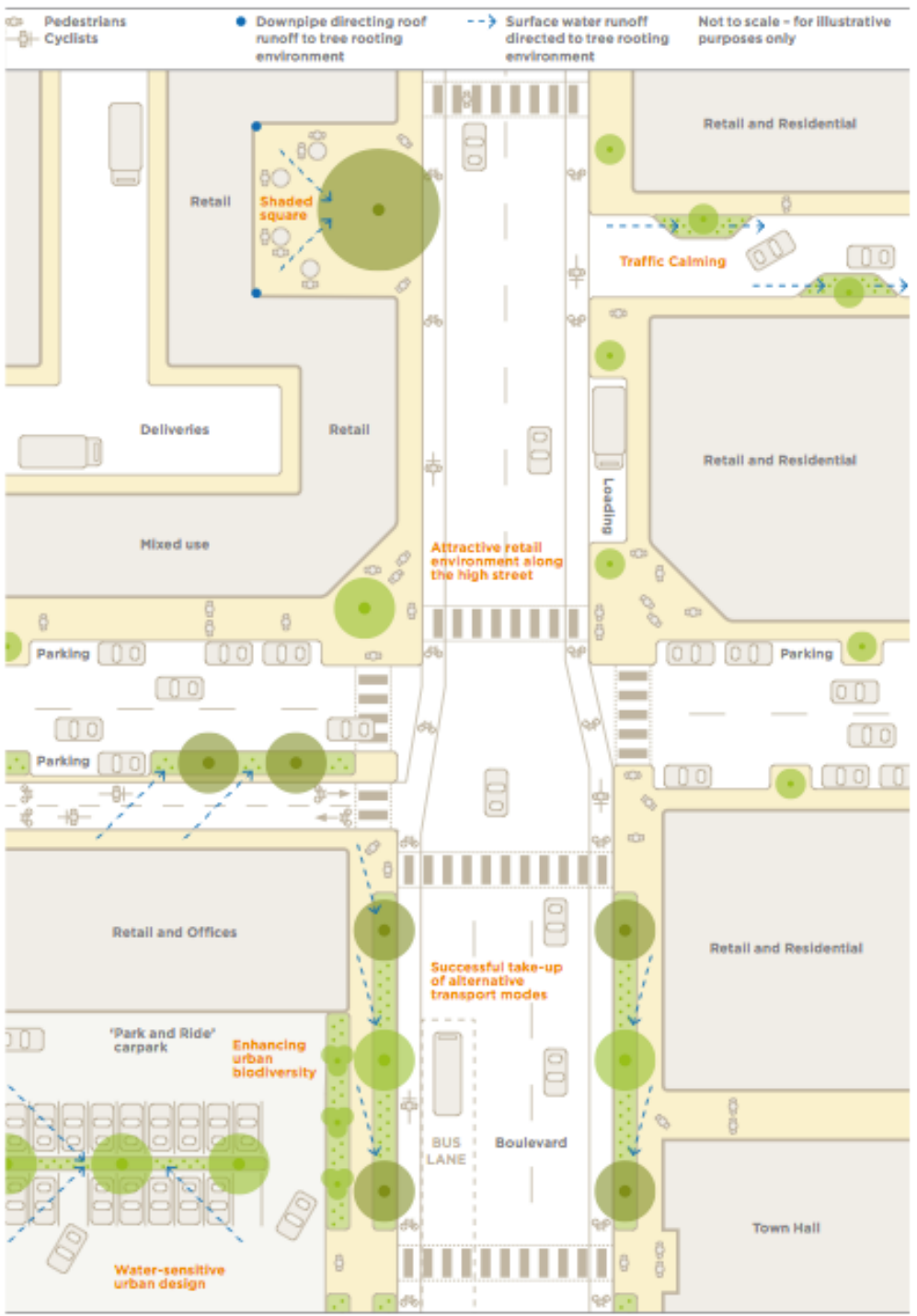
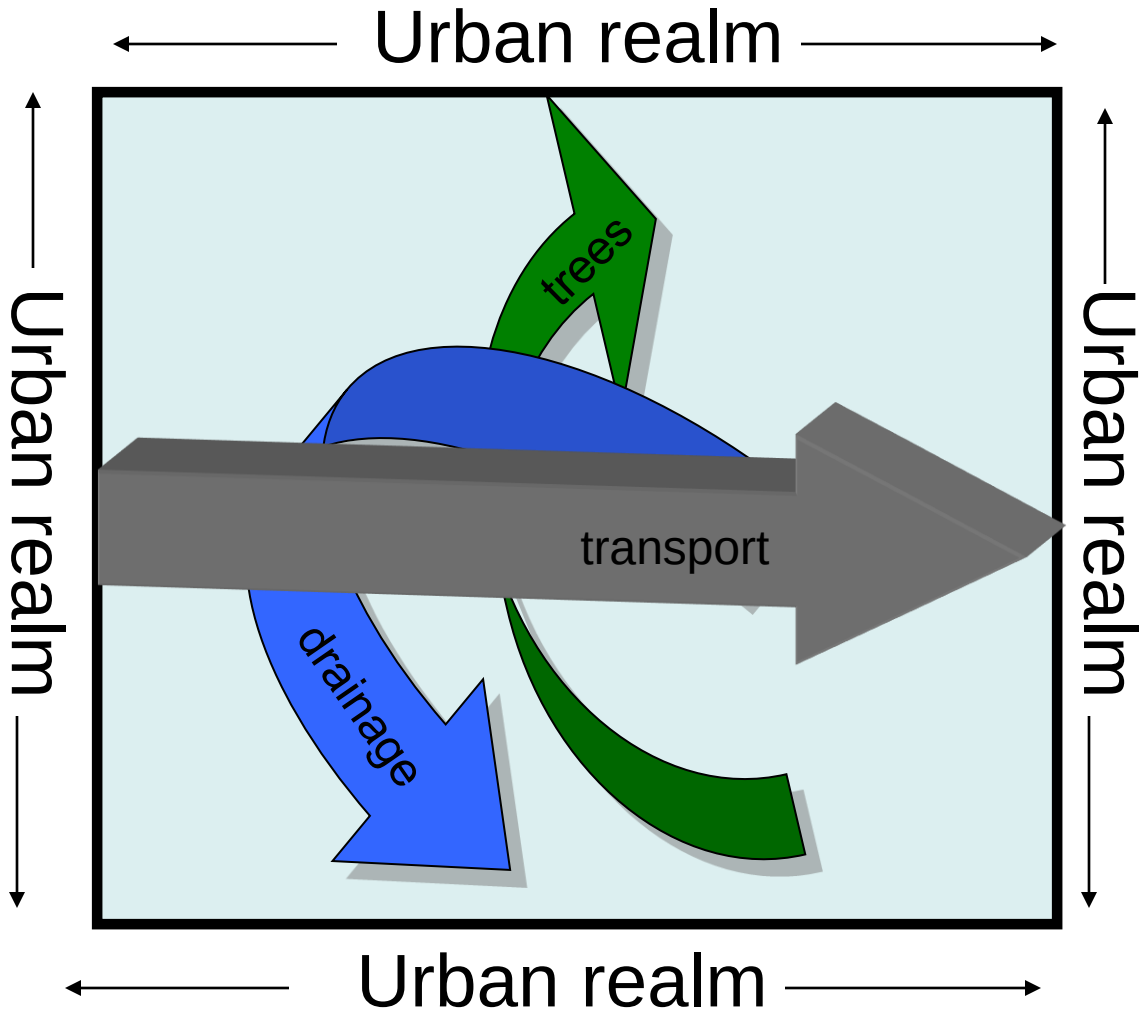

