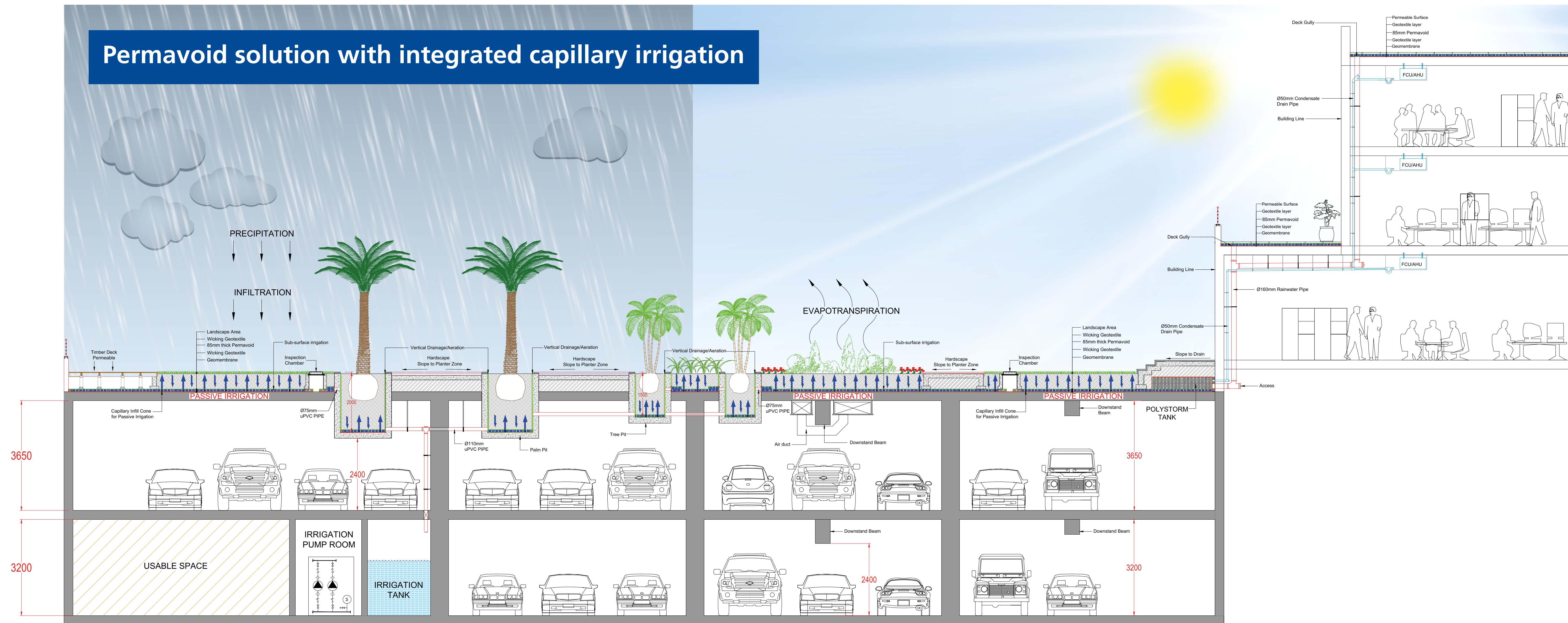
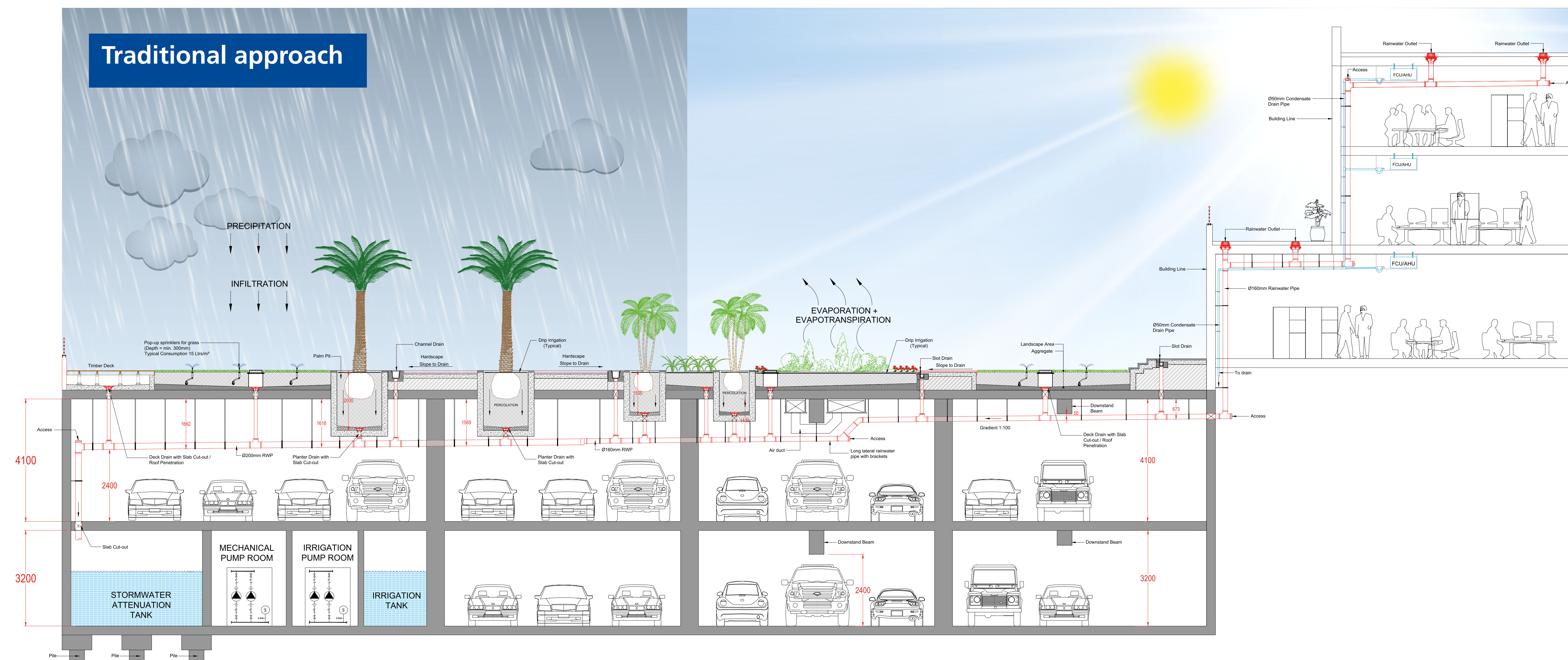


