CONTENTS

1 Introduction

Brown & Root Services Asia Pacific Pty Ltd (Brown & Root) was commissioned by Manningham City Council (Manningham) to develop a Stormwater Management Plan (SWMP) for the Manningham municipality.

Why prepare an SWMP?

Environmental studies have found that urban stormwater inputs from drains, creeks and rivers can adversely affect the environmental quality of waterways. This is attributed to stormwater, which is generally untreated, carrying pollutants that are washed directly from streets and gutters into creeks, rivers, bays and the ocean. Pollutants in the runoff come from a range of different sources and can include fuel and oil from roads, litter, sediment from building sites and unsealed roads, detergents, dog faeces and other wastes from residential activities.

Water quality is also affected by changes to the natural characteristics of the catchment and development patterns, which have the effect of significantly increasing stormwater runoff because of increased impervious surfaces within the catchment and faster conveyance systems (pipes and concrete channels).

Urban stormwater quality management is important in realising the objective of protecting and enhancing the values of the receiving environment. The environmental, social, heritage, and recreational values of the receiving environments are becoming increasingly important to the community.

Objective of the Manningham SWMP

The SWMP is intended to assist Council and other stakeholders to manage the environmental quality of urban stormwater runoff in the municipality to protect and enhance environmental values of waterways. It provides a framework for integrating stormwater management as part of Council's existing management and planning activities.

The SWMP recommends measures for the long-term improvement of Council's management framework as well as a range of specific management strategies to mitigate existing stormwater threats.

Format of the Manningham SWMP

The SWMP is presented in two volumes. This volume (Volume I) summarises the objectives, the process used in developing the plan, and key outcomes and recommendations. Volume II provides more detailed information on:

- the process used in preparing the SWMP
- background information about Manningham City Council
- receiving environmental values, stormwater threats and risk assessment
- priority management issues

- reactive management and management framework strategies
- implementation framework, including monitoring and review measures.

2 The Stormwater Management Planning Process

Overview of the study process

The SWMP has been prepared in accordance with the revised version of Chapter 3 of the *Best Practice Environmental Management Guidelines - Urban Stormwater* (developed by Melbourne Water in 2000). This is a staged process:

- Stage 1—Preliminary Activities
- Stage 2—Priority Management Issues
- Stage 3—Development of the SWMP
- Stage 4—Finalisation of the SWMP.

This process has involved:

- gaining Manningham-wide commitment to the development and implementation of the plan;
- engaging key stakeholders (both within and external to Manningham);
- identifying existing land uses, policies, strategies and responsibilities for management:
- identifying existing environmental values and key stormwater threats;
- undertaking a risk assessment based on the impact of key stormwater threats on receiving environmental values;
- identifying and agreeing on priority management issues and management strategies to address these issues;
- devising a framework that allows for implementation, review, and continuous improvement of the SWMP.

Information was gathered by reviewing literature and field studies, and through consultation (refer Section 2.2). Specific methodologies used for each of the major steps in developing the SWMP are discussed at the beginning of the relevant sections of this document with greater detail provided in Volume II. The SWMP development process and associated consultation is summarised in Figure 2.1.

Figure 2.1 goes here

Stakeholder consultation and involvement

The SWMP process involved consultation with a range of key stakeholders, through the Project Steering Committee and the Project Working Group, and by direct consultation with individuals. The Project Steering Committee consisted of members from the Project Management, Economic and Environmental Planning, Statutory Planning Units, City Development at Manningham, and the EPA and Melbourne Water. The Project Steering Committee was instrumental in guiding the preparation of the SWMP.

The Project Working Group includes representatives from Building Control, Culture and Leisure Services, Health and Local Laws, Manningham Maintenance, Statutory Planning, Project Management, Economic and Environmental Planning Units, and Yarra Valley Water, Melbourne Water, EPA Victoria, Least Waste, Waterwatch, Manningham Conservation Society, Friends of Mullum Mullum Creek, and Yarra Range Shire Council.

The Project Working Group held four workshops at key stages in the development of the SWMP.

A listing of representatives of each of these groups is in Section 2.2 of Volume II.

Key outcomes of the SWMP

The SWMP provides:

- an understanding of and commitment to best practice urban stormwater management planning in the municipality;
- specific **reactive management strategies** to address priority issues in the municipality;
- recommendations for **improvement of Council's management framework** to prevent stormwater degradation before it occurs;
- an implementation and review framework to guide Council in the implementation of the SWMP.

3 Manningham characteristics

Location, characteristics and land uses

Manningham City Council covers an area of 114 km^2 and is located 12 km east of Melbourne's Central Activities District. The Yarra River forms the boundary of the municipality to the north and Koonung Creek to the south. Waterways are a feature of the municipality and are valuable community assets.

The municipality has an estimated resident population of approximately 112,500 (as at 30 June 1998). The population is currently stabilising and is expected to peak at around 115,000 in 2004 (Manningham Municipal Strategic Statement, 2000).

Mullum Mullum Creek divides the municipality in two distinct topographic and land use areas. To the west of Mullum Mullum Creek are the highly urbanised suburbs of Bulleen, Templestowe, Doncaster, Doncaster East, Donvale, and Lower Templestowe. To the east of Mullum Mullum Creek the catchments are more non-urban in character, and include Park Orchards, Warrandyte and Wonga Park.

Whilst the municipality is generally residential in character there are a number of other land uses including public open space, commercial, retail, light industrial and transport.

Manningham has one of the largest networks of parks and open space in metropolitan Melbourne with much of this system associated with the seven main waterways in the municipality. The parks and reserves associated with these waterways form a linear network of natural and modified bushland, open parkland and semi-rural open space in an area otherwise characterised by urban development. In total there are over 1,200 ha of open space, comprising over 300 separate parks, gardens and reserves. Large open space areas include Ruffey Lake Park, Westerfolds Park, Mullum Mullum Linear Creek Park, Warrandyte State Park, Currawong Bush Park and The 100 acres reserve.

The key land use characteristics of the Manningham municipality are as shown in Figure 3.1.

There are no substantial parcels of developable land available in the municipality. Areas of developable land have a number of significant constraints, including site topography, or impacts on watercourses or flora and fauna environmental values. There is some scope for re-development of areas or infill development.

Waterways and study subcatchments

For this study Manningham was divided into six subcatchments, all draining to the Yarra River, and defined by the major waterway which drains them. Generally, stormwater is collected via a local piped drainage system and then enters the tributaries, creeks and rivers within the municipality via piped discharge or overland flow. The major waterways and their associated subcatchments are:

- Koonung Creek
- Ruffey Creek
- Mullum Mullum Creek
- Andersons Creek
- Jumping Creek
- Brushy Creek.

The Yarra River is the major waterway and receiving environment in Manningham and forms the boundary of each of the subcatchments.

The most substantial vegetation remnants are along the Yarra River, Mullum Mullum Creek, Andersons Creek, Jumping Creek and Brushy Creek

Figure 3.1 goes here

Figure 3.2 shows the relative locations of each subcatchment, and provides a description of each waterway. These subcatchments form the basis for values, threats, risk assessment, the identification of priority management issues and management strategies, which are discussed in the remainder of this document. The Yarra River is an integral element of each of these subcatchments.

Stormwater quality management in Manningham

The organisations with interest in urban stormwater quality management within Manningham include Melbourne Water, Council, EPA, VicRoads.

Melbourne Water

Melbourne Water is the regional drainage authority for the Melbourne Metropolitan Area and is responsible for all major drains and waterways, generally in catchments greater than 60 ha. The role of Melbourne Water includes strategic management of urban stormwater, setting of standards, planning and operational responsibility for major waterways and constructed drainage systems.

Melbourne Water has Activity Plans for a number of the waterways within the Manningham including Andersons Creek and Brushy Creek. Melbourne Water is responsible for the in-line litter collection devices installed at Ruffey Lake.

Environment Protection Authority (EPA)

The role of the EPA in urban stormwater management includes establishing environmental standards, encouraging the use of best practice in order to meet environmental standards and the application of regulatory and non-regulatory means to achieve these standards.

