green-tech SPECIFIER

Urban Tree Design for a Sustainable Climate

An introduction to urban tree pits and stormwater management

Alasdair Innes

www.gtspecifier.co.uk

green-tech SPECIFIER

Urban Tree Design for a Sustainable Climate

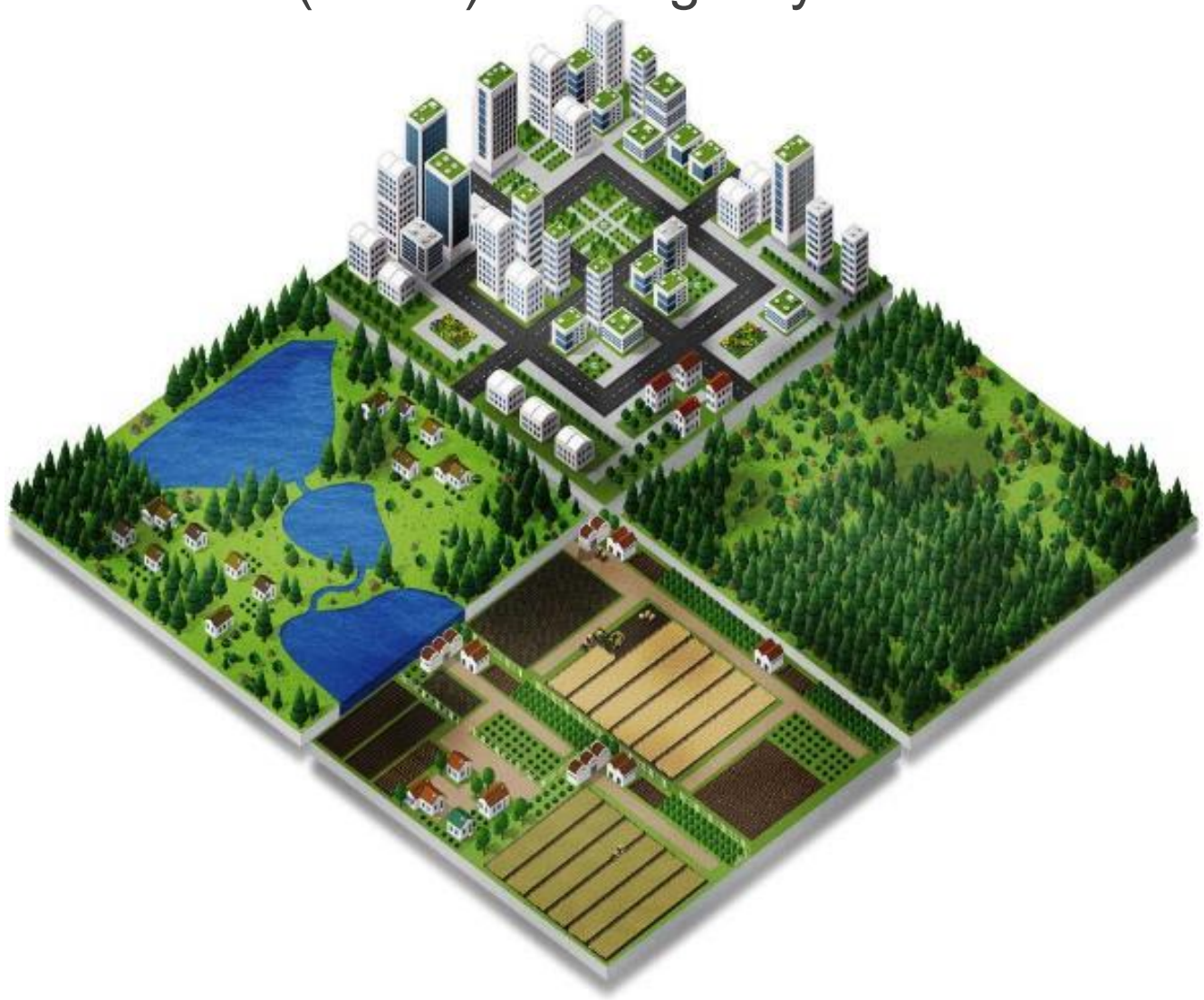
An introduction to urban tree pits and stormwater management

Alasdair Innes

www.gtspecifier.co.uk

What are SuDS?

Sustainable (urban) Drainage System



The Four Pillars of SuDS

Water Quantity

Managing how much runoff

Water Quality

Improving the cleanliness

Amenity

Creating spaces for people to use

Biodiversity

Supporting plants and wildlife

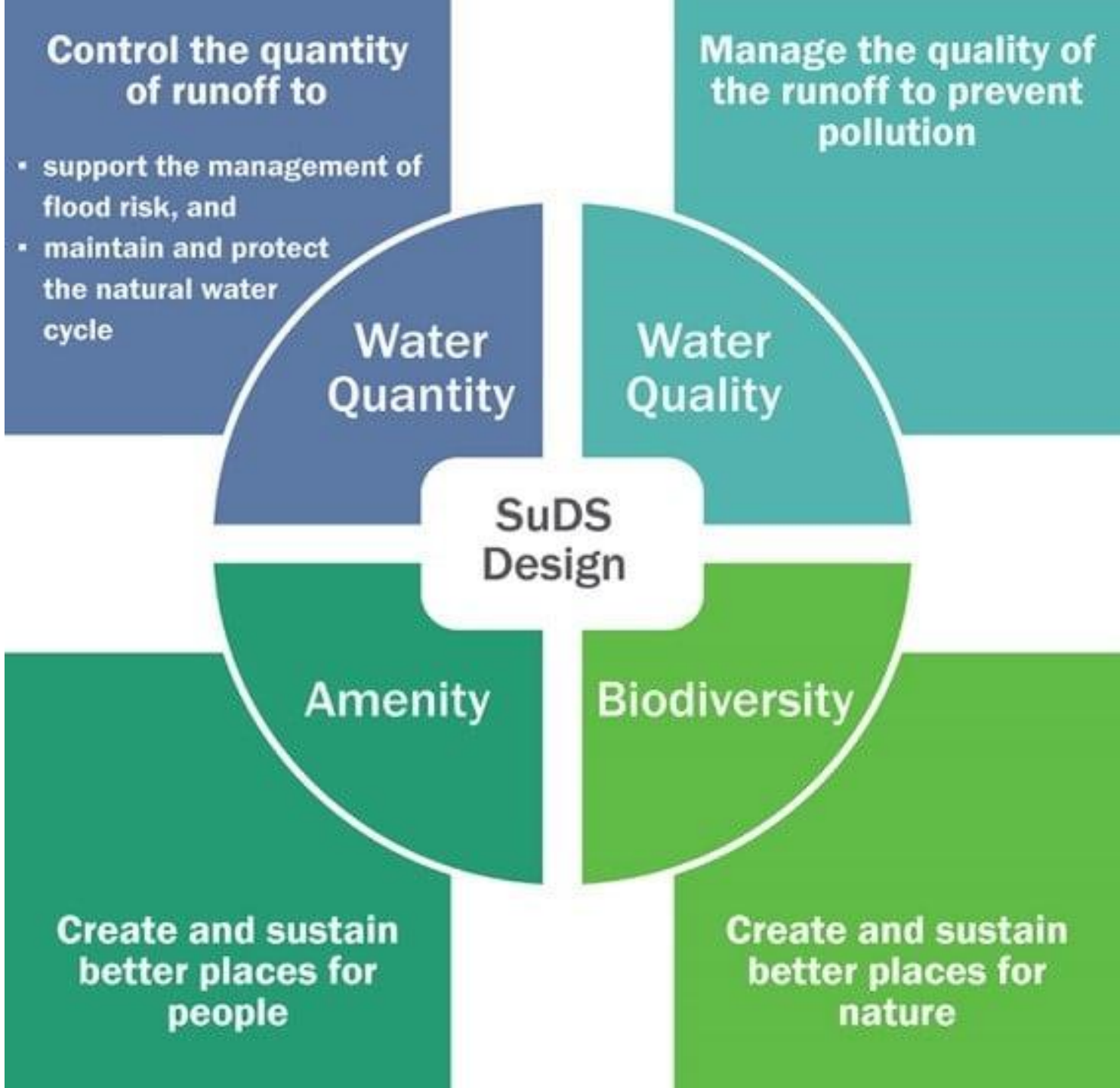


Image: Veolia

Urban Effect on Source Runoff

URBAN

Run-off 95%

To Ground 5%

SUBURBAN

Run-off 70%

To Ground 30%

OPEN COUNTRY

Run-off 5%

To Ground 95%

Storm Water Attenuation

Image: Groundwork.org

Green Roofs


No Green Roof
Queen Caroline Estate
Green Roof
same rain event
Image: @RichbCam - Susdrain