Storm/surface water drainage installation on podium/roof deck/urban landscape



*Designed in accordance with CIRIA SUDS Manual



*For illustrative purposes only

KEY BENEFITS - PERMAVOID SOLUTION

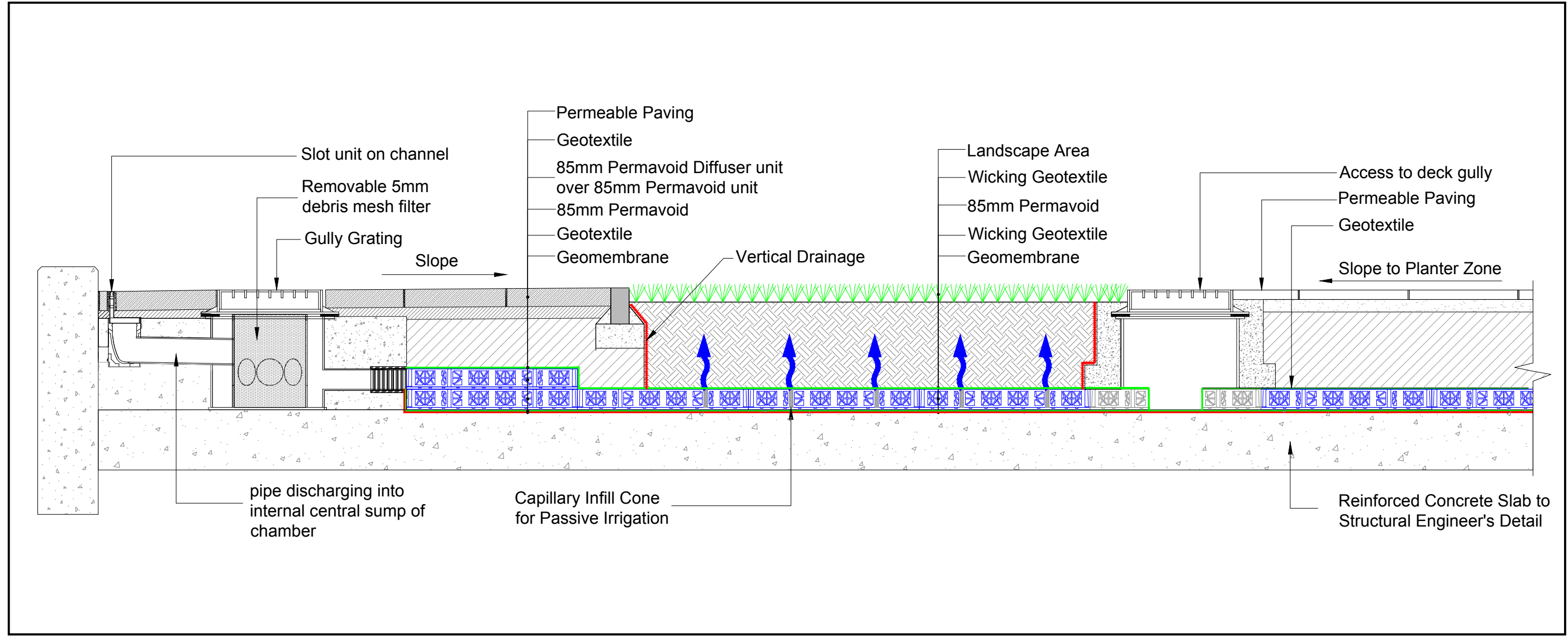
- Basement high-level mechanical services zone with reduced SSL to soffit height
- Local Authority requirement for stormwater attenuation is used in the Permavoid installations. RCC tanks, pumps and mechanical plant/equipment are therefore not required reducing structural/sub-structure considerations
- Storm/surface water discharge to the external Authority drainage network is controlled/attenuated through the Permavoid installations and provides use for passive irrigation
- Storm/surface water protection devices (e.g. silt traps/interceptors) can form part of the Permavoid installation
- Overflow/discharge pipework from the Permavoid system are totally flexible as to their locations
- Landscape drainage mainly confined within the landscaped zone
- Mechanical irrigation can be reduced by utilising the passive irrigation potential of the Permavoid solution reducing water consumption
- Significantly reduces access and maintenance from landscape drainage
- Additional usable/sellable space (parking etc.)
- Compliance with regional authority sustainability initiatives

