



DESIGN & CONSTRUCTION NOTES

STREET TREES AND IRRIGATION DESIGN  
BOOK 700



REV	DATE	AMENDMENT
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### **Irrigation System Materials Specification**

All equipment, materials and accessories shall conform to the appropriate current Australian Standards.

#### **1) PVC pipe**

- a) All underground piping shall be uPVC piping manufactured to *AS1477:2006*
- b) mPVC pipes conforming to *AS4765:2007* will be accepted in 100mm and 150mm sizes of class 12 and above.
- c) Mainlines and Sub-mains Piping supplied and installed by the Contractor shall be in accordance with the following:
  - i) Installed in accordance with the manufacturer's recommendations.
  - ii) A minimum of PN12 pressure rating.
  - iii) Joined using rubber ring socketed pipe for 80mm or larger.
  - iv) Solvent welded for pipe work up to and including 50mm.
- d) Lateral pipe work installed on the down-stream side of the solenoid control valves, supplied and installed by the Contractor shall be in accordance with the following:
  - i) Installed in accordance with the manufacturer's recommendations.
  - ii) A minimum of PN12 pressure rating.
  - iii) Joined using solvent welded joint.

#### **2) PVC Pipe Fittings**

- a) Fittings supplied and installed in underground pipe work for mainlines and sub-main pipes up to 50mm diameter shall be in accordance with the following:
  - i) PVC solvent weld manufactured & installed in accordance with *AS1477:2006*.
  - ii) Compatible with PVC pipe produced in accordance with the Standard.
  - iii) Manufactured to a minimum of PN18.
- b) Fittings supplied and installed in underground pipe work for mainlines and sub-main pipes, 80mm diameter or larger shall be in accordance with the following:
  - i) Bends: PVC rubber ring jointed long radius (not essential), Cat. No. P12 or rubber ring ductile iron.
  - ii) Tees: Rubber ring joint, ductile iron cement lined and bitumen coated or approved equivalent.
  - iii) Tapping Bands: Single branch & cross tapping bands shall be screwed bronze.
  - iv) Reducers: Rubber ring jointed ductile iron.
  - v) Flanged Connectors: All flanged connectors shall be table "E" rubber ring joint ductile iron.
  - vi) Lateral Line Fittings: Lateral pipe work fittings located downstream of solenoid control valves shall be PN18 moulded PVC fittings with solvent cement joints.

#### **3) Solvent Cements**

Solvent cements supplied shall be in accordance with the manufacturer's recommendations for the climatic conditions that prevail during the installation of the system.

#### **4) Priming Fluid**

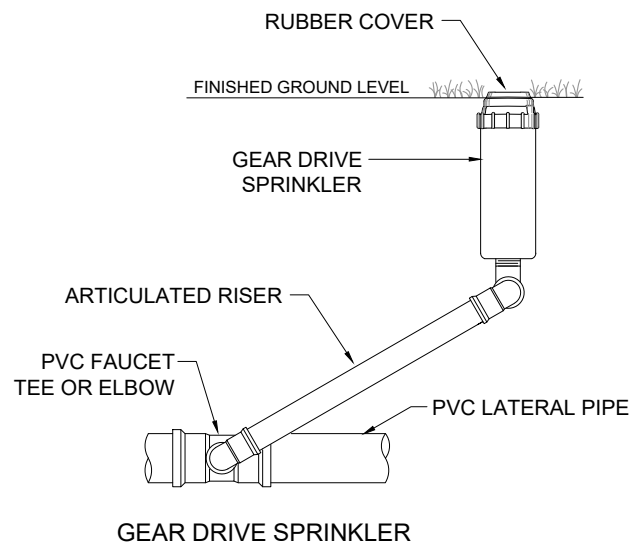
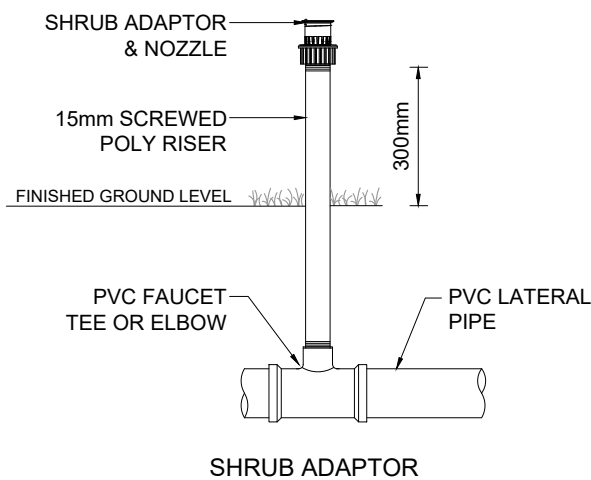
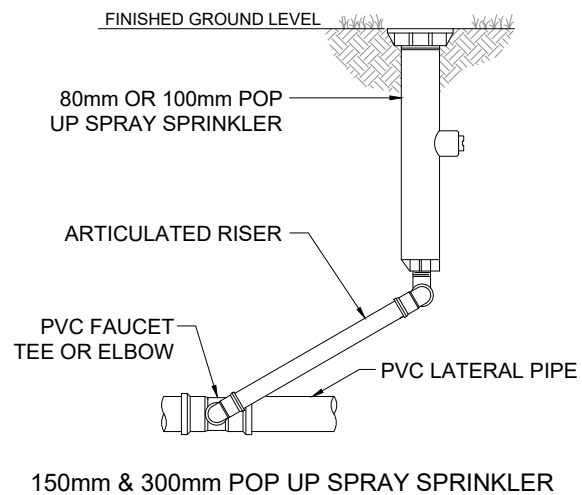
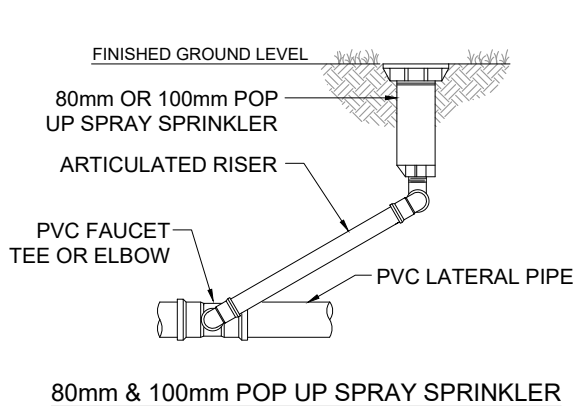
Priming or cleaning fluids shall be as recommended by the pipe manufacturer.

## 5) Rubber Rings &amp; Rubber Ring Lubricant

- a) Rubber rings supplied for pipes and fittings shall comply with AS1646-2007.
- b) Contractors shall include, in the cost of supplying pipe and fittings, o-ring lubricant as recommended by the manufacturer of the pipe or fittings.

## 6) Sprinkler Heads &amp; Sprinkler Risers

- a) Sprinklers shall meet the type, performance and qualities as shown on the drawings. All rotary pop-up sprinkler heads shall be fitted with non-drain valves.
- b) Sprinkler risers: No rigid risers. All risers shall be articulated type of sufficient length to ensure that the riser is inclined at an angle of 45° to the horizontal. Riser diameter shall be equivalent to the sprinkler inlet thread size.





**7) Solenoid Decoders**

Solenoid decoders shall be as provided by aQUAMONIX (Rainman) as specified on the project drawing.

**8) 2-WIRE Cable**

Solenoid control cable shall be a Aquamonix (Rainman) approved 2-Wire cable.

**9) Low Voltage Cables**

Solenoid valve control cables shall be Tyflo multi-strand copper conductors sheathed in polyethylene or polypropylene suitable for direct burial. Cable sizes shall be:

- a) Common Wires: Minimum of 2.5mm<sup>2</sup> conductor or as specified.
- b) Active Wires: 1.5mm<sup>2</sup> if less than 400 metres in total length, or 2.5mm<sup>2</sup> if greater than 400 metres in total length.
- c) Larger size cable may be used to ensure the reliable operation of solenoid valves.

A different colour of active wire shall be used for each solenoid valve with an individual cable being installed to each valve. Common wire shall be black. Spare wires are to be terminated in 910 Valve Box.

**10) Wire Connectors**

All wire joints and connections to control valves are to be Rainbird DBR-Y gel filled waterproof connector. Alternative sealant kits shall not be used unless authorised by the City's Representative.

**11) Conduit**

All conduits shall be a minimum of 25mm MD conduit. Long radius bends are to be installed for all conduit changes of direction including entry to valve boxes.

**12) Cable pits**

All cable pits shall be FCO5 size to be plastic with P2 concrete reinforced lids.

**13) Backflow Device**

Where the irrigation system is connected to mains water supply, a Water Corporation approved backflow device is to be installed.

**14) Pipe Sleeves**

Pipe sleeves shall be a minimum of Class PN9 PVC SWJ sized as specified.

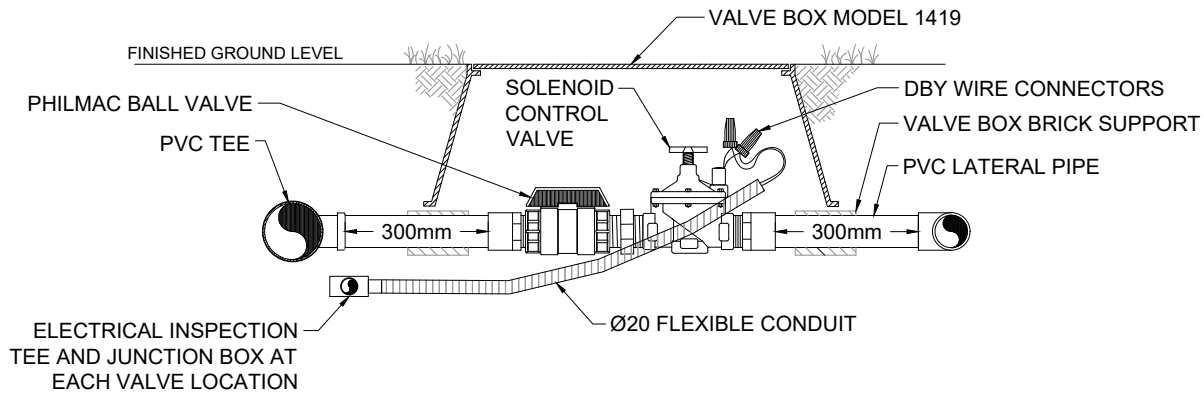
**15) Bolts and Nuts**

All bolts, nuts and washers shall be in accordance with *AS1110.1:2015, AS1110.2:2015, AS1111.1:2015, AS1111.2:2015, AS1112.1-2000, AS1112.2-2000, AS1112.3:2015 and AS1112.4-2000* and hot dipped galvanised in accordance with *AS1214-1983*. Bolts, nuts and washers shall be of similar material. Washers shall be fitted to all bolts and shall be tapered where necessary to give the heads and nuts of bolts a satisfactory bearing surface. The threaded portion of each bolt shall project through the nut by at least one full thread and not more than a distance equal to the bolt diameter.

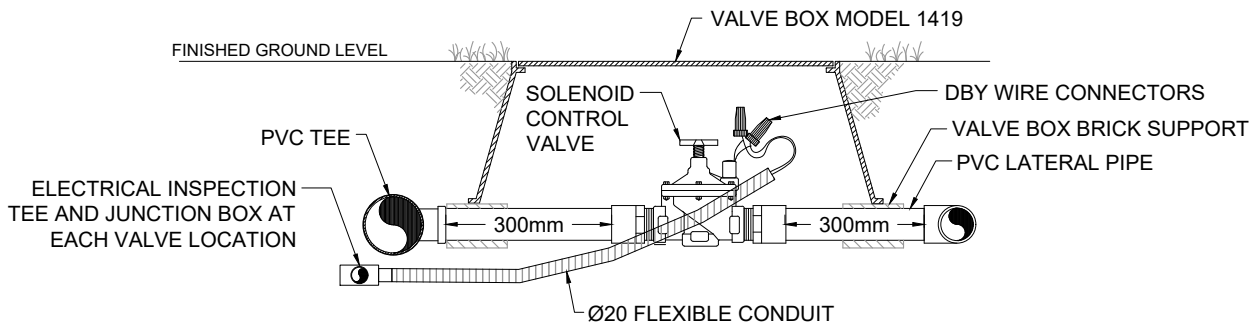
## 16) Solenoid Control Valves

Solenoid control valves shall be glass reinforced nylon of the type specified on the project drawing. All control valves are to be fitted with flow control stem and a manual bleed facility. Only one make of 24-volt AC valve is to be installed for each project.

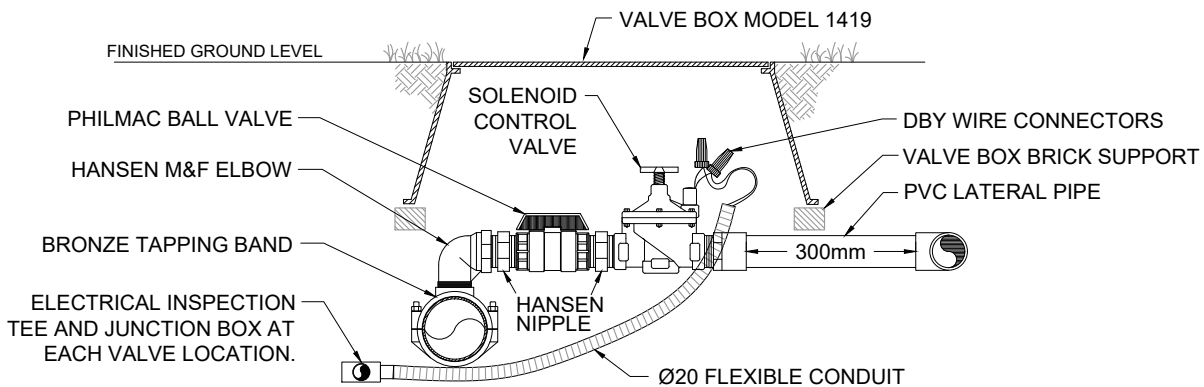
All solenoid valves to have ball valve. All mainlines 80mm and above to have tapping saddle facing upwards with poly elbow, nipple and ball valve



SOLENOID VALVE ON SWJ MAINLINE WITH BALL VALVE



SOLENOID VALVE ON SWJ MAINLINE



SOLENOID VALVE ON RRJ MAINLINE

**17) Valve Boxes**

MDPE valve boxes without pipe portals shall be supplied, with overlay style lockable lids with stainless steel locking bolts. Valve boxes shall have minimum dimensions in accordance with the following models:

Model 1419-12: to be fitted to all solenoid valves, flushing valves and air release valves.

Model 910: to house all isolation valves.

Model 1420: to house other equipment as specified on the project drawing.

Carson Brooks, Rainbird VB series or HR Products valve boxes that meet the specification are acceptable. The valve box lid shall clearly identify the box as being either Carson Brooks, Rainbird or HR Products.

**18) Isolation Valves**

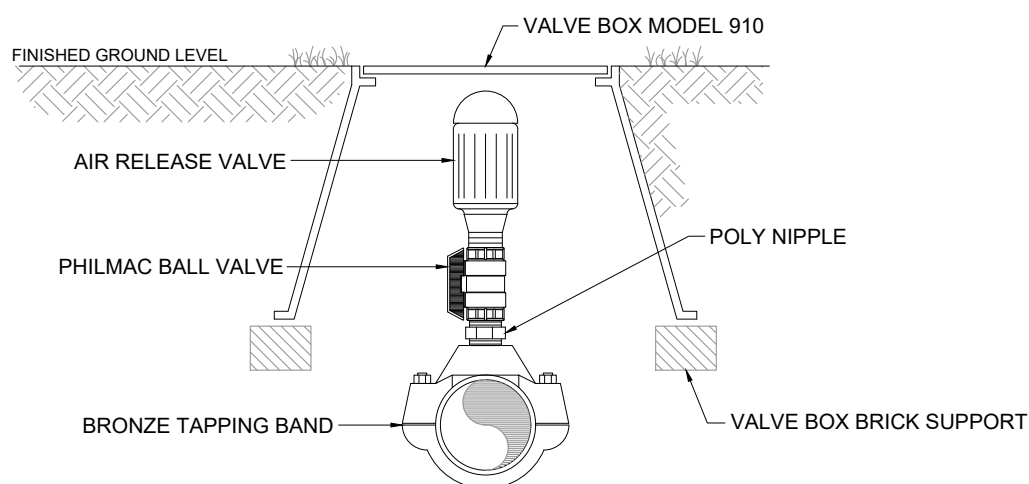
Isolation ball valves installed on the inlet to solenoid control valves and on mainline up to 50mm diameter shall be Philmac nylon ball valves or approved equivalent.

Isolation valves installed on the PVC mainline, 80mm or greater, are to be flanged ductile iron resilient seated valve with spindle cap. Valves shall be 'clockwise turning' to close and the top of the spindle cap shall have an embossed arrow indicating the direction to turn for closing.

Isolation valves shall be installed at junctions of mainlines where shown on the project drawings. The price for supply and installation of isolation valves shall include gaskets, nuts & bolts. Access to valve assemblies located below the bottom of valve boxes shall be provided by the installation of a short piece of PVC 'Ribloc' pipe or equivalent.

**19) Air Valves**

Air/Vacuum release valves shall be Bermad, ARI or Nelson sized as specified on the project drawing. An isolation ball is to be located immediately beneath the air valve and the ball valve shall be left in the open position.



AIR RELEASE VALVE

Referenced Australian Standards

AS 1110.1:2015	ISO Metric hexagon bolts and screws - Product grades A and B - Bolts
AS 1110.2:2015	ISO Metric hexagon bolts and screws - Product grades A and B - Screws
AS 1111.1:2015	ISO Metric hexagon bolts and screws - Product grade C - Bolts
AS 1111.2:2015	ISO Metric hexagon bolts and screws - Product grade C - Bolts
AS 1112.1-2000	ISO Metric hexagon nuts - Style 1 - Product grade A and B
AS 1112.2-2000	ISO Metric hexagon nuts - Style 2 - Product grade A and B
AS 1112.3:2015	ISO Metric hexagon nuts - Product grade C
AS 1112.4-2000	ISO Metric hexagon nuts - Chamfered thin nuts - Product grade A and B
AS 1477:2006	PVC Pipes and Fittings for Pressure Applications
AS 1646-2007	Elastomeric Seals for Waterworks Purposes
AS 4765:2007	Modified PVC (PVC-M) Pipes for Pressure Applications

## STREET TREE SPECIFICATION

702.01

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Referenced Australian Standards

AS 4970:2009 Protection of trees on development sites

AS 4419:2018 Soils for Landscape and Garden Use

AS 4454:2012 Composts, Soil Conditioners and Mulches

AS 2303:2015 Tree Stock for Landscape Use

AS 4678:2002 Earth Retaining Structures

AS 1319:1994 Safety Signs for the Occupational Environment

AS 2436:2010 Guide to noise and Vibration Control on Construction, Demolition and Maintenance Sites

AS 2507:1998 Storage and Handling of Pesticides

Relevant City of Perth DocumentsCity of Perth Street Tree Guide 2023 ([Link](#))City of Perth Street Tree Species List ([Link](#)) & Matrix ([Link](#))City of Perth Tree Protection Policy (CP3.3) ([Link](#))Book 300 - Standard Footpath Design and Installation Details ([Link](#))Book 400 - Standard Kerb Types and Installation Details ([Link](#))Book 500 - Standard Furniture and Installation Details ([Link](#))Book 1000 - Urban Centres: Reinstatement Policies and Vehicle Restrictions ([Link](#))

For further information required, please contact the Transport and Urban Design team at

[TUD.inbox@cityofperth.wa.gov.au](mailto:TUD.inbox@cityofperth.wa.gov.au)Relevant Drawings

This Specification is to be read in conjunction with the Landscape Drawings provided by the City or other project team and within this City of Perth Design and Construction Notes - Book 700 - Street Trees and Irrigation Design.



