



TOWN OF GAWLER ENVIRONMENTAL MANAGEMENT PLAN



*A liveable, cohesive, active, innovative
and sustainable community.*

Gawler





Healthy Environs Pty Ltd has prepared
this report for the Town of Gawler.

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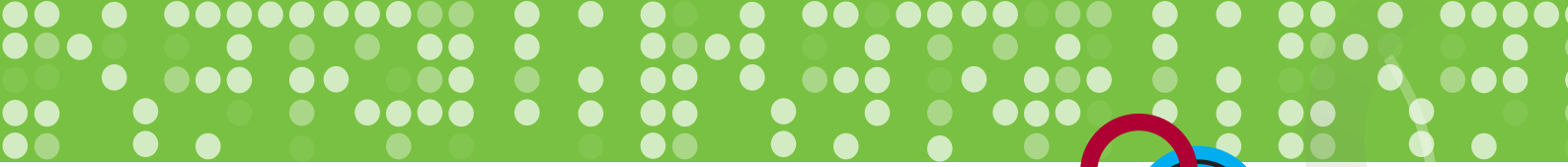


STATEMENT OF COMMITMENT TO INDIGENOUS AUSTRALIANS

**COUNCIL ACKNOWLEDGE THE
LAND OF THE GAWLER TOWNSHIP
IS THE TRADITIONAL LANDS FOR
THE KAURNA PLAINS PEOPLE AND
THAT WE RESPECT THEIR SPIRITUAL
RELATIONSHIP WITH THEIR COUNTRY.
WE ALSO ACKNOWLEDGE THE
KAURNA PEOPLE AS THE CUSTODIANS
OF THE GREATER ADELAIDE REGION
AND THAT THEIR CULTURAL AND
HERITAGE BELIEFS ARE STILL AS
IMPORTANT TO THE LIVING KAURNA
PEOPLE TODAY.**

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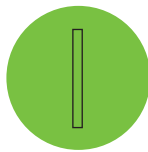
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MESSAGE FROM THE MAYOR



I am pleased to be part of a local community and Council that has pride in protecting and nurturing our local environment.

The Gawler Council has embraced the development of this Environmental Management Plan to guide environmental management performance across Council operations and to support environmental sustainability within our community.

Responsible environmental management is a high priority for Council and the development of our Environmental Management Plan will provide us with a framework to establish, implement and report on our environmental objectives.

The Town of Gawler is renowned for its built heritage and rich natural environment. The core themes for environmental initiatives encapsulated in the Environmental Management Plan include:

- Built Environment
- Resource Management
- Climate Change
- Riverine and Natural Environment
- Community Culture.

We have many champions within our community who are committed to environmental programs and initiatives. I look forward to strengthening our relationship with the local community to manage our environment and foster sustainable practices within our Town.



INTRODUCTION



The Gawler Council is committed to nurturing and enhancing the quality of the local environment. The Council recognises the importance of leading

by example through environmentally responsible corporate practice and fostering environmental stewardship across the wider community.

The Council has developed this Environmental Management Plan (EMP) to guide environmental performance within Council's operational practices and planning activities. The EMP also provides a framework for Council to support environmental improvements through collaboration with community and business stakeholders.

This EMP and its action program are based on the key principle of sustainability, which is defined as:

Development and natural resource use in a way that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs ¹.

The EMP establishes Council's environmental vision, objectives and actions to guide practical and feasible environmental improvements. The five core focus areas include:

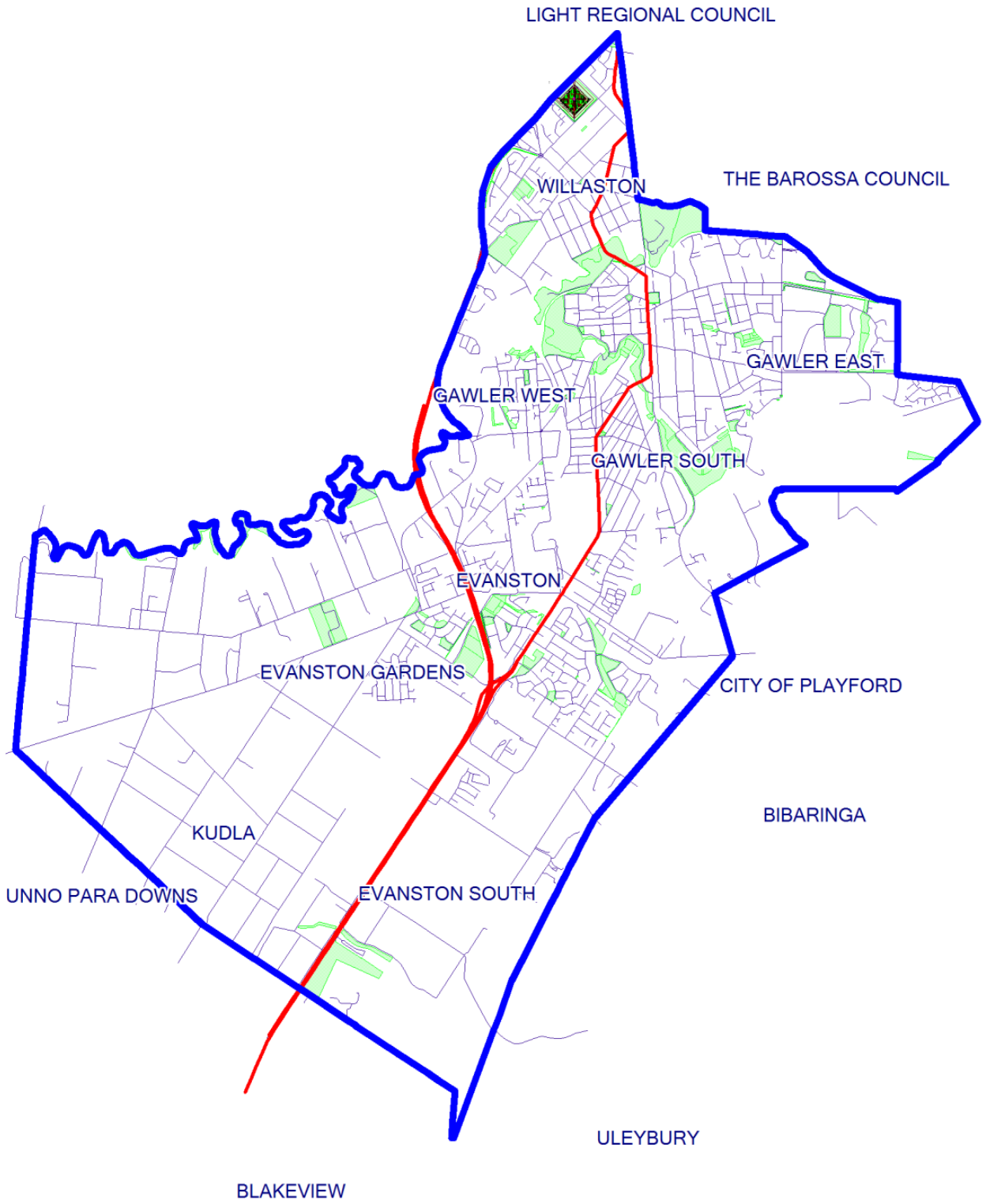
- Built Environment
- Resource Management
- Climate Change
- Riverine and Natural Environment
- Community Culture.

The Town of Gawler – A Unique Identity

The Town of Gawler is located approximately 42km north of Adelaide and adjacent the Barossa Valley and Lower North. It covers 41 square kilometres and is comprised of the areas of Evanston, Evanston Gardens, Evanston Park, Evanston South, Gawler, Gawler East, Gawler South, Gawler West, Hillier, Kudla, Reid, Uleybury (part) and Willaston ^{2,3}.

In 1839 after recognising its potential as the first country township outside of Adelaide, Colonel William Light planned the settlement of Gawler based on similar design principles as those he applied to Adelaide. The grid-like street layout reflected the town topography with parklands assigned to river floodplains nearby. The town was nestled on the confluence of the North Para, South Para and Gawler Rivers, with the hills escarpment to the east. Light's vision of town parklands has been part of the vision of Gawler as a separate town, resisting the Town's absorption into the suburban spread of Adelaide, ².

Since European settlement of the State in 1836, the traditional lands occupied by Kurna people changed significantly. Gawler became a critical service centre for surrounding farming and mining areas from the early 1840s, particularly for the Kapunda and Burra copper mining communities in the lower and mid-north of the State. This resulted in rapid development of Gawler with construction of infrastructure and expansion of industry contributing to many of the heritage buildings still standing today. The expansion and intensification of development in Gawler since the early days of settlement, has had significant impacts on the natural environment. With predictions of the population almost doubling in the next 20 years, the Council is at a critical phase in its urban planning and management of its environmental assets, ².





Why have an Environmental Management Plan?

The Town of Gawler acknowledges that its activities and policies can have a significant impact on the environment. The Council is committed to sustainable development that recognises the relationship between the environmental, economic and social attributes of our town.

