Co-funded Trial Tree Pits

How can remote technology assist with monitoring soil, water and air conditions around trees?

GreenBlue® URBAN

Establishing the future urban landscape

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Introduction

Green Infrastructure, and trees in particular, plays an incredibly important part in many aspects of city life, providing almost incalculable benefits from health and wellbeing to economic impacts and reducing crime.

GreenBlue Urban are keen to learn more about the soil, water, and air conditions and behaviours around trees, use this knowledge to find how to further boost urban tree growth, value and longevity, and to investigate how technology can help in the endeavour.

We are looking for partners to join with us in co-funded trial tree pits throughout the UK.

Remote Technology Process

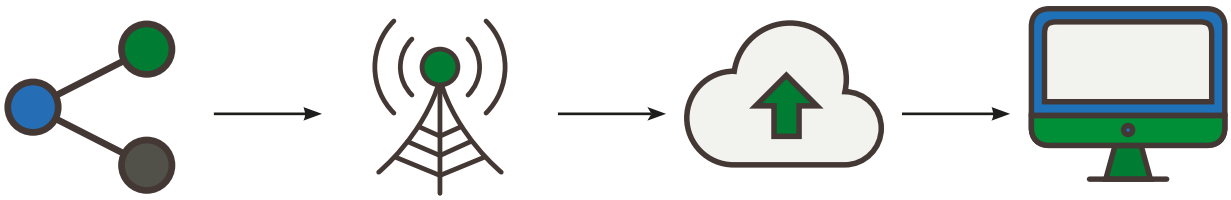
Remote technology is increasingly useful in today's world. Saving costs through eliminating unnecessary site visits and maintenance costs and being able to react immediately to crises, or even to pre-empt them, are just some of the immediate benefits. The cost of tree failure, complete re-excavation and re-planting is completely avoidable.

HOW IT WORKS

Sensor probes are installed in the tree pit with a LoRaWAN transmitter. This is powered by battery which is expected to last 3-5 years, providing a virtually maintenance free system. The transmitter communicates live tree pit conditions directly to a gateway which must be located within a certain distance (e.g. 1km).

The gateway can communicate with any number of sensors and any number of tree pits, and relays data to the cloud. The on-line portal accesses data in the cloud and presents the it in a variety of graphical formats.

Clients and other stakeholders can be provided with log-in credentials to view real time data, and can be set up to recieve alerts on whichever conditions are required.