## STREET TREE SPECIFICATION

702.02

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

General

The City is committed to high quality and consistent processes of design, supply and installation of street trees in an effort to maximise the health, size and longevity of all our street trees, and our urban forest.

Planting street trees is a complex process, carried out by various parties and projects. All parties are required to align their work with several key documents outlining the City's agreed strategies, processes and practices:

- Urban Forest Plan
- Street Tree Guide
- Street Tree List & Matrix
- Design and Construction Notes - Book 700 Street Trees and Reticulation Design

Suitably Qualified and Experienced Consultants and Contractors

- Design of street tree infrastructure should be completed by a suitably qualified and experienced professional such as a landscape architect or designer.
- Design documentation is to be submitted in PDF format for approval by the City's Representative prior to the commencement of work.
- Detailed service investigations to be conducted as part of the design process and provided to the City's Representative.
- As-constructed drawings are to be provided to the City in PDF and geolocated CAD format (As per A-Spec Standards).
- Installation to be completed by suitably qualified professionals - civil contractor for paving, concrete, structures etc. And horticulturist for tree planting. Further details below.

## STREET TREE SPECIFICATION

702.03

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Design

The design of street trees shall generally be in accordance with the City's Urban Forest Plan, Street Tree Guide, Street Tree List & Matrix and these D&C Notes.

Design documentation including street trees is to be reviewed and approved by the City prior to the commencement of works.

Tree homes:

- The City aims to provide the best possible environment for street trees to establish, thrive and mature for many decades - an urban Tree Home. This is done by following the practices set out in this specification and subsequent details and includes the provision of adequate soil volumes, access to water and protection from vandalism or damage.
- Tree homes should include storm water harvesting systems and additional soil volumes via structural soils or cells wherever physically possible.
- Tree homes should be designed wholistically to maximise the size and health of the tree and it's future contribution to our urban forest.
- Further details of the various tree home elements are detailed below.
- Standard tree home designs are outlined in these Design and Construction Notes. Alternatives may be considered in wide verges or medians, parking bay alignments etc (Refer to Street Tree Guide). All alternative designs must be reviewed and approved by the City's Representative.

Alignment

- It is preferred new trees are aligned with existing trees
- Failing this, in softscapes, they are to be centrally located.
- Preferred alignment in hardscapes is grates 400mm (one full paver) from back of kerb.
- Alternative alignments shall be reviewed and approved by the City's Representative.
- Alignment closer to the kerb is sometimes acceptable in narrow footpaths or to avoid existing services. However this is not appropriate for certain species on bus routes.
- Alignments should always allow for a minimum of 2m accessible pedestrian thoroughfares around them (not including the grate). Exceptions to this may apply in very narrow streets. These must be reviewed and approved by the City's Representative.

Spacing

- Trees should be spaced to allow them to fully mature, providing maximum benefit for the longest possible lifespan. This shall include consideration of species, mature size, form, soil volume and above ground space.
- Sites are to be assessed for awnings, powerlines, light poles, CCTV cameras, signage, traffic signals etc.
- Trees should be at least 1.8m from crossovers to allow clear sight lines and 10m back from traffic signals where they could block sightlines to the signals.

Trees should generally be consistently spaced at

- Small Species = 6-8m (canopy spread)
- Medium Species = 8-10m
- Large Species = 10-12m
- Refer to Street Tree List for size categories for each species.

## STREET TREE SPECIFICATION

702.04

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Contract Management

The contractor shall submit a comprehensive method of work statement including:

- Preparation of relevant OSH documentation. All contractors must complete City of Perth safety induction.
- Dust and noise control strategy
- CoP obstruction permit (see below) and parking bay reservations (if required)
- Traffic and pedestrian management plans (see below).
- Site plans showing excavation, stockpiling, laydown, access, fencing, parking, plant & equipment movements and storage.
- Written methodology of works including methods of excavation and installation, inspection & hold points, plant & equipment used, mitigation of noise and dust, nightworks (if required), obstructions and access requirements, clean up and make good
- Program of works including lead times for utility or City of Perth permits and approvals, inspection and hold points
- Protocols for working around high pressure gas infrastructure (ATCO) and high voltage power infrastructure (Western Power)

Traffic Management

- If/when required, traffic management plans shall be prepared by a suitably qualified professional, submitted to the City and approved prior to the commencement of works

Obstructions, permits and access

- The installation contractor is responsible for organising any relevant obstruction permits and traffic management plans to complete works.
- All contractors must complete a City of Perth safety induction
- Site area should be minimised to reduce impact on the public
- Vehicles are not permitted within parks and reserves without prior approval and issue of Parking in Reserve Permit by CoP

Site Hygiene & Environmental Controls

- The City of Perth has a Plant Pathogen Management Plan in place. Adhering to the protocols in the Plant Pathogen Management Plan will help to prevent the spread of plant pathogens.
- Vehicles are not permitted within parks and reserves
- All weed seeds, mud, soil and organic matter must be removed from clothing, footwear, tools, equipment and machinery before entering and exiting any site.
- Equipment shall be cleaned with a brush and sterilised
- All works must adhere to AS2436:2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites

## STREET TREE SPECIFICATION

702.05

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Site Establishment

- The Contractor is responsible for site fencing, and signage as per Obstruction Permit and Traffic Management Plan
- Tree Protection Zone fencing to be established where necessary and approved by the City's arborist prior to work commencing.

Excavation

- In softscape, the existing surface treatment (garden or turf) shall be cut and/or removed neatly.
- In paved areas, the contractor shall remove and store paving safely, securely and neatly in a location which minimises impact to the public. Pavers should not be stacked and stored over existing tree roots or protection zones
- Mechanical excavation not to be conducted within 1m of High Pressure Gas or High Voltage power.
- All works around existing Tree Protection zones to be completed according to AS4970:2009 - Protection of Trees on Development sites. The City's Arborist to attend site under conditions dictated by the standard.
- Vacuum excavation to be utilised where appropriate around existing utilities or tree roots.
- No excavation shall be left open at the conclusion of the day's work. All works shall be left completed, made safe or alternatively filled to grade and smooth. Works areas shall be left clean and surfaces blown down. Absolutely no storage of materials within tree rootzone.
- The contractor is responsible for disposing of any excess spoil. Excess spoil or dirt is not to be stored over tree protection zones, pedestrian thoroughfares or road carriageways.

## STREET TREE SPECIFICATION

702.06

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Working around existing utilities & infrastructure

- A Dial Before You Dig must be conducted as part of design process by the consultant and again by the contractor prior to works commencing.
- Underground service locating must be undertaken via ground penetrating radar or pot-holing to confirm alignment and depths of utilities during design phase.
- Note, ground penetrating radar is often not accurate or informative enough to confirm the type, depth, size or owner of utilities. In this case, pot-holing shall be conducted.
- Underground service location information to be produced in geolocated CAD format and included on design drawings to avoid or minimise changes to the design on site.
- The Contractor is responsible for protection of all utilities, structures or infrastructure and complying with the Western Australian Utility Providers Code of Practice all other statutory requirements for safe work practices.
- The Contractor is required to observe, arrange and pay for all utility providers requirements, applications, permits, approvals, fees, spotters and inspections.
- The Contractor is responsible for repair of any damage caused to existing water, gas or drainage pipes, sewers, electric conduit or other existing works or services including privately owned irrigation systems (or other private assets) to the satisfaction of the City's Representative and the relevant Authority. If repairs are not acceptable or not completed in a timely fashion, the City's Representative may arrange repairs and charge the Contractor
- Where a high-pressure gas main is located in proximity to the proposed works, obtain DBYD plans to identify the presence of gas infrastructure and approximate location and submit details of proposed works to ATCO for assessment. Allow adequate time to obtain an ATCO HP Notification relevant to the works.
- An accredited ATCO spotter is required to supervise pot-holing (services location) and tree installation works. Locate and mark the pipeline using appropriate material.
- Use only utility authority approved methods of excavation. Do not excavate by machine within 1 m of existing underground services.
- If rocks, subsurface materials, or other type of obstructions are encountered which impede works, seek instruction from the City's Representative. THIS IS A HOLD POINT
- Where any conflict with services exists, notify the City's Representative. THIS IS A HOLD POINT
- The proximity trees can be planted near utilities is dictated by the utility owners and is subject to change. The Consultant and Contractor must be aware of the minimum offsets and protection measures required by the various utility owners.
- Any changes on site to the location of trees must be approved by the City's Representative. THIS IS A HOLD POINT



## STREET TREE SPECIFICATION

702.07

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Unexpected Finds

In the event of an unexpected find of contamination, hazard, or heritage artefacts in the work zone, the following general procedure is to be adopted:

- Stop work. Cordon off area with barriers or tape to prevent unauthorised access.
- Notify Site Supervisor, who shall notify City of Perth as soon as practicable to execute appropriate investigation/management procedures.
- Via authorised personnel or sub-contractor, remediate or make good area, or safely manage heritage site to allow for resumption of works.
- Management of any unexpected finds and/or asbestos impacted soils shall be managed according to the Urban Forest Plan Asbestos Management Plan.

Quality Control and Records

- All specified inspections, samples, records and certificates shall be made available or submitted to the City's Representative for approval prior to the commencement of associated work.
- Accepted samples shall become the agreed minimum standard and approved source of supply.
- The Contractor shall be responsible for programming all inspections and review of samples and allow minimum 2 working days notice to the City's Representative unless otherwise stated.
- Samples, records and certificates shall be provided to the City's Representative at least 10 working days prior to bulk delivery
- Written evidence of any product warranties, certificates or test results shall be provided to the city including dates,

Proprietary Items:

- Proprietary items and systems documented are to be used as nominated unless it can be shown that a substitution offers equivalent or better performance. Substitutions may not be used unless prior approval has been obtained.
- Identification of a proprietary item does not necessarily imply exclusive preference for the identified item but indicates the necessary properties and performance of the item.
- If the documented products or systems are unavailable within the time constraints of the construction program, the contractor shall submit evidence.
- If the substitution is for any reason other than availability, the contractor must submit evidence that the substitution:

1. Is of net enhanced value to the principal or;
2. Is consistent with the contract documents and is equivalent to or better than the nominated product in performance, detail and methodology

## STREET TREE SPECIFICATION

702.08

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Soil Volumes

- Due to the poor quality and quantity of soil in typical city streets, The City requires additional soil volumes be installed with all street trees in paved areas, with structural cells or structural soils below paving.
- Location, extent, depth and alignment of structural cells to approved by the City's representative prior to commencement of works.
- Consultants and contractors must advise the City of designed and installed soil volumes for each tree, indicating species and install size, for approval by the City's Representative.
- Target soil volumes are: (Refer to Street Tree List for size classification for each species)
  - 10m<sup>3</sup> for small tree species (3-8m height)
  - 20m<sup>3</sup> for medium tree species (8-15m height)
  - 30m<sup>3</sup> for large tree species (15m+ height)
- These target soil volumes shall be installed wherever physically possible
- If not physically possible due to site constraints, the consultant or contractor shall demonstrate they have maximised the potential soil volume for each tree. Drawings, service investigations and site photos must be provided.
- Structural cells should be prioritised over structural soils due to better spatial efficiency.
- Structural soils are typically 1/3 soil, 2/3 ballast. Therefore the soil volume provided in the same space is less and must be calculated accordingly.
- Structural cells are typically 10% plastic/structure and 90% void/soil. Soil volume calculations must take this into account.
- Structural cells and soils can and should be installed around existing utilities. Future-proofing conduits should be installed where appropriate to avoid the need to remove the cells in future infrastructure upgrades by utility providers.
- Additional soil volumes can be provided by a hybrid solution of structural cells and soils. This is encouraged where it helps to maximise soil volumes in constrained locations.
- Connected pits or trenches of structural cells or soils should be installed where possible.
- Several hold points requiring on-site inspection and approval by City Representative are listed below and must be observed.
- Structural cells must be installed by an installer certified by the supplier. Certification is available via a short, free online training course. All supplier processes are to be followed and proof of warranty provided to the City.
- Location, extent, depth and alignment of installed structural cells and soils to be provided to the City in geolocated CAD format.
- Photographic evidence of full excavation extent and estimated soil volume to be submitted to the City.

## STREET TREE SPECIFICATION

702.09

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Imported Soil Mixes

## Samples and Certification

- Sample of soil mixes (1kg) should be provided to the City's Representative for approval with testing results and certification against the standards and specification at least 10 days prior to installation or delivery (whichever is earlier). Certification of each new batch or delivery must be provided.

## Application

- All tree homes should be filled with the specified "Blended Soil", "Subsoil Sand" and "Drainage Layer" (as required) as per below instructions. This soil mix is suitable for tree homes in softscape, hardscapes and structural cells.
- Soil to be installed in layers and lightly compacted as per CoP details.

## Drainage Layer

- In areas where a drainage layer is required, it must be installed as follows:
- Washed and screened aggregate (Greater than 20mm) to the prescribed depth as shown on the planting details;
- Aggregate to be overlaid with a geotextile (Bidim A14) that is covered by a minimum 100mm deep layer of Subsoil Sand.

## Blended Soil

- The "Blended Soil" to be installed to the top 300mm of the tree home excavation.
- The "Blended Soil" is to comprise of approximately 35% (by volume) of the prescribed "Compost Mix" (see below) with approximately 65% (by volume) of the specified "Sand" (see below) to produce a combined organic matter content of 5% - 8% (by volume) in the final Blended Soil.
- The "Blended Soil" is to have a neutral pH (5.5 - 7.5) with Electrical Conductivity (EC) < 2 ms/cm.
- The "Blended Soil" to be thoroughly mixed by mechanical means prior to installation, to ensure an even distribution of materials throughout the final Blended Soil.

## a) Compost Mix

- A commercially available Compost Mix, that conforms to AS 4454 for 'Mature Compost' with sieved particle size of maximum 5mm and organic carbon content ranging between 20% to 30% (by volume).
- Sample test results will need to be made available for each batch of 'Compost Mix' used to make the Blended Soil.

## b) Sand

- Spearwood Sand (yellow sand);
- Devoid of topsoil organic matter;
- Neutral pH, and;
- Clay content less than 2%.
- Delivery of the Blended Soil to include test results that validate that the specified Compost Mix and Sand were used to make up the final "Blended Soil".

## Subsoil Sand

- The remainder of the excavation (above the "Drainage Layer" and below "Blended Soil" layer) is to be "Subsoil Sand" comprised of:
- Spearwood Sand (yellow sand);
- Devoid of topsoil organic matter;
- Neutral pH, and;
- Clay content less than 2%.

## Soil Remediation:

- Based on analysis of the soil samples collected from specified locations across the Nedlands/Crawley, West Perth and Perth CBD areas, the existing soils are predominately alkaline.

## STREET TREE SPECIFICATION

702.10

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

- The contractor or consultant shall collect soil samples from the planned planting site. If pH is not neutral, soil remediation is required.
- It is recommended that an accredited soil scientist be engaged to carry out the site soil validation pre and post remediation.
- Preference should be given to the selection of neutral to high pH (alkaline) soil adapted species for tree planting. Where this cannot be achieved, soil remediation will be required to adjust soil pH.
- Where soil remediation is required, the contractor is to apply Ferrous Sulphate Tetrahydrate in accordance with the manufacturer's requirements to achieve the required pH levels.

Structural Soils

- Structural soils may be used where existing site conditions do not enable the installation of structural cells and/or to make up additional / target soil volumes.
- Structural cells may be used in addition to structural cells in instances where they enable a connected trench for tree roots or a greater rootable soil volume around existing utilities or infrastructure
- Note that structural soil products are typically only 1/3 soil (2/3 ballast). Soil volume calculations must take this into account.
- Structural soils can and should be installed around existing utilities. Some utility providers may require protective conduits or barriers to their infrastructure prior to compaction. Adhere to all utility providers requirements working around existing services.
- Preferred product - Eclipse Structural Soil - or approved equivalent.
- Structural soil to adhere to AS4419:2018 - Soils for Landscape and Garden Use;
- Sample of structural soil (1kg) shall be provided to the City's Representative for approval with testing results and certification against the standards and specification at least 10 days prior to installation.
- Structural Soil to be installed in layers and lightly compacted as per these Design and Construction Notes
- Structural soil to be installed separately to regular planting soil via plywood + props or similar methodology during compaction
- Structural soils to be installed according to the suppliers instructions to meet compaction requirements nominated in these design and construction notes.

Structural Cells

- Preferred product - City Green Stratavault 45 - or similar approved by City's Representative. Consultant or contractor to confirm with the manufacturer that the product is fit for the intended location and loading.
- Structural cells are preferred over structural soils due to their better spatial efficiency (approx. 90% rootable soil volume)
- To be installed by a certified installer (requiring 1 hr online training).
- The Contractor must follow and document the suppliers inspection protocol to maintain warranty. Written evidence of approval and Warranty to be provided to the City's Representative.
- Excavate full extent of structural cell zone and install sub base as per COP detail and layout cells in place. THIS IS A HOLD POINT.
- Fibregid to be installed to sides of Stratavault modules as per manufacturer's specification and COP details to control cross contamination of soil types and maintain structural integrity.
- Fibregid to be installed as per CoP details - 100Kn Fibregid - top, bottom and sides.
- Installation of structural cells (prior to backfilling) THIS IS A HOLD POINT
- Photographic evidence must be submitted of the structural cells installed prior to backfilling to the City's representative and manufacturer for warranty purposes.

## STREET TREE SPECIFICATION

702.11

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Root Barriers

- Root barriers are only to be installed when and where required by utility providers and approved by the City's Representative
- Any root barriers recommended by ATCO Gas spotters on site must be approved by the City's Representative prior to installation
- Sheet root barriers are to be HDPE installed as per the Design and Construction Notes below.
- Rigid root barriers are to be PVC or high strength concrete, installed as per CoP details and AS4678:2002 Earth Retaining Structures.
- High strength concrete panel and post retaining is the preferred rigid barrier required by ATCO. Refer to CoP details.

