ELSTER CREEK CATCHMENT:
PLANNING FOR THE CATCHMENT

PLANNING SCHEMES REVIEW & ANALYSIS

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March, 2018
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1 Introduction

Hansen has been engaged by Glen Eira City Council to undertake a review of the four municipal planning schemes within the Elster Creek Catchment, namely, Kingston, Bayside, Port Phillip, and Glen Eira. This review forms part of the larger Elster Creek Catchment – Planning for the Catchment project which is a core deliverable of the ‘Elster Creek Catchment Action Plan’ (October 2017).

Following the signing of a Memorandum of Understanding between the four affected municipalities and Melbourne Water, the Action Plan has been developed to provide a consistent approach in responding to flooding risks at a catchment scale and ensuring community resilience.

Part of the project relates to canvasing innovative ideas to implement into the four planning schemes. The first part of this task relates to completing a collective review of the planning schemes, focusing on already existing planning policy related to the reduction of flood risk and adaptation provisions.

The following accordingly provides an outline of the current State and local policies related to flood water and stormwater in the planning schemes, existing controls and an analysis of the findings, providing comparisons between the schemes and potential recommendations in terms of ideas that could be implemented from one scheme into another.
2 State Planning Policy

The State Planning Policy Framework contains broad objectives and strategies in relation to flooding, drainage and stormwater quality and mitigation that are relevant to each municipal planning scheme and inform locally based policies. These policies are outlined below.

Clause 11.04-1: Open Space Planning

Clause 11.04-1 has the broad objective of creating a diverse and integrated network of public space. A key strategy for achieving such networks of open space is to, where possible, create connections along waterways and natural drainage corridors.

Clause 12.02-5: Bays

Seeks to ensure the health of bays and their catchments by ensuring development pressures within catchment areas are appropriately managed so that the stormwater entering waterways is improved particularly from construction sites and road development.

Clause 12.05-1: River Corridors

While not specifically relevant to Elster Creek, the clause contains specific strategies related to ensuring that development does not jeopardise the natural capacity of rivers to manage flood flow.

Clause 13.01: Climate Change Impacts

Is the main State level policy related to climate change. The only climate risk outlined for planning consideration is the potential coastal impacts of sea level rise. Planning is to prepare for a possible sea level rise of 0.8 metres by 2100. There is no mention of the affects of altered rain patterns and the possible impact that this may have on the increased severity of stormwater flooding events and planning for community adaptation to this.

Clause 13.02-1: Floodplain Management

Is the key State level policy related to floodplains and their management. The clause seeks to protect life, property and community infrastructure from flood hazard and the natural flood carrying, storage and environmental significance of floodplains. Strategies relate to ensuring that land affected by flooding is identified, intensive uses and development in such locations avoided, emergency and community facilities located outside floodplains where possible, and that uses with potentially hazardous chemicals or waste are either located away from floodplains or designed in a way to mitigate contact between them.

Clause 14.02: Water

Clause 14 contains the key State policy related to the protection and restoration of catchments as well as other waterways and water bodies. In addition to water ensuring water quality strategies relate to protecting the drainage function and landscape and habitat of natural drainage corridors with vegetated buffer zones, implementing measures (undefined) to minimise the quantity, and mitigate the flow of, stormwater runoff from developments, and coordinating planning with catchment management authority activities. Water Conservation strategies also seek to ensure water resources are managed sustainably by encouraging amongst other things the use of alternative water sources such as rainwater and stormwater by government, developers and households.
Clause 19.03: Development Infrastructure

Clause 19.03 contains objectives related to implementing the use of development contributions plans to facilitate the provision of infrastructure. Planning for the provision of water supply, sewerage, and drainage services that meet the community’s needs as well as protecting the environment is highlighted.

In relation to drainage services, this is to be achieved by ensuring that when planning for urban stormwater drainage systems, this is coordinated at a catchment wide perspective involving adjacent municipalities. Such drainage networks are to include measures to reduce peak flows and assist screening, filtering, re-use and treatment of stormwater, to enhance flood protection and minimise impacts on water quality in receiving waters.

Clause 19.03-2 (Stormwater) also highlights the need to reduce the impact of stormwater on bays and catchments. Particular strategies relate to supporting an integrated response to stormwater quality through a mix of on-site measures and developer contributions, mitigating pollution from construction sites, ensuring stormwater does not have a detrimental effect on wetlands and estuaries, and most relevantly, that water-sensitive urban design techniques are incorporated into developments. This is so that water systems are protected and enhanced, stormwater is integrated with the landscape, water quality is protected, run-off and peak flows are reduced, and drainage and infrastructure costs are minimised.
3 Local Planning Policy

Each council has their own locally specific policies related to floodwaters and stormwater management outlined within the Municipal Strategic Statement and Local Policy sections of their planning schemes that either build on the State standard policies or outline further issues / considerations. These are outlined below.

3.1 Glen Eira Planning Scheme

Within the Municipal Strategic Statement, the Glen Eira Planning Scheme outlines a number of broad directives in relation to flood prone areas in the municipality and highlights the issue of ageing infrastructure such as drainage networks.

Of particular note are the following policies.

Clause 21.04: Housing and Residential Development

While Clause 21.04 deals more broadly with the design, built form and character outcomes of new residential development, it is specifically noted within Objective 3 of Clause 21.04-2 (Objectives Strategies and Implementation) to promote environmental and social sustainability with particular strategies related to reducing water usage and encouraging rainwater retention and usage in larger developments.

Clause 21.11: Infrastructure

Clause 21.11 is Glen Eira’s main policy related to Council infrastructure and highlights planning’s role in its delivery and maintenance. Specifically in regards to drainage, the policy notes that there is great community concern related to flooding as a result of inadequate and ageing infrastructure. The policy makes note of the Drainage Survey completed by Melbourne Water in 1998 which mapped the extent of overflow paths of stormwater in the event of a 1 in 100 year flood.