Rain Gardens


2022


2023
Images: Martha Redman

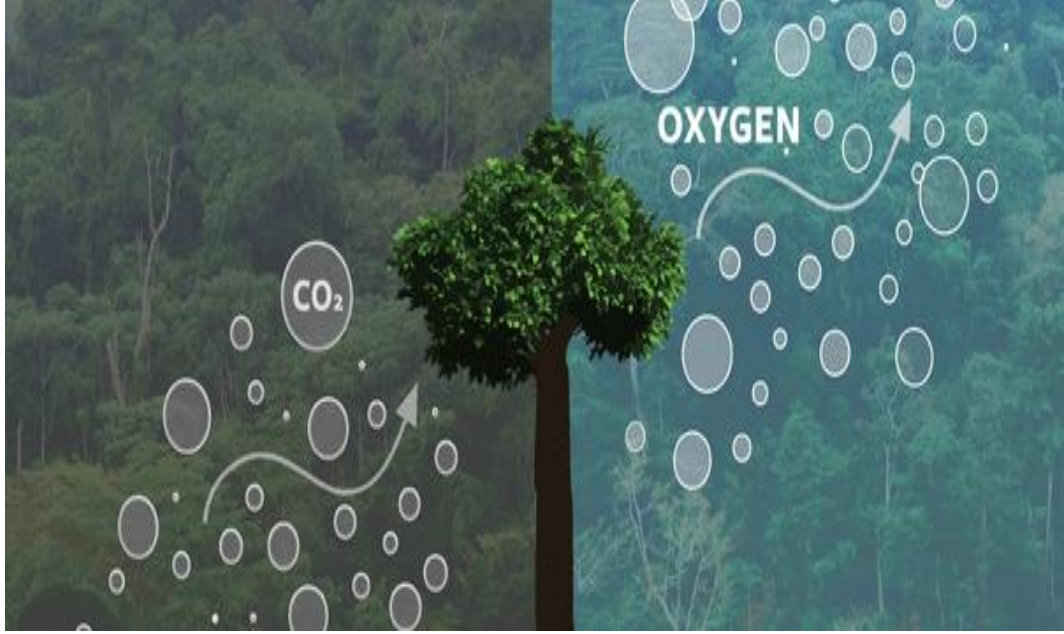
green-tech SPECIFIER

Urban Tree Pits

Featuring TreeParker®

www.gtspecifier.co.uk

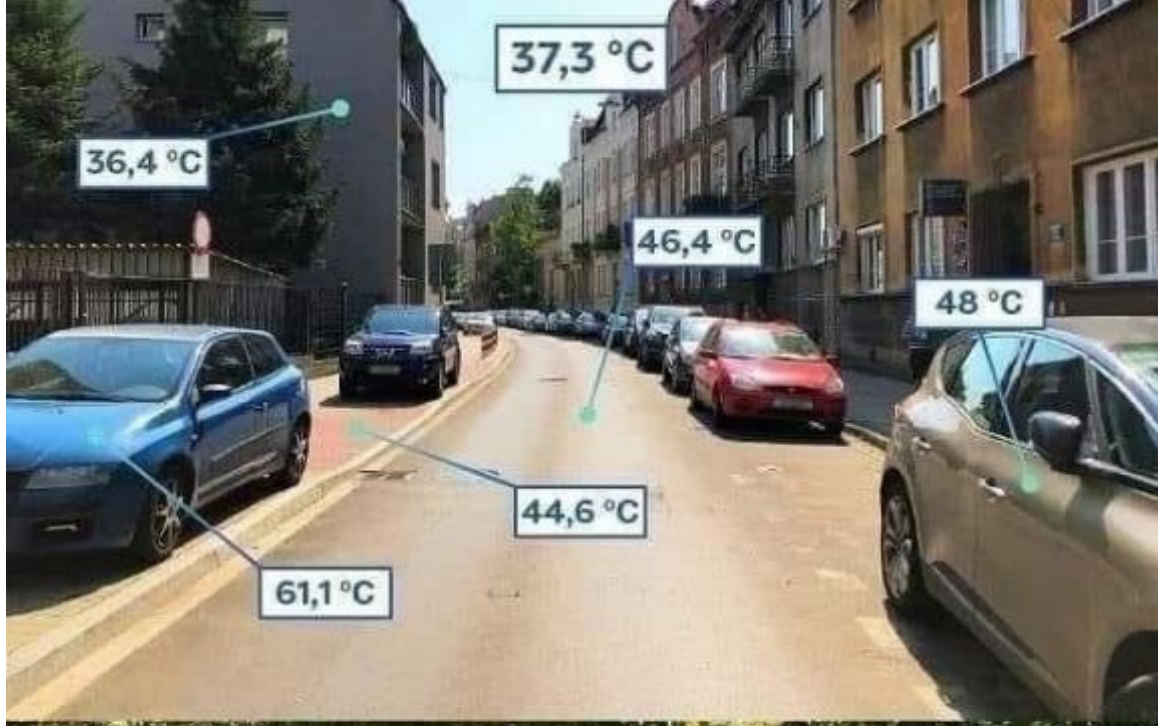
Why more trees?



Grey v Green

Comparing two streets In Kraków, Poland

Grey		Green	
Road	46.4°	Road	22.8°
Air	37.3 °	Air	27.4 °
Walls	36.4°	Walls	26.3°



cooling effect

reduce wind speed

house values

reduce noise pollution

filter pollution

added biodiversity/BNG

calming

storm water attenuation

Image – forestresearch.gov.uk

Trees are Forestry Plants


But Instead…

Soil compaction and available rooting space

Service lines and pipes

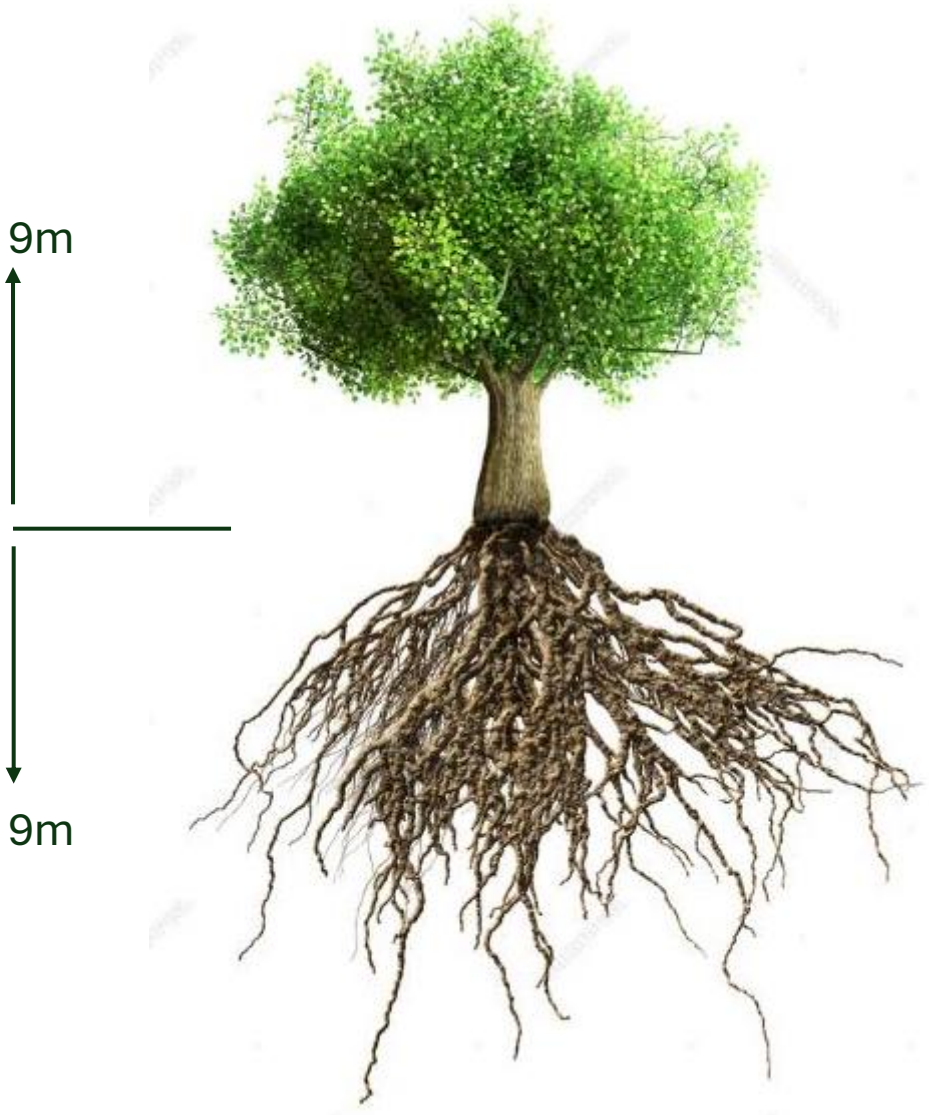
Surface water / irrigation (or lack of)