The EPA also administers the Victorian Stormwater Action Management Programme (VSAP). This programme was established in June 2000 with the goal of improving management of urban stormwater. A key component of VSAP is a grant programme to assist local government implement municipal SWMPs.

VicRoads

VicRoads control and manage the major transport routes through Melbourne and are responsible for associated road run-off. Key roads under the care and management of VicRoads in Manningham are at the eastern end of the Eastern Freeway, Springvale Road (south of Mitcham Road), Manningham Road (between Banksia and Bulleen Roads), and Bulleen Road (south of Manningham Road).

Manningham City Council

Manningham is responsible for municipal functions such as land use planning, infrastructure development and management, and the provision of services. These functions provide an ideal basis for managing stormwater to achieve local and regional outcomes. That is, Council can employ a range of measures specifically aimed at mitigating threats to stormwater values. Currently, stormwater management roles, responsibilities and jurisdictions are divided amongst a number of units within Council (refer Section 6).

Figure 3.2 goes here

Other agencies/organisations

Other agencies are involved as legislators, managers of infrastructure, advisers, educators and/or funding sources in stormwater management in the Manningham municipality. These include Yarra Valley Water (YVW), Least Waste, Parks Victoria and the Port Phillip Catchment and Land Protection Board.

Overview of existing management practices

Urban stormwater quality management within Manningham utilises a combination of structural and non-structural measures and techniques with the primary focus on quantity control. Key structural stormwater management measures and activities contributing to stormwater quality within Manningham include:

- *Litter traps:* at the Donburn Shopping Centre, Macedon Square Shopping Centre. and Hunt Street drain. There are also litter collection devices at Ruffey Lake which are maintained by Melbourne Water.
- *Drainage maintenance:* of Council's drainage systems.
- *Street sweeping*: occurs on road carriageways and footpaths.

Key non-structural urban stormwater quality management measures and activities contributing environmental management, and informally to stormwater quality management within the municipality, include the following:

- *Stream Frontage Management Programme*: focused on educating land owners with frontage to urban streams on basic land management skills and to implement works on the stream frontages within Melbourne Water control and outlined in the Activity Plans.
- *Urban Stream Frontage Programme*: focusing on urban stream frontage improvements in urban areas.
- *Local Environmental Assistance Fund (LEAF) Scheme:* targets rabbits, foxes, erosion control, weed invasion, indigenous vegetation works and many other environmental issues.
- *Waterwatch*: community education focused around a water monitoring programme, involving a range of community groups.
- *Land Management Course:* providing advice to land owners/developers on how to prepare a management plan for their property.
- *Environmental Education Seminars:* held on a monthly basis addressing a range of issues.
- *'Friends of' Groups:* there are currently twenty five 'Friends of' groups within the municipality.
- *Environmental Management System Policy*: provides ISO 14001 accreditation across the organisation.
- *State of the Environment Reporting*: underpins Council's environmental monitoring programme.

- *Manningham Drainage Strategy Review 1998–2008*: a practical framework and methodology to provide for a drainage system, which meets community safety standards and provides for an overall improved amenity.

A range of policies underpin existing urban stormwater quality management practices. These include:

- State Environment Protection (Water of Victoria) Policy
- Manningham Planning Scheme
- Sustainable Manningham Policy
- Greenprint for a sustainable city
- Manningham's Municipal Strategic Statement.

A more detailed review of management bodies, practices and policies is included in Volume II.

4 Stormwater threats

Key stormwater threats

Stormwater threats in the Manningham municipality were identified by the study team for each of the six subcatchments within the municipality. A range of generic threats were identified based on dominant land uses and activities. The severity of each stormwater threat was assessed by the study team for each subcatchment in the municipality and reviewed in a Project Working Group workshop. Table 4.1 summarises the key threats which apply in each subcatchment. These are discussed in greater detail in Volume II, including the cause of the threat and the types of pollutants associated with them. Figure 4.1 shows the location of some of the major stormwater threats in each subcatchment. Photographic examples of threats are included in Section 5.

Table 4.1 Description of major stormwater threats within each subcatchment

Subcatchment	Description of major stormwater threats
Mullum Mullum Creek	Commercial runoff, road works runoff, septic discharge and sullage, light industrial runoff, landfill and contaminated sites, open space runoff, residential development runoff and upstream inflows all threaten Mullum Mullum Creek. The range of pollutants generated by these threats include sediments, litter, trace metals, hydrocarbons, increased flow, nutrients, oxygen depleting material, pathogens, toxicants and surfactants. Sources of light industrial runoff include the Council depot, Doncaster Quarry and United Energy site. Sources of residential development runoff are from new subdivisions occurring at Templestowe adjacent to the Yarra River and Tikalara Park. Upstream inflows from Maroondah City Council are also of concern.

Table 4.1 continued

Subcatchment	Description of major stormwater threats
Koonung Creek	The predominant stormwater threats within the subcatchment are roadworks runoff, major road runoff, light industrial (commercial), residential development, commercial runoff, residential land use runoff. The range of pollutants generated by these threats include sediments, litter, trace metals, hydrocarbons, increased flow, nutrients, oxygen depleting material, pathogens, pesticides and surfactants. A key source of major road runoff is from the Eastern Freeway. A future source of residential development runoff that will need to be managed will be from the new subdivisions associated with the proposed retirement village on Tram Road and apartment style accommodation on Doncaster Hill, near Westfield Shoppingtown.
Andersons Creek	Residential runoff, septic discharge and sullage, building site runoff, major road runoff, roadworks runoff, open space runoff, agricultural/horticultural runoff, unsealed road runoff, residential runoff, commercial runoff, landfill and contaminated site runoff are the key threats to Andersons Creek. The range of pollutants generated by these threats include sediments, litter, trace metals, hydrocarbons, increased flow, nutrients, oxygen depleting material, pathogens, weeds, toxicants, pesticides and surfactants. A key source of major road runoff is from Warrandyte-Ringwood Road, whilst a key source of commercial runoff is from the Warrandyte shops and Warrandyte reserve.
Brushy Creek	The Brushy Creek subcatchment is threatened by unsealed road runoff, agricultural/horticultural runoff, landfill and contaminated sites, upstream inflows, residential land use runoff, building site runoff. The range of pollutants generated by these threats include sediment, litter, nutrients, oxygen depleting material, hydrocarbons, pathogens, trace metals, surfactants and toxicants. Contaminated site runoff is associated with former orchards within the subcatchment that produce residual chemical runoff (for example, DDT).
Jumping Creek	The predominant stormwater threats within the subcatchment are residential development runoff, building site runoff, unsealed road runoff, residential land use runoff, agricultural/horticultural runoff and landfill and contaminated sites. The range of pollutants generated by these threats include sediments, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, surfactants, weeds, pesticides and toxicants. A key source of agricultural and horticultural runoff is from orchards and animal husbandry enterprises actively operating in the subcatchment.
Ruffey Creek	Major road runoff, roadworks runoff, residential development runoff, agricultural/horticultural runoff, residential land use runoff and commercial runoff all threaten Ruffey Creek. The range of pollutants generated by these threats include sediment, litter, trace metals, hydrocarbons, nutrients, pesticides, weeds, oxygen depleting material, pathogens and surfactants. A key source of major road runoff is from Williamsons Road, Mannigham Road, Templestowe Road and Thompsons Road.

5 Receiving environmental values

Key environmental values

Values defined within the receiving environment reflect community expectations of their utilisation and interaction with the environment. Environmental values have an important role in the development of the SWMP and must be quantified to provide performance indicators by which the effectiveness of the plan can be measured. The overall objective of the plan is the protection of values within the receiving environment, which are threatened by stormwater. Within the Manningham municipality these values include:

- environmental (in-stream habitat and riparian habitat and flora)
- amenity (landscape, recreational and visual amenity)
- cultural heritage (indigenous and non-indigenous)
- stormwater (flood and conveyance and water quality treatment)
- economic (property value).

Each of these value types has the potential to be either directly or indirectly affected by stormwater. Table 5.1 summarises the major environmental values in each subcatchment.

