



State of the Environment Report



June 2010

Introduction

This report is the second document of its kind prepared by the Hobart City Council (HCC), to reflect on the state of the environment in the City of Hobart. The first was the State of the Environment Report (SoE Report) 1998.

SoE reporting is a process that provides an indication of the status of, and trends in, environmental and other relevant conditions resulting from either natural variability or human-induced (anthropogenic) pressures.

This report is not a mandatory requirement for Tasmanian councils, as it is for the State and Australian Governments. Notwithstanding this, the HCC has prepared the report to contribute to a better understanding of environmental conditions.

Throughout Australia, organisations are using a variety of frameworks to monitor environmental change and track their progress towards ecologically sustainable outcomes and goals. SoE reporting provides one such framework. The themes used in this report are similar to ones used in the past, i.e. Atmosphere, Biodiversity, Land, Inland Waters and Wetlands, Coastal, Estuarine and Marine.

These reflect past Australian and Tasmanian SoE Reports (but not the recently published State of the Environment Tasmania 2009).

This report does not follow the structure or themes of the Council's 1998 report or structure. For example, there is no part devoted to "Context" that included the "Social Environment" in 1998, and there is no chapter on the "Built Environment".

This report's structure and the content, including the selected indicators, reflect a number of factors, such as:

- The changes since 1998 in the Council's own corporate structure and functions (such as its activities in the sphere of community development)
- Council's greater range of communication and consultation mechanisms including an expanded annual report, a very active web site and the quarterly "Capital City News"
- The availability and cost of gathering data
- Water and Sewage reform

This may be the last of such a formal report given the underlying questions as to the need for a municipal area base SoE Report (given the one produced for the State) and the recognition of the greater complexity of both governance and the assessment of performance.

In addition there will be indicators that may be added or deleted over time in response to changed understanding and awareness.

In this context and having regard to some of the intrinsic issues involved in the preparation of a State of the Environment Report, a review of environmental data collection is recommended as part of the report (see 1.4 Future Direction of State of the Environment Reporting).

Council welcomes feedback on this issue and the document itself.

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Abbreviations

ABS	Australian Bureau of Statistics
CMP	Catchment Management Plan
CCP Program	Cities for Climate Protection
DPIPWE	Department Primary Industries, Parks, Water and Environment
e- CO ₂	Equivalent carbon dioxide is a measure for describing how much global warming a given type and amount of greenhouse gas may cause, using the functionally equivalent amount or concentration of carbon dioxide (CO ₂) as the reference
EMPCA	Environmental Management and Pollution Control Act
EPBC	Environment Protection and Biodiversity Conservation Act
EPP Air	Environmental Protection Policy - Air
RMPS	Resource Management and Planning System
TSPS	Tasmania's Threatened Species Protection Act 1995
UTas	University of Tasmania
WMC	McRobies Gully Waste Management Centre
WWTP	Waste Water Treatment Plant

Figure 1-1 City of Hobart Municipal Area



1 Background

The City of Hobart is the social, cultural, political and economic hub of Tasmania playing a major role in business and commerce, education and learning, social and recreational life, governance and tourism. It is the home for approximately 50,000 residents and over 44,700 workers are accommodated each day within the municipal area (of which approximately 16,700 are residents) along with nearly 400,000 visitors and tourists each year (ABS 2006). The day time population of the city is much higher than the resident population, as many residents from other municipalities work in the City of Hobart or attend educational institutions, use child care facilities, shops, hospitals, specialists and a range of financial and legal services. A table of information compiled by the HCC Strategy & Governance Division providing 'at a glance' information about the people of the City of Hobart can be found in [Appendix A](#).

The planning, land management, civic works, design, asset management and operational needs of the city are carried out by the HCC and are fundamental to the productivity and competitiveness of the economy, the quality of life of all citizens and the ecological sustainability of the environment. The HCC is one of the five local governments that comprise the Greater Hobart area, the others being Brighton, Clarence City, Glenorchy City and Kingborough.

The location of the City of Hobart is within an impressive natural setting with Mount Wellington as a backdrop. It is nestled within the mountain's foothills and along the foreshore of the River Derwent in the Derwent Estuary. A significant proportion of the city's buildings have cultural significance and the land has special significance for local indigenous people. It is Australia's most southerly located capital city, located at 42° 50' south - next stop is Antarctica.

Unlike other capital cities, Hobart has considerable natural values within its municipal boundaries. Today over 60% of its 7790 hectares of municipal area is native vegetation (2009). The City of Hobart prides itself on its clean and green image and the natural environment plays a key role in defining its character and the lifestyle enjoyed - from scenic vistas and views, to walking in the foothills of Mount Wellington, to boating on the River Derwent.

1.1 Environmental Management in the City of Hobart

The HCC has an important role in managing the environment and fulfils this through a variety of mechanisms. It carries out its responsibilities in accordance with the objectives of the Resource Management and Planning System 1993 (RMPS), the basis of which is sustainable development¹ and use of Tasmania's resources. A comprehensive guide to the RMPS can be found at the Tasmanian Planning Commission web site.

A suite of legislation provides the foundation of the RMPS and includes:

¹ "Sustainable development means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while:

- sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations;
- safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
- avoiding, remedying or mitigating any adverse effects of activities on the environment."

- The [Land Use Planning and Approvals Act 1993](#) (LUPAA) – Regulates land use and development in Tasmania through Planning Schemes, planning assessment processes and a permit system.
- The [Environmental Management and Pollution Control Act 1994](#) (EMPCA) - Manages and regulates pollution and other environmental problems through various management tools and prescribed offences.
- The [State Policies and Projects Act 1993](#) – Deals with the creation, enforcement and review of Tasmanian State Policies. It also sets out the requirement for Tasmanian SoE reporting and defines how Projects of State Significance are approved and regulated.
- The [Historic Cultural Heritage Act 1995](#) – Sets up a register of places of historical cultural heritage significance.

The HCC endeavours to undertake all its activities and services using good environmental practice and has incorporated these values into its strategic planning to ensure that the quality of the natural and built environment in Tasmania's capital city is the subject of continuous attention and improvement. The overarching Hobart 2025 20 Year Strategic Framework provides a vision and an agreed direction for Hobart for 20 years and allows for long term planning reference. According to the Vision in the Framework, in 2025 Hobart will be a city that:

- Offers opportunities for all ages and a city for life;
- Is recognised for its natural beauty and quality of environment;
- Is well governed at regional and community levels;
- Achieves good quality development and urban management;
- Is highly accessible through efficient transport options;
- Builds strong and healthy communities through diversity, participation and empathy;
- Is dynamic, vibrant and culturally expressive.

It is envisaged that this report will be a strategic planning tool that describes, evaluates and communicates conditions and trends in the environment (natural and built) and will enable higher level discussion about environmental issues and pressures that we will be facing in the future. An increased awareness of the state of the social and physical environment will aid the HCC in achieving its social and environmental goals listed in the 2008-2013 Strategic Plan including:

FD2.1. The natural beauty of Mount Wellington, the Derwent River, bushland surrounds and foreshore locations is highly valued.

FD2.2. Community connection to the natural environment through the protection of views, vistas, access and linkages is enhanced.

FD2.3. The physical environment has been conserved in a way that ensures we have a healthy and attractive city.

FD2.4. Better understanding of 'climate change' and its potential effect on the natural and built environment and strategies developed.

FD4.1. The city remains unique in its own right, protecting its built heritage and history.

FD4.2. Quality development with the principles of sustainable cities and the reduction of ecological impacts pursued.

FD4.3. Access to the waterfront, foreshores, public and open spaces is valued.

FD5.1. Convenience and accessibility through the greater use of transport alternatives and an effective road and travel network.

FD5.2. An integrated approach to transport planning within the city and across the wider metropolitan region.

The HCC actions are also directed by other statutory regulations such as its own by-laws, strategies, management plans and partnership agreements. These are listed individually in each chapter.

1.2 Towards Environmental Sustainability

This SoE report encompasses the HCC progress towards *some aspects* of environmental sustainability. Sustainability is an aspirational goal of meeting the needs of the present without compromising the ability of future generations to meet their own needs. It involves creating new benefits without undermining or destroying old benefits that are still valued in the community. This involves using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are protected, maintained and restored. It also involves preventing and reversing adverse impacts of economic and social activities on the ecosystem, while continuing to allow the sustainable, equitable development of societies.

Sustaining or maintaining absolutely every component and attribute of the entire physical environment is impossible. A society must first try to understand the current state of the environment, then try to establish what they hope to and are capable of maintaining and what can be allowed to change or what will be made to change. It may be difficult to decide where to begin but movement towards environmental sustainability involves a reduction in the use of physical resources and the adoption of a 'recycle everything/buy recycled' approach. It, therefore, involves the use of renewable rather than depletable resources and the redesign of production processes and products to eliminate the production of toxic materials and waste that cannot be re-used. Effective waste management is an important component of sustainability.

The HCC works in partnership with government, industry and community sectors to facilitate sustainable solutions for managing all wastes.

1.3 Structure of the Report

This report is structured on the five themes of Atmosphere, Biodiversity, Land, Inland Waters and Wetlands and Coastal, Estuarine and Marine. It has the following broad aims:

- to provide the HCC and residents with some accessible information about the condition of the environment within the City of Hobart;
- to contribute to public understanding of issues impacting on the City of Hobart's environment;
- to identify pressures on this environment and provide an early warning of potential problems;
- to document the responses or actions undertaken by the HCC to protect and enhance the local environment;
- to provide the information to better understand the effectiveness of policies and programs designed to protect biological diversity, and maintain ecological processes and systems;
- to create a framework on which to base future data collection and reporting with a view to tracking progress towards socially, economically and ecologically sustainable outcomes and goals.

The HCC SoE report does not aim to introduce and discuss each theme in great detail as this is done by the [Tasmanian SoE Reports](#) and the [Australian SoE Reports](#). The aim is to remain focused on issues affecting, or happening in, the City of Hobart and acknowledge HCC strategies and plans that cover related issues for each theme. Throughout the report readers are directed to sources of more in-depth analysis of the issues relating to each theme.

At the core of SoE reporting are environmental indicators for each theme. These are a series of snapshots of environmental conditions used to identify local trends and help provide a strategic basis for environmental planning and management. In 2000, the Australian and New Zealand Environment and Conservation Council SoE Reporting Task Force identified a set of [Core Environmental Indicators](#) that were scientifically valid and available for application in all jurisdictions choosing to adopt them.

In summary, good indicators of sustainable practice:

- reflect something basic and fundamental about the long term social, economic or environmental condition of a community over a long period of time;
- represent something that can be influenced by community or government;
- are easily understood and can be reliably and readily measured, with data already available or easily obtained;
- are useful for monitoring, analysing and publicising general trends towards or away from sustainable practices.

1.4 Future Direction State of Environment Reporting

The Council recognises that SoE Reporting is a valuable tool for identifying and tracking environmental trends and performance over time. It allows the Council to identify emerging environmental issues and evaluate the effectiveness of its current management responses. While it is not a statutory requirement, SoE reporting is an important demonstration to the community of the Council's commitment and progress on environmental sustainability.

The Council also recognises that a limitation of SoE reporting is that it provides a static snapshot of a dynamic environment - one in which the Council's functions and responsibilities are continuing to evolve and change over time in response to increased knowledge and understanding of environmental processes and ecosystem interrelatedness between environmental factors as well as legislative requirements. To this end SoE reporting must be recognised as a dynamic process in which past reporting methodologies and indicators may not be relevant or appropriate for current/ongoing SoE reporting.

It is appreciated that access to better credible environmental information, condition and trends, ecosystems function and internal relationships underpins sustainable development, and acknowledged that there will always be ongoing issues surrounding indicators including the:

- Evolution and change of indicators over time in response to environmental factors and anthropogenic impacts;
- Lack of long-term and consistent data sets;
- Uncertainty over indicators; and
- Collection of data for project specific purposes rather than for strategic or integrated environment assessment.

Recommendations:

To address the limitations of SoE Reporting the following is recommended:

- A strategic review of environmental data collection, monitoring and access be conducted to assess the needs of the Council's environmental reporting requirements in line with future SoE reporting processes and to increase its flexibility to respond to changed awareness and Council's functions.
- Better data collection, monitoring and reporting regimes be implemented to enable more accurate, integrated and long-term reporting, and an up to date understanding of environmental pressures be coordinated across the Council.
- New formats/mediums be investigated for the delivery of SoE Reporting that reduce its sustainability footprint, increase its reach and position it within access and application of the electronic communications.

2 Atmosphere

2.1 Description

The atmosphere is a finely balanced layer that supports, and is integral to, the health and well-being of all life on earth. It provides breathable air and is a primary regulator of climate and weather patterns. The state of the atmosphere is affected by activities conducted within the municipal area and from activities conducted at the regional, state and global levels.

The major air pollutants of potential concern in the City of Hobart are greenhouse gas emissions, noise, odour, dust, exhaust emissions from vehicles, industrial emissions and respirable particulate matter in the form of particles smaller than 10 micrometers (PM₁₀) and 2.5 micrometers (PM_{2.5}). PM₁₀ and PM_{2.5} come from industrial, domestic and transportation sources and fire. They are very small, can penetrate lung tissue and are associated with respiratory and cardio-vascular disease.

2.1.1 Greenhouse Gas Emissions

The greenhouse effect is a naturally occurring phenomenon that maintains temperatures on earth suitable to support life. Greenhouse gases such as carbon dioxide and methane form an insulating layer around the earth that maintains the temperature. Increases in the presence of greenhouse gases in the atmosphere generated from human activities, such as the burning of fossil fuels for electricity and transport, result in an enhanced greenhouse effect. It is now almost universally accepted that this is causing a warming of the earth's climate that will lead to an increased incidence of extreme climatic events such as floods, severe storms, droughts, wildfires and rising sea levels. The impacts of global warming will significantly change the global climate and earth's ecosystems on which we rely, and the way in which we live on the planet.

At the local level there will be implications for the way the HCC manages the city. The predicted altered rainfall patterns will affect catchment planning, water supply, stormwater management, flooding and environmental flows etc. Predicted temperature trends will influence planning related to the energy efficiency of buildings and infrastructure suitability. Predicted wind pattern trends will affect the dispersal of pollutants throughout an air shed, planning issues such as energy efficiency and preparing for extreme events.

2.1.2 Monitoring

In Tasmania monitoring of air pollution focuses on PM₁₀ in the major urban centres as this is the main indicator of urban air pollution in Tasmania. In the City of Hobart the predominant source is smoke from wood heaters. Data between late 2000 and mid 2006 was collected at the Prince of Wales Bay station by the State Environment Division of DPIPWE. This station was moved to New Town in 2006 to provide a more representative sample of air quality within Greater Hobart as it seemed that air moving down the Derwent kept the smoke emanating from the City of Hobart away from the former site. Data collected at the New Town site more accurately represents a clear peak in PM₁₀ each winter (June and July), which wasn't being picked up at the former site.

Monitoring for carbon monoxide was conducted at the Prince of Wales monitoring station from 2001 to 2004, but was discontinued because the levels were very low.

Routine monitoring for nitrogen dioxide and sulphur dioxide is not conducted in the City of Hobart as concentrations are very low.

Monitoring for lead is not conducted in Tasmania or in most other jurisdictions, as its removal from petrol has made airborne levels extremely low all around Australia.

Monitoring for ozone (which is formed by chemical reactions in the atmosphere, rather than being directly emitted) is deemed unnecessary in Tasmania. In the lower atmosphere, ozone is both a pollutant and a greenhouse gas.

2.1.3 Pressures on Air Quality

Wood heaters continue to be a popular source of heating and a significant source of air pollution, particularly affecting neighbouring properties. On calm, cold, winter days, woodsmoke can accumulate and become a problem for low lying areas.

Planned burns (for fuel reduction/regeneration and property protection) continue to be a source of air pollution and resident dissatisfaction, particularly in the autumn months. The Tasmanian Forest Industry (including Forestry Tasmania, Norske Skog, Gunns and Forest Enterprises Australia) is trialling the Coordinated Smoke Management Strategy developed by the Forest Practices Authority, in autumn 2009 and 2010. The coordination of planned burns aims to minimise the risk of high concentrations of smoke within individual air sheds. The Tasmanian Forest Industry provides information about planned burns being conducted in Tasmania on a map on their [Planned Burns website](#). Planned burning generally commences in mid-March if conditions are suitable. The map shows the burns that the Tasmanian Forest Industry plan to light on that particular day and is updated each morning. The map showing the burns which Forestry Tasmania has alight is updated at 5 minute intervals throughout the day. The data and time of the last update is shown beneath the map.

Vehicle emissions continue to be a major contributor to local air pollution. The principal emissions of concern are those that have been demonstrated to have significant effects on human, animal, plant, and environmental health and welfare. They include hydrocarbons, carbon monoxide, nitrogen oxides, particulates and sulphur oxides. The use of unleaded petrol and improved technology has led to a reduction in pollutants such as lead and carbon monoxide. In addition, the introduction of computer synchronised traffic lights in the city has allowed for better through-flow of traffic through the city, decreasing the time that cars spend idling near high concentrations of pedestrians.

According to the [Tasmanian Climate Change Office](#), in 2006 Tasmania emitted about 8.5 million tonnes of greenhouse gases into the atmosphere. Most of Tasmania's emissions came from transport (22%), agriculture (26%), and manufacturing and construction (20%). Attempting to reduce emissions poses enormous challenges at all levels of society.

2.2 Governance

There are hundreds of pollutants in the air we breathe. The National Environment Protection Measure for Air (Air NEPM) 1998 establishes national ambient air quality standards for six major air pollutants that affect local air quality and are indicative of general ambient air quality. The standards in the Air NEPM are designed to protect human health and wellbeing.

In 2004, the State Government Environment Protection Policy for Air Quality came into effect, providing a framework for the management and regulation of both point and diffuse sources of emissions to air for pollutants with the potential to cause environmental harm including noise, odour and particulate matter.

The legal framework surrounding climate change is rapidly evolving. Legal precedents are continuing to be set, recognising climate change as a consequence of increased anthropogenic greenhouse gases entering the atmosphere. Increasingly, organisations are likely to be exposed to future liabilities based on current decisions and actions that result in either emission of atmospheric greenhouse gases or don't take into account impacts of climate change. It is becoming increasingly imperative that decisions made by councils are considered to be reasonable responses to climate change to avoid potential litigation in the future. The HCC has no formal regulations or statutory controls in respect of greenhouse gas emissions.

2.3 Relevant Strategic Plan Outcomes

The HCC Strategic Plan (2008-2013) identifies the following outcomes to be achieved:

FD1.2. Lifestyle that will encourage all ages to see the city as a desirable location and lifelong home.

FD2.3.3. Promote opportunities to improve the energy efficiency of the city.

FD2.4. Better understanding of 'climate change' and its potential effect on the natural and built environment and strategies developed.

FD3.1. An integrated approach to the planning and development of the wider metropolitan region.

FD3.2. Partnerships with governments, the private sector and local communities in achieving significant regional, city and community goals.

FD3.3. Development of technologies that give young people opportunities to contribute to planning and development in the city.

FD4.2.1. Principles and projects will be developed and promoted to ensure sustainable, energy efficient, quality development.

FD5.1. Convenience and accessibility through the greater use of transport alternatives and an effective road and travel network.

FD5.2. An integrated approach to transport planning within the city and across the wider metropolitan region.

2.4 Core Indicators

The core indicators used to describe and understand the state of, and the factors affecting, the atmospheric environment are:

Average annual winter particulate matter (in the form of PM₁₀) values

The number of air quality complaints received

Corporate greenhouse gas emissions

Community greenhouse gas emissions

Metro Tasmania Passenger Numbers in the southern region

Kilometres of cycleway

These core indicators are presented in graphical and tabular format below and the actions taken by the HCC to address the issues they represent are described in the following section.

Year	June Maxima	July Maxima	June-July average
2006	33.5	51	22.9
2007	39.3	48.9	21.5
2008	48.7	46.4	21.3

Table 2.4.1 Average Winter particulate matter (in the form of PM₁₀) values at the New Town Air Quality Monitoring Station

Winter PM₁₀ values have been chosen as an indicator because they effectively demonstrate air quality in the City of Hobart. Winter PM₁₀ values are measured in micrograms per cubic metre of air sampled (µg/m³). The custodian of the data is the State Environment Division. In June 1998, the NEPC made the Ambient Air Quality NEPM which set uniform standards for ambient air quality. The standards in the NEPM for ambient air quality require that PM₁₀ levels do not exceed 50µg/m³ on more than five days a year. As seen by the data presented above, this is achieved in the City of Hobart.

