Operational Landscape Management Plan

Project Name: NIHON UNIVERSITY NEWCASTLE CAMPUS

Project Address: **9 Church St, The Hill, NSW 2300**

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Revision Date	Nature of Revision	Authorised By		
		Name	Title	Date
20/05/21	DRAFT- For Final Review by dwp/ Nihon	SV	DM	20/05/21
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1.0 Introduction

This Operational Landscape Management Plan (OMP) has been prepared by Built on behalf of Nihon Diagaku Newcastle Australia Pty Ltd in support of a State Significant Development Application (SSDA) submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The Application (referred to as SSDA 9787) seeks approval for the adaptive reuse of the State heritage listed former Newcastle Courthouse as an educational establishment with associated student accommodation.

1.1 Development Description

The Development is Nihon University Newcastle Campus and consists of the restoration and refurbishment of the retained and state heritage listed Newcastle Courthouse building and the construction of 2 x 4 storey buildings comprising student accommodation in the eastern building and teaching space/carpark in the western building.

1.2 Development Location

The location of the Development is at Lot 1 DP1199904 - 9 Church Street, Newcastle, NSW 2300.



1.3 State Significant Development Conditions

Development Condition E35 states:

Prior to issue of an Occupation Certificate, the Applicant must prepare an Operational Landscape Management Plan for the site. The plan must:

(a) Describe the ongoing monitoring and maintenance measures to manage revegetation and landscaping; and

(b) Be consistent with the Applicant's Management and Mitigation Measures at Chapter 10 in the EIS and as updated by the RtS;

1.4 Landscape Design

Extract from Environmental Impact Statement dated 08 May 2019:

The intent for the proposed landscaping scheme is to mirror the development's relationship of old and new and to meet student needs for outdoor areas by considering the limited spaces and best use of light and seasonal variation in the landscape elements. The overall landscape design follows the concepts of 'enhancing student life in Newcastle' and 'the past meets the present'.

Refer to Landscape Design documentation prepared by Moir Landscape Architecture in Appendix 01.

Key features of the landscaping scheme are as follows:

- 4no. new street trees to the front of the site
- Retention and refurbishment of existing original cast iron palisade front fencing (with new brick edge to replace concrete), bollards and plinth fronting site
- Retention of the former public bubbler
- Reuse of existing brick paving in the footpath fronting the site as feature banding around the new front paving the kerb edge of the site.
- Bluestone paving to the Heritage forecourt area
- Concrete paving for entry plaza and service vehicle zone in front of the Residential Building
- 2 new feature trees (*Prunus 'Shimidsu Sakura'* Japanese Flowering Cherry) located in front of the Residential and Education building.
- Low hedge planting (*Gardenia jasminoides*, Cape Jasmine) in terraced concrete planters fronting new Education Building
- Low hedge planting (*Gardenia jasminoides*, Cape Jasmine) and low maintenance shrubs for privacy (*Westringia fruticose*, Coastal Rosemary) fronting the new Residential Building
- Retention of existing vegetation along the site's western boundary and introduction of garden bed with feature planting for seasonal interests (*Camellia hiernalis 'Hiryu'* Camellia)

- Random stepping-stone in decomposed granite, garden bed with feature trees for seasonal interests (*Acer palmatum,* Japanese Maple) and bamboo screening along rear boundary
- Nature garden with random stepping stones and tree fern planting the buildings to the rear of the site
- Rooftop terrace with glazed balustrades, timber decking, shared structures, removable timber planters with coastal plantings and Zen gardens with feature rocks and decomposed granite paving.
- Paved courtyard between Education and Heritage building with low height planting and tree ferns in planter bed.

2.0 Ownership and Contact

The Nihon University Newcastle Campus is owned by Nihon University Diagaku Newcastle Australia Pty Ltd.

2.1 Facilities Management and Maintenance Team

Details of the Facilities Management and Landscape Maintenance Team are detailed below.

Name	Role	Contact Details
Andrew Descas- Descas Landscapes	**Landscape Maintenance**	**0414 446 894**

3.0 Monitoring and Maintenance Measures

3.1 Landscape Management Principles

The following landscape management principles have been identified as being consistent with the Landscape Plans;

- Minimise environmental impacts that may result from landscape management activities and utilise environmentally sustainable practices
- Preserve, enhance and improve the landscape character of the facility
- For new and replacement plantings, the use of endemic plant species where appropriate
- Provide a safe environment, minimising potential risks to people, buildings and property
- Apply best practice landscape maintenance in landscape areas
- Target noxious weeds and pests through the use of integrated pest management approaches
- Maintain high quality outdoor spaces and streetscapes
- Maintain quality passive recreation areas

Below is a summary of general maintenance and ongoing management requirements for revegetation and landscaping works. To be read in conjunction with the maintenance schedule in Appendix 02

3.2 Fertilising, composting and mulching

Fertilising and composting are not critical maintenance activities except where there are obvious deficiencies but should be assessed on an annual basis by observation and leaf analysis. Maintain an adequate level of mulch in planter beds in order to maximise water conservation and supress weeds.

3.3 Pruning

Pruning should be carried out on an annual basis and at a suitable time dependent on the plant species. No more than one quarter of the branching structure should be removed at any one time. All pruning should be completed using clean, sharp tools and cuts to be clean and smooth with bark intact.

Pruning shall be undertaken in accordance with Australian Standard 4373-2007 or as updated – Pruning for Amenity Trees.

3.4 Tree Replacement Plantings

To ensure the density, species and design intent of established tree plantings is maintained, continue to replace failed, damaged or stolen plants. Replacement plant size to be equal to the other adjacent plants of same species, or same size as plant it is replacing.

3.5 Tree Surrounds and Stakes

Replace tree stakes when damaged and/ or remove them when no longer required and the plant is self supporting and no longer susceptible to vandalism.

3.6 Planting Areas

Carry out regular and periodic planting maintenance works including weeding, fertilising, mulching, replacement planting.

Ground covers and shrubs should be maintained as a maximum height of 0.5m along path edges. Remove dead or dying plants from mass planting areas as required. Tip prune to encourage density to 50-100mm as required after flowering. Prune evenly to a height of 500mm above ground along path edges every 4 years after flowering. Prune away from paths where required.

3.7 Replacement Mass Planting

To ensure the density and species of the established plant material within the mass planting areas is maintained, replace plants that have died or failed with the same species and size of those surrounding.

3.8 Mulching

Place and replenish mulch as required periodically to the required depth, clear of plant stems and rake to an even surface flush with the surrounding finished levels. Spread and roll mulch so that after settling, it is smooth and evenly graded between design surface levels sloped towards the base of the plant stems in plantation beds, and not closer to the stem than 50mm in the case of gravel mulches.

3.9 Weeds

Weed monitoring and hand weeding will be required to be undertaken on a regular basis. The management and control will depend on the species of weeds present and the appropriate measures for mitigating any impacts caused by its management on native species. Generally, weed control measures will include:

- Observation of landscape areas to check for weeds and hand weeding of any weeds identified
- Development and implementation of an eradication plan applicable to the circumstances, which may include manual removal and spot spraying
- Regular mulching to suppress weeds
- Disposal of all weeds off site

3.10 Irrigation

All landscape areas are to have a drip irrigation system to minimise water use and evaporation. The irrigation system has been designed by an experienced specialist sub-landscape contractor, nominated by the Landscape Contractor.

The Landscape Contractor has prepared complete dimensioned drawings, based on the approved design plans, of the entire irrigation system as executed, clearly indicating the type and location of all sprinkler lines, heads etc. Refer Appendix 03.

The irrigation system needs to be inspected weekly to ensure that all drip lines are operational.

Irrigation system is to be repaired within 1 week of a defect becoming evident.

3.11 Long Term Site Management Plan

Contaminated soils are present on the Nihon site and the remediation strategy for the site was to manage soils on-site by way of capping beneath structures, pavements and beneath 'clean' soil. A Long Term Site Management Plan was developed by Douglas Partners (Refer Appendix 04) for the purposes of informing property managers of contamination management and provide an outline of maintenance requirements.

Management of contaminated soils within the site has been achieved as follows:

- Via capping with at least 0.3m of validated 'clean' natural soils from within the site or imported VENM/ ENM above an orange geofabric layer, within landscape areas
- Via capping with concrete pavements (buildings and driveways) above a black plastic marker layer in all other areas of the site.

Refer Landscape plan LP02 in Appendix 01 which indicates the location of these areas.

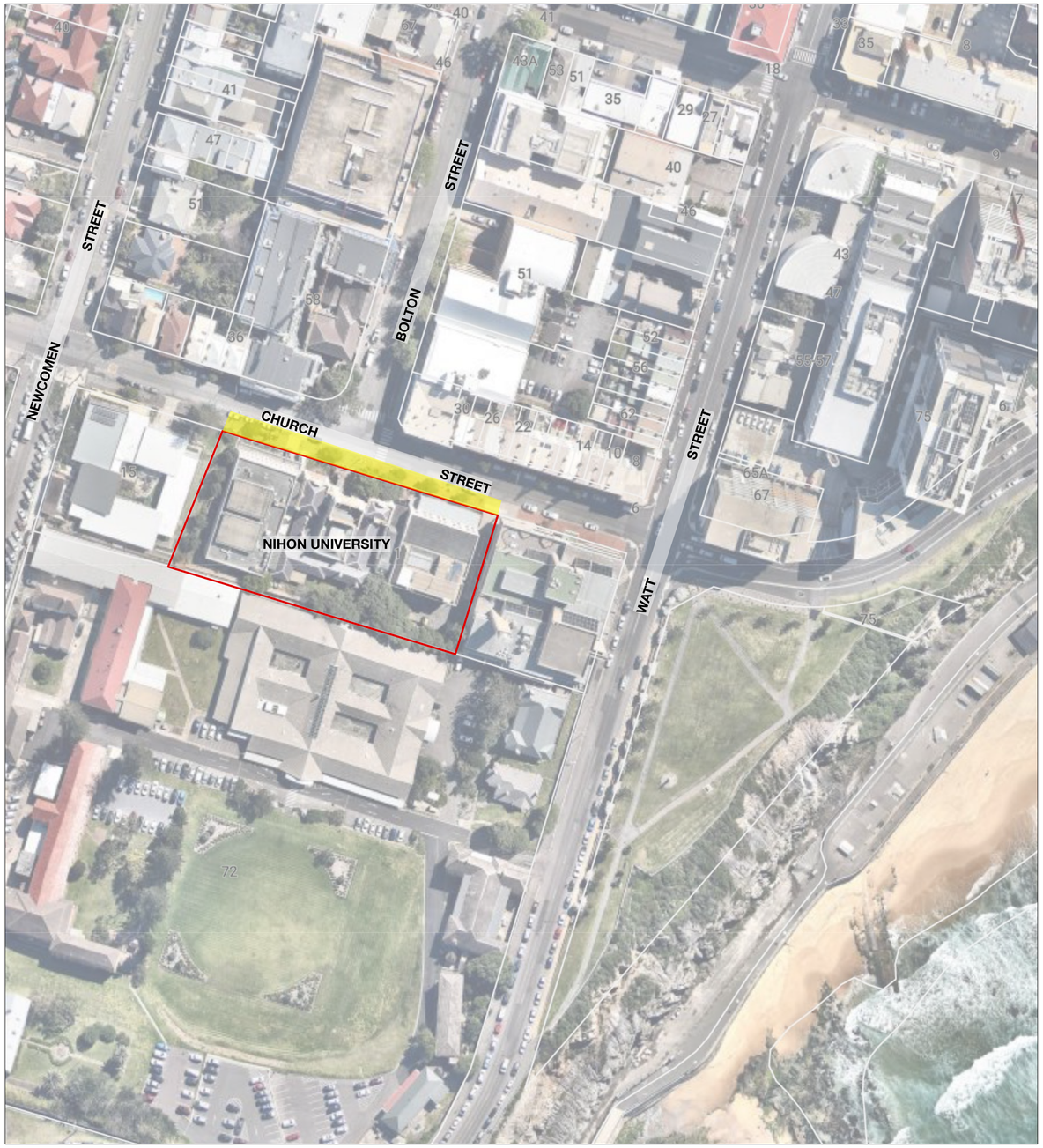
The LTSMP sets out the responsibilities for Nihon, Building Managers and Subcontractors on site. It is imperative that anyone working in these areas reads and is inducted into the LTSMP and follows the recommendations made in the LTSMP.

3.12 Maintenance Records

Landscape maintenance contractor shall keep a logbook to record maintenance works carried out on a monthly basis. Log book should include but not limited to:

- Date, time, plant and equipment and staff members attending site
- Activities carried out during each attendance
- Irregularities encountered and actions taken.

Appendix 01_Landscape Plans



LOCALITY PLAN

Scale: NTS

NIHON UNIVERSITY
CHURCH STREET
PUBLIC DOMAIN LANDSCAPE PLAN

Sheet No.	Sheet Name	Revision	Date
138-LP00	COVER SHEET	2	21/5/21
138-LP01	STREET TREES & PAVING PLAN	2	21/5/21
138-LP02	DETAILS	2	21/5/21
138-LP03	STRATAVAULT SOIL SPECIFICATION	2	21/5/21

2

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2

NOTES:
1. DO NOT SCALE OFF DRAWINGS. FOLLOW WRITTEN DIMENSIONS. IF IN DOUBT OBTAIN WRITTEN ADVICE FROM THE SUPERINTENDENT.
2. VERIFY ALL DIMENSIONS ON SITE.
3. TO BE READ IN CONJUNCTION WITH THE SPECIFICATION.
4. READ IN CONJUNCTION WITH ALL ARCHITECTURAL, CIVIL, STRUCTURAL, HYDRAULIC, MECHANICAL AND ELECTRICAL ENGINEER'S DRAWINGS AND SPECIFICATIONS.
5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY.
7. IMPORTED SOILS (INCLUDING ALL CONSTITUANTS) MUST COMPLY WITH RELEVANT RESOURCE RECOVERY EXEMPTION ORDERS

Architect: AZUSA SEKKEI Architects, Engineers & Consultants

dwp

Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
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1	14/4/21	FOR CONSTRUCTION	AL
2	21/5/21	FOR CONSTRUCTION	AL

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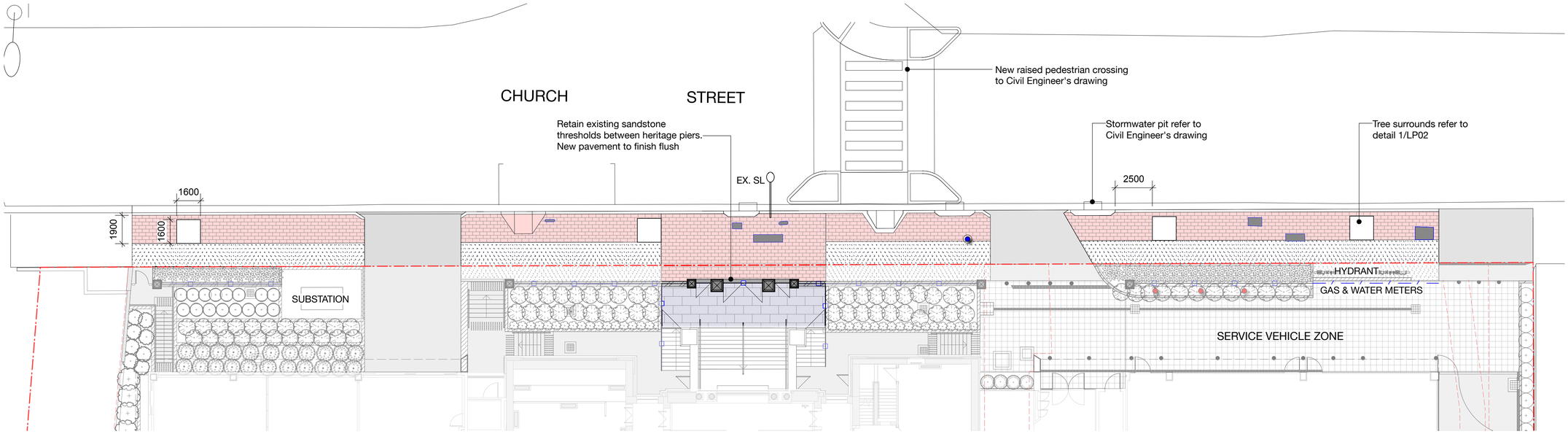
COVER SHEET

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ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

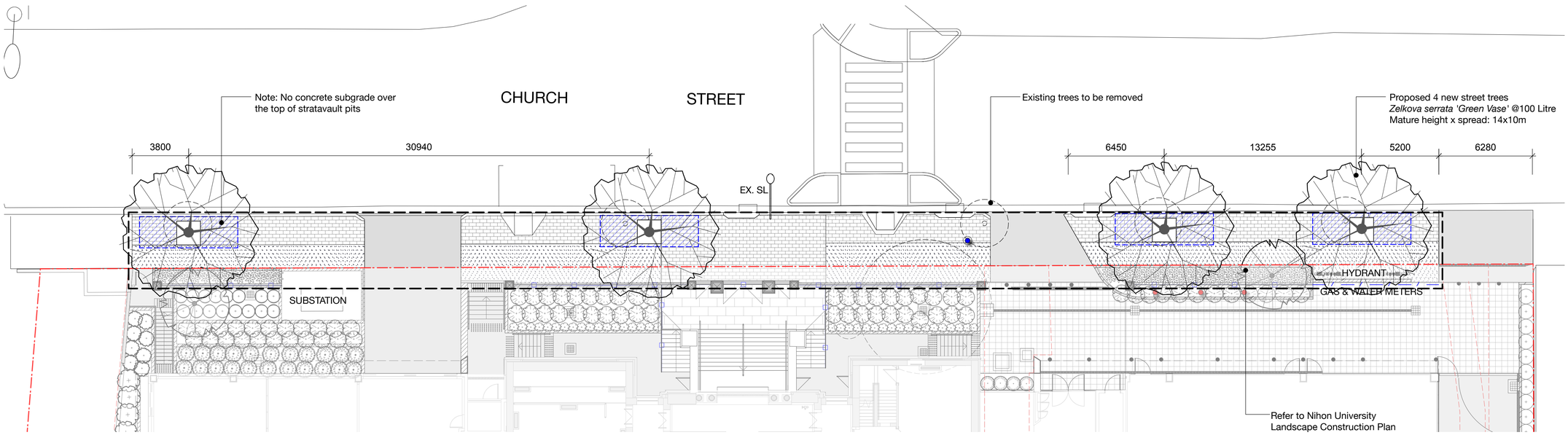
Project No. **1691**

Drawing No. Rev
138-LP00 2



0 2 4 6 8 M

2 PROPOSED PAVING PLAN
1:150 @ A1



0 2 4 6 8 M

3 PROPOSED STREET TREES LOCTION
1:150 @ A1

LEGEND

- Lot boundary
- Extent of work
- Existing trees to be removed
- Existing plinth to be retained
- Proposed removable bollards
- Proposed flag pole
- EX. SL — Existing street light to be retained
- New service pit refer to survey plan
- Heritage brick paving refer to detail 3/LP02
- Bluestone paving refer to detail 4/LP02
- Plain concrete paving refer to Engineer's detail
- Asphalt paving refer to Engineer's detail
- Stone Paving refer to Architect's detail
- Proposed new street trees refer to detail 2/LP02
- Extent of stratavault tree pit refer to LP02
  Pit dimensions are 2100W x 6600L x 850D

Notes:
- Refer to Civil Engineers plans for new design levels and pavement crossfalls.
- Refer to Nihon University approved landscape plans for landscape documentation within lot boundary and specification notes.
- Contact Citygreen for detail specifications and installation instructions.
- The contractor is to procure to 4 *Zelkova serrata* immediately upon Council approval of these drawings to ensure 100Lt trees are available at time of planting.
- The contractor is required to arrange a meeting with the City Greening officer prior to the planting of the trees to assess the compliance of the stock with AS2303-2018, "Tree Stock for Landscape Use".
- Trees are to be planted in accordance with:
a. "City of Newcastle Urban Forest Technical Manual, Part B Public Trees" and maintain necessary clearances from infrastructure.
b. City of Newcastle Standard drawing "A3003-Tree Planting Commercial Street Verge-CBD".

NOTE: WORKS OUTSIDE OF SITE BOUNDARY ARE NOT APPLICABLE TO REMEDIATION ACTION PLAN

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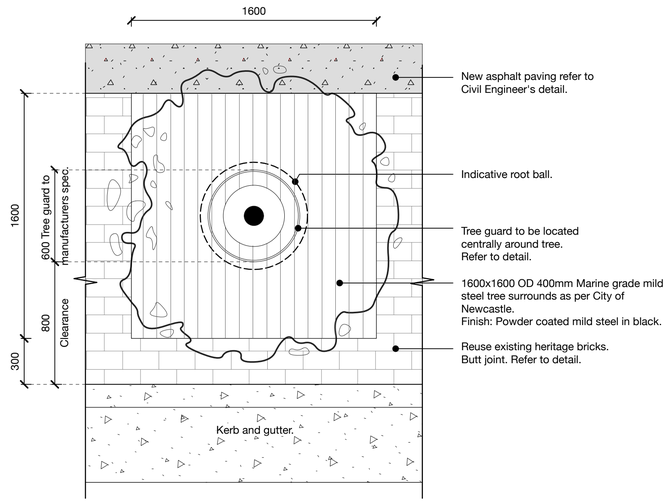
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STREET TREES & PAVING PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.
Drawn By: CX
Checked By: MW

Project No. **1691**
Drawing No. Rev
138-LP01 2



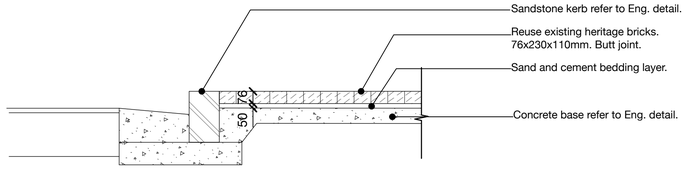
5 NEW STREE TREE PLANTING - PLAN
1:20 @ A1



Tree surrounds (TS2) refer to City Centre Public Domain Technical Manual.

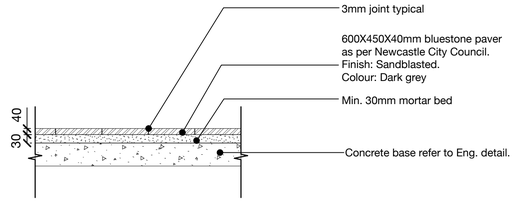


Tree guards (TG1) refer to City Centre Public Domain Technical Manual.



Note: Heritage brick pavers to be sourced from Council stockpiles where existing paver quantities are insufficient.

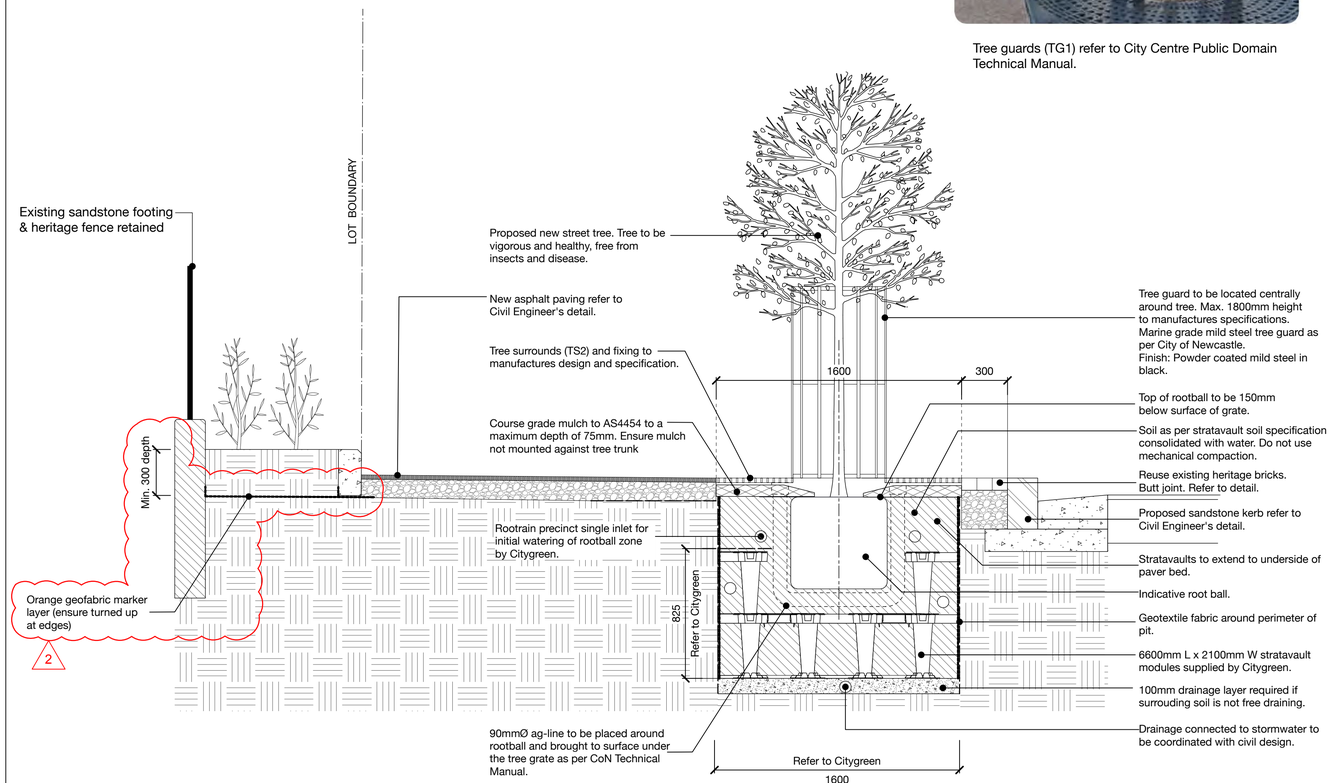
2 HERITAGE BRICK PAVING
1:20 @ A1



3 BLUESTONE PAVING
1:20 @ A1



Pavement type 2 (PT2) stone refer to City Centre Public Domain Technical Manual.



1 NEW STREE TREE PLANTING - SECTION
1:20 @ A1

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DETAILS

SCALE: AS SHOWN
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. **1691**
Drawing No. Rev 138-LP02 2

Soil Specification – Backfill soil for CityGreen Soil Cell Treepits

1.1 General description
The Contractor shall consult both the complete documentation and drawings for soil types, uses and locations. The soil type required shall consist of imported soil that fully complies with this specification.

1.2. Definition
Growing media is defined as an amended existing topsoil that contains organic matter; is capable of sustaining vigorous plant growth; complies generally with the typical uses of AS 4419 (2003); is free from unwanted matter such as:

- Stones, rock and pebbles greater than 10mm measured by longest dimension
- Hard clods or objects greater than 25mm dimension
- Roots with a section diameter exceeding 10mm or a length exceeding 100mm
- Sticks and rubbish
- Material toxic to plants
- Materials that may pose a danger to human health (e.g. glass, hard plastic)

1.3 Performance Specification

The proposed growing media shall be analysed for its chemical and physical properties to ascertain quality. The Contractor is responsible for the collection and analysis of a sufficient number of samples to accurately characterise the resource and if required, determine the amendments required to meet the performance specification indicated in Table 1.

Table 1 Acceptable chemical and physical properties for the growing media used to backfill the Soil Cell matrix after installation.

Property	Unit	Target Range
pH in H_2O[1] (standard range)	-	5.8 to 7.0
pH in $CaCl_2$[1] (standard range)	-	5.2 to 6.5
pH in H_2O[1] (alkaline range*)	-	7.0 – 8.0
pH in $CaCl_2$[1] (alkaline range*)	-	6.6 – 7.6
Electrical conductivity[2]	dS/m	< 2.0
Sodium[3]	% ECEC	<5
Potassium[3]	% ECEC	5 to 15
Calcium[3]	% ECEC	60 to 80
Magnesium[3]	% ECEC	15 to 25
Ca:Mg	ratio	2 to 10

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Property	Unit	Target Range
Mg:K	ratio	1 to 8
Aluminium[4]	% ECEC	< 2
Cation Exchange Capacity	meq/100g (cmol$^+$/kg)	> 8[1]
Phosphate – P sensitive plantings[3]	mg/kg	< 15
Phosphate – General plantings[3]	mg/kg	50 to 150
Ammonium + Nitrate[5]	mg/kg	50 to 100
Sulphate[2]	mg/kg	40 to 100
Boron[3]	mg/kg	0.5 to 5
Copper[3]	mg/kg	5 to 20
Iron[3]	mg/kg	75 to 300
Manganese[3]	mg/kg	25 to 100
Zinc[3]	mg/kg	5 to 20
Organic Matter[6]	% dry weight basis	3 to 6
Bulk Density	Kg/L	> 0.7
Hydraulic conductivity – see Table 2 below	mm/hr	Table 2
Toxicity index[7]	mm	> 70
Nitrogen Draw-down Index[8]	-	> 0.7
Hydrophobicity[9]	seconds	> 40
Dispersibility[10]	Class	1 - 2

Methods: [1] AS4419 (2003) Appendix D [2] AS4419 (2003) Appendix D [3] Extractable nutrients by Mehlich 3 (1984) [4] Method 83.1 to 83.5 Black (1983) [5] AS4419 (2003) Appendix D and Bradley et al (1983) [6] Organic matter based on calculation from Total carbon by Dumas Combustion Furnace [7] AS4419 (2003) Appendix F [8] AS4419 (2003) Appendix E [9] NSW OEH http://www.environment.nsw.gov.au/resources/soils/testmethods/rep.pdf [10] AS4419 (2003) Appendix G

[1] The highest possible CEC is desirable but a CEC of 8 cmol$^+$/kg is considered possible by most commercial producers using available materials within the maximum 6% w/w organic matter requirement.

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Property	Unit	Target Range
*If the material meets the alkaline pH criteria, the species to be planted need to be alkaline tolerant		

Organic matter must be properly composted as per the requirements of A.S. 4454.

Table 2. Target hydraulic conductivity and fines content for different planting situations

Planting situation	Target minimum Hydraulic Conductivity (mm/hr)	Target maximum silt + clay (%)
1. Well drained base with no additional capture of stormwater (incident rain only though porous paving or similar or just irrigation dependant). Aeration in surface 150mm of soil only	20	12
2. Some additional stormwater capture for irrigation purposes	50	10
3. Tree pits used for stormwater filtration or raingarden application. Additional aeration at depth via drains as well as within 150mm of soil surface.	>100	<6

1.4 Controlled Release Fertilisers
Available Nutrients. Small amounts (0.5 to 1 kg/m3 of filler soil) may be needed to achieve the readily available nutrient contents in the above specifcation tables.
Controlled Release Fertiliser. The application of long term (>9 month) controlled release fertilisers at 4 to 6 kg/m^3 form part of the specification for Citygreen Stratacell applications. The recommended products are-

- Nutricote: Nutricote Standard Black 270 Day - 16 : 4.4 : 8.3 at 4 kg/m^3
  Nutricote Standard Brown 360 Day - 16 : 4.4 : 8.3 at 5 kg/m^3
  Nutricote Standard Fawn 700 Day - 16 : 4.4 : 8.3 at 6 kg/m^3
- Osmocote Osmocote Exact Standard15-9-11+2MgO+TE. 8-9 month at 4 kg/m^3
  Osmocote Exact Standard15-9-11+2MgO+TE. 12-14 month at 5 kg/m^3

Note: It is unacceptable for fertiliser(s) and other amendments (as recommended based on laboratory testing) to be applied after growing media placement to bring the chemistry of the material into specification. Growing media should meet the specification before it is installed.