Values were identified in the receiving waterways and riparian environments of each subcatchment to assist in identifying priorities and appropriate management recommendations Figure 4.1 shows the location of the major receiving environmental values in each subcatchment. Photographs are included to illustrate examples of values in the subcatchment.

Detail of the environmental values of each subcatchment are included in Volume II.

Table 5.1 Description of major environmental values within each subcatchment

Subcatchment	Description of major environmental values
Mullum Mullum Creek	Mullum Mullum has the most environmental values in Manningham including in-stream habitat, riparian habitat and flora, recreational amenity, landscape and visual amenity, water quality treatment and flood protection and conveyance. Two areas of high quality indigenous vegetation occur near Mullum Mullum Creek and within Currawong Bush Park. Mullum Mullum Creek is an important landscape asset that provides a significant level of visual amenity and focus for recreational activities in a natural environment. There are a number of sporting facilities along the waterway.
Koonung Creek	The major environmental values within the subcatchment are in-stream habitat and recreational amenity. One of the most significant areas for conservation and recreation is Bulleen Park. In terms of in-stream habitat values, the most significant species supported by the creek is the Broad-finned galaxid fish which is listed as potentially threatened in Victoria. The creek is also an important visual amenity and recreational resource within an urbanised area.
Andersons Creek	Riparian flora and fauna, recreational amenity, landscape and visual amenity, property value and tourism form the major environmental values within the subcatchment. Examples of major sites of biological significance include Warrandyte State Park and Landau Drive Reserve. Platypus are recorded in the lower reaches of the creek, making the conservation of in-stream habitat within the creek essential. A range of recreational opportunities are offered by the creek and its surrounds, including walking and jogging.
Brushy Creek	The major environmental values within the subcatchment are riparian and flora and recreational amenity. Brushy Creek is a major conveyor of stormwater flows and provides a recreational resource for canoeists where it joins the Yarra River.
Jumping Creek	The Jumping Creek subcatchment's major environmental value is in-stream habitat. Warrandyte Park is a site of major biological significance within the subcatchment as it supports relatively intact indigenous vegetation.
Ruffey Creek	The major environmental values within the subcatchment are in-stream habitat, landscape and visual amenity, recreational amenity, flood protection and conveyance and water quality treatment. Westerfolds Park is a major site of biological significance within the subcatchment. Ruffey Lake Park provides an important resource for wetland flora and fauna in the upper and middle subcatchment, and is also an important recreational resource.

Figure 4.1 goes here

Location: Jumping Creek subcatchment. Jumping Creek at Brysons Road
Threat: Weeds, sediment from unsealed road runoff and residential runoff

Location: Warrandyte State Park (Jumping Creek subcatchment). Jumping Creek Reserve car park. Jumping Creek's junction with the Yarra River at this point
Value: natural habitat (platypus), recreational amenity and tourism

Location: Lower reaches of Jumping Creek at Jumping Creek Road. Downstream view.
Value: natural habitat value (platypus), well vegetated banks, woody debris and good water quality, recreational amenity and tourism

Location: Koonung Creek subcatchment. High Street roadworks
Threat: roadworks runoff

Location: Koonung Creek subcatchment. Koonung Creek at Middleborough Road
Value: in-stream habitat values

Location: Mullum Mullum Creek subcatchment - 'The Ridge' residential development
Threat: residential development and residential runoff

Location: Mullum Mullum Creek subcatchment. Currawong Bush Park boundary at Millers Road
Threat: septic discharge and sullage, commercial runoff, upstream inflows, major road runoff and residential runoff

Location: Mullum Mullum Creek subcatchment. Currawong Bush Park - Millers Pond (stormwater detention basin)
Value: in-stream habitat, riparian habitat and flora, landscape and visual amenity, recreational amenity and water quality

Location: Mullum Mullum Creek subcatchment - Mullum Mullum Reserve/Bucks Reserve
Threat: septic discharge and sullage, commercial runoff, upstream inflows, major road runoff and residential runoff
Value: recreational amenity and landscape amenity

Location: Mullum Mullum Creek at Bucks Reserve
Value: recreational amenity and landscape amenity

Location: Andersons Creek subcatchment. Andersons Creek east branch at Glynne Road sewage pumping station entry gate
Threat: residential runoff and septic discharge and sullage

Location: Andersons Creek subcatchment building site in Delatite Court, adjacent to Andersons Creek east branch
Threat: building site runoff

Location: Anderson Creek subcatchment - Andersons Creek at Hussey's Lane and Gold Memorial Drive junction.
Threat: unsealed road runoff

Location: Andersons Creek subcatchment. Andersons Creek on Gold Memorial Drive at forth Hill Reserve, Warrandyte State Park
Values: historic value, recreational amenity, landscape amenity and habitat significance

Location: Andersons Creek subcatchment, Andersons Creek at Deep Creek Reserve bridge
Value: natural environmental values

Location: Brushy Creek subcatchment building site (residential)
Threat: building site runoff on Reserve Road

Location: Brushy Creek subcatchment. Brushy Creek near junction of Yarra River
Threat: weeds, sediment from building site runoff and unsealed road runoff, sewage treatment plant overflow, agricultural runoff and residential runoff

Location: Brushy Creek from Reserve Road
Value: rural subcatchment and landscape amenity

Location: Ruffey Creek in Ruffey Lake Park
Threat: erosion from major road runoff

Location: Ruffey Lake stormwater detention basin
Value: recreational amenity

6 Risk assessment and management framework review

Risk assessment and priority risks

Stormwater management issues were prioritised using a risk assessment approach. Risk assessment quantifies particular impacts by considering the threat posed by particular activities that pollute stormwater or change the natural characteristics of stormwater in an undesirable way, and the consequences for desirable values of the receiving environment.

The assessment considers three values: the magnitude of each threat within a subcatchment; the magnitude of each receiving environmental value within a subcatchment; and the sensitivity of each value to each threat.

Values of the receiving environment within each subcatchment were rated according to their significance, including features of National or State significance, where present.

Risk magnitudes have been calculated for all combinations of values and threats within each of the six subcatchments in Manningham. This was done by converting the qualitative ranking confirmed by the Project Working Group to a numerical ranking (i.e. 1 = Low, 2 = Moderate, 3 = High and 4 = Very High). A sensitivity ranking from 1 to 4 was also assigned based on the influence of the threat on the specific value within the subcatchment, and considers both the frequency of exposure to a particular threat and the magnitude of the area and level/severity of exposure to a particular threat. As an example, a low sensitivity ranking (1) applies where a threat from disused tip leachates occurs downstream of a valued habitat area for a significant species, and is therefore unlikely to impact on its value. A very high sensitivity ranking (4) would be designated where litter, nutrient, hydrocarbons and trace metals from commercial land use and parking areas impacts on the headwaters of a waterway, which has significant environmental and recreational values.

The risk magnitude is calculated for each possible combination of stormwater threats and receiving environmental values within each subcatchment according to the following equation:

$$Risk = Value \times Threat \times Sensitivity.$$

The risk assessment identified a ranking for each value in each subcatchment from stormwater quality related threats. Forty-six ‘very high risk’ threats were identified for Manningham. These are summarised in Section 6 of Volume II, with the full risk calculation included in Appendix B of Volume II.

The forty-six risks of highest priority form twenty-one categories of threat, but only nine major threat types. Therefore, a limited number of threats are responsible for most of the stormwater risks in the municipality and typically recur in several subcatchments. Table 6.1 summarises the nine major threat types and where they occur. The Project Working Group and Steering Committee were instrumental in identifying priority risks for Manningham.

