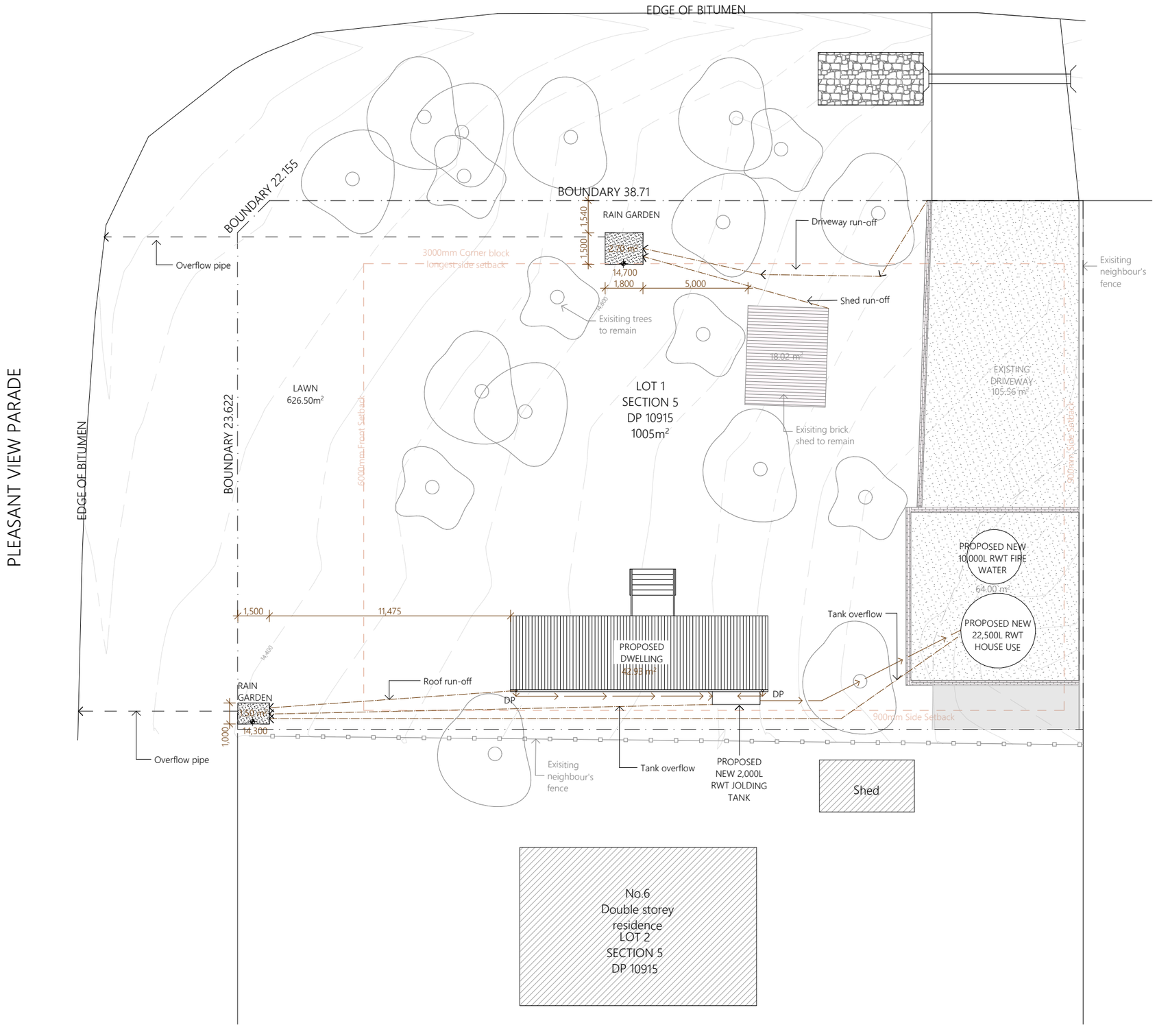
CENTRAL AVENUE

PLEASANT VIEW PARADE



1 Water Sensitive Design - Plan
1:200

SITE AREA 1005 m²

IMPERMEABLE GROUND LEVEL SURFACES: 230.51m²

TOTAL ROOF AREA: 42.93m²

SITE COVERAGE : 22.94%

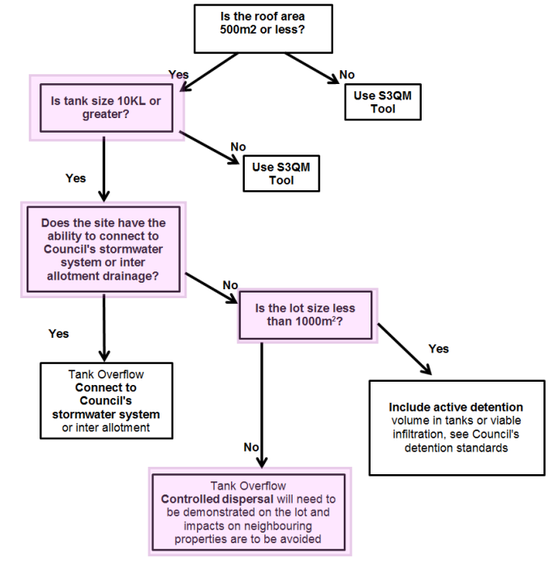
11.4.1.2 Un-serviced Sites (not connected to reticulated water)