STANDARD PODIUM DECK DESIGN CONSIDERATIONS

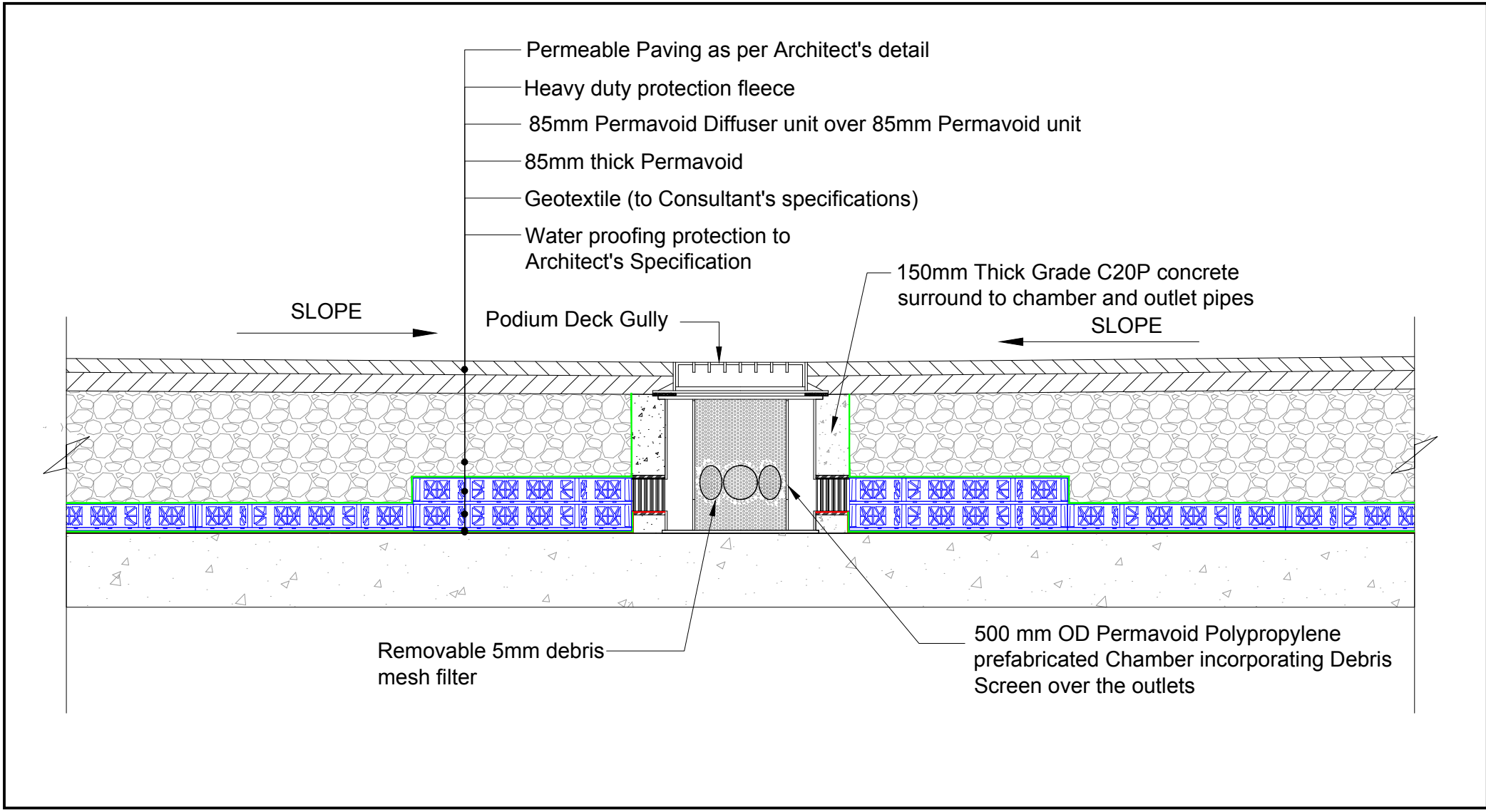
- Landscape drainage requirements
- Basement high-level mechanical services zone with increased SSL to soffit height requirements
- International codes/regulations and Local Authority requirements for stormwater attenuation with associated RCC tanks, pumps and mechanical plant/equipment
- Structural considerations regarding additional sub-structure to accommodate the loads of the storm/surface water RCC tank and plant room
- Controlled discharge of storm/surface water to the external Authority drainage network using proprietary components
- Storm/surface water protection devices such as silt traps, pressure break chambers etc.
- Mechanical irrigation system
- Access and maintenance of basement level high level landscape drainage
- Multiple structural slab penetrations to accommodate the landscape drainage