Table 6.1 Top priority risks

Risk ranking	Major threat type	Values affected by the threat in each subcatchment	Subcatchment
1	Septic discharge and sullage	In-stream habitat; riparian habitat and flora; recreational amenity; landscape and visual amenity; recreational amenity; property value (all for both subcatchments except for latter for Andersons Creek only).	Mullum Mullum Creek Andersons Creek
2	Commercial runoff	In-stream habitat; riparian habitat and flora; landscape and visual amenity; recreational amenity; flood protection and conveyance; water quality treatment (for MM Creek). Recreational amenity for Koonung Creek.	Mullum Mullum Creek Koonung Creek
3	Up-stream inflows	In-stream habitat; riparian habitat and flora; landscape and visual amenity; recreational amenity; flood protection and conveyance; water quality treatment.	Mullum Mullum Creek
4	Unsealed road and eroding drain runoff	Riparian habitat and flora; recreational amenity; in-stream habitat; landscape and visual amenity; tourism.	Andersons Creek
5	Building site runoff	In-stream habitat.	Jumping Creek
6	Major road runoff	In-stream habitat (MMC, RC, KC); landscape and visual (RC); recreational amenity (RC, KC); flood protection and conveyancing; water quality treatment (RC).	Mullum Mullum Creek Ruffey Creek Koonung Creek
7	Residential runoff	In-stream habitat (MMC, AC, JC); riparian habitat and flora; recreational amenity (AC).	Mullum Mullum Creek Andersons Creek Jumping Creek
8	Roadworks runoff	In-stream habitat.	Mullum Mullum Creek Koonung Creek
9	Residential development	In-stream habitat.	Jumping Creek

Review of existing management framework and emerging opportunities

Manningham's management framework was reviewed with respect to stormwater management within the municipality. This included evaluation of the performance of the planning scheme, planning control, development control, infrastructure development and management, regulation, enforcement and education activities, and provision of services. Key areas reviewed included:

- *Statutory and policy requirements*: the relevant statutory and policy requirements were reviewed (refer Volume II) and opportunities were found to amend the Municipal Strategic Statement to: incorporate stormwater management issues; develop local planning policies; and integrate a series of performance objectives with regard to stormwater planning in the existing Land Management Plan and Environmental Management Plan format.
- *Resourcing of management framework functions:* areas of responsibility for each of Manningham's relevant business units, linkages to priority management issues, and opportunities for management framework improvement are summarised in Table 6.2.

- *Coordination and communication:* the various units of Council communicate and coordinate with each other to some extent, particularly in relation to the development of specific policies and strategies that apply across Council, or in relation to statutory approvals.
- *Development approvals process:* takes into account all of the relevant policies, provisions and statutory requirements. It involves referral of matters to external and internal groups.

  There are opportunities to draft a series of standard planning and building permit conditions that relate specifically to the stormwater management plan. This will be limited by the ability of the statutory planning unit to prepare conditions pursuant to the *Planning & Environment Act* 1987. There is however, the opportunity for Council to utilise a combination of legislative tools across its units to address stormwater management. In addition there is opportunity to source feedback from Melbourne Water, YVW, EPA, Parks Victoria and VicRoads with regard to best practice environmental standards with regard to stormwater management and sensitive urban design.
- *Regulation and enforcement:* methods currently employed to address stormwater management are as conditions of planning permits and conditions associated with on-site effluent disposal systems. There are also Local laws relating to dog faeces management and vehicle management. There is scope to develop standard planning permit conditions, building permit conditions and new local laws.

Table 6.2 Summary of Council's current areas of responsibility with regard to stormwater management and Opportunities for improvement

Council Business Unit	Relevant responsibilities	Linkage to priority management issue	Key opportunities
Project Management (PM)	• Management of drainage, construction of roads, buildings, waste management and technical advice to Statutory Planning Unit. • Design and management of drainage (mostly stormwater quantity).	Commercial runoff; upstream inflows; unsealed road runoff; building site runoff; roadworks runoff; residential runoff.	• Design and implementation of structural stormwater quality control measures for construction projects using water sensitive design principles. • Review contract specifications for construction projects to ensure that environmental management measures are required to address water quality control issues. • Rigorous environmental auditing of road works. • Waste management education.
Cultural and Leisure Services (CLS)	• Planning and management of open space areas including sport and recreation facilities.	Up-stream inflows.	• Provide advice to Project Management Unit in the design and implementation of water quality control systems so that they do not negatively impact on open space areas.
Statutory Planning (SP)	• Assessing development approval applications. • Currently focused on no net quantity increase with regard to stormwater management on property developments. • Have a number of standard planning permit conditions related to unmade roads; public infrastructure etc focussed on quantity control.	Septic discharge and sullage; up-stream inflows; roadworks runoff; residential runoff; residential development.	• To develop policies in consultation with other units. • Preparation of additional planning permit conditions focussed on water quality control. • require developers to prepare plans in accordance with water sensitive urban design principles.
Building Control (BC)	• Responsible for issuing building permits and inspection of buildings.	Building Site Runoff.	
Economic and Environmental Planning (EEP)	• Provides all environmental advice to Council at a policy and strategic level. • Strategic planning of open space areas in consultation with Cultural and Leisure Services. • Assessment of site development proposals referred by the Statutory Planning Unit. • Responsibility for management of strategic planning, economic development issues and heritage planning.	All priority management issues	• Can take a prominent role in community education and awareness campaigns. • Can take a lead role in facilitating communication with external and internal groups re SWMP. • Preparation of specific policies to address stormwater quality management issues. • Preparation of guidelines for use by developers and landowners. • Identify stormwater quality management issues for the Statutory Planning Unit during the approval referral process.

Table 6.2 continued

Council Business Unit	Relevant responsibilities	Linkage to priority management issue	Key opportunities
	• Has a number of specific management activities as per GreenPrint in relation to soil and water management (seminars, training, structural measures to minimise erosion of stream banks.) • Community education and liaison role such as Waterwatch, 'Friends of groups'.		
Health and Local Laws (HLL)	• Manage the environmental and public health and amenity issues for Council. • Provide advice to Statutory Planning Unit with regard to on-site effluent disposal in unsewered areas and for progressing the backlog sewerage programme with Yarra Valley Water. • Responsible for food premises around the municipality. • Issue infringement notices with regard to septic systems. • Litter management in parks and reserves and dog faeces management. • Development and enforcement of local laws.	Septic discharge and sullage; commercial runoff; upstream inflows; building site runoff; residential runoff; residential development.	• To develop policies and conditions that can be applied through planning and building approvals and community education. • Continue and prioritise involvement in the pilot scheme developing a Domestic Wastewater Management Plan. • Investigate potential for changing priority of the Manningham Council areas in the YVW backlog sewerage programme. • Community education regarding on-site effluent disposal, waste management at food premises and open-space usage to as to reduce litter and nutrient inputs. • Develop new local laws to address building site management and litter prevention. • Continue investigation of the use of dung beetles to assist with dog faeces management.
Manningham Maintenance (MM)	• Responsible for the maintenance of Council assets, including roads, drains and parks.	Commercial runoff; up-stream inflows; unsealed road runoff; major road runoff; residential runoff.	• Review unsealed road and drain maintenance procedures to minimise potential for sediment runoff • Develop EMP and continue to develop Code of Practice for drain and park maintenance works. • Audits to determine what is removed from drains so that this knowledge can be applied to development and implementation of management measures.

7 Reactive management strategies

Reactive management strategies were developed to address the current major threats to environmental values, that is, priority management issues resulting in the preparation of a list of prioritised Reactive Management Strategies. The Strategies contain specific actions that represent the most cost effective and feasible means of managing priority management issues, and will be underpinned by more long-term management framework changes. A reactive management strategy has been prepared for each priority management issue included in Table 6.1. The reactive management strategies are combinations of the following management elements:

- *Education and awareness (EA)*: targeted literature, stormwater management education workshops, signage and community group consultation.
- *Structural treatment measures (STM):* gross pollutant traps, trash racks, grass swales, porous pavements, wetlands and sewer overflow improvements.
- *Source controls (SC):* improved waste collection, roof water diversion and waterway rehabilitation and revegetation, designed to control pollutants at the source.
- *Site specific strategies and plans(SSDP):* sediment and erosion control plans, and zoning provisions.
- *Information and data collection (IDC):* to support, reinforce and supply feedback on the effectiveness of the management measures.
- *Regulation and enforcement (RE):* effective enforcement will support the successful implementation of many of the management measures.

