Architecture
Interior Design
Landscape Architecture
Planning
Urban Design

Australia
China
Hong Kong
Singapore
United Kingdom
United States of America

EDMONDSON PARK TOWN CENTRE CORE STAGE 01

Public Domain Trees
Deep Soil Strategy & Benchmarks

VERSION 04

Prepared for Frasers Property Australia
13 August 2018

HASSELL

Contact
Georgia Darling
Senior Landscape Architect
gdarling@hassellstudio.com
Calum Nesbitt
cnesbitt@hassellstudio.com

HASSELL
Level 2 Pier 8/9 23 Hickson Road
Sydney NSW
Australia 2000
T +02 9101 1000
hassellstudio.com
@HASSELL_Studio
HASSELL Limited
ABN/Company number here

Document control

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01	20 May 2018		DRAFT
02	07 June 2018		FOR INFORMATION
03	26 July 2018		FOR INFORMATION
04	13 August 2018		FOR INFORMATION

Contents

Section

Edmondson Park Town Centre & NSW Government's 5 Million Trees Program

The Edmondson Park Town Centre Public Domain is focused on the creation of a healthy and liveable community - set amongst active, vibrant pedestrain spaces.

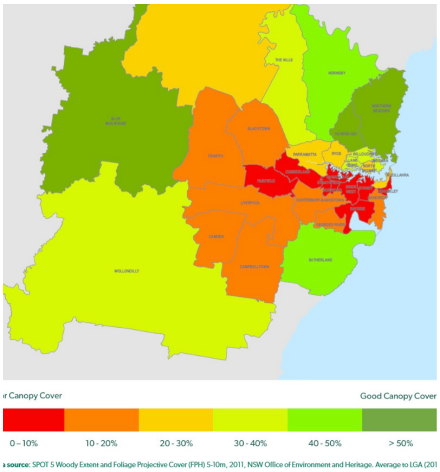
Canopy cover is essential to creating safe, comfortable and liveable places for people to stop, linger and enjoy.

The design of the Town Centre Core, is in line with the NSW Government's '5 million Trees' program, which is about planting more trees in Greater Sydney.

The scheme aims to increase Greater Sydney's tree canopy to 40% by 2030 - at Edmondson Park we will be providing 66% tree canopy cover - far exceeding the NSW Government targets.

10-20%
tree canopy cover within Liverpool Council. The Edmondson Park Town Centre provides;

66%
tree canopy coverage throughout the Town Centre Core



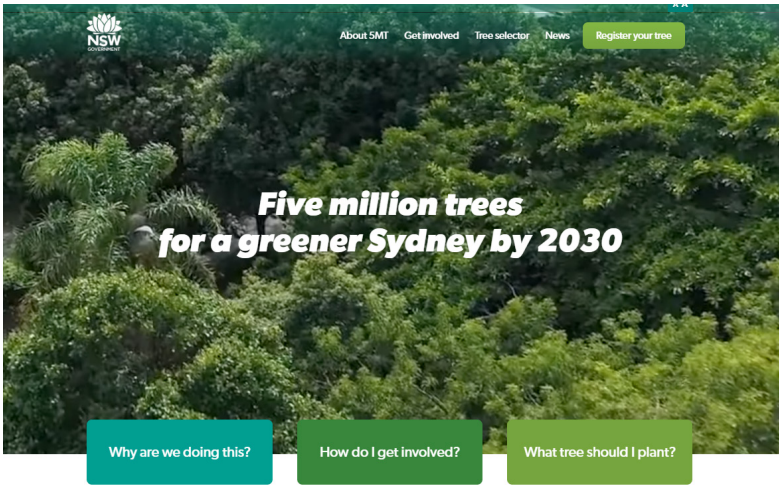


Figure_1.1. Indicative view looking south along Main Street

Town Centre Tree Master Plan

Due to the Town Centre Core landscape being located on-structure, HASSELL worked closely with the project architects and relevant experts to ensure the viability and success of all tree planting within the Town Centre Core.

HASSELL engaged the knowledge of Andreasens Green Nursery to review and develop the chosen species. Species have been selected based on their their appropriateness in an urban environment, their climatic setting and suitability for on-structure planting.

Due to the lack of deep soil zones throughout the Town Centre Core HASSELL engaged SESL Australia (Soil Scientists) to review and coordinate the chosen species, soil specification, and required soil volumes to maximise mature tree growth.

Once required volumes were established HASSELL and the project architects worked to ensure each tree has the require soil volumes.

All tree species are expected to grow to their full height and canopy width. Providing a high level of shade and amenity to the public domain.

Extract From: Edmondson Park – Soil Volume Requirements: Letter to Council

For full response refer Appendix A

SESL Australia Pty Limited (SESL) was initially engaged by HASSELL (the Client) in August 2017 to conduct an investigation of soils located at Edmondson Park (the site). The investigation assessed the viability of the site soil chemistry, physical properties as well as the volume requirements for medium sized trees to be planted within a structural slab along Main Street and Eat Street and the Town Square Podium. There are no lightweight restrictions for these soils.

1. Trees and Shrubs in varying sized pits within the structural slab – Main Street and Eat Street.
   - Main Street consists of 18 x 750L Japanese Elms (Zelkova serrata 'Green Vase') and 21 x 750L Urbanite Ash (Fraxinus 'urbanite').
   - 90% of pits are 25m3, however in the south end of Main Street some share a 40m3 space with 2 trees and in the north end of Main Street there is a 73m3 shared zone containing 3 trees. See Table 1 for more information. These are considered medium sized trees.
   - Eat Street consists of 7 x 1,000L Water Gum (Tristaniopsis laurina) and 6 x 1,000L Chinese Elm (Ulmus parvifoliai). Each pit is primarily 26m3. These are considered small sized trees.
2. Trees in the Town Square podium consists of 42 x 1,500L Honey Locust (Gleditsia triacanthos var. inermis 'Shademaster'. The shared pit is 682m3. These are considered medium sized trees.

SESL understands that Council is concerned with the soil volumes calculated and recommended by SESL and HASSELL.

Current Scheme

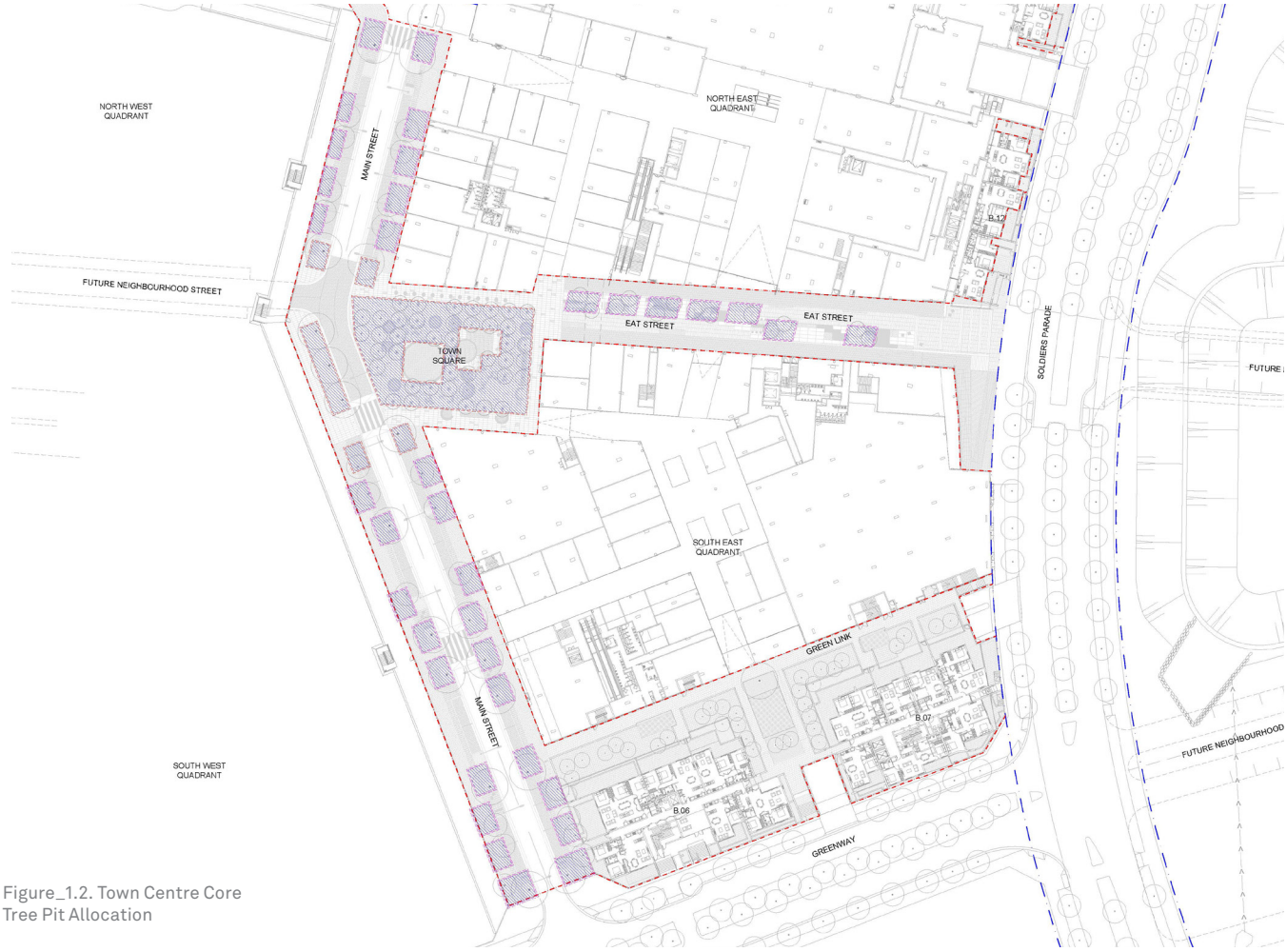


Figure_1.2. Town Centre Core Tree Pit Allocation

Current Scheme

Figure 1 outlines the soil volume requirements for each tree which is outlined in the SESL report *'Town Centre Appendix FB'*. These calculations were made based on the key requirements of the trees and the environmental conditions they will be exposed plus the ongoing maintenance. Refer to Appendix C for further details of the calculations.

Location	Tree Species	Mature Height	Allocated soil volume	Required soil volume	Shared soil Volume
Main Street	Japanese Elms (*Zelkova serrata* 'Green Vase')	~ 14 metres	26m³	25.65 m³	2 trees = 38.5 m³
	Urbanite Ash (*Fraxinus* 'urbanite')	13 - 15 metres	26m³	25.65 m³	3 trees = 51.3 m³
Eat Street	Water Gum (*Tristaniopsis laurina*)	~ 5 - 15 metres	25m³	25.65 m³	
	Chinese Elm (*Ulmus parvifoliai).*	~ 15 metres	25m³	25.65 m³	
Town Square Podium	Honey Locust (*Gleditsia triacanthos var. inermis* 'Shademaster'.	~ 8 metres	682m³ shared space with 42 species.	350m³ shared space with 42 species.	

Revised Scheme - Increased Deep Soil

The majority of Main Street previously had isolated tree pits, a minimum of 25m3 per tree – the updated shared tree pit approach vastly improves on this minimum volume per tree.

The structural slab design has been lowered to allow for a continuous soil volume between trees, approximately 1000mm depth between the beams and a 400mm minimum depth over the beams (refer structural sections).

A typical example of the increase on Main Street can be seen here - previously these 4no. trees sat in 4no. isolated pits of 25m3 each, these same 4no. trees now share a total of 172m3, 43m3 per tree – a 72% increase.