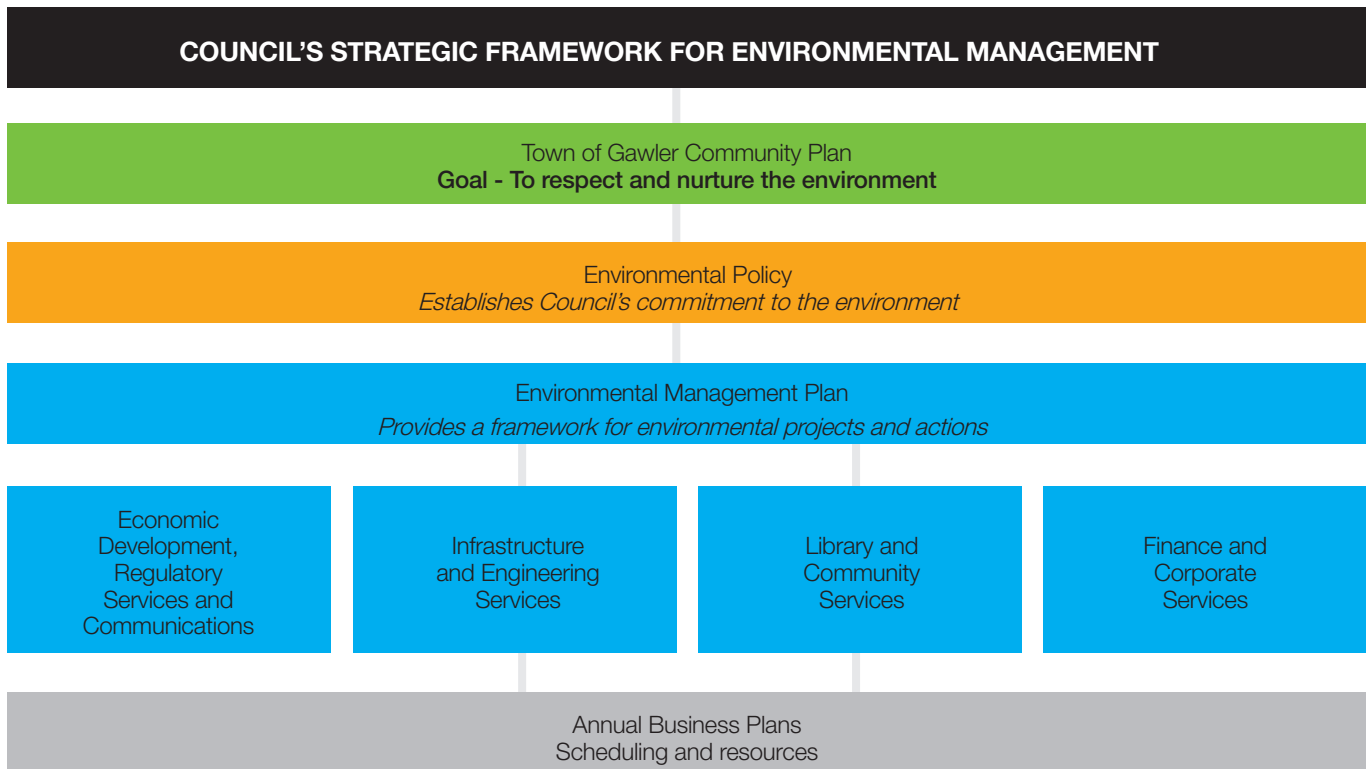
The EMP has been developed to guide Council's environmental commitments. Council's Gawler Community Plan 2014-2024 already includes environmental protection and promotion among its main priorities in Goal 4: *To respect and nurture*

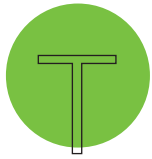
*the environment*². The EMP provides a framework for achieving these priorities and aims to ensure that Council meets legislative requirements with regard to environmental protection (in accordance with relevant State and Commonwealth Acts), and promotes ecologically sustainable development through Council activities (in accordance with the *Local Government Act 1999 e.g. section 3 Objects "(g) to encourage local government to manage the natural and built environment in an ecologically sustainable manner;"*).

The EMP delivers the following performance standards across Council business:

- Best practice environmental management
- Compliance with environmental legislation
- Identification, management and reduction of Council's impact on the environment
- Demonstration of Council's due diligence in environmental management.

The EMP also provides a framework for supporting environmental management action within the community through supportive policy frameworks, education and stakeholder partnerships.





The Council's aim is to develop a focused and realistic EMP that addresses environmental management priorities. Actions have been

prioritised to address environmental protection and sustainability performance. Where possible the EMP recommends the integration of environmental management into current practices and policies as opposed to 'stand-alone' environmental objectives. Involvement of key stakeholders – the community, Council staff and Elected Members – is a cornerstone of developing the EMP, in order to recognise and build on the commitment that currently exists across these groups.

The EMP development has involved:

- **Research** To set the scene with regard to the state of the local Town of Gawler environment
- **Consultation** With Councillors and Senior Management to develop the key principles to underpin the EMP and an overarching 'Environmental Policy' commitment
- **Consultation** With Council staff and an environmental audit of Council facilities
- **Development** Of an 'Environmental Aspects and Impacts Register' and 'Management Program' for Council operations.

- **Determining** Environmental objectives and actions to address:
 - Corporate environmental performance
 - Promoting environmental improvements in the wider community.
- **Consultation** with the Gawler community on the draft EMP and its key directions and interested stakeholders in the community
- **Finalisation** of the draft EMP taking into account community feedback for Council endorsement.

The EMP development process is summarised in the Figure below.

ENVIRONMENTAL MANAGEMENT PLAN DEVELOPMENT PROCESS

Review of relevant Council and regional plans and studies

Council staff consultation and auditing of Council facilities

Environmental principles and policy consultation with Elected Members

Development of a draft EMP for community consultation

Community Consultation: Summary Flyer, Online Survey, Community Workshop

Plan finalisation

Council Report – Final Plan

TOWN OF GAWLER ENVIRONMENTAL POLICY

Policy Objective

The Council aims to respect and nurture the environment through strong civic leadership and community empowerment. The Council will lead by example to protect and enhance the environment, with consideration of innovative practice and affordability for the community.

Policy Scope

The Environmental Policy will guide Council's environmental performance across:

1. The day-to-day operations and activities (as a local government corporation, land owner and employer)
2. The implementation of policy, procedures and activities within Council's jurisdiction to influence
3. The demonstration and promotion of best practice to the wider community.

Policy Commitments

To achieve the Environmental Policy, the Town of Gawler is committed to:

- Integrating sustainability and environmental protection considerations into Council decision-making processes
- Supporting environmental education, innovation and promotion through engagement with the community
- Strengthening relationships with relevant community groups to support environmental and community wellbeing initiatives
- Communicating and promoting Council's environmental objectives and actions
- Monitoring Council's environmental performance and reporting on progress at least annually
- Establishing ecologically sustainable development planning principles and policies to manage sustainable growth
- Reviewing Council's Environmental Management Plan at least every five years
- Complying with legislative requirements including, but not limited to, *the Local Government Act 1999*, *the Development Act 1993*, *the Environment Protection Act 1993*, *the Native Vegetation Act 1991*, *the National Parks and Wildlife Act 1972*, *the Natural Resources Management Act 2004* and *the Environment Protection Biodiversity Conservation Act 1999 (Commonwealth)*.

ENVIRONMENTAL MANAGEMENT PLAN



Themes

Environmental issues are complex and interconnected, and actions taken to address these issues may apply to multiple themes. The five core themes identified and discussed in this EMP include:

- **Built Environment** – Objectives and strategies to address sustainable development and to protect the unique built character of the Town
- **Resource Management** – Objectives and strategies to support sustainable resource management and reduce waste generation
- **Climate Change** – Strategies and actions to support climate change mitigation and adaptation
- **Riverine and Natural Environment** - Strategies and actions to protect and enhance the Town's riverine and natural environment
- **Community Culture and Environment** – Strategies for supporting community awareness and involvement in environmental management.

The EMP provides a detailed account of each theme outlining the current status, achievements, management plans, and strategies/actions addressing corporate and Town of Gawler objectives. This account is summarised in the following format:

- **Setting the Scene** A brief description of the relevant environmental attributes, pressures and activities relevant to the Town of Gawler
- **Management Plans** A management plan encompasses environmental objectives, strategies and actions
- **Achievements** Recent projects and achievements
- **Strategies/Actions** Town of Gawler Strategies and Actions including responsible Council Departments and relevant partners.



BUILT ENVIRONMENT

Setting the Scene

Gawler - A town with character

Despite its location now within the northern fringe of the Adelaide metropolitan area, the Town of Gawler has always identified itself as a separate town with unique assets and heritage^{3,4}. More recently however, there has been increasing growth pressure on Gawler, resulting in a significant rate of population increase between the years 2006-2011 with a gain of 1500 people³.⁵ Its population of 21,041 from the 2011 Census is expected to increase to around 40,000 people within 10-15 years according to the State Government's *30-year Plan for Greater Adelaide*^{6,7,8}. The perception in some places of Gawler as a "dormitory" suburb ripe for development has seen strong support from the Gawler community to invest in design and development that maintains and restores the town's social and environmental identity^{3,4}. Gawler Council's Strategic Plans have identified the value of local history and culture, reflected in policy objectives that aim to preserve heritage properties and rural production^{2,3}. Additionally, the Council and Gawler community takes pride in preserving and promoting the unique natural assets of riverine environment and the maintaining of an open character around urban Gawler through a rural green belt^{3,9}. There are however, land use conflicts: between primary production and rural living as population increases occur within the green belt; and as future demands for industrial and employment lands are made from government and neighbouring Councils. Gawler must play a role in supporting the demands of an increasing population in the rural fringes of metropolitan Adelaide^{8,10}.

Sustainable development

The State Government's Strategic Plan advocates a move towards sustainable development with a particular target of more compact urban communities. Mindful of the significant demographic challenge bearing down on Gawler's identity and natural environment, the Council has decided to address the key issues impacting on its urban development including higher density development around transport corridors^{2,3,10}. The State Government's transport initiatives include integrated systems that will upgrade public transport in Gawler and within the region^{7,8}, with an aim of reducing high levels of private car use (at 15,146 registered motor vehicles in Gawler at the time of the 2011 census).^{5,10} The Council has already assisted with a flexible 'dial a ride' transport service to provide a pick-up and delivery transport service throughout Gawler, Kalbeeba and Hewett at affordable prices¹¹. The Gawler Community Plan focuses also on the development of a town-wide walking and cycle strategy^{3,11}, with further investigation underway as part of a Town of Gawler Traffic Management Plan including on a south-eastern Link Road and a North-East bypass to assist in dealing with the town centre's traffic congestion^{7,8,11}.

