifted asset are only based on currently known work
Operation forecast	C - medium	Based on current budgets and assumed acquisitions
Maintenance forecast	C - medium	Based on current budgets and assumed acquisitions
Renewal forecast - Asset values	D - low	Valuation rates are known to be significantly lower than actual replacement rates. This will be adjusted incrementally over the life of this plan
- Asset useful lives	C- medium	Asset lives are based on industry averages or assumptions rather than observed data
- Condition modelling	E – very low	All condition data (other than for retaining walls) is incomplete, out of date, or based on assumed theory rather than actual inspections.
Disposal forecast	B - high	No disposal forecast

The estimated confidence level for and reliability of data used in this AM Plan is considered overall to be low. However it is anticipated that improvements to asset data will result in:

- Increases to operation and maintenance forecasts
- Increases to asset values
- Decreases to asset lives
- A wide range of condition ratings but the assets that will be the most difficult to replace (such as in the CBD and the older inner densely developed urban areas), are likely to be the ones that require replacement first

All of the factors that are likely to change are predicted to change in the direction of a weaker long term financial position.

8.0 PLAN IMPROVEMENT AND MONITORING

8.1 Status of Asset Management Practices[14]

8.1.1 Accounting and financial data sources

This AM Plan utilises accounting and financial data. The source of the data is the financial management system, Navision.

8.1.2 Asset management data sources

This AM Plan also utilises asset management data. The source of the data is Asset Management Information System, Conquest.

8.2 Improvement Plan

It is important that an entity recognise areas of their AM Plan and planning process that require future improvements to ensure effective asset management and informed decision making. The improvement plan generated from this AM Plan is shown in Table 8.2.

Table 8.2: Improvement Plan

Task	Task	Responsibility	Resources Required	Timeline
1	Undertake survey of customer satisfaction and expectation with the stormwater service	Stormwater Assets	Internal	2021/22
2	Improve condition data for critical pipes	Stormwater Assets	Internal/external	2021/22
3	Improve condition, valuation, and asset ownership data for enclosed section of Hobart Rivulet	Stormwater Assets	Internal/external	2021/22
4	Expand standard designs and Council policies to improve the quality of acquired assets	Stormwater Assets	Internal	2020/21
5	Improve asset data and management plans for natural sections of rivulets and WSUD assets	Stormwater Assets	Internal	2020/22
6	Update asset valuations in line with actual renewal costs	Stormwater Assets, Asset Support	Internal	2020/21
7	Consolidate asset data into single point of truth	Stormwater Assets, GIS, Asset Support	Internal	2020/21
8	Improve planned and reactive maintenance reporting	Stormwater Assets, Maintenance & Capital Works, Asset Support	Internal	2021/22
9	Develop Risk Framework to prioritise maintenance and capital works programs	Stormwater Assets	Internal	2020/21
10	Develop asset criticality/ranking system and incorporate it into the Asset Management System to guide inspection and renewal programs	Stormwater Assets	Internal	2020/21

[14] ISO 55000 Refers to this as the Asset Management System

11	Ensure works crews have the right tools for the job and responsibilities are clearly defined between units	Manager Stormwater	Internal	2020/22
12	Develop and maintain a Risk Register for stormwater assets in the NAMS+ template	Stormwater Assets	Internal	2021/22

8.3 Monitoring and Review Procedures

This AM Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions.

The AM Plan will be reviewed and updated annually to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget are incorporated into the Long-Term Financial Plan or will be incorporated into the Long-Term Financial Plan once completed.

The AM Plan has a maximum life of 4 years and is due for complete revision and updating within 4 years of each Hobart Council election.

8.4 Performance Measures

The effectiveness of this AM Plan can be measured in the following ways:

- The degree to which the required forecast costs identified in this AM Plan are incorporated into the long-term financial plan,
- The degree to which the 1-5 year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the AM Plan,
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans,
- The Asset Renewal Funding Ratio achieving the Organisational target (this target is often 90 – 100%).