PERMAVOID APPLICATIONS

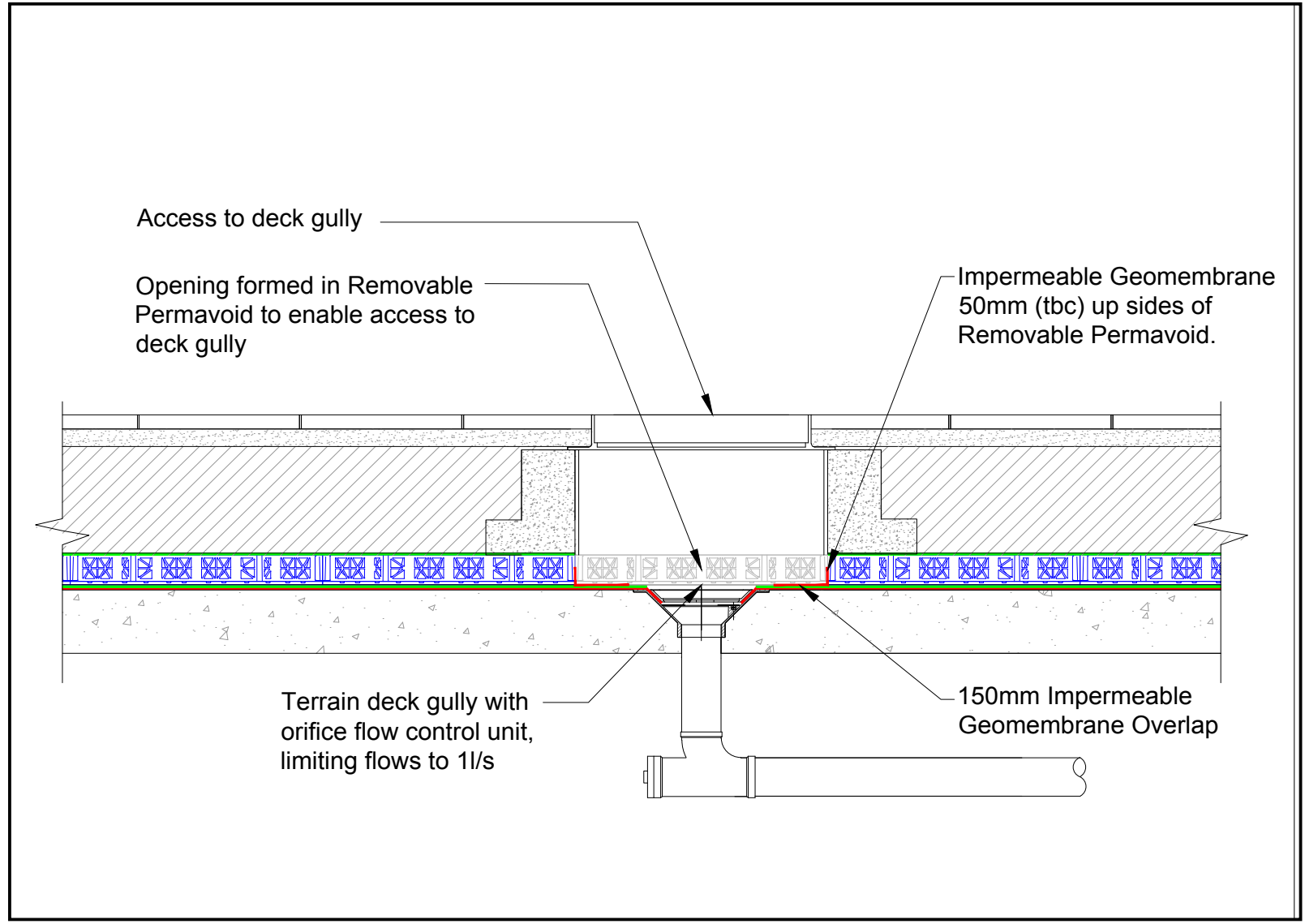
Typical section through podium build up slot drain connection into Permavoid layer



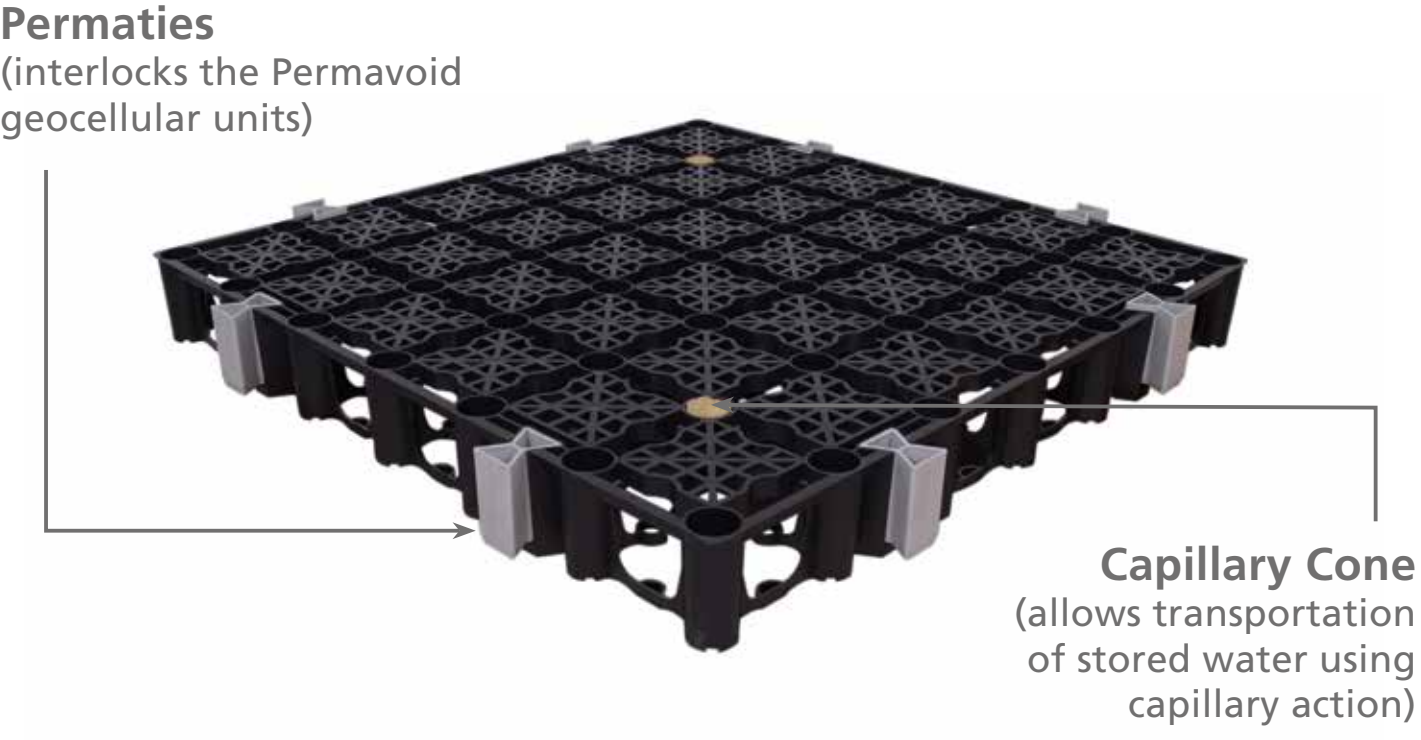
Section through surface water collection gully & connection system