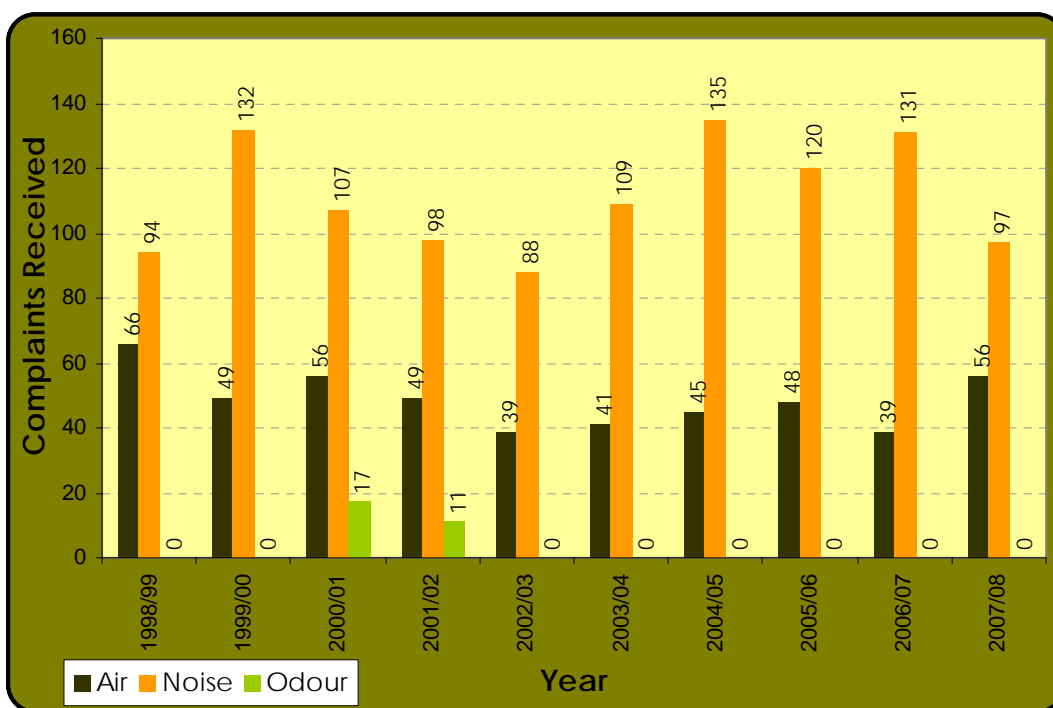


Figure 2-1 The Number of Air Quality Complaints Received

The number of air quality complaints received has been chosen as an indicator because it provides insight into community satisfaction with air quality. Each complaint received is processed by the HCC. The custodians of the data are the Environmental Health Unit and the Engineering Services Group.

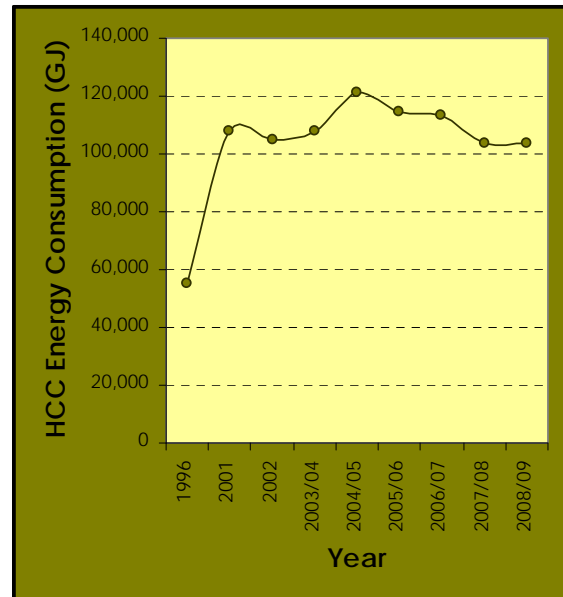
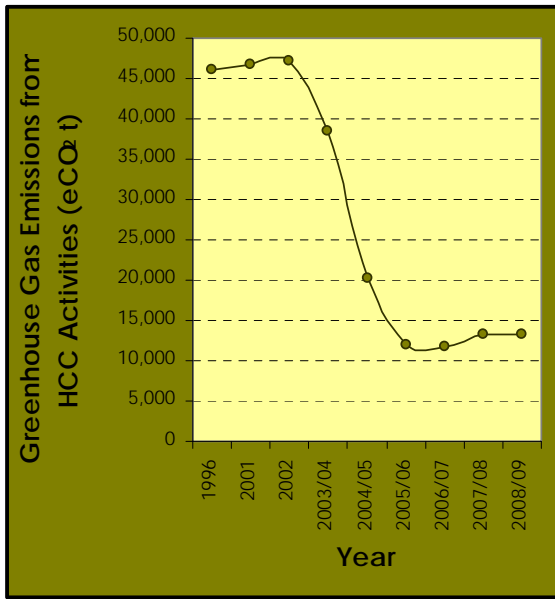


Figure 2-2 The HCC's Total Greenhouse Gas Emissions (eCO₂ t) and Energy Use (GJ)

Corporate greenhouse gas emissions have been chosen as an indicator as they illustrate the HCC's progress towards reductions. The custodians of the data are Civic Solutions HCC, and the Engineering Services Group of the City Services Division HCC. The following table shows additional information related to Figure 2.2.

	1996	2001	2002	2003	2004	2005	2006	2007
Building Sector								
eCO ₂ Output (tonnes)	115	22	61	344	392	481	594	1,321
Energy (GJ)	20 694	38 992	36 775	39 893	40 272	38 495	39 627	35 705
Cost \$	650 590	1 063 454	1 064 972	1 194 224	1 217 990	1 225 447	1 277 636	1 231 252
Vehicle Fleet Sector								
eCO ₂ Output (tonnes)	1 819	2 299	2 388	2 415	3 438	2 867	2 766	2 476
Energy (GJ)	26 254	33 148	34 432	34 825	49 492	41 296	40 346	36 729
Cost \$	431 551	721 081	780 201	803 069	1 086 553	1 193 533	1 278 043	1 307 650
Streetlights Sector								
eCO ₂ Output (tonnes)	65	8	24	125	141	180	208	496
Energy (GJ)	11 754	14 267	14 516	14 554	14 484	14 424	13 837	13 403
Cost \$	662 791	812 033	855 894	880 189	902 146	927 341	959 824	1 020 882

Water/Sewage Sector								
eCO ₂ Output (tonnes)	37	12	32	160	162	258	295	657
Energy (GJ)	6 726	21 298	19 344	18 601	16 697	20 610	19 658	17 750
Cost \$	207 494	582 156	523 978	545 913	567 327	619 120	627 938	612 103
Waste Sector								
eCO ₂ Output (tonnes)	39 400	43 200	43 500	34 191	14 800	6 982	7 762	8 210
Energy (GJ)								
Cost \$	4 599	1 260	1 260	1 260	1 260	1 260	55	55
Total								
eCO ₂ Output (tonnes)	46 035	46 801	47 266	38 495	20 192	12 027	11 680	13 215
Energy (GJ)	55 357	107 705	105 067	107 873	120 945	114 826	113 468	103 587
COST \$	1 952 426	3 178 724	3 225 045	3 423 394	3 774 016	3 965 441	4 143 441	4 171 887

Table 2.4.2 Corporate Greenhouse Gas Emissions (e CO₂ t), associated Energy Use (GJ) and Cost (\$)

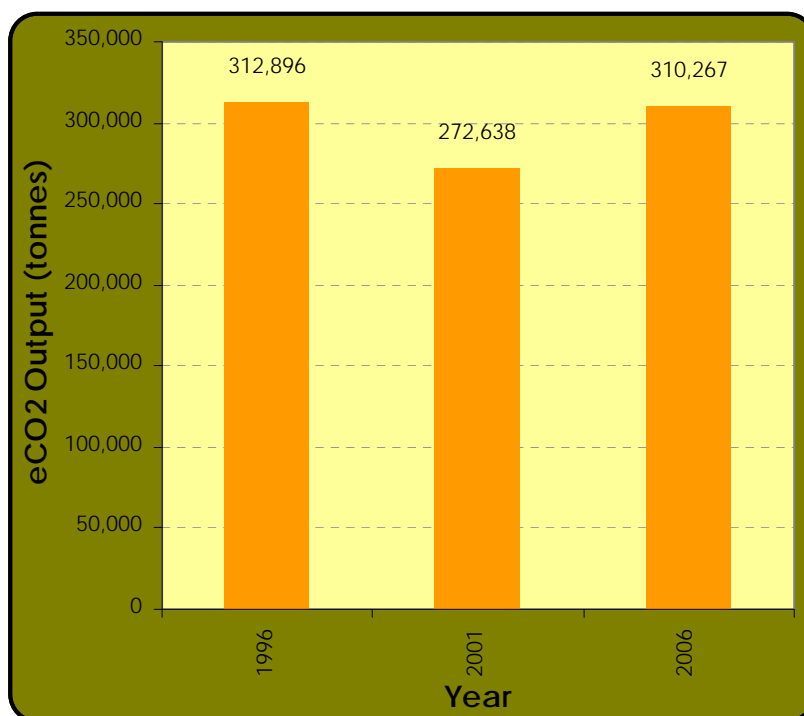


Figure 2-3 The City of Hobart's Total Community Greenhouse Gas Emissions (e CO₂ t)

Community greenhouse gas emissions have been chosen as an indicator as they highlight how the City of Hobart is tracking towards reductions. The custodians of the data are Civic Solutions

and the Engineering Services Group of the City Services Division. The following table shows additional information related to Figure 2.3.

	1996	2001	2006
Residential Sector			
e CO ₂ Output (tonnes)	4 519	4 194	15 843
Energy (GJ)	563 376	594 332	940 702
Commercial Sector			
e CO ₂ Output (tonnes)	12 571	9 023	31 863
Energy (GJ)	1 763 902	2 003 089	1 116 959
Industrial Sector			
e CO ₂ Output (tonnes)	148 914	109 834	133 150
Energy (GJ)	3 358 161	2 231 655	2 046 903
Transportation Sector			
e CO ₂ Output (tonnes)	102 894	106 176	121 594
Energy (GJ)	1 510 002	1 555 994	1 761 937
Waste Sector			
e CO ₂ Output (tonnes)	39 400	43 200	7 762
Other Sector			
e CO ₂ Output (tonnes)	4 599	210	55
Total			
e CO ₂ Output (tonnes)	312 896	272 638	310 267
Energy (GJ)	7 195 441	6 385 070	5 866 501

Table 2.4.3 Community Greenhouse Gas Emissions (e CO₂ t) and associated Energy Use (GJ)



Figure 2-4 Metro Tasmania Passenger Numbers in the southern region

Metro Tasmania Passenger Numbers in the southern region has been chosen as an indicator as it effectively demonstrates community reliance on private vehicles versus public options. The custodians of the data are Metro Tasmania.

Year	Kilometres of cycleway	
1998	5km	Cenotaph to Glenorchy boundary
Sept 2009	10.3km	Cenotaph to Glenorchy boundary (5km) plus Morrison Street to Cenotaph (1km) plus South Hobart Rivulet track (2km) plus the new Argyle Campbell street bike route (2.3km).

Figure 2-5 Kilometres of cycleway

Kilometres of cycleway within the City of Hobart has been chosen as an indicator as it effectively demonstrates the HCC commitment to realising the HCC's 2025 vision for a less car dependent, reduced emissions, more equitable and cheaper transport system for the City of Hobart's residents and visitors.

2.5 The HCC Response

A number of initiatives and planning and other regulatory control mechanisms relating to air pollution have been implemented by the HCC in an attempt to improve air quality in the region and realise a reduction in greenhouse gas emissions.

The HCC is concerned about the implications of climate change for the region and has a role through its planning and regulatory and community service functions to try to understand and manage the effects on the natural and built environment.

It has undertaken and will continue to undertake initiatives to improve energy efficiency reduce reliance on vehicles and increase awareness. The HCC has committed itself to guide and lead all sectors of the community to achieve more efficient and sustainable resource usage patterns.

2.5.1 HCC Projects, Works and Maintenance

- The HCC has much to be proud of with regard to its 10 years of action on 'climate change'. The HCC has been working to better understand and manage greenhouse gas emissions from council and community sources since it joined the Cities for Climate Protection (CCP) Program 10 years ago in 1999. It was the first Tasmanian council to join and it set, and has achieved, the highest Corporate emission reduction goal, (70% from 1996/97 levels by 2010/2011), of any participating council in Australia. As at 30th June 2009, the HCC has abated a total of 166,937 e- CO₂ tonnes from its sites, buildings and activities. This is equivalent to taking 38, 823 cars off the road for one year or turning off all Australian streetlights for 53 days. The HCC initially adopted a 20% energy reduction target for energy consumed by the HCC residents.
- A number of initiatives and planning and other regulatory control mechanisms have been implemented by the HCC in an attempt to reduce greenhouse gas emissions:
 - The HCC Corporate and Community Greenhouse Local Action Plan (LAP) has recently been reviewed. It is now called Hobart's Climate Change Strategies x 5. Included are a range of strategies and actions to be implemented across the HCC and the community to increase awareness about climate change, reduce greenhouse gas emissions and adapt to the impacts of climate change.
 - The HCC approved the Climate Change Policy at its meeting held 25 May 2009. [See Appendix B]
 - Electricity consumption in the Town Hall Annex is anticipated to be reduced by 65% following the 2009 refurbishment. This has been achieved through more efficient lighting systems, better insulation, use of air to air heat exchangers, low emissivity glass, better use of thermal mass, in combination with night purging and using effluent as the heat source/sink for the air conditioning system.
 - In July 2009, the HCC relinquished control of the Macquarie Point and Selfs Point Waste Water Treatment Facilities as part of a hand over of infrastructure relating to water and sewerage to the State managed Southern Water. Prior to their transfer to Southern Water in June 2009 they were owned and managed by the HCC. Many advances were made in the management of the two plants by the HCC. In terms of emission reductions over the last 10 years the HCC, through methane capture and flaring (largely for use as a biofuel to produce electricity for use on site), effectively prevented over 50,000 tonnes of e-CO₂ reaching the atmosphere.
 - In 2004, the HCC commissioned the installation of a 140kW cogeneration plant to burn methane gas from the Macquarie Point Sewage Treatment Plant and reduce the demand on external electricity supply.
 - Since 1999 the HCC has been extracting heat from treated effluent for use at the Hobart Aquatic Centre to heat the pool's hot water and provide air conditioning, using heat pumps and closed loop piping. The effluent is also used for heating and cooling in the Federation Concert Hall, Sandown Village and the Town Hall Annex offices.
 - There have been ongoing upgrades at both the sewerage treatment plants to improve energy efficiency and the largest pump station has been upgraded to reduce energy consumption.
 - In 2008, the Local Government Association, on behalf of Tasmanian Councils, signed the State-wide Partnership on Climate Change with the State Government.

- In 2007, the HCC established an Energy Management Team to investigate ways of reducing energy use - electricity, gas and fuel (petrol and diesel) - throughout the City of Hobart.
 - In 2004, in line with a partnership agreement with the HCC, an energy conversion plant was installed by AGL Energy at the McRobies Gully landfill, to convert methane into energy. Since commissioning, the facility has destroyed 163,659 tonnes of e-CO₂. In the past 12 months the facility has produced 23,859 MWHrs of electricity from the methane captured. This is enough electricity to provide the electricity requirements of around 693 average Tasmanian homes. In doing so, 29,000 tonnes of e-CO₂ was destroyed and the power generated displaced a further 5 487 tonnes of CO₂ if the equivalent power had been generated in Tasmania by any other means. This is equivalent to removing 7,125 cars from the road for one year.
 - All Council owned vehicles must comply with minimum fuel efficiency standards and most of the light vehicle fleet has been replaced with four cylinder vehicles.
 - In addition the HCC is working with Aurora Energy to have more energy efficient streetlights installed and is also investigating the possible use of compressed natural gas to fuel trucks in Council's fleet. A full list of projects undertaken to May 2009 by the HCC relating to greenhouse gas emission reductions can be found on [the HCC website](#).
- The HCC has committed to improving access for sustainable transport options through a number of key actions including:
- The HCC has now installed over 10km of cycle ways in the city and there are plans to extend this over the coming years. The cycleway network throughout the City of Hobart now includes the inner city and Argyle/Campbell Street cycle ways. There has also been continuing development of recreational cycling trails within Wellington Park.
 - DIER, in conjunction with the STCA, produced a [Southern Integrated Transport Plan](#) which was released in July 2009.
 - In 2008, HCC adopted the HCC Strategic Plan, committing to improving cyclist and pedestrian facilities.
 - In 2008, the HCC, in collaboration with the other councils of Greater Hobart, produced a draft Hobart Regional Arterial Bicycle Network Plan. The plan identifies where arterial cycling routes are needed across the greater Hobart region to facilitate safe and efficient transport by bike.
 - In 2008, the HCC released the draft Sustainable Transport Strategy, underpinned by the commitment to realising the HCC's 2025 vision for a less car dependent, more equitable and cheaper transport system with reduced emissions for HCC residents and visitors. Community and stakeholder consultation was undertaken to develop the strategy. The draft strategy outlined an initial set of projects and recognised the importance of assisting the development of sustainable transport networks, facilities and programs, often in conjunction with other councils.
 - In 2007, the HCC adopted the HCC's 2025 Strategic Framework supporting an integrated approach to transport planning across greater Hobart. The Vision, developed through an extensive consultative process, highlights the desire of HCC residents to see improved opportunities for alternative transport options, such as cycling.
 - In 2006, a Sustainable Transport Officer was employed to develop the Sustainable Transport Strategy which was released in 2007. An updated version of the document is due to be released later in 2009. The strategy outlines a way forward for the HCC to improve the sustainability of commuter and passenger transport.

2.5.2 Community Engagement

- As part of a two year project (2004-06) in conjunction with Brighton City Council, the HCC conducted a wood smoke education project aimed at increasing awareness of correct operating procedures for wood heaters as a way of reducing smoke emissions. The education campaign was contemporaneous with the 2004 Federal, State and Local governments wood heater buyback scheme.
- The HCC works hard to lead by example and a number of initiatives have been implemented by the HCC in an attempt to reduce community emissions:
 - Displays and online information have been used to encourage home owners and landlords to retrofit buildings to improve energy efficiency.
 - Rebates for energy efficient building applications, solar and heat pump hot water systems and insulation are offered by the HCC.
 - The HCC prepared a set of Energy Efficiency Guidelines for prospective home builders and designers. The guidelines cover a range of considerations from an analysis of the site and the opportunities it presents for energy efficient design, through to building orientation and layout ventilation/cooling insulation and landscaping.
 - The HCC works with school and community groups to encourage and support actions to reduce emissions.

2.5.3 Data Collection

- In 2009, an audit was undertaken of indoor lighting for the HCC's major buildings (20 buildings out of the 250 use 95% of the electricity) with the aim to improve lighting efficiency.
- In 2004, a transport to work survey was conducted to determine where to direct resources to achieve reductions in greenhouse gas emissions through better use of transport.

2.5.4 Regulation and Control

- Under the auspices of section 199 of the Local Government Act 1993, the HCC has the power to abate 'nuisances' including potential air quality pollution such as noise and odour.
- Under the auspices of the EMPCA, the HCC undertakes regulatory control (including complaint response) of air emissions (including noise and odour) from diffuse sources and Level 1 industries:
 - Odour complaints typically relate to activities such as the sewage treatment plants and landfill, and in the broader community industrial activities such as spray painting (cars).
 - Noise complaints typically relate to heat pumps and machinery (approx 60%), music from hotels and pubs (approx 30%), barking dogs and roosters (approx 10%). Relevant noise issues are dealt with by HCC staff under direction from the Tasmanian Noise Policy developed by the State Environment Division (DPIPWE).
 - Smoke complaints typically relate to wood heaters, backyard burning and forestry fires. Complaints related to forest regeneration burns are directed to the Forest Practices Board.
- In 2004, the HCC provided input and comments for the Environment Protection Policy for Air Quality (EPP Air) and the National Environment Protection Measure on Air Toxics 2004. Air toxics are typically present in low concentrations in the air, and are known or suspected of causing serious health effects.
- Backyard burning was identified as a significant source of air pollution. To this end the HCC developed a Prevention of Outside Burning bylaw in 2000 to improve air quality and reduce environmental nuisance (pursuant to EMPCA).

2.6 Relevant Sources of Information

See [Appendix C](#) for information about Hobart's weather.

[Tasmanian State Government web pages on air quality](#)

[Bureau of Meteorology Tasmania](#)

[Forest Regeneration Burns - Today's Planned Burns](#)

[Woodsmoke Handbook: Wood heaters, Firewood and Operator Practice](#)

[Pollution data and information for the City of Hobart from the DPIPWE](#)

[Environmental Protection Policy for \(Air Quality\) 2004](#)

[National Environment Protection Measure \(Air NEPM\) 1998](#)

[National Environment Protection Measure on Air Toxics 2004](#)

[HCC air quality information](#)

[Air toxics and indoor air quality in Australia](#)

[Tasmania Together benchmarks progress report 2008](#)

[Bureau of Meteorology Tasmania](#)

[Tasmania Climate Change Office](#)

[The Federal Department of Climate Change](#)

[The HCC climate change web pages](#)

[HCC climate change actions and incentives](#)

[Australrain Department of Climate Change - A summary of projected climate change impacts for Tasmania](#)

[Derwent Estuary Climate Change Issues: Regional actions, research and possible impacts](#)

3 Biodiversity

3.1 Description

This chapter covers biodiversity within Hobart's municipal area. Biodiversity or biological diversity refers to the variety of life forms, including plants, animals and micro-organisms and the genetic diversity they contain. Biodiversity supports the critical ecosystem processes that make life possible: the quality of the atmosphere (including climate amelioration), the hydrological cycle (including groundwater recharge, watershed protection, water quality and buffering against extreme events), soil formation and fertility, protection from erosion, cycling and storing of nutrients and pollutant breakdown and absorption. Humans rely on elements of biodiversity for food, clothing, controlling pests and curing diseases. There are also aesthetic and other cultural reasons why biodiversity is important.

The Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 considers biodiversity at three levels:

- genetic: the variety of genetic information contained in all of the individual plants, animals and micro-organisms that inhabit the earth - genetic diversity occurs within and between the populations of organisms that comprise individual species as well as among species
- species: the variety of species on earth
- ecosystem: the variety of habitats, biotic communities and ecological processes.

Together, these three levels of diversity form the complex web of ecosystems supporting life as we know it on earth. They are totally dependent on one another for their survival and we form part of that web. Our actions and activities impact on biodiversity and ultimately the healthy functioning of the ecosystems supporting all life.

The City of Hobart is situated on the River Derwent in the foothills of Mount Wellington, and is influenced by geological, topographical, hydrological and climatic elements. It is unique as it has large areas (over 60%) of native vegetation and the diversity of habitat types found provide for an abundance of native flora and fauna.

The vegetation communities of the bushland areas are varied and diverse. This is due to the varied and diverse soil types, topography/altitudes, aspects and microclimates (resulting from temperature, rainfall and prevailing winds) in Hobart's municipal area. The communities range from the alpine floristics found on Mount Wellington, to the stringy bark and blue gum forests on its foothills and open woodlands with native grassland on dolerite in areas such as the Domain. In addition, remnants of coastal and riparian vegetation communities are found along the fringes of the waterways and the River Derwent.

Many local vegetation communities and species found have been identified as being inadequately reserved across the state, placing increased importance upon ensuring the viability of the bushland areas around the city. Threatened vegetation communities are listed under Schedule 3A of the Nature Conservation Act 2002. Of the 33 native vegetation communities found in the City of Hobart, six are listed as threatened. In accordance with the Forest Practices Act 1985, any clearing or conversion of threatened native vegetation is prohibited other than in exceptional circumstances as approved by the Forest Practices Authority. Threatened vegetation communities are also listed under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999.

Threatened flora and fauna species are listed under the Tasmanian Threatened Species Protection Act 1995 (p.46) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (p.8). A full list of the rare and threatened native flora and fauna species occurring within the City of Hobart in 2004 can be seen in [Appendix D](#). The City of Hobart is known to have an abundant range of fauna occurring within its municipal area. The fauna, like the flora, are adapted to conditions particular to the City of Hobart. The diversity of faunal species is high. Although the total number of species is unknown, the priorities for the conservation of habitat are known, and the location of many rare and threatened species have also been determined. Among the abundant fauna, 13 species are listed within legislation as threatened, including the Swift Parrot, Grey Goshawk, Mount Mangana Stag Beetle and the Geo or Dangerous Metrid Moth. There are also species, such as the Mountain Dragon and Eastern Barred Bandicoot, whose populations are recommended for monitoring to keep track of any further decline.

3.1.1 Wellington Park

In 1993 the Wellington Park Act was passed, which incorporated Mountain Park into the more extensive Wellington Park. The Act also brought into being the Wellington Park Management Trust, a group consisting of representatives from the Department of Primary Industries, Parks, Water and Environment, the Department of Tourism, Hobart and Glenorchy City Councils, and Southern Water. As specified in the Act, the Trust supervised the preparation of the Wellington Park Management Plan which was adopted in January 1997. There are eight different types of land tenure covering the entire Wellington Range. The Hobart City Council is responsible for managing 3200 hectares of the 18,000 hectares covered by the Park, which extends over the eastern face of the mountain leading up to the Pinnacle and out to Wellington Falls.

3.1.2 Pressures on Biodiversity in the City of Hobart

Biodiversity can be threatened by disturbance, fragmentation, inappropriate management (including fire regimes), the introduction of non-native flora and fauna, the collection of firewood, bushwalking, push bike riding, trail bike riding, fences, fire breaks, fire trails and litter dumping. Threatening processes such as salinity, changing hydrological conditions, land clearing and fragmentation of ecosystems also place pressures on biodiversity. The pressures on the City of Hobart's bushland are typically associated with the consequences of both historic and contemporary urban development and activities. Some of the pressures are outlined below.

Urban Development

Apart from the direct impacts of current and historical urban development, there are associated or consequential impacts including vegetation clearance, weed infestation, increases in stormwater discharge, and the level of nutrients found in creeks collecting the suburban runoff. In recent years, though, most big eucalyptus trees that have died in Hobart's bushland, were due to drought and lack of water.

Since about 1945 residential development has been expanding, often into areas previously cleared for agriculture. In more recent years, the distance between the city and the bush has declined as the land zoned for residential purposes has been progressively developed through building estates, the re-subdivision of large lots and infill development on both single dwelling and multi unit lots. Examples of locations where this has occurred are Mount Nelson, Cascades (Strickland Avenue area), Lenah Valley (Pottery Road), and more recently Tolmans Hill. The areas of Fern Tree and Ridgeway have also seen an increase in the take-up of development potential as the semi 'rural' lifestyle they offer has become increasingly popular.

Weeds

Environmental weeds are invasive plant species that have adapted well to environments where they are not native and displace native species. They contribute significantly to land degradation, and reduce productivity. They can be toxic or an irritant to human and to animal well being, cause fire hazards, reduce aesthetic values and visibility. Environmental weeds include plants that have adversely affected the integrity, conservation or biodiversity of natural ecosystems. Blackberry and gorse are two more obvious examples of environmental weeds that have been successful in colonising the disturbed bushland around urban edge. The spread of weeds into bushland occurs both naturally (e.g. wind, animals, water) and through human activity such as the deliberate dumping of garden waste.

The legislation relevant to weed management in Tasmania is the Weed Management Act 1999. Under this act the HCC is required to control weeds that are listed as declared species. A list of weeds identified in Hobart's municipal area, including in the catchments in urban areas, can be seen in [Appendix E](#).

Fire and Biodiversity

Hobart's bushland contains a wide range of vegetation types from alpine heaths on the peak of Mt. Wellington through to dense, wet sclerophyll forest and open dry, grassy woodlands in the lower foothills. Fire is integral to maintaining the ecological processes at work in many of these vegetation types and has been used for thousands of years for this purpose and is used today to manage the ecological values and reduce bushfire risk.

The Council has specific responsibilities under a range of statutes for fire management, fire hazard abatement on private properties, and the conservation and management of native flora and fauna.

The Council has a Fire Management Strategy (1998) which acts as an overarching policy document that covers strategic issues relating to fire management within the Hobart's major bushland areas. It contains generic information regarding the role of fire in natural systems and the Council's approach in protecting life and property whilst retaining the natural biodiversity of bushland areas. The Strategy also presents the Council's activities to meet its legal responsibilities under a range of statutes for fire management, fire hazard abatement on private properties, and the conservation and management of native flora and fauna. The Fire Management Strategy is currently being reviewed and an updated version will be released during 2010.

Fire management plans have been prepared for each of the five large bushland reserves in hazard reduction and biodiversity conservation. Over 80 management burns have been completed in accordance with these plans since 1999. Their execution depends on a range of factors, most critically being the prevailing weather conditions. All burns are carefully planned with consideration for threatened species and habitat management, weed control, smoke management, cultural heritage and recreational values taken into account.

On private land, Bushfire Hazard Management Plans are required for all planning applications that are located within Hobart's designated Bushfire Prone Area. A significant amount of clearing of native vegetation is required to implement these plans to ensure the habitable structures are deemed safe from the impact of wildfire.

Pets

According to Petnet 2005 statistics Australia wide, 63 % of households own one or more pets. It is estimated that Australians share their homes with 3.75 million dogs, 2.4 million cats, 20 million fish and 9 million birds. In 2005 there were over 110, 000 dogs in Tasmania and an estimated 92, 000 pet cats.

The presence of suburbs next to the bushland fringe results in many cats and dogs entering that bushland. Their impact upon the native fauna has been well documented and is significant. Some strategies employed for reducing pet impact include de-sexing, pet registration and curfews, bells for cats, fencing, dog free areas, and introducing no-pet covenants on land titles.

Legislation is currently being developed to provide a long-term strategy for improved cat management in Tasmania, with a view to increasing the level of responsible cat ownership. It is envisaged that the legislation will lead to a reduction in the number of feral cats, which in turn will have positive implications for Tasmania's native fauna. Since the late 1990's over 3,000 unwanted cats have been euthanized every year in Southern Tasmania by the Hobart Cat Centre and the RSPCA Hobart Animal Shelter.

The HCC regulates dog ownership within the City of Hobart through its powers under the Dog Animal Control Act 2000 and its Dog Management Policy (2003). These provide for appropriately sited, leash free, on-leash, dog exercise areas and promote responsible dog ownership to reduce impacts on native fauna through predation and disturbance of habitat. The HCC has declared the following as areas prohibited to dogs on the basis that they provide sensitive habitat for wildlife:

- Cornelian Bay (foreshore western end)
- Skyline Reserve (Lambert Gully Section, Churchill Avenue to Mt Nelson)
- Wellington Park (outside the Recreation Zone)
- Nicholas Drive Reserve
- Knocklofty Reserve (upper section above main fire trail)
- Cartwright Reserve (above Channel Highway)
- Red Chapel Beach

The HCC has declared leash free dog exercise areas on the basis that such areas are required for dog owners. These are listed in [Appendix F](#).

'Climate change'

It has been predicted that in the longer term, the global phenomenon of climate change leading to global warming will have a significant impact on biodiversity with increased species extinctions as individual species and ecosystems reach their habitat extremes.

3.2 Governance

The HCC has responsibilities under a range of statutes for the protection and conservation of biodiversity, including the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC) and the State Threatened Species Protection Act 1995 (TSPA), Environmental Management and Pollution Control Act 1994 (EMPCA) and the objectives of other legislation comprising the Tasmanian Resource Management and Planning System (RMPS).

A threatened native vegetation legislation package became effective in Tasmania in 2007. The legislation establishes a list of threatened vegetation communities under the Nature Conservation Act 2002 as well as measures to protect these communities from clearance and conversion under the *Forest Practices Act 1985*. The regulatory framework for protecting threatened communities is administered by the Forest Practices Authority (FPA) where no permit for development has been granted under the Land Use Planning and Approvals Act 1993 .

The current City of Hobart Planning Scheme 1982 contains various provisions aimed at protecting the environment and biodiversity, in particular Schedule I – Land Clearing and Schedule L Bushland Management.

The draft City of Hobart Planning Scheme (2009) contains a number of schedules (for example the Bushland Values and Waterways Schedules) that address matters relating to biodiversity across a number of zones including the Environmental Management and Low Density Residential Zones.

3.3 *Relevant Strategic Plan Outcomes*

The HCC Strategic Plan (2008-2013) identifies the following outcomes to be achieved:

FD2.1. The natural beauty of Mount Wellington, the Derwent River, bushland surrounds and foreshore locations is highly valued.

FD2.2. Community connection to the natural environment through the protection of views, vistas, access and linkages is enhanced.

FD2.3. The physical environment has been conserved in a way that ensures we have a healthy and attractive city.

FD 2.4. Better understanding of climate change and its potential effect on the natural and built environment and strategies is developed.

FD4.2. Quality development with the principles of sustainable cities and the reduction of ecological impacts is pursued.

FD4.3. Access to the waterfront, foreshores, public and open spaces is valued.

3.4 *Core Indicators*

The core indicators chosen to help describe and understand biodiversity trends and the implications for the City of Hobart are:

HCC ownership of bushland
Hours spent by Bushcare volunteers
Area burnt in planned burns

These core indicators are presented in graphical and tabular format below and the actions taken by the HCC to address the issues they represent are described in the following section.

Bushland tenure within the HCC municipal boundaries (hectares)	1998	August 2009
Total municipal area	7790	7790
HCC owned and/or managed bushland ⁽¹⁾	2800	2975 ⁽²⁾
➤ Wellington park	1600	1600
➤ Ridgeway park	506	506
➤ McRobies Gully	176	176
➤ Knocklofty Res.	124	124
➤ Bicentennial Park		165
➤ Other	394	404

(1) The HCC now owns and manages the Domain area (163ha, 2000), Bicentennial Park (165ha, up to 2007) and other smaller parcels of land. In 1998 these areas were only managed by the HCC. The HCC has also purchased more of Mount Wellington (67ha, Lenah Valley Road 2000) and will continue to purchase or acquire bushland in the future.

(2) Of the 2966 ha of HCC owned and/or managed park/recreation/bushland within the municipal boundary, 2860 ha is managed bushland communities.

Figure 3-1 Ownership of Bushland in the City of Hobart

HCC ownership of bushland has been chosen as an indicator because with the skills and resources available and the resultant economies of scale bushland under government ownership can be more easily protected and biodiversity values enhanced than land under private ownership.

The HCC has responsibility for managing 4589 hectares (ha) of bushland – 2966 ha within the municipal boundary Hobart (38% of the municipal area), and 1623 ha outside of the boundary. The two areas outside the City of Hobart vested in and managed by the HCC are:

- the Barossa vesting that covers approximately 100 ha of bushland and is located within the boundaries of Glenorchy City Council
- approximately 1500 ha of Crown Land in Wellington Park vested in the HCC for drinking water catchment purposes and extending from Neika to Wellington Falls.

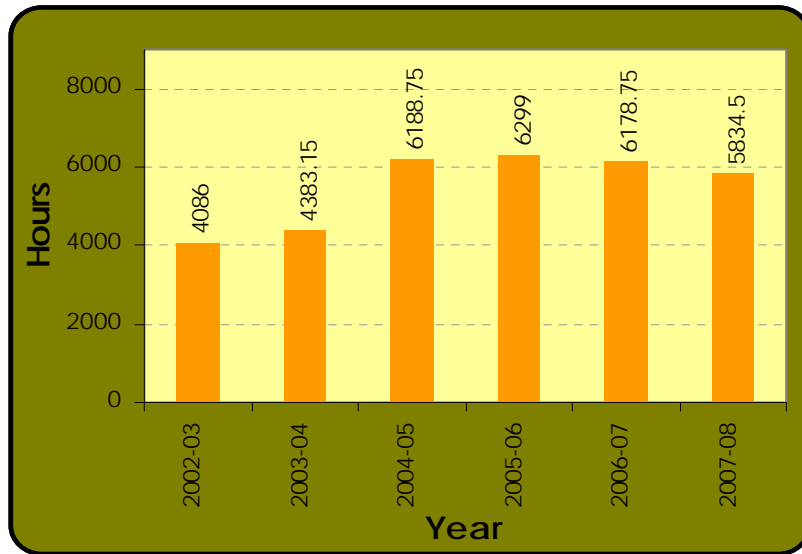


Figure 3-2 Hours Dedicated by Bushcare Volunteers

The hours spent by Bushcare volunteers has been chosen as an indicator to demonstrate community concern and interest in the management of the city's bushland. Data is sourced from the Parks & Customer Services Division.

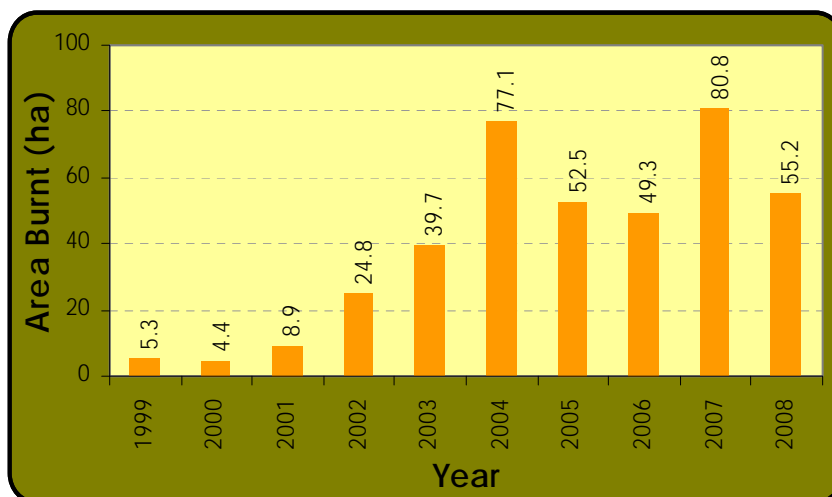


Figure 3-3 Area Burnt in Planned Management Burns

This indicator demonstrates the effectiveness of the Council's Bushland Fire Management operations. It is noted that the annual variability of the area burnt depends on a number of factors. This includes the actual area proposed to be burnt annually in each of the Reserve Fire Management Plans and seasonal weather conditions prevailing at that time. Data is sourced from the Bushland and Reserves Unit.

3.5 The HCC Response

The Council undertakes a wide range of land use planning activities and operations to protect and manage the city's biodiversity. Considerable resources are committed to the management of bushland. Some recent Council initiatives are outlined below.

3.5.1 HCC Projects, Works and Maintenance

- The HCC runs an effective program of bushland management, with a strong emphasis on coordinated actions that assist natural bushland regeneration. The resourcing of these actions is fulfilled through the HCC Bushland and Reserves Unit, Civic Solutions and external contractors.
- The HCC adopted a Bushland Management Strategy which was released in 2008 to provide a coherent strategic framework to drive the management of the City's bushland, a vision and a foundation for cohesive and improved management and planning regimes.
- The City of Hobart Planning Scheme 1982 and the Battery Point Planning Scheme 1979 are proposed to be replaced by a new planning scheme within the next couple of years. [The draft City of Hobart Planning Scheme 2009](#) seeks to better respond to the environmental challenges facing the City of Hobart through the following:-
 - Zone boundaries in environmentally sensitive areas based on a detailed review of environmental values including the most current vegetation mapping.
 - The Bushland Values Schedule designed to protect identified 'bushland values' throughout the City.
 - The Environmental Management Zone and Low Density Residential Zone provisions to address issues related to visual amenity, protection of natural values, bushfire management and vegetation clearance.
 - A range of schedules to deal with environmental matters in a more comprehensive manner. These include the Water Quality, Estuarine, Waterways and Contaminated Land Schedules.
- Management Plans have been prepared for the following bushland reserves:
 - Queens Domain Management Plan 1995; (currently being reviewed and due for release in 2010)
 - Wellington Park Management Plan 1997;
 - Lambert Park/Skyline Reserve Management Plan 1998 (to be reviewed in 2010);
 - Waterworks Valley Management Plan for Waterworks Gully Landcare Group 1999; Upper Hobart Rivulet Natural Area Action plan for Cascades Landcare Group 2000; and Knocklofty Reserve Vegetation Management Plan 2002 (currently being reviewed).
- Uncontrolled wildfire is a significant threat for biodiversity and areas that interface with the City of Hobart's bushland. The HCC, in response to this threat, adopted a Fire Management Strategy in October 1998. The Strategy recommends the preparation of individual bushfire management plans for reserves under HCC ownership and/or management. Bushfire management plans prescribe the ecological and technical fire management provisions necessary to protect human life and property, as well as conserve and enhance the biodiversity of bushland. The Strategy is currently being reviewed and will be released in 2010.
- Fire management plans have been developed for all 5 of the broad acre bushland reserves below, in consultation with the Tasmania Fire Service, the Threatened Species Branch of State Government, the Bushcare groups operating in the reserve concerned, adjoining residents

and a range of other stakeholders. Each plan has a 5-year review cycle. The existing fire management plans are:

- Wellington Park 2007
 - Lambert Park/Skyline Reserve 1998
 - [The Queens Domain](#) 1995
 - [The Knocklofty-McRobies Gully](#), revised 2002
 - Ridgeway and Waterworks Reserve 2003
- The HCC manages trees where they occur on HCC owned and managed land to ensure public safety. Trees are inspected and assessed in terms of their long term viability and the potential risk they pose to the community. They are recorded in the HCC asset database. Generally, the HCC replaces trees when they have been removed. The HCC manages approximately 22,000 trees in its parks and streets. This does not include the trees within City of Hobart's bushland areas.
- The HCC has a Draft Open Space Plan (2000) which identifies areas for purchase to integrate into the public open space system within the City of Hobart. Since 2000, the HCC has acquired 184 ha of land in line with this program. The majority has been bushland including the land that contributed to the formation of Bicentennial Park. Since 2005 the HCC has been committed to constructing the North-South Track, a 10 km shared use track for mountain bikers and bushwalkers. It extends across the slopes of Mt Wellington from the Springs to Junction Cabin. Stages 1 and 2 were constructed through the combined efforts of the Council's track crew and two Green Corps teams. Stage 3 will link to Glenorchy City Council Fire Trails and be completed in 2011.

3.5.2 Community Engagement

- The Council resources a flourishing Bushcare and Bush Adventures program. Supported by the Bushcare-Coordinator, 15 Bushcare Groups contribute substantial volunteer hours to bushland management within the reserves. Bush Adventures provides a range of seasonal activities for families in the city's bushland reserves.

