

QMS Fm 121

REVIEW OF ENVIRONMENTAL FACTORS: REF03624

CONCLUSIONS AND SIGN-OFF FOR **STAGE 2C**

BOTANIC GARDENS RAINFOREST WALK

This report documents the outcomes of the Review of Environmental Factors (REF) undertaken for the proposed Stage 2 works comprising of a boardwalk and landscaping features within Wollongong Botanic Gardens Rainforest Walk, Keiraville. This REF should be read in conjunction with REF03861 BGRW (2A) and REF03862 BGRW (2B). Stage 2C will occur within Gleniffer Brae and Kooloobong Park which are State Heritage sites. **State Heritage section 60 approval has been obtained refer to Appendix I.**

The proposed activity has been assessed against the SEPP (Transport and Infrastructure) 2021 and does not require consent under Chapter 2 Division 12 Parks and public reserve.

As the proposed activity does not require development consent, the environmental impacts have been considered in accordance with the environmental assessment requirements of Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). In accordance with the requirements of Part 5 of the EP&A Act, the factors listed in Clauses 170 and 171 of the *Environmental Planning and Assessment Regulation 2021* have been taken into account in the consideration of the likely impacts of the proposed activity on the environment.

Works are to commence, and be substantially completed, within 2 years of the REF sign off date. Any substantial works to be undertaken outside this period will require a review of the REF.

Publication Requirements:

The application does require publication in accordance with EP&A Regulation (clause 171(4)). The Statement of Heritage Impact (2023) reported that the community have been engaged in and involved in the development of the Rainforest Walk concept over a number of years, with formal consultation on the Draft Botanic Gardens Masterplan being undertaken in 2018. The Botanic Garden Masterplan Consultation Report prepared by Wollongong City Council's engagement team is attached as Appendix E (SOHI). A key outcome identified in the Masterplan was the construction of Stage 2 of the Rainforest Walk. See Statement of Heritage Impact in Appendix A. Council held an onsite information stand which was attended by 25 community members and also received a total of 564 formal submissions during the public exhibition period. The following stakeholders and community groups were specifically engaged during the project:

1. Wollongong Council Aboriginal Reference group
2. Illawarra Local Aboriginal Lands Council
3. Friends of the Botanic Garden
4. Wollongong Council Heritage Reference Group

Themes that emerged as part of analysis of the submissions, included the enhancement the Rainforest Walk and connection of the walk to Mt Keira walking trails to the west and as well as general support for the completion of the Rainforest Walk. Therefore the proposed Stage 2(c) works are in line with Community feedback and achieve a desired outcome for the site. The results of the REF indicate that the proposed activity will have no significant environmental impacts, provided the safeguards identified in this report are strictly implemented. If the scope of works or work methods described in this report change significantly, additional environmental assessment must be undertaken by an Environment Strategy Officer.

Review of Environmental Factors
REF03624

REF Preparation Sign Off

I, the undersigned, certify that I have reviewed and endorsed the contents of this REF document, and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading.

REF Preparation:	Annette Williams	REF Review:	Jo Glynn
Position:	Environment Strategy Officer	Position:	Environment Strategy Officer
Signature:	<i>AWilliams</i>	Signature:	
Date:	17/05/2023	Date:	17/05/2023

Design certifies that the Design Specification will incorporate the requirements of this REF03624.

Name:	Nyrie Davis-Raiss	Name:	
Position:	Landscape Architect	Position:	
Signature		Signature:	
Date		Date:	

Construction certifies that the project will be carried out in accordance with this REF document

Name:		Name:	
Position:		Position:	
Signature		Signature:	
Date		Date:	

Table of Contents

1. INTRODUCTION	4
2. PROJECT DETAILS	4
3. ENVIRONMENTAL SAFEGUARDS	4
4. LEGISLATIVE REQUIREMENTS.....	13
5. ENVIRONMENTAL FACTORS IDENTIFIED.....	5

Appendix A:	AHIMS/Statement of Heritage Impact
Appendix B:	Incident Management Procedure
Appendix C:	Tree Protection Procedure
Appendix D:	Arborist Assessment Summary Report Tree Removal
Appendix E:	Flora and Fauna Assessment
Appendix F:	Environmental Constraints Aerial / Photographs
Appendix G:	Structural & Landscape Drawings
Appendix H:	Consultation Plan Section 60 Application
Appendix I:	Heritage Section 60 Approval

1. INTRODUCTION

As the proposed activity does not require development consent, the environmental impacts have been considered in accordance with the environmental assessment requirements of Part 5 of the EP&A Act. In accordance with the requirements of Part 5 of the EP&A Act, the factors listed in Clause 170 of the *Environmental Planning and Assessment Regulation 2021* have been taken into account in the consideration of the likely impacts of the proposed activity on the environment.

The assessment has been undertaken through impact identification and a risk management assessment. This report documents the outcomes of the assessment and identifies the environmental safeguards that must be implemented in conjunction with the proposal.

2. PROJECT DETAILS

Project Name	Rainforest Walk Stage 2C
Location	Murphys Avenue, Keiraville - Wollongong Botanic Gardens Kooloobong Park Lot 2 DP 252694, Lot 3 DP 252694 Gleniffer Brae
Land Ownership	Wollongong City Council
Land Classification	Community Land. A “Risk of Transfer Assessment” has not been prepared.
Project Description	To objective to complete an accessible compliant path. The existing blue metal/mulch path will be replaced. Existing trees will be protected but approx. 19 trees will be removed, and one tree pruned. See Appendix D for detail information. Stage 2 C ▪ Asphalt Pathway - 27m long x 1.8m wide x 200mm deep ▪ Install Flush Concrete Edge to asphalt path 150 x 150mm ▪ Install brick paver edge – woodlands garden unit pavers ▪ Install Node Paving ▪ Make good connection to existing mulch paths ▪ Install Treetop Rainforest Canopy Bridge - 58m long ▪ Install Nature Artwork to be developed ▪ Install sandstone retaining wall at Node 1 and southern asphalt path. ▪ Random rock boulders for informal seating at nodes.
Work Period	Between 7.00 am and 6.00 pm Monday to Friday - 2023-2024
Work Equipment & Machinery	Small scale mechanical and hand excavation. Chainsaw and other hand tools.
Proposed work hours	Between 7.00 am and 6.00 pm Monday to Friday 8.00am and 1.00pm Saturday (Refer to Safeguards section in this REF)
Alternative proposals considered	Alternative is to do nothing, but the Botanic Garden pathways would not comply with Australian Standards. Therefore, it is concluded that the proposal should proceed as the works have minimal impact to the ground and the proposed boardwalk will protect the ground and tree roots from compaction.

If the scope of works or works methods described in this report change significantly following the awarding of the works contract, additional EIA must be undertaken. Any revised EIA must be approved by Council’s Strategy Environment Officer.

3. ENVIRONMENTAL SAFEGUARDS

Ensure at induction that the work crew are informed of the following site-specific environmental controls and monitor controls throughout the works.

Project Manager	Prior to construction, notification to Environment Strategy Officer of exact start date and finish date, so that an audit of works may be undertaken.
Environmental Awareness	
▪ The work crew or contractor must have a copy of the REF in the site truck and be fully aware of the REF safeguards to be implemented. ▪ The work crew or contractor will undergo an induction prior to work commencing and complete the induction checklist. The induction may cover environmental constraints and incident responses. A register of inductions and induction checklist will be maintained and provided if requested. ▪ Dial Before you Dig (DBYD) as part of this scope preparation. It is expected that the contractor will organise their own DBYD. ▪ Site meetings may be frequently conducted to identify issues that arise during the works regarding environment, safety, community and production. A register of attendees will be maintained. ▪ An Environmental Audit may be conducted to assess compliance with the REF and provide feedback on ways to improve work practices.	
Erosion & Sediment Control	
The proposed works have the potential to create soil erosion and sediment pollution. Prior to works commencing, erosion and sediment controls should be implemented for the duration of the works. The basic principles of erosion and sediment control are summarised below: ▪ Assess likely soil and water implications at planning stage. ▪ Plan for erosion and sediment control concurrently with engineering and landscaping design. ▪ Install erosion and sediment control measures as a first step in the works program and maintain these in an effective condition throughout the construction phase. ▪ Concentrate on source controls. ▪ Control water flow. Divert upslope waters around works and limit slope length to 80m on disturbed lands if rainfall is expected. ▪ Minimise onsite traffic movements. ▪ Rehabilitate disturbed lands quickly. Landscape Drawing ▪ All surface water and erosion and sediment control measures are detailed on the approved management plans must be in place before the commencement of construction and continue to operate after completion of the construction until the vegetation is established for superintendent's acceptance. ▪ Measures used to manage erosion and sediment control will include - Sediment control fences to filter runoff from disturbed areas and stockpiles. ▪ All site runoff should be discharged into grass fields, sedimentation traps down slope of disturbed areas to collect, convey and treat sediment-laden runoff. ▪ Silt fences should be installed on the downslope side of all stockpiles ▪ Measures shall be taken to minimise the risk of erosion to disturbed areas. Bare areas should be stabilised within 14 days of the completion of construction activities. Temporary stabilisation techniques such as erosion matting, sediment screens, straw bale energy dissipaters, mulching, hydroseeding and grass species establishment should be implemented on disturbed areas as required.	

- Weekly inspection and maintenance of all works and rehabilitated areas shall be undertaken, inspection records to be kept on site.
- Following successful re-vegetation and after inspection, temporary erosion control measures are to be removed. This may involve cleaning and removal of diversion works, sediment traps and check dams.
- Erosion and sediment control structures to be inspected weekly and immediately after every storm and runoff event to check they are operating satisfactorily and to schedule any maintenance work and repairs that may be required. Weekly maintenance will include
 - Sediment removal from drains.
 - Replacement as required.
- Dust suppression equipment to be available at all times (including weekends, roster days and public holidays) to reduce the emission of dust from site.
- Any incidents on site likely to cause pollution (fuel, chemicals, stormwater etc) must be reported immediately to the superintendent.
- All works are to be carried out in accordance with 'managing stormwater, soil & construction' produced by the NSW Department Of Housing ("the blue book").
- This plan shows typical soil & water management measures that will be required but is not intended to limit the contractor to any particular construction methodology. Any changes are to be approved by Council or PCA.
- Permanent batter to be topsoiled (min. 150mm) and turfed with approved turf.
- All disturbed areas to be turfed immediately upon completion with approved turf. Turfed areas to be regularly watered to promote rapid growth.
- Any re-vegetated areas which fail to establish within three months must be re-turfed.
- Earthworks and trenching to be staged to keep work areas to a manageable size.
- Excavated material from trenches to be stockpiled uphill of trench until backfilling can occur.
- Public roads to be kept clear of debris at all times. Constructor to provide shake down pad for vehicles entering/leaving site
- Haulage vehicles to remain on sealed roads or defined tracks at all times within the site.
- Sediment traps are to be provided around all pits during the following construction barriers and traps can be removed upon successful re-vegetation upstream as directed by the superintendent
- Any existing trees to be retained should be fenced off from all vehicle and foot traffic to avoid damage to the root system while construction is taking place. Refer to WCC Tree protection details, detail a, on Plan 7000_LD01_1
- For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed, minimum 2m high. Refer to WCC tree protection details, detail b, on plan 7000_LD01_1

Flora & Fauna

- Where possible site compounds will be located on previously disturbed areas away from vegetation and waterways and ponds where **water birds may forage and nest.**
- The **Square-tailed kite** breeds July to February and during this time inspect for nests in the fork or on a large, horizontal limb of *Angophora spp.* or *Eucalypt spp.*, and generally located along or near watercourses.
- Native fruit in trees increases during spring and summer for bird visiting the gardens. Care must be taken when tree work is carried out.
- The **Superb fruit-dove** breeding takes place spring and summer, and nest is a structure of fine interlocked forked twigs and is usually 5-30 meters up in the canopy of moist forests.

- The **Eastern pygmy possum** feeds mostly on the pollen and nectar from Banksias, Eucalypts, Bottlebrushes and understorey plants. Be mindful when walking off the path within the gardens and when working amongst the lower canopies.
- All native birds, reptiles, amphibians and mammals are protected in NSW. All hollow bearing trees are to be retained.
- If fauna is present on site and there is the need to assess animal condition, obtain advice from Wires on 1300 094 737 or call a licensed wildlife operator.
- **If a trench/pit remain open overnight, check for fauna prior to commencing machinery the next morning to prevent injury.**
- Check hollow logs, rock crevices and burrows within the work site to prevent injury to fauna.
- Ensure when trimming vegetation that fauna is not injured adjacent to the proposed footpath.

Tree Protection

- Refer to the **Tree Protection Plan** below to prevent tree trunk and root damage. **If impact occurs to any tree not listed for removal**, contact a Level 5 AQF Arborist as soon as possible. Adopt the Arborist remedial recommendation so as to reduce any long-term adverse effect on the tree's health. Tree root systems are essential for the health and stability of the tree.
- **All trees to be retained must be protected** using the provision of temporary fencing, barricades or No-Go Zones. These controls must be installed to prevent damage to the trunk or root system from materials; equipment and soil build up around tree base.
- The tree protection fencing post should not involve the severance of any roots greater than 50mm in diameter without the prior approval of the Level 5 AQF Arborist.
- Use hand excavation in and around the roots of trees, when encountered. Under the guidance of a Level 5 AQF Arborist, any roots 50mm or less in diameter may be pruned cleanly with a sharp saw. In general roots extend outward from the trunk and occupy irregularly shaped areas 4 to 7 times larger than the projected crown area with an average diameter of two or more times the height of the tree.
- **One tree pruning is required, and Council's Level 3 Arborist must complete A Tree Environmental Assessment Form prior to the works.**
- Pruning must be undertaken in accordance with 'AS4373-2007 Pruning of Amenity Trees'.
- Tree protection must be undertaken in accordance with 'AS4970-2009 Protection of Trees on Development Sites'.
- The plan in Appendix D outlines Stage 2C works for the rainforest walk. Within in Stage 2C there are **approx. nineteen trees to be removed and one tree to be pruned.**
- **All access is restricted to the existing pathways and no parking of vehicles overnight on the path verge within the No Go Zone. The No Go Zone covers all areas outside the pathways. A nominated overnight parking area is required outside the work area. See following image.**

Hold Points for Arborist inspections:

There are nineteen trees to be removed as part of the proposed construction works (See Appendix D). There will likely be encroachment within some Tree Protection Zones of these trees. As such, a construction hold point must be in place.

The hold points must be adhered to as per Australian Standard AS 4970-2009 *Protection of Trees on Development Sites*.

Tree Removal

- Trees proposed to be removed should be clearly identified and confirmed prior to removal to reduce risk of erroneous removal of tree.
- Any additional trees to be removed must be assessed by a Level 5 AQF Arborist and appropriate Tree Assessment completed.

- Any tree removal must be undertaken by a Level 3 AQF Arborist.
- Trees to be removed must be felled to avoid any impact to other vegetation or trees.
- To reduce potential impact to fauna sheltering in the tree/accidental removal of native vegetation, keep the impact footprint to a minimum to avoid unnecessary impacts to surrounding vegetation.
- Ensure that the appropriate protocols are carried out to minimise the spread of weed material during works and when travelling to/from site
- Prior to work, inspect the tree for fauna and if present, prevent injury or contact WIRES 1300094737.

Traffic & Access

Appropriate traffic management plan should be implemented to protect the surrounding trees and parking of equipment and vehicles must not occur within the tree protection zone.

- **A traffic route for all site vehicles is to be nominated.**
- Public safety for access around the site is to be ensured.
- Well-defined work compound must be secured to prevent public access.
- Refer to the Tree Protection Plan and Traffic Management Plan for specific access requirements.

Water Quality

- Any waste water is to be contained and removed off site for disposal at an approved facility.
- Waste water is not allowed to enter any stormwater drain or waterway.
- At no time shall any material, soluble or non-soluble, be allowed to enter the waterway.
- A fully equipped spill kit is to be kept on site at all times and, if used, restock spill kit. (Refer to Incident Management Procedure in Appendix B)
- All chemicals and fuels will be stored in suitable bunded areas away from waterways and stormwater pits
- Bunded area capacity will be at least 120% of the largest container within the storage area.
- The stored containers will be identified with appropriate labels.
- The relevant Material Safety Data Sheets (MSDS) will also be kept on site.
- Where possible compounds will be located on previously disturbed areas away from waterways

In-Situ Waste Classification Summary

The desktop investigation has not identified any potential contamination (Intramaps – Contaminated Land; Landfill; Aerial Photographs; Previous Land Use).

All works are to be carried out in accordance with the following procedures (or equivalent if works being undertaken by a contractor):

- **City Works & Services Procedure for Waste Classification & Transportation**
- **Unexpected Finds Procedure – Council Owned Land/Worksites**

Potential contaminants or contamination indicators that should be monitored and reported include asbestos containing material; coal tar; oils; and other chemicals causing discolouration and/or emitting strong odours.

Material Removed Off-site / Waste Generation

In addition to the requirements of the Materials Handling Process, the following specific controls are applicable:

- After dewatering is completed, classify the materials and treat/remove as per classification.
- Any waste generated, including excavated materials, should be removed from the site and disposed of appropriately, according to waste classification.
- General waste (rubbish) is not to be allowed to lie or accumulate on the site. Provide appropriate receptacles (bins) to store all general wastes generated from the works. The receptacles are to be emptied

immediately at works completion. Consideration is to be given to the source separation of recyclable and re-useable materials. ▪ All dockets/receipts for waste management/disposal are to be kept and copies forwarded to the project manager and/or site coordinator as proof of disposal for environmental audit purposes. ▪ Material/waste is not to be stored in any transit locations.
Imported Fill Material and Reuse on Site
▪ Only Virgin Excavated Natural Material (VENM) can be imported on site. VENM is natural material (clay, gravel, sand, soil or rock fines) that has been excavated or quarried from areas that are not contaminated. A Classification Docket with chemical assessment should be undertaken or requested from the supplier prior to importing the fill. ▪ Where excavated material cannot be classified as VENM it may be eligible for reuse on site if it is accompanied by appropriate documentation (from a qualified technician) confirming it does not contain any acid sulphate soils, asbestos and/or other potential contaminants. ▪ Documents/records of the transport and use of material imported onto site must be kept and submitted to the project manager and/or site coordinator as proof of correct waste management practices and for environmental auditing purposes.
Fill Material Managed within the Road Reserve
When working within the road reserve the following is applicable: ▪ Material excavated from within the road reserve must be classified. ▪ Excavated public road material includes rock; soil; sand; bitumen; asphalt pavement; gravel; slag; fly and bottom ash; concrete; brick and ceramics. ▪ If the excavated material contains coal tar or asbestos; or any waste that is classified as hazardous; restricted solid; special or liquid waste, it cannot be reused on the road reserve. ▪ This excavated material that is not classified as hazardous can be stored and re-used within the road corridor. ▪ Excavated public road material cannot be applied to private land.
Acid Sulfate Soils - Best Practice Guidelines must be adhered to. For sampling and identification on site refer to: https://www.waterquality.gov.au/sites/default/files/documents/sampling-identification-methods_1.pdf
Not Applicable
Air Quality & Energy
The machinery chosen is to have been well maintained and is to be operated in a proper and efficient manner to minimise fumes and energy consumption.
Visual Environment
During the work period, the work site and site compound should be maintained in a neat and tidy condition.
Noise & Vibration
▪ If there is to be any significant noise impacts, neighbouring residents are to be notified. ▪ The machinery chosen is to have been well maintained and is to be operated in a proper and efficient manner to minimise noise. ▪ Recommended Office of Environment and Heritage standard hours for construction work: - Normal construction - Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm.

- **No work on Sundays or public holidays.**
- Blasting - Monday to Friday 9 am to 5 pm, Saturday 9 am to 1 pm
- No blasting on Sundays or public holidays.
- Works that may be undertaken outside the recommended standard hours are:
 - The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads
 - Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
 - Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
 - Public infrastructure works that shorten the length of the project and are supported by the affected community
 - Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

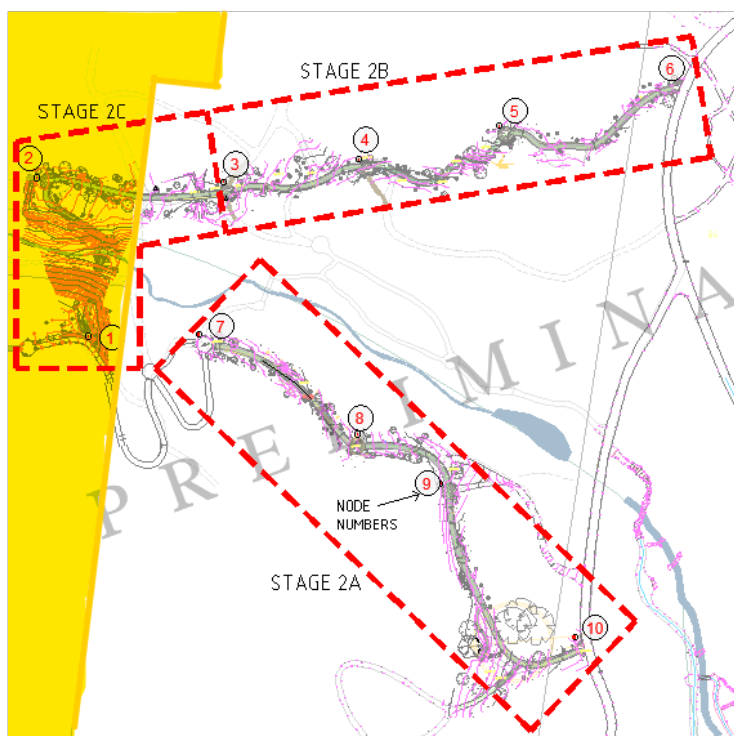
ID 2603: Section 60 Works Approval State Heritage Register No 00557

- **The HIS recommends that consideration should be given to incorporation of interpretation material for the project area in consultation with the local Aboriginal community to identify cultural values associated with the Rainforest ecosystem and location of the Botanic Gardens at the foothill of Mt Keira.**
- It is strongly recommended that the identification of cultural values is guided by Heritage NSW's Aboriginal cultural heritage assessment process, as best practice. This should include full consultation with the Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
- Should any Aboriginal objects be uncovered by the work which is not covered by a valid Aboriginal Heritage Impact Permit, excavation or disturbance of the area is to stop immediately and Heritage NSW is to be informed in accordance with the National Parks and Wildlife Act 1974. Works affecting Aboriginal objects on the site must not continue until Heritage NSW has been informed and the appropriate approvals are in place. Aboriginal objects must be managed in accordance with the National Parks and Wildlife Act 1974.
- Section 148 of the Heritage Act 1977 (the Act) allows people authorised by the Minister to enter and inspect, for the purposes of the Act, with respect to buildings, works, relics, moveable objects, places or items that is or contains an item of environmental heritage. Reasonable notice must be given for the inspection.
- Significant built and landscape elements are to be protected during site preparation and the works from potential damage. Protection systems must ensure significant fabric, including landscape elements, is not damaged or removed.
- The Applicant must ensure that if substantial intact archaeological deposits and/or State significant relics or any other buried fabric, are discovered, work must cease in the affected area(s) and the Heritage Council of NSW must be notified. Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.

European Heritage

- **Work is not to impact upon heritage items; in particular, no work shall occur within the boundary or the curtilage of any heritage item or property, until all necessary consultations and approvals have been undertaken / obtained.**

- Works to be carried out with care at or adjacent to an existing heritage monument when undertaking tree management works, as branches are not to be dropped on heritage monuments.



GENERAL ARRANGEMENT PLAN 1:500@A1 AND STAGING PLAN

- Refer to the Concept Plan for the Rainforest Canopy Bridge for a structural visual impression.
- The Statement of Heritage Impact 2023 recommends that the Review of Environmental Factors (REF), as well as to inform the approval process and relevant conditions of consent:
 - An application for approval under Section 60 of the NSW Heritage Act 1977 should be sought for the Stage 2(c) of the project, including construction of the elevated Rainforest Walk partially within the SHR Area; **(Completed)**
 - The works are to be constructed in line with the recommendations of the conditionally endorsed Conservation Management Plan; **(Completed)**
 - Heritage NSW should progress final endorsement of the CMP; **(Completed)**
 - An unexpected finds protocol for both Non-Aboriginal and Aboriginal Archaeology is to be implemented in the REF documentation; **(Completed)**
 - Consideration should be given to incorporation of interpretation material for the project area in consultation with the local Aboriginal Community to identify cultural values associated with the Rainforest ecosystem and located of the Botanic Gardens at the foothill of Mt Keira. **(Completed)**

Aboriginal Heritage

- If any previously undetected archaeological site, object or artefact is uncovered or unearthed during the course of any works or activities associated with the proposal, works should cease in the vicinity of that site, object or artefact. Council's Heritage Advisor should be contacted immediately.

Heritage Unexpected Finds

What is an unexpected heritage find? - An 'unexpected heritage finds' can be defined as any unanticipated archaeological discovery that has not been identified during a previous assessment or is not covered by an

existing permit under relevant legislation such as the NPW Act or Heritage Act. The find may have potential cultural heritage value, which may require some type of statutory cultural heritage permit or notification if any interference of the heritage item is proposed or anticipated.

The range of potential archaeological discoveries can include but are not limited to:

- Aboriginal stone artefacts, shell middens, burial sites, engraved rock art, scarred trees
- remains of rail infrastructure including buildings, footings, stations, signal boxes, rail lines, bridges and culverts
- remains of other infrastructure including sandstone or brick buildings, wells, cisterns, drainage services, conduits, old kerbing and pavement, former road surfaces, timber and stone culverts, bridge footings and retaining walls
- artefact scatters including clustering of broken and complete bottles, glass, ceramics, animal bones and clay pipes archaeological human skeletal remains.

In the event that an unexpected heritage finds (the 'find') is encountered on site, contact the following:

- The Contractor/Supervisor will Stop Work Immediately when an unexpected heritage find is encountered.
- The Contractor/Supervisor will cordon off area until Council's Heritage Officer advises that work can recommence.
- The Contractor's Environment Manager will:
 - Manage the process of identifying, protecting and mitigating impacts on the 'find'.
 - Liaise with Council Heritage Officer/Heritage advisor and maybe the relevant authorities on significance of the find, mitigation and regulatory requirements.
 - Complete incident report and review CEMP for any changes required. Propose amendments to the CEMP if any changes are required.
 - Advise Contractor/Supervisor to recommence work.
- Council's Heritage Officer/Heritage advisor will provide expert advice to the Contractor's Environment Manager on 'find' identification, significance, mitigation, legislative procedures and regulatory requirements.
- Contractor's Environment Manager will notify Council's ESO of 'find' and manage incident reporting once completed by Contractor's Environment Manager.
- The Department of Premier and Cabinet (OEH for Aboriginal objects) will regulate the care, protection and management of Aboriginal objects and will issue Aboriginal heritage impact permits.
- Department of Premier and Cabinet (Heritage Division for relics) will regulate the care, protection and management of relics and will issue excavation permits.

Landscaping and Vegetation Management (Bush Fire Protection Planning)

The landscaping and the site must be maintained at all times as follows:

- There shall be minimal fine fuel at ground level which could be set alight by a bushfire.
- Use of non-combustible ground surfaces such as gravel roads, paved areas, in-ground pools, etc is acceptable.
- Lawn areas shall be maintained low cut and clear.
- Areas under fences, fence posts, gates and trees shall be raked and kept clear of fine fuel.
- Gutters, roofs and roof gullies shall be kept free of leaves and other debris.
- Verandas, decks, carports, etc shall not be used to store combustible materials and shall be kept free of leaves and other debris.
- Areas within courtyards shall be maintained free of leaves and other debris.
- Reticulated or bottle gas services shall be installed and maintained in accordance with AS 1596.

- Gas cylinder relief valves shall be directed away from the building and away from any hazardous materials such as firewood, etc.
- No part of a tree should overhang within two metres of any building.
- Trees that are smooth barked species or, if rough barked, shall be maintained free of decorticated bark and other ladder fuels (rough barked species are not encouraged).
- No part of a tree shall be closer to a power line than the distances set out in the current edition of “Planning for Bush Fire Protection”.
- The use of local native plants with features that minimise the extent to which they contribute to the spread of bush fires is encouraged within the site.
- Landscaping to the site is to comply with the principles of Appendix 5 (SOHI, 2023) of Planning for Bush Fire Protection 2019.

4. LEGISLATIVE REQUIREMENTS

The following legislative requirements have been assessed against the proposed works and under the SEPP (Transport and Infrastructure) 2021 the works do not require consent under Chapter 2 **Division 12 Parks and other public reserves**.

SEPP (Transport and Infrastructure) 2021

Chapter 2

2.3 Interpretation - general

(4) If this Chapter provides that development for a particular purpose that may be carried out without consent includes **routine maintenance works**, the following works or activities are (subject to and without limiting that provision) taken to be routine maintenance works if they are carried out for that purpose:

- (a) routine repairs to or replacement of equipment or assets,
- (b) temporary construction yards,
- (c) **clearing of vegetation (including any necessary cutting, lopping, ringbarking or removal of trees) and associated rectification and landscaping.**

Division 12 Parks and other public reserves

2.72 Definitions - In this Division

Crown land manager has the same meaning as in the Crown Land Management Act 2016.

Crown managed land has the same meaning as in the Crown Land Management Act 2016.

Ministerial Corporation has the same meaning as in the Crown Land Management Act 2016.

public reserve has the same meaning as it has in the Local Government Act 1993 but does not include a Crown reserve that is dedicated or reserved for a public cemetery.

Secretary has the same meaning as in the Crown Land Management Act 2016.

Division 4 Exempt development

Note 1—Section 4.1 of the Act contains requirements applying to exempt development.

Note 2— In addition to the requirements set out in this Chapter in relation to exempt development, adjoining owners' property rights, the applicable common law and other legislative requirements for approvals, licences, permits and authorities still apply. For example, requirements relevant to the kind of exempt development concerned may be contained in the Act, the *Environmental Planning and Assessment Regulation 2000*, various State environmental planning policies, the *Protection of the Environment Operations Act 1997*, the *Roads Act 1993* and Acts applying to various infrastructure authorities. If the development is in proximity to infrastructure, including water, stormwater and sewer mains, electricity power lines and telecommunications facilities, the relevant infrastructure authority should be contacted before commencing the development.

2.20 General requirements for exempt development

(1) This section applies to any development that this Chapter provides is exempt development

Note—Section 2.21 and other provisions of this Chapter identify kinds of development that are exempt development if they meet the requirements of this section.

(2) To be exempt development, the development—

- (a) must meet the relevant deemed-to-satisfy provisions of the *Building Code of Australia*, or if there are no such relevant provisions, must be structurally adequate, and
- (b) must not, if it relates to an existing building—
 - (i) cause the building to contravene the *Building Code of Australia*, or
 - (ii) compromise the fire safety of the building or affect access to any fire exit, and

- (c) must be carried out in accordance with all relevant requirements of the Blue Book, and
- (d) must not be designated development, and

Note—Designated development is defined in section 4.10 of the Act as development that is declared to be designated development by an environmental planning instrument or the regulations.

- (e) if it is likely to affect a State or local heritage item or a heritage conservation area, must involve no more than minimal impact on the heritage significance of the item or area, and
- (e1) must not involve the demolition of a building or work that is, or is part of, a State or local heritage item, and
- (e2) if it involves the demolition of a building, must be carried out in accordance with Australian Standard AS 2601—2001, *The demolition of structures*, and
- (f) must be installed in accordance with the manufacturer's specifications, if applicable, and
- (g) must not involve the removal or pruning of a tree or other vegetation that requires a permit or development consent for removal or pruning, unless that removal or pruning is undertaken in accordance with a permit or development consent, and

Note—A permit for the removal or pruning of a tree or other vegetation may be granted under a local environmental plan. A development consent for the removal of native vegetation may be granted under the [Native Vegetation Act 2003](#).

- (h) must not involve the removal of asbestos unless that removal is undertaken in accordance with *Working with Asbestos: Guide 2008* (ISBN 0 7310 5159 9) published by the WorkCover Authority.

2.74 Exempt development

- (1) Development for any of the following purposes that is carried out in the prescribed circumstances is exempt development—

- (a) construction or maintenance of—
 - (i) walking tracks, raised walking paths (including boardwalks), ramps, stairways or gates,
 - (viii) seats, picnic tables, barbecues, bins (including frames and screening), shelters or shade structures, or
- (b) routine maintenance of playing fields and other infrastructure, including landscaping,

Local Government Act 1993

48 Responsibility for certain public reserves

- (1) Except as provided by section 2.22 of the *Crown Land Management Act 2016*, a council has the control of:
 - (a) public reserves that are not under the control of any other body or lease from the Crown,
 - (b) **public reserves that the Governor, places under the control of the council.**

STATE ENVIRONMENTAL PLANNING POLICY (Biodiversity and Conservation) 2021 incorporates:
Chapter 2 Vegetation in Non-Rural Areas - This is not applicable as an assessment pathway for clearing of native vegetation on urban land and land in environmental zones is not required. Refer to [Biodiversity Values Map](#).

Chapter 4 Koala Habitat Protection

For most of the LGA, Chapter 4 of the SEPP applies (**NOTE** for RU1, 2, or 3, Chapter 3 - Koala Habitat Protection 2020 applies).

core koala habitat means—

- (a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or
- (b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

Note:

- *If the site is under 1ha and has no history or evidence of koalas and no feed trees, then we can be satisfied that it is not core koala habitat and no assessment or further consideration is required.*
- *If it is over 1ha, and we are satisfied that it is not core koala habitat and is likely to have low or no impact on koalas or koala habitat, then again, no assessment or further consideration is required.*
- For any of the listed Koala habitat trees to be removed, within a core habitat, a test of significance for tree removal is required to determine the significant effect on the population of the Koala and to determine if the project requires referral of the matter. Note use of precautionary principle - as not all sites have been recorded.

Schedule 3 Koala Use tree species – South Coast

Scientific Name	Common Name
<i>Allocasuarina littoralis</i>	Black She-oak
<i>Angophora floribunda</i>	Rough-barked Apple
<i>Corymbia gummifera</i>	Red Bloodwood
<i>Corymbia maculata</i>	Spotted Gum
<i>Eucalyptus agglomerata</i>	Blue-leaved Stringybark
<i>Eucalyptus baueriana</i>	Blue Box
<i>Eucalyptus bosistoana</i>	Coast Grey Box
<i>Eucalyptus consideniana</i>	Yertchuk
<i>Eucalyptus cypellocarpa</i>	Monkey Gum
<i>Eucalyptus elata</i>	River Peppermint
<i>Eucalyptus eugenioides</i>	Narrow-leaved Stringybark
<i>Eucalyptus fastigata</i>	Brown Barrel
<i>Eucalyptus globoidea</i>	White Stringybark
<i>Eucalyptus longifolia</i>	Woollybutt
<i>Eucalyptus maidenii</i>	Maiden's Blue Gum
<i>Eucalyptus muelleriana</i>	Yellow Stringybark
<i>Eucalyptus obliqua</i>	Messmate
<i>Eucalyptus paniculata</i>	Grey Ironbark
<i>Eucalyptus pilularis</i>	Blackbutt
<i>Eucalyptus piperita</i>	Sydney Peppermint
<i>Eucalyptus punctata</i>	Grey Gum
<i>Eucalyptus saligna</i>	Sydney Blue Gum
<i>Eucalyptus sclerophylla</i>	Hard-leaved Scribbly Gum
<i>Eucalyptus sieberi</i>	Silvertop Ash
<i>Eucalyptus tereticornis</i>	Forest Red Gum
<i>Eucalyptus tricarpa</i>	Mugga (Red) Ironbark
<i>Eucalyptus viminalis</i>	Ribbon Gum

4.State Environmental Planning Policy No 19 – Bushland in Urban Areas (Chapter 6)

This Chapter refers to Schedule 5 Areas and part areas to which Chapter 6 applies and Wollongong City Council is not listed, therefore, **this SEPP is not applicable.**

State Environmental Planning Policy (Resilience and Hazards) 2021 incorporates:

- State Environmental Planning Policy (Coastal Management) 2018 (under Chapter 2) is not applicable
- State Environmental Planning Policy 33 – Hazardous and Offensive Development is not applicable

- State Environmental Planning Policy 55 – Remediation of Land (under Chapter 4) is not applicable

Biodiversity Conservation Act 2016 (BC Act)

All vulnerable and endangered species and endangered ecological communities listed under the *BC Act* within Wollongong City Council LGA have been identified using BioNet.

The results of the **BioNet** search for biodiversity data if required are included within the Flora & Fauna Assessment and / or Assessment of Significance. **Provided the safeguards identified are implemented, the proposed works are not likely to significantly affect any threatened species, populations or ecological communities listed under the *BC Act* and the preparation of a Species Impact Statement is not warranted.**

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The Act provides for the listing of nationally threatened native species and ecological communities, native migratory species and marine species.

Significant Impact is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impact. Refer to **SPRAT** the Australian Government EPBC Act Database for species profile and threats.

Protection of the Environment Operations Act 1997 (POEO)

Is the principal environmental protection legislation for NSW that defines 'waste' for regulatory purposes and establishes management and licensing requirements for waste. It defines offences relating to waste and sets penalties. The POEO Act also establishes the ability to set various waste management requirements via the POEO (Waste) Regulation.

Should it be necessary to remove any material from the work site (including sediment), it is considered waste, and must be classified by an appropriate officer, as per *Division 1 Waste Classifications of the NSW Protection of the Environment Operations Act 1997 (POEO)*. Waste may be classified as:

- Special waste
- Liquid waste
- Hazardous waste
- Restricted solid waste
- General solid waste (putrescible)
- General solid waste (non-putrescible)

If it is not possible to separate wastes, the whole waste must be classified according to the highest class of waste. All Waste must be disposed of at an appropriately licenced waste facility as landfill.

Part 7.3 of the Protection of the Environment Operations Act 1997

Appropriate documentation is to be maintained on the type and transport of material / waste.

