

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 1 of 8

SECTION 4 : PLANTED STORMWATER DEVICES

4.1 GENERAL

This section covers the preparation, installation and maintenance of all new and existing engineered stormwater devices that have a designed landscape component (PSD). This includes, but is not restricted to, stormwater ponds, raingardens, vegetated filters and swales.

4.2 STANDARD LANDSCAPE SPECIFICATIONS

The specifications in this Section are supplementary to and take precedence over the Council Standard Technical Specifications Part 7 - Landscape Works, Sections 1 and 2. In all other instances, the Council Standard Technical Specifications Part 7 - Landscape Works, Sections 1 and 2 are to be followed in the site preparation, establishment and maintenance of all PSDs. These specifications are to be implemented in conjunction with this Manual's Volume 2: Design Guide, Part 9 — Planted Stormwater Devices.

4.3 MULCH

All PSDs shall be mulched except for areas that are grassed or turfed. All mulch is to be approved by the Engineer prior to spreading. Specific PSD mulch applications are as follows:

4.3.1 Amenity Planting

Landscape planting between the drainage reserve boundary to the Upper Bank Zone shall only be mulched with bark or aged woodchip mulch where there is no possibility of surface ponding, flooding or mulch travel. Where surface ponding, flooding and mulch travel is possible within this area, biodegradable weed matting shall be used for all landscape planting.

4.3.2 Stormwater Ponds

No synthetic geotextile weed matting is to be utilized in the installation of the landscaping portion of landscaping engineered stormwater devices. However, synthetic geotextiles and other materials may be used, as applicable, to meet functional engineering requirements; for example, for inlets, outlets and high velocity channels.

4.3.3a Upper Bank and Lower Bank Zone Mulching

All plants shall be mulched with Council approved 0.5 metre diameter biodegradable weed mat rounds that shall be secured around plants, allowing adequate room around the stem for future growth. Firmly secure fabric mulch with wooden or other biodegradable pegs as per the manufacturer's instructions so that the fabric mulch does not detach from the soil, during inundation and high winds.

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 2 of 8

4.3.3b Marginal Zone Mulching

Council approved biodegradable weed mat is to be laid in a manner that the mulch will not uplift during inundation. Ensure that plants have adequate room around the stems for future growth.

4.3.3c Wet Zone Mulching

No mulching is required within the Wet Zone.

4.3.4 Raingardens

Raingardens shall be mulched with Council approved biodegradable weed matting. River rocks (with a diameter of between 50mm and 150mm) in gabion mats (100mm to 300mm deep) may be permissible depending on stormwater engineering requirements and long-term maintenance requirements.

4.3.5 Swales

Roll-on turfed swales are not to be mulched.

Non-turfed swales are to mulched according to the surface treatment and stormwater flow velocities, swale design, site location and long-term maintenance requirements. Mulching shall be installed as per manufacture's instructions.

Vegetated Swales planted with Carex sedges shall be mulched with biodegradable weed mat or secure biodegradable mat rounds.

Swales mulched with river rocks shall either be constructed with:

- Loose 50-150mm diameter river rocks on biodegradable weed mat; or
- River rocks of 50-150mm diameter encased in gabion matting.

4.3.6 Vegetated Filters

Vegetated Filters shall be mulched with biodegradable weed mat. Grassing and roll-on turfing does not require mulching.

4.4 PLANTING

All PSD landscaping shall be designed and installed according to the Council Development Manual, Volume 2: Design Guide, Part 7: Landscaping Engineered Stormwater Devices.

4.4.1 Grassing

All areas of engineered stormwater devices that are to be permanently grassed instead of vegetated with shrubs and/or trees shall be established according to the Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 — Landscape Works, Section 2: Grassing and Turfing specifications. With the exception of Stormwater Ponds and turfed Swales, the grass seed mix shall be as specified in Section 2: Grassing and Turfing.

During establishment and maintenance, ensure that no grass debris enters any water body or watercourse.

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 3 of 8

4.4.2 Stormwater Pond Planting

Permanent stormwater ponds shall be planted up as soon as possible after the completion of civil works construction. Where site conditions such as unstable soil structures require a more rapid groundcover than shrubs and trees provide, pond slopes shall be stabilised with grassing first and a Staged Pond Planting is permitted as detailed in clause 4.4.3.

4.4.3 Staged Pond Planting

The staged pond planting shall be:

Stage 1: Grassing

Pond banks shall be prepared and sown with grass seed to establish rapid ground stabilization, according to the Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 — Landscape Works, Section 2: Grassing and Turfing specifications.

