

## Urban Forest Technical Manual

### Appendix 2a – Tree Pit Soil Specification

(Acknowledge of Newcastle City Council for developing and supplying the original)

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#### Part A. 'Fit-for-purpose' performance description

A high permeability medium for use as the growing medium and light pavement support in urban tree pit installations. The permeability, aeration and compaction resistance are the important physical factors to consider in this mix however the nutrition is equally important to sustain plant life.

The mix is installed in two or three layers; 100mm of medium coarse sand on top of one or two layers of Amsterdam tree soil as per Figures 1 and 2. The Amsterdam Tree Soil A horizon is comprised of predominantly medium coarse sand with 2-5% clay and 4-5% organic matter (A Mix). The B horizon is comprised of predominantly coarse sand with 2 – 4% clay and <3% organic matter (B Mix).

#### Part B. Product specification (technical parameters)

Generally, the soil must be free of 'unwanted material' and must meet all the Target ranges of Tables 1.0 and 2.0. Where engineers have otherwise specified permeability that specification will over-ride permeability from Table 1.0.

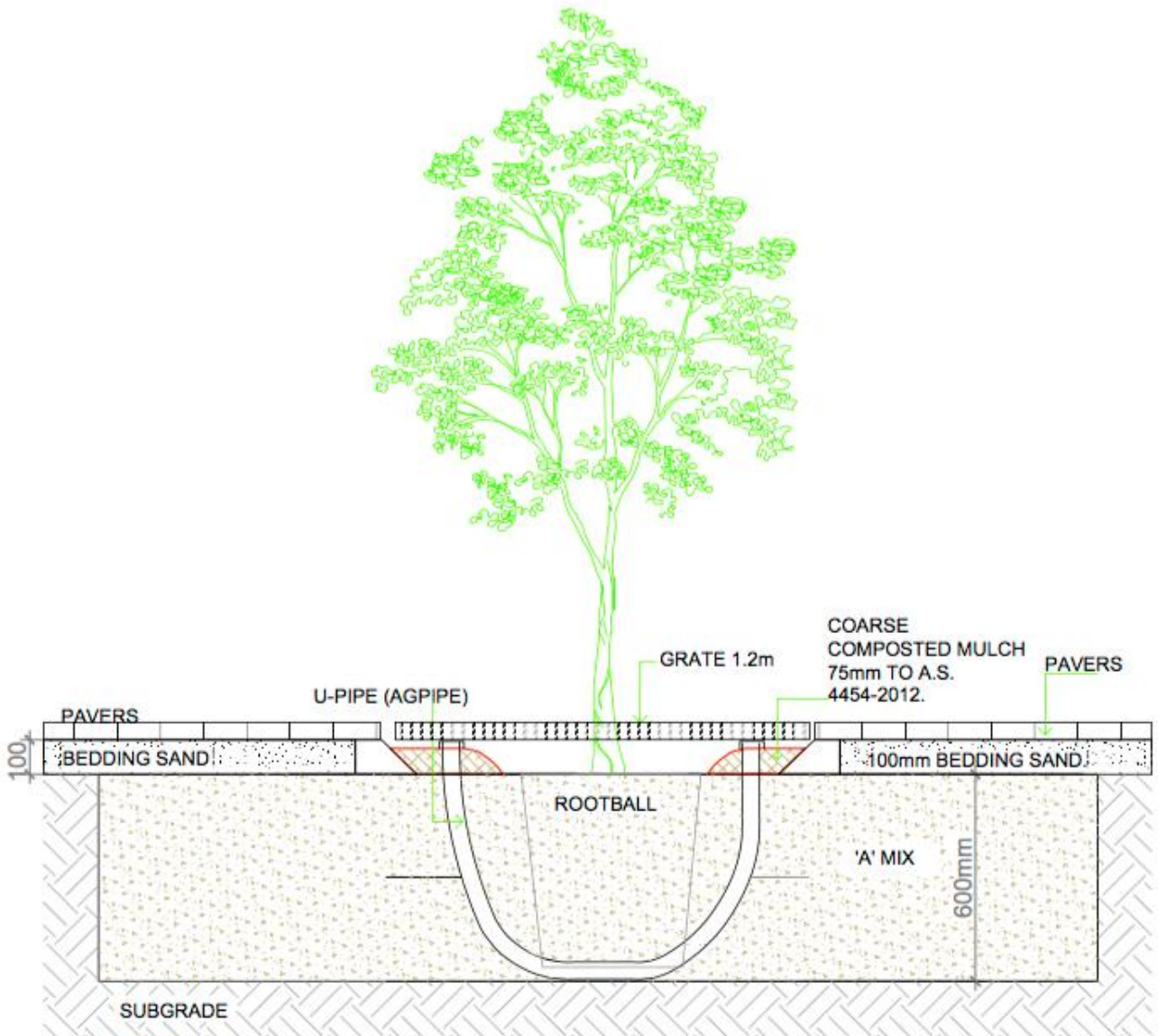


Figure 1: Two-layered Amsterdam Tree Soil Profile. Refer to Council's standard drawings for design details.