Lack of nutrients

Contaminants


Soil
compaction

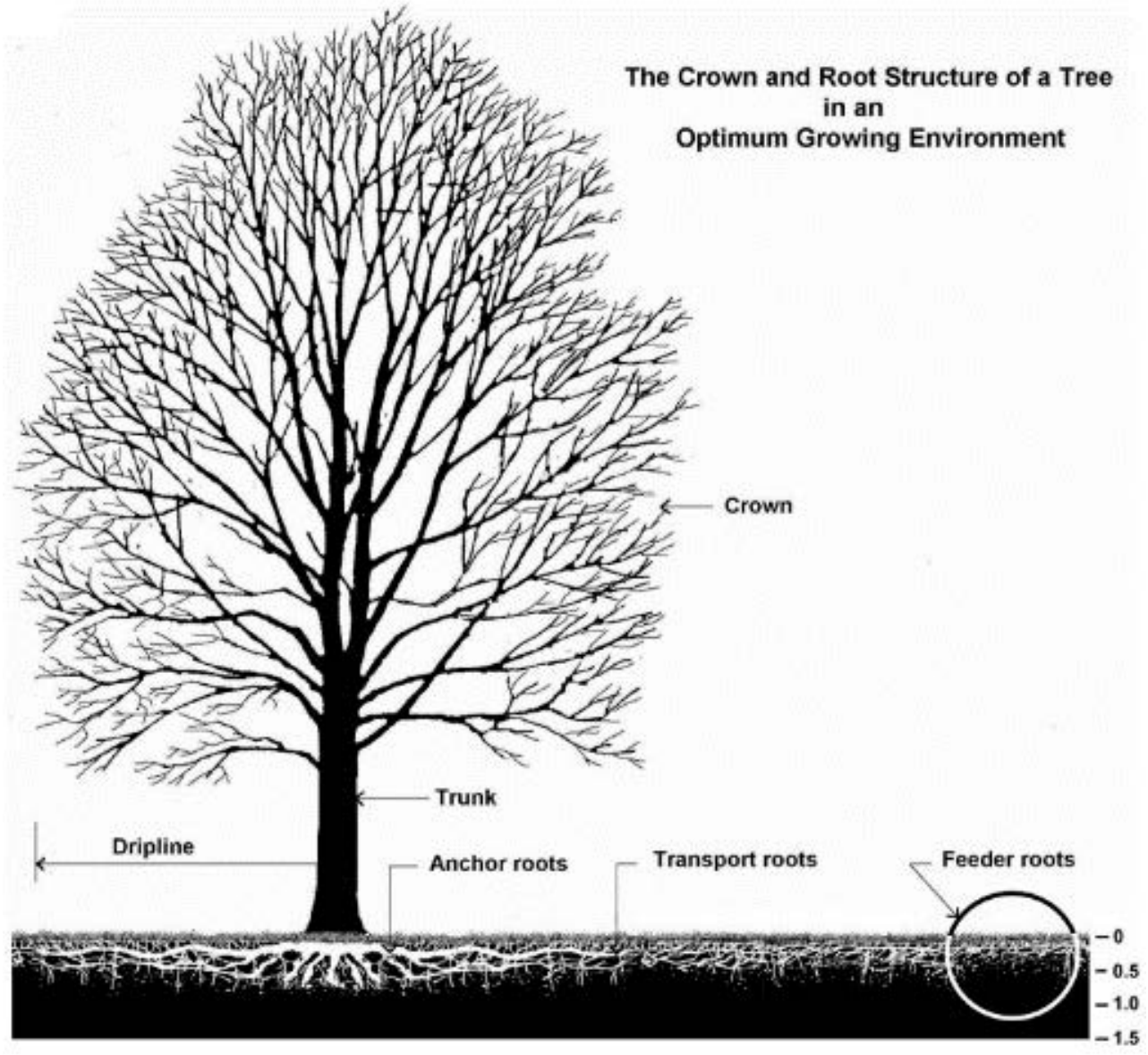
(Mis-) Understanding Nature



- Deep excavations
- Root barriers
- Structural Soil
- Top soil below the root ball

In reality…

Understanding Nature



- Most UK species are shallow rooting
- 90% of root growth is within top 500mm
- BS advises - top soil should be no deeper than 300mm
- Forcing incorrect downward root growth with root barriers inhibits natural root growth

species selection

tree pit volume by species

volume achievable on site

How difficult can it be?