Where ponds are to be established in nitrogen-deficient soils and at the Engineers discretion, the seed mixture shall be:

Annual Rye Grass	150 kg/ha
Sweet Clover	100 kg/ha

All seed shall be certified and less than 12 months old at the time of sowing. The Ryegrass component is to be certified as having greater than 80% live endophyte content. The Engineer may prohibit the use of seed that has deteriorated because of wetting, fertiliser-burning, etc.

Otherwise the standard landscaping grass seed specifications shall apply as per Volume 3, Part 7 — landscape Works, Section 2, Clause 4.0..

The site shall be grassed for at least 3 months and meet establishment requirements for sown areas prior to landscaping. Marginal Zone planting and mulching shall be established at Stage 1.

Stage 2: Landscape Planting

Stage 2 Planting shall occur within the Council planting season (2 April to 30 September) once Stage 1 sown grass has established. Ensure that no weed species exist throughout the site. Where weed species need to be eradicated either carefully spot spray and/or hand-pull in such a manner that erosion is minimised and surrounding groundcover remains undamaged. The sown grass groundcover shall be spot sprayed to 0.50m diameter for each location where individual plants are to be planted 4 weeks prior to planting, ensuring that the established grass between spot sprays remains undamaged. Maintain sprayed areas so that no new weed growth exists at time of planting. Install and establish planting and mulching as per the Volume 3: Part 7 Standard Technical Specifications — Landscape Works, Sections 1, 2, 3 and 4.

Raingardens and Vegetated Filters

Raingardens and Vegetated Filters are to be planted up according to Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 — Landscape Works, Sections 1 and 2.

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 4 of 8

4.4.4 Swales

Turfed swales shall be prepared, established and maintained as per the Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 — Landscape Works, Section 2: Grassing and Turfing. Both during and post-establishment, the height of the turf shall be consistently maintained at least fortnightly to designed stormwater engineering requirements. Turf shall be of a drought-resistant hard-wearing rye-grass based variety with no weeds species.

Swales planted with Carex species shall be planted according to Volume 3: Part 7 Standard Technical Specifications — Landscape Works, Sections 1.

4.4.5 Spraying and Weed Control

Ensure that no spray enters any water body or watercourse. In respect to Stormwater Ponds, where weed species exist both on and within 2.5m adjacent to the normal standard waterline, weeds shall be controlled by either hand-pulling or weed-eating in such a manner that no debris enters any water body or watercourse.

4.4.6 Tree Staking and Protection

Trees shall be tied to two stakes on opposite sides to the tree using biodegradable flexible ties made from either cloth or flax. The ties are to be positioned 1/3rd up the tree's main stem and with enough give to move in the wind to ensure adequate trunk development.

4.5 DEFECTS LIABILITY

4.5.1 Defects Liability Period Inspection

The Contractor, after completing all proposed works, shall advise the Operations Engineer (Programmes), Water & Waste Services, Hamilton City Council, at least 7 working days prior to the proposed commencement of the defects liability period and shall be available for a joint pre-defects liability period inspection.

4.5.2 Defects Maintenance Requirements

The Contractor (or Developer) shall be responsible for the routine maintenance of the landscape planting works including weeding, mulching, replacement of plants and watering during the defects liability period.

The minimum standards required during the Defects Liability Period shall be as per Table 1 — Defects Period PSD Maintenance Schedule.

The Contractor at the end of the required defects liability period shall advise the Operations Engineer (Programmes), Water & Waste Services, Hamilton City Council, at least 7 working days prior to the proposed commencement of Council acceptance of the asset and its ongoing maintenance.

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 5 of 8

4.5.3 Defects Liability Periods

The following Defects Liability Periods apply to PSDs after obtaining the Engineers Approval as per Clause 4.5.1 of this Part.

4.5.3a Stormwater Ponds (& Wetlands)

Permanent Grassing Without Planting

Where Stormwater Ponds are to be permanently grassed, the Defects Liability Period for the grassing is a minimum of 6 months if sown between April 2 and September 30. If sown between October 1 and April 1 the period is extended for a further 6 months.

Staged Planting

Where a Stormwater Pond planting is implemented according to the Staged Pond Planting (refer to Clause 4.4.3 of this Part):

- **Stage 1: Temporary Grassing**
The Stage 1 Grassing Defects Liability Period will extend for a minimum of 6 months or until such time as Stage 2 Planting is investigated.
- **Stage 2: landscape Planting**
The Stormwater Pond Stage 2 Defects Liability Period shall be a minimum of 12 months except when planting is carried out between October 1 and April 1 the Defects Liability Period shall be extended for an additional 6 months.