Particular objectives relate to ensuring:
- The maintenance and improvement of drains within the municipality;
- That new development contributes appropriately where it is likely to impact on existing infrastructure; and
- That development on land liable to flooding is managed appropriately to minimise costs associated with storm events.

Strategies highlight the need to:
- Implement approaches and appropriate funding mechanisms to identify and make improvements to existing infrastructure.
- Develop and provide information on areas prone to flooding and overland drainage flow paths to regulate flow paths in these areas.

Implementation options canvas ideas related to:
- Levying development contributions to fund improvements to existing, and the provision of, new infrastructure in areas where development will have an impact on existing capacity levels;
- Seeking Melbourne Water advice on proposals within overland flow paths and flood prone areas,
- Minimising impervious surfacing.
- Using the Special Building Overlay for areas identified by Melbourne Water that are flood prone identify in the planning scheme land liable to inundation and to ensure appropriate development.

The policy notes further strategic work such as investigating additional development contributions mechanisms and preparing a Municipal Stormwater Plan incorporating a Drainage Framework Plan.
3.2 Kingston Planning Scheme

The Municipal Profile (Clause 21.02) of the Kingston Planning Scheme recognises the diverse environmental landscape of Kingston including its waterways and floodplains highlighting that the municipality is on the receiving end of regional catchment systems and shares integrated catchment management responsibilities with adjoining municipalities and agencies. Clause 21.03 (Land use Challenges for the New Millennium) notes the need to protect and enhance the ecological value of Kingston’s natural environments with a key priority to improve the management of urban stormwater, land use and resource management and integrated catchment planning. Future management is to focus on initiatives that re-establish wetland morphologies and improve water quality and flood storage. Clause 21.08 (Foreshore) contains a strategy related to establishing performance standards and monitoring regimes for catchment management to minimise the risk of pollution on coastal environments.

Of particular note are the following clauses.

Clause 21.09: Environment, Wetlands and Waterways

Clause 21.09 highlights that there is opportunity within Kingston to enhance the natural environments of Kingston through improvements to urban stormwater and integrated catchment planning. The limits of existing drainage networks to manage flooding highlights the need to ensure that land use planning consider flood risks by avoiding intensifying flooding impacts through inappropriately located uses and development and improving the flood storage and water quality treatment functions of existing floodplains and waterways through the creation of a chain of wetlands along Mordialloc Creek as a primary drainage and flood management function. Such objectives tie the creation of open space and environmental management with strategies for floodplain management. Key issues highlight the degradation of waterways and water quality due to past drainage works and modifications to drainage and land use, altering natural flood regimes and subsequent need to provide adequate flood storage and improve stormwater management practices.

Such objectives and strategies are to be implemented by discouraging, in the decision-making process, use and development that would have significant impacts on local waterway performance and ensuring that the SBO and LSIO are implemented in areas liable to overland flows from drainage systems and land along waterways respectively.

Further strategic work highlights the need for continuing to undertake drainage survey works, developing Catchment Management Plans, and development Stormwater Management Plans.

Clause 22.11: Residential Development Policy

While Clause 22.11 predominantly relates to the management of housing change in terms of design and neighbourhood character, it specifically notes the need to limit the amount and impact of stormwater runoff from new development into drainage systems. Specific ‘Performance Measures’ are outlined for new development to achieve stormwater run-off mitigation and quality management including:

- Wherever possible, using unpaved landscape areas or porous paving.
- Where appropriate, constructing on-site stormwater detention with delayed release into the stormwater drainage system.
- Designing to limit the impervious area.
- Incorporating on-site water re-cycling systems for stormwater run-off.
- Directing stormwater run-off into garden areas to reduce watering and the demand on drainage infrastructure.

It notes specifically:

_The design of an on-site stormwater detention system should consider the effect of the delayed release of stormwater in conjunction with the time of concentration of flows from the whole catchment at the point of discharge from the property._
Drainage systems should be designed to minimise potential for transportation of silt and debris, and provide for their collection and removal at accessible locations.

Building locations should take into account overland flow paths and ensure that buildings do not divert flows, causing increased flooding on adjacent properties.

**Amendment C152**

It is worth mentioning that Kingston currently have an active Planning Scheme Amendment (Amendment C152) to introduce a local policy to provide objectives and application requirements for residential and non-residential development that require a planning permit to incorporate stormwater treatment measures, similar to what Bayside and Port Phillip have as outlined below.
3.3 Bayside Planning Scheme

A key directive outlined within the MSS of the Bayside Planning Scheme recognises the environmental risks associated with flooding and stormwater management and the need to manage the impacts of urban consolidation and the intensification of development on the flow of water and flooding.

Of particular note are the following policies in addition to the Development Contributions Plan Overlay – Schedule 1 outlined below.

Clause 21.05-1: Flooding & Stormwater

Clause 21.05-1 acknowledges that Port Phillip is at the receiving end of the Port Phillip catchment system and therefore stormwater runoff management has implications on water quality in Port Phillip Bay. The clause recognises the pressure that urban consolidation and intensification can place on drainage systems due to increases in the magnitude of peak stormwater flows and pollutants and subsequent excess flood water. It highlights that there is a need to encourage sustainable development based on the principles of integrated water management.

The clause contains objectives related to:

- Ensuring stormwater and groundwater in the Port Phillip catchment and impacts of peak stormwater flows are mitigated by ensuring environmental best practice is used in the management of stormwater.
- Recognising the need to increase on-site retention and re-use of stormwater and the regulation of the flow of flood water by incorporating water sensitive urban design, site cover and hard surface limitations, and including stormwater recycling and quality management techniques on-site.

