

Position paper

June 2020

Improving Levee Bank Management in South Australia



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1 Introduction

The position paper **Improving Levee Bank Management in South Australia** has been developed to address concerns about levee bank management in South Australia and in response to the failure or near failure of levees during the floods in the spring of 2016. It builds on the draft position paper released for public consultation in February 2019.

The draft position paper proposed a framework with a number of elements to improve levee bank management in South Australia for discussion. Some elements would require legislative change and/or increase obligations or contributions from landholders and other stakeholders and therefore require input from stakeholders before they can be finalised and implemented

The elements of the levee bank management policy in this position paper have been adjusted based on stakeholder feedback and further investigation of a number of options.

The following levee bank management outcomes are sought:

- Roles and responsibilities for levee bank management are clearly articulated, agreed and understood by all relevant parties and can be implemented (subject to funding).
- There is clarity on how levee banks can be factored into flood risks and flood response as there is confidence in their location, function and performance.
- There is a strategic approach to levee bank construction and management of existing levee banks which considers flood mitigation as well as water resource management outcomes.

The position paper outlines the elements of a levee bank management framework, to deliver improved levee bank management and identifies actions to move towards implementing these elements. The position paper was endorsed by the State Emergency Management Committee and the outcomes, framework and proposed actions noted by the Emergency Management Council of South Australia

This position paper is one of three papers finalised as a result of the consultation process. The other two are:

- **Improving Dam Safety Management in South Australia**
- **Priorities for Improved Flood Management in South Australia**

2 Background

Levee banks are one type of flood mitigation infrastructure and can be broadly described as artificially raised or constructed embankments or walls for the purpose of reducing the likelihood of flooding during high flow events in a watercourse.

Extensive levee bank networks exist on the River Murray at Renmark and the lower River Murray, with smaller sections of levee banks at several other towns including Paringa, Lyrup and Berri. Elsewhere in South Australia, there are known to be levee banks on the Gawler River, Little Para River, Dry Creek, Onkaparinga River, River Torrens and Hindmarsh River as well as in the South East of the State as part of the South Eastern Water Conservation and Drainage Scheme. The total number and location of levee banks is unknown.

In some locations, levee banks are a major flood mitigation measure however there is no clarity on the level of protection they are meant to provide or their maintenance status. This results in uncertainty about levee bank performance during a flood: are they "fit for purpose" and can they provide the flood risk mitigation for which they were originally constructed. Levee bank failure along the Gawler River in 2016 contributed to the significant economic costs of the floods in the horticultural area north of Adelaide. The uncertainty surrounding management of levee banks is a long standing issue in South Australia.

The lack of clarity on roles and responsibilities for designing, constructing and maintaining levee banks causes uncertainty about their performance during flood events. This creates an unnecessarily large flood response burden for the South Australian State Emergency Service (SASES) to manage levee banks that are failing or threatening to fail during flood events. Impacts of floods resulting from levee bank failure are inevitably high because communities are often not prepared for flood in those areas as they assumed the levee bank would protect them. This can create risks to both life and property.

The benefits of well-managed flood mitigation infrastructure were demonstrated at Nuriootpa in the Barossa Valley, where a combination of permanent and temporary levees were used to effectively control potential flooding during the 2016 event.

2.1 Scope

The levee banks in scope for this position paper are outlined in table 1.

In Scope	Out of Scope
Levee bank construction and maintenance designed to protect multiple properties	Flood mitigation infrastructure other than levee banks, unless it has a levee bank component
Additional maintenance requirements for roads and other infrastructure that act as levee banks	Maintenance of levee banks that protect an individual property and where failure would only impact on an individual property
Maintenance of levee banks where failure could impact on multiple properties	Construction of coastal levee banks
	State Government owned levees along the Lower River Murray
	Levees of the South Eastern Water Conservation and Drainage Scheme

Table 1: Scope of levee bank management policy in South Australia

Flood mitigation infrastructure other than levee banks is out of scope for the purpose of this paper, unless it includes a levee bank component. Maintenance of levee banks that protect an individual property and where failure would only impact on an individual property is also out of scope for this paper. Such levee banks are an individual land owner's responsibility.