Sensor Probe | Gateway | Cloud | Online Portal

Soil Sensor attached to tree grille

Installed: GreenBlue Urban Gateway

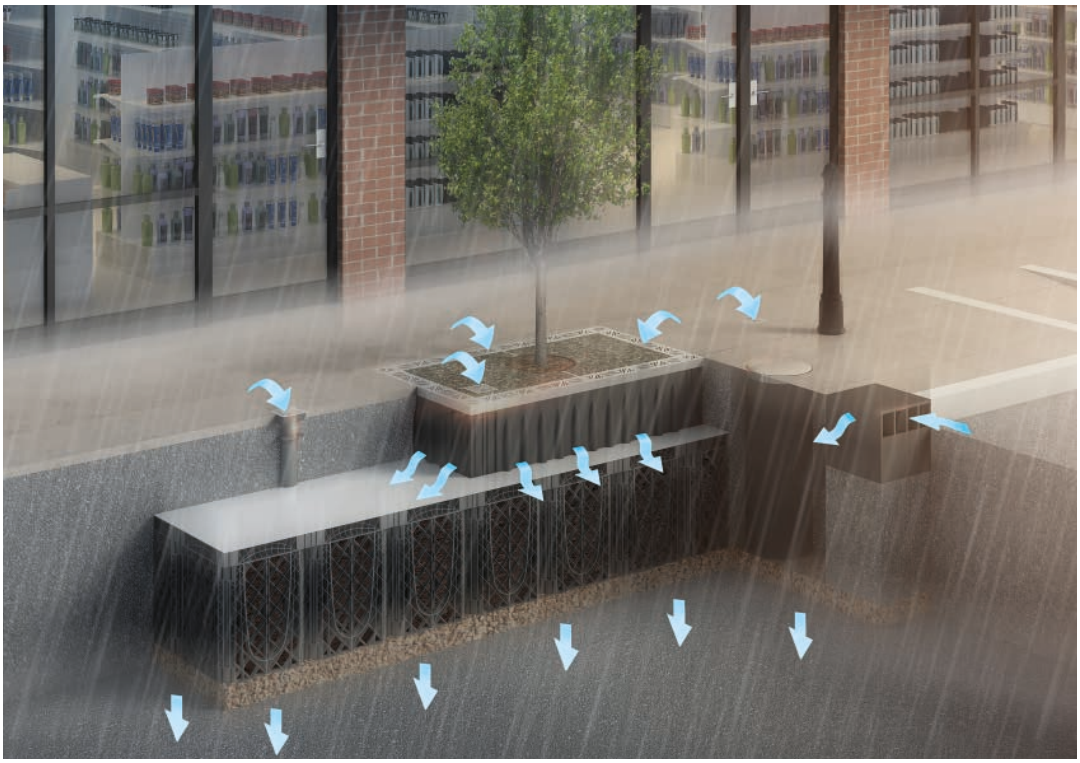
Conditions to be Monitored

There is a huge variety of different conditions which can be monitored, but we wish to focus on soil conditions, water attenuation, and air quality. We can design a bespoke system according to the specific objectives and constraints of your region, project or client:

Conditions are normally reported every hour, but this can be altered to anything from every second to every 24 hours, or more, depending on the level of analysis required. The cost of the data needs to be borne in mind as this is much higher if conditions are reported more frequently.

Conditions can be set with minimum and/or maximum levels and a choice of email, SMS, and telephone alerts can be selected.

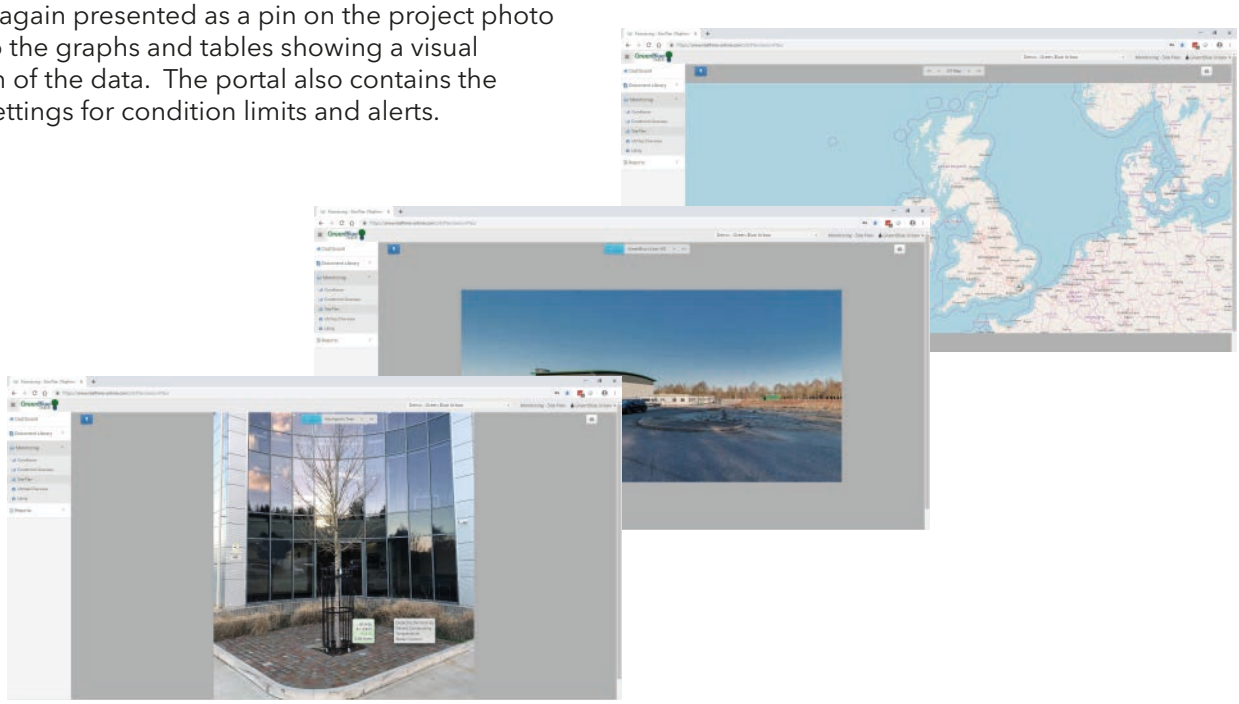
SOIL CONDITIONS	WATER ATTENUATION	AIR QUALITY
Oxygen content	Water levels	PM2.5s
Moisture	Water outflow quantity	PM10s
Temperature	Water quality	NOx
Salinity		CO2