Protection of the Environment Operations (Waste) Regulation 2014

Provides for contributions to be paid by occupiers of scheduled waste facilities for each tonne of waste received at the facility or generated in a particular area; exempts certain occupiers or types of waste from these contributions; and allows deductions to be claimed in relation to certain types of waste. It also sets out provisions covering:

- the proximity principle
- record-keeping requirements, measurement of waste and monitoring for waste facilities
- tracking of certain waste
- reporting
- transportation of waste

- transportation and management of asbestos waste
- recycling of consumer packaging
- classification of waste containing immobilised contaminants
- miscellaneous topics.

Department of Environment & Climate Change NSW Fact Sheet: Virgin Excavated Natural Material

Only material excavated from site and classified as VENM may be stored on site for re-use or taken to another construction site for reuse.

Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Excavated Natural Material Order 2014

Where material cannot be classified as VENM and is proposed for re-use on a site, it must be accompanied by appropriate documentation confirming it does not contain acid sulphate soils or other contaminants.

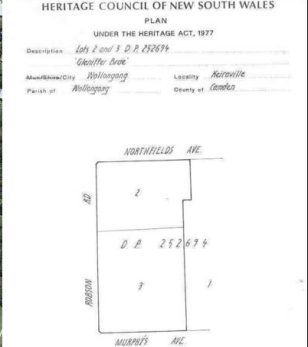
Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Excavated Public Road Material Exemption 2014

Applies to excavated public road material that will be applied/reused to land within the road corridor for road related activities such as construction, maintenance and installation of road infrastructure facilities.

5. ENVIRONMENTAL FACTORS IDENTIFIED AND EVALUATED

The following table has been completed following a site inspection and interrogation of Council's Intrapap system.

ENVIRONMENTAL FACTOR	Impact L/M/H	Extent, Duration, Type Comment
Heritage		
Is there any Aboriginal Heritage within or close proximity to the worksite? (Refer to AHIMS)	Overall impact – LOW	No
Does the site have landscape features that are likely to indicate presence of Aboriginal objects? If the proposed activity is: i. within 200m of waters ii. located within a sand dune system iii. located on a ridge top iv. ridge line or headland v. located within 200m below or above a cliff face vi. within 20m of or in a cave, rock shelter, or a cave mouth vii. is on land that is not disturbed land particularly at any of the above locations		Yes. Within 200m of waters.
Is there any European Heritage listed on the current LEP?		Yes. The heritage listing includes DP 252694 Lot 2 and DP 252694 Lot 3. Gleniffer Brae and surrounding Sorenson Gardens Site Id: 5940 Local Significance. Gleniffer Brae is also listed under National Trust of Australia Register; Register of the National Estate and the Royal Australian

ENVIRONMENTAL FACTOR	Impact L/M/H	Extent, Duration, Type Comment
 		Institute of Architects Register of Significant Buildings. Minor impact will occur to this site and a section 60 application has been received. Refer to Appendix I. Gleniffer Brae and Kooloobong Park is protected under the State Heritage Register. ID: 00557 Gazetted Date: 04/02/1999.
Will the project impact these Heritage Items?		No impact will occur to these lots. The proposed works are adjacent to these protected lots and will not require heritage approval.
Water Quality/Erosion & Sedimentation/Demand on Resources/Waste Disposal		
Are the works likely to disturb any acid sulfate soils listed on the Current LEP?	Overall impact – LOW	No
Are the works to be conducted within 40m of watercourses or any other type of natural water body?		Yes. Riparian Category 2 in the Fairy Creek Catchment.
Will the works result in changes to water flow in any way?		No
Are the works within a flood affected zone?		Yes. The proposal does not represent an increased risk to life or property in regard to flooding
Do the works involve the use or storage within the work areas of fuels or other chemicals (other than fuels contained within the work vehicles)?		Unsure. A site container will be required.
Will the works create areas of unprotected soil or loose surface for more than 24 hours?		Yes. Refer to section 3 of the REF for erosion and sediment controls.
Could the works result in disturbance of contaminated land or contaminated material listed under WCC IntraMaps?		Unsure. No contaminated soils have been identified on IntraMaps. Refer to section 3 of the REF for waste classification controls.
Will the waste generated by the works include hazardous substances (such as lead, asbestos or other substances designated as hazardous by the National Occupational Health and Safety Commission)? Refer to Council's ARO		No
Are the works a Coastal Geotechnical risk under Coastal Zone Study under WCC IntraMaps?		No

ENVIRONMENTAL FACTOR	Impact L/M/H	Extent, Duration, Type Comment
 Constraints  Coastal Zone Study Information  Coastal Geotechnical Risk  2010 Ocean Inundation Extent  2050 Ocean Inundation Extent  2100 Ocean Inundation Extent  2010 Reduced Foundation Capacity  2050 Reduced Foundation Capacity  2100 Reduced Foundation Capacity		
Are the works subject to the <i>Wollongong Coastal Zone Management Plan 2017</i> ?		No
Flora & Fauna/Tree Protection/Access/Community Environmental Impacts		
Is any vegetation required to be removed?	Overall impact – LOW	Yes. Approx 19 trees to be removed and one tree pruned. Refer to Arborist Information in Appendix D. With the safeguards in the REF the impact risk would be reduced to Low.
Will the work occur within a regulated category listed under Part 5A of <i>Local Land Services Act 2013</i> ? Refer to the Native Vegetation Regulatory Map .		No. Land excluded from the Map
Are the works relevant to the SEPP (Biodiversity and Conservation) 2021? Chapter 2. Refer to Biodiversity Values Map		No Biodiversity Values within the Gardens
Are the works relevant to SEPP (Biodiversity and Conservation) 2021? Chapters 3 and 4 where relevant. Refer to Koala Habitat Protection Map		Wollongong LGA is mapped under the Koala Management Area. However, there are records of Koalas sightings from 2020 approx. 513 m west of the site up catchment. Refer to Appendix E for the Koala assessment.
Is the area within a Vegetation Community identified in NP Vegetation Layer under WCC IntraMaps Constraints?		Yes. MU56c Weeds & Exotics x 11 MU56a Artificial Wetland x 2 MU8 Escarpment Moist blue Gum forest
Are the works located on land identified as the Escarpment Management Plan Area under WCC IntraMaps Constraints?		No
Is the area within a Habitat Model in WCC IntraMaps Constraints?		Yes. Green-crowned Snake (H) Powerful Owl (H) x 24
Do the works occur within Key Fish Habitat? Refer to Threatened Fish Species List .		No

ENVIRONMENTAL FACTOR	Impact L/M/H	Extent, Duration, Type Comment
Are the works to be conducted within a Natural Area Asset? (Refer to the WCC IntraMaps Environmental Restoration layer)		Yes. Natural Area 430
Are the works near a seed collection point on the WCC IntraMaps Environmental Restoration layer?		Yes. Outside the area of impact. Refer to controls. 
Is there any Bush Care or other Environmental Restoration undertaken at the site?		No
Is the worksite listed as Bushfire Prone Land under the WCC IntraMaps Planning DCP layer?		No
Are there any Endangered Ecological Communities or potential habitat for threatened species as listed on the Planning DCP layer or on the BC Act BioNet or the EPBC Act SPRAT on or adjacent to the work site?		No EECs. Threatened Fauna: Square-tailed Kite VP3 - Plan 4 Powerful Owl VP3 - Plan 1, 2 & 3 x 7 Regent Honeyeater – Outside Plan Grey-headed Flying-fox x 3 
Amenity / Noise		
Are the works located on land identified as Community Land, on the WCC IntraMaps LEP Community Land Maps?	Overall impact – LOW	Yes. Wollongong Botanic Gardens
Will the works result in a reduction of the aesthetic and/or recreational qualities of the area or restrict the beneficial uses of the area in the future? Refer to Point of Interest in features on the Base Map Information		No. A section of the proposed canopy walkway has been prepared by Wollongong City Council to ensure the design is cited appropriately in the topography, and the structure will not be visible from key views identified in the CMP and from Gleniffer Brae and the Illawarra Escarpment. The structure remains well below the established rainforest vegetation in height and sits within a valley to the north of the terraced lawn.
Will the works cause excess noise?		No
Are the works within the management areas defined by SEPP (Resilience and Hazards)		No

ENVIRONMENTAL FACTOR	Impact L/M/H	Extent, Duration, Type Comment
2021.Chapter 2 - Coastal Management? Refer to Department of Planning Coastal Management Map		
Any transformation of a locality? Human and non-human environment?		No. The elevated walkway, which has potential to have visual impact on the setting of the House, has been carefully designed to be sympathetic and visually recessive in the existing rainforest setting. Through the citing, materiality and design it is assessed as having no visual impact from Gleniffer Brae and the Sorenson Garden. The works will not be visible from the house due to the topography and the established rainforest vegetation which forms a key component of the Wollongong Botanic Gardena and has social significance values as a community Botanic Garden on land donated by Hoskin's for that intended purpose. (SOHI, 2023)
Does the works fall under SEPP (Transport and Infrastructure) 2021 Exempt Developments?		Yes
Cumulative Impact Assessment - existing or future?		Minor. The proposed upgrades to the Rainforest Walk as identified in the Masterplan will improve connectivity around the Botanic Gardens and to Gleniffer Brae and the 4-acre Sorenson Garden, with accessibility upgrades which will allow all members of the community to have greater access to the broader site integrating travel through to the Botanic Garden and restabilising the connection to the Kooloobong Ovals to the north. The project also improves movement through the Botanic Gardens to various Mt Keira walking trails to the west, which is an opportunity to highlight Aboriginal Heritage values through interpretative elements in the Rainforest Walk and has the potential to have positive heritage impacts on the State Heritage item. (SOHI, 2023)
Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act Issues, objectives, policies and actions identified in local, district and regional plans		Yes. Wollongong Local Strategic Planning Statement 2020 A Plan of Management for the Garden was adopted by Council in 2006. On 10 October 2016 Council resolved to exhibit a new the draft Wollongong Botanic Garden Plan of

ENVIRONMENTAL FACTOR	Impact L/M/H	Extent, Duration, Type Comment
		Management (2017), draft Gleniffer Brae Conservation Management Plan and a draft Planning Proposal to enable functions to occur in Gleniffer Brae. The draft Plans were exhibited from 26 October 2016 to 9 December 2016. On 23 July 2018, Council resolved to exhibit the draft Wollongong Botanic Garden Master Plan. The draft Master Plan was exhibited from 6 August to 3 September 2018. Council is waiting on endorsement of the draft Gleniffer Brae Conservation Management Plan by NSW Heritage to enable the Plan of Management, Master Plan and Planning Proposal to be progressed. Once the documents are able to be adopted they will guide the future use and improvements to the Garden.

Wollongong City Council's requirements are considered to have been satisfied through the identification and assessment of environmental issues and risks undertaken in this report. Provided there are no changes to the scope of works identified in this report, no further EIA is required.

Appendix A: AHIMS / Statement of Heritage Impact

Council's Intramap records indicated that there was not a possible presence of an Aboriginal heritage item within the vicinity of the proposed works. A NSW Heritage (former OEH) **Aboriginal Heritage Information Management System (AHIMS)** search was undertaken to confirm the presence of Aboriginal heritage within or close to the works site. **The AHIMS search identifies 0 Aboriginal sites or places recorded in within 200m of the proposed works.**

It was determined that the proposed activity would not harm any Aboriginal heritage due to the following:

- Although the proposed works will disturb the ground surface, the works are a low impact activity on land that has already been disturbed.
- Vegetation will need to be removed and all other trees will be protected on site.
- There are no Aboriginal objects located within or close to the site (AHIMS confirmation).
- A REF has been prepared and identifies that if during the course of the works any unknown Aboriginal objects are found, works must cease immediately.

As such, an **Aboriginal Heritage Impact Permit (AHIP)** is not required.



AHIMS Web Services (AWS) Search Result

Your Ref/PO Number : REF03624

Client Service ID : 719663

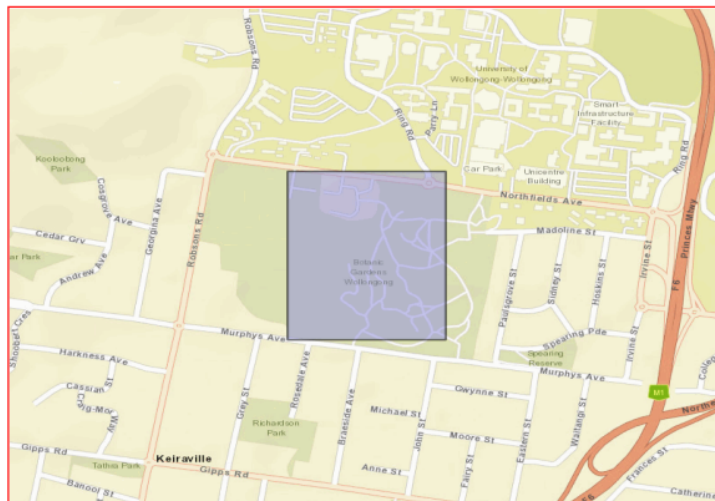
Wollongong City Council
Locked Bag 8821
Wollongong DC New South Wales 2500
Attention: Annette Williams
Email: awilliams@wollongong.nsw.gov.au

Date: 21 September 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 304574.0 - 304915.0, Northings : 6190171.0 - 6190600.0 with a Buffer of 0 meters, conducted by Annette Williams on 21 September 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

STATEMENT OF HERITAGE IMPACT

STAGE 2 – Botanic Garden Rainforest Walk



Wollongong Botanic Gardens, Murphy Avenue Keiraville

This Statement of Heritage Impact has been prepared to support a Section 60 Application to Heritage NSW under the NSW Heritage Act 1977 for the works within the Gleniffer Brae SHR curtilage (SHR No 1635).

Date: March 2023

Prepared by:

Joel Thompson, Coordinator Heritage, Wollongong City Council &
Carly Boag, Heritage Officer, Wollongong City Council.

Prepared For:

Wollongong City Council

Doc Ref: 24048115

VERSION CONTROL

Version 1.0

Statement of Heritage Impact Report, dated March 2023

Table of Contents

1.	Introduction	3
1.1	Supporting Documentation	3
1.2	Site Location	3
1.3	Heritage Listings in Precinct	5
1.4	Relevant Legislation	7
2.	Background	9
2.2	Community Consultation	11
3.	Understanding Significance	12
3.1	Aboriginal History of the Area	12
3.2	History of the Wollongong Botanic Gardens	12
3.6	Statement of Heritage Significance	23
4.	The Project – Proposed Works	25
4.1	Project description	25
5.	Heritage Impact Assessment	27
5.1	Potential Heritage Impacts	27
5.2	CMP Policies	27
5.3	Key Views	30
5.4	Analysis in response to NSW Heritage Guidelines	33
6.	Conclusion and Recommendations	39
7.	References	40

1. Introduction

This Statement of Heritage Impact (SoHI) has been prepared to support a Section 60 Application for the construction of Stage 2(c) of the Botanic Gardens Rainforest Walk which is partially located within the Gleniffer Brae and Surrounding Gardens State Heritage curtilage.

Stage 1 of the Rainforest Walk was approved under the previous Section 57(2) Exemption process as endorsed by Heritage NSW and has now been constructed. under the State Environmental Planning Policy (Infrastructure) 2007 (The Infrastructure SEPP). Stage 2 of the Rainforest Walk has been divided in three stages (2(a), 2(b) and 2(c) (see Figure 16).

All of these remaining stages will also be progressed under the planning mechanisms provided under Part 5 of the EP&A Act 1979, through the provisions of the Infrastructure SEPP, no Development Application is required. See Part 4 of the Draft REF (Appendix B) for an assessment of the legislative pathway. It is Council's understanding that a Section 60 Approval will be required under the NSW Heritage Act 1977 to allow the progression of the project as this stage partially falls within the State Heritage Precinct. The works that fall within the SHR curtilage are identified as Stage 2(c).

Heritage NSW is currently assessing a Conservation Management Plan prepared for Gleniffer Brae and the surrounding Sorensen Garden, which was conditionally endorsed on 23 December 2020 (DOC20/565015) and is awaiting finalisation. This Statement of Heritage Impact has been prepared to consider and document the potential heritage impacts of the Stage 2(c) works against the Conservation Management Plan policies as part of a formal Section 60 application.

It is noted that the authors of this report have been involved in informing the project from its inception, and that the design process has been an iterative process that has been continually informed by Heritage input provided by the authors.

1.1 Supporting Documentation

The following documents are attached as Appendices to this Report as background to support and assist the assessment of the Section 60 application:

- A. Gleniffer Brae Conservation Management Plan, July 2022 prepared by Architectural Projects
- B. Draft Review of Environmental Factors prepared by Wollongong City Council dated March 2023
- C. Landscape and Structural Plans prepared by Wollongong City Council dated March 2023
- D. Stage 1 Stamped Plans Landscape and Civil
- E. Draft Botanic Garden Master Plan Engagement Report 2018
- F. Draft Botanic Gardens Master Plan 2018
- G. Section 57 Exemption Notification Heritage NSW, 2016 and 2017

1.2 Site Location

The Wollongong Botanic Gardens site includes the Gleniffer Brae Manorhouse, Sorenson Gardens, former SKEGS buildings and broader Botanic Gardens and associated infrastructure and pathway networks, owned and managed by Wollongong City Council.

The broader Rainforest Walk is, located land owned and managed by Wollongong City Council legally described as Lot 2 DP 252694, Lot 3 DP 252694 and traverses through the SHR curtilage to the north east.

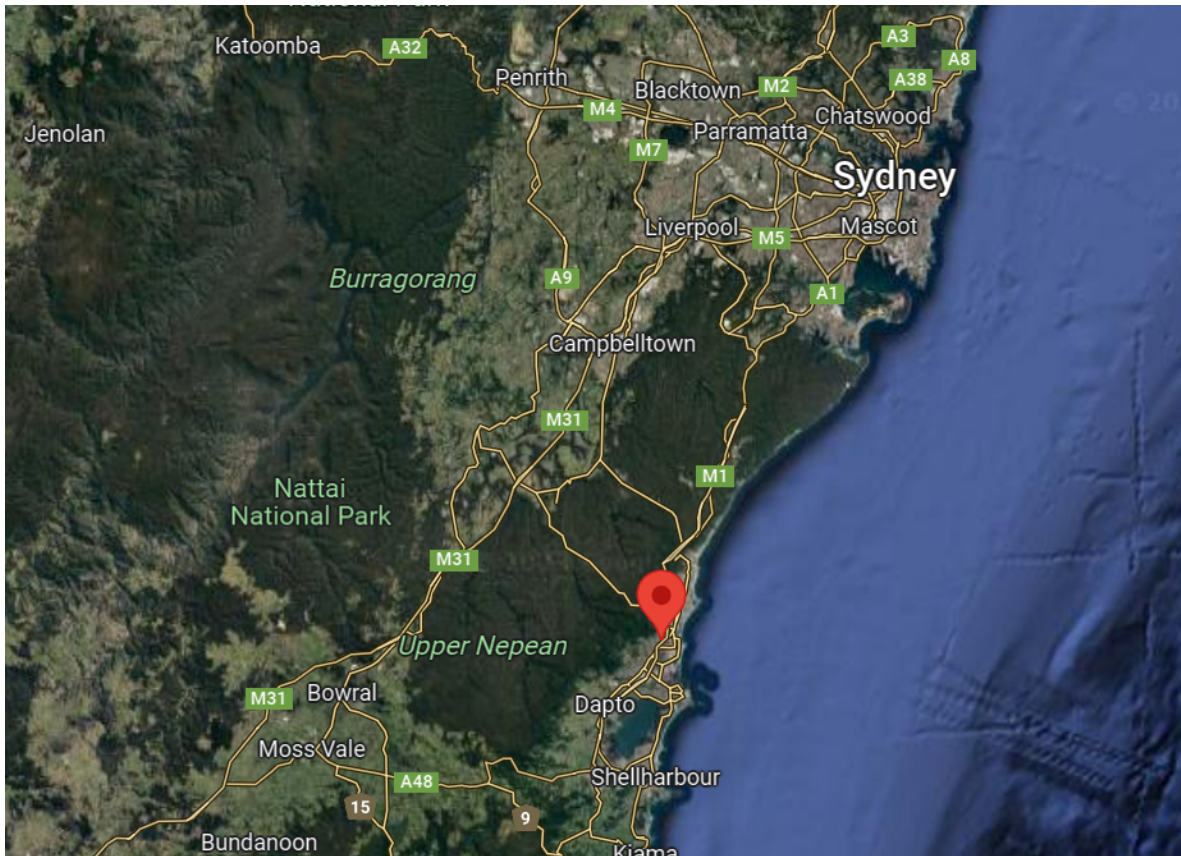


Figure 1: North Wollongong Beach, located approximate 80km south of Sydney (Google Maps)



Figure 2: Site Plan (CMP)

1.3 Heritage Listings in Precinct

There are a number of overlapping local Heritage listings within the vicinity of the works area as well as a Heritage Conservation Area.

Local LEP Heritage Listings are shown in Figure 3 below and include:

- #5940 “Gleniffer Brae” and Surrounding Sorenson Garden
- Illawarra Escarpment Heritage Conservation Area

State Heritage Listings relevant to the Study Area include:

- SHR 00557 – Gleniffer Brae and Surrounding Gardens



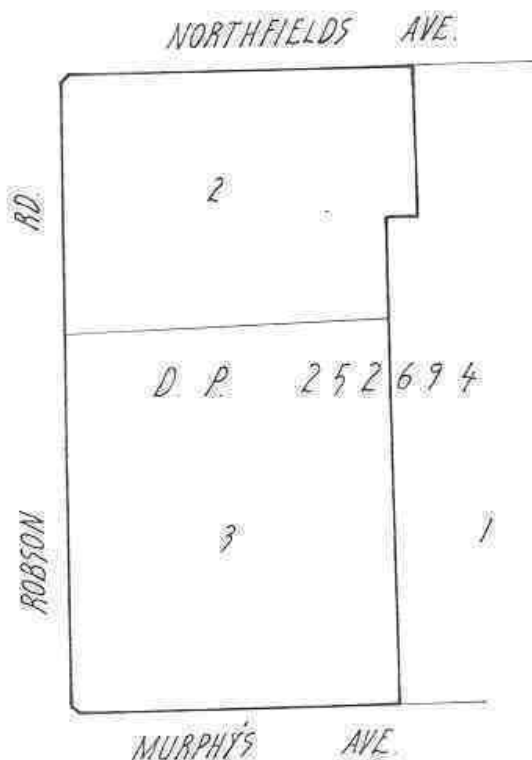
Figure 3: LEP Heritage Curtilage Listing, red hatched shows Conservation Area and Blue dotted line denotes State Heritage Precinct

HERITAGE COUNCIL OF NEW SOUTH WALES

PLAN

UNDER THE HERITAGE ACT, 1977

Description Lots 2 and 3 D.P. 252694
'Gleniffer Brae'
Mun/Shire/City Wollongong Locality Keiraville
Parish of Wollongong County of Camden



Scale 1:400

SUBJECT LAND SHOWN THUS:

THIS IS THE PLAN REFERRED TO IN ~~INTERIM~~/PERMANENT CONSERVATION ORDER No. 557

N.S.W. GOVERNMENT GAZETTE No. 41 OF 26.7.88

PLAN APPROVED

PLAN NUMBER
H.C.

FILE H.C. 32168

DRAWN BY R.E.B.

for
SECRETARY, HERITAGE COUNCIL

1183

Figure 4: Gleniffer Brae State Heritage Area Boundary (Heritage NSW Database)

1.4 Relevant Legislation

Environmental Planning and Assessment Act 1974

The works proposed within this Section 60 application relate to the upgrade and improvement of an existing reserve and include the upgrade and renewal of park infrastructure. The works proposed in the application are able to be completed without Development Consent under the State Environmental Planning Policy (Infrastructure) 2007 as works without consent. As such, the works may proceed under Part 5 of the Environmental Planning and Assessment Act 1979.

A detailed Draft Review of Environmental Factors (REF) has been prepared to ensure the appropriate management of the relevant environmental factors as required under Part 5 of the Act. This document sets out in full the approval pathway for the project in Part 4, Page 10 (appendix B).

NSW Heritage Act 1977

The proposed works within the Stage 2, known as Stage 2(c) project fall within the State Heritage Listing for Gleniffer Brae and Surrounding Garden (SHR 00557).

It is noted Stage 1 of these works, with a similar impact to the Gleniffer Brae SHR Site were approved by Heritage NSW under the Section 57 Exemption notification process. However following the review of the Exemption process in 2021, and the introduction of new non-notifiable standard exemptions, the Stage 2(c) works no longer fit within the specifications for any of the new exemptions. Due to the cost of the project, which is above \$150,000 the works also do not fall within the fast-track Section 60 requirements, and therefore now require a Section 60 approval under the Act.

This Report has been prepared to support a Section 60 Application for approval under the Act.

Protection of “Relics” under the Act

The Conservation Management Plan was required to address this issue and the proposed works area was assessed as having no potential. A Historical Archaeological Assessment (2018) prepared by Casey and Lowe is included as an Appendix to the CMP.

Therefore an unexpected finds condition on any future Section 60 approval is expected adequate to manage this issue.



Figure 3.7: Summary of archaeological potential across the site. SIX Maps, LPI, 2018.

Figure 5: Casey and Lowe (2018) showing small area of potential outside of works area

NSW National Parks and Wildlife Act 1974

The Study Area does not include any known Aboriginal sites recorded on AHIMs. However, due to the archaeological and cultural sensitivities attached to similar landform contexts throughout the area it was considered appropriate to carefully assess and consider the potential for Aboriginal sites, areas of cultural significance or objects associated with Aboriginal occupation to be present on the site.

An Aboriginal Archaeological Assessment (2019) was prepared for the Botanic Garden Site by AMBS Ecology and Heritage in consultation with the Illawarra Aboriginal Land Council was prepared and included as Part 5 of the Conservation Management Plan.

The site was assessed as low archaeological potential and no Aboriginal Sites were identified.

Therefore, an Aboriginal Heritage Impact Permit under s 90 of the NPWA is not required.

Native Title Act 1994 and Aboriginal Land Rights Act 1983

The land is owned by Wollongong City Council and is not Crown Land under Council's management and control. Therefore, these Acts do not apply.

2. Background

2.1 Gleniffer Brae Conservation Management Plan and Wollongong Botanic Garden Master Plan

A Conservation Management Plan was prepared for Gleniffer Brae and the Surrounding Garden by Architectural Projects, dated July 2022 (Appendix A). The CMP has been under assessment for endorsement by Heritage NSW for a number of years and is now conditionally endorsed subject to amendment of a site specific exemption relating to a temporary shade structure located outside of the proposed works area.

The Gleniffer Brae CMP has been coordinated with the master planning for the future of the Wollongong Botanic Garden to ensure consistency of aims, approaches and outcomes. The recommendations of the 2008 Landscape Master Plan Gleniffer Brae have been analysed and incorporated into this document. The CMP has in turn guided the development of the Draft Masterplan for the Wollongong Botanic Garden (2018) prepared by Architectural Projects and Clouston Associates ('The Masterplan') and is attached to this application as Appendix F.

The Masterplan was developed to identify long term improvements to guide the development and service delivery for the study area, and to maintain and enhance the heritage of the site. Council have drafted the following priority masterplan projects which are identified in Part 1.2 of the CMP, including:

- Replacement of the Joseph Banks Glasshouse;
- New entry, visitor centre, admin and depot, and carparking;
- Duck pond café;
- Discover centre café/restaurant;
- Rainforest Walk;
- Murphy's avenue entry;
- Irrigation design and installation; and
- Gleniffer Brae function and parking

The proposed Section 60 application is to complete the staged construction of the proposed rainforest walk identified in the Masterplan. Stage 1 of which was partially within the SHR area was constructed in 2018.



Figure 6: 2018 Draft Botanic Garden Masterplan (Appendix F)

2.2 Community Consultation

The community have been engaged in and involved in the development of the Rainforest Walk concept over a number of years, with formal consultation on the Draft Botanic Gardens Masterplan being undertaken in 2018. The Botanic Garden Masterplan Consultation Report prepared by Wollongong City Council's engagement team is attached as Appendix E. A key outcome identified in the Masterplan was the construction of Stage 2 of the Rainforest Walk.

Council held on an onsite information stand which was attended by 25 community members and also received a total of 564 formal submissions during the public exhibition period. The following stakeholders and community groups were specifically engaged during the project:

- Wollongong Council Aboriginal Reference group
- Illawarra Local Aboriginal Lands Council
- Friends of the Botanic Garden
- Wollongong Council Heritage Reference Group

Themes that emerged as part of analysis of the submissions, included the enhancement the Rainforest Walk and connection of the walk to Mt Keira walking trails to the west and as well as general support for the completion of the Rainforest Walk.

Therefore the proposed Stage 2(c) works are in line with Community feedback and achieve a desired outcome for the site.

3. Understanding Significance

3.1 Aboriginal History of the Area

Prior to European occupation of the Illawarra, the area around North Wollongong and the surrounding coastline was used by the Dharawal people as a natural harbour and sheltered area for all manner of cultural and ceremonial activities for more than 20,000 years and possibly as many as 40,000 years.

The region would have provided rich marine resources for the inhabitants, in terms of both food resources and shelter. Shellfish and fish such as Sydney Rock Whelk and Sydney Rock Oyster were integral to the diet of coastal tribes, as were snapper and bream. The diet of Dharawal people within the region could have also included rhizomes of the Bracken Fern, seeds of the wattle, fruit of the Geebung, and terminals and buds of the Cabbage Palm. Hawkesbury sandstone geology that make up the Illawarra Escarpment provided ample rock platforms and overhangs for sheltering from inclement weather and for art production.

According to tradition the Aboriginal custodians of the Illawarra region, the Wodi Wodi, first arrived at the mouth of Lake Illawarra in canoes. They spoke a variant of the Dharawal language, named after the cabbage tree palm that they brought with them from the north. Depending on the part of the region they occupied, the Wodi Wodi identified as fresh water, bitter water or salt water people.

Ceremonies took place at Mount Keira to the west of the subject site, a significant site for Aboriginal people of the Wollongong region. Mount Keira forms part of the creation story of the region, connecting the escarpment to the coast. In the creation story, Oola-boola-woo had six daughters, Mimosa, Wilga, Lilli Pilli, Wattle, Clematis and Geera, who lived on top of the Illawarra escarpment. One by one, the first five children misbehaved and as a result were casted out to sea with the stone beneath them, forming the Five Islands, located off the Wollongong coast. Geera was the only child left on the escarpment and would spend her days alone, watching the camps of the local Aboriginals and looking out to sea to her five sisters. After many years of isolation, she eventually turned to stone, dust and leaves, becoming part of the escarpment and forming what is now known as Mount Keira.

3.2 History of the Wollongong Botanic Gardens

A full history of Gleniffer Brae is not reproduced in this document. See Part 3 of the CMP which details a comprehensive history of the site, the previous ownership and Hoskins contribution to the Steelworks industry and construction of the Manorhouse.

The following information relating to the establishment of the Botanic Gardens and the works area has been extracted from the CMP:

The Hoskins interest in gardens and their sense of patrimony led the Hoskins to gift most of their joint properties to the City Council for a public garden. In July 1951, Mr Hoskins wrote to Wollongong Council with the intention of dedicating approximately 50 acres of land, adjoining Gleniffer Brae, for a war memorial park or botanic garden. The land excluded Gleniffer Brae and Sorensen Gardens. On 12 December 1951, a Memorandum of Agreement between Hoskins family and Council was entered into. The site area subject to survey, fencing and covenants. Covenants state that land cannot be used 'for dog or horse racing, nor have erected on it any sales yards, or any other building inconsistent with the land remaining a park or garden'.

The educational interest was maintained when the Sydney Church of England Girls School Council (SCEGGS), which conducted several regional establishments together with the head school at Darlinghurst, purchased Gleniffer Brae. In June 1954, The Illawarra Mercury reported that Gleniffer Brae and 38 acres of land had been purchased by SCEGGS. SCEGGS requested more land, and in agreement with HM Hoskins, Council transferred approximately 21 acres to the north

and east of Gleniffer Brae to SCEGGS. The grounds were used for play areas. Various buildings were constructed on the site relating to the SCEGGS use including a swimming pool and facilities in the location of the amphitheatre, and developed hockey fields and tennis courts on Northfields Avenue in the location of Kooloobong Oval and the adjoining operational area of the Wollongong Botanic Garden.

Financial difficulties put a halt to any new construction projects by the school and in 1976, Council purchased 15 acres from SCEGGS for inclusion in the Botanic Garden (Lot 1 DP 252694). In 1977, SCEGGS closed the school at Gleniffer Brae and amalgamated with Illawarra Grammar School. The following year, Council purchased the remaining land from SCEGGS described as Lots 2 and 3 DP 252694 including Gleniffer Brae, merging it with the now enlarged Botanic Garden which had officially opened to the Public as 'Hoskins Park-Wollongong Botanic Garden in 1971.

By 1993, the Botanic Garden's operational area had again expanded into its current arrangement.

3.3 Rainforest Walk Construction and Chronology

The Stage 1 works, including area partially in the Gleniffer Brae SHR curtilage, were approved under a section 57(2) Exemption and constructed in 2018. The Exemption notification is included as Appendix G.

Wollongong City Council received approval on 7 January 2016 under the NSW Heritage Act 1977, for works considered minor activities under the previous Standard Exemption Number 7 for the proposed Rainforest Walk Extension in the Botanic Gardens.

Stage 1 included constructing a bitumen path and five sets of stairs, installation of concrete paving at node points, sandstone block walls for retaining various areas, timber seats, drinking fountains and bike racks and associated cut and fill. An additional approval was obtained under Standard Exemption No 8 for the removal of twelve non-significant rainforest trees within Lot 2 and 3 of DP 252694 to complete construction of Stage 1, which was assessed as having no impact to the State Heritage item by Heritage NSW.

The Stage 2 project, includes an area known as stage 2(c) includes works within the Gleniffer Brae and Sorensen Garden State Heritage Precinct, which includes upgrades to existing pathways and the construction of an elevated accessible walkway across a watercourse and required removal of vegetation and non-significant trees, as part of the completion of the Rainforest Walk, which connects and integrates into to the existing Stage 1 works.

3.4 Site Photos

The following photos were taken during a site visit by Council’s Heritage Officers on 9 March 2023.



Figure 7: View from Gleniffer Brae looking north to Mt Pleasant showing existing rainforest vegetation along creekline below terraced tennis court area (known as View 3 and 4 in CMP)



Figure 8: View northwest to Mt Keira from upper terrace at Gleniffer Brae obscured by vegetation (known as View 2 in CMP).



Figure 9: View from lower terrace west to Mt Pleasant showing existing rainforest vegetation



Figure 10: Part of Stage 1 of Rainforest Walk on southern site of creekline vegetation



Figure 11: View from Stage 1 of the Rainforest Walk south to Gleniffer Brae, which can be seen outside of creekline vegetation



Figure 12: Stage 1 of Rainforest Walk showing vegetation



Figure 13: View of existing informal track to creekline where canopy walk is proposed.



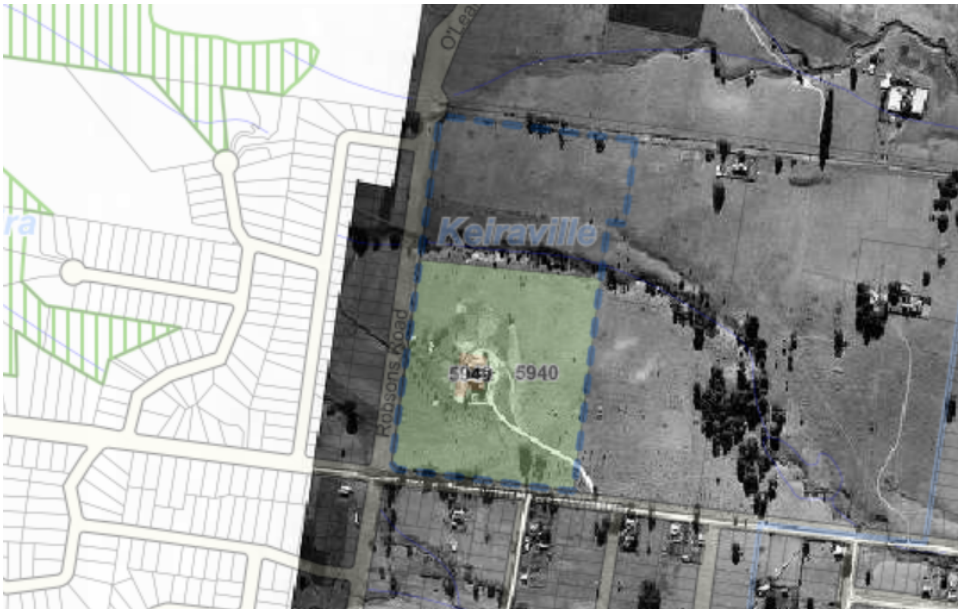
Figure 14: Location of Elevated Canopy Walkway showing vegetation and small trees proposed to be removed



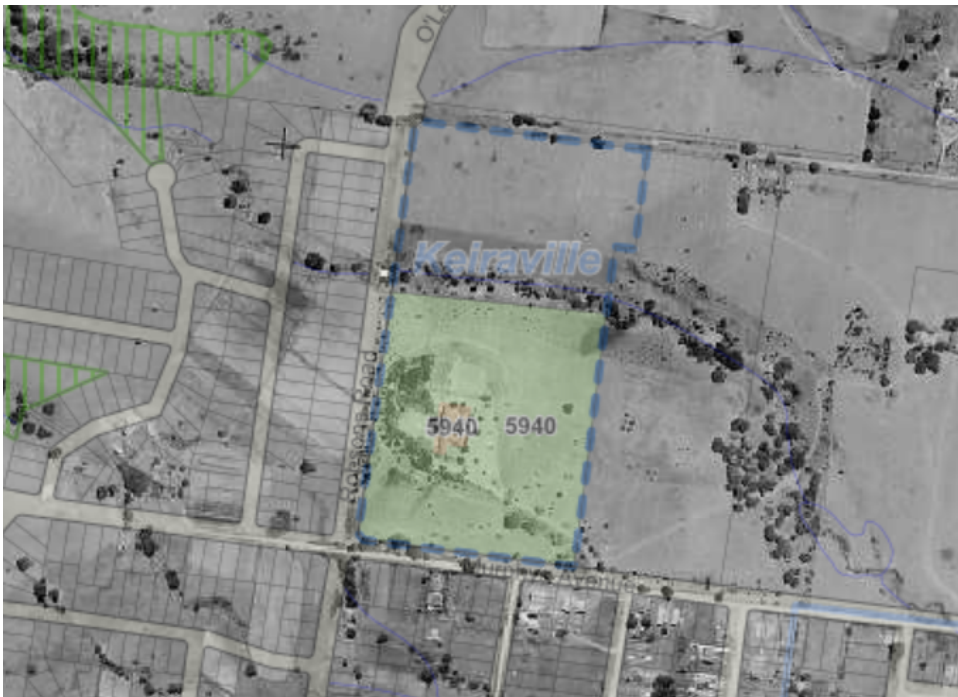
Figure 15: View looking south from informal track to creekline, Gleniffer Brae is completely screened by vegetation

3.5 Aerial Photography Chronology

The following historic aerial photography of the site is available from 1938 through to 2021 and shows the development of the Hoskins Estate, Gleniffer Brae and Sorenson Garden and the Wollongong Botanic Gardens following dedication and the changes in the landscape over this time.