The Town's natural environment

To address and ensure sustainable growth management within the Gawler Council region, environmental management has become an integral part of the planning process. The *Gawler Rivers Floodplain Policy Area* assists with management for land use and development in close proximity of the North Para, South Para and Gawler rivers while the *Town of Gawler - Development Plan* defines 'Bushfire Protection Areas' where planning and building controls are applied to reduce and manage bushfire risk⁴. While new residential areas have been developing in the southern and eastern parts of the

Council area (especially Evanston Park, Gawler East and Evanston Gardens), the natural environment is still viewed and maintained as a valuable asset in the region^{3,10}. The State Government's *30 Year Plan for Greater Metropolitan Adelaide* calls for sustainable residential growth in the region. The Gawler Council aims to develop a network of greenways and open space precincts including a designated open space buffer zone between the Town of Gawler, the northern suburbs of Playford and new growth areas. The greenway development is expected to include a linear park along Gawler River and expansion of the Metropolitan Open Space System (MOSS)^{8,12}. In addition Gawler Council has developed policies to ensure that natural creeklines and gullies which are located in these new development areas are conserved and restored as part of open space and biodiversity corridors.

Physical infrastructure can be seamlessly integrated with the social and environmental realm when appropriate planning is applied to create spaces and places that provide Gawler residents and visitors opportunity for leisure and relaxation. The development of walking and cycling facilities, sport facilities and 'community greens' within or in close proximity to new residential developments increase opportunities for physical activity while the preservation of rural areas and protection of agricultural lands ensures access to fresh and healthy food. Promoting public health through environmental management and protection projects can achieve an appropriate balance between nature and the built environment, and is crucial not only to reduce urban pressure on the natural environment but to contribute to the health and wellbeing of the community. This integrated approach is the backbone of a sustainable future for the Town of Gawler^{4,9,10,12}.

Recent Initiatives and Achievements

Some of Council's recent sustainable development initiatives and achievements include:

- Success in acquiring State Government funding to develop a Barossa, Light and Lower North Region Open Space, Recreation and Public Realm Strategy which contributed to the development of the Gawler Open Space, Sport and Recreation Plan (currently in final Draft Stage)
- Development of the Gawler Cultural Heritage Collection Management Plan; work on the Town Centre Strategy Framework and substantial progress on a Town Character Development Plan Amendment
- Preservation of the rural open space through negotiations with the State Government in spite of land management difficulties and demographic pressure, underpinned by a Memorandum of Understanding with the State Government
- Creation of Reid Reserve, which comprises some 25 hectares of mainly flood-prone land
- Development of the Gawler Urban Rivers Master Plan
- Successful advocacy for the development of the Gawler-East link road to divert regional traffic around the perimeter of Gawler
- Ongoing improvement of pedestrian and cycling Infrastructure (Tapa Pariara - Gawler Rivers Path, upgrade of Paternoster Road, Town Centre Upgrade project, Footpath Renewal Program, Kerb and Gutter Renewal Program)
- Support for better public transport in Gawler and the 'Dial-a-ride' transport service.

Built Environment Management Plan

OBJECTIVES	PARTNERS
SUSTAINABLE AND MANAGED URBAN GROWTH	Government - Adelaide and Mount Lofty Ranges Natural Resource Management Board, Department Planning, Transport and Infrastructure (DPTI), and Local Government Association-South Australia (LGA-SA).
RESPECT AND MAINTAIN THE BUILT ENVIRONMENT	Community – Residents, Businesses, Developers, local and regional environment and built heritage organisations and groups including National Trust.(SA and Gawler branch) and Gawler Environment & Heritage Association, Gawler History Team, Regional Development Authority (RDA).
PROTECT USEABLE OPEN SPACE TO PRESERVE AMENITY AND BIODIVERSITY	



Corporate Action Plan

Council corporate operational strategies and actions for promoting a sustainable built environment for the Town of Gawler are detailed in Table 1.

Table 1 – Corporate Action Plan for the Built Environment

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Promote sustainable development principles in the design, upgrade and maintenance of Council buildings and assets.	Develop a Council Policy to support sustainable and adaptive building performance and heritage protection for Council buildings and assets.	2015/16	Council adoption 2015/16 and implementation of Policy	Economic Development, Regulatory Services and Communications
Develop a sustainable and resilient landscaping approach for urban areas.	Promote energy efficient Council buildings and street lighting through Council's asset maintenance and upgrades.	ongoing	Energy efficient technologies incorporated	Infrastructure and Engineering Services
	Establish a systematic identification, surveying and monitoring program within the Council area for the protection and enhancement of habitats and to guide future landscape initiatives.	2016/17	Council adoption 2016/17 and implementation of program	Infrastructure and Engineering Services
	Finalise and implement a street and public reserve tree planting program to promote township amenity. Incorporate indigenous plant species in suitable landscapes to improve biodiversity and create habitat corridors.	2015/16, then ongoing	Council adoption of program and projects undertaken in accordance with the policy.	Infrastructure and Engineering Services
	Consider environmental performance criteria (promoting biodiversity, shading, reconcile with the Australian environment, minimising water consumption, protecting heritage and climate adaptability) through the review of Council's Street Tree Policy.	2016/17	Street Tree Policy reviewed	Infrastructure and Engineering Services
Prevent environmental impacts from Council building and operations sites (soil and contamination, noise and air quality).	Develop a register of Council-owned properties and their associated risk of soil contamination. Assign priorities and audits for each site.	2017/18	Register adopted	Infrastructure and Engineering Services
	Undertake an environmental risk assessment for Council operations and facilities. Update the risk assessment at least annually.	Ongoing	Environmental risk assessment completed and reviewed annually	All

Town Action Plan

Strategies and actions to work with the community in promoting a sustainable built environment are detailed in Table 2.

Table 2 – Town Action Plan for the Built Environment

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Prevent environmental impacts from Council building and operations sites (soil and stormwater contamination, noise and air quality).	Refine planning policies to support sustainable building design principles and renewable/low energy technologies, through land use policy, planning and development control.	2015/16 and ongoing	Planning policies reviewed	Economic Development, Regulatory Services and Communications Planning) Infrastructure and Engineering Services
	Refine planning policies to protect Gawler's heritage and character.	2015/16 and ongoing	Planning policies reviewed	Economic Development, Regulatory Services and Communications (Planning)
	Develop land use policies that support a compact and diverse urban form with integrated private and public transport – Investigate the possibility of a mixed-use <i>Development Plan Amendment</i> .	2016/18	Land use policies developed	Economic Development, Regulatory Services and Communications (Planning)
	Ensure that environmental aspects are taken into consideration in the <i>Process Improvement Project</i> undertaken by the Development Assessment Team.	2015/16	Process Improvement Project reviewed	Economic Development, Regulatory Services and Communications (Planning)
	Undertake an investigation of rural land use and infrastructure to provide guidance on the development of land use policies for the rural area – undertake a <i>Rural Areas Development Plan Amendment</i> .	2017/18	Investigation undertaken, Rural Areas Development Plan Amendment adopted	Economic Development, Regulatory Services and Communications (Planning)
	Develop policies that target the reduction of the number of unsightly properties.	2016	Policies developed	Economic Development, Regulatory Services and Communications (Planning)
	Continue to lobby government and agencies to ensure that State or Regional policies contribute to vision of its environment.	Ongoing	Vision taken into account in State and Regional policies	Economic Development, Regulatory Services and Communications



STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Promote development which reduces reliance on private car use and promotes active transport.	Development: Focus on higher density development in appropriate parts of transit corridors.	Ongoing	Appropriate development policies in place and promoted	Economic Development, Regulatory Services and Communications (Planning)
	Community culture: Promote sustainable and active transport options across the Town of Gawler in partnership with local schools and businesses.	2016/17 and ongoing	Sustainable transport promotion strategy developed with community partners	Economic Development, Regulatory Services and Communications Library and Community Services
	Public Transport: Advocate and plan for the: <ul style="list-style-type: none"> Upgrading and extension of rail infrastructure for improved standards of service Upgrade of public transport infrastructure, including train and train station precincts. 	Ongoing	Upgrading and extension of public transport	Economic Development, Regulatory Services and Communications
	Walking and cycling opportunities: <ul style="list-style-type: none"> Develop an interconnected network of cycle/walking paths for every day destinations Develop an integrated directional signage strategy and other associated infrastructure to encourage people to ride bikes Develop pedestrian-friendly areas in key civic and new growth areas/Prepare Centre Urban Design Plans. 	Ongoing	Upgrading and extension of walking and cycling paths	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Transport management and reduction: <ul style="list-style-type: none"> Continue to work with State Government (DPTI) to plan for a new south-eastern Link Road and North-East by-pass to mitigate traffic flow from central Gawler Enhance Smart centre/creative industries that promote work-from-home, tele-conferencing and use of Metro card. 	Ongoing	Traffic reduction in central Gawler	Economic Development, Regulatory Services and Communications
Develop networks of greenways and open space precincts.	Maintain and further develop the rural green belt and open space through appropriate planning and the implementation of the Gawler Open Space, Sport and Recreation Plan.	Ongoing	Planning measures incorporated and implementation of the Gawler Open Space, Sport and Recreation Plan	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Pursue the planning implementation process for greenways (e.g. linear park along the Gawler River and the expansion of <i>Metropolitan Open Space System</i>) and the implementation of the Gawler Open Space, Sport and Recreation Plan.	Ongoing	Planning implemented	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services

SUSTAINABLE RESOURCE MANAGEMENT

Setting the Scene

Land management

Sustainable resource management involves an understanding of how competing demands can impact on resources and finding the balance between the needs of the population, the natural environment and economic development. The *Environment Protection Authority's State of the Environment of South Australia report states that the "landscape is under continual pressure as the city's programs and land uses change"*⁹. With the Town of Gawler anticipating an annual average growth rate of up to 3 per cent over the next 15 years¹⁰, it is essential that urban development be balanced with the protection of the Town's natural resources.