Key strategies to achieve this is through the use of local policy Clause 22.08 (outlined below) and applying the SBO and LSIO to land affected.

Further strategic work highlights the need for a stormwater management plan, identifying areas with environmental and infrastructure constraints, a strategy for the management of drainage assets, and identifying areas with limitations on drainage capacity to accommodate higher density development.

Clause 21.05-2: Climate Change

Clause 21.05-2 recognises the impact that climate change will have on natural processes such as more frequent storm events, sea level rise, temperature and rainfall patterns. It is acknowledged that this will have an impact on amongst other things, infrastructure damage and inundation. Like the State level policy related to climate change, the clause relates to the impacts on the coastal environment as a result of extreme storm tide and sea level rise. No direction is provided on the impacts of altered rain patterns on stormwater issues and the community’s ability to adapt to this.

Clause 21.06-2: Sustainability

Clause 21.06-2 highlights the need to incorporate sustainable development principles in new development particularly integrated water management principles which at a minimum include water sensitive urban design techniques and innovative solutions for larger developments.

Clause 21.10: Infrastructure

Clause 21.10 recognises the pressure that urban consolidation has on existing physical infrastructure. It highlights the need for future strategic work to explore options for Development Contributions Plans to upgrade infrastructure.

Clause 22.08: Water Sensitive Urban Design (Stormwater Management)

Of particular importance is Clause 22.08 which is a local policy dedicated to providing guidance on incorporating stormwater treatment measures into the design of new development to mitigate the effects of increased development on waterways. The policy outlines objectives, policy direction, application requirements and decision guidelines for new buildings, extensions and subdivision.
Objectives relate to:

- Promoting the use of water sensitive urban design (WSUD) such as stormwater reuse.
- Protecting surface water and groundwater from pollutants.
- Reduce impacts of peak stormwater flows.
- Integrating stormwater treatment into the landscape.

Application requirements include:

- The development of a site layout plan showing the location of proposed stormwater treatment measures.
- The use of an industry accepted performance measurement tool such as STORM or MUSIC.
- Design details of stormwater measures.
- A site management plan for construction.
3.4 Port Phillip Planning Scheme

As set out at Clause 21.01-2 (Strategic approach), at the heart of the Port Phillip Planning Scheme is a fundamental intent of responding to climate change by placing an emphasis on sustainable development. A key approach in this regard is the reduction in the use of potable water (50% by 2020 on 2001 levels). Clause 21.03: Ecological Sustainable Development furthers this and recognises the role that the built environment has on the natural environment. A key objective is to promote sustainable design and development particularly through development that encourages water re-use and recycling and water sensitive urban design techniques to increase stormwater retention and treatment.

The planning scheme also has broad references to water use and retention within activity centres and neighbourhoods. Clause 22.09: St Kilda Foreshore Area Policy for instance applies to the St Kilda foreshore and contains built form policy related to ensuring that the water quality of Port Phillip Bay is protected from new development through the application of the City of Port Phillip Stormwater Management Plan and requiring the preparation of site management plans to manage stormwater and improve water quality.

Key policies are the following.

Clause 21.05-4: Physical Infrastructure

Clause 21.05-4 relates to the planning of new physical infrastructure. It is highlighted that drainage should be designed to ensure minimal impact on waterways with the primary goal of stormwater management being the maintenance of ecologically sustainable waterways. This is to be achieved by requiring development to contribute to or provide new infrastructure, reducing stormwater run-off by managing its quality and quantity from individual sites, and promoting water sensitive urban design principles.

Clause 22.12: Stormwater Management (Water Sensitive Urban Design)

Similar to the Bayside Planning Scheme, Clause 22.12 is Port Phillip’s key Local Policy related to stormwater management that seeks to incorporate stormwater treatment measures into the design of development based on Water Sensitive Urban Design principles. The policy outlines objectives, policy direction, application requirements and decision guidelines for new buildings, extensions and subdivision and notes the Port Phillip Water Sensitive Urban Design Guidelines as a reference document.

In terms of objectives, the policy highlights the need to achieve best practice water quality performance as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999, encouraging WSUD to mitigate downstream impacts and minimise peak stormwater flows and pollutants, and integrating urban water into the landscape.

An application must be accompanied by a WSUD Response that includes:

- Site Layout Plan – indicating stormwater treatment measures such as harvesting and reuse measures, treatment measures, infiltration measures and passive irrigation measures.
- A Report utilising such industry tools as the STORM calculator or MUSIC model outlining how policy objectives are met.
- Design details of any measure so the technical effectiveness of the measures can be assessed.
- A site management plan for construction.
- A maintenance program outlining future management measures.

Policy direction outlines a number of stormwater treatment measures to improve the quality and reduce the flow of water including:

- Collection and reuse of rainwater and stormwater on site.
- Vegetated swales, buffer strips and rain gardens.
- Installation of water recycling systems.
- Multiple uses of water within a single manufacturing site.
- Direction of flow from impervious ground surfaces to landscaped areas.

**Clause 22.13: Environmentally Sustainable Development**

Clause 22.13 is the municipality’s main ESD policy providing direction for new development to achieve environmental design standards. Policy objectives relate energy performance, indoor environment quality, transport, waste management, and urban ecology as well as the relevant categories of water resources and stormwater management. Such relevant objectives relate to the encouragement of stormwater collection and reuse and the incorporation of WSUD techniques to reduce the impact and improve the quality of stormwater run-off.