permeable paving

vehicular or pedestrian traffic

obstructions or services

drainage


Image – Johan Östberg

Soil Volume Guidelines

Varies by species

Small
Prunus fruticosa
'Globosum'
Cherry

5 – 12m3

Medium
Acer campestre 'Streetwise'
Maple

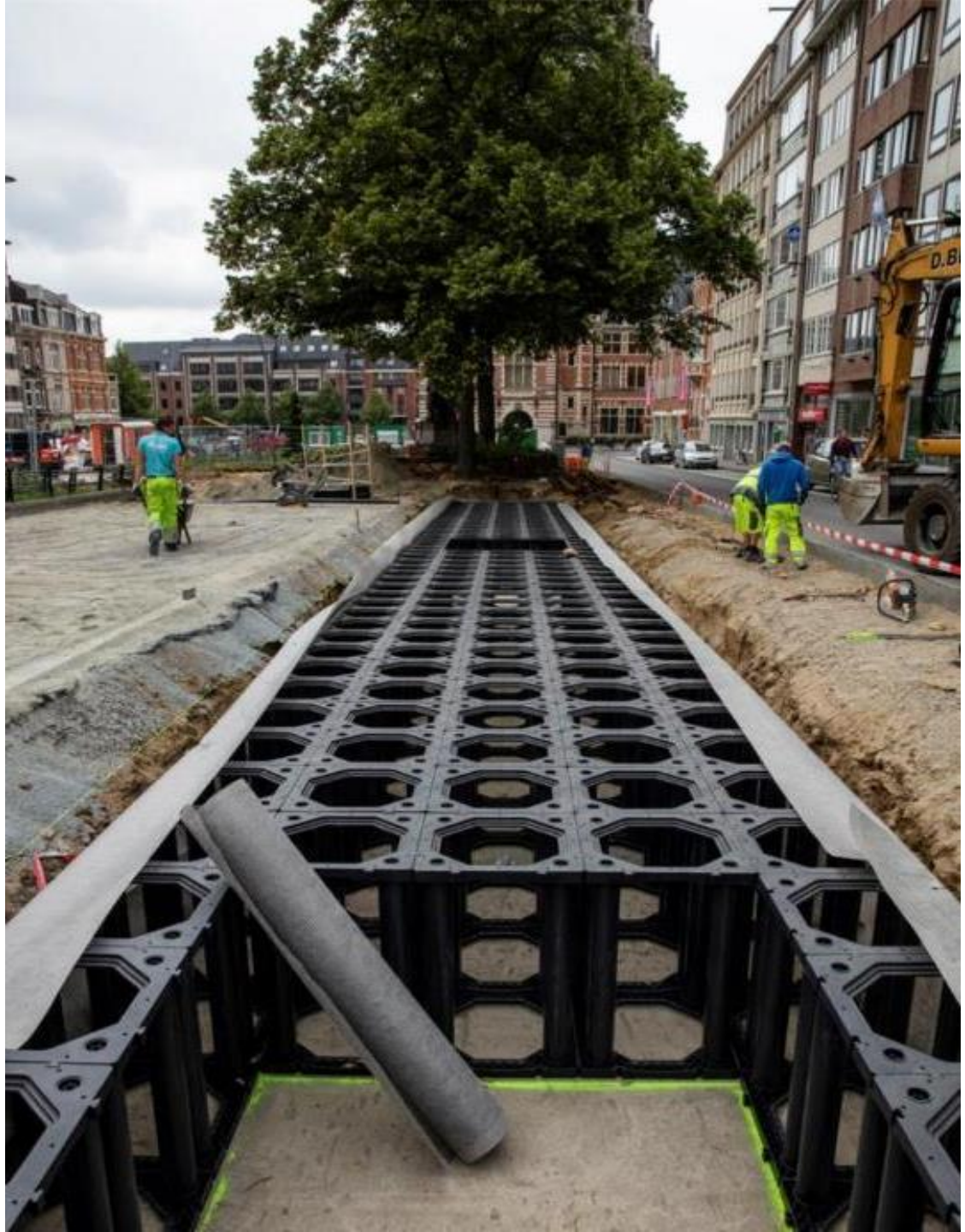
12 – 18m3

Medium/Large
Tilia cordata 'Greenspire'
Small Leaved Lime

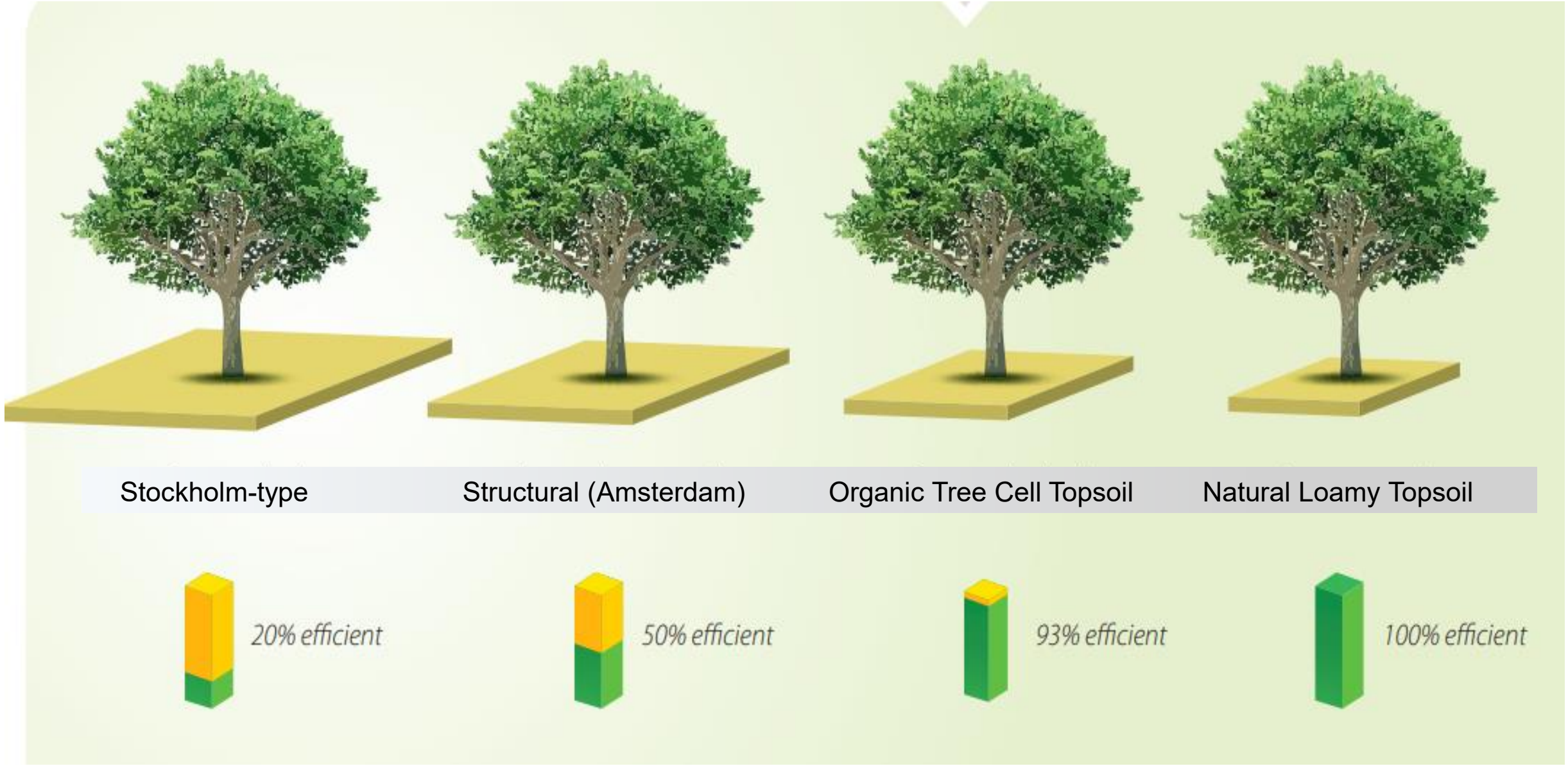
18 – 24m3

Large
Platanus x hispanica
London Plane

24 – 30m3

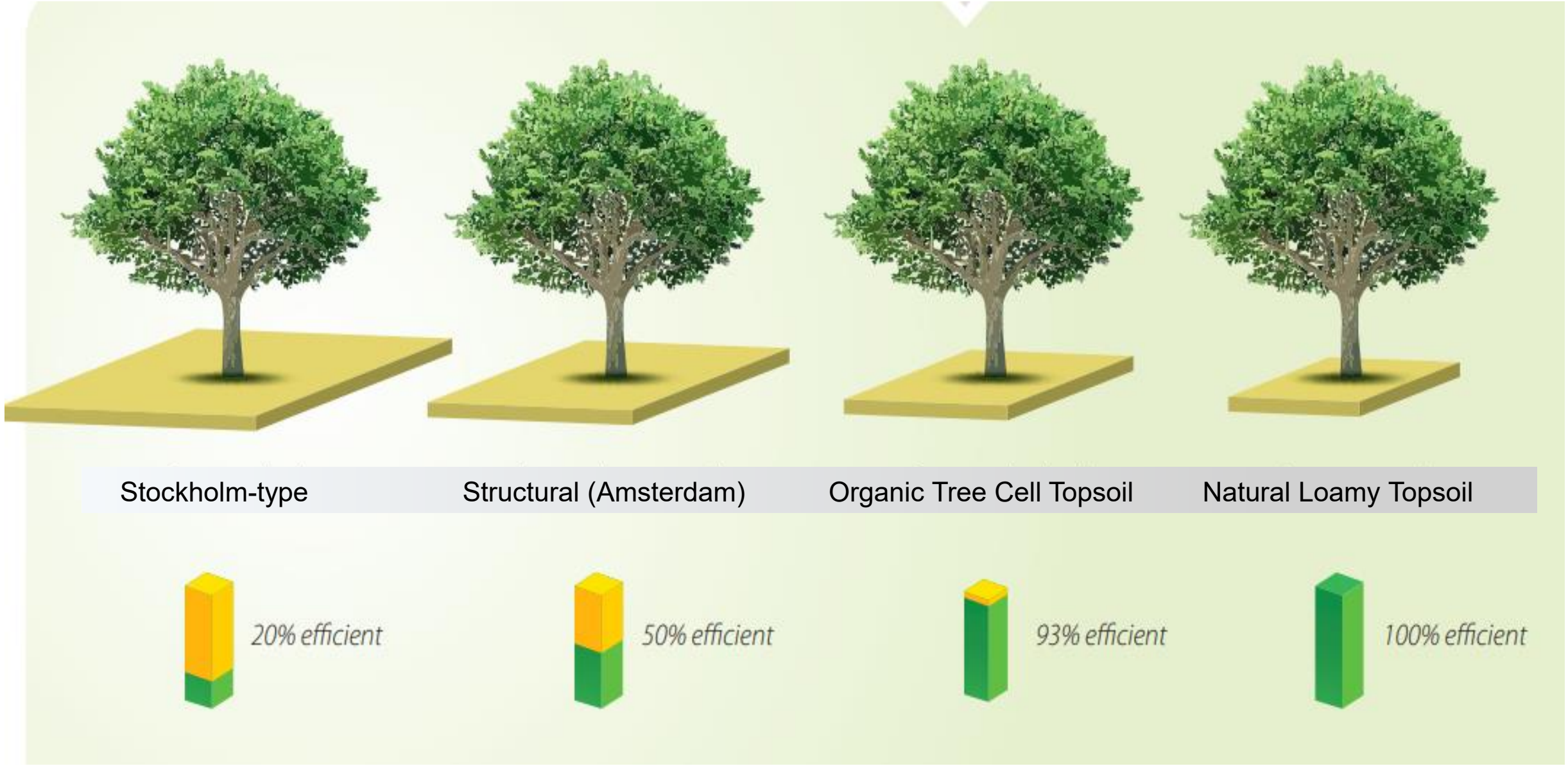


Herbert Hoover Square - Leuven - Belgium



Research: Comparative research for tree planting solutions in hardened areas, Bartlett Tree Laboratories, Dr Tom Smiley 2015.