There are other types of infrastructure that act as levee banks, such as roads and railway lines. In that case, the responsibility for management rests with the manager of the road/railway. There may be a need to ensure that the infrastructure is maintained to ensure it continues to fulfil its flood protection function, even though that is not its primary function. These requirements may go beyond the general maintenance requirements of the infrastructure and are within scope for this policy.

Construction of coastal levee banks are out of scope as they are managed under the *Coast Protection Act 1972* and the Coast Protection Board will consider proposals for coastal levee banks. However, arrangements for management of existing levee banks proposed in this position paper could equally apply to coastal levee banks.

Approximately 67km of 110km of the Lower River Murray levee banks are managed by the State Government and annual maintenance is carried out to ensure that they are fit for purpose. These levee banks need to be maintained primarily for ongoing water security and to facilitate gravity irrigation on reclaimed land. The State Government managed levee banks are outside the scope of this position paper, as there are clear roles, responsibilities and management regimes. The privately owned Lower River Murray levee banks are within scope.

Similarly, the banks of the South Eastern Water Conservation and Drainage (SEWCD) scheme are out of scope, as they are maintained by the SEWCD Board, as part of its obligations under the *South Eastern Water Conservation and Drainage Act 1992*.

2.2 Current regulation of construction

The construction of new levee banks is authorised under the *Landscape SA Act 2019* (Landscape SA Act) with a water affecting activity permit, unless the levee bank is classified as development under the *Planning Development and Infrastructure Act 2016* (PDI Act) and requires development approval¹. Along the River Murray, authorisations under the *River Murray Act 2003* may also apply.

The development application for such levee banks will also be assessed against the water affecting activity policies in a water affecting activities control policy or a water allocation plan. Water affecting activity policies can specify matters that should be taken into account when assessing an application for a permit and make provision for conditions that a permit or other approval should be subject to.

There is a need to consider both water resource management and flood management when approving new levee banks. Water affecting activity criteria for assessing applications for levee bank construction consider matters such as whether the levee bank could:

- cause or increase the risk of upstream or downstream flooding;
- impact the natural flow of a watercourse or lake including restricting or increasing the natural flow to a water dependent ecosystem;
- impact the natural flow between the floodplain and a watercourse;
- impact the migration of native fish or aquatic biota;
- cause significant erosion or increase the risk of erosion;
- risk public safety or damage property and infrastructure.

The South Australian Planning Policy Library provides guidance on levee banks including:

Development, including earthworks associated with development, should not do any of the following:

- *impede the flow of floodwaters through the land or other surrounding land*
- *increase the potential hazard risk to public safety of persons during a flood event*
- *aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood*
- *cause any adverse effect on the floodway function*
- *increase the risk of flooding of other land*
- *obstruct a watercourse.*

Construction of new levee banks or upgrades of existing ones are sometimes considered as part of a stormwater management plan. As part of this process, consideration needs to be given to the flood risk to be mitigated, the potential consequences of flooding, the implications of levee bank construction for flood risk elsewhere and whether a levee bank is the appropriate mechanism to manage the risk identified.

¹ Activities classified as development under the *Planning, Development and Infrastructure (General) Regulations 2017* include:

- Any excavating or filling (or excavating and filling) of land, or the forming of a levee or mound, in a designated flood zone, subzone or overlay, or any other zone, subzone or overlay identified under the Planning and Design Code for the purposes of this clause, but not including the excavating or filling (or excavating and filling) of land—
 - (a) incidental to the ploughing or tilling of land for the purpose of agriculture; or
 - (b) incidental to the installation, repair or maintenance of any underground services; or
 - (c) on or within a public road or public road reserve; or
 - (d) in the event of an emergency in order—
 - (i) to protect life or property; or
 - (ii) to protect the environment where authority to undertake the activity is given by or under another Act.
- Without limiting any other clause, the forming of a levee or mound with a finished height greater than 3 metres above the natural surface of the ground.

