Shire of Bridgetown-Greenbushes

Stormwater Management Guidelines

Adopted 28 April 2011

1.0 Introduction

Due to steep terrain, variable soil and vegetation types throughout the district, and low pre-development stormwater runoff rates, erosion is a major issue affecting development and land use within the Shire of Bridgetown-Greenbushes.

Development potentially increases the amount of impervious surfaces (including but not limited to roads, car parks, paving and buildings) within a water catchment area, and can dramatically change both the quantity and quality of stormwater runoff and groundwater recharge rates, increase the risk of localised flooding, soil erosion and watercourse turbidity and sedimentation. Effectively managing impacts of stormwater flow, flooding, water quality, erosion and sedimentation is a significant issue for the Shire and landholders.

Stormwater can be defined as *"water flowing over ground surfaces and in natural streams and drains as a direct result of rainfall over a catchment"* (ARMCANZ & ANZECC, 2000); or *"stormwater consists of rainfall runoff and any material (soluble or insoluble) mobilised in its path of flow. Stormwater management examines how these pollutants can best be managed from source to the receiving water bodies using the range of management practices available"* (Dow 2007).

These Guidelines have been prepared to identify measures that, where practicable reduces stormwater runoff through onsite management; and to assist landowners in better managing stormwater runoff on their own property for protection of private and public land. They will also assist landowners and developers ensure water management issues are included at an early stage in the design process of development and subdivision applications to improve stormwater management outcomes.

2.0 Aims and Objectives

2.1 The **aim** of the Shire of Bridgetown-Greenbushes Stormwater Management Guidelines is to:

Ensure that stormwater runoff from any site is effectively managed to protect the built and natural environment.

2.2 The **objectives** of the Shire of Bridgetown-Greenbushes Stormwater Management Guidelines are to:

(a) Avoid or minimise the risk of erosion caused by rainfall runoff from impermeable surfaces;

(b) Prevent sedimentation and turbidity of watercourses;

(c) Avoid overloading the Shire of Bridgetown-Greenbushes stormwater drainage network through management that holds or slows the flow of water through the catchment;

(d) Ensure that stormwater infiltration and runoff post development has no more of an off-site impact than pre-development by considering Water Sensitive Urban Design (WSUD) techniques as well as other possible solutions; and

(e) Minimise the risk of localised flooding caused by increased stormwater runoff from impervious surfaces.

3.0 The Guidelines

3.1 Stormwater runoff from impermeable surfaces in developments can be managed by any one or more of the following measures:

(i) Installation of soak-wells (if appropriate);

(ii) Construction of a stormwater detention basin(s) or the installation of a water garden (WSUD or biofiltration system) or collection and storage in tanks above or below ground for later use;

(iii) Construction of a diversion or catch drain(s) across a slope to convey runoff at a non-erosive velocity and to divert runoff from upslope areas around the site of a disturbance or an area at risk of erosion;

(iv) Construction of a level water spreader, which slowly discharges water from the outlet of a drain or pipe onto an undisturbed area stabilised by vegetation cover. The purpose of the spreader is to convert a concentrated potentially erosive outflow from a discharge point into non erosive sheet flow. A construction note illustrating this method is included as **Appendix 1**;

(v) Installation of a weed-free straw bale barrier(s) positioned so as to intercept runoff and sediment. The primary purpose of the straw bale barrier is to reduce runoff velocities and filter runoff. A construction note illustrating this method is included as **Appendix 2**;

(vi) Installation of a sediment fence(s) to reduce runoff velocities and cause the deposition of silt. These fences are usually used to intercept sheet flow from disturbed areas. A construction note illustrating this method is included as **Appendix 3**;

(vii) Planting of continuous vegetated buffers to intercept sediment laden sheet flow. The buffers remove the silt from runoff by trapping soil and sediment particles and are most effective where the flow is shallow and spread over a large area; and

(viii) Any other method identified as being acceptable for controlling stormwater runoff from developments as identified in supporting guidelines and documentation including, but not limited to, further resources referenced in Section 4.0 of these Guidelines.

3.2 Stormwater runoff during the construction phase of a development can be managed with the following measures:

(i) Topsoil is retained on site and redistributed to disturbed areas post-construction;

(ii) Soil is prevented from being washed off site and is kept out of any existing or proposed drainage system(s);

(c) Mulching, revegetation or other stabilisation of disturbed sloping areas;

(d) Construction of a level water spreader, which slowly discharges water from the outlet of a drain or pipe onto an undisturbed area stabilised by vegetation cover. The purpose of the spreader is to convert a concentrated potentially erosive outflow from a discharge point into non-erosive sheet flow; and

(e) Provision of stabilised site access.

