February 2016

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I, Ian Hunter, Minister for Sustainability, Environment and Conservation, hereby adopt this Natural Resources Management Plan, Volume 2: business and operational plan pursuant to section 80(3)(a) of the Natural Resources Management Act 2004.

Ian Hunter

Date: 6/4/16

Minister for Sustainability, Environment and Conservation
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Professor Chris Daniels

As the Presiding Member of the Adelaide and Mount Lofty Ranges Natural Resources Management Board, I present this Business and Operational Plan 2016-17 to 2018-19.

The Business and Operational Plan complements our Strategic Plan, which serves as the overarching guide to the areas that need to be addressed in natural resource management in our region. The Strategic Plan explains why action is needed, and how the most appropriate actions are determined and delivered. Both the Strategic Plan and the Business and Operational Plan are based on the best available information and science.

This Business and Operational Plan sets out the activities the board will fund; identifies the income the board receives through levies and other funding; explains how the board will spend that money to achieve the regional targets in the strategic NRM plan; and details the conditions under which the board will issue a permit for a water affecting activity.

The board’s planning processes enable the community to participate at every step, providing advice on how the region’s natural resources should be managed. With limited financial and practical resources available, these processes also allow the board to set priorities to ensure its resources are best directed.

The development of this Business and Operational Plan is in response to the unexpected state budget pressures handed down in June 2015. The board has considered how best to address these pressures, while minimising the impact on the region’s levy payers and maintaining our commitment to the Adelaide and Mount Lofty Ranges Natural Resources Management (NRM) Plan and the actions needed to ensure the sustainability of our region’s natural resources. A socio-economic study was commissioned to help inform the decisions made.

As a result of these discussions the board proposes several ways to respond to the budget pressures. These include: minimising the impact by using retained earnings in the 2015-16 and 2016-17 years (subject to Treasury approval); reprioritising work programs; maintaining our commitment to hold the water levy at the same rate for three years; and introducing a modest annual increase in the regional NRM levy over the three-year life of this plan.

The board is also taking this opportunity to make changes to the Strategic Plan to reflect the local-level planning that is now our focus, which was supported by the 2014-15 Community Connect initiative. This initiative is about working with you, our community, to understand what’s important to you, and making decisions about what we need to do in the landscape, and where to do it.

We invite you to continue your involvement with the board as we all have a role in ensuring a resilient, sustainable future. For some, it might simply be through paying their annual NRM levy, or volunteering for one of our region’s many environmental projects. For others it may be through choosing local native species for their home garden, or adopting good water and land management practices to help ensure their rural property’s long-term sustainability.

At whatever level you wish to participate, we welcome your active involvement in our local-level planning as we continue to better understand our natural resources issues and what we need to do to address them.
ABOUT THIS PLAN

The Adelaide and Mount Lofty Ranges Natural Resources Management Plan (the NRM Plan) has been prepared under the *Natural Resources Management Act 2004* (the Act) and is presented in two volumes:

- **Strategic Plan for the Adelaide and Mount Lofty Ranges Region 2014-15 to 2023-24:**
  a 10-year strategic plan for the region, which the Act intends to apply to all stakeholders managing natural resources in the Adelaide and Mount Lofty Ranges (AMLR) region
- **Adelaide and Mount Lofty Ranges Natural Resources Management Board Business and Operational Plan 2016-17 to 2018-19:**
  which outlines how the board will invest the money it raises through levies and other funding sources (this document).

Under the Act, the Strategic Plan for the region is required to be reviewed at least once in every 10-year period. The board intends the Strategic Plan to be an adaptive plan and therefore aims to review and amend it frequently to ensure that it remains an up to date and usable document.

Under the Act, the Business and Operational Plan must be reviewed at least once every three years, or at any time the board proposes an increase above the CPI in the amount to be raised by a levy. This document is an amendment to the Business and Operational Plan 2015-16 to 2017-18. The amendment has been triggered by the proposal to increase the regional NRM levy (in respect of land) above that previously stated. There are no proposed increases to the water levies in the Adelaide and Mount Lofty ranges region in this revision.

It is intended that the Business and Operational Plan will not undergo a further review for three years, unless there is a requirement to increase the levy beyond that outlined in this plan.

This document includes the draft Implementation Plan for 2016-17 (Appendix A). This is a detailed list of the board’s projects and expected expenditure for 2016-17. Our ongoing adaptive planning process means that, for each year of this business plan, the board will publish an annual Implementation Plan supplement at the commencement of each financial year. The final version of the 2016-17 Implementation Plan will be published by the board following its endorsement at the June 2016 board meeting.

The Strategic Plan for the Adelaide and Mount Lofty Ranges region

Volume 1 of the Adelaide and Mount Lofty Ranges Natural Resources Management Plan, the Strategic Plan, sets the direction for all stakeholders to work together to improve the natural resources of the region.

This plan adopts a systems (resilience) approach to natural resources management (NRM), which is about:

- thinking about the region as linked systems, rather than individual natural resources assets (e.g. water, pests, biodiversity)
- recognising complexity, uncertainty and natural variability
- identifying the drivers that may cause a system to move to a more undesirable state
- identifying the way in which those drivers may act on a system and the thresholds that may exist between the states
- targeting effort towards those areas where it can make the greatest difference in preventing systems approaching or crossing thresholds.
The Strategic Plan outlines the long-term vision for the region and identifies the strategic directions required to maintain systems in healthy states. The key elements of the plan are summarised in Figure 1. A number of additional documents will support the implementation of the NRM Plan, although they are not formally a part of the plan (Figure 1).

Guiding principles for the NRM Plan

A set of guiding principles outline the underlying philosophy for implementing the NRM Plan:

- Achieve results through government, communities, research institutions and businesses working together.
- Plan for uncertainty and take action using an adaptive management approach.
- Consult with stakeholders to balance competing social and economic demands to ensure healthy natural resources that underpin healthy communities.
- Base decisions on the best available information.
- Allow for innovation.
- Protect and enhance core natural resource assets and processes.
- Allow for the intergenerational timeframes required to manage ecological systems.
WHAT THE NRM PLAN IS TRYING TO ACHIEVE

Vision, goals and targets

The NRM Plan is based on a long-term vision for the future of the region and was developed following extensive consultation undertaken for the first plan in 2008.

The vision, **Thriving communities caring for our hills, plains and seas**, is supported by four goals which outline what the stakeholders in the region are aiming to achieve by 2028 (20 years from the adoption of the first NRM Plan). The desired future described in the goals forms the basis to guide action by stakeholders in managing and improving the natural resources of the region. The goals are:

1. **Ecological processes for life and livelihood**
   - healthy seas, rivers and landscapes
   - well functioning ecological processes that support life and livelihoods.

2. **Communities engaged and active**
   - communities living within resource limits
   - informed and engaged communities actively protecting and restoring our natural resources.

3. **Amenity, culture and environment valued**
   - use and reuse of natural resources based upon environmental, economic, social and cultural values
   - iconic sites protected and new ones created.

4. **Knowledgeable decisions and action partners**
   - uncertainty acknowledged and actions anticipate change
   - partners committed to working together to achieve natural resources outcomes.

The regional targets, introduced in 2008 to support the vision and goals, describe the desired condition of natural resources in 2028. The 20-year regional targets (Table 1) assist with evaluating the region’s collective performance towards achieving the shared vision and goals over the long term. Details on how the regional targets link to the regional conceptual models, and other elements of the plan are given in the Strategic Plan (Volume 1).

The regional targets require action from all stakeholders and individuals with a commitment to managing natural resources in the region in order to be achieved. An evaluation of the regional targets late in 2012 considered the rate of progress of their implementation and any refinements that might be necessary. Minor changes were made to targets 1, 2, 5, 9 and 13, and target 4 was removed. Most of the changes improved the targets alignment with South Australia’s Strategic Plan and State NRM Plan targets. The regional targets are ambitious, but are considered to be achievable with appropriate investment.
Measuring success against the regional targets is an important element of measuring the success of the plan’s implementation. A set of core indicators is used to monitor progress and report cards are produced to report on progress against the targets. Further information on these indicators and report cards can be found at www.naturalresources.sa.gov.au/adelaidemtloftyranges.

Table 1: Regional targets

<table>
<thead>
<tr>
<th>Target* by 2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1  The region will have the system capacity to harvest up to 35 GL of stormwater and 50GL of wastewater per annum</td>
</tr>
<tr>
<td>T2  Aquatic ecosystems and groundwater condition is maintained or improved</td>
</tr>
<tr>
<td>T3  All water resources used within sustainable yield (allowing for variability)</td>
</tr>
<tr>
<td>T5  Maintain or increase the productive capacity of agriculture</td>
</tr>
<tr>
<td>T6  Land condition for primary production improved by 15%</td>
</tr>
<tr>
<td>T7  Condition and function of ecosystems (terrestrial, riparian) recovered from current levels</td>
</tr>
<tr>
<td>T8  Extent of functional ecosystems (coastal, estuarine, terrestrial, riparian) increased to 30% of the region (excluding urban areas)</td>
</tr>
<tr>
<td>T9  Improvement in conservation prospects of native species (terrestrial, aquatic, marine) from current levels</td>
</tr>
<tr>
<td>T10 Land based impacts on coastal, estuarine and marine processes reduced from current levels</td>
</tr>
<tr>
<td>T11 Halt the decline of seagrass, reef and other coast, estuarine and marine habitats and a trend towards restoration</td>
</tr>
<tr>
<td>T12 All coast, estuarine and marine water resources meet water quality guidelines to protect defined environmental values</td>
</tr>
<tr>
<td>T13 Increase participation in natural resources management activities by 20%</td>
</tr>
</tbody>
</table>

Note: T4 (Average annual cost of flood damage reduced) removed after a review and evaluation of targets
Indicators of achievement - business performance

As part of the process to evaluate and report on the success of the Business and Operational Plan, the board developed five-year intermediate targets to measure its contribution to, and progress towards, meeting the 20-year regional targets set for achievement in 2028. The targets were developed based on the first NRM Plan (published in 2008). The intermediate targets were set for a period of five years, which will be realised in June 2016. A final evaluation of achievement against these targets will be published on the board’s website by the end of 2016 at www.naturalresources.sa.gov.au/adelaidemtloftyranges/about-us/our-regions-progress#Report%20cards.

The current regional NRM Plan has been developed using a systems-based approach, with a basis in resilience thinking. To align with this planning framework, the board is intending to continue to report on the progress of the implementation of the plan according to key performance indicators rather than targets. The indicators (Table 2) enable the board to connect project outcomes to regional targets and to report on the implementation of this plan.