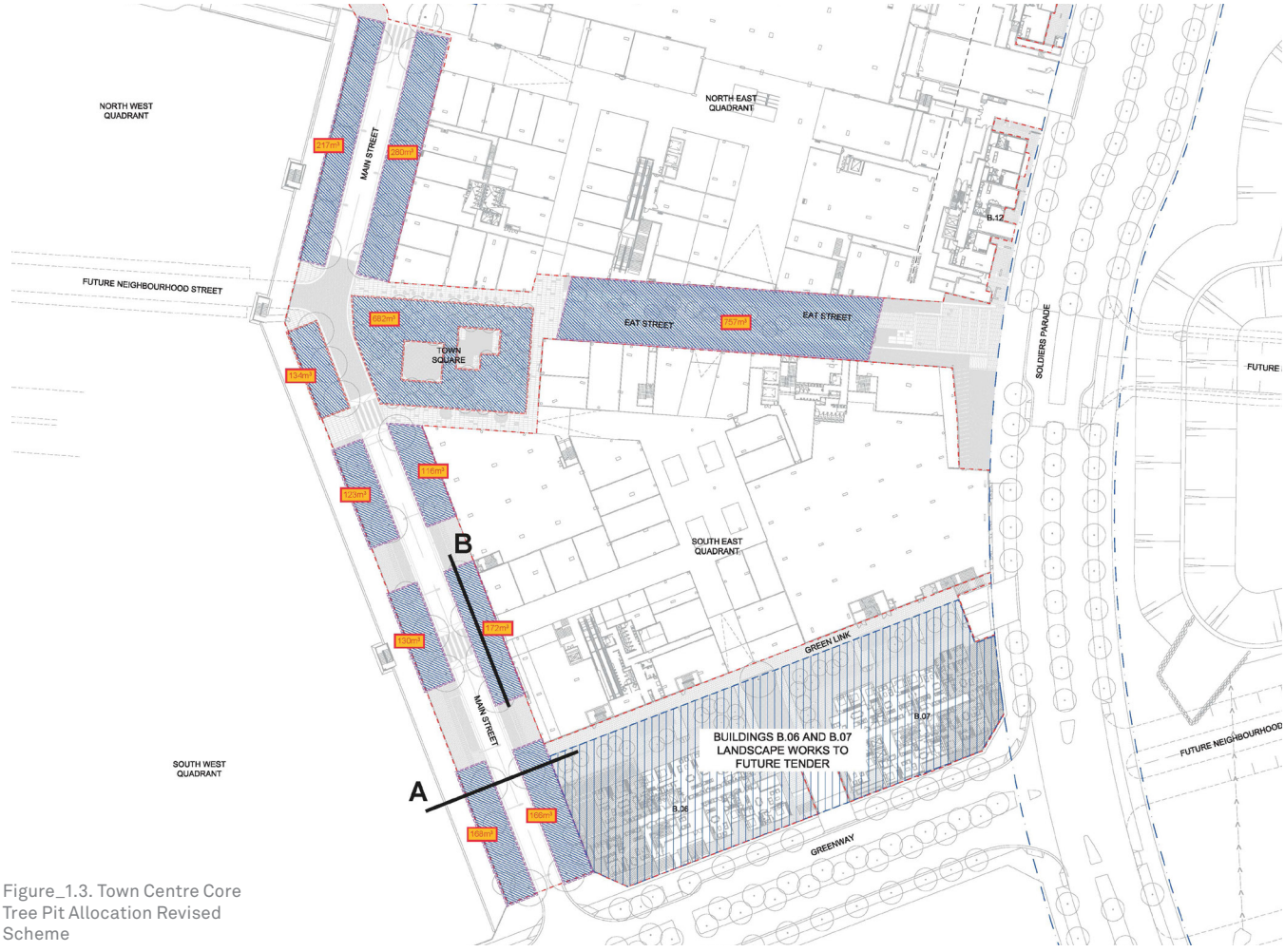
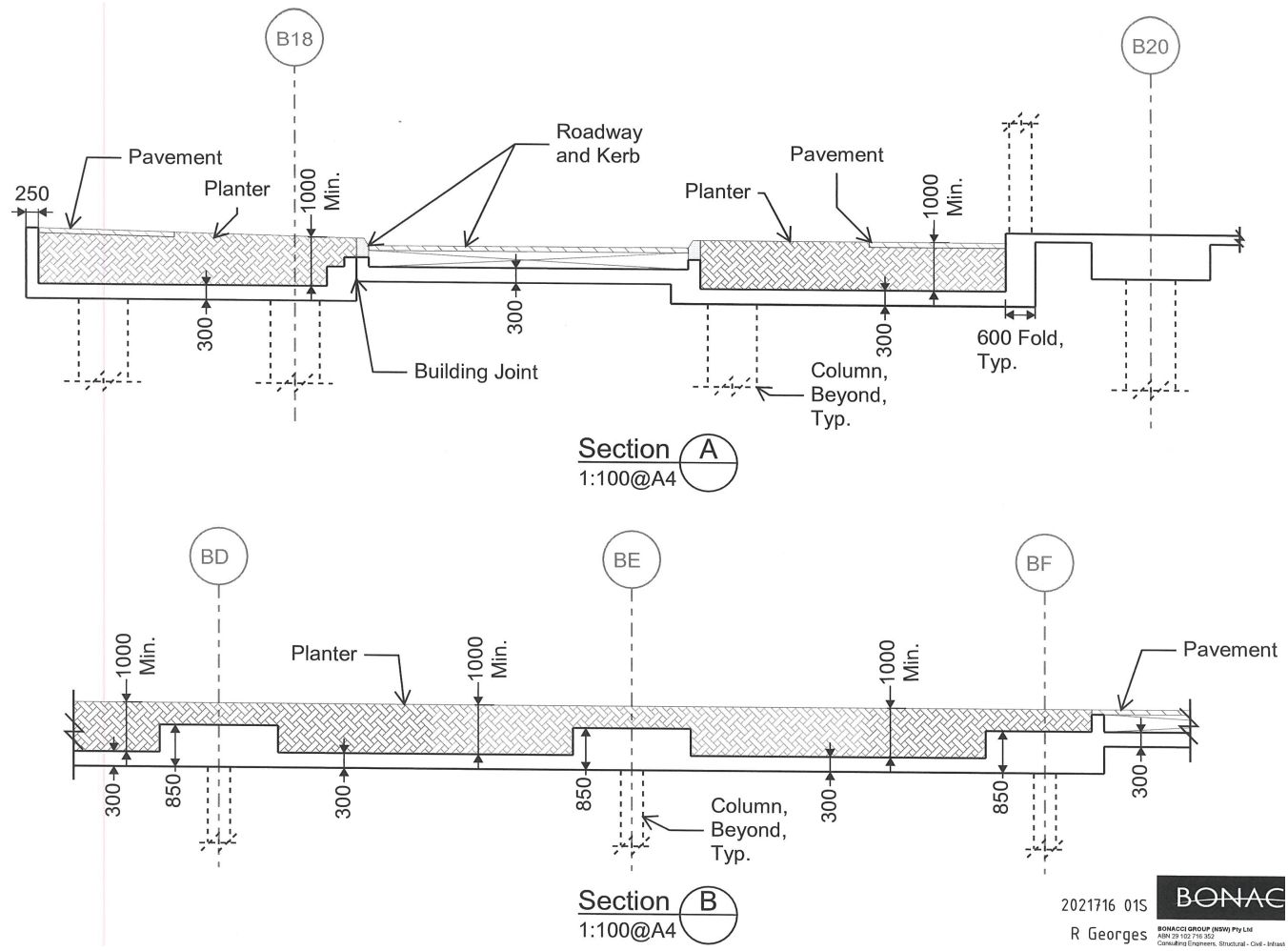


Figure_1.3. Town Centre Core Tree Pit Allocation Revised Scheme

Revised Scheme - Increased Deep Soil



03 Reference Projects
Australia

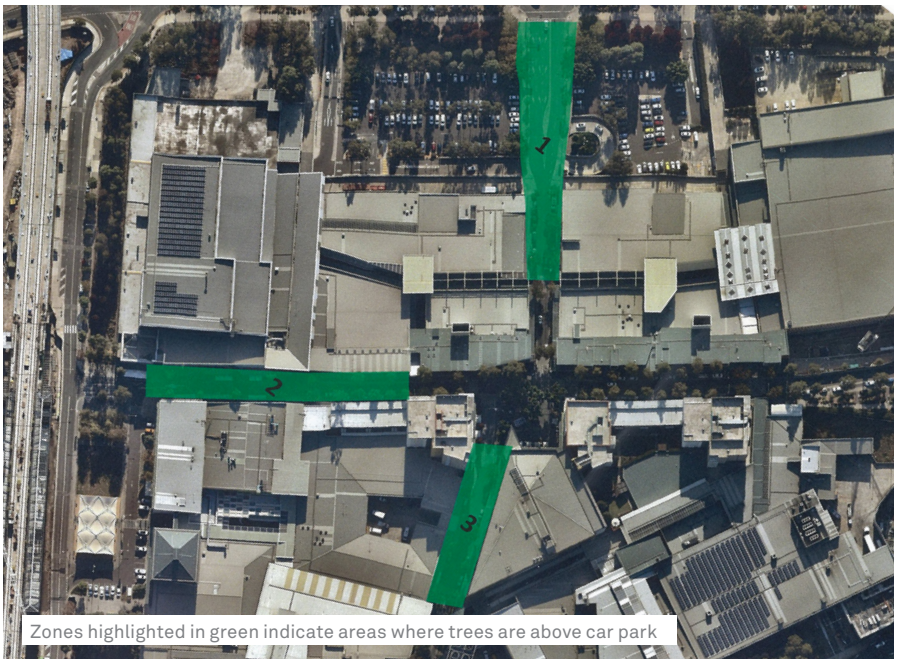
NOTE: Documentation not produced by HASSELL. Sourced from HDR July 2018

Rouse Hill Town Centre
Sydney, Australia

Architect
HDR
Oculus Landscape Architects

Trees highlighted in green zones are growing above the Rouse Hill Town Center car park.

Completion Date
2009
Tree Age
9

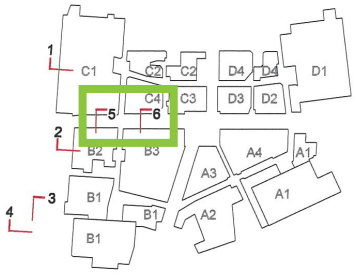


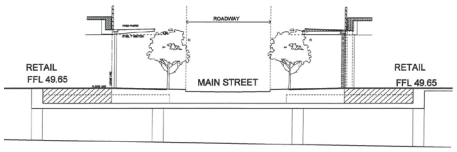
Zones highlighted in green indicate areas where trees are above car park


Current street view

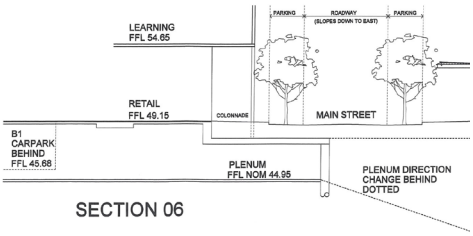
NOTE: Documentation not produced by HASSELL. Sourced from HDR July 2018

Cross sections through Rouse Hill Town Centre streets showing car park below.





SECTION 05



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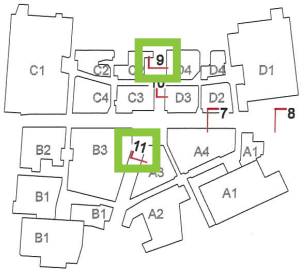
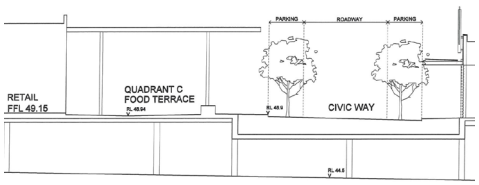
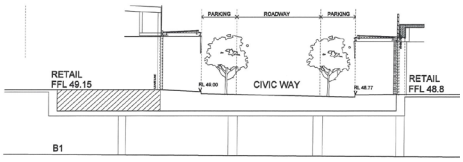




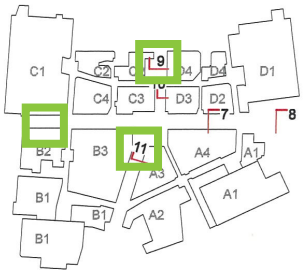
SECTION 09

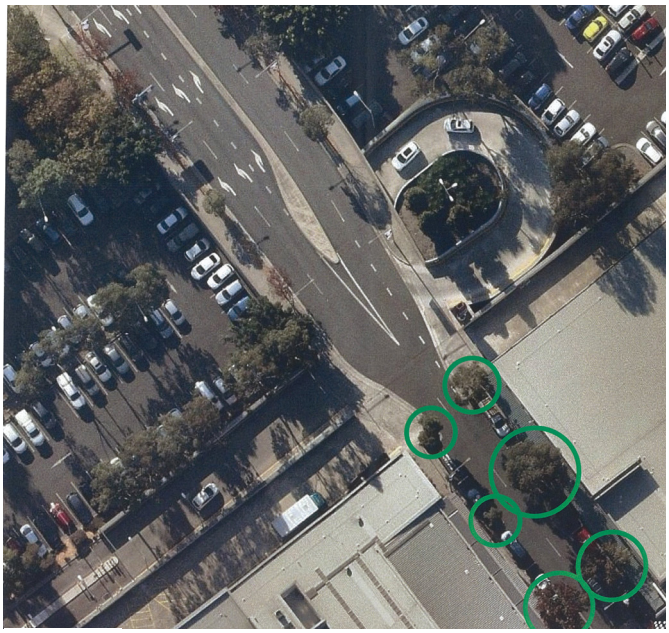


SECTION 11

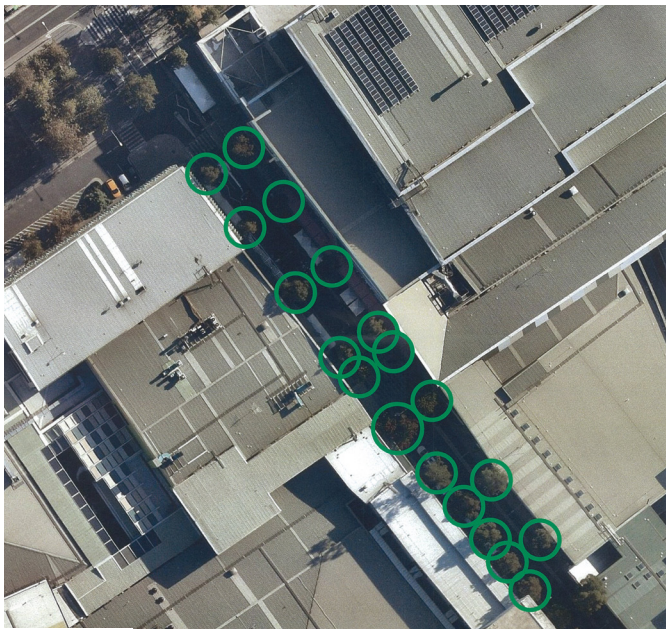
NOTE: Documentation not produced by HASSELL. Sourced from HDR July 2018

Aerial view identifying trees growing above the car park.