Note on use of heavily textured soils. Soils texturing as having higher clay content than a sandy loam can be used provided additional aeration at 900mm centres coming within 300mm of the newly planted rootball are used.

2 Quality Assurance and Control (QA/QC)

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A minimum of two (2) weeks before Works commence, obtain and submit written statements from suppliers of growing media, giving:

- Production capacity for material of the required type, quantity and quality
- Source of supply
- Lead times for delivery of materials to the site
- A certificate of compliance stating that all material supplied complies with contract requirements and is suitable for the intended use (see section 2.1 below)
- Details of conditions associated with warranties
- Recommendations for use and maintenance

2.1 Testing

Before soil installation, the contractor or soil manufacturer is required to submit soil samples to a testing laboratory. Testing is to be carried out on stockpiled growing media that has been dedicated for use on the project, and to the criteria specified in Table 1. Samples must be submitted allowing sufficient time for testing (at least one month) and re-formulation in case of failure.

All testing as required by the specification shall be arranged and carried out by the Contractor and all test results records made available to the Superintendent. The cost of all such testing shall be borne by the Contractor.

Once compliant, a test certificate clearly stating compliance with the criteria in Table 1 must be presented. Compliance certificates will be in the form of a report clearly stating the material is compliant, with an attachment showing the test result relied upon. The test certificate will be accompanied by a statement of compliance from a competent person (e.g. qualified agronomist horticulturist or soil scientist).

If material is non-compliant, Hold Point 1 is generated.

Hold Point 1: If the material demonstrates minor non-compliance, a clear statement must be obtained form a qualified independent agronomist or soil scientist waiving the compliance and certifying the sample is compliant with or without conditions.

Non-compliance with the target range criteria does not necessarily render a soil not fit-for-purpose but making this judgement requires an expert person to take responsibility for such deviation. Also, a conditional compliance certificate may be issued requiring that a certain fertiliser or further organic matter or some other amendment be added, with the aim of achieving compliance.

If suitable documentation is received and the Superintendent is satisfied, the media may be installed.

In the case of substantive non- compliance **HOLD Point 2** will occur.

Hold Point 2. In the event that quality control samples show substantial non- compliance from the approved performance requirements, the supplier must demonstrate compliance of any future loads. This may require re-formulation or alteration to existing formulations and may require the advice of a qualified person to meet correct analysis, making adjustments to mixing ratios, additives and procedures to achieve compliance.

Growing media is not to be installed until a certificate of compliance is provided.

The nominated soil testing laboratory for this project is:
SESL Australia Pty Ltd
Laboratory: 16 Chilvers Road THORNLEIGH NSW 2120
Phone: 02 9980 6554

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VIC Level 1 88 Mt Alexander Rd Flemington VIC 3031
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Fax: 02 9484 2427

2.2 Testing Frequency

Testing frequency shall follow the rates contained in Table 3 or an approved Quality Management System as deemed appropriate by the Superintendent. The Contractor should refer to the testing frequencies indicated in Table 3. Variations to the frequencies in this table are permitted on the submission to the Superintendent of an alternative testing program that clearly achieves the desired outcome of quality control.

Growing media shall only be supplied for installation from certified stockpiles that have been tested (as a minimum) at the rate specified in Table 3 and shown to conform to the requirements indicated in relevant sections and table of this report.

Table 3 Testing frequency

Material type	Application	Minimum test frequency
Growing media	For backfilling StrataCell modules after installation	One (1) at approval then one per 100m^3 or part thereof

2.3 Stockpile Management

Once the growing media has been produced and all QC approvals have been met, the stockpiled material shall be protected against the effects of weather. If heavy rain is expected, stockpiles shall be covered where practical. To protect against wind erosion of soil or organic components, the stockpiles shall be kept moist on the surface of the stockpile.

Once the growing media is transported to the installation site, care shall be taken to ensure that the loading equipment and haul vehicles are properly sanitized such to contain no foreign soil, aggregate, asphalt, etc., that might contaminate the Growing media. When the stockpile material is being picked up for loading, care shall be exercised to assure that the bucket of the loading equipment is not picking up underlying material and that tyres or tracks are not 'tilling' other material into the mix.

Once a stockpile has been tested and certified, no further material is to be added to the stockpile.

2.4 Lateral Pipe installation

Perforated aeration pipes must be installed within the top layer of modules, as per tree pit design details. The pipe must be laid in a complete connected circuit, within 600mm (24") of outer edge of matrix. Junctions and risers to be fitted at spacings of no more than 3.6 metres (12'). Riser pipes to be trimmed to 150mm (6") above finished pavement level, and supported in vertical position by temporary staking. Open ends of pipe to be sealed with caps or weather-proof tape.

2.5 QA/QC
Design, manufacturing and placement of a high quality growing media requires a well designed and administered calibration and QC program. This program shall set the parameters to be included in the QC testing, the procedures

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for sampling, sampling intervals, handling the samples (chain of custody), the limits/tolerances or confidence intervals for accept/reject status within a sample, and the allowable variability of test parameters between samples.

The quality control system must have a paper trail that provides for traceability at any point down the track. Each batch of soil should be identified by date of manufacture, quantity, and a corresponding test result and should link into when the material was delivered and where the material was placed.

Materials supplied from operations that have a third party endorsed Quality Assurance Program may be acceptable pending submission of the relevant documentation.

2.6 Unsuitable Material
Unsuitable material is that material brought to site by the Contractor that fails to comply with the performance specifications listed in Table 1. Unsuitable materials may ultimately be approved for use if sufficient documentation and supporting laboratory testing from a suitably qualified agronomist is submitted, stating that the proposed material is equivalent or superior to the material specified.

All costs associated with testing, reworking, removal or replacing any material that the Superintendent deems to be unsuitable for renovation because of non-compliance to the performance specification shall be borne by the Contractor.

2.7 Records
The Contractor shall keep and maintain all Quality System records as required by AS/NZS ISO 9001 and this Specification. They shall be systematically recorded, indexed and filed so as to be retrievable and accessible to the Superintendent or an appointed Quality Auditor on a job basis within one working day of requisition. Each batch of soil must be identified by date of manufacture, quantity, and a corresponding test result and must link into when the material was delivered and where the material was placed.

Conformance records shall be stored and maintained such that they are readily retrievable and in facilities that provide a suitable environment to minimise deterioration or damage and to prevent loss.

The Contractor shall make the quality records available to the Superintendent at all reasonable times. If requested by the Superintendent, the Contractor shall provide copies of the records or test results at no cost to the Principal.

2.8 Non-conformance
All nonconforming Works detected by the Contractor's Quality System shall be reported to the Superintendent via a Non-conformance Report (NCR) within one working day of being detected. NCR's shall be submitted with all records that indicate a departure from the requirements of the specification. The NCR shall indicate the proposed corrective action.

If the corrective action of the non-conformance cannot be determined within one working day, the Contractor shall submit a partially completed NCR identifying the non-conformance.

The non-conforming product shall not be covered up unless a corrective action has been accepted/approved by the Superintendent and implemented by the Contractor.

A NCR will automatically create a **HOLD POINT** which shall apply until conformance has been achieved and the Superintendent has signed the Authorisation to Proceed.

2.8.1 Authorisation to Proceed
The Superintendent will issue a Corrective Action Request (CAR) when a non-conformance to the Contractors Quality System or Methods is detected. Unless specifically stated, this will not create a Hold Point.

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2.8.2 Corrective Action Request (CAR)
Where the Superintendent's inspections, surveillance or audits detect product Non-conformance, he will issue a Notice of Non- conformance (NNC). This will immediately create a Hold Point and the Contractor is required to submit an NCR in accordance with this Clause

2.8.3 Notice of Non-conformance (NNC)
In instances where there is a discrepancy between the test results obtained by the Superintendent and those provided by the Contractor, the results from the Superintendent shall prevail except where the Superintendent may determine a specific audit test procedure to resolve the discrepancy.

2.8.4 Inspection and Rectification
Authorised representatives of the Contractor and Superintendent as applicable shall sign off all actions.
The Contractor shall nominate a proposed corrective action for any non-conformance within five (5) working days or shall show cause to the Superintendent for any further delay. Under no circumstances will the deliberation on corrective action of a non- conformance justify an extension of time to the Contract period.

The Contractor shall advise the Superintendent in the NCR of the proposed corrective action of the particular non-conformance. This proposed corrective action will constitute corrective action for the Works or material referred to in the NCR and may comprise one of the following:

a) propose additional Works to bring the Works or material up to the specified standard; or
b) replace all or part of the Works or material to bring it up to the specified standard; or
c) request utilisation of a Works or material for a reduced level of service if such a clause exists in the relevant Technical Specification; or
d) for incidental defects, request that the Superintendent accept the Works or material without alteration as an exception with or without alteration to the respective unit rates.

Any proposed corrective action shall be subject to the approval of the Superintendent. Reworked/replaced Works or materials shall be verified to conform to the specified requirements.

2.8.5 Corrective Action
The Contractor will be required to indicate on the NCR corrective action appropriate to ensure that the Quality Plan is effective in avoiding recurrence of the non-conformance and continues to be effective.

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5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY.
7. IMPORTED SOILS (INCLUDING ALL CONSTITUANTS) MUST COMPLY WITH RELEVANT RESOURCE RECOVERY EXEMPTION ORDERS

Architect: AZUSA SEKKEI Architects, Engineers & Consultants
Engineer: Cardno Shaping the Future
dwp

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1	14/4/21	FOR CONSTRUCTION	AL
2	21/5/21	FOR CONSTRUCTION	AL

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STRATAVAULT SOIL SPECIFICATION

SCALE:
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. **1691**
Drawing No. Rev
138-LP03 2



LOCALITY PLAN

Scale: NTS

NIHON UNIVERSITY
ISSUE FOR CONSTRUCTION

Sheet No.	Sheet Name	Revision	Date
LP00	COVER SHEET	M	21/5/21
LP01	DEMOLITION PLAN	M	21/5/21
LP02	GENERAL ARRANGEMENT PLAN	M	21/5/21
LP03	DETAIL PLANTING PLAN -1	M	21/5/21
LP04	DETAIL PLANTING PLAN -2	M	21/5/21
LP05	DETAIL PLANTING PLAN -3	M	21/5/21
LP06	DETAIL PLANTING PLAN -4	M	21/5/21
LP07	ARRANGEMENT PLAN - 4F	M	21/5/21
LP08	SETOUT PLAN - 1	M	21/5/21
LP09	SETOUT PLAN - 2	M	21/5/21
LP10	NORTH ELEVATION	M	21/5/21
LP11	SECTIONS - 1	M	21/5/21
LP12	SECTIONS - 2	M	21/5/21
LP13	PLANTING DETAILS	M	21/5/21
LP14	DETAILS	M	21/5/21
LP15	SPECIFICATIONS	M	21/5/21
LP16	SPECIFICATIONS	M	21/5/21
LP17	REMEDIATION ACTION PLAN	M	21/5/21

M

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Engineer: Cardno Shaping the Future

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COVER SHEET

SCALE: NTS
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. **1691**

Drawing No. Rev
LP00 M

CHURCH STREET

Existing fence retained and make good.

Existing sandstone pillar removed.

Existing tap and plinth retained and make good

Existing tree to be removed for driveway

Existing sandstone pillar relocated and make good

Existing fence and sandstone footing retained and make good

Existing street trees to be removed

Bench mark drill hole

Existing sandstone pillar relocated.

Existing driveway surface replaced.

Cutback fence

Existing planter and hydrant removed.

Existing gate and fence demolished.

Existing vegetation retained.

Existing fence and sandstone footing retained and make good

Existing sandstone pillar and gate retained and make good.

Retain stone paver at threshold between sandstone pillars.

Cutback fence for pad mount Kiosk

Existing planter downsized to enlarge entry

Existing stairs and paving replaced. Refer to engineers drawing.

Existing fence retained.

Existing wall retained and protected.

Existing wall retained and protected.

Existing trees removed.

X 25.23 X 23.57 X 23.04 X 22.04 TAP X 21.98 X 22.11 X 22.37

X 23.62 X 23.24

26.96 X

X 23.03

X 24.07

X 22.86

Easement for Services Variable width

Easement for drainage of water 3m wide

Easement for Services 1.7m wide

Restriction on the use of Land 3m wide

Right Of Foot Way 2.51m Wide

Easement to Permit Encroaching Structure to Remain 0.05m & 0.75m wide

0 5 10 15 20 M

LEGEND

- Site boundary
- Easement line
- Existing Spot level
- Existing tree - to be retained & protected
- Existing tree - to be removed
- Existing asphalt to be removed
- Existing brick paving removed and stored for re-use in new paving
- Existing vegetation & elements retained and protected
- Area of demolition works
- Existing sandstone footing to be retained
- Existing fence retained and protected
- Existing wall retained and protected
- Existing stormwater pit
- Existing concrete bollard to be removed and stored for re-use on site
- Existing tap and plinth retained and protected

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Engineer: Cardno Shaping the Future

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DEMOLITION PLAN

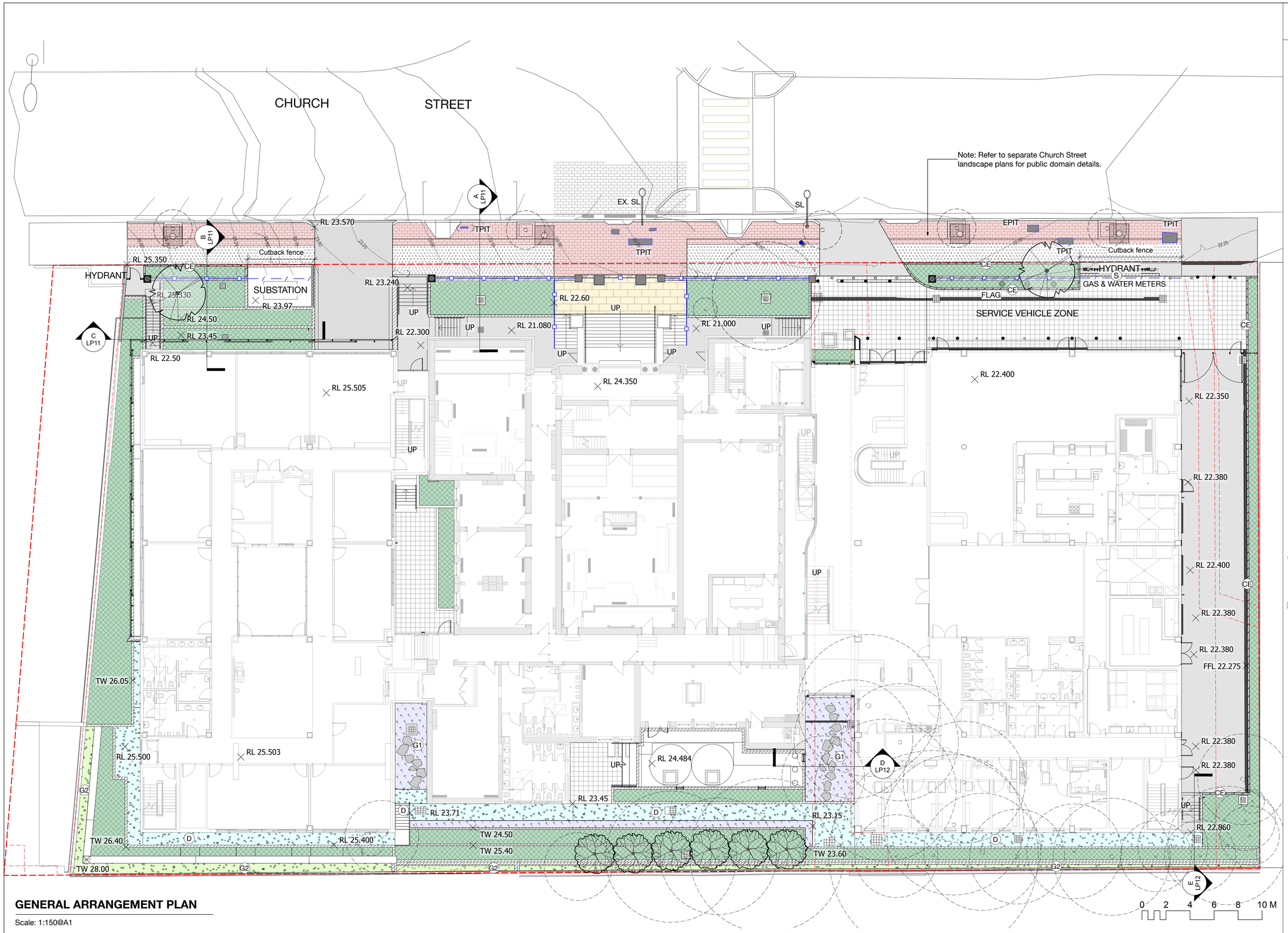
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Project No. 1691

Drawing No. LP01 M

Rev



GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
- Bluestone paving refer to 4/LP14
- Concrete paving refer to Engineer's detail. Colour: Natural.
- Asphalt paving refer to Engineer's detail
- Pavement refer to Architect's detail
- D Decomposed granite - refer to 3/LP14
- G1 White crushed gravel -refer to specification
- G2 Blue metal -refer to specification
- Random stepping stones -refer to 1/LP14
- CE Concrete edge refer to Engineer's detail
- S Signage wall by Architect
- Existing plinth to be retained
- Proposed removable bollards
- FLAG Proposed flag pole
- SL New street light refer to Engineer's detail
- EX. SL Existing street light to be retained
- Existing sandstone pillar to be retained & relocated
- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13

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Engineer: Cardno Shaping the Future

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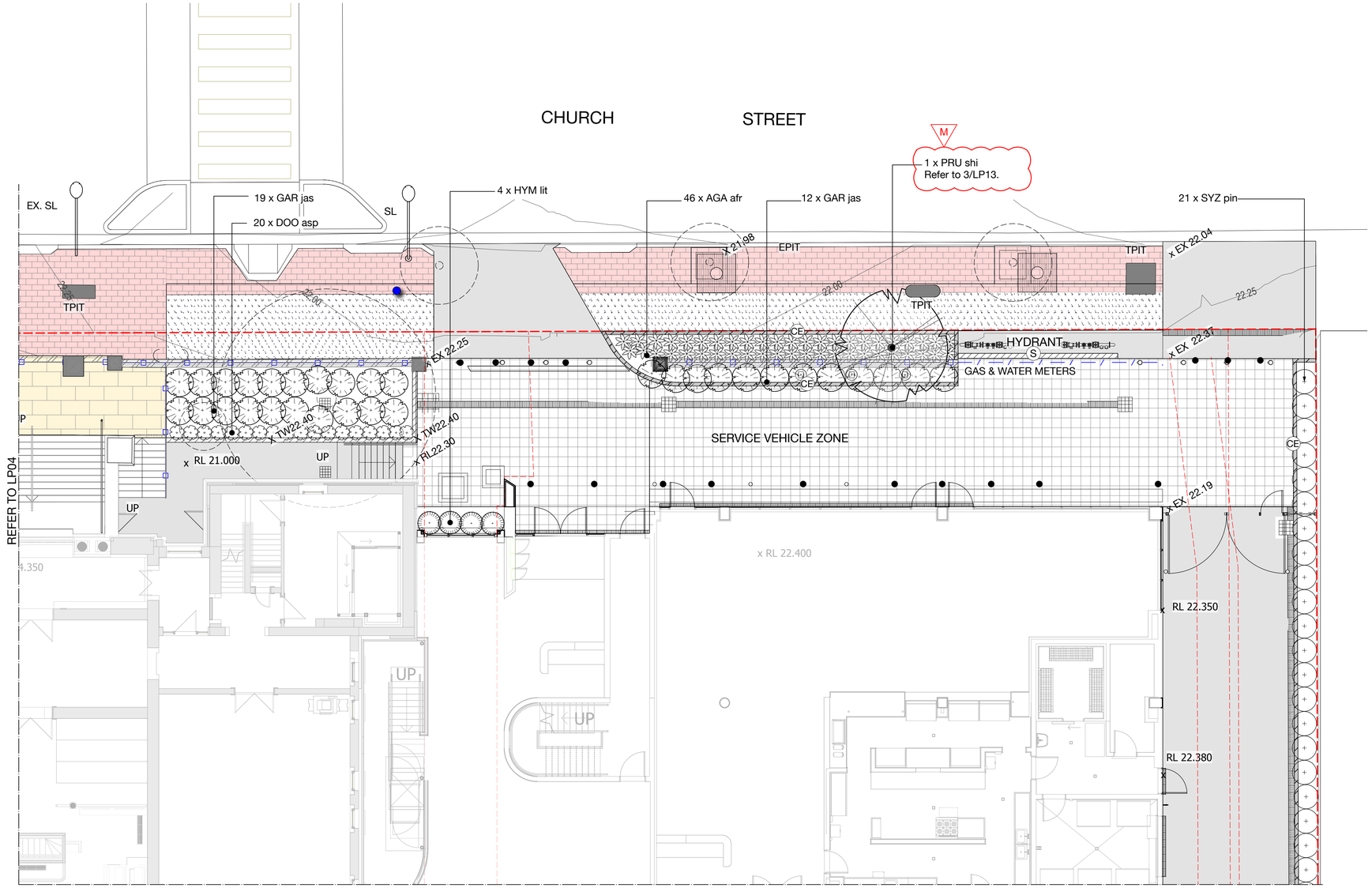
GENERAL ARRANGEMENT PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP02 Rev M



REFER TO LP06

DETAIL PLANTING PLAN -1

scale: 1:100@A1

0 2 4 6 8 M

PLANT SCHEDULE

Code	Botanical Name	Common Name	Pot Size	Mature Height	Mature Spread	Qty
Trees						
ACE nes	*Acer palmatum*	Japanese Maple	100 litre	4 - 5m	2.5 - 4m	6
PRU shi	*Prunus 'Shimidus Sakura'*	Japanese Flowering Cherry	100 litre	4m	3m	2
Shrubs/groundcovers						
ACM smi	*Acmena smithii 'Forest Flame'*	Acmena Forest Flame	200mm	1-2m	1m	16
AGA afr	*Agapanthus africanus*	African Lily	140mm	0.5-1m	0.5-1m	75
ANT and	*Anthurium andraeanum 'White Winner'*	Anthurium White Winner	200mm	0.6-0.8m	0.6m	10
BLE gib	*Blechnum gibbum*	Blechnum Silver Lady Fern	200mm	1m	2m	18
CAM him	*Camellia hiemalis 'Hiryu'*	Camellia	300mm	2-3m	2m	42
DOO asp	*Doodia aspera*	Prickly Rasp Fern	200mm	0.4 - 0.5m	0.4 - 0.6m	84
GAR jas	*Gardenia jasminoides*	Cape Jasmine	200mm	1-2m	1.5-3m	74
HYM lit	*Hymenocallis littoralis*	Spider Lily	200mm	0.3-0.6m	0.3-0.6m	4
MON del	*Monstera deliciosa*	Swiss Cheese Plant	200mm	2m	2m	6
PIT tob	*Pittosporum tobira 'Miss Muffet'*	Dwarf Pittosporum	200mm	1m	1.5m	56
POL mun	*Polystichum munitum*	Western Sword Fern	200mm	0.6-1m	0.6-1m	18
RHO hyb	*Rhododendron hybrid 'Conlee'*	Azalea Autumn Amethyst	200mm	1.0m	1.0m	33
SYZ pin	*Syzygium pinnacle*	Pinnacle Lilly Pilly	300mm	6m	1-1.5m	47
WES fru	*Westringia fruticosa*	Coastal Rosemary	200mm	1-2m	2-4m	8
Mass planting & Hedging						
BAM tex	*Bambusa textilis var. Gracilis*	Slender Weaver's Bamboo	10 litre	6-7m	ø3cm	190
TRA jas	*Trachelospermum jasminoides*	Star Jasmine	140mm	0.2m	5-8m	50
CHL com	*Chlorophytum comosum 'Ocean'*	Spider Plant	140mm	0.3m	0.3m	79
LIR mus	*Liriope muscari*	Liriope muscari Variegata	140mm	0.2m	0.2m	51

(Contractor is required to check all numbers on drawings and confirm with schedule prior to ordering.)

LEGEND

- Lot boundary
- Easement line
- Existing trees to be removed
- Steel edge - refer to 7/LP14

TREES

- PRU shi — *Prunus 'Shimidsu Sakura'* Japanese Flowering Cherry
- ACE pal — *Acer palmatum* Japanese Maple

SHRUBS / GROUNDCOVERS

- GAR jas — *Gardenia jasminoides* Cape Jasmine
- HYM lit — *Hymenocallis littoralis* Spider Lily
- WES fru — *Westringia fruticosa* Coastal Rosemary
- ACM smi — *Acmena smithii 'Forest Flame'* Acmena Forest Flame
- CAM him — *Camellia hiemalis 'Hiryu'* Camellia
- SYZ pin — *Syzygium pinnacle* Pinnacle Lilly Pilly
- PIT tob — *Pittosporum tobira 'Miss Muffet'* Dwarf Pittosporum
- MON del — *Monstera deliciosa* Swiss Cheese Plant
- RHO hyb — *Rhododendron hybrid 'Conlee'* Azalea Autumn Amethyst
- DOO asp — *Doodia aspera* Prickly Rasp Fern
- AGA afr — *Agapanthus africanus* African Lily
- POL mun — *Polystichum munitum* Western Sword Fern
- BLE gib — *Blechnum gibbum* Blechnum Silver Lady Fern

MASS PLANTING / HEDGING (3-4/m²)

- MP1 — *Bambusa textilis var. Gracilis* Slender Weaver's Bamboo
- MP2 — *Trachelospermum jasminoides* Star Jasmine
- MP3 — *Chlorophytum comosum 'Ocean'* Spider Plant
- MP4 — *Liriope muscari* Liriope muscari Variegata

Note:
Planting schedule on drawing LP03

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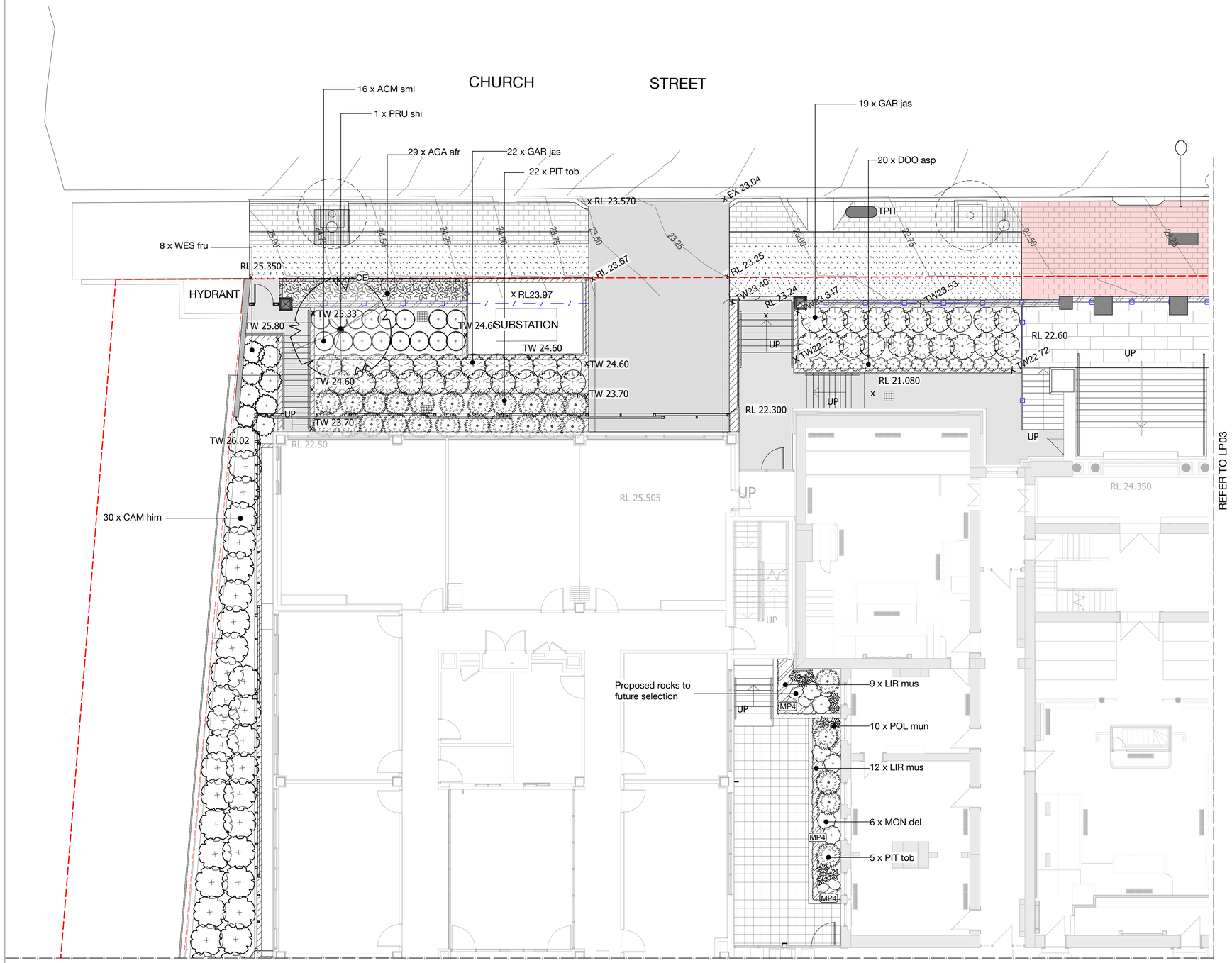
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DETAIL PLANTING PLAN -1

SCALE: 1:100@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691
Drawing No. LP03 M
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DETAIL PLANTING PLAN - 2

scale: 1:100@A1

0 2 4 6 8 M

LEGEND

- Lot boundary
- Easement line
- Existing trees to be removed
- Steel edge - refer to 7/LP14

SE

TREES

PRU shi — *Prunus 'Shimidsu Sakura'* Japanese Flowering Cherry

ACE pal — *Acer palmatum* Japanese Maple

SHRUBS / GROUNDCOVERS

GAR jas — *Gardenia jasminoides* Cape Jasmine

HYM lit — *Hymenocallis littoralis* Spider Lily

WES fru — *Westringia fruticosa* Coastal Rosemary

ACM smi — *Acmena smithii 'Forest Flame'* Acmena Forest Flame

CAM him — *Camellia hiemalis 'Hiryu'* Camellia

SYZ pin — *Syzygium pinnacle* Pinnacle Lilly Pilly

PIT tob — *Pittosporum tobira 'Miss Muffet'* Dwarf Pittosporum

MON del — *Monstera deliciosa* Swiss Cheese Plant

RHO hyb — *Rhododendron hybrid 'Conlee'* Azalea Autumn Amethyst

DOO asp — *Doodia aspera* Prickly Rasp Fern

AGA afr — *Agapanthus africanus* African Lily

POL mun — *Polystichum munitum* Western Sword Fern

BLE gib — *Blechnum gibbum* Blechnum Silver Lady Fern

MASS PLANTING / HEDGING (3-4/m²)