The Town of Gawler has 350 ha of 'greenfield' land zoned "*Residential*" and 100 ha of land zoned "*Deferred urban*". Based on the SA Strategic Direction Report 2013-2017, these zoned areas are predicted to meet Gawler's growth¹⁰. Mindful in preparing for this increase of population, the Council is committed to protecting primary production and environmentally significant land, as advocated by the State Government's *30 Year Plan for Greater Metropolitan Adelaide South Australia Planning Strategy*^{2, 3, 8, 10}.

Cropping predominates primary production especially to the north of Gawler while some grazing lands are located to the east, with horticultural practices mostly located to the west. Horticulture is characterised by a large number of small producers and includes both in-ground and glasshouse production. Irrigated horticulture is highly

dependent on good quality groundwater resources and recycled water provided in the region⁹. In the northern region of the Gawler River, increasing opportunities to use recycled water is boosting irrigated agricultural activity⁸. Sustainable farming practice is essential to manage water resources, protect biodiversity and maintain agricultural productivity in the region.

The Town of Gawler Development Plan is important in offering a level of protection and management of natural resources to enable continued agricultural practice in the region. The Plan provides for development to comply with land management provisions which ameliorate and/or avoid adverse impacts on the natural environment and lands under cultivation⁴.

Water resources

Water supply in the Town of Gawler Council is comprised of surface water and groundwater from the Gawler River and its two tributaries, the North and South Para Rivers in addition to reticulated water. While the Gawler River and its tributaries have variable flows, they supply water for agriculture and rural living purposes. Surface water flows vary within the catchment. Water-diverting infrastructure, such as farm dams and water supply reservoirs in the North and South Para sub-catchments, has changed the quantity and pattern of flows in the Gawler River.

The groundwater resource of the region lies within the sedimentary aquifers of the Adelaide Basin, supporting industries and agriculture, most notably horticulture. Sustainability of the region's groundwater use is managed through regulated water extraction (as stipulated in the regional Water Allocation Plan) and managed

aquifer recharge⁹. Groundwater quality is affected by dryland salinity, loss of riparian vegetation, intensive agriculture practices, and soil erosion. A long term gradual increase in salinity may be due to downward leakage from the overlying aquifer⁶. As a result, overall trends indicate degradation that may compromise future use⁹.

With the call for diverse and secure water resources through the *Natural Resource Management Act 2004*, alternative sources such as waste-water recycling and stormwater capture and reuse, are strongly promoted by the South Australian Government¹³. Local Government authorities have jurisdiction over and are responsible for stormwater management and flood mitigation as they own stormwater infrastructure¹³. The Town of Gawler is capable of capturing and recycling of stormwater in the Council region. To the west of Gawler, the use of recycled water has already enabled the expansion of horticulture production. However, there is opportunity to investigate further use of recycled water in the region^{7, 8}.

Trunk sewer systems between Gawler and Bolivar are near capacity with sewer duplication works required³. Barossa Metro Drinking Water System supplies Gawler with drinking water and despite water availability all year round, the water system operates near capacity at peak periods^{7, 14}.

The Council's *Development Plan* addresses water use and recycling through policy provisions that require new residential and commercial urban developments to include design elements that satisfy 'Water Sensitive Urban Design' principles.



The application of Water Sensitive Urban Design in current and future development in the Council region can contribute to the improvement of water capture and reuse. Given the issues inherent to the availability of water resources in the near future, water use by the community and capacity of storage within the region, is given serious priority^{8, 13}.

Energy and fuel use

As highlighted in South Australia's Greenhouse Strategy (2007-2020), at present South Australia sources its energy needs predominantly from fossil fuel supplies. In burning these fossil fuels we gain essential energy services such as heat and electricity but we also generate over 64% of South Australia's greenhouse gas emissions¹⁶. Through the implementation of its *Development Plan and Gawler Community Plan*, Gawler Council is assisting the South Australian Government's energy management policies^{8, 4}. Council development policy aims to reduce energy consumption in all new dwellings through "*development designed and sited to conserve energy*", which includes the provision of adequate natural light particularly during winter months, and buildings oriented north-facing to increase exposure to the winter sun. The inclusion and use of renewable energy will be encouraged by orienting buildings in order that photovoltaic panels may be used in an efficient way (i.e. roof orientation to maximise exposure to direct sunlight and avoid overshadowing from neighbouring buildings). *The Development Plan* also supports the development of renewable energy facilities in the Rural Zone, as long as adverse impacts are avoided or minimised⁴.

Reducing energy and fuel use associated with Council operations has been a key focus area. Through the 'Gawler Going Green' project, Council has made various upgrades to its assets, including the Gawler Aquatic Centre and the Gawler Sport and Community Centre to reduce energy use at these facilities. Gas is the primary energy source for pool heating at the Gawler Aquatic Centre. A new, more efficient heater has recently been installed for the 50-metre pool to reduce gas consumption. Operational resource use is detailed in Table 3.

Waste management and recycling

South Australia's Waste Strategy 2011-2015 aims to reduce waste to landfill by 35% by 2020. The Strategy is based on the waste management hierarchy recognised internationally as an aspirational framework for sustainability¹⁷. This hierarchy approach - Avoid, Reduce, Reuse, Recycle, Recover, Treat and Dispose - has been integrated into the Town of Gawler Development Plan, stipulating that any management or treatment of solid or liquid waste must prevent adverse effect on the environment including land, biodiversity, public health and amenity⁴. Gawler works collaboratively with Councils in the 'Northern Adelaide Waste Management Authority' (NAWMA) for the management of waste in the region, the services of which include the collection of household rubbish, green waste and recycling. Since 2008, the ratio of waste diverted from landfill has constantly increased reaching 45.7% in 2012^{17, 18}. The Gawler Council has also successfully participated in an e-waste recycling program in collaboration with Zero Waste SA, contributing to recycling opportunities for residents in the Council area.

Operational resource use

Usage of electricity, water and fuel across Council operations is monitored by the Finance and Corporate Services Department. Usage for the previous three financial years is shown in Table 3. Electricity and fuel usage has decreased, whilst water use has increased over the three year period.

Table 3 – Operational Resource use

RESOURCE	2010/11	2011/12	2012/13	2013/14	2014/15
Total electricity use (kw)	1,154,369	1,529,536	1,699,469	1,712,641	1,692,245
Water use (kl)	82,891	115,386	110,271	116,807	166,465
Fuel purchased for Council fleet and plant (l)	134,806	125,458	116,021	107,706	112,140
Gas (MJ)	2,182,282	3,528,824	3,108,615	2,375,615	3,128,811



Recent Initiatives and Achievements

Some of Council's recent sustainable resource management initiatives and achievements include:

- *Gawler Going Green* project, which delivered energy efficiency improvements in key Council buildings and at the Gawler Aquatic Centre
- Success in obtaining funding to prepare a Gawler and Surrounds Stormwater Management Plan. This plan will identify flood mitigation measures to reduce the risk of flood damage. The completion of the Plan is expected in 2016
- The installation of a centrally controlled, automatic irrigation control system for Council parks (enabling irrigation management based on weather conditions)
- The provision of an electronic-waste recycling program in collaboration with NAWMA (ongoing) and Zero Waste SA (initial trial)
- Ongoing stormwater and side entry pit maintenance to reduce rubbish and leaves entering the surface water systems.

Sustainable Resource Management Plan

OBJECTIVES	PARTNERS
SUPPORT SUSTAINABLE USE OF NATURAL RESOURCES	<p>Government - AMLR NRM Board, SA Water, NAWMA, EPA, Zero Waste SA, DEWNR, Renewables SA.</p> <p>Community – Transition Gawler, Gawler Regional Natural Resource Centre, Gawler Environment and Heritage Association.</p>
MINIMISE DISPOSAL OF WASTE TO LANDFILL	
PROTECT ENVIRONMENTALLY SIGNIFICANT AREAS OF NATIVE VEGETATION FOR PRESENT AND FUTURE GENERATIONS	
MINIMISE COUNCIL'S CARBON FOOTPRINT THROUGH REDUCED ENERGY AND CONSUMPTION	

Council Corporate Action Plan

Internal corporate operational strategies and actions for promoting a sustainable resource management for the Town of Gawler are detailed in Table 4.