2.3 Current maintenance arrangements

There is a lack of clarity on roles and responsibilities for maintaining levee banks and this causes uncertainty about their performance during flood events. There is limited documentation of the location, design or maintenance status of levee banks.

Levee banks can be situated on crown land, local government owned land and private land. The issue of access for the purpose of maintenance is very similar to that for urban watercourses.

Both the Landscape SA Act (section 30) and the *Local Government Act 1999* (schedule 1A, section 21) provide identical powers to a Landscape Board or a Council respectively to enter onto private land for the purposes of undertaking stormwater management or flood mitigation works.

Permanent infrastructure construction or works can be carried out under an agreement with the property owner subject to that property owner's consent, and if the property owner agrees to undertake ongoing care, control and management of the works. Where the Landscape Board or Council retains ongoing responsibility for care, control and management of the permanent works, then the Landscape Board or Council must acquire an easement or other appropriate interest over the land (e.g. acquisition of land). The powers under the *Local Government Act 1999* may only be exercised by Councils where there is a Stormwater Management Plan approved by the Stormwater Management Authority and gazetted.

Roles and responsibilities for levee bank maintenance are sometimes set out in stormwater management plans.

3 Elements of the levee bank management policy

The elements of the levee bank management policy are based on the recommendations from the South Australian Levee Bank Management Issues Paper (DEWNR, 2015) and the approaches and experiences in managing levee banks interstate. In developing the elements, alignment between levee bank management, stormwater management, coastal management and watercourse management has been sought, to streamline processes and reduce red tape. Stakeholder feedback on proposed elements has also been considered before settling on the final policy elements.

Resolving responsibilities for maintenance of levee banks that extend beyond individual properties has similarities to resolving responsibilities for watercourse management in South Australia. Resolving watercourse management is out of scope for this paper, however a number of principles apply to both watercourse and levee bank management:

- Relying on individual landholder responsibilities to maintain sections of levee banks (or watercourses) on their property, does not deliver effective maintenance, in particular where maintenance actions require specific skills, equipment or expertise;
- Effective maintenance requires assignment of responsibility to one entity, with access to the complete levee bank (or watercourse).

There are several elements for the levee bank management framework. The elements are listed below and illustrated in Figure 1:

1. Documentation of existing levee banks, including their location, land ownership, maintenance status, height, size and accessibility, flood mitigation standard and governance arrangements.
2. A planning process to identify priority existing and proposed levee banks and determine formal management arrangements.
3. Development of a business case for construction, remediation or upgrade of priority existing and proposed levee banks and establishing cost-sharing arrangements
4. Access arrangements for construction, remediation and maintenance of levee banks, including clarification of responsibilities of landowners in relation to levee banks on their land that are managed by a third party.

5. Guidelines relating to the siting, design, construction, modification and maintenance of levee banks that consider both water resource management impacts and flood risks and/or options to regulate these requirements.
6. Consolidation of the approval process for siting, design, construction and modification of levee banks under the PDI Act with referral to Landscape Boards or DEW to avoid gaps, duplication or inconsistencies between land use planning and water resource management requirements.
7. Management arrangements for non-priority levee banks.