The policy requires the generation of an assessment depending on the type of development as outlined in Table 1 of the policy. For instance, developments of 2-9 dwelling require a Sustainable Design Assessment (SDA) by either utilising the STORM or MUSIC tool.
4 Zones and Overlays

The planning schemes contain a number of state standard VPPs related to flooding matters they include:

- Urban Floodway Zone (UFZ)
- Floodway Overlay (FO)
- Land Subject to Inundation Overlay (LSIO)
- Special Building Overlay (SBO)

**Special Building Overlay**

Of most relevance is the **Special Building Overlay (SBO)** which identifies land in urban areas that is liable to inundation by overland flows specifically from the drainage systems. SBOs are based upon the extent of overland flooding that would result from a 1 in 100 year flood. The purpose of the SBO is to ensure that new development is designed to maintain the free passage and temporary storage of floodwaters to minimise flood damage and not cause any significant rise in flood level or flow velocity that may adversely affect existing properties. For properties in the SBO, a planning permit is required to construct or carry out works and to subdivide land. This enables drainage and flooding issues to be addressed early in the development process. Applications are referred to Melbourne Water who will require the applicant build a certain level (usually 600mm) above the 1 in 100 year flood level.

The use of a schedule under the SBO is to exempt certain buildings and works from requiring a permit such as minor extensions, fencing, carports, etc.

**Land Subject to Inundation Overlay**

The **Land Subject to Inundation Overlay (LSIO)** is less relevant as it identifies land subject to mainstream flooding, that is, flooding from the overflowing of a watercourse (usually streams and rivers). Mainstream flooding generally excludes water carriers constructed with pipes or artificial channels, which are considered as stormwater channels.

**Overlay Use**

As identified on the map in Appendix 1, the SBO currently applies to land surrounding the drainage network of the Elster Creek Catchment. A small section of the LSIO applies in Bayside, however as outlined below it is proposed to be removed as part of Amendment C153 and replaced with the SBO.

The application of the SBO is based on differing modelling, with some municipalities being based on more recent modelling than others due to when they were implemented and amended as outlined below.

Details of each municipality’s use of the SBO is outlined as follows:

- **Glen Eira** – first introduced into the planning scheme via Amendment C016 in 2002. Has remained the same apart from a minor amendment (Amendment C35) in 2004.
- **Kingston** – first introduced via Amendment C032 in 2005 and has remained the same since.
- **Bayside** – first introduced into the planning scheme via Amendment C001 in 2002. As a result of new modelling conducted by Melbourne Water, Bayside currently have an active planning scheme amendment (Amendment C153) to update the coverage of the SBO. The amendment also deletes the LSIO within the municipality and replaces it with the SBO to make the control more consistent with stormwater related flooding.
- **Port Phillip** – has been in the planning scheme since the introduction of the VPPs in 1997. Amendment C111 in 2016 revised the coverage due to new flood modelling conducted by Melbourne Water.

**Development Contributions Overlay**

Another control of note is the **Development Contributions Plan Overlay (DCPO)** which is utilised in designated areas to levy contributions for the provision of services, infrastructure and facilities. Of particular relevance is Bayside’s use of the **Development Contributions Plan Overlay – Schedule 1 (DCPO1)** which implements the Bayside Drainage
Development Contributions Plan. DCP01 was implemented into the planning scheme via Amendment C139 in 2017 and requires proponents of new development to contribute to the upgrade of Bayside’s municipal drainage network via the payment of a levy. The DCP01 imposes a cost on development that intensifies land use, for instance, the rates require that $2,000 be paid for each new ground floor dwelling, $1,000 for each upper storey dwelling and $520 per 100 square metres of gross floor area for new commercial uses.
5 Discussion

Based on the above review, a number of observations can be made about each planning schemes’ approach to flooding and stormwater management.

5.1 Council Breakdown

Glen Eira

Overall, apart from broad objectives and strategies within the Municipal Strategic Statement, Glen Eira’s Planning Scheme is lacking in relation to specific policy related to managing the effects of flooding, particularly the contribution that new development can make towards mitigating the effects and impacts of stormwater.

The key policy (Clause 21.11) related to such issues is focused on protecting and managing drainage networks with minimal guidance on strategies related to WSUD for instance. There is opportunity to further realise the contribution that planning can make through development requirements (eg. WSUD techniques) when dealing with flooding and stormwater reduction rather than focusing heavily on infrastructure upgrades.

The scheme however positively highlights the importance of capturing development contributions for the purposes of infrastructure upgrades and additions such as new drainage. The Development Contributions Plan Overlay however has not been utilised in any areas of the municipality.

In terms of the use of controls, the planning scheme makes appropriate use of the SBO in areas surrounding the drainage network of the Elster Creek Catchment. The SBO coverage however is based on old modelling, having not been amended and remaining largely unchanged since its introduction in 2002.

Kingston

While not containing a specific policy related to stormwater management, the Kingston Planning Scheme recognises the limits that drainage networks have for mitigating the effects of flooding associated with stormwater runoff and the need to utilise integrated water management techniques. The two key policies highlight ways in which inappropriate development can exacerbate flooding issues.

Clause 22.11 positively integrates stormwater runoff mitigation and quality management measures with residential development policy so as it is considered as one of many design outcomes for new development. A number of site specific design techniques are outlined such as stormwater detention with delayed release systems to ensure development can assist with minimising urban floodwater.

As mentioned above, Amendment C152 to the Kingston Planning Scheme is seeking to introduce a stormwater management policy at Clause 22.19 similar to Bayside and Port Phillip. Such a tool will require planning permit applications to demonstrate stormwater treatment measures in new development.

Similar to Glen Eira, while the SBO applies to drainage areas identified in the Elster Creek Catchment, its coverage is based on old modelling and has not been amended since being introduced in 2005.

Bayside

Bayside’s Municipal Strategic Statement and subsequent Local Policies and Overlays are linked to the idea that increased urban consolidation and intensification places pressure on the capacity of drainage networks to deal with stormwater run-off.