1938 – showing original Hoskins Estate



1948 - showing original creek alignment and vegetation



1955 – showing connection across water course to Kooloobong Ovals and increasing creek vegetation



1977 – showing SKEGGS pool and tennis courts



1993 – Showing significantly increase vegetation and establishment of Botanic Garden greenhouses to the north



2011 – Showing infilled pool and loss of connection to Kooloobong Oval



2022 - showing exiting rainforest vegetation along creek line and established Botanic Gardens setting of Gleniffer Brae and Sorenson Garden

3.6 Statement of Heritage Significance

The following Statement of Significance has been prepared in the conditionally endorsed CMP, however the SHR Listing has not been updated:

Gleniffer Brae is intimately associated with that period of Illawarra's history which saw the beginning of major economic development. It is associated with the Hoskins family and particularly Arthur Sidney Hoskins, pioneers of the steel industry and responsible for its creation and development at Port Kembla. The estate is thus not only a gentleman's residence but the manager's house for a large industrial complex. A.S. Hoskins, for whom the house and garden was designed and built, was instrumental in establishing the Illawarra steel industry and made a significant contribution to the community life of Wollongong.

Gleniffer Brae forms a well-designed residential estate in sympathy with the surrounding site which was selected for its views and topographical setting. It is associated with architect Geoffrey Loveridge and landscape designer Paul Sorensen, who both received recognition for their work. The Tudor Manor style "lent itself to a richness of craftsmanship together with opulent decoration." Gleniffer Brae exhibits a high quality of craftsmanship in the fabric of the original buildings. The detailing represents the finest in Australian building skills of the inter-war period and this is enhanced by the fact that its original fabric has a high degree of integrity. The four Art Deco silk and wool rugs provide an important link with the Hoskins family and their occupation. The open space around the house permits a full appreciation of the scale and design of the house in the round.

The house constitutes a fine example of the Inter-war period Old English Tudor style of architecture, directly influenced by Compton Wynyates, cleverly adapted to the requirements of a single storey complex. The choice of the English Tudor style reflected the orientation and values of wealthy families in the Interwar period during the depression. The size of the house and its setting apart from the adjacent village of Keiraville and from the town of Wollongong reflects the success and sensibilities of AS Hoskins. The house is a fine representative example of the work of Geoffrey Loveridge.

Few capitalists associated with the mining and industrial development chose to live in the Illawarra, and so Gleniffer Brae stands apart as a rare example of a grand Interwar house on a large estate in the City of Wollongong. Gleniffer Brae together with Invergowrie at Exeter are a unique pair, both estates being the outcome of the collaboration between architect Geoffrey Loveridge and landscape designer Paul Sorensen. The houses were built for two brothers Cecil and Sidney Hoskins, family who each married a sister of Geoffrey Loveridge. Their rarity is heightened by the fact that the pair of estates survive as relatively intact outstanding examples of Interwar period architecture and landscape design.

*The gardens constitute an integral part of the design and setting of the house and show the outcome of an integrated association between architect and landscape designer. The grounds' original garden design is representative of designer Paul Sorensen's ability to incorporate the surrounding landscape and flora into the overall design and to capture and extend the dramatic effect of the natural landscape through spatial planning, planting, including transplanting of several large Coral trees (*Erythrina* sp.), and construction of hard landscape elements. It is one of an important group of Sorensen Gardens in NSW. The entire site including the house landscape and associated items has been associated with the life of the community and the area since its occupation by Hoskins who held community events in the grounds and gifted the bulk of the estate for a municipal botanical garden. The site of Gleniffer Brae is now part of the Wollongong Botanic Garden, and a such continues the estate's association with the community and educational life of Wollongong and the Illawarra region.*

The house's current use as home of the Wollongong Conservatorium of Music, continues the association of the site with the development of education in the Illawarra, starting with SCEGGS in 1954.

Gleniffer Brae is still held in high esteem by the local community, and particularly the Friends of the Wollongong Botanic Garden, who have a demonstrated ongoing interest in its conservation and management. Gleniffer Brae constitutes an important element of the Wollongong Botanic Garden precinct.

4. The Project – Proposed Works

4.1 Project description

The proposed works included within the future Section 60 application relate only to the Stage 2(c) works area (see Figure 16). It is noted that works relating to Stage 1 were separate approvals under the Infrastructure SEPP and the Environmental Planning and Assessment Act and NSW Heritage Act 1977 have been constructed.

The proposed works which are the subject of this application will be detailed within the Architectural, Landscape, Civil and Structural Plans, a full suite of which is attached to this Report to support the Section 60 application as Appendix C.

A Draft Review of Environmental Factors (REF) has been prepared and provides a detailed description of the proposed works and outline environmental considerations and controls that will ensure the proposed works can be undertaken in a considered and environmentally sensitive manner (Appendix B).

The landscape and structural plans included as Appendix C provide detail on the scope of the works as it is laid out across the whole Stage 2 project area, majority of which are not within the SHR curtilage. The following works description has been extracted from the draft Review of Environmental Factors (REF) for the project. The scope of Works for Stage 2(c) includes the following:

- Asphalt Pathway - 27m long x 1.8m wide x 200mm deep
- Install Flush Concrete Edge to asphalt path 150 x 150mm
- Install brick paver edge – woodlands garden unit pavers
- Install Node Paving
- Make good connection to existing mulch paths
- Install Rainforest Canopy Bridge - 58m long
- Install Nature Artwork (to be developed)
- Install sandstone retaining wall at Node 1 and southern asphalt path.
- Random rock boulders for informal seating at nodes.

Additional discussion of the project works specifically as they relate to heritage significance and heritage features across the site are also provided within the Heritage Impact Assessment section of the report. Refer to the Detailed Heritage Impact Assessment Table for additional details.

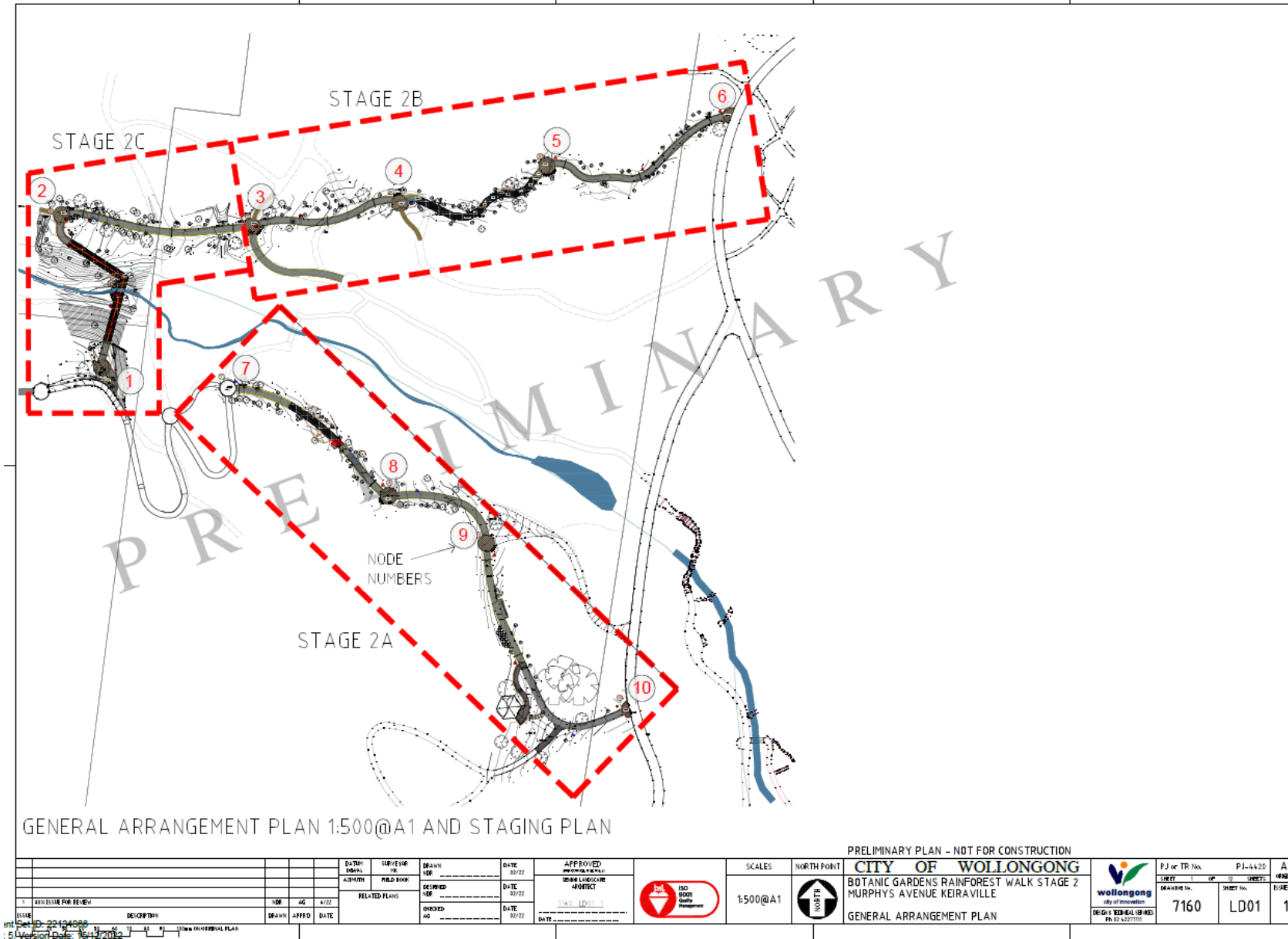


Figure 16: Concept Landscape Plan and Staging Detail

5 Heritage Impact Assessment

5.1 Potential Heritage Impacts

The proposed works to finalise Stage 2(c) of the Rainforest Walk are located within the curtilage for Gleniffer Brae and Surrounding Landscape. The works will not require any direct works to or impacts upon the key identified heritage features within the precinct or inner Sorensen Garden.

Stage 1 of the Rainforest Walk was approved under the previous Exemption notification process in 2016 and 2017, with the then Office of Environment and Heritage assessing the proposed works as having minor impacts on the heritage values of Gleniffer Brae:

This exemption is endorsed on the basis that the works are to be undertaken in accordance with the report/drawings listed above and that the proposed works described in your application have been assessed as likely to have a minor impact on the heritage values of Gleniffer Brae.

Stage 2, including Stage 2(c) is a continuation of the Rainforest Walk and the construction of low-scaled pathways, within the already established rainforest area, and outside of the 4-acre Sorensen Garden defined in the CMP will have little impact on the heritage values of the SHR area.

The elevated walkway, which has potential to have a level of visual impact on the setting of the House, has been carefully designed to be sympathetic and visually recessive in the existing rainforest setting. Through the citing, materiality and design it is assessed as having no visual impact from Gleniffer Brae and the Sorensen Garden. The works will not be visible from the house due to the topography and the established rainforest vegetation which forms a key component of the Wollongong Botanic Garden and has social significance values as a community Botanic Garden on land donated by Hoskin's for that intended purpose.

The proposed upgrades to the Rainforest Walk as identified in the Masterplan will improve connectivity around the Botanic Gardens and to Gleniffer Brae and the 4-acre Sorensen Garden, with accessibility upgrades which will allow all members of the community to have greater access to the broader site integrating travel through to the Botanic Garden and restabilising the connection to the Kooloobong Ovals to the north. The project also improves movement through the Botanic Gardens to various Mt Keira walking trails to the west, which is an opportunity to highlight Aboriginal Heritage values through interpretative elements in the Rainforest Walk and has the potential to have positive heritage impacts on the State Heritage item.

5.2 CMP Policies

The following CMP policies are relevant to the construction of Stage 2(c) of the Rainforest Walk and the proposed development has been assessed in regard to consistency with these policies.

Policy 8.3.3 - The historic link between the subject building and the Wollongong Botanic Garden as part of the original Hoskins estate should be interpreted and enhanced.

8.5.16 - Views and physical links between Wollongong Botanic Garden and Gleniffer Brae should be Reinforced.

The Rainforest Walk was included in the master planning process for the site to improve connectivity between the Wollongong Botanic Garden and the 4-acre Sorensen Garden through upgrades to the pathway network, and an accessible elevated walkway over the water course, which currently limits movements through the site and will reestablish a physical

connection to Kooloobong Oval to the north, which are also part of the SHR listed area and have had previously had stronger links to the site for use by SKEGGS students.

8.8.4 - New development could occur in areas identified as having moderate significance, located outside of the Sorensen Garden beyond the landscape screen (Refer Figure 6.2).

The Rainforest Walk including Stage 2(c) is located outside of areas of moderate significance and the Sorenson Garden as per figure 6.2 of the CMP, shown as figure 17 below.

9.7.6 - The area of Kooloobong Oval, which is identified as moderate significance, is screened from the landscape setting by the rainforest creek vegetation. Kooloobong oval was formerly the continuity of use of the Oval as open space- paddocks, SCEGGS hockey fields and Kooloobong Oval is desirable. The area has limited scope for new development. Any new development would need to be screened by the creek vegetation.

The elevated walked will be screened by the existing rainforest creek vegetation and is intended to provide an experience through the Rainforest canopy, which would inherently be screened by the established vegetation and replacement planting of the vegetation and small trees proposed to be removed to accommodate construction of Stage 2(c), to ensure the intent of the Rainforest Walk experience is achieved.

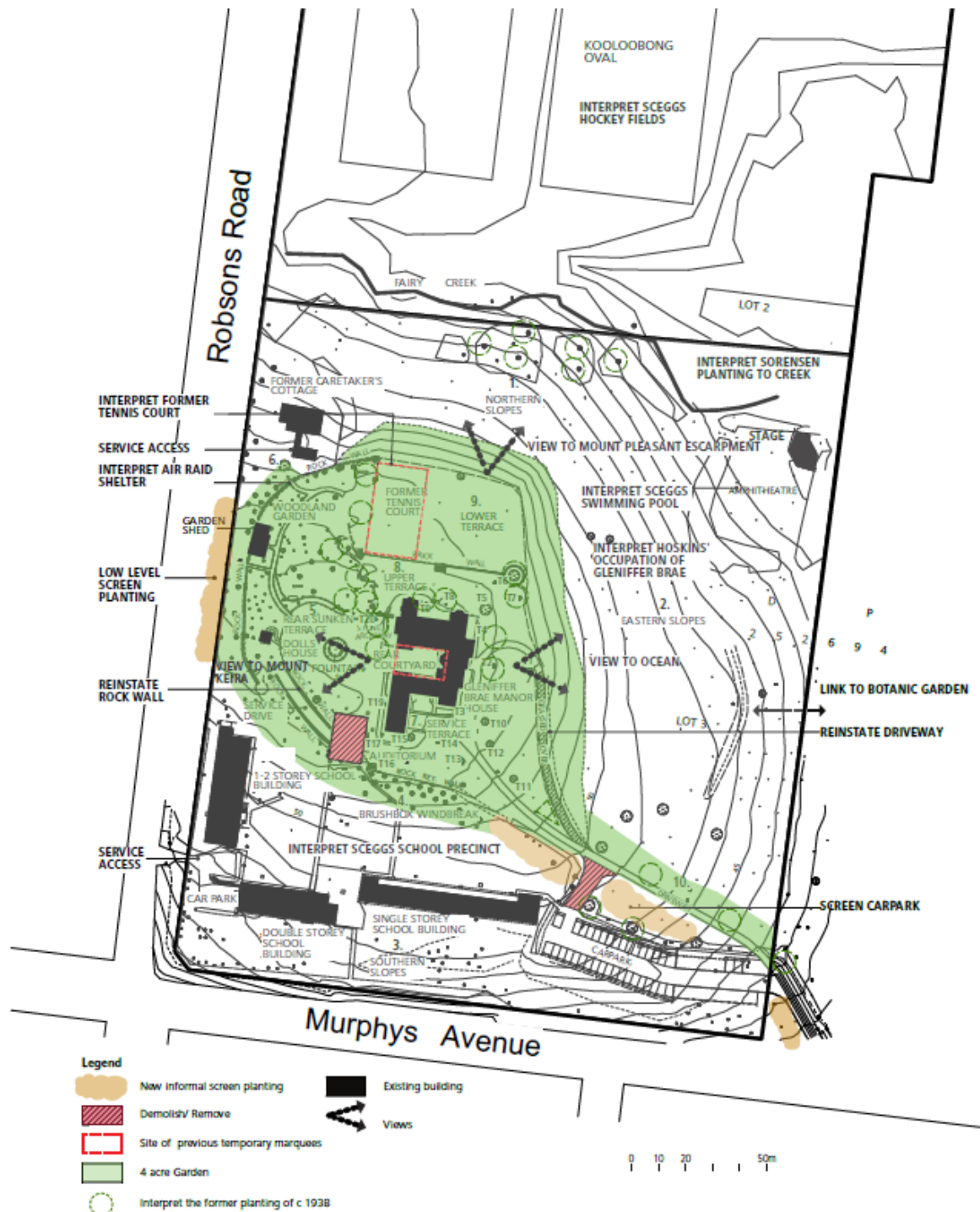


Figure 17: Constraints and Opportunities Map CMP (Figure 6.2, Page 196) as reference in Policy 8.8.4

5.3 Key Views

Additionally to the above policies, potential impacts to key views to and from the State Heritage listed site identified in the CMP have been considered as part of the design process. The Rainforest Precinct of the Botanic Garden sits in the valley between Gleniffer Brae and Kooloobong Oval to the north and this topography provides an opportunity to ensure the elevated walkway does not impact on any significant views as identified in Figure 18 below. Views of the Illawarra Escarpment to the north from Gleniffer Brae and the Sorenson are noted as being significant in the CMP, the creek vegetation in the valley is situated significantly lower than the Manor House and 4 acre garden due to the landform and the citation of the dwelling on the crest of the hill.

Views 3 and 4 from Gleniffer Brae to Mt Pleasant and Illawarra Escarpment has the potential to be impacted by the elevated canopy walkway, as per policy 8.8.2 of the CMP this potential visual impact has been carefully considered at design phase.

8.8.2 New development should be subservient to the house and its ability to be viewed in the ground, and not impact permanently upon key views and the visual setting.

A section of the proposed canopy walkway has been prepared by Wollongong City Council to ensure the design is cited appropriately in the topography, which shows the structure will not be visible from key views identified in the CMP and from Gleniffer Brae and the Illawarra Escarpment. As shown in Figures 19 and 20 below, the structure remains well below the established rainforest vegetation in height and sits within a valley to the north of the terraced lawns.

Additionally an anodised aluminium finish in ‘camouflage green’ with hardwood timber rails has been selected to ensure the elevated walkway is visually recessive and reflects the tonal rainforest colours.

All other works relates to upgrades of existing pathways and the construction of low scale accessible paths and associated infrastructure, therefore no significant views will be impacted by the propose construction of Stage 2(c) of the Rainforest Walk.



Figure 18: Key views as identified in the CMP



Figure 19: View 3 and 4 north to Mt Pleasant showing existing canopy

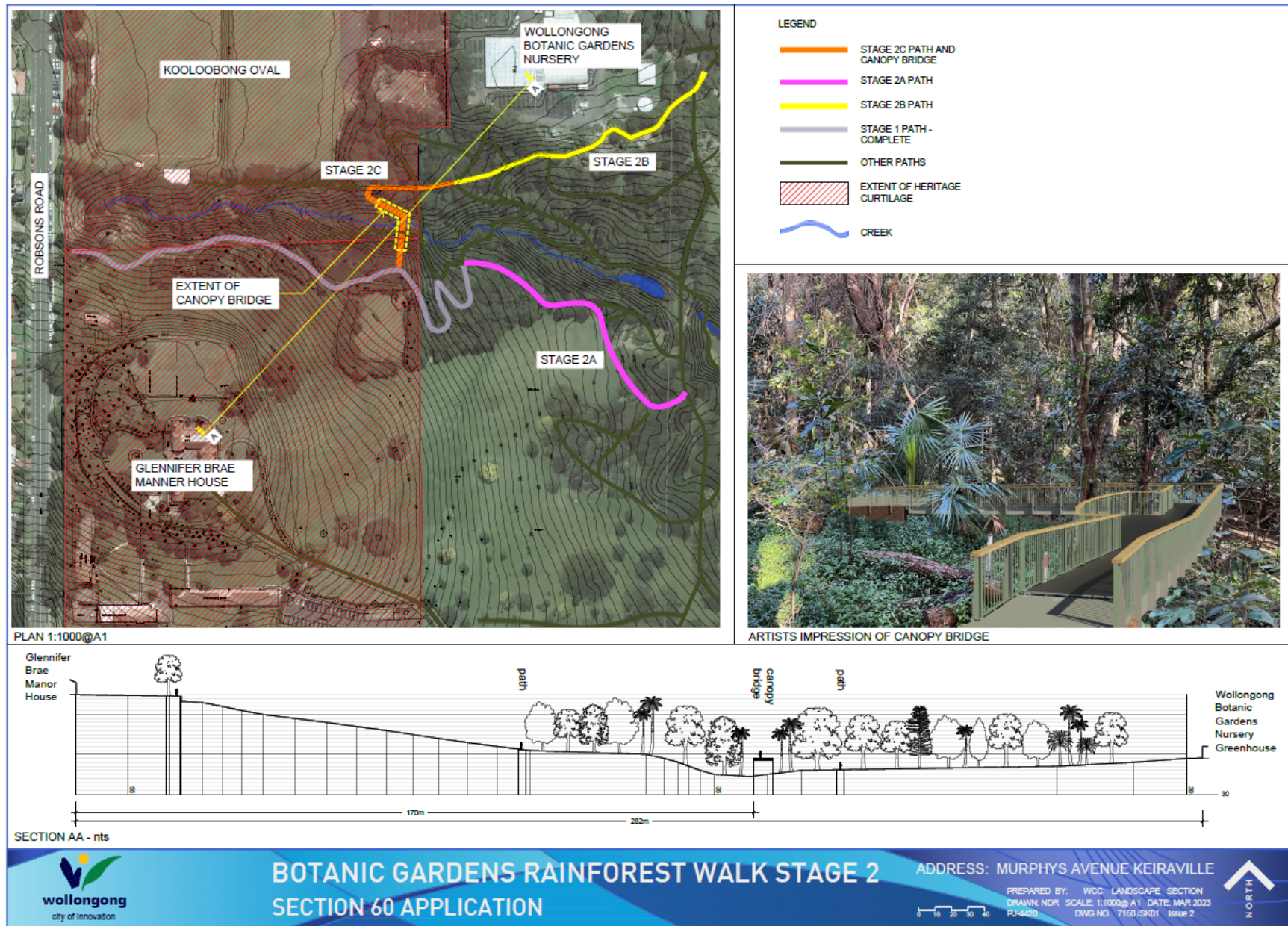


Figure 20: Section A-A showing topography and height of elevated canopy bridge, view 9 will not be affected

5.4 Analysis in response to NSW Heritage Guidelines

This section of the report discusses the heritage impacts of the proposed development. This discussion responds to the recommended questions to be addressed in the Heritage NSW Guidelines for Statements of Heritage Impact as they relate to the proposed project.

The following table outlines responses to the relevant matters for the proposed project. Matters which are not relevant to the proposal have been left out of this table to focus on the key relevant matters for the site.

Proposed Change to Heritage Item	Questions to be Answered in a Statement of Heritage Impact	Discussion/Response
Demolition of a building or structure	• <i>Have all options for retention and adaptive re-use been explored?</i> • <i>Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?</i> • <i>Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?</i> • <i>Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?</i>	No demolition proposed.
Minor partial demolition (including internal elements)	• <i>Is the demolition essential for the heritage item to function?</i> • <i>Are important features of the item affected by the demolition (e.g. fireplaces in buildings)?</i> • <i>Is the resolution to partially demolish sympathetic to the heritage significance of the item?</i> • <i>If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?</i>	No demolition proposed.

Major partial demolition (including internal elements)	• <i>Is the demolition essential for the heritage item to function?</i> • <i>Are particular features of the item affected by the demolition (e.g. fireplaces in buildings)?</i> • <i>Is the detailing of the partial demolition sympathetic to the heritage significance of the item (e.g. creating large square openings in internal walls rather than removing the wall altogether)?</i> • <i>If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?</i>	No demolition proposed.
Change of use	• <i>Has the advice of a heritage consultant or structural engineer been sought? Has the consultant's advice been implemented? If not, why not?</i> • <i>Does the existing use contribute to the significance of the heritage item?</i> • <i>Why does the use need to be changed?</i> • <i>What changes to the fabric are required as a result of the change of use?</i> • <i>What changes to the site are required as a result of the change of use?</i>	No change of use is proposed. The proposed works achieve an ongoing and significant function of the site as the Wollongong Botanic Gardens and strengthen physical links between the Botanic Gardens and Gleniffer Brae to activate the site as per CMP policies.

New development adjacent to a heritage item (including additional buildings and dual occupancies) Note: Most planning instruments (such as local and regional environmental plans) require the approval authority to take into account the impact of new development on adjacent heritage items or conservation areas.	• <i>How is the impact of the new development on the heritage significance of the item or area to be minimised?</i> • <i>Why is the new development required to be adjacent to a heritage item?</i> • <i>How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?</i> • <i>How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?</i> • <i>Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?</i> • <i>Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?</i> • <i>Will the additions visually dominate the heritage item? How has this been minimised?</i> • <i>Will the public, and users of the item, still be able to view and appreciate its significance?</i>	
Repainting using new colour schemes	• <i>Have previous (including original) colour schemes been investigated? Are previous schemes being reinstated?</i> • <i>Will the repainting effect the conservation of the fabric of the heritage item?</i>	The colour scheme of the proposed elevated Rainforest walkway has been carefully selected, anodised steel is a high quality finish with ‘camouflage green’ finish will reflect the rainforest colours and be visually recessive. The top handrail is proposed to be hardwood timber to soften the walkway. All other walkway finishes are to match existing as approved by Heritage NSW as part of Stage 1.
New landscape works and features (including carparks and fences)	• <i>How has the impact of the new work on the heritage significance of the existing landscape been minimised?</i> • <i>Has evidence (archival and physical) of previous landscape work been investigated? Are previous works</i>	The works are outside of the 4-acre Sorensen Garden identified in the CMP as high significance.

	<i>being reinstated?</i> • <i>Has the advice of a consultant skilled in the conservation of heritage landscapes been sought? If so, have their recommendations been implemented?</i> • <i>Are any known or potential archaeological deposits affected by the landscape works? If so, what alternatives have been considered?</i> • <i>How does the work impact on views to, and from, adjacent heritage items?</i>	The proposed works area does not have archaeological potential and no approvals are required under the NHPA and Heritage Act. See Part 1.4 of this SoHI and Appendixes to the CMP for full archaeological assessments. See Part 5.3 of this SoHI for assessment of potential impacts to key views identified in CMP.
Tree removal or replacement Note: Always check the tree preservation provisions of your local council when proposing removal of trees	• <i>Does the tree contribute to the heritage significance of the item or landscape?</i> • <i>Why is the tree being removed?</i> • <i>Has the advice of a tree surgeon or horticultural specialist been obtained?</i> • <i>Is the tree being replaced? Why?</i>	Approximately 20 self-seeded rainforest tree/vegetation will require removal within the Stage 2(c) Area to accommodate the elevated canopy walkway, see Figure 21. Councils AQF5 Arborist was involved in design process to avoid impacts to trees with high retention ratings. The proposed trees to be removed are not identified in the register of significant trees associated with the Sorenson Garden (Appendix F of the CMP) and considered non-significant fabric planted as part of the relatively recently established rainforest garden. The location of the Rainforest Walk has been designed to minimise removal of established and significant vegetation (to ensure retention of the canopy) and the proposed tree removals are largely immature and self seeded, and will have no significant impact on the belt of vegetation that provides a low level screening from Gleniffer Brae toward the University of Wollongong Kooloobong student accommodation.
New signage Note: Check whether the local council has a signage policy or design guidelines	• <i>How has the impact of the new signage on the heritage significance of the item been minimised?</i> • <i>Have alternative signage forms been considered (e.g. free standing or shingle signs). Why were they rejected?</i>	No commercial signage or advertising signage is proposed within this application. Some additional interpretation material and artworks, which are yet to be commissioned through an expression of interest process will be included along the accessible walkway.

	• <i>Is the signage in accordance with section 6, 'Areas of Heritage Significance', in Outdoor Advertising: An Urban Design-Based Approach? (1) How?</i> • <i>Will the signage visually dominate the heritage item/ heritage conservation area or heritage streetscape?</i> • <i>Can the sign be remotely illuminated rather than internally illuminated?</i>	
--	---	--

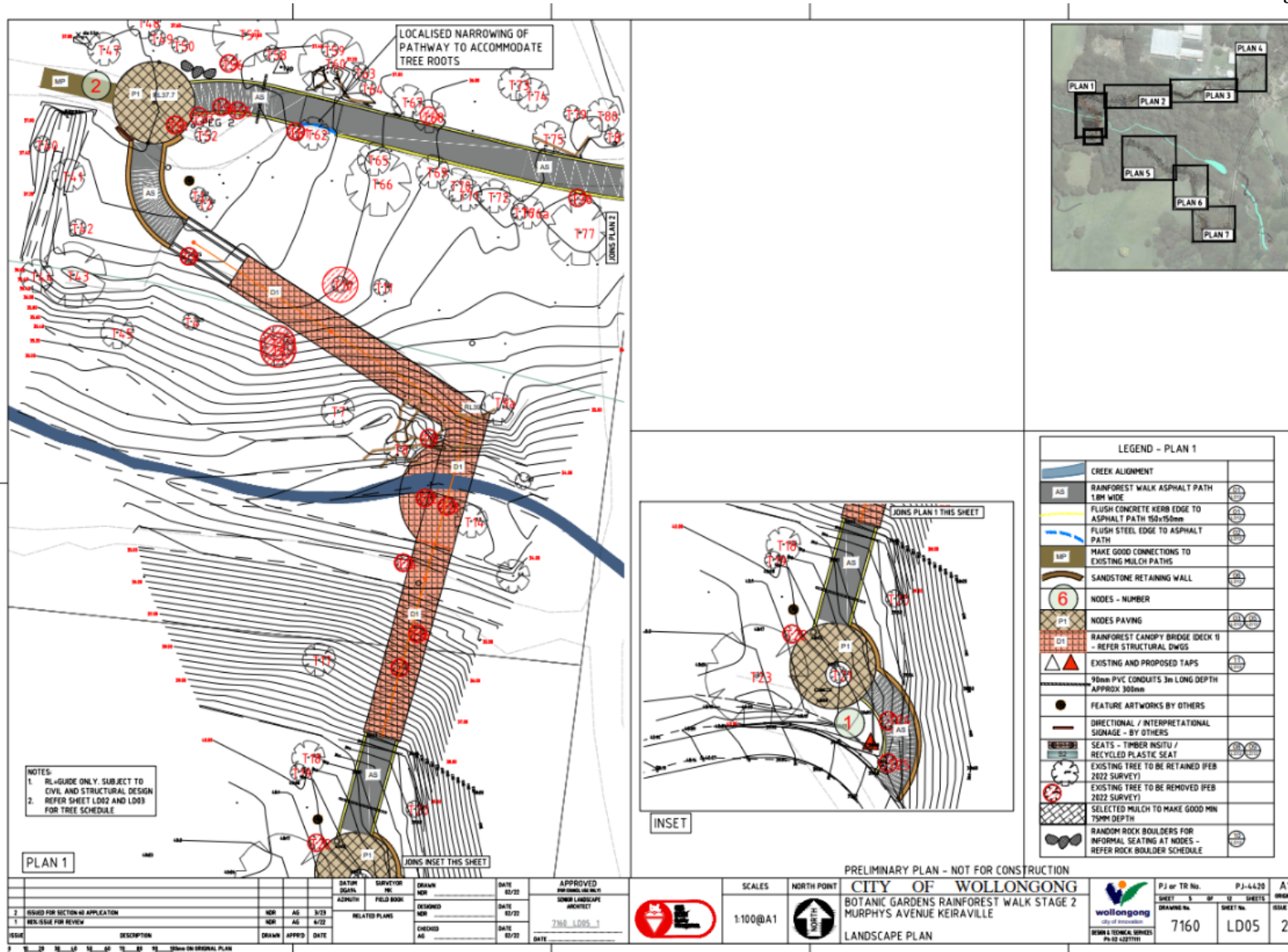


Figure 21: Landscape Plan showing proposed tree removal and tree root avoidance measures

6 Conclusion and Recommendations

The works proposed in the submitted application are supported on heritage grounds and in line with the endorsed Conservation Management Plan policies. The elevated walkway is not expected to have any impact on key views to and from the Gleniffer Brae State Heritage item. High quality finishes and materiality have been selected to ensure any elevated structures are visually recessive, and the detailed design has carefully been cited to limit tree removal to new growth vegetation outside of the identified Sorensen Garden and to ensure canopy rainforest trees are retained. The works will have a positive heritage impact through improving the connection between the Manor House and Sorensen Garden and establishing the connection between Kooloobong Ovals and the Wollongong Botanic Gardens, on land dedicated to Council by Hoskin's for this purpose through accessibility and connectivity upgrades.

Stage 1 was approved under the previous Heritage NSW Exemption process for minor works with minimal heritage impacts, and Stage 2(c) will allow the continuation of upgrades and completion of the Rainforest Walk as envisaged in the Draft Botanic Garden Masterplan.

The following recommendations provide project controls and are intended to guide the development of detailed construction plans and project controls have been incorporated into the Review of Environmental Factors (REF), as well as to inform the approval process and relevant conditions of consent:

1. An application for approval under Section 60 of the NSW Heritage Act 1977 should be sought for the Stage 2(c) of the project, including construction of the elevated Rainforest Walk partially within the SHR Area;
2. The works are to be constructed in line with the recommendations of the conditionally endorsed Conservation Management Plan;
3. Heritage NSW should progress final endorsement of the CMP;
4. An unexpected finds protocol for both Non-Aboriginal and Aboriginal Archaeology is to be implemented in the REF documentation;
5. Consideration should be given to incorporation of interpretation material for the project area in consultation with the local Aboriginal Community to identify cultural values associated with the Rainforest ecosystem and located of the Botanic Gardens at the foothill of Mt Keira.

7 References

Gleniffer Brae Conservation Management Plan, Architectural Projects July 2022

Gleniffer Brae and Surrounding Gardens, *Heritage NSW State Heritage Database*, URL:
<https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=2700134>

Appendix B: Incident Management Procedure

TITLE

Accidental oil spill in watercourses and drains

PURPOSE

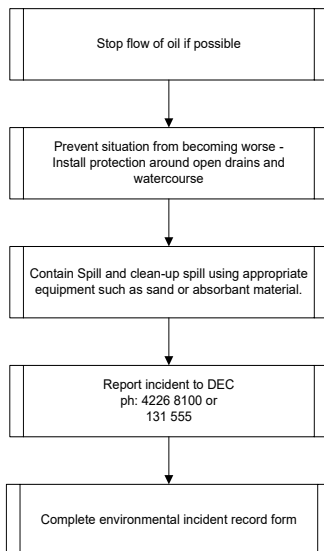
To ensure all practicable means are used to prevent oil spillage during construction or maintenance works near watercourses and drains.

APPLICATION

This procedure applies to all watercourses including coastal water, rivers, lakes, dams, watercourses, artificial channels, ditches and gullies, and stormwater drains.

Depot Co-ordinators to ensure all operators working near watercourses are trained in this procedure.