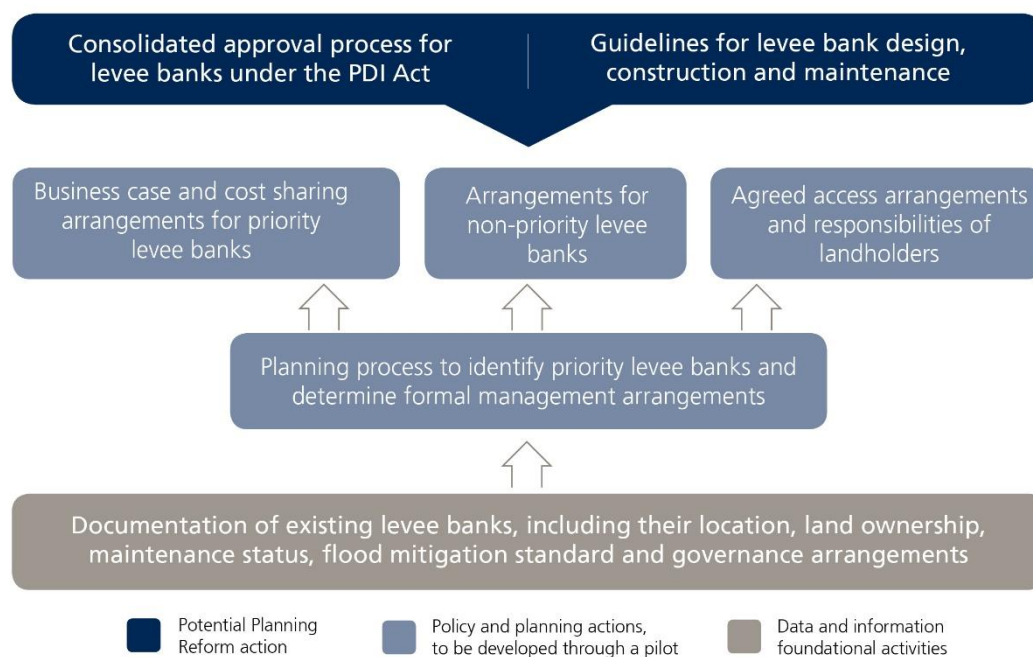


Figure 1: Levee bank management policy elements

Each element is discussed in more detail below.

3.1 Documentation of existing levee banks

This element aims to develop a state-wide authoritative spatial database that can be used for multiple purposes, including stormwater management, flood prevention and emergency response planning, asset management and land use planning. This project will require significant resourcing, and is a foundational element for other components of the proposed levee bank management policy.

The documentation process should include:

- an assessment of the location and condition of the infrastructure as well as height and flood mitigation standard, based on the best available information.
- an assessment of land ownership and presence of easements or management agreements in relation to access to the levee banks
- current roles and responsibilities for levee bank management and maintenance regime
- development of a spatial dataset for this information

Stakeholder consultation highlighted broad support for the development of such a database, but the process of gathering information for the database needs careful consideration, as it would be resource intensive and further consultation with stakeholders to determine an effective approach to information gathering would be needed.

In terms of access to information in the database, it was suggested that location and flood mitigation standard should be available to the public, land ownership should be linked to the approach by Land Services SA and maintenance status and governance arrangements should be accessible to Councils, and State Government entities.

Suggestions for information to be stored included: asset details, maintenance and upgrade responsibility, asset management plans, design criteria, failure mechanisms (for controlled failure), extent of potential inundation if rupture occurs (including maps) and Population at Risk.

Proposed further actions:

1. Develop a funding proposal to seek funding for a baseline of existing levee bank locations and land ownership.
2. Develop a funding proposal to undertake a pilot for collection and storage of more detailed information for existing levee banks in (part of) the Gawler River catchment.
3. Develop a business case and approach for collecting and storing levee bank information across the State, based on the pilot.