Table 2: Indicators of achievement

<table>
<thead>
<tr>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in activities and programs aimed at up-skilling natural resource managers</td>
</tr>
<tr>
<td>Participation in activities and programs aimed at raising awareness of natural resource issues</td>
</tr>
<tr>
<td>Participation in NRM through approved management plans</td>
</tr>
<tr>
<td>Positive behaviour change/adoption of sustainable practices</td>
</tr>
<tr>
<td>Investment in on-ground actions for improved management of natural resources</td>
</tr>
<tr>
<td>Investment in control of declared pest species</td>
</tr>
<tr>
<td>Pollutants (silt, debris and litter) prevented from entering estuarine and marine environments</td>
</tr>
</tbody>
</table>

Note: This is an initial list that will be refined and added to over time, in line with the Monitoring and Evaluation Framework.
THE REGION

The Adelaide and Mount Lofty Ranges region is one of eight natural resources management (NRM) regions established in South Australia under the Natural Resources Management Act 2004. It includes metropolitan Adelaide and the western side of the Mount Lofty Ranges, extending from Mallala and the Barossa in the north, to the Fleurieu Peninsula in the south (Figure 2). The region also extends up to 30 km into the marine environment. It covers a total area of approximately 11,200 square kilometres, of which approximately 59% is land. The marine area makes up the remaining 41%.

Further detail about the natural resources of the region is given in the Strategic Plan, which presents information about the region in two key ways:

- regional conceptual models
- subregional social ecological systems.

These two elements are summarised below.

Regional conceptual models

Regional conceptual models have been developed to help us to understand the key dynamics of the region. They focus on identifying potential states that can occur, key threats and drivers that may be moving systems towards an undesired state, and the management actions that can move a system towards a desired state.

The models are intended to broadly address both biophysical and socio-economic factors in an integrated approach. However, at this stage, the models are either primarily biophysically or primarily socially based. Over time, as more information becomes available, biophysical and socio-economic factors should be further integrated in these models, and the models will be scaled down to be more relevant at a local level. This is now occurring as part of the local-level planning being undertaken by the board.

The primarily biophysical models focus mainly on the ‘health’ of a system, and should be considered in association with the socially based conceptual models and the subregional systems to gain a full picture of the key dynamics of the Adelaide and Mount Lofty Ranges region. The three models with a primarily biophysical focus are:

- terrestrial landscape health
- marine health
- aquatic health.

The four socially based conceptual models describe the dynamics between people and the management of natural resources. These models are intended to work together and should not be considered in isolation. They should also be considered along with the biophysical conceptual models and the subregional systems to gain a full picture of the key dynamics in the region.

The four socially based models, and their focus, are:

- community support for natural resources management - all people in the region, whether or not they manage land
• building capacity of natural resources managers - land managers in the region, regardless of whether or not their properties commercial
• sustainable primary production - primary producers in the region, that is, land managers who derive an income and run a business from their property
• adapting to a changing climate - adaptation needs for a changing climate.

Subregional social ecological systems

The region has also been described using subregional social ecological systems which were identified through community engagement and technical input.

Social ecological systems are areas with generally (although not exclusively) consistent social and ecological characteristics including land form, vegetation types, land uses, and social structures and dynamics. The Adelaide and Mount Lofty Ranges region has been divided into seven subregions:

• Metropolitan Adelaide
• Northern Coast and Plains
• Northern Hills
• Central Hills
• Willunga Basin
• Fleurieu Peninsula
• Marine.

Subregions overlap. Each shares a concentration of common characteristics compared with adjacent areas. Subregions are described under the three key headings of:

• Lifestyles — about the people that live in the subregion
• Landscapes — about the landscapes in the subregion, including biodiversity and water resources
• Livelihoods — about the industry and commercial enterprises that rely on the natural resources of the subregion.

Managing public land in the region

Within the Adelaide and Mount Lofty Ranges region, there are more than 58,000 hectares of protected areas in national parks, marine parks, other reserves and specific areas of crown land managed for conservation purposes. The region also has extensive areas of land that is owned and managed by SA Water, and forestry reserves managed by Primary Industries and Resources SA (PIRSA). These public lands form an important part of the regional social-ecological systems and contribute to natural resources outcomes such as conservation of biodiversity, improved water quality and soil quality. The board works in an integrated way across the landscape taking into account public land areas and working closely with the relevant land managers. With the Department of Environment, Water and Natural Resources (DEWNR) being the major provider of services in the board’s delivery of the NRM Plan, there is a particularly close relationship and integration with NRM-related activities across DEWNR managed public land. This contributes to improved outcomes for both the board and DEWNR. Some public land management activities such as the provision of visitor services and fire management do not have a direct link to the objectives of the NRM Plan. These activities are included in the DEWNR Corporate Plan but are delivered in an integrated way across the region to ensure the best outcomes for its natural resources.
Activities in national parks, marine parks, other reserves and specific areas of Crown land are delivered through the following region-wide strategic actions:

- improve visitor infrastructure, access and experiences across the public estate
- manage and enhance the protected area network to provide for conservation of natural resources assets
- minimise bushfire risk on public land and maintain appropriate bushfire response capability and capacity

Figure 2: Adelaide and Mount Lofty Ranges NRM region
Key drivers of change in the region

Four key drivers of change have been identified for the Adelaide and Mount Lofty Ranges region as a consequence of understanding the regional dynamics and subregional systems that characterise a region. These drivers could push terrestrial, aquatic or marine health, as well as a range of social systems across thresholds to a different state or undesirable condition. The key drivers of change are:

- climate change
- land management and change
- economic impacts
- knowledge and capacity

Climate change

The future climate in the Adelaide and Mount Lofty Ranges region is predicted to:

- be warmer and drier with longer and hotter hot spells
- have less reliable rainfall and later breaks in the season
- have sea level rise and storm surges, which impact on coastal infrastructure and ecosystems (including internationally significant migratory bird species).

These predicted changes are likely to drive a wide range of changes to natural resources in the region, and changes to the industries that rely on those natural resources. Further information on the predicted changes and potential impacts of climate change can be found in the ‘Adapting to a changing climate’ regional conceptual model in Volume 1: Strategic Plan of the Adelaide and Mount Lofty Ranges NRM Plan 2014-2024.

Land management and change

Land use in the region is changing. In particular, urban areas are expanding, rural living is increasing and primary production uses are intensifying. These changes, along with the way land is managed, can result in a wide range of impacts on natural resources such as:

- clearance, and fragmentation of, vegetation
- increased use of water resources and decreasing water quality
- fragmentation of primary production land and reduction in farm size leading to less ability to run a profitable primary production business
- intensification of land use leading, to soil impacts
- conflicts between adjoining land uses

As well as threats to natural resources, such as:

- invasive species (e.g. pest plants, animals and pathogens)
- altered fire regimes (pre-existing and new/emerging threats).
Economic impacts

Areas within 100 km of the Adelaide GPO consistently generate around 25% of South Australia’s total farm-gate value of production, much of it from high-value horticulture, winegrape and livestock industries. This distinctive pattern of production arises from a combination of favourable natural resources and climate, major investments in infrastructure, and good access to labour, transport and support industries. Very few parts of the state enjoy this combination of factors. These same areas also present important opportunities for adapting to the impacts and uncertainties of climate change, water scarcity, and a carbon-constrained economy. Within this region SA’s farm-sector and food system are buffered from external shocks by the high rainfall, and cool climate conditions of the Mount Lofty Ranges, by access to multiple water resource options, including recycled wastewater, and by proximity to a major market and national freight network.

Commercial fisheries contribute $7.6 million (gross regional product) and important social benefits to the region. The main fisheries include the Gulf St Vincent Prawn Trawl fishery for Western King Prawn (as well as by-product catches of Slipper Lobster and Calamari) and the mixed species Marine Scalefish Fishery. A number of invertebrate species such as Calamari, Cuttlefish, Sand Crab, Blue Crab, and Goolwa and Mud Cockles are managed through the Marine Scalefish Fishery. The Australian Sardine fishery takes a range of small pelagic fish, including Sardine (Pilchard), Anchovy, Sprat and Round Herring in Gulf St Vincent waters.

The coast and marine environment also supports a range of recreational industries, for example, recreational fishing and charter boat activities. The main species of fish sought by charter boats in the Gulf St Vincent–Kangaroo Island region are Bight Redfish, King George Whiting and Snapper.

The ability of natural resources managers to implement works for improvement is dependent on the profibility of the enterprise.

Knowledge and capacity

People are an integral part of the environment, particularly in the this region, which has a significant population for its geographic area. Most land in the region is in private ownership and therefore to achieve improved natural resources outcomes it is critical to work with the people of the region.

People also provide a significant opportunity for NRM, contributing through both physical action on the ground and advocacy to policy-makers and the broader community about the value of natural resources to the community - both in the intrinsic value offered by the natural resources and the value of the industries those natural resources support.

Planning and improvement

In addition to the four key drivers of change that underpin the NRM Plan, the board also presents information, budget and projects against a fifth ‘driver of change’. This is the support required for ongoing adaptive planning and continuous improvement. The projects encompassed by this driver include:

- ongoing monitoring, evaluating and reporting on the successful implementation of the plan
- ongoing monitoring, evaluating and reporting on the state of natural resources
- continuous improvement to the plan, including supporting lower level plans.
FUNDING BOARD ACTIONS — FUNDING SOURCES

The board expects to receive funds to support its Implementation Plan (Appendix A) from a range of sources (Table 3). These include the regional NRM levy, the NRM water levy and various state and Australian government funding programs.

Table 3: Summary of board income streams

<table>
<thead>
<tr>
<th>Funding source</th>
<th>2015-16 adopted budget ($)</th>
<th>Estimated budgets ($)</th>
<th>2016-17</th>
<th>2017-18</th>
<th>2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levy funds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Division 1 - regional NRM levy
1                        | 25,790,000                |                        | 27,337,400 | 28,977,644 | 30,716,303 |
| Division 2 water levy — (prescribed water resources)
1                        | 696,000                   |                        | 696,000 | 696,000 | 696,0002 |
| Division 2 water levy — (public water supply)                        | 1,200,000                 |                        | 1,200,000 | 1,200,000 | 1,200,000 |
| Australian Government funding |                       |                        |         |         |         |
| National Landcare Program                        | 1,705,000                 |                        | 1,704,746 | 1,730,160 | -       |
| Biofund — Samphire Coast                          | 543,000                   |                        | 689,600 | -       | -       |
| Biofund — Resilient Landscapes                      | 999,000                   |                        | 1,230,000 | -       | -       |
| NRM planning for climate change                    | 24,000                    |                        | -       | -       | -       |
| River Torrens Recovery project                      | 500,000                   |                        | -       | -       | -       |
| Other income sources |                       |                        |         |         |         |
| 20 Million Trees Programme                        | 71,000                    |                        | 47,500 | -       | -       |
| Private industry/community contribution to- Water Sensitive SA | -                        |                        | 15,000 | -       | -       |
| Adelaide Living Beaches — Tennyson Dunes           | 52,000                    |                        | 50,000 | -       | -       |
| Council contribution to gross pollutant trap maintenance4 | 40,000                   |                        | 40,000 | 40,000 | 40,000 |
| Water levy penalties                                | 150,000                   |                        | 150,000 | 150,000 | 150,000 |
| Interest                                           | 200,000                   |                        | 200,000 | 200,000 | 200,000 |
| **TOTAL INCOME**                                   | **31,820,000**            |                        | **33,360,246** | **32,993,804** | **33,002,303** |
| Additional funding source — draw down retained earnings5 | 2,000,000                |                        | 1,500,000 |         |         |
| **TOTAL FUNDING SOURCES**                          | **33,820,000**            |                        | **34,860,246** | **32,993,804** | **33,002,303** |

1 Further information on the levy and its impact can be found in Appendix B
2 Indicative – may change if licensing is complete in Central Adelaide Prescribed Wells Area and a levy is introduced
3 Currently under renegotiation
4 Income derived from existing agreements with individual local governments
5 Subject to Department of Treasury and Finance approval
FUNDING BOARD ACTIONS — EXPENDITURE

The board’s work program is based on the required action for the region, as outlined in the Strategic Plan. Projects to be undertaken by the board are presented under the key drivers of change for the region, identified as:

- climate change
- land management and change
- economic impacts
- knowledge and capacity.