GOING UNDERGROUND

Designing with Trees



A daunting density and complexity of constraints



0.5% of the UK grey infrastructure budget = 141% increase of our green infrastructure budget

The underworld allocation process

Perceived constraints to delivery of sustainable GI?

- Developers renege on GI delivery once they have planning permission
- Highways engineers are anti trees
- Utility companies destroy trees
- Numbers driven political agendas
- GI design lacks appropriate specialist input
- Failure to secure management budgets

Tree people like talking to tree people

Recognising opportunities

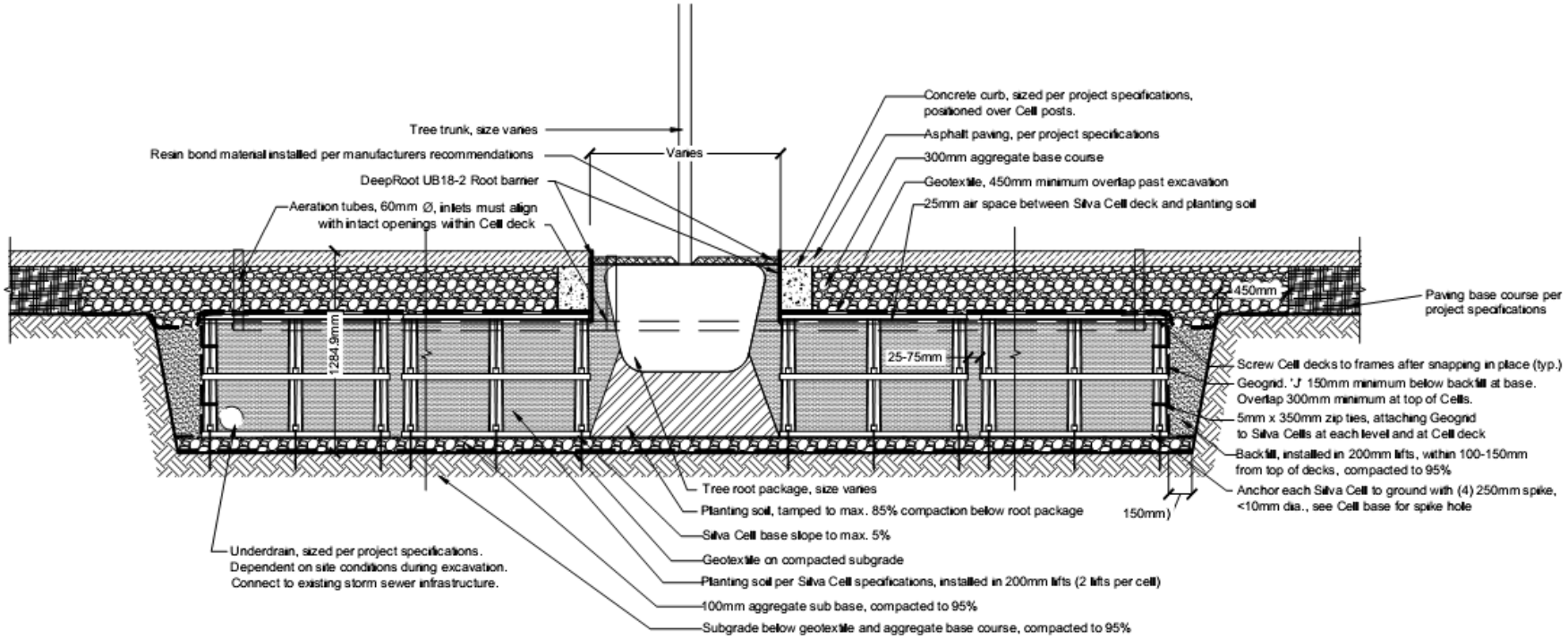
Car parks offer large areas of urban open space