Geotextile Fabric

- Preferred product Bidim Green A49G by Geofabrics Australia or similar approved by City's Representative
- Fibergrid for structural cells to be 100Kn

Storm Water Harvesting Systems:

- A Stormwater harvesting system should be installed as per CoP details on all trees where it is practical and useful.
- Practical meaning where there is sufficient space, depth and condition of kerbs or asphalt is not compromised by installation.
- Useful meaning there is a sufficient catchment area to provide substantial water flow into the system.
- Standard inlets to be utilised wherever kerb height allows (min 50mm). Alternative inlets may be proposed. Design must be reviewed and approved by the City's representative prior to works commencing.
- Pipes and connectors to be 65mmØ UPVC.
- Inlet pipes to have a minimum fall of 5% to allow water flow.
- Watering Rings to be 100mm slotted agricultural pipe wrapped in nylon sock.
- Watering ring layout should be modified to cover maximum area within soil zone and work around existing infrastructure or services.
- Two watering rings should be installed if soil zone is greater than 5m<sup>3</sup> - one in close proximity to rootball and one close to the edge of excavation / soil zone.
- Inlet alignment - preferred alignment is central to tree grate, directly adjacent and perpendicular. Location of inlet may be shifted to avoid existing services or retaining required for grates at the back of kerb.
- Vertical riser preferred product - Citygreen Snorkil™ Root Rain Urban or similar approved.
- Photographic evidence must be submitted showing the completed stormwater system installed, prior to backfilling.



## STREET TREE SPECIFICATION

702.12

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Supply of Trees

- Supplier nurseries must be accredited by NIASA (Nursery Industry Accreditation Scheme Australia)
- Tree stock is to be made available for inspection by the City's Arborist at least 10 working days prior to installation. THIS IS A HOLD POINT
- If for any reason the City's standard is not achievable the Contractor is to notify the City's representative in writing.
- Street tree stock should generally be supplied in 200-300L bags or air prune pots.
- All trees to be labelled with species botanic names
- Tree stock shall comply with AS2303:2018 (most current version of AS2303 to be applied) with specific emphasis on the below assessment criteria:
- True to type - the trees selected must be exactly as specified in terms of genera, species, variety (for a recognised cultivar) and species provenance (i.e. identified source of production material particularly with the supply of native trees)
- Indication of north - Indicate north on the bag during selection to ensure the bark (cambium) sheltered from the sun in the nursery is not exposed on planting. The tree should be planted with the same orientation. This is particularly important for trees 100lt upwards.
- Health and vigour - in order to ensure that the trees are able to grow on successfully they must be healthy and vigorous at the time of delivery from the nursery. The foliage size, texture and colour must be consistent with that shown in healthy specimens of the nominated species. Extension growth must be consistent with that exhibited in vigorous specimens of the species nominated.
- Free of pests, diseases and injury - trees should not show any evidence of pest, disease or injury.
- Dieback free certification is to be provided upon delivery of stock.
- Crown balance & uniformity of growth - the crown should be well balanced either side of the stem axis. Any imbalance must not exceed 60/40.
- Stem taper and potential for stability - the caliper of the main stem at any given position is to be less than that at a lower point on the stem. Trees shall have a taper that allows them to be self-supporting at planting.
- Container position the tree shall be located centrally in the nursery container.
- Crown Structure:
  - Must be proportionate to stem calliper and root ball size.
  - The diameter of the main stem above a lateral branch union shall be greater than the diameter of the lateral branch at point of attachment.
  - Trees must have a clear, defined central leader. In tree species that do not form adominant central leader, e.g. Mallee, Weeping Trees, all terminal buds are to be healthy.
  - Trees are to be growing no greater than 15 degrees off a vertical alignment.
- Trees should not be unnecessarily pruned to remove low branches. Wherever possible as much canopy as possible is to be retained as is practicable.
- 1.8m clear trunk to the underside of canopy/ first branching (where practicable).
- Height and Caliper - is to be appropriate to the individual tree species as per AS2303
- Rootball:
  - The rootball shall remain intact on removal from the container with no greater than 10% loss of the soil medium.
  - The root system should show healthy, well-structured development. There is to be no indication of circling or girdled roots.

## STREET TREE SPECIFICATION

702.13

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

Installation of Trees

- Trees are not to be planted in extreme weather conditions (above 35<sup>o</sup> or below 10<sup>o</sup>).
- Trees are to be planted between and inclusive of April and October. Any trees planted outside these months are to be approved by the City's Representative and will require additional watering.
- Trees shall be planted in accordance with any relevant drawings. If it is necessary to vary tree locations and/or size to avoid underground services, or for other reasons, approval is to be given by City's Representative. THIS IS A HOLD POINT
- Tree planting to be undertaken only by suitably qualified and experienced person/s with a minimum Certificate 3 in Horticulture or Arboriculture.

The contractor shall:

- Excavate the hole to the full extent shown on the drawings
- Break up the base of the hole to a depth of 100 mm and loosen compacted sides of the hole to prevent confinement of root growth.
- Remove the plant from the container with minimum disturbance to the root ball.
- Root prune to make sure all circling roots have been either severed or aligned radially into the surrounding soil. The root ball shall be moist, and trees shall be centred to the planting hole
- Backfill around root ball, tap lightly and water to eliminate air pockets. Make sure that soil mix is not placed over the top of the root ball.
- Thoroughly water the tree(s) before planting and immediately after planting to maintain growth rates free of stress - Initial watering is to be a minimum of 45 litres per tree, applied in stages during backfilling.
- Where required, install stakes for trees as per these design and construction notes. Stakes are not to be driven into the root ball. Contractor is to avoid damage to tree bark.
- Mulch is to be applied 100mm thick over the root zone of the tree with a 50mm clearance around tree trunk. Additionally, sufficient clearance is to be maintained beneath bottom of the tree grates and top of mulch.
- Where mulch is noted as a lone treatment, mulch is to be applied over the root zone of the tree to a depth of 100mm with a 50mm clearance around tree trunk.
- Where the tree has no grate or guards, 2 x hardwood timber stakes are to be installed with two flexible rubber ties (or similar approved) to support the tree.
- Where soil remediation is required by the City of Perth to lower soil pH, undertake the following:
  - On site test of pH to validate pH levels
  - Review pH test against the pH tolerances of the proposed tree to be installed
  - Apply Ferrous Sulphate Tetrahydrate in accordance with the manufacturer's requirements to achieve the required pH levels.
- Engage an accredited soil scientist to carry out the site soil validation pre and post remediation.

## STREET TREE SPECIFICATION

702.14

STREET TREE AND IRRIGATION DESIGN

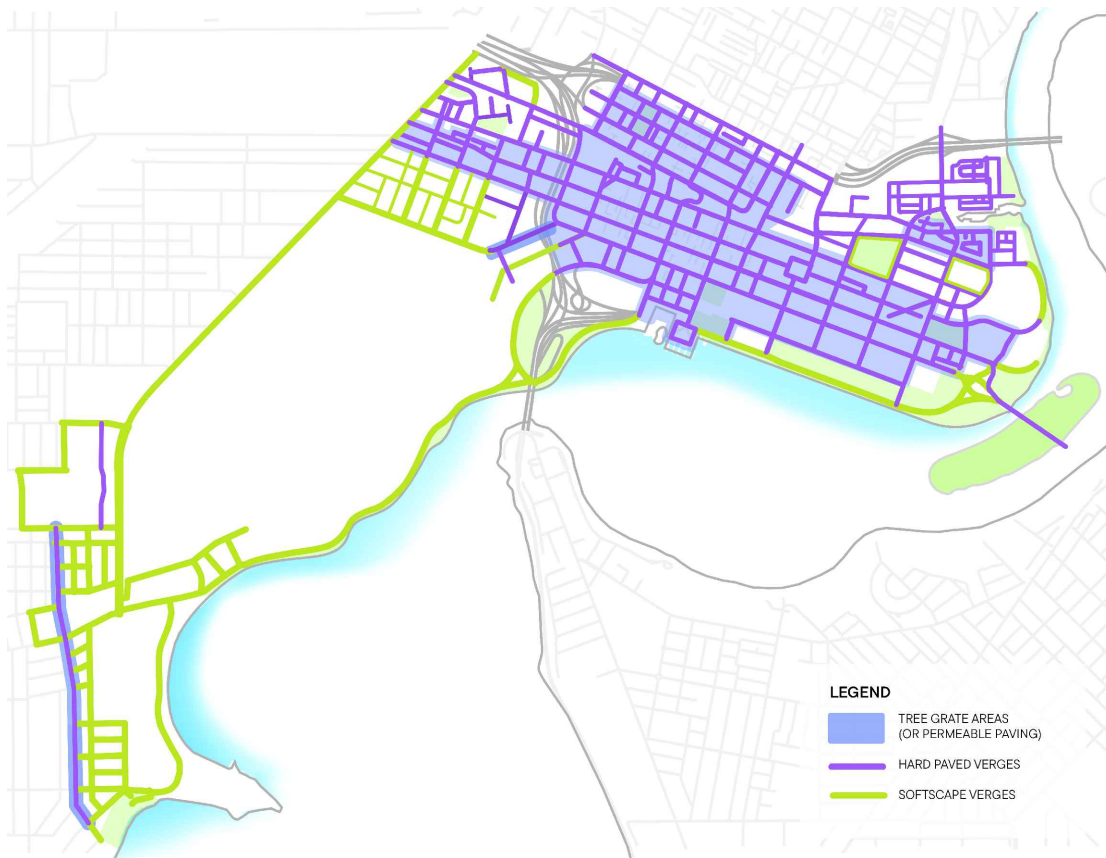
REVIEWED: 15.03.2024

Organic Mulch

- Organic mulch supplied must meet AS 4454:212
- Preferred product is Eclipse Aquamore Boutique organic mulch or product equal or better performance approved.
- Organic mulch is to be a hard wood, pasteurized, large particle size product
- Sample of mulch (1kg) should be provided to the City's Representative for approval with testing results and certification against the standards and specification at least 10 days prior to installation.
- Mulch to be installed as per CoP details.
- No mulch to spill onto adjacent paths or roads.

Tree Grates, Frames and Guards:

- Tree grates to be installed to all trees in hardscape environments within the area indicated in Figure 1. This area typically covers Central Perth and neighbourhood centres
- If streets outside this area have predominantly tree grates as the existing treatment, this shall be maintained.
- Additionally, tree grates may be required outside of these areas in plazas, narrow footpaths, narrow streets and laneways (to be approved by City of Perth Representative).



- In areas where tree grates are not required, the preferred surface finish is mulch. Mulched tree pits should still be the standard 1200x1200mm to allow free movement of pedestrians, cyclists and space for other infrastructure.
- There may be instances in large verges or footpaths where a larger tree pits can be accommodated. These may be understory planted in high amenity areas. Approval by the City's Representative is required.

## STREET TREE SPECIFICATION

702.15

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024

- Tree grates to be standard 1200x1200 City tree grates unless otherwise approved by the City's representative. (Continues overleaf)
- Cut RINGS on site if/as required using reciprocating saw with regards to final tree placement and to ensure the provision of a 100mm gap between the inner edge of the grate and the tree trunk.
- All cuts to be neat and tidy, no sharp edges or angles. Symmetrical full circles only.
- Tree guards shall be installed to all tree grates unless otherwise instructed by the City's Representative
- Tree guards to be standard City of Perth tree guards unless otherwise approved by the City's Representative
- Tree guards to be installed flush with surrounding paving +/- 3mm. Note the joining bar in corners must be installed straight and flush to achieve this.

Tree Grate Blanking Plates

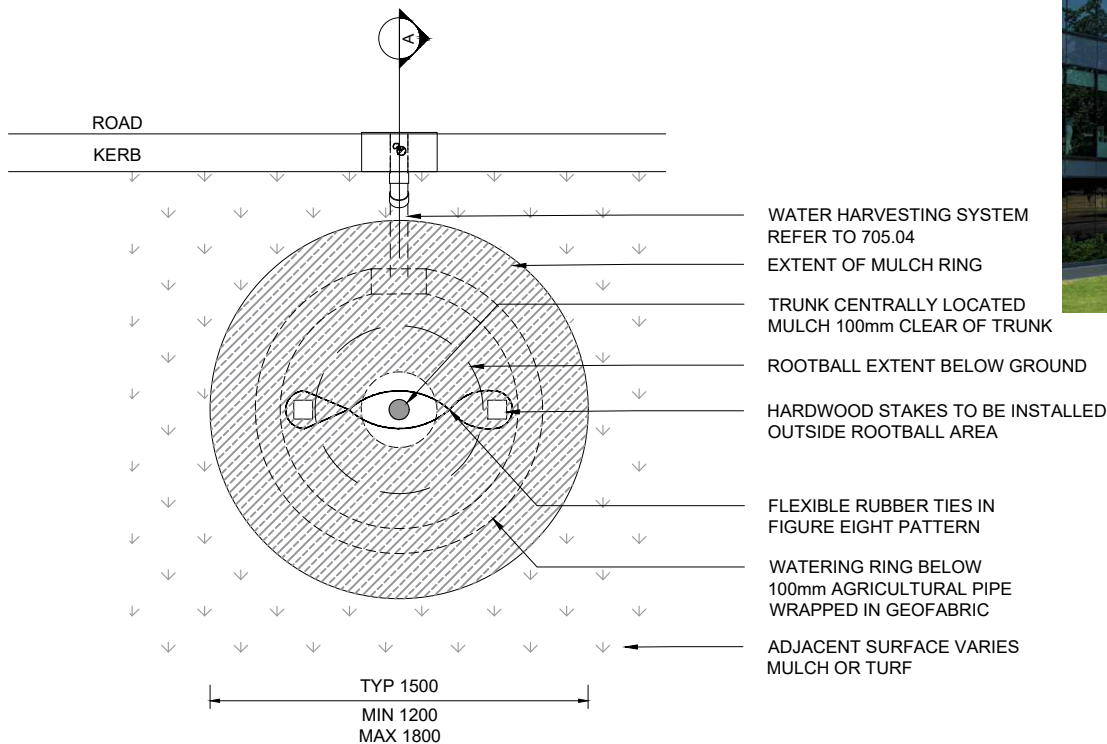
- Where trees cannot be installed at the same time as the tree home and grates, a temporary blanking plate must be fixed to the tree grate to avoid a hazard.
- Material and finish: 304SS, 20.40 garnet blast, pickle, passivate and electropolish.

Porous Paving

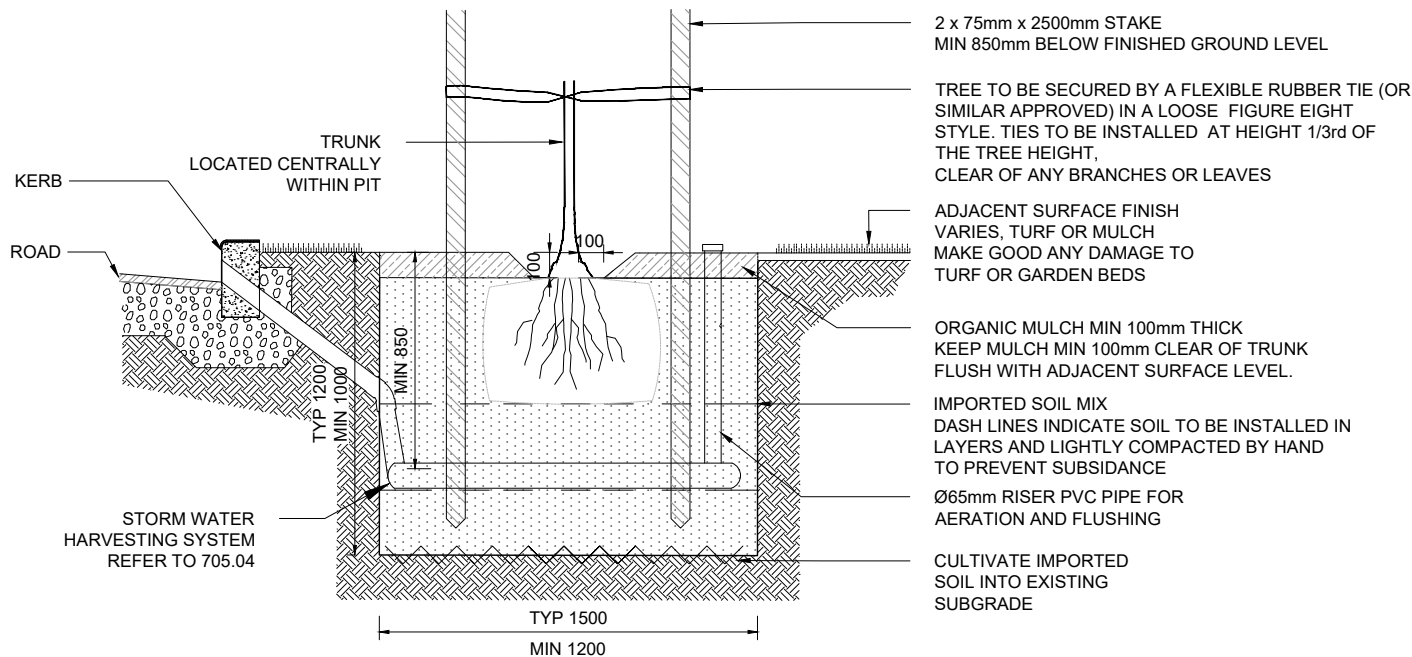
- Resin Bound Aggregate Porous Paving is the preferred surface treatment for replacing tree grates damaged by, or lifting around established trees.
- Paving being lifted by tree roots is to be removed and reinstated to remove or minimise any uneven, unsafe or non-compliant paving. Paving is to be reinstated as per the City's Design and Construction Notes Books 300 & 500.
- Porous paving treatments are not to be installed around new trees unless otherwise approved by the City's Representative.
- Resin bound aggregate mix porous paving is to be installed as per CoP detail.
- Preferred product: 6mm StoneSet Resin Bound Aggregate Porous Paving or similar approved by the City's Representative. Colour - light grey. Sub-base - 5mm washed blue metal or no fines concrete. Geofabric - 100kN Fibregid.
- Installed as per manufacturer's instructions and City of Perth detail.