Of most importance is Bayside’s use of Clause 22.08: Water Sensitive Urban Design (Stormwater Management) which specifically outlines application requirements, such as the generation of a STORM report, and decision guidelines for new development to deal with stormwater management and WSUD. The location of this policy within
the Local Policy section of the planning scheme also ensures that it carries more statutory weight then policy within the MSS.

The other important and positive aspect of the Bayside Planning Scheme’s approach to drainage is the use of the Development Contributions Plan Overlay to leverage funds to upgrade and manage existing drainage networks within the municipality as a result of the intensification of use and development. In this way, new development contributes to any new public drainage works so increased pressure on the drainage system can be appropriately offset and public resource use minimised.

The coverage of the SBO within the municipality is also currently being revised via Amendment C153 utilising up-to-date modelling provided by Melbourne Water.

**Port Phillip**

Port Phillip’s approach to stormwater mitigation in the planning scheme is tied to their overall vision in responding to climate change and increasing environmentally sustainable development within the municipality. In this way, the management of stormwater and flooding is integrated with such environmental considerations in a holistic manner.

Similar to Bayside, the Port Phillip Planning Scheme has a Local Policy (Clause 22.12) dedicated to Stormwater Management and WSUD. The detailed planning application requirements and decision guidelines are important for ensuring a consistent approach to stormwater issues in new development. Similar techniques are also included within the ESD policy located at Clause 22.13.

The application of the SBO within Port Phillip has also been recently updated in 2016 via Amendment C111.

### 5.2 Conclusions and Recommendations

The planning scheme review has revealed that each municipality has differing responses, levels of detail and implementation strategies when it comes to planning for flood impacts from stormwater and ensuring drainage networks are suitably managed.

The key findings from this review relate to the need for consistent Stormwater Policy, the need for Special Building Overlay updates and the use of Development Contributions Plans, and adaptation provisions.

**Stormwater Policy**

While public infrastructure such as drainage networks are important for mitigating flooding risks associated with urban stormwater, the design of new development plays an important role in mitigating the effects of increased stormwater at its source. The limits of existing drainage networks to manage flooding highlights the need to ensure that land use planning mitigate flood risks through appropriately designed development.

Specific stormwater management and WSUD policy as utilised by Port Phillip and Bayside appears to be an appropriate way to ensure that such matters are responded to in the planning process through application requirements and decision guidelines. Incorporating variations of such policies within the Glen Eira and Kingston planning schemes would be considered a positive way to further embed WSUB considerations in planning schemes.

The effectiveness of such policies for ensuring that WSUD measures are included in new development is however beyond the scope of this stage of the study. It is noted however that the effectiveness of these policies to implement the best practice stormwater flooding reduction techniques will be further understood in the next phase of the project which will research and highlight current best practice and innovative techniques.

On first assessment the policies are heavily geared towards increasing stormwater quality and reducing pollutants rather than reducing the stormwater runoff that leads to urban flooding which is the main focus of this project. For instance, the application requirement to produce a STORM report assesses a developments response to stormwater quality performance objectives, such as nitrogen, phosphorus and suspended soils retention, as guided by the *Urban*...
**Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999,** rather than specifically urban flooding mitigation.

**Special Building Overlay Updates**

The Special Building Overlay is the most appropriate tool within planning schemes to provide a level of control over building responses to flood risk in allowing for the free passage and temporary storage of floodwaters caused by drainage systems. The use of the SBO triggers the need for referral to Melbourne Water which requires the calculation of appropriate floor level heights above flood levels.

The SBO has been appropriately implemented across all planning schemes within the Elster Creek Catchment area, generally applying along the drainage network as identified in Appendix 1. The implementation of the SBO however is based on varying ages of modelling across the four municipalities. Glen Eira’s SBO coverage for instance is based on Melbourne Water modelling from 1999.

In accordance with the need for ‘further strategic work’ as highlighted by each of the planning schemes, it would be beneficial for each planning scheme to be based on the most recent modelling so as a consistent application of the SBO within the catchment is provided. It is noted that Bayside is currently undertaking this through Amendment C153.

**Development Contributions**

The maintenance and upgrading of existing stormwater drainage networks to ensure their future capacity is the key engineering response for mitigating the impacts of urban flooding. The planning scheme can play an important role in ensuring this, not just through policy direction, but also through more practical measures such as securing funding from new development.

The intensification of land can place a greater strain on existing drainage networks so ensuring that the upgrading of infrastructure happens in tandem with increased development is important for mitigating future capacity constraints and subsequent flooding issues. The Development Contributions Plan Overlay (DCPO) is the most appropriate and effective tool within planning schemes to leverage development contributions from new land uses and development that may place greater strain on the drainage network.

While this is highlighted in all planning schemes as a policy direction, as observed, it is only within the Bayside Planning Scheme that the DCPO has actually been utilised for this purpose. Implementing a consistent approach across the four planning schemes to leverage funding for the upgrade of the Elster Creek Catchment drainage network should be explored.

**Adaptation**

Climate change will increase the likelihood and severity of extreme climate events such as heat waves, droughts, storm surges, altered rain patterns, floods and bushfires. There are two main categories of responses to climate change: mitigation and adaptation. Whereas mitigation responses are intended to reduce the magnitude of human contribution to climate change, such as reducing greenhouse gas emissions, adaptation responses seek to reduce the impact and consequences of climate change as well as harnessing any beneficial opportunities.

The Department of Environment and Energy defines climate change adaptation as the ability for individuals, communities, organisations and natural systems to deal with the consequences of climate change that cannot be avoided. Adaptation recognises the shared responsibility that all levels of government and private individuals and business have in reducing climate risks.