Stockholm Tree Pit
Image: Ben Rose

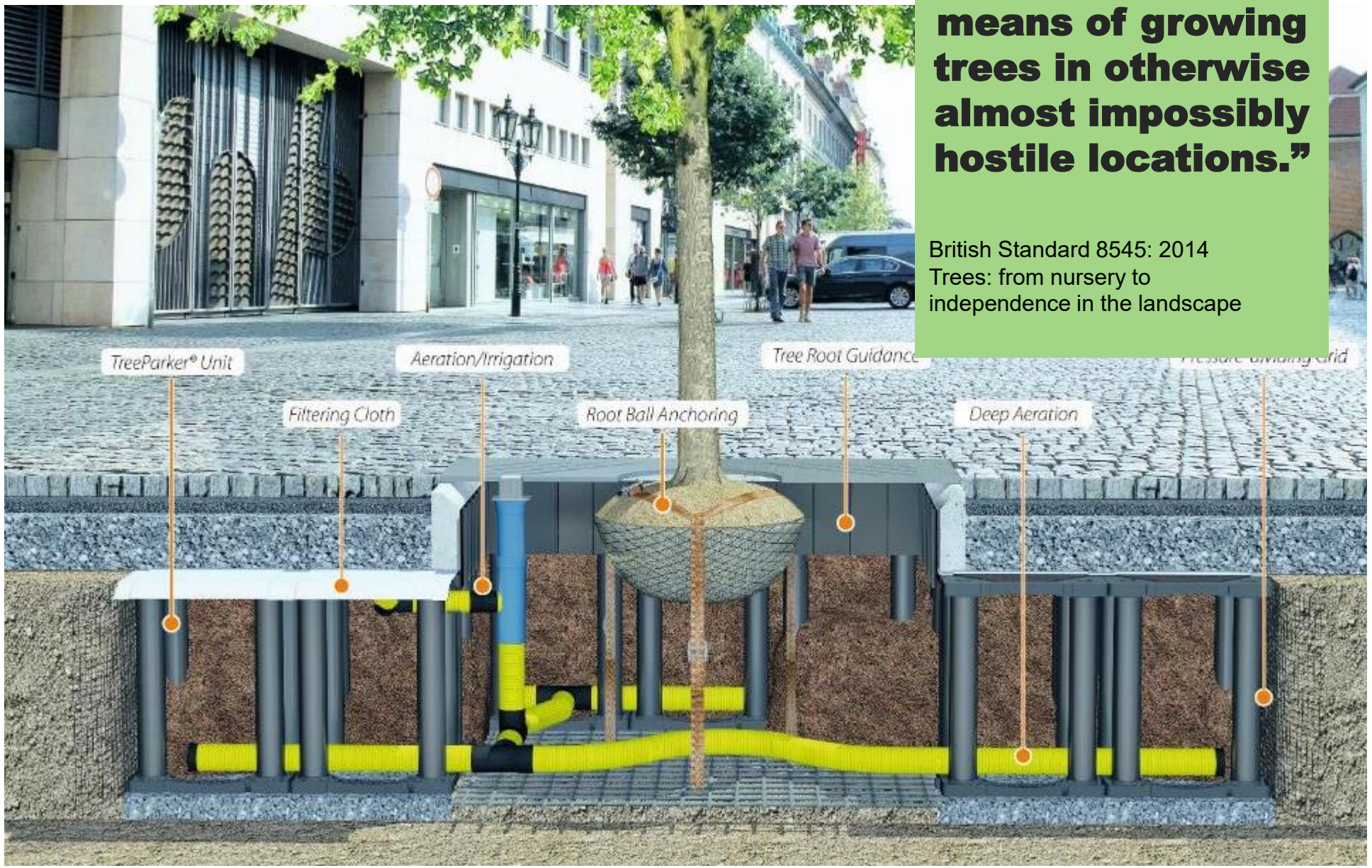


Research: Comparative research for tree planting solutions in hardened areas, Bartlett Tree Laboratories, Dr Tom Smiley 2015.

TreeParker®

“Cellular systems offer a feasible means of growing trees in otherwise almost impossibly hostile locations.”

British Standard 8545: 2014
Trees: from nursery to independence in the landscape



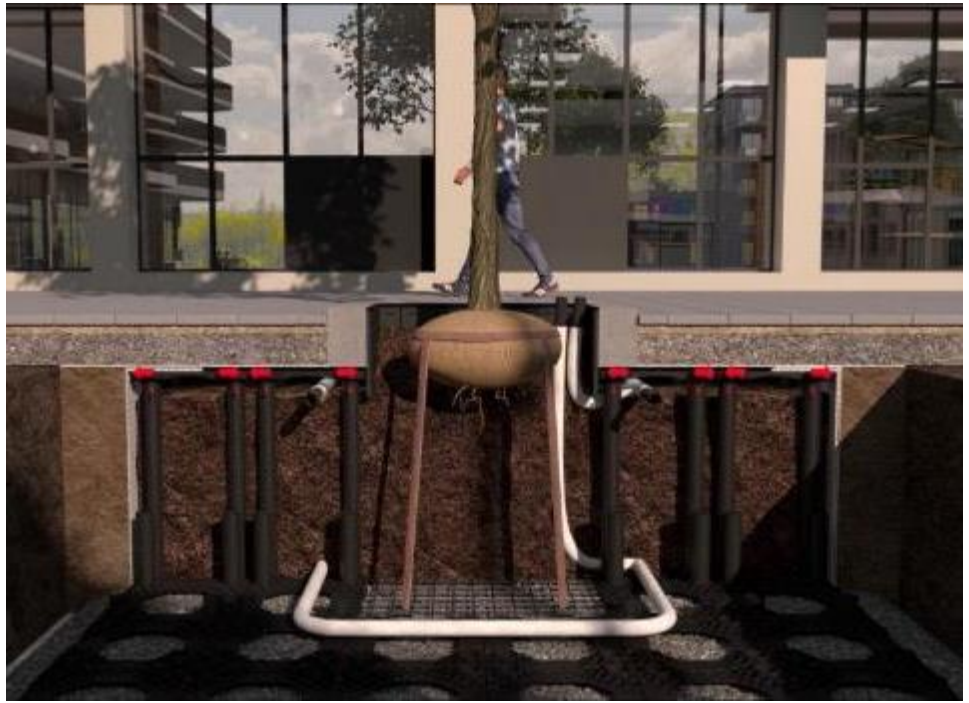
Green-tree
Amenity Tree Soil

Green-tree
Topsoil

Protects the soil from compaction

Allows the use of a friable, organic topsoil, rather than A structural tree soil

Encourages healthy, natural root growth



TreeParker® Components

Supports surface finish above

Protects organic topsoil below

Stock heights:

400

600

800

1000

1200

1500

TreeParker® Dimensions

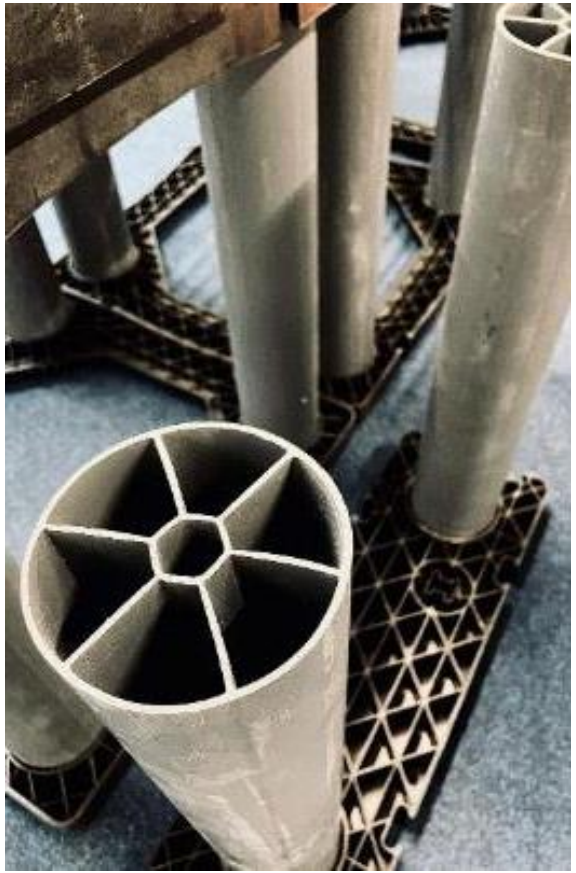
Dimensions: 605mm x 605mm x

400 / 600 / 800 / 1000 / 1200 / 1500mm

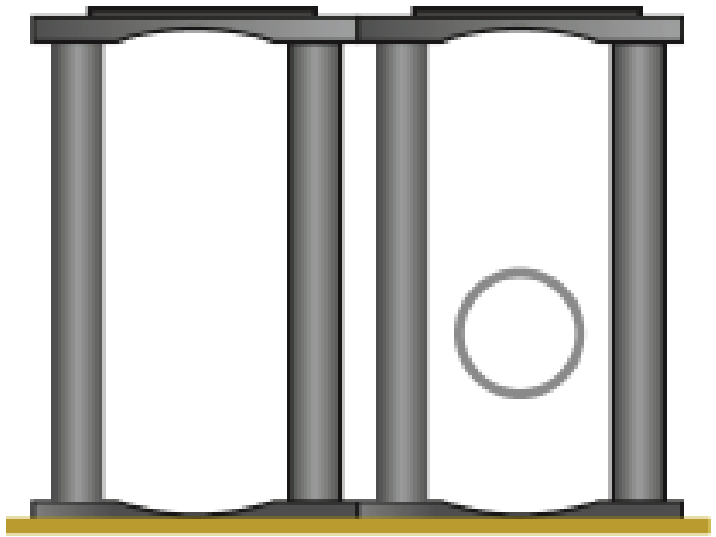
Various stock height options allow for flexible layouts and stepped gradients. No need to stack.