Reinstatement, Make Good and Cleaning:

- Reinstall surrounding pavement in accordance with City of Perth - Design and Construction Notes - Book 300 for Standard Footpath Design. Reinstall pavers level with surrounding pavers.
- Garden/turf restored to previous condition and in accordance with the Representative's requirement. Yellow builders sand not to be used as turf or garden bed fill. City of Perth Soil Specification applies.
- Make good and backfill excavations to the requirements of the service Authorities and the City of Perth
- Contractor shall reinstall excavations below slabs or pavements by providing selected fill compacted to the specified density as per AS 3798
- Some surplus materials (eg City pavers) may be recycled by delivering to the City's Depot - in Osborne Park. To be approved by the City's representative. Notice period depends on quantities.
- Damage and/or cracked existing pavers are to be replaced. Replacements are to be collected from City of Depot in Osborne Park with prior notice. Consult Main Stores to discuss requirements. Period of notice will vary depending on quantity required.
- Clean all surfaces, remove debris, dirt, waste, surplus materials, signage, fencing, traffic cones etc from the site



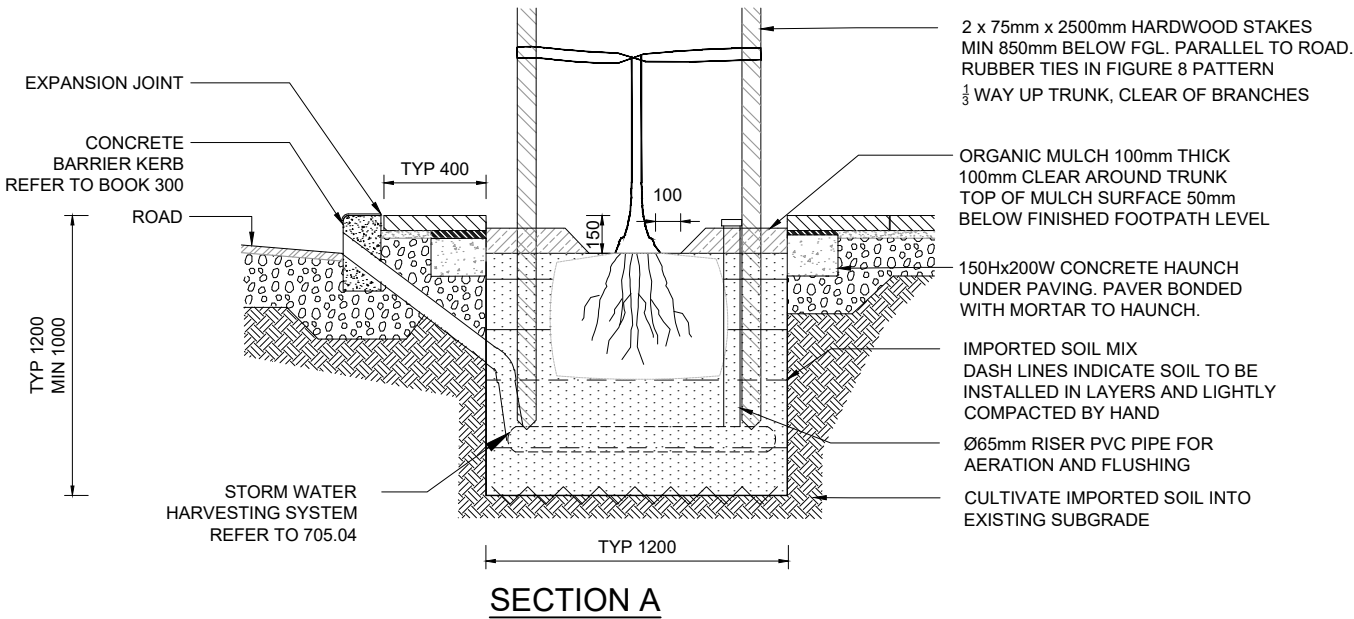
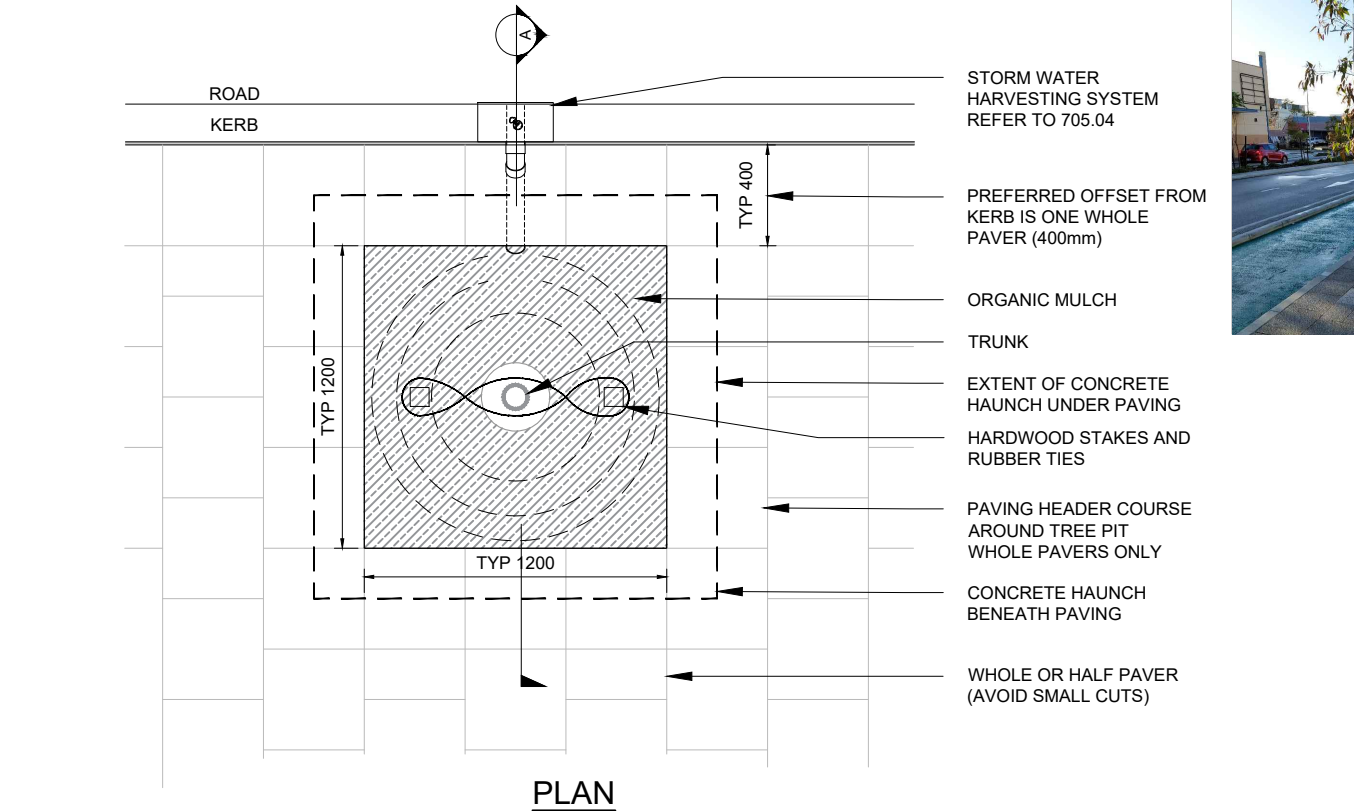
PLAN VIEW



SECTION VIEW

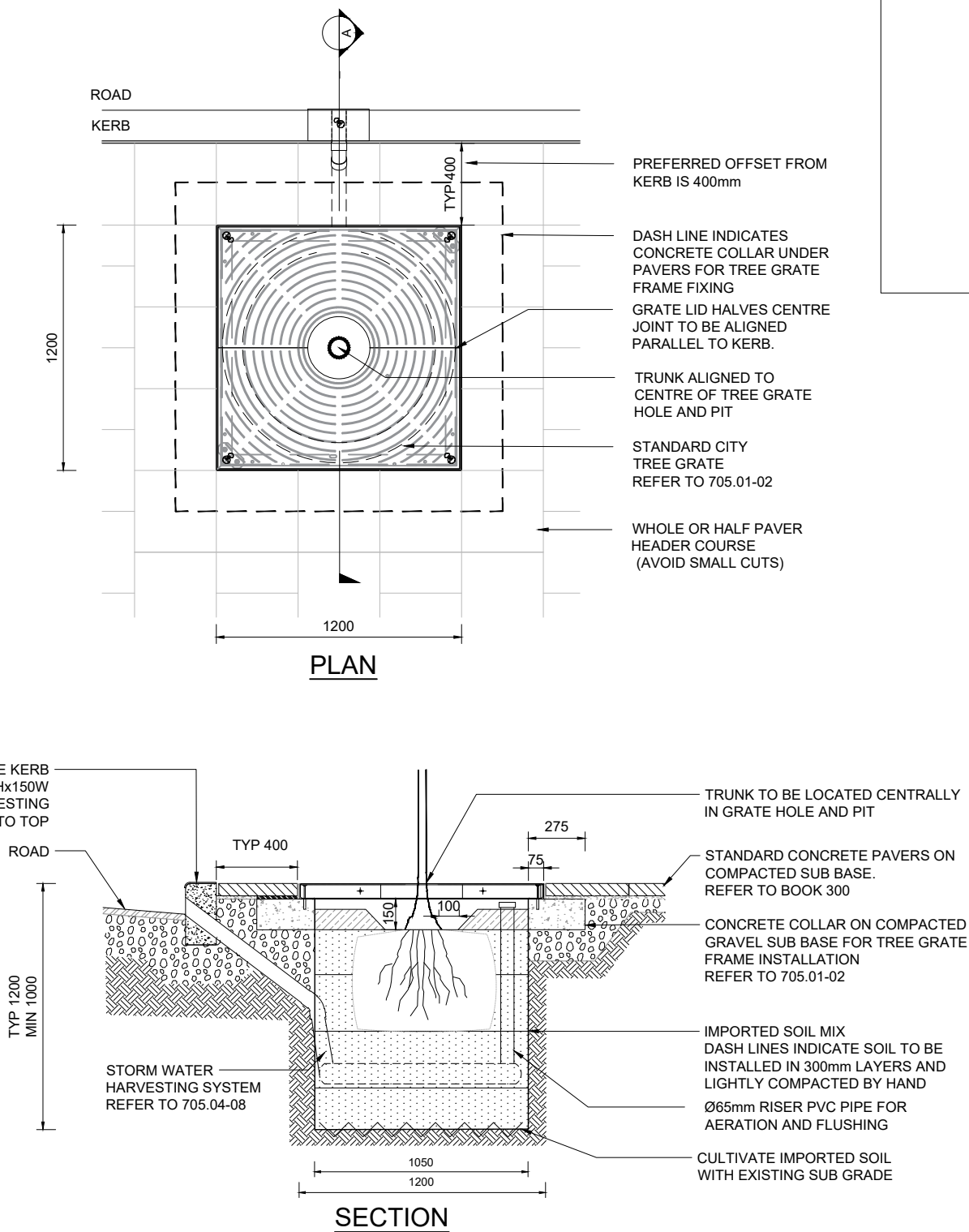
- NOTES
1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
  2. THIS DETAIL IS TO BE UTILISED IN ALL SOFTSCAPE STREET TREE INSTALLATIONS.
  3. GENERALLY, TREES TO BE ALIGNED WITH EXISTING TREES OR CENTRALLY IN SOFT VERGE UNLESS OTHERWISE SHOWN ON THE LANDSCAPE DRAWINGS
  4. ALL ROAD BASE, ROCK, DEBRIS AND RUBBISH TO BE REMOVED FROM TREE PIT PRIOR TO BACKFILLING.



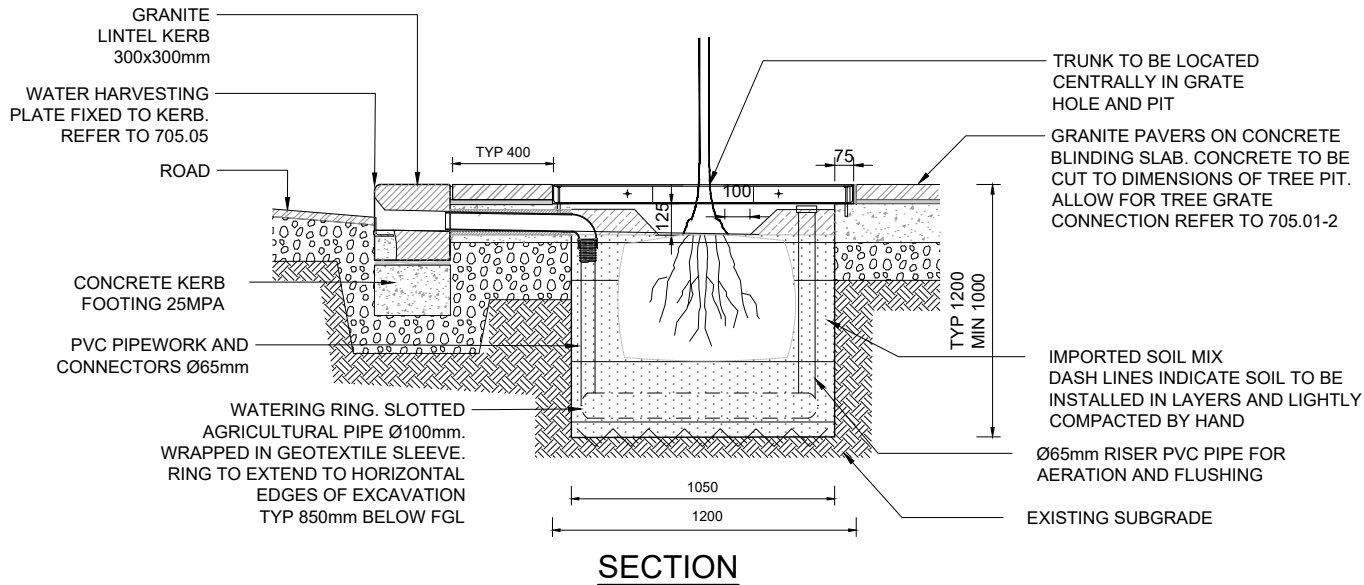
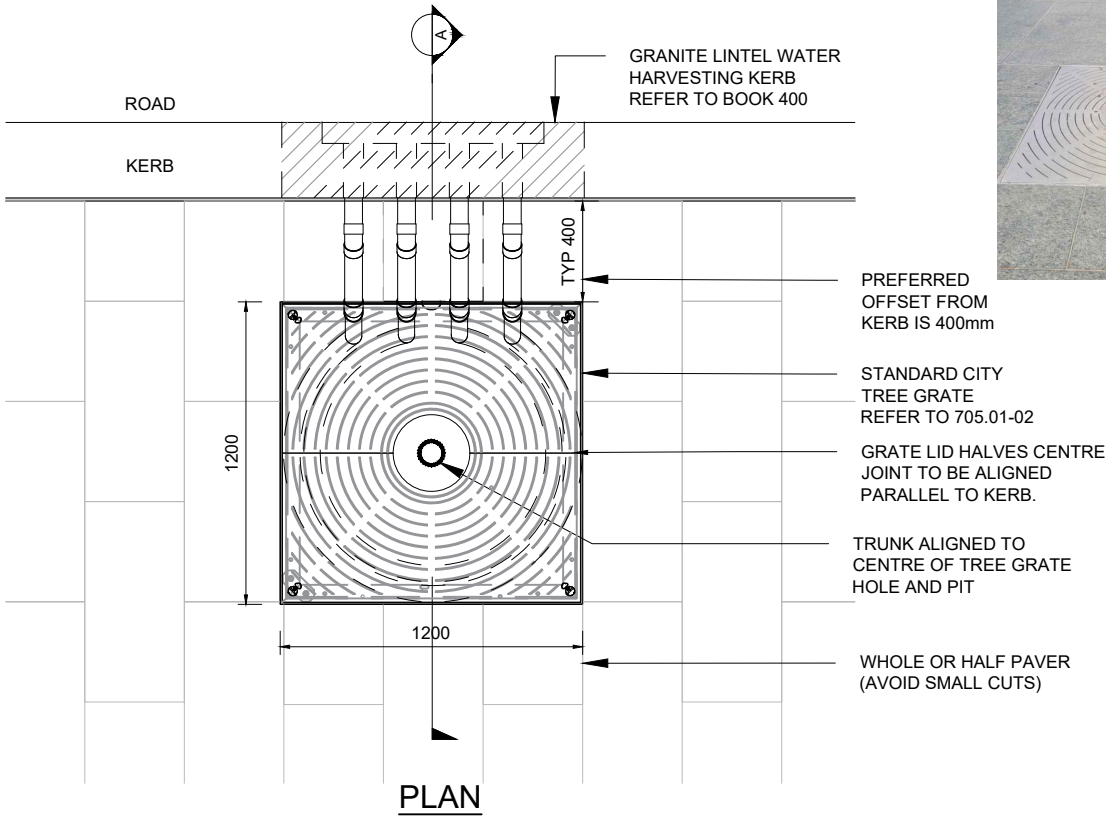