Section 9



Section 5 /6

Section 11

ICC Sydney Public Domain
Sydney, Australia

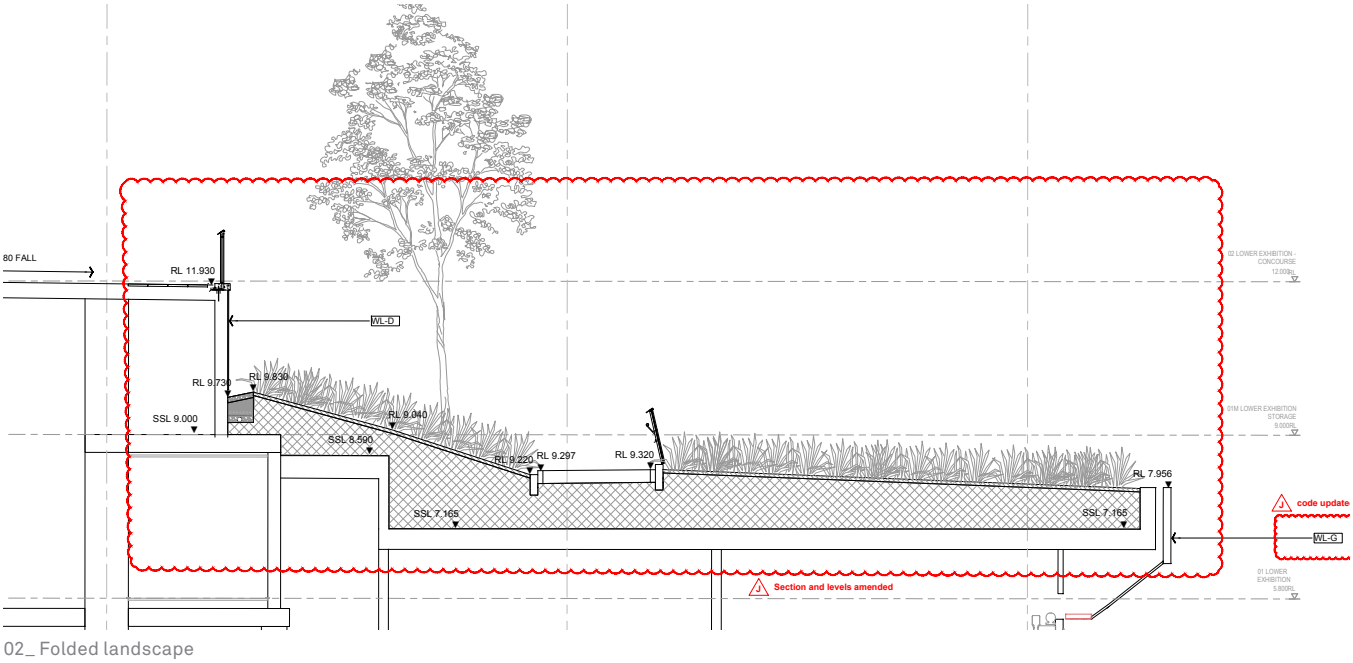
Landscape Architect
HASSELL

The design and documentation of the Darling Harbour Public Domain was completed by HASSELL. Trees growing on the folded landscape are grown on slab. These trees have been growing successfully since installation.

Trees on the folded landscape are growing above the Exhibition Centre loading dock.

Completion Date
2017
Tree Age
1

The details below outline tree pit construction documentation for the folded landscape.



02_ Folded landscape

Crown Towers
Perth, Australia

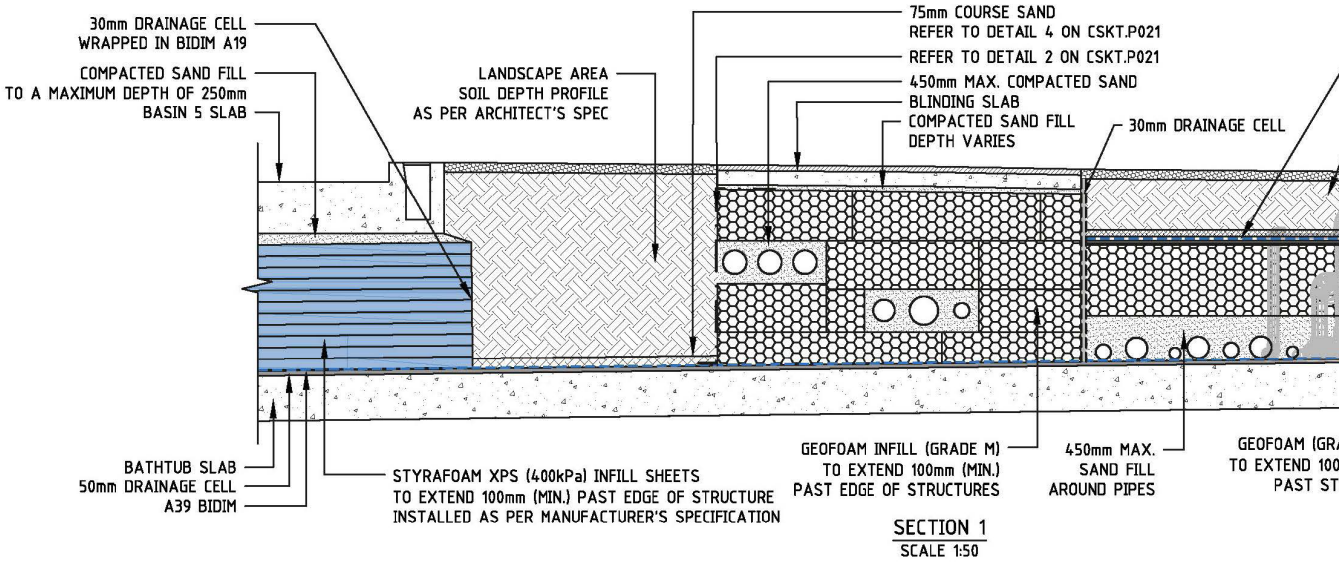
Landscape Architect
HASSELL

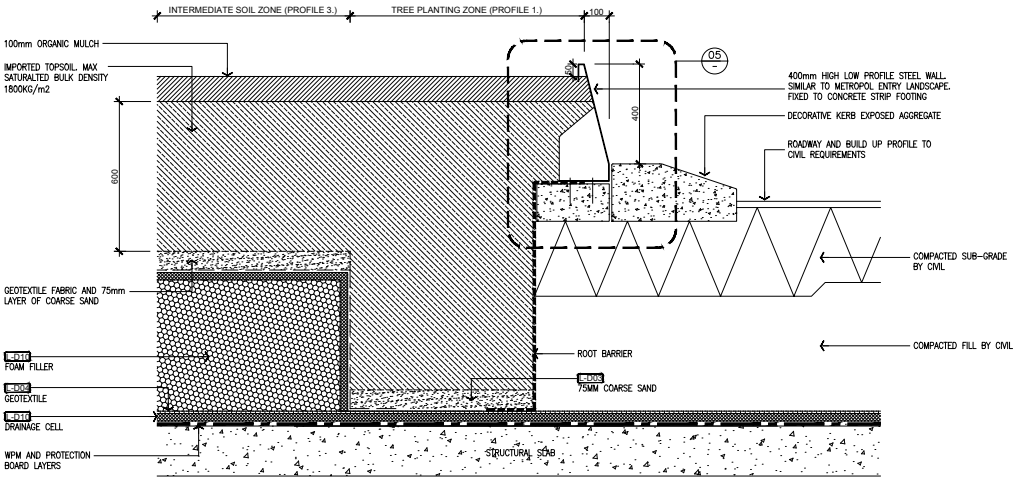
The design and documentation of Crown Towers Hotel, Perth was completed by HASSELL in 2016.

Trees in the pool and entry precinct are installed on slab. They ahve been growing successfully since installation.

Completion Date
2016
Tree Age
3

The details below outline tree pit construction documentation for the tree pits.





Harold Park, Precinct 3
Sydney, Australia

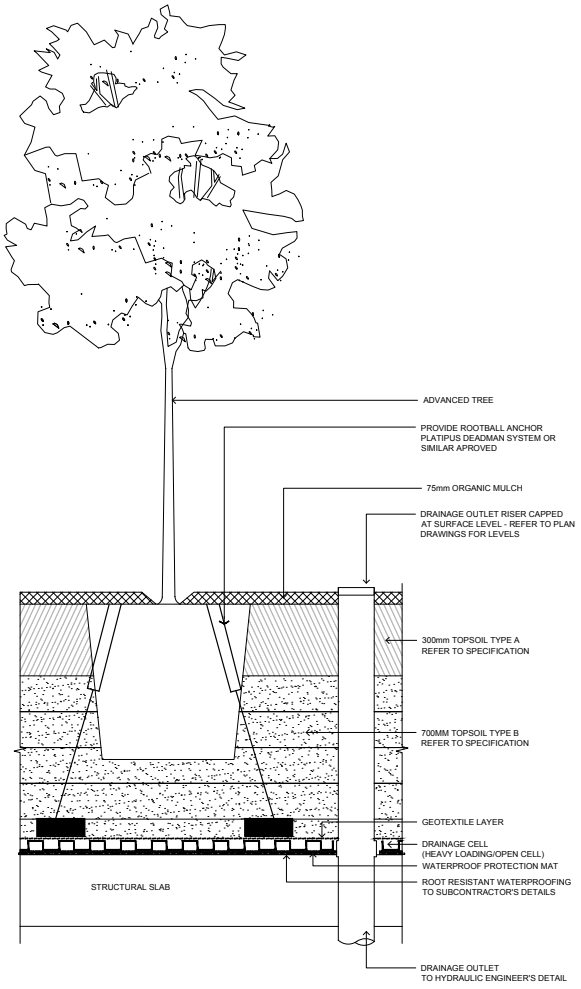
Landscape Architect
HASSELL

The design and documentation of Maestro at Harold Park was completed by HASSELL.

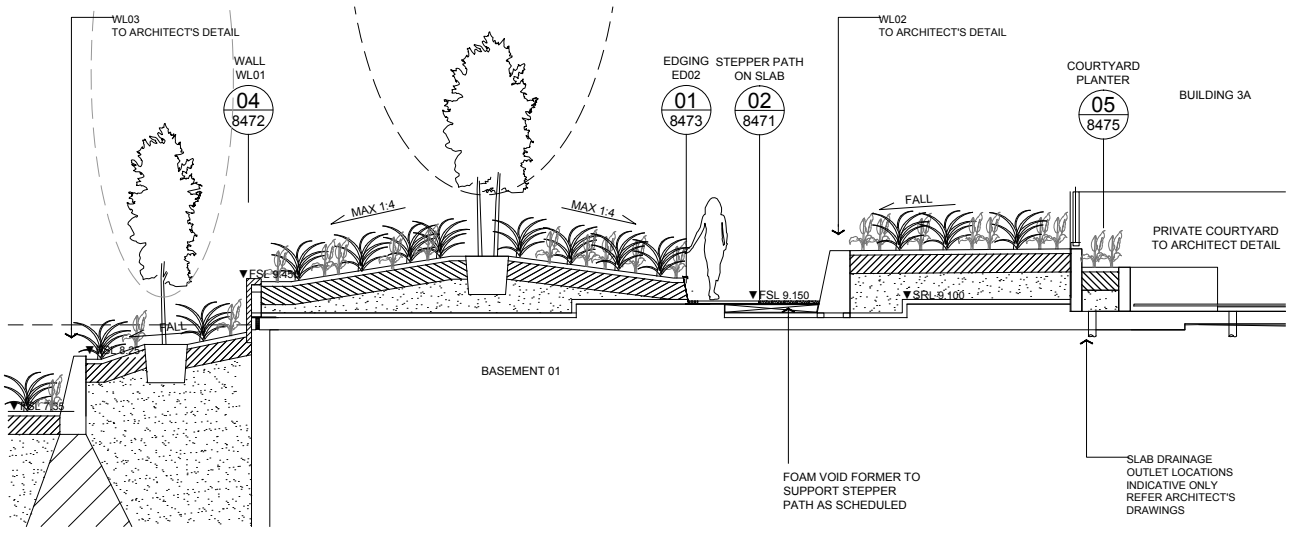
Trees in the central courtyard and residential perimeter have been installed above the residential car park.

