Waitakere City Council
Te Taiao o Waitakere

V E R S I O N 1 . 0

Stormwater Solutions for Residential Sites

Section 2 – Stormwater Management Approach

Prepared for

EcoWater Solutions

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2.1 Do the Methods Described in this Document Apply ?

It is important as a first step to establish whether or not the design approaches detailed in this document apply to a given situation.

The design approaches and methods in this document primarily cover situations where there is no existing drainage system to connect into, or connection to an existing drainage system is difficult due to limitations with the capacity of an existing network or other problems (e.g. access to a connection).

Where there is no drainage network site development is generally limited to 15% impervious cover on a residential site (WCC District Plan).

Where there is an existing network the option of connecting to, or increasing the volume of stormwater discharging to this network will need to be determined from WCC.

WCC has developed models of the stormwater network throughout Waitakere City, and the outputs from these need to be referenced by WCC staff to check whether there are any limitations in the network.

The following key decision points apply:

1. *Is there an existing stormwater network either on the property or within 50 m and does it have capacity for additional flow (up to the 20 % AEP)?*

    - If the answer is yes, then stormwater from the development can be discharged to the network.
    - If connection is possible but capacity is a problem, the methods described below may apply. WCC should be consulted to confirm the correct approach.
    - If there is no possible connection point to a network then an alternative discharge point needs to be identified in conjunction with WCC.

2. *Is there a stream on or near to the property where stormwater could be discharged, or is discharge to the coast a possibility ?*

    - If the answer is yes, methods described in this document apply.
    - If the answer is no the possibility of discharging to an adjacent road should be investigated.

3. *Is the property adjacent to a road with kerb and channel and if so is there a stormwater network with catchpits?*

    - If the answer is yes the option of connection to the road drainage system should be explored with WCC. WCC will advise if direct connection is possible and if methods described in this document to attenuate flows must be applied upstream of such a connection.
    - If the answer is no, discharge options are clearly limited and the property owner will need to talk with WCC directly about possible site-specific solutions.

2.2 Design Approach

This document supports the following design approach to stormwater management defined as:

Maintain existing (pre-development) peak flows from a property for events up to the 50 % AEP (2 year return period) storm event and minimise increases in runoff volume where practicable.

This design approach is applicable to the whole of a site and not just the proposed new development.

Local drainage networks in Waitakere City are generally designed to convey flows associated with the 20 % AEP event. When a more severe event occurs drainage passes via overland flow paths that are generally designed for a 1 % AEP event.

This approach provides protection to streams immediately below sites as well as mitigating against increased flooding locally and further downstream.

Property owners are advised to confirm with Council that this design approach is applicable to their site before progressing with design of a stormwater management system based on this approach.

2.3 Design Information

The design information in this document has been developed to provide the flexibility to select the various stormwater management options and combination of options that are most appropriate for a site. Property owners may wish to develop sites using different methods that are applicable to the site conditions and the style of development. For instance it may not be feasible to fully offset the effects of development by constructing a roof tank due to architectural and landscaping concerns. Similarly rain gardens may be more applicable to "green-fingered" owners. This document provides flexibility for landowners to implement combinations of methods to be used.

Sections 4 to 9 outline various stormwater management options, and provide appropriate design detail to select combinations of stormwater management techniques.

2.4 Site Layouts

An important first step is to understand where stormwater currently flows on the site.

Obtain the relevant drainage plans from Council for the site.

It is very important to consider the location of any development in relation to existing overland flow paths. Blockage of overland flow paths by construction of new buildings or landscaping can cause stormwater to be diverted into site or neighbouring buildings. This is one of the most common causes of localised flooding.

Before progressing with any new development talk to Council about overland flow paths, to check if any run through the property and try and observe directly where water flows on the site when it rains.

This will assist with designing the layout for a stormwater management system.

The ultimate discharge point for stormwater from the site should be determined based on application of the process outlined in Section 2-1.

When assessing the placement of stormwater detention devices, consideration of the proximity to residential dwellings needs to be made. For example if you are considering the use of a raingarden it should be located downgradient of the house and sufficient freeboard needs to be provided between the floor of the house and the stormwater detention area.

The topography and ground stability of the site must also be considered. Rain gardens are likely to be unsuitable for steep sites.

Figures 2-1 illustrates conceptual layouts of typical sites showing possible stormwater management systems that could be implemented to mitigate the effects of development on the environment and downstream infrastructure.