NOTES

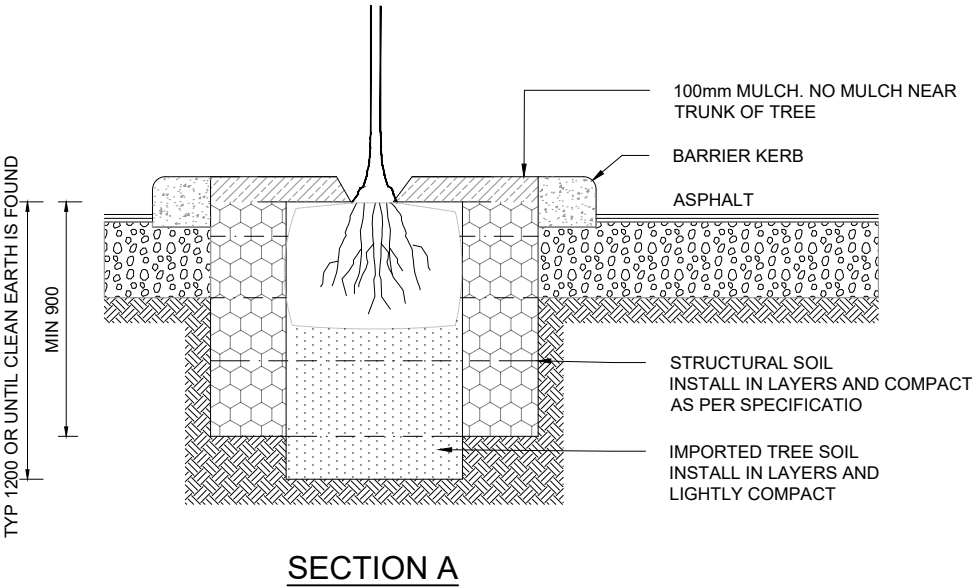
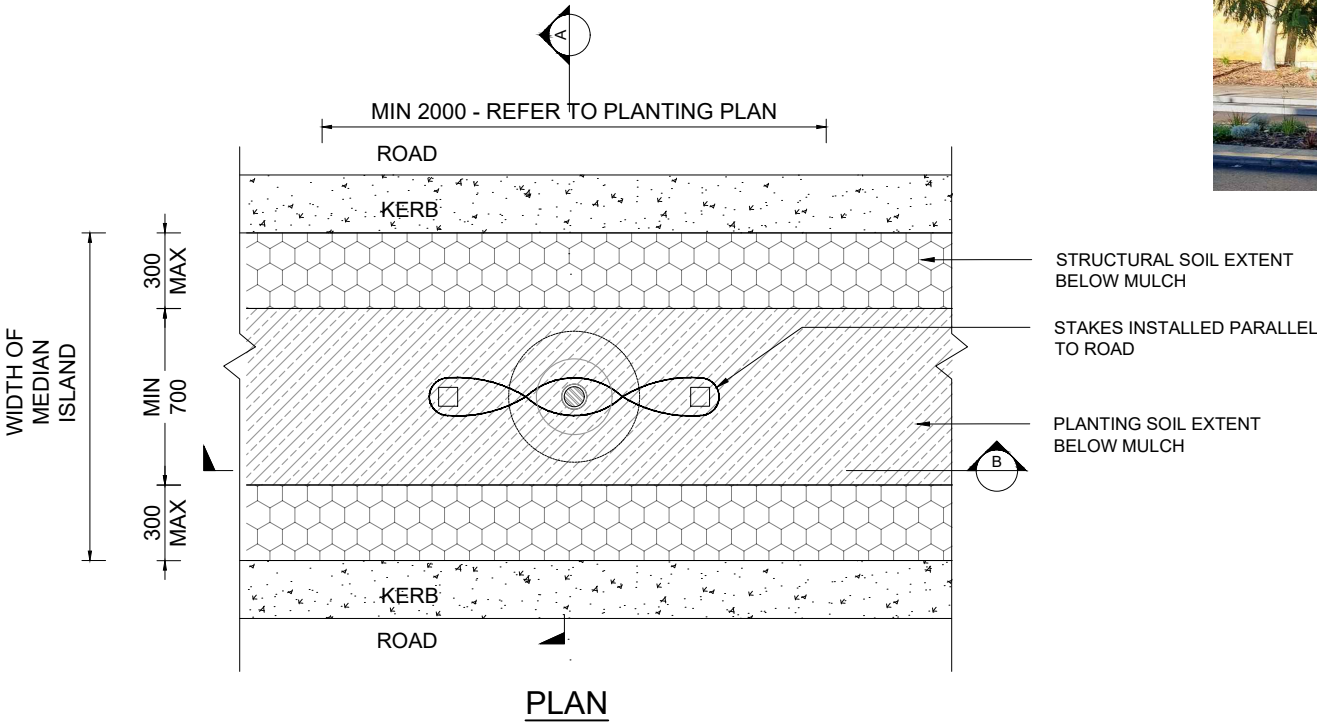
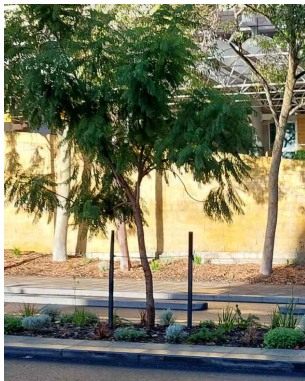
1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
2. ALL ROAD BASE, ROCK, DEBRIS AND RUBBISH TO BE REMOVED FROM TREE PIT PRIOR TO BACKFILLING.
3. WHERE TREE IS PROPOSED WITHIN INSITU CONCRETE PATH ENSURE SAW CUT IS EXTENDED TO NEAREST EXPANSION JOINT IN EITHER DIRECTION
4. TREE HOMES AND SOIL ZONES SHOULD NOT BE RESTRICTED TO THE SIZE SHOWN HERE. THE USE OF STRUCTURAL SOILS AND/OR CELLS IS REQUIRED IN ADDITION TO THIS DETAIL TO ACHIEVE TARGET SOIL VOLUMES. REFER TO 704.01-05
5. WATER HARVESTING INLETS NOT ALWAYS REQUIRED. REFER TO DRAWINGS AND SPECIFICATION.
6. ROAD AND FOOTPATH CONSTRUCTION SHALL BE COMPLETED PRIOR TO DIGGING TREE PIT.
7. PREFERRED ALIGNMENT IS ONE FULL PAVER (400MM) FROM THE BACK OF KERB UNLESS OTHERWISE STATED ON LANDSCAPE DRAWINGS.
8. CONSTRUCTION OF FOOTPATHS, KERBS, FOOTPATHS ETC AS PER DESIGN AND CONSTRUCTION NOTES BOOKS 100, 300 & 400



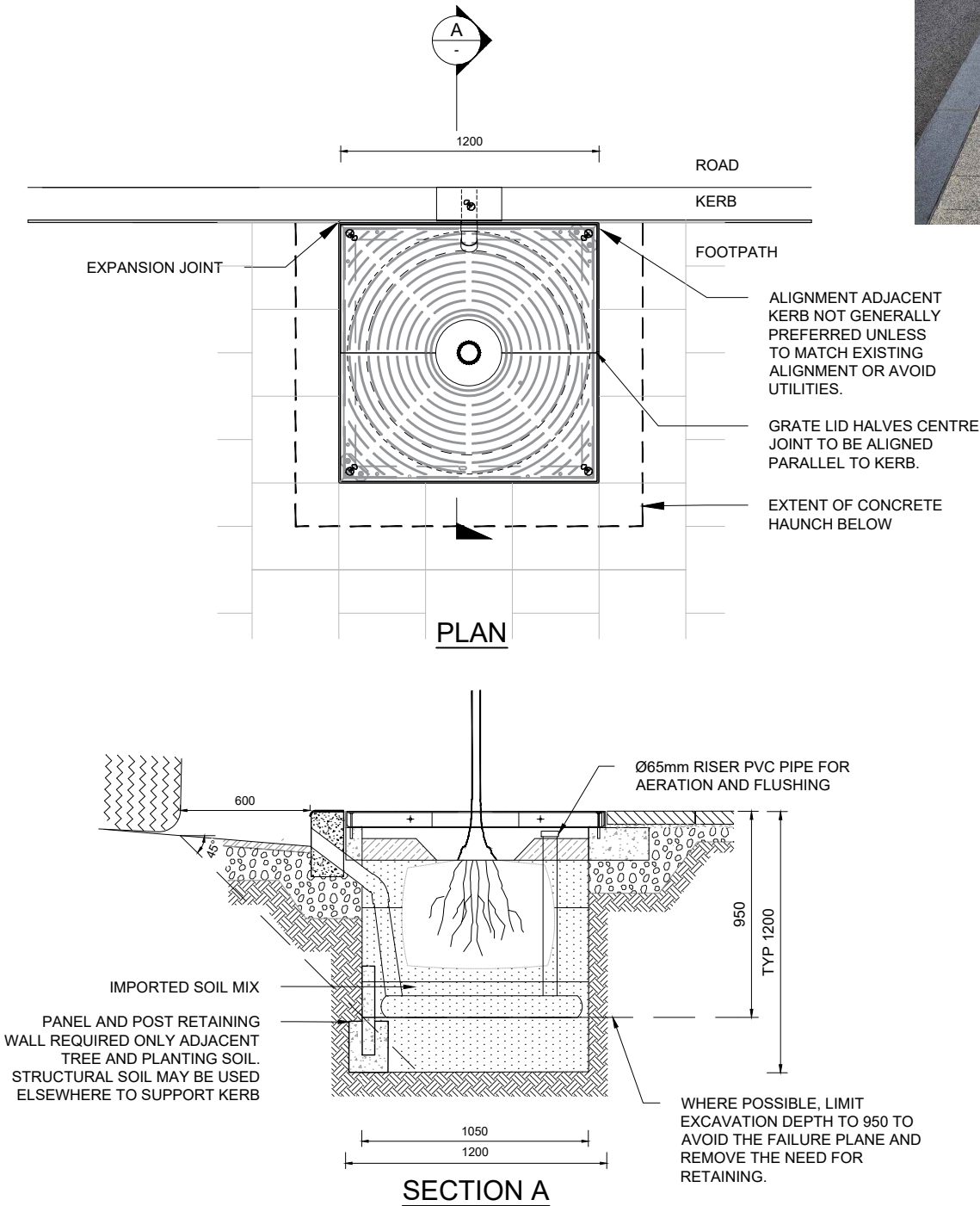
- NOTES
1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
  2. PREFERRED ALIGNMENT IS 400mm BEHIND BACK OF KERB. ALTERNATIVE ALIGNMENTS CONSIDERED IN WIDE FOOTPATHS OR TO AVOID UNDERGROUND SERVICES. CITY REPRESENTATIVE TO APPROVE AND ALTERNATIVE ALIGNMENTS.
  3. TREE HOMES AND SOIL ZONES SHOULD NOT BE RESTRICTED TO THE SIZE SHOWN HERE.THE USE OF STRUCTURAL SOILS AND/OR CELLS IS REQUIRED TO IN ADDITION TO THIS DETAIL TO ACHIEVE TARGET SOIL VOLUMES. REFER TO 704.01-05
  4. WATER HARVESTING INLETS NOT ALWAYS REQUIRED. REFER TO DRAWINGS AND SPECIFICATION.
  5. GRATES ARE REQUIRED IN ALL AREAS INDICATED IN THE STREET TREE SPECIFICATION SECTION ON TREE GRATES.



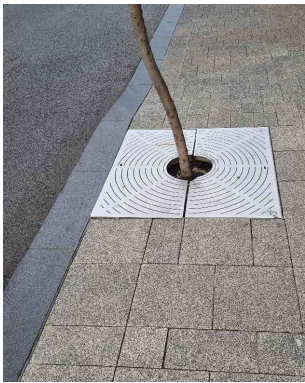
- NOTES
1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
  2. PREFERRED ALIGNMENT IS 400mm BEHIND BACK OF KERB. ALTERNATIVE ALIGNMENTS CONSIDERED IN WIDE FOOTPATHS OR TO AVOID UNDERGROUND SERVICES. CITY REPRESENTATIVE TO APPROVE AND ALTERNATIVE ALIGNMENTS.
  3. TREE HOMES AND SOIL ZONES SHOULD NOT BE RESTRICTED TO THE SIZE SHOWN HERE.THE USE OF STRUCTURAL SOILS AND/OR CELLS IS REQUIRED TO IN ADDITION TO THIS DETAIL TO ACHIEVE TARGET SOIL VOLUMES. REFER TO 704.01-05
  4. TREES IN GRANITE PAVING AREAS ALWAYS REQUIRE TREE GRATES. NO MULCH FINISHES UNLESS OTHERWISE APPROVED BY CITY REPRESENTATIVE



- NOTES:
1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
  2. DIMENSIONS SHOWN ARE INDICATIVE ONLY - TREE PIT SIZE AND SOIL VOLUMES TO BE MAXIMISED
  3. REFER TO 704.05-06 ON STRUCTURAL SOILS



- NOTES
1. PREFERRED ALIGNMENT IS 400mm BEHIND BACK OF KERB. ALTERNATIVE ALIGNMENTS CONSIDERED IN NARROW FOOTPATHS OR TO AVOID UNDERGROUND SERVICES OR TO ALIGN WITH EXISTING STREET TREES. CITY REPRESENTATIVE TO APPROVE ANY ALTERNATIVE ALIGNMENTS.
  2. PANEL AND POST RETAINING ONLY REQUIRED IF EXCAVATION IS DEEP ENOUGH TO ENCROACH ON PLANE OF FAILURE SHOWN. AND ONLY DIRECTLY ADJACENT TREE AND PLANTING SOIL. STRUCTURAL SOILS CAN BE USED ELSEWHERE TO SUPPORT KERB.
  3. WATER HARVESTING INLET MAY BE SHIFTED LATERALLY ALONG KERB ONLY IF REQUIRED TO AVOID RETAINING OR CONCRETE GRATE COLLAR. ALTERNATE LOCATIONS TO BE APPROVED BY COP REPRESENTATIVE.



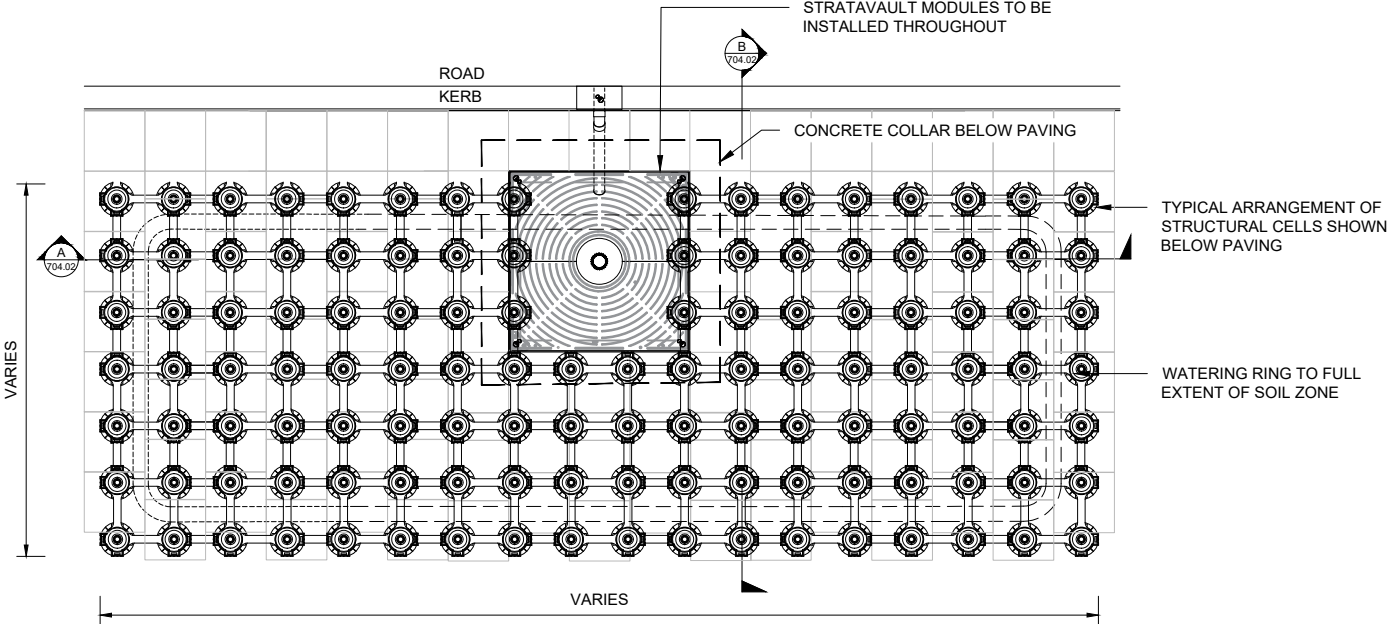


STREET TREE HOME WITH STRUCTURAL CELLS - PLAN

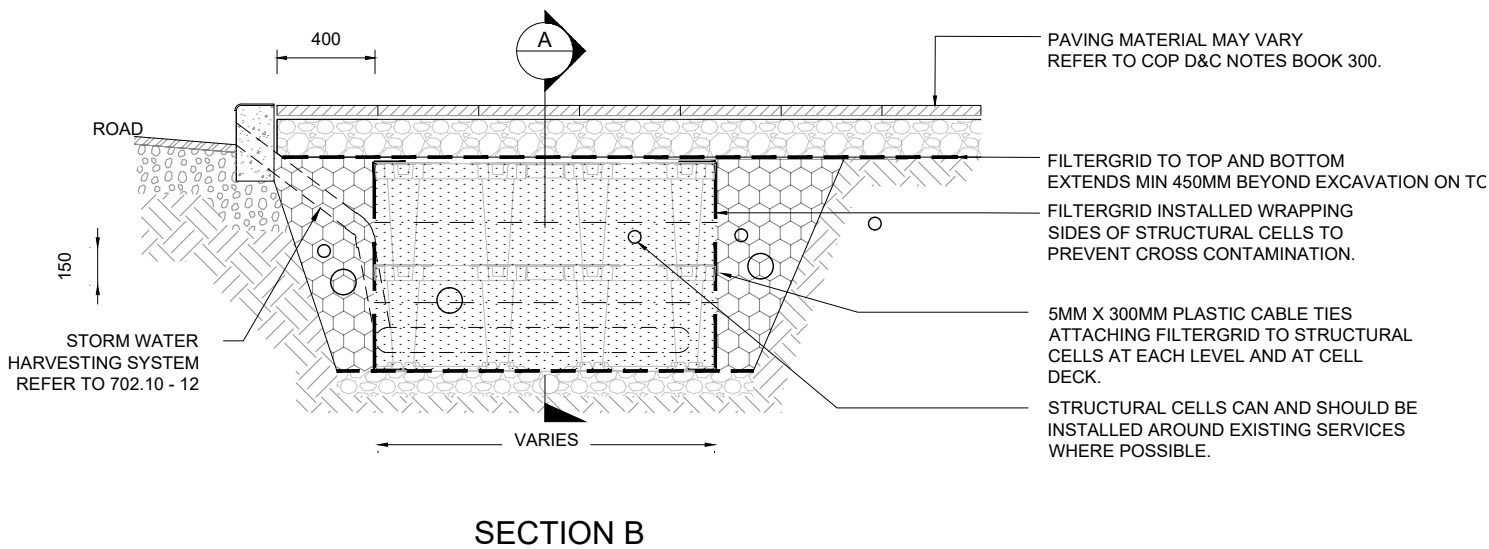
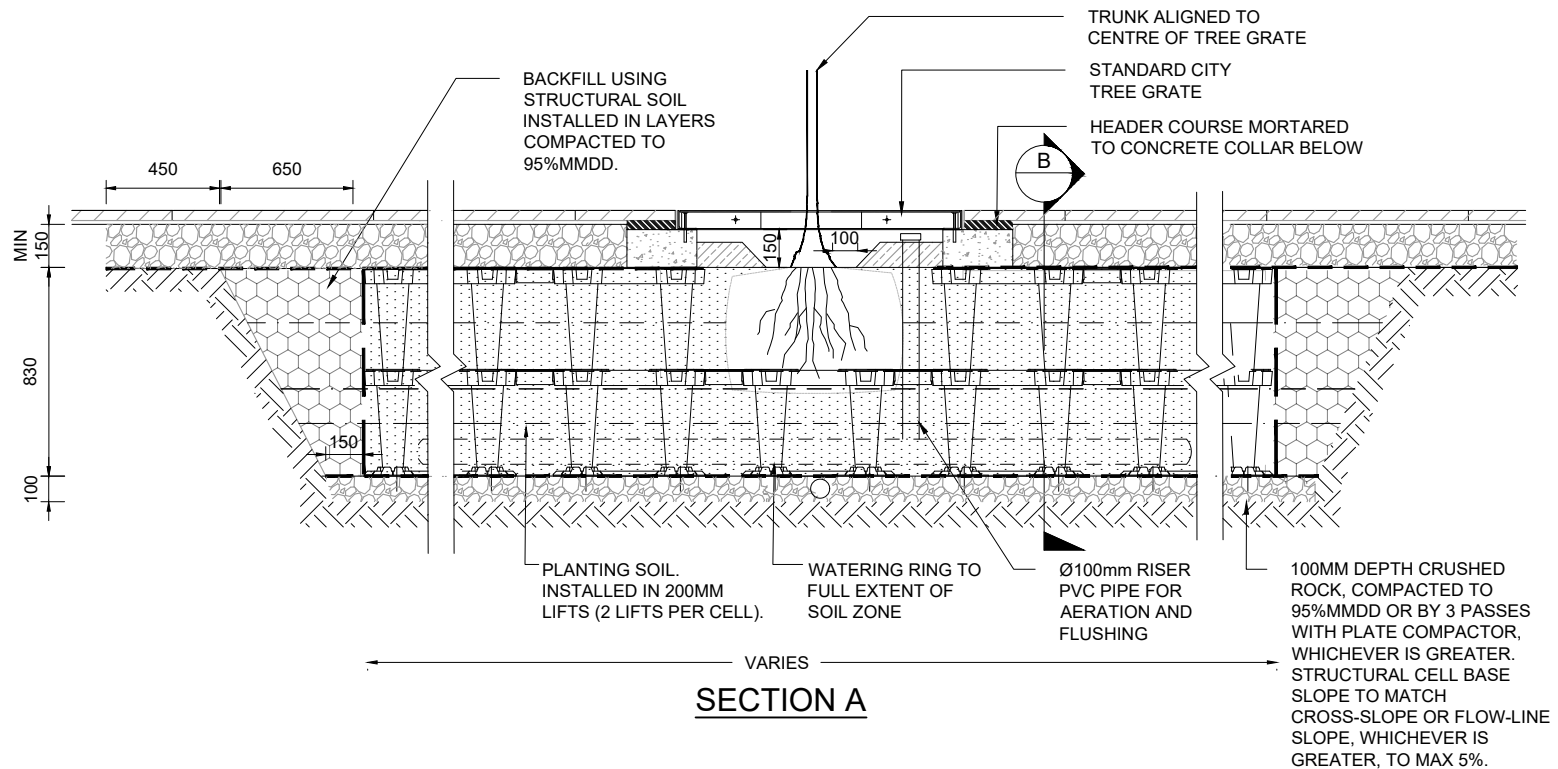
704.01