Completion Date
2016
Tree Age
3

The details below outline tree pit construction documentation for the tree pits.



03 SL04 - TREE PLANTING - ON SLAB TYPICAL DETAIL
Scale: 1:10



03 SITE SECTION INTERNAL COURTYARD
Scale: 1:50

Adelaide Zoo Entry Precinct
Adelaide, Australia

Architect
HASSELL

The design and documentation of Adeliade Zoo Entry Precinct was completed by HASSELL in 2009.

The collection of Eucalypt species in the entry forecourt have been installed on slab. The trees have been growing successfully for 9 years.

Completion Date
2009
Tree Age
9

Tree heights on installation

Current google street view

Burswood Peninsular
Perth, Australia

Architect
HASSELL

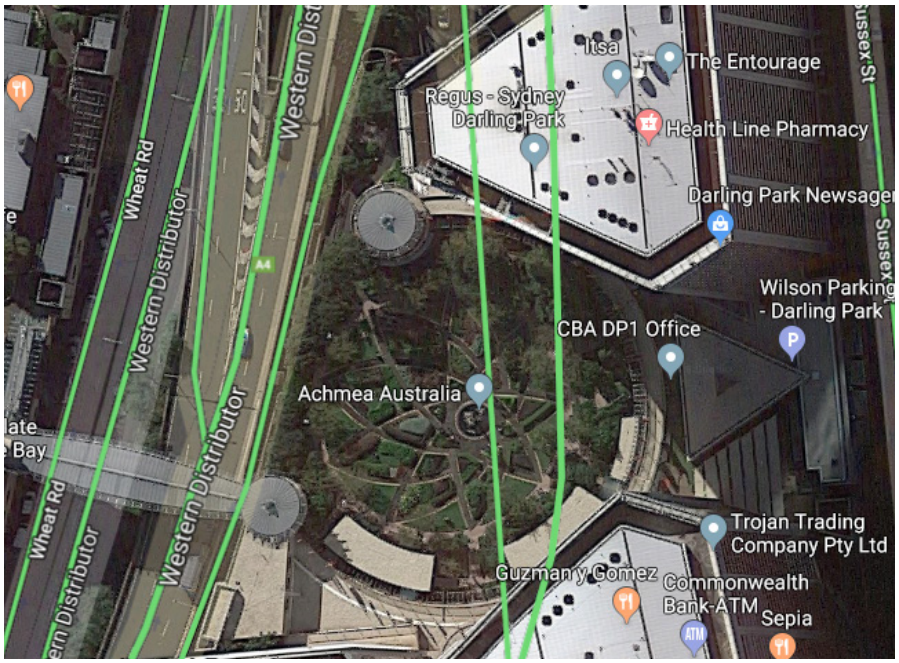
The design and documentation of Burwood Peninsular was compled by HASSELL in 2006.

Figs in the central open space have been installed on slab. The trees have been growing successfully for 12 years.

Completion Date
2006
Tree Age
12

Current tree sizes

03 Reference Projects
Sydney



Darling Park
Sydney, Australia

Architect
Unknown

The trees at Darling Park are growing on slab above the Western Distributor, Darling Park food court and car park.

Completion Date
1990
Tree Age
10

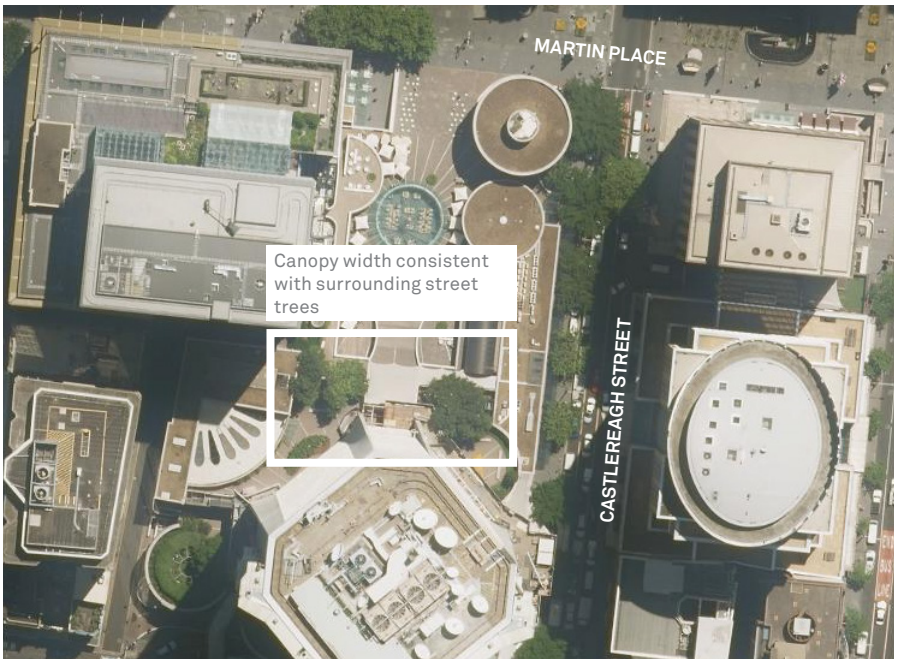
MLC Centre
Sydney, Australia

Architect
Harry Seidler

Ficus tree species are growing on slab at the MLC Centre. Below them is the MLC Centre Food Court.

These trees have been growing successfuly for over 20 years.

Completion Date
1977-1992
Tree Age
Approximately 26 years old



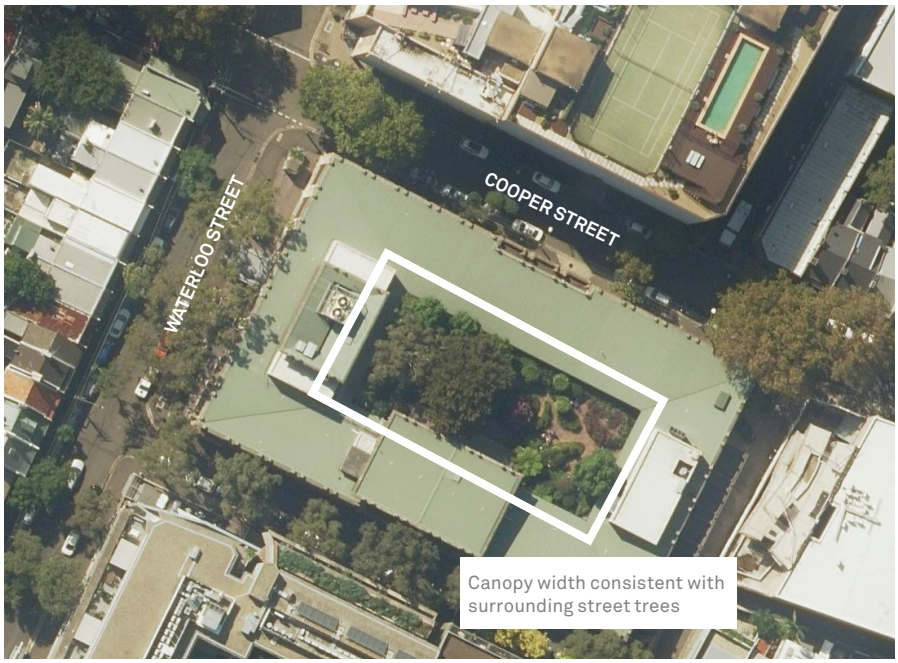
View shows retail below Fig trees

Readers Digest, 26 Waterloo Street
Sydney, Australia

Architect
John James
Bruce Mackenzie

Fig trees at the Reader Digest Building are growing on the rooftop of the building.

Completion Date
Late 1960s
Tree Age
Approximately 48 years old



SESL RESPONSE

A

Our Ref: J000999 - Edmondson Park- On Slab Trees V3.0 .docx

1 June 2018

Mr Callum Nesbitt

Hassell – Sydney Studio

Level 2, Pier 8/9, 23 Hickson Rd

Sydney NSW 2000

Attention: Callum Nesbitt

Re: Edmondson Park – Soil Volume Requirements: Letter to Council

Dear Callum,

SESL Australia Pty Limited (SESL) was initially engaged by Hassell (the Client) in August 2017 to conduct an investigation of soils located at Edmondson Park (the site). The investigation assessed the viability of the site soil chemistry, physical properties as well as the volume requirements for medium sized trees to be planted within a structural slab along Main Street and Eat Street and the Town Square Podium. There are no lightweight restrictions for these soils.

1. Trees and Shrubs in varying sized pits within the structural slab – Main Street and Eat Street.
   - Main Street consists of 18 x 750L Japanese Elms (*Zelkova serrata* 'Green Vase') and 21 x 750L Urbanite Ash (*Fraxinus* 'urbanite'). 90% of pits are 25m^3, however in the south end of Main Street some share a 40m^3 space with 2 trees and in the north end of Main Street there is a 73m^3 shared zone containing 3 trees. See Table 1 for more information. These are considered medium sized trees.
   - Eat Street consists of 7 x 1,000L Water Gum (*Tristaniopsis laurina*) and 6 x 1,000L Chinese Elm (*Ulmus parvifoliai).* Each pit is primarily 26m^3. These are considered small sized trees.
2. Trees in the Town Square podium consists of 42 x 1,500L Honey Locust (*Gleditsia triacanthos var. inermis* 'Shademaster'. The shared pit is 682m^3. These are considered medium sized trees.

SESL understands that Council is concerned with the soil volumes calculated and recommended by SESL and Hassell. Hassell have engaged SESL to provide references of how we have developed our calculations and examples

of successful project works where trees have achieved a mature height and canopy being planted in similar environments and soil volumes which will be presented to Council.

Figure 1 outlines the soil volume requirements for each tree which is outlined in the SESL report *'Town Centre Appendix FB'*. These calculations were made based on the key requirements of the trees and the environmental conditions they will be exposed plus the ongoing maintenance. Refer to Appendix C for further details of the calculations.

Location	Tree Species	Mature Height	Allocated soil volume	Required soil volume	Shared soil Volume
Main Street	Japanese Elms (*Zelkova serrata* 'Green Vase')	~ 14 metres	26m³	25.65 m³	2 trees = 38.5 m³
	Urbanite Ash (*Fraxinus* 'urbanite')	13 - 15 metres	26m³	25.65 m³	3 trees = 51.3 m³
Eat Street	Water Gum (*Tristaniopsis laurina*)	~ 5 - 15 metres	25m³	25.65 m³	
	Chinese Elm (*Ulmus parvifoliai).*	~ 15 metres	25m³	25.65 m³	
Town Square Podium	Honey Locust (*Gleditsia triacanthos var. inermis* 'Shademaster'.	~ 8 metres	682m³ shared space with 42 species.	350m³ shared space with 42 species.	

Figure 1. Soil volume calculations sourced from SESL report *'Town Centre Appendix FB'* and amended to include shared spaces with 2 and 3 trees.

Soil volumes were assessed using the *'Soil Volume Simulator' (SVC)* developed by Soil Scientist, Simon Leake (BSc Ag (Hons) CPSS) and registered landscape architect Elke Haege (UNSW Hons and AQF Level 5 Dip. Arboriculture). The SVC uses a selection process for calculating the soil volume requirements by understanding the complexities of the site conditions;

1. Climatic growing conditions
2. Available soil moisture and water holding capacity
3. Physical soil properties & texture
4. Available soil nutrients for plant growth
5. Maintenance establishment and care
6. Proposed soil ameliorations
7. Shared root systems & expected lifespan / replating frequency.

These properties were considered by researching international references, publications on research, and tests performed to quantify optimum and minimum soil volumes. The published research findings have been conducted on trees in Australia, the United Kingdom, Canada, the USA, the Netherlands and Germany, as well as other western European countries. It should be noted that research findings have used varying species, and different growing conditions and climates to measure optimum soil growing volumes. A summary of these workings can be seen in Figure 2.

Minimum soil volume recommendations expressed as an average and derived from published research findings as listed in table below					
Relative tree size at maturity[8]	Small	Medium	Large	Optimum recommendation	Refer to tables following for averages on tree sizes
Averages for research findings	13.3 m^3	31.3 m^3	> 18m^2 area	42 m^3	Measurements (converted into m^3 where required)
Minimum soil volume recommendations expressed as an average and derived from regulatory documents as listed in table below					
Averages for published regulatory documents	11.9 m^3	21.7 m^3	37.9 m^3	34 m^3	Note: Predominantly Canadian and USA sources.