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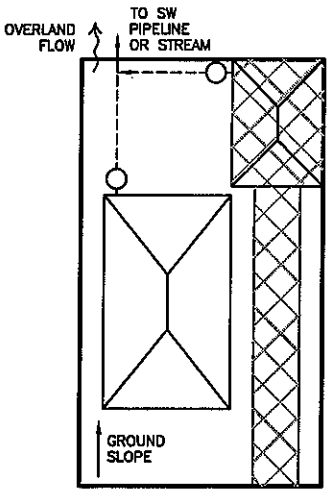
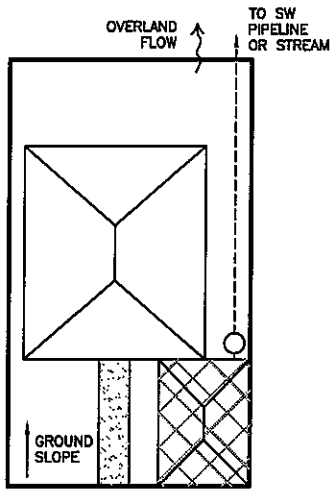
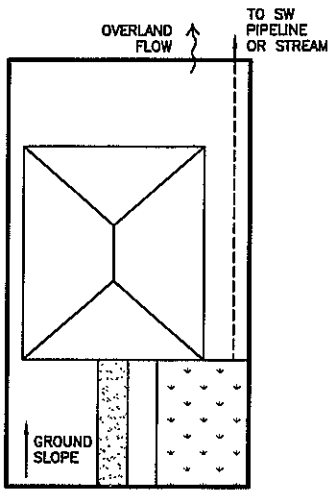


NEW CARPORT WITH RAIN TANK AND NEW DRIVEWAY WITH EQUIVALENT RAINTANK FOR EXISTING HOUSE

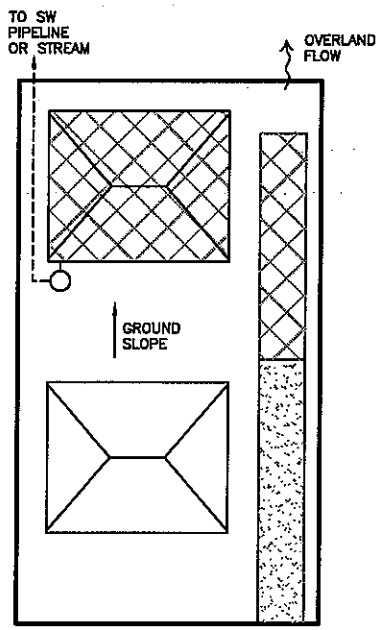


NEW CARPORT WITH RAIN TANK

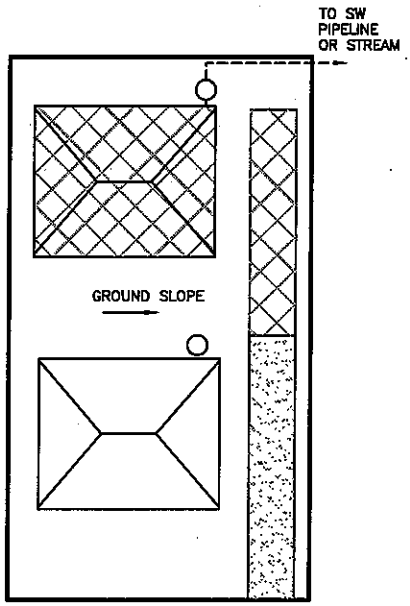


NEW CARPORT WITH GREEN ROOF

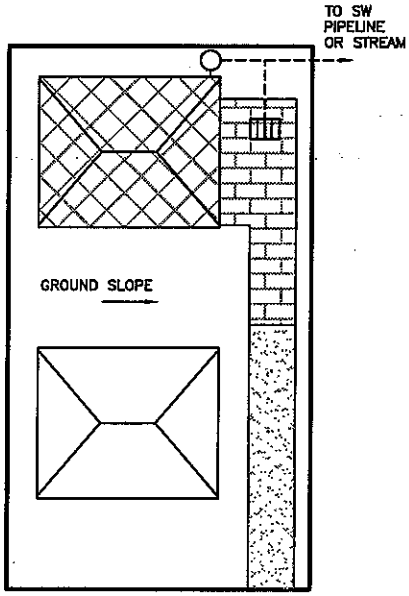
CARPORT CONSTRUCTION



NEW HOME AND DRIVE EXTENSION WITH RAIN TANK



NEW HOME WITH RAIN TANK ON EXISTING HOME TO MITIGATE DRIVEWAY



NEW HOME AND DRIVE EXTENSION WITH RAIN TANK, AND PERMEABLE PAVERS TO INCREASE DRIVE COVERAGE

NEW HOME CONSTRUCTION

KEY

- OVERLAND FLOW
- RAIN TANK
- GREEN ROOF
- CATCHPIT
- PERMEABLE PAVERS
- ADDITION OF IMPERVIOUS AREA
- DRIVEWAY OR PATH

NOTE:

1. DISCHARGE RAIN TANK, RAIN GARDEN, GREEN ROOF AND SWALE TRENCH TO APPROVED DRAINAGE OUTLET

URS
Woodward Clyde
Dames & Moore

Waitakere *City Council*
Te Taiao o Waitakere

Title
CONCEPTUAL SITE STORMWATER MANAGEMENT LAYOUT
Figure No. **2-1**

2.5 Application of Methods not Listed in the Document

This document is intended to be a guide to appropriate stormwater management **on sites of 1,000 m^2 or less**. The stormwater management measures listed in the document are simple to use and aimed at providing methods that are considered most applicable for the conditions encountered. However other variations of the methods proposed in this document may be used if designed in accordance with the ARC technical publications referenced earlier (Section 1.5). Details of all methods used and the design details should be included with any application for building consent.