Online Portal

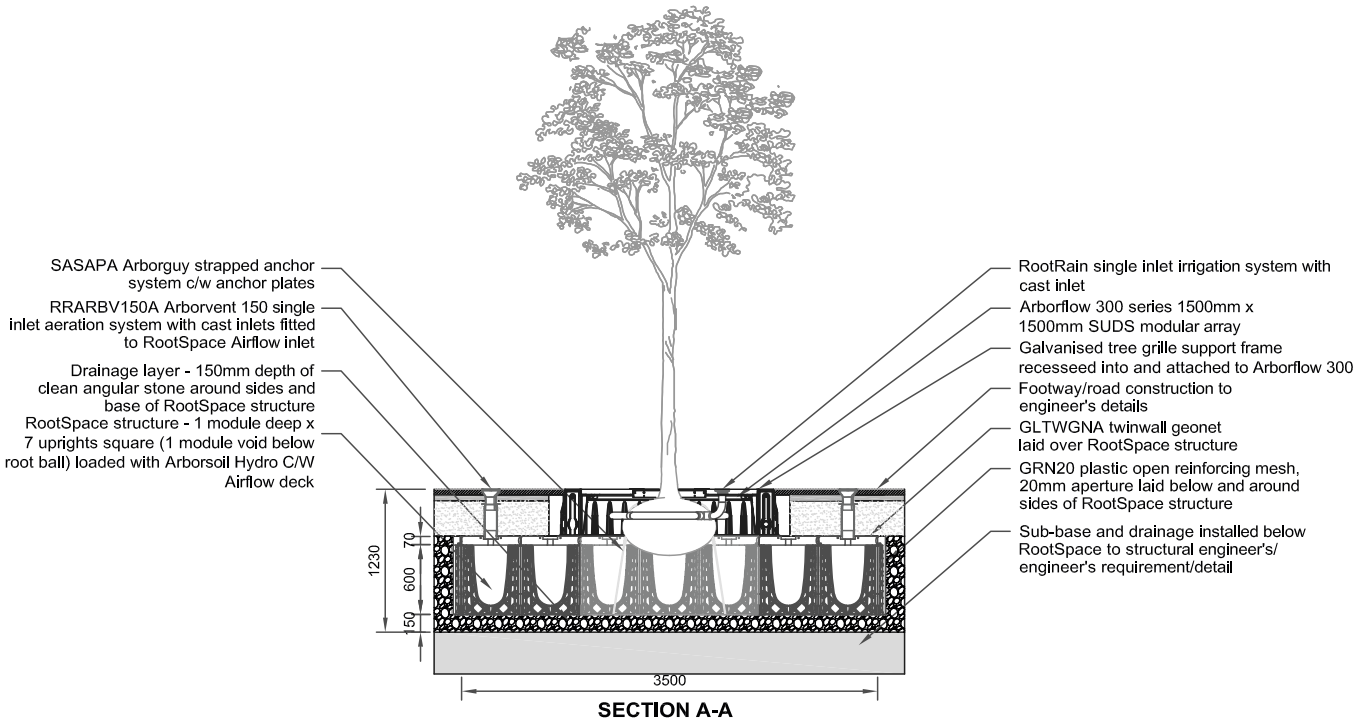
On logging into the system, the geographic location of the project is presented as a pin on a UK map. The project pin opens to an aerial photographic presentation of the whole site which could consist of several tree pits.