3.5.3 Data Collection

- The HCC has mapped the extent of weeds in most of the of Hobart's major reserves including the Queens Domain, Knocklofty Reserve, Ridgeway Park and Lambert Park-Skyline Reserve (now named Bicentennial Park). Of the 600+ plant species known from bushland, at least 200 are thought to be introduced. Of particular concern are environmental weeds which invade and persist in native bushland to the detriment of the existing plant and animal species.
- The Council has surveyed and mapped all the native vegetation within Hobart. This has informed the development and ongoing review of a GIS native vegetation layer for Hobart which assists in bushland management and planning throughout the Council.
- In 2002, the HCC conducted a comprehensive survey of the types and condition of urban riparian vegetation. The survey focused on riparian strips that were outside of the mapped bushland areas and identified almost 90 species of plant growing that are considered as environmental weeds. The survey identified 194 different herbs, shrubs and trees – it excluded graminoides (grasses, rushes sedges etc). Of these, 74 (38%) were native (endemic to the City of Hobart), 120 (55%) were exotic (introduced into the local environment, most commonly as garden escapees) and 13 (7%) were declared weed species. Overall the condition of the riparian vegetation was rated to be poor to low. Within the urban landscape there were few remnant riparian communities. Overall the survey showed over three quarters was less than 60% native and 55% had less than 20% vegetation cover.

3.5.4 Regulation and Control

- The Hobart City Council has a range of regulatory and statutory controls that are used to manage its public open space system. Regulations, by-laws, leases, licences, permits, planning controls and various State and Commonwealth statutes provide a range of means by which Council allows and polices the use of Council owned land, or conversely for Council to negotiate use of private land.
- Two regulatory systems are used primarily – these are by-laws and regulations. The ongoing care, control and management of Wellington Park is carried out according to the Wellington Park Regulations 1999. Within the Council owned bushland and parks outside of Wellington Park, the Hobart City Council Parks, the Recreation and Natural Areas By-Law (No. 5 of 2008) is the primary regulatory tool used to prosecute offenders.
- Permits, leases and licenses are issued by the Council for third party minor activities in reserves. Permits are used for scientific research purposes, major events and one-off access through a reserve. Licences are issued for regular access through a reserve.
- Under the City of Hobart Planning Scheme 1982, the Bushland Management Schedule includes other provisions which are designed to prevent any development having an adverse effect on vegetation, fauna, water quality and bushland character. Breaches can result in civil enforcement action being taken under Section 64 of the Land Use Planning and Approvals Act 1993 (LUPAA).
- The Council has a delegated statutory responsibility under the Weed Management Act 1999 to order the removal of declared weeds on private property within Hobart.
- Under the Dog Control Act 2000, the Council has developed a Dog Management Policy 2003 and promotional brochure. The policy and brochure details dog controls and defined walking, exercise and dog-free areas outside of Wellington Park. Council's two Animal Control Officers, who are authorised under the Act, enforce these controls.
- The HCC supports the Hobart Cat Centre that processes unwanted cats and in doing so indirectly helps reduce the number of feral cats. The HCC provides cat cage hire to members of the public wishing to catch feral cats and take them to the Hobart Cat Centre. In addition, the HCC responds to public complaints relating to cats.

3.6 Relevant Sources of Information

Biodiversity and the issues relating to it are discussed in great detail in the [HCC Bushland Management Strategy](#) and on the HCC website.

The key pieces of legislation and statutes governing the management of native flora and fauna are the:

[City of Hobart Planning Scheme 1982](#)

[Environment Protection and Biodiversity Conservation Act 1999](#)

[Forest Practices Act 1985](#)

[Forest Practices Regulations 2007](#)

[Land Use Planning and Approvals Act 1993](#)

[Nature Conservation Act 2002](#)

[Threatened Species Protection Act 1995](#)

[The Weed Management Act 1999 - Schedule 1](#)

[Wellington Park Act 1993](#)

[Wildlife Conservation Act 1950](#)

[Environmental Management and Pollution Control Act 1994 \(EMPCA\)](#)

[HCC Dog Management Policy \(2003\)](#)

[Review of Construction and Development Control in Bushfire Prone Areas](#)

4 Land

4.1 Description

The land, and the way we manage it, affects the whole environment. Nutrients, chemicals, and particles washed from the land into rivers and estuaries, affect aquatic estuarine and marine systems. The quality of the soil, and the vegetation it supports, are critical for biological diversity.

This chapter covers the geological composition and characteristics of the land underpinning the fabric of the City of Hobart. It is the landform that defines the structure, features and character of our natural and built environment. It determines the hydrological processes of surface waters and ground waters; soils and the flora and fauna that are adapted to them; landscape relief and topographical features; and the character of our city and activities. The natural diversity of our non-living environment is called geodiversity.

Protecting the land and geodiversity means maintaining natural rates and magnitudes of change in those features and processes as well as protecting significant examples of bedrock features, landforms, soil features and processes. Proper management of areas adjacent to urban development can maintain representative elements of the geodiversity of the urban region as a whole, and can help to mitigate the impacts (e.g. soil degradation and artificially triggered landslips) of urban development on natural processes.

The HCC aims to protect the land for its own intrinsic values, for its importance to and influence on biodiversity and for human centred values such as heritage.

As discussed in the previous chapter, the Hobart municipal area is 7834 hectares. Of this, 61% (4738ha) is native vegetation owned privately and by the State and the HCC. The HCC owns and/or manages 2964 ha of native vegetation or bushland (38% of the total municipal area of the Hobart and 62% of all bushland); 506 (11%) is in State ownership and the remaining 1268 ha (27%) is in private ownership.

4.1.1 Geomorphology of the Hobart City of Hobart

Geomorphology is the science of surface landforms and their interpretation on the basis of geology and climate. It is used here to describe the nature and origin of the landscape forms.

The most influential factor in determining the overall pattern of the landscape is the nature of geological events that have occurred in the past. These include the slow moving tectonic plates, sea level changes, volcanoes, and land movement through faulting and earthquakes. The City of Hobart landscape is unusual and unique in comparison to that of other Australian cities as geological activity in the area took place relatively recently.

Volcanoes were active along the edges of the Derwent during the Tertiary period (65 to 2 million years ago). The runny, molten basalt spewed out from about 20 different sites over the surrounding low-lying areas. As with dolerite, basalt is quite resistant to erosion, and so many of these once low lying areas are now elevated in the landscape.

The Derwent valley was formed by downward faulting during the Cretaceous period (145 to 65 million years ago). A drop in sea level about 30,000 years ago contributed to the creation of steep side valleys. Downstream of Macquarie Point and Bellerive the river itself is deep, having an average depth of between 20 and 25 metres.

Molten dolerite was forced up into the existing rock to cool during the Jurassic period (170 million years ago). Dolerite, also known as ironstone or bluestone, is extremely resistant to erosion. Weaker, surrounding rocks slowly weather away, resulting in dolerite features being the highest in the landscape. Mount Wellington, characterised by the dolerite columns of the Organ Pipes, is one of these high points. In addition, the mountain range was also elevated by processes related to those which formed the Derwent Valley.

4.1.2 Geology and Soils

The oldest rocks found in southern Tasmania are Precambrian mudstones, sandstones and dolomites which are at least 800 million years old. These ancient rocks underlie much of the City of Hobart area. These have moved with continental drift (tectonic plate movement), been intruded on by volcanic activity, eroded by wind, rain and chemical weathering processes, submerged under seas, subject to ice ages and deposits from glaciers, and formed part of old valleys and rift deposits. Finally, they provide the foundation for our urban environment and the natural environment we share.

Geological events also give rise to the soil types upon which the natural and built environment is assembled. The geological forms (rocks) found in the City of Hobart are complex, principally the dolerites and sandstones from the more recent tertiary period. Dolerite, a volcanic rock that has cooled slowly, is the dominant rock. However other rock types can be found throughout the municipal area.

Igneous (cooled and crystallized magna) intrusions of dolerite comprise the landmass of Mount Wellington, Glebe, the Domain, Battery Point, Lenah Valley, Dynnyrne, Mount Nelson and Ridgeway. These are from the Jurassic period, being clayey soils with high plasticity. They are subject to landslides and soil creep on steep slopes with thick soils. Possible foundation movement can be experienced due to expansive clays.

Cornelian Bay, Mount Stuart, West Hobart, South Hobart, Sandy Bay and Lower Sandy Bay soils are typically dolerites with traces of mudstone and other rocks in a clayey matrix, from the Tertiary period. They are subject to gully and tunnel erosion on cleared slopes.

The Springs, Cascades, Hobart, North Hobart and Newtown landmass are from the Triassic sediments of sandstones and mudstones. Mudstones are subject to gully and tunnel erosion on cleared slopes.

Blinking Billy Point and Cornelian Bay Point are basaltic in their origin from the Tertiary period.

The area of Sandy Bay behind Nutgrove and Long Beach is the only example of windblown sand sheets from the Quaternary period occurring in Hobart's municipal area. Old vegetated sand dunes can be blown out following disturbance of their thin stabilising soil cover, be it through vegetation clearing, vehicle use or fire.

Ferntree and McRobies Gully through to Brushy Hill are sandstone, siltstone and mudstone from the Permian period. These are susceptible to gully and tunnel erosion on cleared slopes and sheet erosion on rocky outcrops.

Mountain Park is made up of dolerite materials washed down from Mount Wellington.

4.1.3 Geo-conservation in the City of Hobart

Geo-conservation aims to preserve the natural diversity of our non-living environment (geo-diversity). This means protecting significant examples of bedrock features, landforms, soil features and processes, as well as maintaining natural rates and magnitudes of change in those features and processes. A number of geo-conservation sites have been identified in the City of Hobart and are listed in the Tasmanian Geo-conservation Database (TGD) which is a source of information about earth science features, systems and processes of conservation significance in the State of Tasmania.

Table 4.1.1 Recognised Geo-conservation Sites in 2008.

Sites of Geo-conservation significance 2008
<p>1) Organ Pipes - Cliffs known as the Organ Pipes on Mt Wellington. Regional significance Age Quaternary Conservation status - potential threat Columnar jointed Jurassic dolerite cliffs. Highly visible and readily accessible. The feature was noted by early French and English explorers, and is an important aesthetic feature of the City of Hobart.</p>
<p>2) Sphinx Rock on the eastern face of Mt Wellington. Regional significance Age Cainozoic Conservation status - secure Sandstone cave with impressive overhang. The feature probably is the result of seepage leading to breakdown of the rock, followed by wind removal of the debris.</p>
<p>3) Wellington Range Periglacial Terrain Tasmanian significance Age Pleistocene Conservation status - potential threat The most extensive and well-developed high altitude periglacial terrain in Tasmania that has not otherwise been affected by glaciation (ie. periglacial landforms unmodified by glaciation).</p>
<p>4) Knocklofty Fossil Reptile Locality - Entire quarry Australian significance Age Triassic Conservation status - potential threat Location of fossils of rare reptiles and amphibians, one of them being closely related to fossil amphibians from India, South Africa and China. The quarry exposes a section (close to the type section) of the Triassic Knocklofty sandstones and shales, and is useful for teaching geology.</p>
<p>5) Blinking Billy Point Basaltic Volcanics - Foreshore for 325 m south of point and road cut opposite Tasmanian significance Age Tertiary Conservation status - potential threat</p>

Folded lavas and basaltic pyroclastics are the remnants of a Tertiary volcanic centre, the top lava flow dated at 26.5 million years. First recognised as a volcanic centre by Charles Darwin in 1836. Locality used for teaching at senior secondary and tertiary levels. Site probably includes the One Tree Point plant fossil site of R.M. Johnston.

6) Grange Quarry Stratigraphy - Entire quarry

Local significance

Age Permian

Conservation status – unknown

Formerly considered as a type section of the enigmatic Permian "Grange Mudstone".

Work conducted since 1979 indicates that the sequence here is essentially similar to that at Granton. The section is no longer considered as significant as it once was.

Fossiliferous.

7) Dead Island Area Marsh and String Bogs - Marsh area surrounding and downstream from Dead Island

Tasmanian significance

Age "Holocene"

Conservation status – unknown

Outstanding example of Alpine marsh and string bogs.

8) Mt Nelson Dolerite Intrusion exposures - Bedrock exposures of intrusive relationships in road cuttings & quarries along the Southern Outlet near the Olinda Grove intersection; also accessory features in and near Waterworks Reserve, Tolmans Hill and along the Sth outlet.

Australian significance

Age Jurassic

Conservation status – unknown

Excellent exposures of various features of a dolerite intrusion.

Data source - the Tasmanian Geo-conservation Database version 6 published in 2008

4.1.4 Land Use Zoning

The use and development of land in the city is controlled through planning schemes prepared under the Land Use Planning and Approvals Act 1993. These schemes are required to further the objectives of the RMPS of Tasmania. The City of Hobart Planning Scheme 1982 and the Battery Point Planning Scheme 1979 are proposed to be replaced by a new planning scheme. The dominant zone types under the current and proposed planning schemes are shown on Figures 4-1 and 4-2.

4.1.5 Solid Waste

The HCC is responsible for managing the McRobies Gully Waste Management Centre (WMC) in South Hobart and has made great inroads in improving waste management in the City of Hobart and will continue to do so in the coming years. General mixed and domestic waste, construction & demolition waste (hard waste), green waste and a limited range of hazardous (i.e. controlled) waste types are currently accepted.

The WMC has been in operation since 1975 and occupies approximately 20 hectares in the foothills of Mt Wellington. There is a large composting operation on site, which diverts approximately 10,000m³ of green organic waste from landfill per annum, along with a range of other organic wastes such as fish waste. These valuable resources are shredded, combined and processed to produce mulch, compost and soil conditioners (made to the Australian Standard AS 4454). These products are used by the HCC and are available to the public for purchase.

The HCC provides the community with a range of recycling services for glass, metals, green waste, metals, concrete/rocks, tyres, oil, paper/cardboard and reusable household items through a Resource Tip Shop on the site.

All wastes not diverted, including those collected each week through the kerbside waste bin collection, are deposited in the landfill.

Currently there are three landfills servicing the Greater Hobart area. They are Jackson Street in the Glenorchy City Council, the Copping Landfill owned by Clarence City, Sorell and Tasman Councils and McRobies Gully in Hobart.

Readers are directed to the [Tasmanian Waste and Resource Management Strategy](#) for a broader analysis of waste management in Tasmania.

4.1.6 Pressures on the City of Hobart's Land

Since its establishment as a penal colony in 1804, the City of Hobart has developed and grown as a modern urban city. Rivulets have been hardened, rerouted and piped underground; overland flow has been diverted to the stormwater drains; foothills have had roads and housing built into them; quarries have been cut into hillsides; wetlands have been filled in; and the coast has been hardened.

The City of Hobart Planning Scheme makes use of 'zones' for allowing certain activities within various areas which helps manage the density and impacts of development. Proper management can maintain representative elements of the geo-diversity of the urban region as a whole and can help mitigate impacts of urban development on natural processes. The City of Hobart has a wide range of land uses. These include the central business district, residential, open space, commercial, industrial and rural, through to large areas of bushland in the foothills of Mount Wellington.

Urbanisation and infrastructure development can exert considerable pressure on the land features. Development that is not sensitive to inherent land characteristics can affect the hydrological processes (running water and catchment), affect landscape and topography, impact on or destroy geo-diversity and geo-conservation sites and increase the risk of erosion, bushfire, flooding hazard, sedimentation of creeks and stormwater systems, hill slope stability and skyline vistas.

Much of the development activity (although not all) is now in areas already modified rather than in natural areas. Both new and existing development still needs to be managed. A number of the pressures facing land are described below.

Landslip, Erosion and Sedimentation

Development on steep slopes, combined with inherently unstable soils (i.e. Jurassic derived dolerite soils subject to water logging, mass slip and the like) can lead to an increased potential for landslip. Landslip events are more frequent on slopes above 25° with little vegetation and high annual rainfall.

With less low lying and moderate flatter landform available for development in the City of Hobart, steeper land in more marginal areas is being developed for residential purposes and other activities. This has resulted in an increase in the potential for water management issues leading to landslip, mass slip and accelerated erosion and sedimentation.

The predominantly dolerite-derived soils within Hobart's municipal area have a high risk of soil erosion from: land clearance; construction of roads, buildings and infrastructure; fuel reduction burns; landscaping; changed water regimes through stormwater practice; increases to the impervious area of catchments etc. Accelerated soil erosion can cause significant problems.

Contamination

Previous and current industrial and commercial activities and practices have resulted in the contamination of land, potentially making it unsuitable for wider or more intensive use by the community without appropriate investigation and treatment. Some activities intrinsically give rise to contamination more frequently than others, such as landfill (including closed landfill sites) and heavy industry. However, there are a range of commonplace commercial activities upon which we rely on a regular basis that have or may result in the build up of pollutants in the soils, such as petrol stations, car dealerships, dry cleaners, boat yards and wreckers. In Tasmania, the management of contaminated sites is shared by the State Environment Division and local Council. Under this framework, the Contaminated Sites Unit of the Environment Division regulates contaminated sites that pose a significant risk of harm to human health and/or the environment under the EMPCA. Other contaminated sites that do not pose a significant risk of harm to human health or the environment, and therefore are suitable for the current or approved use, are managed by local councils through the land use planning and approvals process.

The HCC has identified nearly 600 historic or current activities that may have led to land contamination. These are incorporated in the HCC Geographical Information System (GIS) and development in these areas is subject to more rigorous investigation to ensure that they do not pose a risk of harm to human health or the environment during development or in the designated future use. In addition, there are a number of sites that are currently recognised as contaminated sites. Once identified, these are managed by the State Environment Division.

'Climate change'

It has been predicted that in the longer term, the global phenomenon of climate change leading to global warming will have a significant impact on landforms. There are a range of natural hazards that may occur, such as inundation from storm surges, erosion and landslides, for which long term management, assessment and strategic mitigation is required. Hazards are predicted to be intensified by the changing climate.

4.2 Governance

The HCC Parks, Recreation and Natural Areas By-Law (made to regulate and control conduct in the parks, recreation and natural areas) forbids the damming up or diverting of any water on or under the surface; or interfering with, digging up, cutting up, collecting, damaging, or removing any sand, gravel, clay, rock or other natural substance.

Tasmania's Nature Conservation Strategy 2002-06 is a Tasmanian Government document which provides an action plan to protect both biodiversity and geo-diversity and maintain ecological processes and systems. It aims to improve and co-ordinate existing conservation measures and increase community ownership of natural conservation programs in Tasmania.

The Planning Schemes also regulate the use and development of all land in the city whether by public agencies (including the HCC itself and the Crown) as well as by private individuals or entities.

The HCC governs the use of the city's local parks/playgrounds and its sports fields and recreation areas through the HCC Parks, Recreation and Natural Areas By-Law, the Local Government Act and the Planning Schemes.

4.3 Relevant Strategic Plan Outcomes

The HCC Strategic Plan (2008-2013) identifies the following outcomes to be achieved:

- FD2.1. The natural beauty of Mount Wellington, the Derwent River, bushland surrounds and foreshore locations is highly valued.
- FD2.2. Community connection to the natural environment through the protection of views, vistas, access and linkages is enhanced.
- FD2.3. The physical environment has been conserved in a way that ensures we have a healthy and attractive city.
- FD2.4. Better understanding of 'climate change' and its potential effect on the natural and built environment and strategies developed.
- FD4.2. Quality development with the principles of sustainable cities and the reduction of ecological impacts pursued.
- FD5.1. Convenience and accessibility through the greater use of transport alternatives and an effective road and travel network.
- FD7.1. A destination of choice and a place for business.

4.4 Core Indicator

The core indicator chosen to help describe and understand environmental sustainability trends and the implications for the City of Hobart is:

The percentage of wastes diverted from landfill

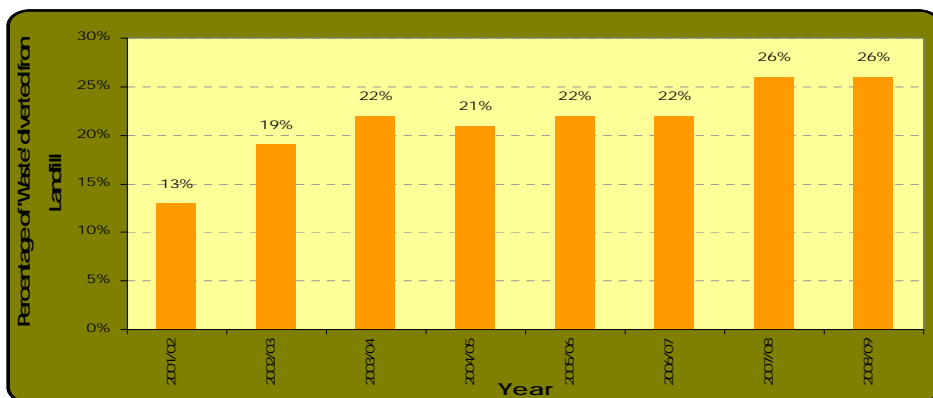


Figure 4-13 The Percentage of 'Waste' Diverted from Landfill

The percentage of 'wastes' diverted from landfill has been chosen as an indicator because it clearly demonstrates the HCC's commitment to managing wastes in a more sustainable fashion. The custodian of the data is the Environmental Engineering Unit.