Calculating Water Sensitive Design Measures
There are two options for calculating the treatments required to meet the Stormwater Quality Targets for building a house or dual occupancy on an un-serviced site;

1. The Deemed to Comply Solution (un-serviced sites); or
2. The Small Scale Stormwater Quality Model (S3QM).

1. Deemed to Comply Solution (un-serviced sites)
The Deemed to Comply Solution (un-serviced sites) seen in the flowchart below is a simplified alternative that outlines the minimum size of the rainwater tank needed and provides guidance on where to direct tank overflow. To satisfy water sensitive design using this method the proposed development must meet the following criteria:

1. Where a Stormwater Strategy or Drainage Plan has stipulated a Water Quality Target of 'Neutral or Beneficial Effect' this flowchart cannot be used.
2. 100% of the roof area including any proposed outbuildings will be directed to the rainwater tank;
3. water from the rainwater tank will be used to service the household; and
4. all other hard surfaces including (but not limited to) driveway, pathways and courtyards will be directed to adjoining landscaped areas within the property.



2 Deemed to Comply Summary Table

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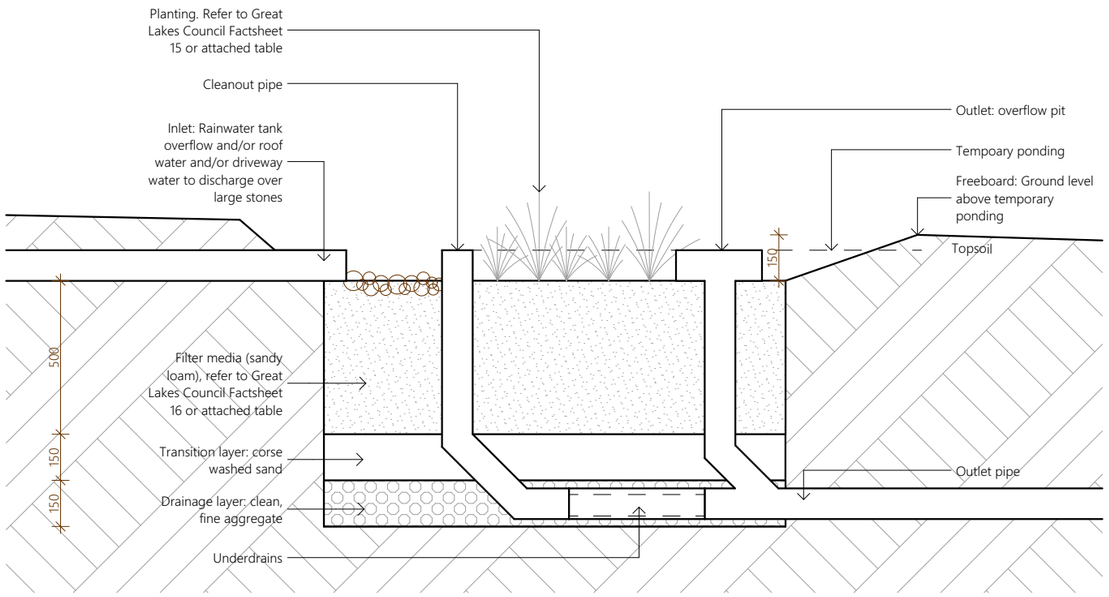
WATER SENSITIVE DESIGN 1/2



1 Typical Raingarden Clay Soils Detail
1:20

MAKING YOUR OWN FILTER MEDIA (ONLY APPLICABLE TO SMALL SCALE DEVELOPMENT)

When making up your own filter media, it is best to start with a material that is already free draining and add in the materials that will make it suitable for plants to grow in. We suggest that you use a washed and well-graded sand with a good mix of particle sizes like the table shown above. The type of sand that is used for building turf profiles such as golf greens is usually the most appropriate, but it needs to be checked to make sure it doesn't contain high levels of salt or high levels of clay or silt.

Large amounts can usually be bought directly from sand suppliers, though garden and landscaping centres may have suitable amounts.