Full Initial Planting

Where a Stormwater Pond is planted directly after completion of civil works construction, the planting Defects Liability Period shall be a minimum 12 month period, except when planting is carried out between October 1 and April 1 the Defects Liability shall be extended for an additional 12 months.

4.5.3b Raingardens & Vegetated Filters

Raingardens and Vegetated Filters shall have a minimum 12 month Defects Liability Period, except when planting is carried out between October 1 and April 1 the Defects Liability shall be extended for an additional 6 months.

4.5.3c Swales

The Defects Liability Period for grassed and planted swales shall be a minimum of 6 months except when the planting is carried out between October 1 and April 1 the Defects Liability Period shall be extended for an additional 6 months.

4.5.3 Final Defects Inspection Criteria

To achieve final Defects Liability approval, the PSD shall meet the following criteria, based on Volume 2, Part 9, Clause 9.4.4 — Planting Definitions and Table 2 — Approved PSD Species Plant Types. Percentages indicated are based on the total quantity of plants specified on the approved PSD Planting Plan Plant Schedule. Note: Any Defects Liability Period extensions shall apply to the whole PSD site.

Hamilton City Development Manual		
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works	
Authorised by : Parks & Gardens Manager	Section 4	Page 6 of 8

Planting Establishment

Wet Zone

- 75% planting established, 25% establishing.

Marginal Zone

- 100% plants established.

Lower Bank Zone

- Groundcovers 75% established, 25% establishing.
- Shrubs 50% established, 50% establishing.
- All trees establishing.

Upper Bank Zone

- Groundcovers 75% established, 25% establishing.
- Shrubs 50% established, 50% establishing.
- All trees establishing.

Plant Canopy

- Lower & Upper Bank Zone groundcover canopy is providing 50% minimum cover over ground surface.

Planting Density

- Installed plantings are at the approved consent planting plan centres.

PSD Maintenance

**Loose Mulch
(For example, bark)**

- 75mm minimum depth between plants and 25mm maximum depth around plant stems.
- No loose mulch is below the bottom edge of the Upper Bank Zone.

Permanent Grass

- Permanent grass has established and is maintained according to Development Manual, Volume 3, Part 7, Section 2

Planted Areas Soil

- All planted areas shall be moist to at least 200mm.

Replacements

- All replacement plants that have been installed due to plant failure have been successfully establishing onsite for at least 3 months. The Engineer may request replacement records to verify installation dates; *and*,
- No more than 25% replacements have been installed 3 months prior to the final defects inspection.
 - More than 25% replacements shall incur a 12 month minimum defects extension.
- Should the final defects inspection find that areas of the PSD require replacement planting:
 - Less than 25% replacements shall incur an additional 3 months defects period after replacement planting has been completed to the Engineers approval, if the replacement planting occurs between 1 April and 1 October, otherwise the extended defects shall be 6 months minimum.
 - More than 25% replacements shall incur an additional 12 months defects period after replacement planting has been completed to the Engineers approval.

Rubbish

- No rubbish, including domestic & building material is evident within the Drainage Reserve PSD, or where the PSD is located elsewhere, in and within 5m of the PSD.

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 7 of 8

- Spraying**
- There is no evidence of installed plants killed or severely damaged by weed spraying.
- Stormwater Inlets & Outlets**
- No plants are evident within 1m of the inlet and outlet pipes.
- Trees**
- Where trees were installed with stakes, the trees are staked and tied as per the Development Manual.
 - Trees are upright, healthy, free of disease & pests, without spray or weed-trimmer damage, and of good conformation.
 - No self-seeded trees are growing within the Wet or Marginal Zones.
- Weed Cover**
- The PSD has no noxious or Environment Waikato notifiable plants evident.
 - There is no more than one 300mm maximum height weed per 1m² within the PSD.
 - All plants are fully weed released.
 - There is no evidence of vegetative waste within the Drainage Reserve PSD, or where the PSD is located elsewhere, in and within 10m of the PSD.
- Weed Matting**
- Within 24 months of planting installation, biodegradable matting remains intact, has no non-plant stem holes or rips, and has not become brittle enough for a hole to be created if stood on by an adult wearing safety boots.
 - Where matting rounds have been used:
 - These are intact;
 - Are properly pegged to the ground around plants as per manufacturer's instructions; and,
 - Have no weeds uplifting them from underneath the round.