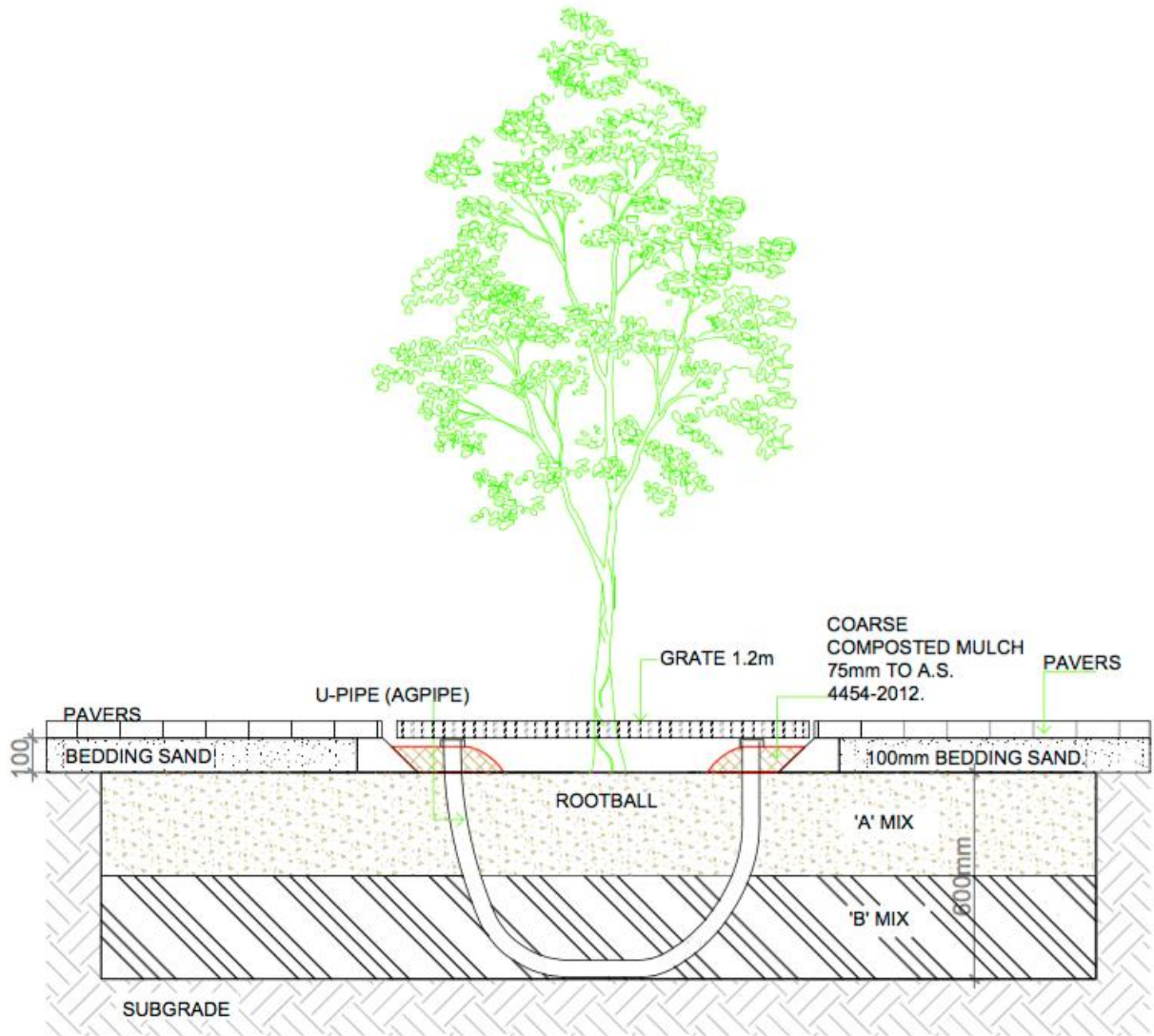


Figure 2. Three-layered Amsterdam Tree Soil typical profile. Refer to Council's Standard Drawings for design detail.

Table 1 Physical properties – A & B horizons

Property	Units	Target range (A mix)	Target range (B mix)
Texture, preferred range	n/a	Sandy Loam	Loamy sand
Permeability (USGA)	mm/hr	25 - 50	40 - 80
Wettability	mm/hr	>5	>5
<b><i>Large particles (naturally occurring)</i></b>			
2–20 mm	% w/w	< 20	< 20
> 20 mm	% w/w	< 10	< 10
Visible contaminants > 2 mm (glass, plastic and metal)	%w/w	< 0.5	< 0.5
D60/D10 of the sand	-	>2.5	>2.5
pH (1:5 in water)	pH units	5.5–7.5	5.5–7.5
Electrical conductivity (1:5)	dS/m	< 1.2	< 1.2
Phosphorus P-Tolerant Plants	mg/kg	30 – 80	N/A
Phosphorus P-Sensitive Plants	mg/kg	< 30	N/A
Available nitrogen	mg/kg	> 25	N/A
Organic matter	% w/w	3-5%	<3%

***Target particle size distribution***

2.0–3.35 mm fine gravel	% w/w	< 7%	< 7%
1.0mm very coarse sand	% w/w	5-20%	5 – 20%
0.50mm coarse sand	% w/w	< 60%	<70%
0.25mm medium sand	% w/w		
0.15mm fine sand	% w/w	< 40%	<35%
0.106mm very fine sand	% w/w		

Property	Units	Target range (A mix)	Target range (B mix)
0.053mm very fine sand	% w/w		
0.02mm silt	% w/w	< 10%	<5%
0.002mm clay	% w/w		

Note that the particle size ranges are suggested, and the compacted hydraulic conductivity is a more important parameter for suppliers to meet. Predicting hydraulic conductivity based on particle size is difficult and variable.