MP1 — *Bambusa textilis var. Gracilis* Slender Weaver's Bamboo

MP2 — *Trachelospermum jasminoides* Star Jasmine

MP3 — *Chlorophytum comosum 'Ocean'* Spider Plant

MP4 — *Liriope muscari* Liriope muscari Variegata

Note:
Planting schedule on drawing LP03

moir landscape architecture
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Islington NSW 2296
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5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp

Engineer: Cardno Shaping the Future

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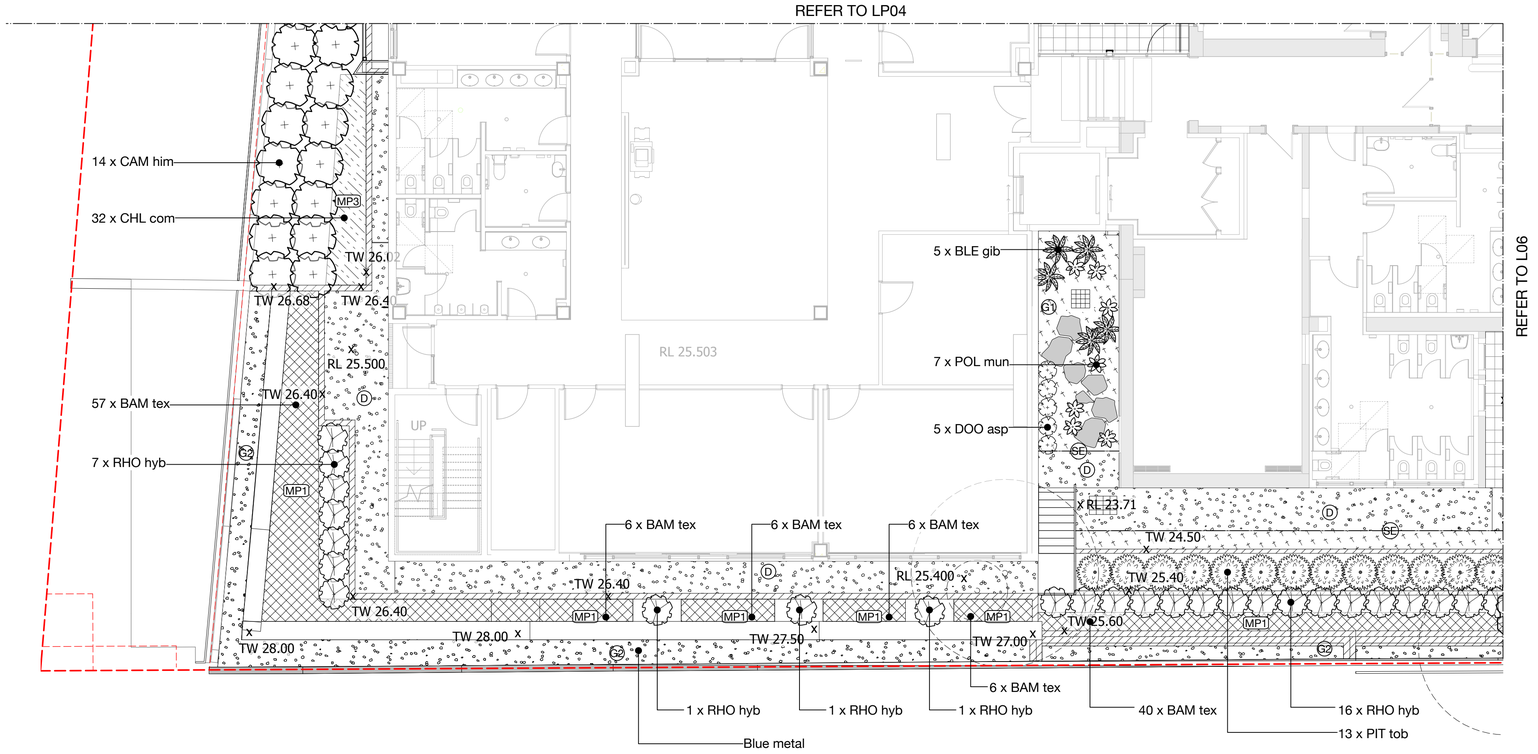
DETAIL PLANTING PLAN -2

SCALE: 1:100@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. **1691**

Drawing No. LP04 Rev M



DETAIL PLANTING PLAN - 3

scale: 1:100@A1

0 2 4 6 8 M

LEGEND

- Lot boundary
- Easement line
- Existing trees to be removed
- Steel edge - refer to 7/LP14

TREES

PRU shi	*Prunus 'Shimidsu Sakura'* Japanese Flowering Cherry
ACE pal	*Acer palmatum* Japanese Maple

SHRUBS / GROUNDCOVERS

GAR jas	*Gardenia jasminoides* Cape Jasmine
HYM lit	*Hymenocallis littoralis* Spider Lily
WES fru	*Westringia fruticosa* Coastal Rosemary
ACM smi	*Acmena smithii 'Forest Flame'* Acmena Forest Flame
CAM him	*Camellia hiemalis 'Hiryu'* Camellia
SYZ pin	*Syzygium pinnacle* Pinnacle Lilly Pilly
PIT tob	*Pittosporum tobira 'Miss Muffet'* Dwarf Pittosporum
MON del	*Monstera deliciosa* Swiss Cheese Plant
RHO hyb	*Rhododendron hybrid 'Conlee'* Azalea Autumn Amethyst
DOO asp	*Doodia aspera* Prickly Rasp Fern
AGA afr	*Agapanthus africanus* African Lily
POL mun	*Polystichum munitum* Western Sword Fern
BLE gib	*Blechnum gibbum* Blechnum Silver Lady Fern

MASS PLANTING / HEDGING (3-4/m²)

MP1	*Bambusa textilis var. Gracilis* Slender Weaver's Bamboo
MP2	*Trachelospermum jasminoides* Star Jasmine
MP3	*Chlorophytum comosum 'Ocean'* Spider Plant
MP4	*Liriope muscari* Liriope muscari Variegata

Note:
Planting schedule on drawing LP03

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Engineer: Cardno Shaping the Future

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DETAIL PLANTING PLAN -3

SCALE: AS SHOWN
ORIGINAL DRAWING AT A1.
Drawn By: CX
Checked By: MW

Project No. 1691
Drawing No. Rev LP05 M

REFER TO LP03

REFER TO LP05

UP

Easement for drainage of water 3m wide

RL 22.400

RL 22.380

RL 22.380

FFL 22.275

RL 22.380

RL 22.380

RL 22.380

Restriction on the use of Land 3m wide

26 x SYZ pin

50 x TRA jas

15 x DOO asp

11 x POL mun

13 x BLE gib

RL 24.484

UP

x RL 23.453

28 x DOO asp

30 x LIR lus

TW 24.234

TW 24.140

TW 23.797

MP4

x TW 23.20

TW 23.797

x RL 23.15

TW 24.50

TW 23.60

TW 24.60

MP1

MP3

TW 23.01

CE

UP

RL 22.860

MP2

x EX 23.0

TW 23.60

TW 24.60

9 x RHO hyb

16 x PIT tob

6 x ACE pal

70 x BAM tex

Blue metal

47 x CHL com

DETAIL PLANTING PLAN - 4

scale: 1:100@A1

0 2 4 6 8 M

LEGEND

- Lot boundary
- Easement line
- Existing trees to be removed
- Steel edge - refer to 7/LP14

TREES

PRU shi	*Prunus 'Shimidsu Sakura'* Japanese Flowering Cherry
ACE pal	*Acer palmatum* Japanese Maple

SHRUBS / GROUNDCOVERS

GAR jas	*Gardenia jasminoides* Cape Jasmine
HYM lit	*Hymenocallis littoralis* Spider Lily
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ACM smi	*Acmena smithii 'Forest Flame'* Acmena Forest Flame
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PIT tob	*Pittosporum tobira 'Miss Muffet'* Dwarf Pittosporum
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RHO hyb	*Rhododendron hybrid 'Conlee'* Azalea Autumn Amethyst
DOO asp	*Doodia aspera* Prickly Rasp Fern
AGA afr	*Agapanthus africanus* African Lily
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MASS PLANTING / HEDGING (3-4/m²)

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MP4	*Liriope muscari* Liriope muscari Variegata

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DETAIL PLANTING PLAN -4

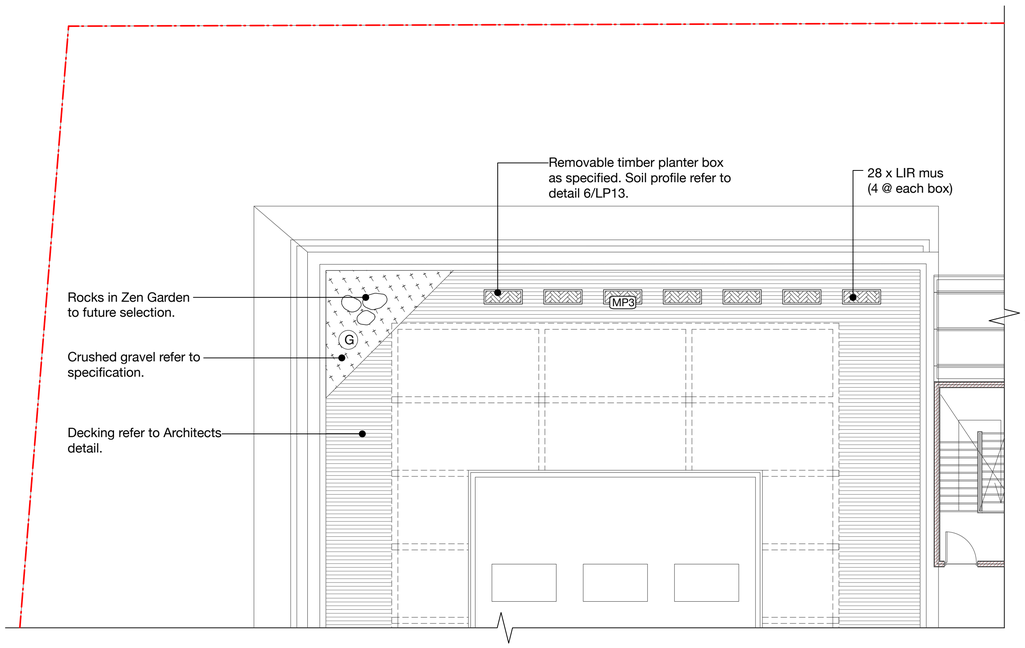
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Drawn By: CX
Checked By: MW

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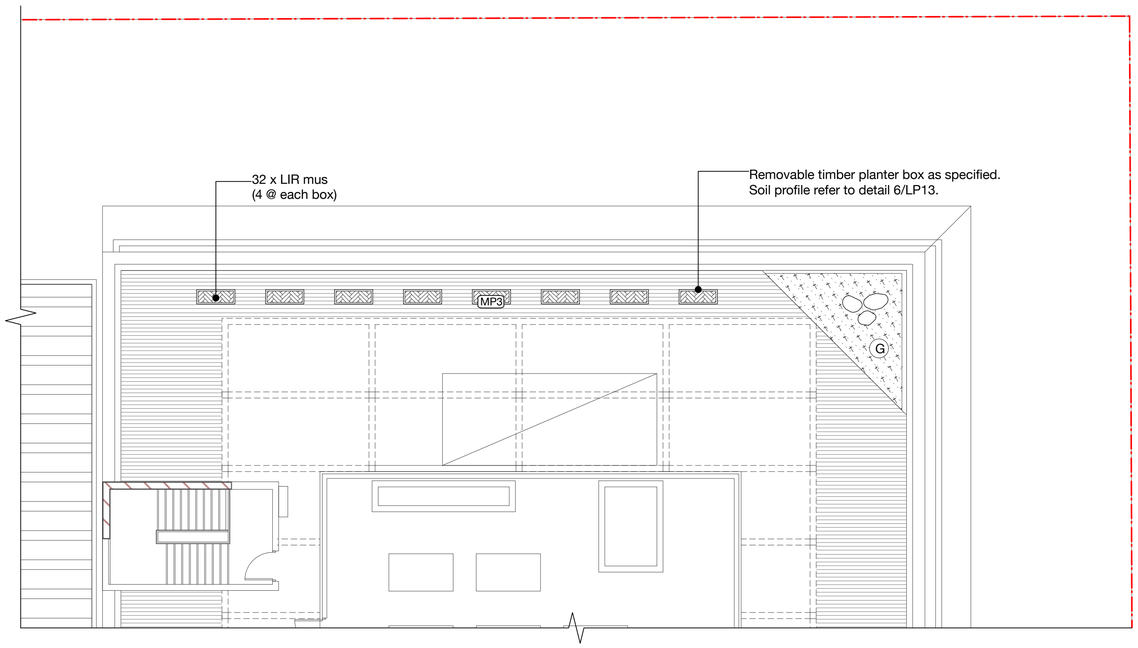
Drawing No. LP06 M

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DETAIL ARRANGEMENT PLAN - 4F NORTHWEST

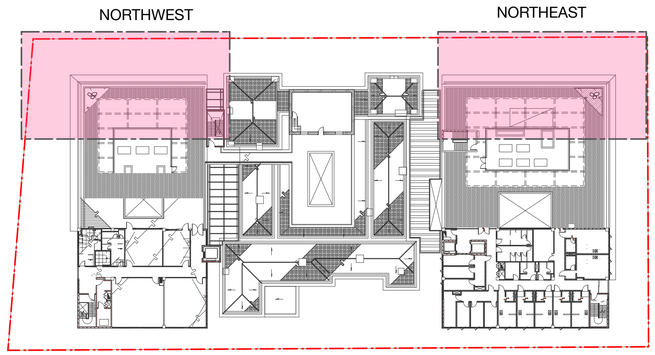
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DETAIL ARRANGEMENT PLAN - 4F NORTHEAST

scale: 1:100@A1

0 2 4 6 8 M



KEY PLAN - 4F

scale: NTS

LEGEND

- Lot boundary
- Easement line
- Existing trees to be removed
- Existing trees to be retained
- SE — Steel edge - refer to 7/LP14

TREES

- PRU shi — *Prunus 'Shimidsu Sakura'* Japanese Flowering Cherry
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SHRUBS / GROUNDCOVERS

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Note:
Planting schedule on drawing LP03

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Engineer: Cardno Shaping the Future

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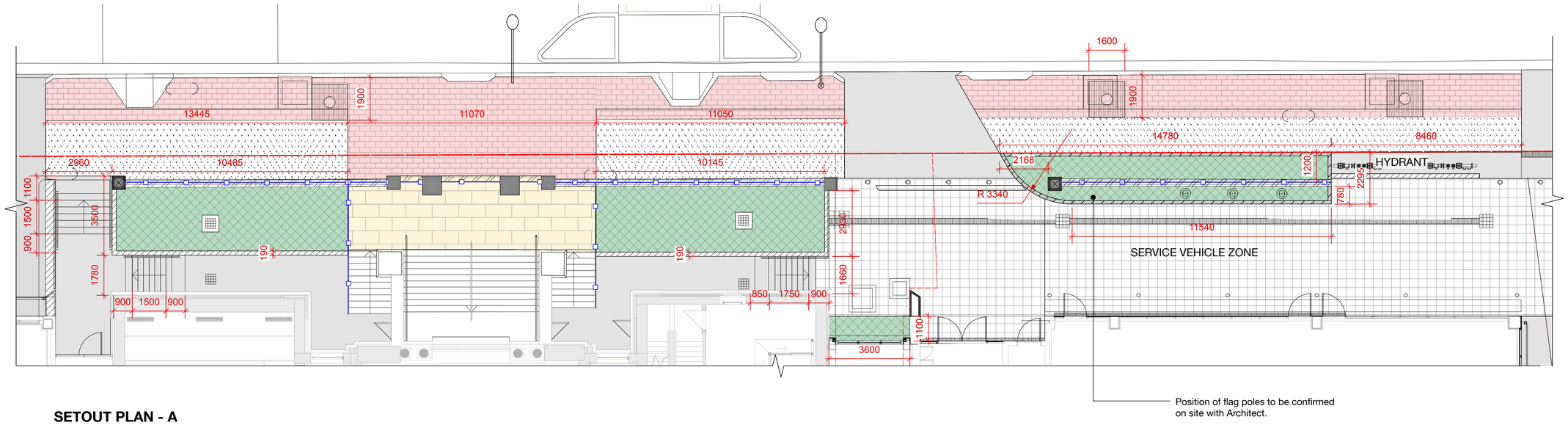
ARRANGEMENT PLAN - 4F

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ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

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Drawing No. LP07 Rev M



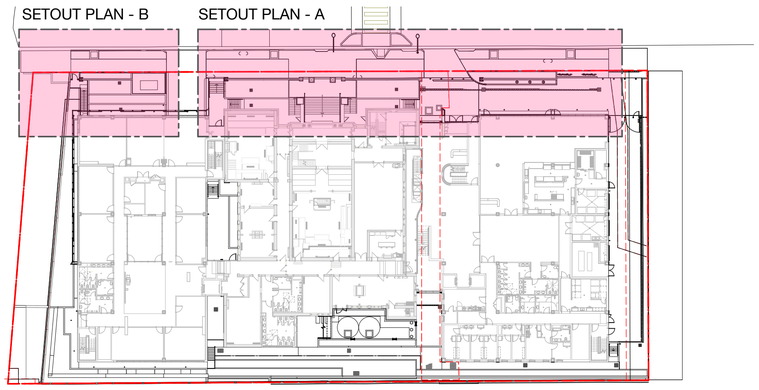
SETOUT PLAN - A

scale: 1:100@A1

0 2 4 6 8 M

SETOUT PLAN - B

scale: 1:100@A1



KEY PLAN

scale: NTS

LEGEND

Lot boundary

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SETOUT PLAN - 1

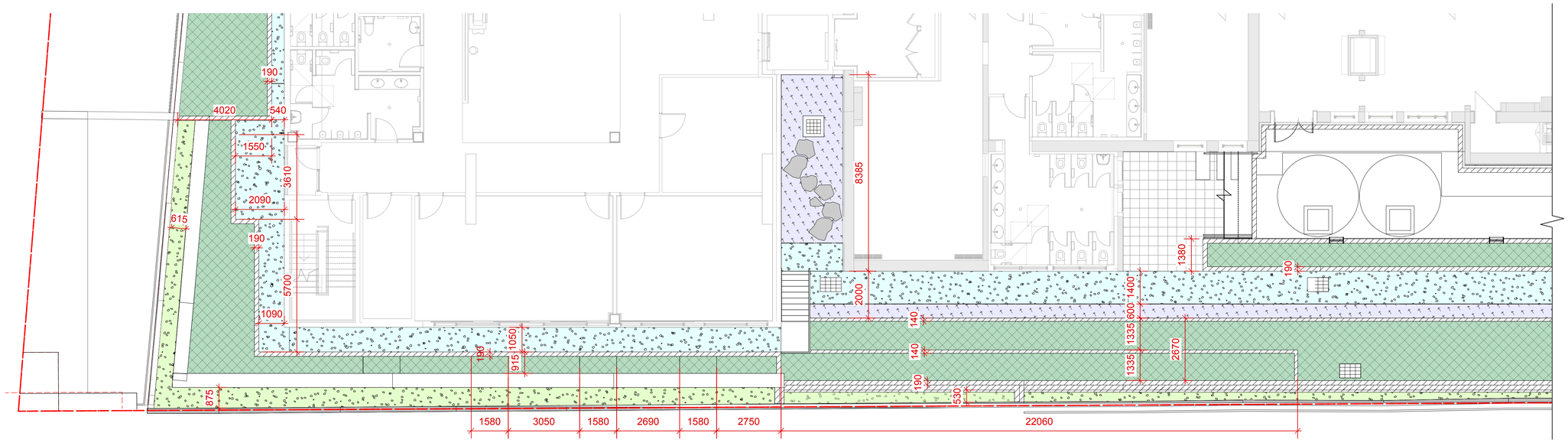
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Project No. 1691

Drawing No. LP08 M

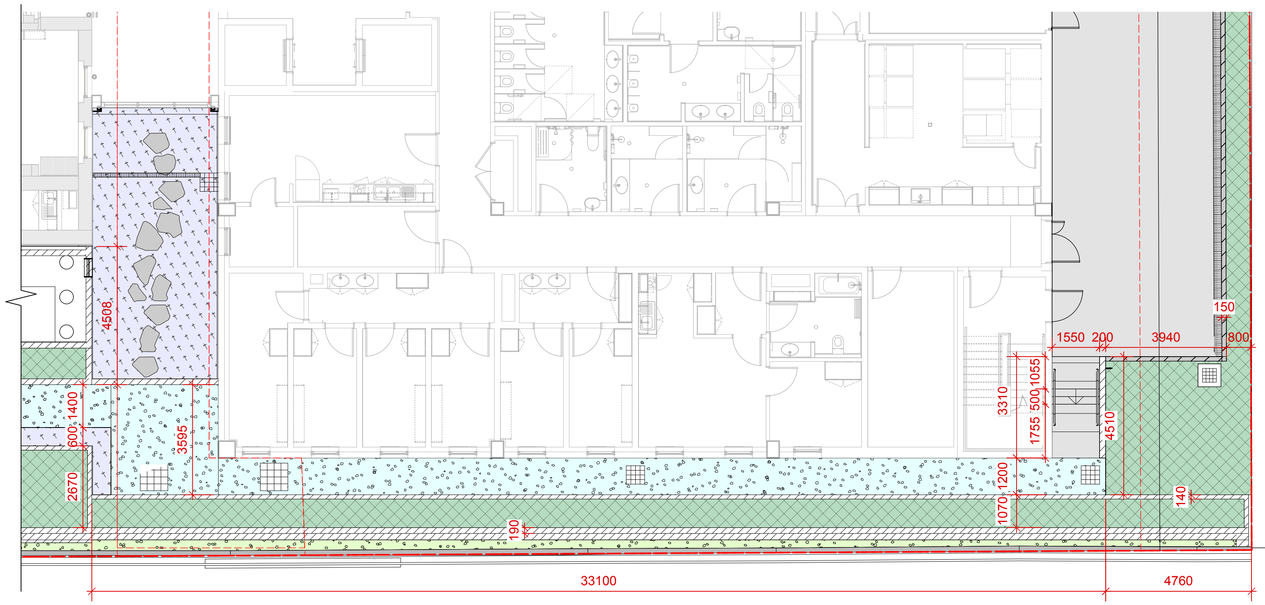
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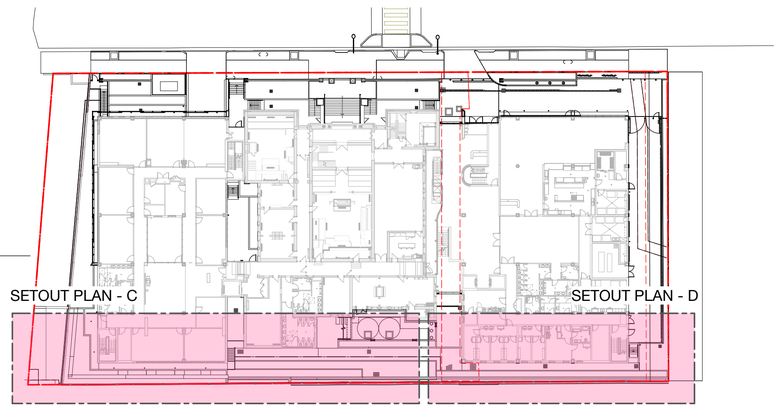
SETOUT PLAN - C

scale: 1:100@A1



SETOUT PLAN - D

scale: 1:100@A1



KEY PLAN

scale: NTS

LEGEND

Lot boundary

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SETOUT PLAN - 2

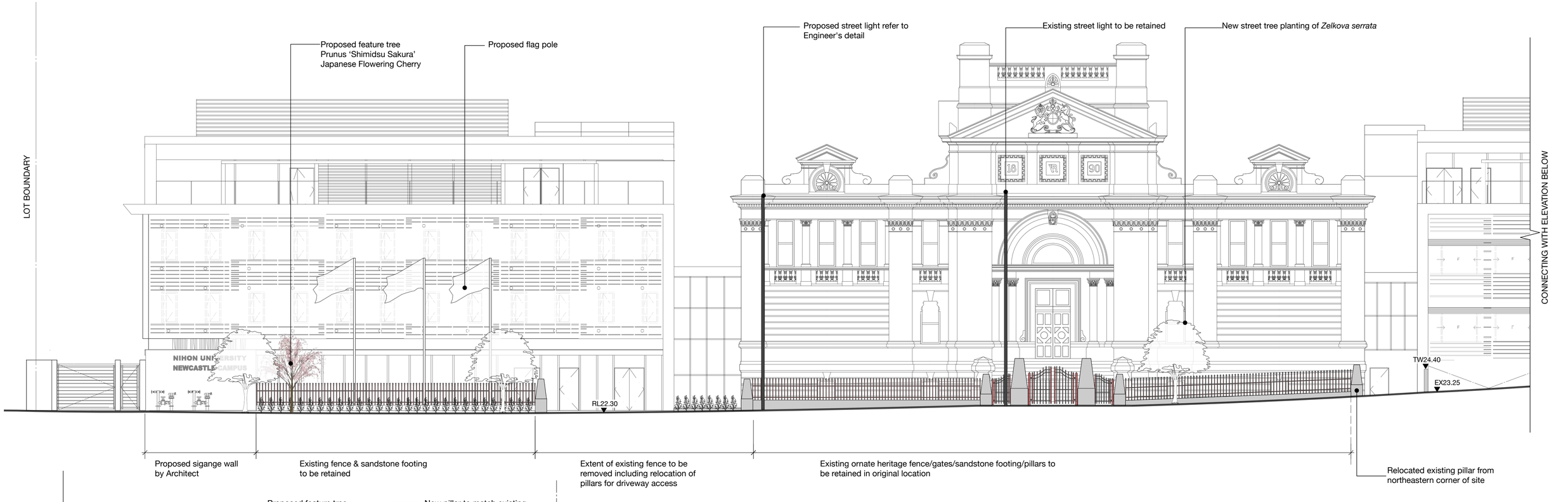
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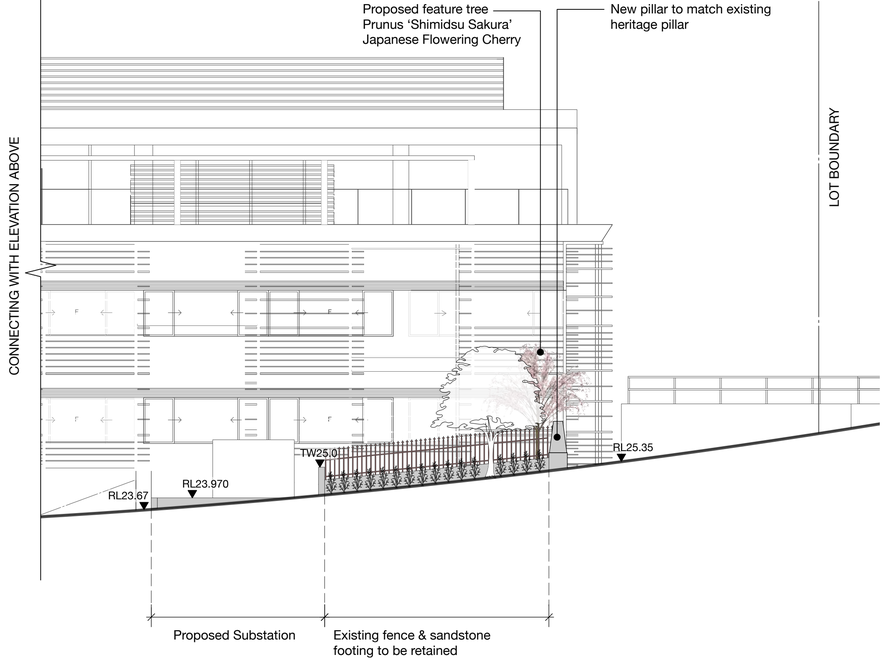
Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP09 M

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NORTH ELEVATION - CHURCH STREET

scale: 1:100@A1

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NORTH ELEVATION

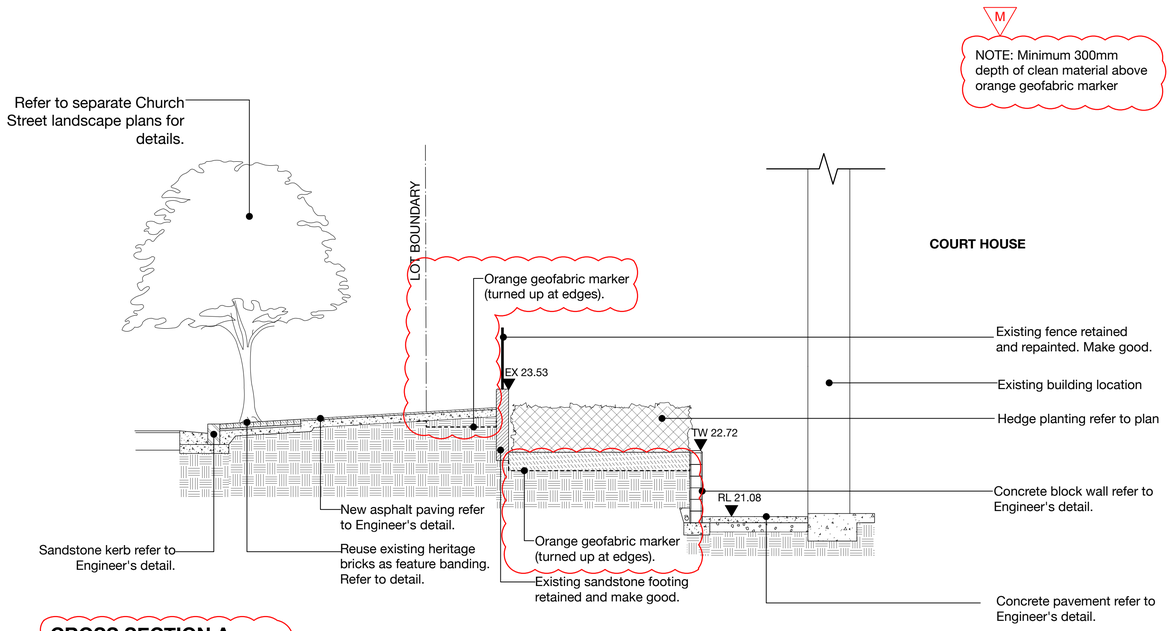
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Drawn By: CX
Checked By: MW