A staged process was followed to identify reactive management strategies. It included:

Task 1: Management action screening: identifying a range of generic management actions to eliminate management actions that are not considered to be applicable to the specific stormwater threat;

Task 2: Management action opportunity assessment: a more detailed assessment regarding specific opportunities and their application to each of the nine priority management issues. This involved identification of specific locations for structural measures; providing a description of the specific nature of non-structural measures; providing an overview of advantages and disadvantages for each opportunity, culminating in an indicative estimate of capital and ongoing (maintenance) costs. This assessment produced a list of management action opportunities that could be integrated to form management strategies.

Task 3: Management strategy formulation: involved assessing each management opportunity for its cost effectiveness by applying a multi-criteria analysis.

Full details of the management strategy formulation process are included in Volume II.

Reactive management strategies were selected for each priority management issue and the highest priorities are as shown in Tables 7.1 to 7.10. The complete strategies are presented in Volume II of the SWMP, with management action opportunities included in Appendix C of Volume II. The strategies are numbered in Tables 7.1 to 7.10 to relate to the type of strategy described above, the subcatchment to which they apply, and the management action opportunity identification number found in Appendix C of Volume II.

Responsibilities for implementation of each strategy are also identified in Tables 7.1 to 7.10, along with a priority for implementation. Council business units responsible for implementation of various strategies are:

- Project Management (PM)
- Economic and Environmental Planning (EEP)
- Manningham Maintenance (MM)
- Building Control (BC)
- Health and Local Laws (HLL)
- Statutory Planning (SP)
- Cultural and Leisure Services (CLS)
- City Parks (CP).

Agencies external to Council with an involvement in implementation of strategies include:

- Melbourne Water (MW)
- Environment Protection Authority (EPA)
- Yarra Catchment Action Committee (YCAC)
- Yarra Valley Water (YVW)
- Ecorecycle
- Least Waste.

The first named organisation or Council Business Unit in the reactive management strategy tables is responsible for coordinating the implementation of the strategy in consultation with other units and organisations named.

Table 7.1 Management Strategy 1: Management elements common to a number of priority management issues

This strategy was developed to address a number of common management elements for a range of priority management issues across the Manningham municipality.						
Threats: All **Values:** All						
Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-MMC,RC&KC-5	**Media Release.** Use local press opportunistically to advertise the impact of various activities on the environmental values of receiving waterways as a result of stormwater quality.	Staff time	Allow $5,000 to overview	Marketing Unit	Municipality wide	Very high
EA-MMC,JC&KC-9	**Training of relevant Council officers.** Train staff in best practice urban stormwater management. This includes training in water sensitive urban design, soil and water management principles, drawing upon available courses.		$6,000	EEP including input from EPA, MW, YVW, and VicRoads	Municipality wide	Very high
EA-MMC,RC&KC-6	**Community and special interest group consultation.** Raise awareness of the impact of all priority risks amongst the wider community to increase support and understanding of Council initiatives.	Staff time—allow $5,000	–	All units as relevant	Municipality wide	Very high
EA-MMC, RC&KC-8	**Business stakeholder groups and committees.** Liaise directly with Chamber of Industry and Commerce groups, shopping centre management, light industry and commercial business operators regarding waste management and stormwater management objectives.	Part of ongoing staff cost.		All units as relevant	Municipality wide	High
EA-MMC&KC-1	**Targeted literature/guideline development.** Preparation and distribution of brochures to address stormwater quality management issues and what residents and businesses can do to assist.	$10,000–$12,000 for basic brochures	$3,000 per year to update	EEP in consultation with HLL & PM, EPA, YVW, MW, EcoRecycle, YCAC, neighbouring Councils	Municipality wide	High
EA	**Demonstration projects showing best practice.** Set up demonstration model (to scale) of a dwelling that has been designed to meet best practice stormwater management standards. Run competition to build models and award prizes.	$5,000 for prize and advertising	N/A	EEP, SP & CLS	Municipality wide	High
SC-MMC,RC&KC-37	**Street sweeping.** Assess the street cleaning programme and identify 'hot spots' where pollutants accumulate to increase the effectiveness of the street sweeping programme including commercial areas, main roads and construction areas.	$5,000 for assessment		MM	Municipality wide	Very high
SC-AC-38	**Drain maintenance.** Monitor the accumulation rates of litter, silt and leaves in the drainage system during inspections and cleaning. This will assist in providing feedback on the effectiveness of the measures in place, and in adjusting maintenance practices to maximise effectiveness of treatment.	Staff time	Allow $5,000 for recording	MM	Municipality wide	Very high
RE-MMC,JC&KC-64	**Infringement notification and fines.** On the spot fines of the audit and inspection process for poor stormwater management and waste management. These can be developed and issued in relation to practices on development and building sites, infringements of proper waste management in commercial areas, unsatisfactory septic tank management and any other activity with the potential for negative impact.	$50,000 to draft and implement the by-law	$40,000 to administer and review	HLL	Municipality wide	Very high

Table 7.1 continued Management Strategy 1: Management elements common to a number of priority management issues

Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
RE-MMC,JC&KC-63	**Audit and inspection.** Conduct regular audits and inspections of contractors working on road works, building/development sites, residents with septic tanks, commercial operators within the municipality. Publicise audit process to raise awareness.		$10,000 for 1 day per fortnight/year and $10,000 for admin. support	PM & HLL	Municipality wide	High
IDC-MMC-61	Establish a **programme** to **monitor** the effectiveness of the stormwater management plan. Key areas to monitor include: • effectiveness of structural treatment measures • condition of receiving environment • conduct of and effectiveness of education programmes • litter reduction in the municipality.	$20,000 to set up	$5000 to undertake an annual review	EEP with the assistance of YVW, MW, EPA and integrate with the Waterwatch Programme	Municipality wide	very high

Table 7.2 Management Strategy 2: Impact of septic discharge and sullage—Mullum Mullum Creek (MMC) and Andersons Creek (AC)

Threats: Septic discharge and sullage

Values: In-stream habitat (MMC&AC) Landscape and visual amenity (MMC & AC) Water quality treatment (MMC) Riparian habitat and flora (MMC & AC) Recreational amenity (MMC & AC) Property value (AC) Tourism (AC)

Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-MMC&AC-2a	**Targeted literature/guideline development.** Develop and prepare brochures for residents with septic treatment systems regarding their maintenance responsibilities, ongoing monitoring requirements and about responsible water and waste management practices.	$10,000–$12,000 for basic brochure	$3,000 to update	HLL in consultation with EEP, EPA, and YVW	Municipality wide, (especially MMC, AC and JC)	Very high
STM-MMC&AC-MW/YVW	**Extension of sewer system** on the western side of Mullum Mullum Creek. Review opportunities to extend sewer system either further south of the service unsewered Donvale area or extend sewer east across Mullum Mullum Creek to enable sewering of Park Orchards area.	YVW capital cost		PM, HLL in consultation with YVW	MMC & AC	Very high
RE-MMC&AC-62	**Financial incentives** for septic system upgrade and compliance audit certification, completed in the next twelve months. Individual residents on septic systems can install an approved septic system upgrade and undergone a compliance audit concerning responsible on-site waste and water management strategies to receive a rates rebate.	$50,000 to draft and implement the by-law	$40,000 to administer and review	HLL	MMC - specifically Park Orchards and Donvale	Very high

Table 7.3 Management Strategy 3: Impact of commercial runoff—Mullum Mullum Creek (MMC), Koonung Creek (KC) and Ruffey Creek (RC)