STREET TREE AND IRRIGATION DESIGN

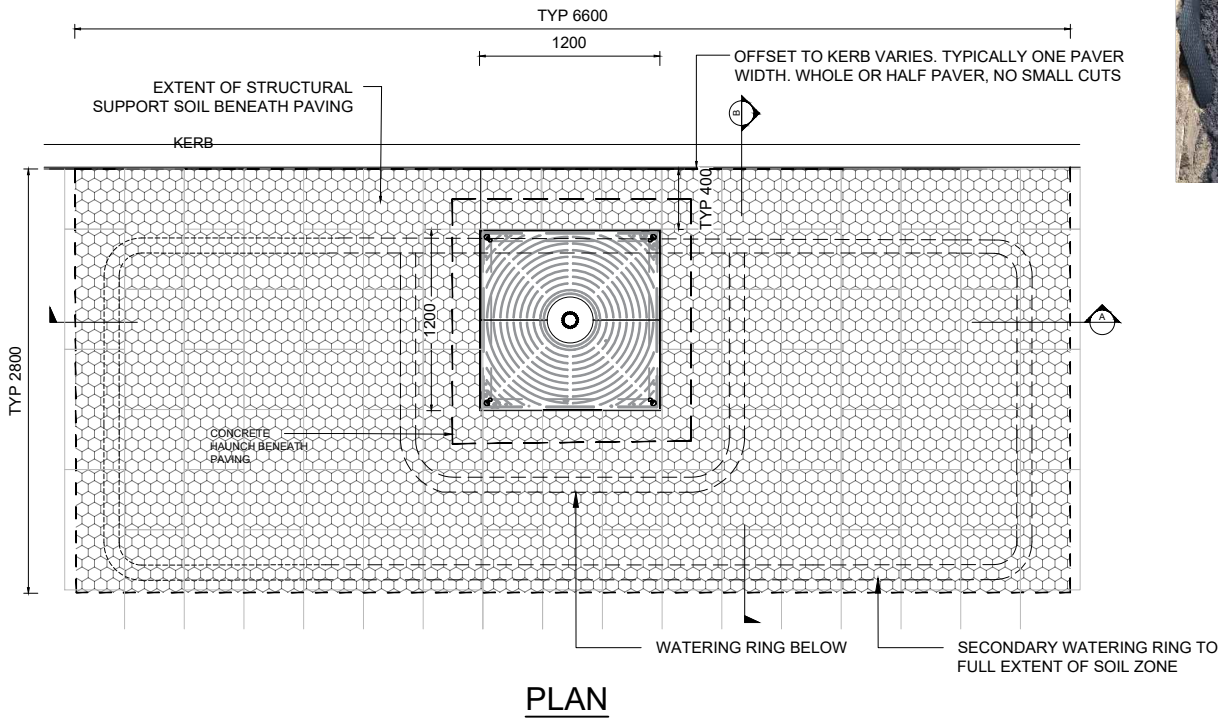
REVIEWED: 15.03.2024



- NOTES:
1. REFER TO SPECIFICATION
  2. REFER TO 704.02 FOR SECTION DETAILS
  3. LAYOUT SHOWN ABOVE IS TYPICAL ONLY. LAYOUT AND SOIL VOLUME SHOULD BE MODIFIED TO SITE CONSTRAINTS AND TREE SPECIES TO ACHIEVE MINIMUM TARGET SOIL VOLUMES. REFER TO SPECIFICATION.
  4. NOTE, STRUCTURAL CELLS ARE PREFERRED TO STRUCTURAL SOIL DUE TO SPATIAL EFFICIENCY. A HYBRID OF BOTH IS ACCEPTABLE AND ENCOURAGED IN CONSTRAINED LOCATIONS.
  5. STRUCTURAL CELLS DESIGN AND INSTALLATION AS PER MANUFACTURER'S SPECIFICATIONS OBSERVING ALL INSPECTION AND REPORTING PROTOCOLS TO MAINTAIN WARRANTY
  6. OBSERVE ALL CITY HOLD POINTS (REFER TO SPECIFICATION)
  7. NO STRUCTURAL CELLS OR SOILS ARE TO BE POSITIONED UNDER ROAD CARRIAGEWAYS.

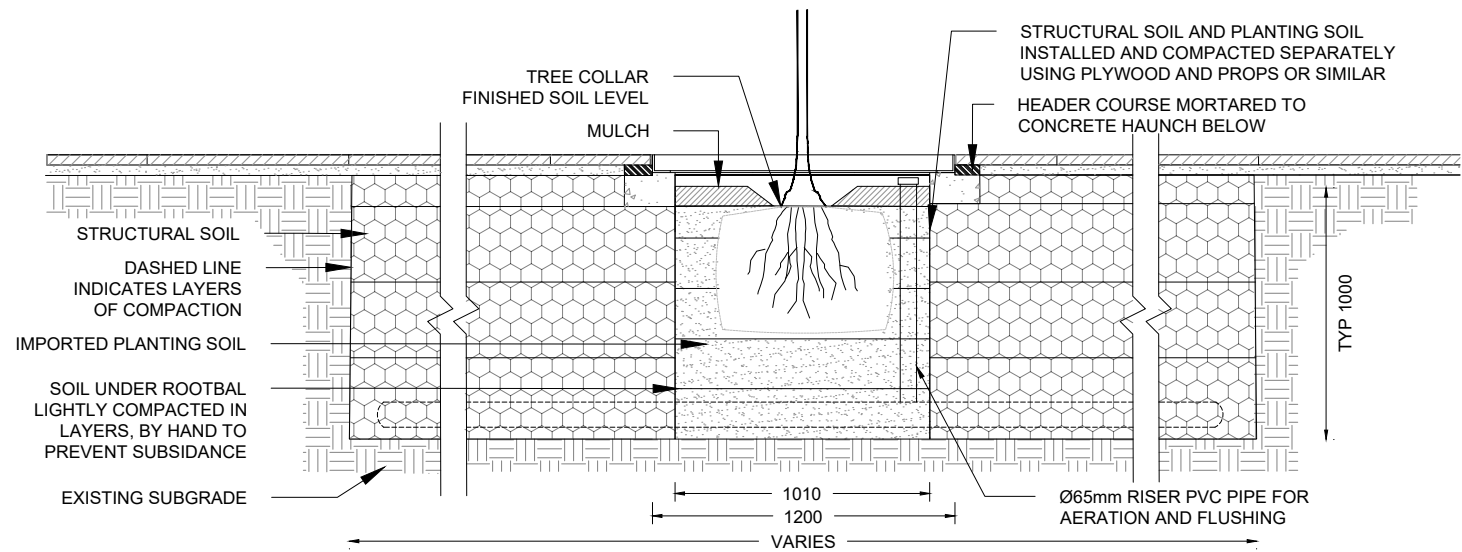


- NOTES:
1. REFER TO SPECIFICATION SECTION ON STRUCTURAL CELLS
  2. REFER TO 704.01 FOR DETAIL PLAN
  3. NOTE, STRUCTURAL CELLS ARE PREFERRED TO STRUCTURAL SOIL DUE TO SPATIAL EFFICIENCY. A HYBRID OF BOTH IS ACCEPTABLE AND ENCOURAGED IN CONSTRAINED LOCATIONS.
  4. STRUCTURAL CELL BASE SLOPE TO MATCH CROSS-SLOPE OR FLOW-LINE SLOPE, WHICHEVER IS GREATER, TO MAX 5%.PAVING, BASE AND COMPACTED SUB-GRADE.
  5. STRUCTURAL CELLS TO BE INSTALLED AS PER MANUFACTURERS SPECIFICATIONS BY AN ACCREDITED INSTALLER, OBSERVING ALL INSPECTIONS AND REPORTING REQUIREMENTS TO MAINTAIN WARRANTY.
  6. NO STRUCTURAL CELLS OR SOILS ARE TO BE POSITIONED UNDER ROAD CARRIAGEWAYS.
  7. REFER TO D&C NOTES BOOK 300 FOR FOOTPATH PAVING SPECIFICATION AND INSTALLATION DETAILS.

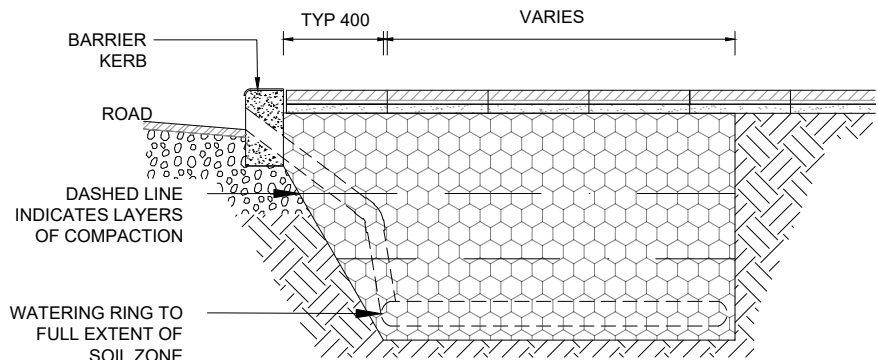


- NOTES
1. STRUCTURAL SOIL TO BE INSTALLED AND COMPACTED IN LAYERS AS PER MANUFACTURER'S INSTRUCTIONS TO ACHIEVE NOMINATED COMPACTION.
  2. STRUCTURAL SOIL AND PLANTING SOIL TO BE INSTALLED SEPARATELY USING PLYWOOD AND PROPS OR SIMILAR METHODOLOGY.
  3. PLANTING SOIL TO BE INSTALLED AND LIGHTLY HAND COMPACTED IN LAYERS TO PREVENT SUBSIDENCE.
  4. LAYOUT OF STRUCTURAL SOIL SHOWN IS TYPICAL ONLY. LAYOUT SHOULD BE MODIFIED TO ACHIEVE TARGET SOIL VOLUMES AROUND EXISTING SITE CONSTRAINTS.
  5. IF TARGET SOIL VOLUMES CANNOT BE ACHIEVED DUE TO EXISTING SITE CONSTRAINTS, THE CONSULTANT OR CONTRACTOR MUST DEMONSTRATE SO AND PROVE MAXIMISATION OF SOIL VOLUME WITHIN CONSTRAINTS VIA DRAWINGS, SERVICE INVESTIGATIONS AND/OR SITE PHOTOS.
  6. STRUCTURAL SOIL CAN AND SHOULD BE INSTALLED DIRECTLY AROUND, AROUND, ADJACENT, UNDER AND OVER EXISTING UTILITIES, INFRASTRUCTURE AND STREET FURNITURE.
  7. IF THE DEPTH OF THE TREE PIT EXCEEDS 1200MM DEEP LESS THAN 400MM OF KERB, CONCRETE RETAINING IS REQUIRED.
  8. IF UTILITY SERVICES DIRECTLY UNDERNEATH ROOT BALL WHICH EFFECTS PLANTING HEIGHT: CONTAC CITY OF PERTH REPRESENTATIVE.
  9. IT IS PREFERRED THAT TREE GRATES ARE ONE FULL PAVER (400mm) BEHIND BACK OF KERB. ALIGNMENT CAN BE CHANGED UNDER APPROVAL FROM COP REPRESENTATIVE.



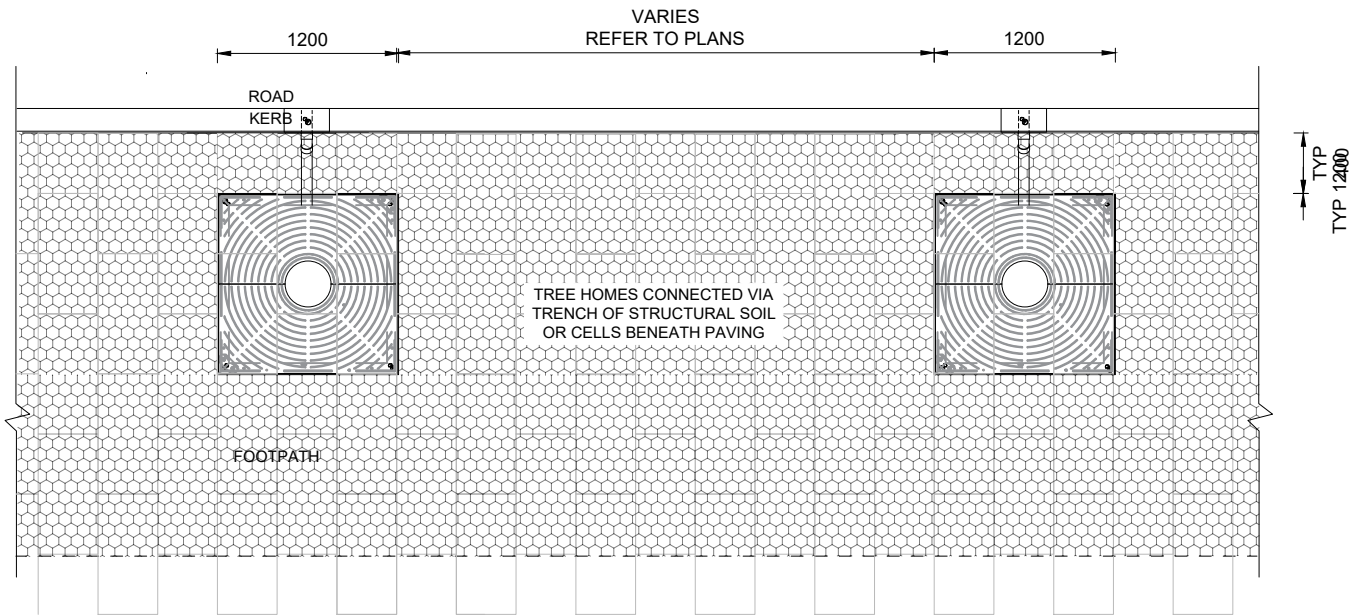


SECTION A



SECTION B

- NOTES
1. STRUCTURAL SOIL TO BE INSTALLED AND COMPACTED IN LAYERS AS PER MANUFACTURER'S INSTRUCTIONS TO ACHIEVE NOIMNATED COMPACTION.
  2. STRUCTURAL SOIL AND PLANTING SOIL TO BE INTALLED SEPERATELY USING PLYWOOD AND PROPS OR SIMILAR METHODOLOGY.
  3. PLANTING SOIL TO BE INSTALLED AND LIGHTLY HAND COMPACTED IN LAYERS TO PREVENT SUBSIDENCE.
  4. LAYOUT OF STRUCTURAL SOIL TRENCH SHOWN IS TYPICAL ONLY. LAYOUT SHOULD BE MODIFIED TO ACHIEVE TARGET SOIL VOLUMES AROUND EXISTING SITE CONSTRAINTS. REFER TO SPECIFICATION.
  5. IF TARGET SOIL VOLUMES CANNOT BE ACHIEVED DUE TO EXISTING SITE CONSTRAINTS, THE CONSULTANT OR CONTRACTOR MUST DEMONSTRATE SO AND PROVE MAXIMISATION OF SOIL VOLUME WITHIN CONSTRAINTS VIA DRAWINDS, SERVICE INVESTIGATIONS AND/OR SITE PHOTOS.
  6. STRUCTURAL SOIL CAN AND SHOULD BE INSTALLED DIRECTLY AROUND, AROUND, ADJACENT, UNDER AND OVER EXISTING UTILITIES, INFRASTRUCTURE AND STREET FURNITURE.
  7. THIS DETAIL IS TO BE READ IN CONJUNCTION WITH OTHER TREE HOME DETAILS IN THIS BOOK.



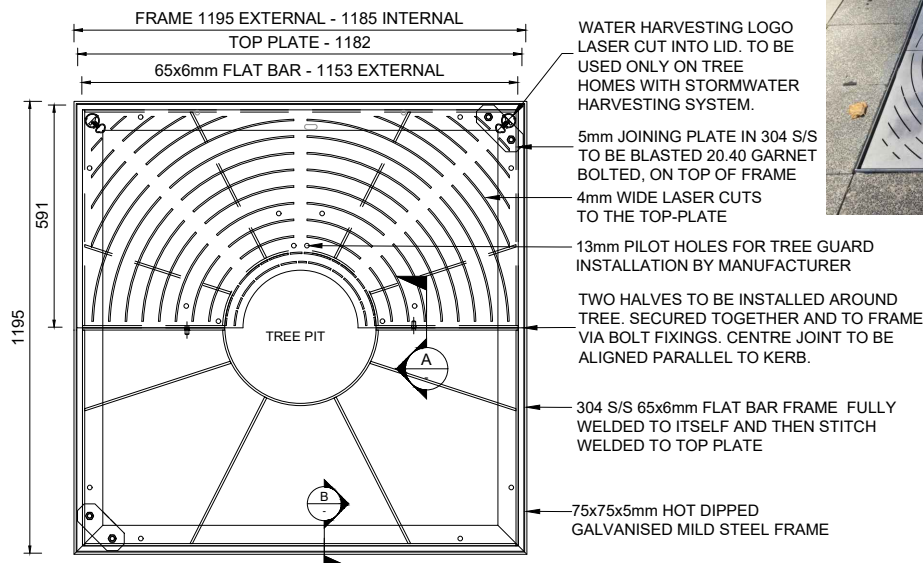
- NOTES
1. THIS DETAIL MAY BE IMPLEMENTED AND IS ENCOURAGED USING STRUCTURAL SOILS OR CELLS.
  2. DIMENSIONS OF TRENCH ARE TYPICAL ONLY AND MAY BE MODIFIED TO FIT AROUND UTILITIES & INFRASTRUCTURE OR TO INCREASE SOIL VOLUMES.
  3. THE CITY MAY CONSIDER REDUCING TARGET SOIL VOLUMES PER TREE IF THEY ARE CONNECTED BY A SHARED SOIL TRENCH.