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Drawing No. LP10 M

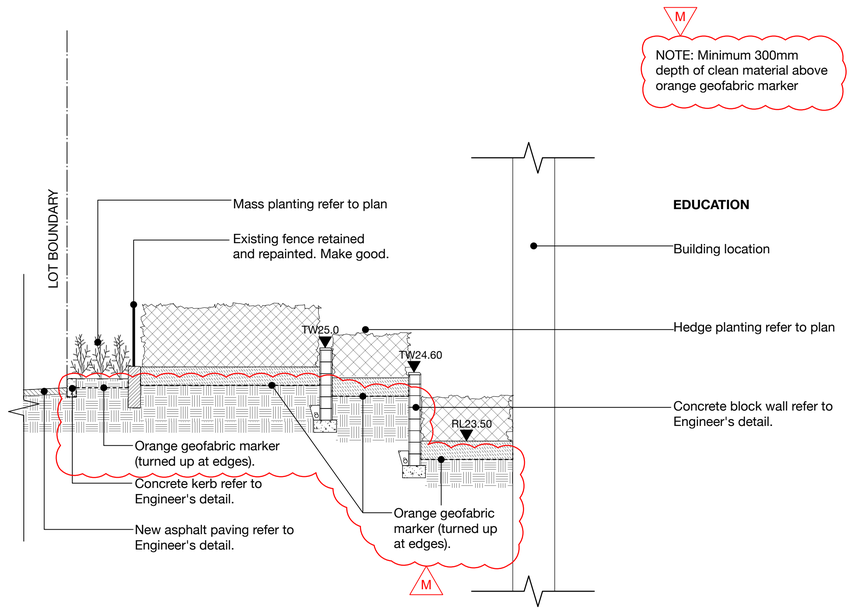
Rev



CROSS SECTION A

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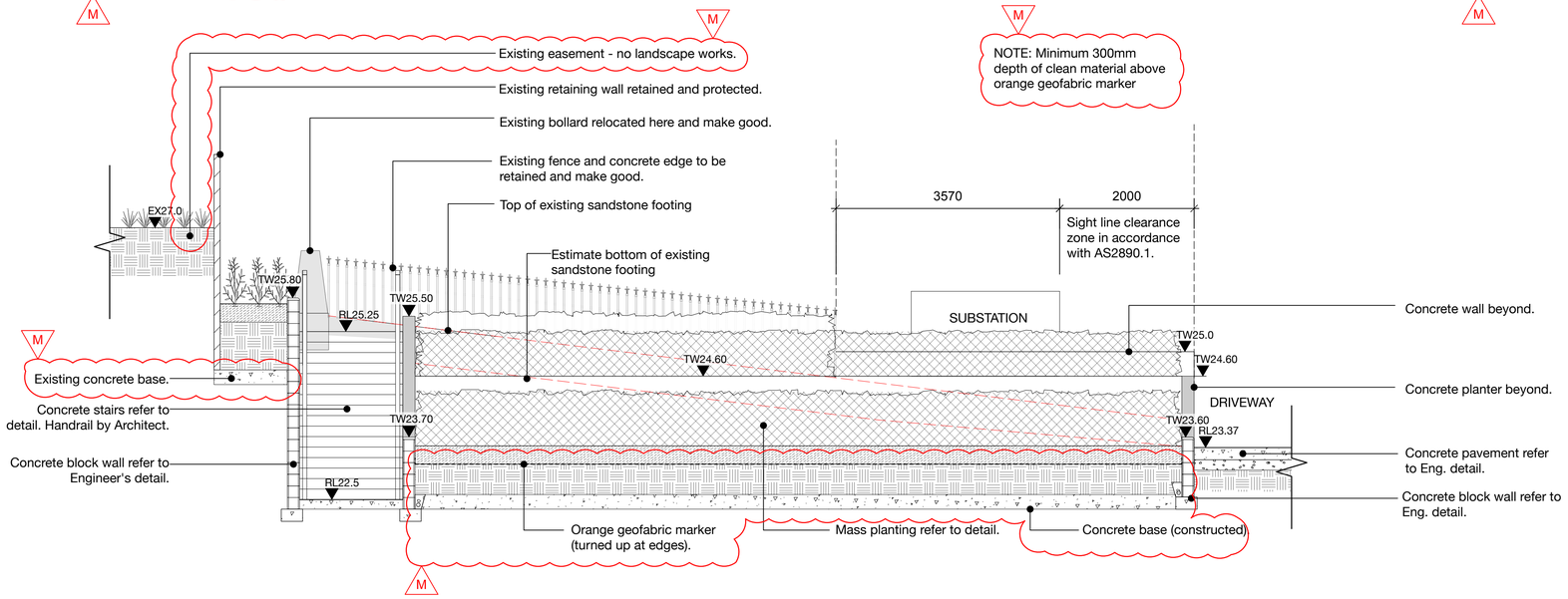
REFER TO LP17



CROSS SECTION B

scale: 1:50@A1

REFER TO LP17



CROSS SECTION C

scale: 1:50@A1

REFER TO LP17

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SECTIONS - 1

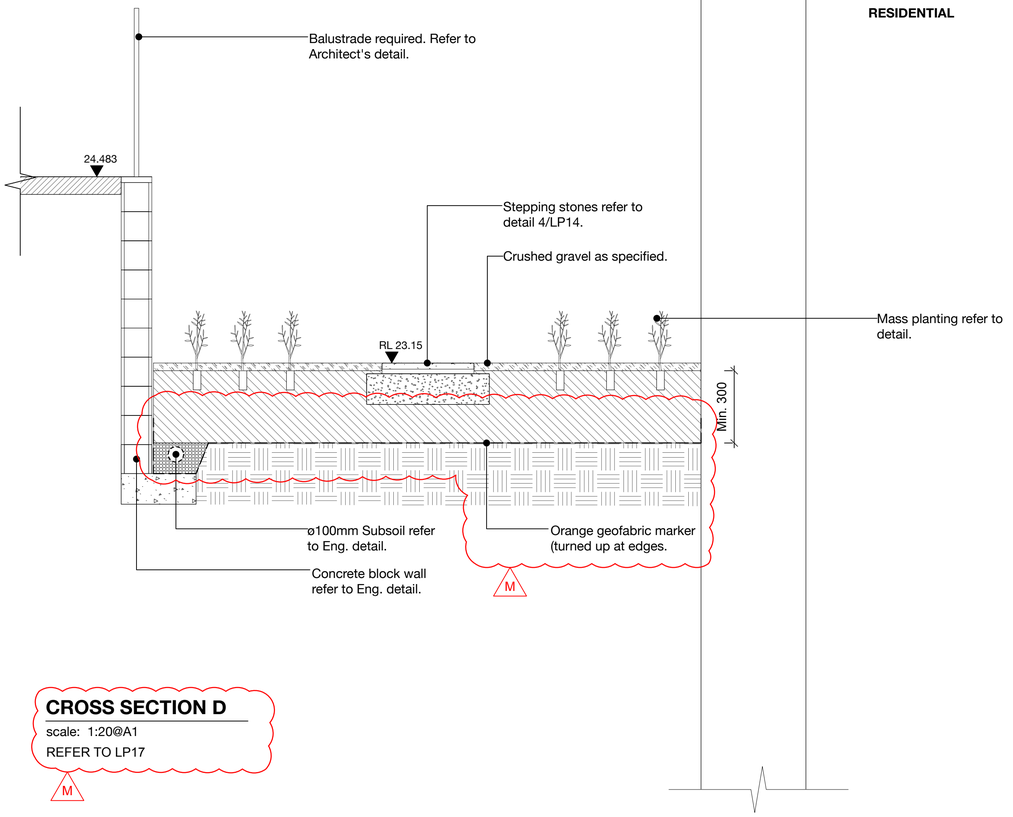
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Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP11 Rev M

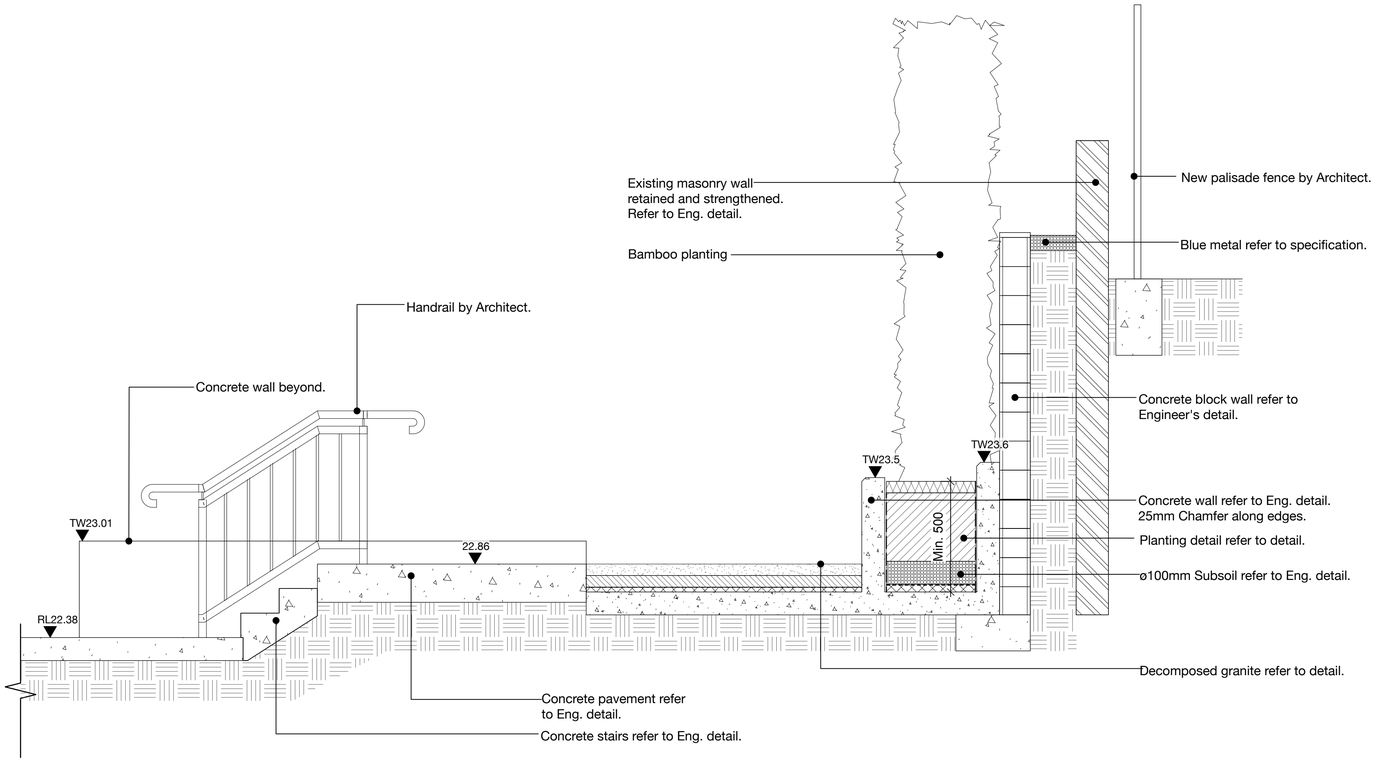
RESIDENTIAL



CROSS SECTION D

scale: 1:20@A1

REFER TO LP17



CROSS SECTION E

scale: 1:20@A1

REFER TO LP17

M

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6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp

Engineer: Cardno Shaping the Future

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North

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SECTIONS - 2

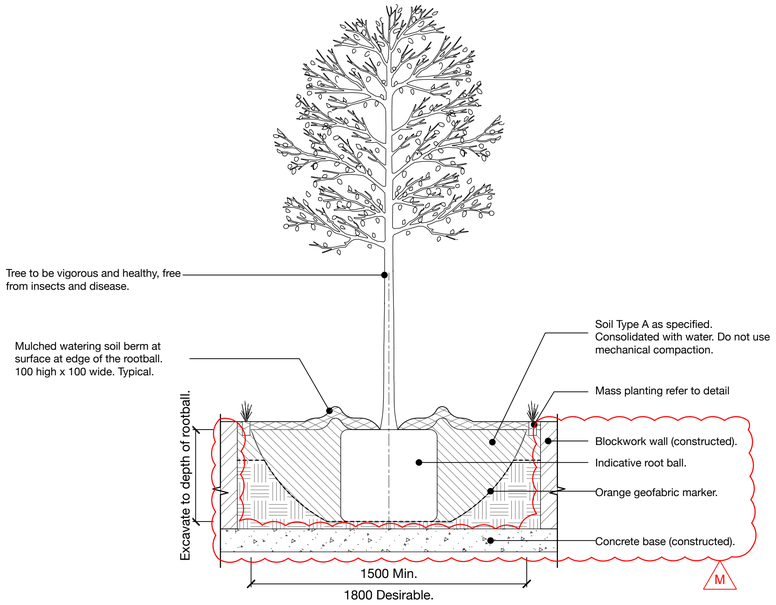
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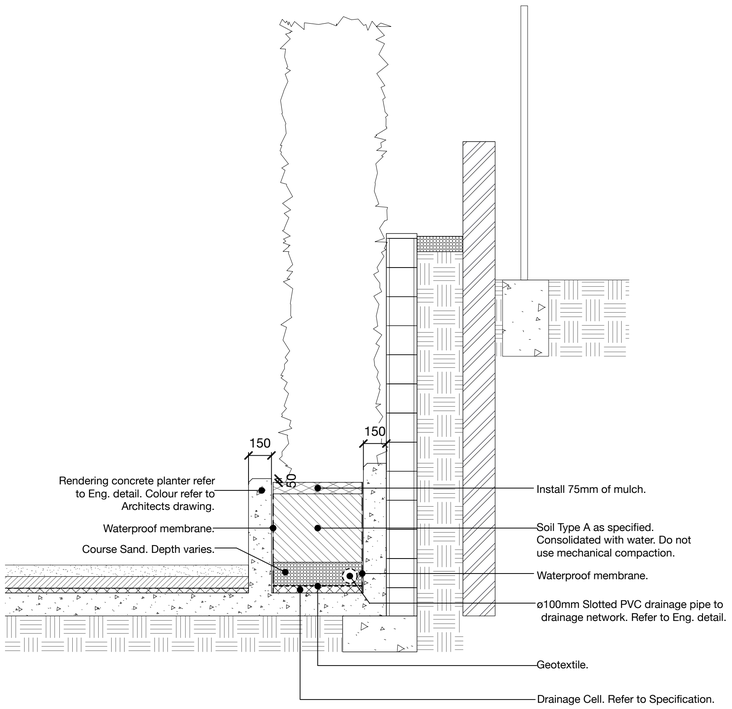
Drawn By: CX
Checked By: MW

Project No. **1691**

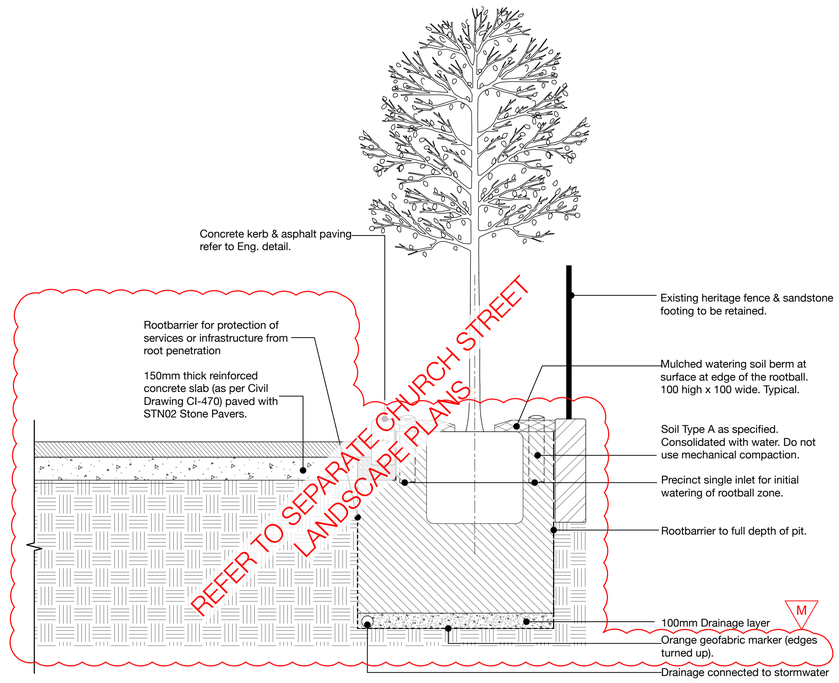
Drawing No. LP12 Rev M



1 Tree in Mass Planting (South)
1:20 @ A1
REFER TO LP17
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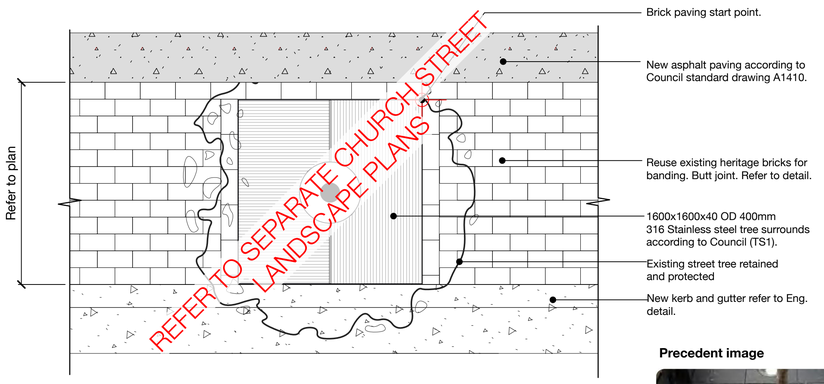


2 Shrub In Concrete Planter (South)
1:20 @ A1
REFER TO LP17
M



3 Tree Pit
1:20 @ A1
REFER TO LP17
M

NOTE: No tree vaults within site boundary
M

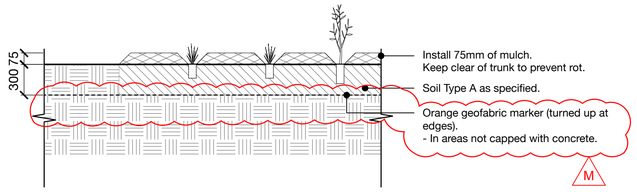


4 Existing Street Tree Detail Plan
1:20 @ A1

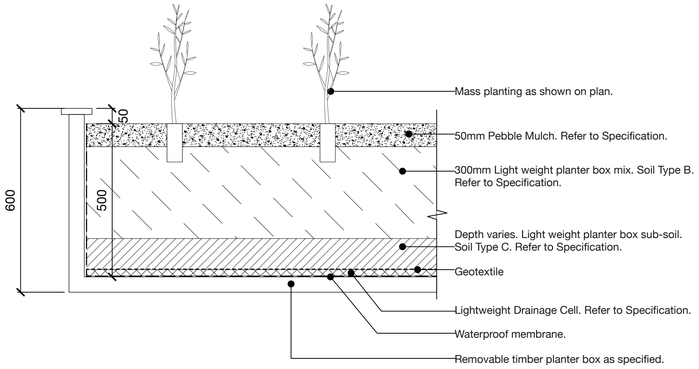
Precedent image



Tree surrounds streetscape (TS1)
from City Centre Public Domain Technical Manual



5 Mass Planting - Typical
1:20 @ A1
REFER TO LP17
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6 Timber Planter Box - Soil Profile
1:10 @ A1

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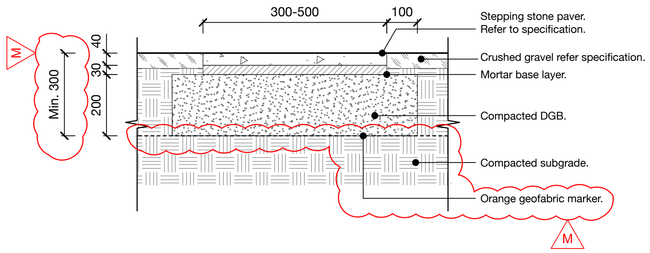
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PLANTING DETAILS

SCALE: AS SHOWN
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Checked By: MW

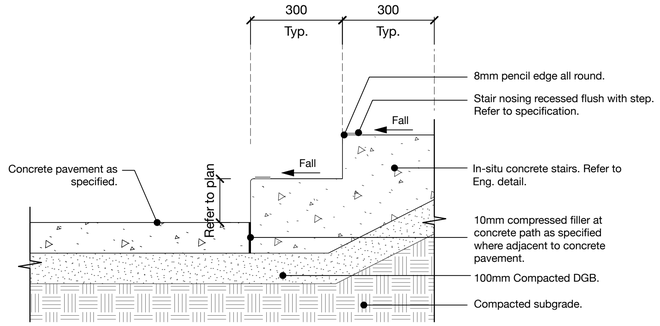
Project No. 1691
Drawing No. LP13 M
Rev



1 Stepping Stone Pavers
1:10 @ A1

REFER TO LP12 - CROSS SECTION D
REFER TO LP17

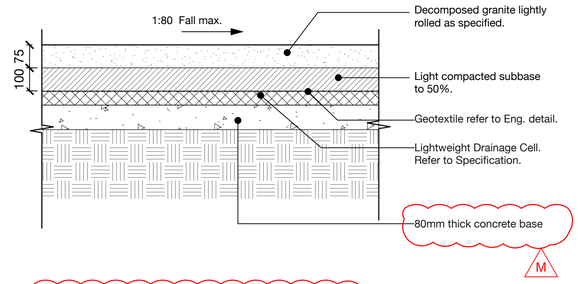
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2 Concrete Stairs Detail
1:10 @ A1

REFER TO LP12 - CROSS SECTION E
REFER TO LP17

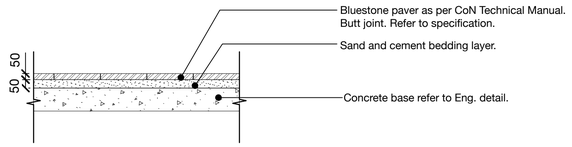
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3 Decomposed Granite Detail
1:10 @ A1

REFER TO LP12 - CROSS SECTION E
REFER TO LP17

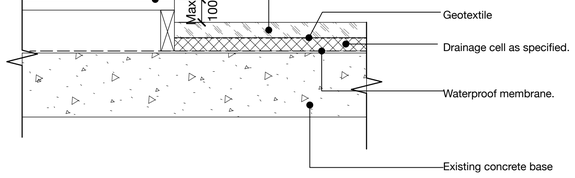
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4 Bluestone Paving
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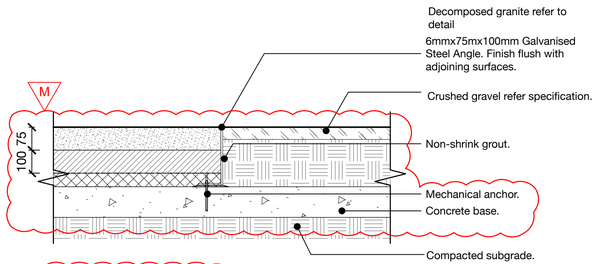
REFER TO LP17

M



5 Crushed Gravel - Rooftop
1:10 @ A1

6 Brick Paving
1:20 @ A1



7 Steel Edge
1:10 @ A1

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DETAILS

SCALE: AS SHOWN
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. **1691**

Drawing No. LP14 Rev M

SPECIFICATIONS:

SECTION A: TREE SUPPLY SPECIFICATION - AS2303:2015

Trees to be supplied in accordance with AS2303:15 Tree Stock for landscape use.

SECTION B: PLANTING SPECIFICATION

1.0 GENERAL

1.1 EXISTING SERVICES
Existing services on site include storm water drainage, water, and associated power service conduits. Locations of all services should be established prior to excavation of planting holes and installation of trees. The drawings DO NOT indicate the extent of existing services. Existing services must be confirmed by the contractor prior to excavation. Do not excavate by machine within 1m of existing underground services without prior approval or identification of service location.

1.2 SITE CLEARING
Extent
Requirement: Clear only areas to be occupied by works such as structures, paving, excavation, regrading and landscaping or other areas designated to be cleared.

Clearing and grubbing
Clearing: Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees, timber, stumps, boulders and rubble.
Grubbing: Grub out stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under buildings, embankments or paving, or 300 mm below finished surface in unpaved areas. Backfill holes remaining after grubbing with sand material to prevent ponding of water. Compact the material to the relative density of the existing adjacent ground material.
Redundant/decommissioned works: Remove works, including slabs, foundations, pavings, drains and access chambers covers found on the surface.
Any site soils excavation should be treated as contaminated and require waste classification prior to removal from site. Safe handling practises for potentially contamintated (bonded ACM) soils must be followed and included in Subcontractor SWMS. M

Surplus material
Topsoil and excavated material: Continually remove unwanted stripped soil and other material from the site as the work proceeds, including any material dropped on footpaths or roadways.

1.3 PROTECTION OF EXISTING FEATURES
During installation protect all existing trees, shrubs and other specified vegetation, features and improvements, structures and utilities. Protect trees to be retained from damage from groundworks. Take necessary precautions, including the following:

Harmful Materials: Do not store or otherwise place bulk materials and harmful materials under or near trees. Do not place spoil from excavations against tree trunks, even for short periods. Prevent wind blown materials such as cement from harming trees and plants.
Damage: prevent damage to tree bark. Do not attach stays, guys and the like to trees.
Work under trees: Do not add or remove topsoil within the drip line, use hand methods such that root systems are preserved intact and undamaged.
Open up excavations under tree canopies for as short a period as possible.
Roots: Where it is necessary to cut tree roots, use means such that the cutting
does not unduly disturb the remaining root system.
Compacted Ground: Avoid compaction of the ground under trees.

1.4 TREES TO BE REMOVED
Designation
Marking: Mark trees and shrubs to be removed 1000 mm above ground level.

1.5 TREE PROTECTION
General
Warning signs: Display in a prominent position at each entrance to the site, warning that trees and plantings are to be protected during the contract. Remove on completion.
Lettering: Road sign type sans serif letters, 100 mm high to AS 4970 Appendix C.
Protection measures: Provide before commencement of earthworks.
Trees to be retained
Extent: All trees NOT marked for removal.
Tree protection
Tree protection zone (TPZ): To AS 4970 Section 3.
Tree protective measures: To AS 4970 Section 4.
Monitoring and certification: To AS 4970 Section 5.
Work near trees
Harmful materials: Conform to the following:
- Keep the area within the dripline free of sheds and paths, construction material and debris.
- Do not place bulk materials and harmful materials under or near trees.
- Do not place spoil from excavations against tree trunks.
- Prevent wind-blown materials such as cement from harming trees and plants.

Damage: Prevent damage to tree bark. Do not attach stays, guys and the like to trees.
Work under trees: Do not remove topsoil from, or add topsoil to, the area within the dripline of the trees.
Excavation: If excavation is required near trees to be retained, give notice. Minimise period of excavation under tree canopies.
Hand methods: Use hand methods to locate, expose and cleanly remove the roots on the line of excavation. If it is necessary to excavate within the drip line, use hand methods so that root systems are intact and undamaged.
Roots: Do not cut tree roots exceeding 50 mm diameter. Where it is necessary to cut tree roots, use cutting methods that do not excessively disturb the remaining root system. Immediately after cutting, water the tree and apply a liquid rooting hormone to stimulate the growth of new roots.
Backfilling: Backfill excavations around tree roots. Place the backfill in layers of 300 mm maximum depth and compacted to a dry density similar to that of the original or surrounding soil. Do not backfill around tree trunks to a height greater than 200 mm above the original ground surface. Immediately after backfilling, thoroughly water the root zone surrounding the tree.
Backfill material:
- Mix proportions (topsoil:well-rotted composts) by volume: 3:1.
- Neutral pH value.
- Free from weed growth and harmful materials.

Compacted ground: Do not compact the ground or use skid-steel vehicles under the tree dripline. If compaction occurs, give notice.
Compaction protection: Protect areas adjacent the tree dripline. Submit proposals for an elevated platform to suit the proposed earthworks machinery.
Watering: Water trees as necessary, including where roots are exposed at ambient temperature more than 35°C.
Mulching: Spread 100 mm thick organic mulch to the whole of the area covered by the drip line of all protected trees.

2.0 MATERIALS

2.1 PLANT MATERIAL
Discrepancies within the planting schedule and the drawing should be referred to Moir Landscape Architecture for clarification. Make no substitutions unless approved. Substitutions shall not be approved unless the contractor complies with this specification.

Plant material: Plants shall be of the species, sizes and quantities as shown on the drawing. Plants shall be vigorous, well established, of good form, not soft or forced, free from disease and insect pests. Plants shall have large healthy root systems.

2.2 SOILS & MULCH

SOIL TYPE A:
Top 300mm soil to be equal to AS4419-2018 'Organic Soil' with texture to AS4419-2018 Table 1- Sandy Loam.
Below 300mm do not incorporate organic matter. Below 300mm soil to be equal to AS4419-2018 'Soil blend' with max 5% organic matter content.
Texture to AS4419-2018 Table 1- Sandy Loam.

SOIL TYPE B:
Imported Top Soil - Benedict smart Mix No.4 - Lightweight planter box mix, or equivelent product as approved by superintendant.
Installation: Install to a depth of 300mm
Supplier (recommended): Benedict Industries ph. (02) 9986 3555, web. benedict.com.au

SOIL TYPE C:
Imported Sub-soil - Benedict Smart Mix No.5 - lightweight planter box subsoil mix, or rquivelent product as approved by superintendant.
Installation: Install to a depth of 300mm
Supplier (recommended): Benedict Industries ph. (02) 9986 3555, web. benedict.com.au

General: Where available use ameliorated site topsoil. Where unavailable Import topsoil from an off-site source approved by the Superintendent.
All imported soil/materials to be VENM/ENM, or comply with relevant RRO/RRE. Must be approved by Geotechnical Engineer prior to delivery to site.
Orange geofabric marker is required over all exposed (potentially contaminated) existing site soils prior to importing and backfilling with clean soils (photos to be submitted to Project Manager). M

Source Landscape Soil:
Soil to be used for these landscape works shall be: Imported General Purpose Soil to the areas and locations as specified. Soil for the works shall be free from noxious weeds etc. Soil shall be assumed to be placed to all areas and backfill to all plantings. Unless otherwise directed by site superintendent, the landscape contractor is responsible for the removal and or disposal of all spoil or excess soil excavated in the process of implementing the landscape works.

Sampling: As recommended in AS 4419 (2003) Appendix A (when on site soil is to be used).
Sampling technique: The following sampling technique should be used in conjunction with the guidelines recommended in AS 4419 (2003). Where discrepancies arise, refer to the Superintendent for clarification prior to proceeding with any works.

The Contractor shall arrange for the following soil tests to be carried out:
• Three tests of any proposed imported topsoil.

For each test, take six samples of each soil type. These should be taken from various locations. Each sample should be approximately a spade full in quantity. For each soil type, thoroughly mix the six samples together to obtain an 'average' sample. Ensure that mixing is carried out in a clean mixing container, with no impurities such as cement residue or imported soil etc present. Extract 1kg (approximately a 2L ice cream container) final samples from each of the three mixed batches. Package and forward to the soil laboratory for testing, together with a site plan locating sources of soil samples and a record of any relevant details about the site and source locations.

Results: The results of all soil tests should be submitted to the superintendent when available.

Lead time: Allow a minimum of five full working days for completion of soil testing, and check with laboratory to ensure testing will not delay landscaping works. Supply soil tests to site superintendent once available.

MULCH:
Mulch type: Coarse Grade mulch in accordance with AS4454-2018. Free of deleterious and extraneous matter including soil, weeds and sticks. Do not include fine mulch.
Supplier & product: ANL 'Forest Fines'. Phone: 02 9450 1444 Fax: 02 9450 2428

PEBBLE MULCH:
To be used where indicated on LP401. Mulch in Soil Profile Type 1.
Type: Nepean River Pebble 10mm
Supplier: ANL - Australian Native Landscapes Pty Ltd
Contact: Hue Hue Road, Jilliby NSW, 2259 (02) 43536025. anlandscape.com.au
Depth: 50mm.