To make the filter material, use the following method:

Initial Layer	After adding in the drainage pipes, drainage gravel and transition layer, for a 500mm deep filter add 400mm of washed, well graded sand	
Compaction	Compact this layer lightly with either a single pass of a vibrating plate or a drum lawn roller	
Secondary Layer	Add in more washed, well graded sand until the filter media is level with the bottom of the temporary ponding area	
Additional Nutrients to Secondary Layer (Note: these numbers are based on a 1m^2 water quality garden. For larger gardens multiply these numbers by common factor eg. a 5m^2 garden requires 5 times each nutrient)	500g	Granulated poultry manure fines
	20g	Superphosphate
	30g	Magnesium sulfate
	20g	Potassium sulfate
	10g	Trace element mix
	40g	Fertiliser (with an N:P:K ration of 16:4:14 or thereabouts)
	200g	Lime
Mixing	Mix in well in the top layer only. Another light pass of a drum roller may be beneficial but not necessary	
Final	You are ready for planting!	

This level of nutrients and trace elements is designed to last around 4 weeks, as after this the nutrients from the stormwater runoff should contain enough nutrients to sustain the plants.

Ideally, the system would now be tested to make sure it is free draining as per the ASTM F1815-06 method so that the hydraulic conductivity is between 100-300 mm/hr. Where this cannot be done, simply hosing the area for a short period and then checking that the water drains away gives an indication that all is functioning, but this isn't a guarantee that it will stay that way as some compaction and migration of fine material might still occur.

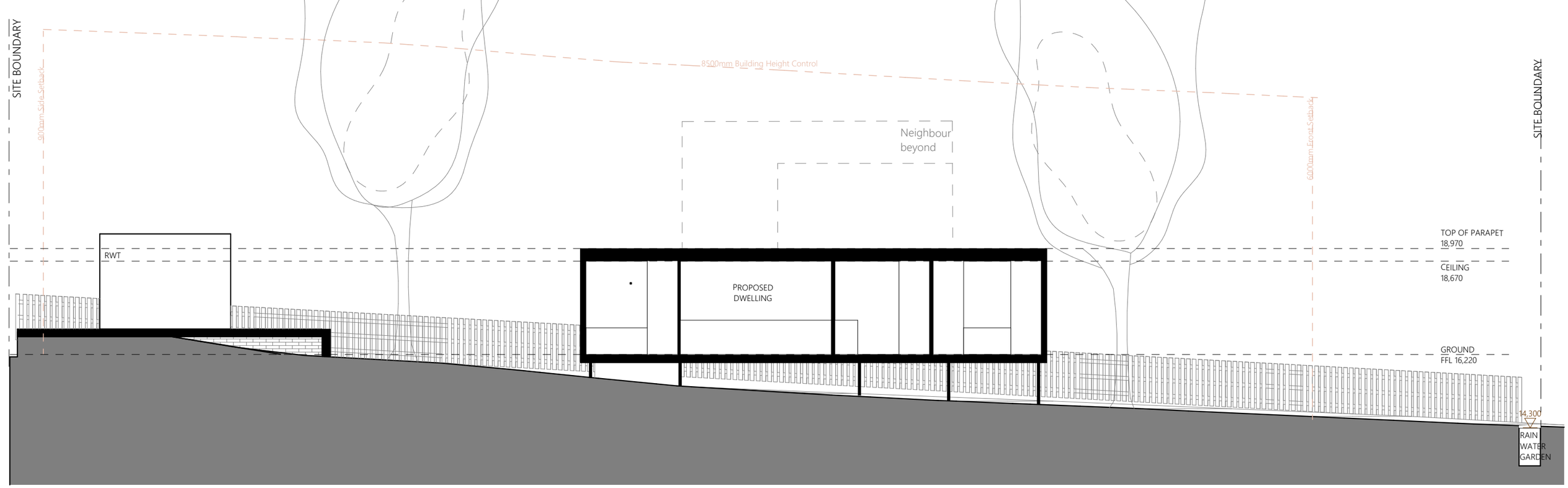
2 Filter Media Table
1:2

Localised species list for raingarden planting and planting densities:

Species Name	Common Name	Planting density /m^2
Shrubs / trees		
Melaleuca ericifolia	Swamp paperbark	1
Melaleuca linariifolia	Flax-leaf paperbark	1
Melaleuca nodosa	Prickly-leafed paperbark	2
Melaleuca quinquenervia	Broad-leafed paperbark	1
Melaleuca sieberi	Small-leaved paperbark	1
Sedges / rushes		
Carex appressa	Tall Sedge	10
Carex fascicularis	Tassel Sedge	10
Carex polyantha	Creek Sedge	10
Cyperus exaltatus	Tall flat sedge	6
Ficinia nodosa (formerly *Isolepis nodosa*)	Knobby club rush	6
Juncus kraussii (suitable for salty conditions)	Sea rush	8
Dianella longifolia var. longfolia (shade tolerant)	Pale flax-lily	6
Lomandra longifolia	Matt Rush	6
Lomandra hystrix	Creek matt rush	6

Where shrubs or trees are selected for the raingarden an understorey of sedges / rushes should also be planted at the density specified.

3 Planting table
1:2



4 Water Sensitive Design - Section
1:100

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WATER SENSITIVE DESIGN 2/2