The bedding sand will be a well-graded material that meets the following particle size requirements.

Table 2 Physical properties Bedding Sand

Sieve size (mm)	Unit	% Passing
9.52	% w/w	100
4.75	% w/w	90 – 100
2.36	% w/w	80 – 100
1.18	% w/w	50 – 85
0.600	% w/w	25 – 60
0.300	% w/w	10 – 30
0.150	% w/w	5 – 15
0.075	% w/w	0 - 10

### Part C. Example components for the soil supplier

The following table outlines suggested components that may likely meet the physical Target ranges of this specification. This is **not** part of the product specification. It is an example for the edification of the soil supplier of what might meet the product specification. The arrangement of soil elements is shown in Figure 10.1.

**Example suggested components for the A and B horizons**

Component	A mix	B mix
Loamy sand or sandy loam soil	20% v/v	10 – 20% v/v
Medium coarse sand (0.2-0.5mm)	70–80% v/v	70 – 85% v/v
Composted soil conditioner conforming with AS4454	20 - 30% v/v	10% v/v

**Example base level Target ranges for fertilisers for the A mix layer (to be verified by laboratory testing and per agronomist's report)**

Organic fertiliser (e.g. poultry manure)	5 kg/m <sup>3</sup> or 500 g/m <sup>2</sup>
Compound controlled release fertiliser NPK (16:4:14)	4 kg/m <sup>3</sup>
Trace element mix	0.1 kg/m <sup>3</sup> or 10 g/m <sup>2</sup>

For the purposes of tendering, the contractor must allow for the inclusion of the above soil amendments, but the specific amendments required must be verified by laboratory testing and agronomist recommendations.