PROCEDURE



OPERATING CRITERIA

- Spill kit to be onsite at all times during operation
- Refuelling and storage to be undertaken at Depot
- Machinery not in use to be parked away from drains and watercourse banks in case of natural disaster or vandalism
- All staff and contractors to be trained in oil spillage response

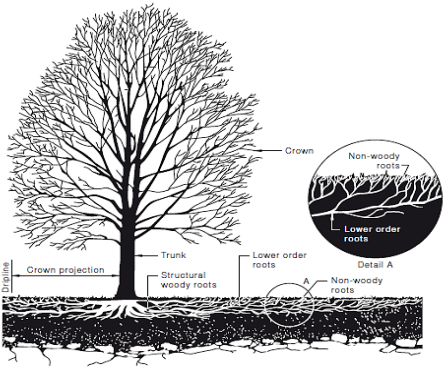
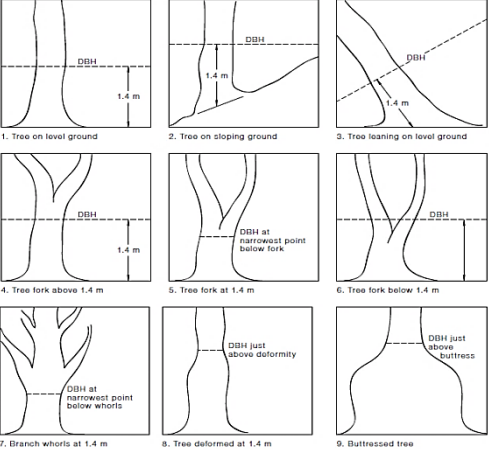
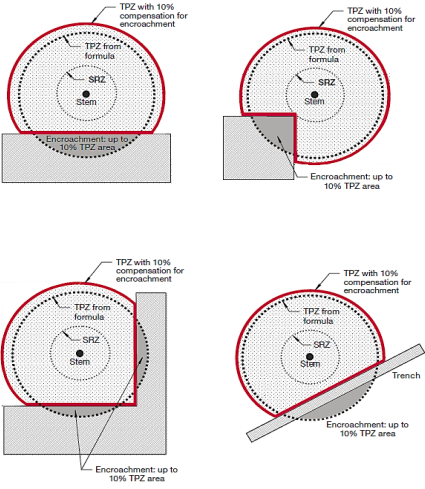
REFERENCE

Incident database

AUDIT CHECKLIST

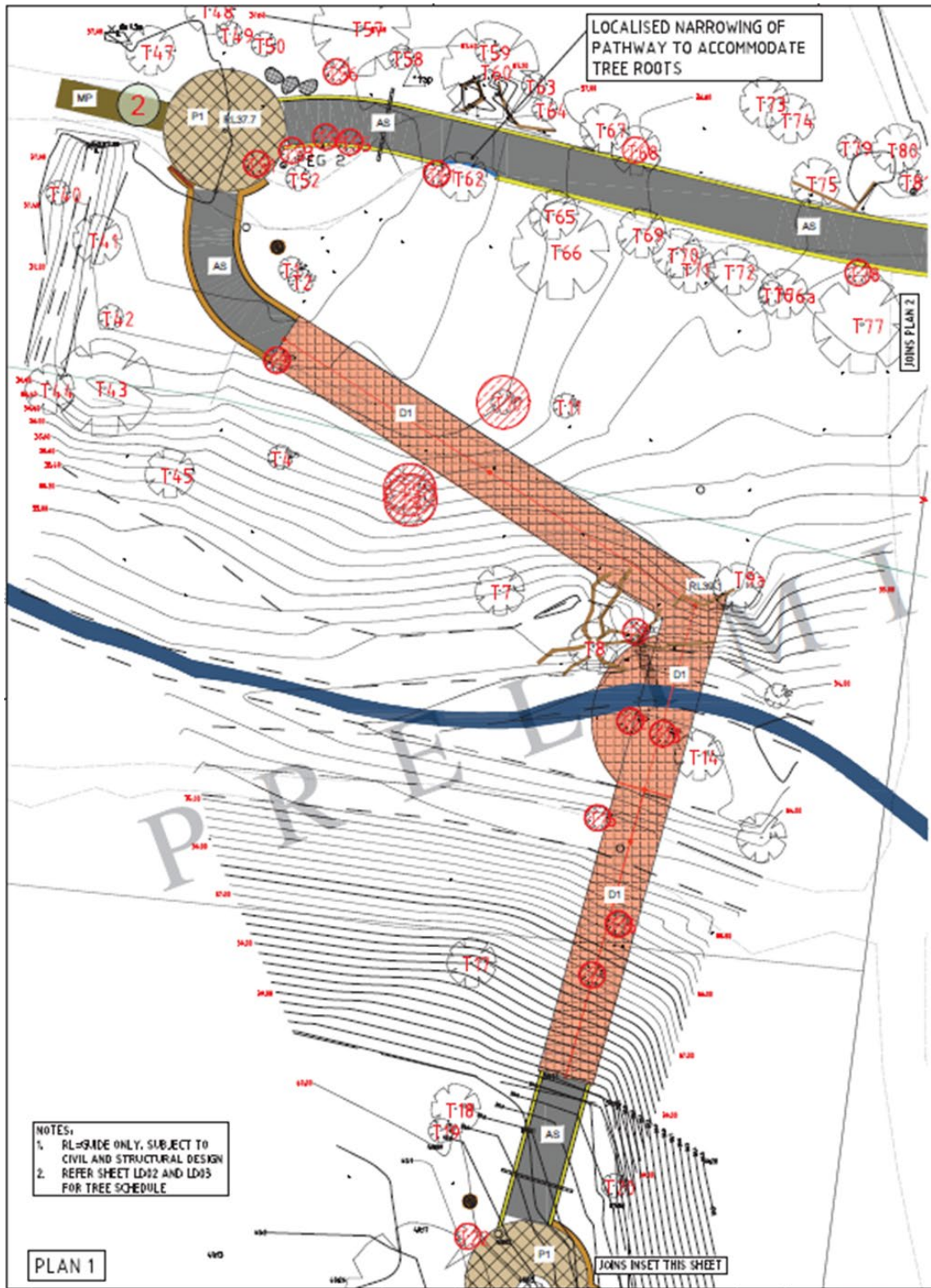
Spill kit kept at site and kept in order
All staff is aware of procedure

Appendix C: Tree Protection Procedure

 FIGURE B1 STRUCTURE OF A TREE IN A NORMAL GROWING ENVIRONMENT www.standards.org.au © Standards Australia	A Tree Protection Zone (TPZ) is an important area around the trunk of a tree in which key feeder and stabilising roots can be found just beyond the tree canopy. This area must be protected to prevent instability and minimise loss of health of the woody root system of the tree. Restricted activities include excavation, storage, dumping of waste and parking of vehicles/plant. TPZ standard should be: - TPZ = DBH x 12 (Where DBH is the trunk diameter measured at 1.4m above ground). - Not greater than 15m. TPZ should not be less than 2m nor greater than 15m (Except where crown protection is required). TPZ of palms, tree ferns, other monocots and cycads should not be less than 1m outside the crown projection. - Refer to the Arborist Report for dimensions for the TPZ / Buffers
 1. Tree on level ground 2. Tree on sloping ground 3. Tree leaning on level ground 4. Tree fork above 1.4 m 5. Tree fork at 1.4 m 6. Tree fork below 1.4 m 7. Branch whorls at 1.4 m 8. Tree deformed at 1.4 m 9. Buttressed tree	Due to a range of growing environments the Tree DBH is measured using a range of methods to suit the situation. See adjacent image or Australian Standard AS 4970-2009. Delineate an area with the use of appropriate signage for: - Protective fencing installed or no-go zones will be created and maintained for the duration of works - Ground protection (e.g. mulch) if temporary access for machinery is required. The Structural Root Zone (SRZ) is an area within the TPZ that is particularly significant for stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when major encroachment into a TPZ is proposed. Many factors affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture, rocks, footings etc).
 TPZ with 10% compensation for encroachment TPZ with 10% compensation for encroachment TPZ with 10% compensation for encroachment TPZ with 10% compensation for encroachment En encroachment: up to 10% TPZ area En encroachment: up to 10% TPZ area En encroachment: up to 10% TPZ area En encroachment: up to 10% TPZ area	The indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula: - SRZ radius = $(D \times 50)0.42 \times 0.64$ (Where D = trunk diameter in metres measured above the root buttress) Note: The SRZ for trees with trunk diameter less than 0.15m will be 1.5m Encroachment into TPZ is sometimes unavoidable: - Minor encroachment is possible without root investigations. (Must be under 10% of the TPZ area and outside the SRZ) - Major encroachment is possible if an arborist can prove the tree will be sustained. (Refer to AS 4790 for recommended considerations) Any additional Encroachment must be reviewed by the Level 5 AQF Arborist for works within the TPZ (E.g. excavation) is possible with variation to the above standards.

Appendix D: Arborist Assessment Summary Report Tree Removal Plan 1 Northside

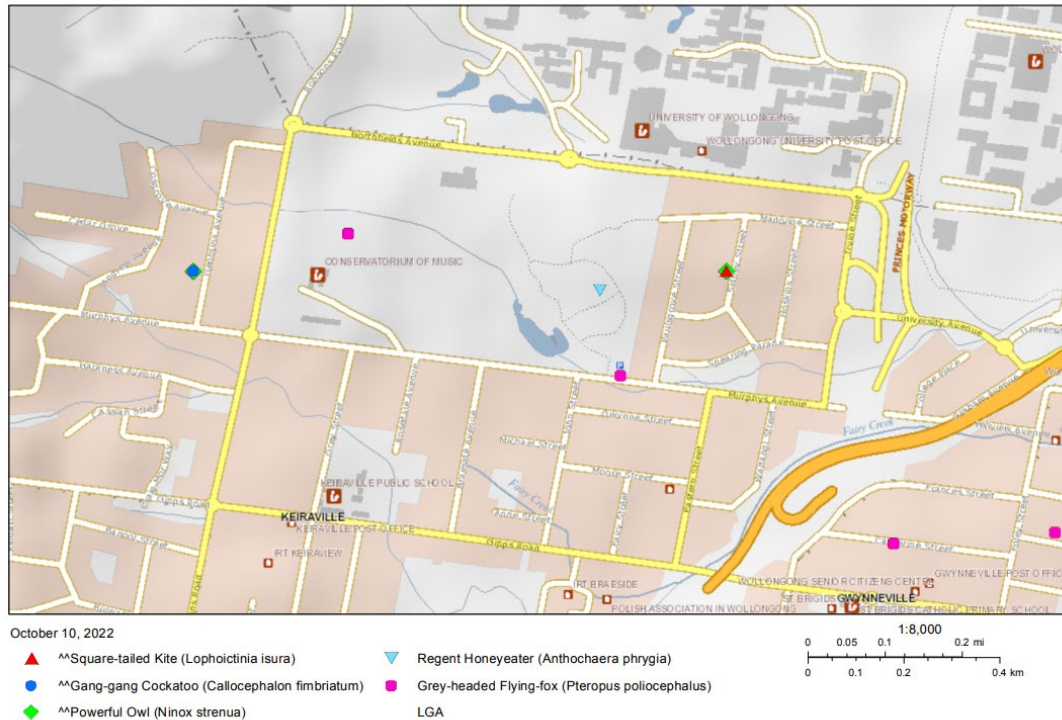
T3-34213 <i>Glochidion ferdinandi</i>	REMOVE
T5-50680 Climber	REMOVE
T6-50682 <i>Alphitonia excelsa</i>	REMOVE
T9-51226 <i>Pittosporum undulatum</i>	REMOVE
T10	DEAD
T12-50670 <i>Archontophoenix cunninghamiana</i>	REMOVE
T13-50672 <i>Archontophoenix cunninghamiana</i>	REMOVE
T15-50667 <i>Argyodendron trifoliatum</i>	REMOVE
T16-50668 - collect seed <i>Grevillea helmsii</i>	PRUNE
T22-50666 <i>Pipturus argenteus</i>	REMOVE
T24-51240 <i>Araycaria bidwillii</i>	REMOVE
T25-33682 <i>Cassia brewsteri</i>	REMOVE
T51-51128 <i>Hymenosporum flavum</i>	REMOVE
T53-51129 <i>Drypetes deplanchei</i>	REMOVE
T54-51131 Unknown sp.	REMOVE
T55-51132 <i>Notelaea longifolia</i>	REMOVE
T56-51136 <i>Elatostachys nervosa</i>	REMOVE
T61-51138 <i>Pittosporum undulatum</i>	REMOVE
T68-51139 <i>Archontophoenix cunninghamiana</i>	REMOVE
T78 -51143 <i>Archontophoenix cunninghamiana</i>	REMOVE



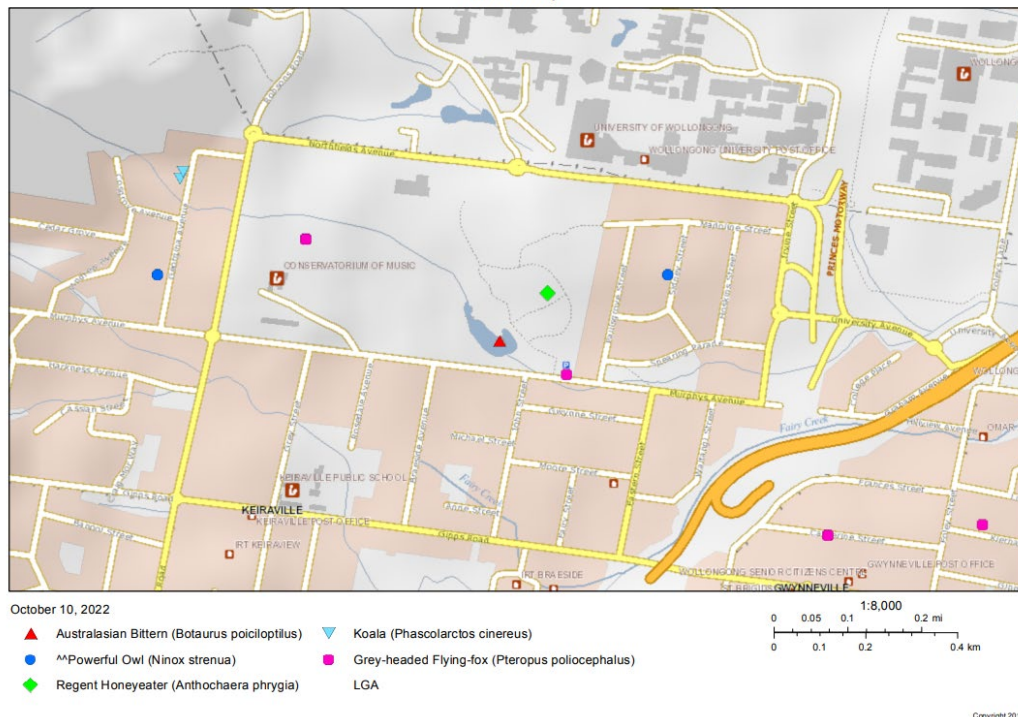
Appendix E: Flora and Fauna Assessment

Table of all threatened species and endangered ecological communities listed under the NSW *Biodiversity Conservation Act* 2016 and Commonwealth *Environmental Protection & Biodiversity Conservation (EPBC) Act* 1999, within a 2 km radius, has been searched as identified by the threatened fauna & flora and EECs layers in Intramaps on 28 September 2022. The table also considers the potential habitat at the site for native fauna by using the Habitat Model layer and Key Fish Habitat layer. Since five species can be only listed on the Atlas Map, two maps have been produced in regard to the following table.

Atlas Map



Atlas Map





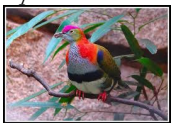
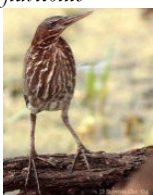
The above Intramap aerial captures seven threatened fauna recorded within the study area and four within the work site and this is reflected in the following table. The more current Atlas Bionet Map has four recorded sites, and all of these sites are outside the work site.

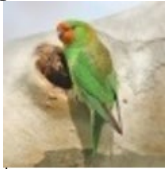
Scientific Name	Common Name	BC Act	EPBC Act	Habitat Requirements	Likelihood
<i>Phascogaleola cinerea</i> 	Koala	E,P	E	Main Koala Food Trees within the Local Land Services: Southern Rivers area (DOPE): Koala Primary food trees: Cabbage gum <i>E. amplifolia</i> Forest red gum <i>E. tereticornis</i> Ribbon gum <i>E. viminalis</i> SEPP - Schedule 2 Feed tree species South Coast koala management area Scientific Name Common Name <i>Allocasuarina littoralis</i> Black She-oak <i>Angophora floribunda</i> Rough-barked Apple <i>Corymbia gummifera</i> Red Bloodwood <i>Corymbia maculata</i> Spotted Gum <i>E. agglomerata</i> Blue-leaved Stringybark <i>Eucalyptus baueriana</i> Blue Box <i>Eucalyptus bosistoana</i> Coast Grey Box <i>Eucalyptus considiana</i> Yertchuk <i>Eucalyptus cypellocarpa</i> Monkey Gum <i>Eucalyptus elata</i> River Peppermint <i>E. eugenioides</i> Narrow-leaved Stringybark <i>Eucalyptus fastigata</i> Brown Barrel <i>Eucalyptus globoidea</i> White Stringybark <i>Eucalyptus longifolia</i> Woollybutt <i>Eucalyptus maidenii</i> Maiden's Blue Gum <i>E. muelleriana</i> Yellow Stringybark <i>Eucalyptus obliqua</i> Messmate <i>Eucalyptus paniculata</i> Grey Ironbark <i>Eucalyptus pilularis</i> Blackbutt <i>Eucalyptus piperita</i> Sydney Peppermint <i>Eucalyptus punctata</i> Grey Gum <i>Eucalyptus saligna</i> Sydney Blue Gum	Unlikely Three sites were recorded just west of the site within 2km radius from the centre of the garden in 2020. These Koalas were recorded in Georgina Avenue Keiraville. Koalas feed primarily on the leaves of Eucalyptus trees. There is no current corridor linking the recorded site in Keiraville and after speaking with Karen Holmes Botanic Gardens Acting Curator she confirmed that there are no recorded siting of Koalas within the gardens. The activity does not require the removal of a koala 'use' or 'feed' trees.

Review of Environmental Factors
REF03624

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Requirements	Likelihood
				<i>E. sclerophylla</i> Hard-leaved Scribbly Gum <i>Eucalyptus sieberi</i> Silvertop Ash <i>Eucalyptus tereticornis</i> Forest Red Gum <i>E. tricarpa</i> Mugga (Red) Ironbark <i>Eucalyptus viminalis</i> Ribbon Gum	
<i>Callocephalon fimbriatum</i> 	Gang-gang Cockatoo	V3P	E	The Gang-gang Cockatoo in summer is found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open Eucalypt forests, particularly in box-ironbark assemblages, and often found in urban areas. Prefers old growth attributes for nesting and roosting. There have been 197 sightings within Wollongong LGA.	Unlikely Thirty three sites were recorded within 2km radius from the centre of the gardens. Some of these species were recorded in 1991 at Lot 100 DP 1257652 belonging to the University west and outside the work site.
<i>Ninox strenua</i> 	Powerful Owl	VP		Habitat preference may be a result of distribution of prey (common Ringtail Possums and Greater Gliders). Usually breeds and roosts in closed forest, including rainforests and wet sclerophylls. It roosts by day in dense vegetation comprising species such as <i>Syncarpia glomulifera</i>, <i>Allocasuarina littoralis</i>, <i>Acacia melanoxylon</i>, <i>Angophora floribunda</i>, <i>Exocarpus cupressiformis</i> and a number of eucalypt species.	Unlikely. Fourteen sites have been recorded within a 2km radius of the centre of the gardens and this species was recorded seven times within the Lot 1 DP 252964 & Lot F DP 390257 (Wollongong Botanic Garden) in 2017 & 2018. The trees to be removed are not old enough to have hollows and therefore, it is unlikely that this species will be impact if the safeguards in the REF are implemented. There are no sites within the work area.
<i>Botaurus poiciloptilus</i> 	Australasian Bittern (Also known as Brown Bittern)	E	E	Frequents reed beds, and other vegetation in water such as cumbungi, lignum and sedges. The Australasian bittern is a secretive, stocky, heron-like bird, living in wetlands where it forages. Bitterns are very well camouflaged and can be difficult to spot in the reeds and rushes. On occasion they will even sway in time with reeds to blend into their surroundings. The distinctive booming call of males gives them away.	Unlikely One site recorded within the pond area just outside the work area to the east of the site but within the garden site. They were recorded in 1991 and within Lot 1 DP 252964 & Lot F DP 390257 (Wollongong Botanic Garden) but it is unlikely that this species will be impacted.
<i>Lophoictinia isura</i> 	Square-tailed kite	V3P		The Square-tailed Kite typically inhabits the coastal forested and wooded lands dominated by Woollybutt <i>Eucalyptus longiflora</i>, Spotted Gum <i>E. maculata</i> or Peppermint Gum <i>E. elata</i>, <i>E. smithii</i>. The species has also been sighted in forests containing <i>Angophora spp.</i> and <i>Callitris spp.</i> with a shrubby understorey and Box-Ironbark woodland (Debus & Czechura 1989).. Breeding season is from July to	Unlikely One site recorded in 2012, within Lot 1 DP 252964 & Lot F DP 390257 (Wollongong Botanic Garden) but not within the work area. It is unlikely that this species will be impacted if the

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Requirements	Likelihood
				February. Nesting sites are generally located along or near watercourses, in the fork or on a large, horizontal limb of <i>Angophora spp. or Eucalypt spp.</i> (Cameron 1992; Jolly 1989).	safeguards in the REF are implemented.
<i>Anthochaera phrygia</i>  <i>Formerly known as Xanthomyza phrygia</i>	Regent Honeyeater	CE4AP	CE	Most records appear to be in late spring and summer, so it may continue to be a casual visitor to flowering trees in the area, though the winter flowering Swamp Mahogany is also an important resource in other localities. The species favours Box Ironbark Eucalypt associations though also utilised wet lowland coastal forests dominated by Swamp Mahogany, Spotted Gum and Riverine Casuarina woodlands. Remnant stands of timber and street trees also provide important habitat at certain times.	Unlikely One site recorded within Lot 1 DP 252964 & Lot F DP 390257 (Wollongong Botanic Garden) but just outside the work area. Recorded in 2018 on single male feeding in the African Walnut Tree, along B;acl-faced Cuckoo-Shrike like calls. It is unlikely that this species will be impacted.
<i>Pteropus poliocephalus</i> 	Grey-headed flying-fox	VP	V	The Grey-Headed Flying-Fox has a variety of habitats including rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens with cultivated fruit crops also provide habitat for this species. The species feeds on flowers from the <i>Eucalyptus, gummifera, E. muellerana, E. globoidea</i> and <i>E. botryoides</i> , and fruits from a wide range of rainforest trees, including Fig.	Unlikely There were forty-three sites recorded for this species within a 2km radius of the centre of the gardens. Within the gardens it was recorded 2012, 2013, 2018 in Lot 2 DP 252694, Lot 3 DP 252694 (Gleniffer Brae). In 2016 this species was recorded in Lot 1 DP 252964 & Lot F DP 390257 (Wollongong Botanic Garden) but outside the work area. It is unlikely that this species would be impacted as there is no suitable habitat within the study area.
<i>Petaurus norfolkensis</i> 	Squirrel Glider	VP		Two sightings reported in the Cataract and Avon catchments, Royal National Parks and recent records from the Wedderburn area. This species is often difficult to identify from the common Sugar Glider so it may exist in small numbers above the escarpment.	Unlikely One recorded site within the university grounds in 2015. Refer to safeguards in the REF.
<i>Lathamus discolor</i> 	Swift parrot	E1P	E	The Swift Parrot inhabits dry sclerophyll eucalypt forests and woodlands. It occasionally occurs in wet sclerophyll forests. Individuals or small groups may be expected to occur infrequently in areas with fruiting trees, including gardens. The Swift Parrot breeds only in Tasmania and predominantly forages within habitats that have been cleared and classified as endangered ecological communities. (OEH)	Unlikely Eight sites were recorded within a 2 km radius. The closest was records were within the University just north of the gardens in 2002. In this site this species were recorded six times and one record was at the entrance of the Uni in 2020. It is unlikely that this species will be

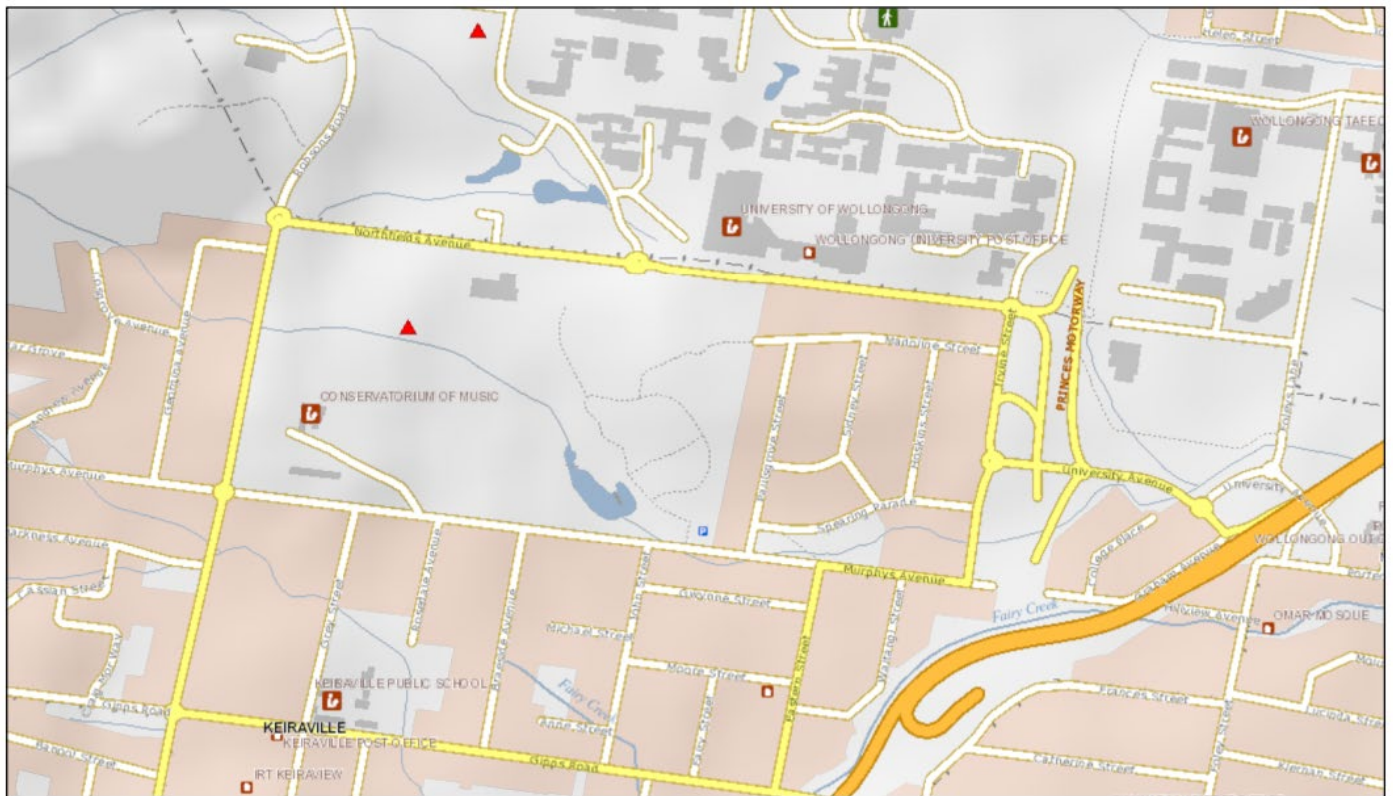
Scientific Name	Common Name	BC Act	EPBC Act	Habitat Requirements	Likelihood
					impacted as there is no suitable habitat at the site
 <i>Oxyura australis</i>	Blue-billed Duck	VP		It is generally only during summer or in drier years that they are seen in coastal areas. It prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover.	Unlikely. One site recorded within a 2km radius of the garden centre. It is unlikely that this species will be impacted as suitable habitat would not be impacted and safeguards are in place to prevent impact.
 <i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	VP		Rose Crowned Fruit Doves occur mainly in sub tropical and dry rainforest and occasionally in moist Eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. Some populations are migratory in response to food availability numbers in North Eastern NSW increase during spring and summer then decline in April or May.	Unlikely. Two sites recorded within a 2km radius of the garden centre. They are rarely seen in southern NSW, but food (fruit) availability increases in spring and summer and safeguards are in place.
 <i>Ptilinopus superb</i>	Superb fruit-dove	VP		Inhabits rainforest and similar closed forests eating the fruits of many tree species such as figs and palms and may also forage in <i>Eucalypt</i> or <i>Acacia</i> Woodlands e.g. <i>Syncarpia glomulifera</i> where there are plentiful fruit bearing trees. Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs and is usually 5-30 meters up in the canopy. Three individual sightings recorded at Mt Pleasant, Keiraville and Mangerton area.	Unlikely Two sites recorded within a 2km radius of the garden centre. Refer to the REF safeguards for protection of this species.
 <i>Ixobrychus flavicollis</i>	Black Bittern	VP		The Black Bittern inhabits terrestrial and estuarine wetlands, generally where there is permanent fresh water. It also prefers wetlands with dense vegetation including sledges, rushes, and reeds though it may also occur in similar habitats in estuarine situations with either swamp (<i>Casuarina glauca</i>) or River Oak (<i>Casuarina cunninghamiana</i> subspecies <i>cunninghamiana</i>).	Unlikely. One site was recorded within a 2km radius of the garden centre. It is unlikely that this species will be impacted if the REF safeguards are implemented, and work site sheds and equipment stay away from their preferred habitat.
 <i>Haliaeetus leucogaster</i>	White Bellied Sea Eagle	P	M	Birds have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, salt marsh, sewage ponds, seashore, bays and inlets, beaches, reefs, lagoons, estuaries and mangroves. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding territories are located close to water, and mainly in tall open forest or woodland and sometimes dense forest (including rainforest), closed scrub or in remnant trees on cleared land. Given the widespread distribution of the species, it is	Unlikely Even though there has been three sites recorded within a 2km radius of the garden centre it is unlikely that this species will be impacted as there is no suitable foraging habitat within the gardens. Refer to safeguards in the REF for implementation.

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Requirements	Likelihood
				possible that the sea-eagle may occur in one or more of the threatened communities listed under the EPBC Act 1999.	
<i>Hieraaetus morphnoides</i> 	Little Eagle	VP		The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment . It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. There have been eight sightings of this species within Wollongong LGA.	Unlikely. One recorded site within a 2km radius of the garden centre and it is unlikely that this species will be impacted.
<i>Pluvialis squatarola</i> 	Grey Plover	P	CJK	Grey Plovers inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. (Marchant & Higgins 1993 and references therein). On their breeding grounds they inhabit tundra (Dement'ev & Gladkov 1951). They usually roost in sandy areas, such as on unvegetated sandbanks or sand-spits on sheltered beaches or sheltered estuaries or lagoons (Jaensch et al. 1988; Pegler 1983).	Unlikely There were two recorded sites within a 2km radius of the centre of the gardens. It is unlikely that this species will be impacted as there is no suitable habitat within the work site.
<i>Glossopsitta pusilla</i> 	Little Lorikeet	VP		Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina. Nesting season extends from May to September and in years when flowering is prolific. (OEH)	Unlikely Three sites were recorded within a 2km radius of the gardens centre, but it is unlikely that this species or its habitat will be impacted as the trees to be removed have been selected to avoid old growth trees with potential hollows.
<i>Polytelis anthopeplusoides monarchoides</i> 	Regent Parrot (eastern subspecies)	E1P	V	The Regent Parrot had been sighted in Bill Madden Park Mount Pleasant. This is the only sighting in 1990 recorded in the LGA. Typical nest trees are large, mature healthy trees with many spouts (though dead trees are used) and are usually located close to a watercourse. Principal foraging habitat is mallee woodlands, though foraging also occur in riverine forests and woodlands (OEH).	Unlikely One site was recorded within a 2km radius of the garden centre. It is unlikely that this species will be impacted as there is not suitable foraging habitat.
<i>Ninox connivens</i> 	Barking Owl	VP		Individuals may occasionally occur as vagrants, particularly on the plains in the southern part of the LGA . Usually inhabits dry open Eucalypt forests and woodlands, preferring riparian vegetation, where it roosts in dense foliage during the day. It nests in hollows, usually of large Eucalypts trees (OEH).	Unlikely One site was recorded within a 2km radius of the gardens centre, but it is unlikely that this species or its habitat will be impacted as the trees to be removed have been

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Requirements	Likelihood
					selected to avoid old growth trees with potential hollows.
 <i>Coracina lineata</i>	Barred Cuckoo-shrike	V		Barred Cuckoo-shrikes are generally uncommon in their range and are rare in NSW. The occasional individual may be expected to occur in Wollongong, particularly in fruiting fig trees. It is restricted to lowland (below 500 metres) rainforests, including subtropical, dry and littoral, and isolated fruiting trees.	Unlikely One site recorded within a 2km radius of the gardens centre. It is unlikely that this species will be impacted as they are rare south of Newcastle..
 <i>Cercartetus nanus</i>	Eastern pygmy possum	VP		Found in a broad range of habitats from rainforest through Sclerophyll (including Box Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred. Feeds mostly on the pollen and nectar from Banksias, Eucalypts, Bottlebrushes and understorey plants. Also soft fruits and insects. Nests in tree hollows, under bark of Eucalypts and abandoned bird nests.	Unlikely One site recorded within a 2km radius of the garden centre. It is unlikely that this species will be impacted but refer to the REF safeguards for implementation.
 <i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	VP		This bat is relatively large with a reddish-brown back and paler grey underside. It has long slender ears set well back on the head with some sparse hair on the nose. It prefers moist habitats with trees taller than 20m and roosts in eucalypt hollows or under loose bark on trees or in buildings. Hunters insects just below the tree canopy.	Unlikely One site was recorded within a 2km radius of the gardens centre, but it is unlikely that this species or its habitat will be impacted as the trees to be removed have been selected to avoid old growth trees with potential hollows.
 <i>Scoteanax rueppeli</i>	Greater Broad-nosed Bat	VP		Usually found in gullies draining east, where it utilises creeks and clearings for hunting. It usually roosts in tree hollows, though it may also utilise old buildings to roost. It may occur in small numbers in forested areas above the escarpment. Creeks and small rivers are favoured corridors where the species hunts for prey, sometimes within 1 m of water. It also hunts at forest edges.	Unlikely One site was recorded within a 2km radius of the gardens centre, but it is unlikely that this species or its habitat will be impacted as the trees to be removed have been selected to avoid old growth trees with potential hollows.
 <i>Miniopterus australis</i>	Little Bent Wing Bat	VP		Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, <i>Melaleuca</i> swamps, dense coastal forests and banksia scrub. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They congregate in maternity colonies during summer. Females congregate in maternity colonies with the eastern bent-wing bat from August. Young are born in December.	Unlikely There were four site recorded within the 2km radius of the garden centre, but it is unlikely that this species or its habitat will be impacted as the trees to be removed have been selected to avoid old growth trees with potential hollows and any creek crossing will not impact on potential habitat.

Native Vegetation of the Illawarra Escarpment and Coastal Plain (NVIE&CP 2002)		
Map Unit/Name (NVIE&CP 2002) Habitat description / characteristic species	Ecological Community Status (BC Act and EPBC Act)	Likelihood of impact
Escarpment Moist Blue Gum Forest MU8 A very tall Eucalypt forest with a prominent subcanopy of rainforest trees and mesic shrubs. The canopy is dominated by Blue Gums (<i>Eucalyptus saligna</i> X <i>botryoides</i>, <i>E. saligna</i>) with co-dominant species that include <i>E. quadrangulata</i>, <i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i> Turpentine and <i>E. pilularis</i> Blackbutt. The rainforest trees present include subtropical influences such as <i>Diploglottis australis</i> Native Tamarind and <i>Toona ciliata</i> Red Cedar as well as typical warm temperate species such as <i>Acmena smithii</i>, Lilly Pilly, <i>Cryptocarya</i> spp., <i>Doryphora sassafras</i> Sassafras and the palm <i>Livistona australis</i>. It occurs primarily north of Mount Kembla and Mt Keira on Illawarra Coal Measures or Narrabeen Group geologies at elevations between 60 and 300 metres. It is also present in the deeper gullies on Shoalhaven Group Shales and siltstones underlying Mangerton Park. 	BC Act: Blue Gum High Forest in the Sydney Basin Bioregion Conservation Status: Critically E4B A moist, tall open forest community, with dominant canopy trees of Sydney Blue Gum (<i>Eucalyptus saligna</i>) and Blackbutt (<i>E. pilularis</i>). Forest Oak (<i>Allocasuarina torulosa</i>) and Sydney Red Gum (<i>Angophora costata</i>) also occur. Species adapted to moist habitat such as Lilly Pilly (<i>Acmena smithii</i>), Sandpaper Fig (<i>Ficus coronata</i>), Rainbow Fern (<i>Calochleana dubia</i>) and Common Maidenhair (<i>Adiantum aethiopicum</i>) may also occur. Occurs north of Bulli and within the escarpment. Conservation Status: Critically Endangered 	Unlikely One tree has been identified in this community that will be removed. The young <i>Ficus coronata</i> will be removed which regenerated from its mother plant which will remain. It is unlikely that this community will be impacted by one tree being removed. The recorded tree on Bionet Atlas is outside the work area. See the following map.

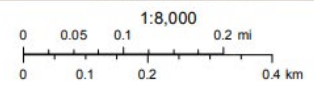
Atlas Map



October 10, 2022

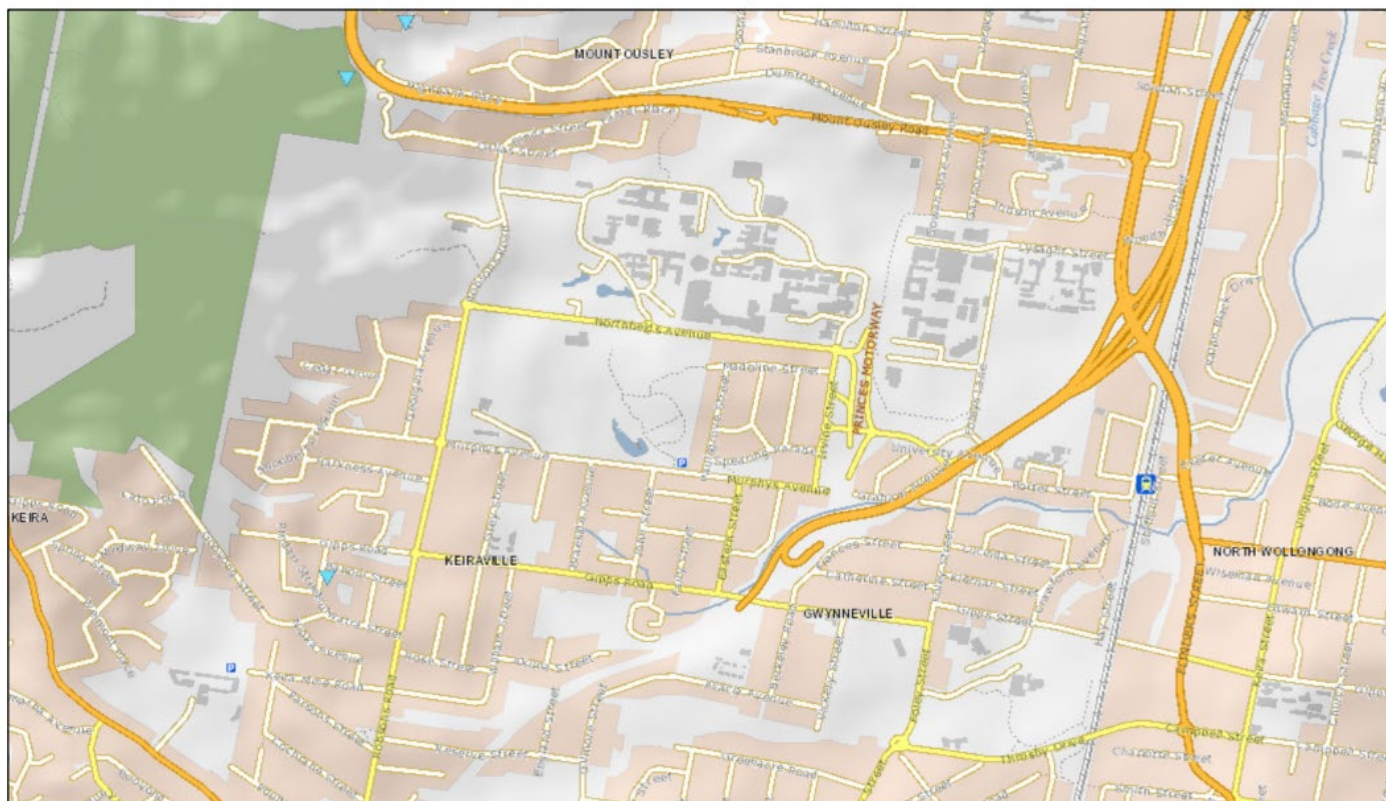
▲ Creek Sandpaper Fig (*Ficus coronata*)

LGA



Copyright 2017

Atlas Map



October 10, 2022

▼ *Gossia acmenoides* population in the Sydney Basin Bioregion south of the Georges River
LGA

1:16,000
0 0.125 0.25 0.5 mi
0 0.2 0.4 0.8 km

Copyright 2017

An endangered population Bionet Search

■ *Gossia acmenoides* population in the Sydney Basin Bioregion south of the Georges River
Gossia acmenoides NSW Status - E2 15 sites have been recorded with Wollongong LGA
No recorded sites within the study area and within the Botanic Gardens.