4.5 The HCC Response

The HCC undertakes a wide range of activities to preserve the city's geodiversity and manage the impact of urbanisation and infrastructure development on hydrological processes, geomorphic processes and soils.

4.5.1 HCC Projects, Works and Maintenance

- The HCC continues to actively implement and develop initiatives that encourage the community, including commercial and industrial sectors, to reduce, reuse and recycle waste produced and to divert organic wastes, concrete, steel, timber and other recyclable materials from Council's Landfill.
- In order to protect the integrity of the land and ensure appropriate development, the HCC requests a Geotechnical Assessment when development occurs on slopes steeper than 15 degrees, on water ways, on the coastal escarpment, near a quarry or where there have been previous incidents of land instability.
- Infrastructure design (e.g. stormwater infrastructure) and maintenance are carried out to minimise disturbance to the land.
- The Derwent Estuary Program (of which HCC is a major sponsor) and NRM South have developed best practice guidelines for Soil and Water Management on Building and Construction Sites (2008) to minimise soil erosion and control sediment run-off. These guidelines are designed for use by councils in the regulation of building and construction sites, especially by means of planning or building permits.
- The HCC provides Soil and Water Management on Building & Construction Sites fact sheets with practical measures to prevent pollution. The fact sheets were produced in 2008 in collaboration with the Local, State and Federal Governments, the Derwent Estuary Program, NRM South and Industry.
- Soil and Water Management Plans are required by a Permit condition where there is a reasonable likelihood of erosion and sediment transfer from development sites into the stormwater infrastructure, waterways and neighbouring properties. The Plans also work to maintain the capability of the soil on site. The plan is approved prior to the development commencing.
- The HCC maintains a register of potentially contaminated sites, in line with the provisions of EMPCA, and incorporates this as a layer in their Geographical Information System. Applications for development on sites with potential contamination are dealt with accordingly to ensure there is no threat of exposure to the occupier or spread of contamination to surrounding areas.
- As mentioned in Chapter 3 the HCC purchased the Mt. Nelson foothills bushland for reserves in order to minimise impacts and improve its integrity. With the skills and resources available and the resultant economies of scale, bushland owned and managed by the local and state government can be more easily protected and enhanced to protect biodiversity values than parcels of private land.

4.5.2 Community Engagement

- Rebates for water tanks were offered from January 2004 until July 2009 to reduce the strain on the piping infrastructure. Water tanks also reduce the amount of water travelling through the rivulet/stormwater network.

- The HCC aims to allow for public consultation wherever possible. The public is given the opportunity to comment on documents being produced by the HCC such as Planning Schemes, Local Area Plans (such as the Ridgeway Local Area Plan 2003), Strategies (such as the Equal Access Strategy 2004), Management Plans (such as the Cornelian Bay Management Plan 2006) and the Strategic Plan.

4.5.3 Data Collection

- The strategic action number 56, listed in the HCC Bushland Management Strategy (2008), is to prepare systematic inventories of significant elements of geo-diversity in the City of Hobart's bushland and coastal areas and appropriately manage their maintenance.
- A report identifying significant areas of native vegetation with respect to flora and fauna habitat was commissioned - Flora and Fauna Habitat Identification and Assessment Process for the HCC 2004. The report includes a prioritised classification system for the condition and long-term viability of areas of native vegetation on both public and private land.

4.5.4 Regulation and Control

- Land use in the city is regulated through three planning schemes: the City of Hobart Planning Scheme 1982, the Battery Point Planning Scheme 1979 and the Sullivans Cove Planning Scheme 1997 (administered by the Sullivans Cove Waterfront Authority).
- As mentioned in the previous chapter, the City of Hobart Planning Scheme 1982 and the Battery Point Planning Scheme 1979 are proposed to be replaced by a new planning scheme. [The draft City of Hobart Planning Scheme 2009](#) seeks to better respond to the environmental challenges facing City of Hobart through the following:-
 - Zone boundaries in environmentally sensitive areas based on a detailed review of environmental values including the most current vegetation mapping.
 - The Bushland Values Schedule is designed to protect identified 'bushland values' throughout the city.
 - The Environmental Management Zone and Low Density Residential Zone provisions will address issues related to visual amenity, protection of natural values, bushfire management and vegetation clearance.
 - A range of schedules dealing with environmental matters in a more comprehensive manner. These include the Water Quality, Estuarine, Waterways and Contaminated Land Schedules.
 - The dominant zone types under the current and proposed planning schemes are shown on Figures 4-1 and 4-2.
- Waste is collected from residential and commercial properties on a weekly basis, whilst recyclables are collected fortnightly, sorted and sent to the appropriate reuse locations.
- The HCC provides an annual hard waste collection and biannual green waste collections. The HCC also provides numerous public place recycling bins around the HCC.
- The HCC will provide financial support to Veolia for a new glass crusher. The glass crusher will take most varieties of glass (broken or unbroken) and will eliminate the need to export glass overseas for recycling.
- The McRobies Gully Waste Management Centre has also undergone a thorough examination of its environmental impact on groundwater and surface water. The latest groundwater results have shown the facility has negligible impact on groundwater. Any significant surface water impacts are limited to major rain events. Work is continuing to improve ground and surface water management. The HCC is currently in the first stage of diverting McRobies

Creek around the landfill and into the stormwater system, rather than collecting the stream runoff in the leachate pond and diverting it to the sewer.

- Landfill rehabilitation is an expensive undertaking, particularly landfills as large as McRobies Gully Waste Management Centre. As such, the HCC has decided to commence full rehabilitation of selected areas (at final fill level) around the facility.
- In February 2005, the McRobies Gully Waste Management Centre received environmental certification in line with ISO 14001. The Centre had previously received quality assurance certification in line with ISO 9001.
- The HCC, as planning authority, is required by the Objectives of Schedule 1 of LUPAA to ensure that applications for the use or development of land promote 'sustainable development'.

4.6 *Relevant Sources of Information*

[Reconnaissance soil map series of Tasmania](#)

[The HCC Parks, Recreation and Natural Areas By-Law](#)

[HCC Bushland Management Strategy](#)

[DPIW Geo-conservation web pages](#)

[The Tasmanian Geo-conservation Database](#) - records features of special geological significance recognised in the Hobart region

[The Wellington Park Management Plan 1997](#) - contains an assessment of geo-heritage values of the area

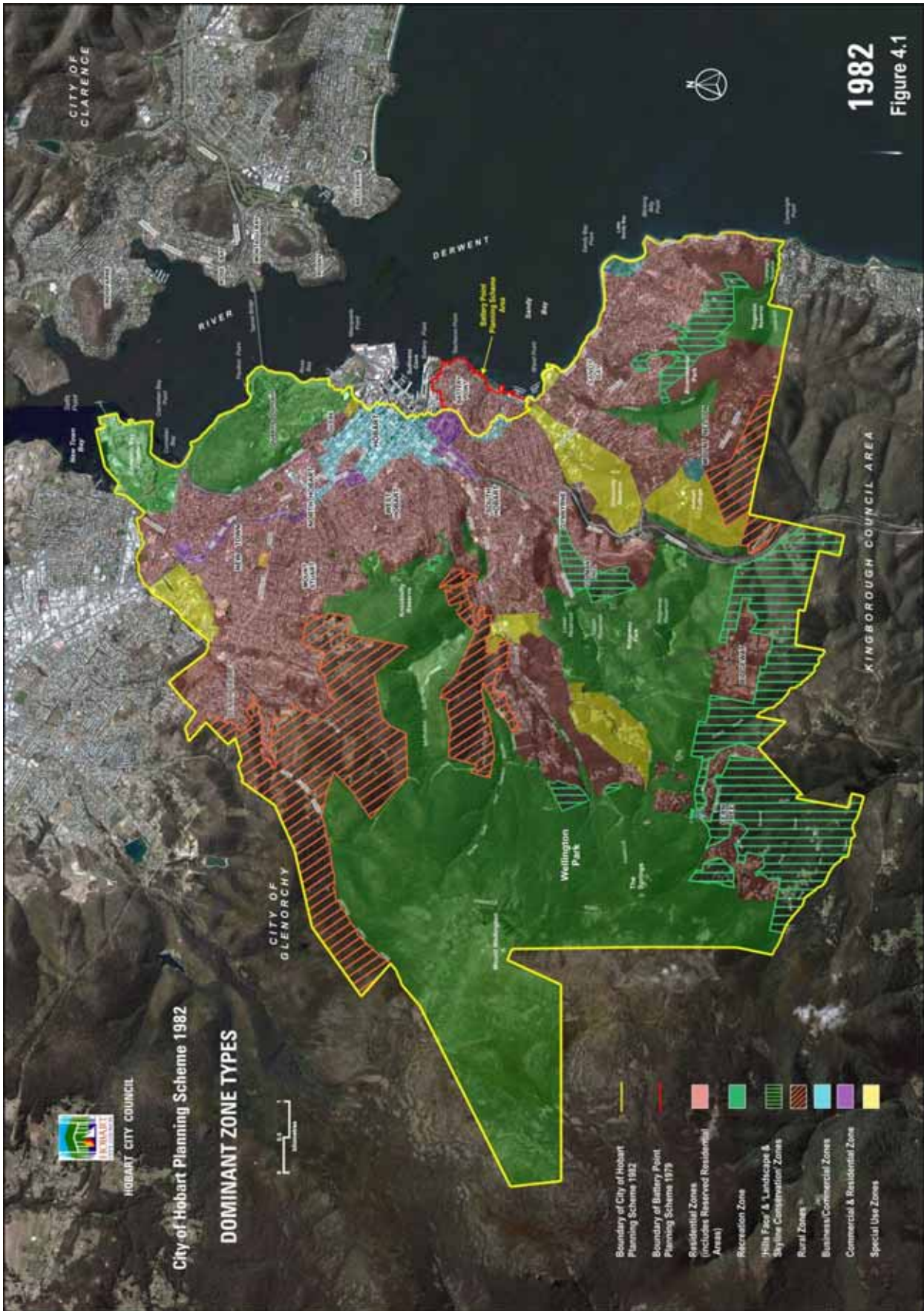
[The National Local Government Biodiversity Strategy 1999](#)

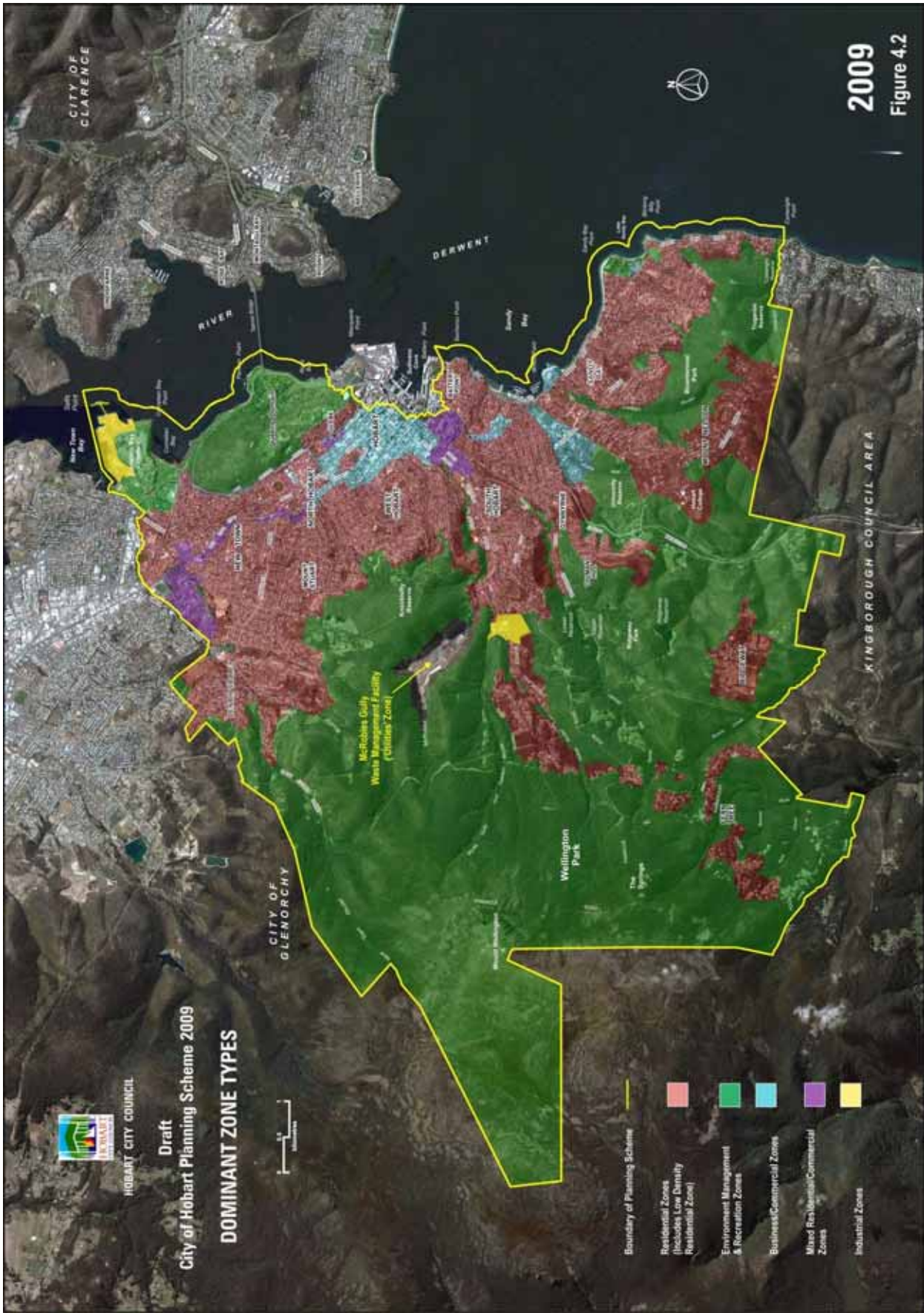
[Tasmania's Nature Conservation Strategy – 2002-2006](#)

[City of Hobart Planning Scheme 1982](#)

[Draft city of Hobart Planning Scheme 2009](#)

[Tasmanian Waste and Resource Management Strategy](#)





5 Inland Waters and Wetlands

5.1 Description

Water is essential to the health of the environment and is one of the most important environmental concerns now facing Australia. As a valuable natural resource it has two dimensions that are closely linked - quantity and quality.

This chapter covers the City of Hobart's "fresh" waterways, which includes its rivulets, creeks, wetlands, stormwater systems, water storages and water supply. This chapter will examine both the state of catchments and waterways, and the issues associated with meeting the water needs of residents.

The Hobart municipal area is contained in the Derwent River/Estuary water catchment area. Its layout and character has been heavily influenced by the proximity of the Derwent and the location of tributaries such as the Hobart Rivulet. These waterways have seen intensive historical use. See [Appendix G](#) for a brief look at historical water supply in the City of Hobart. A number of the larger creeks and rivulets have been influential in the historic development of the City, being an essential resource for domestic, agricultural and industrial water supply, and as a sewer in the days before a piped drainage network existed. Historically, and to a limited extent now, the waterways also provide a potable source of water.

The HCC, through various initiatives, is working towards restoring these waterways to a point where, in addition to the safe transport of stormwater out of the city area, they provide recreation opportunities for residents and habitat for species of flora and fauna. This involves examining issues such as erosion and water quality from a catchment-wide and often long-term perspective.

The City of Hobart has many catchments, each with tributaries (creeks and rivulets) that have their source in the foothills of Mount Wellington and discharge to the River Derwent. In the upper reaches these remain in near pristine condition, typically where they are located in reserves and the Mountain Park. However in the lower reaches they are highly modified, forming part of the City of Hobart's stormwater system and are incorporated into the urban fabric.

Catchment boundaries extend across municipal boundaries. The City shares three catchments associated with New Town Rivulet and to a minimal extent Barossa and Humphreys Rivulet with Glenorchy City, and the catchments of Cartwright, Vincents, Dunns and Browns Rivers and Fern Tree, Hobart and Myrtle Creeks with Kingborough Council.

The catchments incorporate land having a range of uses from natural bushland areas to the highly modified environments of urban areas. Overall, land use shapes the character and integrity of the catchments, particularly in terms of their waterways and associated biodiversity.

5.1.1 The City of Hobart Creeks

A short description of the principal creeks which flow through the City of Hobart to the Derwent can be seen below.

Hobart Rivulet

Hobart Rivulet is the largest creek of the largest catchment. The headwaters are located on the eastern face of Mount Wellington, with tributaries including Guy Fawkes Rivulet, Myrtle Gully Creek and McRobies Gully Creek.

The rivulet was integral to the development of the city, and saw intensive use and modification. Today the lower reaches below Molle Street are completely lined and mostly underground, with the section below the Royal Hobart Hospital having been completely redirected.

In the past, the quality of water in the rivulet has reached toxic levels due to the sewage and industrial effluent that was discharged straight to the stream. Modern inputs to the system are much improved, being restricted to road run-off and stormwater from residential and industrial properties.

The Cascade Brewery is one of the largest commercial operations in the city. It is located on the Hobart Rivulet and maintains an intake on the rivulet near Strickland Falls. However no water used in operations is released into the rivulet. The water is stored in settling ponds and then used for activities such as cleaning, pasteurisation and to a degree, cooling. After being used once, this water is either used on the Visitor Centre Gardens or sent via the sewer to the Waste Water Treatment Plant (WWTP). In order to reduce the strain on the WWTP, waste water is stored in holding tanks until after hours. Cascade is committed to reducing water intake over the coming years. Interestingly, the water for the beer itself is taken from the mains water supply.

New Town Rivulet

The second largest catchment, New Town Rivulet, flows down from the area of the Chalet and Lost World on Mount Wellington, through Lenah Valley and New Town, to empty in New Town Bay. In the early days this catchment, including the tributaries Brushy, Pottery and Maypole Creeks, supported the widespread agricultural industries of the New Town area, such as grazing and fruit orchards.

New Town Bay has been partially reclaimed, being the City of Hobart's primary landfill between 1930 and 1960. The Bay has also faced the ongoing problem of siltation from flooding and erosion reducing amenity of the site. This has been complicated by the presence of heavy metals such as lead, zinc and cadmium in the sediment, originating from the nearby zinc works. In the late 1990s the contaminated sediments were removed from New Town Bay by the HCC and placed in two clay-based wetlands, one estuarine and one freshwater, created adjacent to the site. Funding for the project came from the Natural Heritage Trust, Cleaner Seas Infrastructure Program. The estuarine wetland site has been covered in and made into parkland.

Similar to Hobart Rivulet, water quality in the New Town catchment is also much improved in comparison to that of times past.

Sandy Bay Rivulet

The catchment of Sandy Bay Rivulet, once known as Wellington Rivulet, is relatively small and does not extend any further up Mount Wellington than Huon Road near Fern Tree. Consequently it has a much lower discharge than Hobart or New Town Rivulets. Two dams, the upper and lower Waterworks Reservoirs, are located on the Sandy Bay Rivulet, although they are actually filled with water piped from elsewhere. Sandy Bay Rivulet is channelled around the side of the dams before making its way through Dynnyrne and Sandy Bay to join the Derwent just south of Battery Point. Below Regent Street, the banks of the Rivulet have been completely lined.

Lambert Creek

Lambert Creek is even smaller than Sandy Bay Rivulet, originating on the ridge of Mount Nelson and so receiving none of the high rainfall experienced closer to Mount Wellington. 70% of the catchment remains in Bicentennial Park, on Mount Nelson, which serves to buffer the upper reaches from urban stormwater.

Due to the upper catchment steepness, and historic efforts lower down to retain the creek within a natural reserve, almost no development has encroached on the banks of the creek itself. The creek is not lined or piped until it passes under Sandy Bay Road, shortly to enter the Derwent just north of Wrest Point. Despite the undeveloped nature of the catchment, there has been an increase in flood volumes and through stormwater, resulting in some instances of bank and bed erosion along the creek.

Browns River

The catchment of Browns River lies predominantly in the Kingborough municipality, with the River flowing through Kingston to discharge at the northern end of Kingston Beach. Both Fern Tree and Mount Nelson are located within the catchment area, and therefore have some influence (e.g. from sewage incidents and the diversion of water for the City of Hobart's supply) on those downstream areas located within Kingborough.

5.1.2 Water Consumption

As of 1 July 2009, Southern Water is responsible for water consumption and conservation, drinking water quality and bulk water supplies for the southern region. Water for the City of Hobart is sourced from Lake Fenton (Mt Field), Mount Wellington and the Derwent River (near New Norfolk). The Derwent River supplies about 70 per cent of the water. Southern Water's predecessor supplied 72,000 ML to councils in the Southern region in 2007-08, with the largest volumes supplied to Glenorchy, Hobart and Clarence City councils ([Tasmanian Water and Sewerage State of the Industry Report 2007-08](#)).

The water sourced from the Derwent River runs through a treatment plant, which filters and chlorinates the water. Water from Mt Wellington and Lake Fenton is also chlorinated by Southern Water. All drinking water is fluoridated.

