

Council Strategy

Council strategy title:	Drainage Upgrade Strategy
Council strategy owner:	Director Infrastructure Services
Adopted by:	Bayside City Council
Date adopted:	July 2015
Document Reference no:	DOC/15/86752

1. Introduction

Due to the age of the existing drainage network within Bayside and the lower design standards of the time of construction, much of the underground drainage system performs below current standard and in some locations the performance of the system has a detrimental impact on adjacent properties.

When localised flooding occurs, a range of impacts results, from inundation of habitable floors of homes and businesses, to yard flooding to temporary ponding within the streetscape. During the investigation of flooding complaints, it is necessary to assign a category to assist in the prioritisation of drainage upgrade projects arising from incidents of localised flooding.

Much of the drainage system that performs below desired capacity cannot be upgraded without significant investment. Although it is neither practical nor affordable to retrofit upgrades to bring all parts of the drainage system up to standards, it is reasonable to treat areas where flooding is demonstrated to have a negative impact on habitable rooms or business premises.

Planning for drainage upgrades to address key sites has determined that a program of works to the value of \$20.3M (in 2014 dollars) is necessary. An estimated 12.1km (3%) of the network has been identified as under-performing, meaning that there is a current situation where the probability of flooding and the impacts of flooding on public safety and property damage are unacceptable. The 10-year drainage upgrade strategy in Attachment 1 includes 40 projects arising from complaints of flooding occurring during intense rainfall events in 2011 and from drainage capacity assessments undertaken between 2005 and 2009.

2. Objectives & Performance Measures

The objectives of the Drainage Upgrade Strategy (DUS) are to:

- set out a 10 year program of the highest priority drainage upgrade projects (40 in total) that aims to improve the performance standard of the underground pipe network that is under performing at locations known to be susceptible to damage from flooding, with respect to the consequences of public safety and damage to property from flooding. In 10 years, 65% of the known under-performing parts of the network will have been addressed;
- provide a process for categorising flooding complaints based on the consequences of the flood damage and the likelihood of recurrence (risk assessment);
- set out an action plan for improvements to Council's Stormwater Management service; and
- Improve the current level of performance of the drainage system to a desired state where the flooding of habitable floors and business premises is minimised.

3. Strategic Context

The provision of drainage infrastructure is considered a key role of Council in providing a safe and functional built environment for its community. Given the unpredictability of storm events that result in damage from flooding, the provision of adequate drainage is not straight forward and is required to balance the competing objectives of community need (or level of service), cost and risk.

Council's role as defined by the Local Government Act 1989 (LGA) is to monitor incidents of flooding and to undertake works and measures to address these incidents. Whereas major outfall structures are within designated flood plans and generally administered by Melbourne Water, Council is directly responsible for the preparation and implementation of drainage networks within those areas outside of the major drainage system. The LGA specifies the functions of Council related to the drainage of roads and prevention and abatement of nuisance. Other relevant legislation includes the Planning and Environment Act 1987, Building Act 1993 and Emergency Management Act 1986.

The implementation of the DUS is consistent with the strategic objectives and strategies of the Bayside the Council Plan, particularly:

Goal 3 - A liveable city by:

- Ensuring community assets and infrastructure meet current and expected needs; and

Goal 7 - Financial responsibility and good governance by:

- Creating community value through effective management of resources and finances; and
- Open and transparent decision making and strong accountability to the community.

4. Bayside's Drainage Network Capacity and Current Design Standards

The majority of Bayside's drainage network was constructed between 1940 and 1970. The standards of drainage design during this period were lower than if similar systems were to be implemented today, with much of the underground system being designed for typical, frequent, low intensity storms (a 100% chance of occurrence) and with little consideration of overland flow paths to convey large volumes of runoff during extreme localised rainfall.

Current drainage design standards for new developments in Bayside require both the underground pipes and overland flow paths to cater for flows generated by rare, high intensity storms (with a 1% chance of occurrence). The underground pipe network should be designed for a storm event with a 20% chance of occurring in residential areas and a 10% chance of occurring in industrial and commercial areas and roads must convey the remainder of the runoff from the 1% chance storm. If the existing roads and overland flow paths cannot cater for the runoff from the 1% chance storm, the pipes need to be increased to a size where the entire system can cater for such flows.

Due to the prohibitive cost and limitations imposed by the capacity of Melbourne Water's drainage system, it is not practical to retrofit upgrades to bring all parts of Bayside's drainage system up to current standards. However, drainage upgrade projects identified either from flooding complaints or capacity assessments can significantly mitigate the impact of flooding in susceptible parts of Bayside's catchments.

This Strategy aims to improve the drainage system in known areas where the probability of flooding and the impacts of flooding on public safety and private property are unacceptable.

5. The 10-year drainage upgrade plan

A prioritised drainage upgrade program is included in Attachment 1. This list of projects has been developed from investigations of direct flooding complaints and drainage network improvement planning work conducted between 2005 and 2009 which identified critical parts of the network that are under-capacity and locations susceptible to flooding within the municipality.