The most relevant climate change risk posed for the Elster Creek Catchment will be altered rainfall patterns and to a lesser extent, storm surges. While climate change will likely result in a drier climate in Australia more generally, the intensity and frequency of storm events as a result of altered rainfall patterns is likely to increase. This will have impacts on the level, frequency severity and associated risk of catchment wide flooding as it will alter the amount of stormwater run off in the coming years.
As has been outlined above, the planning schemes are generally silent on the impacts of climate change, particularly altered rainfall patterns, on the catchment and the resulting impacts on stormwater and flood risk. While Port Phillip’s MSS ties in stormwater responses with climate change and sustainability objectives more generally, and Bayside contains specific climate change policy geared towards sea level rise and inundation, the planning schemes fall short of canvassing adaptation options for the community. As such, adaptation responses are not included in Council planning policies and their associated objectives and strategies.
Appendix 1

Elster Creek Catchment Area and Relevant Planning Scheme
Overlays Relating to Flooding etc.
Appendix 2

Example Stormwater Management Policies from Port Phillip and Bayside Planning Schemes
22.12 STORMWATER MANAGEMENT (WATER SENSITIVE URBAN DESIGN)

This policy applies to applications for:

- New buildings
- Extensions to existing buildings which are 50 square metres in floor area or greater.
- A subdivision in a commercial zone

This policy does not apply to an application for:

- A subdivision of an existing building.

22.12-1 Policy Basis

Increased development can result in greater hard surface area and changes to the volume, velocity and quality of stormwater drainage into natural waterways.

Achieving improved stormwater quality is a key objective in reducing the environmental impact of urban development on waterways and receiving water bodies in the Port Phillip catchment, this policy implements the best practice performance objective outlined in the **Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999** (or as amended) to achieve the objectives of the State Environment Protection Policy (Water of Victoria).

Waterways are an important environmental asset and measures that protect, or improve, water quality will be of significant benefit environmentally, socially and economically.

Incorporating stormwater treatment measure into the design of development, including wetlands, bio-retention systems and porous pavements to filter pollutants, will help to protect and improve the condition of the natural waterways and passively irrigate urban vegetation.

Water sensitive urban design (WSUD) is the design of buildings, subdivisions and works to minimise the hydrological impact of urban development on the surrounding environment. WSUD provides the means for treating stormwater run-off in a variety of ways so that the flow is reduced, and the quality of run-off is improved. Stormwater management can take various forms in the urban environment including infrastructure upgrades, streetscape layout changes, piping reconfigurations, storage tanks, and the use of different paving.

22.12-2 Objectives

- To achieve the best practice water quality performance objectives set out in the **Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999** (or as amended). Currently, these water quality performance objectives are:
  - Suspended Solids - 80% retention of typical urban annual load
  - Total Nitrogen - 45% retention of typical urban annual load
  - Total Phosphorus - 45% retention of typical urban annual load
  - Litter - 70% reduction of typical urban annual load.
- To promote the use of water sensitive urban design, including stormwater re-use.
- To mitigate the detrimental effect of development on downstream waterways, by the application of best practice stormwater management through water sensitive urban design for new development.
- To minimise peak stormwater flows and stormwater pollutants to improve the health of water bodies, including creeks, rivers and bays.
To reintegrate urban water into the landscape to facilitate a range of benefits including microclimate cooling, local habitat and provision of attractive spaces for community use and well being.

### 22.12-3 Policy

It is policy to:

- Require that development applications provide for the achievement of the best practice performance objectives for suspended solids, total phosphorus and total nitrogen, as set out in the *Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999* (or as amended).

- Require the use of stormwater treatment measures that improve the quality and reduce the flow of water discharged to waterways. This can include but is not limited to:
  - collection and reuse of rainwater and stormwater on site
  - vegetated swales and buffer strips
  - rain gardens
  - installation of water recycling systems
  - multiple uses of water within a single manufacturing site
  - direction of flow from impervious ground surfaces to landscaped areas.

- Encourage the use of measures to prevent litter being carried off-site in stormwater flows, including:
  - appropriately designed waste enclosures and storage bins, and
  - the use of litter traps for developments with the potential to generate significant amounts of litter.

- Encourage the use of green roofs, walls and facades on buildings where practicable (to be irrigated with rainwater/stormwater) to enhance the role of vegetation on buildings in managing the quality and quantity of stormwater.

### 22.12-4 Application requirements

An application must be accompanied by a Water Sensitive Urban Design Response including, as appropriate:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Detail Required</th>
</tr>
</thead>
</table>
| A site layout plan showing the location of proposed stormwater treatment measures. | Show location, area draining to a treatment measure, and the connection points, of any:  
1. Harvesting and Reuse Measures: such as raingarden tanks (must identify what the tank is connected to; toilets, gardens etc).  
2. Water Quality Treatment Measures: such as raingardens, wetlands, buffers and swales.  
3. Infiltration Measures: such as porous paving and infiltration trenches/sumps.  
4. Passive Irrigation Measures: such as directing runoff into gardens. |
| A report outlining how the application achieves the objectives of this policy. | A report including an assessment from an industry accepted performance measurement tool such as STORM or MUSIC (or equivalent). |
| Design details, such as cross | Design details as appropriate to the stormwater |
### Requirement | Detail Required
--- | ---
sections, to assess the technical effectiveness of the proposed stormwater treatment measures. | treatment measure proposed.
A site management plan which details how the site will be managed through construction. | A statement is required outlining construction measures to prevent litter, sediments and pollution entering stormwater systems.
A maintenance program which sets out future operational and maintenance arrangements. | A statement is required outlining operational and maintenance measures to check the effective operation of all systems.