Typical section through outflow chamber



Permavoid Geocellular Unit



Permavoid Design Criteria

Scope Of Works

A performance specification should cover both the design and installation requirements for the Permavoid shallow attenuation/detention or infiltration/soakaway systems and include suitable geotextile or membrane material.

- Designs shall be based on sound structural and hydraulic calculations and in accordance with CIRIA guidelines and local Authority requirements
- The Permavoid modular system shall be installed on a firm, stable and uniform/level base
- The installation shall fully comply with the Polypipe installation recommendations and requirements of the on-site monitoring/supervision team
- Consideration must be given to the selection of appropriate geotextiles and/or membranes
- Consideration must be given to the design requirements; retention, detention, attenuation, infiltration/soakaway or passive/capillary irrigation
- Site staff training for Permavoid installations will be provided

Relevant Standards and Regulations

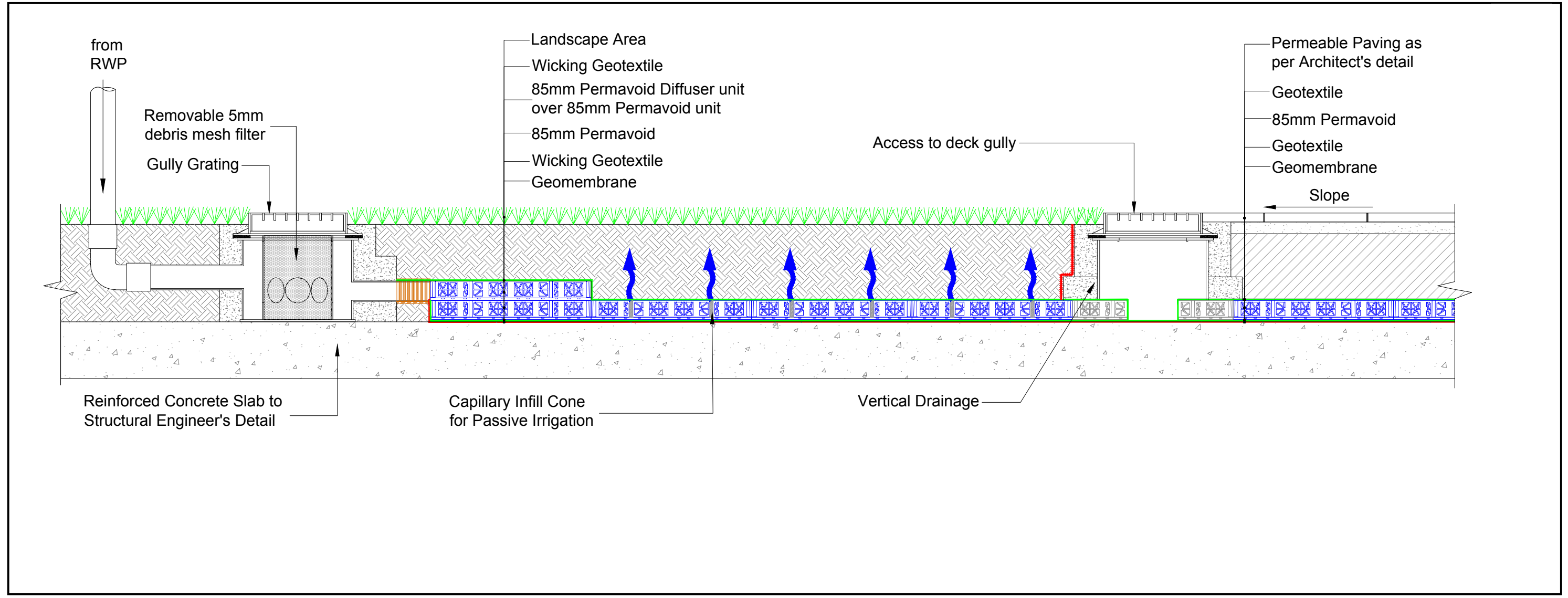
- Local Authority requirements, standards and guidelines
- CIRIA report C680 (2008) Structural design of modular geocellular drainage tanks
- CIRIA SUDS C697 The SuDS Manual
- BS 7533-13:2009 Pavements constructed with clay, natural stone or concrete pavers. Part 13 – Guide for the design of permeable pavements constructed with concrete paving blocks and flags, natural stone slabs and setts and clay paviors
- BS EN 752: 2008 Drain and sewer systems outside buildings
- BS 8582: 2013 Code of practice for surface water management for development site