Projects listed from investigations of flooding complaints have been assessed on the severity of the flood damage and the number of properties affected and benefitting from the upgrade and the affordability of the works. Although current drainage standards are targeted during the design of these works, the attainment of the desired standard can be prohibitively expensive. In such cases, the highest reasonable level of flood mitigation for that part of the network is delivered.

Projects listed on the program from planning for under-capacity parts of the network have been based on the following principles:

- Catchment locations at major risk of inundation are given a high priority;
- Properties are given a higher priority if they are subject to inundation on a frequent basis; and
- Cost effectiveness.

In the event that future incidents of flooding result in more drainage upgrade projects being identified, the investigation of these incidents will be conducted in accordance with the category system described below to assign relative priorities to such works based on the consequence of flood damage.

6. A Category System for Assessing Flood Damage

Drainage upgrade projects arising from flooding complaints need to be prioritised based on the consequence of the flood event (i.e. the severity of damage or interruption) and the likelihood of recurrence (a risk assessment). A category system for the purposes of differentiating the impacts of flooding and prioritising projects listed in the drainage capital works program is presented below. The following categories must be applied to all assessments of flooding complaints that lead to the listing of projects to the capital works program:

Priority Categories	Description of flooding consequence
1	A public safety matter
2	To reduce the risk of flooding of habitable floors of buildings (excluding garages, laundries etc), where the building has relevant town planning and building permits
3	To reduce the risk of flooding to non-habitable floors, private yards, road reserves and parkland
4	To improve amenity issues where there is no damage or loss arising from frequent nuisance drainage issues

The assignment of a category to all future flooding complaints will assist in the prioritisation of capital works projects to address future flooding complaints.

7. Alignment with the Drainage DCP

Council has recently adopted a 25 year Development Contribution Plan for drainage infrastructure. The project areas identified in the DCP for attracting contributions are derived from the same catchment analysis and drainage network planning discussed in Section 5 above and a number of the projects listed in the 10-year program will attract DCP funding. It is expected that the majority of the projects listed in the drainage upgrade program over the next 10 years will fulfil Council's obligation within the DCP to undertake works within the nexus of the contributing development(s). Once a DCP project listed in the upgrade program is completed, funds collected under the DCP can be refunded to rates.

8. Stormwater Quality Improvement and Reuse

Council is committed to integrating measures to improve the quality of drainage flows to Port Philip bay within the scope of drainage projects wherever possible. Such measures are can take various forms depending on the target contaminant and volume of runoff to be treated and include stormwater detention systems, gross pollutant traps and Water Sensitive Urban Design (WSUD) elements such as rain gardens and infiltration swales.

In some locations, there may be potential for stormwater harvesting for reuse purposes, such as irrigation for sports fields. Site specific conditions and the ability for water demand to be met by a sufficient supply of rainwater will be primary determinants of the feasibility of such initiatives.

9. Strategy Actions

The drainage upgrade strategy requires the implementation of actions as listed below:

1. Council continues its current allocation and undertakes the attached program of drainage upgrade works, but considers increasing its future allocation to undertake the priority projects should further incidents of flooding occur.
Timeframe – Short-medium term.
Cost – within current funding levels of the 4-year capital works program and Long Term Financial Plan.
2. Continues to approach design and the allocation of funding of drainage upgrades that focuses on providing protection to those properties where it has been demonstrated that floor levels are inundated during heavy storms (with a probability of occurrence of 1% or less) and that a critical analysis of possible surface treatments and practical alternatives to ensure maximum benefit is achieved from any funds expended.
Timeframe – Short-medium term.
Cost – within current funding levels of the 4-year capital works program and Long Term Financial Plan.
3. Continues to advocate to Melbourne Water to upgrade the capacity of trunk mains that current limit the effectiveness of high priority planned upgrades to local drainage systems
Timeframe – Short-medium term.
Cost – Officer time only, no additional costs
4. Undertake negotiations with Melbourne Water and VicRoads to redefine their responsibility for the management of catchment size and trunk main drains.
Timeframe – medium term
Cost – Officer time only, no additional costs
5. Incorporate a rolling annual catchment analysis program for the remaining urbanised areas in the municipality, as part of Council's Capital Works design program.
Timeframe – Short-medium term
Cost – within current funding levels
6. Investigate the resource requirements of providing an On-site Detention Device (OSD) inspection service and review maintenance and enforcement processes;
Timeframe – Short-medium term
Cost – Officer time only, no additional costs
7. Undertake a municipal wide study and development of a (GIS) overlay to protect and enhance overland flow paths.
Timeframe – Medium term
Cost – within current funding levels
8. Review progress on and update the 2001 Stormwater Quality Management Plan.
Timeframe – Medium term
Cost – within current funding levels

9. Integrate stormwater quality improvement where possible as part of the design criteria during the implementation of the drainage upgrade program.