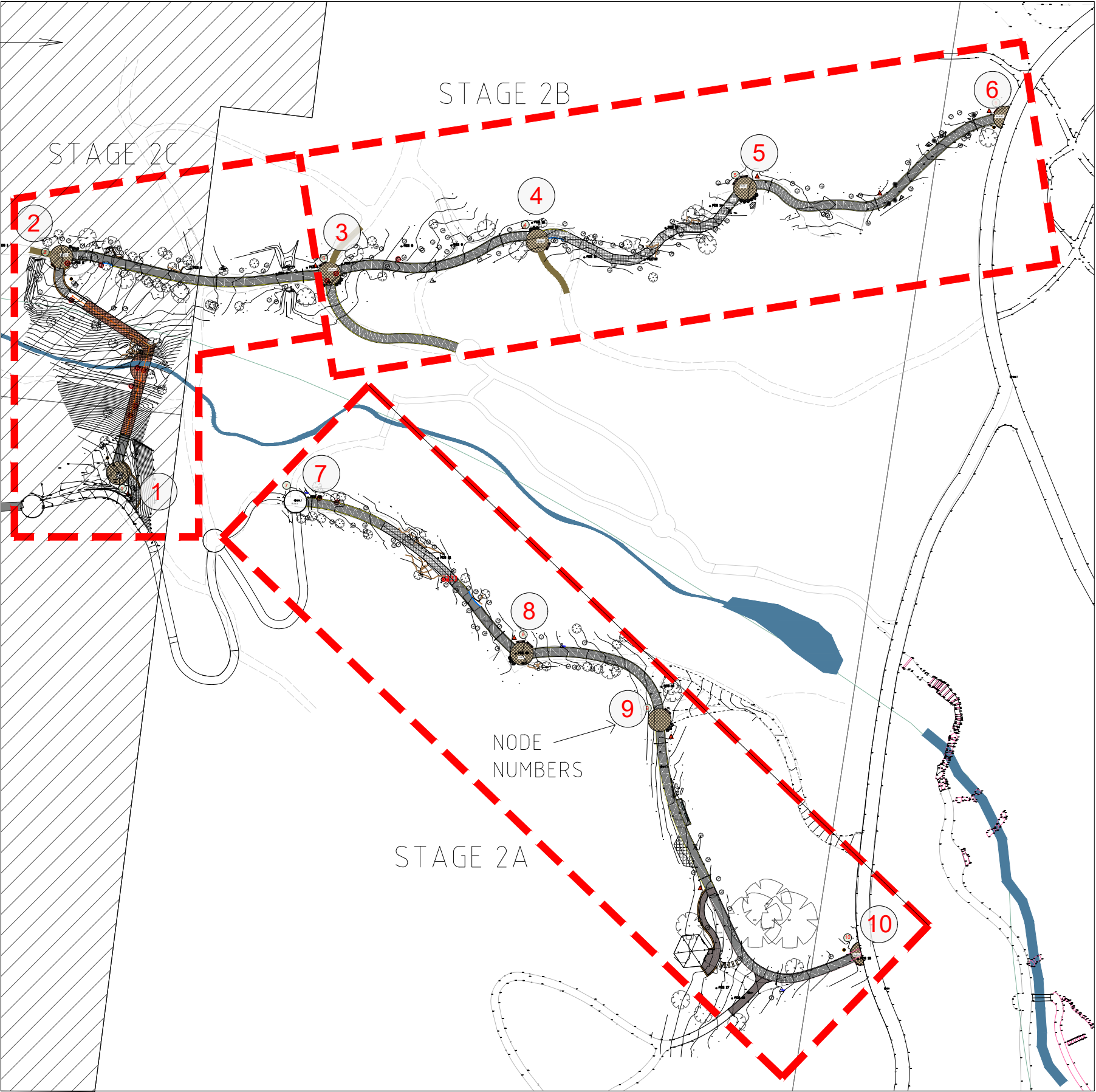
Appendix F: Environmental Constraints Aerial / Photographs



October 2022

Appendix G: Structural & Landscape Drawings

EXTENT OF
HERITAGE
CURTILAGE

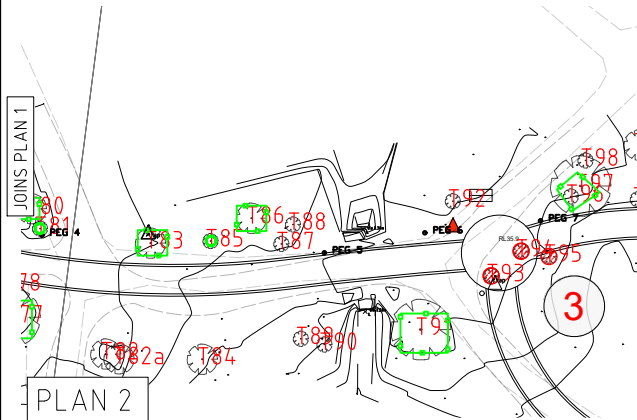
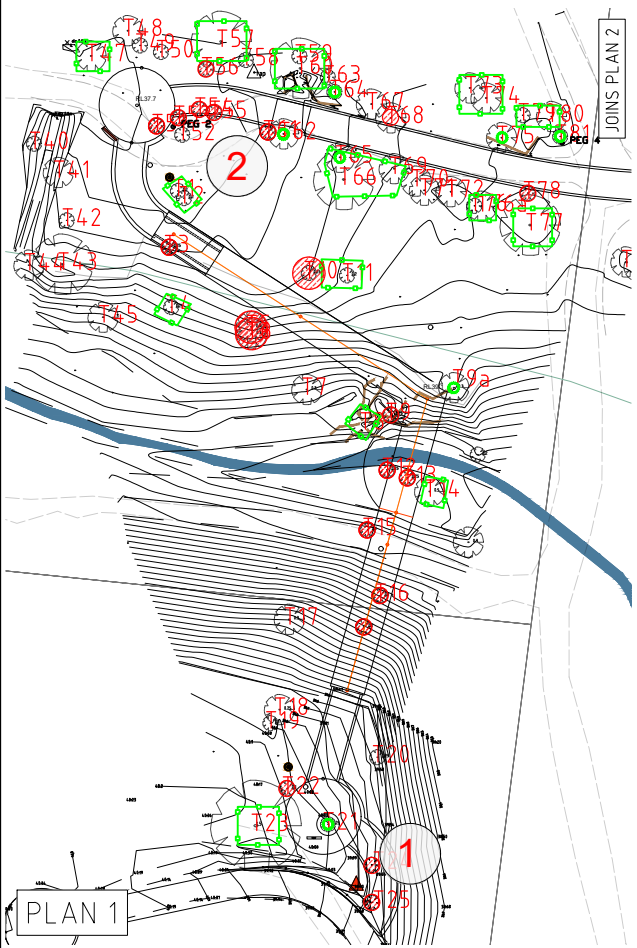


GENERAL ARRANGEMENT PLAN 1:500@A1 AND STAGING PLAN

PRELIMINARY PLAN - NOT FOR CONSTRUCTION

				DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY) SENIOR LANDSCAPE ARCHITECT 7160_LD01_1		SCALES 1:500@A1		CITY OF WOLLONGONG BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE GENERAL ARRANGEMENT PLAN	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ or TR No. PJ-4420		A1	
				FIELD BOOK	DESIGNED NDR	DATE 02/22	SHEET 1 OF 12 SHEETS							ORIGINAL			
2	ISSUED FOR SECTION 60 APPLICATION			NDR	AG	03/23	RELATED PLANS	CHECKED AG						DATE 02/22	DATE	DRAWING No. 7160	SHEET No. LD01
1	80% ISSUE FOR REVIEW			NDR	G	6/22											
ISSUE DESCRIPTION				DRAWN	APPR'D	DATE											

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL PLAN



Botanic Gardens Rainforest Walk Stage 2				
Existing Tree Schedule - North Side				
No	RL	Description H, D, S	Species	Action
T1	37.17	h 9m d 0.15m s 6m	Guioa semiglauc	Retain
T2	37.47	h 9m d 0.15m s 6m	Pittosporum undulatum	Retain
T3	37.6	h 6m d 0.2m s 3m	Glochidion ferdinandi	Remove
T4	36.3	h 12m d 0.25m s 6m	Glochidion ferdinandi	Retain
T5	36.54	h 12m d 0.4m s 4m	Alphitonia excelsa	Remove
T6	36.31	h 12m d 0.4m s 4m	Alphitonia excelsa	Remove
T7	34.84	h 14m d 0.4m s 4m	Elaeocarpus grandis	Retain
T8	34.23	h 16m d 0.6m s 10m	Elaeocarpus grandis	Retain
T9	34.22	h 6m d 0.15m s 2m	Pittosporum undulatum	Remove
T9a	34.22	h 6m d 0.06m s 2m????	Pittosporum undulatum	Retain
T10	37.01		Unknown	Dead
T11	36.73	h 8m d 0.2m s 6m	Unknown sp.	Retain
T12	33.92	h 12m d 0.25m s 6m	Archontophoenix cunninghamiana	Remove
T13	33.96	h 12m d 0.25m s 6m	Archontophoenix cunninghamiana	Remove
T14	33.96	h 14m d 0.5m s 6m	Elaeocarpus grandis	Retain
T15	34.54	h 8m d 0.1m s 3m	Argyrodendron trifoliatum	Remove
T16	35.77	h 8m d 0.1m s 3m	Grevillea helmsii	Prune
T17	37.98	h 6m d 0.4m s 6m	Rhodospaera rhodanthema	Retain
T18	39.99	h 12m d 0.3m s 6m	Ficus fraseri	Retain
T19	39.93	h 8m d 0.15m s 3m	Pipturus argenteus	Retain
T20	39.54	h 14m d 0.3m s 4m	Agathis robusta	Retain
T21	40.01	h 10m d 0.3m s 5m	Flindersia australis	Retain
T22	40.02	h 7m d 0.1m s 3m	Pipturus argenteus	Remove
T23	40.18	h 12m d 1.2m s 1m	Ficus virens	Retain
T24	39.73	h 12m d 0.3m s 4m	Araucaria bidwillii	Remove
T25	39.67	h 12m d 0.4m s 5m	Cassia brewsteri	Remove
T40	37.169	h 5m d 0.1m s 3m	Archontophoenix cunninghamiana	Retain
T41	37.312	h 10m d 0.3m s 5m	Waterhousea floribunda	Retain
T42	37.296	h 8m d 0.2m s 3m	Pittosporum undulatum	Retain
T43	36.685	h 12m dia 0.6m s 6m	Ficus virens	Retain
T44	36.564	h 10m d 0.5m s 4m	Waterhousea floribunda	Retain
T45	35.506	h 12m d 0.3m s 4m	Elaeocarpus grandis	Retain
T47	37.664	h 10m d 0.3m s 5m	Ficus watkinsiana	Retain
T48	37.589	h 11m d 0.4m s 6m	Melia azedarach	Retain
T49	37.545	h 5m d 0.1m s 3m	Claoxylon australe	Retain
T50	37.483	h 10m d 0.15m s 3m	Melia azedarach	Retain
T51	37.552	h 4m d 0.05m s 2m	Hymenosporum flavum	Remove
T52	37.582	h 8m d 0.15m s 2m	Unknown sp.	Retain
T53	37.513	h 7m d 0.07m s 2m	Drypetes deplanchei	Remove
T54	37.498	h 7m d 0.1m s 2m	Unknown sp.	Remove
T55	37.467	h 4m d 0.05m s 1m	Notelaea longifolia	Remove
T56	37.439	h 8m d 0.15m s 3m	Elatostachys nervosa	Remove
T57	37.618	h 15m dia 0.8m s 8m	Eucalyptus grandis	Retain
T58	37.331	h 8m d 0.15m s 3m	Archontophoenix cunninghamiana	Retain
T59	37.339	h 8m d 0.15m s 3m	Pittosporum undulatum	Retain
T60	37.279	h 12m dia 0.5m s 4m	Elaeocarpus grandis	Retain
T61	37.363	h 6m d 0.1m s 3m	Pittosporum undulatum	Remove
T62	37.381	h 10m d 0.25m s 5m	Unknown sp.	Retain

T63	37.081	h 10m d 0.15m s 3m	Unknown sp.	Retain
T64	37.089	h 10m d 0.15m s 3m	Flindersia australis	Retain
T65	36.958	h 10m d 0.25m s 3m	Toona ciliata	Retain
T66	36.975	h 15 dia 0.7m s 8m	Eucalyptus grandis	Retain
T67	36.887	h 8m d 0.15m s 3m	Archontophoenix cunninghamiana	Retain
T68	36.834	h 6m d 0.1m s 4m	Archontophoenix cunninghamiana	Remove
T69	36.79	h 6m d 0.2m s 4m	Glochidion sumatranum	Retain
T70	36.64	h 6m d 0.15m s 3m	Syzygium francisii	Retain
T71	36.618	h 4m d 0.1m s 3m	Archontophoenix cunninghamiana	Retain
T72	36.533	h 4m d 0.1m s 3m	Archontophoenix cunninghamiana	Retain
T73	36.675	h 10m d 0.25m s 4m	Ficus watkinsiana	Retain
T74	36.786	h 8m d 0.2m s 4m	Archontophoenix cunninghamiana	Retain
T75	36.652	h 6m d 0.1m s 3m	Archontophoenix cunninghamiana	Retain
T76	36.573	h 10m d 3"0.25m s 5m	Ficus watkinsiana	Retain
T77	36.713	h 15 dia 0.9m s 8m	Eucalyptus grandis	Retain
T78	36.638	h 5m d 0.15m s 4m	Archontophoenix cunninghamiana	Remove
T79	36.768	h 11m d 0.2m s 3m	Archontophoenix cunninghamiana	Retain
T80	36.79	h 10m d 0.45m s 6m	Ficus obliqua	Retain
T81	36.691	Failed and removed 02/23	Pisonia umbellifera	Retain
T82	36.678	h 12m d 0.5m s 10m	Ficus obliqua	Retain
T83	36.412	h 9m d 0.4m s 5m	Melia azedarach	Retain
T84	36.06	h 9m d 0.3m s 6m	Lophostemon confertus	Retain
T85	36.323	h 9m d 0.1m s 2m	Flindersia australis	Retain
T86	36.278	h 9m d 0.5m s 4m	Grevillea robusta	Retain
T87	36.242	h 4m d 0.1m s 4m	Claoxylon australe	Retain
T88	36.246	h 8m d 0.15m s 4m	Unknown sp.	Retain
T89	35.828	h 4m d 0.1m s 1m	Unknown sp.	Retain
T90	35.795	h 8m d 0.25m s 5m	Pittosporum undulatum	Retain
T91	35.937	h 11m dia 0.8m s 8m	Eucalyptus fastigata	Retain
T92	36.024	h 6m d 0.15m s 6m	Ficus rubiginosa	Retain
T93	35.849	h 6m d 0.1m s 3m	Acmena smithii	Remove
T94	35.947	h 11m dia 0.8m s 7m	Eucalyptus fastigata	Remove
T95	35.812	h 6m d 0.1m s 4m	Acmena smithii	Remove
T96	35.808	h 6m d 0.25m s 6m	Ficus coronata	Retain
T97	35.866	h 6m d 0.1m s 4m	Eucalyptus fastigata	Retain
T98	35.873	h 6m d 0.1m s 3m	not found	Retain
T99	35.773	h 9m d 0.4m s 5m	Eucalyptus fastigata	Retain
T100	35.707	h 6m d 0.01m s 3m	Cryptocarya sp.	Retain
T101	35.609	h 8m d 0.08m s 3m	Syzygium smithii	Retain
T102	35.626	h 8m d 0.08m s 3m	Syzygium smithii	Retain
T103	35.295	h 8m d 0.2m s 3m	Pittosporum undulatum	Remove
T104	35.402	h 9m d 0.25m s 4m	Cryptocarya glaucescens	Retain
T105	35.175	h 8m d 0.15m s 3m	Acmena smithii	Remove
T106	35.253	h 8m d 0.15m s 3m	Ceratopetalum apetalum	Retain
T107	35.39	h 8m d 0.05m s 3m	Claoxylon australe	Retain
T108	35.161	h 8m d 0.1m s 3m	Hibiscus heterophyllus	Retain
T109	35.14	h 5m d 0.05m s 2m	Ficus coronata	Retain
T110	35.082	h 5m d 0.05m s 2m	Synoum glandulosum	Retain
T111	34.957	h 5m d 0.05m s 2m	Syzygium oleosum	Retain
T112	34.989	h 8m d 0.15m s 3m	Elaeocarpus reticulatus	Retain
T113	34.84	h 8m d 0.15m s 3m	Hibiscus heterophyllus	Retain
T114	34.965	h 6m d 0.35m s 2m	Livistona australis	Retain
T115	34.913	h 8m d 0.15m s 3m	Pennantia cunninghamiana	Retain
T116	34.912	h 8m d 0.15m s 3m	Elaeocarpus reticulatus	Retain

T117	34.729	h 8m d 0.25m s 4m	Ficus coronata	Retain
T118	34.459	h 6m d 0.2m s 4m	Ficus coronata	Retain
T119	34.326	h 6m d 0.1m s 3m	Acacia binervata	Retain
T120	34.806	h 11m dia 0.8m s 10m	Eucalyptus quadrangulata	Retain
T121	34.304	h 8m d 0.2m s 3m	Mealeuca styphelioides	Retain
T122	34.189	h 11m dia 0.8m s 10m	Eucalyptus microcois	Retain
T123	34.505	h 9m d 0.4m s 5m	Lophostemon confertus	Retain
T124	34.163	h 8m d 0.2m s 3m	Archontophoenix cunninghamiana	Retain
T125	34.098	h 8m d 0.2m s 3m	Archontophoenix cunninghamiana	Retain
T126	34.242	h 6m d 0.05m s 3m	Alectryon subcinerus	Retain
T127	34.121	h 6m d 0.05m s 3m	Ficus coronata	Remove
T128	33.913	h 6m d 0.15m s 3m	Archontophoenix cunninghamiana	Retain
T129	33.935	h 2m d 0.05m s 3m	Stenocarpus salignus	Retain
T130	34.147	h 8m d 0.2m s 4m	Mealeuca styphelioides	Retain
T131	33.972	h 4m d 0.15m s 4m	Mealeuca styphelioides	Remove
T132	34.039	h 9m d 0.25m s 5m	Mealeuca styphelioides	Retain
T133	34.11	h 8m d 0.15m s 3m	Mealeuca styphelioides	Retain
T134	33.965	h 8m d 0.15m s 3m	Mealeuca styphelioides	Retain
T135	33.952	h 2m d 0.1m s 2m	Archontophoenix cunninghamiana	Retain
T136	33.51	h 6m d 0.15m s 4m	Alectryon subcinerus	Retain
T137	33.674	h 6m d 0.2m s 4m	Ficus coronata	Retain
T138			Mealeuca styphelioides	Dead
T139	33.956	h 4m d 0.1m s 2m	Archontophoenix cunninghamiana	Retain
T140	34.11	h 4m d 0.1m s 2m	Archontophoenix cunninghamiana	Retain
T141	34.062	h 10m d 0.3m s 5m	Mealeuca styphelioides	Retain
T142	34.011	h 4m d 0.12m s 2m	Archontophoenix cunninghamiana	Retain
T143	34.143	h 4m d 0.1m s 2m	Archontophoenix cunninghamiana	Retain
T144	33.683	h 5m d 0.15m s 3m	Archontophoenix cunninghamiana	Retain
T145			Mealeuca styphelioides	Retain
T146			Mealeuca styphelioides	Retain
T147			Mealeuca styphelioides	Retain
T148	34.173	h 11m dia 0.6m s 9m	Eucalyptus grandis	Retain
T149	33.867	h 6m d 0.2m s 3m	Mealeuca styphelioides	Retain
T150	33.678	h 10m d 0.5m s 5m	Eucalyptus grandis	Retain
T151	33.927	h 4m d 0.06m s 2m	Acronychia oblongifolia	Remove
T152	33.97	h 6m d 0.25m s 3m	Ficus coronata	Retain
T153	34.184	h 3m d 0.1m s 2m	Archontophoenix cunninghamiana	Retain
T154	34.414	h 7m d 0.2m s 4m	Archontophoenix cunninghamiana	Remove
T155	34.631	h 7m d 0.2m s 4m	Archontophoenix cunninghamiana	Retain
T156	34.926	h 4m d 2" 0.05m s 3m	Acmena smithii	Retain
T157	34.341	h 5m d 0.3m s 2m	Livistona australis	Retain
T158	35.445	h 7m dia 0.4m s 3.5m	Ficus henneana	Retain
T159	35.665	h 4m dia 0.3m s 2.5m	Livistona australis	Retain
T160	35.112	h 5m d 0.15m s 3m	Acmena smithii	Remove
T161	34.423	h 6m dia 0.4m s 3m	Livistona australis	Retain
T162	35.617	h 7m d 0.2m s 4m	Ficus coronata	Retain
T163	36.229	h 7m d 2"0.1m s 2	Guioa semiglauc	Retain
T164	36.218	h 7m d 5" 0.12m s 4	Ficus coronata	Retain
T165	35.804	h 8m d 5" 0.4m s 4	Ficus coronata	Retain
T166	35.832	h 5m d 0.1m s 3	Acmena smithii	Retain
T167	35.772	h 5m d 0.15m s 1.5m	Hibiscus heterophyllus	Retain
T168			Livistona australis	Retain
T169			Ficus coronata	Retain
T170	35.778	h 5m d 0.15m s 3.5m	Not found	
T171	35.829	h 6m d 0.2m s 3.5m	Archontophoenix cunninghamiana	Retain

T172	35.812	h 3m d 0.15m s 3.5m	Archontophoenix cunninghamiana	Retain
T173	35.811	h 3m d 0.15m s 3.5m	Archontophoenix cunninghamiana	Retain
T174	35.794	h 3m d 0.15m s 3m	Archontophoenix cunninghamiana	Retain
T175	35.806	h 3m d 0.15m s 3m	Archontophoenix cunninghamiana	Retain
T176	35.817	h 10m d 0.25m s 2m	Casuarina sp.	Retain
T177	35.942	h 7m d 0.1m s 1m	Polycias elegans	Retain
T178	35.95	h 5m d 0.08m s 2.5m	Homalanthus populifolius	Retain
T179	36.499	h 5m d 5" 0.08m s 2m	Ficus coronata	Retain
T180	36.389	h 5m d 0.15m s 2m	Homalanthus populifolius	Retain
T181	36.467	h 3.5m d 5" 0.05m s 2m	Breynea oblongifolia	Retain
T182	36.706	h 7m d 0.15m s 5m	Ficus coronata	Retain
T183	36.69	h 7m d 0.15m s 4m	Homalanthus populifolius	Retain
T184	36.662	h 10m dia 0.5m s 9m	Corymbia intermedia	Retain

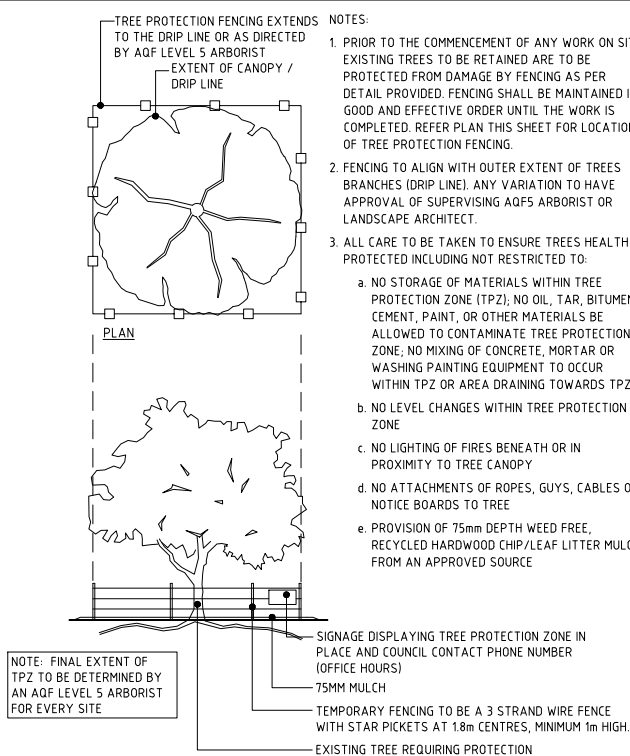
LEGEND		
	CREEK ALIGNMENT	
	NODES - NUMBER	
	DEMOLITION	
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED OR TRANSPLANTED (FEB 2022 SURVEY)	
	TREE PROTECTION FENCING	DETAIL A SHEET LD03
	TRUNK PROTECTION	DETAIL B SHEET LD03

3 ISSUED FOR SECTION 60 APPLICATION				NDR	AG	3/23	DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY)	SCALES	NORTH POINT	CITY OF WOLLONGONG			PJ or TR No. PJ-4420	A1 ORIGINAL	
2 Amendments to existing trees				NDR	AG	9/22	AZIMUTH	FIELD BOOK	DESIGNED NDR	DATE 02/22	SENIOR LANDSCAPE ARCHITECT	1:250@A1		BOTANIC GARDENS RAINFOREST WALK STAGE 2			SHEET 2 OF 12 SHEETS	ISSUE	
1 80% ISSUE FOR REVIEW				NDR	AG	6/22	RELATED PLANS		CHECKED AG	DATE 02/22	7160 LD02 1			MURPHYS AVENUE KEIRAVILLE			DRAWING No. 7160		SHEET No. LD02
ISSUE DESCRIPTION				DRAWN	APPR'D	DATE									EXISTING TREES AND DEMOLITION PLAN			3	
															NORTH SIDE				

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL PLAN

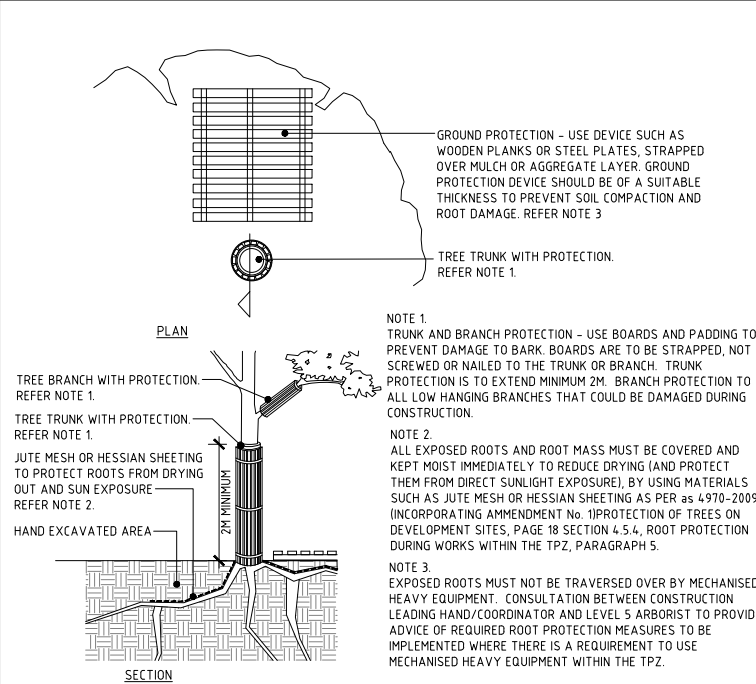
Botanic Gardens Rainforest Walk Stage 2				
Existing Tree Schedule - South Side				
No	RL	Description H, D, S	Species	Action
T185	27.993	H 5.5m D 0.15m S 2m	Magnolia sp.	Retain
T186	28.424	H 12m D 0.7m S 5m	Syncarpia glomulifera	Retain
T187	28.602	H 5m D 2'0.15m S 2m	Acer palmatum	Retain
T188	29.025	H 10m D 2'0.5m S 10m	Syncarpia glomulifera	Retain
T189	29.55	H 12m D 1.2m S 10m	Eucalyptus blakeyi	Retain
T190	29.825	H 15m D 2'1m S 10m	Syncarpia glomulifera	Retain
T191	29.609	H 3m D 0.15m S 2m	Acer palmatum 'Okushimo'	Retain
T192	29.29	H 3m D 0.15m S 2m	Acer palmatum 'Trompenburg'	Remove
T193	29.675	H 4m D 0.15m S 2m	Camellia sp.	Remove
T193a				Retain
T194	29.351	H 6m D 0.15m S 3m	Dias cotinifolia	Retain
T194a			Syncarpia glomulifera	Retain
T194b			Syncarpia glomulifera	Retain
T194c			Syncarpia glomulifera	Retain
T195	29.494	H 3m D 0.05m S 1m	Betula sp.	Retain
T196	29.498	H 6m D 0.1m S 2m	Betula sp.	Retain
T197	29.64	H 4m D 0.05m S 1m	Betula sp.	Retain
T198	30.091	H 3m D 0.05m S 1m	Betula sp.	Retain
T199	29.6	H 4m D 0.05m S 2m	Betula sp.	Retain
T200	30.56	H 11m D 0.8m S 8m	Syncarpia glomulifera	Retain
T201	30.668	H 11m D 0.8m S 8m	Syncarpia glomulifera	Retain
T202	30.545	H 10m D 0.4m S 4m	Melaleuca stypheloides	Retain
T203	30.951	H 10m D 0.4m S 4m	Melaleuca stypheloides	Retain
T204	31.147	H 8m D 0.28m S 3m	Syncarpia glomulifera	Retain
T205	31.241	H 11m D 0.5m S 8m	Eucalyptus punctata	Retain
T206	31.302	H 9m D 0.2m S 5m	Syncarpia glomulifera	Retain
T207	31.532	H 9m D 0.3m S 5m	Syncarpia glomulifera	Retain
T208	31.377	H 4m D 0.1m S 2m	Croton verreauxii	Retain
T209	31.235	H 5m D 0.1m S 7m	Hibiscus heterophyllus	Retain
T210	31.696	H 10m D 0.2m S 3m	Alphitonia excelsa	Retain
T211	31.689	H 10m D 0.2m S 3m	Syncarpia glomulifera	Retain
T212	31.781	H 8m D 3'0.15m S 5m	Syncarpia glomulifera	Retain
T213	31.273	H 9m D 0.3m S 5m	Melaleuca stypheloides	Retain
T214	31.971	H 9m D 0.4m S 5m	Syncarpia glomulifera	Retain
T215	32.051	H 8m D 0.3m S 5m	Toona ciliata	Retain
T216	31.913	H 5m D 0.15m S 3m	Alectryon subcinerus	Retain

T217	32.641	H 8m D 2'0.1m S 3m	Croton verreauxii	Retain
T218	32.529	H 8m D 2'0.1m S 3m	Sarcocaulis simplicifolia	Retain
T219	32.527	H 8m D 0.1m S 3m	Pittosporum undulatum	Retain
T220	32.754	H 8m D 2'0.05m S 3m	Croton verreauxii	Retain
T221	32.78	H 6m D 0.05m S 3m	Sarcocaulis simplicifolia	Retain
T222	32.822	H 8m D 3'0.1m S 4m	Croton verreauxii	Retain
T223	32.895	H 8m D 2'0.1m S 4m	Croton verreauxii	Retain
T224	32.925	H 8m D 0.1m S 4m	Sarcocaulis simplicifolia	Retain
T225	32.499	H 8m D 0.1m S 3m	Ehretia acuminata	Retain
T226	32.541	H 12m D 0.4m S 7m	Ficus obliqua	Retain
T227	32.667	H 8m D 0.1m S 3m	Ehretia acuminata	Retain
T228	32.703	H 6m D 2'0.05m S 3m	Alchornea ilicifolia	Retain
T229	32.9	H 10m D 0.2m S 4m	Ehretia acuminata	Remove
T230	32.952	H 8m D 0.1m S 3m	Croton verreauxii	Remove
T231	32.915	H 12m D 0.3m S 7m	Alphitonia excelsa	Retain
T232	33.141	H 8m D 0.1m S 3m	Scolopia braunii	Remove
T233			Pisonia umbellifera	Remove
T234	33.003	H 10m D 0.2m S 4m	Litsea sp.	Retain
T235	33.085	H 10m D 0.2m S 4m	Alphitonia excelsa	Retain
T236	33.401	H 12m D 0.4m S 7m	Ficus henneana	Retain
T237	33.237	H 8m D 2'0.4m S 3m	Pisonia umbellifera	Retain
T238	33.183	H 8m D 0.2m S 4m	Brachychiton acerifolius	Retain
T239	33.368	H 11m D 0.6m S 6m	Ficus macrophylla	Retain
T240	33.502	H 8m D 0.1m S 4m	Planchonella australis	Retain
T241	33.492	H 10m D 0.2m S 4m	Ehretia acuminata	Retain
T242	33.526	H 6m D 0.05m S 2m	Neolitsea dealbata	Remove
T243	33.827	H 1m D 0.4m S 5m	Ficus obliqua	Retain
T244	33.725	H 8m D 0.1m S 4m	Melia azedarach	Retain
T245	33.693	H 10m D 0.2m S 4m	Gmelina leichhardtii	Retain
T246	33.661	H 18m D 0.1m S 4m	Croton verreauxii	Retain
T247	33.796	H 8m D 0.15m S 4m	Ceropetalum apetalum	Retain
T248	33.941	H 6m D 0.3m S 4m	Livistona australis	Retain
T249	34.016	H 8m D 0.1m S 2m	Cryptocarya microneura	Retain
T250	34.156	H 6m D 0.4m S 4m	Livistona australis	Retain
T251	34.177	H 4m D 0.3m S 2m	Livistona australis	Retain
T252	34.412	H 6m D 0.1m S 4m	Pittosporum undulatum	Retain
T253	34.442	H 6m D 0.25m S 3m	Livistona australis	Retain
T254	33.741	H 4m D 0.3m S 3m	Livistona australis	Retain

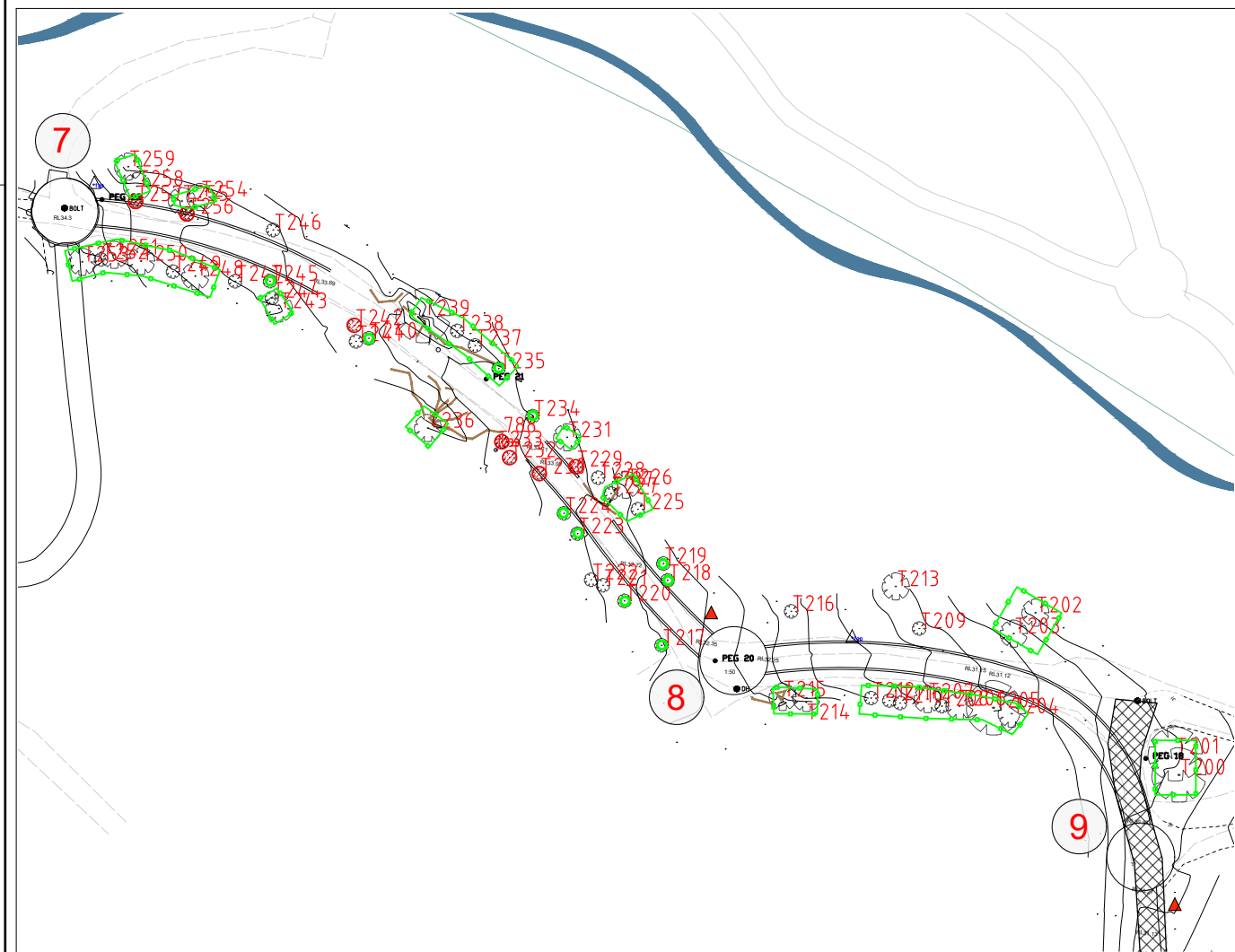
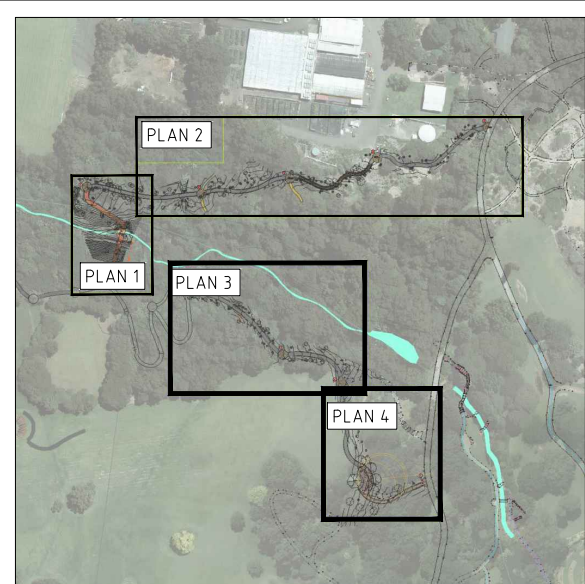