3.2 A planning process to identify priority levee banks and determine formal management arrangements

A planning process is required to determine priority existing and proposed levee banks and determine roles and responsibilities for asset management. State Government will only consider investing in construction or upgrades of priority levee banks. Formal management arrangements ensure that there is agreed and clearly documented accountability for ongoing management. The planning process will build on the documentation and assessment of existing levee banks outlined in section 3.1

The following criteria are proposed for the planning process, adapted from the Victorian Floodplain Management Strategy. These criteria will need to be tested using one or more pilots:

- Due process – Communities will be consulted so that their concerns, their local knowledge and their ideas about flood mitigation options can be considered
- Due diligence – Decision-making processes will set clear objectives, be evidence-based and will examine all reasonable options to mitigate flood risks.
- Risk based approach – the level of protection to be provided will be informed by an assessment of flood risk: the likely flooding frequencies, and the potential impacts on the environmental, social and economic values in the local area.
- Effectiveness and efficiency – The benefits in reduction in flood risk (likelihood and consequence) achieved by the levee bank are outlined and compared to the cost (including both capital and ongoing costs) as well as costs and benefits of alternative solutions.
- Community benefits –The levee bank should have primary community benefits in terms of the protection of:
 - human life and safety
 - community safety, by ensuring major evacuation routes are maintained
 - community welfare, by ensuring the continuity of social services, particularly those provided by public infrastructure
 - existing dwellings, where it is only feasible to protect them through collective action
 - other priority assets identified as having broader community value.

- Environmental impact – The effect on the environment, such as impeding the normal flow of the watercourse or the flow across the floodplain, will need to be considered as part of the process.
- Accountability for ongoing management – State Government investment in building or upgrading levee banks only occurs if the accountability for ongoing asset management is agreed and clearly documented. Arrangements for ongoing management will need to consider:
 - the community's willingness and ability to pay for ongoing management and maintenance;
 - the establishment of access arrangements to enable restoring and maintaining the infrastructure to a reasonable standard of protection;
 - capacity of accountable organisations to undertake or oversee asset management

Construction or upgrades of levee banks designed to mainly protect proposed new development on flood prone land will generally not meet the criteria for investment by State Government. The State Planning Policies clearly outline the risk hierarchy of avoid, accommodate and adapt with regard to the location and design of proposed new development.

The elements of the proposed planning process could be built into the guidelines for stormwater management plans, regional/ local development or infrastructure planning or as a stand-alone planning process. It is proposed to undertake one or more pilot planning processes as stand-alone processes.

The planning process is not intended to undertake a comprehensive identification of any new levee banks to be constructed across South Australia, but is intended to apply to all proposals for new or extended levee banks, as well as all existing levee banks.

The proposed planning process to identify priority levee banks and resolve asset management arrangements was generally supported by stakeholders but further suggestions and some alternatives were provided. A coordinated approach through State Government for the planning process was suggested to ensure consistency and leadership, as well as alignment with capabilities.

It was suggested that the PDI Act or the Landscape SA legislation could include legislative requirements for the planning process, including criteria to identify priority levee banks and non-priority levee banks. The planning process would need to ensure ongoing financial capacity, expertise and experience for maintaining and managing levee banks.

One suggestion for the end point of the planning process was that priority levee banks should be incorporated into Councils' asset management plans and their capital works programs, while others considered that priority levee banks would become a State Government responsibility. There is an option that the planning process identifies state and local priorities for levee banks. A levee bank that prevents a major highway from being flooded could be a State priority, while a levee bank within a local Council area that protects part of a town within that same Council area could be a local priority.

The feasibility of identifying and assessing all existing levee banks to determine their priority was questioned and it was considered that a more targeted or strategic approach would be needed. Piloting a planning process for some existing levee banks to help develop and refine the process was supported.

During stakeholder consultation the Gawler River Flood Management Authority (GRFMA) expressed interest in being part of a pilot for the planning process for the existing Gawler River levee banks, to align with work being undertaken to determine additional flood mitigation options for the Gawler River.

During stakeholder engagement, it was noted that rail lines and roads frequently act as levee banks and store large volumes of floodwater acting as detention basins and protecting downstream properties. The planning process for these structures may be different as they may never have been designed to act as levee banks.