To support the adaptive planning approach adopted by the board, a number of additional projects have been identified (see the Planning and Improvement chapter in the Strategic Plan). These projects are grouped in this document in Appendix A in Table A2 under the heading ‘Planning and improvement’.

The budget expenditure presented in this section is at the key driver level for all three years of this Business and Operational Plan (Table 4). The board will publish an annual Implementation Plan, which outlines the budget at a more detailed level against projects. The first draft Implementation Plan for the 2016-17 year is provided in Appendix A. The annual Implementation Plan will be published on the board website in July, following its adoption by the board by the end of June each year.

The community will have ongoing opportunities to provide input into more detailed action planning across the region. This planning process will focus on further understanding the key issues for each subregion, and developing the projects the board will fund through the Implementation Plan to address those issues.

Table 4: Summary expenditure 2016-17 to 2018-19

<table>
<thead>
<tr>
<th>Key Driver</th>
<th>2016-17 Budget ($)</th>
<th>2017-18 Budget ($)(^1)</th>
<th>2018-19 Budget ($)(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>840,055(^2)</td>
<td>795,078</td>
<td>795,283</td>
</tr>
<tr>
<td>Land management and change</td>
<td>23,521,749</td>
<td>22,262,378</td>
<td>22,268,113</td>
</tr>
<tr>
<td>Economic impacts</td>
<td>1,025,701</td>
<td>970,784</td>
<td>970,784</td>
</tr>
<tr>
<td>Knowledge and capacity</td>
<td>6,701,224</td>
<td>6,342,436</td>
<td>6,344,070</td>
</tr>
<tr>
<td>Planning and improvement</td>
<td>2,771,517</td>
<td>2,623,128</td>
<td>2,623,804</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>34,860,246</strong></td>
<td><strong>32,993,804</strong></td>
<td><strong>33,002,303</strong></td>
</tr>
</tbody>
</table>

\(^1\) Indicative: subject to the development of projects in the 2017-18 and 2018-19 Implementation Plans

\(^2\) This funding relates primarily to Australian Government funding that is specific to climate change. Climate change adaptation and understanding of climate change impacts is also incorporated within a wide range of projects funded under other key drivers.
Staff and physical resources required to implement the plan

Staff resources

The projects outlined in this plan are implemented by Department of Environment, Water and Natural Resources staff who are provided to the board through a service agreement, negotiated on an annual basis. A range of partnerships and service agreements with, and grants to, other organisations also support project officers who assist in the delivery of the projects in this plan. These project officers are funded on a specific project basis, and are tied to specific project outcomes.

Physical resources

Staff supporting the delivery of the plan on behalf of the board are located in a number of offices distributed across the region, the aim being to maintain close links with the community.

In the period 2016-17 to 2018-19 the board will continue with the construction of wetlands, gross pollutant traps and stormwater and wastewater reuse projects. The associated structures will not require the acquisition of land as these projects will be undertaken with partner organisations on their land. After completion, the asset will be handed over to the partner organisation through an appropriate transfer from the board’s asset register.

It is not envisaged that the board will need to acquire any land or existing infrastructure assets during 2016-17 to 2018-19.
GUIDING ACTION THROUGH LOCAL-LEVEL PLANNING

Why more detailed planning?

The Adelaide and Mount Lofty Ranges Natural Resources Management Plan (the regional NRM Plan), completed in 2013, is a high-level plan for the region. Its purpose is to provide the overall strategic direction to all stakeholders, on the types of actions needed to address the important natural resources issues.

Being a high-level plan, it does not provide enough detail to guide action at the local scale. For this reason, the intention has always been to provide a more detailed level of planning to link the Strategic Plan to local action.

Information gathered during the development of the NRM Plan was scaled up for its formulation, and has been scaled down to provide the starting point for local-level planning.

The key purpose of this local-level planning process is to be clear, in conjunction with our stakeholders, about what we do, why we do it, where we do it and when we do it. To achieve this we need a process that:

- is transparent and provides a consistent approach to investment in action
- bases investment decisions on the best available information
- targets action at the best possible point of intervention in a system.

A key part of the planning process is to clearly document the evidence that supports our understanding of an issue, and the action we plan to take. In this context, we consider evidence to include information gained from expert opinion (including local and community experts) through to peer-reviewed journal articles.

Adaptive planning – what are the elements in the region?

Regional and local-level planning are part of the ongoing adaptive planning process in the region. In its simplest form, adaptive planning is about continuous learning and therefore regular improvements to the NRM Plan. An adaptive planning process allows us to regularly test our understanding (and the assumptions we make) of issues and actions in our region; this is often commonly referred to as a ‘plan-do-learn cycle’. The key focus is to have a process that allows for sound decision-making, using the best available information in an uncertain environment. It also allows us to take advantage of changing funding sources when developing projects.
The elements of the adaptive planning framework, and how they fit together are shown in Figure 3. The key documents that form part of this adaptive planning framework are:

- Adelaide and Mount Lofty Ranges NRM Plan
  - Volume 1: Strategic Plan 2014-15 to 2024-25
  - Volume 2: Business and Operational Plan 2016-17 to 2018-19 (this document)
- Annual Implementation Plan (see Appendix A)
- Strategic plan to local action - the process of local-level planning (see following sections of this chapter).

![Figure 3: Elements of the adaptive planning framework for the Adelaide and Mount Lofty ranges region](image)

**The process for local-level planning**

The local-level planning process is the next step in adaptive planning for the region. Ultimately, it will guide action on the ground and result in improvements to the NRM Plan. This process is not about starting again from the beginning - it's about building on the regional NRM Plan and linking it to local action. An outline of the overall process is shown in Figure 4.

Broadly there are two key components to the process:

1. describing our understanding of issues
2. developing projects to address those issues.

**Describing issues**

Social-ecological systems form the basis of the NRM Plan and they are complicated. Even at a local scale, it is difficult to try to understand all the:

- links within and between systems
- causes and effects of changes to that system
- responses to threats.
This makes it hard to clearly target action to where it will have the biggest impact. To help manage this complexity, and provide meaningful direction to investment in action, the local-level planning process has been designed to break down systems into more manageable issues that can be more simply described. An issue can be defined as:

*A subset of a more complex social-ecological system that is described by a manageable set of links between the socio-economic drivers, the resultant changes to natural resources and the flow on socio-economic consequences.*

An issue is only one aspect of a social-ecological system, and a system can be broken down in many ways. There is no right or wrong way to do it. The approach is about taking a subset (or set of cause-and-effect relationships) of a multi-dimensional system and breaking it down in a way that makes it possible to describe the cause-and-effect relationships, without getting sidetracked in complexity. Systems are complicated, which means there are always going to be interactions and overlaps between the various issues.
Describing the issues can be conceptualised as the ‘diagnosis’ phase. An important component of describing our understanding of an issue is the development of a causal model. The model describes the parts (boxes in the causal model) within the system and the cause-and-effect relationships between the parts (the arrows between the boxes in the causal model). The causal models are described areas asking three key questions:

Describing the issue in this way incorporates social and economic elements (dealing with the issue as part of a social-ecological system) rather than considering the issue in terms of the straightforward biophysical elements.

The board has begun to develop an initial list of issues as part of this process. The initial list has been compiled based on:

- community and stakeholder input to the regional planning process
- input from other planning processes in the region
- discussion with staff across the region.

The list will continue to be added to over time as new issues arise, and issues on the list are managed by projects designed to address them. The issues that are not immediately identified as a priority for investment (see below) will not be discarded, they will be held and reviewed if new information about the issue becomes available. In this way the issues list will be continuously changing as issues are addressed and new issues added. This is a key part of the adaptive planning process.

The current initial list of issues can be viewed at:


Making decisions about priority issues

The board has developed a decision support framework to help to guide decision-making about issues and projects. The part of the framework relating to issues uses two sets of criteria to assist in the identification of the issues that require further consideration.

For an issue to proceed to a more detailed assessment it must:

- be within the scope of the NRM Plan
- be spatially identifiable
- be clearly defined with respect to causes and impacts
- have evidence and data that verifies that there are impacts
- be unable to resolve itself without intervention (not natural variability)
- be aligned with the NRM Plan (Volume 1 Strategic Plan).

The second element of the framework will then rank issues as a high, medium or low priority for investment in action to address the issue.

The factors considered in the ranking of issues are:

- trends indicating a significant decline in condition of a natural resource (or social) capacity
- trends indicating that the issue is approaching a known or suspected threshold that once crossed will be difficult, expensive or impossible to reverse
• the presence of known or suspected emerging threats that will significantly impact on the issue
• declining diversity in the system
• additional investment resulting in a better outcome
• agreement across stakeholders about the causes and effects.

The end product will be a web-based list of high, medium and low priority issues for investment in action. This is a list for all stakeholders in the region. The board will use this list as the basis for the development of projects to be funded through the annual Implementation Plan.

Developing projects

The second part of this process involves the development of the projects in which the board will invest to address the key natural resources issues for the region. This can be conceptualised as the ‘treatment’ of the issues. Projects will not be developed in a 1 to 1 relationship with issues. Issues in a similar location, or with similar actions required, may be grouped to develop projects. Although issues may be described at a more local scale to ensure all drivers of change are well understood - it may make more sense to deliver a project at a more regional scale.

The current projects are provided in the draft Implementation Plan, given in Appendix A.

Making decisions about priority projects

The decision support tool also includes a range of criteria that will be used to support project investment decisions. The criteria cover a wide range of areas that the board believes are important in developing and implementing projects. The board will assess project proposals annually and make decisions about which projects will be funded and implemented in the annual Implementation Plan.

Factors considered in the ranking of projects include:

• alignment with the Strategic Plan
• the effectiveness of the type of action in addressing an issue
• how the project contributes to the general resilience of a system by building diversity, social networks and leadership in the community
• innovation
• engagement and collaboration in project development and implementation
• cost effectiveness
• learning and adapting - ensuring that the project achieves its desired outcomes and there is overall improvement in the natural resources of the region
APPENDIX A: DRAFT IMPLEMENTATION PLAN 2016-17

The board’s work program is based on the required action for the region, as outlined in Volume 1 of the regional NRM Plan: Strategic Plan. In line with the Strategic Plan, the projects the board will fund in 2016-17 are presented under the key drivers of change for the region:

- climate change (e.g. ecosystem adaptation, primary production adaptation)
- land management and change (e.g. land management, water management - including stormwater, coast and marine management)
- economic impacts (e.g. sustainable industries, water reuse)
- knowledge and capacity (e.g. volunteer support, school education, capacity building for land managers).