P815 KPX


PEUGEOT


P
GB
RO

Bespoke design below ground maximises future compatibility

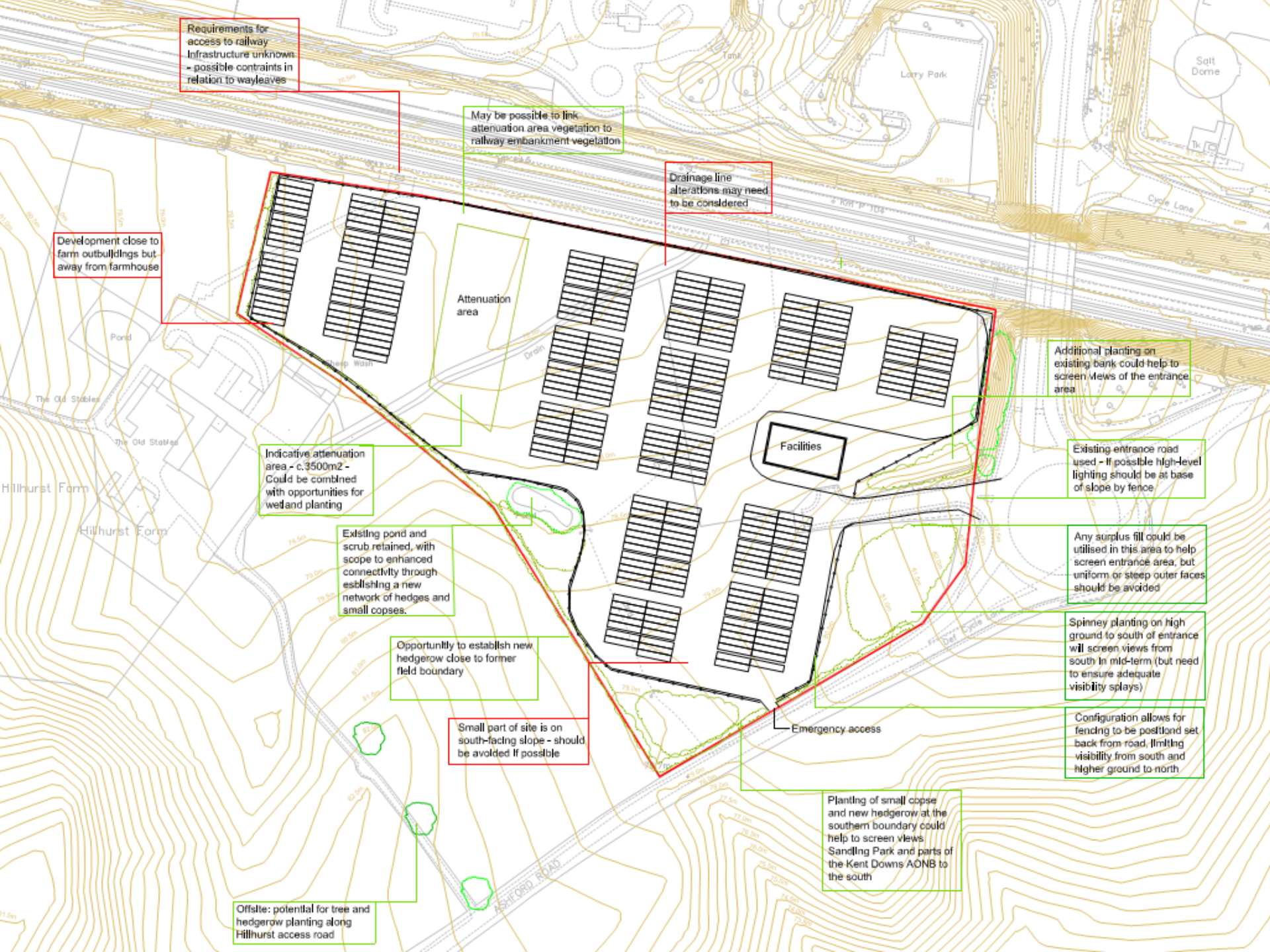



P815 KPX


OASIS
HT05 NNF

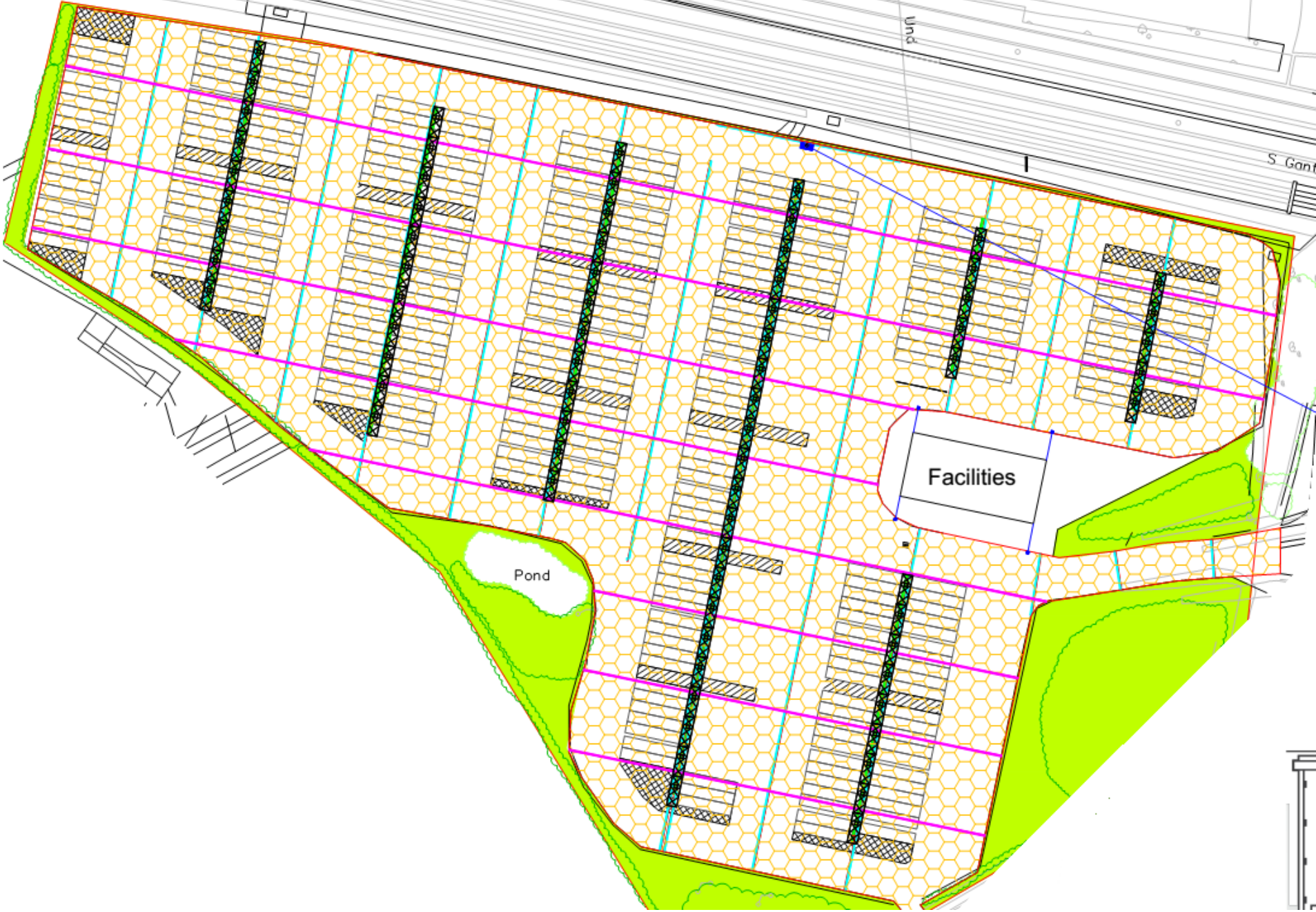
Flexi-Pave: recycled tyres, aggregate and bonding agent create highly permeable, flexible wearing surface