Threats: Commercial Runoff containing nutrients, sediment, litter, hydrocarbons, pathogens, trace metals and surfactants. **Values:** In-stream habitat, riparian habitat and flora, landscape and visual amenity, recreational amenity, flood protection and conveyance and water quality treatment						
Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-MMC&KC-4	**Commercial runoff abatement competition/awards.** Competition awarding prizes and publicity to winning business and light industries in the municipality who demonstrate practices that improve quality of stormwater runoff from their area.	$15,000		PM in consultation with Least Waste, EPA, co-sponsorship by local press	Municipality wide	Very high
EA-MMC&KC-7	**Signage.** In car parking areas regarding waste minimisation objectives (especially strip shopping centres). Locations include Tunstall Square, The Pines Shopping Centre, Westfield Doncaster Shoppingtown and Jackson Court Shopping Centre. Also, revisit drain-stencilling programme and identify outlet pipes with identification codes so that people wanting to report pollution events can easily identify them.	$2,000 for signs	Allow $500 for maintenance.	PM for signage and drain outlet identification. EEP for drain stencilling	Strip shopping centres. Drain stencilling and identification at all appropriate locations	High
STM-MMC, RC & AC	**In-line traps** down stream of commercial centres to address threats to Koonung Creek, Ruffey Creek and Yarra River. Possible locations:			PM	KC &RC	Very high
	• Warrigul Road and Yarra Valley Road (Bulleen Plaza);	$50,000	$9,000			
	• vicinity of Greenaway Light Industrial area;	$25,000	$5,000			
	• near corner of Seville and Parker Streets (Templestowe Village);	$45,000	$7,000			
	• vicinity of Bulleen Plaza;	$15,000	$2,000			
	• below ground along nature strip in Tram Road. (Westfield Shopping Centre);	$150,000	$25,000			
	• in vicinity of Tunstall Road and Russell Crescent intersection. Alternatively two smaller in-line traps closer to the Tunstall Square Shopping Centre;	$42,000	$7,000			
	• on Bulleen Road and Calin Court in the reserve (Jackson Court Shopping Centre);	$85,000	$14,000			
	• on Franklin Road and/or the laneway near Blackburn Road (Devon Plaza);	$100,000	$15,000			
	• in reserve near Irene Court and in-line traps possibly in the Ted Ajani reserve (underground) (Macedon Square); and	$90,000	$15,000			
	• Council reserve near corner of Firth Street and Beaconsfield Street (commercial and Light industrial area).	$90,000	$15,000			
	At source control required at The Pines Shopping Centre as this centre drains to a number of locations.	$50,000	$15,000			
	At source control in vicinity of shops in George Street.	$90,000	$15,000			
	At source control near corner of Springvale Road and Mitcham Road.	$90,000	$15,000			

Table 7.3 continued Management Strategy 3: Impact of commercial runoff— Mullum Mullum Creek (MMC), Koonung Creek (KC) and Ruffey Creek (RC)

Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
SC-MMC&KC-46	**Unloading and loading areas.** Audit unloading and loading measures to ensure pollution into the stormwater system is not occurring. Ensure pollution risks are accounted for adequately.	$5,000 for random audit reports		PM	Commercial areas in municipality	High
SSSP-MMC&KC-54	Develop **Environmental Management Plans** (incorporating stormwater management issues) for key commercial areas or sites.	Contractor or business cost	Council cost in processing and auditing	PM & SP in consultation with Least Waste	Municipality wide.	Very high

Table 7.4 Management Strategy 4: Impact of up-stream inflows—Mullum Mullum Creek (MMC)

Threats:	Up-stream inflows containing nutrients, sediment, litter, hydrocarbons, pathogens, trace metals and surfactants.
Values:	In-stream habitat, riparian habitat and flora, landscape and visual amenity, recreational amenity, flood protection and conveyance and water quality treatment

Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-MMC-3	**Consultation** with Maroondah City Council, Melbourne Water, EPA, YVW and YCC to address management of pollutants originating from outside Manningham.	Officer time		PM	Mullum Mullum Creek	Very high
STM-KC-MW	**Stability works.** Along creek within Freeway Public Golf Course and Manningham Club and Conference Centre.	$120,000		MW	Koonung Creek	High

Table 7.5 Management Strategy 5: Impact of unsealed road and eroding drain runoff—Andersons Creek (AC)

Threats: Unsealed Road and eroding drain run-off containing nutrients, sediment, litter, hydrocarbons, pathogens, trace metals and surfactants. **Values:** In-stream habitat, riparian habitat and flora, up-stream habitat, landscape and visual amenity, and tourism						
Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
STM-AC-19	**Circular settling tanks.** Falconer Road.	$30,000	$5,000 per year	PM	Andersons Creek subcatchment	Very high
STM-AC-18	**Sediment settling basins.** Possible locations include Gold Memorial Drive near but after junction with Husseys Lane.	$20,000	$5,000 per year.	PM	Andersons Creek subcatchment	Very high
SC-AC-42	**Unsealed road and drain maintenance.** Schedule grading to coincide with optimum moisture content in road material. Grade shoulders of roads to direct drainage away from tributaries. Review methods of maintaining table drains to minimise sediment and vegetation disturbance. Review other treatment trains, e.g. bioretention, grass swales and drop structures.		Incorporate into existing maintenance schedule.	MM	Mostly rural or urban/rural/parts of municipality	Very high
SC-AC	**Alternative pavements**. Review the possibility of using alternative road and drain sealing methods such as light weight pavements.	$5000 to undertake study	–	PM	Creek subcatchment	Very high

Table 7.6 Management Strategy 6: Impact of building site runoff—Jumping Creek Sub catchment (JC)

Threats: Building Site Runoff containing sediment, litter, hydrocarbons, pathogens, trace metals and surfactants. **Values:** In-stream habitat (JC)						
Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-JC-1	**Targeted literature/guideline development.** Preparation and distribution of brochures to residents, and construction contractors and to local chambers of commerce, industry groups.	$10,000 to $12,000 for basic brochure	$3,000 per year to update	EEP in consultation with EPA, MW, and Marketing Unit	Municipality wide	Very high
EA-JC-2	**Best practice demonstration workshops.** Develop and conduct a number of workshops from Council offices and/or at building sites.	Allow $4,000 for each half day workshop	Allow $2,000 per year to update material	EEP in consultation with SP, BC, DOI, EPA, MW, EcoRecycle and other municipalities	Municipality wide	Very high
STM-JC-12	**Near source treatment.** Require all building sites to install near source treatment measures.	$50,000 to develop by-law	$40,000 to administer	HLL	Municipality wide	High
SC-JC-52	**Site management plans.** Minimise pollution from construction sites by requiring a site management plan and conduct a site inspection to ensure compliance. The plan should address key issues including sediment and waste management. Best practice guidelines for urban stormwater provide an outline for these types of plans.	Publicise requirements for plan. $5,000	Staff time to conduct site inspections. $10,000	BC in consultation with PM, SP & EEP	Municipality wide	Very high

Table 7.7 Management Strategy 7: Impact of major road runoff—Mullum Mullum Creek (MMC), Ruffey Creek (RC) and Koonung Creek (KC)

Threats: Major Road Run-off containing nutrients, sediment, litter, hydrocarbons, pathogens, trace metals and surfactants. **Values:** In-stream habitat, landscape and visual amenity, recreational amenity, flood protection and conveyance and water quality treatment.						
Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
STM-AC-23	**In-line treatment**. Circular screens at Williamsons Road; Foote Street.	$35,000 for smaller, precast unit	$20,000	PM & MM	MMC	High
STM-KC-MW	**In-line treatment:** • Litter traps, open space area south of Hampshire Road and Brindy Crescent, near Wetherby Road, north of Koonung Creek. • Sediment pond (in open space area near intersection of High Street and Eastern Freeway). • Sediment pond, within vicinity of TAFE	 $140,000 $90,000 $20,000	 $23,000 $15,000 $20,000	VicRoads and MW	KC	High
STM-KC-MW	**Stability works** near intersection of Sheahans Road and Templestowe Road.	$75,000		MW	RC	High

Table 7.8 Management Strategy 8: Impact of residential runoff—Mullum Mullum Creek (MMC)and Andersons Creek (AC)