9.0 REFERENCES

- IPWEA, 2006, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2015, 3rd edn., 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2008, 'NAMS.PLUS Asset Management', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/namsplus.
- IPWEA, 2015, 2nd edn., 'Australian Infrastructure Financial Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/AIFMM.
- IPWEA, 2020 'International Infrastructure Financial Management Manual', Institute of Public Works Engineering Australasia, Sydney
- IPWEA, 2018, Practice Note 12.1, 'Climate Change Impacts on the Useful Life of Assets', Institute of Public Works Engineering Australasia, Sydney
- IPWEA, 2012, Practice Note 6 Long-Term Financial Planning, Institute of Public Works Engineering Australasia, Sydney, https://www.ipwea.org/publications/ipweabookshop/practicenotes/pn6
- IPWEA, 2014, Practice Note 8 – Levels of Service & Community Engagement, Institute of Public Works Engineering Australasia, Sydney, https://www.ipwea.org/publications/ipweabookshop/practicenotes/pn8
- ISO, 2014, ISO 55000:2014, Overview, principles and terminology
- ISO, 2018, ISO 31000:2018, Risk management – Guidelines
- City of Hobart Strategic Plan 2019 – 2029
- City of Hobart Strategic Asset Management Plan (SAMP)

10.0 APPENDICES

Appendix A Acquisition Forecast

A.1 – Acquisition Forecast Assumptions and Source

The following assumptions have been made in the Acquisition Forecast:

1. The capital works program for new and upgrade projects will be required to extend the network to inadequately drained urban areas and unserviced customers in order to meet the City's obligation under the Urban Drainage Act, and to further the objectives of the Urban Drainage Act with regards to improving water quality and environmental amenity of the urban waterways
2. There will be no further new assets donated from new subdivisions beyond those associated with the existing 12 large subdivisions currently under construction
3. Property connections will continue at the same rate for the life of this plan
4. Property connections constructed by the City will be fully funded for the life of this plan

A.2 – Acquisition Project Summary

The project titles included in the lifecycle forecast are included here. This list does not include property connections as these projects are small, numerous, with the details generally not known in advance.

Table A2 Summary of Construction Projects

Program	Project Name	Project Budget	Construction Year	Comments
New	Soundy Park GPT (Providence Valley Rivulet)	$500,000	2021/22	Not funded
New	Hampden Road- Ellerslie to Sandy Bay - Stormwater Improvements	$200,000	2022/23	Approved in principle
New	Implementation of Stormwater Strategy - Water Quality Improvement Program	$300,000	Annual program	Not funded
New	Stormwater - McRobies Gully - Select Residential Works	$310,000	2023/24	Submitted for grant funding
New	Churchill Avenue - Sandy Bay to Sonning - DN300 Main Extension	$324,000	2023/24	Not funded
New	Providence Catchment Detention	$550,000	2022/2023	Includes contribution from developer. Submitted for grant funding
New	Stormwater New/Extension Program - UDA Service Provision	$400,000	Annual program	Not funded
Upgrade	Letitia Street - Ryde St to Wellington St stormwater bypass system	$1,500,000	2021/24 (over 3yr)	Not funded
Upgrade	Pinnacle Road Culvert Upgrades Program	$450,000	2021/26 (over 5yr)	Not funded
Upgrade	Harbroe Avenue No. 1-9 Stormwater Upgrade	$30,000	2021/22	Not funded
Upgrade	Maypole Stormwater Upgrade - Headwaters to Brooker Highway	$1,200,000	2024/27 (over 3yr)	$100,000 approved in 21/22. $1,900,000 approved in principle in 22/23
Upgrade	New Town Rivulet - Brushy Creek Confluence - Ref: Entura Flood Mitigation Options Report	$310,000	2023/24	Not funded
Upgrade	New Town Rivulet - 237 Lenah Valley to 202 Lenah Valley - Ref: Entura Flood Mitigation Options Report	$560,000	2024/25	Not funded

Upgrade	Stormwater Flood Risk Reduction Program	$300,000	2023/24	Not funded
Upgrade	Pottery Creek - 188 Lenah Valley & John Turnbull Park - Ref: Entura Flood Mitigation Options Report	$380,000	2025/26	Not funded
Upgrade	Stormwater - Inlet Upgrades (Placeholder)	$360,000	2022/23	Not funded