Table 4 – Corporate Action Plan for Sustainable Resource Management

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Reduce resource use and waste generation associated with Council operations.	Review and include environmental performance criteria in relevant Council Purchasing Policies/Guidelines: <ul style="list-style-type: none"> Relevant Council Purchasing Policies/ Guidelines Purchasing Policy. 	2015/16	Guidelines and Purchasing Policies reviewed	Economic Development, Regulatory Services and Communications
	Implement actions to reduce paper consumption and printing resources: <ul style="list-style-type: none"> Raise staff awareness on paper usage and print costs Establish standard paper saving print settings across all staff computers Support electronic communications for Council meetings. 	2015/16 and Ongoing	Reduction of paper consumption and printing materials	Economic Development, Regulatory Services and Communications
	Benchmark product selection and environmental practices with other Councils.	Ongoing	Number of collaborations and appropriate selections	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Monitor research with regard to environmental performance (i.e. recycled road construction products).	Ongoing	Number of new environmental improvement approaches selected	Economic Development, Regulatory Services and Communications
	Support the purchase of recycled content public furniture.	Ongoing	Recycled content public furniture showcased in public areas	Infrastructure and Engineering Services
	Pursue investment and implementation of Digital Technology for Council meetings.	Ongoing	Digital Technology is available for meetings	Finance and Corporate Services
	Continue operational recycling initiatives: office and library recycling, green organics recycling.	Ongoing	Recycling initiatives promoted and implemented	Infrastructure and Engineering Services
	Ensure compliant storage and management of hazardous wastes and materials associated with property maintenance.	2015/2016	Compliant hazardous wastes management	Infrastructure and Engineering Services



STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Reduce the environmental impact of Council's motor vehicle and plant fleet.	Review Council's Fleet Management Policy to include up-to-date environmental performance criteria.	2016/17	Policy reviewed	Infrastructure and Engineering Services
	Develop tools to measure Council's ecological footprint - Monitor and report on fuel use for the Council fleet at least annually.	2016/17	At least annual reporting	Infrastructure and Engineering Services
	Pursue investment and implementation of Digital Technology for Council meetings.	Ongoing	Number of meetings where Digital Technology is used	Finance and Corporate Services
Review water consumption and implement priority reduction opportunities across Council assets.	Ongoing review of Council's irrigation management system including service levels to minimise irrigation water use across priority reserves, sporting properties and open spaces.	2016/17	Development of landscape irrigation management plan and Irrigation Policy	Infrastructure and Engineering Services
	Investigate the use of recycled water for irrigation purposes as part of the development of Council's Management Plan.	2016/17	Investigation undertaken	Infrastructure and Engineering Services
	Investigate options to reduce water consumption through Council's property management (i.e. efficient taps, develop 'green' public toilets, replace water taps).	2016/17 Ongoing	Storm water Management Plan Implemented	Infrastructure and Engineering Services
	Purchase new swimming pool covers at the Council Aquatic Centre.	2016/17	Efficiency of water and gas use	Infrastructure and Engineering Services
	Undertake a water efficiency audit of Council assets including offices, Town Hall, Council Reserves.	2016 Ongoing	Tool developed Annual monitoring	Finance and Corporate Services
Review energy use and implement priority reduction opportunities across Council assets.	Undertake a lighting efficiency audit of Council assets including offices, Town Hall, Council Reserve and open space public lighting.	2016/17	Audit undertaken	Infrastructure and Engineering Services
	Establish energy efficiency standards for Council office equipment and educate staff on energy saving features: computer use, printers, heating/cooling and lighting.	2016/17	Energy efficiency standards and training undertaken	Finance and Corporate Services Infrastructure and Engineering Services
	Develop tools to measure Council's ecological footprint - Monitor and report on energy use across Council buildings and assets at least annually.	2016/17 Ongoing	Tool developed Annual monitoring undertaken	Infrastructure and Engineering Services Finance and Corporate Services
	Support best-practice building energy efficiency standards through the Gawler Connect project.	2015/16	Energy efficiency standards included	Economic Development, Regulatory Services and Communications
	Implement the Regional Energy Efficiency Program including LED Lightning program.	2015/16	Regional Energy Efficiency Program implemented	Economic Development, Regulatory Services and Communications

Town Action Plan

Strategies and actions to work with the community in promoting a sustainable resource management are detailed in Table 5.

Table 5 – Town Action Plan for Sustainable Resource Management

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Support for actions that respect the environment and considers the impacts of climate change.	Plan sustainable urban form to reduce the community's ecological footprint through a sustainable urban design policy framework.	2016/17	Council adoption of policy framework	Economic Development, Regulatory Services and Communications
	Develop and pilot an energy efficiency scheme for homeowners and businesses. Investigate available schemes such as the Essential Services Commission Retailer Energy Efficiency Scheme.	2016/17	Pilot scheme developed	Economic Development, Regulatory Services and Communications Library and Community Services
Support the adoption of water-sensitive urban design principles for the design, function and maintenance of streets and open spaces.	<i>Update/Develop a Water-Sensitive Urban Design Framework.</i>	2016/17	Stormwater Management Plan developed	Infrastructure and Engineering Services
	Complete and implement the Stormwater management Plan. Investigate options for managing and using storm water in a holistic approach (Including wetlands which could also meet the local biodiversity needs especially in summer).	2015/16 plan completed, implementation ongoing.	Stormwater Management Plan developed and implementation monitored.	Infrastructure and Engineering Services
	Establish and enforce WSUD design principles for large-scale development and sub-divisions.	Ongoing	WSUD design principles implemented for new developments.	Development, Environment & Regulatory Services and Communications
	Involvement in the Gawler Wastewater Network Capacity Upgrade (WWSAW) to upgrade STEDS.	2016/17	STEDS upgraded	Infrastructure and Engineering Services
	Identify opportunities to reduce mains water consumption and find alternative sources (rainwater harvesting, reuse of storm and grey water).	2016/17	Stormwater Management Plan developed Landscape Irrigation Management Plan Developed	Infrastructure and Engineering Services

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Promote responsible waste management and minimise waste disposal to landfill.	Actively promote the environmental benefit of the waste management hierarchy (including avoidance of unnecessary personal or organisation consumption).	Ongoing	Waste diversion trend	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Undertake illegal dumping education and control.	2015/16	Reduction of illegal dumping	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Investigate improved waste management practices and innovative pilot opportunities.	Ongoing	Investigation reporting to Council and pilot programs undertaken.	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Investigate the benefits of implementing a food waste collection program.	2016	Investigation undertaken	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Work with NAWMA to provide waste management services to the community that promote waste minimisation and recycling.	2016/17	Services provided	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Investigate opportunities for a hard waste collection service and expanded recycling e.g. soft plastics.	2016	Investigation undertaken	Infrastructure and Engineering Services
Support sustainable landscapes and protect native flora, fauna and ecosystems.	Protect and restore native flora, fauna and ecosystems through the identification, retention and rehabilitation of environmentally significant areas of native vegetation. Also part of proposed Council Biodiversity Plan.	Ongoing	Native flora, fauna and ecosystems restoration occurring Monitored outcomes	Infrastructure and Engineering Services
	Develop management plans for Council-managed land and reserve areas including zoning of specific areas of open space for conservation purposes. Also part of proposed Council Biodiversity Plan.	2016/17	Implement a biodiversity strategy	Infrastructure and Engineering Services
	Implement Council's <i>Animal Management Plan 2014-2017</i> to effectively deal with pest birds, over-abundant native birds and encourage responsible dog and cat ownership in order to reduce nuisance, social and environmental harm.	Ongoing	Plan implemented	Economic Development, Regulatory Services and Communications
	Protect sensitive conservation areas from dogs yet promote dog friendly park areas.	2017	Dog Park strategy finalised	Economic Development, Regulatory Services and Communications

CLIMATE CHANGE

Setting the Scene

The 'Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4)(IPCC 2007)' states that the continual increase of atmospheric carbon dioxide and other greenhouse gases due essentially to fossil fuel use, leads inexorably to global climate changes. As a result, South Australia is likely to experience continued increases in average temperatures, changes in rainfall (likely reductions in winter and spring), an increase in daily rainfall intensity but longer dry spells between rainfall events, and an increase in evapotranspiration (the combined effects of evaporation and plant transpiration). An increase in very hot days and nights, a reduction in the frequency of frosts and a likely increase in the number of extreme fire danger days are also forecasted ²⁰.

Climate change adaptation

The 'Central Local Government Region', comprised of 15 Council authorities, have undertaken an Integrated Climate Change Vulnerability Assessment for the region. The methodology was essentially based on risk management and includes a vulnerability assessment as defined by the IPCC to analyse and evaluate the impacts of climate change across the region's environment, economic and social capital ¹⁹.

Results for the Gawler area indicate a medium economic and social vulnerability with higher environmental vulnerability due to a low adaptive capacity, reinforcing the necessity to proactively protect the natural environment of the region. The Gawler Council is considering and incorporating regional vulnerability environmental, economic and social capital predictions in strategic policies, documents, development and community plans, and is committed to mitigating climate change impacts, and addressing adaptation issues by further developing adaptive measures and practice ^{3, 4}.

Mitigation of carbon dioxide emissions

Several measures to mitigate and offset carbon dioxide emissions are specified in the Council's Development Plan with planning provisions promoting the development of: energy efficient buildings; use of renewable energy; increased use of public transport; increased walking and cycling opportunities; and preservation of the rural green belt and open space ^{10, 19}.

Various Council energy and fuel reduction initiatives have also been undertaken (see Sustainable Resource Management).

Adaptation to future water resource deficiency

The Adelaide Mount Lofty Ranges Natural Resource Management Plan 2014

estimates that most of the regional water resources are close to or have already reached their sustainable limits ⁹.

The lack of water is considered to be one of the most serious threats to the long-term economic and environmental sustainability of the Gawler region, which will be worsened by the 'long-term drying phenomenon' caused by the climate change ¹⁹. The Gawler Council is already involved in the protection of natural water resources through an integrated approach to natural resource planning, and is committed to incorporating water sensitive urban design principles to harvest rain water and reduce water consumption by Council assets ³. Stormwater harvesting/reuse as well as the wastewater reuse are particularly crucial in developing and pursuing a sustainable approach ¹³.

Emergency preparation

The gently undulating plains and floodplains of the Gawler region make the region particularly vulnerable to the impacts of floods events, likely to increase in intensity with predicted climate change ⁹. The 'Gawler River Flood Plain Management Authority' has been established to undertake the construction, operation and maintenance of flood mitigation infrastructure in the Gawler River area and to ensure a coordinated approach between the Council's involved ²¹. The Gawler Council has also developed policies and procedures to align with the *Fire and Emergency Services Act 2005* in order prevent and implement appropriate actions against bushfires, predicted to increase in frequency and intensity ¹⁹.