3.0 EXECUTION

3.1 EXCAVATION OF PLANTING HOLES
Locations for plants and/or outlines of areas to be planted are to be staked out at the site. Locate and mark all subsurface utility lines. Approval of the stakeout by the supervisor is required before excavation begins. Tree pits are to be excavated to the depth and widths indicated on the drawings. If the planting area under any tree is initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped. The sides of the excavation of all planting areas shall be sloped at 45 degrees. The bottom of the planting hole shall slope parallel to the proposed grades or toward any subsurface drain lines within the planting bed. The bottom of the planting hole directly under any tree shall be horizontal such that the tree sits plumb.

Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not excavate compacted subgrades of adjacent pavement or structures.

Subgrade soils shall be separated from the topsoil with orange geofabric marker layer, removed from the area, and not used as backfill in any planted or lawn area. Excavations shall not be left uncovered or unprotected overnight. For trees and shrubs planted in individual holes in areas of good soil that is to remain in place and/or to receive amendment in the top 150mm layer, excavate the hole to the depth of the root ball and to widths shown on the drawing. Slope the sides of the excavation at a 45 degree angle up and away from the bottom of the excavation. M

Preparation of subgrades to be inspected prior to the installation or modification of topsoil or planting mix. Till the subsoil into the bottom layer of topsoil or planting mix. Loosen the soil of the subgrade to a depth of 50 to 75 mm with a rototiller or other suitable device.

Detrimental soil conditions: The supervisor is to be notified, in writing, of soil conditions encountered, including poor drainage, that the contractor considers detrimental to the growth of plant material. When detrimental conditions are uncovered, planting shall be discontinued until instructions to resolve the conditions are received.

Obstructions: If rock, underground construction work, utilities, tree roots, or other obstructions are encountered in the excavation of planting areas, alternate locations for any planting shall be determined by the landscape architect.

3.2 PLANTING OPERATIONS
Before planting begins thoroughly water the plants and planting areas. Water plants again immediately after planting.

Subsurface drainage etc
Install subsurface drains as shown on the details and connect to Stormwater. All tree planting holes and mass planting areas shall have subsurface drainage.

Trees
Plants shall be set on flat-tamped or unexcavated pads at the same relationship to finished grade as they were to the ground from which they were dug, unless otherwise noted on the drawings. Plants must be set plumb and braced in position until topsoil or planting mix has been placed and thoroughly watered in to stabilise the root ball of the tree (Do not tamp down soil). Improper stabilization of the soil around the root ball may result in the tree settling or leaning. Plants shall be set so that they will be at the same depth and so that the root ball does not shift or move laterally one year later.

Determine the elevation of the root flare and ensure that it is planted at grade. This may require that the tree be set higher than the grade in the nursery. If the root flare is less than 50mm below the soil level of the root ball, plant the tree at the appropriate level above the grade to set the flare even with the grade. If the flare is more than 50mm at the center of the root ball the tree shall be rejected.

Lift plants only from the bottom of the root balls or with belts or lifting harnesses of sufficient width not to damage the root balls. Do not lift trees by their trunk or use the trunk as a lever in positioning or moving the tree in the planting area.

Remove plastic, paper, or fiber pots from containerised plant material. Score the side of the root ball with a sharp knife and tease out roots. Immediately after removing the container, install the plant such that the roots do not dry out. Pack planting mix around the exposed roots while planting. Completely remove any waterproof or water-repellant strings or wrappings from the root ball and trunk before backfilling.

Soils and mulch
Place soil mixes, tamping lightly to reduce settlement. Ensure that the backfill immediately around the base of the root ball is tamped with foot pressure sufficient to prevent the root ball from shifting or leaning.

Thoroughly water all plants immediately after planting. Apply water by hose directly to the root ball and the adjacent soil. Remove all tags, labels, strings, etc. from all plants. Remove any excess soil, debris, and planting material from the job site at the end of each workday.

Fine Grading
Provide smooth transitions between slopes of different gradients and direction. Modify the grade so that the finish grade is flush with all paving surfaces or as directed by the drawings. Fill all dips and remove any bumps in the overall plane of the slope.

Staking
For Trees, stake as per the details.

Pruning
Plants shall not be heavily pruned at the time of planting. Pruning is required at planting time to correct defects in the tree structure, including removal of injured branches, double leaders, waterspouts, suckers, and interfering branches. Healthy lower branches and interior small twigs should not be removed except as necessary to clear walks and roads. In no case should more than one-quarter of the branching structure be removed. Retain the normal or natural shape of the plant. All pruning shall be completed using clean, sharp tools. All cuts shall be clean and smooth, with the bark intact with no rough edges or tears.

Mulching
All trees are to be mulched to the depths shown on the drawing. Mulch must not be placed within 8 cm of the trunks of trees. Spread 75mm layer mulch to all mass planting beds and individual plantings in turf. Finish to the required levels. Keep mulch away from the plant stems.

SECTION C: LANDSCAPE MAINTENANCE SPECIFICATION

1.0 SCOPE

1.1 PERIOD
The 26 week Planting Establishment Period commences at the date of Practical Completion.

The contractor is to also allow for maintenance from the date of Practical Completion to the start date of the 26 week Planting Establishment Period. The allowance shall be for a weekly rate which will then be implemented until the formal maintenance period commences.

1.2 PROGRAM
Furnish a proposed planting maintenance program with the tender.

1.3 MAINTENANCE LOGBOOK
Contractor to keep a maintenance record of works carried out on a monthly basis. Log should include but not limited to:
- Activities carried out during each attendance;
- Irregularities encountered and actions taken;

NB: Maintenance payments will be evaluated on submission of monthly logbooks.

1.4 RECURRENT WORKS
Throughout the Planting Establishment Period, continue to carry out recurrent works of a maintenance nature including, but not limited to, watering, mowing, weeding, rubbish removal, fertilising, pest and disease control, staking and tying, replanting, cultivating, pruning and keeping the site neat and tidy. All rubbish related to landscape works shall be removed by the landscape contractor before it is allowed to accumulate.

1.5 PLANTING
Commence recurrent planting maintenance works at the completion of planting. Ensure the stock arriving on site is protected and maintained for healthy growth.

1.6 REPLACEMENTS
Continue to replace failed, damaged or stolen plants for the extent of the Planting Establishment Period.

1.7 MULCHED SURFACES
Maintain the surface in a clean and tidy condition and reinstate the mulch as necessary.

1.8 GRASSED AREAS
Commence grass maintenance works at the completion of turfing, and continue to carry out grass maintenance throughout the contract and Planting Establishment Period, maintaining healthy weed free growth.

1.9 STAKES AND TIES
Adjust or replace as required. Remove those not required at the end of the Planting Establishment Period.

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4. READ IN CONJUNCTION WITH ALL ARCHITECTURAL, CIVIL, STRUCTURAL, HYDRAULIC, MECHANICAL AND ELECTRICAL ENGINEER'S DRAWINGS AND SPECIFICATIONS.
5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp
Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status: FOR CONSTRUCTION
NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

SPECIFICATIONS

SCALE: NTS
ORIGINAL DRAWING AT A1.
Drawn By: CX
Checked By: MW

Project No. 1691
Drawing No. Rev LP15 M

SPECIFICATIONS:

1.11 WATERING
Generally: Maintain a vigorous healthy appearance.
Site Water: The contractor shall be responsible for supplying water and/or paying for water for the duration of the works.
Timing: Water at times of day to minimise water evaporation loss. Do not water during the hottest period of Summer days.
Public areas without installed watering systems: Water in dry periods. Make available all necessary equipment to carry out hand and sprinkler watering as required.
Water restrictions: Coordinate the water supply and confirm the watering regime against federal and state government legislation and restrictions at the time.
Hand watering: Manually water all lawn and planting areas in the absence of an irrigation system or until the proposed irrigation system is fully operational.

2.0 REPORTS

2.1 LANDSCAPE PRACTICAL COMPLETION REPORT
Following an inspection of the installed landscape, Moir Landscape Architecture is to submit a 'Landscape Practical Completion Report' to the Principle Certifying Authority. This report will confirm that the landscape has been installed as per the approved plans, or outline any deviations from the plans, and any rectifications required.

2.2 LANDSCAPE MAINTENANCE REPORT
'Landscape Maintenance Reports' shall be submitted to the Principle Certifying Authority by the contractor verifying that satisfactory maintenance of the landscape works has been undertaken and that any necessary rectification measures have been carried out to a high professional standard. This documentation is to be submitted through the plant establishment period.

PLANT ESTABLISHMENT & MAINTENANCE PERIOD:
The planting establishment period shall be 26 weeks during which time the landscape contractor shall undertake the following.

MAINTENANCE LOGBOOK:
Contractor to keep a maintenance record of works carried out on a monthly basis. Log should include but not limited to:
- Activities carried out during each attendance;
- Irregularities encountered and actions taken;

PLANTING:
Commence recurrent planting maintenance works at the completion of planting. Ensure the stock arriving on site is protected and maintained for healthy growth.
Replacements: Continue to replace failed plants or plants damaged during site works. Report any vandalism or theft immediately.

RECURRENT WORK:
Throughout the planting establishment period carry out maintenance work including: watering, weeding, rubbish removal, fertilising, pest and disease control, replanting and, reinstatement of mulch, and keeping the site neat and tidy. Any additional work required should be undertaken and documented in the maintenance log book.

MULCHED SURFACES:
Maintain the surface in a clean and tidy condition and reinstate the mulch as necessary.

SECTION D: HARDWORKS

1.0 EDGING
Steel edge to be used between crushed gravel and organic mulch. Refer to landscape plan for detailed location.

STEEL EDGE
General: Galvanised steel edge
Standard: To AS4680
Size and profile: 75x75mmx5mm Equal angle with HDG and 100mm x 6mm steel plate.
Finish: Hot-dip galvanised.
Refer to landscape detail.

2.0 DRAINAGE CELLS
General: Drainage cells are to be installed beneath the planter troughs as per details unless approved otherwise by site superintendant. Drainage cells must be connected to drainage outlet as per engineer's detail.
Type: 52mm Flo-Cell
Dimensions: 52mm (H) x 260mm (W) 480mm (L)
Supplier: Atlantis (3/19-21 Gibbes St, Chatswood, NSW 2067. 02 9417 8344)

3.0 PLANTING VAULTS
General: Stratavault is installed under the roots of new trees in the public domain area.
Install to manufacturer's instruction.
Supplier: Citygreen (https://citygreen.com/products/stratavault/)

4.0 PAVING

CONCRETE
Scope: Refer to plans for locations. Details refer to engineerings drawing.
Construction is to AS 3600. Set out to dimensions and falls as indicated on engineerings drawing.
Colour: Natural

CRUSHED GRAVEL
General: Angular crushed white limestone gravel graded to 10mm in size. Spread loose material over the compacted base.
Thickness: Screed to minimum 50 mm thick.
Colour: White
Supplier: Australian Native Landscapes (ANL) supplies or similar approved.
Refer to landscape detail.

DECOMPOSED GRANITE
General: Mix 75% gold granite, 25% Rutolite, 2% dry weight soil bond granite sand stabiliser. Do not add water to surface material. Allow the natural ground water to rise and stabilise the mixture. Product to be factory premixed not site mixed. Spread blended dry mix over compacted subgrade. Product to be factory premixed not site mixed. Lightly rolled.
Thickness: Screed to minimum 75 mm thick.
Compaction: 90% of the maximum dry density.
Supplier: Australian Native Landscapes (ANL) supplies or similar approved.
Refer to landscape detail.

STEPPING STONES
General: Natural schist stone steppers.
Size: The size of the natural stone vary between 300 - 500mm, average 300x500x40mm.
Colour: Grey
Supplier: Bunnings Warehouse supplies or similar approved.
Refer to landscape detail.

BLUESTONE PAVING
Type: Bluestone unit paver
Colour: Dark Grey
Size: 600X450X50mm
Supplier: Council approved.
Refer to landscape detail.

BRICK PAVING
General: Reuse existing heritage bricks in horizontal pattern for feature banding. Refer to landscape plan.
Colour: Red and brown
Size: Typically 76x230x110mm
Refer to landscape detail.

5.0 FIXTURES & FURNITURE

TACTILE GROUND SURFACE INDICATORS (TGSI)
Type: Discreet tactile, Polyurethane with star shaft
Colour: Black
Location: As shown on the plan.
Supplier: Pathfinder Systems or equivalent approved
To confirm to the recommendation of AS/NZS 1428.1.
Refer plans for location information.
Install to manufacturer's instruction.

STAIR NOSING
Type: SC12 Aluminium Ripple Trim.
Colour: Black & silver.
Supplier: Pathfinder Systems or equivalent approved.
Install to manufacturer's instruction.
AS1428.1:2009 Design for Access and Mobility compliant.

WIRE TRELLIS VERTICAL
General: 7 x 19 stainless steel wire, wire trellis at 3.2mm.
Material: Stainless steel
Location: As shown on the plan.
Supplier: Miami Stainless (https://spec.miamistainless.com.au)
Fixing /install to manufacturer's instruction.

TIMBER PLANTER BOX
General: Removable timber planter box on wheels.
Type: Garbolino 470mm x 1250mm, 600mm high. Food grade liners.
Location: As shown on the plan.
Material & Finish: Hardwood capping and organic timber, screwless.
Supplier: Modbox (www.modbox.com.au) or equivalent approved.

TREE INSPECTION FORM

General

Date		Special requirements	
Purchaser		Reference	
Supplier		Inspected by (supplier/purchaser/agent)	
Species		Batch identification	
Number of trees in batch		Container/rootball size	
Height range		Calliper range	

Above ground

Labelling	❑	
Health and vigour	❑	
Free from pests/disease	❑	
Free from injury	❑	
Self-supporting	❑	
Stem taper	❑	
Pruning	❑	
Apical dominance	❑	
Crown symmetry	❑	
Stem structure	❑	
Included bark	❑	
Trunk position	❑	
Compatibility of graft unions	❑	
Indication of north	❑	

Below ground

Inspection method used	❑	External only
	❑ ❑	External plus investigative destructive ❑ partial
Number of trees in sample	❑	
Root division	❑	
Root direction	❑	
Dia. nonconforming roots at rootball extremity	❑	
Rootball occupancy	❑	
Rootball depth	❑	
Height of root crown	❑	
Non-suckering rootstock	❑	

Balance

Balance	❑	

Conformance with specification

Conforming	❑ Yes ❑ No
Comments	
Name and signature (inspector)	

All landscape works must be intalled in accordance with the requirements of the Douglas Partners Remediation Action Plan including the installation of orange geofabric marker layer in concealed areas and plastic marker under concrete capping in paved areas. Appropriate photos & survey levels of all installed geofabric marker layers must be submitted upon completion.

M

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NOTES:
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Engineer: Cardno Shaping the Future

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9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

SPECIFICATIONS

SCALE: NTS
ORIGINAL DRAWING AT A1.
Drawn By: CX
Checked By: MW

Project No. 1691
Drawing No. LP16 M
Rev

CHURCH STREET

Type 2 Civil Pavement/Asphalt detail - refer to Cardno Drawing CI-551

Note: Refer to separate Church Street landscape plans for public domain details.

Type 4 Civil Pavement detail (typical for concrete pavement) - refer to Cardno drawing CI-551.

Type 3 Civil Pavement - refer to Cardno Drawing CI-551

EX. SL

SL

EPIT

TPIT

Cutback fence

GAS & WATER METERS

FLAG

RL 23.570
RL 25.350
RL 25.330
RL 23.97
RL 24.50
RL 23.45
RL 22.50
RL 25.505
RL 23.240
RL 22.60
RL 22.300
RL 21.080
RL 21.000
RL 24.350
RL 22.400
RL 22.350
RL 22.380
RL 22.400
RL 22.380
RL 22.380
FFL 22.275
RL 24.484
RL 23.45
RL 23.71
RL 25.503
RL 25.500
RL 25.400
TW 26.05
TW 26.40
TW 28.00
TW 24.50
TW 25.40
TW 23.60
RL 22.860

1 LP14
2 LP13
3 LP14
3 LP13
4 LP14
5 LP13
5 LP13
7 LP14
1 LP13

UP

M

0 2 4 6 8 10 M

GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
- Bluestone paving refer to 4/LP14
- Concrete paving refer to Engineer's detail. Colour: Natural.
- Asphalt paving refer to Engineer's detail
- Pavement refer to Architect's detail
- D Decomposed granite - refer to 3/LP14
- G1 White crushed gravel -refer to specification
- G2 Blue metal -refer to specification
- Random stepping stones -refer to 1/LP14
- CE Concrete edge refer to Engineer's detail
- S Signage wall by Architect
- Existing plinth to be retained
- Proposed removable bollards
- FLAG Proposed flag pole
- SL New street light refer to Engineer's detail
- EX. SL Existing street light to be retained
- Existing sandstone pillar to be retained & relocated
- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13
- Landscape and paved areas with concrete capping and plastic marker below
- Landscape and paved areas with orange geofabric marker and minimum 300mm clean fill above

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NIHON UNIVERSITY

REMEDIATION ACTION PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691
Drawing No. Rev LP17 M

Appendix 02_Maintenance Schedule

CATEGORY	TIMEFRAMES/ FREQUENCY				
	Daily/ Weekly	**2 Weekly/ Monthly**	**3 to 6 months**	**As Required**	**Task and Specification**
Weeding and Rubbish Removal		✓			Weed garden areas manually or with approved herbicide. Prior approval required for Herbicide use. Approved Herbicide use to be in accordance with regulation rates and manufacturer's recommendation. Protect plants from overspray and avoid if rain is likely with 12-hour period. Do not spray in windy conditions Dispose of any waste material using appropriate methods and at designated disposal sites.
Leaf Litter Removal		✓	✓		Remove leaf litter from pathways and garden beds
Mulching		✓	✓		Reapply mulch to maintain to a depth of 75mm in areas that are deficient. Soil should be aerated before placing mulch. After 12 months, mulching will have broken down and should be topped up to ensure depth of 75mm. A slow release, low phosphorous fertiliser should also be applied.
Plant Fertiliser			✓		Fertilise all plants at specified rated based on soil testing results. Prior approval required for fertiliser use.
Plant & Disease Control		✓		✓	Check for incidence of fungal and insect attach. Avoid use of chemical sprays. Apply appropriate treatment for fungal and insect attack if necessary subject to approval. Prior approval required of chemical to be applied.
Pruning, Trimming, Stakes and Ties		✓			Remove deadwood, remove suckering roots from root ball, check ties. Improve plant shape and encourage new growth. Adjust ties and stakes as necessary Stakes can be removed once plants are self-supporting. Notify in writing to Management any perceived need for tree structural work.
Plant Removal and Replacements		✓			Inspect for failed or dying plants requiring replacement and record probably cause. Replant after dead or failed plant removal. Densities, sizes and species to be in accordance with the Landscape Plans Water replacement plantings for a minimum of 12 weeks after planting.
Watering	✓	✓			Set irrigation timer for 3 times per week. Monitor and adjust accordingly. Irrigation should be set for early morning or late afternoon to minimise evaporation.

Appendix 03_Long Term Site Management Plan

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Long-term Environmental Management Plan

Nihon University
9 Church Street, Newcastle

Prepared for
Nihon Daigaku Australia Newcastle

Project 91667.03
September 2021



Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	91667.03	Document No.	R003.Rev1.LTEMP
Document title	Long-term Environmental Management Plan Nihon University		
Site address	9 Church Street, Newcastle		
Report prepared for	Nihon Daigaku Australia Newcastle		
File name	91667.03.R003.Rev1.LTEMP.docx		

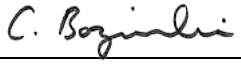
Document status and review

Status	Prepared by	Reviewed by	Date issued
Draft A	Matthew Blackert	Chris Bozinovski	24 March 2019
Draft B	Matthew Blackert	Chris Bozinovski	26 March 2019
Revision 0	Matthew Blackert	Chris Bozinovski	9 September 2021
Revision 1	Matthew Blackert	Chris Bozinovski	10 September 2021

Distribution of copies

Status	Electronic	Paper	Issued to
Draft A	1	0	Sita Vasanthakumar, Built Pty Limited
Draft B	1	0	Sita Vasanthakumar, Built Pty Limited
Revision 0	1	0	Ben Moss, Built Pty Limited
Revision 1	1	0	Ben Moss, Built Pty Limited

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		10 September 2021
Reviewer	 CEnvP – No. SC41163SC	10 September 2021

bsi. ISO 9001 Quality Management
FS 604853

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Appendix A: About This Report

Appendix B: Table 2: Emergency Contacts

Table 3: Capping/Condition Inspection Guide

Letter from Azusa Sekkei Co Ltd (acting on behalf of Nihon University) dated 10 September 2021

Table 10 DP(2020c) - Results of Chemical Analysis of Soil (Contamination)

Appendix C: Drawing 1 – Test Location Plan

Moir LP02 (Rev M) - General Arrangement dated 21.05.2021

Moir - LP17 (Rev M) - Remediation Action Plan dated 30.08.2021

Geosurv Asbuilt Remediation Layers Plans (191196-AB-R-01 (E) dated 6.09.2021)

Report on Long-term Environmental Management Plan
Nihon University
9 Church Street, Newcastle

1. Introduction

This Long-term Environmental Management Plan (LTEMP) provides procedures for long term management of contaminated soils, which are present within the subject site shown on Drawing 1 attached.

Contaminated soils/fill containing bonded asbestos-containing materials (ACM) are present across the site due to uncontrolled historic fill and historic demolition of structures within the site. Based on the results of previous assessments at the site, the remediation strategy for the proposed redevelopment comprised the management of bonded asbestos impacted soils under structures, pavements, or beneath 'clean' soil capping. While Polycyclic Aromatic Hydrocarbons (PAH), heavy metals and petroleum hydrocarbon (TRH) impacts were identified within fill on site exceeding the adopted Tier 1 health based and ecological investigation / screening levels (refer to DP 2020a for details), remediation for these contaminants was not warranted based on statistical analysis and consideration of the ecological setting and the proposed development.

On-site management (capping) of contaminated soils was conducted in a controlled manner with reference to regulatory requirements and the NSW EPA Auditor approved Remediation Action Plan (RAC) for the site (DP, 2020a) to render the site suitable for use as a university campus. Details of remediation and validation works are provided in the validation report for the site (DP, 2021). In summary, significant volumes of fill material were removed from site during construction, and the remaining potentially impacted soils were capped beneath existing and proposed buildings, new pavements and landscape areas, as shown on Geosurv Asbuilt Remediation Layers Plan in Appendix C. It is noted that the capped area excludes a variable width easement for services along the western boundary of Lot 1, DP1199904, which falls outside the development footprint and is not covered by the LTEMP.

The objective of the LTEMP is to provide awareness of the contamination managed on site and prevent and manage breaching of the cap. The LTEMP promotes awareness of the contamination management and the requirements to avoid disturbance (where possible) and provides an outline of maintenance requirements. It is noted that only passive management measures are required.

The preparation of this LTEMP is a requirement under Clause E32 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development, as is the notation of this LTEMP on the Section 10.7 certificate for the site by Council. Ongoing management of the site by Nihon Daigaku Australia Newcastle Pty Ltd (Nihon) is required in accordance with this LTEMP and SSD-9787 Consent Condition E34 and F7. The draft LTEMP was reviewed by Nihon, who agreed to implement it (see letter from SureScope dated 9 September 2021 on behalf of Nihon University in Appendix B).

The LTEMP should be incorporated as part of documentation to fulfil WHS regulation requirements for an asbestos management plan (AMP) and register for asbestos remaining on the site.

This LTEMP must be incorporated into the Nihon University overall property management plans/procedures to allow implementation of the management procedures within this plan for routine maintenance and for targeted subsurface works if and when required within the site. The requirement for ongoing site management must be noted on the appropriate planning certificate. Consideration should be given to recording the requirements on the title information for the site.

Implementation and enforcement of this LTEMP must remain until such time that specific additional assessment is conducted at the site that finds that the LTEMP is no longer required. Any such additional assessment and subsequent removal of the LTEMP requirements must be subject to review and approval by an NSW EPA-accredited Auditor, or the NSW EPA.

The remediation and validation and long-term environmental management plan is subject to review by Mr Ian Gregson, a NSW EPA-accredited Auditor.

2. Site Description

The site is described as part Lot 1 DP 1199904, 9 Church Street, Newcastle, NSW and comprises a rectangular shaped area of approximately 4880 m^2. The site (for the purposes of this LTEMP) excludes a variable width easement for services along the western boundary of Lot 1 which falls outside the development footprint.

The site was formerly known as the Newcastle Courthouse and comprised three adjoining structures – the original Courthouse, the Administration Building and the Supreme Court Building with a rear carpark (south-east corner) and landscape areas.

The site is shown on Drawing 1 in Appendix C and Figure 1 below.



Figure 1: Approximate extent of development area ('the site') in red, Nihon University (Metromap Image dated 6 June 2021)

3. Site Development / Location of Capping

The university development included construction of two four-storey buildings consisting of a 108 bed 'Student Accommodation Building' (east wing) and an 'Education Building' (west wing), both connected to the central 'Public Building' (former Courthouse building that was retained) by atria. A carpark for 20 cars is contained on the lowest level of the 'Education Building'. The three buildings are surrounded by landscape areas and pavements.

The site condition as of 20 August 2021 (final inspection date) is shown in Figures 2 to 22 below.

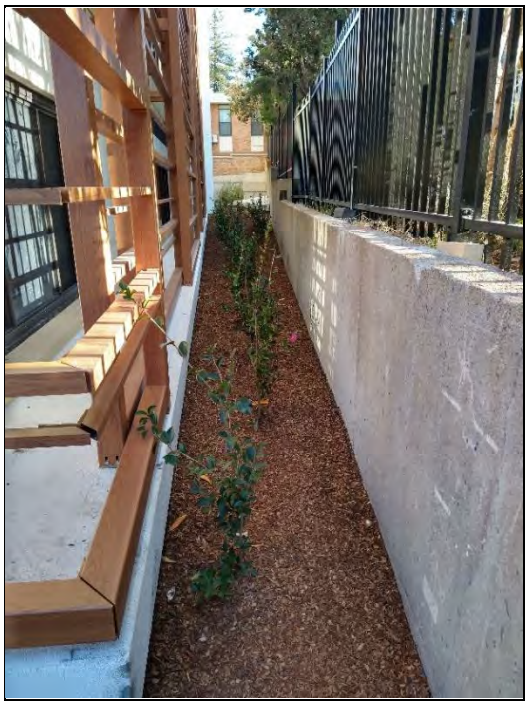


Figure 2 – Looking south at garden bed and mulch along western investigation boundary adjacent Education Building (20 August 2021)



Figure 3 – Looking north at garden bed along western investigation boundary adjacent Education Building. (20 August 2021)

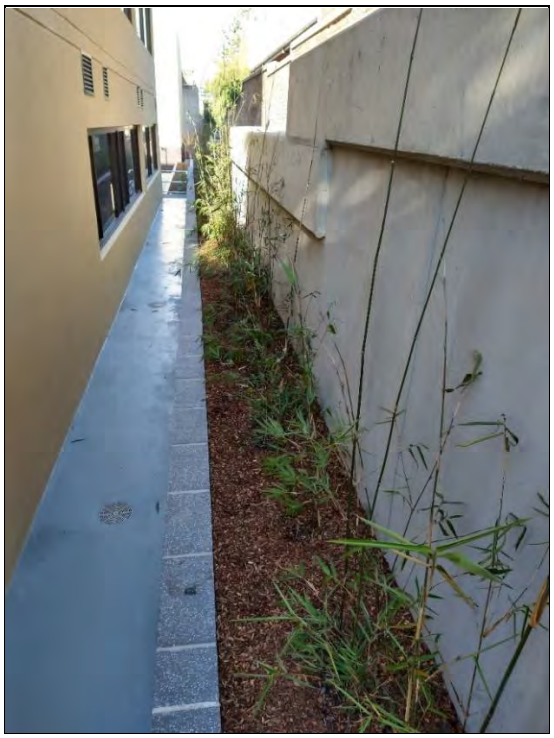


Figure 4 – Looking east at garden bed along southern site boundary adjacent Education Building.

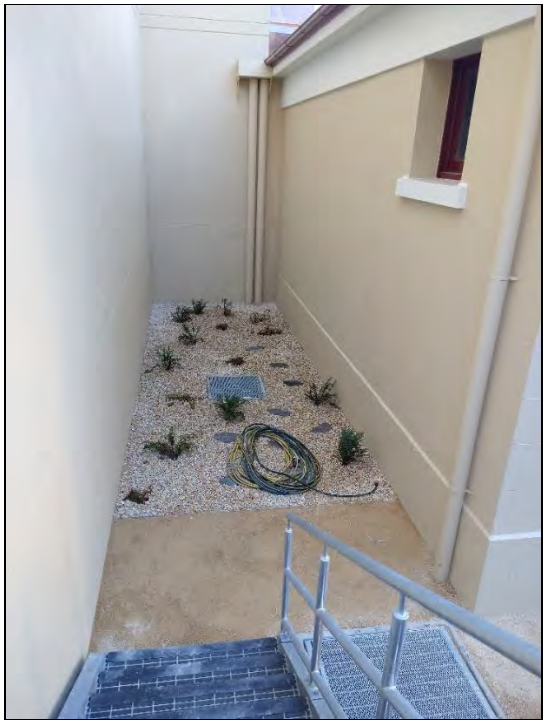


Figure 5 – Looking north at garden bed and walkway along southern side of Education Building. (20 August 2021)



Figure 6 – Looking east at garden bed and walkway along southern side (rear) of central building (20 August 2021)



Figure 7 – Looking north at garden bed and walkway along southern side of Atrium (20 August 2021)

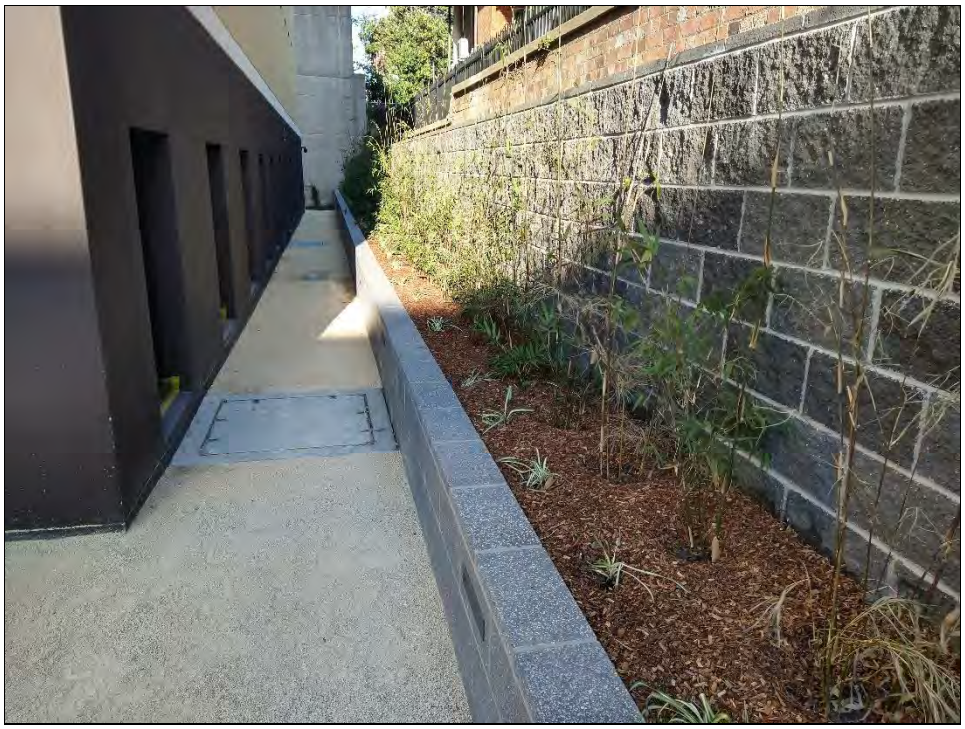


Figure 8 – Looking east at garden bed and walkway along southern side of Student Accommodation Building (20 August 2021)



Figure 9 – Looking east at garden bed and walkway in south eastern corner of site (20 August 2021)



Figure 10 – Looking north at concrete driveway and adjacent garden bed along the eastern site boundary (20 August 2021). Student Accommodation Building to the left and the Newcastle Police Station to the right.