Figure 2. Summary of average soil volume minimum and optimum recommendations from leading industry professionals. Source: *Soils for Landscape Development. Selection, Specification and Validation (Leake & Haege 2014.*

A full reference of list of the research articles that were used to develop this calculator can be found in Appendix A as well as a table in Appendix B which outlines the industry-accepted publications and scientific findings in relation to both canopy diameters and recommended minimum soil volumes for tree rooting capacity.

Drainage and Aeration

Adequate drainage and aeration are important for tree survival in confined spaces. SESL will typically specify a suitable backfill media surrounding the rootball which overlays or connects to a subsurface drainage. We also highly recommend a 65mm slotted agriculture drain pipe (u-shaped) to be installed under the root ball and left open to the surface either side of the tree. Refer to Figure 3 for a diagram of the pipe and backfill.

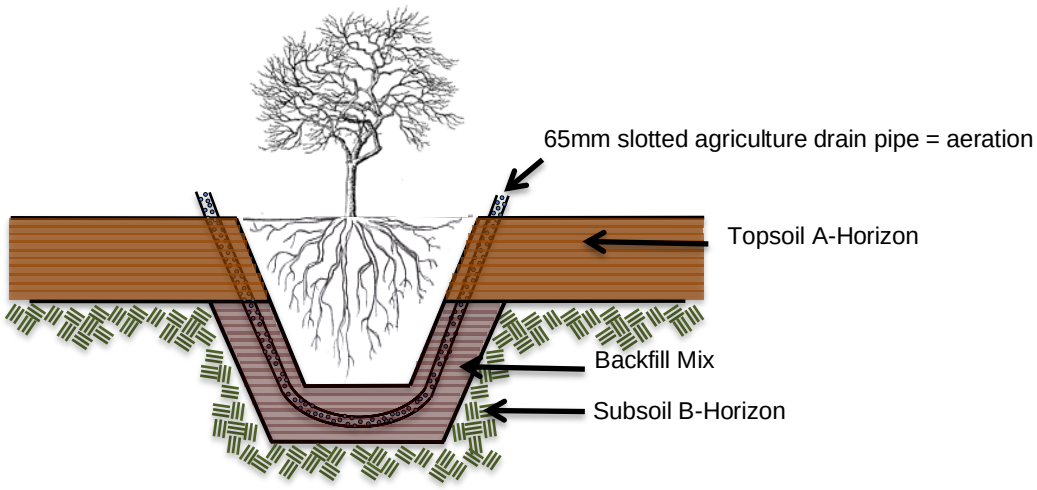


Figure 3. Example of street tree with backfill mix and 65mm slotted Ag. pipe

SESL Street Tree Examples

The soil volume calculator was developed in 2014 in conjunction with Simon Leake and Elke Haeges book, *Soils for Landscape Development. Selection, Specification and Validation (Leake & Haege 2014).* Therefore, the examples of works provided below extend back to 2001 when soil volumes were typically calculated in reference to *Up by Roots (Urban 1992)* which focuses on the ratio of tree size to soil volume. The SVC draws on references from Urban as well as multiple other sources which can be viewed in Appendix A and Appendix B.

1. **Darling Harbour 2014 (Hassell Studios)** Development of soil profile construction and specifications for trees within confined spaces at Darling Harbour.

Figure 4. Darling Harbour Street Trees. Photo supplied by HASSELL. Public Domain Design: HASSELL. Photography by: Simon Wood

2. **Crown Street, Wollongong 2013** *Client:* SoilCo Structural soil and pier and vault development for street trees within confined spaces of Crown Street.
3. **Laman St, Newcastle 2011** *Client:* Newcastle City Council. Development of soil and planting specifications using "City Green" root cell structures for *Ficus hillii* tree replacement program for Newcastle City Council.
4. **Barangaroo Redevelopment Sydney 2010 – 2015** *Client:* Johnson Pilton Walker and Peter Walker Partners. Soil concepts using crushed rock and recycled green waste composts. Detailed design and specification to validate the specifications for native flora. Quality control of installation.
5. **Sydney Olympic Park 2001** *Client:* Hassell and Peter Walker Partners, concept design team. Soil concepts using site fill and recycled crushed rock. Structural soil, green roof media, horticultural display. 2001.

Please feel free to contact me should you require any further information.

SESL AUSTRALIA PTY LIMITED

Chantal Milner
Soil Scientist
B Env Sci

Simon Leake
Principal Soil Scientist
(B Sc Ag (Hons) ASSSI. ASPAC WMA CPSS

ATTACHMENTS

A - Reference List

B - Industry accepted publications and scientific findings

C - Soils Volume Calculator

Limitations of This Report:

SESL has performed an investigation and consulting services for this project as outlined in our discussions and in accordance with current professional and industry standards for environmental site assessment. The findings of this report are the result of discrete/specific methodologies used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of this site and do not represent the actual state of the site at all points. Should materials or conditions be encountered other than those which have been described these will require additional assessment.

SESL assessment is based on the result of limited site investigation. SESL cannot provide unqualified warranties nor assume any liability for site conditions not observed, accessible during the time of the investigations.

Despite all reasonable care and diligence, the ground conditions encountered and the concentrations of contaminants measured may not be representative of conditions between the locations samples and investigated. In addition, site characteristics may change as a result of soil heterogeneity, chemical reactions and other events. These changes may occur subsequent to SESL investigation and assessment.

This report and associated documentation and the information herein have been prepared solely for the use of the client and any relevant authority. Any reliance assumed by third parties on this report shall be at such parties own risk. Any ensuring liability resulting from use of the report by third parties cannot be transferred to SESL.

WATER ■ MINING ■ SPORTS & RECREATION ■ HORTICULTURE & AGRICULTURE ■ ENVIRONMENTAL ■ ENGINEERING & GEOTECH ■ URBAN HORTICULTURE & LANDSCAPING

ABN 70 106 810 708
T 1300 30 40 80
F 1300 64 46 89
E info@sesl.com.au
W sesl.com.au

POST PO Box 357, Pennant Hills NSW 1715
LAB 16 Chilvers Rd, Thornleigh NSW 2120
ACT Level 5 Tower A, 7 London Cct, Canberra ACT 2601
VIC Level 1, 21 Shields St, Flemington VIC 3031
QLD Level 10, 15 Green Square CI, Fortitude Valley QLD 4006

Appendix A

Reference List for developing the *Soil Volume Simulator*

Reference List for developing the Soil Volume Simulator

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ABN 70 106 810 708
T 1300 30 40 80
F 1300 64 46 89
E info@sesl.com.au
W sesl.com.au

POST PO Box 357, Pennant Hills NSW 1715
LAB 16 Chilvers Rd, Thornleigh NSW 2120
ACT Level 5 Tower A, 7 London Cct, Canberra ACT 2601
VIC Level 1, 21 Shields St, Flemington VIC 3031
QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

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Appendix B

Industry-accepted publications and scientific findings in relation to both canopy diameters and recommended minimum soil volumes for tree rooting capacity

Table C3. Industry-accepted publications and scientific findings in relation to both canopy diameters and recommended minimum soil volumes for tree rooting capacity

Canopy diameters	**Small**	**Medium**	**Large**	**Notes source (refer to reference list below table)**	
Average canopy diameters (in metres)	< 9 m	< 15 m	> 15 m + [11]	Note: measurements represent crown diameter* (canopy plane)	
Planning Department of NSW (2011), stated canopy diameters	4 m canopy diameter	8 m canopy diameter	16 m canopy diameter	To be used as a guide for a small, medium or large tree (at maturity in ideal conditions) **Note:** Account for fastigiate trees that have a smaller canopy spread than umbrageous species	
Recommended minimum soil volume findings	**Minimum small tree soil volume (m^3)**	**Minimum medium tree soil volume (m^3)**	**Minimum large tree soil volume (m^3)**	**Recommended soil volume (m^3)**	**Notes**
Urban (2008)	23			34	
Bakker (1983) cited in Kopinga (1991)	14–21	23.5–35 (for a 15 m crown diameter		Recommends: 1/2 to 3/4 m^3 of medium coarse sand with 5–7% organic matter per 1 m^2 of crown projection*. Tree evaporation: 1.5 times in urban situation versus forest	
Gilman (1997)(Gilman provides areas, not volumes)	Area: 4–9 m^2	Area: 9–18 m^2	Area: > 18 m^2		Observations conducted in Florida, USA
Helliwell (1986) (average for South East England)				44.6	
Kent et al. (2006)				42.5	
Kopinga (1991)				42.4	
Lindsey and Bassuk (1991)	18	30		40	2 ft^3 per every 1 ft of crown projection*
Lindsay and Bassuk (1992)		5 m^3 (per tree for shared 'trenches' only and expressed as a minimum)		Research based on water requirements and evapotranspiration levels in British climate conditions	

Table C3. (*Continued*)

Canopy diameters	Small	Medium	Large		Notes source (refer to reference list below table)
Schoenfield (1975)				45	Netherlands, Dutch Elms
Schoenfield and van den Burg (1984)	11			45	Netherlands roadside poplars. >10 ideal 45 m^3. 1/10th volume of rooting volume per total live canopy (in UK)
Schoenfield and van den Burg (1984)	10			43 m^3 with 750 mm soil depth	Mature tree height in metres to correspond with the soil volume in m^3. E.g. 15 m high = 15 m^3 soil
Averages for all above entries (m^3)	13.3 m^3	31.3 m^3	Only 1 entry. Area given: Area: > 18 m^2 (further research is needed)	42 m^3	Measurements (converted into m^3 where required)
	Small tree volume	Medium tree volume	Large tree area (after Gilman, 1997)	Optimum volume	

Table C4. Outlines of industry regulatory documents and government policies relating to recommended minimum soil volumes for tree rooting capacity

Recommended minimum soil volume findings for publications/regulatory documents	Minimum small tree soil volume (m^3)	Minimum medium tree soil volume (m^3)	Minimum large tree soil volume (m^3)	Recommended soil volume (m^3)	Notes
The following entries have been cited from: Marritz (2012). Source documents have been reviewed, verified and converted to m^3 where needed.					
Tree size	**Small**	**Medium**	**Large**	**Optimum**	Notes
Planning Department of NSW (2011)	9 m^3 minimum Soil depth: 800 mm	35 m^3 minimum Soil depth: 1 m	130 m^3 minimum Soil depth: 1.3 m *		*'Large tree' defined as having a 16 m canopy diameter. (volume considered to be excessive)
City of Toronto, Canada	15			30	(Advocates shared planters)
Oakville, Ontario, USA	15			30	(Advocates shared planters)
Baltimore Waterfront Harbour Initiative				42	http://www.waterfrontpartnership.org/
University of Florida, *IFAS Extension*	8.5	34	76.5		With reference to trees withstanding wind loading
West Virginia Department of Environmental Protection	14	21	27	Based on recommendations from Prince William County, Virginia, USA	
Athens-Clarke County, Georgia, Guidelines, USA	5.7	12.74	22.65		
State of Minnesota *Sustainable Building Guidelines (MSBG)*	14.16				B3-MSBG Version 2.1, 2009
Charlotte North Carolina and Mecklenburg County	7.7			City of Charlotte Land Development Standards Manual (CLDSM)	
British Colombia, Canada. *Landscape Standards*	6	9	20	2008, 7th edition, British Colombia Society of Landscape Architects and Nanaimo, BC, 2009 public works recommendations	

Table C4. (*Continued*)

Recommended minimum soil volume findings for publications/regulatory documents	Minimum small tree soil volume (m^3)	Minimum medium tree soil volume (m^3)	Minimum large tree soil volume (m^3)	Recommended soil volume (m^3)	Notes
AECOM 2009.Markham, Ontario, '*Trees for Tomorrow: Streetscape Manual*', USA	15	23	30	**Trees in parking lots:** 15 m^3 min. with 1 tree every 5 car spaces.**Street verges:** tree pit width: 1.5 m minimum. To give 15 m^3 per tree (30 m^3 for large trees). 10 m maximum spacing intervals per street tree	
Aspen, Colorado and Pitkin County	7.07	28.31	63.71		
Denver Parks Forestry Department (2011)	21.237	'... tree pit areas not accepted ... must use trenches, root zones, break out zones, structural cells, other uncompacted soil technology. 1.5 m × 1.5 m is not acceptable'.' ..credited soil analysis required and remediation works to be proposed'			
Emeryville precedent, California, USA	17	25.4	33.9		
City of Alexandria, Virginia (2007)	8.495				'one tree per 10 car parking spaces'
'Greenleaf' Structural Soil Guidelines			30		Recommended equivalent without using their product
Averages for the above published regulatory documents (m^3)	11.9 m^3 Small tree soil volume	21.7 m^3 Medium tree soil volume	37.9 m^3 Large tree soil volume	34 m^3 Optimum volume	Predominantly Canadian and USA sources

*'Crown projection' refers to the area (circle area) out to the trees dripline – and refers to a mature tree at its full optimum potential.
Refer to **C10 Reference list for tree roots and volumes** for full reference and source of information.