Impact on primary production

Warming and drying trends are also likely to challenge the viability of agricultural production, and transformational changes may be necessary. Temperature increase is a threat to the horticultural industry but water availability will be the greatest concern for the expansion of the industry. Adaptations include careful selection of cultivars, changing planting and harvest dates and flexibility to manage seasonal variability including pest outbreaks²⁰. *The Gawler Strategic Direction Report 2013* has highlighted the need to investigate mitigation measures addressing the impact of climate change on primary production¹⁰.

Impact on biodiversity

Biodiversity, already severely impacted by habitat loss due to native vegetation clearance and invasions by pest plants and animals, is highly sensitive to climate change. The highly fragmented landscape and numerous threatened species in the Gawler region currently pose significant conservation challenges^{20, 6}. The *Adelaide Mount Lofty Ranges Natural Resources Management Plan* states that a number of plant communities including *Peppermint Box Grassy Woodland*, Iron-grass Natural Temperate Grassland and Southern Cypress Pine Woodland, are under threat in the Gawler/northern Adelaide Plains area. The deterioration of habitat conditions has led to the declining status of fauna such as many woodland bird species and aquatic/riparian species⁹. The relevant threats involve multiple factors including climate change.

Revegetation of watercourses and protection/maintenance of existing vegetation will assist in the mitigation of climate change impacts on native terrestrial animals by providing refuges in extreme heat events and also mitigating impacts on aquatic animals by reducing evaporation and temperatures in permanent refuge pools.

Gawler Council's current policy to maintain and develop open spaces and the rural green belt is crucial to re-establishing and preserving habitat corridors for native fauna and flora^{10, 19}. Protecting vegetation along the river systems is also a priority for the region. These vegetation communities provide the best opportunity for habitat connection across the landscape between the coast and the hills, an imperative adaptation measure in response to climate change⁹.

Public Health

The State Public Health Plan 'South Australia: A Better Place to Live' identifies 'preparing for climate change' as a priority area for public health planning by Councils¹³. It recognises that climate change has potential direct and indirect impacts to the health and wellbeing of South Australian communities such as, social disruption, heat related health risks, increased infectious disease risks and risks associated with extreme events.

Gawler Council currently addresses the impacts on public health through service delivery to the community including: fire hazard and flood prevention; storm water drainage and reuse; health education; and public health assessments (swimming pool inspections, food premises, wastewater treatment and supported residential facilities)¹⁹. Council has identified the development of a *Disaster Recovery Plan* and the implementation of climate change mitigation and adaptation measures as key priorities^{2, 3}.

Recent Initiatives and Achievements

Some of Council's recent sustainable resource management initiatives and achievements include:

- *Gawler Going Green* project, which delivered energy efficiency improvements in key Council buildings
- Various works to the riverine environment as part of the Gawler Urban Rivers Biodiversity Project
- Participation in the *Central Local Government Region Climate Change Vulnerability Assessment*
- Participation in the Barossa Regional Development Authority regional *Climate Change Adaptation Plan* development
- Success in obtaining funding to prepare a *Gawler and Surrounds Stormwater Management Plan*. This Plan will identify flood mitigation measures to reduce the risk of flood damage and stormwater management options.

Climate Change Management Plan

OBJECTIVES	PARTNERS
<p>DEVELOP ADAPTATION AND MITIGATION STRATEGIES FOR COUNCIL AND THE COMMUNITY TO EFFECTIVELY MITIGATE AND RESPOND TO THE IMPACTS OF CLIMATE CHANGE</p>	<p>Government - DEWNR, AMLR NRM board, SA Water, DPTI, RDA Barossa, Zone Emergency Management Committee, SA Health.</p> <p>Community - local and regional environment organisations and groups including: Transition Gawler, Gawler Regional Natural Resource Centre, Gawler Environment and Heritage Association.</p>



Council Corporate Action Plan

Internal corporate operational strategies and actions to develop adaptation and mitigation strategies for the Town of Gawler are detailed in Table 6.

Table 6 – Corporate Action Plan for Climate Change

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
<i>Implement climate change mitigation measures.</i>	Energy, fuel and resource consumption reduction initiatives as detailed in Table 4 'Sustainable Resource Management'.			All
	Develop a policy and position statement to attract low-carbon and renewable energy investment to the Town of Gawler.	2017	Policy and position statement publicised	Economic Development, Regulatory Services and Communications
<i>Promote sustainable development principles in the design, upgrade and maintenance of Council buildings and assets as identified in 'Built Environment'.</i>	Sustainable development policy as detailed in Table 1 'Built Environment'.			All
Consider climate change prediction and risks for the Town of Gawler in the review of relevant Council policies and plans.	Instigate a review to incorporate a climate change mitigation and adaptation focus into the review of relevant Council policies and plans – Development policy reviews, stormwater management planning, emergency planning, community service planning, open space planning and vegetation/street tree policies.	2016/17	Framework developed	All
Consider climate change adaptation in the Planning of Council community services and environmental health regulation.	Develop community service and public health surveillance policies to cater for climate change conditions/events such as heat waves. <ul style="list-style-type: none"> Consider impacts on community facility access, community transport and home and community care services Develop educational material for public health, food safety and waste management. 	2016/17	Services and policies developed	Library and Community Services Economic Development, Regulatory Services and Communications

Town Action Plan

Strategies and actions to work with the community in developing mitigation and adaptation approaches detailed in Table 7.

Table 7 – Town Action Plan for Climate Change

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
<i>Implement mitigation measures to reduce the community's carbon footprint (as identified in 'Sustainable Resource Management').</i>	Energy, fuel and resource consumption reduction initiatives as detailed in Table 4 'Sustainable Resource Management'.	Ongoing	Reductions achieved	All
Plan for water scarcity. Protect biodiversity.	Within the community, pursue measures that aim to reduce water consumption (residential and agricultural), further develop stormwater and rain water harvesting, and promote water reuse (wastewater and storm water).	2016/17 Ongoing	Record/Monitor successful measures	Infrastructure and Engineering Services Economic Development, Regulatory Services and Communications
	Work with the AMLR NRM Board to engage the agricultural sector in the improvement of agricultural practices based on climate change forecast.	2016/17 Ongoing	Monitor improvement in conjunction with AMLR NRM Board	Economic Development, Regulatory Services and Communications
	Preserve and promote environmental corridors for native fauna and flora. Protect rivers and riverine environment.	2016/17	Implement Biodiversity Strategy	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
Prepare for increased natural disasters (flood bushfire and heat wave).	Review the existing plans (e.g. <i>Disaster Recovery Plan</i>) and policies with regard to the climate change vulnerability assessment.	2016/17	Plans reviewed	All
	Take into account extreme weather events to manage flood mitigation, and the collection and reuse of stormwater (through the development of the <i>Stormwater Management Plan</i> and working with <i>Gawler River Floodplain Management Authority</i>).	2015/16	Extreme weather event integrated in Stormwater Management Plan	Infrastructure and Engineering Services
Engage with relevant sectors of the community on climate change adaptation.	Participate in the implementation of the Regional Climate Change Adaptation Plan in partnership with relevant government and regional industry stakeholders.	Ongoing	Continued liaison	All

RIVERINE AND NATURAL ENVIRONMENT

Setting the Scene

The Town of Gawler lies at the confluence of two tributaries of the Gawler River, the North and South Para Rivers, which emerge from the surrounding Adelaide Hills.

The significance of the riverine and natural environment

The riverine environment of Gawler is intimately related to the Aboriginal history and culture in the region with the Gawler, North and South Para Rivers recognised as areas of cultural significance for the Kaurna people prior to European settlement and today. *Through the Gawler Community Plan*, the Council is committed to protecting and promoting Aboriginal culture, as a sign of respect and recognition of Aboriginal heritage and culture in the area ².

This commitment is reinforced through the *Gawler Development Plan*, which identifies Aboriginal cultural heritage into its policy and planning provisions ¹⁰. An embodiment of Council's commitment to respecting significant areas of Kaurna interest in riparian and floodplain areas was the development of the *Gawler Rivers Path – Tapa Pariara*, associated with the *Gawler River Master Plan*, 2011 ¹⁹. This followed the earlier Paridla Taikondi - Gawler River Junction reserve Reconciliation project which was launched in 2003.

The original township of Gawler, founded and planned by Colonel Light in 1839, followed the riverine topography of the area with parklands concentrated near the rivers ¹⁰. *The Gawler Community Plan 2014-2024* reinforces the significance of the rivers by concluding that, "*The Gawler*

Rivers are iconic features of the township".

The Plan includes a number of strategies aimed at creating and maintaining "a riverine environment that reflects the social, cultural and landscape values of the river corridor" ².

The Council is committed to the protection and maintenance of Gawler's riverine environment in order to achieve the various initiatives and environmental policies aimed at protecting and maintaining the health of natural resources, as specified in the South Australian *30 Year Plan for Greater Metropolitan Adelaide* and the *Adelaide Mount Lofty Ranges Natural Resource Management Plan*. Council's *Community Plan and Development Plan* guides community, urban and environmental development to encourage the re-establishment and maintenance of biodiversity corridors, imperative in enabling the natural environment to adapt in some measure to predicted climate change, and significant in contributing positively to community health and wellbeing ^{8, 12, 9}.

Catchment management

The development of Gawler since its establishment in 1839, has had adverse impacts on the riverine ecosystem and water quality in Gawler and downstream. The Gawler River water quality in close proximity to the Town of Gawler was concluded to be very poor (based on 2008 results), with the Fish Health Indicator of 2011 indicating that the native fish population was at risk ⁹.