Figure 11 – Looking southeast at concrete paved driveway and adjacent garden bed along the eastern site boundary (20 August 2021)

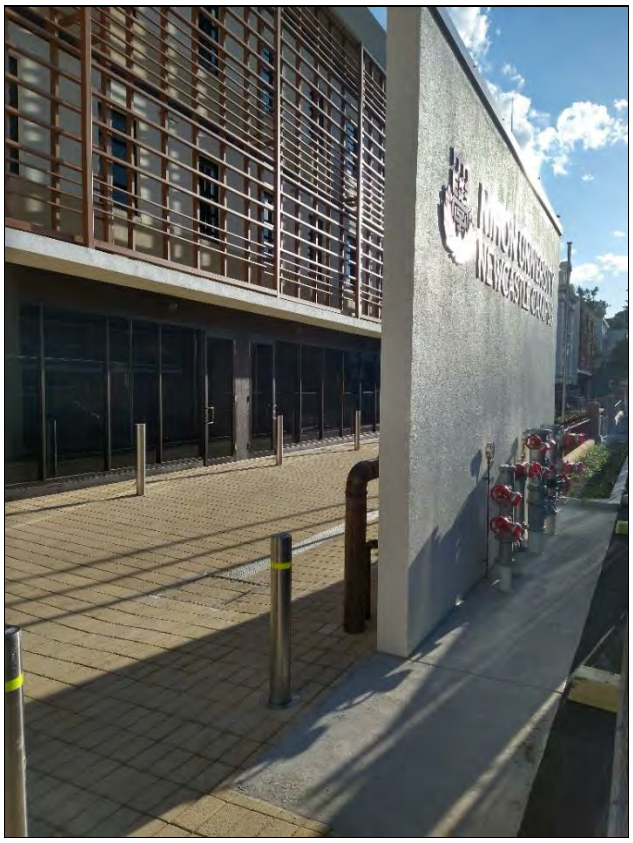


Figure 12 – Looking west at concrete paved driveway/footpath along the north side (front) of the Student Accommodation Building (20 August 2021)

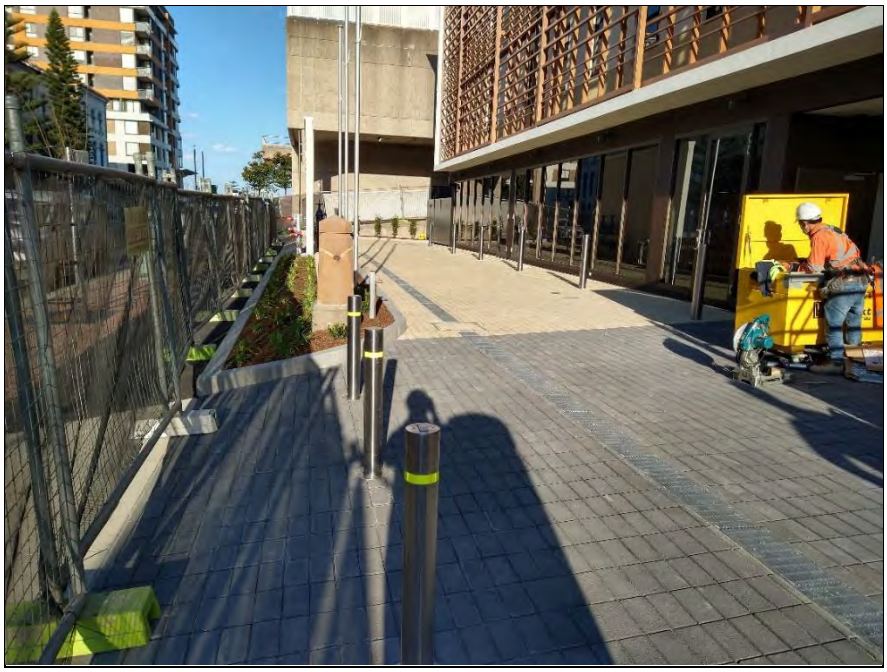


Figure 13 – Looking east at concrete paved driveway/footpath and adjacent garden bed along the northern side (front) of the Student Accommodation Building (20 August 2021)



Figure 14 – Looking west at concrete paving and adjacent garden bed along the northern side (front) of the central building (20 August 2021)

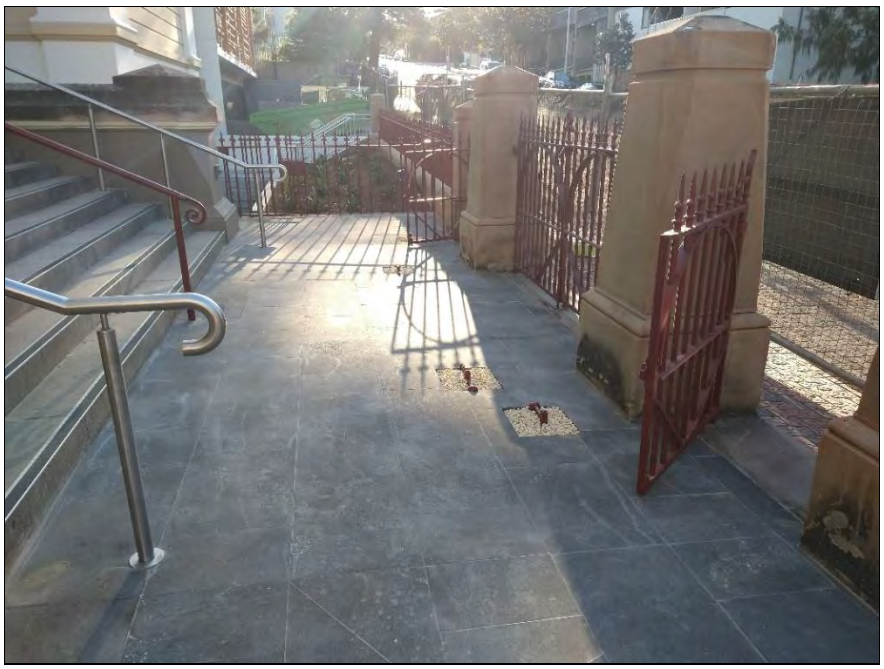


Figure 15 – Looking west at Bluestone paving and adjacent garden bed along the northern side (front) of the central building (20 August 2021)

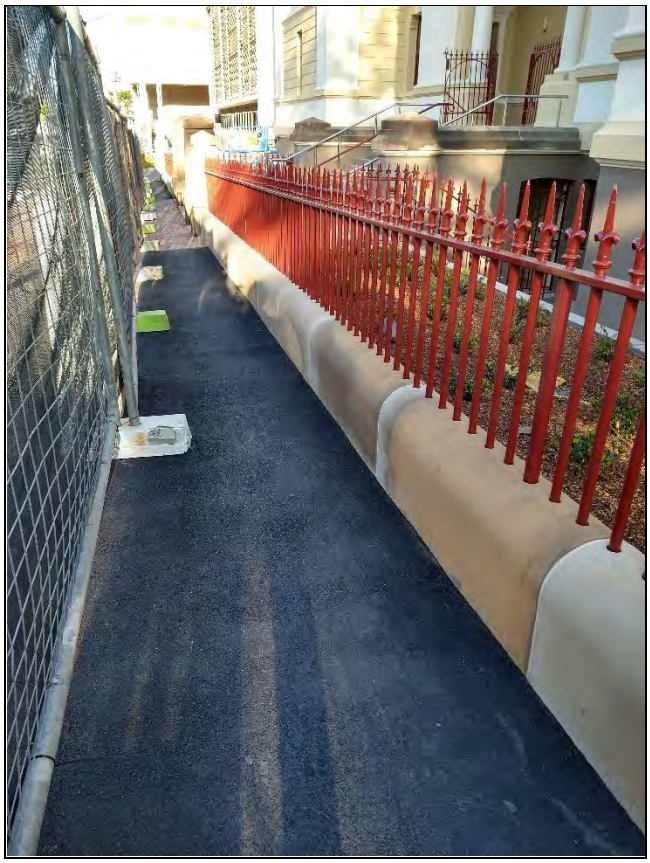


Figure 16 – Looking east at asphalt paving and adjacent garden bed along the northern side (front) of the central building (20 August 2021)

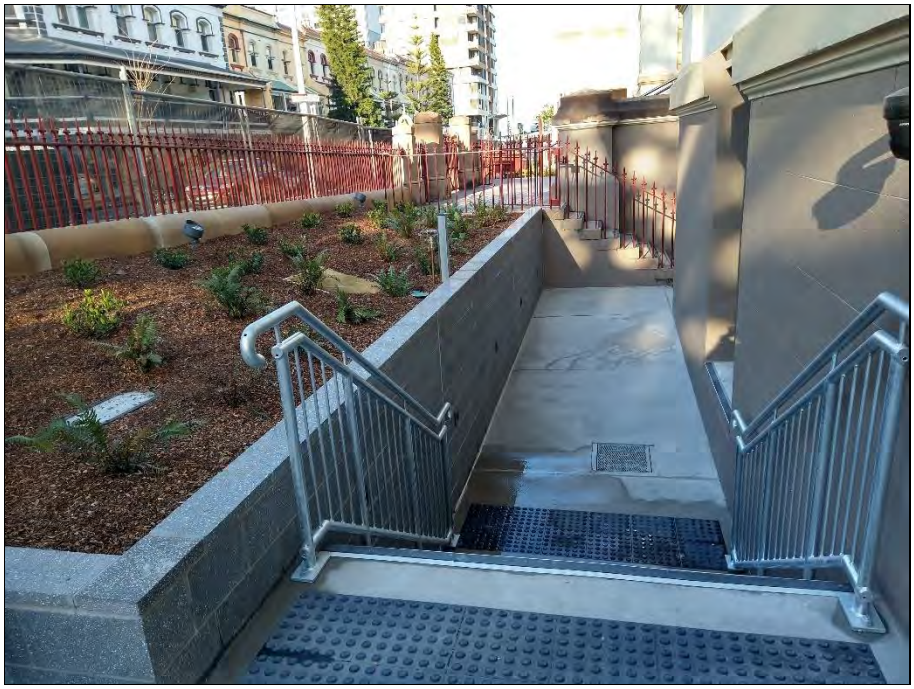


Figure 17 – Looking east at garden bed and concrete footpath pavements along the northern side (front) of the central building (20 August 2021)



Figure 18 – Looking west at electrical kiosk along the northern side (front) of the Education Building (20 August 2021)



Figure 19 – Looking east at garden beds along the northern side (front) of the Education Building (20 August 2021)



Figure20 – Looking east at asphalt pavement and garden beds along the northern (front) boundary and northern side of the Education Building (20 August 2021)



Figure 21 – Looking south at concrete pavements within the underground carpark of the Education Building (20 August 2021)



Figure 22 – Looking south east at Church Street and the Nihon University development site (20 August 2021). Newcastle Police Station to the left.

Management of contaminated soils within the site has been achieved as follows:

- Via capping with a minimum of 125 mm of pavement thickness, comprising concrete, placed over the black plastic marker layer within the internal pavements / building slabs / footpaths / some landscape areas and raised garden beds. Some of these concrete pavements were further overlaid with landscaping materials (ie roadbase and white granite in pathways, imported soil and mulch in garden beds etc – refer to Geosurv survey plans and Moir landscape plans for details);
- Via capping within landscape areas. Capping was generally greater than 300 mm. Minor exceptions to this occurred in the landscape area immediately south of the Atrium (minimum 193 mm) and the localised landscape area immediately north of the Atrium (minimum 191 mm) (Refer to Geoserv Asbuilt Survey Plan in Appendix C). Garden beds comprised imported soil (Hills premium garden mix) and either surficial woodchips (mulch) or white scoria gravel over an orange geo-fabric marker layer which was placed over the ground surface in the landscape beds across the site. Moir Landscape Architecture (Moir, 2021) indicated that sufficient landscape depths were present to sustain the planting installed as per the landscape design;
- Via Approximately 219 mm to 382 mm (average thickness for each area) of imported roadbase and asphalt placed over an orange geofabric marker layer which was placed over the ground surface in asphalt footpaths along the northern (front) site boundary;
- Via approximately 396 mm (average thickness) of imported roadbase from Boral Seaham and 10 mm blue metal gravel from Saddingtons - Quarry Products (Newcastle) was placed over an orange geofabric marker layer over the ground surface in the vicinity of the electrical kiosk in the north western portion of the site.

The provided survey information (in Appendix C) confirms that appropriate capping has generally been achieved as required by the RAP.

The minimum thickness of capping as presented in the RAP has generally been achieved across the site with the minor exception of the two landscape areas to the north and south of the Atrium (min 191mm as shown on Geosurv Asbuilt Plan in Appendix C). The survey plan provides accurate levels indicating the depth to the geofabric marker layer. This depth should be considered during any future disturbance/maintenance of soils within the site on Geosurv Asbuilt Remediation Layers survey plan in Appendix C. Any changes to depth (eg. as a result of landscaping requirements) should be documented as part of LTEMP review and maintenance.

Typical placement of the orange geofabric marker layer beneath capping materials within landscape areas is shown in Figures 23 to 24 below.



Figure 23 – Orange geofabric marker layer in garden bed at the rear of the Atrium (16 July 2021)



Figure 24 – Orange geofabric marker layer within garden bed on northern (front) side of the Student Accommodation Building (22 July 2021 – supplied by Built)

Typical placement of black plastic marker layer beneath concrete pavements within buildings and driveways is shown in Figures 25 to 27 below.



Figure 25 - Black plastic marker layer beneath Student Accommodation Building concrete slab (30 July 2020 - supplied by Built)



Figure 26 - Black plastic marker layer beneath Atrium concrete slab (25 August 2020 - supplied by Built)



Figure 27 – Black plastic marker layer beneath concrete pavement on northern (front) side of Student Accommodation Building (26 June 2021 – supplied by Built)

It is noted that crushed demolition waste (concrete/brick) together with imported fine crushed rock was also utilised on-site during construction beneath capping in some areas.

Drawings showing the capping and landscaping undertaken for the site are as follows:

- Moir LP17 (Rev M) Remediation Action Plan in Appendix C shows the nature of various capping within the site (ie concrete capping and plastic marker layer or imported material capping over an orange geofabric marker layer);
- Moir LP02 (Rev M) – General Arrangement Plan in Appendix C shows finished materials at surface although it is noted roadbase and crushed granite was not laid over the concrete footpath in the south western corner adjacent to the Education Building as shown on this plan;
- Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 6.09.2021) in Appendix C shows thickness of capping within site and marker layer present.

Geosurv Asbuilt Remediation Layers Plan and Figure 1 above indicates the location of the areas to be managed under this LTEMP. As a precautionary measure, all materials beneath the marker layers, pavements or buildings across the site as indicated in Geosurv Asbuilt Remediation Layers Plan and Figure 1 must be treated as potentially contaminated in the event that the capping is penetrated. It is noted that the stormwater pipeline trench excavated within the HWC easement located parallel to the eastern side of the former Courthouse (Now central Public Building) was backfilled with ‘clean’ materials in the event that future maintenance or replacement was required (albeit unlikely). Further details on the management of the HWC easement is provided in DP (2020b).

4. Nature of Capped Material Requiring Management

The detailed site investigation (DP, 2020c) conducted for the proposed Nihon University identified the following pertinent site conditions:

- Presence of fill within all bores / pits to depths of 0.1 m to >3.3 m;
- Presence of ash, slag and asphalt within some fill materials;
- Presence of building materials (brick, concrete, tile, metal, wood, glass) within some fill materials across the majority of the site spatially which may be an indicator of the presence of hazardous building materials (HBM) including asbestos;
- Presence of elevated lead and PAH impacts within fill / soil;
- Bonded ACM has been confirmed within filling under both buildings and within the car park and landscape areas (ie all areas of the site proposed for development);
- The groundwater table on the site is variable in height (ranging in depth from approximately 6.5 m to 11.2 m depth and present within the upper highly weathered bedrock. It should be noted that groundwater levels are affected by factors such as climatic conditions and soil permeability and will therefore vary with time;
- Groundwater testing was generally within the adopted guidelines with the exception of heavy metal concentrations (namely nickel and zinc) which were marginally above the adopted criteria (GILs for marine waters). It is noted that the groundwater concentrations in the up-gradient well (Bore 203) was typically higher or commensurate with concentrations detected in downgradient wells. It is also noted that no obvious visual or olfactory indications of impact to groundwater (ie no obvious staining, odours, slicks or free product) were detected during purging / sampling and no detectable concentrations of hydrocarbons (TRH, BTEX, PAH, VOCs) were identified within groundwater samples;
- Ground gas monitoring has indicated the general absence of mine gases or volatile hydrocarbons associated with USTs associated infrastructure and wash bay on the adjacent Police Station, within the bores and buildings / site grounds.

The results of chemical analysis undertaken on soil samples including previous soil analysis results (Prensa, 2016) were summarised in Table 10 (DP, 2020c) with comparison to the adopted site assessment criteria (SAC) for contamination. Table 10 (DP, 2020c) is provided in Appendix B for completeness.

Bonded ACM impacted fill materials were identified during the DSI (DP, 2020c) across all areas of the site (ie both the Administration Building, the Supreme Court Building, landscape areas and the car park). The bonded ACM impacts appeared to be associated with the fill materials across the site which contained extensive building wastes. ACM was also observed to have been utilised as formwork for existing footings/structures below ground. We understand that a licensed contractor was engaged by Built to validate the removal of hazardous building materials (HBM) from all the buildings including the Administration building and Supreme Court building which were demolished as part of the Nihon University development.

Bonded ACM materials, where encountered in fill, were typically observed to comprise a few to numerous fibro sheeting fragments (general in sound condition). Based on a qualitative assessment, the frequency of ACM were considered to exceed the NEPC (2013) concentration limits in the absence of a detailed asbestos assessment (ie field sieving for bonded ACM). Based on these observations and the presence of widespread building wastes within fill across the site, the presence of further bonded ACM impact was anticipated across the site as evidenced during exposure of fill materials beneath the former Administration Building. The ACM encountered was generally observed to be in sound condition. Friable asbestos (ie AF/FA) was not detected within the soil samples analysed. The identified asbestos impacts at the site were therefore associated with bonded ACM.

It is noted that the bonded ACM utilised as formwork on the external walls of the former Courthouse building and on the external walls of the tunnel extended beneath the ground surface. Given the tunnel and Courthouse are to remain in-situ, it was not considered practical to remove ACM in these areas. ACM therefore remained beneath the ground surface and was managed beneath the site capping as instructed by the client.

It is noted that significant volumes of fill material were removed from site during construction, however, no areas were stripped and validated to verify removal of potentially impacted fill materials at the client's request. All fill materials were excavated from the trench excavation for the new stormwater pipeline in the easement beneath the new Atrium. The trench was backfilled with clean imported materials (refer to DP, 2020b for further details). All soils remaining beneath the site capping (ie beneath existing and new buildings, new pavements and landscape areas, as shown on Geosurv Asbuilt Remediation Layers Plan in Appendix C) should therefore be considered as potentially ACM impacted soils unless investigation and testing confirms otherwise.

While Polycyclic Aromatic Hydrocarbons (PAH), heavy metals and petroleum hydrocarbon (TRH) impacts were identified within fill on site exceeding the adopted Tier 1 health based and ecological investigation / screening levels (refer to DP 2020a for details), remediation for these contaminants was not warranted based on statistical analysis (see below) and consideration of the ecological setting and the proposed development.

The statistical analysis of lead and B(a)P TEQ concentrations undertaken for the DSI (DP, 2020c) included consideration of the following:

- All test results across the site;
- Results of both fill and natural soils independently;
- Soil properties at different depths and spatially across the site.

The analysis (DP, 2020c) was conducted using USEPA ProUCL Version 5.1 and considered non-detects. The results of statistical analysis indicated the following:

- Maximum concentrations detected for lead (1400 mg/kg) and B(a)P TEQ (9.8 mg/kg) are less than 2.5 times the HIL-B criteria (1200 mg/kg and 4 mg/kg respectively) and are therefore not considered to represent a 'hot spot' with reference to NEPC (2013);

- The 95% UCL of the mean for B(a)P TEQ were within the HIL-B criteria (ie 4 mg/kg) as follows:
  - All fill samples (3.09mg/kg);
  - All fill samples including natural samples 203/0.5, D3 and 201/7.9 (likely to be associated with cross contamination from upper fill material) (3.54 mg/kg);
  - All fill and natural samples (3.068 mg/kg).
- The standard deviation (SD) for all B(a)P TEQ scenarios above ranged from 2.35 to 2.68 which is >50% of the HIL-B criteria (considered a possible exceedance of the HIL with reference to NEPC (2013) Schedule B1 Section3.2.1);
- While some scenarios show marginal exceedances of the SD values (ie above 50% of the HIL-B criteria), the results are not considered to be significant based on the following:
  - No 'hot spots' were detected;
  - The PAH impact is aged (ie which would allow a theoretically higher HIL with reference to the PAH HIL derivation outlined in Schedule B7, Appendix A2 of NEPC (2013)).
- The 95% UCL of the mean for Pb were within the HIL-B criteria of 1200 mg/kg as follows:
  - All fill and natural samples (303.3 mg/kg);
  - All fill samples (490.3 mg/kg);
  - All fill and natural samples within the upper 3 m (407.7 mg/kg);
- Given that no 'hot spots' were detected for lead and the 95% UCL values for all scenarios were below the conservatively derived HIL-B criteria, the elevated lead result at Bore 5/0.1 m does not constitute significant contamination requiring remediation.

Based on the above findings, remediation of the site was deemed necessary to remediate the bonded ACM impacts across the site. Risks associated with ACM impacts are subject to the condition of the materials and the manner in which they are treated. The pathway to human receptors for asbestos impacts is via the respiratory route. The impacted materials were assessed to be suitable to remain on the site subject to appropriate management/capping, on the basis of the low potential to cause environmental impact and subject to long-term management to minimise potential human health impacts (DP, 2020c).

On-site management of the bonded ACM impacts was proposed and was undertaken with reference to the RAP (DP, 2020a). On the basis of the remediation and validation works completed, the site is considered to be suitable for the proposed university campus with respect to site contamination.

The site is subject to long-term management (as shown in Figure 1 above and Geosurv Asbuilt Remediation Layers Plan in Appendix C) due to the potential presence of bonded asbestos containing materials (ACM) impacted soils beneath building slabs, pavements or landscape areas.

5. On-site Management (Capping) of Contaminated Soils

5.1 Introduction

The capping layer installed across the site provides a physical barrier between underlying potentially contaminated soils and the ground surface. The high visibility orange geofabric marker layer at the base of the capping layer in landscape areas readily identifies the base of this capping layer to minimise accidental penetration into underlying potentially contaminated soils. Under the normal use of the site (including landscaping maintenance such as plant removal/reinstatement) this capping will prevent exposure of personnel to the remaining potentially contaminated soils on site. Exposure to underlying potentially contaminated soils would only occur is soils beneath the orange marker layer if landscape areas are disturbed or if the concrete capping and underlying black plastic marker layer are penetrated in building slabs, pavements and other concrete paved landscaping areas such as may be required for maintenance or redevelopment.

The long-term management of contaminated soils located within capping across the site will be achieved by maintaining the cap. This will confirm that the site remains suitable for use as a university campus. A summary of affected parties and responsibilities is provided in Table 1 below.

5.2 Responsibilities

Table 1: Responsibilities/Actions for Personnel

Personnel	Responsibilities
Newcastle City Council	• Notification on planning certificates. • Maintain a copy of the current approved LTEMP.
Nihon University – Chancellor/Executive	• Updating property management records and procedures; • Provision of university policy for management of impacted soils; • Notification of site management in university-specific documentation, capital works programs, maintenance etc; • Informing staff of the soil management; • Create/amend university policy for maintenance staff and subcontractors; • Preparation of site-specific maintenance procedures and record keeping with university maintenance staff; • Documenting changes and/or disturbances to capping. • Providing Council will a copy of any updated versions of the LTEMP.

Table 2: Responsibilities/Actions for Personnel

Personnel	Responsibilities
Nihon University – Maintenance Staff	• Reading and compliance with LTEMP; • Preparation of site-specific maintenance procedures and record keeping; • Routine checks of managed areas to confirm cap integrity (eg quarterly or during routine maintenance inspections); • Implementation of induction procedures for new maintenance staff, subcontractors and site workers; • Reinstatement of capped areas following cap penetration; • Generation of records to confirm reinstatement of capping; • Documenting changes and/or disturbances to capping.
Subcontractors/site workers	• Reading and compliance with LTEMP; • Preparation of SWMS for site works, taking into account working in managed areas; • Reinstatement of capped areas following cap penetration; • Generation of records to confirm reinstatement of capping; • Documenting changes and/or disturbances to capping.

5.3 Notifications / Implementation Requirements

The site management (Nihon University, University Chancellor and maintenance staff) will be responsible for the implementation of the LTEMP as per Conditions E34 and F7 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development. The Chancellor or designated representative will also be responsible for notifying all personnel whose activities may impact on managed areas under building slabs, concrete pavements or capped landscaped areas. All designated personnel must read and understand the provisions of the LTEMP.

A notation must be placed on the Section 10.7 certificate for the site by Council as required under Condition E33 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development, indicating that the site is subject to the requirements of this LTEMP.

The LTEMP should be incorporated as part of documentation to fulfil WHS regulation requirements for an asbestos management plan (AMP) and register for asbestos remaining on the site.

Regular inspections must be conducted within the site to confirm the integrity of capping (refer to Table 3 attached). Capping must be repaired as soon as possible if damaged.

Any activities which require excavation/disturbance of greater than the thickness of capping shown on the Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 6.09.2021) or which have the potential to penetrate the capping and marker layers (ie excavations, repairs or installation of additional services), must be conducted in the manner described below.

As a precaution, a contractor licensed to handle asbestos waste should be engaged. The contractor must prepare a safe work method statement (SWMS) prior to conducting the work in accordance with relevant regulatory and statutory requirements (including the Worksafe Australia Asbestos Code of Practice), which will generally include the following:

- Prepare temporary areas to receive clean and contaminated soils resulting from excavations;
- Careful excavation and segregation of overlying clean soils (ie to expose the orange geofabric marker / separation layer without damaging it) in areas managed via soil capping;
- Cut orange geofabric marker / separation layer and carefully excavate and segregate contaminated soils to minimise cross contamination with clean soils;
- All materials below concrete slabs or marker layer in the capped areas must be assumed to be contaminated;
- Conduct the works with minimal disturbance of contaminated soils;
- Remove, classify, transport and dispose any excess contaminated soils in accordance with regulatory requirements;
- Reinstate contaminated soils beneath the geofabric marker layer where practical, and reinstate the orange geofabric marker / separation layer, clean cap and/or concrete slab above the contaminated soils;
- Any imported materials must be suitable for their intended purpose and be lawfully received at the site (eg VENM, ENM, material subject to a resource recovery exemption (RRE) or compliant with an appropriate standard such as for landscaping materials);
- Provide documentation of the activities that disturb capping (ie location, depth, evidence of cap reinstatement, transport and disposal records, records of imported material and photographs of work);
- A brief unexpected finds protocol, eg in the unlikely circumstance that excavations encounter unexpected contamination that has not previously been identified at the site, as apparent from staining, odour or other observations. A suitably qualified environmental consultant should be engaged to assess the contamination and recommend appropriate management requirements in the event of an unexpected find.

All operations and activities conducted on the site must comply with the provisions of relevant NSW WHS legislation, and must include measures to minimise migration/cross contamination of contaminated soils. The SWMS must be reviewed by the principal/project manager prior to the works.

A qualified contaminated land consultant must undertake inspections during and following the completion of the works to confirm the following:

- The work was conducted in accordance with the approved SWMS;
- The work has not resulted in any adverse human health or environmental impact;
- Site capping has been appropriately reinstated;
- Site remains suitable for use as a university campus.

Any observed defects or damage to the capped area must be reported to the Chancellor and university maintenance staff.

Emergency contact details for relevant personnel including the Nihon University, Chancellor, Maintenance Manager, Council and after hours contact are to be provided in Table 3 attached.

The above LTEMP has been prepared in general accordance with current professional and industry standards for the management of land contamination.

Notwithstanding the above recommendations, any work associated with the handling or disposal of contaminated soils must be conducted in accordance with the relevant statutory and regulatory requirements.

5.4 Review of the LTEMP

This LTEMP must be regularly reviewed (at least annually and if any incidents occur which indicate the LTEMP needs updating) to confirm its suitability for continued use. The LTEMP must be revised/updated should the provisions of the LTEMP not cover site activities adequately. Any revisions to the LTEMP must be submitted to Council within one month of the update. Any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA-accredited site auditor or the NSW EPA.

Site management (Nihon University, University Chancellor, designated representative and maintenance staff) will be responsible for the continued implementation of the LTEMP and any revisions made as per Conditions E34 and F7 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development.

5.5 Record Keeping

Records of implementation and review of the LTEMP and submission of revised versions to Council should be maintained together with the LTEMP, including documentation of any activities that disturb capped material (ie location, depth, evidence of cap reinstatement), routine inspection records (refer to Table 3 attached), incidents and responses and any changes to the LTEMP.

Any observed defects or damage to the capped area must be reported to the Chancellor and university maintenance staff as per Section 5.3.

6. References

DP. (2020a). *Remediation Action Plan, Proposed Nihon University, 9 Chursh Street Newcastle.* Document No. 91667.02.R.004.Rev1: Douglas Partners Pty Ltd.

DP. (2020b). *Stormwater Easement Management Strategy, Proposed Nihon University, 9 Church Street, Newcastle.* Document No. 91667.03.R.001.Rev1: Douglas Partners Pty Ltd.

DP. (2020c). *Report on Detailed Site Investigation, Proposed Nihon University, 9 Church Street Newcastle.* Document No. 91667.02.R.003.Rev2: Douglas Partners Pty Ltd.

DP. (2021). *Report on Validation of Remediation, Nihon University, 9 Church Street, Newcastle.* Document No. 91667.03.R.002.Rev0: Douglas Partners Pty Ltd.