To support the adaptive planning approach adopted by the board, a number of additional projects have been identified (e.g. regional and local-level planning, monitoring, evaluation and reporting). As noted earlier in this document these projects are grouped under the heading ‘Planning and improvement’.

A summary breakdown of the budget against the key drivers is presented in Figure A1 and Table A1. Details of the projects under each key driver, and their associated operational budgets are presented in Table A2. Department of Environment, Water and Natural Resources staff support the delivery of the plan through the projects outlined below. The costs associated with staff support to deliver the plan are summarised in Table A1 at the key driver level. The final Implementation Plan will be published by the board on its website at the beginning of the 2016-17 year, following its endorsement by the board at the June 2016 meeting.

Figure A1: Summary of expenditure by key driver 2016-17

LEGEND
- Land management and change (land, water, coast and marine)
- Climate change
- Planning and improvement
- Knowledge and capacity (volunteers, schools increase capacity of NRM)
- Economic impacts
Table A1: Summary expenditure by key driver 2016-17

<table>
<thead>
<tr>
<th>Key driver</th>
<th>Operational ($)</th>
<th>Salaries and overheads ($)</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>729,600</td>
<td>110,455</td>
<td>840,055</td>
</tr>
<tr>
<td>Land management and change</td>
<td>14,995,832</td>
<td>8,525,917</td>
<td>23,521,749</td>
</tr>
<tr>
<td>Economic impacts</td>
<td>471,630</td>
<td>554,071</td>
<td>1,025,701</td>
</tr>
<tr>
<td>Knowledge and capacity</td>
<td>3,486,907</td>
<td>3,214,317</td>
<td>6,701,224</td>
</tr>
<tr>
<td>Planning and improvement</td>
<td>1,383,938</td>
<td>1,387,579</td>
<td>2,771,517</td>
</tr>
</tbody>
</table>

1 This funding relates primarily to Australian Government funding that is specific to climate change. Climate change adaptation, and understanding of climate change impacts, is also incorporated with in a wide range of projects funded under other key drivers.

Table A2: Proposed projects 2016-17

<table>
<thead>
<tr>
<th>Action</th>
<th>Operational ($)</th>
<th>Links to regional conceptual models¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key driver: Climate change</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC-1: Protect and rehabilitate the Samphire Coast from the impacts of</td>
<td>689,600</td>
<td>✓ ⚫</td>
</tr>
<tr>
<td>climate change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC-2: Support the development of locally relevant climate change</td>
<td>40,000</td>
<td>✓ ⚫</td>
</tr>
<tr>
<td>☰ Responses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Key driver: Land management and change                                  |                 |                                       |
| LM-1: Implement the coastal action plan for the Northern Coast         | 132,738         | ✓ ⚫                                  |
| LM-2: Support land managers to protect and improve the condition of    | 190,800         | ✓ ⚫                                  |
| watercourses, terrestrial landscapes, and their ecosystems in the      |                 |                                       |
| Northern Coast and Plains                                              |                 |                                       |
| LM-3 Support land managers to protect and improve the condition of     | 246,962         | ✓ ⚫                                  |
| remnant ecosystems in the Barossa and South Para                       |                 |                                       |

Key - link to regional conceptual models
✓ - Primary
⚫ - Secondary
1 - Climate change adaptation is an integral part of the board’s work and is linked to all projects where relevant
2 - Project part of a ministerial direction

Key driver: Climate change
(This funding relates primarily to Australian Government funding that is specific to climate change. Climate change adaptation, and understanding of climate change impacts, is also incorporated within a wide range of projects funded under other key drivers)
<table>
<thead>
<tr>
<th>Action</th>
<th>Operational ($)</th>
<th>Links to regional conceptual models¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-4: Support land managers to improve and expand grassy ecosystems in the Northern Foothills and Upper Light</td>
<td>248,787</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-5: Support land managers to protect and improve the condition of watercourses and riparian zones in the Northern Hills</td>
<td>213,835</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-6: Support land managers to protect and enhance biodiversity in the Central Hills, focusing on the shrubby forest and woodland landscapes</td>
<td>408,940</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-7: Support land managers to restore the grassy woodland landscapes in the Central Hills</td>
<td>205,904</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-8: Support land managers to protect and improve the condition of watercourses (including improving water quality and riparian zones) in the Central Hills</td>
<td>142,935</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-9: Support land managers to protect and improve the condition of watercourses, land systems and ecosystems in the Willunga Basin</td>
<td>363,074</td>
<td>☑️ ☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-10: Implement the coastal action plan for the Fleurieu Peninsula</td>
<td>194,238</td>
<td>☑️ ☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-11: Support land managers to protect and improve remnant ecosystems in the Deep Creek to Newland Head area, Hindmarsh Tiers and South West Fleurieu</td>
<td>358,600</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-12: Support land managers to restore and reinstate the grassland systems in the Fleurieu Peninsula</td>
<td>128,480</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-13: Support land managers to protect and improve the condition of watercourses and riparian zones in the Fleurieu Peninsula</td>
<td>108,500</td>
<td>☑️ ☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-14: Support land managers to protect and improve the condition of Fleurieu Swamps</td>
<td>164,700</td>
<td>☑️ ☑️ ☑️</td>
</tr>
<tr>
<td>LM-15: Implement the coastal action plan for Metropolitan Adelaide and the Willunga Basin</td>
<td>185,576</td>
<td>☑️ ☑️ ☑️ ☑️</td>
</tr>
</tbody>
</table>

Key - link to regional conceptual models
- Primary
- Secondary
1 - Climate change adaptation is an integral part of the board’s work and is linked to all projects where relevant
2 - Project part of a ministerial direction
<table>
<thead>
<tr>
<th>Action</th>
<th>Operational ($)</th>
<th>Links to regional conceptual models¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrestrial landscape health</td>
<td>Marine health</td>
<td>Aquatic health</td>
</tr>
<tr>
<td>LM-16: Support land managers to restore ecosystems in the Hills Face Zone, focusing on Grey Box Grassy Woodlands</td>
<td>84,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-17: Restore Tennyson Dunes</td>
<td>50,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-18: Work with partners to improve urban and peri-urban watercourse condition and reduce impacts on the marine environment</td>
<td>1,653,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-19: Patawalonga Cost Recovery²</td>
<td>975,800</td>
<td>✓</td>
</tr>
<tr>
<td>LM-20: Work in partnership with key stakeholders to improve the long-term prospects of threatened and declining species and communities</td>
<td>452,933</td>
<td>✓</td>
</tr>
<tr>
<td>LM-21: Work in partnership to provide environmental flows in the Western Mount Lofty Ranges Prescribed Water Resources Area and downstream of reservoirs</td>
<td>440,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-22: Encourage the increased adoption of water sensitive urban design through capacity building programs and demonstration sites</td>
<td>815,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-23: Partner with local government to improve the land use planning system to achieve NRM outcomes</td>
<td>20,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-24: Support continued estuary and coastal conservation planning activities</td>
<td>105,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-25: Protect and improve the condition of marine ecosystems and species, including reefs, seagrass habitats and offshore islands</td>
<td>290,353</td>
<td>✓</td>
</tr>
<tr>
<td>LM-26: Undertake and support the strategic management of over abundant native species</td>
<td>16,000</td>
<td>✓</td>
</tr>
<tr>
<td>LM-27: Undertake and support the strategic management of priority pest plants and vertebrate pests, including in the urban environment</td>
<td>346,227</td>
<td>✓</td>
</tr>
<tr>
<td>LM-28: Implement Adelaide Living Beaches Strategy²</td>
<td>2,654,750</td>
<td>✓</td>
</tr>
</tbody>
</table>

Key - link to regional conceptual models
✓ - Primary
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<tr>
<td></td>
<td></td>
<td>Terrestrial landscape health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aquatic health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community support for NRM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Building capacity of natural resource managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sustainable primary production</td>
</tr>
<tr>
<td>LM-29: Undertake restoration works to create resilient landscapes in priority areas</td>
<td>1,280,000</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM-30: Support local government in the development of stormwater management plans</td>
<td>150,000</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM-31: Undertake water resources management planning to support the sustainable use and management of water resources</td>
<td>2,368,700</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM-32: Provide advice and support to approvals and referrals from other organisations</td>
<td>0</td>
<td>✓ ✓</td>
</tr>
</tbody>
</table>

Key driver: Economic impacts

| EI-1: Work in partnership with agri-industry groups to improve NRM outcomes | 210,000        | ✓ ✓ ✓                                 |
|                                                                          |                |                                       |
| EI-2: Increase the knowledge and management options for the use of native grasses in sustainable production systems | 20,000         | ✓ ✓ ✓                                 |
|                                                                          |                |                                       |
| EI-3: Work in partnership with marine industry groups to improve NRM outcomes | 41,630         | ✓ ✓ ✓                                 |
|                                                                          |                |                                       |
| EI-4: Work in partnership with other organisations to support and optimise the use of alternative water supplies (stormwater harvesting) | 200,000        | ✓ ✓ ✓                                 |

Key driver: Knowledge and capacity

| KC-1: Support and expand the network of natural resources centres across the region | 463,264        | ✓ ✓                                   |
|                                                                                |                |                                       |
| KC-2: Support school sustainability initiatives and opportunities to extend education to their connected communities | 1,313,278      | ✓ ✓                                   |

Key - link to regional conceptual models
✓ - Primary
✓ - Secondary
1 - Climate change adaptation is an integral part of the board’s work and is linked to all projects where relevant
2 - Project part of a ministerial direction
<table>
<thead>
<tr>
<th>Action</th>
<th>Operational ($)</th>
<th>Links to regional conceptual models¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>KC-3: Support the involvement of volunteers in managing natural resources</td>
<td>1,039,365</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>KC-4: Build community understanding and support of natural resources management through the implementation of a communications strategy</td>
<td>200,000</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>KC-5: Provide opportunities for key stakeholders to participate in natural resources management capacity building and decision making, including Aboriginal communities, non-government organisations and local government</td>
<td>135,000</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>KC-6: Build urban residents’ understanding and capacity to change behaviour in relation to natural resources management, sustainable living and food production</td>
<td>200,000</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>KC-7: Promote improved land management practices through improving the knowledge, skills and capacity of land managers, including delivery of the Landcare program in the region</td>
<td>136,000</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
</tbody>
</table>

**Key driver: Planning and improvement**

| PI-1: Continue to improve the regional NRM Plan, and develop policies and plans to support the implementation of the plan | 80,000 | ✓ ✓ ✓ ✓ ✓ |
| PI-2: Coordinate and support the monitoring and evaluation of the condition of natural resources to enable reporting on the implementation of the NRM Plan and the regional targets | 1,035,000 | ✓ ✓ ✓ ✓ ✓ |
| PI-3: Report on the status of natural resources and the implementation of the NRM Plan to the community, including developing and maintaining information management systems | 268,938 | ✓ ✓ ✓ ✓ |

---

1 - Climate change adaptation is an integral part of the board’s work and is linked to all projects where relevant
2 - Project part of a ministerial direction
APPENDIX B: THE LEVY AND ITS IMPACT

The Adelaide and Mount Lofty Ranges Natural Resources Management Board specifies the collection of two levies: the Division 1 Regional NRM Levy and the Division 2 NRM Water Levy. A significant review of both levies was undertaken in 2013.