Legs can be trimmed on site to fit exact depth requirements.

Side unit 605 x 200mm available for most cost-effective layouts.

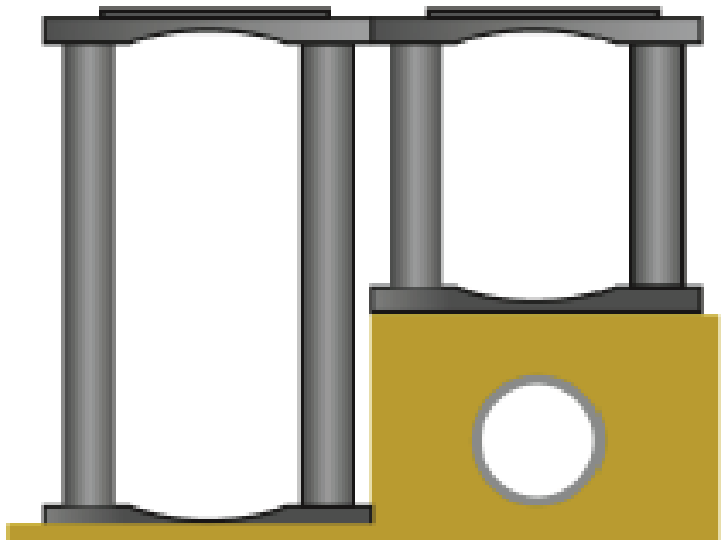


Option 1 Running utilities through unit



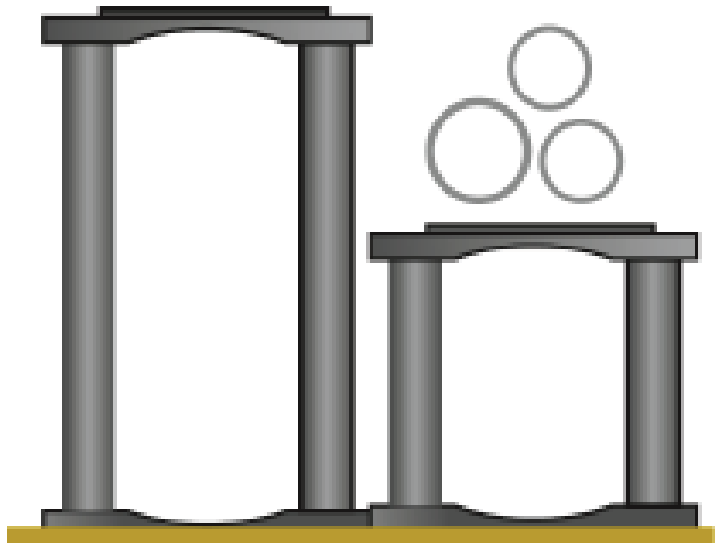
The most commonly used option is to run utilities through the TreeParker system. Due to the open design of the units, TreeParker can accommodate pipes, conduits, and other underground utilities up to 300 mm in diameter.

Option 2 Bridging utilities



The most common used option for integrating underground obstacles. Due to the flexible height of the post, the TP unit can be adjusted in height on location.

Option 3 Tunneling utilities



The most commonused option if it is not permitted to integrate the utilities inside the TreeParker system. Due to the flexible height of the post, the TP unit can be adjusted in height on location.

TreeParker® Loading

Single axle – 15 tonnes - Up to 56 t/m2 (400mm) 50 t/m2 (800mm) 48 t/m2 (1000mm)

TreeParker® Loading

A fully loaded 44t artic’ spreads the load by approx. 9 tonne per laden axle.