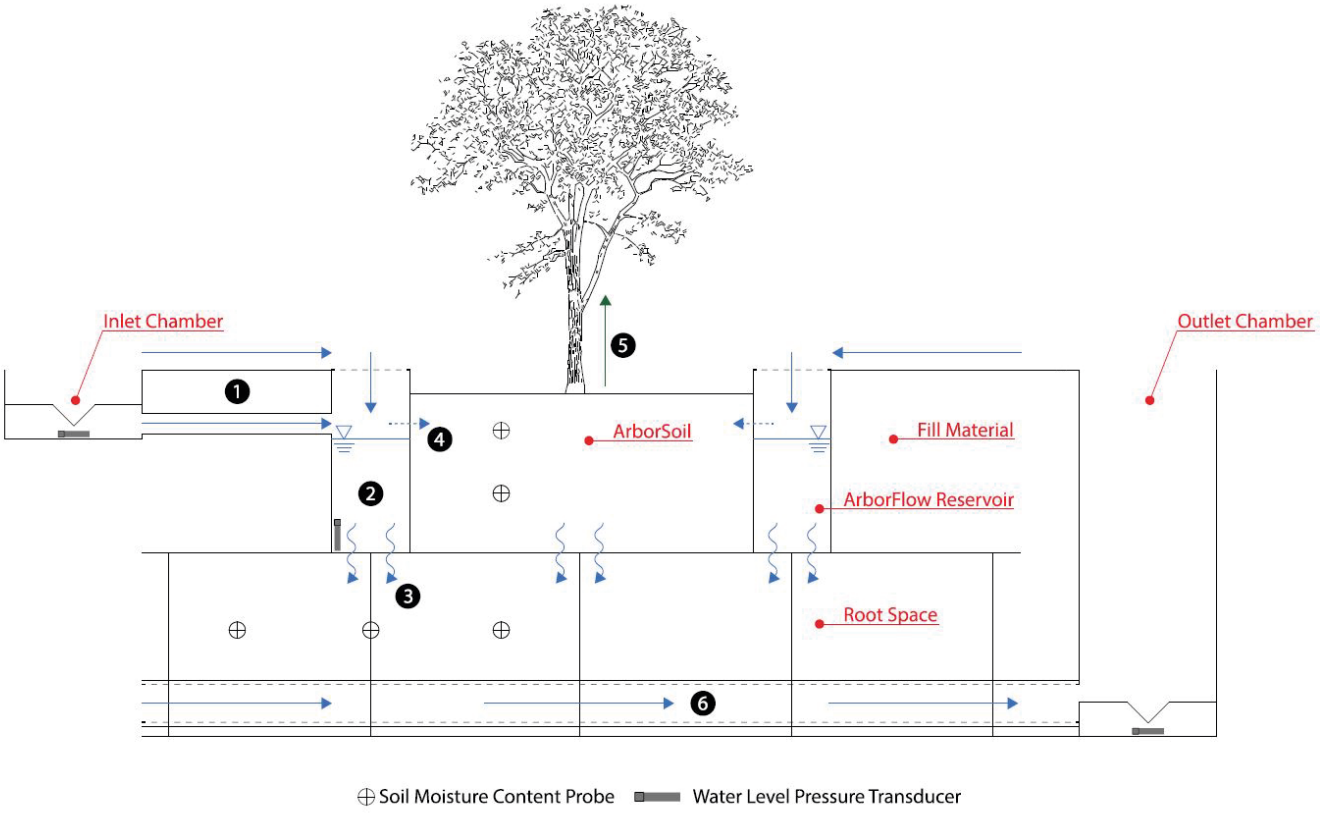
Each tree is again presented as a pin on the project photo and leads to the graphs and tables showing a visual presentation of the data. The portal also contains the advanced settings for condition limits and alerts.



Tree Pit Design

The tree pit is based on a standard GBU SuDS tree pit package but can be adjusted to suit individual constraints and requirements.





Typical Project Requirements

ASPECT	REQUIREMENTS
Number of trees	Approximately 5-10 individual trees
Area of project	Approximately 0-3km between extents
Location examples	Roadside preferable Outside schools Public plazas Areas suffering air pollution or high flood risk
Gateway	Access to power Potentially a hard internet connection for 'fall-over' back-up provision Secure location with access for servicing Location ideal approximately equidistant between project extents

Funding Proposal

GreenBlue are proposing to co-funding a bespoke package to suit your requirements according to whatever objectives, opportunities or constraints you are confronted with.

A preliminary meeting can be held to discuss your objectives and the detail of your project before a formal proposal can be presented.

An example funding proposal could consist typically of:

COST CENTRE	GREENBLUE	CO-FUNDER
Tree pit design (including sensor technology systems)	Fund	
Standard tree pit products	Fund	
On site installation training and support	Fund	
Tree pit installation (including sensor technology systems)		Fund
Remote technology design, software and hardware	Co-fund	Co-fund
3-year technology support	Co-fund	Co-fund
Data plan		Fund
Online portal log-in credentials per user		Fund
Case study report	Fund	

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