The reviews reached the following conclusions:

- continue to use Option 1: the value of rateable land to determine the Division 1 Regional NRM Levy
- continue to use a combination of Option 2: quantity of water allocated, and Option 6: quantity of water used, for determining the Division 2 NRM Water Levy
- continue to collect both the Division 1 Regional NRM Levy and the Division 2 NRM Water Levy rather than to move the collection of only one levy.

Since 2013, a further review of the water levy has been undertaken, the conclusion of which was to base the water levy solely on water allocated. A social impact of the water levy was also undertaken at this time, and is included below. The water levy remains unchanged from the previous Business and Operational Plan, as there is no proposal to change it during the life of this plan. This plan proposes an increase to the Division 1 Regional NRM Levy, and the social impact assessment of the proposed increase in the levy is also outlined below.

Division 1 Regional NRM Levy: quantum and social impact

Quantum of the Division 1 Regional NRM Levy

The Business and Operational Plan identifies a range of projects that the board proposes to undertake over the next three years to assist in implementing the Strategic Plan. The board’s proposed expenditure over the next three years is summarised in Table B1. Also indicated is the quantum of the regional NRM levy proposed to be raised to support the board’s work program.

The proposed annual increase in the levy in each of the three years: 2016-17, 2017-18 and 2018-19 is 6%.

<table>
<thead>
<tr>
<th></th>
<th>2016-17</th>
<th>2017-18</th>
<th>2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board proposed expenditure</td>
<td>$34,710,246</td>
<td>$32,846,804</td>
<td>$32,852,303</td>
</tr>
<tr>
<td>Regional NRM Levy</td>
<td>$27,337,400</td>
<td>$28,977,644</td>
<td>$30,716,303</td>
</tr>
</tbody>
</table>
Social impact of the Division 1 Regional NRM Levy

The board undertook an assessment of the social and economic impacts of the Division 1 Regional NRM Levy, to assist in the determination of the appropriate amount of the levy. The complete report is available from the board. The key findings from the report are summarised below. To assess the social and economic impacts an economic model was constructed.

A new social impact assessment for the Division 1 Regional NRM Levy was undertaken in 2015, to assess the impact of the levy increase the proposed this Business and Operational Plan (as outlined above). For the Division 1 Regional NRM Levy, the analysis concentrated on the impact of the levy on residential property owners. Four measures of household income were used:

- mean income - includes wages and salaries, investment income, income from own business
- mean wages and salaries (before and after tax)
- full age pension for couples
- full age pension for singles.

The average levy per residential property in each council area was calculated on the basis of value of rateable land. The levy amount was calculated as a percentage of each measure of income listed above (e.g. mean income, mean wages and salaries). The levy was calculated for maximum property values in each local government area, as well as for properties of average value.

Key points arising from the modelling

The impact of the division 1 levy can be summarised as follows:

- Among the four main land use types, residential properties account for 81% of the levy raised ($22.14 million); commercial properties 11% ($3.06 million); rural properties 3% ($0.86 million); and industrial properties 2% ($0.51 million).
- Residential property levy: mean of $40 across the region (ranging from $22 in Playford to $71 in Walkerville); median of $40, maximum of $4,352 (in Victor Harbor); and minimum of less than $1.
- Commercial property levy: mean of $73 across the region (ranging from $32 in Mallala to $99 in Marion); median of $35, maximum of $28,469 (in Adelaide); and minimum of less than $1.
- Industrial property levy: mean of $90 across the region (ranging from $19 in Yankalilla to $159 in Light); median of $39, maximum of $61,858 (in West Torrens); and minimum of less than $1.
- Rural property levy: mean of $54 in the region (ranging from $2 in Unley to $64 in Mount Barker); median of $41, maximum of $4,675 (in Mallala); and minimum of less than $1.
- Across all properties: mean of $41 (ranging from $25 in Playford to $70 in Burnside); median of $35, maximum of $61,858 (in West Torrens); and minimum of less than $1.

The average per property levy (residential, industrial, commercial) per local government area is shown in Table B2. The levy would be a minor impost on both average-income and low-income households. The exception would be for a household with the maximum capital value in the region combined with a low income (single pensioner), where the impact could be significant.
Table B2: Average levy per property and estimated share of levy

<table>
<thead>
<tr>
<th>Local government area</th>
<th>Average levy per property ($)&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Estimated share of levy ($)&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adelaide</td>
<td>61</td>
<td>1,465,202</td>
</tr>
<tr>
<td>Adelaide Hills</td>
<td>49</td>
<td>886,896</td>
</tr>
<tr>
<td>Alexandrina</td>
<td>44</td>
<td>162,145</td>
</tr>
<tr>
<td>Barossa</td>
<td>35</td>
<td>432,886</td>
</tr>
<tr>
<td>Burnside</td>
<td>70</td>
<td>1,466,668</td>
</tr>
<tr>
<td>Campbelltown</td>
<td>43</td>
<td>1,001,895</td>
</tr>
<tr>
<td>Charles Sturt</td>
<td>44</td>
<td>2,504,213</td>
</tr>
<tr>
<td>Gawler</td>
<td>30</td>
<td>328,948</td>
</tr>
<tr>
<td>Holdfast Bay</td>
<td>53</td>
<td>1,093,763</td>
</tr>
<tr>
<td>Light</td>
<td>38</td>
<td>309,488</td>
</tr>
<tr>
<td>Mallala</td>
<td>33</td>
<td>162,513</td>
</tr>
<tr>
<td>Marion</td>
<td>40</td>
<td>1,682,675</td>
</tr>
<tr>
<td>Mitcham</td>
<td>50</td>
<td>1,468,661</td>
</tr>
<tr>
<td>Mt Barker</td>
<td>47</td>
<td>101,077</td>
</tr>
<tr>
<td>Norwood, Payneham and St Peters</td>
<td>56</td>
<td>1,111,232</td>
</tr>
<tr>
<td>Onkaparinga</td>
<td>33</td>
<td>2,606,295</td>
</tr>
<tr>
<td>Playford</td>
<td>25</td>
<td>994,500</td>
</tr>
<tr>
<td>Port Adelaide Enfield</td>
<td>37</td>
<td>2,337,467</td>
</tr>
<tr>
<td>Prospect</td>
<td>50</td>
<td>489,370</td>
</tr>
<tr>
<td>Salisbury</td>
<td>31</td>
<td>1,874,664</td>
</tr>
<tr>
<td>Tea Tree Gully</td>
<td>37</td>
<td>1,588,699</td>
</tr>
<tr>
<td>Unley</td>
<td>63</td>
<td>1,175,788</td>
</tr>
<tr>
<td>Victor Harbor</td>
<td>35</td>
<td>379,019</td>
</tr>
<tr>
<td>Walkerville</td>
<td>69</td>
<td>270,392</td>
</tr>
<tr>
<td>West Torrens</td>
<td>42</td>
<td>1,260,136</td>
</tr>
<tr>
<td>Yankalilla</td>
<td>32</td>
<td>182,808</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>27,337,400</strong></td>
</tr>
</tbody>
</table>

<sup>1</sup> Estimated based on July 2015 capital value data. All property types (residential, commercial, industrial, rural).

<sup>2</sup> Estimated based on July 2015 capital value data. Final figures will be published in the Government Gazette following the adoption of the plan.

Local government collection of the Division 1 Regional NRM Levy

The share of the total to be collected by each local government will be calculated based on the proportion of the total capital value of the region within that council area. The estimated share for each local government for the 2016-17 year is presented in Table A3. The final contribution for each local government area will be published annually in the Government Gazette.
The Natural Resources Management (Financial Provisions) Regulations 2005 allows local government to recover ongoing costs associated with the cost of a levy (4(C)(6)) on the basis of:

‘$1,848 (indexed) plus 18 cents (indexed) for each assessment of levy against a piece of rateable land’

Division 2 NRM Water Levy: quantum and social impact

Representative financial models were used to assess the impact of changes in the NRM Water Levy. The analysis required reasonably detailed financial models of the main irrigated agricultural enterprises in the region. The financial models were structured to generate a range of financial indicators, such as measures of profitability (earnings before interest and tax - EBIT), total variable costs and total costs (fixed plus variable). The levy as a proportion of costs and its impact on profitability (EBIT) were calculated. The basis for the levy was the volume of water allocated and the volume of water received. This work was undertaken for the 2015-16 Business and Operational Plan. No changes are proposed to the Division 2 NRM Water Levy for this Business and Operational Plan.

Quantum of the Division 2 NRM Water Levy

The Department of Environment, Water and Natural Resources bills licensed water users and collects the revenue on behalf of the board. Table B3 outlines the prescribed resources and the levy rate per megalitre (ML) proposed to be charged for the 2015-16 to 2017-18 years.

The proposed rate for the Division 2 Water Levy is $6/ML for all prescribed areas. In 2015-16 this was a new levy for the Western Mount Lofty Ranges Prescribed Water Resources Area (PWRA), and a reduction in the levy for the other prescribed areas, which were previously $5/ML on allocation plus $5/ML on use.

<table>
<thead>
<tr>
<th>Area</th>
<th>Rate ($) per megalitre and basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>McLaren Vale Prescribed Wells Area</td>
<td>$6/ML on water allocated</td>
</tr>
<tr>
<td>Northern Adelaide Plains Prescribed Wells Area</td>
<td>$6/ML on water allocated</td>
</tr>
<tr>
<td>Barossa PWRA</td>
<td>$6/ML on water allocated</td>
</tr>
<tr>
<td>Western Mount Lofty Ranges PWRA</td>
<td>$6/ML on water allocated</td>
</tr>
<tr>
<td>Western Mount Lofty Ranges PWRA (water allocated for public water supply)</td>
<td>Fixed charge of $1.2 million</td>
</tr>
<tr>
<td>Central Adelaide Prescribed Wells Area</td>
<td>* levy may be introduced in 2018-19 pending licensing</td>
</tr>
<tr>
<td>NRM Water Levy on persons authorised under Section 128 of the NRM Act to take water from a water resource within the:</td>
<td>$6/ML on water allocated</td>
</tr>
<tr>
<td>• Western Mount Lofty Ranges PWRA</td>
<td></td>
</tr>
<tr>
<td>• Barossa PWRA</td>
<td></td>
</tr>
<tr>
<td>• McLaren Vale PWRA</td>
<td></td>
</tr>
<tr>
<td>• Adelaide Plains PWRA</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C: WATER AFFECTING ACTIVITY PERMITS

Section 75(3)(k) of the *Natural Resources Management Act 2004* (the Act) requires the Adelaide and Mount Lofty Ranges Natural Resources Management Board (the board) to set out matters it will consider when exercising its powers to grant or refuse permits under Chapter 7 Part 2 of the Act.