Testing and Commissioning

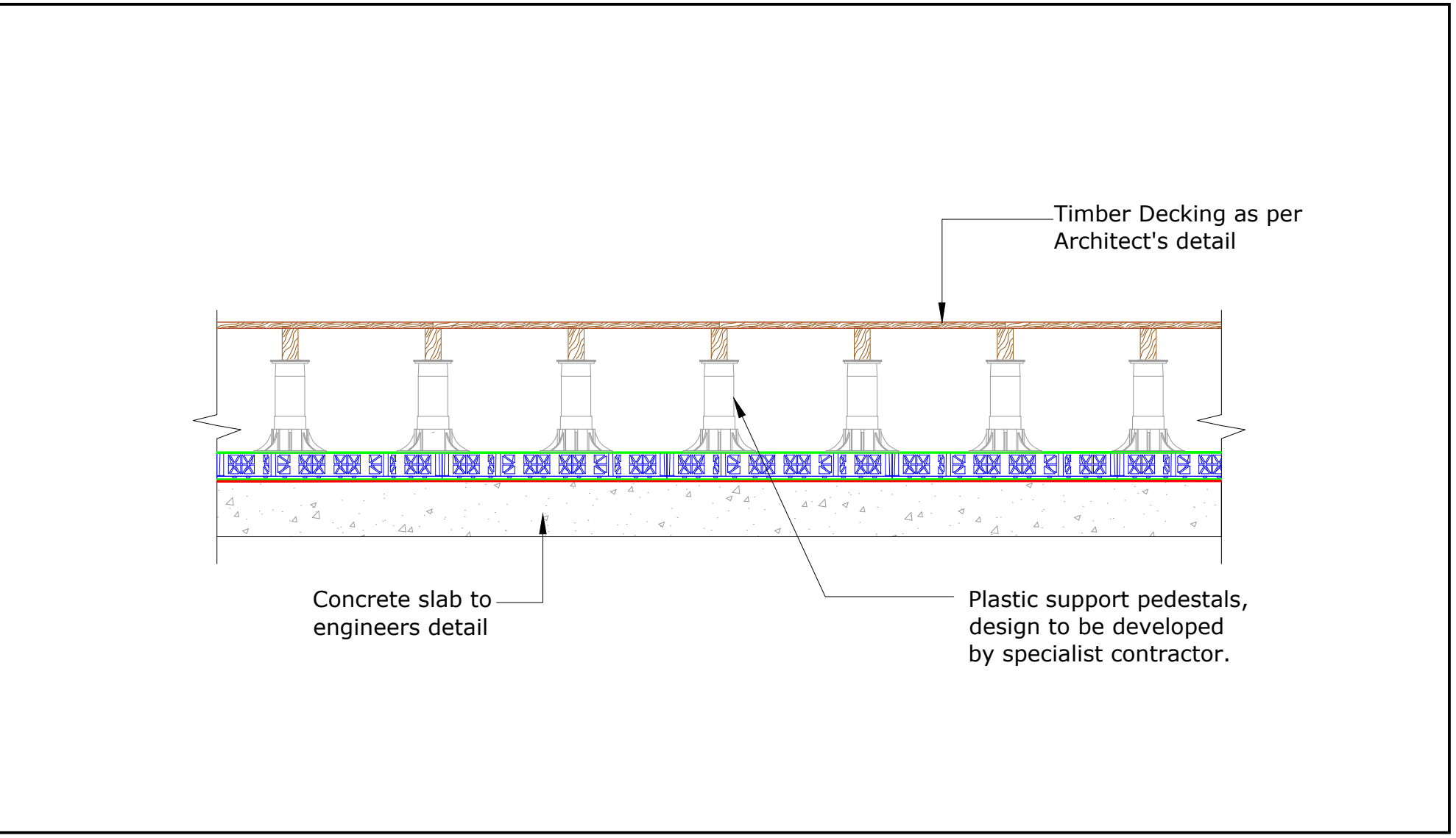
Testing and commissioning shall be under the governance of the Resident Engineer and in accordance with the project requirements, specifications, manufacturers' requirements and the Polypipe on-site supervision recommendations.

Note: Early engagement with the Polypipe Technical team is recommended at concept / design stage to provide appropriate system design guidance. Product performance / specification and standard details relative to individual schemes are available on request. On site guidance is available and recommended prior to commencing installation.