If the water quality performance objectives set out in the *Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999* (or as amended) are not met, an application must include justification for how the development meets the objectives of this policy.

#### 22.12-5 Decision guidelines

Before deciding on an application, the responsible authority will consider, as appropriate:

- The extent to which the development meets the objectives and requirements of this policy.
- Whether the application meets the best practice performance objective and treatment measures.
- Whether the proposal is designed and incorporates works to maintain, or improve, the quality of stormwater within or exiting the site.
- Whether the proposal will significantly add to the stormwater discharge or adversely affect water quality entering the drainage system.
- Opportunities for water conservation and reuse that influence the use of water sensitive urban design.
- The level of ongoing management required to achieve and maintain the desired stormwater quality measures that will be used during the construction phase to prevent a loss of stormwater quality as a result of building activities, such as silt traps.

#### 22.12-6 Reference documents


State Environment Protection Policy (Waters of Victoria), Environment Protection Authority, 2003 (as amended from time to time).

Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO, 1999 (as amended from time to time).


STORM calculator (as amended from time to time)

MUSIC – model for urban stormwater improvement conceptualisation tool (as amended from time to time).
22.12-7  Expiry

Expiry

This policy will expire when superseded (as determined by the Minister for Planning) by Water Sensitive Urban Design provisions in the Victoria Planning Provisions or the Building Code of Australia Regulations, whichever happens first.
WATER SENSITIVE URBAN DESIGN (STORMWATER MANAGEMENT)

This policy applies to an application for:

- Accommodation.
- Construction of a building to be used for commercial, industrial or mixed use purposes.
- A subdivision in a business zone.

This policy does not apply to an application for:

- An extension or alteration of an existing building of less than 50 square metres in floor area.
- Subdivision of an existing building.

Policy basis

Increased development can result in greater hard surface area and changes to the volume, velocity and quality of stormwater drainage into natural waterways.

Achieving improved stormwater quality is a key objective in reducing the environmental impact of urban development on waterways and receiving water bodies in the Port Phillip catchment. This policy implements the best practice performance objective outlined in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999 to achieve the objectives of the State Environment Protection Policy (Waters of Victoria).

Waterways are an important environmental asset and measures that protect, or improve, water quality will be of significant benefit environmentally, socially and economically.

Incorporating stormwater treatment measures into the design of development, including wetlands, bio-retention systems and porous pavements to filter pollutants, will help to protect and improve the condition of the natural waterways.

Objectives

- To promote the use of water sensitive urban design, including stormwater re-use.
- To protect the surface water and ground waters in the Port Phillip Bay catchment from stormwater pollutants.
- To reduce the impacts of peak stormwater flows.
- To integrate stormwater treatment measures into the landscape.
- To reduce the entry of pollutants into stormwater run-off.

Application requirements

An application must be accompanied by the following information, as appropriate:

- A site layout plan showing the location of proposed stormwater treatment measures.
- Demonstrated compliance, such as a report from an industry accepted performance measurement tool, with the best practice performance objective set out in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999.
- Design details, such as cross sections, to enable the Council to assess the technical effectiveness of the proposed stormwater treatment measures.
- A site management plan which details how the site will be managed through construction and which sets out future operational and maintenance arrangements.
22.08-4 Policy

It is policy that:

- Post construction stormwater run-off should be treated to remove 80% suspended solids, 45% total phosphorous and 45% total nitrogen of typical urban annual load and maintain discharges for the 1.5 year ARI at pre-development levels. This is the best practice performance objective set out in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999.

- Best practice measures such as those contained in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999 be incorporated into the design of a development.

- Stormwater quality treatment measures be designed to prevent litter being carried to receiving waters. This includes, appropriate design of waste enclosures and use of gross pollutant traps for development with potential to generate significant amounts of litter.

22.08-5 Decision Guidelines

In assessing an application the responsible authority will:

- Assess compliance of the development using an industry accepted performance measurement tool.

- Assess the technical effectiveness of the treatment measures such as the efficiency in filtrating pollutants, the capacity of the system and ongoing maintenance and performance, using published industry guidelines and standards.

Before deciding on an application, in addition to the decision guidelines of Clause 65, the responsible authority will consider, as appropriate:

- The objectives of the policy and the effects of development on the health of the receiving waters.

- Whether the applicant has reasonably demonstrated that every effort has been made to meet the best practice performance objective and treatment measures.

- Whether the proposal is designed and incorporates works to maintain, or improve, the quality of stormwater within or exiting the site.

- Whether the proposal will significantly add to the stormwater discharge or adversely affect water quality entering the drainage system.

- Opportunities for water conservation and reuse that influence the use of water sensitive urban design.

- The level of ongoing management required to achieve and maintain the desired stormwater quality.

- Measures that will be used during the construction phase to prevent a loss of stormwater quality as a result of building activities, such as silt traps.

22.08-6 Expiry

This policy will expire when superseded (as determined by the Minister for Planning) by Water Sensitive Urban Design provisions in the Victoria Planning Provisions or the Building Code of Australia Regulations, whichever happens first.
Reference documents


Appendix 3

Exhibited Kingston Stormwater Management Policy
(Amendment C152)
22.19 STORMWATER MANAGEMENT

This policy applies throughout the City of Kingston to residential and non-residential developments that require a planning permit in accordance with the thresholds in Table 1 of this Policy.

22.19-1 Policy Basis

The City of Kingston recognises that stormwater runoff from our streets, roofs, and other impervious areas have a negative impact on downstream receiving waters including Mordialloc Creek, Patterson River and Port Phillip Bay.

Increased development can increase the amount of hard and impervious surfaces such as buildings, roads and car parks and change the volume, velocity and quality of stormwater drainage into natural waterways. The majority of the rain that falls in urban areas is converted into stormwater. Traditional stormwater management practices direct stormwater into urban waterways affecting the health and amenity of our waterways. Large volumes of stormwater can cause flooding that damages both natural and built environments.