Proposed further action:

4. Pilot the levee bank planning process in part of the Gawler River catchment.

3.3 Development of a business case and cost sharing arrangements for construction, remediation or upgrade of priority levees

The documentation of existing levee banks (section 3.1) and the planning process to determine priority levee banks (section 3.2) will provide the information necessary to develop a business case for remediation/upgrade of existing priority levee banks or construction of proposed new priority levee banks. It will outline the costs and benefits of the proposal compared to alternative solutions, the risk mitigation to be achieved and community's/beneficiary's willingness to pay. It will identify the cost to ensure access arrangements for ongoing operation and maintenance. It could distinguish between State and local level priorities.

As mentioned in Section 3.2, flood mitigation should be considered after avoidance and adaptation. This principle should be reflected in the assessment of any proposed new levee banks, and may also need to be considered when assessing plans for remediation or upgrades of existing levee banks.

The costs of designing and constructing new priority levee banks or upgrading/remediating existing levee banks should be shared between State and local government. Access to Commonwealth government funding will need to be actively pursued where possible to reduce the cost burden for State and local government.

Different arrangements for cost-sharing design, construction or upgrades of levee banks may be negotiated on a case-by-case basis, for example contributions by third parties such as major asset holders to the design, construction, upgrade or remediation of levee banks.

The proposed use of the beneficiary pays principle for ongoing routine operation and maintenance of levee banks (excluding upgrades or major repairs) received mixed responses. The problem of identifying the beneficiaries was highlighted, for example avoiding interruption to or loss of a transport route affects a broad community and should be paid for by a broad community. The beneficiary pays principle could be an option for new levee banks protecting new developments, but was by many respondents considered unsuitable for existing ones.

Perceptions about what current Council rates and Landscape and water levies already cover will need to be addressed when considering a mechanism for covering levee bank operation and maintenance costs.

As a general rule, Council rates are the most logical mechanism for funding routine ongoing operation and maintenance of local priority levee banks, once any upgrade, remediation and other legacy work has been completed. This is the funding model for operation and maintenance of any new levees funded by the Coast Protection Board or the Stormwater Management Authority and the approach to management of priority levee banks in Victoria. Different arrangements could apply where existing road or railway embankments act as levee banks or where levee banks are identified as a State level priority.

Proposed further action:

5. Explicitly consider and test the cost sharing arrangements for a levee bank, identified to be a priority levee bank through a pilot planning process.

3.4 Access arrangements for construction, remediation and maintenance of levee banks, including clarification of responsibilities of landowners

Levee banks that protect multiple properties require one authority for ongoing management. The managing authority needs to have access to the entire levee bank, regardless of the current ownership of the land the levee bank was built on.

The acquisition of land provides the highest level of certainty that the relevant authority has access to the levee bank for ongoing maintenance. The South Eastern Water Conservation and Drainage Board is responsible for managing

the drains and associated embankments in the South East region and has ownership for approximately 75-80% of the land on which that infrastructure is located and access for much of the upper south east network through easements.

Creation of an easement to cover the levee bank also provides certainty of access for the party responsible for ongoing operation and maintenance. As an easement is attached to the property title, it continues after a property has been transacted and is essentially perpetual unless revoked by agreement by both parties.

Easements can be procured by agreement or compulsory acquisition. Acquisition by agreement would be the preferred approach. The cost of acquiring easements or land will need to be factored into the business case for the levee bank.

It is also important that responsibilities of landholders are clear and can be enforced to ensure levee bank structures are not damaged or modified without the consent of the authority responsible for operation and maintenance.

Generally there was agreement during consultation that there are very few viable alternative options to easements or purchase to ensure access to a levee bank for a responsible entity. It was suggested that for levee banks with strategic flood mitigation importance for the community, State Government may need to consider taking on the responsibility of establishing easements.

Relying on individual landholders to undertake maintenance of their section of a levee bank was considered unlikely to be effective by most respondents.