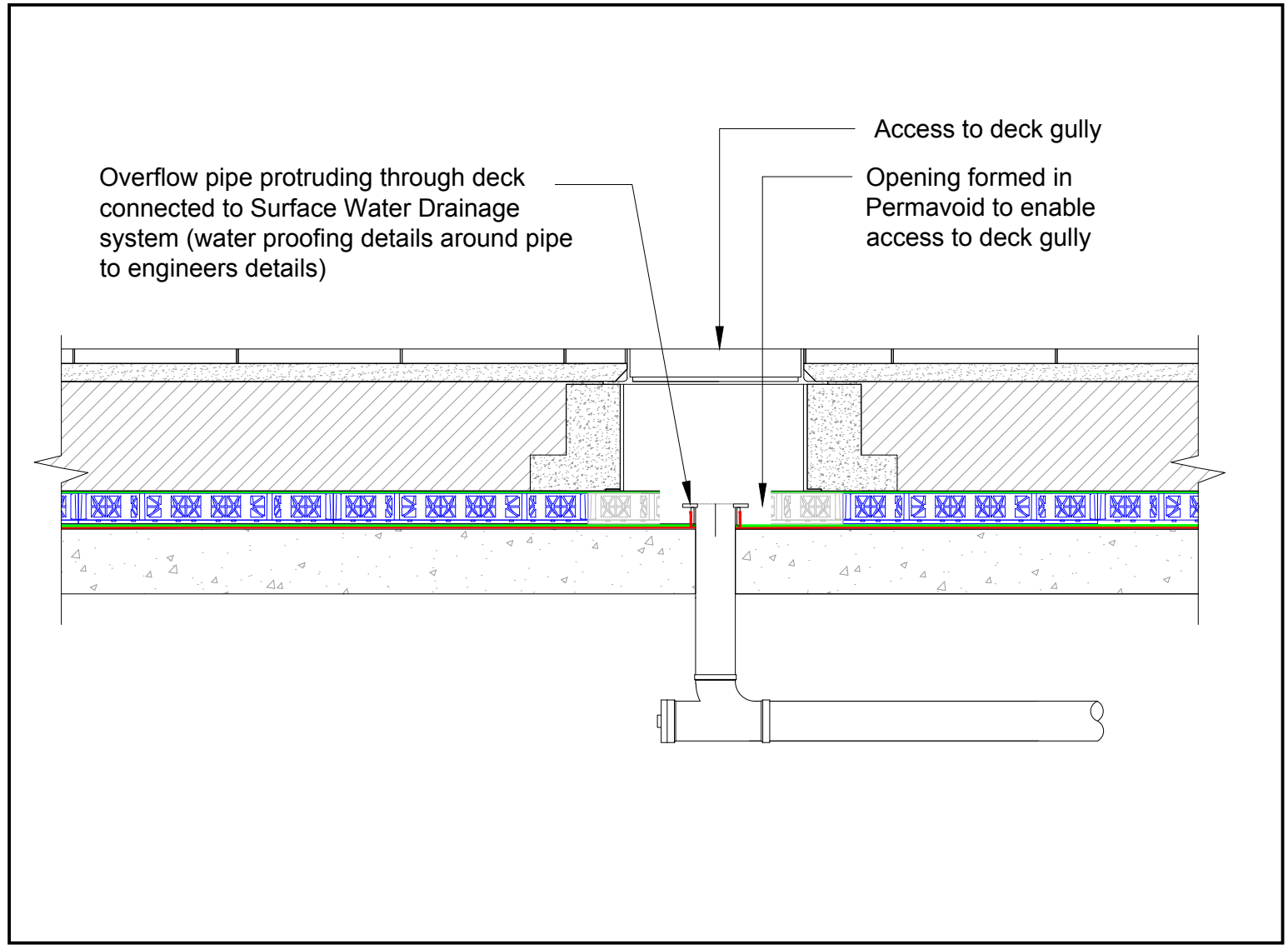
Typical section through podium build up showing RWP connection into Permavoid layer



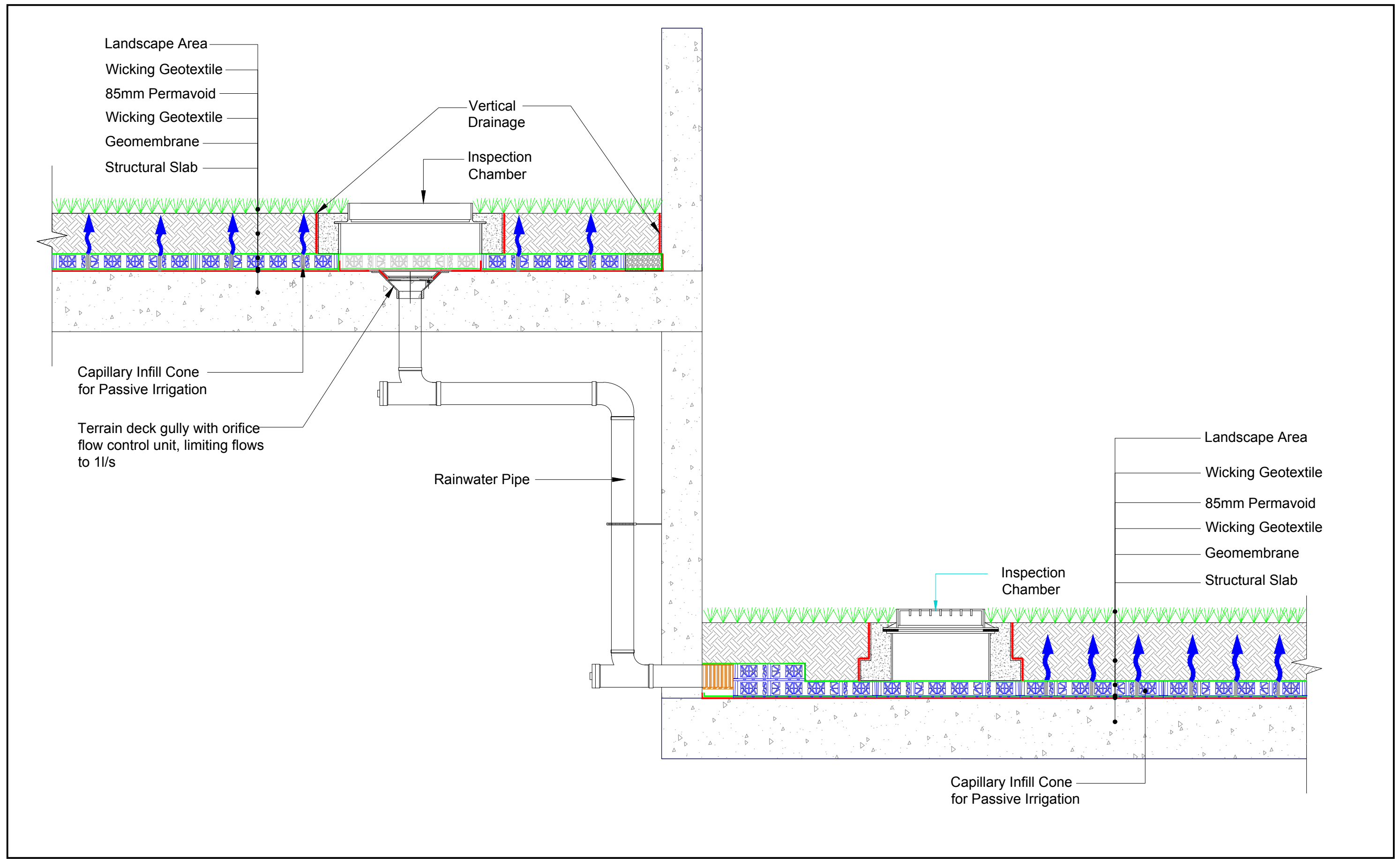
Typical supported timber deck over Permavoid raft detail