Integrating Water Sensitive Urban Design (WSUD) to capture, treat and reuse stormwater onsite can significantly improve the quality and quantity of water entering our waterways. Stormwater treatments can take various forms including wetlands, bio-retention systems, storage tanks, and the use of different paving.

This policy provides a framework for early consideration of stormwater management and WSUD at the initial building design stage in order to achieve improved stormwater quality. It implements the best practice performance objective outlined in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999 to achieve the objectives of the State Environment Protection Policy (Water of Victoria).

22.19-2 Objectives

- To improve the water quality of stormwater run-off.
- To reduce the impact of stormwater run-off.
- To incorporate the use of WSUD in development including stormwater reuse.
- To ensure that developments comply with the best practice performance objectives for suspended solids, total phosphorus and total nitrogen, as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999.

22.19-3 Policy

It is policy that applications for the types of developments listed in Table 1 be accompanied by information which demonstrates how relevant policy objectives will be achieved.

22.19-4 Application requirements

An application must be accompanied by the information as specified in Table 1.

### Table 1: Stormwater Management Information Required

<table>
<thead>
<tr>
<th>TYPE OF DEVELOPMENT</th>
<th>APPLICATION REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Scale</td>
<td></td>
</tr>
<tr>
<td>Residential and/or mixed use developments of 1 to 2 dwellings.</td>
<td>A satisfactorily completed Drainage Declaration in a form approved by the Responsible Authority explaining how the requirements and objectives of this policy will be met.</td>
</tr>
<tr>
<td>Residential developments and/or mixed use developments with a new building gross floor area greater than 500 m².</td>
<td></td>
</tr>
<tr>
<td>Non-residential developments with a new gross floor area less than 500 m².</td>
<td></td>
</tr>
<tr>
<td>An application must be accompanied by the information as specified in Table 1.</td>
<td></td>
</tr>
</tbody>
</table>
Medium Scale
- Residential and/or mixed use developments of 3 to 9 dwellings.
- Non-residential developments with a new building gross floor area between 500m² and 1000m².
- Subdivision of vacant land between 1,000m² and 4,999m².

Large Scale
- Residential and/or mixed use developments of 10 or more dwellings.
- Non-residential developments with a new building gross floor area greater than 1,000m².
- Subdivision of vacant land greater than 4,999m².
- Subdivision of land involving public road networks or public open space as determined by Council.

22.19-5 Decision guidelines
In determining an application, the Responsible Authority will consider, as appropriate:
- The extent to which the development meets the objectives and requirements of this policy.
- The extent to which the design incorporates WSUD.
- Whether the proposal is designed and incorporates works to maintain, or improve, the quality of stormwater within or exiting the site.
- Whether appropriate tools and assessment methods have been used and the development meets their targets.
- Whether the proposal will significantly add to the stormwater discharge or adversely affect the water quality entering the drainage system.
- Whether the design provides opportunities for water conservation and reuse.
- Whether stormwater protection measures, such as slit traps, will be used during the construction phase to prevent a loss of stormwater quality as a result of building activities.

22.19-6 Reference documents

Note: The above reference documents and websites may be amended from time to time. It is intended that these documents and websites (or amended versions) are relevant reference documents to this policy.
22.19-7  Expiry

This policy will expire two years from its gazettal into the Kingston Planning Scheme unless superseded (as determined by the Minister for Planning) by revised WSUD provisions in the Victorian Planning Provision or the Building Code of Australia Regulations, whichever happens first.
Appendix 4

Bayside’s Schedule 1 to the Development Contributions Plan Overlay (DCP01)
**SCHEDULE 1 TO CLAUSE 45.06 DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY**

Shown on the planning scheme map as DCPO1.

**BAYSIDE DRAINAGE DEVELOPMENT CONTRIBUTIONS PLAN**

1. **Area covered by this development contributions plan**

   Land within the DCPO1 area.

2. **Summary of costs**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Total cost $</th>
<th>Time of provision</th>
<th>Actual cost contribution attributable to development $</th>
<th>Proportion of cost attributable to development %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage</td>
<td>16,085,291</td>
<td>20 years</td>
<td>7,881,800</td>
<td>49</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>16,085,291</strong></td>
<td><strong>20 years</strong></td>
<td><strong>7,881,800</strong></td>
<td><strong>49</strong></td>
</tr>
</tbody>
</table>

3. **Summary of contributions**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Levies payable by the development ($)</th>
<th>Development infrastructure</th>
<th>Community infrastructure</th>
<th>All infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>resident</td>
<td>non-resident</td>
<td>resident</td>
</tr>
<tr>
<td>Drainage</td>
<td>2000</td>
<td>520</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2000</strong></td>
<td><strong>520</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

**Note:**

The levy payable by development on residential land is specified in dollars per dwelling (note: a ground floor dwelling equates to 2 upper floor dwellings) and for other development in dollars according to site area.

The levy payable by commercial development is in dollars per 100 sq.m of site area or additional gross building floor area, whichever is the lesser.

The amounts in this schedule are in December 2014 dollars. The responsible authority will adjust the levy annually commencing in 2017 by applying the Building Price Index, as published in the latest edition of Rawlinsons Australian Construction Handbook.

4. **Land or development excluded from development contributions plan**

   The following development is exempt from the development contributions plan:
   - Residential development that does not create any additional dwellings;
   - Commercial development that does not create any additional floor space; or
   - Development on public land.

**Note:**

This schedule sets out a summary of the costs and contributions prescribed in the development contributions plan. Refer to the incorporated development contributions plan for full details.