3.3 Connection to the Shire's stormwater drainage network (where available) will only be permitted where that represents the best drainage solution and the drainage system has been designed to accommodate connection of the development or property to that system. Connection includes the direction of runoff into the Shire's stormwater drainage network, whether through a physical pipe connection discharging into the network, surface flow, table drain, or otherwise.

3.4 The Shire may require the applicant of a development proposal to submit a detailed Stormwater Management Plan or water management methodology for consideration before determining their application, or as a condition of any Planning Approval granted for the development. Where required, such a plan should demonstrate how stormwater runoff from the development will be managed to comply with the aims and objectives of these Guidelines to the satisfaction of the Shire of Bridgetown-Greenbushes.

3.5 The information contained within these Guidelines does not remove or replace the need for professional engineering or hydrological advice in the preparation of stormwater management solutions.

4.0 Further Resources

Further information regarding stormwater management and erosion control measures is available from:

- The Local Government Natural Resource Management (NRM) Policy Manual – Erosion and Sedimentation Control Guidelines for the Swan Coastal Plain (EMRC, 2008 – Updated Version) www.emrc.org.au/files/Section-3---Stormwater-Management---NRM-Policy-Manual.pdf

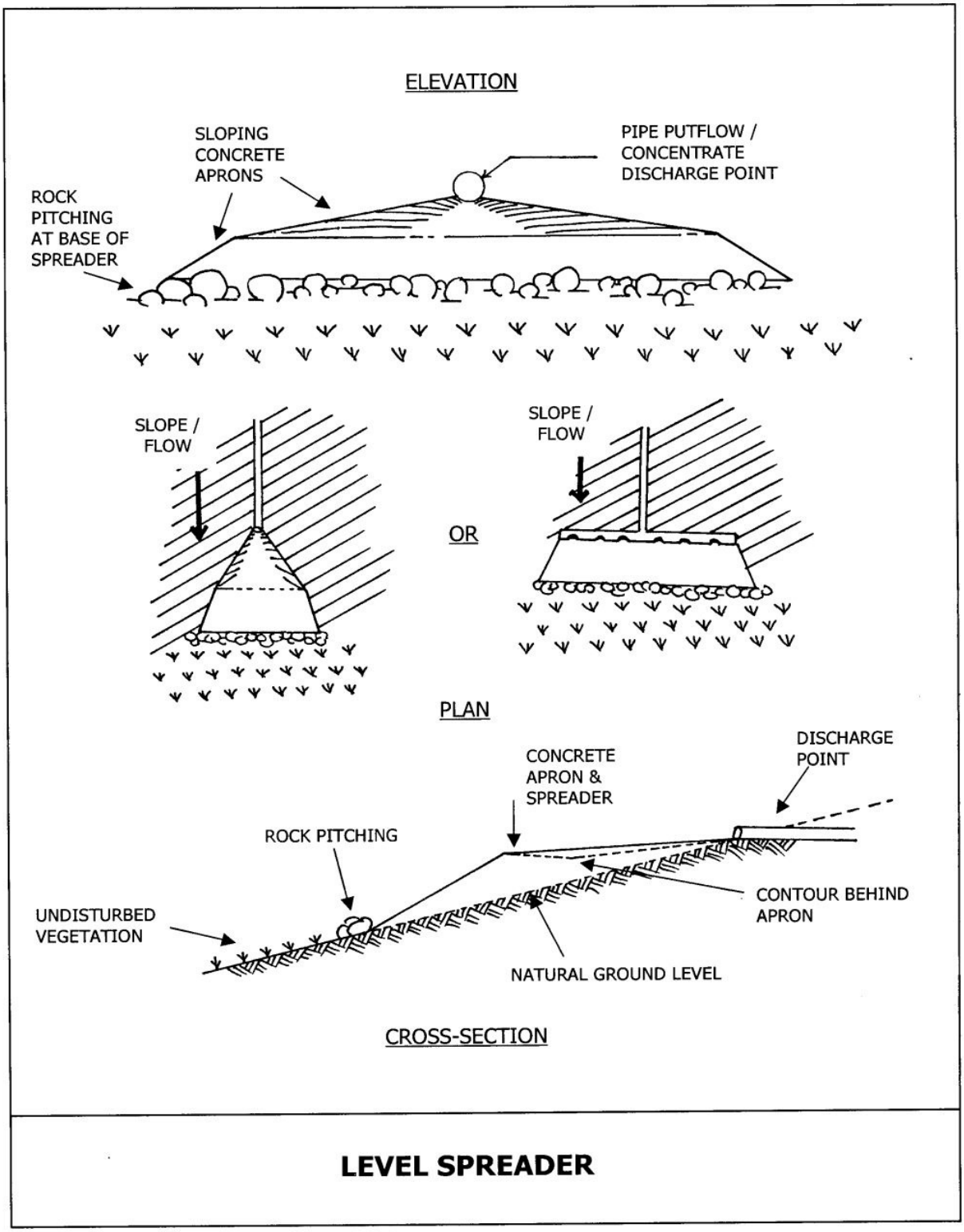
- Better Urban Water Management (WAPC, 2008)