Threats: Residential Runoff containing nutrients, sediment, litter, hydrocarbons, oxygen depleting material, pathogens, trace metals, pesticides and surfactants. **Values:** In-stream habitat (MMC&AC) Landscape and visual amenity (MMC & AC) Water quality treatment (MMC) Riparian habitat and flora (MMC & AC) Recreational amenity (MMC & AC) Property value (AC) Tourism & other (AC)						
Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-MMC & AC	**Targeted literature/guideline development.** Develop and prepare brochures for residents to raise awareness of how typical residential activities on stormwater quality and responsible water and waste management practices. Draw on EPA and other agencies materials	$10,000-$12,000 for basic brochure	$3,000 per year to update	EEP in consultation with H&LL, PM, EPA, YVW, MW, EcoRecycle	Municipality wide, (especially MMC &AC)	Very high
EA-MMC&AC-2a	**Demonstration projects showing best practice.** Set up demonstration model (to scale) of a dwelling that has been designed to meet best practice stormwater management standards. Run school/university competition to build models and award prizes.	$5,000 for prize and advertising	N/A	EEP & CLS	Municipality wide	High
STM-MMC&AC-35	**Constructed wetlands.** • South of Gold Memorial Drive, north of Beauty Gully/Husseys Lane and east of Harris Gully Road. • Westerfolds Park to address sediment issues; and in • Tikalara Park near Cliveden Crescent, west of Mullum Mullum Creek.	 $300,000 to $404,000	 $20,000 to $30,000	EEP, MW, Parks Victoria and PM	Less developed parts of the municipality	Very High

Table 7.9 Management Strategy 9: Impact of roadworks runoff—Mullum Mullum Creek (MMC), Andersons Creek (AC) and Jumping Creek (JC)

Threats: Roadworks Runoff containing sediment, litter and pollutants. Could provide a reference. EPA guidelines for major construction sites.

Values: In-stream habitat (KC, MMC & JC)

Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-MMC & KC-1	**Targeted literature/guidelines development.** Guidelines for road construction contractors regarding management of stormwater. EPA guidelines for major construction sites could provide a reference. Guidelines can be used to prepare EMPs.	$10,000 to $12,000	$3000 for updating	PM in consultation with EEP and VicRoads	Municipality wide	Very High
STM-MMC, JC & KC - 28	**Grass swales.** Planning/design of roadworks to incorporate road medians, verges, car park runoff areas, and parks where appropriate. The grass swales should be located work in association with silt fences. For example, Park Road construction activity - review opportunity for use of sections of Alan Morton Reserve for a grass swale. Note - gradient may be a limiting factor.	Individual project cost		PM	MMC	High
EA-MMC&JC-2	**Best practice demonstration workshops.** Demonstration of key best practice actions with regard to road construction sites.	Allow $4,000 for preparation of material and staff time for each half-day workshop	Allow $2,000 per year to up date material	EEP in consultation with H&LL & PM & seek support from DOI, EPA, MW, EcoRecycle and other municipalities	Municipality wide	High
STM-MMC, JC & KC - 23	**In-line measure.** Sediment control measures required for the duration of construction.	Project based	Project based	PM & MM	MMC, JC & KC	Very high
SC-MMC,JC&KC -52	**Site management plans.** Require site management plans for all construction activities, in particular to target sedimentation, erosion and waste management.		Approx. $10,000 for site audits	PM	Municipality wide.	Very high

Table 7.10 Management Strategy 10: Impact of residential development—Jumping Creek (JC)

Threats: Residential Development containing sediment, litter and pollutants, sufacants.

Values: In-stream habitat

Number (refer Appendix C, Vol. II	Description of management element	Capital cost	Ongoing cost	Responsibility	Extent of application	Priority
EA-JC-1	**Targeted literature/guideline development.** Preparation and distribution of brochures to building contractors and developers. Use EPA guidelines for major construction sites as a guide.	$10,000 to $12,000	Allow $3,000 to update	EEP including input from EPA, MW, YVW, Mar &VicRoads	Municipality wide, especially MMC, AC, JC	Very high
EA-JC-2a	**Stormwater management and education workshops.** Develop and conduct workshops for developers and targeting development site runoff control measures. Conduct workshops from Council offices.	Allow $4,000 for each half day workshop	$2,000 to update material	EEP in consultation with PM, H&LL, DOI, EPA, MW, EcoRecycle and other municipalities	Municipality wide, especially MMC, JC	High
SC-JC-52	**Site management plans.** Minimise pollution from development sites by requiring a site management plan and conduct a site inspection to ensure compliance. Site management plans should specifically address soil and water management, vegetation retention and waste management.	Publicise requirements for plan. $5,000	Staff time to conduct site inspections. $10,000	PM	Municipality wide	Very high

8 Management framework strategies

Underpinning the reactive management strategies are management framework strategies. The strategies are intended to define a range of management actions that respond to the stormwater quality management issues, and improve management practices so that future problems are mitigated or avoided. The management strategies also have the effect of raising the profile of stormwater quality issues and their management.

The management framework strategies relate to the following aspects of Council's responsibilities:

- changes to the Planning Scheme, including the Municipal Strategic Statement (MSS), local policies and permit conditions;
- incorporation of stormwater quality issues into strategic planning activities;
- changes to specifications for service delivery (engineering standards);
- modifications to the local approvals process;
- opportunities to improve coordination and communication within Council;
- opportunities to improve coordination and communication with external agencies;
- ongoing management of infrastructure and operations;
- internal training and skill requirements.

Development of the strategies involved consideration of results from a management framework review and the risk assessment (Section 6) and discussions with Council officers and stakeholders.

Table 8.1 provides a summary of the recommended management framework strategies identified as part of the SWMP development. A full discussion of the strategies is included in Volume II.

Table 8.1 Summary of recommended management framework strategies
Strategy 1: Changes to Manningham Planning Scheme and modification to statutory approvals process

Proposed action	Relevant Priority Management Issue	Assignment of responsibility for implementation.	Recommended priority
The Manningham Planning Scheme—specifically the Municipal Strategic Statement should be amended to address stormwater quality management objectives.	All.	EEP in consultation with other Units of Council to draft policies and amendments to MSS.	High—to be prepared now and implemented at the next planning scheme review which is due to take place during 2003.
Draft a local policy under the planning scheme that defines expectations with regard to development and use of land by Council, the private sector and other public authorities.	All.	EEP in consultation with other Units of Council to draft policies and amendments to the MSS.	High—to be undertaken no later than the next planning scheme review which is due to take place in 2003.
Prepare a series of standard planning and building permit conditions that relate specifically to the SWMP and the statements included in the MSS and local policies.	All.	SP and BC consultation with the EEP.	High.
Provide a series of performance objectives for the preparation of Land Management Plans and Environmental Management Plans.	All.	EEP to prepare in consultation in PM.	High.
Refer projects to MW, EPA, Parks Victoria, VicRoads with regard to achieving best practice environmental standards for stormwater management and sensitive urban design.	All.	SP.	High.

Strategy 2: Changes to specifications for service delivery

Proposed action	Link to Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
During review of Local Laws, identify opportunities to integrate stormwater management outcomes.	All.	HLL.	High—for residential development/building site runoff and litter.
Secure Councillor and management commitment with regard to the recommendations of the Manningham SWMP.	All.	EMT and stormwater management committee.	Very high.
Define roles and responsibilities for stormwater management within Council.	All.	EMT and stormwater management committee.	High.
Identification of the need to consider the SWMP by tenders for relevant contracts where stormwater quality management is an issue.	Unsealed road runoff; building site runoff; roadworks runoff.	PM.	Medium.

Strategy 2 continued

Proposed action	Link to Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
Set up an appropriate reporting mechanism for ongoing monitoring of the stormwater system—in terms of litter, pollutant spills, ineffective structural controls (for example, where a device appears to be malfunctioning).	All.	MM and PM.	Medium.
Establishment of operational benchmarks for Council activities in open space management, road maintenance, street cleaning and drain maintenance.	Upstream inflows, Unsealed road, major road, roadworks and commercial runoff.	CP, PM and MM.	Medium.
Review of contract specifications regarding stormwater quality control for construction projects.	Up-stream inflows; building site runoff; roadworks runoff.	PM.	Medium.
Review contract specifications for the Manningham Maintenance Unit to enable them to implement measures relevant to stormwater quality control in their maintenance activities.	Up-stream inflows; commercial runoff; unsealed road runoff.	EMT.	High.
Incorporate stormwater quality control measures in all new drainage design and upgrade drainage designs.	Up-stream inflows; unsealed road runoff; residential runoff; major road runoff.	PM.	High.
Investigate the use of lightweight and alternative pavements to treat unsealed roads to minimise sediment runoff.	Unsealed road runoff.	PM.	High.