The issue of damage or unauthorised changes to levee banks by landholders and how to address this, raised a number of responses. It was noted that this requires an inspection/auditing regime by the managing body, and powers to direct or undertake actions. It was suggested to investigate arrangements for damage to other infrastructure such as stormwater infrastructure, power lines etc.

Incorporating suitable enforcement mechanisms when establishing land access, possibly by incorporating into the PDI Act was suggested as an option, as was the approach used under the *Fire and Emergency Services Act 2005* (FES Act), which places responsibilities on landholders and creates authorised persons who can provide advice and notices of compliance.

Proposed further actions:

6. Explore easements to ensure levee bank access as part of a pilot planning process.
7. Explore application of arrangements for other infrastructure such as power lines and stormwater infrastructure and use of powers under the FES Act to address damage or unauthorised change to levee banks.

3.5 Guidelines relating to the siting, design, construction, modification and maintenance of levee banks

Current assessment criteria in regional NRM Plans and the South Australian Planning Policy library already cover many aspects of levee bank siting and focus on third party impacts and watercourse management aspects. It is important to ensure these criteria are maintained in the transition to the Planning and Design Code and/or the water affecting activity control policy under the Landscape SA Act.

Assessment criteria currently do not cover levee bank design from a hydrological or engineering perspective. Victoria's approach has been to provide guidelines for design, construction, management, upgrade, renewal and decommissioning (see [Levee Management Guidelines](#)). Adapting these guidelines for the South Australian context is recommended to provide more guidance on levee bank management.

The level of flood protection to be provided by levee banks should not only be guided by the likelihood of flood occurrence but should consider the consequence of flooding and what is considered an acceptable level of risk. Factors such as presence or absence of evacuation routes and locations, depth and velocity of water as well as loss of access causing isolation during a flood will all play a part in assessing the level of protection required.

Designing and building controlled flooding pathways in case the levee bank is overtopped is important as it will aid in emergency response and predictability of flooding patterns.

Consultation feedback suggested that guidelines may not be sufficient and that a performance standard may need to be included in the Planning and Design Code. The levee bank construction requirements developed in Victoria were considered a good starting point.

Proposed further actions:

8. Review and develop improved requirements in the Planning and Design Code for levee bank design and construction utilising the Victorian guidelines as a starting point.
9. Develop guidelines for levee bank operation and maintenance utilising the Victorian guidelines as a starting point and seek feedback from stakeholders.

3.6 Consolidated approval process for levee banks under the PDI Act

Clearer definitions and boundaries that determine when a levee bank requires development approval or a water affecting activity permit are needed. The reference to the flood overlay in the PDI regulations is logical, but relies on a comprehensive flood overlay in the Planning and Design Code, which does not yet exist. The generic 3 metre height limit, which provides a trigger for levee banks to require development approval outside the flood overlay, should be reviewed, as this is considered too high in many cases.

The Landscape SA Act refers to a building or structure being erected, constructed or placed in a watercourse or on the floodplain of a watercourse but the floodplain may not always be clearly defined. There is significant uncertainty about whether or not a levee bank requires development approval or a water affecting activity permit.

Consultation feedback confirmed that current approval processes for levee banks are confusing and in need of further work to provide a consistent and transparent process. A recurring suggestion was that all levee banks should be assessed under the PDI Act with a referral under the Landscape SA legislation for water resource and floodplain impacts. An appropriate trigger level in terms of the height of a levee bank or the area of impact (reduced or increased flooding risk) needs to be determined to avoid inadvertently capturing small earthworks for soil and wind erosion. The opportunity to further refine levee bank regulation in the Planning and Design Code was recognised by a number of respondents, including DPTI.

Proposed further action:

10. Scope amendments to Planning and Design Code and/or PDI regulations as well as policies under the Landscape SA Act to support a consistent approval process for levee banks under the PDI Act with referral to Landscape Boards or DEW and seek further feedback on these amendments.