TreeParker® Recycled

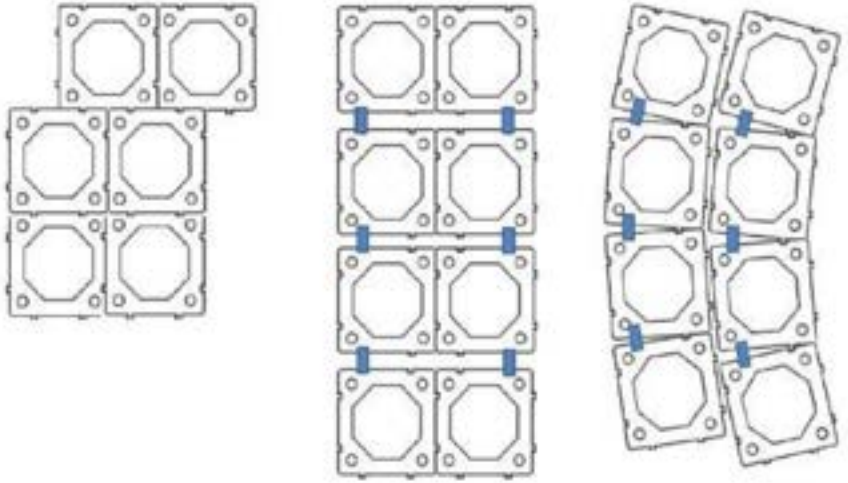
100%

Plastic now exceeds performance of concrete

Plastic is more durable than concrete

Plastic is inert in underground conditions

Spacers: 50 & 75mm



Radius ≥ 5 metres

Example 14m3 tree pit

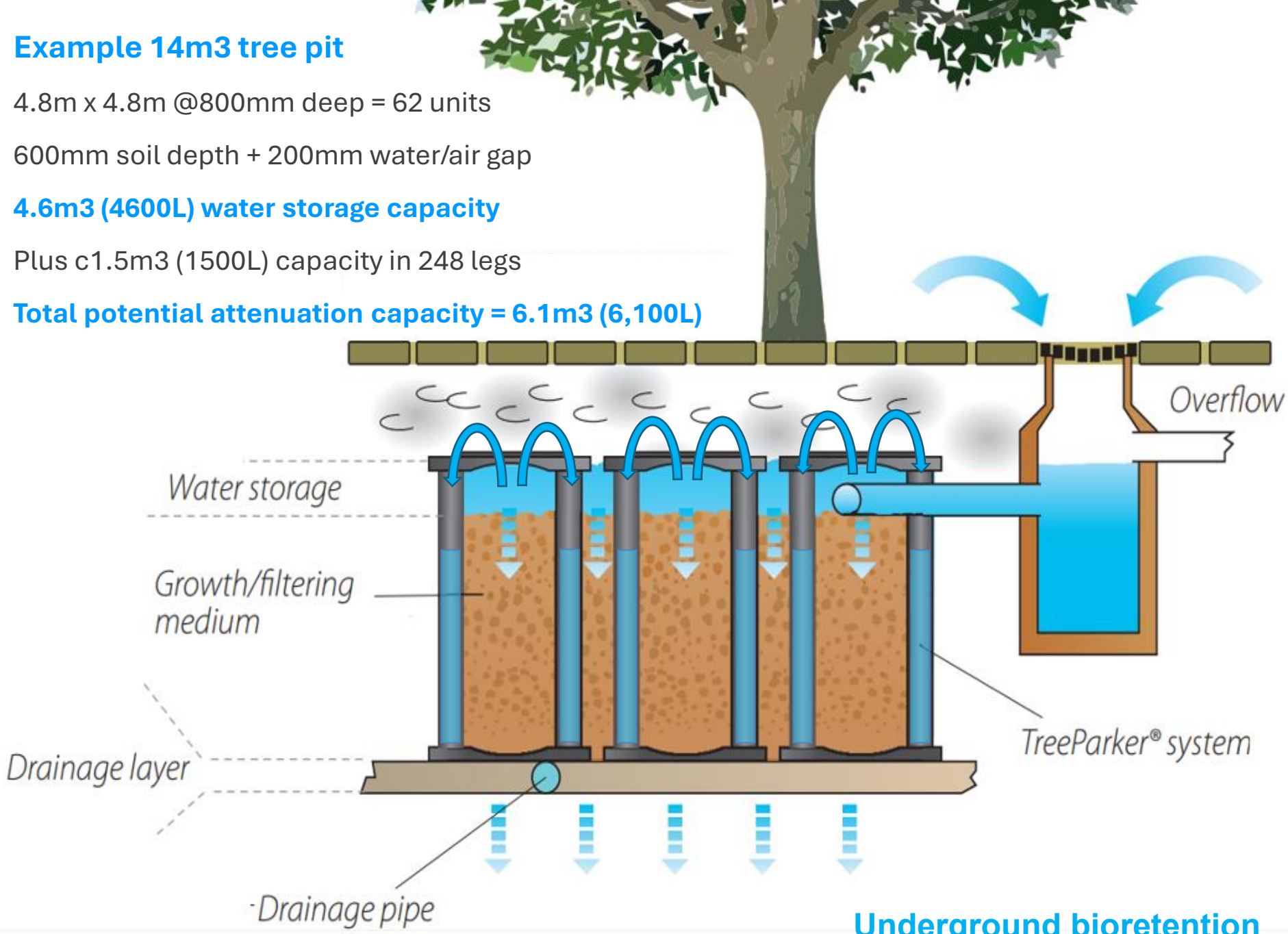
4.8m x 4.8m @800mm deep = 62 units

600mm soil depth + 200mm water/air gap

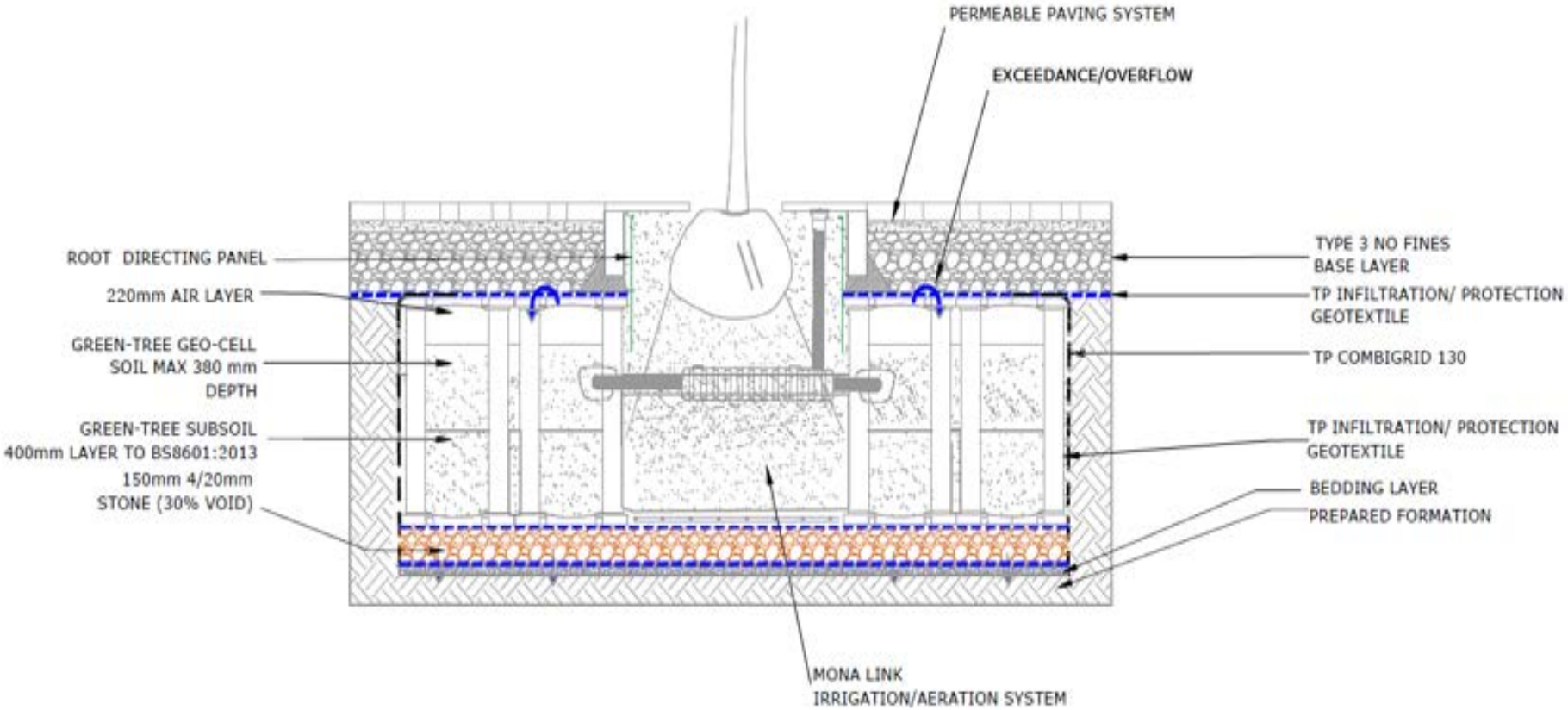
4.6m3 (4600L) water storage capacity

Plus c1.5m3 (1500L) capacity in 248 legs

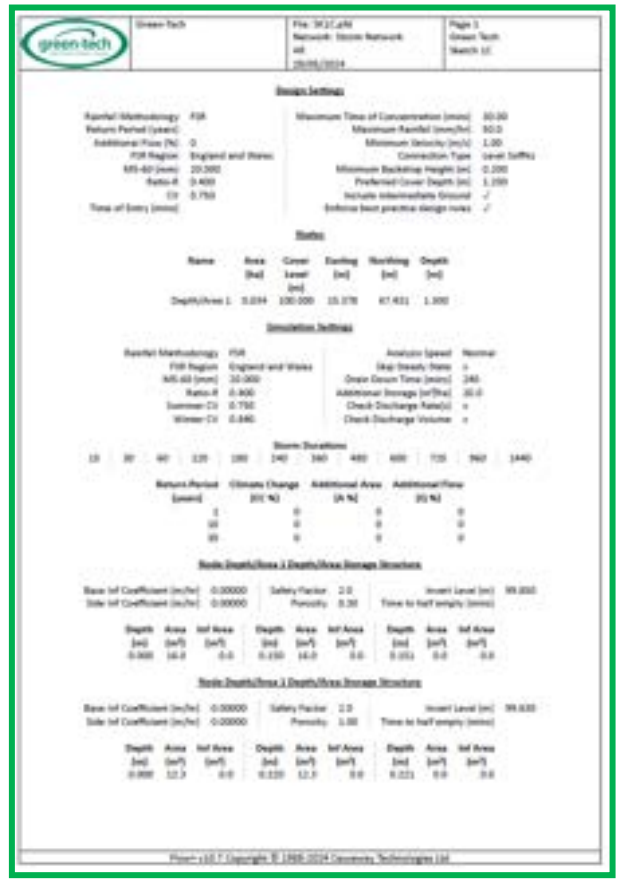
Total potential attenuation capacity = 6.1m3 (6,100L)



Underground bioretention



SK1c - TREEPARKER SUDS TREEPIT
1000mm DEEP TREEPARKER SYSTEM WITH 200mm AIRGAP AND
150mm CLEAN STONE BASE
(INFILTRATION AND PERMEABLE PAVING - WHERE FEASIBLE)



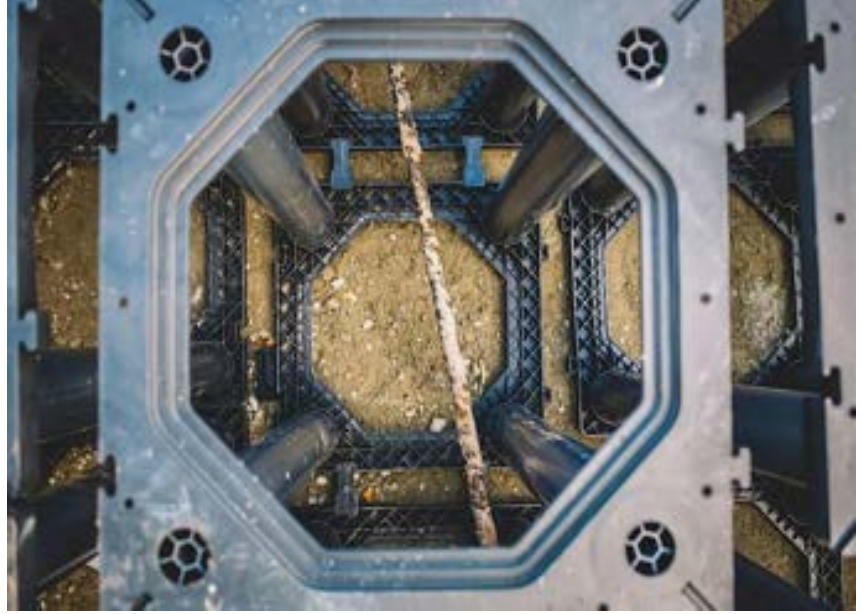
TreeParker® 436 cubic metre SuDS installation