- Stormwater Management Manual for Western Australia: Stormwater Management Plans (DoW, 2007)

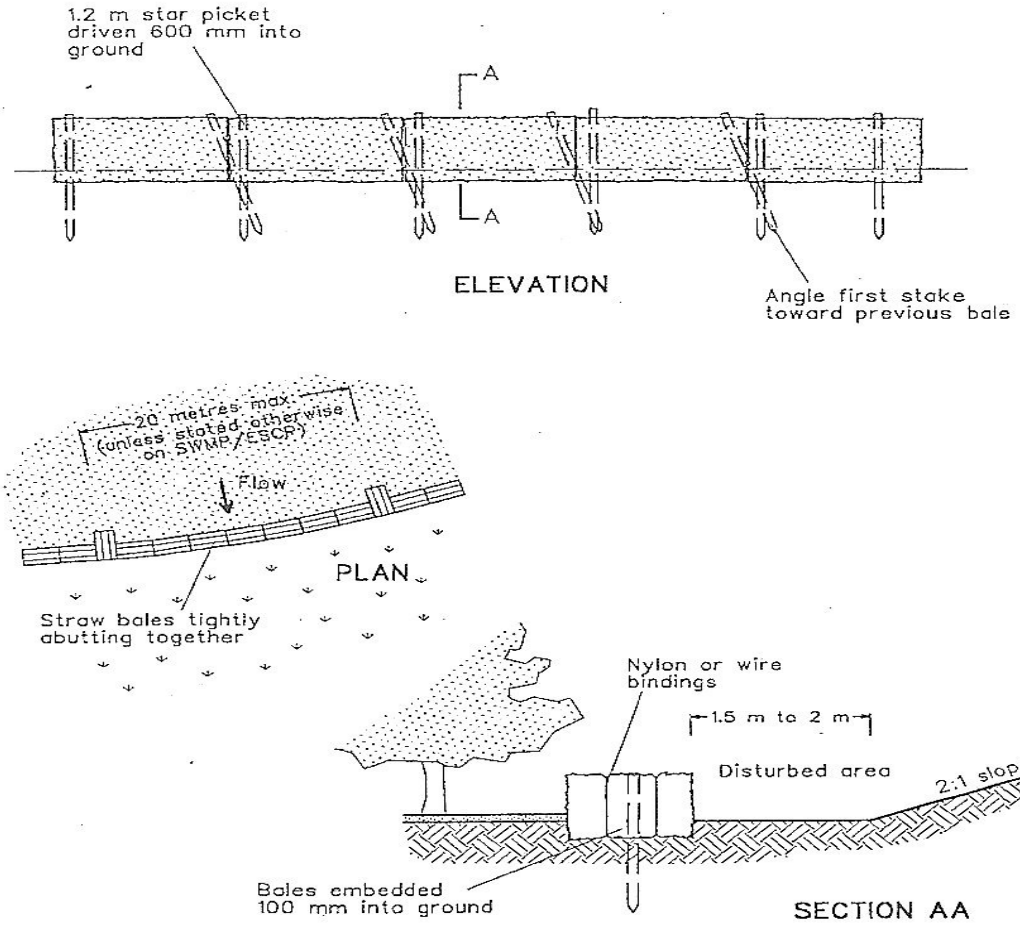
- Decision Process for Stormwater Management in Western Australia (DoW, 2009)

- Stormwater Biofiltration Systems Adoption Guidelines; Planning, Design and Practical Implementation (Facility for Advancing Water Biofiltration (FAWB) 2009)

Appendix 1


ELEVATION
SLOPING CONCRETE APRONS
PIPE PUTFLOW / CONCENTRATE DISCHARGE POINT
ROCK PITCHING AT BASE OF SPREADER
SLOPE / FLOW
OR
SLOPE / FLOW
PLAN
CONCRETE APRON & SPREADER
DISCHARGE POINT
ROCK PITCHING
UNDISTURBED VEGETATION
CONTOUR BEHIND APRON
NATURAL GROUND LEVEL
CROSS-SECTION
LEVEL SPREADER