Appendix C

Soil Volume Calculator

Soil Volume Simulator

Soil volumes were assessed using the *'Soil Volume Simulator' (SVC)* developed by Soil Scientist, Simon Leake (BSc Ag (Hons) CPSS) and registered landscape architect Elke Haege (UNSW Hons and AQF Level 5 Dip. Arboriculture). The SVC uses a selection process for calculating the soil volume requirements by understanding the complexities of the site conditions. These conditions are entered into the simulator to provide the soil volume. The SVC tool can be found at: https://elkeh.com.au/soils-no-text/.

In order to calculate the soil volumes at Edmondson Park, worst case scenarios were entered into the calculator to give conservative values. Therefore, it is likely that the trees will thrive in volumes smaller than what SESL has specified.

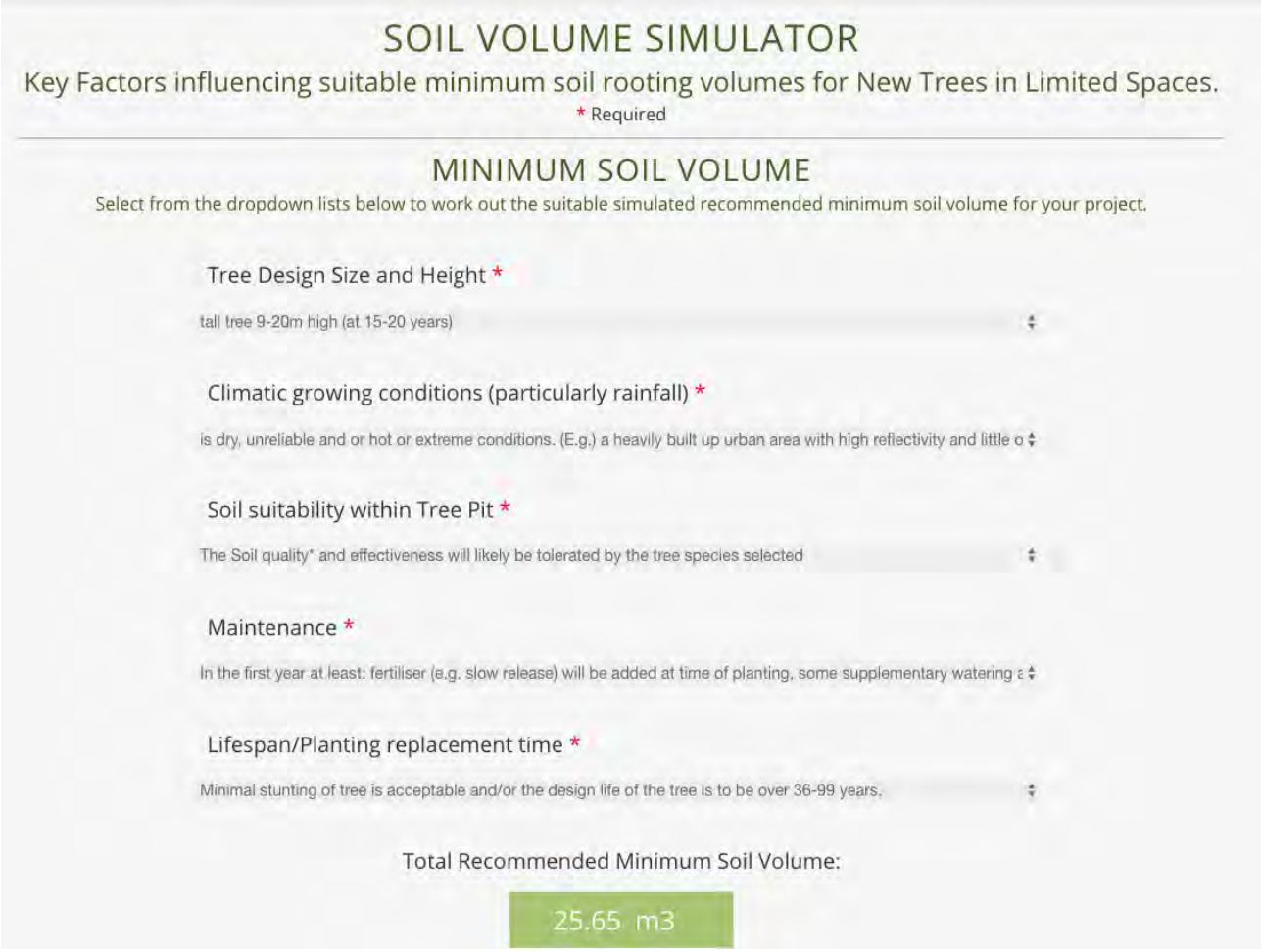


Figure 1. Screen shot of properties entered to obtain a minimum soil volume of 25.65m^3

The total soil volume can be reduced when trees share root space. The total value has been calculated

using formulas that consider the weighting of the different environmental properties.

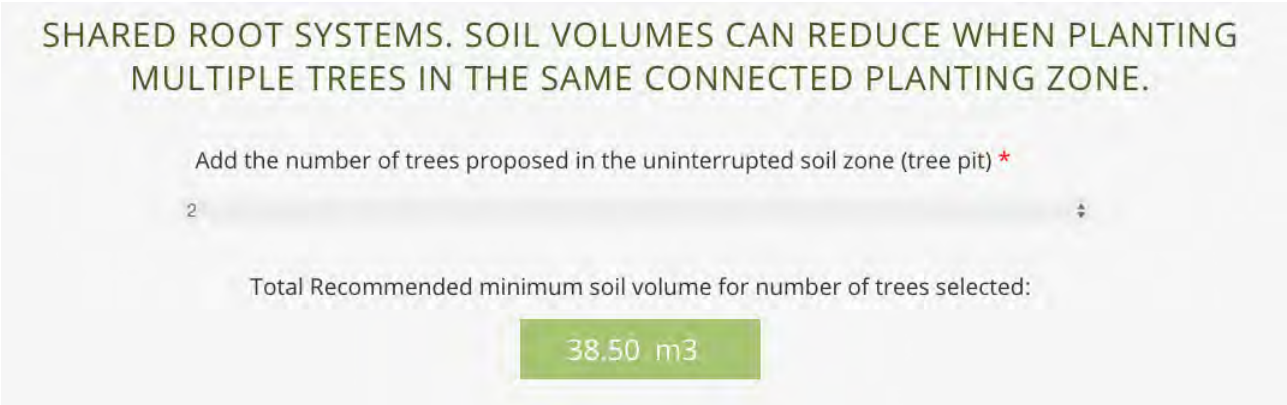


Figure 2. Shared zone with 2 trees sharing space.

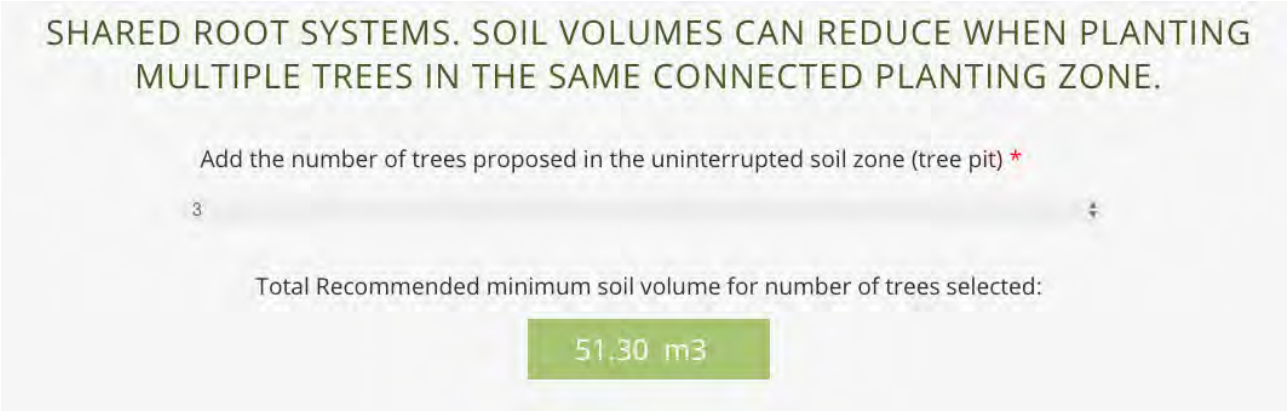
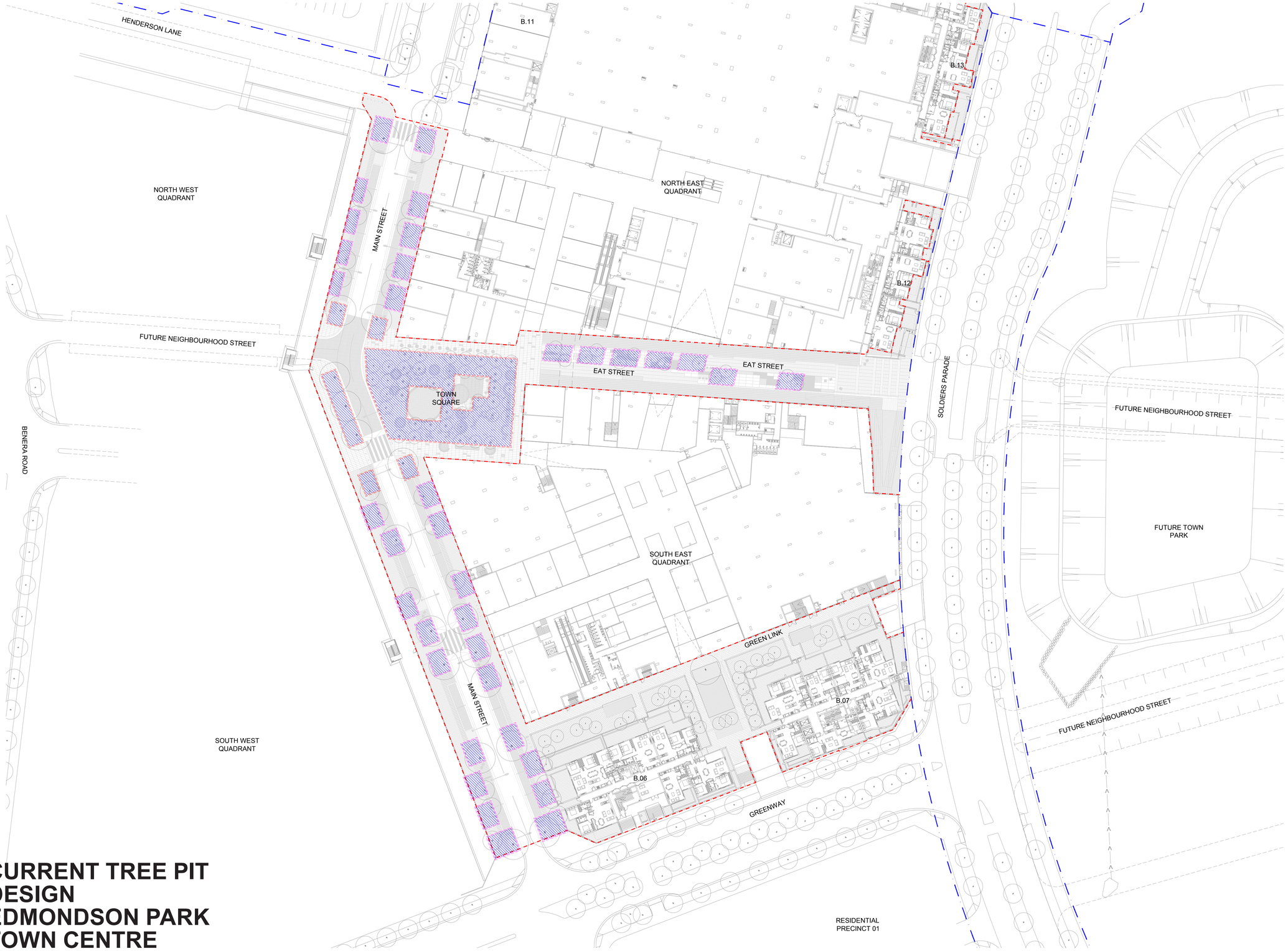


Figure 3. Shared zone with 3 trees sharing space.