# STANDARD CITY TREE GRATE ASSEMBLY

## STREET TREE AND IRRIGATION DESIGN

705.01

REVIEWED: 15.03.2024



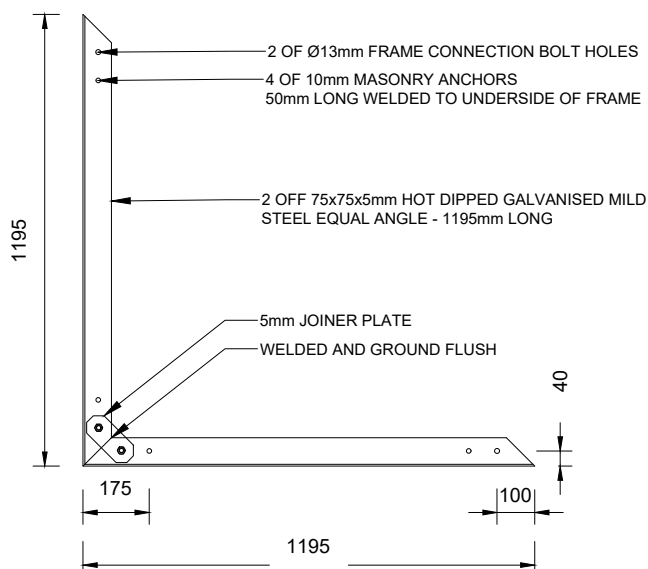
STANDARD TREE GRATE PLAN



WATER HARVESTING LOGO  
LASER CUT INTO LID BY  
MANUFACTURER FOR TREE  
HOMES WITH STORMWATER  
HARVESTING SYSTEM ONLY

## NOTES

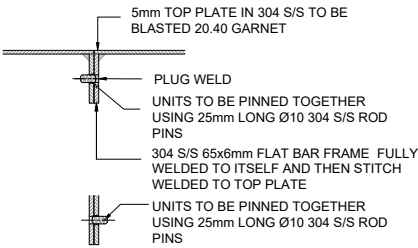
1. ALL FLAT BARS, FIXINGS AND SURFACES TO BE 304 STAINLESS STEEL WITH MILL FINISH.
2. ALL FLAT BARS TO BE TIG WELDED.
3. MANUFACTURE AND INSTALLATION TO COMPLY WITH ALL APPROPRIATE AUSTRALIAN STANDARDS - INCLUDING SLIP RESISTANCE AND LOAD BEARING.
4. FOR MANUFACTURING DETAILS & SPECIFICATIONS, CONTACT CITY REPRESENTATIVE.
5. WATER RETENTION (REINFORCED) TREE-GRATE WITH LOGO IS TO BE USED AT ALL WATER HARVESTING TREE-PITS.
6. REFER TO SPECIFICATION FOR GUIDANCE ON WHERE TREE GRATES ARE REQUIRED.
7. FRAME AND TOP PLATE TO BE INSTALLED WITH 2 HALVES AND CENTRE LINE PARALLEL WITH KERB, ALLOWING A GUARD TO BE INSTALLED PARALLEL TO KERB.



## STANDARD TREE GRATE FRAME ASSEMBLY

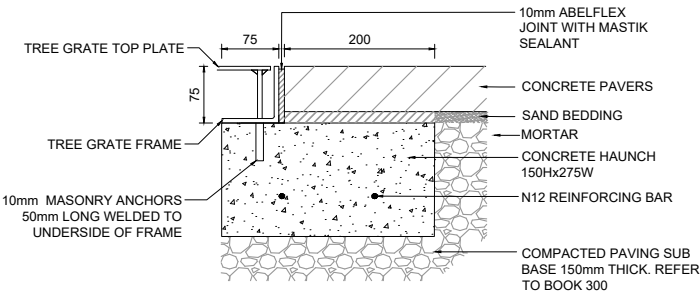
NOTES:

- NOTES:
1. TREE-GRATE FRAME TO COME IN TWO SEPARATE 'L' SHAPED PIECES AND INSTALLED SNUG TOGETHER. CHECK SQUARE AND FLUSH (1690mm ACROSS CORNERS) BEFORE SETTING IN CONCRETE FOOTING.
  2. 5mm JOINDER PLATES TO BE FIXED TO TOP OF FRAME

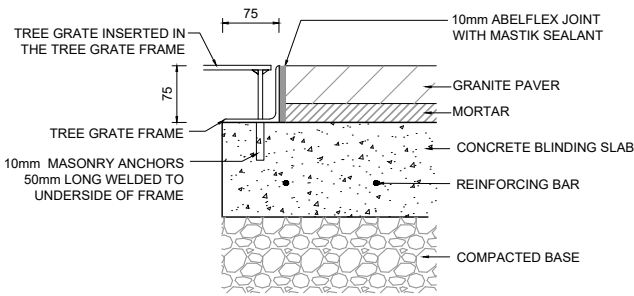


SECTION A - FIXING OF TWO HALVES OF GRATE

(REFER TO 705.01)

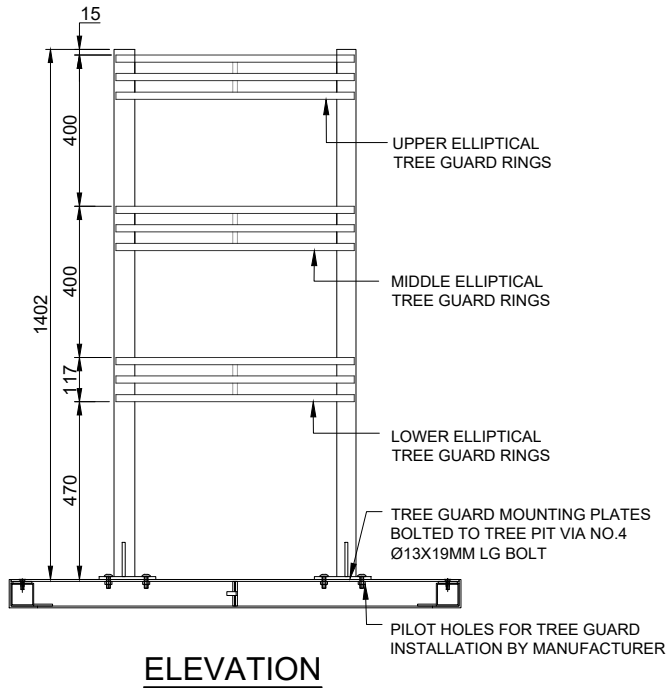
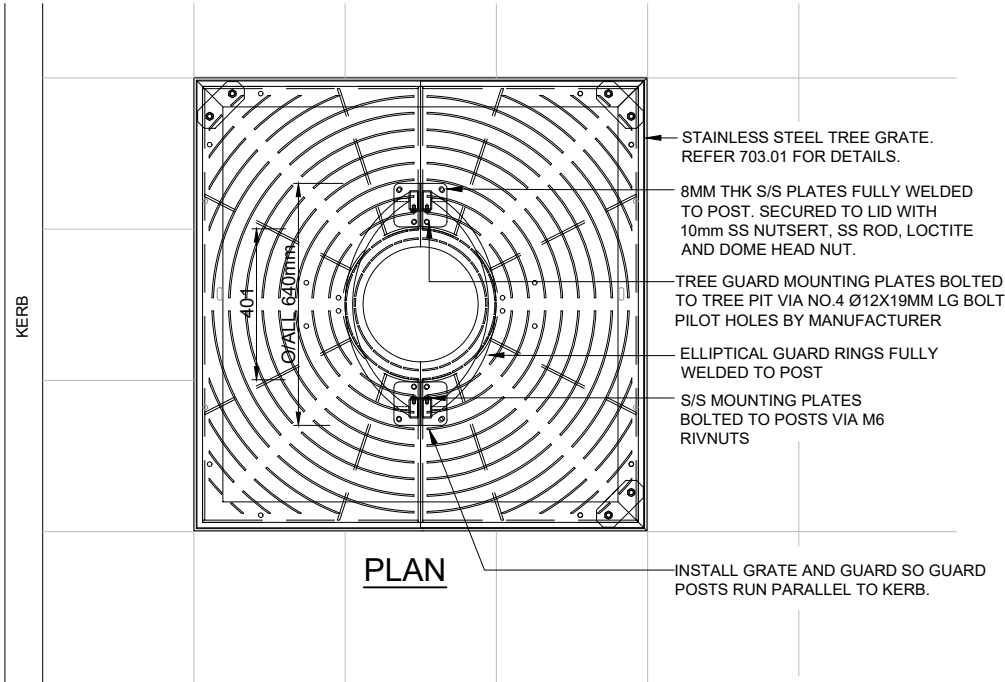


SECTION B - STANDARD TREE GRATE FIXING IN CONCRETE PAVERS

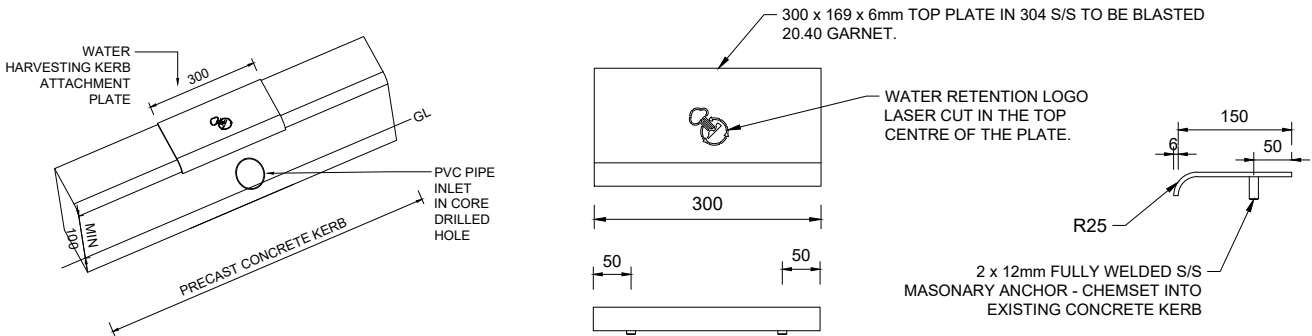
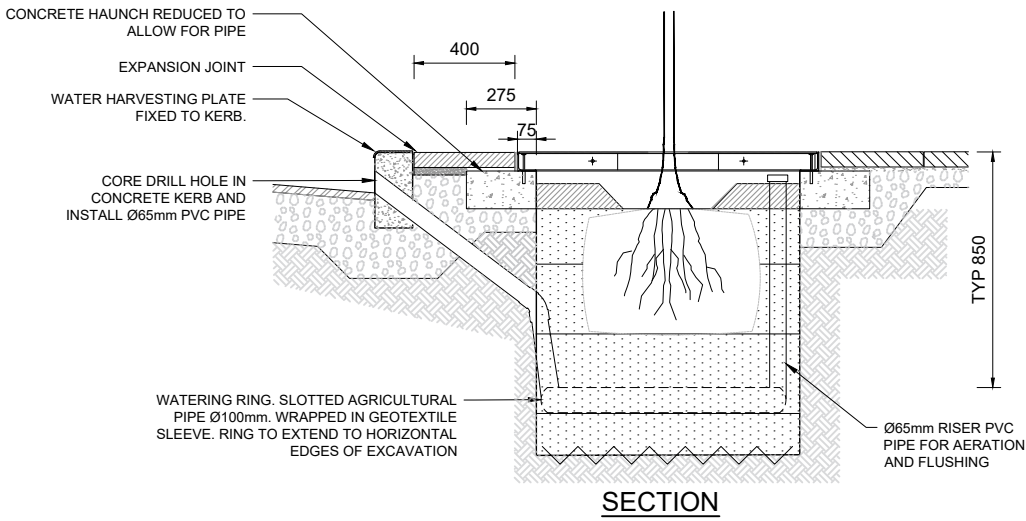
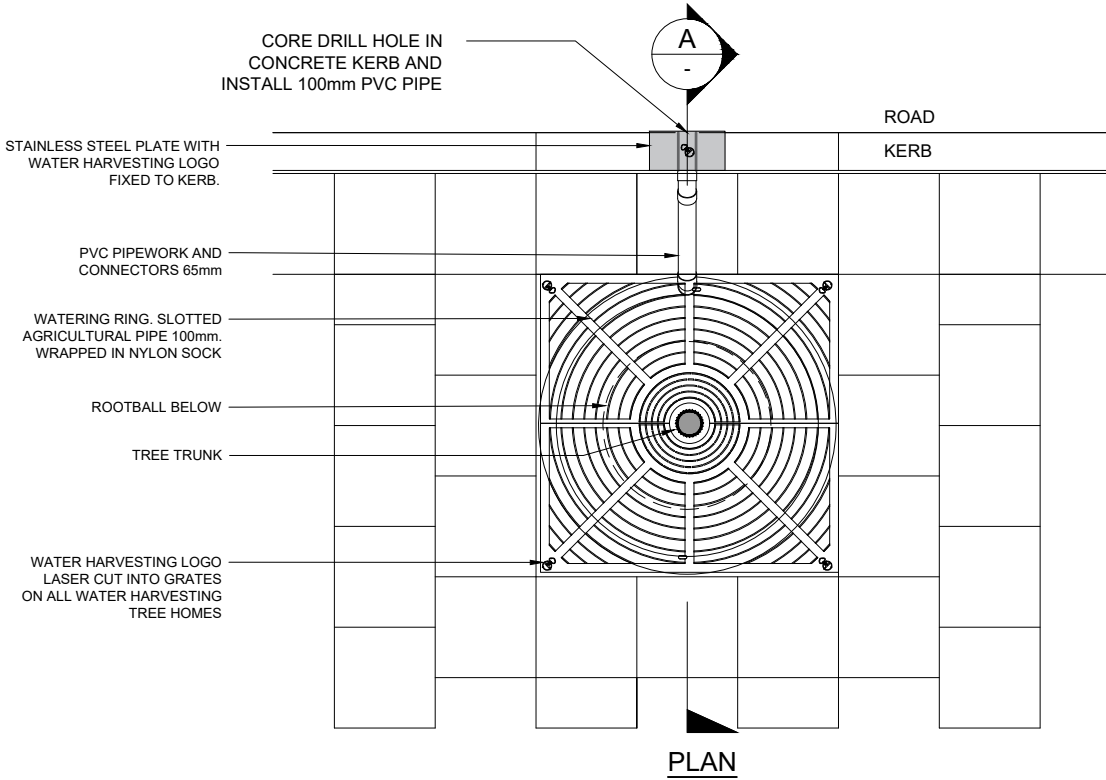


SECTION B - STANDARD TREE GRATE FIXING IN GRANITE PAVING

- NOTES
1. REFER TO BOOK 300 FOR CONCRETE PAVING SPECIFICATION AND DETAILS.
  2. REFER TO BOOK 1000 FOR GRANITE PAVING SPECIFICATION AND DETAILS.



- NOTES:
1. ENSURE WELDED SURROUND RINGS ON THE SAME SIDE AS THE ROLLED TREE COVER GUIDE
  2. GUARD INSTALLED WITH POSTS PARALLEL TO KERB.

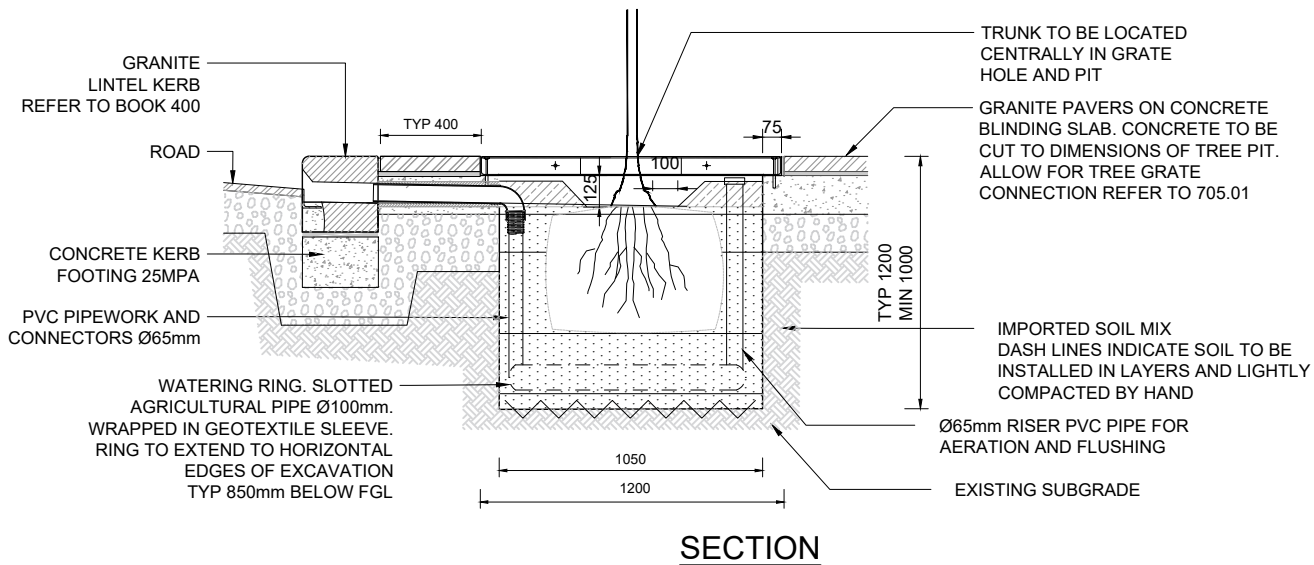
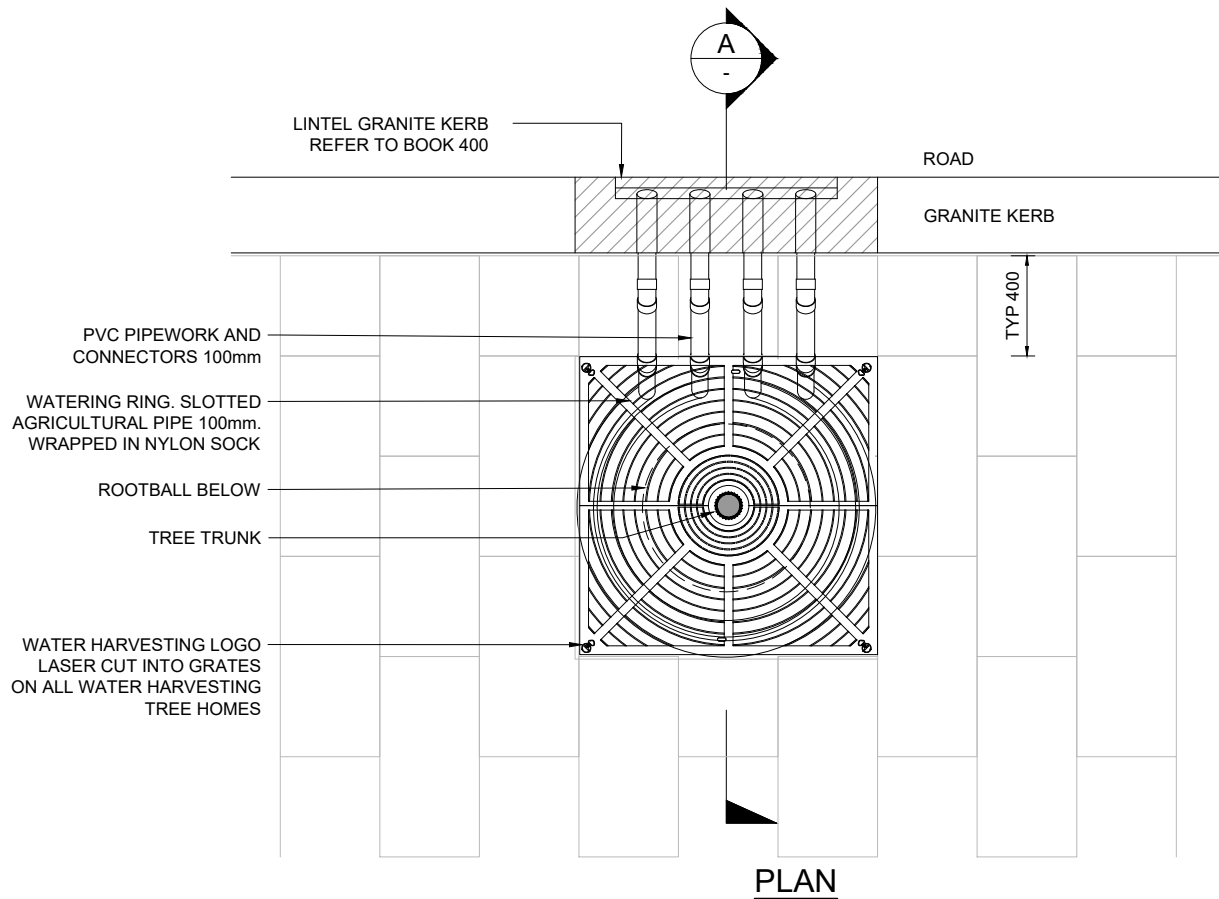