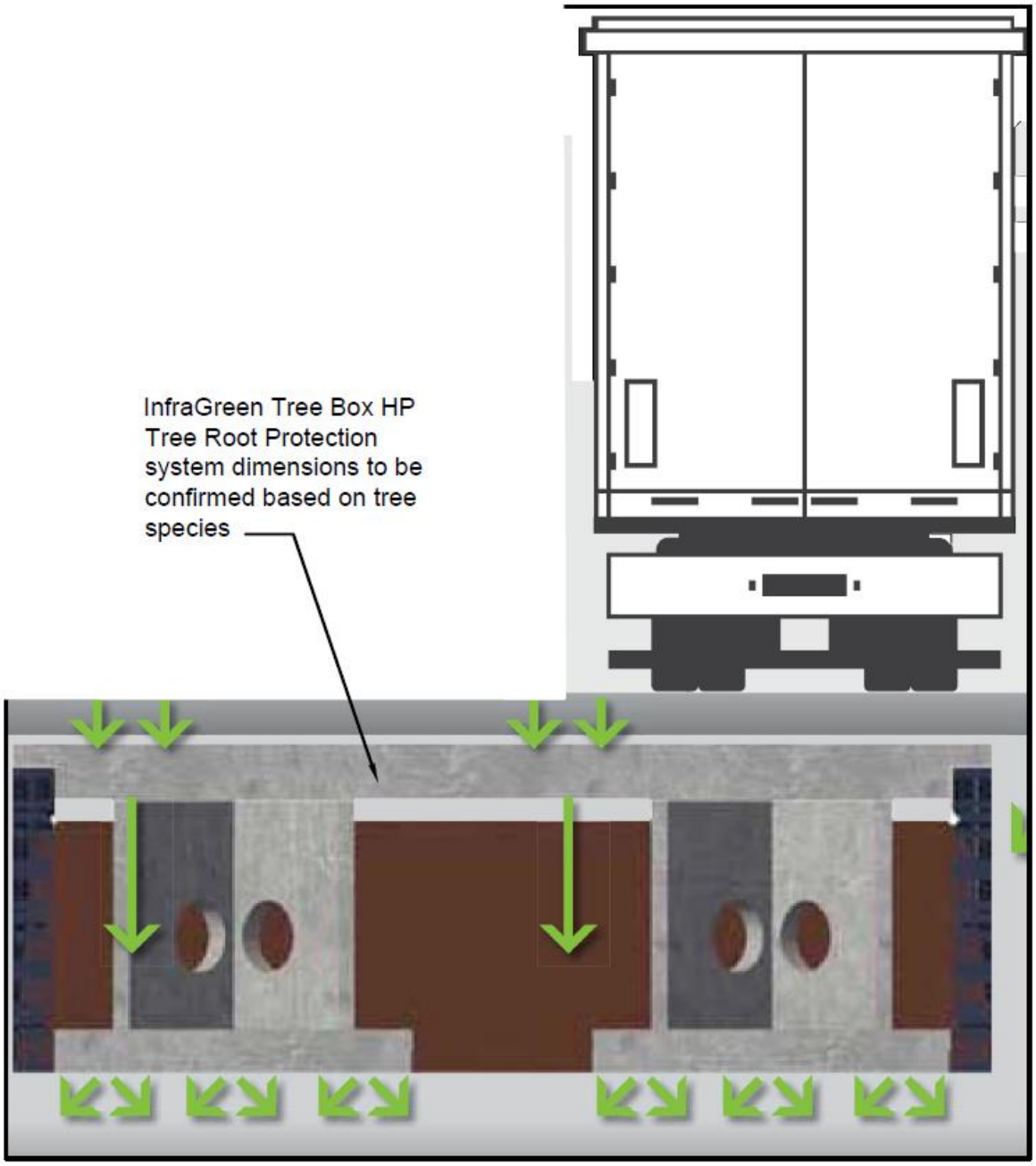
Operation Stack turns M20 into lorry park and tailbacks stretch 20 MILES as Channel Tunnel travel chaos enters sixth day


Requirements for access to railway infrastructure unknown - possible contraints in relation to wayleaves
May be possible to link attenuation area vegetation to railway embankment vegetation
Drainage line alterations may need to be considered
Development close to farm outbuildings but away from farmhouse
Attenuation area
Facilities
Additional planting on existing bank could help to screen views of the entrance area
Existing entrance road used - If possible high-level lighting should be at base of slope by fence
Indicative attenuation area - c.3500m2 - Could be combined with opportunities for wetland planting
Existing pond and scrub retained, with scope to enhanced connectivity through esblishing a new network of hedges and small copses.
Any surplus fill could be utilised in this area to help screen entrance area, but uniform or steep outer faces should be avoided
Spinney planting on high ground to south of entrance will screen views from south in mid-term (but need to ensure adequate visibility splays)
Opportunitly to establish new hedgerow close to former field boundary
Small part of site is on south-facing slope - should be avoided if possible
Emergency access
Configuration allows for fencing to be positiond set back from road, limiting visibility from south and higher ground to north
Planting of small copse and new hedgerow at the southern boundary could help to screen views Sandling Park and parts of the Kent Downs AONB to the south
Offsite: potential for tree and hedgerow planting along Hillhurst access road
Pond
The Old Stables
Hillhurst Farm
Sheep Wash
Drain
Lorry Park
Salt Dome
Cycle Lane
ASHFORD ROAD