TREE PIT DETAILS

B



CURRENT TREE PIT DESIGN
EDMONDSON PARK TOWN CENTRE

Approximate Volume Assumptions
1000mm Depth Below Paving/Planting
25m^3 per tree (excluding shared pits)

0 5 20 40m

Revision	Date	Scale	Client	Project Name	Drawing
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HASSELL

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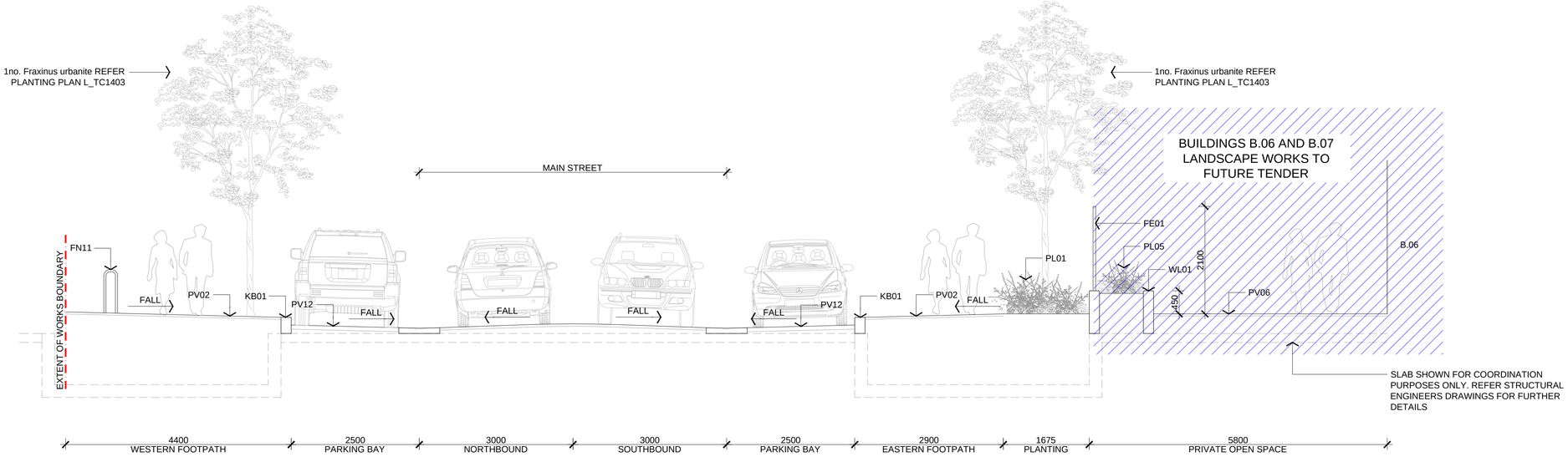

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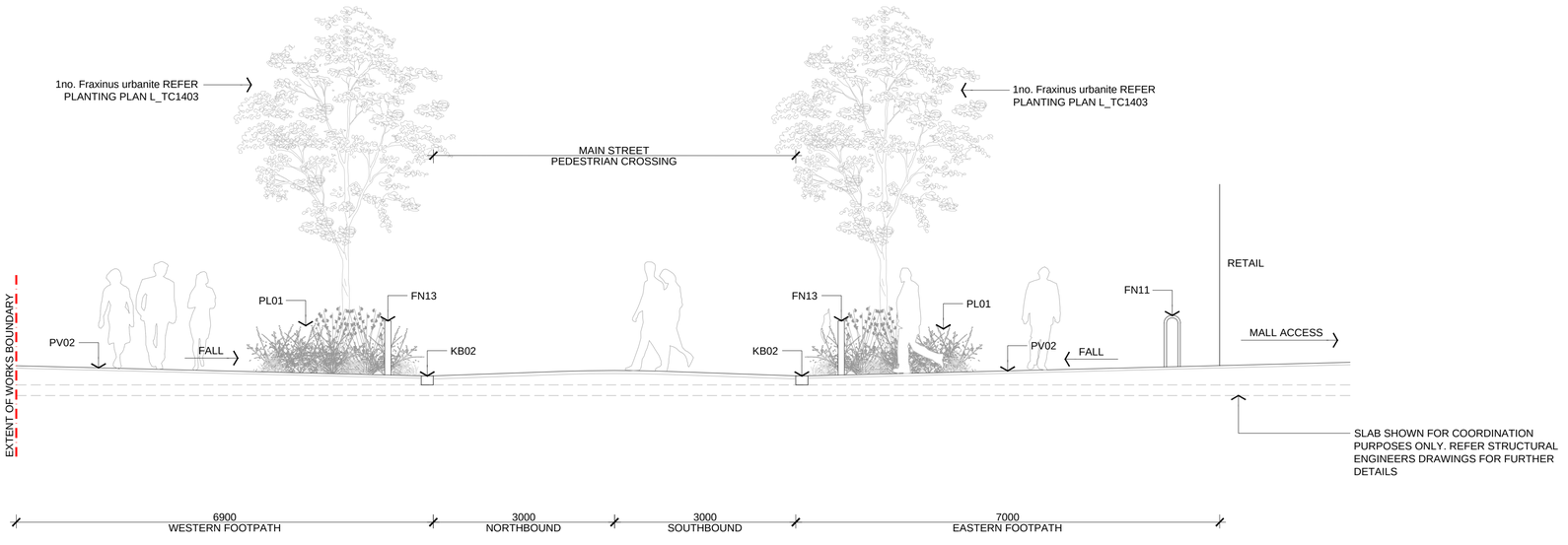

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L_TC1303

MAIN STREET - SECTION 02

Typical Section - Scale: 1:50@A1

REFERENCE MAP NORTH

NOTES

1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK. HASSELL SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS AND DRAWINGS.

REV	DESCRIPTION	DATE
02	ISSUED FOR TENDER	14.11.2017
01	ISSUED FOR DRAFT TENDER	30.10.2017

CONSULTANT

HASSELL LIMITED ACN 007 711 435
LEVEL 2 PIER 8/9 23 HICKSON ROAD
SYDNEY NSW 2000 AUSTRALIA
SYDNEY@HASSELLSTUDIO.COM
T 61 2 9101 2000

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PROJECT

EDMONDSON PARK FRASERS TOWN CENTRE PUBLIC DOMAIN AND PRIVATE OPEN SPACE LANDSCAPE WORKS

0 1 2 4m

DRAWING TITLE

SITE SECTIONS
SHEET 01 OF 04

STATUS

TENDER — NOT FOR CONSTRUCTION

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1:50	CN	GD	AE	JH

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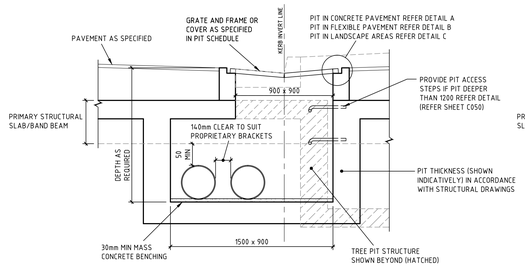

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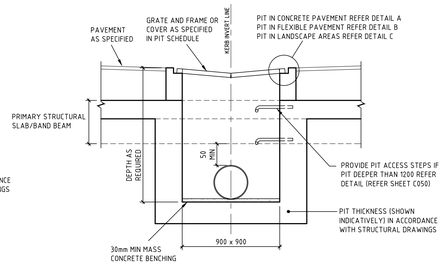

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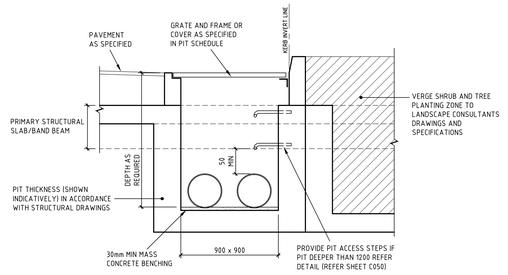

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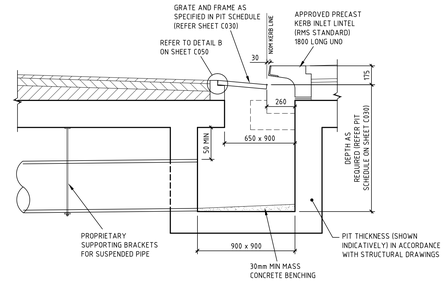

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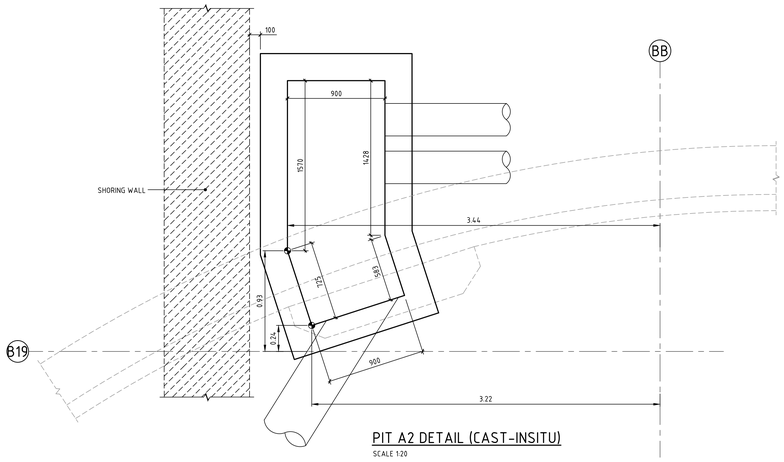

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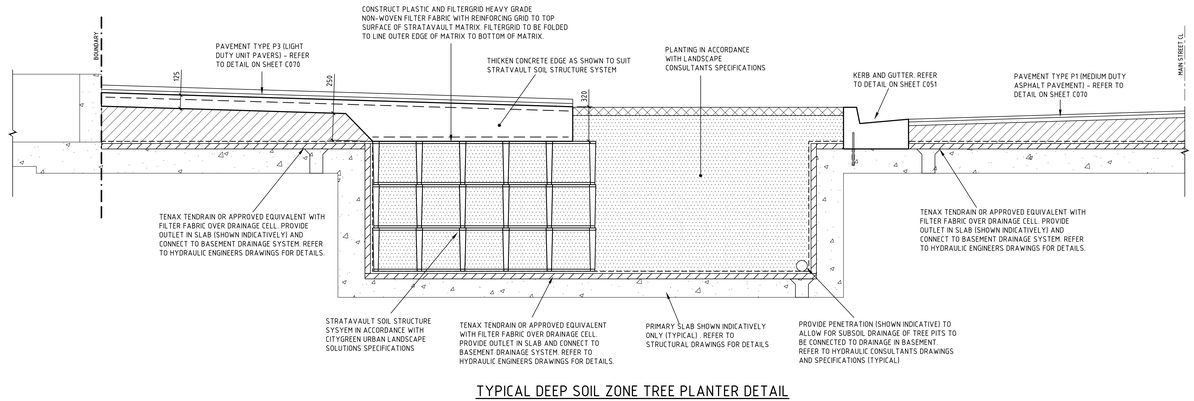
NOTE - REFER TO CAST-INSITU KERB INLET DETAIL FOR SIMILAR DETAIL



TYPICAL DEEP SOIL ZONE TREE PLANTER DETAIL

DETAIL A C031

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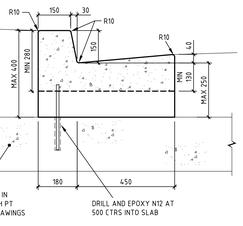

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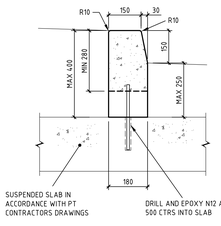

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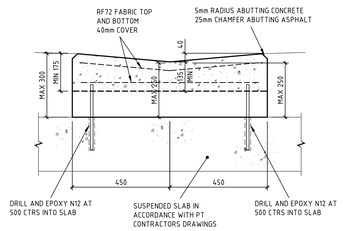

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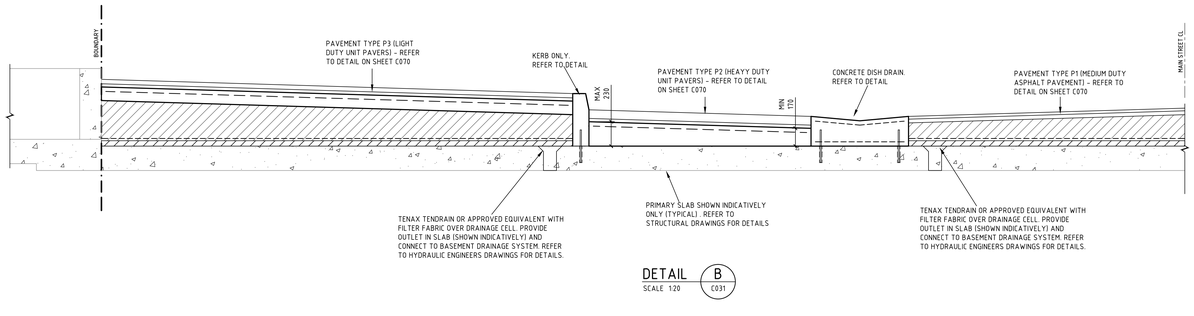
REFER TO SHEET C050 FOR KERB DETAILS ON-GRADE