A.3 – Acquisition Forecast Summary

Table A3 - Acquisition Forecast Summary

Year	Constructed	Donated (Large Subdivisions)[1]	Donated (Property Connections)[2]
2020	$478,620	$-	$245,139
2021	$1,725,000	$318,471	$250,042
2022	$1,970,000	$483,048	$255,043
2023	$2,114,000	$-	$260,143
2024	$2,100,000	$771,721	$265,346
2025	$1,920,000	$768,177	$270,653
2026	$1,500,000	$-	$276,066
2027	$700,000	$-	$281,588
2028	$700,000	$434,984	$287,219
2029	$700,000	$-	$292,964
2030	$700,000	$-	$298,823
2031	$700,000	$237,222	$304,800
2032	$700,000	$-	$310,896
2033	$700,000	$-	$317,113
2034	$700,000	$-	$323,456
2035	$700,000	$-	$329,925
2036	$700,000	$-	$336,523
2037	$700,000	$-	$343,254
2038	$700,000	$-	$350,119
2039	$700,000	$-	$357,121

[1]Value of future assets from subdivisions based on assumed unit rates. Timeframes for handovers are guesses only and will be entirely determined by the developers.

[2]Property connections include both those constructed by the private sector and those constructed by the City where the cost is recovered from the benefiting property owner

Appendix B Operation Forecast

B.1 – Operation Forecast Assumptions and Source

The operations forecast has been based on the existing operational budget with an allowance for projected acquired assets. It assumes that current operational activity is sufficient to maintain a reliable level of service across the network. For asset types that have been historically under serviced – for example water sensitive urban design assets – this assumption may not be valid.

By asset type:

- Water Sensitive Urban Design (WSUD) – increase by 5% of updated asset value (based on 20 year design life, and asset value of 0.5 of installation cost)
- Iron – + $1433.76 per new iron
- Gross pollutant traps (GPTs) – increase by $5,600 per GPT in the system (Vac truck cost)

B.2 – Operation Forecast Summary

Table B2 - Operation Forecast Summary

Year	Operation Forecast	Additional Operation Forecast	Total Operation Forecast
2020	$257,229	$-	$257,229
2021	$257,229	$5,600	$262,829
2022	$257,229	$18,300	$275,529
2023	$257,229	$41,050	$298,279
2024	$257,229	$46,650	$303,879
2025	$257,229	$54,150	$311,379
2026	$257,229	$59,750	$316,979
2027	$257,229	$67,250	$324,479
2028	$257,229	$72,850	$330,079
2029	$257,229	$80,350	$337,579
2030	$257,229	$85,950	$343,179
2031	$257,229	$93,450	$350,679
2032	$257,229	$99,050	$356,279
2033	$257,229	$106,550	$363,779
2034	$257,229	$112,150	$369,379
2035	$257,229	$119,650	$376,879
2036	$257,229	$125,250	$382,479
2037	$257,229	$132,750	$389,979
2038	$257,229	$138,350	$395,579
2039	$257,229	$143,950	$401,179

Appendix C Maintenance Forecast

C.1 – Maintenance Forecast Assumptions and Source

The maintenance forecast has been based on the existing maintenance budget with an allowance for projected acquired assets. It assumes that current maintenance activity is sufficient to maintain a reliable level of service across the network. For asset types that have been historically under serviced this assumption may not be valid.

By asset type:

- Pipes - increase by 0.015% of updated asset value (based on 132 year design life)
- Connections - increase by 0.57% of updated asset value (based on 35 year design life)
- Rivulet retaining walls – increase by 0.27% of updated asset value (based on 75 year design life)

C.2 – Maintenance Forecast Summary

Table C2 - Maintenance Forecast Summary

Year	Maintenance Forecast	Additional Maintenance Forecast	Total Maintenance Forecast
2020	$567,650	$-	$567,650
2021	$567,650	$1,462	$569,112
2022	$567,650	$3,104	$570,754
2023	$567,650	$5,104	$572,754
2024	$567,650	$7,497	$575,147
2025	$567,650	$10,670	$578,320
2026	$567,650	$12,571	$580,221
2027	$567,650	$14,325	$581,974
2028	$567,650	$15,990	$583,640
2029	$567,650	$17,752	$585,402
2030	$567,650	$19,482	$587,132
2031	$567,650	$21,245	$588,895
2032	$567,650	$23,078	$590,728
2033	$567,650	$24,910	$592,560
2034	$567,650	$26,778	$594,428
2035	$567,650	$28,681	$596,331
2036	$567,650	$30,622	$598,272
2037	$567,650	$32,600	$600,250
2038	$567,650	$34,617	$602,267
2039	$567,650	$36,672	$604,322

Appendix D Renewal Forecast Summary

D.1 – Renewal Forecast Assumptions and Source

It is assumed that renewals program in 2021/2022 will be fully funded.