Project brief, scope and constraints

- What you have to work with - geology
- Loading and capacity specification
- Available space below ground
- Water management objectives
- Impact mitigation - landscape and amenity
- Security - lighting, CCTV etc

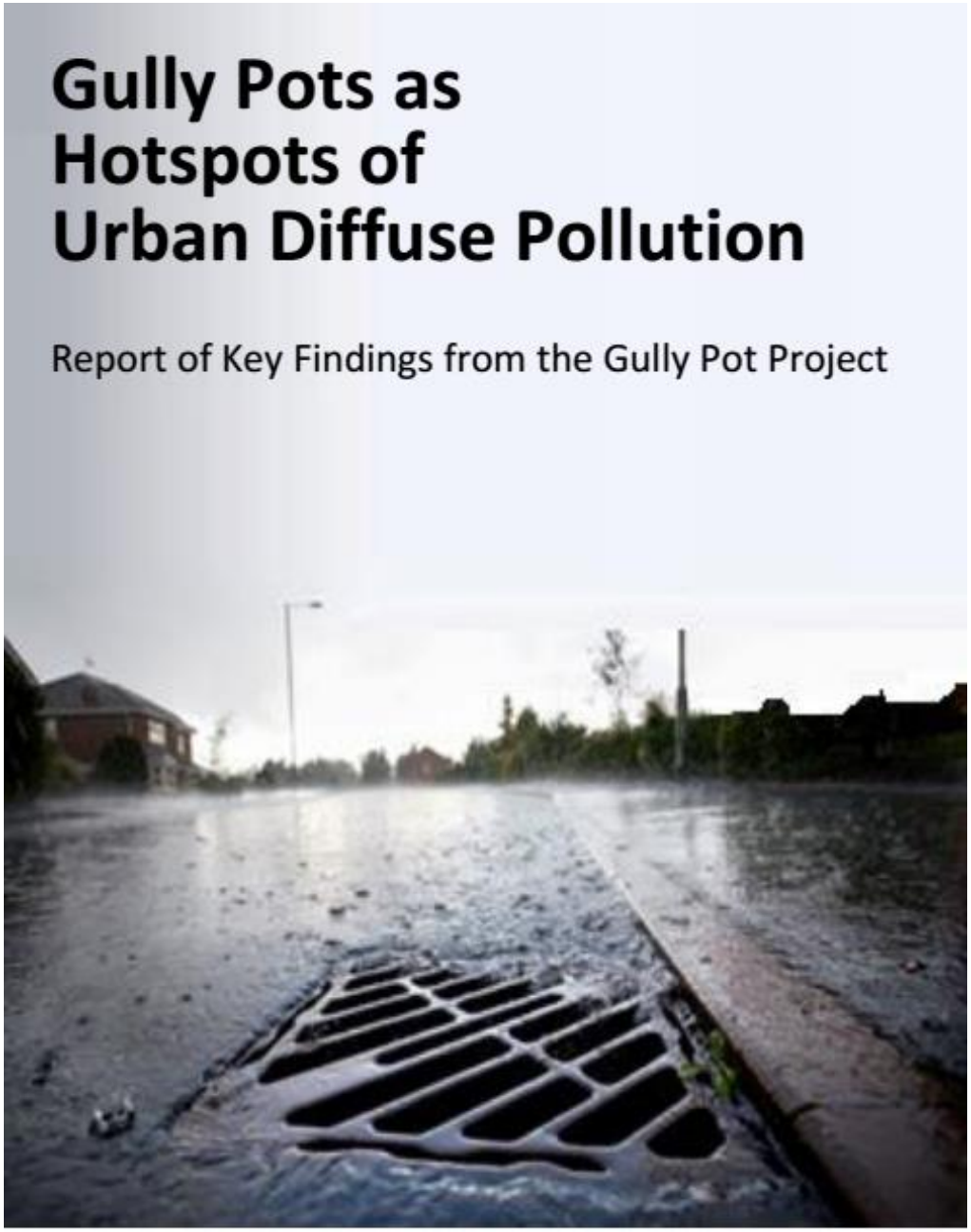

Facilities
Pond



TYPICAL SECTION THROUGH INFRAGREEN TREEBOX HP SYSTEM

Gully Pots as Hotspots of Urban Diffuse Pollution

Report of Key Findings from the Gully Pot Project



MANCHESTER 1824
The University of Manchester

Environment Agency

redroseforest

Key findings:

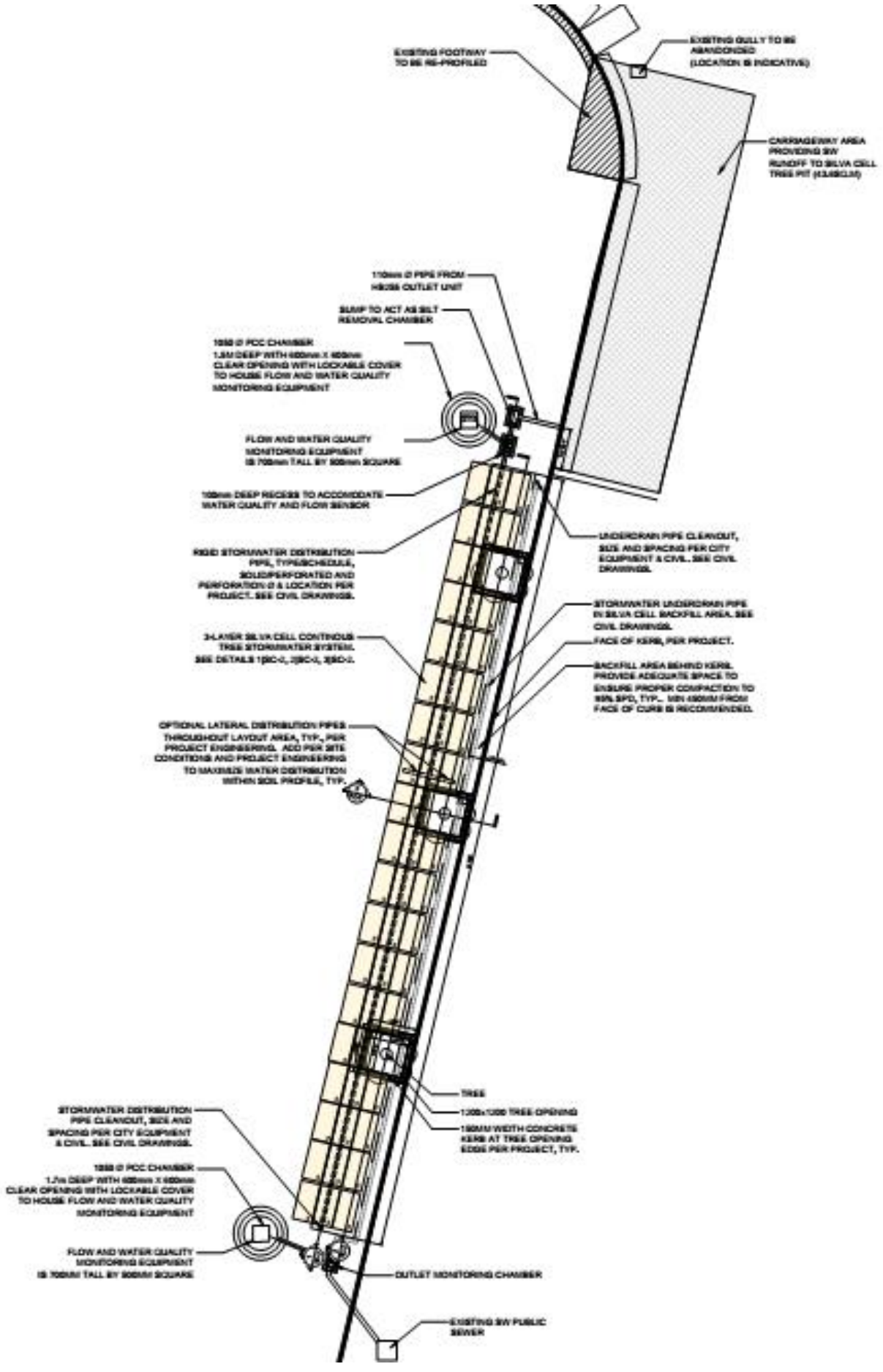
- Gully pot pollutant concentrations were variable within and between pollutant types.
- Zinc, Copper and PAH concentrations were high, exceeding environmental quality standards for the dissolved phase and guideline values for the sediment-bound phase.
- Other more common pollutants, including biochemical oxygen demand, nutrients and faecal indicator organisms were generally low.
- Pollutant fingerprinting revealed that PAHs were derived from a mix of combustion and non-combustion sources, whilst Zn originated predominantly from tyre wear.
- Loadings for Zn, Hydrocarbons and road-salt derived constituents exceeded 10 kg/km^2/y, and are likely to make a significant contribution to urban runoff loads when compared to SAGIS model outputs for the River Irwell and River Medlock.
- There were complex spatial patterns in pollutant levels, although hotspots were associated with high vehicular traffic (train station approaches, bus interchanges, major arterial routes, and approaches to car parks) and legacy soil contamination.
- Areas of existing green infrastructure in the city were generally associated with lower levels of Zinc and Hydrocarbons in both dissolved and sediment-bound phases.