Along the Gawler and North and South Para rivers there are persistent pools identified as "groundwater dependent ecosystems", the flow of which can contribute to streamflow and assisting the riparian and deep-rooted vegetation found in these rivers. The perched nature of the river, and its flat floodplain, means floodwaters break out of the channel and flood adjacent land downstream from central Gawler, with inundation for days or weeks after a flood event ⁹.

The Gawler River catchment (including the North and South Para river systems) has been heavily modified by reservoirs, farm dams, weirs, flood mitigation schemes and reduced aquifer recharge ⁷. Threats to the river include increased weed and pest pressure as well as increased pressure on land capability with primary production and residential development. In turn, the resources required to ensure the watercourse is being managed appropriately are also placed under stress ⁹.

Recent Initiatives and Achievements

Some of Council's recent riverine environment initiatives and achievements include:

- North Para river bank reinstatement and water quality improvements (construction of trash racks, energy dissipation structures and work to modify river bank profile with replanting to protect against erosion)
- Various works to the riverine

environment as part of the Gawler Urban Rivers Biodiversity Project

- Participation in the Central Local Government *Region Climate Change Vulnerability Assessment*
- Creation of walking and cycling paths via existing riverside shared paths and bridges through the Reid Reserve Project
- Continual maintenance and upgrading of facilities within the riverine environment (e.g. repairs of footpaths and safety fences at the Gawler Mill Bridge).

Riverine and Natural Environment Management Plan

OBJECTIVES	PARTNERS
<p>CREATE AND MAINTAIN A RIVERINE ENVIRONMENT THAT REFLECTS THE SOCIAL, CULTURAL, NATURAL AND BIODIVERSITY VALUES OF THE RIVER CORRIDOR</p>	<p>Government – AMLR NRM Board, Local Government Association, Gawler River Floodplain Management Authority, neighbouring Councils.</p> <p>Community – local and regional environment organisations and groups including Gawler Regional Natural Resource Centre, Gawler Environment and Heritage Association, Gawler Para Alliance.</p>



Council Corporate Action Plan

Council corporate operational strategies and actions for promoting Gawler's riverine and natural environment are detailed in Table 8.

Table 8 – Corporate Action Plan for the Riverine and Natural Environment

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Continue works and maintenance of the riverine environment.	Continue river management: support natural habits, ensure bank stability, protect water quality and provide access to the public.	Ongoing	Improved bank stability. Improvement in water quality in close proximity to the Town	Infrastructure and Engineering Services
	Support water sensitive urban design principles through the development of Council's Stormwater Management Plan. Ensure connections with neighbouring Councils.	2016/17	Water Sensitive Urban Design integrated in Stormwater Management Plan	Infrastructure and Engineering Services
Work with the NRM Board to develop strategies to ensure river corridors remain healthy.	Develop Best Practice and Environmental Operating Procedures, to manage environmental impacts from council maintenance activities.	2016/2017 Ongoing	Operating procedures developed	Infrastructure and Engineering Services
	Regular clean out of Stormwater Entry Pits reduces rubbish and leaves entering the stormwater systems and rivers.	Ongoing	Reduction of rubbish in the river	Infrastructure and Engineering Services
	Remove invasive weeds: e.g. woody weeds such as Pepper trees, Ash trees, Bamboo and Castor Oil in Riverine environment.	Ongoing	Monitor and control invasive weeds and introduce trees along river corridors	Infrastructure and Engineering Services
Maintain and develop sustainable biodiversity habitats.	Sustainable landscaping of the riverine environment through plant selection and maintenance.	Ongoing	Monitor sustainability of the landscape	Infrastructure and Engineering Services
	Work towards a Town of Gawler Biodiversity Plan.	2016/17	Consider funding options and timeframe for a Plan	Infrastructure and Engineering Services
	Promote community involvement in the maintenance of river sections.	Ongoing	Patches of river sections being maintained by community groups	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services

Town Action Plan

Strategies and actions to work with the community in protecting the riverine and natural environment are detailed in Table 9.

Table 9 – Town Action Plan for the Riverine and Natural Environment

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Ensure the protection and enhancement of river corridors and natural areas.	Implement the <i>Gawler Urban Rivers Master Plan</i> .	Ongoing	Plan implementation continued Monitor and report ongoing biodiversity outcomes	Infrastructure and Engineering Services
	Manage open space along the three river corridors to provide improved use and greater visual appeal, in accordance with the finalised Gawler Open Space, Sport and Recreation Plan.	Ongoing	Increase of open space visitation Implementation of Gawler Open Space, Sport and Recreation Plan	Infrastructure and Engineering Services
	Continue to increase awareness of biodiversity, native fauna and flora for the visitors of reserves, parks and area of native vegetation, (Including signs to identify and provide information about native species).	Ongoing	Number of measures undertaken	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Update and implement guidelines and policies related to land division where natural creeklines, gorges and gullies exist and which may become open space contributions to Council as part of land division.	Ongoing	Development Plan policies and Council Land Division Technical Guidelines providing for protection and restoration of natural creekline, gorges and gullies kept up to date and implemented to ensure that quality open space and habitat corridors are created prior to Council accepting transfer of such land	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services
	Explore opportunities to expand Gawler's open space provisions along each of the three rivers corridors in accordance with the Gawler Open Space, Sport and Recreation Plan. Undertake a review of the Special Use Zone in the <i>Gawler Development Plan</i> .	Ongoing 2016/17	Grants obtained. Special Use Zone reviewed	Economic Development, Regulatory Services and Communications
	Investigate potential funds/grants to continue rehabilitation and new projects over the coming years in partnership with upstream and downstream Councils and State and Federal agencies.	Ongoing	Grants obtained.	Infrastructure and Engineering Services

COMMUNITY CULTURE AND ENVIRONMENT

Setting the Scene

Building a culture of environmental awareness and commitment will be an essential for achieving environmental improvements across the Town of Gawler. Through the *Gawler Community Plan*, the Council demonstrates a commitment to raising awareness of educational and behavioural changes required by the community in addressing the pressures placed on the natural environment. Volunteers are considered a particularly valuable asset, as they are usually heavily involved in the range of projects, priorities and initiatives across Council; they also play a critical role in maintaining local social networks, and deciphering and promoting information and awareness.

The 2013 South Australian *State of the Environment* report also points to education as a cornerstone for protecting, restoring and enhancing the natural environment 6. According to the AMLR NRM *Natural Resource Management Plan*, a number of key stakeholders and community groups – including urban developers, business owners, community leaders, students and local farmers – can contribute to a ‘Plan to Learn’ approach with regard to environmental protection 9.

Local knowledge regarding the capture, management and use of water resources is valuable in moving towards a water-sensitive community 13. Community education and access to technology is also important for community members to effectively apply knowledge in relation to climate change mitigation and community resilience 19.

Recent Initiatives and Achievements

Some of Council’s recent environmental community development initiatives include:

- Valued and continued contribution of volunteers in Council programs including graffiti removal program, the establishment of the Youth Precinct at Clonlea Park, involvement of community members in Gawler Rivers Biodiversity Project Working Group and a range of community services and events
- Community education and awareness of the waste management hierarchy and resource preservation in conjunction with NAWMA
- Community engagement and education on energy consumption through the Gawler Going Green project
- Community grants for environmental initiatives.

Community Culture and Environment Management Plan

OBJECTIVES	PARTNERS
REVIVE COMMUNITY CULTURE THROUGH ENGAGEMENT, COMMUNITY AND EDUCATION.	AMLR NRM Board, Local Government Association, NAWMA. All sectors of the community.

Town Action Plan

Strategies and actions to work with the community to foster an environmentally progressive culture are detailed in Table 10.

Table 10 – Action Plan for Community Culture and Environmental Management

STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Promote environmental awareness within the community.	<p>Use existing facilities and events to promote environmental awareness:</p> <ul style="list-style-type: none"> Use Public Council events as an opportunity to increase environmental awareness among the visitors (e.g. events at the Gawler Showground) Advertise and explain existing success of Council projects (e. g. recent upgrade of the Gawler Sport and Community Centre in insulation and lighting; pool covers and solar panels at the Gawler Aquatic Centre; upgrades in open spaces and Reserves). 	Ongoing	Number of promotion activities on website, at events and awareness sessions undertaken	<p>Economic Development, Regulatory Services and Communications</p> <p>Library and Community Services</p> <p>Infrastructure and Engineering Services</p>
Involve the community in Council decision-making and projects for environmental management.	<p>Target community groups:</p> <ul style="list-style-type: none"> Identify key groups such as urban developers, business owners, community leaders, students, local farmers and community organisations for environmental awareness sessions in partnership with other stakeholders Involve Council's Youth Advisory Committee and local schools in the environmental policy development and planning process. 	Ongoing	Public involvement monitored and improvement reported	<p>Economic Development, Regulatory Services and Communications</p> <p>Library and Community Services</p>
	<p>Integrate environmental awareness into current initiatives:</p> <ul style="list-style-type: none"> Develop ideas related to Community Gardens or similar Develop new roles and programs to allow greater engagement in Council Volunteering in environmental fields Include environmental aspects in community information sessions organised by Gawler Council Library Promote Friends groups for significant areas of native vegetation and open space 	Ongoing	<p>Number of promotion activities on website and awareness sessions</p> <p>Number of Friends groups operating</p>	<p>Economic Development, Regulatory Services and Communications</p> <p>Library and Community Services</p> <p>Infrastructure and Engineering Services</p>
	<p>Recognise community environmental initiatives:</p> <ul style="list-style-type: none"> Foster relationships with local environmental groups Engage local environmental champions in awareness raising initiatives Support local groups through an environmental grants initiative Support local schools. 	Ongoing	Continued liaison and grant schemes	Economic Development, Regulatory Services and Communications Infrastructure and Engineering Services