Hamilton City Development Manual	
Volume 3 : Standard Technical Specifications	Part 7 — Landscape Works
Authorised by : Parks & Gardens Manager	Section 4 Page 8 of 8

Table 1. Defects Period PSD Maintenance Schedule

MAINTENANCE TYPE	SUB TYPE	REGIME	FREQUENCY (Months)
Mulching	Bark	<ul style="list-style-type: none"> • Check and ensure that mulch has not deteriorated nor travelled below the Upper Bank Zone. • Replace where quality and depth has diminished below specification requirements. Bark should only be topped up during winter or spring. 	12
	Biodegradable Matting	<ul style="list-style-type: none"> • Check, repair or replace any matting that has rips and non-plant stem holes. Matting should remain intact for minimum 24 months post-planting installation. 	6
	Biodegradable Rounds	<ul style="list-style-type: none"> • Check and ensure rounds are intact and remain properly pegged around plant stems for minimum 24 months post-planting installation. Remove any weeds that have uplifted rounds. 	3
Permanent Grass		<ul style="list-style-type: none"> • Check and ensure that permanent grass is establishing and maintained to a minimum 100mm height and maximum 200mm height in accordance with the Development Manual Volume 3, Part 7, Section 2 Specifications. 	3
Planting	Establishment	<ul style="list-style-type: none"> • Check and ensure all installed plants are healthy & free of pests, disease, spray & weed-trimmer damage, and are growing generally consistent with the species type shape & form. • Where plants are not establishing, either remediate or replace plants. 	3
	Installed Trees	<ul style="list-style-type: none"> • Check and ensure that trees remain staked as per specifications. • Check and ensure that all trees are growing upright. 	3
	Self-seeded Trees	<ul style="list-style-type: none"> • Remove all self-seeded trees from the Wet Zone and Marginal Zone without damaging embankment toe and installed plants. 	3
	Replacements	<ul style="list-style-type: none"> • Keep a record of all replacement plants installed, including the plant species botanical name, plant grade, quantity and date(s) planted. • Replacement installations should only occur between 1 April to 1 October each year in the Marginal, Lower Bank and Upper Bank Zones. Planting in the Wet Zone may occur in any season as long as the soil is moist to a depth of 300mm at the location of planting. 	As Required

Hamilton City Development Manual

Volume 3 : Standard Technical Specifications

Part 7 — Landscape Works

Authorised by : Parks & Gardens Manager

Section 4

Page 9 of 8

Rubbish		<ul style="list-style-type: none"> Check and remove any domestic rubbish or building material within the PSD site. 	3
Soil Moisture		<ul style="list-style-type: none"> Check and ensure that all areas with installed planting have soil that is moist to a 200mm depth. Irrigation may be required during summer if planting installation was late spring-early summer. 	3
Stormwater Inlets & Outlets	Plant Cover	<ul style="list-style-type: none"> Ensure that no plants are evident with 1m of the stormwater inlet and outlet pipes. 	3
Swale Maintenance	Channel	<ul style="list-style-type: none"> Check and remove weeds, dead plants, debris dams and pest damage. Remediate any channel surface scouring that has occurred. Ensure that Wet Zone plants are no higher than 0.5m high. Remove any non-installed plants from the swale channel. 	6
Vegetative Waste		<ul style="list-style-type: none"> Ensure that all vegetative waste is safely removed and disposed of offsite. Check and remove any vegetative debris that is blocking the PSD access track. 	3
Weeds	Noxious Plants	<ul style="list-style-type: none"> Check, remove and dispose of safely all noxious plants, including root systems from the PSD. 	3
	Notifiable Plants	<ul style="list-style-type: none"> Notify Environment Waikato should any notifiable weeds be identified within the PSD. 	3
	Weed Cover	<ul style="list-style-type: none"> Check and ensure that there is no more than one 300mm high weed per 1m² throughout the PSD. 	3
	Weed Control	<ul style="list-style-type: none"> Check and ensure that all plants are fully weed-released. Weeds may be controlled by weed-trimming, chemical or steam spraying, hand or other manual releasing unless otherwise specified. 	3
	Chemical Spraying	<ul style="list-style-type: none"> Ensure that no chemical spraying occurs in the Wet Zone and Marginal Zone. All weeds growing in these Zones must be removed by other means. 	As Required