DETAIL A - TYPICAL TREE PROTECTION ZONE (TPZ) FENCING DETAIL

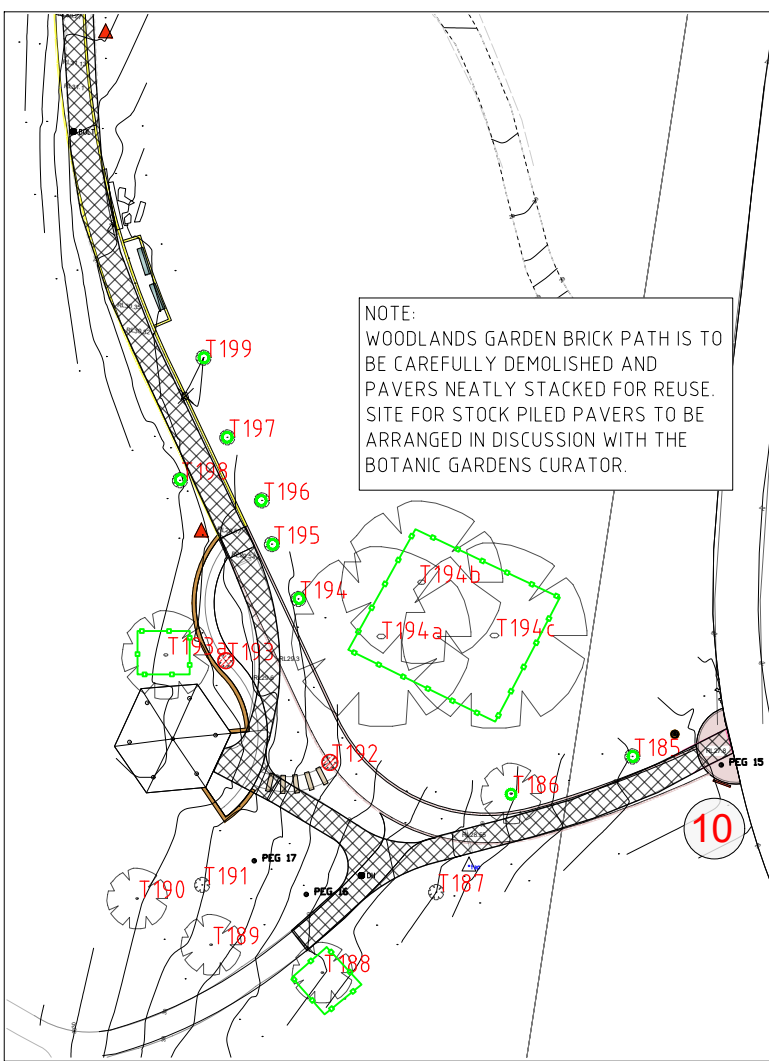
(REFERENCE AS 4790)



DETAIL B - TREE PROTECTION - TYPICAL TREE TRUNK, BRANCH AND ROOT DETAIL



PLAN 3



PLAN 4

LEGEND		
	CREEK ALIGNMENT	
	NODES - NUMBER	
	DEMOLITION	
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED OR TRANSPLANTED (FEB 2022 SURVEY)	
	TREE PROTECTION FENCING	DETAIL A SHEET LD03
	TRUNK PROTECTION	DETAIL B SHEET LD03

				DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY)			SCALES	NORTH POINT	CITY OF WOLLONGONG			PJ or TR No. PJ-4420		A1						
3	ISSUED FOR SECTION 60 APPLICATION			RELATED PLANS	FIELD BOOK	DESIGNED NDR	DATE 02/22	SENIOR LANDSCAPE ARCHITECT			1:250@A1		BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE EXISTING TREES AND DEMOLITION PLAN SOUTH SIDE			SHEET 3 OF 12 SHEETS		ORIGINAL						
2	Amendments to existing trees					CHECKED AG	DATE 02/22	7160 LD02 1								DRAWING No. 7160	SHEET No. LD03	ISSUE 3						
1	80% ISSUE FOR REVIEW																							
ISSUE			DESCRIPTION	DRAWN	APPR'D	DATE			DESIGN & TECHNICAL SERVICES Ph 02 42277111															

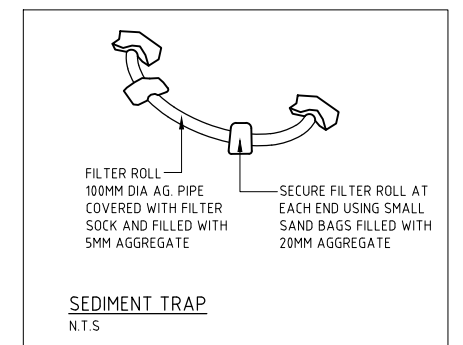
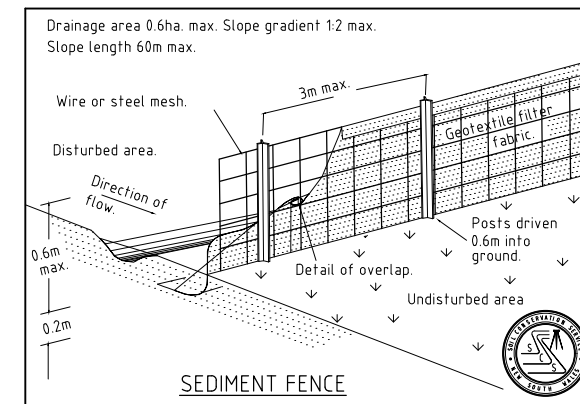


ENVIRONMENTAL MANAGEMENT PLAN 1:500@A1

- LEGEND
- SEDIMENT FENCE (REFER DETAIL)
 - SEDIMENT TRAP (REFER DETAIL)

SEDIMENT CONTROL GENERAL NOTES

- ALL SURFACE WATER AND EROSION AND SEDIMENT CONTROL MEASURES AS DETAILED ON THE APPROVED MANAGEMENT PLANS MUST BE IN PLACE BEFORE THE COMMENCEMENT OF CONSTRUCTION AND CONTINUE TO OPERATE AFTER COMPLETION OF THE CONSTRUCTION UNTIL THE VEGETATION IS ESTABLISHED FOR SUPERINTENDENTS ACCEPTANCE.
- MEASURES USED TO MANAGE EROSION AND SEDIMENT CONTROL WILL INCLUDE:
 - OSB BASIN TO POND DIRTY RUNOFF FROM DISTURBED AREAS AND EXISTING UPSTREAM CATCHMENTS. SEDIMENT WILL SETTLE OUT OF SUSPENSION IN THESE PONDS.
 - SEDIMENT CONTROL FENCES TO FILTER RUNOFF FROM DISTURBED AREAS AND STOCKPILES.
 - CHECK DAMS TO FILTER LARGER FLOWS OF SEDIMENT LADEN RUNOFF TO TRAP SEDIMENT.
- ALL SITE RUNOFF SHOULD BE DISCHARGED INTO GRASSED FIELDS, SEDIMENTATION TRAPS, OR CHECK DAMS DOWN SLOPE OF DISTURBED AREAS TO COLLECT, CONVEY AND TREAT SEDIMENT-LADEN RUNOFF.
- SILT FENCES SHOULD BE INSTALLED ON THE DOWNSLOPE SIDE OF ALL STOCKPILES.
- MEASURES SHALL BE TAKEN TO MINIMISE THE RISK OF EROSION TO DISTURBED AREAS. BARE AREAS SHOULD BE STABILISED WITHIN 14 DAYS OF THE COMPLETION OF CONSTRUCTION ACTIVITIES. TEMPORARY STABILISATION TECHNIQUES SUCH AS EROSION MATTING, SEDIMENT SCREENS, HAY BALE ENERGY DISSIPATORS, MULCHING, HYDROSEEDING AND GRASS SPECIES ESTABLISHMENT SHOULD BE IMPLEMENTED ON DISTURBED AREAS AS REQUIRED.
- WEEKLY INSPECTION AND MAINTENANCE OF ALL WORKS AND REHABILITATE AREAS SHALL BE UNDERTAKEN, INSPECTION RECORDS TO BE KEPT ON SITE.
- FOLLOWING SUCCESSFUL RE-VEGATION AND AFTER INSPECTION, TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED. THIS MAY INVOLVE CLEANING AND REMOVAL OF DIVERSION WORKS, SEDIMENT TRAPS AND CHECK DAMS.
- EROSION AND SEDIMENT CONTROL STRUCTURES TO BE INSPECTED WEEKLY AND IMMEDIATELY AFTER EVERY STORM AND RUNOFF EVENT TO CHECK THEY ARE OPERATING SATISFACTORILY AND TO SCHEDULE ANY MAINTENANCE WORK AND REPAIRS THAT MAY BE REQUIRED. WEEKLY MAINTENANCE WILL INCLUDE:
 - SEDIMENT REMOVAL FROM DRAINS AND CHECK DAMS.
 - REPLACEMENT AS REQUIRED.
- DUST SUPPRESSION EQUIPMENT TO BE AVAILABLE AT ALL TIMES (INCLUDING WEEKENDS, ROSTER DAYS AND PUBLIC HOLIDAYS) TO REDUCE THE EMISSION OF DUST FROM SITE.
- ANY INCIDENTS ON SITE LIKELY TO CAUSE POLLUTION (FUEL, CHEMICALS, STORMWATER ETC) MUST BE REPORTED IMMEDIATELY TO THE SUPERINTENDENT.
- ALL WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH "MANAGING STORMWATER, SOIL & CONSTRUCTION" PRODUCED BY THE NSW DEPARTMENT OF HOUSING. (THE BLUE BOOK)
- THIS PLAN SHOWS TYPICAL SOIL & WATER MANAGEMENT MEASURES THAT WILL BE REQUIRED BUT IS INTENDED TO LIMIT THE CONTRACTOR TO ANY PARTICULAR CONSTRUCTION METHODOLOGY. ANY CHANGES ARE TO BE APPROVED BY COUNCIL OR PCA.
- PERMANENT BATTER TO BE TOPSOILED (MIN. 300mm) AND HYDROSEEDING WITH APPROVED SEED MIX.
- ALL DISTURBED AREAS TO BE HYDROSEEDING IMMEDIATELY UPON COMPLETION WITH APPROVED SEED MIX.
- HYDROSEEDING AREAS TO BE REGULARLY WATERED TO PROMOTE RAPID GROWTH.
- ANY RE-VEGATED AREAS WHICH FAIL TO ESTABLISH WITHIN THREE MONTHS MUST BE RE-SOWN.
- EARTHWORKS AND TRENCHING TO BE STAGED TO KEEP WORK AREAS TO A MANAGEABLE SIZE.
- EXCAVATED MATERIAL FROM TRENCHES TO BE STOCKPILED UPHILL OF TRENCH UNTIL BACKFILLING CAN OCCUR.
- PUBLIC ROADS TO BE KEPT CLEAR OF DEBRIS AT ALL TIMES. CONSTRUCTOR TO PROVIDE SHAKE DOWN PAD FOR VEHICLES ENTERING/LEAVING SITE.
- HAULAGE VEHICLES TO REMAIN ON SEALED ROADS OR DEFINED TRACKS AT ALL TIMES WITHIN THE SITE.
- SEDIMENT TRAPS ARE TO BE PROVIDED AROUND ALL PITS DURING THE FOLLOWING CONSTRUCTION. BARRIERS AND TRAPS CAN BE REMOVED UPON SUCCESSFUL RE-VEGATION UPSTREAM AS DIRECTED BY THE SUPERINTENDENT.
- ALL WORKS ENCLOSED AT ALL TIMES BY 1800mm HIGH CHAIN WIRE FENCE.



NOTE !
LOCATION OF SERVICES TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION CONTACT "DIAL BEFORE YOU DIG" Phone 1100

PRELIMINARY PLAN - NOT FOR CONSTRUCTION

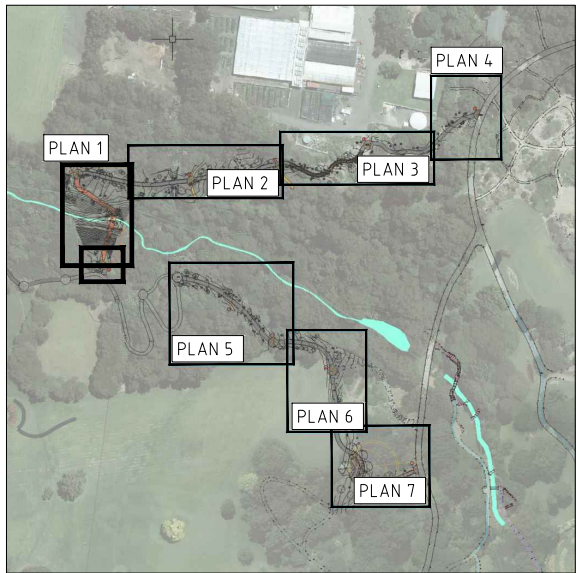
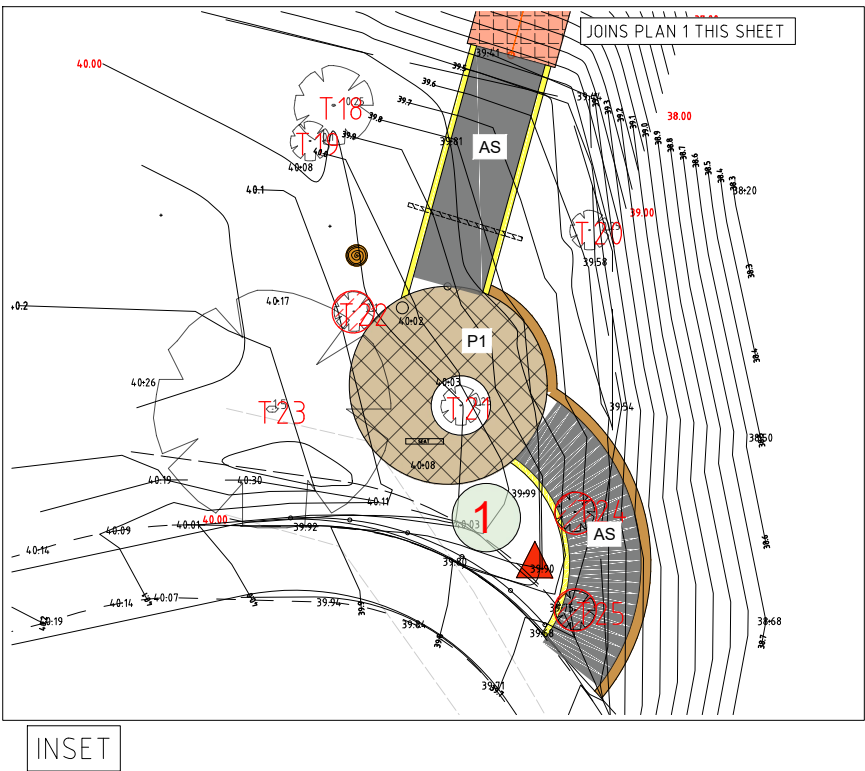
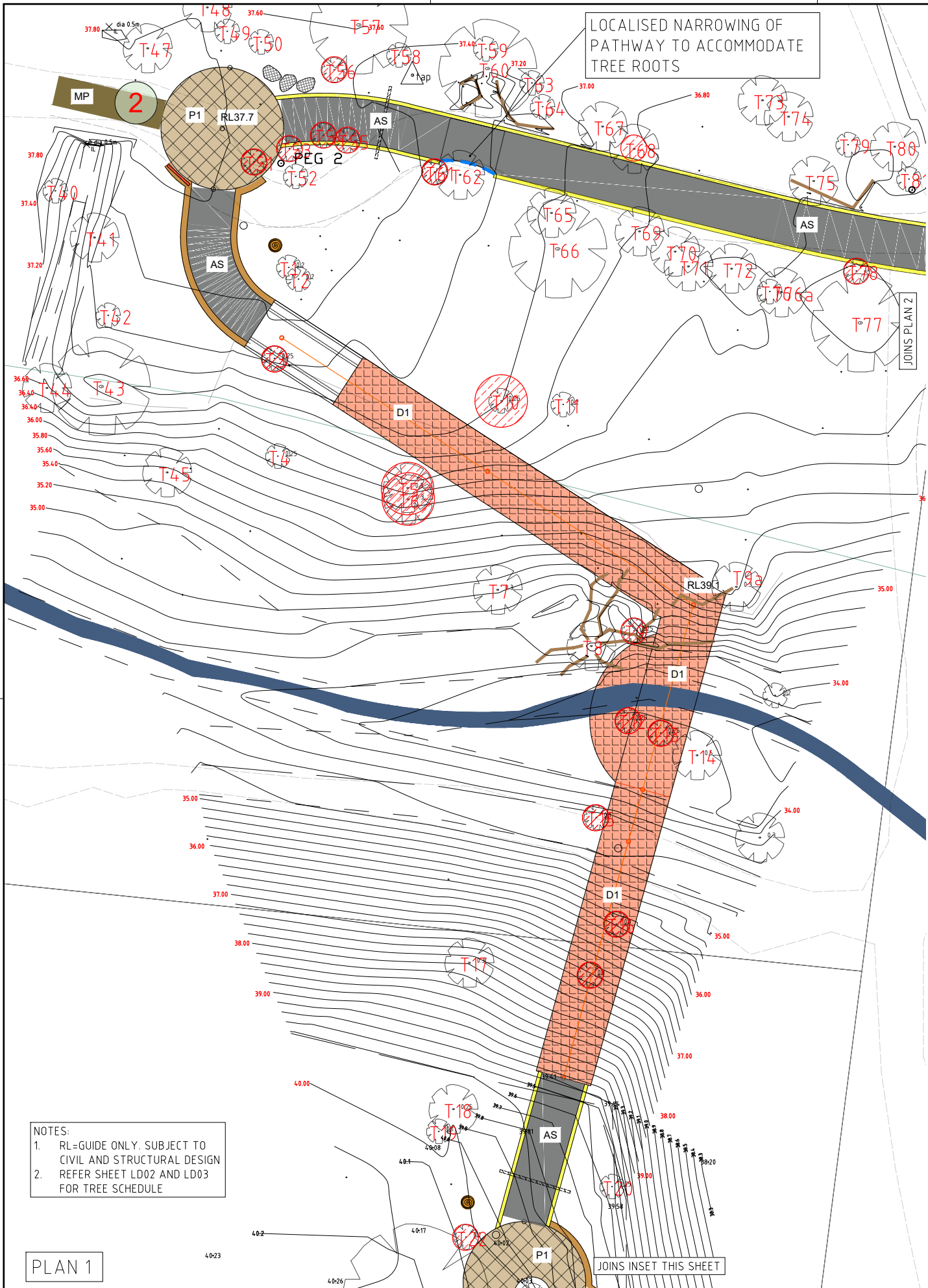
CITY OF WOLLONGONG
BOTANIC GARDENS RAINFOREST WALK STAGE 2
MURPHYS AVENUE KEIRAVILLE
ENVIRONMENTAL MANAGEMENT PLAN



PJ or TR No.	PJ-4420	A1
SHEET	4 OF 12 SHEETS	ORIGINAL
DRAWING No.	7160	ISSUE
SHEET No.	LD04	2

2	ISSUED FOR SECTION 60 APPLICATION	NDR	AG	3/23	DATUM	DGA94	SURVEYOR	MK	DRAWN	NDR	DATE	02/22	APPROVED	(FOR COUNCIL USE ONLY)
1	80% ISSUE FOR REVIEW	NDR	AG	6/22	AZIMUTH		FIELD BOOK		DESIGNED	NDR	DATE	02/22	SENIOR LANDSCAPE	ARCHITECT
					RELATED PLANS				CHECKED	AG	DATE	02/22	7160 LD03 1	
ISSUE	DESCRIPTION	DRAWN	APPR'D	DATE										

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL PLAN



LEGEND - PLAN 1		
	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	01 LD12
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	01 LD12
	FLUSH STEEL EDGE TO ASPHALT PATH	02 LD12
	MAKE GOOD CONNECTIONS TO EXISTING MULCH PATHS	
	SANDSTONE RETAINING WALL	06 LD12
	NODES - NUMBER	
	NODES PAVING	03 05 LD12 LD12
	RAINFOREST CANOPY BRIDGE (DECK 1) - REFER STRUCTURAL DWGS	
	EXISTING AND PROPOSED TAPS	11 LD12
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	08 09 LD12 LD12
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	RANDOM ROCK BOULDERS FOR INFORMAL SEATING AT NODES - REFER ROCK BOULDER SCHEDULE	10 LD12

PRELIMINARY PLAN - NOT FOR CONSTRUCTION

2	ISSUED FOR SECTION 60 APPLICATION	NDR	AG	3/23	DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY)
1	80% ISSUE FOR REVIEW	NDR	AG	6/22	AZIMUTH	FIELD BOOK	DESIGNED NDR	DATE 02/22	SENIOR LANDSCAPE ARCHITECT
ISSUE	DESCRIPTION	DRAWN	APPR'D	DATE	RELATED PLANS				
					7160 LD05 1				
					DATE				

SCALES
1:100@A1

CITY OF WOLLONGONG

BOTANIC GARDENS RAINFOREST WALK STAGE 2

MURPHYS AVENUE KEIRAVILLE

LANDSCAPE PLAN

PJ or TR No. PJ-4420

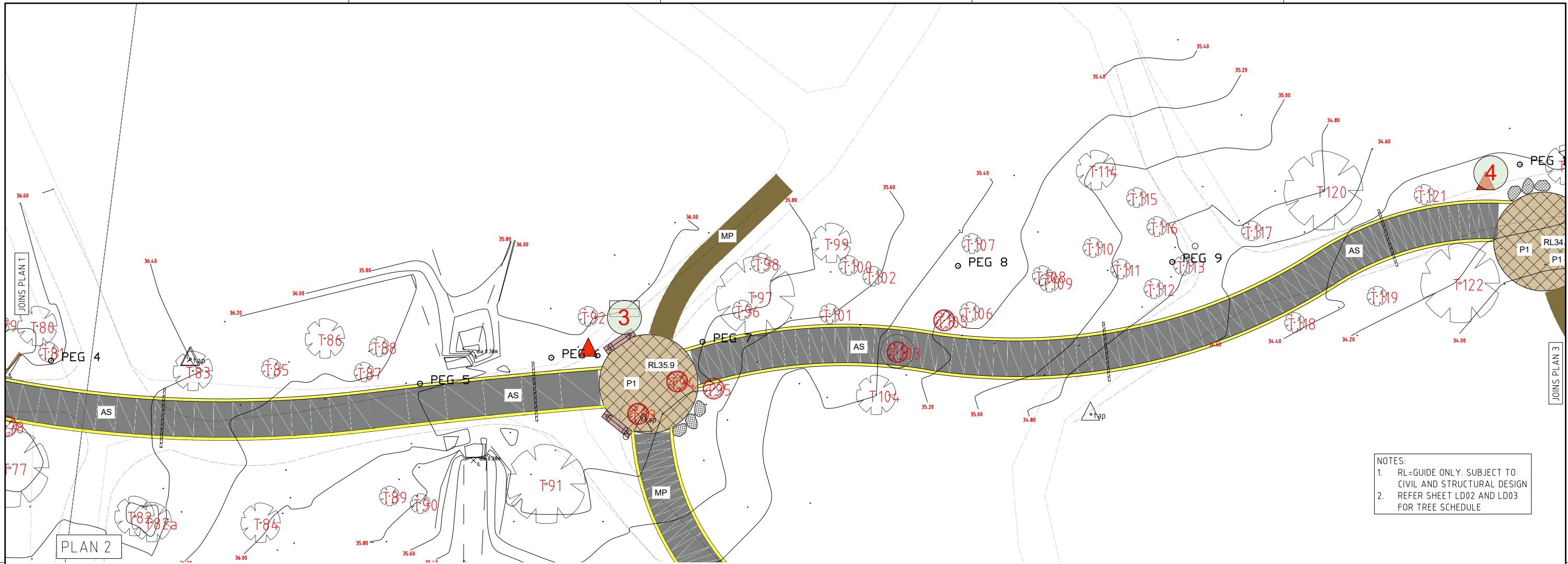
SHEET 5 OF 12 SHEETS

DRAWING No. 7160

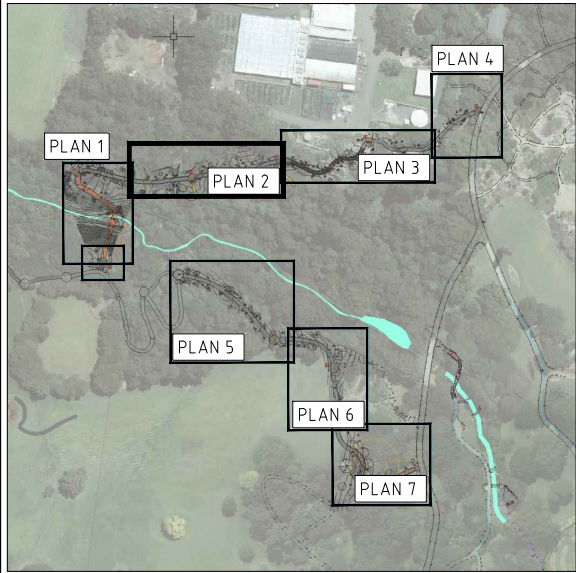
SHEET No. LD05

ISSUE 2

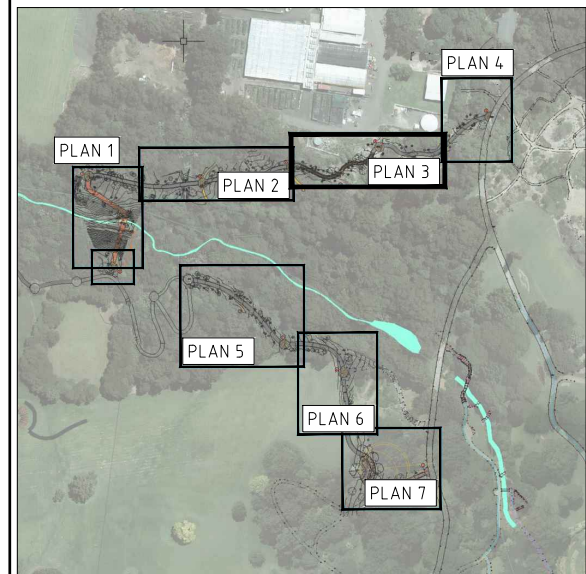
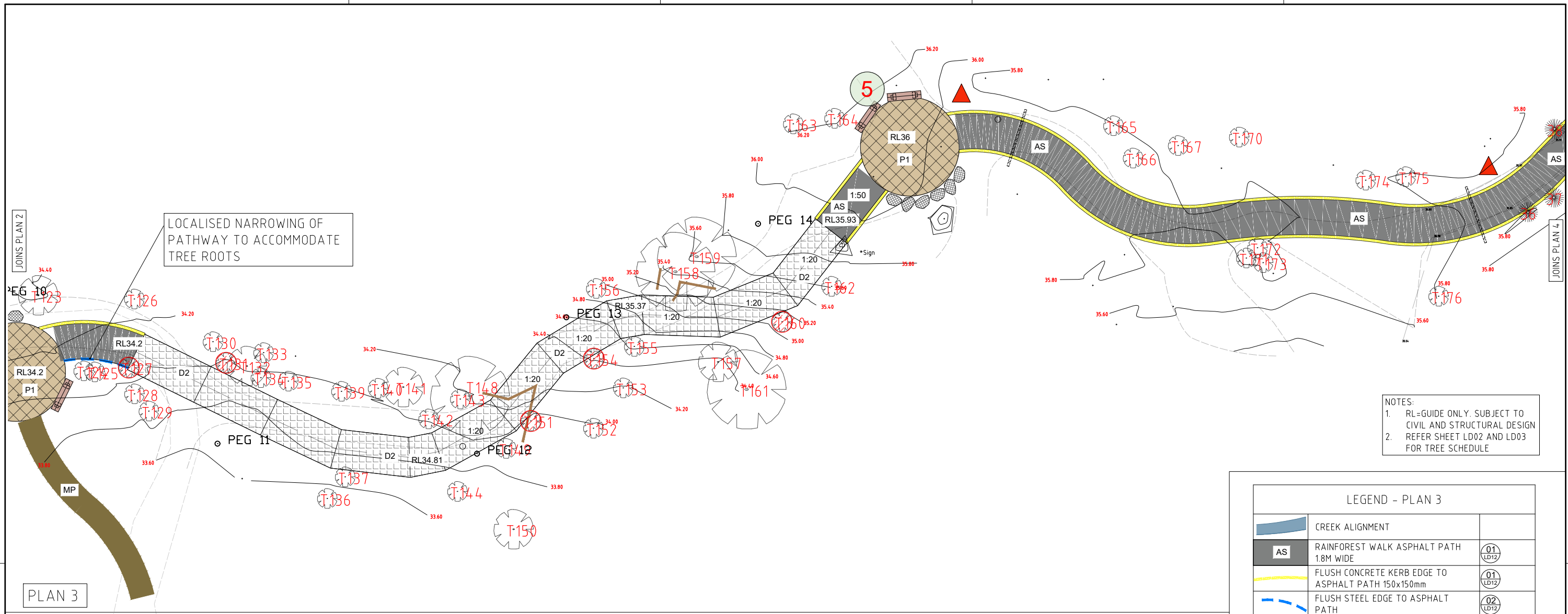
A1 ORIGINAL



NOTES:
1. RL=GUIDE ONLY. SUBJECT TO CIVIL AND STRUCTURAL DESIGN
2. REFER SHEET LD02 AND LD03 FOR TREE SCHEDULE



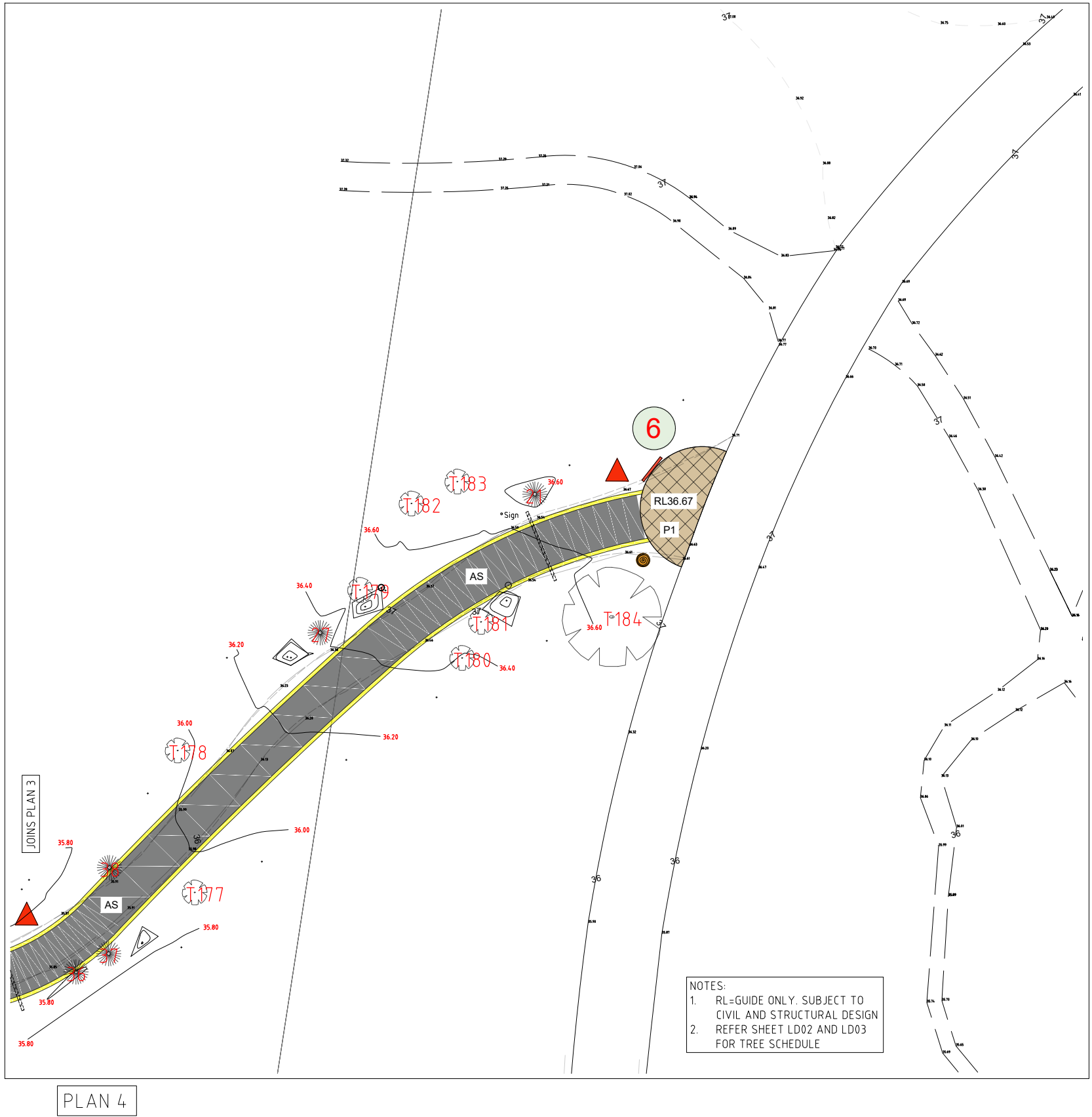
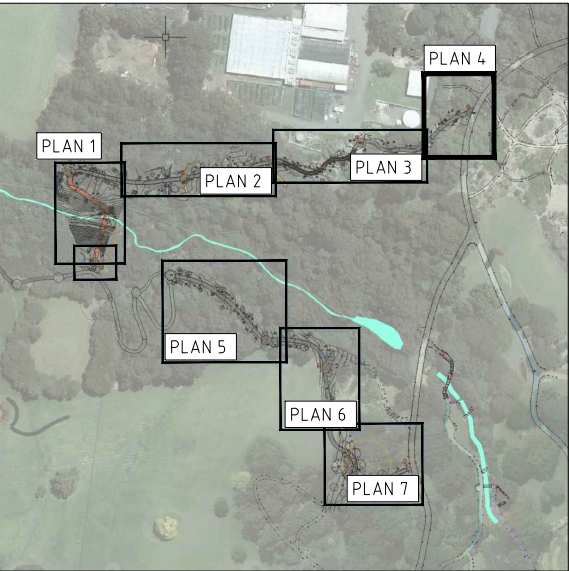
LEGEND - PLAN 2		
	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	01 LD12
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	01 LD12
	FLUSH STEEL EDGE TO ASPHALT PATH	02 LD12
	MAKE GOOD CONNECTIONS TO EXISTING MULCH PATHS	
	NODES - NUMBER	
	NODES PAVING	03 LD12 05 LD12
	EXISTING AND PROPOSED TAPS	11 LD12
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	08 LD12 09 LD12
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	RANDOM ROCK BOULDERS FOR INFORMAL SEATING AT NODES - REFER ROCK BOULDER SCHEDULE	10 LD12



LEGEND - PLAN 3		
	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	01 LD12
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	01 LD12
	FLUSH STEEL EDGE TO ASPHALT PATH	02 LD12
	MAKE GOOD CONNECTIONS TO EXISTING MULCH PATHS	
	NODES - NUMBER	
	NODES PAVING	03 05 LD12 LD12
	BOARDWALK (DECK 2) - REFER STRUCTURAL DWGS	
	EXISTING AND PROPOSED TAPS	11 LD12
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	08 09 LD12 LD12
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	SURFACE TREE ROOTS	
	TURF TO MAKE GOOD	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	RANDOM ROCK BOULDERS FOR INFORMAL SEATING AT NODES - REFER ROCK BOULDER SCHEDULE	