STRATEGIES	ACTIONS	TIMEFRAME	PERFORMANCE MEASURE	RESPONSIBLE DEPARTMENT
Develop a communication and participation strategy targeting specific aspects of the environment.	Riverine and natural environment: <ul style="list-style-type: none"> Continue to involve the Gawler community in the different programs related to the riverine environment Educate the community on the health of the river system Educate the community on local biodiversity. 	Ongoing	Number of awareness sessions Work of Gawler Rivers Biodiversity Project Working Group reported	Economic Development, Regulatory Services and Communications Library and Community Services
	Waste management: <ul style="list-style-type: none"> Increase community awareness to reduce consumption, waste production and Increase recycling Undertake illegal dumping education. 	Ongoing	Access to waste management education programs via. Council website, promotion activities and awareness sessions.	Economic Development, Regulatory Services and Communications Library and Community Services
	Climate Change and Sustainable Resource Management: <ul style="list-style-type: none"> Educate the community regarding mitigation measures and adaptation to climate change (simplify the 'climate change' message). 	Ongoing	Access to climate change education programs via. Council website, promotion activities and awareness sessions	Economic Development, Regulatory Services and Communications Library and Community Services
	Protection of the natural environment and nuisance mitigation: <ul style="list-style-type: none"> Encourage the community to beautify and revitalise their property, including with native plantings for habitat Provide information and guidance to the community to minimise issues related to pest birds (e.g. feral pigeons) and native birds of abundance (e.g. Little Correllas) Encourage responsible dog and cat ownership in order to reduce nuisance, social and environmental harm. 	Ongoing	Access to environmental education programs via. Council website, promotion activities, and awareness sessions	Economic Development, Regulatory Services and Communications Library and Community Services

FRAMEWORK FOR IMPLEMENTATION AND MONITORING



Structure for Driving Environmental Management

It is evident that all Council Departments have a role to play in driving corporate and community environmental management. Successful implementation of the EMP requires sustainability principles and considerations to be embedded across Council, as portrayed in Figure 3.

Resourcing the Environmental Management Plan

Whilst responsibility for 'environmental management' needs to be integrated across staff roles, support for a 'Sustainability Coordinator' position within Council is recommended for:

- Facilitating sustainability considerations across Council operations (as shown in the structure in Figure 3)
- Developing and monitoring relevant Council policies
- Facilitating and monitoring the implementation of the EMP across Council
- Coordinating awareness raising and training
- Assisting with community development and engagement for environmental initiatives
- Developing environmental risk management procedures and associated training.

System Elements

Whilst a certified Environmental Management System is not proposed in the short term, the following priority system elements are recommended to address environmental performance across Council operations (these actions address a range of environmental impact areas):

- Develop an operational procedure for environmental incident response and reporting
- Undertake an annual environmental risk assessment for Council operations and facilities
- Establish a Standard Operating Procedure and training module ('Toolbox Talk') for depot operations staff on "environmental protection for field activities" for the town/horticultural maintenance and parks/open space management
- Incorporate environmental management as a standard item in all Council reports
- Incorporate environmental awareness into Council staff and volunteer training
- Instigate annual environmental data reporting: electricity, water and fuel use for Council assets and other environmental measures.

Review and Reporting

The EMP progress will be reviewed and reported to Council at least annually. Reporting to the community will be undertaken via Councils Annual Report and through Officer Reports to Council and Council Committee meetings as appropriate.



Figure 3 – Embedding Sustainability at the Town of Gawler



GLOSSARY

Best Practice Managing and implementing activities in ways that are designed to achieve agreed and beneficial environmental outcomes and performance targets.

Biodiversity Is the totality of the variety of living organisms, the genetic differences among them and the communities and ecosystems in which they occur. It is the natural wealth of the earth, which supplies all of our food and much of our shelter and raw materials.

Carbon footprint the amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organization, or community.

Climate change Climate change in United Nations Intergovernmental Panel on Climate Change (IPCC) usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. The IPCC has concluded that currently experienced and expected climate change over the next decades is strongly influenced by human activity that alters the composition of the global atmosphere.

Ecological footprint A concept that defines a theoretical area of land (hectares per person) needed to provide products for human consumption as well

as that required for waste disposal.

Environment Protection Act 1993 defines the notion of Environment as "land, air water, organisms and ecosystems, and includes human-made or modified structures or areas; and the amenity values of an area."

Ecologically Sustainable Development Is development that aims to meet the needs of society today, while conserving ecosystems for the benefit of future generations. To do this will require using environmental resources in ways that maintain and, where possible, improves their range, variety and quality. Sustainability also involves trying to balance social, economic and environmental goals.

Environmental Corridor A vegetated strip of land linking wildlife habitat areas and itself adding habitat.

Fauna The collective name for the animals or animal life of any particular region.

Flora The collective name for the plants or plant life of any particular region.

Green Belt Is the term given to the area of undeveloped or agricultural land surrounding an urban development.

Grey Water Domestic wastewater from washing machines, showers, baths and dishwashing. Particular health and soil quality issues need to be considered in relation to grey water re-use.

Habitat The normal abode or locality of an animal or plant.

Indigenous Native or original to an area, not introduced from outside the particular region or environment.

Riparian The area adjacent to the edge of a waterway, including the banks.

Stormwater Is runoff from hard surfaces like roads, roofs, pavements and car parks.

Sustainability The simultaneous pursuit of economic prosperity, social equity and environmental quality.

Vector Borne Disease Diseases transmitted among human, animal, or plant hosts by arthropods, usually insects.

Water Sensitive Urban Design A philosophical approach to urban planning and design that aims to minimise the hydrological effect of urban development on the surrounding environment.

Waste management hierarchy A nationally and internationally accepted guide for prioritising waste management practices with the objective of achieving optimal environmental outcomes. It sets out the preferred order of waste management practices, from most to least preferred. The hierarchy promotes waste avoidance ahead of recycling and disposal.



ACRONYMS

AMLR NRM Board Adelaide and Mount Lofty Ranges Natural Resources Management Board

CRCCV Climate Change Vulnerability Assessment

DA Development Application

DEWNR Department of Environment, Water and Natural Resources

EMS Environmental Management System

ESD Ecological Sustainable Development

EMP Environmental Management Plan

EPA Environmental Protection Agency

GRFMA Gawler River Flood Plain Management Authority. GRFMA is a local government regional subsidiary organisation responsible to Adelaide Hills, Barossa, Gawler, Light, Mallala and Playford Councils.

GDEs Groundwater dependent ecosystems

GURMP Gawler Urban River Master Plan

MOU Memorandum of Understanding

MOSS Metropolitan Open Space System

NAWMA Northern Adelaide Waste Management Authority. NAWMA is a local government regional subsidiary body owned by the Salisbury, Playford and Gawler Councils

REEP Regional Energy Efficiency Program

SOP Standard Operation Procedure

STED Septic Tank Effluent Drainage

SMP Stormwater Management Plan

TRIM Total Records and Information Management

WAP Water Management Plan

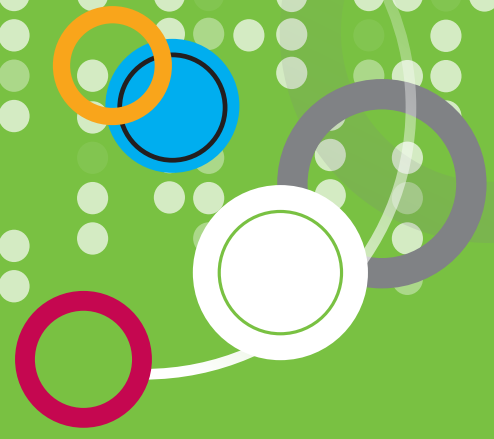
WHS Work Health and Safety

WSUD Water Sensible Urban Design

REFERENCES

1. World Commission on Environment and Development. Our Common Future. Oxford 1987.
2. Town of Gawler. Gawler Community Plan 2014-2024 - A livable, cohesive, active, innovative and sustainable community.
3. Town of Gawler. Strategic Plan 2010-2018.
4. Government of South Australia- Department of Planning Transport and Infrastructure. Town of Gawler Development Plan 2015.
5. Australian Bureau of Statistics. Gawler Last update accessed June 2014.
6. Government of South Australia - Environment Protection Authority. State of the Environment - South Australia 2013.
7. Government of South Australia. Strategic Infrastructure Plan for South Australia - Regional Overview 2005/6-2014-15 2005.
8. Government of South Australia - Department of Planning and Local Government. The 30-years Plan for Greater Adelaide, a volume of the South Australian Planning Strategy 2010.
9. Government of South Australia - Adelaide and Mount Lofty Ranges Natural Resources Management Board. Adelaide Mount Lofty Ranges Natural Resources Management Plan 2013.
10. Town of Gawler. Strategic Directions Report 2013-2017.
11. Town of Gawler. Moving Around Town 2004.
12. Gawler Urban Rivers Master Plan 2013.
13. Government of South Australia - SA Health. South Australia: A Better Place to Live. Promoting and protecting our community's health and wellbeing 2013.
14. Government of South Australia. Water for Good: A plan to ensure our water future to 2050 2010.
15. SA Water. Drinking Water Quality Report 2012-13.
16. Government of South Australia. Tackling Climate Change - South Australia's Greenhouse Strategy 2007-2020.
17. Government of South Australia - Zero Waste. South Australia's Waste Strategy 2011-2015 2011.
18. Northern Adelaide Waste Management Authority (NAWMA). 2014/15 Annual Report.
19. Town of Gawler. Town of Gawler Annual Report 2013-14.
20. Government of South Australia. Central Local Government Region Integrated Climate Change Vulnerability Assessment 2030 - Natural Disaster Resilient Program 2011.
21. Town of Gawler. Gawler River Floodplain Management Authority Annual Reports to 2015.





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