WATER HARVESTING ICON KERB PLATE FIXINGS

NOTES

1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
2. STORM WATER HARVESTING SYSTEMS TO BE INSTALLED WHEREVER POSSIBLE AND PRACTICAL - REFER TO SPECIFICATION AND PROJECT DRAWINGS.
3. EXISTING KERB TO MUST BE MIN 100mm HEIGHT ABOVE GL TO ENSURE STRUCTURAL INTEGRITY AND ROOM FOR 65mm PVC PIPE.





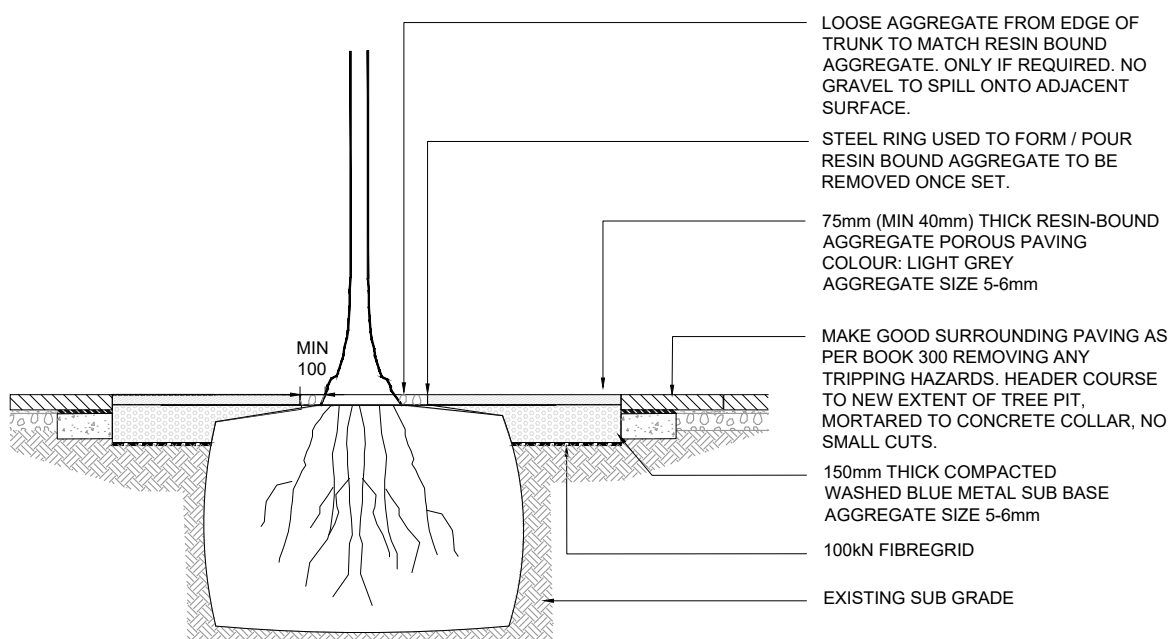
NOTES  
1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.

## POROUS PAVING TREE HOME RESURFACE (RETROFIT ONLY)

705.06

STREET TREE AND IRRIGATION DESIGN

REVIEWED: 15.03.2024



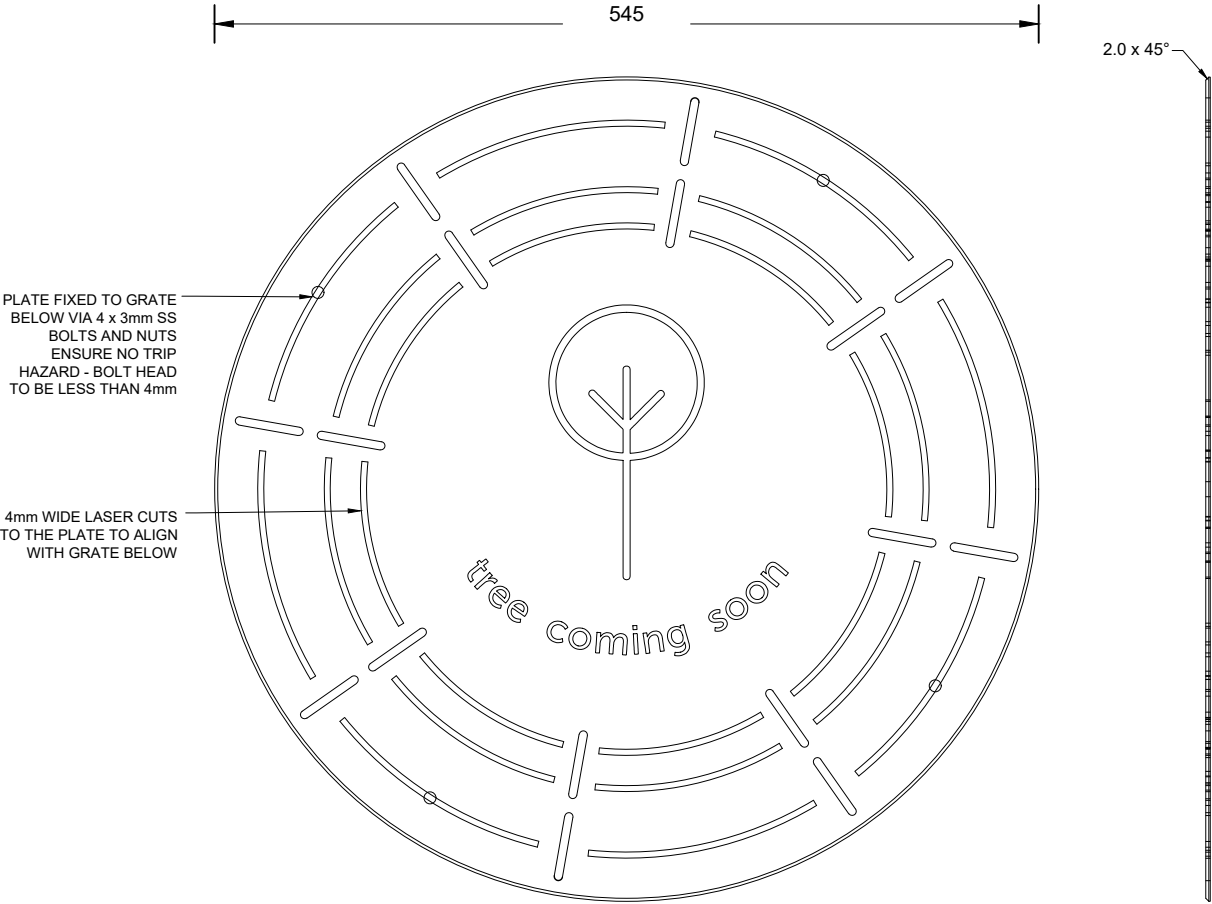
## NOTES:

1. TO BE READ IN CONJUNCTION WITH THE STREET TREE SPECIFICATION AND ALL OTHER DETAILS IN THIS BOOK 700.
2. POROUS PAVING TREATMENT ONLY TO BE USED TO RETROFIT EXISTING TREE PITS WHERE GRATES ARE FAILING OR PAVING IS BEING LIFTED BY TREE ROOTS.
3. POROUS PAVING NOT TO BE INSTALLED ON JUVENILE TREES UNLESS APPROVED BY THE CITY'S REPRESENTATIVE.
4. LOCATE NEW SURFACE TREATMENT CENTRALLY AND SYMMETRICALLY AROUND TRUNK.
5. ALL EXCAVATION AROUND EXISTING TREE ROOTS TO BE CARRIED OUT UNDER THE SUPERVISION OF A QUALIFIED AND COP APPROVED ARBORIST.
6. ANY COMPACTING OVER ROOT ZONE TO BE CARRIED OUT BY HAND.
7. FAILING TREE GRATES TO BE REMOVED.

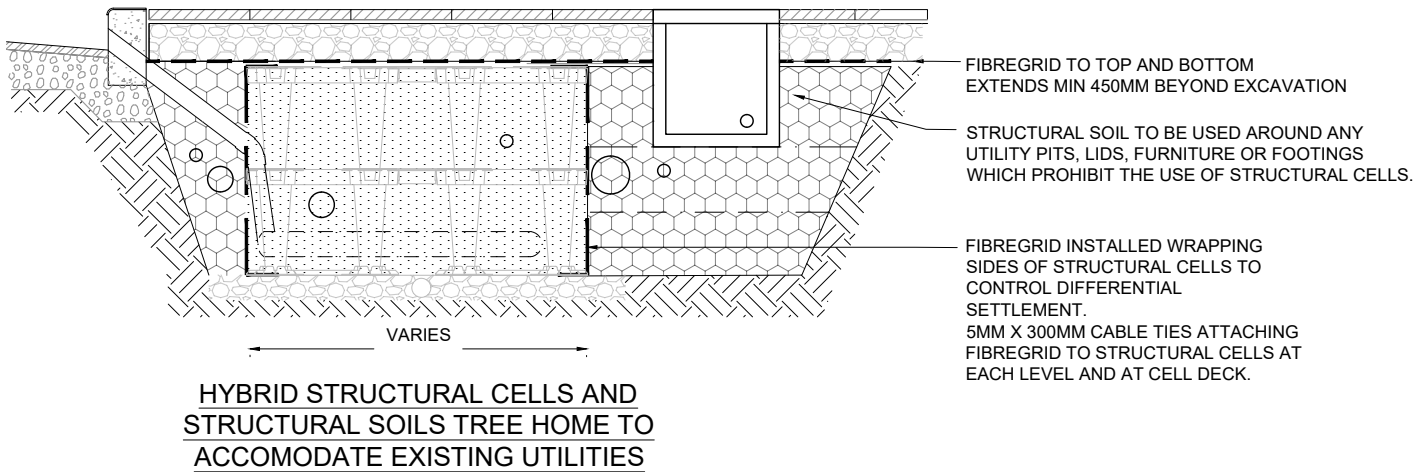
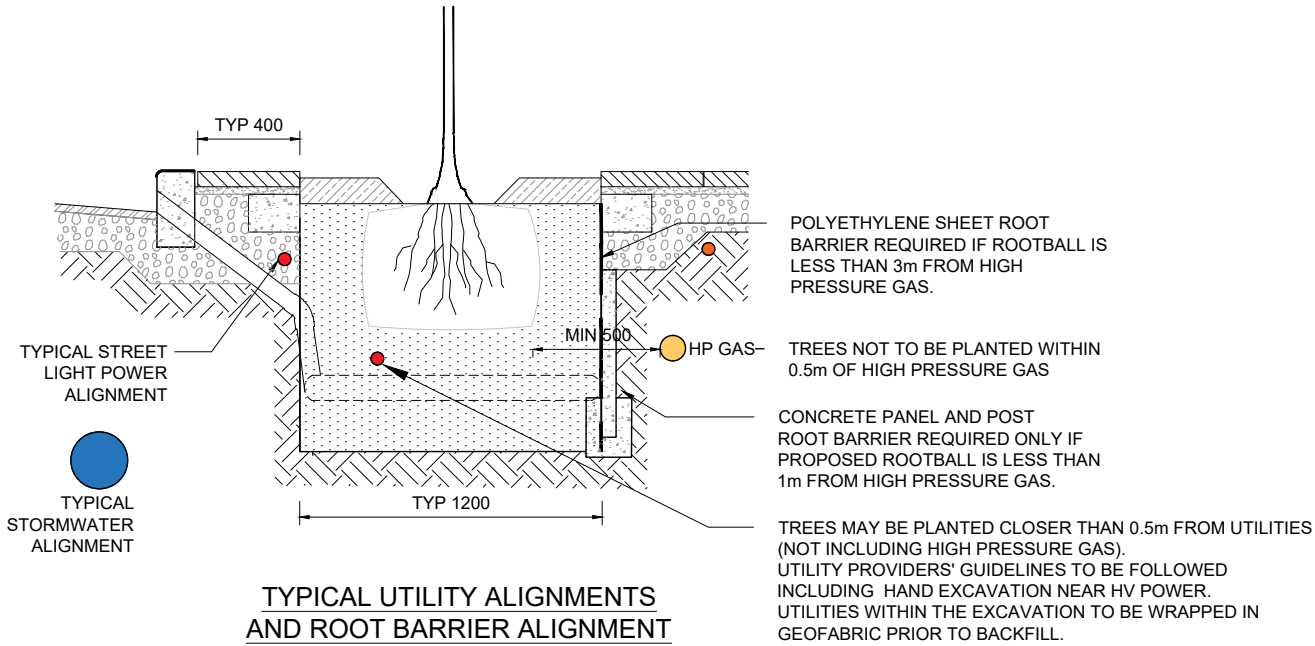
## DISCLAIMER:

THIS DOCUMENT HAS BEEN PREPARED BY THE CITY OF PERTH AND IS SUBJECT TO CHANGE. IT IS THE RESPONSIBILITY OF THE USER TO ENSURE THAT THAT DESIGN AND CONSTRUCTION NOTE HAS NO FURTHER REVISIONS BY CHECKING <https://perth.wa.gov.au/en/building-and-planning/building-and-works/building-and-construction-notes>





- NOTE:
1. TREE GRATE BLANKING PLATES TO BE INSTALLED IF TREE CANNOT BE INSTALLED AT THE SAME TIME AS TREE HOME AND GRATE.
  2. MATERIAL AND FINISH: 304 SS, 20.40 GARNET BLAST, PICKLE, PASSIVATE AND ELECTROPOLISH



- NOTES:
1. STRUCTURAL CELLS TO BE USED WHERE SPATIALLY POSSIBLE. STRUCTURAL CELLS MAY BE USED IN COMBINATION TO ACCOMMODATE SERVICE PITS, LIDS, FURNITURE FOOTINGS ETC.
  2. REFER TO SPECIFICATION SECTION 702.06 - WORKING AROUND EXISTING UTILITIES AND INFRASTRUCTURE
  3. OFFSETS FROM UTILITIES ARE MEASURED FROM THE OUTSIDE OF THE PIPE/CONDUIT TO THE EDGE OF ROOTBALL AT INSTALLATION (VARIES - APPROX Ø600).
  4. CONSULTANTS AND CONTRACTORS ARE TO OBSERVE THE WESTERN AUSTRALIAN UTILITY PROVIDERS CODE OF PRACTICE AND ALL UTILITY PROVIDERS OWN INSTRUCTIONS FOR WORKING NEAR THEIR ASSETS.
  5. DIAL BEFORE YOU DIG AND UNDERGROUND SERVICE INVESTIGATIONS TO BE COMPLETED PRIOR TO COMMENCING WORKS ON SITE. POT-HOLING IS USUALLY NECESSARY TO CONFIRM ALIGNMENTS OF SERVICES PRIOR TO EXCAVATION.
  6. WORKING NEAR HIGH PRESSURE GAS: (NOTE ATCO's REQUIREMENTS ARE SUBJECT TO CHANGE. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING COMPLIANCE AT TIME OF WORKS)
    - 6.1. ATCO APPROVAL AND SPOTTER REQUIRED ON SITE FOR ANY EXCAVATIONS OR PLANTINGS WITHIN 3m OF A HIGH PRESSURE GAS LINE.
    - 6.2. NO PLANTING TREES WITHIN 0.5m OF HIGH PRESSURE GAS.
    - 6.3. IF PLANTING WITHIN 0.5m-1m OF HIGH PRESSURE GAS, A RIGID ROOT BARRIER IS REQUIRED. REFER TO ATCO GUIDELINES.
    - 6.4. IF PLANTING 1-3m FROM HIGH PRESSURE GAS, SHEET STYLE ROOT BARRIER IS REQUIRED. REFER TO ATCO GUIDELINES.
  7. NOTE, STRUCTURAL CELLS AND STRUCTURAL SOILS CAN AND SHOULD BE INSTALLED AROUND EXISTING UTILITIES TO MAXIMISE TREE PLANTINGS AND SOIL VOLUMES.
  8. EXCAVATIONS WITHIN 500mm OF WESTERN POWER ASSETS TO BE CARRIED OUT BY HAND.
  9. REPORT ANY HAZARDOUS UTILITIES OR CONDITIONS TO THE SITE SUPERVISOR, UTILITY OWNER AND AND CITY'S REPRESENTATIVE IMMEDIATELY.