3.7 Management arrangements for non-priority levee banks

Existing or proposed levee banks that are identified as non-priority levee banks but still within scope of this position paper (impact on multiple properties) may still be approved to be constructed or upgraded but will not receive State Government funding. Construction or upgrades of such levee banks will still need to satisfy environmental and downstream impact considerations and arrangements for accountability for ongoing management that are agreed and clearly documented.

Non-priority existing levee banks can be removed or modified to ensure “controlled failure”, unless a third party takes responsibility for their maintenance. The option to leave existing non priority infrastructure unmanaged and

unmaintained or only maintained to a low standard can be considered, but requires an assessment of risks, costs and benefits.

Consultation feedback suggested the need for re-assessment of flood maps to determine impact of failure for levee banks that are not maintained. This would be a major piece of work. There may be an opportunity for non-priority levee banks to be maintained by individual landholders in consultation with other landholders and supported by formal agreements. Management arrangements for non-priority levee banks could also include cost sharing arrangements for the removal of levees, in particular where these levees may increase flood risk on other properties.

Proposed further action:

11. Explicitly consider options for management of non-priority in scope levee banks as part of the pilot.

3.8 Summary of proposed actions

Table 2 outlines the proposed actions for improved levee bank management in South Australia, with lead agencies and supporting agencies to deliver the actions. Most actions will require extensive stakeholder engagement and participation. The timelines are indicative and dependent on resourcing and /or regulatory reform.

	Action	Lead	Support	Timeframe	Comments
1	Develop a funding proposal to seek funding for a baseline of existing levee bank locations and land ownership.	DEW	DPTI, SAFECOM	December 2020	Can be delivered with existing resources
2	Develop a funding proposal to undertake a pilot for collection and storage of more detailed information for existing levee banks in (part of) the Gawler River catchment.	DEW	GRFMA, DPTI, SAFECOM	December 2020	Can be delivered with existing resources
3	Develop a business case and approach for collecting levee bank information across the State, based on the pilot	DEW	DPTI	tbd	Dependent on completion of pilot of levee bank information (action 2)
4	Pilot the levee bank planning process in part of the Gawler River catchment.	DEW	GRFMA	December 2021	Dependent on completion of pilot of levee bank information (action 2) and additional resources
5	Explicitly consider and test the cost sharing arrangements for a levee bank, identified to be a priority levee bank through a pilot planning process.	DEW	GRFMA, DPTI	December 2021	Link to planning process pilot (action 4)
6	Explore easements to ensure levee bank access as part of a pilot planning process	DEW	GRFMA, DPTI	December 2021	Link to planning process pilot (action 4)
7	Explore application of arrangements for other infrastructure such as power lines and stormwater infrastructure and use of powers under the FES Act to address damage or unauthorised change to levee banks	DEW	DPTI, SASES, local government	Aligned with future legislative review process for the FES Act	Requires regulatory change
8	Review and develop improved requirements in the Planning and Design	DPTI	DEW	June 2021	Requires regulatory change

	Action	Lead	Support	Timeframe	Comments
	Code for levee bank design and construction utilising the Victorian guidelines as a starting point				
9	Develop guidelines for levee bank operation and maintenance utilising the Victorian guidelines as a starting point and seek feedback from stakeholders	DEW	DPTI, local government	March 2021	Can be delivered with existing resources
10	Scope amendments to the P&D Code and PDI regulations as well as policies under the Landscape SA Act to support a consistent approval process for levee banks under the PDI Act with referral to Landscape Boards or DEW and seek further feedback on these amendments	DPTI DEW	Landscape Boards	June 2021	Requires regulatory change
11	Explicitly consider options for management of non-priority, in scope levee banks as part of the pilot	DEW	GRFMA DPTI	December 2021	Link to planning process pilot (action 4)

Table 2: Proposed actions for improved levee bank management in South Australia