The conditions under which the Board will grant or refuse a permit may be outlined in either the Regional NRM Plan (this document) or a relevant water allocation plan (WAP). Where a WAP exists (and outlines policies for any given water affecting activity) the policies within the WAP will be used as the basis for the assessment of the permit application. The policies in this section will be used only where a relevant WAP does not apply.

A permit is required for water affecting activities (WAAs) described in section 127(3) of the Act, and may be required for activities listed in section 127(5) of the Act. A number of activities are excluded from requiring a permit under section 129 of the Act, for example activities approved under other legislation, such as the *Environment Protection Act 1993* (SA) or the *Development Act 1993* (SA). In addition, the board has identified some instances where activities that would otherwise require a permit are excluded (Table C1).

A WAA permit application is assessed by taking the steps of:

1. ascertaining the nature and scope of the WAA with reference to section 127(5) of the Act
2. precisely defining the affected site and determining if it is affected by a WAP
3. ensuring sufficient information has been provided by the applicant to enable the relevant authority to make an informed decision
4. determining if the WAA permit application qualifies as an exclusion (if it does not, it will be assessed through the ‘on-merit’ process
5. assessing ‘on-merit’ applications against the WAA permit policies in the NRM Plan.

**Public notification**

Public notification is not required for any WAA permit applications under the Act.

**Current recommended practice**

The board has determined a process for granting exemptions to landowners for particular WAAs that would otherwise require a permit.

Current recommended practices (CRPs) are approved procedures endorsed by the board. A CRP sets out what the board considers to be the most appropriate approach, methodology and/or design for undertaking activities pursuant to section 127 of the Act. In addition, a CRP may clarify the standards required to discharge the specific duty pursuant to section 133 of the Act.

In some instances, a CRP will negate the requirement for a WAA permit. Table C1 lists the WAAs that have the potential to be low risk and therefore suitable for a CRP. A list of approved CRPs is published on the board’s website.
Best practice operating procedures

The board has determined a process for granting exemptions to local government and other statutory authorities for particular WAAs that would otherwise require a permit. Best practice operating procedures are approved procedures developed by eligible authorities to exceed minimum standards of operations for a range of water activities undertaken.

Table C1: Water affecting activities (WAA) exclusions

| (a) 127(3)(a) | Act definition: | Drilling, plugging, backfilling or sealing a well  
|              |                | *e.g. Well closure*  
|              | WAAs excluded from requiring a permit: | None  
|              | Relevant authority: | Minister  

| (b) 127(3)(b) | Act definition: | Repairing, replacing or altering the casing, lining or screening of a well  
|              |                | *e.g. Well maintenance or upgrade*  
|              | WAAs excluded from requiring a permit: | None  
|              | Relevant authority: | Minister  

| (c) 127(3)(c) | Act definition: | Draining or discharging water directly or indirectly into a well  
|              |                | *e.g. Managed aquifer recharge*  
|              | WAAs excluded from requiring a permit: | None  
|              | Relevant authority: | Minister  

### 127(3)(d)

**Act definition:**
The erection, construction or enlargement of a dam, wall or other structure that will collect or divert:

1. water flowing in a prescribed watercourse,
2. water flowing in a watercourse in the Mount Lofty Ranges watershed that is not prescribed, or
3. surface water flowing over land in a surface water prescribed area or in the Mount Lofty Ranges watershed

*e.g. Construction of a dam, wall or other structure; channelling a watercourse*

**WAAs excluded from requiring a permit:**
- None

**Relevant authority:**
Board

### 127(5)(a)

**Act definition:**
The erection, construction or enlargement of a dam, wall or other structure that will collect or divert water flowing in a watercourse, that is not in the Mount Lofty Ranges watershed and that is not prescribed, or flowing over any other land that is not in a surface water prescribed area or in the Mount Lofty Ranges watershed

*e.g. Construction of a dam, channelling a watercourse*

**WAAs excluded from requiring a permit:**
- None

**Relevant authority:**
Board

### 127(5)(b)

**Act definition:**
The erection, construction or placement of any building or structure in a watercourse or lake or on the floodplain of a watercourse

*e.g. Buildings or structures <10m²; culvert; crossing point or bridge; fencing*

**WAAs excluded from requiring a permit:**
- Activity that is proposed to be undertaken beyond the 1 in 100 year flood recurrence level, where flood mapping is available, or a distance of 10 metres or more from the banks of the nearest watercourse where flood mapping is not available
- Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board endorsed best practice operating procedure addressing the activity
- Activity undertaken in accordance with any board-endorsed current recommended practice (CRP)
- A board-endorsed activity
- Activity pursuant to an obligation under either the *Metropolitan Drainage Act 1935*, or *South-Western Suburbs Drainage Act 1959*

**Relevant authority:**
Board
<table>
<thead>
<tr>
<th>Section</th>
<th>Act definition</th>
<th>WAAs excluded from requiring a permit</th>
<th>Relevant authority</th>
</tr>
</thead>
</table>
| 127(5)(c) | Draining or discharging water directly or indirectly into a watercourse or lake  
*e.g. Stormwater from buildings* | • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board-endorsed best practice operating procedure addressing the activity  
• Activity undertaken in accordance with any board-endorsed current recommended practice (CRP)  
• A board-endorsed activity  
• Activity that involves draining or discharging water in a manner, and of a quality, that does not detrimentally affect receiving waters (in application of this exclusion, the board will determine what constitutes detrimental effect)  
• Activity pursuant to an obligation under either the *Metropolitan Drainage Act 1935*, or *South-Western Suburbs Drainage Act 1959* | Board |
| 127(5)(d) | Depositing or placing an object or solid material in a watercourse or lake  
*e.g Island in an on-stream dam; rip raps; rocks; tyres; snags; filling a watercourse, etc* | • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board-endorsed best practice operating procedure addressing the activity  
• A board-endorsed activity  
• Activity undertaken in accordance with any board-endorsed current recommended practice (CRP)  
• Activity pursuant to an obligation under either the *Metropolitan Drainage Act 1935*, or *South-Western Suburbs Drainage Act 1959* | Board |
| 127(5)(e) | Obstructing a watercourse or lake in any other manner  
*e.g. Planting vegetation* | • Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board-endorsed best practice operating procedure addressing the activity  
• A board-endorsed activity  
• Activity undertaken in accordance with any Board endorsed current recommended practice | Minister |
Act definition:
Depositing, or placing an object or solid material on the floodplain of, a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse or lake

*e.g. Levee; depositing fill*

**WAAs excluded from requiring a permit:**
- Activity pursuant to an obligation under either the *Metropolitan Drainage Act 1935*, or *South-Western Suburbs Drainage Act 1959*
- A board-endorsed activity
- Activity undertaken in accordance with any board-endorsed current recommended practice

**Relevant authority:**
Minister

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Act definition:
Destroying vegetation growing in a watercourse or lake, or growing on the floodplain of a watercourse

*e.g. Removal or destruction of trees, shrubs, grasses*

**WAAs excluded from requiring a permit:**
- Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board-endorsed best practice operating procedure addressing the activity
- A board-endorsed activity
- Activity undertaken in accordance with any board-endorsed current recommended practice
- Plants declared for control or destruction under the NRM Act

**Relevant authority:**
Board

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Act definition:
Excavating or removing rock, sand or soil from:

(i) a watercourse or lake or the floodplain of a watercourse, or

(ii) an area near to the banks of a lake, so as to damage, or create the likelihood of damage to, the banks of the lake

*e.g. Desilting, wetlands, swamps and springs*

**WAAs excluded from requiring a permit:**
- Activity undertaken by local government (directly or by its contractors), a state agency or utility that has a board-endorsed best practice operating procedure addressing the activity
- Activity undertaken in accordance with any board-endorsed current recommended practice
- Activity pursuant to an obligation under either the *Metropolitan Drainage Act 1935*, or *South-Western Suburbs Drainage Act 1959*
- Desilting a dam, provided it:
  - Involves the removal of unconsolidated material deposited since dam construction or since the dam was previously desilted
  - Does not involve a WAA pursuant to 127(5)(d)

**Relevant authority:**
Board
<table>
<thead>
<tr>
<th>Section</th>
<th>Act definition</th>
<th>WAAs excluded from requiring a permit</th>
<th>Relevant authority</th>
</tr>
</thead>
</table>
| 127(5)(i) | Using water, in the course of carrying on a business in an NRM region, at a rate that exceeds 1 ML/ha/yr, if the water has been brought into the region by means of a pipe or other channel.  
  *e.g.* Use of imported water for irrigation. |  
  - Where the water is sourced from an SA Water owned or operated mains water supply network  
  - Activity undertaken in accordance with the board’s current recommended practice | Minister |
| 127(5)(j) | Using effluent, in the course of carrying on a business in an NRM region, at a rate that exceeds 1 ML/ha/yr.  
  *e.g.* Use of treated effluent. | None | Minister |
| 127(5)(k) | An activity prescribed by the regulations.  
  *e.g.* Forestry. | None | Board |
Water affecting activity permit policies for the region

The following general objectives and principles apply to all ‘on merit’ WAA applications assessed in the Adelaide and Mount Lofty Ranges region.

Objectives

1. Develop and use water resources in a sustainable manner to maximise productive use, while providing for the needs of natural ecosystems.
2. Prevent activities which could lead to deterioration in the quality and quantity of surface or underground water.
3. Protect and preserve watercourse, lake and floodplain geomorphology.
4. Protect the long term integrity of ecological functions and dependent biodiversity.

Principles

1. Activities should not compromise the use or quality of water resources, or the capacity for natural systems to restore or maintain water quality.
2. Activities should not take place where they are likely to adversely impact on the migration of biota.
3. Natural creek and watercourse systems should be retained.
4. The design, construction and management of structures and activities must not result in watercourse erosion.
5. Activities should be designed and located so as not to alter the geomorphology of a watercourse or lake.
6. Activities should not contribute to dryland salinity or rising water tables.
7. Activities should not compromise the integrity of authorised scientific data collection and monitoring facilities related to the assessment and management of water resources.
8. Activities should not:
   a. be located in ecologically sensitive areas
   b. cause or exacerbate unnatural waterlogging, or increase groundwater induced salinity
   c. affect water-dependent ecosystems, or environmental water requirements for underground water, watercourse, wetlands or floodplains
   d. cause or increase the risk of flooding, upstream or down
   e. cause or increase erosion, or affect bed and bank stability, or
   f. detrimentally impact on ecological diversity and habitats.
Objectives and principles for specific water affecting activities

The following objectives and principles relate to specific situations. They are additional to those expressed in the region for water affecting activities permit policies.

Well construction and repair (Section 127(3)(a) and (b))

Where a WAP applies, the objectives and principles in the relevant WAP will be used as the basis for assessment.

The following objectives and principles apply to permits for activities relating to wells under the following sections of the Act:

- 127(3)(a) drilling, plugging, backfilling or sealing of a well
- 127(3)(b) repairing, replacing or altering the casing, lining or screen of a well.