D.2 – Renewal Project Summary for 2021/2022

The project titles included in the lifecycle forecast for 2021/2022 are included here.

Program	Project Name	Budget FY21/22	COMMENT
Renewal	Federal St 25 – Park Rivulet Stormwater Renewal/Duplication	$100,000	Commitment to developer
Renewal	Hobart Rivulet - Debris Iron Renewals	$150,000	
Renewal	Hobart Rivulet - Rock Tunnel - Rockfall Remediation	$80,000	Design only
Renewal	Hobart Rivulet - Wall Repair - Left Bank Vicinity of 82-84 Liverpool	$400,000	
Renewal	Hobart Rivulet - Minor Repairs & Renew Program	$150,000	Annual program
Renewal	New Town Rivulet Outfall - Bank Reinstatement	$375,000	
Renewal	Parliament Lawns & Salamanca Place 750bk - Relining	$650,000	
Renewal	Pottery Creek - Stormwater Treatment - Development contribution for 25 Copley Rd PLN-15-00371-01	$40,000	Contribution from developer
Renewal	Stormwater - Connection Renewals - Program (Placeholder)	$327,600	Annual program
Renewal	Stormwater Pipeline Inspection & Relining Program (Placeholder)	$100,000	Annual program
Renewal	Stormwater Pipeline Renew Program (Placeholder)	$300,000	Annual program
Renewal	Stormwater Rivulets - Retaining Wall Renewal Program (Placeholder)	$1	PLACE HOLDER
Renewal	Summerleas Road (96a) Stormwater Renewal	$80,000	Commitment to customers
Renewal	Wignal St to Ryde 450mm Dia Pipe Relining & Wignal 48 Pipe Replacement	$200,000	

D.3 – Renewal Forecast Summary

Table D3 - Renewal Forecast Summary

Year	Renewal Forecast	Renewal Budget
2020	$3,648,236	$2,464,801
2021	$3,299,169	$2,952,601
2022	$2,575,279	$1,734,248
2023	$2,827,057	$1,734,248
2024	$2,916,876	$1,734,248
2025	$3,355,575	$1,734,248
2026	$437,909	$1,734,248
2027	$887,869	$1,734,248
2028	$409,136	$1,734,248
2029	$666,086	$1,734,248
2030	$621,762	$1,734,248
2031	$329,417	$1,734,248
2032	$821,382	$1,734,248
2033	$581,399	$1,734,248
2034	$372,990	$1,734,248
2035	$388,780	$1,734,248
2036	$859,853	$1,734,248
2037	$681,307	$1,734,248
2038	$3,974,305	$1,734,248
2039	$916,143	$1,734,248

Appendix E Disposal Summary

E.1 – Disposal Forecast Assumptions and Source

It is assumed that no assets of any significance will be disposed of over the life of this asset management plan.

Table E3 – Disposal Activity Summary

Year	Disposal Forecast	Disposal Budget
2020	0	0
2021	0	0
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0
2031	0	0
2032	0	0
2033	0	0
2034	0	0
2035	0	0
2036	0	0
2037	0	0
2038	0	0
2039	0	0

Appendix F Budget Summary by Lifecycle Activity

It is assumed that operations or maintenance budgets will not be increased in response to new acquisitions. It is assumed that renewals will be fully funded in 2021 and new and upgrades will be partially funded in 2021 and 2022 but not beyond. Long term budgets are based on the stormwater levy minus overheads. It is assumed that property connections constructed by the City will be cost neutral. Indexing has not been applied. All values are in today's dollars.

Table F1 – Budget Summary by Lifecycle Activity

Year	Acquisition	Operation	Maintenance	Renewal	Disposal	Total
2020	$478,620	$257,229	$567,650	$2,464,801	$-	$3,768,300
2021	$100,000	$257,229	$567,650	$2,952,601	$-	$3,877,480
2022	$2,100,000	$257,229	$567,650	$1,734,248	$-	$4,659,127
2023	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2024	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2025	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2026	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2027	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2028	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2029	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2030	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2031	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2032	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2033	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2034	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2035	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2036	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2037	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2038	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127
2039	$-	$257,229	$567,650	$1,734,248	$-	$2,559,127