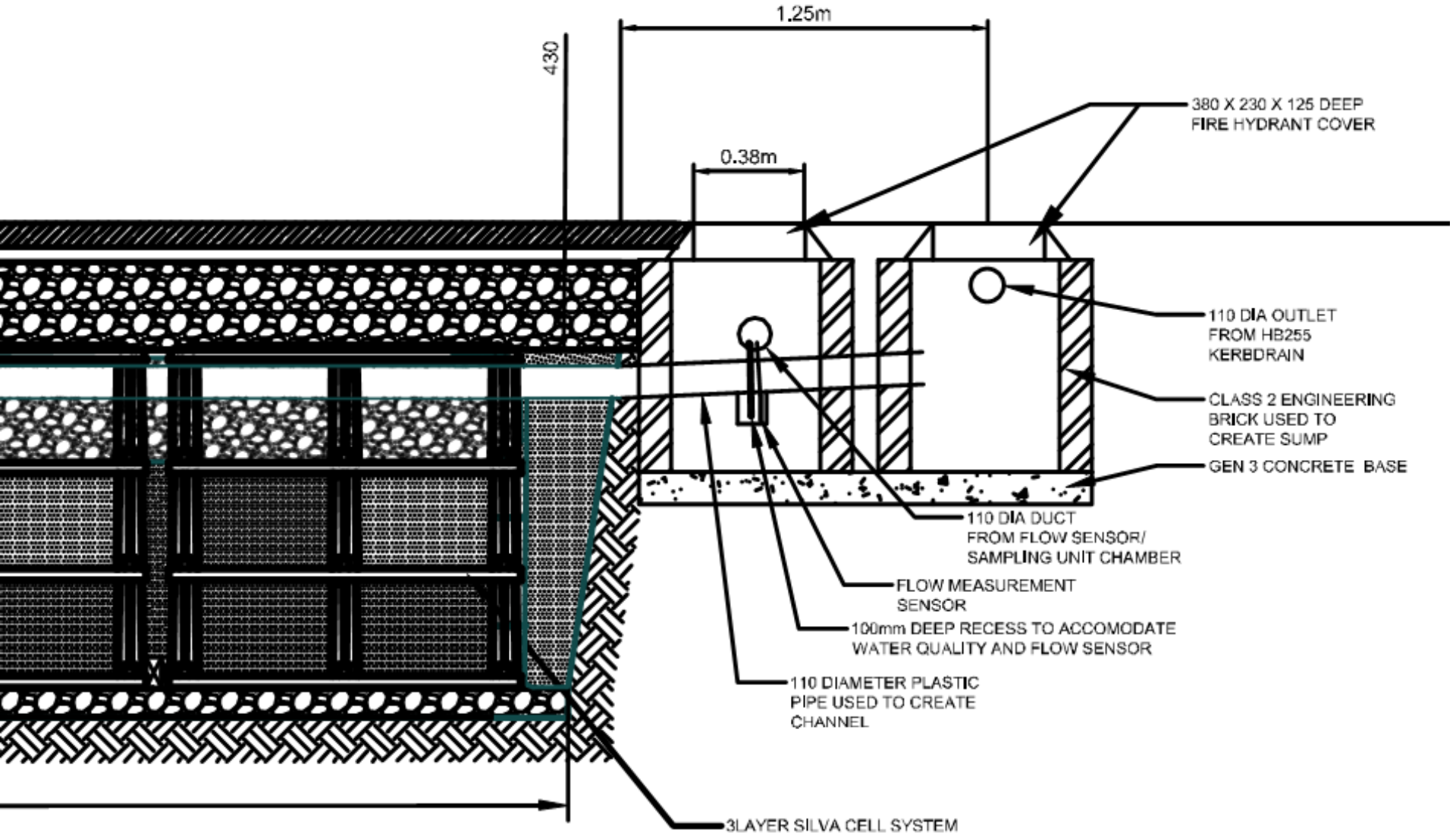
Salford research project

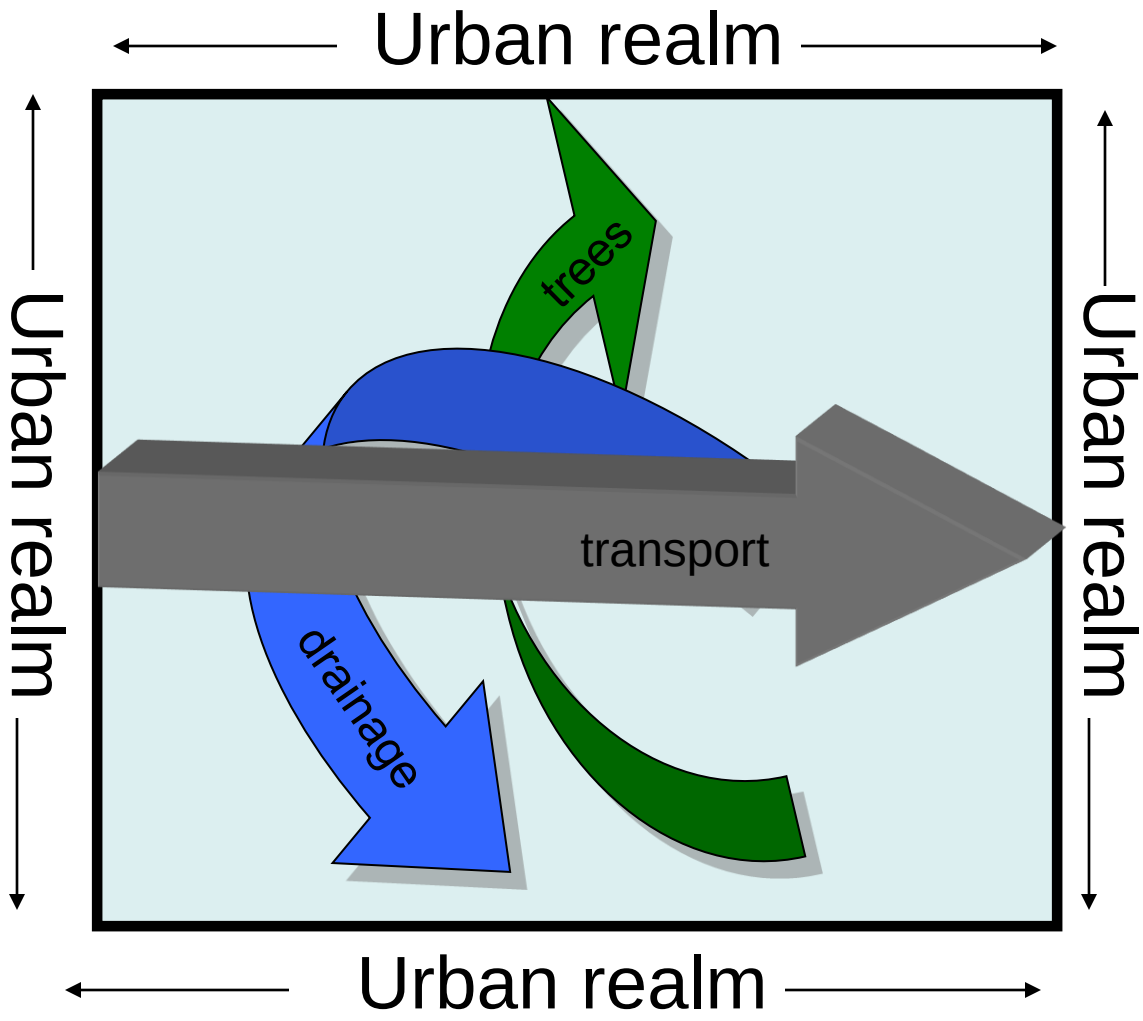
Potential to manage stormwater runoff quality and quantity using green infrastructure

Partners include:

- Red Rose Community Forest
- Salford Borough Council
- The Environment Agency
- Manchester University
- United Utilities Group plc!