DETAIL B C031

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Rev	Description	Date	By	App

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BONACCI GROUP (NSW) Pty Ltd
ABN 29 102 735 352
Consulting Engineers, Structural - Civil - Infrastructure
Level 6, 37 York Street, Sydney, NSW 2000, Australia
Tel: +61 2 8247 8400 Fax: +61 2 8247 8444
sydney@bonaccigroup.com
www.bonaccigroup.com

Project Name: EDMONDSON PARK TOWN CENTRE

Drawing Title: SITEWORKS & STORMWATER DRAINAGE DETAILS SHEET 21

TENDER

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Date	APR 2017		
Sheet	A0		

North

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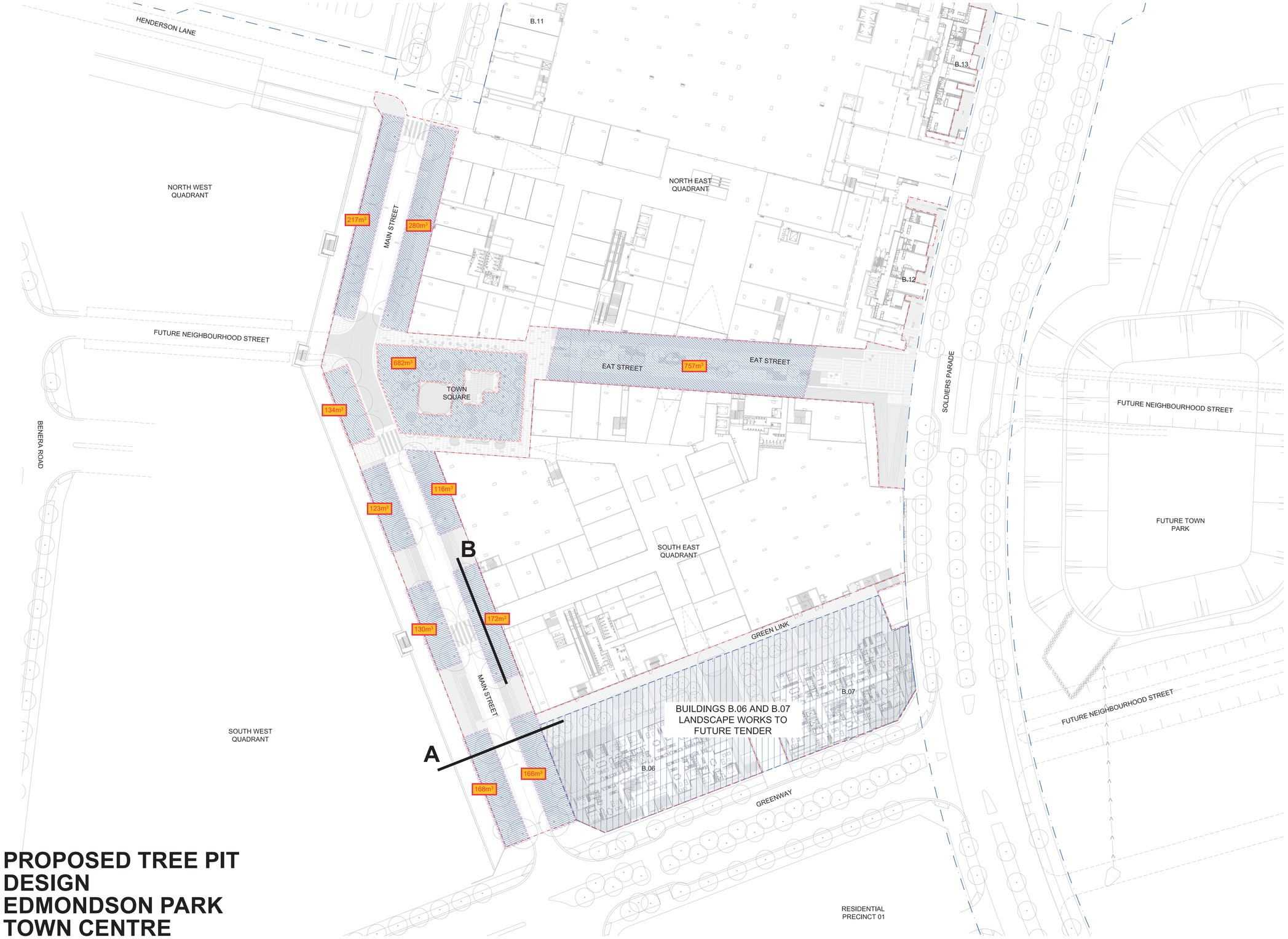

PROPOSED TREE PIT DESIGN EDMONDSON PARK TOWN CENTRE

Approximate Volume Assumptions
1000mm Depth Below Paving/Planting
600mm Depth Below Parking Bays
400mm Depth Above Band Beams

0 5 20 40m

Revision	Date	Scale	Client	Project Name	Drawing
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HASSELL

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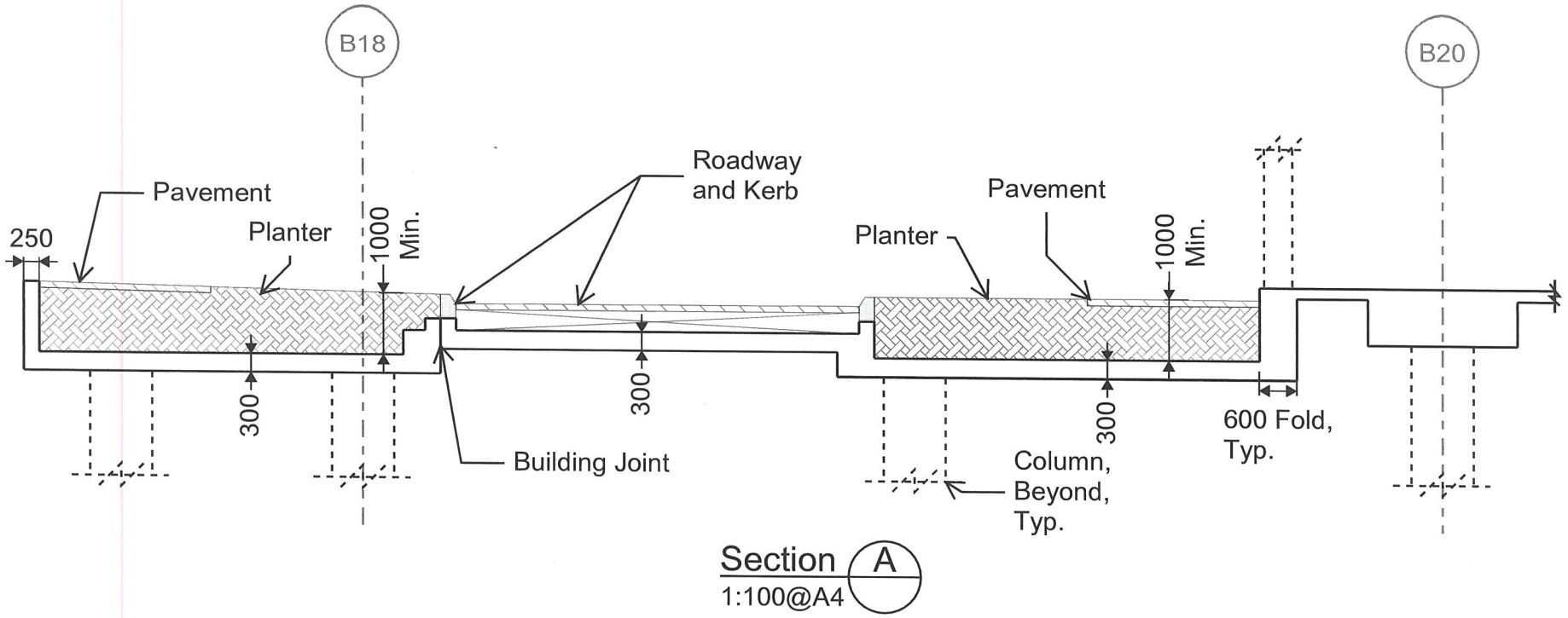

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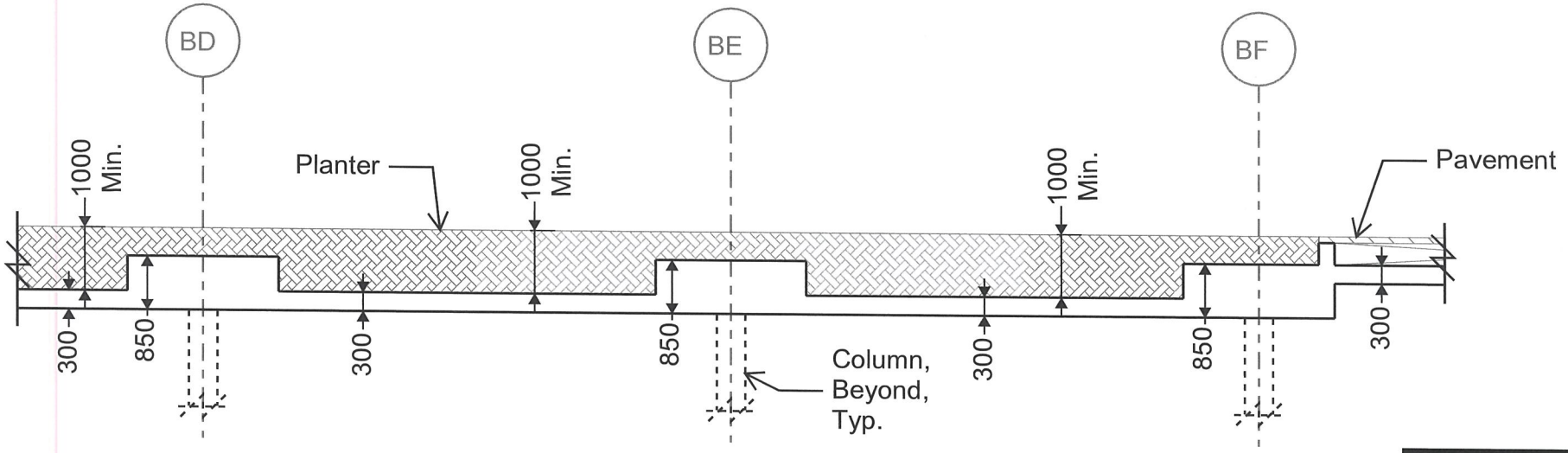

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13/08/2018

BONACCI
BONACCI GROUP (NSW) Pty Ltd
ABN 29 102 716 352
Consulting Engineers, Structural - Civil - Infrastructure
Level 6, 37 York Street, Sydney, NSW 2000 Australia
Tel +61 2 8247 8400 Fax +61 2 8247 8444
sydney@bonaccigroup.com
www.bonaccigroup.com

Australia

Adelaide
HASSELL
Level 1
82 Waymouth Street
Adelaide SA
Australia 5000
T +61 8 8220 5000
E adelaide@hassellstudio.com

Brisbane
HASSELL
36 Warry Street
Fortitude Valley QLD
Australia 4006
T +61 7 3914 4000
E brisbane@hassellstudio.com

Melbourne
HASSELL
61 Little Collins Street
Melbourne VIC
Australia 3000
T +61 3 8102 3000
E melbourne@hassellstudio.com

Perth
HASSELL
Level 1 Commonwealth Bank Building
242 Murray Street
Perth WA
Australia 6000
T +61 8 6477 6000
E perth@hassellstudio.com

Sydney
HASSELL
Level 2
Pier 8/9, 23 Hickson Road
Sydney NSW
Australia 2000
T +61 2 9101 2000
E sydney@hassellstudio.com

China

Beijing
HASSELL
Suite 308-B011 Building A
Beijing Fortune Centre
7 Middle Dong San Huan Road
Chaoyang District
Beijing 100026 China
T +8610 5126 6908
E beijing@hassellstudio.com

Hong Kong
HASSELL
22F, 169 Electric Road
North Point Hong Kong
T +852 2552 9098
E hongkong@hassellstudio.com

Shanghai
HASSELL
12F base 45 Caoxi North Road
Xuhui District
Shanghai 200030 China
T +8621 5467 9333
E shanghai@hassellstudio.com

South East Asia

Singapore
HASSELL
33 Tras Street #02-01
078973 Singapore
T +65 6224 4688
E singapore@hassellstudio.com

United Kingdom

Cardiff
HASSELL
Level 2 Park House
Greyfriars Road
Cardiff CF10 3AF United Kingdom
T +44 29 2072 9071
E cardiff@hassellstudio.com

London
HASSELL
1 Curtain Place
London EC2A 3AN United Kingdom
T +44 20 7490 7669
E london@hassellstudio.com

United States of America

San Francisco
HASSELL
Level 7
25 Taylor Street
San Francisco CA 94102
United States of America
T +1 415 860 7067
E sanfrancisco@hassellstudio.com