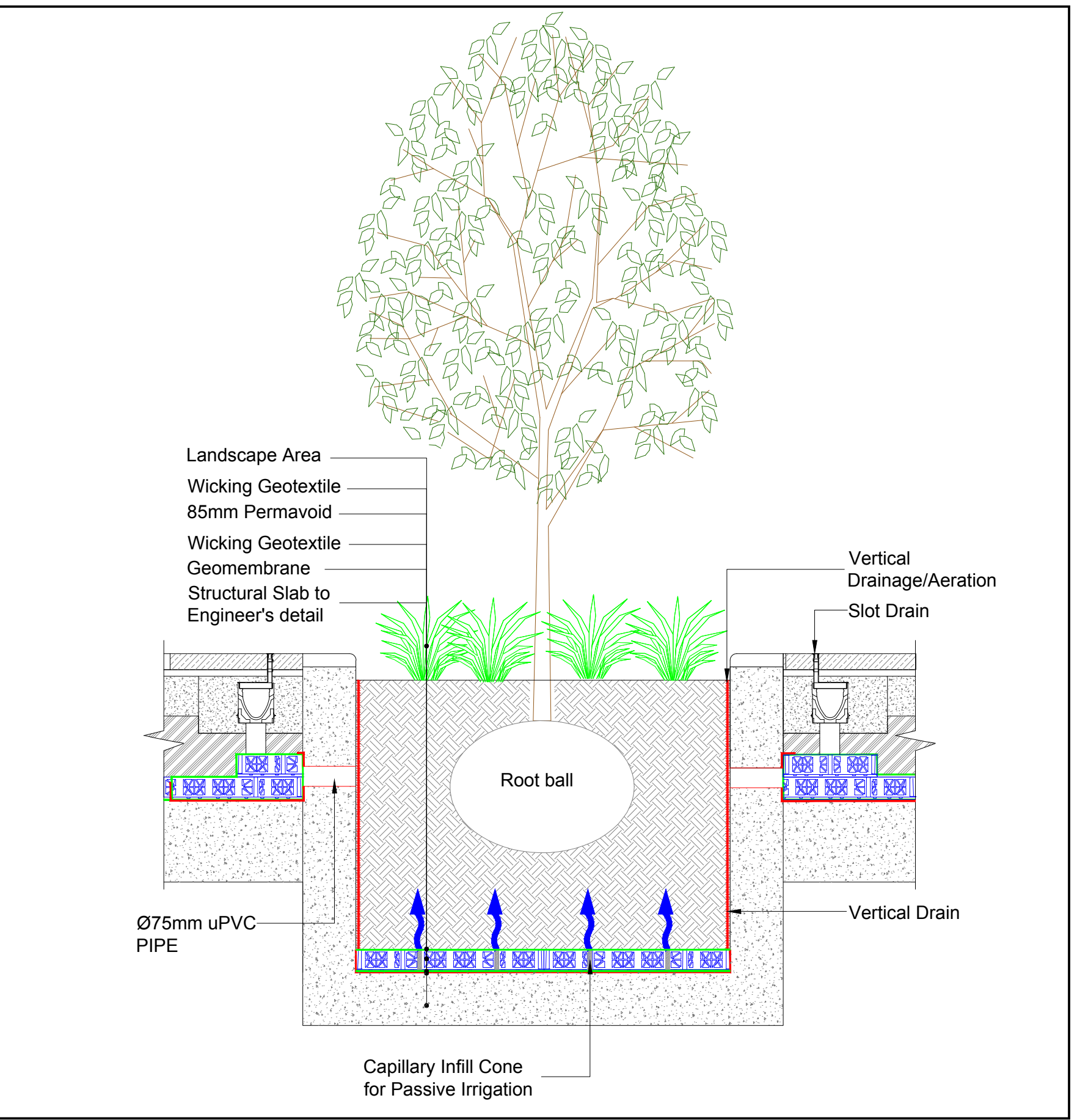
Typical section through overflow chamber



Typical section on podium/roof deck using Permavoid on different levels



Typical Permavoid passive on-demand tree-pit planter irrigation detail



Typical section through podium showing Permavoid connection into drainage system