Moir. (2021). *Landscape Soil Depth Confirmation - Nihon University, Newcastle.* Letter dated 9 September 2021: Moir Landscape Architecture Pty Ltd.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2017). *Guidelines for the NSW Site Auditor Scheme (3rd Edition).* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

7. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 9 Church Street, Newcastle with reference to DP's proposal dated NCL190520.P.001.Rev1 dated 16 September 2019 and subsequent email budget update of 1 July 2020 and acceptance received from Sita Vasanthakumar of Built Pty Ltd dated 30 October 2019 on behalf of Nihon Daigaku Australia Newcastle Pty Ltd. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Nihon Daigaku Australia Newcastle Pty Ltd and Built Pty Limited for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions

across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has been detected by observation and by laboratory analysis, either on the former surface of the site, or in filling materials at the previous test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile etc, were, also, located in previous below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Table 2: Emergency Contacts
Table 3: Capping/Condition Inspection Guide
Letter from Azusa Sekkei Co Ltd (acting on behalf of Nihon University) dated 10 September 2021
Table 10 DP (2020c) - Results of Chemical Analysis of Soil (Contamination)

Table 3: Emergency Contacts

Name	Contact Phone Number
Emergency Services (Fire Brigade, Ambulance, Police)	000
Nihon University	TBC
Chancellor – Nihon University	TBC
Maintenance Manager – Nihon University	TBC
After Hours Contact	TBC
Newcastle City Council	(02) 4974 2000

This table is to be regularly updated by the site owner, managers or their representatives.

Table 3: Capping/Condition Inspection Guide / Form

Inspection Guide/Form					
Inspected by: _____		**Company: _____**		**Date of Inspection: _____**	
No.	**Visual Check**	**Pass/ Fail**	**Fault / Action Required / Comments**	**Corrective Action**	
				Corrective Action Undertaken	**Date Completed**
1	Building slabs (condition, cracking, staining, evidence of damage)				
2	Outdoor pavers condition (cracked, broken, shifted, uneven, visible bedding material)				
3	Asphaltic concrete and concrete footpaths (condition, cracking, staining, evidence of damage, visible bedding material or marker layer)				
4	Crushed granite walkways (condition, evidence of erosion, visible roadbase bedding material)				
5	Condition of garden areas (i.e. thickness of cap retained, evidence of visible marker layer at the surface, vegetation stress)				
6	Condition of stormwater/drainage infrastructure - pipes and subsurface grates/pits etc. (cracking, broken, evidence of flooding, siltation)				
7	Condition of slab penetrations (e.g. footings of outdoor structures, drainage/sewer pipes)				
8	Overall building condition				
9	Evidence of unauthorised excavation/penetration of capping and marker layer or pavements				
Update to LTEMP Required (Y/N?)					
Nihon Daigaku Australia Newcastle Pty Ltd Notification Date:					

Tokyo, Sept.10th, 2021

Att: Scott O'Donohue
A1 Acredited Certifier
Managing Director,
SureScope
Address: Suite 4C 250 Pacific Hwy Charlestown NSW 2290
E-mail: scott@scopecert.com.au

Subject: Long Term Environmental Management Plan (LTEMP)

Dear Mr.Donahue,

On behalf of Nihon University, and being nominated as their representative, I hereby attest that once the operation starts Nihon University would manage the site in accordance with the submitted approved LTEMP.
In the meantime, due to COVID restrictions of international travels, the site would be managed temporarily under caretaker mode by Built, whom will be managing the site in accordance with the LTEMP.

Warm regards,



Junichi YOKOBORI
Chief Project Manager
Azusa Sekkei Co., Ltd.
On behalf of Nihon University

Table 10: Results of Chemical Analysis of Soil (Contamination)

Analyte	Units	PQL	NSW EPA 2014 - General Solid Waste CT1 (No TCLP)	NSW EPA 2014 - Restricted Solid Waste CT2 (No TCLP)	CRC Care Direct Contact HSL-B	CRC Care Direct Contact Intrusive Maintenance Worker	CRC Care Intrusive MW Soil HSL Vapour I, Sand 0-2m	CRC Care Intrusive MW Soil HSL Vapour I, Sand 2-4m	CRC Care Intrusive MW Soil HSL Vapour I, Sand >4m	NEPM 2013 Table 1A(1) HILs Res B Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand 0-1m	NEPM 2013 Table 1A(3) 1-2m	NEPM 2013 Table 1A(3) 2-4m	NEPM 2013 Table 1A(3) >4m	NEPM 2013 EILs Res/Open Space Aged	NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil[1]	NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil
Coal Tar Identification	-																
Metals																	
Aluminium	mg/kg	10															
Antimony	mg/kg	7															
Arsenic	mg/kg	4	100	400						500					100		
Boron	mg/kg	3								40000							
Cadmium	mg/kg	0.4	20	80						150							
Chromium (III+VI)	mg/kg	1	100	400						500					190		
Cobalt	mg/kg	1								600							
Copper	mg/kg	1								30000					55		
Iron	mg/kg	10															
Lead	mg/kg	1	100	400						1200					1100		
Magnesium	mg/kg	10															
Manganese	mg/kg	1								14000							
Mercury	mg/kg	0.1	4	16						120							
Nickel	mg/kg	1	40	160						1200					9		
Selenium	mg/kg	2	20	80						1400							
Tin	mg/kg	1															
Zinc	mg/kg	1								60000					150		
TRH																	
C10-C16	mg/kg	50			4200	62000											1000
C16-C34	mg/kg	100			5800	85000										300	2500
C34-C40	mg/kg	100			8100	120000										2800	10000
F2-NAPHTHALENE	mg/kg	50					NL	NL	NL		110	240	440	NL		120	
C6 - C9	mg/kg	25	650	2600													
C10 - C14	mg/kg	50															
C15 - C28	mg/kg	100															
C29-C36	mg/kg	100															
+C10 - C36 (Sum of total)	mg/kg		10000	40000													
C10 - C40 (Sum of total)	mg/kg	50															
C6-C10 less BTEX (F1)	mg/kg	25					NL	NL	NL		45	70	110	200		180	
C6-C10	mg/kg	25			5600	82000											700
BTEX																	
Benzene	mg/kg	0.2	10	40	140	1100	77	160	NL		0.5	0.5	0.5	0.5		50	
Ethylbenzene	mg/kg	1	600	2400	5900	85000	NL	NL	NL		55	NL	NL	NL		70	
Toluene	mg/kg	0.5	288	1152	21000	120000	NL	NL	NL		160	220	310	540		85	
Xylene (m & p)	mg/kg	2															
Xylene (o)	mg/kg	1															
Xylene Total	mg/kg	3	1000	4000	17000	130000	NL	NL	NL		40	60	95	170		105	
MAH																	
1,2,4-trimethylbenzene	mg/kg	1															
1,3,5-trimethylbenzene	mg/kg	1															
Isopropylbenzene	mg/kg	1															
n-butylbenzene	mg/kg	1															
n-propylbenzene	mg/kg	1															
p-isopropyltoluene	mg/kg	1															
sec-butylbenzene	mg/kg	1															
Styrene	mg/kg	1	60	240													
tert-butylbenzene	mg/kg	1															
Chlorinated Hydrocarbons																	
1,1,1,2-tetrachloroethane	mg/kg	1	200	800													
1,1,1-trichloroethane	mg/kg	1	600	2400													
1,1,2,2-tetrachloroethane	mg/kg	1	26	104													
1,1,2-trichloroethane	mg/kg	1	24	96													
1,1-dichloroethane	mg/kg	1															
1,1-dichloroethene	mg/kg	1	14	56													
1,1-dichloropropene	mg/kg	1															
1,2,3-trichloropropane	mg/kg	1															
1,2-dibromo-3-chloropropane	mg/kg	1															
1,2-dichloroethane	mg/kg	1	10	40													
1,2-dichloropropane	mg/kg	1															
1,3-dichloropropane	mg/kg	1															
2,2-dichloropropane	mg/kg	1															
Bromochloromethane	mg/kg	1															
Bromodichloromethane	mg/kg	1															
Bromoform	mg/kg	1															
Carbon tetrachloride	mg/kg	1	10	40													
Chlorodibromomethane	mg/kg	1															
Chloroethane	mg/kg	1															
Chloroform	mg/kg	1	120	480													
Chloromethane	mg/kg	1															
cis-1,2-dichloroethene	mg/kg	1															
cis-1,3-dichloropropene	mg/kg	1															
Dibromomethane	mg/kg	1															
Hexachlorobutadiene	mg/kg	1															
Trichloroethene	mg/kg	1	10	40													
Tetrachloroethene	mg/kg	1	14	56													
trans-1,2-dichloroethene	mg/kg	1															
trans-1,3-dichloropropene	mg/kg	1															
Vinyl chloride	mg/kg	1	4	16													
Halogenated Hydrocarbons																	
1,2-dibromoethane	mg/kg	1															
Bromomethane	mg/kg	1															
Dichlorodifluoromethane	mg/kg	1															
Trichlorofluoromethane	mg/kg	1															
Halogenated Benzenes																	
1,2,3-trichlorobenzene	mg/kg	1															
1,2,4-trichlorobenzene	mg/kg	1															
1,2-dichlorobenzene	mg/kg	1	86	344													
1,3-dichlorobenzene	mg/kg	1															
1,4-dichlorobenzene	mg/kg	1	150	600													
2-chlorotoluene	mg/kg	1															
4-chlorotoluene	mg/kg	1															
Bromobenzene	mg/kg	1															
Chlorobenzene	mg/kg	1	2000	8000													
Hexachlorobenzene	mg/kg	0.1								15							
Solvents																	
Cyclohexane	mg/kg	1															
PAH/Phenols																	
Total Positive PAHs	mg/kg	0.05	200	800						400							
Acenaphthene	mg/kg	0.1															
Acenaphthylene	mg/kg	0.1															
Anthracene	mg/kg	0.1															
Benz(a)anthracene	mg/kg	0.1															
Benzo(a) pyrene	mg/kg	0.05	0.8	3.2												33	
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.5								4							
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.5								4							
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.5								4							
Benzo(b,j+k)fluoranthene	mg/kg	0.2															
Benzo(g,h,i)perylene	mg/kg	0.1															
Chrysene	mg/kg	0.1															
Dibenz(a,h)anthracene	mg/kg	0.1															
Fluoranthene	mg/kg	0.1															
Fluorene	mg/kg	0.1															
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1															
Naphthalene	mg/kg	0.1			2200	29000	NL	NL	NL		3	NL	NL	NL	170		
Phenanthrene	mg/kg	0.1															
Phenolics Total	mg/kg	5	288	1152						130							
Pyrene	mg/kg	0.1															
Polychlorinated biphenyls																	
PCBs (Sum of total)	mg/kg	0.1	49.9999	49.9999						1							
Arochlor 1016	mg/kg	0.1															
Arochlor 1221	mg/kg	0.1															
Arochlor 1232	mg/kg	0.1															
Arochlor 1242	mg/kg	0.1															
Arochlor 1248	mg/kg	0.1															
Arochlor 1254	mg/kg	0.1															
Arochlor 1260	mg/kg	0.1															
Organochlorine pesticides																	
Endosulfan	mg/kg		60	240						400							
4,4-DDE	mg/kg	0.1															
a-BHC	mg/kg	0.1															
Aldrin	mg/kg	0.1															
Aldrin + Dieldrin	mg/kg									10							
b-BHC	mg/kg	0.1															
Chlordane (cis)	mg/kg	0.1															
Chlordane (trans)	mg/kg	0.1															
d-BHC	mg/kg	0.1															
DDD	mg/kg	0.1															
DDT	mg/kg	0.1													180		
DDT+DDE+DDD	mg/kg	0.1								600							
Dieldrin	mg/kg	0.1															
Endosulfan I	mg/kg	0.1															
Endosulfan II	mg/kg	0.1															
Endosulfan sulphate	mg/kg	0.1															
Endrin	mg/kg	0.1								20							
Endrin aldehyde	mg/kg	0.1															
g-BHC (Lindane)	mg/kg	0.1															
Heptachlor	mg/kg	0.1								10							
Heptachlor epoxide	mg/kg	0.1															
Methoxychlor	mg/kg	0.1								500							
Organophosphorous Pesticides																	
Azinophos methyl	mg/kg	0.1															
Bromophos-ethyl	mg/kg	0.1															
Chlorpyrifos	mg/kg	0.1	4	16						340							
Chlorpyrifos-methyl	mg/kg	0.1															
Diazinon	mg/kg	0.1															
Dichlorvos	mg/kg	0.1															
Dimethoate	mg/kg	0.1															
Ethion	mg/kg	0.1															
Fenitrothion	mg/kg	0.1															
Malathion	mg/kg	0.1															
Parathion	mg/kg	0.1															
Ronnel	mg/kg	0.1															
Pesticides																	
Moderately Harmful Pesticides (total)	mg/kg		250	1000													
Pesticides (total, NSW Waste 2014)	mg/kg																
Scheduled chemicals (NSW Waste 2014)	mg/kg		49.999	49.999													
Asbestos																	
Asbestos Identification	g/kg	0.1								D							

Field_ID	201/0.9-1.2	201/7.9	202/4.8	202/7.0	203/0-0.05	203/0.5	D3-11/12/19	MS4 / 0.02	MS4 / 0.2	F1	F2	301/0.05	301/0.2	301/0.4	D3 - 3-3-20	T2 -3-3-20	301/0.7
LocCode	201	201	202	202	203	203	203	MS4	MS4	F1	F2	301	301	301	301	301	301
Fill (F) / Natural (N)	F	N	N	N	Asphalt	N	N	Asphalt	F	Material	Material	F	F	F	F	F	N
Sample Depth	0.9-1.2	7.9	4.8	7	0-0.05	0.5	0.5	0.02	0.2	Surface	Surface	0.05	0.2	0.4	0.4	0.4	0.7
Sample Date	12/12/2019	12/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	19/11/2019	19/11/2019	22/11/2019	22/11/2019	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020
Coal Tar Identification	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-	-	-	-
Metals																	
Aluminium	5000	7000	9000	8900	-	7000	6400	-	-	-	-	5000	5400	3300	2700	3320	1400
Antimony	<7	<7	<7	<7	-	<7	<7	-	-	-	-	<7	<7	<7	<7	<5	<7
Arsenic	<4	5	10	<4	-	24	14	-	<4	-	-	<4	<4	<4	<4	<5	<4
Boron	<5	<3	<3	<3	-	<3	<3	-	-	-	-	5	<3	<3	<3	<50	<3
Cadmium	<0.4	<0.4	<0.4	<0.4	-	<0.4	2	-	<0.4	-	-	1	1	<0.4	<0.4	<1	<0.4
Chromium (III+VI)	4	9	12	11	-	7	10	-	24	-	-	21	15	7	5	7	2
Cobalt	1	4	<1	2	-	1	3	-	-	-	-	4	5	1	1	<2	<1
Copper	7	17	27	41	-	29	46	-	23	-	-	170	140	26	16	26	8
Iron	4900	15,000	28,000	27,000	-	11,000	11,000	-	-	-	-	8500	8700	6000	5500	6660	2700
Lead	6	16	9	12	-	100	240	-	4	-	-	770	670	190	54	163	14
Magnesium	1500	1700	820	1700	-	510	920	-	-	-	-	1500	1200	610	490	500	270
Manganese	60	81	15	43	-	64	130	-	-	-	-	260	290	60	34	56	19
Mercury	<0.1	<0.1	<0.1	<0.1	-	0.2	0.2	-	<0.1	-	-	0.3	0.4	1.4	0.3	0.3	<0.1
Nickel	3	9	1	8	-	5	8	-	18	-	-	10	9	5	3	5	1
Selenium	<3	<2	<3	<3	-	<2	<2	-	-	-	-	<2	<2	<2	<2	<5	<2
Tin	<1	<1	<1	<1	-	6	6	-	-	-	-	3	3	1	<1	<5	<1
Zinc	15	120	12	49	-	170	500	-	34	-	-	620	470	110	39	150	14
TRH																	
C10-C16	<50	<50	<50	<50	-	<50	<50	-	<50	-	-	-	<50	-	-	-	-
C16-C34	<100	<100	<100	<100	-	<100	290	-	300	-	-	-	190	-	-	-	-
C34-C40	<100	<100	<100	<100	-	<100	<100	-	110	-	-	-	<100	-	-	-	-
F2-NAPHTHALENE	<50	<50	<50	<50	-	<50	<50	-	<50	-	-	-	<50	-	-	-	-
C6 - C9	<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-
C10 - C14	<50	<50	<50	<50	-	<50	<50	-	<50	-	-	-	<50	-	-	-	-
C15 - C28	<100	<100	<100	<100	-	<100	210	-	240	-	-	-	120	-	-	-	-
C29-C36	<100	<100	<100	<100	-	<100	110	-	130	-	-	-	100	-	-	-	-
+C10 - C36 (Sum of total)	<250	<250	<250	<250	-	<250	345	-	395	-	-	-	245	-	-	-	-
C10 - C40 (Sum of total)	<50	<50	<50	<50	-	<50	290	-	410	-	-	-	190	-	-	-	-
C6-C10 less BTEX (F1)	<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-
C6-C10	<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-
BTEX																	
Benzene	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	-	-	-	<0.2	-	-	-	-
Ethylbenzene	<1	<1	<1	<1	-	<1	<1	-	<1	-	-	-	<1	-	-	-	-
Toluene	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-	<0.5	-	-	-	-
Xylene (m & p)	<2	<2	<2	<2	-	<2	<2	-	<2	-	-	-	<2	-	-	-	-
Xylene (o)	<1	<1	<1	<1	-	<1	<1	-	<1	-	-	-	<1	-	-	-	-
Xylene Total	<3	<3	<3	<3	-	<3	<3	-	<3	-	-	-	<3	-	-	-	-
MAH																	
1,2,4-trimethylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
n-butylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
n-propylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
p-isopropyltoluene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
sec-butylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Styrene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
tert-butylbenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Chlorinated Hydrocarbons																	
1,1,1,2-tetrachloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,1,2-trichloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,1-dichloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,1-dichloroethene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,1-dichloropropene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,2-dichloropropane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,3-dichloropropane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
2,2-dichloropropane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Bromoform	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Chloroethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Chloroform	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Chloromethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
cis-1,2-dichloroethene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
cis-1,3-dichloropropene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Dibromomethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Trichloroethene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
trans-1,2-dichloroethene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Halogenated Hydrocarbons																	
1,2-dibromoethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Bromomethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Halogenated Benzenes																	
1,2,3-trichlorobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
2-chlorotoluene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
4-chlorotoluene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Bromobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Solvents																	
Cyclohexane	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-
PAH/Phenols																	
Total Positive PAHs	<0.05	42	<0.05	<0.05	-	20	77	-	100	-	-	23	39	12	10	21.8	0.1
Acenaphthene	<0.1	0.3	<0.1	<0.1	-	<0.1	0.1	-	5.7	-	-	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	-	0.1	0.8	-	0.2	-	-	0.3	0.6	0.2	0.2	0.6	<0.1
Anthracene	<0.1	0.8	<0.1	<0.1	-	0.3	2.2	-	4.2	-	-	0.3	0.7	0.2	0.2	0.8	<0.1
Benz(a)anthracene	<0.1	2.7	<0.1	<0.1	-	2	8	-	8.5	-	-	1.9	3.5	1.3	1.2	2.1	<0.1
Benzo(a) pyrene	<0.05	3	<0.05	<0.05	-	1.8	6.4	-	4.6	-	-	2.1	3.2	1.1	0.88	1.8	<0.05
Benzo(a)pyrene TEQ calc (zero)	<0.5	4.2	<0.5	<0.5	-	2.7	9.8	-	7.1	-	-	3	4.8	1.7	1.3	2.4	<0.5
Benzo(a)pyrene TEQ calc(half)	<0.5	4.2	<0.5	<0.5	-	2.7	9.8	-	7.1	-	-	3	4.8	1.7	1.3	2.7	<0.5
Benzo(a)pyrene TEQ calc(PQL)	<0.5	4.2	<0.5	<0.5	-	2.7	9.8	-	7.1	-	-	3	4.8	1.7	1.3	2.9	<0.5
Benzo(b,j+k)fluoranthene	<0.2	4.2	<0.2	<0.2	-	3	10	-	8.5	-	-	3.6	5.6	2	2	3.1	<0.2
Benzo(g,h,i)perylene	<0.1	2.3	<0.1	<0.1	-	1.1	3	-	2.6	-	-	1.3	1.7	0.5	0.4	1	<0.1
Chrysene	<0.1	2.1	<0.1	<0.1	-	1.6	5.5	-	7.1	-	-	1.9	3.2	1.2	1	1.8	<0.1
Dibenz(a,h)anthracene	<0.1	0.3	<0.1	<0.1	-	0.2	1.2	-	0.5	-	-	0.3	0.4	0.1	0.1	<0.5	<0.1
Fluoranthene	<0.1	9	<0.1	<0.1	-	3.9	13	-	20	-	-	4.1	7.4	2.1	1.9	4.6	0.1
Fluorene	<0.1	0.3	<0.1	<0.1	-	<0.1	0.8	-	1.5	-	-	<0.1	0.4	<0.1	<0.1	<0.5	<0.1
Indeno(1,2,3-c,d)pyrene	<0.1	1.6	<0.1	<0.1	-	0.9	2.7	-	2.4	-	-	1.3	1.7	0.5	0.4	0.9	<0.1
Naphthalene	<0.1	<0.1	<0.1	<0.1	-	<0.1	<1 - 0.4	-	<1 - 0.4	-	-	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
Phenanthrene	<0.1	6.1	<0.1	<0.1	-	1.5	10	-	20	-	-	1.9	4	1	0.9	2.3	<0.1
Phenolics Total	<5	-	-	-	-	<5	<5	-	-	-	-	-	-	-	-	-	-
Pyrene	<0.1	9	<0.1	<0.1	-	3.7	13	-	17	-	-	3.7	6.4	1.8	1.6	4	<0.1
Polychlorinated biphenyls																	
PCBs (Sum of total)	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1016	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1221	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1232	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1242	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1248	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1254	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Arochlor 1260	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Organochlorine pesticides																	
Endosulfan	<0.3	-	-	-	-	<0.3	<0.3	-	-	-	-	-	-	-	-	-	-
4,4-DDE	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
a-BHC	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Aldrin	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	<0.2	-	-	-	-	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-
b-BHC	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Chlordane (cis)	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Chlordane (trans)	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
d-BHC	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
DDD	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
DDT	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
DDT+DDE+DDD	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Dieldrin	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Endosulfan I	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Endosulfan II	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Endosulfan sulphate	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Endrin	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Endrin aldehyde	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
g-BHC (Lindane)	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Heptachlor	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Methoxychlor	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Organophosphorous Pesticides																	
Azinophos methyl	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Bromophos-ethyl	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Diazinon	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Dichlorvos	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Dimethoate	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Ethion	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Fenitrothion	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Malathion	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Parathion	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Ronnel	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Pesticides																	
Moderately Harmful Pesticides (total)	<0.6	-	-	-	-	<0.6	<0.6	-	-	-	-	-	-	-	-	-	-
Pesticides (total, NSW Waste 2014)	<0.6	-	-	-	-	<0.6	<0.6	-	-	-	-	-	-	-	-	-	-
Scheduled chemicals (NSW Waste 2014)	<2.3	<1	<1	<1	-	<2.3	<2.3	-	-	-	-	-	-	-	-	-	-
Asbestos																	
Asbestos Identification	-	-	-	-	-	-	-	-	ND	D	ND	-	ND	-	-	-	-

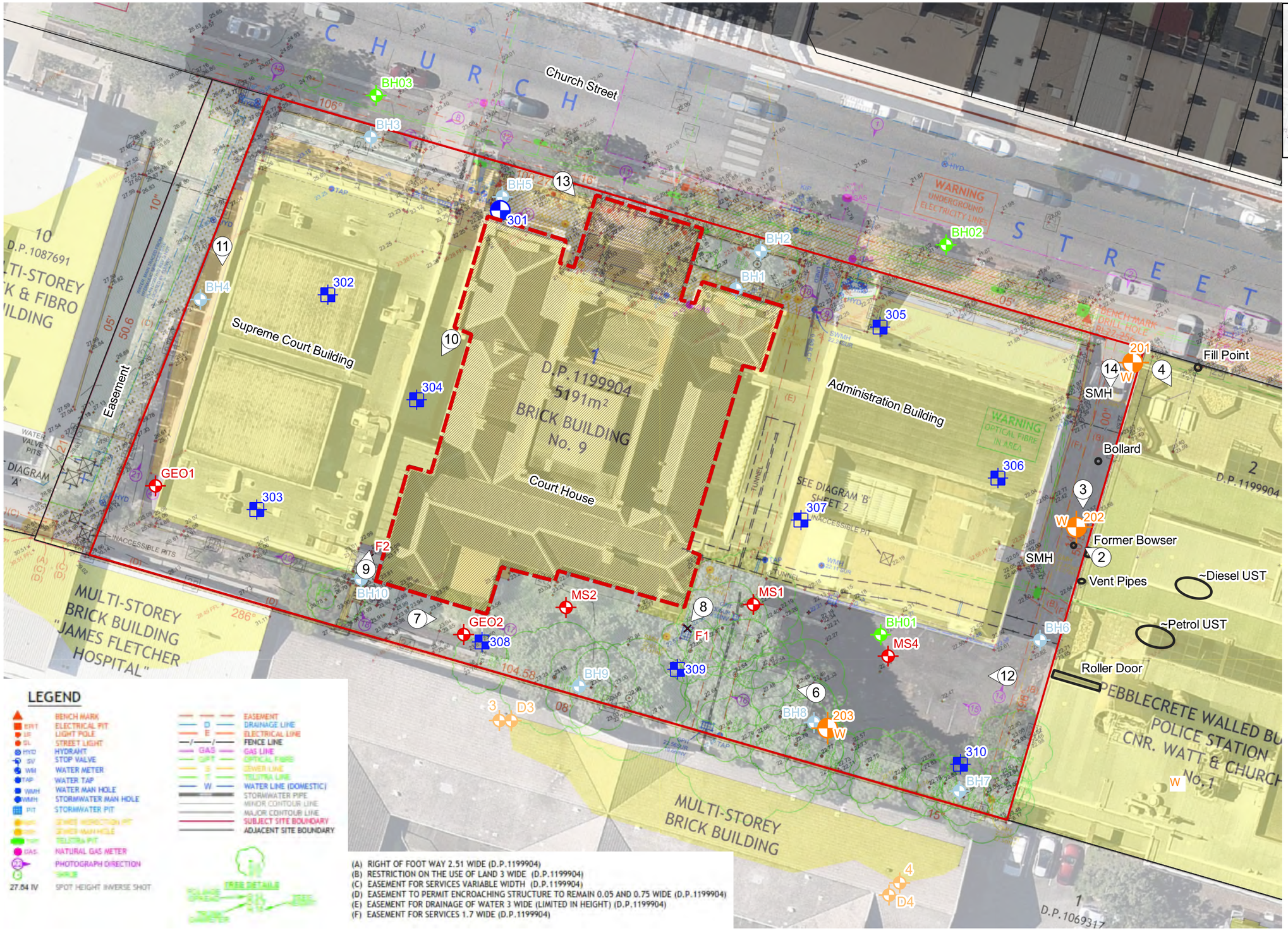
Field_ID	302/F1	302/0.3	303/0.2	304/0.2	306/0.5	307/F1	307/F1S	307/F2	307/F2S	308/0.1	309/0.3	309/0.5	310/F1	310/0.2
LocCode	302	302	303	304	306	307	307	307	307	308	309	309	310	310
Fill (F) / Natural (N)	F	F	F	F	N	F	F	F	F	F	F	N	F	N
Sample Depth	0.5	0.3	0.2	0.2	0.5					0.1	0.3	0.5	0.05	0.2
Sample Date	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020	3/03/2020
Coal Tar Identification	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals														
Aluminium	-	3400	11000	2600	18000	-	-	-	-	5700	5800	9500	-	9400
Antimony	-	<7	<7	<7	<7	-	-	-	-	<7	<7	<7	-	<7
Arsenic	-	<4	5	<4	10	-	-	-	-	<4	7	6	-	5
Boron	-	<3	<3	<3	<3	-	-	-	-	4	<3	4	-	<3
Cadmium	-	<0.4	<0.4	<0.4	<0.4	-	-	-	-	<0.4	<0.4	<0.4	-	<0.4
Chromium (III+VI)	-	4	12	4	23	-	-	-	-	11	9	12	-	15
Cobalt	-	2	2	2	<1	-	-	-	-	3	11	15	-	<1
Copper	-	15	10	15	3	-	-	-	-	30	18	360	-	<1
Iron	-	8400	14000	4600	36000	-	-	-	-	7800	17000	13000	-	17000
Lead	-	75	68	44	10	-	-	-	-	19	50	180	-	5
Magnesium	-	310	410	260	780	-	-	-	-	1800	1700	2100	-	380
Manganese	-	140	130	53	6	-	-	-	-	270	500	1100	-	3
Mercury	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	0.2	-	<0.1
Nickel	-	4	5	3	2	-	-	-	-	6	13	11	-	<1
Selenium	-	<2	<2	<2	<4	-	-	-	-	<2	<2	<2	-	<2
Tin	-	1	1	<1	<1	-	-	-	-	<1	<1	3	-	<1
Zinc	-	89	50	46	4	-	-	-	-	58	85	280	-	2
TRH														
C10-C16	-	<50	<50	<50	<50	-	-	-	-	<50	<50	<50	-	<50
C16-C34	-	<100	<100	<100	<100	-	-	-	-	<100	<100	220	-	<100
C34-C40	-	<100	<100	<100	<100	-	-	-	-	<100	<100	150	-	<100
F2-NAPHTHALENE	-	<50	<50	<50	<50	-	-	-	-	<50	<50	<50	-	<50
C6 - C9	-	<25	<25	<25	<25	-	-	-	-	<25	<25	<25	-	<25
C10 - C14	-	<50	<50	<50	<50	-	-	-	-	<50	<50	<50	-	<50
C15 - C28	-	<100	<100	<100	<100	-	-	-	-	<100	<100	130	-	<100
C29-C36	-	<100	<100	<100	<100	-	-	-	-	<100	<100	130	-	<100
+C10 - C36 (Sum of total)	-	<250	<250	<250	<250	-	-	-	-	<250	<250	285	-	<250
C10 - C40 (Sum of total)	-	<50	<50	<50	<50	-	-	-	-	<50	<50	360	-	<50
C6-C10 less BTEX (F1)	-	<25	<25	<25	<25	-	-	-	-	<25	<25	<25	-	<25
C6-C10	-	<25	<25	<25	<25	-	-	-	-	<25	<25	<25	-	<25
BTEX														
Benzene	-	<0.2	<0.2	<0.2	<0.2	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2
Ethylbenzene	-	<1	<1	<1	<1	-	-	-	-	<1	<1	<1	-	<1
Toluene	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5
Xylene (m & p)	-	<2	<2	<2	<2	-	-	-	-	<2	<2	<2	-	<2
Xylene (o)	-	<1	<1	<1	<1	-	-	-	-	<1	<1	<1	-	<1
Xylene Total	-	<3	<3	<3	<3	-	-	-	-	<3	<3	<3	-	<3
MAH														
1,2,4-trimethylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
n-butylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
n-propylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
p-isopropyltoluene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
sec-butylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
tert-butylbenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Chlorinated Hydrocarbons														
1,1,1,2-tetrachloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-trichloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,1-dichloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,1-dichloroethene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,1-dichloropropene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloropropane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,3-dichloropropane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
2,2-dichloropropane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-dichloroethene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-dichloropropene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-dichloroethene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Halogenated Hydrocarbons														
1,2-dibromoethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Halogenated Benzenes														
1,2,3-trichlorobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
2-chlorotoluene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
4-chlorotoluene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Solvents														
Cyclohexane	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
PAH/Phenols														
Total Positive PAHs	-	4.4	6.4	1.8	<0.05	-	-	-	-	7	4.8	25	-	<0.05
Acenaphthene	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1
Acenaphthylene	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	0.3	-	<0.1
Anthracene	-	0.1	0.2	<0.1	<0.1	-	-	-	-	0.1	0.1	0.5	-	<0.1
Benz(a)anthracene	-	0.4	0.7	0.2	<0.1	-	-	-	-	0.6	0.5	2.4	-	<0.1
Benzo(a) pyrene	-	0.4	0.54	0.2	<0.05	-	-	-	-	0.5	0.4	2.2	-	<0.05
Benzo(a)pyrene TEQ calc (zero)	-	0.5	0.7	<0.5	<0.5	-	-	-	-	0.7	0.5	3.1	-	<0.5
Benzo(a)pyrene TEQ calc(half)	-	0.6	0.8	<0.5	<0.5	-	-	-	-	0.7	0.6	3.1	-	<0.5
Benzo(a)pyrene TEQ calc(PQL)	-	0.6	0.8	<0.5	<0.5	-	-	-	-	0.8	0.6	3.1	-	<0.5
Benzo(b,j+k)fluoranthene	-	0.7	1	0.3	<0.2	-	-	-	-	0.9	0.7	3.5	-	<0.2
Benzo(g,h,i)perylene	-	0.2	0.2	<0.1	<0.1	-	-	-	-	0.3	0.2	1	-	<0.1
Chrysene	-	0.4	0.6	0.2	<0.1	-	-	-	-	0.5	0.4	2.1	-	<0.1
Dibenz(a,h)anthracene	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	0.2	-	<0.1
Fluoranthene	-	0.8	1.3	0.4	<0.1	-	-	-	-	1.7	1	5	-	<0.1
Fluorene	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	0.3	-	<0.1
Indeno(1,2,3-c,d)pyrene	-	0.2	0.2	<0.1	<0.1	-	-	-	-	0.3	0.2	1	-	<0.1
Naphthalene	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1
Phenanthrene	-	0.5	0.6	0.2	<0.1	-	-	-	-	0.6	0.4	2.6	-	<0.1
Phenolics Total	-	<5	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	-	0.8	1	0.4	<0.1	-	-	-	-	1.5	0.8	4.4	-	<0.1
Polychlorinated biphenyls														
PCBs (Sum of total)	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1016	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1221	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1232	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1242	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1248	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1254	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Arochlor 1260	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Organochlorine pesticides														
Endosulfan	-	<0.3	-	-	-	-	-	-	-	-	-	-	-	-
4,4-DDE	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
a-BHC	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-
b-BHC	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane (cis)	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane (trans)	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
d-BHC	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
DDD	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
DDT	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
DDT+DDE+DDD	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan I	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan II	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan sulphate	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Endrin aldehyde	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
g-BHC (Lindane)	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Organophosphorous Pesticides														
Azinophos methyl	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Bromophos-ethyl	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Diazinon	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorvos	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Dimethoate	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Ethion	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Fenitrothion	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Malathion	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Parathion	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Ronnel	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides														
Moderately Harmful Pesticides (total)	-	<0.6	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides (total, NSW Waste 2014)	-	<0.6	-	-	-	-	-	-	-	-	-	-	-	-
Scheduled chemicals (NSW Waste 2014)	-	<2.3	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos														
Asbestos Identification	D	ND	-	ND	-	ND	ND	D	ND	ND	ND	-	D	-