Objectives

1. Protect the quality of underground water resources.
2. Protect groundwater-dependent ecosystems.
3. Minimise the impact on underground water resources.
4. Protect underground water resources from pollution, deterioration and undue depletion.
5. Ensure the integrity of headworks is maintained.

Principles

1. Well construction must be in accordance with the General Specification for Well Construction, Modification and Abandonment in South Australia (or any subsequent or related policy), as provided by the relevant authority.

Impact of well works on water quality and integrity of the aquifer

2. The equipment, materials and methods used in the drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, must not adversely affect the quality of the underground water resource.

3. Aquifers must be protected during the drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts on the integrity of the aquifer.

4. New wells constructed for the purpose of taking underground water must not be located within 300 metres of an operational well that has a permit or licence to recharge the underground aquifer and is being used for managed aquifer recharge (MAR) unless:
   a. the new well will be completed in an aquifer that is not in direct hydraulic connection with the aquifer into which the water is being recharged; or
   b. the new well is part of the existing MAR scheme.
Sealing between aquifers

5. Where a well passes, or will pass, through two or more aquifers, an impervious seal shall be made and maintained between all aquifers.

Wells for drainage or discharge

6. The headworks for the draining or discharge of water must be constructed so that extraction and draining or discharge operations can be metered without interference.

7. The headworks for the drainage or discharge of water must be constructed so that water cannot leak if the well becomes clogged.

8. Wells constructed for the drainage or discharge of water must be pressure cemented along the full length of the casing.

Draining or discharge of water into a well (section 127(3)(c))

Where a WAP applies, the objectives and principles in the relevant WAP will be used as the basis for assessment.

The following objectives and principles apply specifically to activities under section 127(3)(c) of the Act, comprising the draining or discharging of water directly or indirectly into a well (commonly part of an MAR scheme).

In addition the Environment Protection (Water Quality) Policy 2003 (or any subsequent or related policy), prepared under the Environment Protection Act 1993 (SA), should also be considered.

Note: In addition to the requirements outlined below for drainage or discharge into a well, an MAR development may also require a water licence for the recovery component of the scheme, and a water licence for the source water.

Objectives

1. The sustainable operation and management of managed aquifer recharge schemes.

2. Reasonable and practicable measures are taken to avoid the discharge of contamination to the receiving underground water resource during the draining or discharging of water into a well.

3. Prevent environmental harm from the draining or discharging of water into a well.

4. Ensure that draining or discharging water directly or indirectly into a well does not have the potential to adversely affect:
   a. the quality of underground water
   b. the integrity of the aquifer, including (but not limited to) the confining layer of the aquifer and the ability of the aquifer to transmit water
   c. water tables, including (but not limited to) waterlogging, land salinisation and damage to infrastructure (e.g. roads, buildings, foundations)
   d. any underground water-dependent ecosystem or ecologically sensitive area that depends on the underground water resource
   e. the ability of other persons to lawfully take from that underground water, or
   f. the longevity of operations.
Principles

1. Water that is drained or discharged into a well must comply with the *Environmental Protection Act 1993* and any associated policy.

2. A permit to drain or discharge water into a well will not be issued unless a hydrogeological risk assessment is undertaken to the satisfaction of the relevant authority. This hydrogeological risk assessment must be consistent with the *National Water Quality Management Strategy - Australian Guidelines for Water Recycling: Managing Health & Environmental Risks*, Phase 1 2006 (or any subsequent or related policy), and include:
   a. an investigation into the suitability of the draining or discharging site, including, but not limited to, tests for transmissivity, maximum injection pressures and calculated likely impacts on the integrity of the well and confining layers, and impacts of potentiometric head changes to other underground water users
   b. an appropriate operation or management plan demonstrating that operational procedures and monitoring regimes are in place to protect the integrity of the aquifer, minimise the wastage of water and protect the discharge site on an ongoing basis
   c. a water quality assessment, which identifies hazards in the source water
   d. a report on the consequences and impacts to the ambient underground water resource, where the water quality characteristics (salinity and chemistry composition) of the water to be discharged differs to that of the ambient underground water.

3. Water that is drained or discharged into a well by means of gravity only is exempt from meeting the requirements of principle 2(a).

4. Roof runoff (surface water) that is drained or discharged into a well via a closed system of capture and transport is exempt from meeting the requirements of principles 2(a), (c) and (d), provided that the system is equipped with a mechanism to divert first flush water.

5. Further to principle 2(b), continuation of draining and discharge is dependent on an annual report that addresses the impacts to the ambient underground water at the draining or discharge site. Roof runoff (surface water) captured in a closed system and then drained or discharged into a well is exempt from this principle.

6. For the purposes of principles 2 and 3, the relevant concentrations, levels or amounts shall be measured in sufficient representative samples of:
   a. the water to be drained or discharged
   b. ambient underground water collected from the proposed point of injection, or as near as possible to the proposed point of injection.

Note: ‘Sufficient representative samples’ means suitable samples, collected with equipment appropriate for the substance, material or characteristic to be measured and taken at suitable locations and times so as to accurately represent the quality of the relevant water.

7. For the purposes of this plan, the term ‘ambient underground water’ means water that occurs at the proposed site of injection in the relevant aquifer, before beginning the proposed draining and discharge activity.
8. The draining or discharging of water directly or indirectly into a well must not detrimentally affect the ability of other persons to lawfully take from that underground water, or degrade ecosystems dependent on the underground water.

9. The headworks for the draining or discharge of water shall be constructed so that extraction and draining and discharge operations can be metered without interference.

10. The headworks for the draining or discharge of water shall be constructed so that water cannot leak if the well becomes clogged.

Note: For the purposes of this plan, the term ‘headworks’ means any assembly on top of a well and located between the well casing and the water delivery system.

11. Wells constructed for the draining or discharge of water at pressures greater than gravity must be pressure cemented along the full length of the casing. This does not exempt the need to follow the general specifications for well construction.

**Water storage and diversion (section 127(3)(d) and 127(5)(a))**

Where a WAP applies, the objectives and principles in the relevant WAP will be used as the basis for assessment.

Where a WAP does not exist, or is not in operation, the objectives and principles that follow apply specifically to an activity under:

- Section 127(3)(d) - the erection, construction, modification, enlargement or removal of a dam, wall or other structure that will collect or divert, or collects or diverts (i) water flowing in a prescribed watercourse; or (ii) water flowing in a watercourse in the Mount Lofty Ranges watershed that is not prescribed; or (iii) surface water flowing over land in a surface water prescribed area or in the Mount Lofty Ranges watershed

- Section 127(5)(a) - the erection, construction, modification, enlargement or removal of a dam, wall or other structure that will collect or divert, or collects or diverts, water flowing in a watercourse that is not in the Mount Lofty Ranges watershed and that is not prescribed, or flowing over any other land that is not in a surface water prescribed area or in the Mount Lofty Ranges watershed.

Note: Dams that have a wall height greater than 3 metres or a volume of 5 megalitres or greater require development approval under the Development Act 1993, therefore, do not require a permit for a water affecting activity. Development approval is issued by local councils. Applications received by a local council are referred to the relevant authority for direction.

**Objectives**

1. Maintain and improve the quality and quantity of water flowing in the region.

2. Ensure that dams, walls or other water collection or diversion mechanisms in watercourses and drainage paths are constructed and managed in a manner which:
   a. protects the needs of downstream users
   b. protects water quality and quantity
   c. protects ecosystems dependent on these resources.
Principles

1. The combined capacity of all dams in a catchment within an allotment shall not exceed 50% of the annual runoff for that catchment in the allotment.

Note: For the purposes of principle 1, ‘annual runoff’ is a volume derived from 10% of the mean annual rainfall for the allotment, multiplied by the area of the allotment.

Note: For the purposes of principle 1, the term ‘allotment’ means an allotment delineated on a certificate of title under the Real Property Act 1886 and includes two or more contiguous allotments owned or occupied by the same person and operated as a single unit for the purpose of primary production.

Location

2. Dams, including dam walls and spillways must not be located:
   a. upstream or downstream of an ecologically sensitive area
   b. in an area prone to erosion
   c. on-stream for third order, or higher, streams (and water should be diverted to an off-stream dam wherever possible for first and second order streams), or
   d. where the migration of aquatic biota could be adversely affected.

3. In order to minimise impacts on downstream water-dependent ecosystems:
   a. dams must not be located on-stream for third order or higher streams; or
   b. water should be diverted to an off-stream dam wherever possible for first and second order streams.

Note: For the purpose of principle 3, an ‘on-stream dam’ means a dam, wall or other structure placed on, or constructed across, a watercourse or drainage path for the purpose of holding back and storing the natural flow of that watercourse, or the surface runoff flowing along that drainage path.

Note: For the purpose of principle 3, an ‘off-stream dam’ means a dam, wall or other structure that is not constructed across a watercourse or drainage path and is designed to hold water diverted, or pumped, from a watercourse, a drainage path or aquifer, or from another source. Off-stream dams may capture a limited volume of surface water from the catchment above the dam, but may not take an amount of surface water, from the catchment above the dam, in excess of 5% of its total volume.

Dam construction and design

4. Dams should be sited and constructed to:
   a. minimise the loss of soil from the site through soil erosion and siltation
   b. minimise the removal or destruction of in-stream or riparian vegetation.

5. Provision shall be made for flow to pass the dam as follows:
   a. A diversion structure shall include a device that prevents the diversion of water from the watercourse or drainage line during periods of flow at, or below, the threshold rate.
   b. An on-stream dam, wall or structure shall include a device that regulates the diversion of any flow at, or below, the threshold rate, away from the dam and returning it back to the same watercourse or drainage line below the dam, wall or structure.
Note: For the purposes of principle 5, the threshold flow rate (litres/second) means:

a. The flow rate of a watercourse or drainage line (litres/second) determined by multiplying the unit threshold rate (litres/second/square kilometre) by the area of catchment (square kilometre) that contributes to the watercourse or drainage line, that is above the point where the water is diverted from the watercourse or drainage line: or

b. 1 litre/second, whichever is the greater.

c. For the purposes of (a), the unit threshold flow rate of a subcatchment can be determined by dividing the 10th percentile flow rate (litres/second) for a subcatchment (square kilometres), where the 10th percentile flow rate is the flow rate (litres/second) obtained from a time weighted annual flow duration curve (with the time step being 1 day - mean flow), which is greater than or equal to 10% of all flows during that period.

6. Collection or diversion of water flowing in a watercourse, or over land, must not adversely affect downstream water-dependent ecosystems by causing reduced stream flow duration, lengthened periods of no or low flow, or other such impacts, unless it is part of a Regional Plan project of the board (e.g. constructed wetland).

Removal of a dam

7. Removal of a dam shall not result in:

a. increased erosion

b. increased flooding

c. bed and bank instability

d. downstream sedimentation

e. loss of riparian vegetation

f. decline in water quality, or

g. alteration to the natural or pre-existing flow regimes of a watercourse.

8. The site of the dam should be remediated and revegetated so that there are no ongoing impacts on the downstream environment.

Structures in watercourses (section 127(5)(b))

The objectives and principles that follow apply specifically to an activity under section 127(5)(b), the erection, construction or placement of any building, or structure, in a watercourse, or lake, or on the floodplain of a watercourse.