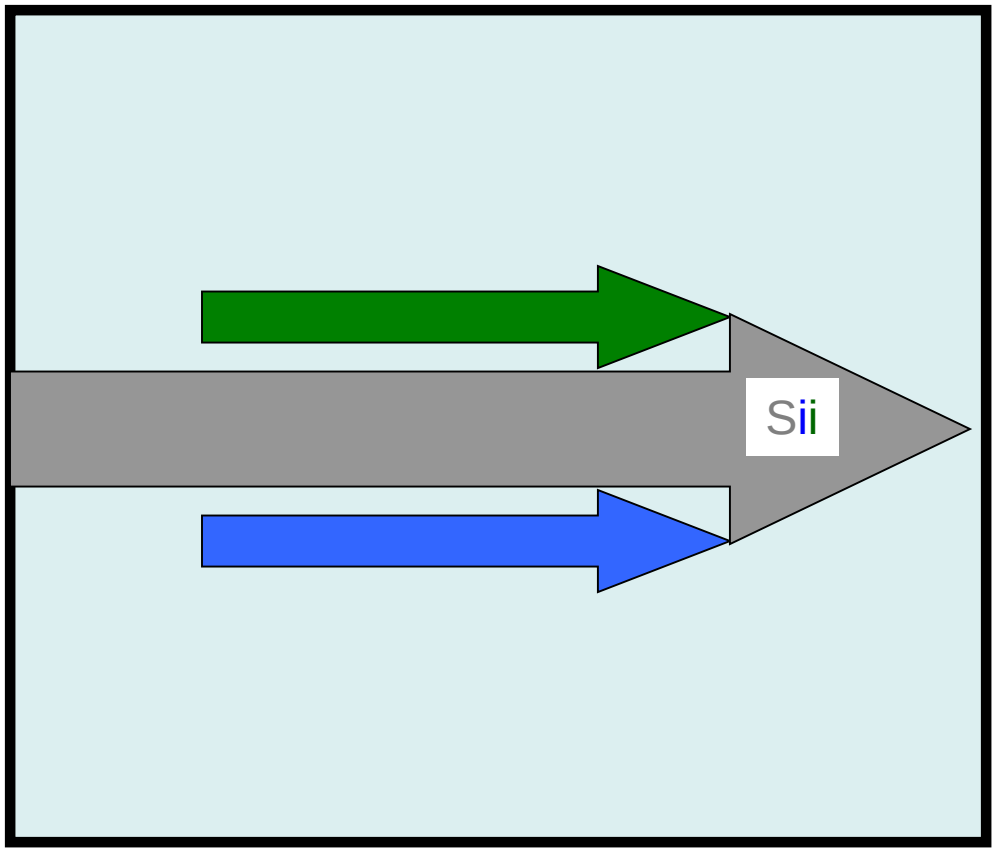

EXISTING FOOTWAY TO BE RE-PROFILED
EXISTING GULLY TO BE ABANDONED (LOCATION IS INDICATIVE)
CARRIAGEWAY AREA PROVIDING SW RUNOFF TO SILVA CELL TREE PIT (13.48SQM)
110mm Ø PIPE FROM HOUSE OUTLET UNIT
SUMP TO ACT AS SILT REMOVAL CHAMBER
1050 Ø PCC CHAMBER 1.5M DEEP WITH 600mm X 600mm CLEAR OPENING WITH LOCKABLE COVER TO HOUSE FLOW AND WATER QUALITY MONITORING EQUIPMENT
FLOW AND WATER QUALITY MONITORING EQUIPMENT IS 700mm TALL BY 500mm SQUARE
100mm DEEP RECESS TO ACCOMODATE WATER QUALITY AND FLOW SENSOR
RIGID STORMWATER DISTRIBUTION PIPE, TYPE/SCHEDULE, SOLID/PERFORATED AND PERFORATION Ø & LOCATION PER PROJECT. SEE CIVIL DRAWINGS.
3-LAYER SILVA CELL CONTINOUS TREE STORMWATER SYSTEM. SEE DETAILS 1[SC-1], 2[SC-1], 3[SC-1].
OPTIONAL LATERAL DISTRIBUTION PIPES THROUGHOUT LAYOUT AREA, TYP., PER PROJECT ENGINEERING. ADD PER SITE CONDITIONS AND PROJECT ENGINEERING TO MAXIMIZE WATER DISTRIBUTION WITHIN SOIL PROFILE, TYP.
UNDERDRAIN PIPE CLEANOUT, SIZE AND SPACING PER CITY EQUIPMENT & CIVIL. SEE CIVIL DRAWINGS.
STORMWATER UNDERDRAIN PIPE IN SILVA CELL BACKFILL AREA. SEE CIVIL DRAWINGS.
FACE OF KERB, PER PROJECT.
BACKFILL AREA BEHIND KERB. PROVIDE ADEQUATE SPACE TO ENSURE PROPER COMPACTION TO 95% SPD, TYP.. MIN 450MM FROM FACE OF CURB IS RECOMMENDED.
TREE
1200x1200 TREE OPENING
150MM WIDTH CONCRETE KERB AT TREE OPENING EDGE PER PROJECT, TYP.
STORMWATER DISTRIBUTION PIPE CLEANOUT, SIZE AND SPACING PER CITY EQUIPMENT & CIVIL. SEE CIVIL DRAWINGS.
1050 Ø PCC CHAMBER 1.7m DEEP WITH 600mm X 600mm CLEAR OPENING WITH LOCKABLE COVER TO HOUSE FLOW AND WATER QUALITY MONITORING EQUIPMENT
FLOW AND WATER QUALITY MONITORING EQUIPMENT IS 700MM TALL BY 500MM SQUARE
OUTLET MONITORING CHAMBER
EXISTING SW PUBLIC SEWER


1.25m
430
0.38m
380 X 230 X 125 DEEP
FIRE HYDRANT COVER
110 DIA OUTLET
FROM HB255
KERBDRAIN
CLASS 2 ENGINEERING
BRICK USED TO
CREATE SUMP
GEN 3 CONCRETE BASE
110 DIA DUCT
FROM FLOW SENSOR/
SAMPLING UNIT CHAMBER
FLOW MEASUREMENT
SENSOR
100mm DEEP RECESS TO ACCOMODATE
WATER QUALITY AND FLOW SENSOR
110 DIAMETER PLASTIC
PIPE USED TO CREATE
CHANNEL
3LAYER SILVA CELL SYSTEM


Urban realm
Urban realm
Urban realm
Urban realm
trees
transport
drainage

Sustainable integrated infrastructure - Sii

Compatible



Effective

Resilient

Look beyond the tree pit…

Sii – The Future