Although the city is very fortunate that there is ample supply of high quality treated drinking water available from the River Derwent, impacts on water supply levels can occur at peak usage time, in particular during hot summer periods.

Water consumption for domestic use such as showers, toilets, pools etc per person is difficult to assess because of metering inconsistencies and the large number of people commuting into the City of Hobart every day for work. Overall consumption is in decline. Factors which have contributed to the decline in consumption include water efficiency, education campaigns, reducing the number of leaks in the supply system by replacing old infrastructure, the mandatory use of dual-flush toilets for new houses, water efficiency rebates and introducing user-pays for the larger industrial and commercial users. Decline in use in turn reduces the need to replace and upgrade water infrastructure, enables more efficient sewage treatment, and reduces the impact of the city on the natural water balance.

Drinking water quality has been routinely tested by Southern Water (and its predecessor Hobart Water) and the HCC. The HCC relinquished their drinking water monitoring responsibilities to Southern Water in July 2009. The quality of water must meet both the Australian Government's Drinking Water Guidelines and the State Government's Guidelines. The city's water quality has consistently been within the limits specified by these Guidelines.

5.1.3 Pressures on City of Hobart's Creeks

Stormwater Drainage Network

There is a direct relationship between catchment development, increases in stormwater, the appearance of problems such as flooding, erosion, siltation, and changes in the nutrient balance.

The HCC has a responsibility to ensure effective transport of stormwater out of the urban area and for management purposes, rivulets have traditionally been considered as part of the stormwater drainage network and in some sections have been highly modified for this purpose. The Cornelian Bay modifications, for example, include lining and piping of the natural watercourse either along its original watercourse or rerouting.

This poses a dilemma in that a stream with a natural structure will not cope with urban stormwater in a sustainable manner. It is forced to adapt to larger, faster volumes of water by eroding a deeper, wider channel, and wider meanders.

Many of the problems faced by rivulets can be difficult to solve where development has taken place adjacent to the stream edge. It increases the risk of flood damage to property, decreases the options available to those attempting to solve problems, inhibits the stream from evolving a new course in response to changed environmental conditions, limits public access to a natural reserve, and negates the opportunity to establish valuable fauna and flora reserves. In the past retaining walls were often erected along the banks to protect property, eventually leading to construction of an artificial channel which has been straightened and concrete lined. This also allows water to move downstream quicker and so avoids the build up of floodwater. Water flowing through these faster channels further encourages erosion in the unlined sections downstream.

It soon becomes apparent that any urban stream, unless somehow stabilised, will eventually be totally artificial in the more developed parts of the catchment. This can be seen in the lower sections of Hobart, Sandy Bay and New Town Rivulets.

With improvements in sewage treatment, stormwater is now the most serious water quality issue which the HCC can directly influence. Improving the management of stormwater requires a strategic whole-catchment approach, particularly when attempting to deal with water sensitive development and the impact of such things as dog faeces on footpaths or car oil off streets.

Stormwater is an issue that requires sustained and co-ordinated attention, particularly within and between the various divisions that have responsibilities in the area of waterway management, including City Services, Civic Solutions, Development and Environmental Services and Parks and Customer Service.

Siltation

Sediment is deposited at spots in the catchment where the water velocity slows down, most significantly at the mouth of the creek. Consequently many of the bays along the Derwent have been slowly silting up over the years, interfering with boats and, in some areas, becoming completely filled in. Some of the sediment consists of larger rocks and boulders which cause additional problems in storms as they roll down the creek, impacting off the sides and exacerbating the erosion problem. Sediment has an impact on the plants and animals living in the receiving waters by:

- reducing sunlight penetration through the water column, reducing photosynthesis;
- smothering of benthic vegetation and bottom-dwellers with deposited sediment;
- causing respiratory illness by sediment entering fish gills; and
- distributing contaminants absorbed by the sediment particles.

Clearing of vegetation in the catchment amplifies the potential for increased sedimentation and results in loss of biodiversity as discussed in Chapter 3 Biodiversity.

Water Pollution

Pollutants from our everyday lives such as litter, cigarette butts, heavy metals from traffic, seepage from septic tanks, detergents, animal faeces, pesticides, herbicides and nutrients from gardening, sporting and farming activities can find their way into waterways and contribute to a reduction in water quality and compromise aquatic ecosystems. Sources of faecal bacteria within urban catchments include sewer blockages and overflows, illegal stormwater-sewerage connections and animal faeces. Stormwater inputs of faecal bacteria can adversely affect water quality in receiving waters, such as at estuarine swimming beaches, particularly following rainfall. High nutrient levels can increase the likelihood of exotic vegetation infestations and cycles of eutrophication and subsequent algal blooms followed by high oxygen demand.

Legislation and regulation over the past 20 years have helped to diminish the influence of polluting activities within the City of Hobart. However unplanned, small scale commercial and industrial liquid trade waste discharges and run-off from building sites sporadically affect water quality.

The HCC monitors the water quality of the waterways within its municipal area. The microbiological composition of the major rivulets is influenced heavily by urban development. Enterococci bacteria are used as an indicator organism for the assessment of bacterial contamination and waterway health for recreational uses including primary contact with water such as swimming, and secondary contact such as boating and fishing where direct contact is minimal. There is an increasing level of pollution as waterways move from upper catchments only minimally affected by human activity, to more heavily urbanised lowland streams and stormwater drains where runoff from a large array of land surfaces contributes to stream flow. The pristine and upland waterways consistently meet ANZECC (2000) guidelines for both secondary and primary recreational water quality guidelines (i.e. water of swimming standard). Lowland streams and drains within the city consistently fail to meet even secondary (e.g. boating) contact guidelines.

5.2 Governance

In 2008, the State Government introduced the Water and Sewerage Act (2008) and the Water and Sewerage Industry Act (2008). The legislation established new water and sewerage corporations and an enhanced regulatory system. The legislation established:

- three regional water and sewerage businesses – 1 North, 1 South and 1 North-West
- a fourth business to provide common services to the three regional water and sewerage businesses;
- an economic regulator which will independently set prices, set minimum customer service standards and monitor the performance of the businesses;
- an expanded role for the Tasmanian Ombudsman to resolve complaints from water and sewerage customers;
- the need for a yearly State of the Industry Report that monitors water quality and environmental performance as well as the financial performance of the corporations.

Although no longer responsible for sewerage or water supply, the HCC is responsible for the implementation of the various legislative requirements in relation to the management of waterways and catchments within its municipal area. These include EMPCA as described in Chapter 1 and the State Policy on Water Quality Management 1997, the broad objective of which is to facilitate and promote integrated catchment management by:

- maintaining or enhancing water quality;
- ensuring that pollutants discharged to waterways are reduced as far as is reasonable and practical by the use of best practice environmental management; and
- ensuring that efficient and effective water quality monitoring programs are carried out and that the responsibility for monitoring is shared by those who use and benefit from the resource, including polluters, who should bear an appropriate share of the costs arising from their activities, water resource managers and the community.

The Water Management Act 1999 is part of the State's integrated Resource Management and Planning System and provides for the management of Tasmania's freshwater resources. In particular the Act is to provide for the use and management of freshwater resources in Tasmania having regard to the need to:

- Promote sustainable use and facilitate economic development of water resources;
- Recognise and foster the significant social and economic benefits resulting from the sustainable use and development of water resources for the generation of hydro-electricity and for the supply of water for human consumption and commercial activities dependent on water;
- Maintain ecological processes and genetic diversity for aquatic and riparian ecosystems;
- Provide for the fair, orderly and efficient allocation of water resources to meet the community's needs;
- Increase the community's understanding of aquatic ecosystems and the need to use and manage water in a sustainable and cost-efficient manner; and
- Encourage community involvement in water resources management.

Local Government can play a key role in managing water in Tasmania by providing:

- Water quality tests for recreational waters;
- Stormwater systems together with natural waterways;
- Monitoring for minor point source pollution;
- Catchment planning;
- Stormwater reuse schemes on parks, gardens, sports grounds, and for commercial and agricultural uses; and
- Landfill facilities with water leachate collection and treatment systems.

The Hydraulic Services By-law and the Drains Act 1954 allow the Council to control discharges to stormwater drains.

Under the [State Policy on Water Quality Management 1997](#), protected environmental values (PEVs) must be set for all Tasmanian surface waters. PEVs are the current uses and values of the waterways. The Policy provides five categories of PEVs - Protection of Aquatic Ecosystems; Recreational Water Quality and Aesthetics; Raw Water for Drinking Water Supply; Agricultural Water Uses; and Industrial Water Supply. PEVs provide a strategic framework for water quality

management. PEVs have been set for the Derwent Estuary Catchment in the [Derwent Estuary Catchment Final Paper](#).

The Derwent Estuary Program through the State Environment Division has prepared the Draft State Stormwater Strategy 2009 that sets planning and design objectives for the construction phase throughout the operational life of a development. These design objectives require the application of best practice stormwater management measures and need to be considered at the concept design phase of the development. The planning and design objectives apply to any development that creates 500m² or greater of additional impervious surface (including roads, car parking, subdivisions, multi-lot stratum, commercial and industrial developments).

5.3 Relevant Strategic Plan Outcomes

The HCC strategic plan (2008-2013) identifies the following results to be achieved:

FD2.3. The physical environment has been conserved in a way that ensures we have a healthy and attractive city.

FD2.4. Better understanding of 'climate change' and its potential effect on the natural and built environment and strategies developed.

FD3.1. An integrated approach to the planning and development of the wider metropolitan region.

FD3.2. Partnerships with governments, the private sector and local communities in achieving significant regional, city and community goals.

FD4.2. Quality development with the principles of sustainable cities and the reduction of ecological impacts pursued.

5.4 Core Indicator

Due to the absence of any indicators that meet the requirements described in Section 1.3 no core indicators have been chosen for this Chapter.

5.5 The HCC Response

The HCC strongly endorses environmentally sustainable development and has a number of water related programs and projects in place to work towards the responsible use and management of natural resources.

5.5.1 HCC Projects, Works and Maintenance

- The HCC has developed Catchment Management Plans (CMPs) for a number of the city's major urban rivulets. The aim of a CMP is to provide a working document that highlights current environment problems and provides a strategic framework for remediation of these issues. CMPs for [Wayne Rivulet](#) (2000) and Sandy Bay Rivulet (2002) have been prepared and are publicly available. A CMP for the Hobart Rivulet is due to be released in 2010.
- The HCC has installed a number of stormwater improvement devices including floating litter traps on the Hobart Rivulet and in New Town, a sediment trap weir with a trash rack to catch floating debris. In addition Enviropods, litter traps inserted in the gutter pits, have been installed throughout the city.
- In 2005, the Royal Tasmanian Botanical Gardens in conjunction with the HCC undertook a project to capture stormwater run-off from the Gardens and treat it via use of a rain garden. A

rain garden has the ability to improve the quality of the stormwater prior to it entering the Derwent River, reducing the nutrient and pollutant loading entering the river.

- In 2007, the Royal Tasmanian Botanical Gardens in conjunction with the HCC undertook a project to capture and re-use the rainwater from the Gardens visitor centre to supply the cisterns in the public toilet block. This has the potential to save in excess of 200,000 litres of drinking water that would normally supply these toilet cisterns.
- To respond to the water management challenges the HCC prepared the [Water Sensitive Urban Design Guidelines 2006](#). The guidelines are intended to assist both the HCC and Hobart's design practitioners mitigate the long-term impacts urbanisation has on the waterways of new and existing development of various types from subdivision through to vehicle parking areas. The guidelines promote the on-site collection, treatment and utilisation of stormwater and waste water, as well as the installation of more efficient 'home' fittings and appliances as part of an integrated system.
- The Derwent Estuary Program (supported by the HCC) developed best practice guidelines for [Soil and Water Management on Building and Construction Sites \(2008\)](#) to minimise soil erosion and control sediment run-off. These guidelines are designed for use by councils in the regulation of building and construction sites, especially by means of planning or building permits.
- The HCC produced a [Public Environmental Report](#) regarding the environmental activities and performance of the McRobies Gully Waste Management Centre for the period 1 July 2005 to 30 June 2008. The Report covers a wide range of environmental aspects, such as emissions, energy use, waste minimisation, education and quality assurance.
- In 2001, the HCC developed a [Water reform package](#). The package covers water reform initiatives relating to physical environmental sustainability, financial reform and public health.
- Management of waterways is included in HCC bushland management practices to protect and conserve natural values and attributes.
- The HCC encourages responsible ownership of dogs within its municipal area. The HCC Dog Management Policy (2003) meets the requirements of the Tasmanian Dog Control Act 2000. The Policy provides for the protection of drinking water quality. Restricting dog walking from some areas in Ridgeway Reserve, Wellington Park and all of the Waterworks Reserve will protect the resource and infrastructure from contamination.
- In 2001/02, an artificial [Inland Wetland](#) was constructed to accelerate bio-remediation of contaminated sediments in New Town Bay.

5.5.2 Community Engagement

- The HCC rates rebate scheme for purchasing and installing water efficient fixtures and appliances (including tanks) ran from January 2004 to June 2009. This area is now the responsibility of Southern Water.

5.5.3 Data Collection

- In 2002 and 2004, the HCC conducted benchmark surveys of the fresh waterways within its urban area. The aim of the surveys was to provide a baseline inventory of the condition of the riparian zone for use as an indicator of the overall health of the catchment and to assist in strategic and town planning. The study looked at riparian vegetation and erosion within the riparian zone.
- Until September 2009, the HCC monitored drinking water quality and reported this information to the Department of Health and Human Services each year. This has now ceased. Southern Water now carries out this monitoring.
- Through the 'Hobart's Waterways Monitoring Program' sampling is conducted in the upper and lower reaches of Hobart's waterways for Enterococci bacteria and E. coli concentrations.

- Leachate collection measures at the McRobies Gully Landfill site ensure that all water generated on site, travelling through the site or falling on the site, is collected and directed to the leachate collection pond. In exceptional circumstances, such as very high rainfall events, some water does leave the site to the storm water system. However work is being undertaken to improve the quality of the discharge in the future. Any water that leaves the leachate collection pond does so via the sewer system. The City Services Division of the HCC conducts water quality testing both above and below the landfill site to ensure surrounding water courses are not being contaminated. A number of substances are monitored including total suspended solids (TSS), total nitrogen (TN), total phosphorus (TP), heavy metals (such as copper, lead and zinc), E. coli, Faecal Streptococci and Thermotolerant Coliforms.

5.6 *Relevant Sources of Information*

[Water Management Act 1999](#)

[State Policy on Water Quality Management 1997](#)

[Southern Water](#)

[Derwent Estuary stormwater and rivulet monitoring program - Water quality summary report for 2002 to 2005 & 04/05 report card](#)

[The Derwent Estuary Program](#)

[Derwent Estuary Program Environmental Management Plan February 2009](#)

[Tasmanian Water and Sewerage State of the Industry Report 2007-08](#)

[The HCC Water Sensitive Urban Design Guidelines 2006](#)

[Soil and Water Management on Building and Construction Sites \(2008\)](#)

6 Coastal, Estuarine and Marine

6.1 Description

This chapter covers the City of Hobart's coastal and estuarine environments.

Under the State Coastal Policy Validation Act 2003, a reference in the State Coastal Policy 1996 identifies that "the coastal zone is to be taken as a reference to State waters and to all land to a distance of one kilometre inland from the high-water mark." For the purpose of the actions of the Australian Government, the boundaries of the coastal zone are considered to extend as far inland and as far seaward as necessary to achieve the Coastal Policy objectives, with a primary focus on the land-sea interface. For the purposes of this SoE report the coastal, estuarine and marine environment considered will extend from low water mark of the River Derwent landward to encompass:

- natural features such as coastal vegetation, intertidal flats, dunes, wetlands and beaches including Red Chapel, Nutgrove, Cornelian Bay and Long Beaches;
- steep cliffs, rocky shorelines and rocky reefs at Self's, Pavilion and Blinking Billy Points;
- embayment's such as Little Sandy Bay and Cornelian Bay;
- open space, conservation and public reserves; and
- artificial structures such as the Franklin Wharf, carparks, walking/access tracks, slips, marinas, jetties, boatsheds, boat ramps, wharves and residential development and other modifications to the foreshore.

The City of Hobart is located on the River Derwent, in approximately the middle of the largest estuary in Tasmania and its municipal boundary extends to low water mark. The lower section of the River Derwent south of New Norfolk forms an estuary. Here the River Derwent broadens and salt waters from the southern ocean mix with freshwater flows. The Estuary extends to Tinderbox (western side) and the Iron Pot (eastern side). It has a relatively deep channel that contains a highly stratified salt wedge in the upper reaches and is well mixed in the lower reaches. Typically, the estuary has low tides with incoming flow along the western (Hobart's) shore and outgoing flow on the eastern shore. This means that Hobart generally receives clean oceanic water.

The coastal zone is highly valued and is a significant source of natural, recreational, economic and cultural heritage values. Almost half the population of Tasmania reside on the coastal fringe of the estuary. The river is a place where people enjoy a range of opportunities like boating, kite surfing, windsurfing and swimming. There are two public marinas (Domain and Royal Yacht Club), one public boat ramp (Domain) and two public jetties (Battery Point and Domain).

The City's coastline extends 18.6 kilometres from Cartwright Creek to the New Town Bay. Approximately 7km of this is managed as open space by the HCC to maintain, enhance and protect the natural coastal values and functions. Nearly 3km of coastline is included in the Sullivan's Cove Planning Scheme which is managed by the Sullivan's Cove Waterfront Authority and includes Salamanca and the Port area, right through to Franklin Square.

Tides within the River Derwent are typically just over one metre and range from a minimum of 0.3m to 1.6m. Tidal currents are typically weak and usually experience a huge variation in the heights of successive tides.

Whilst some sections of the coastal zone remain relatively intact, other areas are highly modified. Sullivan's Cove, Selfs Point and Marieville Esplanade are hubs of maritime activity supporting significant port and marina infrastructure. Long Beach at Sandy Bay has historically undergone beach stabilisation (sand groynes) in an attempt to minimise coastal erosion. Urban development extends the entire length of coastal zone encroaching to varying degrees within the immediate foreshore/estuarine zone.

The City of Hobart's coastal zone provides significant cultural heritage values for both European and Aboriginal communities. Midden sites are found along the entire length of the coastal zone – though many have been lost due to urban development that now extends along the entire length of the coastal zone. The present site of the City of Hobart was established in February 1804 at Sullivan's Cove. The colony's location on the Derwent River - one of the world's finest deep-water harbours - was a key to its successful development, and Hobart Town (as it was known until 1881) was proclaimed a city in 1842.

Although now highly modified the foreshore or intertidal zone plays a vitally important role in terms of the function of the estuary. It provides significant habitat opportunities for a range of species, in particular performing the function of nursery for fish and other sea life. The Derwent provides suitable environments for the sea grass *Zostera muelleri*. Cornelian Bay contains areas of this seagrass extending approximately 50 – 80m from the shore. Another sea grass *Heterozostera tasmanica* is located in the deeper sections, to two metres, of the bay. A sampling program undertaken at Cornelian Bay found that prior to 1900, the sediments were sandy and supported a rich array of sea life including scallops and native oysters. See the [Derwent Estuary Website](#) for more information about habitats and species occurring in the Estuary including fish, crabs and seastars and a range of birds including little penguins and the migratory short-tailed shearwater.

6.1.1 Derwent Estuary Program

The [Derwent Estuary Program](#) (DEP) commenced in 1999 to restore and protect the River Derwent. It is a joint initiative of the Hobart, Glenorchy, Brighton, Derwent Valley, Clarence and Kingborough City Councils in collaboration with the State Government, community and industry representatives.

The DEP vision for the Derwent is “an estuary with a healthy and diverse ecosystem that supports a wide range of recreational and commercial uses and is a source of community pride and enjoyment”.

The DEP operates in accordance with an [Environmental Management Plan \(2009\)](#) to guide program activities to enhance and protect the estuary's values and to inform and involve the community in the process.

The DEP conducts a range of monitoring and science. A summary of the monitoring data is published annually in an [annual report card](#). More detailed information is made available in five-yearly [State of the Derwent Estuary](#) reports. Their water quality monitoring obligations include weekly sampling at Sullivan's Cove, Boat Sale's Warf, Victoria Dock, Waterman's Dock and the Regatta Pavilion and at the outfall of the Hobart Rivulet next to the Regatta Pavilion.

6.1.2 Pressures on the City of Hobart's Coastal Zone

Water Quality

A number of factors contribute to the water quality in the Derwent including pathogens, nutrients, organic matter, sediment, litter, heavy metals and hydrocarbons. Potential sources of contaminants entering the Derwent include discharges from sewage treatment plants, industry, stormwater, landfill, agriculture, slipways, marinas and ships.

Heavy Metal Contaminants

Sources of heavy metals in the water systems include natural processes such as the weathering of rocks, leaching from soils and atmospheric deposition. Human activities such as vehicle and tyre wear and illegal discharges or spills and mining or industrial discharges also contribute to heavy metal loads in many waterways. High traffic roads and car parks are a major input of heavy metals. Heavy metals are persistent in the environment and can become toxic to estuarine and marine mammals, and to humans if ingested through the consumption of seafood.