2 ISSUED FOR SECTION 60 APPLICATION				NDR	AG	3/23	RELATED PLANS	DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY) SENIOR LANDSCAPE ARCHITECT 7160 LD07 1	bsi. ISO 9001 Quality Management	SCALES 1:100@A1	NORTH POINT 	CITY OF WOLLONGONG BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE LANDSCAPE PLAN	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ or TR No. PJ-4420 SHEET 7 OF 12 SHEETS DRAWING No. 7160	SHEET No. LD07	A1 ORIGINAL ISSUE 2
1 80% ISSUE FOR REVIEW				NDR	AG	6/22		AZIMUTH	FIELD BOOK	DESIGNED NDR	DATE 02/22									
ISSUE				DRAWN	APPR'D	DATE				CHECKED AG	DATE 02/22									

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL PLAN



NOTES:
1. RL=GUIDE ONLY. SUBJECT TO
CIVIL AND STRUCTURAL DESIGN
2. REFER SHEET LD02 AND LD03
FOR TREE SCHEDULE

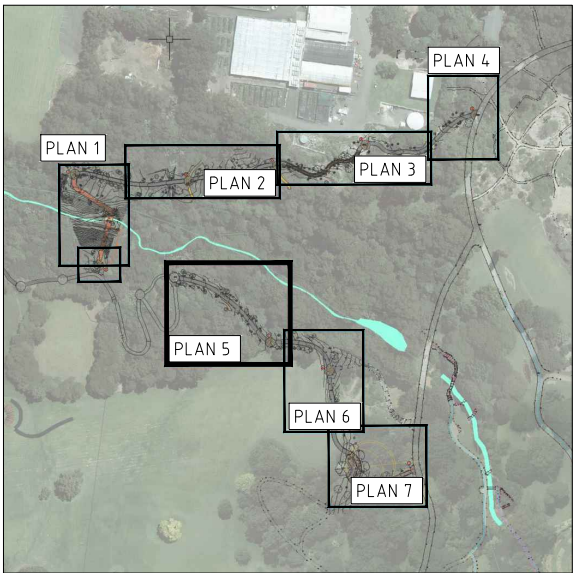
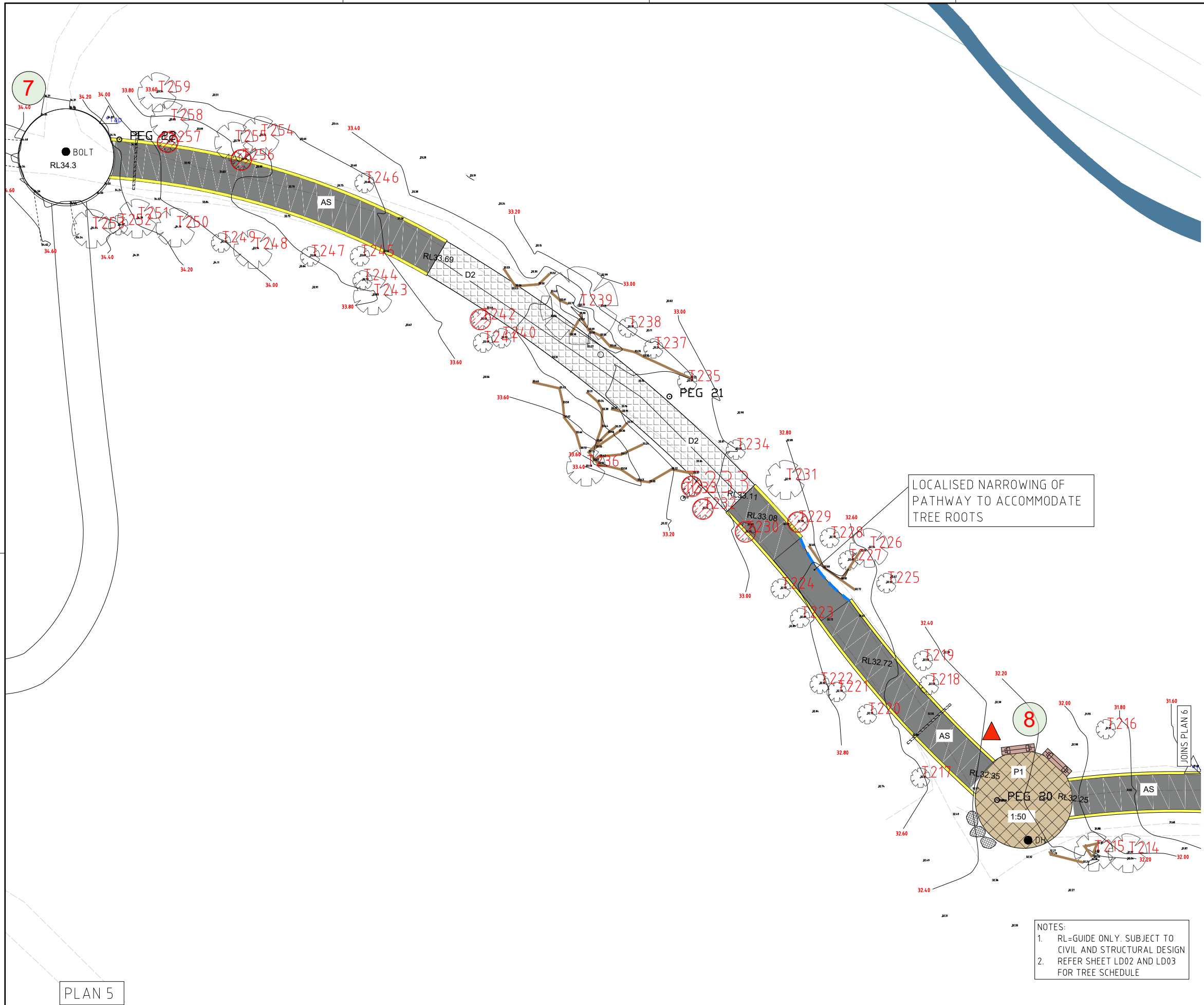
LEGEND - PLAN 4

	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	
	NODES - NUMBER	
	NODES PAVING	
	EXISTING AND PROPOSED TAPS	
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	TURF TO MAKE GOOD	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	RANDOM ROCK BOULDERS FOR INFORMAL SEATING AT NODES - REFER ROCK BOULDER SCHEDULE	

PRELIMINARY PLAN - NOT FOR CONSTRUCTION

				DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY) SENIOR LANDSCAPE ARCHITECT 7160 LD08 1		SCALES 1:100@A1		CITY OF WOLLONGONG BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE LANDSCAPE PLAN	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ or TR No. PJ-4420		A1
				AZIMUTH	FIELD BOOK	DESIGNED NDR	DATE 02/22							SHEET 8 OF 12 SHEETS	ORIGINAL	
ISSUED FOR SECTION 60 APPLICATION				NDR	AG	RELATED PLANS	CHECKED AG	DATE 02/22						DRAWING No. 7160	SHEET No. LD08	ISSUE 2
80% ISSUE FOR REVIEW				NDR	AG											
ISSUE DESCRIPTION				DRAWN	APPR'D	DATE										

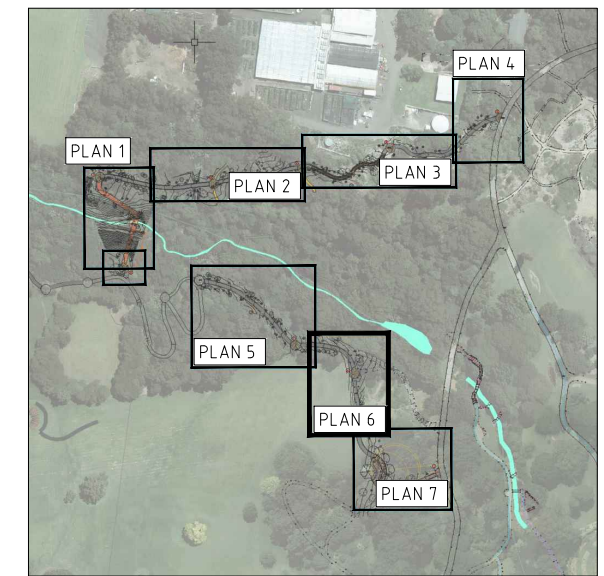
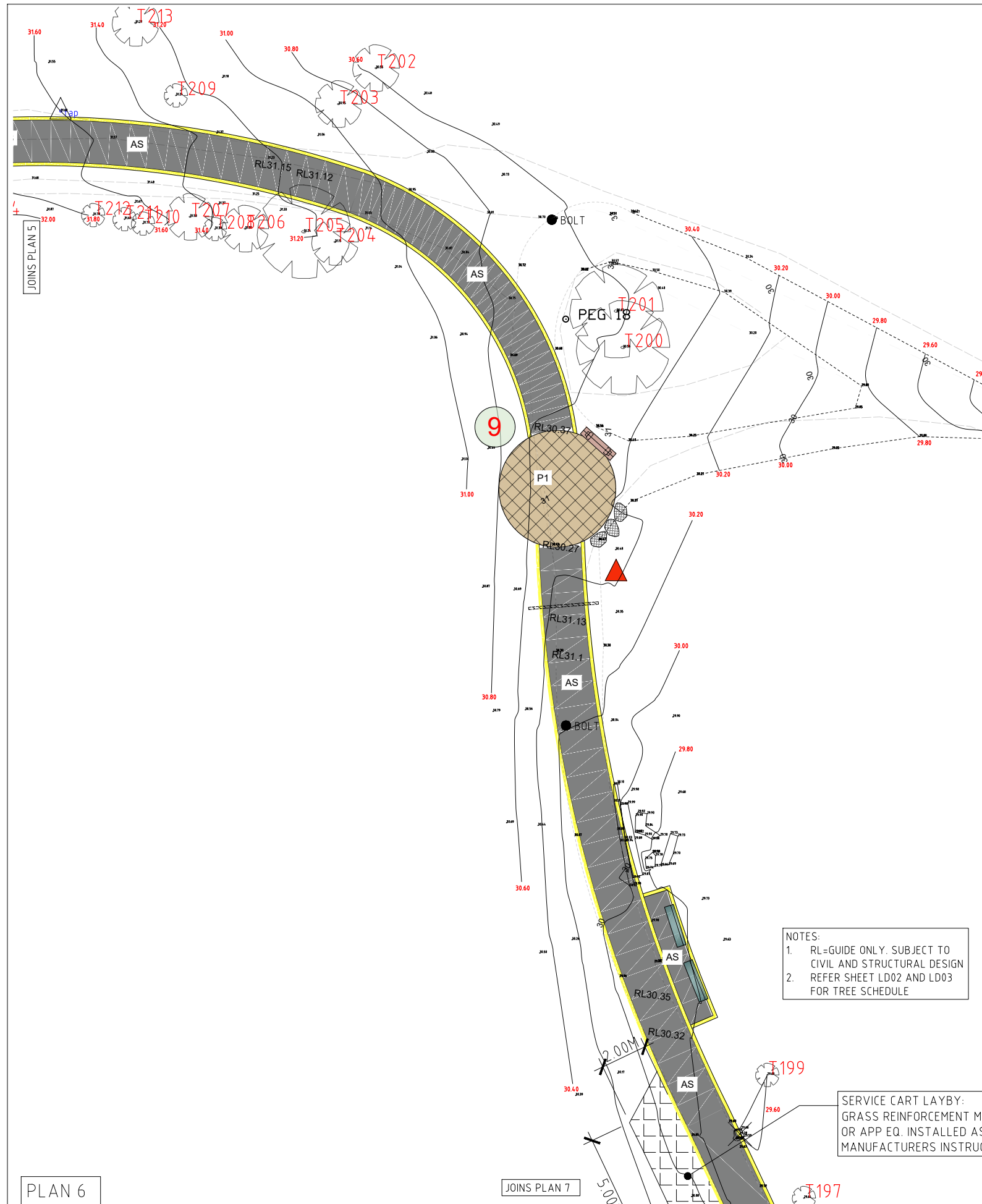
0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL PLAN



LEGEND - PLAN 5		
	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	(01) LD12
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	(01) LD12
	FLUSH STEEL EDGE TO ASPHALT PATH	(02) LD12
	NODES - NUMBER	
	NODES PAVING	(03) LD12 (05) LD12
	BOARDWALK (DECK 2)	
	EXISTING AND PROPOSED TAPS	(11) LD12
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	(08) LD12 (09) LD12
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	TURF TO MAKE GOOD	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	RANDOM ROCK BOULDERS FOR INFORMAL SEATING AT NODES - REFER ROCK BOULDER SCHEDULE	

NOTES:
1. RL=GUIDE ONLY. SUBJECT TO CIVIL AND STRUCTURAL DESIGN
2. REFER SHEET LD02 AND LD03 FOR TREE SCHEDULE

								DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY) SENIOR LANDSCAPE ARCHITECT 7160 LD09 1 DATE		SCALES 1:100@A1		CITY OF WOLLONGONG BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE LANDSCAPE PLAN	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ or TR No. PJ-4420		A1
								AZIMUTH	FIELD BOOK	DESIGNED NDR	DATE 02/22							SHEET 9 OF 12 SHEETS		ORIGINAL
2 ISSUED FOR SECTION 60 APPLICATION				NDR	AG	3/23	RELATED PLANS		CHECKED AG	DATE 02/22	DRAWING No. 7160							ISSUE		
1 80% ISSUE FOR REVIEW				NDR	AG	6/22					SHEET No. LD09			2						
ISSUE DESCRIPTION				DRAWN	APPR'D	DATE														

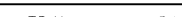


LEGEND - PLAN 6		
	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	
	NODES - NUMBER	
	NODES PAVING	
	EXISTING AND PROPOSED TAPS	
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	TURF TO MAKE GOOD	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	RANDOM ROCK BOULDERS FOR INFORMAL SEATING AT NODES - REFER ROCK BOULDER SCHEDULE	

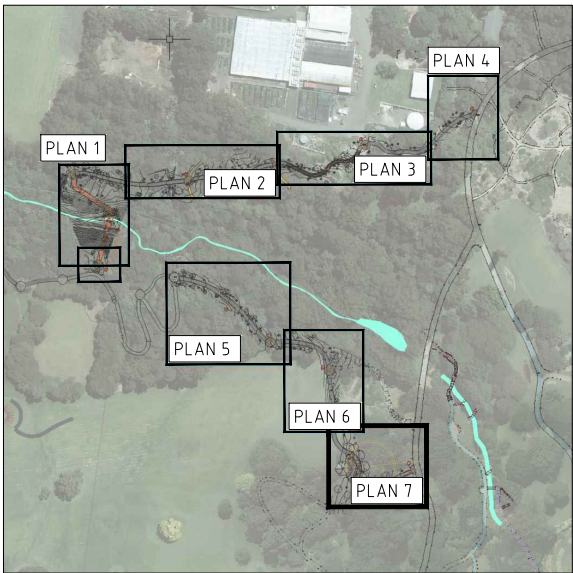
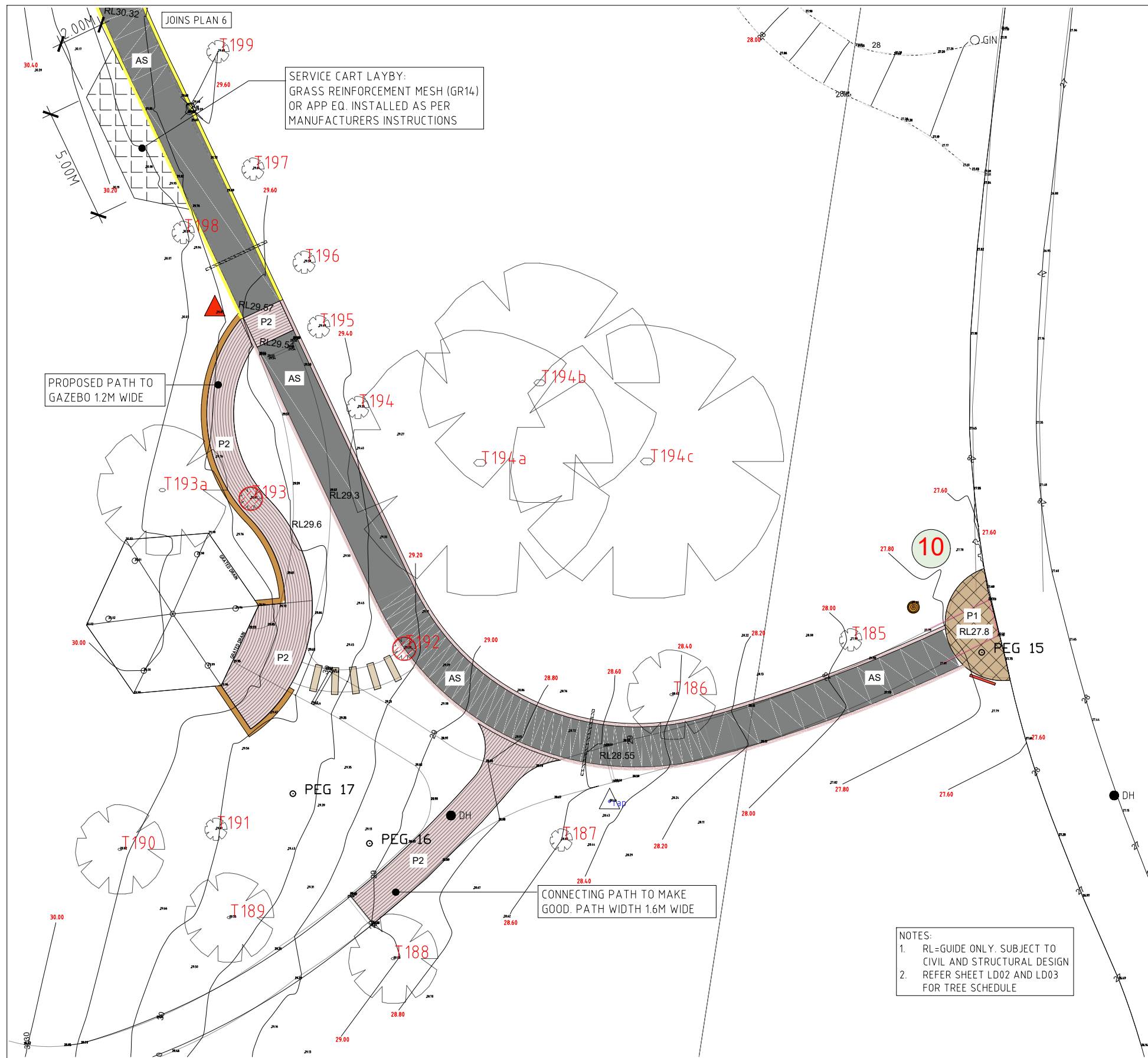
NOTES:
1. RL=GUIDE ONLY. SUBJECT TO
CIVIL AND STRUCTURAL DESIGN
2. REFER SHEET LD02 AND LD03
FOR TREE SCHEDULE

SERVICE CART LAYBY:
GRASS REINFORCEMENT ME
OR APP EQ. INSTALLED AS
MANUFACTURERS INSTRU

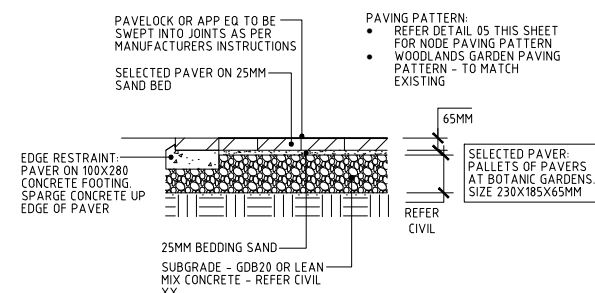
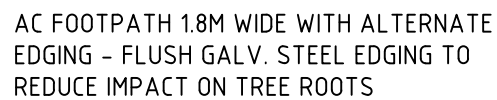
PRELIMINARY PLAN - NOT FOR CONSTRUCTION

				DATUM DGA94	SURVEYOR MK	DRAWN NDR	DATE 02/22	APPROVED (FOR COUNCIL USE ONLY) SENIOR LANDSCAPE ARCHITECT 7160 LD10 1		SCALES 1:100@A1		CITY OF WOLLONGONG BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE LANDSCAPE PLAN	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ or TR No. PJ-4420		A1 ORIGINAL
				AZIMUTH FIELD BOOK	DESIGNED NDR	DATE 02/22	SHEET 10 OF 12 SHEETS							ISSUE		
2	ISSUED FOR SECTION 60 APPLICATION			NDR	AG	3/23	RELATED PLANS	CHECKED AG	DATE 02/22	DATE				7160	LD10	2
1	80% ISSUE FOR REVIEW			NDR	AG	6/22										
ISSUE				DESCRIPTION			DRAWN	APPR'D	DATE							

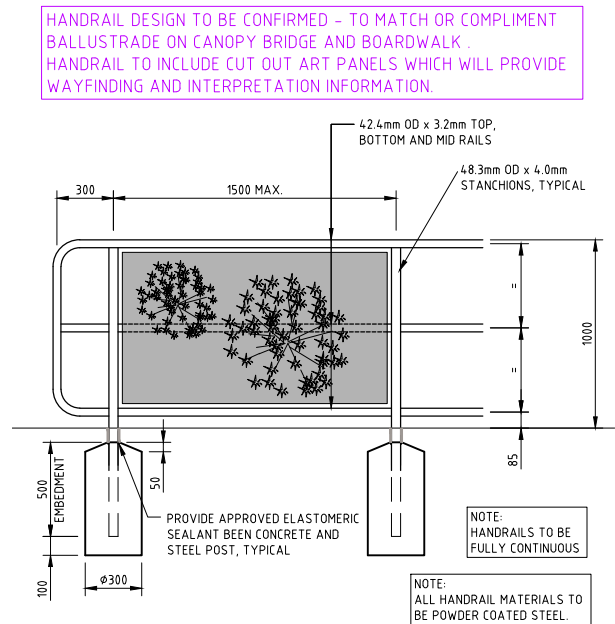
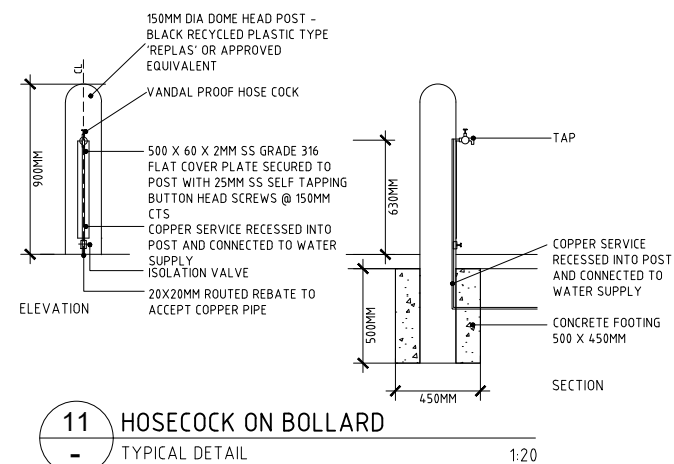
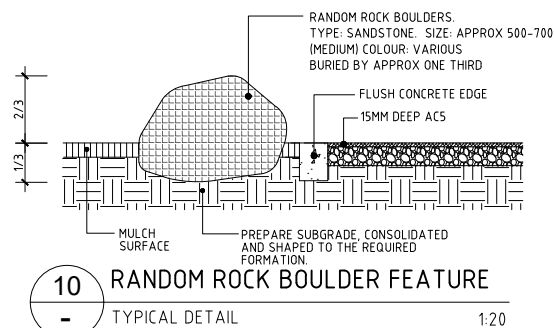
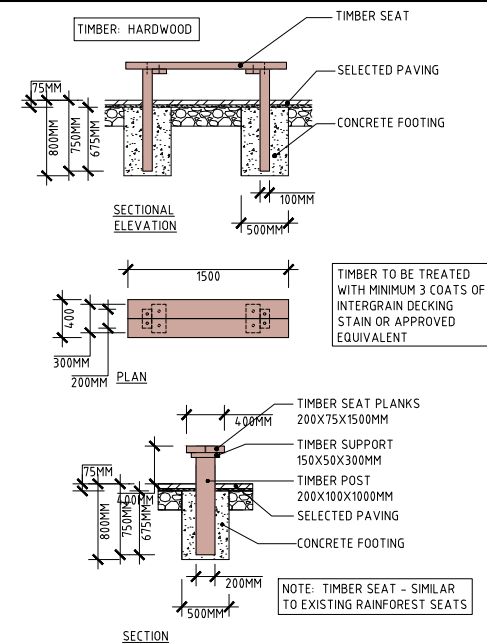
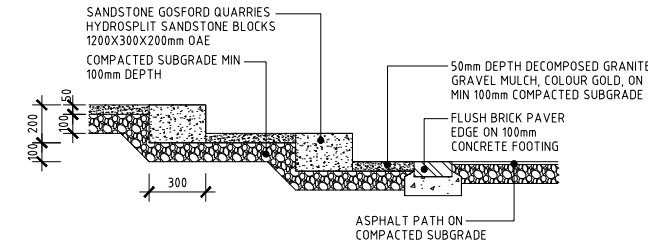
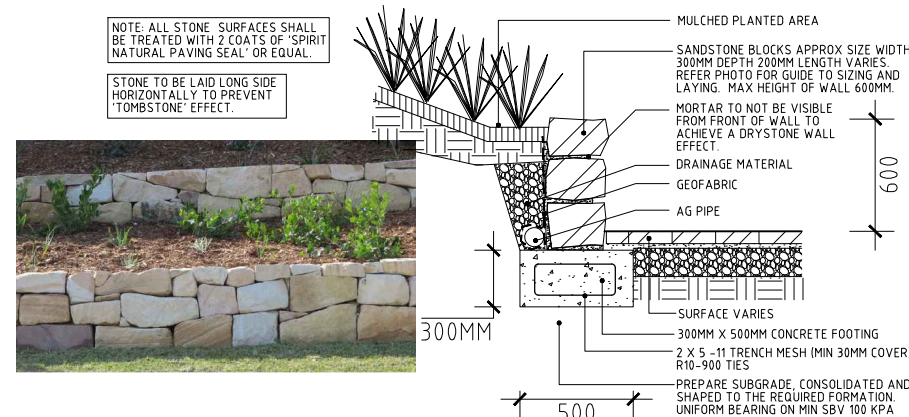
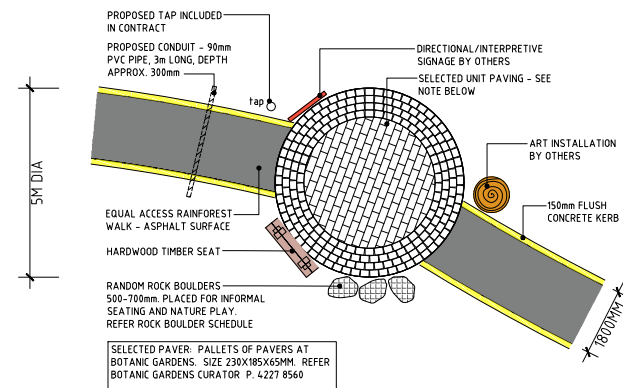
0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL PLAN



LEGEND - PLAN 7		
	CREEK ALIGNMENT	
	RAINFOREST WALK ASPHALT PATH 1.8M WIDE	(01 LD12)
	FLUSH CONCRETE KERB EDGE TO ASPHALT PATH 150x150mm	(01 LD12)
	BRICK PAVER EDGE - WOODLANDS GARDEN UNIT PAVER	(04 LD12)
	NODES - NUMBER	
	NODES PAVING	(03 LD12) (05 LD12)
	WOODLANDS GARDEN UNIT PAVING	(03 LD12)
	EXISTING AND PROPOSED TAPS	(11 LD12)
	90mm PVC CONDUITS 3m LONG DEPTH APPROX 300mm	
	FEATURE ARTWORKS BY OTHERS	
	DIRECTIONAL / INTERPRETATIONAL SIGNAGE - BY OTHERS	
	SEATS - TIMBER INSITU / RECYCLED PLASTIC SEAT	(08 LD12) (09 LD12)
	EXISTING TREE TO BE RETAINED (FEB 2022 SURVEY)	
	EXISTING TREE TO BE REMOVED (FEB 2022 SURVEY)	
	TURF TO MAKE GOOD	
	SELECTED MULCH TO MAKE GOOD MIN 75MM DEPTH	
	SANDSTONE STEPS	(07 LD12)

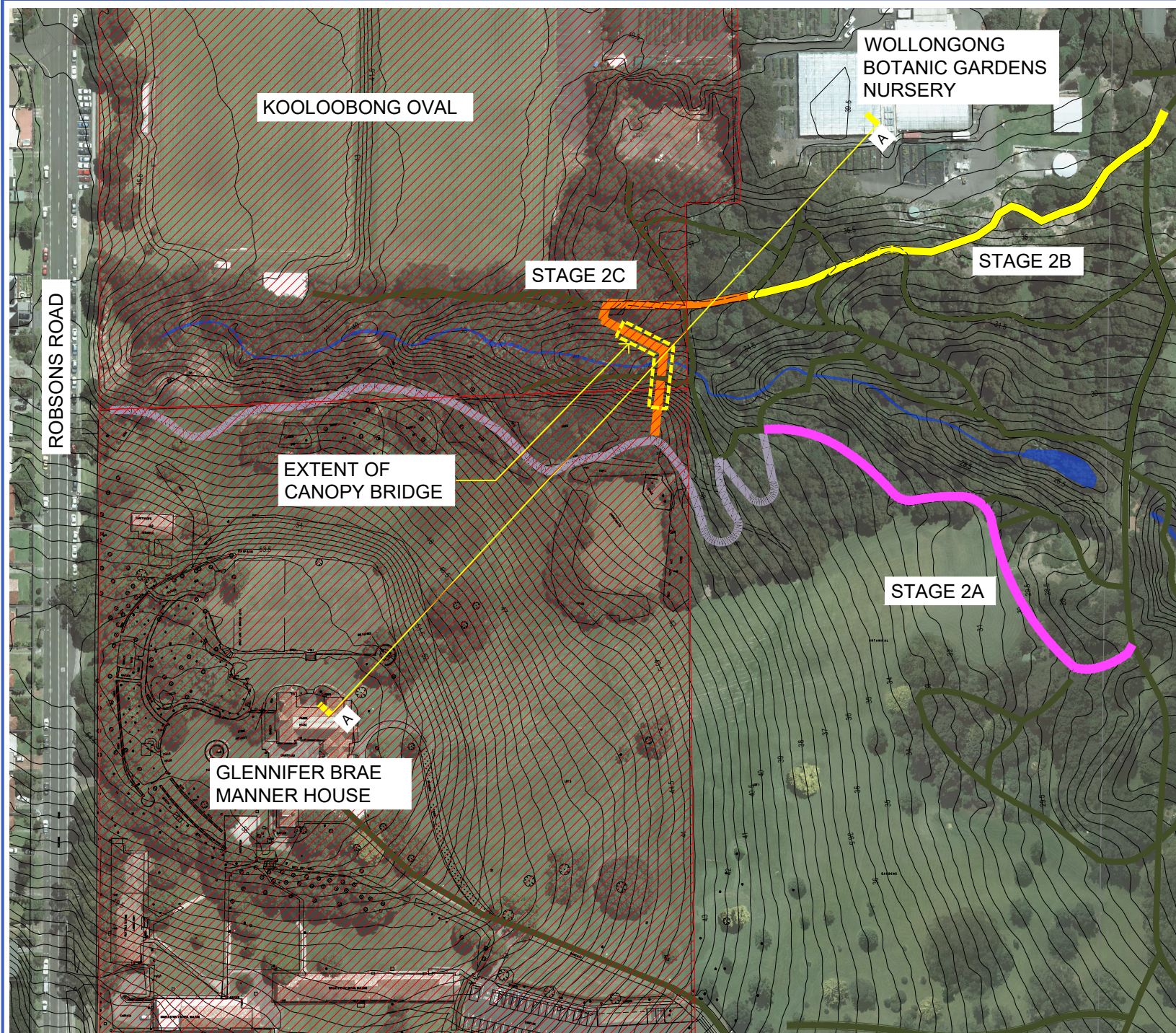


Node Schedule							
Number	Shape	Random Rock Boulder	Timber Seat	Access Compliant Seat	Tap	Sign	Sculpture
1	Circular			2		1	1
2	Circular	3		2		1	1
3	Circular	3	2				
4	Circular	3	1	1			
5	Circular	6	2				
6	Semicircular			1		1	1
7	Existing	NA	NA	NA	NA	NA	NA
8	Circular	3	2				
9	Circular	3	1				
10	Semicircular			1		1	1



TYPICAL PEDESTRIAN BARRIER DETAIL
(WITH FOOTING)
SCALE 1:20 @ A1 - 1:40 @ A3

				DATUM DGA84	SURVEYOR MK	DRAWN NDR	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES	NORTH POINT	CITY OF WOLLONGONG	PJ or TR No. PJ-4420		A1		
				AZIMUTH	FIELD BOOK	DESIGNED NDR	DATE	SENIOR LANDSCAPE ARCHITECT					SHEET 12 OF 12 SHEETS	ISSUE	ORIGINAL		
				RELATED PLANS			CHECKED AG	DATE		7160_LD12_1	AS NOTED		BOTANIC GARDENS RAINFOREST WALK STAGE 2 MURPHYS AVENUE KEIRAVILLE	DRAWING No. 7160	SHEET No. LD12	2	
ISSUED FOR SECTION 60 APPLICATION				NDR	AG	3/23											
80% ISSUE FOR REVIEW				NDR	AG	06/22											
1																	
ISSUE	DESCRIPTION			DRAWN	APPR'D	DATE						LANDSCAPE DETAILS					



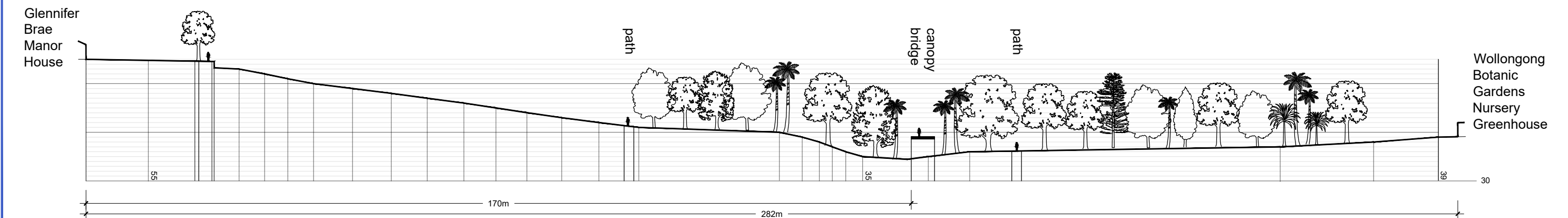
LEGEND

- STAGE 2C PATH AND CANOPY BRIDGE
- STAGE 2A PATH
- STAGE 2B PATH
- STAGE 1 PATH - COMPLETE
- OTHER PATHS
- EXTENT OF HERITAGE CURTILAGE
- CREEK



PLAN 1:1000@A1

ARTISTS IMPRESSION OF CANOPY BRIDGE



SECTION AA - nts

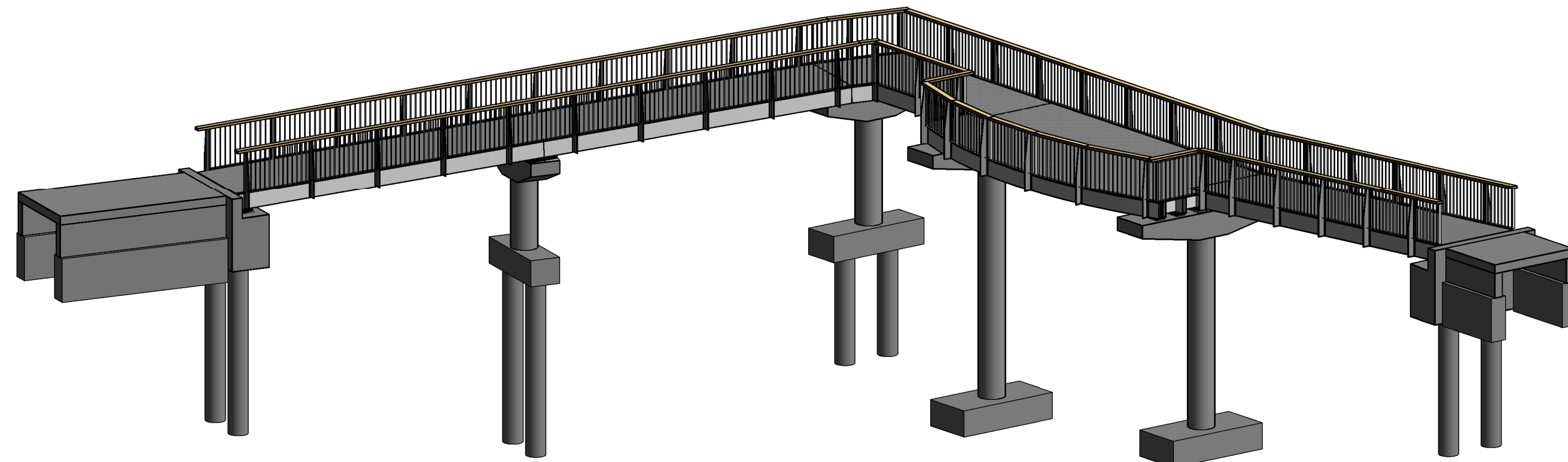
WOLLONGONG BOTANIC GARDENS

ELEVATED TREETOP CANOPY WALK

PJ4420

- DRAWING LIST -

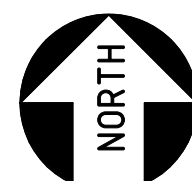
S00.00	COVER SHEET & DRAWING LIST
S00.01	STRUCTURAL SPECIFICATION NOTES - SHEET 1
S00.02	STRUCTURAL SPECIFICATION NOTES - SHEET 2
S07.01	CONSTRUCTION SEQUENCE - SHEET 1
S07.02	CONSTRUCTION SEQUENCE - SHEET 2
S07.03	CONSTRUCTION SEQUENCE - SHEET 3
S10.01	GENERAL ARRANGEMENT PLAN
S10.02	GENERAL ARRANGEMENT - ELEVATIONS
S10.03	GENERAL ARRANGEMENT - SECTIONS
S15.01	PILE SETOUT
S15.02	PILE ELEVATIONS AND SECTION
S20.01	ABUTMENT A CONCRETE - SHEET 1
S25.01	ABUTMENT B CONCRETE - SHEET 1
S30.01	PIER 1 CONCRETE - DETAILS
S30.02	PIER 2 CONCRETE - DETAILS
S30.03	PIER 3 CONCRETE - DETAILS
S30.04	PIER 4 CONCRETE - DETAILS
S40.01	BEARING SETOUT PLAN
S50.01	GIRDER PLAN
S60.01	DECK - FRP PANELS LAYOUT
S70.01	APPROACH SLAB PLAN SECTIONS AND DETAILS
S70.02	APPROACH SLAB SECTIONS AND DETAILS
S80.01	BALUSTRADE LAYOUT PLAN
S80.02	MISC DETAILS
S90.01	BAR SHAPES DIAGRAMS