Timeframe – Medium term

Cost – within current funding levels

10. Assessing Progress & Performance

The completion of the strategy actions will demonstrate Council's performance in implementing this strategy. From the community point of view, the long term effectiveness of this strategy will be demonstrated by an improved level of flood immunity for susceptible properties and catchments within the Municipality.

11. Communication Plan

Communication with the Bayside community of the implementation of this strategy is based on Project information each year and responses to residents affected by flooding. The improvements to the network will be communicated in annual reports on the Council Plan and strategic resource plan

12. Definitions and Abbreviations

Habitable floors	The floor space of a dwelling where people cannot comfortably live if damaged by flooding, such as bedrooms, kitchen, lounge room etc
Localised flooding	Inundation occurring when the rainfall intensity exceeds the capacity of the drainage system at a given location (as different to regional flooding or floodplain inundation)
Overland flowpaths	The route that surface flows take when underground drainage pipes are full.

13. Related Documents

Stormwater Drainage Network Improvement Strategy 2005-2009 MWH Consulting

Australian Rainfall & Runoff (1999), Engineers Australia

Bayside Development Contribution Plan for Drainage

Bayside Planning Scheme

Bayside Stormwater Quality Management Plan 2001

Please note: This strategy is current as at the date of approval. Refer to Council's website (www.bayside.vic.gov.au) or staff intranet to ensure this is the latest version.



10 Year Drainage Upgrade Program

Project	Suburb	2016/17 Year 1	2017/18 Year 2	2018/19 Year 3	2019/20 Year 4	2020/21 Year 5	2021/22 Year 6	2022/23 Year 7	2023/24 Year 8	2024/25 Year 9	2025/26 Year 10
Seaview Shops (Balcombe Road)	Beaumaris	\$568,922									
New Street drain, Brighton (South Rd)	Brighton	\$92,700									
Nepean Highway drain	Brighton East	\$154,500									
Ardoyne Street drain	Black Rock	\$721,000									
Kinane street Drain	Brighton	\$463,500	\$2,174,845								
Billson Avenue drain	Brighton East			\$218,545							
Hanby Street Easement drain	Brighton			\$76,491							
William Street	Brighton			\$163,909							
Bath Street drain	Sandringham			\$32,782							
Cheltenham Recreation Reserve drain (Mackenzie Street)	Cheltenham			\$229,473							
Were Street drain	Brighton			\$65,564							
Champion Street drain	Brighton			\$188,495							
North Road drain	Brighton			\$764,909							
Victory Street drain	Sandringham			\$218,545							
Head Street and Horton Close drain	Brighton				\$2,025,916	\$811,492					

Project	Suburb	2016/17 Year 1	2017/18 Year 2	2018/19 Year 3	2019/20 Year 4	2020/21 Year 5	2021/22 Year 6	2022/23 Year 7	2023/24 Year 8	2024/25 Year 9	2025/26 Year 10
Harold Street drain	Sandringham					\$231,855					
Wagstaff Court drain	Brighton					\$162,298					
Howell Avenue	Beaumaris					\$869,456					
Mary Street drain	Beaumaris						\$119,405				
west of St Kilda St	Brighton						\$19,494				
west of Gillies and Kanowna Sts, Highett Rd & Barnfield St	Hampton						\$872,389				
west of Pellew St	Sandringham						\$1,013,725				
west of Wentworth Ave	Black Rock/ Cheltenham							\$180,715			
west of St Kilda St	Brighton							\$25,099			
west of Thomas St	Brighton East							\$943,739			
west of and including Hartley and Mair Sts	Brighton							\$35,139			
west of Fernhill Rd	Sandringham							\$356,411			
south of Balcombe Rd, Balcombe Park Lane and its connections	Beaumaris							\$321,273			
west of St Kilda St	Brighton							\$15,059			
west of Bluff Rd	Sandringham/ Black Rock							\$70,277			
south of Point Ave	Beaumaris							\$15,059			

Project	Suburb	2016/17 Year 1	2017/18 Year 2	2018/19 Year 3	2019/20 Year 4	2020/21 Year 5	2021/22 Year 6	2022/23 Year 7	2023/24 Year 8	2024/25 Year 9	2025/26 Year 10
connections from the Melbourne Water main drain to the fourth pit	Hampton								\$336,082		
Melbourne Water main drain connections to the fourth pit	Brighton East								\$1,478,759		
west of Surf Ave	Black Rock/ Beaumaris								\$196,479		
west of Bluff Rd	Hampton									\$1,949,171	
west of New St	Brighton									\$69,233	
south of and including Weatherall Rd	Black Rock/ Beaumaris										\$351,063
Dendy St, connections between Kinross St and South Road, connections from Melbourne Water main drain to fourth pit, connections from South and Bluff Rds to fourth pit	Brighton East										\$614,361
west of Fernhill Rd	Sandringham										\$38,397
north of Tulip St	Sandringham/ Highett										\$1,075,133
TOTALS		\$2,000,622	\$2,174,845	\$1,958,713	\$2,025,916	\$2,075,101	\$2,025,014	\$1,962,770	\$2,011,319	\$2,018,403	\$2,078,954