Major industry has been the main historic source of heavy metal contamination in the Derwent. The zinc smelter at Risdon (now Nystar) and the newsprint mill at Boyer (now Norske Skog) both historically discharged heavy metals into the river. In recent years, however, heavy metal discharges have largely been eliminated from the newsprint mill and dramatically reduced from the smelter.

[According to the Nystar website](#) - Contaminated groundwater from the Nystar zinc works site is a major current source of metal in the Derwent. The zinc works has installed five groundwater interception systems to recover and treat contaminated groundwater. These groundwater extraction systems recover 56 tonnes of metal each year that would otherwise be discharged into the estuary over time. The site also has a number of stormwater retention ponds that collect and treat surface water on-site to prevent surface contaminants discharging directly into the estuary.

Long-term data sets suggest 5 to 10-fold decreases in water column concentrations of zinc, cadmium and other metals over the last thirty years. In addition, there is an indication of a gradual reduction in sediment heavy metal levels, particularly in some of the most highly contaminated mid-estuary sites. Nonetheless sediment metal concentrations remain high by national and international standards including the ANZECC (2000) guideline for concentrations of heavy metals for the protection of human health and aquatic ecosystems.

Stormwater and Urban Development Management

Stormwater is the most prevalent source of pollution including litter, sediments and pathogens. Rainfall runoff from containing contaminants enters the Derwent via a number of major rivulets and large pipes. With improvements in sewage treatment, and given that most pollution enters the Derwent upstream from the City of Hobart, stormwater is now the most serious water quality issue affecting the Derwent which the HCC can directly influence. Stormwater and relevant HCC actions (including the installation of pollution control devices) are not discussed in this chapter as they are covered in detail in Chapter 5 - Inland Water and Wetlands.

Wastewater Discharge

Wastewater is all water that goes down the sink or toilet into the sewer. Any wastewater from commercial and industrial premises is referred to as "liquid trade waste" and this can be more difficult to treat than that from residential sources. In the Hobart City Council area, the wastewater is delivered to wastewater treatment plants (WWTP) via what is now Southern Water's sewerage network. The wastewater is collected primarily by gravity systems, however needs to be pumped from low-lying areas of the city.

There are two WWTPs in the City of Hobart, one at Selfs Point and one at Macquarie Point, which together collect wastewater from three catchment areas.

The Selfs Point WWTP treats wastewater from the southern (largely Sandy Bay and Mt Nelson) and northern (largely New Town and Lenah Valley) catchments. Both of these catchments are predominantly residential with a few industrial dischargers, the most significant of which is a milk

processing plant at Lenah Valley, which contributes 10-15% of the organic load to the Sels Point WWTP.

Sels Point is a biological nutrient removal plant treating wastewater to a very high standard, including ultraviolet light disinfection. The majority of treated wastewater (effluent) is pumped to Sandy Bay where it is discharged via a deep river outfall 750m off Blinking Billy Point. Some of the effluent is used as process water within the plant and it is also used to irrigate sports fields and other grassed areas, and as a heat source for the Hobart Aquatic Centre, the Town Hall Annex, Federation Concert Hall and other users along the pipeline.

The Macquarie Point WWTP treats wastewater from the city or central catchment (including the Hobart CBD, North Hobart, West Hobart, South Hobart and Battery Point), which contains a mix of commercial, industrial and residential activities. This catchment has higher strength wastewater due to the greater number of businesses such as restaurants and other liquid trade waste-licensed premises from the CBD, waterfront and city areas, along with the Cascade Brewery in South Hobart. The Macquarie Point WWTP is a secondary wastewater treatment plant, with only limited nutrient removal and chlorine based disinfection. Effluent from the plant is discharged into the river off Macquarie Point. Improvements in water usage by all sectors, and particularly Cascade Brewery, have resulted in a reduction of wastewater flow being treated at the Plant from about 16,000,000 litres per day in 1980 to less than 11,000,000 litres per day in 2009.

In July 2009, HCC passed control of the Macquarie Pt and Sels Pt Waste Water Treatment Plants, along with the water and wastewater networks, to Southern Water, as part of the State Government changes to water and sewerage. The HCC contributed a total of 11,500 assets to Southern Water, including:

- 473 km of water pipes
- six water pump stations
- 20 water reservoirs,
- 415 km of sewer pipes
- 21 sewerage pump stations
- two waste water treatment plants, and
- Sels Point Laboratory and equipment.

Prior to the transfer of the WWTPs to Southern Water many advances were made in the environmental performance of these sites, including reductions in both electricity and water consumption, lower chemical use, improved odour treatment and progress in effluent and bio solids reuse.

Approximately 50% of the electricity used at the Macquarie Pt Plant is sourced from biogas made onsite and used to fuel a cogeneration system.

In 2003, no effluent reuse occurred at the Sels Point WWTP. However by 2009 over 133,000 litres a day was diverted for reuse. In 2009 59% of the water used at the plant in processing the wastewater was treated effluent replacing the same volume of drinking water. Similarly at Macquarie Point WWTP effluent supplied over 82% of the process water used on the plant and reduced the effluent discharged to the Derwent River by over 832,000 litres per day, while lowering water consumption by the same amount.

All of the biosolids produced at the Sels Pt WWTP (approximately 3,000 tonnes per annum) is used on farms to improve soil productivity. The biosolids sludge cake from Macquarie Pt WWTP is

composted at the McRobies Gully Waste Management Centre for beneficial use, except for when the composting facility is at capacity (a total of 1,670 tonnes was composted in the 2008/09 year).

Boat wastes

As well as receiving many visiting cruise and fishing vessels and over 100 Sydney to Hobart Yacht Race boats each year, the Derwent is the home port for many fishing and recreational vessels. Wastes associated with shipping and boating activities can be detrimental to the environment and include seepage, bilge water, ballast water, slipway generated wastes, oil leaks and spills, solid wastes and litter, and leaching of anti fouling paints containing tributyl tin (TBT) and other biocides.

Within Hobart's municipal area there are seven 'large' slipways where boats can be hauled out for maintenance and repairs.

- Domain Slipways
- Sandy Bay Yacht Club
- Derwent Sailing Squadron
- Royal Yacht Club
- Taylor Brothers (Battery Point)
- Muir Engineering (Battery Point)
- Creese's Boatyard (Battery Point)

There are a number of smaller slipways:

Sea Level Rise

Monitoring of sea level within the estuary has been conducted by Hobart Ports and the CSIRO. Average estimates for sea level rise resulting from the temperature increases are about 65 cm by 2070. The International Panel on Climate Change has estimated that the global sea level rise will be 0.1 – 0.9 of a metre by 2100 relative to the level in 1900. Although this may sound small, this will significantly affect natural features such as dune systems leading to shore line retreat. Infrastructure in low lying coastal areas will also be affected. The impact of sea level rise will be significant during storm events and storm surges, which are predicted to increase in number and ferocity as a result of climate change.

6.2 Governance

There is no single management authority for the coast. Instead this diverse area is managed by a range of state and local government agencies. General guidance and an overall framework for the management of the coast are provided by the [State Coastal Policy 1996](#). This policy is administered by the Coastal and Marine Branch within the Environment Division of DPIPWE and is currently being updated. The Policy operates as a framework for statutory regulatory generation or development and was evaluated against while developing the Sullivan Cove Planning Scheme in 1997.

The [Derwent Estuary Program](#) focuses on restoring and protecting the coastal foreshore and estuarine resources of the Derwent River. The Program was formalised via a Partnership Agreement between the Tasmanian State Government, Southern Water and six local councils that border on the estuary: The HCC, Glenorchy City Council, Kingborough Council, Clarence City Council, Brighton Council and Derwent Valley Council.

6.3 Relevant Strategic Plan Outcomes

The HCC Strategic Plan (2008-2013) identifies the following outcomes to be achieved:

- FD1.2 Lifestyle that will encourage all ages to see the city as a desirable location and lifelong home.
- FD2.1. The natural beauty of Mount Wellington, the Derwent River, bushland surrounds and foreshore locations is highly valued.
- FD2.3 The physical environment has been conserved in a way that ensures we have a healthy and attractive city.
- FD2.4 Better understanding of 'climate change' and its potential effect on the natural and built environment and strategies developed.
- FD4.2. Quality development with the principles of sustainable cities and the reduction of ecological impacts pursued.
- FD4.3 Access to the waterfront, foreshores, public and open spaces is valued.

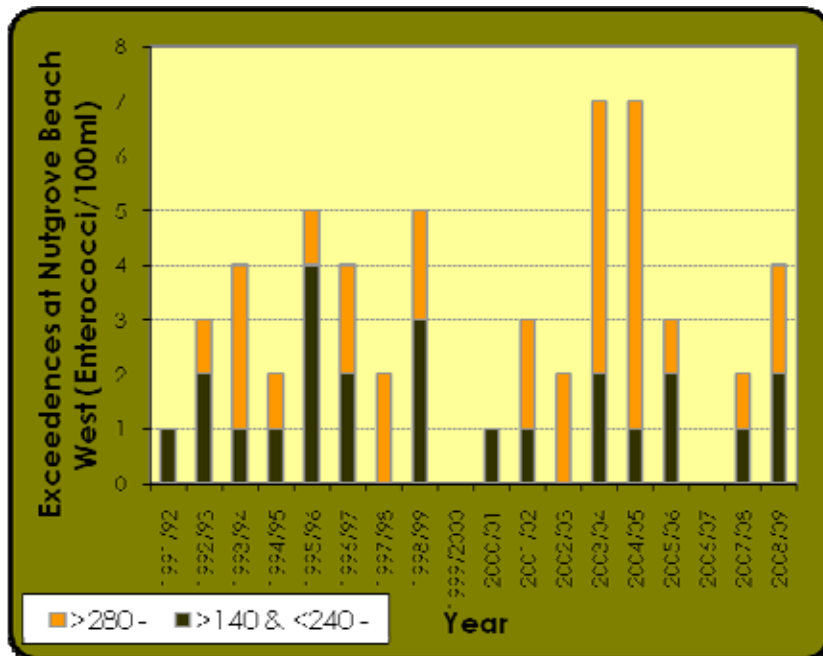
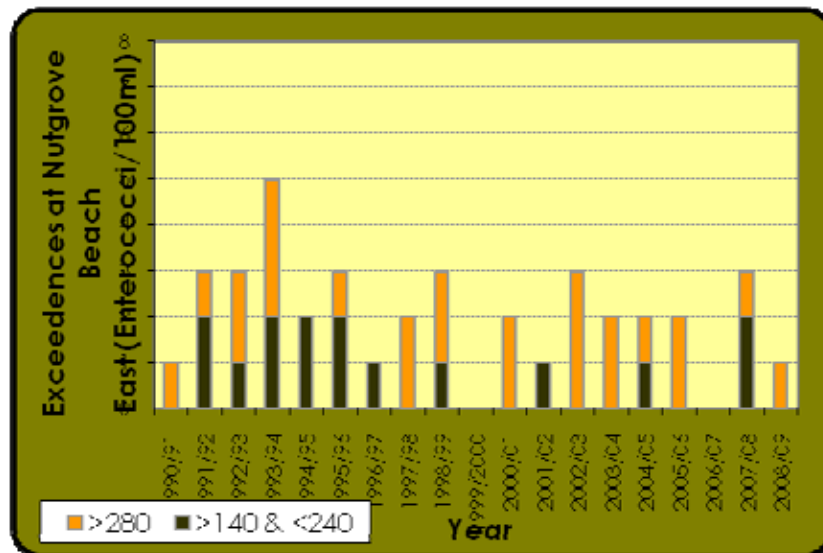
Whilst actions and strategies relating to the coastal zone can be extrapolated from the Strategic Plan, the coast as an entity is not specifically recognised or addressed. The coastal zone however is a highly valued asset. In real estate terms waterfront properties command the highest property prices, and the beach is a popular place for recreational pastimes for the community whether it be walking, beach going, swimming, sailing and rowing. It is also the community's first and most significant line of defence against sea level rise associated with climate change.

6.4 Core Indicators

The core indicators used to describe and understand the state of, and the factors affecting, the coastal, estuarine and marine environments are:

- Exceedences of recreational water quality standards
- Discharges from the Self's Point Waste Water Treatment Plant
- Discharges from the Macquarie Point Waste Water Treatment Plant

These core indicators are presented below and the actions taken by the HCC to address the issues they represent are described in the following section.



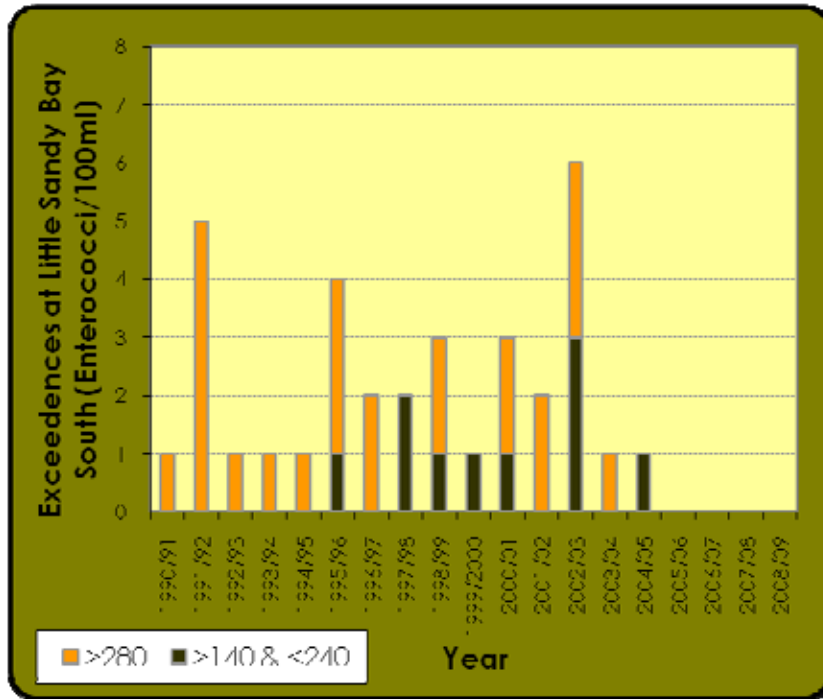


Figure 6-1a,b and c Exceedences of recreational water quality standards

Exceedence of recreational water quality standards in the Derwent River has been chosen as an indicator because the data highlights the health of the Derwent River. The HCC samples for enterococci/100mL, an indicator of contamination of faeces. A resample is required if a reading greater than 140 enterococci/100mL is received and two samples with a reading greater than 280 enterococci/100mL requires the closure of a beach and re-tests. The custodian of the data is the Derwent Estuary Program.



Figure 6-2 Discharges from the Self's Point Waste Water Treatment Plant

Waste water treatment plant discharges to the Derwent River from the Self's Point WWTP has been chosen as an indicator because the data highlights the HCC's achievements in managing the amount of waste water entering the river. The custodian of the data was the City Services Division.

The annual volume of discharge to the Derwent River from the Self's Point WWTP is shown in Figure 6-2. The discharge from the plant varies from year to year depending on rainfall, as there is some infiltration of storm water into the sewerage system during wet weather from such sources as illegal stormwater connections and cracked pipes. Apart from the 2004/05 year when about 50% of the flow was diverted to the Macquarie Point WWTP to allow repairs to a major pipeline, the data shows a slight uptrend in the annual discharge over the past 10 years. It is considered that this largely reflects the additional new housing development and population growth in the Self's Point WWTP catchments.

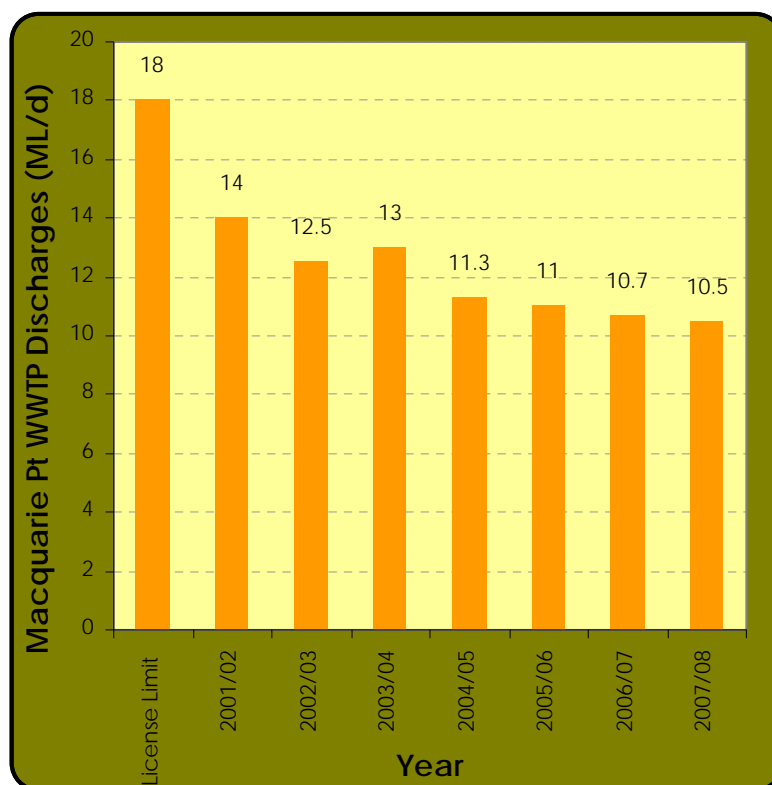


Figure 6-3 Discharges from the Macquarie Point Waste Water Treatment Plant

Waste water treatment plant discharges to the Derwent from the Macquarie Point WWTP has been chosen as an indicator because the data highlights the HCC's achievements in reducing the amount of waste water entering the Derwent. The custodian of the data was the City Service Division. Data for the period from 5 November to 17 December 2004 (when Sandy Bay catchment was diverted to Macquarie Pt WWTP) has been excluded to enable the trends in the influent data from Macquarie Pt catchment to be compared with previous years.

The annual volume of discharge to the Derwent River from the Macquarie Point WWTP is shown in Figure 6-3. The discharge has decreased from 14 million litres per day in 2001/02 to 10.5 million litres per day in 2007/08. About 1 million litres per day reduction has been achieved by recycling effluent within the treatment plant and replacing potable water. The Cascade Brewery significantly reduced wastewater discharge during this period through a range of water saving and water recycling measures. It is also considered that there is an increased awareness of water leading to reduced usage by both residents and businesses in general.

6.5 The HCC Response

The HCC undertakes a wide range of activities to preserve and manage the impact of urbanisation and infrastructure development on the Derwent Estuary foreshore.

6.5.1 HCC Projects, Works and Maintenance

- The HCC continues to be a major supporter of the Derwent Estuary Program which recently released the 'Derwent Estuary Climate Change Issues: Regional Actions, Research and Possible Impacts' paper. The paper aims to increase awareness of potential climate change impacts on water quality and coastal and estuarine habitats.

- The HCC is committed to protecting and enhancing the populations of penguins within the City of Hobart. Sustained and dedicated efforts by the HCC, the Derwent Estuary Program, the State Government and the community (in particular land owners) have led to protection of the existing penguin colonies from dogs and inappropriate development. In 2005, the HCC spent over \$5000 installing nest boxes, signage, gates and other infrastructure in order to prevent dog attacks to protect penguin habitat. In 2004, the HCC commissioned mapping to identify penguin habitat. It is envisaged that, in the future, information such as this will be incorporated into the HCC GIS to ensure that development applications near penguin colonies consider the implications of the development.
- The HCC routinely carries out sanitary surveys when there have been exceedences in water quality. The HCC conducts infrastructure testing, maintenance and repairs.
- Considerable progress has been made in the treatment and management of sewage and industrial wastes, with further improvements planned. Highlights include the tertiary treatment of Sandy Bay sewage and effluent and biosolid reuse. By 2009, 100% of the biosolids at the Self's Point WWTP were captured and diverted to certain types of farms. In addition, 59% of the water used at the Self's Point WWTP and 82% of water used on the Macquarie Point WWTP is diverted effluent.
- In recent years, the HCC has been implementing a wide-ranging program of stormwater quality improvement initiatives often with the assistance of grants. More information can be found in the Inland Waters and Wetlands Chapter and on the HCC website -[HCC Stormwater Improvement Projects](#).

6.5.2 Community Engagement

- In 2009, the Derwent Estuary Program, with support from the HCC, commissioned four community service announcements for the television. The announcements were aimed at raising awareness of Derwent Estuary related topics including recreational water quality, Little penguins, stormwater and marine pests.

6.5.3 Data Collection

- The HCC conducts a recreational water quality (faecal and enterococci) monitoring program at Nutgrove and Sandy Bay Beaches from November through to March. In addition, the HCC monitors water quality at Cornelian Bay which, whilst not a swimming beach, is a popular recreational area and Marieville Esplanade. The HCC samples for enterococci/100mL, an indicator of contamination of faeces. A resample is required if a reading greater than 140 enterococci/100mL is received and two samples with a reading greater than 280 enterococci/100mL requires the closure of a beach and re-tests are to be taken every 24-48 hours until the sample is below 140 enterococci/100mL. If a beach closure occurs it is typical practice for the HCC to undertake a sanitary type survey/investigation as to why this has occurred (e.g. infrastructure malfunction etc).