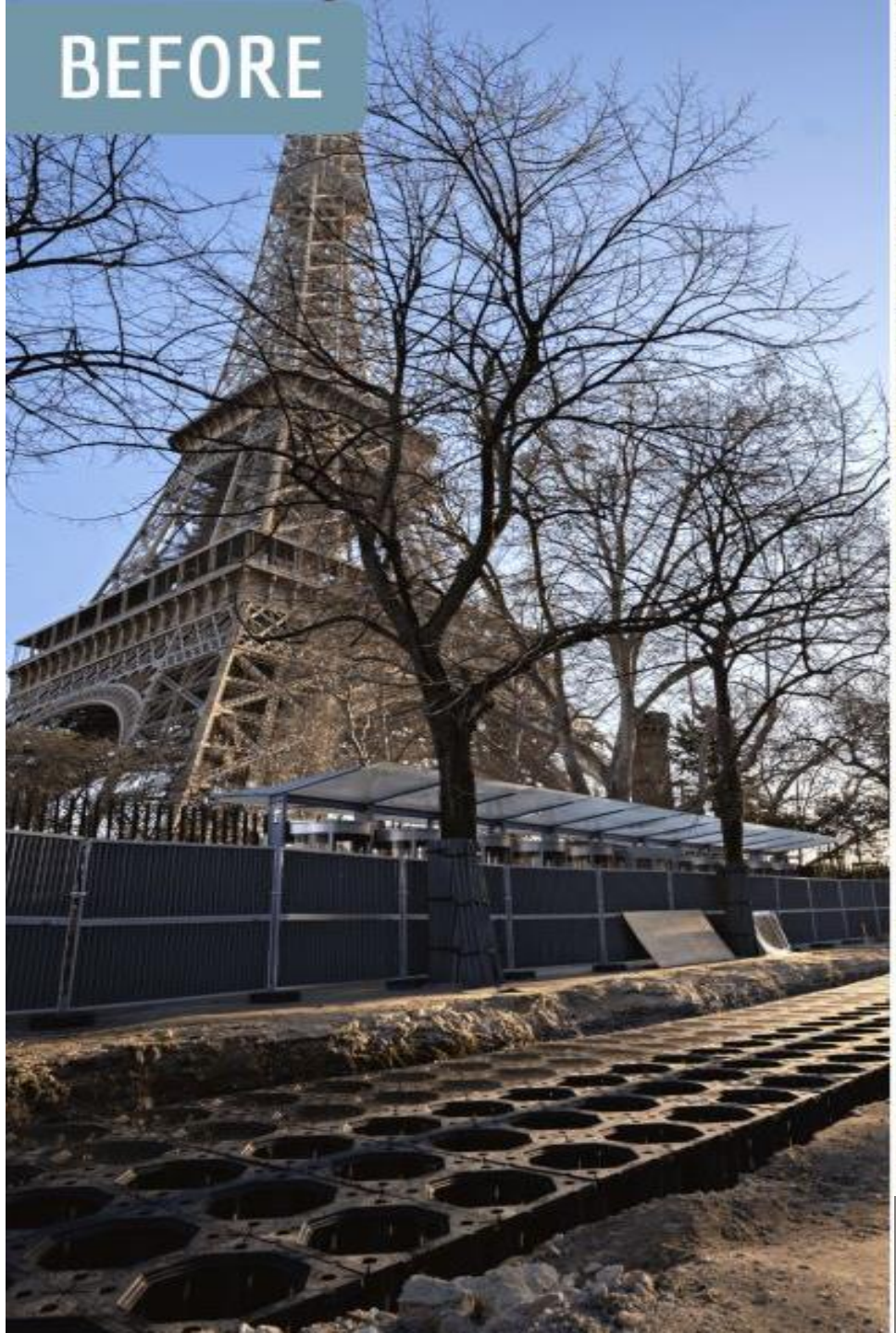
Antwerp – Media Square

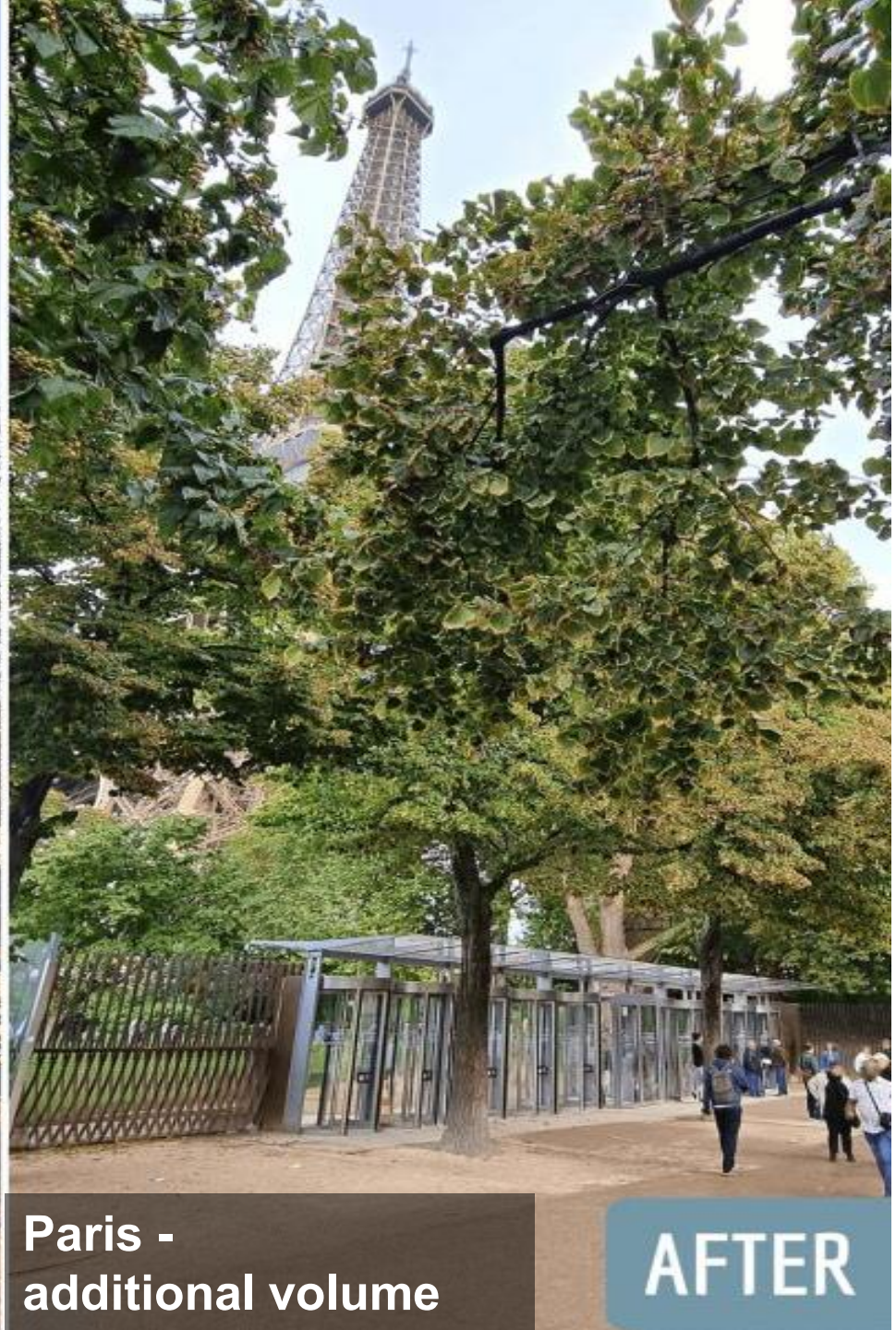
Athlone Ireland – April 2023

Athlone Ireland – July 2024

Harrogate – June 2023




BEFORE


Paris -
additional volume
AFTER

Thank You

alasdair.innes@green-tech.uk