Objectives

1. Minimise the potential for erosion and the restriction of surface water flows.

2. Protect the ecology of a watercourse, or lake, or the floodplain of a watercourse.
Principles

1. Construction and placement of structures, including roads, in a watercourse, a floodplain of a watercourse, a lake, a wetland, or an area subject to inundation:
   a. shall be designed to minimise the risk of erosion resulting from the construction and location of the structure
   b. must not adversely affect the provision of environmental water requirements of those areas (e.g. by impeding flows)
   c. must not adversely affect the migration of aquatic biota
   d. must not alter the hydrology of a stream in such a way as to adversely impact on the ecology
   e. must not result in flooding, either upstream or downstream
   f. must not be constructed where it, or any debris collected by it, would increase the risk of damage to property or the risk to safety of persons.

2. Structures that impede the flow of water, including but not limited to weirs, must be designed to enable flows at or below the threshold flow rate, excluding structures for the specific purpose of measuring stream flow for scientific purposes.

Draining or discharge of water into a watercourse or lake (section 127(5)(c))

The objectives and principles that follow apply specifically to an activity under section 127(5)(c) draining or discharging water directly, or indirectly, into a watercourse or lake.

In addition to the objectives and principles outlined in this section, the requirements of the Environment (Water Quality) Policy 2003 (or any subsequent or related document) prepared under the Environment Protection Act 1993 (SA) should be considered.

Objectives

1. Protect ecosystems dependent on the receiving water resources.
2. Sustain the existing uses of the receiving water resources.

Principles

1. Drained and discharged water must be of a suitable quality to:
   a. sustain the existing uses of the receiving waters
   b. protect ecosystems that are dependent on the receiving waters.

2. Draining or discharging water must be undertaken in a manner that ensures:
   a. contaminants in drainage or discharge water are contained and managed on site to minimise the conveyance of contaminants into watercourses, lakes, or underground water resources
   b. the quality of water drained, or discharged, into a watercourse, or lake, is of the same quality or better than that of the receiving water environment.
3. The discharge or drainage of water into a watercourse must be at a rate and in a location such that:
   a. the geomorphology of the watercourse is protected
   b. the flow capacity of the watercourse is considered
   c. there is no increase in the risk of flooding downstream
   d. the migration of aquatic biota is not adversely affected.
4. Drainage or discharge of water into a watercourse, or lake, shall be undertaken only where protective measures have been provided to minimise erosion or degradation in the quality of the receiving water.
5. Watercourses shall be retained in their natural state, to promote natural filtering and pollutant removal processes.

**Depositing objects in a watercourse (sections 127(5)(d), 127(5)(e) and 127(5)(f))**

The objectives and principles that follow apply specifically to an activity under:

- section 127(5)(d) depositing or placing an object or solid material in a watercourse, or lake
- section 127(5)(e) obstructing a watercourse, or lake, in any other manner
- section 127(5)(f) depositing or placing an object or solid material on the floodplain of a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse, or lake.

**Objectives**

1. Watercourses and lakes are protected against:
   a. destruction of bed and banks
   b. water pollution
   c. erosion
   d. habitat destruction.

2. Watercourses, or lakes, are free of obstructions that may:
   a. impede natural stream flow, or
   b. cause unnecessary flooding.

**Principles**

1. An object, or solid material, shall be deposited or placed in a watercourse, or lake, only where it includes:
   a. the construction of an erosion control structure, for example a rock chute or rip rap
   b. a device or structure used to extract or regulate water flowing in a watercourse, for example diversion weirs, or
   c. an activity required for scientific purposes, for example flow measuring devices.
2. Any object or solid material used in the control or prevention of watercourse erosion shall not cause:
   a. increased erosion upstream or downstream
   b. detrimental impacts.

3. The depositing or placing of an object, or solid material, in a watercourse, or lake, shall not adversely affect:
   a. water-dependent ecosystems
   b. the migration of aquatic biota, or
   c. the natural flow regime.

4. Obstructing a watercourse or lake shall not cause erosion.

5. Depositing or placing an object, or solid material, on the floodplain of a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse, or lake, shall not:
   a. adversely impact upon the natural flow of a watercourse
   b. increase the risk of flooding, upstream or downstream, or
   c. cause or increase watercourse erosion.

6. Depositing or placing an object, or solid material, on the floodplain of a watercourse, or near the bank or shore of a lake, to control flooding from the watercourse, or lake, should:
   a. provide for the needs of ecosystem processes (including the migration of aquatic biota)
   b. minimise the impact or risk of flooding on human communities.

Note: For the purpose of these principles, an ‘object’ can include vegetation, such as fallen trees and other plant debris.

Destroying vegetation or excavating in a watercourse (sections 127(5)(g) and 127(5)(h))

These sections do not apply where the clearance of vegetation requires approval under the Native Vegetation Act 1991.

The objectives and principles that follow apply specifically to an activity under:
- section 127(5)(g), destroying vegetation growing in a watercourse, or lake, or growing on the floodplain of a watercourse
- section 127(5)(h), excavating or removing rock, sand or soil from:
  - a watercourse, or lake, or the floodplain of a watercourse, or
  - an area near to the banks of a lake, so as to damage, or create the likelihood of damage to, the banks of the lake.

Objectives

1. Ensure that watercourses, lakes and floodplains are protected against adverse impacts arising from the destruction of vegetation or the excavation and removal of rock, sand and soil.
Principles

1. Vegetation shall be destroyed only where it is for the protection of existing development or infrastructure, or rehabilitation of a watercourse, and does not result in any of the following:
   a. increased erosion
   b. increased flooding
   c. bed and bank instability
   d. downstream sedimentation
   e. decline in water quality
   f. alteration to the natural flow regime of a watercourse
   g. destruction of significant habitat for wildlife.

2. The excavation and removal of rock, sand or soil must not adversely impact on:
   a. the ecology of a watercourse, lake or floodplain
   b. migration of aquatic biota.

3. The excavation and removal of rock, sand or soil must not result in:
   a. increased erosion
   b. increased flooding
   c. bed and bank instability
   d. downstream sedimentation
   e. loss of riparian vegetation
   f. decline in water quality
   g. alteration to the natural flow regime of a watercourse.

Use of imported water or treated effluent water (sections 127(5)(i) and 127(5)(j))

Where a WAP applies, the objectives and principles in the WAP will be used as the basis for assessment.
Where a WAP does not exist, or is not in operation, the objectives and principles that follow will apply specifically to an activity under:
- section 127(5)(i), for the application of water on land, in the course of carrying on a business, at a rate that exceeds 1 ML/hectare/year, if the water has been brought into the region by means of a pipe or other channel
- section 127(5)(j), using effluent, in the course of carrying on a business, at a rate that exceeds 1 ML/hectare/year.

Note: If the use of effluent is managed through a licence issued by the Environment Protection Authority, this section (section 127 (5)(j)) does not apply.
Objectives

1. The sustainable use of imported water or effluent so that it does not adversely impact on:
   a. structures or ecosystems, through a rise in underground water levels
   b. the natural flow of watercourses
   c. the quality of surface water, underground water or water in watercourses
   d. the productive capacity of the land, through rising underground water levels, salinity, sodicity, waterlogging or nutrient levels, or
   e. the condition, biodiversity or extent of water-dependent ecosystems.

Principles

1. Use of imported water or effluent water should not cause a rise in the underground water level, sufficient to detrimentally affect structures or ecosystems.
2. Use of imported water or effluent should not adversely affect the natural flow of water, or the quality of surface water, underground water or water in a watercourse, or lake.
3. Use of imported water or effluent should not adversely affect the productive capacity of the land, by causing salinity, sodicity, waterlogging, perched water tables or other such impacts.
4. Use of imported water or effluent should not adversely affect water-dependent ecosystems.
5. Imported water or effluent should be stored in a closed system, with no natural catchment, and constructed to prevent:
   a. leakage to the surrounding soils
   b. overflow from the dam to the surface of the land surrounding the dam
   c. overflow from the dam into a watercourse.
Glossary

Aquifer
A permeable zone of rock or sediment in which underground water is stored.

Board-endorsed activity
An activity for which express written support or approval has been provided by the board or its representative (e.g. agreed property work plan).

Best practice operating procedure
Board-approved procedures developed by eligible authorities to exceed minimum standards of operations for a range of water activities undertaken.

Catchment
An area of land determined by topographic features where water is collected by the natural landscape and all rain and runoff flows to a creek, river, lake or ocean, or into the groundwater system.

Current recommended practice (CRP)
Guidelines which stipulate the board’s ‘current recommended practice’ for undertaking specific water affecting activities. In some cases, a CRP will negate the need to apply for a WAA permit application.

Detrimentally affect
An activity that causes, or is likely to cause, temporary or permanent damage or harm to: water quality, aquatic life or ecosystem health.

Environment Protection (Water Quality) Policy 2003 (currently under review)
In 1992, the Commonwealth, state and territory governments introduced the National Water Quality Management Strategy (NWQMS) to achieve sustainable use of the nation’s water resources. The Water Quality Policy brings South Australia in line with the NWQMS. The main objective of the Water Quality Policy is to:

“...achieve the sustainable management of waters, by protecting or enhancing water quality while allowing economic and social development”

First order watercourse
A watercourse that does not have a tributary flowing into it.

Floodplain
As per the Natural Resources Management Act 2004 (SA).

Headworks
An assembly on top of a well that is located between the well casing and the water delivery system.
Managed aquifer recharge (MAR)

Water is artificially recharged (by draining or discharging water into a well) to an aquifer for subsequent recovery.


These guidelines provide a generic ‘framework for management of recycled water quality and use’ that applies to all combinations of recycled water and end users.

Rip rap

Graded rock placed on the bed or banks of a watercourse as an erosion protection measure.

Rock chute

An engineered rock structure designed to control the bed grade of a watercourse.

Second order watercourse

Where two first order watercourses join, the subsequent watercourse becomes a second order watercourse.

Third order watercourse

When two or more second order watercourses join they form a third order watercourse.

Threshold flow rate

The rate of flow (in litres per second) at, or below, which water must not be diverted or collected by a dam, wall or other structure. This rate is site specific and can be calculated by the following method:

- The flow rate of a watercourse or drainage line (litres/sec) determined by multiplying the unit threshold rate (litres/sec/square kilometre) by the area of catchment (square kilometre) that contribute to the watercourse or drainage line, that is above the point where the water is diverted from the watercourse or drainage line; or 1l/second, whichever is the greater.
- For the purposes of (a), the unit threshold flow rate of a subcatchment can be determined by dividing the 10th percentile flow rate (litres/second) for a subcatchment (square kilometres), where the 10th percentile flow rate is the flow rate (litres/second) obtained from a time weighted annual flow duration curve (with the time step being 1 day - mean flow), which is greater than or equal to 10% of all flows during that period.

Watercourse

As per the Natural Resources Management Act 2004 (SA).

Water pollution

Any chemical, physical or biological change in the quality of a body of water that has a harmful effect on any living thing that drinks, uses or lives in, and around it.