Strategy 3: Improvements to coordination and communication within Council and provision of internal training

Proposed action	Link to Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
Designate a committee responsible for the implementation of the plan throughout Council's Units.	All.	EMT and committee of management.	High.
Identify a Council officer who is responsible for all enquires particularly those of proponents with regard to statutory requirements of the SWMP.	All.	EMT and committee of management.	Very high.

Strategy 3: cont.

Proposed action	Link to Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
All relevant council offices should attend a short training course which will familiarise them with the SWMP.	All.	Corporate Development.	Very high.
Provide a programme of technical training for Council officers with regard to implementation of best practice stormwater management guidelines.	All.	Corporate Development.	High.
All Council officers who regularly use the planning scheme provisions, should attend an in-house workshop/seminar regarding SWMP requirements.	All.	Corporate Development with the assistance of EEP and Committee of Management.	High.
Provide an opportunity for exchange of information relating to stormwater management practices. For example, lunch time forums with guest speakers and presentations by Council officers.	All.	Committee of Management; Corporate Development and EEP.	Medium.

Strategy 4: Improvements in coordination with external agencies

Proposed action	Link to Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
Identify opportunities for joint seminars, brochures for specific issues areas with external agencies eg EPA, YVW, DOI.	All.	EEP and HLL.	Medium.
Identify opportunities to work with adjoining municipalities in addressing 'regional' stormwater management issues such as commercial runoff; upstream inflows and residential runoff.	All.	EMT and Committee of Management with the assistance of EEP.	Medium.
Where appropriate integrate feedback from relevant authorities into statutory approval process.	All.	SP.	High.
Ensure that VicRoads are aware of responsibilities regarding major road and roadworks runoff. Maintain ongoing consultation regarding these issues.	Road works runoff. Major roads runoff.	PM.	Very high.
Liaise regularly with community groups who have an interest in environmental management issues—in particular stormwater management.	All.	EEP and HLL.	Medium.
Identify existing education/community awareness campaigns that can be used as part of Council's community education/awareness campaign.	All.	EEP and PM.	Medium.

Strategy 5: Improvements to Council's strategic planning activities

Proposed action	Link to Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
Include reference to the Manningham SWMP in the Corporate Plan.	All.	Corporate Development.	Medium.
Each unit should identify opportunities for inclusion of the SWMP in their annual work programmes and annual budgets.	All.	Individual units.	Medium.
Where appropriate, reference to the SWMP should be included in the Municipal Strategic Statement, GreenPrint, and Council's EMS.	All.	EEP.	High.
Integration of recommendations of the SWMP into the Drainage Strategy (approved by Council on 25 May 1999).	All.	PM.	High.
Integration of recommendations of the SWMP into the Open Space Strategy where appropriate.	All.	EEP and CLS.	High.
Integration of recommendations of the SWMP into the Waste Management Strategy.	All.	PM.	High.
Integration of recommendations of the SWMP into Arterial Road Improvement Strategy.	Major Road runoff.	PM in consultation with VicRoads.	Medium.

Strategy 6: Ongoing management of infrastructure and operations

Proposed action	Link To Priority Management Issue	Assignment of responsibility for implementation	Recommended priority
Set up a process of monitoring drainage clearance activities undertaken by the Manningham Maintenance Unit.	All except septic discharge and sullage.	MM	High
Preparation of an overall EMP to guide drainage maintenance works.	Commercial runoff; upstream inflows; unsealed road maintenance.	MM.	High.
Review unsealed road and drainage management practices to minimise sediment runoff.	Up-stream inflows; unsealed road runoff.	PM and MM.	High.
Review street sweeping procedures to maximise potential for pollutant collection.	Up-stream inflows; major road runoff	MM.	Medium.
Audit litter collection activities to ensure that no litter is left uncollected or spilt as required by the contract conditions.	Commercial runoff; residential runoff.	PM.	Medium.
Preparation of an overall Environmental Management Plan (EMP) and site specific EMPs for operation and maintenance activities in open space areas.	Upstream inflows.	MM	Medium.

9 Implementation framework

The effective implementation of the Manningham SWMP will be a crucial factor in its success. To achieve this, an implementation framework has been prepared based on the outcomes of the management framework review and in consultation with key Council officers and the Project Working Group. Key elements of the implementation framework are discussed below.

Accountability and responsibility for implementation of the plan

It is recommended that overall responsibility for implementing the SWMP would be undertaken most effectively at an executive level. In view of this, it is suggested that a SWMP Implementation Committee be formed with representatives from each Council Unit at the commencement of the implementation phase to increase the opportunity for 'ownership' of the SWMP. Membership of this committee could be reduced to key units with the highest level of involvement once the initial implementation phase has been completed. The committee should be chaired by a representative of the Executive Management Team (EMT). The brief of the committee would be to ensure the implementation of the SWMP takes place, and provide a forum for raising issues pertaining to the plan's implementation.

Whilst coordination of the implementation of the plan's recommendations would be by the committee, accountability for delivery of the individual recommendations of the outcomes of the SWMP is spread amongst a number of Units of Council and individuals as identified in Sections 7 and 8. Individual units would report to the committee, which has overall responsibility for ensuring that the actions outlined in the SWMP are being implemented.

The committee should meet on a monthly basis, and should report to EMT on a six monthly basis.

It would be advisable to appoint an individual to coordinate the activities of the committee and to keep track of activities of Council units in achieving set targets.

Implementation priorities and optimising implementation efficiency

The Reactive Management Strategies and Management Framework Strategies in Sections 7 and 8 of this document clearly define responsibility for the implementation of each action item or strategy and priority.

Individual units within Council would prepare action plans for activities that have been identified as their responsibility for implementation that would allocate responsibilities to individual officers/positions within the unit.

There are a number of recommendations within the various reactive management strategies in Section 7, which could be applied across the entire municipality. These include elements such as media releases, literature/guidelines development, workshops, education programmes, ongoing consultation with individual, groups and other agencies and development of by-laws. These recommendations have largely

been integrated into Management Strategy Number 1, however, there is some scope for further integration. Responsibility integrated actions should be assigned to a specific position within the relevant Council Unit.

The SWMP Implementation Committee would prepare a detailed implementation schedule for the management strategies, which aims to implement a certain percentage of the strategies per year. They would also schedule and source accompanying budget allocations which optimise Council's opportunities for external funding contribution over the next three years (e.g. VSAP—refer below).

Implementation monitoring and review process

The success of the SWMP can only be judged by monitoring of the outcomes of implementation. As these outcomes may be difficult to detect in terms of direct physical evidence, it would be prudent to establish specific objectives and milestones that will facilitate benchmarking and review of the implementation process. Milestones should relate to the priority of specific risk and to:

- achieving improvements in specific receiving values that are currently threatened (particularly in relation to the implementation of specific management measures); or
- reductions in specific risks, both in terms of magnitude and exposure in relation to the implementation of specific management measures.

These milestones and objectives should be identified by the SWMP Committee when the implementation schedule is prepared.

Summary of funding opportunities and implementation

A substantial funding commitment is required to successfully implement the SWMP. The Council has a number of mechanisms through which it can source internal and external funding for stormwater management within its municipality. These include levying rates, user charge schemes, government grants and partnerships agreements.

Some potential sources are as listed below:

- Development Contributions under the *Planning and Environment Act 1987*, Part 3B: Development.
- Waterwatch, Gould League, CERES Scienceworks, and Landcare, and National Heritage Trust programs.
- The Environment Protection Authority Victoria is coordinating Victorian Stormwater Action Program (VSAP), for which there is $22.4 million allocated over the next three years to improve the environmental management of urban stormwater in Victoria. Funding assistance is to be matched by local governments on a dollar for dollar basis for priority projects identified in SWMPs.
- EcoRecycle Victoria for waste management and education.
- EPA for educational material.
- Linking of activities in this SWMP with programmes or capital works activities undertaken by agencies such as Melbourne Water, Parks Victoria and VicRoads.