Appendix 2



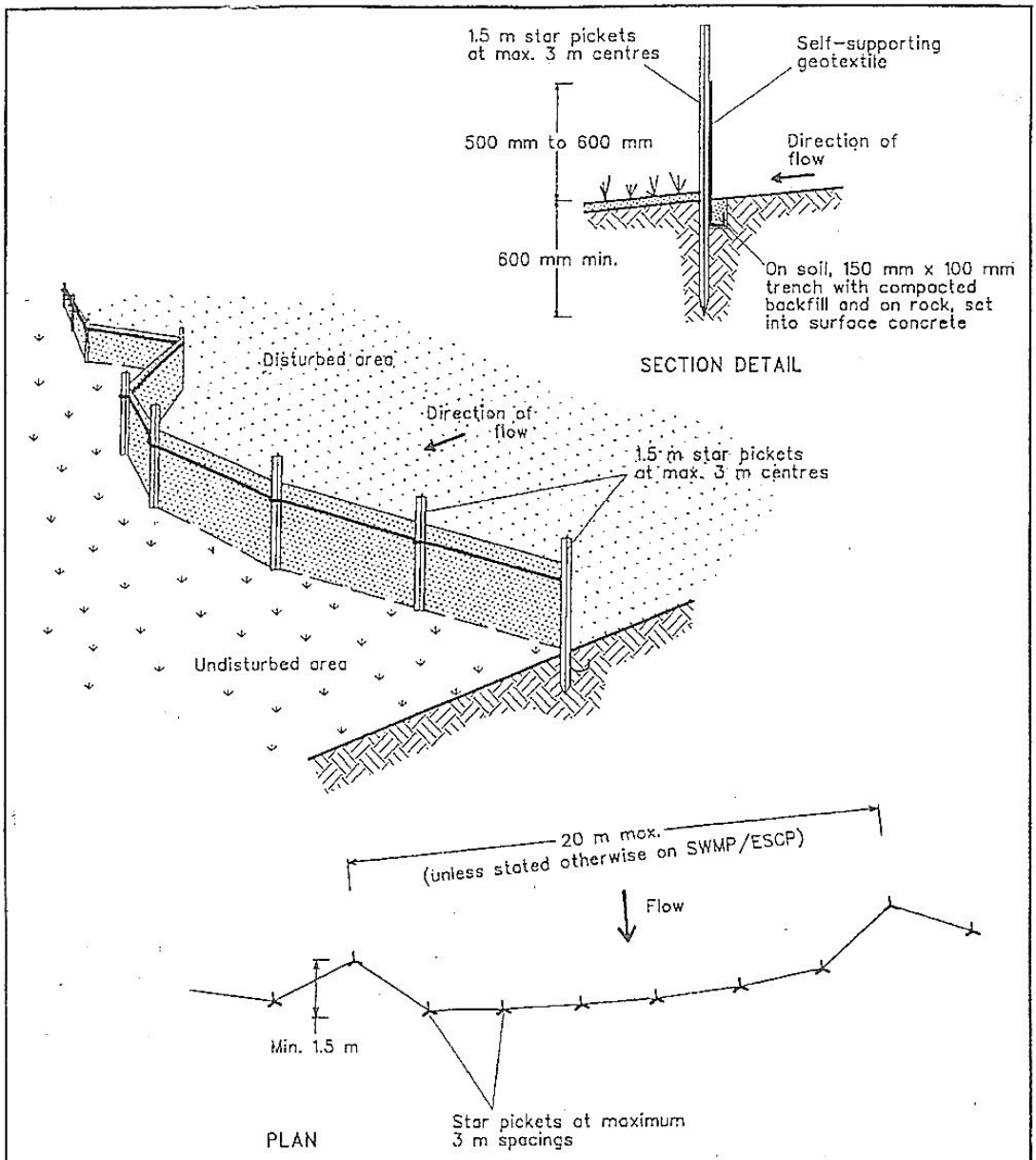
Construction Notes

1. Construct straw bale filter as close as possible to parallel to the contours of the site or at the toe of a slope.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws to be placed parallel to ground.
3. Maximum height of filter is one bale.
4. On soft materials, embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets. Angle the first stake in each bale towards the previously laid bale. Drive stakes 600 mm into the ground and flush with the top of the bales.
5. Where a straw bale filter is constructed downslope from a disturbed batter the bales should be located 1.5 to 2 metres downslope from the toe of the batter.

STRAW BALE FILTER

(Source: Local Government NRM Policy Manual – Erosion and Sedimentation Control Guidelines for the Swan Coastal Plain (EMRC, 2002)).

Appendix 3



Construction Notes

1. Construct sediment fence as close as possible to parallel to the contours of the site.
2. Drive 1.5 metre long star pickets into ground, 3 metres apart.
3. Dig a 150 mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
4. Backfill trench over base of fabric.
5. Fix self-supporting geotextile to upslope side of posts with wire ties or as recommended by geotextile manufacturer.
6. Join sections of fabric at a support post with a 150 mm overlap.

SEDIMENT FENCE

(Source: Local Government NRM Policy Manual – Erosion and Sedimentation Control Guidelines for the Swan Coastal Plain (EMRC, 2002)).