6.6 Relevant Sources of Information

[Derwent Estuary Program](#)

[DPIW - Tasmanian Climate Change Projections](#)

[Climate Change and Coastal Risk Assessment Project](#)

[Climate Change Projections for Tasmania](#) - the Australian Climate Change Science Program

[State Coastal Policy](#)

[Environmental Guidelines for Boat Repair and Maintenance](#)

[Environmental management guidelines for slipways](#)

7 Appendix

Appendix A - City of Hobart Vital Signs

Population (ABS ERP June 2008)	Hobart	49,611
	Greater Hobart	209,287
	Tasmania	497,529
Resident Population (ABS 2006 Census)	Median Age	37
	Median Weekly Individual Income	\$526
	Labour Force Participation	25,163
	Number of Eligible Voters ((HCC database, 2009))	35, 919
Working Population (ABS 2006 Census - unpublished data)	Working Population (ABS 2006 Census)	44, 702
	Live & work within the city	16, 712 or 37%
	Live outside but work within the city	27, 991 or 63%
	Median Weekly Individual Income	\$760
	Travel to Work - no. of vehicles (ABS 2006 Census)	24, 331
	Unemployment Rate (State of the Regions 2008)	3.5%
Business	Number of Businesses	5, 664
Key Industries (employment) (ABS 2006 Census)	Public Administration & Safety	8, 098
	Health Care & Social Assistance	7, 038
	Retail Trade	4, 659
	Education & Training	4, 013
	Professional, Scientific & Technical Services	3, 781
	Accommodation & Food Services	3, 527
Office Market (Property Council of Australia Jan 2009)	Total CBD Office Stock (sqm)	343, 334
	CBD Office Vacancy Rate	2.8%
Property Market (HCC database, 2009/10)	Rateable Properties	23, 373
	Residential Rateable Properties	20, 198 or 86%
	Average Residential Rates	\$1, 617
	Median House Price (REIT, June Quarter 2009)	\$425, 000
	Median House Rent (REIT, June Quarter 2010)	\$350
Tourism (Tourism Tasmania, June 2009)	Visitors	658, 500
	Average Stay (nights)	3.8
	Average Spend	\$1, 600
Attractions (Tourism Tasmania, June 2009)	Salamanca Market (Sat only)	349, 700
	Mount Wellington	225, 100
	Royal Tasmanian Botanical Gardens	128, 900
	TMAG	88, 100
Cruise Ships (Tourism Tasmania, 2008/09)	Number of cruise ship visits to Hobart	35
	Number of Passengers & Crew	77, 000
	Total Direct Expenditure (Cruise Down Under 2008/09)	\$9.4M

Education / Students (HCC research, 2009)	Hobart Education Providers	30
	Students Living in Hobart (ABS 2006 Census)	16 575
	Student % of Hobart resident population (ABS 2006 Census)	35%
	Students Studying in Hobart	33, 266
	International Students Studying in Hobart	3, 212 or 10%
Hobart Facts (HCC Gaps & Opportunities Analysis, 2008)	Number of individuals with post school qualifications grew by 23% from 1996 to 2006	
	Working population grew 12.9% from 1996 - 2006	
	Hobart LGA hosts 52% of all employment in Greater Hobart	
	40% of employment base is in government funded sectors	
	Hobart LGA hosts 25% of Greater Hobart population	
	Hobart LGA hosts 40% of Greater Hobart retail employment	

Appendix B - Climate Change Policy

INDEX NO.: 5-11-01

TITLE: GENERAL – ENVIRONMENTAL

SUBJECT: CLIMATE CHANGE

DATE OF COUNCIL

APPROVAL: 25 May 2009

POLICY: The Hobart City Council, on the issue of climate change, will:

- (i) Provide effective and strong leadership to the region and to its communities to respond to climate change and build a sustainable region;
- (ii) Develop and implement actions and strategies that assist communities to reduce carbon footprints, adapt to climate change impacts and increase their awareness and understanding of climate change and sustainability;
- (iii) Complement, collaborate and establish strong partnerships with key stakeholders and other tiers of government that strengthen the Council responses to climate change; and
- (iv) Plan for and manage Hobart's adaptation to the impacts of climate change, particularly where these impacts represent a threat to people and property.

Appendix C - Hobart City of Hobart Weather

State-wide Tasmania's climate zone is cool temperate with mild to warm summers and cold winters. Hobart's climate is subject to a temperate marine climate as its close proximity to the sea tends to buffer the temperature resulting in fewer extremes. The maximum average temperature varies between 21.6°C in February and 11.6°C in July, while the minimum average varies between 11.9°C in February and 4.5°C in July.

The City of Hobart receives more sunshine than Melbourne, has a greater mean minimum temperature than Canberra, and at around 620mm the second lowest annual rainfall of any capital city besides Adelaide. It also has the lowest mean maximum temperature, 16.8°C!

Because Hobart is the southernmost Australian capital, being about 43 degrees south of the equator, it also shows the most variation throughout the year in daylight hours, with about 15 hours expected in mid-summer down to 9 hours in winter.

The topography of the Derwent Valley in conjunction with the Wellington Range influences the movement of airflow and subsequent climate experienced in the city. Its northwest to southeast orientation, combined with katabatic winds from the Wellington range, results in winds predominantly from the northwest.

The average rainfall is 624.2mm for the year, varying from 39.9mm in February to 62.8mm in October. These values have been measured at the Bureau of Meteorology weather station in Ellerslie Road (Battery Point), and vary greatly with measurements taken from other sites within the municipal boundary. The average annual rainfall at Fern Tree, for example, is about 1150mm. This large difference is due to the influence of Mount Wellington.

Mount Wellington regularly receives annual falls of snow, especially in winter and spring. Whilst snow typically falls in the winter months, snow can occur at any time of year with the right weather conditions.

Appendix D - Threatened Species

Threatened flora and fauna species are listed under the Tasmanian Threatened Species Protection Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. This information is taken from the Flora and Fauna Habitat Identification and Assessment Process 2004 written for the HCC by North Barker and Associates.

Fauna species and common name	TSPA	EPBC Act
Accipiter novaehollandiae Grey Goshawk	Endangered	
Aquila audax fleayi Wedge-tailed eagle	Endangered	Endangered
Discocharopa vigens Hobart Disc Snail	Vulnerable	-
Fraus latistria Broad-striped ghost moth	Rare	-
Hadronyche pulvinator Cascade funnel web spider	Extinct	-
Hydrobiosella armata Caddis Fly	Rare	
Lathamus discolour Swift parrot	Endangered	Endangered
Lissotes menalcas Mt Mangana stag beetle	Vulnerable	-
Pardalotus quadragintus Forty Spotted Pardolote	Endangered	Endangered
Perameles gunnii Eastern barred bandicoot	-	Vulnerable
Pseudemoia pagenstecheri Tussock grass skink	Endangered	-
Robinella agnewi Silky snail		
Tyto novae-hollandiae castanops Masked owl		
Flora species and common Name	TSPA Act	EPBC Act
Acacia mucronata var. dependens Variable Sallow Wattle	Rare	
Agrostis billardierei var. filifolia Coast Blown Grass	Rare	
Allocasuarina duncanii Duncan's She Oak	Rare	

Atriplex suberecta Sprawling Saltbush	Vulnerable	
Australina pusilla ssp. Muellieri Mueller's Small Shade Nettle	Rare	
Austrodanthonia popinensis Roadside Wallaby Grass	Endangered	Endangered
Austrostipa bigeniculata Double-jointed Spear Grass	Rare	
Austrostipa nodosa Knotty Spear Grass	Rare	
Bolboschoenus caldwellii Sea Club-rush	Rare	
Brachyglottis brunonis Brown's Tree Daisy	Rare	
Brachyscome perpusilla Tiny Daisy	Rare	
Brachyscome radicata Rooted Daisy	Rare	
Caladenia sylvicola Forest Fingers	Endangered	Endangered
Carex gunniana Mountain Sedge	Rare	
Carex longebrachiata Drooping Sedge	Rare	
Carex tasmanica Curly Sedge		Vulnerable
Cynoglossum australe Austral Hound's-tongue	Rare	
Deyeuxia benthamiana Bentham's Bent Grass	Rare	
Deyeuxia densa Heath Bent Grass	Rare	
Dianella amoena Matted Flax Lily	Extinct	Endangered
Diuris palustris Swamp Diuris	Endangered	
Epacris virgata 'Kettering' Pretty Heath	Vulnerable	
Euphrasia gibbsiae ssp. Wellingtonensis Wellington Eyebright	Rare	
Euphrasia scabra Yellow Eyebright	Endangered	
Genoplesium nudiscapum Dense Midge Orchid	Extinct	
Hyalosperma demissum Moss Sunray	Endangered	
Hydrocotyle laxiflora Stinking Pennywort	Vulnerable	
Isoetopsis graminifolia Grass Cushions	Endangered	
Isolepis Habra Alpine Clubrush	Rare	
Juncus amabilis Gentle Rush	Rare	
Lepidium hyssopifolium Basalt Peppercress	Endangered	Endangered
Lepidium pseudotasmanicum Shade Peppercress	Rare	
Myoporum parvifolium Creeping Myoporum	Vulnerable	
Muriophyllum crispatum Curling Water Milfoil	Rare	
Pimelea flava ssp.flava Yellow Rice Flower	Rare	
Prasophyllum amoenum Dainty Leek Orchid	Endangered	Endangered
Prasophyllum apoxychilum Tapered Leek Orchid	Endangered	Endangered
Prasophyllum perangustum Knocklofty Leek Orchid	Endangered	Critically Endangered
Pterostylis squamata Ruddy Greenhood	Rare	
Rytidosperma procerum Tall Wallaby Grass	Rare	
Scleranthus fasciculatus Spreading Knawel	Rare	
Senecio squarrosus Leafy Groundsel	Rare	
Senecio velleioides Forest Groundsel	Rare	
Velleia paradoxa Spur Velleia	Vulnerable	
Vittadinia gracilis Woolly New Holland Daisy	Rare	
Vittadinia muelleri Narrow Leaf New Holland Daisy	Rare	

Agrostis aemula var. aemula Blown Grass and Gahnia rodwayi Rodway's Saw Sedge are also listed by the TSPA as rare (although not in this document)

Appendix E - Declared Weeds

Declared Weeds currently (2009) listed in Schedule 1 of the Weed Management Act (1999).		
1.	Acacia nilotica ssp. indica	Prickly Acacia
2.	Achnatherum caudata	Espartillo
3.	Allium vineale	Crow Garlic
4.	Alternanthera philoxeroides	Alligator Weed
5.	Annona glabra	Pond Apple
6.	Anthemis cotula	Stinking Mayweed
7.	Asparagus asparagoides (= Myrsiphyllum asparagoides)	Bridal Creeper
8.	Asphodelus fistulosus	Onion Weed
9.	Bassia scoparia (= Kochia scoparia)	Kochia
10.	Berkheya rigida	African Thistle
11.	Bifora testiculata	Bifora
12.	Cabomba caroliniana	Fanwort
13.	Cardaria draba	White Weed (Hoary Cress)
14.	Carduus nutans	Nodding Thistle
15.	Carduus pycnocephalus	Slender Thistle
16.	Carduus tenuiflorus	Slender Thistle
17.	Carex albula (C. comans)	Sedge
18.	Carex buchananii	Sedge
19.	Carex flagellifera	Sedge
20.	Carex testacea	Sedge
21.	Carthamus lanatus L.	Saffron Thistle
22.	Cenchrus incertus (= Cenchrus pauciflorus)	Spiny Burrgrass
23.	Cenchrus longispinus	Spiny Burrgrass
24.	Ceratophyllum demersum	Hornwort
25.	Chondrilla juncea	Skeleton Weed
26.	Chrysanthemoides monilifera (including subspecies)	Boneseed, Bitou Bush
27.	Cirsium arvense	Californian Thistle
28.	Cortaderia spp.	Pampas Grasses
29.	Cryptostegia grandiflora	Rubber Vine
30.	Cuscuta spp. (excluding Cuscuta)	Dodder
31.	Cynara cardunculus	Artichoke Thistle
32.	Cytisus scoparius	English Broom
33.	Datura spp.	Datura

34.	Echium plantagineum	Paterson's Curse
35.	Echium vulgare	Viper's Bugloss
36.	Egeria densa (= Elodea densa)	Egeria (Dense Water Weed)
37.	Eichhornia crassipes	Water Hyacinth
38.	Elodea canadensis	Canadian Pondweed (Elodea)
39.	Emex australis	Spiny Emex
40.	Equisetum spp.	Horsetail
41.	Eragrostis curvula	African Lovegrass
42.	Erica lusitanica	Spanish Heath
43.	Foeniculum vulgare	Fennel
44.	Galium spurium	False Cleavers
45.	Galium tricornutum	Three-horned Bedstraw
46.	Genista monspessulana	Montpellier Broom
47.	Gymnocoronis spilanthoides	Temple Plant
48.	Heliotropium europaeum	Common Heliotrope
49.	Hieracium spp.	Hawkweed, Orange Hawkweed, Mouse Ear Hawkweed
50.	Homeria spp.	Cape Tulips
51.	Hydrilla verticillata	Hydrilla
52.	Hymenachne amplexicaulis	Hymenachne
53.	Hypericum perforatum	St John's Wort
54.	Lagarosiphon major	Lagarosiphon
55.	Lantana camara	Lantana
56.	Lycium ferocissimum	African Boxthorn
57.	Marrubium vulgare	Horehound
58.	Miconia spp.	Miconia
59.	Mimosa pigra	Mimosa
60.	Myriophyllum aquaticum (= M. brasiliense)	Parrot's Feather
61.	Nassella neesiana	Chilean Needle Grass
62.	Nassella trichotoma	Serrated Tussock
63.	Onopordum spp.	Onopordum Thistles
64.	Orobanche spp. (except O. minor and O. cernua var. australiana)	Broomrape
65.	Parkinsonia aculeata	Parkinsonia
66.	Parthenium hysterophorus	Parthenium Weed
67.	Pennisetum macrourum	African Feathergrass
68.	Pennisetum villosum	Feathertop
69.	Prosopis spp.	Mesquite
70.	Rorippa sylvestris	Creeping Yellowcress
71.	Rubus fruticosus agg.	Blackberry

72.	Sagittaria graminea	Sagittaria
73.	Sagittaria montevidensis	Sagittaria
74.	Salix spp. except S. babylonica, S. X calodendron and S. X reichardtii	Willows except weeping willows, pussy willow and sterile pussy willow
75.	Salphichroa origanifolia	Pampas Lily-of-the-Valley
76.	Salvinia molesta	Salvinia
77.	Senecio jacobaea	Ragwort
78.	Solanum elaeagnifolium	Silver-leaf Nightshade
79.	Solanum marginatum	White-edged Nightshade
80.	Solanum sodomaeum	Apple-of-Sodom
81.	Striga spp. (all non-indigenous species)	Witchweed
82.	Tamarix aphylla	Athel Pine
83.	Trapa spp.	Floating Water Chestnut
84.	Tribulis terrestris	Caltrop
85.	Ulex europaeus	Gorse
86.	Xanthium spp.	Burrs

Appendix F - Dog Exercise Areas

Off-lead exercise areas

The following areas are listed as off-lead exercise areas and subject to ensuring a dog off-lead is under effective control:

- Sports fields when sport is not being played or activities undertaken
- Surrounds of sports fields except where prohibited
- Cornelian Bay – the foreshore car park to Cornelian Bay Point
- John Turnbull Park, Lenah Valley – area below the oval
- Kalang Avenue Reserve, Lenah Valley
- Rangeview Crescent Reserve, Lenah Valley
- Queens Domain – The Wireless Station (area bounded by the Summit Loop Road) and mowed area to the east of the summit loop road, and the area between the Hobart Aquatic Centre and the Domain Tennis Centre
- Ross Patent Slip, Battery Point – grassed area off Napoleon Street
- Short Beach and Errol Flynn Reserve, Marieville Esplanade, Sandy Bay
- MacFarlane Street, South Hobart – public open space over footbridge alongside the Hobart Rivulet. Entry off Tara or MacFarlane Streets
- Wellesley Park, South Hobart – area below the sports field
- Skyline Reserve – area off 27 Brinsmead Road, Mt Nelson
- Churchill/Edith Avenue, Sandy Bay – open space adjoining Churchill Avenue
- Alexandra Battery, Churchill Avenue, Sandy Bay – Alexandra Battery except the Battery, the lookout and the car park
- Blinking Billy Point Reserve, Sandy Bay
- Cartwright Point Reserve, Sandy Bay – area below Sandy Bay Road

- Queens Domain, Regatta Grounds – area surrounding the Cenotaph and approaches
- Ridgeway – old recreation oval (track to oval – on-lead)

On-lead exercise areas

The following areas are permitted as on-lead dog exercise areas:

- All road pathways and road related areas within the municipal area
- Unless otherwise indicated, dogs can only be exercised on-lead on all established tracks and trails, and grassed areas in all City of Hobart parks, reserves and bushland areas
- Wellington Park – unless otherwise sign posted or notified, exercise of dogs on-lead is permitted on:
 - Approved walking tracks, roads and vehicular tracks in the Recreation Zone (defined as the lower eastern foothills of Mount Wellington, below Pinnacle Road from the Springs to the Old Hobartians Track), but not including the Silver Falls Track (from the Pipeline Track to Middle Track);
 - Radfords Track;
 - The Springs Zone (if making a connection to other approved tracks and trails); and The Pinnacle Zone (if the dog is confined within a vehicle)
 - The Pipeline Track (between Fern Tree and the municipal boundary) Note: the Pipeline Track extends into the Kingborough municipal area
- Ancanthe Gardens, Lenah Valley
- New Town Bay Reserve
- Franklin Square
- St Davids Park

Restricted areas

A selection of the City of Hobart's parks, beaches and bushland are permitted as off-lead exercise areas within certain timeframes, subject to the dog being under effective control, as follows:

Parks

- Princes Park
- Cascade Gardens
- Fitzroy Gardens
- Soundy Park
- Benjafield Terrace

Dogs are permitted off -lead from 7.00pm to 9.00am during daylight savings time and between 3.00pm and 9.00am at all other times. Dogs are permitted on-lead between 9.00am and 7.00pm during daylight savings time and between 9.00am and 3.00pm at all other times.

Beaches

- Nutgrove Beach

Dogs are permitted off-lead between 7.00pm and 9.00am during daylight savings time and between 3.00pm and 9.00am at all other times. Dogs are permitted on-lead between 9.00am and 7.00pm during daylight savings time and between 9.00am and 3.00pm at all other times.

Bushland

- Knocklofty Reserve – Tracks and trails in the area between Forest Road car park, Poets Road, Fielding Drive reservoir and the walking track to the west.

Dogs are permitted on-lead between 8.00pm and 6.00am during daylight savings time and between 5.00pm and 7.00am at all other times. Dogs are permitted off-lead between 6.00am and 8.00pm during daylight savings time and between 7.00am and 5.00pm at all other times.

All other areas of Knocklofty Reserve are on-lead at all times

Training areas

Soldiers Memorial Oval (formally, the Domain Cross Roads Oval) is declared as an off-lead dog training area during dog training hours.

Appendix G - A Look Back in Time – History of Water Supply in the City of Hobart

The management of waterways in most cities is historically associated with both water supply and sewerage. The water supply offered by Hobart Rivulet was extremely influential in the early development of the HCC, with the growing population depending on it both for water and as a sewer. In 1832, after some delays and worsening health problems, the town was connected via a pipe to a dam on the Rivulet. This was located above the settlement near Cascade Brewery, and delivered unpolluted water to various tanks, wells and pumps in the town. Similar works were proposed on the New Town Rivulet although these plans were abandoned due to protests from the farmers in the area. Access to this dam water was restricted, resulting in some wells being dug to the water table so as to avoid the necessity of using the increasingly contaminated rivulet water.

As it became apparent that the water from Hobart Rivulet would not be sufficient to meet the needs of the growing city, the idea arose to shift water supply to a new reservoir located on Sandy Bay Rivulet. This is the lower Waterworks reservoir and was completed in 1861 - currently the second oldest operating dam in Australia. Sandy Bay Rivulet is actually routed around the side of the dam, with all water in the reservoir being piped from catchments to the south such as Browns River. This water was, and still is, of very high quality, having come from the undeveloped slopes of Mount Wellington, and so greatly improved the situation in the City of Hobart.

The upper Waterworks reservoir was completed in 1888. This provided additional storage, and also allowed repairs to be made to the lower reservoir which suffered a serious leak in 1876 - the water level falling from 22ft to 13ft. It eventually had to be reconstructed and was operational again in 1895. In 1900, despite protest from residents of Kingborough, Parliament gave approval for water as far south on Mount Wellington as North-West Bay River to be also diverted into the Waterworks reservoirs for use by the City of Hobart.

The Ridgeway Reservoir was completed in 1918 as an additional storage for both the city and Kingborough. In 1939 a pipeline was run from Lake Fenton near Mount Field, with further inputs being secured from the West Derwent Supply which began pumping in 1961.