Field_ID	S1	S2	55499_BH1	55499_BH4	55499_BH5	55499_BH6	55499_BH7	55499_BH8	55499_BH9	55499_BH10
LocCode	Stockpile B	Stockpile B	BH1	BH4	BH5	BH6	BH7	BH8	BH9	BH10
Fill (F) / Natural (N)	F	F	F	F	F	F	F	F	F	F
Sample Depth			0.3	0.5	0.1	0.5	0.1	0.1	0.6	0.4
Sample Date	12/03/2020	12/03/2020	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016
Coal Tar Identification	-	-	-	-	-	-	-	-	-	-
Metals										
Aluminium	10000	6600	-	-	-	-	-	-	-	-
Antimony	<7	<7	-	-	-	-	-	-	-	-
Arsenic	8	5	5	<4	7	<4	<4	<4	4	5
Boron	<3	<3	-	-	-	-	-	-	-	-
Cadmium	<0.4	<0.4	<0.4	<0.4	2	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium (III+VI)	11	7	9	9	27	10	17	18	9	22
Cobalt	2	<1	-	-	-	-	-	-	-	-
Copper	14	7	19	17	420	10	65	20	39	9
Iron	23000	14000	-	-	-	-	-	-	-	-
Lead	44	22	58	40	1400	8	38	25	70	14
Magnesium	1200	650	-	-	-	-	-	-	-	-
Manganese	580	210	-	-	-	-	-	-	-	-
Mercury	0.2	0.1	0.2	<0.1	0.2	<0.1	<0.1	<0.1	0.4	<0.1
Nickel	4	2	4	4	15	4	16	19	7	3
Selenium	<2	<2	-	-	-	-	-	-	-	-
Tin	3	1	-	-	-	-	-	-	-	-
Zinc	58	31	48	39	1100	35	210	75	85	13
TRH										
C10-C16	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34	<100	<100	120	<100	240	<100	<100	<100	340	<100
C34-C40	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F2-NAPHTHALENE	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C10 - C14	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28	<100	<100	<100	<100	160	<100	<100	<100	240	<100
C29-C36	<100	<100	<100	<100	120	<100	<100	<100	330	<100
+C10 - C36 (Sum of total)	<250	<250	<250	<250	305	<250	<250	<250	395	<250
C10 - C40 (Sum of total)	<50	<50	-	-	-	-	-	-	-	-
C6-C10 less BTEX (F1)	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C6-C10	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
BTEX										
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylene Total	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
MAH										
1,2,4-trimethylbenzene	<1	<1	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	<1	<1	-	-	-	-	-	-	-	-
Isopropylbenzene	<1	<1	-	-	-	-	-	-	-	-
n-butylbenzene	<1	<1	-	-	-	-	-	-	-	-
n-propylbenzene	<1	<1	-	-	-	-	-	-	-	-
p-isopropyltoluene	<1	<1	-	-	-	-	-	-	-	-
sec-butylbenzene	<1	<1	-	-	-	-	-	-	-	-
Styrene	<1	<1	-	-	-	-	-	-	-	-
tert-butylbenzene	<1	<1	-	-	-	-	-	-	-	-
Chlorinated Hydrocarbons										
1,1,1,2-tetrachloroethane	<1	<1	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	<1	<1	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	<1	<1	-	-	-	-	-	-	-	-
1,1,2-trichloroethane	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethane	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethene	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloropropene	<1	<1	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	<1	<1	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloroethane	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloropropane	<1	<1	-	-	-	-	-	-	-	-
1,3-dichloropropane	<1	<1	-	-	-	-	-	-	-	-
2,2-dichloropropane	<1	<1	-	-	-	-	-	-	-	-
Bromochloromethane	<1	<1	-	-	-	-	-	-	-	-
Bromodichloromethane	<1	<1	-	-	-	-	-	-	-	-
Bromoform	<1	<1	-	-	-	-	-	-	-	-
Carbon tetrachloride	<1	<1	-	-	-	-	-	-	-	-
Chlorodibromomethane	<1	<1	-	-	-	-	-	-	-	-
Chloroethane	<1	<1	-	-	-	-	-	-	-	-
Chloroform	<1	<1	-	-	-	-	-	-	-	-
Chloromethane	<1	<1	-	-	-	-	-	-	-	-
cis-1,2-dichloroethene	<1	<1	-	-	-	-	-	-	-	-
cis-1,3-dichloropropene	<1	<1	-	-	-	-	-	-	-	-
Dibromomethane	<1	<1	-	-	-	-	-	-	-	-
Hexachlorobutadiene	<1	<1	-	-	-	-	-	-	-	-
Trichloroethene	<1	<1	-	-	-	-	-	-	-	-
Tetrachloroethene	<1	<1	-	-	-	-	-	-	-	-
trans-1,2-dichloroethene	<1	<1	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	<1	<1	-	-	-	-	-	-	-	-
Vinyl chloride	<1	<1	-	-	-	-	-	-	-	-
Halogenated Hydrocarbons										
1,2-dibromoethane	<1	<1	-	-	-	-	-	-	-	-
Bromomethane	<1	<1	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	<1	<1	-	-	-	-	-	-	-	-
Trichlorofluoromethane	<1	<1	-	-	-	-	-	-	-	-
Halogenated Benzenes										
1,2,3-trichlorobenzene	<1	<1	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	<1	<1	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	<1	<1	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	<1	<1	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	<1	<1	-	-	-	-	-	-	-	-
2-chlorotoluene	<1	<1	-	-	-	-	-	-	-	-
4-chlorotoluene	<1	<1	-	-	-	-	-	-	-	-
Bromobenzene	<1	<1	-	-	-	-	-	-	-	-
Chlorobenzene	<1	<1	-	-	-	-	-	-	-	-
Hexachlorobenzene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Solvents										
Cyclohexane	<1	<1	-	-	-	-	-	-	-	-
PAH/Phenols										
Total Positive PAHs	8	6.9	50	1.3	62	3.7	<0.05	0.58	61	19
Acenaphthene	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	<0.1	<0.1	0.6	<0.1	1.2	<0.1	<0.1	<0.1	1.3	0.4
Anthracene	0.3	0.4	1.6	<0.1	1.4	<0.1	<0.1	<0.1	2.1	0.6
Benz(a)anthracene	0.6	0.6	4.3	0.1	4.5	0.2	<0.1	<0.1	6.3	1.5
Benzo(a) pyrene	0.53	0.4	3.6	0.1	4.7	0.3	<0.05	0.1	5	1.4
Benzo(a)pyrene TEQ calc (zero)	0.7	0.6	5.2	<0.5	6.8	<0.5	<0.5	<0.5	7.3	2
Benzo(a)pyrene TEQ calc(half)	0.8	0.6	5.2	<0.5	6.8	<0.5	<0.5	<0.5	7.3	2
Benzo(a)pyrene TEQ calc(PQL)	0.8	0.7	5.2	<0.5	6.8	<0.5	<0.5	<0.5	7.3	2
Benzo(b,j+k)fluoranthene	0.9	0.7	6	0.2	7.8	0.5	<0.2	<0.2	7.9	2.2
Benzo(g,h,i)perylene	0.3	0.3	1.9	<0.1	2.7	0.2	<0.1	<0.1	1.8	0.6
Chrysene	0.6	0.5	3.9	0.1	4.7	0.3	<0.1	0.1	5.4	1.4
Dibenz(a,h)anthracene	<0.1	<0.1	0.3	<0.1	0.5	<0.1	<0.1	<0.1	0.6	0.1
Fluoranthene	1.6	1.5	9.9	0.3	12	0.8	<0.1	0.2	11	3.6
Fluorene	0.1	0.1	0.2	<0.1	0.4	<0.1	<0.1	<0.1	0.3	0.1
Indeno(1,2,3-c,d)pyrene	0.3	0.2	2.1	<0.1	3	0.2	<0.1	<0.1	2.2	0.8
Naphthalene	<0.1	<0.1	<1 - 0.1	<0.1	<1 - 0.2	<0.1	<0.1	<0.1	<1 - 0.3	<0.1
Phenanthrene	1.2	1	6.7	0.1	7.8	0.4	<0.1	<0.1	6.5	2.6
Phenolics Total	<5	<5	-	-	-	-	-	-	-	-
Pyrene	1.4	1.2	8.9	0.3	11	0.8	<0.1	0.2	10	3.3
Polychlorinated biphenyls										
PCBs (Sum of total)	<0.1	<0.1	-	-	-	-	-	-	-	-
Arochlor 1016	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Organochlorine pesticides										
Endosulfan	<0.3	<0.3	-	-	-	-	-	-	-	-
4,4-DDE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
a-BHC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin + Dieldrin	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
b-BHC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlordane (cis)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlordane (trans)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
d-BHC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DDD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DDT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DDT+DDE+DDD	<0.1	<0.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dieldrin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin aldehyde	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
g-BHC (Lindane)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organophosphorous Pesticides										
Azinophos methyl	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pesticides										
Moderately Harmful Pesticides (total)	<0.6	<0.6	-	-	-	-	-	-	-	-
Pesticides (total, NSW Waste 2014)	<0.6	<0.6	-	-	-	-	-	-	-	-
Scheduled chemicals (NSW Waste 2014)	<2.3	<2.3	-	-	-	-	-	-	-	-
Asbestos										
Asbestos Identification	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes to Table:
D - Detected
ND - Not Detected at laboratory reporting limit
1 - ESL for B(a)P based on CRC CARE (2017) high reliability screening levels for aged contamination

Appendix C

Drawing 1 – Test Location Plan
Moir LP02 (Rev M) - General Arrangement dated 21.05.2021
Moir - LP17 (Rev M) - Remediation Action Plan dated 30.08.2021
Geosurv Asbuilt Remediation Layers Plans (191196-AB-R-01 (E) dated 6.09.2021)





Site Location

LEGEND

BENCH MARK
ELECTRICAL PIT
LIGHT POLE
STREET LIGHT
HYDRANT
STOP VALVE
WATER METER
WATER TAP
WATER MAN HOLE
STORMWATER MAN HOLE
STORMWATER PIT
NATURAL GAS METER
PHOTOGRAPH DIRECTION
SPOT HEIGHT INVERSE SHOT

EASEMENT
DRAINAGE LINE
ELECTRICAL LINE
FENCE LINE
GAS LINE
OPTICAL FIBRE
SEWER LINE
TELSTRA LINE
WATER LINE (DOMESTIC)
STORMWATER PIPE
MINOR CONTOUR LINE
MAJOR CONTOUR LINE
SUBJECT SITE BOUNDARY
ADJACENT SITE BOUNDARY

TREE DETAIL

(A) RIGHT OF FOOT WAY 2.51 WIDE (D.P.1199904)
(B) RESTRICTION ON THE USE OF LAND 3 WIDE (D.P.1199904)
(C) EASEMENT FOR SERVICES VARIABLE WIDTH (D.P.1199904)
(D) EASEMENT TO PERMIT ENCROACHING STRUCTURE TO REMAIN 0.05 AND 0.75 WIDE (D.P.1199904)
(E) EASEMENT FOR DRAINAGE OF WATER 3 WIDE (LIMITED IN HEIGHT) (D.P.1199904)
(F) EASEMENT FOR SERVICES 1.7 WIDE (D.P.1199904)

Legend

- Proposed Environmental Pit Location Post-Demolition (DP)
- Proposed Environmental Bore Location Post-Demolition (DP)
- Environmental Bore Location Pre-Demolition (DP)
- Environmental Well Location
- Geotechnical Test Location Pre-Demolition (DP)
- Previous Test Locations (Prensa 2016)
- Previous Test Locations (Cardno 2018)
- Site Boundary
- Proposed Buildings Structures to be Retained
- Approximate Location of Material Sample
- Approximate Figure &Orientation Location

0 10 20 30 40 m

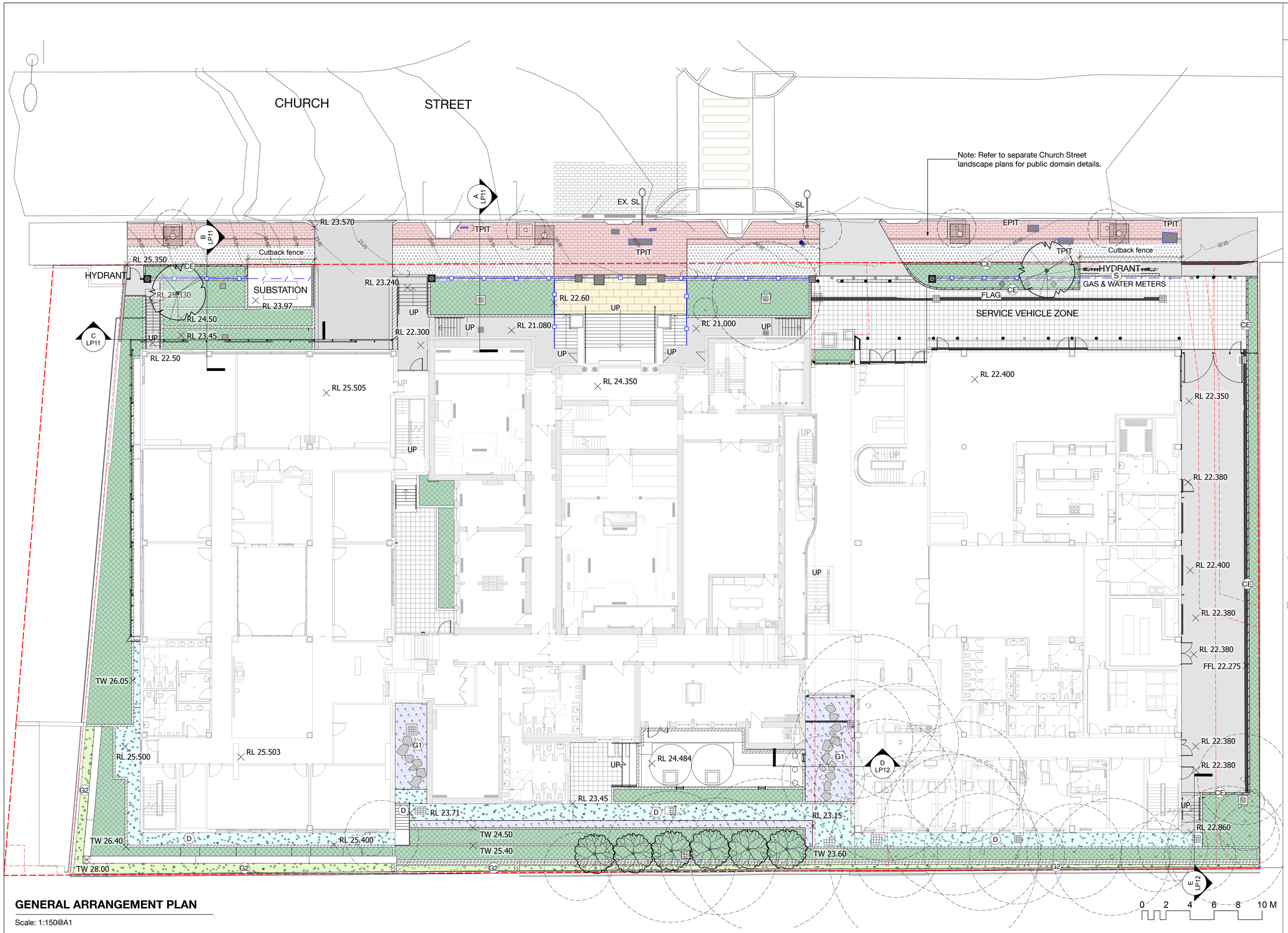
Drawing adapted from Nearmap Image dated 22.10.2019, plan by ADW Johnson ref 239815-DET-001-A dated 10.09.2018, and plan by Prensa ref 55499 Figures, Figure 2, Rev 1 dated 07.10.2016.

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Nihon Daigaku Australia Newcastle Pty Ltd		
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400 @ A3	DATE: 02.March.2020	

TITLE: **Test Location Plan**
Proposed Nihon University
9 Church Street, Newcastle

PROJECT No:	91667.02
DRAWING No:	1
REVISION:	1



GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
- Bluestone paving refer to 4/LP14
- Concrete paving refer to Engineer's detail. Colour: Natural.
- Asphalt paving refer to Engineer's detail
- Pavement refer to Architect's detail
- D Decomposed granite - refer to 3/LP14
- G1 White crushed gravel -refer to specification
- G2 Blue metal -refer to specification
- Random stepping stones -refer to 1/LP14
- CE Concrete edge refer to Engineer's detail
- S Signage wall by Architect
- Existing plinth to be retained
- Proposed removable bollards
- FLAG Proposed flag pole
- SL New street light refer to Engineer's detail
- EX. SL Existing street light to be retained
- Existing sandstone pillar to be retained & relocated
- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13

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NOTES:

1. DO NOT SCALE OFF DRAWINGS. FOLLOW WRITTEN DIMENSIONS. IF IN DOUBT OBTAIN WRITTEN ADVICE FROM THE SUPERINTENDENT.
2. VERIFY ALL DIMENSIONS ON SITE.
3. TO BE READ IN CONJUNCTION WITH THE SPECIFICATION.
4. READ IN CONJUNCTION WITH ALL ARCHITECTURAL, CIVIL, STRUCTURAL, HYDRAULIC, MECHANICAL AND ELECTRICAL ENGINEER'S DRAWINGS AND SPECIFICATIONS.
5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp

Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status: FOR CONSTRUCTION

NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

GENERAL ARRANGEMENT PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP02 Rev M

CHURCH STREET

Type 2 Civil Pavement/Asphalt detail - refer to Cardno Drawing CI-551

Note: Refer to separate Church Street landscape plans for public domain details.

Type 4 Civil Pavement detail (typical for concrete pavement) - refer to Cardno drawing CI-551.

Type 3 Civil Pavement - refer to Cardno Drawing CI-551

GAS & WATER METERS

FLAG

Cutback fence

RL 25.350 RL 25.330 RL 24.50 RL 23.97 RL 23.570 RL 23.240 RL 22.60 RL 22.300 RL 21.080 RL 21.000 RL 22.50 RL 25.505 RL 24.350 RL 22.400 RL 22.350 RL 22.400 RL 22.380 RL 22.380 RL 22.380 FFL 22.275 RL 22.380 RL 22.380 RL 22.860

TW 26.05 TW 26.40 TW 28.00 RL 25.500 RL 25.503 RL 25.400 RL 24.484 RL 23.45 RL 23.71 TW 24.50 TW 25.40 TW 23.60

EX. SL SL TPIT EPIT UP

A LP11 B LP11 C LP11 D LP12 E LP12

1 LP14 2 LP13 3 LP14 4 LP14 5 LP13 7 LP14 1 LP13 3 LP13 5 LP13

0 2 4 6 8 10 M

GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
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- Asphalt paving refer to Engineer's detail
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- G1 White crushed gravel -refer to specification
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- Existing sandstone pillar to be retained & relocated
- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13
- Landscape and paved areas with concrete capping and plastic marker below
- Landscape and paved areas with orange geofabric marker and minimum 300mm clean fill above

M

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5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp
Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status: FOR CONSTRUCTION

NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

REMEDIATION ACTION PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691
Drawing No. Rev LP17 M

Min Depth = 237mm
Max Depth = 539mm
Avg Depth = 400mm

Min Depth = 396mm
Max Depth = 396mm
Avg Depth = 396mm

Concrete Capping
200mm thick

Concrete Capping
150mm thick

Asphalt Capping Avg.
382mm Depth

Min Depth = 480mm
Max Depth = 735mm
Avg Depth = 610mm

Concrete Capping
150mm thick

Asphalt Capping
Avg. 219mm Depth

Min Depth = 414mm
Max Depth = 603mm
Avg Depth = 515mm

Concrete Capping
150mm thick

Concrete Capping
125mm thick

Min Depth = 688mm
Max Depth = 803mm
Avg Depth = 726mm

Min Depth = 1002mm
Max Depth = 1729mm
Avg Depth = 1439mm

Concrete Cap 250mm thick

Concrete Capping
125mm thick

Min Depth = 191mm
Max Depth = 317mm
Avg Depth = 274mm

Education Building
Concrete Capping 125mm
thick

Concrete Capping
300mm thick

Concrete Capping
125mm thick

Concrete Capping
300mm thick

Concrete Capping
125mm thick

Concrete Capping
125mm thick

Courthouse Terrace
Concrete Capping
200mm thick

Concrete Capping
500mm thick

Concrete Capping
600mm thick

Concrete Capping
500mm thick

Min Depth = 302mm
Max Depth = 594mm
Avg Depth = 424mm

Min Depth = 193mm
Max Depth = 325mm
Avg Depth = 275mm

ADJOINS PAGE 1
ADJOINS PAGE 2

NORTH[APPROX]

LEGEND

22.000 GEOFAB

22.000 FINISHED CAPPING/SURFACE LEVEL

22.000 PLASTIC

LANDSCAPE & PAVED AREAS WITH CONCRETE CAPPING & PLASTIC MARKER BELOW

LANDSCAPE & PAVED AREAS WITH ORANGE GEOFABRIC MARKER & NOMINAL CLEAN FILL ABOVE

ASPHALT CAPPED AREA WITH GEOFABRIC MARKER LAYER

GREGORY IRETON GIBSON SURVEY ID 1101
SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT,2002 (NSW)

NOTES:

1. ALL SPOT LEVEL HEIGHTS SHOWN ARE ACCURATE AT TIME OF SURVEY

2. GEOSURV TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THE SPOT LEVELS POST SURVEY DATA

3. THIS SURVEY IS FOR PURPOSE OF REMEDIATION LAYERS SPOT LEVEL AS-BUILT CHECKS ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE

4. PLAN HAS BEEN PRODUCED AS A PRIORITY AS PER BUILDERS REQUEST. FOR CLARITY OF THE OFFSET MARKS SHOWN PLEASE ENLARGE SECTION OF THE PLAN WHEN PRINTING. SEEK CLARIFICATION FROM GEOSURV IF UNSURE OF THE OFFSET OR THE DIRECTION OF THE OFFSET TO THE LOCATION OF THE MARK PLACED

5.FINISHED CAPPING/SURFACE LEVELS ARE COMBINED POINTS SURVEYED ON PAVING, TILES, CONCRETE CAPPING BEAM, BITUMEN & NATURAL SURFACE AREAS.

PLANS USED:

1691_CC_20210719_AL.dwg

REV.	DATE	AMENDMENTS	INT.
E	02.09.21	HATCHING ADDED & POINT LAYERS COMBINED	GPAP
D	30.08.21	HATCHING & LEGEND UPDATED	GPAP
C	26.08.21	ADDITIONAL DATA & PAGE 2 ADDED	GPAP
B	16.08.21	ADDITIONAL DATA ADDED	GPAP
A	20.07.21	ISSUED FOR INFORMATION	BTP

PREPARED BY:

geosurv. with you from beginning to end

locating surveying 3Dscanning access

www.geosurv.com.au 1300 554 675

PREPARED FOR:

Built.

PLAN OF:

ASBUILT
REMEDIATION LAYERS
NIHON UNIVERSITY NEWCASTLE
9 CHURCH STREET
NEWCASTLE
NSW

ORIGINAL SIZE: A1 Page 1 of 2

SCALE:	1:100	CO-ORD:	SITE
DATUM:	SITE	ORIG DATUM:	PM 19805
SURVEY BY:	SJF	DATE:	VARIOUS
DRAWN BY:	GPAP	DATE:	20.07.21
CHECKED BY:	SJF	DATE:	20.07.21
APPROVED BY:	ADF	DATE:	20.07.21

DRAWING #:

191196-AB-R-01 [E]

Plot Date: 3 September 2021 - 12:00 PM
Cad File No: 191196-AB-R-01 (E).dwg

Asphalt Capping
Avg. 382mm Depth

Min Depth = 480mm
Max Depth = 735mm
Avg Depth = 610mm

Concrete Capping
150mm thick

Asphalt Capping
Avg. 219mm Depth

Min Depth = 414mm
Max Depth = 603mm
Avg Depth = 515mm

Concrete Capping
150mm thick

Min Depth = 249mm
Max Depth = 403mm
Avg Depth = 327mm

Min Depth = 299mm
Max Depth = 502mm
Avg Depth = 421mm

RL 22.60

RL 21.080

RL 21.000

Concrete Capping
125mm thick

Concrete Capping
125mm thick

Min Depth = 191mm
Max Depth = 317mm
Avg Depth = 274mm

RL 24.350

RL 22.400

Concrete Capping
150mm thick

RL 22.350

ADJOINS PAGE 1
ADJOINS PAGE 2

Concrete Capping
300mm thick

Residential Building
Concrete Capping
125mm thick

Atrium Area Concrete
Capping 125mm
thick

Concrete Capping
125mm thick

RL 22.380

Courthouse Terrace
Concrete Capping
200mm thick

Concrete Capping
300mm thick

Min Depth = 302mm
Max Depth = 594mm
Avg Depth = 424mm

Min Depth = 193mm
Max Depth = 325mm
Avg Depth = 275mm

Min Depth = 277mm
Max Depth = 402mm
Avg Depth = 350mm

FFL 22.275

Atrium Area
Concrete Capping
600mm thick

Concrete Capping
500mm thick

Atrium Area
Concrete Capping
125mm thick

RL 23.71

TW 24.50

TW 25.40

RL 23.15

TW 23.60

Concrete Capping
600mm thick

Concrete Capping
125mm thick

Min Depth = 312mm
Max Depth = 553mm
Avg Depth = 447mm

RL 22.380

NORTH[APPROX]

LEGEND

- 22.000 GEOFAB
- 22.000 FINISHED CAPPING/SURFACE LEVEL
- 22.000 PLASTIC

LANDSCAPE & PAVED AREAS WITH CONCRETE CAPPING & PLASTIC MARKER BELOW

LANDSCAPE & PAVED AREAS WITH ORANGE GEOFABRIC MARKER & NOMINAL CLEAN FILL ABOVE

ASPHALT CAPPED AREA WITH GEOFABRIC MARKER LAYER

GREGORY IRETON GIBSON SURVEY ID 1101
SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT,2002 (NSW)

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5.FINISHED CAPPING/SURFACE LEVELS ARE COMBINED POINTS SURVEYED ON PAVING, TILES, CONCRETE CAPPING BEAM, BITUMEN & NATURAL SURFACE AREAS.

PLANS USED:

1691_CC_20210719_AL.dwg

REV.	DATE	AMENDMENTS	INT.
E	02.09.21	HATCHING ADDED & POINT LAYERS COMBINED	GPAP
D	30.08.21	HATCHING & LEGEND UPDATED	GPAP
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A	20.07.21	ISSUED FOR INFORMATION	BTP

PREPARED BY:

geosurv. with you from beginning to end

locating surveying 3Dscanning access

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PREPARED FOR:

Built.

PLAN OF:

ASBUILT
REMEDIATION LAYERS
NIHON UNIVERSITY NEWCASTLE
9 CHURCH STREET
NEWCASTLE
NSW

ORIGINAL SIZE: A1 Page 2 of 2

SCALE:	1:100	CO-ORD:	SITE
DATUM:	SITE	ORIG DATUM:	PM 19805
SURVEY BY:	SJF	DATE:	VARIOUS
DRAWN BY:	GPAP	DATE:	20.07.21
CHECKED BY:	SJF	DATE:	20.07.21
APPROVED BY:	ADF	DATE:	20.07.21

DRAWING #:

191196-AB-R-01 [E]

Plot Date: 3 September 2021 - 11:58 AM
Cad File No: 191196-AB-R-01 [E].dwg

Appendix 04_Irrigation Plan

Nihon University Irrigation access plan



DETAIL ARRANGEMENT PLAN - 4F NORTHWEST

DETAIL ARRANGEMENT PLAN - 4F NORTHEAST

Key

- 40mm Pn12.5 pipe required for access (water and coms) to be installed by others
- Tap required for irrigation connection

0 2 4 6 8 M