LOCALITY PLAN

NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

				DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES	NORTH POINT	CITY OF WOLLONGONG	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ-4420		A1 ORIGINAL			
				AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL		1:100		WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK COVER SHEET & DRAWING LIST		SHEET OF SHEETS		ISSUE			
				RELATED PLANS		CHECKED P.JAMESON	DATE	DRAWING No. 221016						SHEET No. S00.00					
1	50% DESIGN - PRELIMINARY ISSUE			P.J.	30.11.22														
ISSUE	DESCRIPTION			ISSUED	APPR'D	DATE													

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



PJ-4420		OF	SHEETS	A1 ORIGINAL
SHEET	DRAWING No.			
221016	S00.00			1

GENERAL

- G1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH SPECIFICATIONS AND OTHER CONSULTANT'S DRAWINGS.
- G2. ALL DISCREPANCIES SHALL BE REFERRED TO THE PROJECT MANAGER AND RESOLVED BEFORE PROCEEDING WITH THE WORK.
- G3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. THESE STRUCTURAL DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. THE RL'S SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND ARE FOR THE SOLE PURPOSE OF ASSISTING THE STRUCTURAL DOCUMENTATION. THEY ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES. REFER TO ARCHITECTURAL DRAWINGS FOR CONFIRMATION OF ALL RL'S, ALL LEVELS ARE IN METRES (m) AND DIMENSIONS ARE IN MILLIMETRES (mm)
- G4. ALL WORKMANSHIP, TESTING, MATERIALS AND SUPERVISION ARE TO BE IN ACCORDANCE WITH THESE SPECIFICATIONS, THE WORK HEALTH AND SAFETY ACT 2011. ENFORCED BY THE WORKCOVER AUTHORITY AND CURRENT RELEVANT AUSTRALIAN STANDARDS.
- G5. PROPRIETARY ITEMS SPECIFIED SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN RECOMMENDATIONS. DO NOT VARY SPECIFIED PROPRIETARY PRODUCTS WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.
- G6. THESE DRAWINGS AND ISSUED WRITTEN INSTRUCTIONS DURING THE COURSE OF THE CONTRACT DEPICT THE COMPLETE STRUCTURE. THEY DO NOT DESCRIBE A WORK METHOD. THE ARRANGEMENT, DESIGN AND INSTALLATION OF TEMPORARY WORKS REMAINS THE RESPONSIBILITY OF THE CONTRACTOR.
- G7. THE DETERMINATION OF A SAFE WORK METHOD REMAINS THE RESPONSIBILITY OF THE CONTRACTOR. ANY ELEMENT WHICH POSES AN UNACCEPTABLE LEVEL OF SAFETY RISK TO CONSTRUCT SHALL BE REFERRED TO THE STRUCTURAL ENGINEER. TEMPORARY BRACING AND SUPPORT OF STRUCTURE IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE MAINTAINED DURING ALL STAGES OF CONSTRUCTION.
- G8. NOTES ON ANY DRAWING APPLY TO ALL DRAWINGS IN THE SET UNLESS SPECIFIED OTHERWISE
- G9. THE BUILDER SHALL PROVIDE CERTIFICATION ON ANY DESIGN AND CONSTRUCT COMPONENT BY A CHARTERED PROFESSIONAL ENGINEER (NER).
- G10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF ALL SERVICES IN THE VICINITY OF THE WORKS. ANY SERVICES SHOWN ARE PROVIDED FOR INFORMATION ONLY. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL SERVICES PRIOR TO COMMENCING AND SHALL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGE CAUSED TO SERVICES, AS WELL AS ANY LOSS INCURRED AS A RESULT OF THE DAMAGE TO ANY SERVICE.
- G11. THE STRUCTURAL COMPONENTS DETAILED ON THESE STRUCTURAL DRAWINGS ARE JOB SPECIFIC AND HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS AND BUILDING CODE OF AUSTRALIA FOR THE FOLLOWING LOADS:

WIND LOADS:

- IMPORTANCE LEVEL	= 2
- REGION	= A2
- ANNUAL PROBABILITY OF EXCEEDENCE	= 1:2000
- REGIONAL WIND SPEED V	= 48 m/s
- TERRAIN CATEGORY	= TC2 & TC3
- TERRAIN MULTIPLIER Mz,cat	= 0.91 , 0.83
- WIND DIRECTION MULTIPLIER Md	= 1.0
- SHIELDING MULTIPLIER Ms	= 1.0
- TOPOGRAPHIC MULTIPLIER Mf	= 1.0

EARTHQUAKE LOADS:

- IMPORTANCE LEVEL	= 2
- ANNUAL PROBABILITY OF EXCEEDENCE (P)	= 1:500
- PROBABILITY FACTOR (kp)	= 1.3
- HAZARD FACTOR (Z)	= 0.09
- SITE SUB-SOIL CLASS	= Be
- BRIDGE EARTHQUAKE DESIGN CATEGORY (BEDC)	= 2

- G12. THE METHOD OF CONSTRUCTION AND THE MAINTENANCE OF SAFETY DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER. IF ANY STRUCTURAL ELEMENT PRESENTS DIFFICULTY IN RESPECT TO SAFETY THE MATTER SHALL BE REFERRED TO NORTHPROP CONSULTING ENGINEERS FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
- G13. NO CHANGES IN ANY STRUCTURAL ELEMENT SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM NORTHPROP CONSULTING ENGINEERS. IF THERE IS A DISCREPANCY THEN FOR TENDER PURPOSES ALLOW FOR THE MOST EXPENSIVE OPTION. NORTHPROP CONSULTING ENGINEERS SHALL BE CONTACTED TO CONFIRM PRIOR TO CONSTRUCTION.
- G14. CONSTRUCTION USING THESE DRAWINGS SHALL NOT COMMENCE UNTIL THE DRAWINGS ARE DESIGNATED "ISSUED FOR CONSTRUCTION".
- G15. NORTHPROP CONSULTING ENGINEERS ACCEPTS NO RESPONSIBILITY FOR ANY WORK NOT INSPECTED OR NOT APPROVED BY NORTHPROP CONSULTING ENGINEERS DURING CONSTRUCTION.

ABBREVIATIONS:

FF	DENOTES FAR FACE	CHS	DENOTES CIRCULAR HOLLOW SECTION
NF	DENOTES NEAR FACE	EA	DENOTES EQUAL ANGLE
EF	DENOTES EACH FACE	PEC	DENOTES PARALLEL FLANGE CHANNEL
LV	DENOTES LENGTH VARIES	SHS	DENOTES SQUARE HOLLOW SECTION
USO	DENOTES UNLESS SPECIFIED OTHERWISE	RHS	DENOTES RECTANGULAR HOLLOW SECTION
NSOP	DENOTES NOT SHOWN ON PLAN	UA	DENOTES UNEQUAL ANGLE
NSOE	DENOTES NOT SHOWN ON ELEVATION	UB	DENOTES UNIVERSAL BEAM
CFW	DENOTES CONTINUOUS FILLET WELD	UC	DENOTES UNIVERSAL SECTION
CBW	DENOTES CONTINUOUS BUTT WELD	IP	DENOTES INTERSECTION POINT
AADT	DENOTES AVERAGE ANNUAL DAILY TRAFFIC	Nl	DENOTES NUMBER
HOG	DENOTES HOT DIP GALVANISED	Pl	DENOTES PLATE
SOP	DENOTES SET OUT POINT	FL	DENOTES FLAT
SOL	DENOTES SET OUT LINE	PCD	DENOTES PITCH CIRCLE DIAMETER
ULS	DENOTES ULTIMATE LIMIT STATE	CSK	DENOTES COUNTERSUNK
UTS	DENOTES ULTIMATE TENSILE STRENGTH	CJ	DENOTES CONSTRUCTION JOINT
SLS	DENOTES SERVICEABILITY LIMIT STATE	EJ	DENOTES EXPANSION JOINT
DWS	DENOTES DECK WEARING SURFACE	R	DENOTES RADIUS
DRG	DENOTES DRAWING	DIA or Ø	DENOTES DIAMETER
TBC	DENOTES TO BE CONFIRMED	ID	DENOTES INTERNAL DIAMETER
COS	DENOTES CONFIRM ON SITE	OD	DENOTES EXTERNAL DIAMETER
NTS	DENOTES NOT TO SCALE	CL or C	DENOTES CENTERLINE
RL	DENOTES REDUCED LEVEL	C/C	DENOTES CENTRE TO CENTRE
FSL	DENOTES FINISHED SURFACE LEVEL	REQD	DENOTES REQUIRED
EGL	DENOTES EXISTING GROUND LEVEL	PTFE	DENOTES POLYTETRAFURO-ETHYLENE
NGL	DENOTES NATURAL GROUND LEVEL	PVC	DENOTES POLYVINYLCHLORIDE
IL	DENOTES INVERT LEVEL	PSC	DENOTES PRESTRESSED CONCRETE
TYP.	DENOTES TYPICAL	RC	DENOTES REINFORCED CONCRETE
MAX.	DENOTES MAXIMUM	ST	DENOTES STREET
MIN.	DENOTES MINIMUM	RD	DENOTES ROAD
NOM.	DENOTES NOMINAL	UPVC	DENOTES UNPLASTICISED POLYVINYLCHLORIDE
CTS	DENOTES CENTERS	VC	DENOTES VERTICAL CURVE
HSNS	DENOTES HIGH-STRENGTH, NON-SHRINK		

CONCRETE

- C1. CARRY OUT ALL CONCRETE WORK IN ACCORDANCE WITH AS3600-2018, AS5100.5-2017, AS2159-2009, AND TfNSW TECHNICAL QA SPECIFICATION B80 FOR CONCRETE.
- C2. CONCRETE PROPERTIES AND COVER TO REINFORCEMENT :
- | | | |
|----------------------|--------|--------|
| ELEMENT: | GRADE: | COVER: |
| CAST-IN PLACE PILES: | N40 | 85mm |
| ABUTMENT/HEADSTOCK: | N40 | 60mm |
| RETAINING WALL: | N40 | 60mm |
| APPROACH SLAB: | N32 | 45mm |
| FOOTPATH EXTENSION: | N32 | 45mm |
- C3. COMPACT ALL CONCRETE, INCLUDING FOOTINGS AND SLABS USING MECHANICAL VIBRATORS.
- C4. PLACE CONCRETE CONTINUOUSLY BETWEEN CONSTRUCTION JOINTS SHOWN ON PLAN. DO NOT BREAK OR INTERRUPT SUCCESSIVE POURS SUCH THAT COLD JOINTS OCCUR. ANY REVISIONS OR ADDITIONS TO CONSTRUCTION JOINTS SHOWN ON PLAN REQUIRE APPROVAL FROM THE NORTHPROP CONSULTING ENGINEERS.
- C5. CONCRETE PROFILES :
- BEAM DEPTHS ARE WRITTEN FIRST AND INCLUDE THE SLAB THICKNESS.
 - SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
 - NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN SHOWN IN THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF NORTHPROP CONSULTING ENGINEERS.
 - PROVIDE DRIP GROOVES AT ALL EXPOSED EDGES. CHAMFERS, DRIP GROOVES, REGLETS ETC TO ARCHITECT'SDETAILS.
- C6. ALL PENETRATIONS TO HAVE 2/N16 TRIMMER BARS TOP AND BOTTOM TO EACH FACE. U.S.O. EXTEND TRIMMERS 600 BEYOND PENETRATION.
- C7. ALL REINFORCING BARS SHALL BE GRADE D500N IN ACCORDANCE WITH AS/NZS 4671-2001 U.S.O.
- C8. USE ONLY PLASTIC OR CONCRETE CHAIRS AT EXTERNAL SURFACES.
- C9. SITE BENDING OF REINFORCEMENT BARS SHALL BE DONE WITHOUT HEATING USING A RE-BENDING TOOL. THE BARS SHALL BE RE-BENT AGAINST A FLAT SURFACE OR A PIN WITH A DIAMETER NOT LESS THAN THE MINIMUM PIN SIZE PRESCRIBED IN AS3600-2018.
- C10. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN ON THE STRUCTURAL DRAWINGS OR IN POSITIONS OTHERWISE APPROVED IN WRITING BY NORTHPROP CONSULTING ENGINEERS. LAPS SHALL NOT BE LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR AND IN ACCORDANCE WITH AS3600-2018 SECTION 13.
- C11. LAPS IN PILES SHALL BE 500mm MIN FOR N12 BARS AND 700mm MIN FOR N16 BARS.
- C12. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY NORTHPROP CONSULTING ENGINEERS.
- C13. AT EXTERNALLY EXPOSED SURFACES NO METALLIC ITEMS INCLUDING FORM BOLTS, FORM SPACERS, METALLIC BAR CHAIRS AND TIE-WIRE ARE TO BE PLACED IN THE COVER ZONE.
- C14. ALL REINFORCEMENT, ANCHOR BOLTS AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION AND INSPECTED BY NORTHPROP CONSULTING ENGINEERS PRIOR TO PLACING CONCRETE.
- C15. HOLD DOWN BOLTS SHALL BE HOT DIPPED GALVANISED.
- C16. ALL CONCRETE MIXES SHALL BE DESIGNED BY A RECOGNISED TESTING LAB AND SUBMITTED FOR REVIEW BY NORTHPROP CONSULTING ENGINEERS.
- C17. ALL COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO NORTHPROP CONSULTING ENGINEERS FOR REVIEW.
- C18. PROJECT CONTROL TESTING SHALL BE CARRIED OUT ON ALL CONCRETE IN ACCORDANCE WITH AS1379-2007. TEST CYLINDERS ARE TO BE KEPT ON SITE.
- C19. CURING OF ALL CONCRETE IS TO BE ACHIEVED BY KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF 7 DAYS, UNLESS SPECIFIED OTHERWISE. APPROVED SPRAY ON CURING COMPOUNDS THAT COMPLY WITH AS3799-1998 MAY BE USED WHERE FLOOR FINISHES WILL NOT BE AFFECTED. POLYTHENE SHEETING OR WET HESSIAN MAY BE USED TO RETAIN CONCRETE MOISTURE WHERE PROTECTED FROM WIND AND TRAFFIC. CURING IS TO COMMENCE IMMEDIATELY AFTER CONCRETE PLACEMENT.
- C20. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY, AND NOT NECESSARILY IN TRUE PROJECTION. BARS SHOWN ARE INDICATIVE ONLY AND LENGTHS MAY VARY. BEAM ELEVATIONS TAKE PRECEDENCE OVER SECTIONS. SLAB PLANS TAKE PRECEDENCE OVER SECTIONS. REFER TO SECTIONS FOR EXTRA BARS THAT MAY BE REQUIRED.

CONSTRUCTION PHASE SERVICES (WITNESS POINTS)

- WP1. OBTAIN NORTHPROP CONSULTING ENGINEERS WRITTEN INSTRUCTION AT THE FOLLOWING HOLD POINTS:
- PREPARATION OF FOUNDING MATERIAL, INCLUDING PIER BORE HOLES.
 - REINFORCEMENT PRIOR TO PLACEMENT OF CONCRETE or COREFILLING OF BLOCKWORK.
 - STEEL AND TIMBER FRAME INSPECTION PRIOR TO SHEETING.
- WP2. PROVIDE MINIMUM 48 HOURS NOTICE FOR ANY REQUIRED INSPECTIONS.

TEMPORARY WORKS

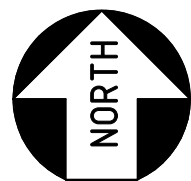
- TW1. THESE DRAWINGS DEPICT THE "PERMANENT" STRUCTURE, TEMPORARY WORKS REMAIN THE RESPONSIBILITY OF THE CONTRACTOR.
- TW2. BUILDER MUST ENGAGE (NER) QUALIFIED STRUCTURAL ENGINEER FOR THE DESIGN OF ALL TEMPORARY WORKS NECESSARY TO SAFELY ERECT THIS STRUCTURE. AS A MINIMUM THE FOLLOWING WORKS REQUIRE ATTENTION;
- FORMWORK / TEMPORARY PROPPING / NEEDLE BEAMS / SCAFFOLDING / UNDERPINNING
- TW3. BUILDER SHALL CONTACT NORTHPROP CONSULTING ENGINEERS IF THEY CONSIDER ANY PART OF THIS STRUCTURE IS UNSAFE TO ERECT

PRECAST CONCRETE

- PC1. ALL PRECAST CONCRETE WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH AS3850.1-2015, AS3850.2-2015, AS3600-2018 AND AS3610-2018 AS APPROPRIATE, AND THE VICTORIAN WORKCOVER AUTHORITY INDUSTRY STANDARD "PRECAST AND TILT-UP CONCRETE FOR BUILDINGS" APRIL 2001.
- PC2. THE PRECAST CONCRETE SUPPLIER SHALL BE RESPONSIBLE FOR THE DETAILING OF PRECAST ELEMENTS AND ANY CONNECTIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
- PC3. REINFORCEMENT SHOWN ON STRUCTURAL DRAWINGS IS THE MINIMUM REQUIRED FOR IN-SERVICE CONDITIONS. THE SUPPLIER IS RESPONSIBLE FOR ANY ADDITIONAL REINFORCEMENT REQUIRED FOR LOADS DUE TO HANDLING, PROPPING, TRANSPORTATION AND ERECTION. A SUITABLY QUALIFIED ENGINEER SHALL BE ENGAGED (BY OTHERS) TO FILL THE ROLE OF "ERECTION DESIGN ENGINEER". THE ERECTION DESIGN ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL ELEMENTS FOR CASTING, HANDLING, TRANSPORTATION & ERECTION. THEY SHALL PROVIDE WRITTEN CERTIFICATION TO NORTHPROP CONSULTING ENGINEERS PRIOR TO FABRICATION.
- PC4. DETAILS ON THESE DRAWINGS SHOW ONE POSSIBLE METHOD OF SUPPORTING THE PRECAST. THE SUPPLIER CAN USE AN ALTERNATE METHOD, PROVIDED IT CONFORMS WITH THE REQUIRED CONCRETE OUTLINES AND IS SHOWN TO BE STRUCTURALLY SOUND AND IS CERTIFIED BY NORTHPROP CONSULTING ENGINEERS.
- PC5. ALTERNATIVE MATERIALS SUCH AS LIGHTWEIGHT CONCRETE MAY BE USED IN LIEU OF REINFORCED CONCRETE IF REQUIRED PROVIDED PRIOR WRITTEN APPROVAL FROM NORTHPROP CONSULTING ENGINEERS IS OBTAINED.
- PC6. THE STRUCTURAL DRAWINGS HAVE BEEN PREPARED TO INDICATE THE STRUCTURAL INTENT. THE SUPPLIER SHALL PREPARE SHOP DRAWINGS SHOWING DIMENSIONS OF ALL PANELS INCLUDING CHAMFERS, DRIP GROOVES AND REBATES FOR WINDOWS, ETC, AND ALL STRUCTURAL DETAILS. WHERE NECESSARY THE SHOP DETAILER IS TO MAKE ASSUMPTIONS AND SUBMIT TO NORTHPROP CONSULTING ENGINEERS FOR RESOLUTION. SHOP DETAILER IS TO ALLOW TO RE-WORK SHOP DRAWINGS AS REQUIRED, THESE SHALL BE SUBMITTED, ALONG WITH CALCULATIONS, TO THE BUILDER FOR THEIR APPROVAL. BUILDER SHALL LODGE TWO HARD COPIES OF APPROVED DRAWINGS TO NORTHPROP CONSULTING ENGINEERS FOR REVIEW ALLOW FIVE WORKING DAYS FOR THE REVIEW OF SHOP DRAWINGS. THESE DRAWINGS SHALL COVER THE HANDLING PROCEDURE OF THE UNITS THROUGHOUT ALL STAGES INCLUDING STRIPPING, LIFTING, STACKING, TRANSPORTING AND ERECTION. CONCRETE STRESSES THROUGHOUT HANDLING SHALL NOT CAUSE CRACKING. COMPUTATIONS AND DETAILS SHALL INCLUDE LOCATION AND SIZE OF INSERTS AND TESTS PROVING ANCHORAGE CAPACITY OF LIFTING FERRULES
- PC7. THE SUPPLIER SHALL ENSURE THE BUILDER IS GIVEN ADEQUATE NOTICE OF FIXING DETAILS WHICH MAY AFFECT THE CONSTRUCTION OF THE STRUCTURE, EG. INSERTS IN BEAMS, HOLES IN STRUCTURAL STEEL MEMBERS, ETC.
- PC8. COLOUR AND FINISH SAMPLES OF PRECAST ELEMENTS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL BEFORE ELEMENTS ARE CAST.
- PC9. CRANES SHALL ONLY ACCESS GROUND SLABS OVER SLAB EDGE BEAMS.
- PC10. THE CONTRACTOR SHALL ENSURE THAT CRANE OUTRIGGER LOADS ARE SPREAD AND LOCATED TO AVOID CRACKING OF THE GROUND SLAB AND UNDER NO CIRCUMSTANCES LOAD SLAB WITHIN 500mm OF A FREE EDGE
- PC11. NOTE: CRANES WILL NOT BE PERMITTED ON ADJACENT PROPERTY FOR ERECTION OF TILT PANELS.
- PC12. THE CONCRETE IN THE PANELS IS TO HAVE A CHARACTERISTIC STRENGTH F'c = 40MPa U.S.O.
- PC13. THE CONCRETE STRENGTH AT REMOVAL FROM MOULDS IS TO BE A MINIMUM OF 20 MPa U.S.O.
- PC14. THE PANELS MUST BE STACKED IN SUCH A WAY THAT:
- (A) CRACKING WILL NOT OCCUR
 - (B) WARPING IN EXCESS OF THAT GIVEN IN THE RELEVANT CODES WILL NOT OCCUR.
- PC15. CONCRETE COVER TO EXPOSED FACE 45mm UNLESS SPECIFIED OTHERWISE. TOLERANCE + 5mm, - 0mm U.S.O.
- PC16. LIFTING FIXINGS - THE CONTRACTOR SHALL SUPPLY AND FIT LIFTING FIXINGS AS REQUIRED. THESE SHALL TAKE THE FORM OF CAST IN CABLES OR FERRULES. THEY SHALL NOT BE LOCATED IN THE FACE WHICH IS EXPOSED TO VIEW IN THE FINAL CONDITION AND AFTER USE SHALL BE PROTECTED TO AVOID CORROSION AND STAINING.
- PC17. THE MINIMUM PORTLAND CEMENT CONTENT FOR THE PRECAST PANELS IS TO BE 320kg/m³. THE CONTRACTOR SHALL SUBMIT THEIR PROPOSED CONCRETE MIX DESIGN FOR APPROVAL PRIOR TO CASTING OF PANELS.
- PC18. ALL GAPS SHALL BE PROPERLY SEALED WHEN GROUTING UP THE PRECAST CONNECTIONS TO AVOID THE GROUT FILLING THE GAP BETWEEN THE PANEL AND THE STRUCTURE AND TO AVOID GROUT SPOILING THE FACE OF THE PANELS.
- PC19. GROUT TO BE USED SHALL BE NON-SHRINK, AND HAVE A 28 DAY CHARACTERISTIC STRENGTH OF 40 MPa U.S.O. DETAILS OF THE PROPOSED GROUT SHALL BE SUBMITTED TO NORTHPROP CONSULTING ENGINEERS FOR APPROVAL.
- PC20. ALL BRACES SHALL BE FIXED TO PANELS AND BRACING SUPPORTS WITH MECHANICAL INSERTS SUCH AS CAST-IN, DRILLED THROUGH OR UNDERCUT ANCHORS. U.S.O. MASONRY EXPANSION ANCHORS MAY ONLY BE USED WITH THE PRIOR WRITTEN APPROVAL OF NORTHPROP CONSULTING ENGINEERS. CHEMICAL ANCHORS MAY ONLY BE USED IF EACH ANCHOR IS PROOF LOAD TESTED TO ITS WORKING LOAD LIMIT AND WRITTEN PERMISSION HAS BEEN OBTAINED FROM NORTHPROP CONSULTING ENGINEERS.
- PC21. ALL FIXINGS IN FIRE RATED WALLS AND FIRE RATED EXTERNAL WALLS TO COMPLY WITH SPECIFICATION C111 OF THE BCA.
- PC22. THE CONTRACTOR SHALL ENSURE THAT THE PANEL STACKING HEIGHTS AND LOCATIONS DO NOT EXCEED THE GROUND SLAB CAPACITY AND SHALL UNDER NO CIRCUMSTANCES STACK PANELS MORE THAN 5 HIGH.
- PC23. THE CONTRACTOR SHALL ENGAGE A SUITABLY QUALIFIED STRUCTURAL ENGINEER TO INSPECT THE REINFORCEMENT OF ALL ELEMENTS PRIOR TO CONCRETE PLACEMENT. THEY ARE TO PROVIDE A WRITTEN CERTIFICATION TO NORTHPROP ENGINEERS STATING THAT ELEMENTS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH NORTHPROP DRAWINGS & DRAWINGS FROM "ERECTION DESIGN ENGINEER".

FORMWORK

- FW1. THE DESIGN, CERTIFICATION, CONSTRUCTION, INSPECTION AND PERFORMANCE OF THE FORMWORK AND FALSE WORK SHALL BE THE RESPONSIBILITY OF THE FORMWORK SUB-CONTRACTOR, EXCEPT TO THE EXTENT THAT FORMWORK DESIGN IS SHOWN ON THE STRUCTURAL DRAWINGS.
- FW2. FORMWORK SHALL BE CERTIFIED BY A STRUCTURAL ENGINEER EXPERIENCED IN FORMWORK DESIGN IN ACCORDANCE WITH WORKCOVER REGULATIONS AND THE WORKCOVER CODE OF PRACTICE.
- FW3. FORMWORK SHALL BE DESIGNED IN ACCORDANCE WITH AS3610-2018. THE DESIGN SHALL ACCOMMODATE MOVEMENTS AND LOAD RE-DISTRIBUTION DUE TO ANY POST TENSIONING.
- FW4. PROVIDE RESTRAINT OR SUPPORT TO ENSURE STABILITY OF FORMWORK THAT IS INDEPENDENT OF THE PERMANENT STRUCTURE. APPROVAL FROM NORTHPROP CONSULTING ENGINEERS IS REQUIRED IF FORMWORK SUPPORT IS REQUIRED FROM THE PERMANENT STRUCTURE.
- FW5. FOUNDATIONS SUPPORTING THE FORMWORK SHALL BE DETERMINED BY THE FORMWORK SUB-CONTRACTOR FROM THE CONDITIONS EXISTING ON SITE AT THE TIME OF CONSTRUCTION. REFER TO THE GEOTECHNICAL REPORT FOR THE SITE.
- FW6. FORMWORK CONSTRUCTION DIMENSIONAL TOLERANCES AND STRIPPING TIMES SHALL COMPLY WITH AS3610-2018 AND AS3600-2018 UNLESS OTHERWISE APPROVED BY NORTHPROP CONSULTING ENGINEERS.
- FW7. DURING CONSTRUCTION, SUPPORT PROPPING WILL BE REQUIRED WHERE LOADS FROM STACKED MATERIALS, FORMWORK AND OTHER SUPPORTED SLABS INDUCE LOADS IN A SLAB OR BEAM WHICH EXCEED THE DESIGN CAPACITY FOR STRENGTH OR SERVICEABILITY LIMIT STATES AT THAT AGE. ONCE THE NOMINATED 28 DAY STRENGTH HAS BEEN ATTAINED, THESE LOADS SHALL NOT EXCEED THE DESIGN SUPERIMPOSED LOADS SET OUT IN THESE GENERAL NOTES AT ITEM G13.
- FW8. IT IS TO BE ANTICIPATED IN MULTI-STOREY CONSTRUCTION THAT BACK-PROPPING MAY BE REQUIRED TO EXTEND A NUMBER OF LEVELS BELOW THE FLOOR BEING CAST. PROP REMOVAL IS TO BE PROGRAMMED TO AVOID DISTRESS TO PREVIOUSLY CAST FLOORS. RE-SHORING OR BACKPROPPING PROPOSALS SHALL BE SUBJECT TO THE APPROVAL OF NORTHPROP CONSULTING ENGINEER'S.
- FW9. FORMED CONCRETE SURFACES SHALL HAVE FORMWORK CLASS AND SURFACE FINISHES IN ACCORDANCE WITH AS3610-2018, AS SPECIFIED BY THE PROJECT ARCHITECT, AND THE CONCRETE SECTION OF NORTHPROP CONSULTING ENGINEERS STRUCTURAL NOTES.
- FW10. DO NOT PLACE PERMANENT LOADS ON THE CONCRETE STRUCTURE UNTIL AFTER FORMWORK AND PROPPING IS REMOVED.
- FW11. REFER TO PROJECT ARCHITECT'S DRAWINGS FOR TEST PANEL REQUIREMENTS. REINFORCEMENT FOR TEST PANELS SHALL BE SIMILAR TO THAT IN THE PERMANENT STRUCTURE REPRESENTED BY THE TEST PANEL.
- FW12. BEFORE PLACING REINFORCEMENT IN THE FORMWORK, APPLY A RELEASE AGENT TO THE FACE OF THE FORMWORK IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- FW13. DO NOT APPLY A RELEASE AGENT TO THE FACE OF CONCRETE WHERE CONCRETE SURFACE FINISH OR APPLIED COVERINGS ARE INCOMPATIBLE WITH RELEASE AGENT.
- FW14. CHAMFER RE-ENTRANT ANGLES AND FILLET ALL CORNERS BY 25mm U.S.O. PROVIDE DRIP GROOVES TO UNDERSIDE OF ALL EXPOSED EDGES.
- FW15. BEFORE PLACING CONCRETE, REMOVE ALL WATER, DUST AND DEBRIS FROM THE FORMWORK.
- FW16. FILL ALL HOLES LEFT BY FORMWORK TIE BOLTS WITH MORTAR MATCHING THE COLOUR OF THE FINISHED SURFACE.

						DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES	NORTH POINT	PRELIMINARY - NOT FOR CONSTRUCTION CITY OF WOLLONGONG WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK STRUCTURAL SPECIFICATION NOTES - SHEET 1			
						AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL		1:100		SHEET DRAWING No.	221016	OF SHEETS SHEET No.	A1 ORIGINAL ISSUE
						RELATED PLANS	CHECKED P.JAMESON	DATE									
1	50% DESIGN - PRELIMINARY ISSUE			P.J.	30.11.22												
ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE													

0

10

20

30

40

50

60

70

80

90

100mm ON ORIGINAL SHEET

FOUNDATIONS

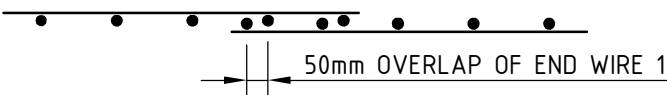
- F1. ASSUMED ULTIMATE BEARING CAPACITY AND SKIN FRICTION:
- BORED PIERS ± 3000kPa END BEARING, 25kPa SKIN FRICTION.
- F2. A GEOTECHNICAL REPORT HAS BEEN CARRIED OUT, REFER TO REPORT NO. P2606_01 PREPARED BY MORROW GEOTECHNICS, DATED 10/08/2022.
- F3. THE CONCRETE WORKS HAVE BEEN DESIGNED IN ACCORDANCE WITH AS2159-2009, AS5100.3-2017, AS5100.5-2017 AND AS3600-2018. A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO BE CONTACTED DURING EXCAVATION TO CONFIRM THE GEOTECHNICAL ASSUMPTIONS DURING PILING.
- F4. THE CONTRACTOR SHALL ALLOW TO ENGAGE A QUALIFIED (NER) GEOTECHNICAL ENGINEER TO APPROVE THE FOUNDATION MATERIAL. OBTAIN GEOTECHNICAL ENGINEERS APPROVAL AND SUBMIT CERTIFICATE IN WRITING TO NORTHPROP CONSULTING ENGINEERS PRIOR TO CONCRETING FOUNDATIONS.
- F5. ENSURE STABILITY OF ADJACENT BUILDINGS AND PATHS IS MAINTAINED DURING ALL STAGES OF CONSTRUCTION.
- F6. DO NOT ALLOW EXCAVATED MATERIAL TO BE STOCKPILED WITHIN 1500mm OF EXCAVATIONS. NO EARTH OR DETRITUS IS TO FALL INTO THE PILE SHAFTS BEFORE OR DURING CONCRETE PLACEMENT.
- F7. PILES SHALL BE CENTRALLY LOCATED UNDER BRIDGE BEARING UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS.
- F8. FOOTINGS SHALL BE EXCAVATED TO THE DETAILED DEPTH AND WIDTH. FOOTINGS SHALL BE INSPECTED AND FILLED WITH CONCRETE AS SOON AS POSSIBLE TO AVOID EITHER SOFTENING OF THE FOUNDATION MATERIAL OR DRYING OUT BY EXPOSURE.
- F9. THE BASE OF ALL PIER HOLES SHALL BE FREE OF WATER AND CLEANED OF LOOSE MATERIAL OR DEBRIS PRIOR TO PLACEMENT OF CONCRETE. ALLOW TO PROVIDE TEMPORARY LINERS AS DEEMED NECESSARY.

PILING

- PP1. PILING WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH AS2159-2009, TFNSW QA SPECIFICATION B30 ,AND TO THE REQUIREMENTS SPECIFIED BELOW AND ON THE DRAWINGS.
- PP2. REFER TO GEOTECHNICAL REPORT PREPARED BY MORROW GEOTECHNICS. THIS REPORT IS PROVIDED TO ASSIST IN DESIGN AND CONSTRUCTION OF THE PIERS, IT WILL BE ASSUMED THAT ALL TENDERS HAVE READ THIS REPORT AND DRAWN THEIR OWN CONCLUSIONS AS TO SUB-SURFACE CONDITIONS.
- PP3. THE CONTRACTOR SHALL MAINTAIN RECORDS FOR ALL PILES AS REQUIRED UNDER THE PROVISIONS OF AS2159-2009. ACCURATE RECORDS OF ROCK LEVELS AND FOUNIDNG LEVEL OF PILES SHALL BE KEPT.
- PP4. MINIMUM EMBEDMENT OF THE PILES SHALL BE AS SHOWN ON THE DRAWINGS.
- PP5. THE CONTRACTOR SHALL CLEAN THE BASE OF THE PILES SO AS TO ENABLE INSPECTION BY THE GEOTECHNICAL ENGINEER.
- PP6. THE APPROVAL OF THE STRUCTURAL ENGINEER IS REQUIRED PRIOR TO PLACEMENT OF CONCRETE.
- PP7. THE CONTRACTOR SHALL SCABBLE THE TOP OF THE POURED PILE TO ENSURE A LEVEL SURFACE OF GOOD QUALITY CLEAN CONCRETE.
- PP8. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY APPROVALS FROM THE RELEVANT AUTHORITIES, AND ADJACENT PROPERTY OWNERS PRIOR TO COMMENCEMENT OF WORK.
- PP9. IF ANY PILE NEEDS TO BE TRIMMED BY THE PILING OR EXCAVATION CONTRACTOR FOR REASONS OF ACCESS ETC. SUCH TRIMMING SHALL BE AT A LEVEL NOT LESS THAN 100MM ABOVE THE FINAL TRIMMED LEVEL. NO SUCH TRIMMING SHALL TAKE PLACE WITHOUT THE PRIOR AGREEMENT OF THE ENGINEER.
- PP10. CONCRETE FOR THE PILES SHALL BE TESTED BY PROJECT CONTROL TESTING AS SPECIFIED IN AS3600 WITH A MINIMUM RATE OF TESTING OF ONE SAMPLE PER BATCH OF CONCRETE.
- PP11. THE PILE SET OUT POSITIONS WILL BE AVAILABLE PRIOR TO THE COMMENCEMENT OF THE SITE WORK.
- PP12. THE CONTRACTOR SHALL PRODUCE A REPORT TO DEMONSTRATE THAT THE PILES HAVE BEEN INSTALLED IN ACCORDANCE WITH THESE NOTES AND THE DESIGN REQUIREMENTS.
- PP13. ANY BORED PILES FAILING TO REACH DESIGN DEPTH SHALL BE NOTIFIED TO THE ENGINEER IMMEDIATELY, AND THE REASONS SHALL BE STATED.

SLAB ON GROUND

- SG1. UNLESS SPECIFIED OTHERWISE SLABS TO BE 100mm THICK WITH SL82 FABRIC THROUGHOUT TOP. CAST SLABS ON 0.2mm POLYTHENE MEMBRANE LAID OVER A NOMINAL SAND LEVELING LAYER ON FIRM CUT ORIGINAL GROUND OR COMPACTED FILL AS SPECIFIED.
- SG2. MESH LAPS:
THE TWO OUTERMOST TRANSVERSE WIRES OF ONE SHEET OF MESH MUST OVERLAP THE TWO OUTERMOST TRANSVERSE WIRES OF SHEET BEING LAPPED, AS SHOWN BELOW.



- SG3. PROVIDE 3-N12 TRIMMER BARS 2000mm LONG TIED TO UNDERSIDE OF FABRIC AT ALL RE-ENTRANT CORNERS.
- SG4. ALL CONCRETE IS TO BE PLACED USING A VIBRATOR. CURING METHODOLOGY TO BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER PRIOR TO CONCRETE BEING PLACED.

TRENCH BACKFILL AND UNDERGROUND SERVICES

- TB1. ALLOW FOR EXCAVATION IN ALL MATERIALS AS FOUND ON SITE AND AS DETAILED IN GEOTECHNICAL REPORT U.N.O.
- TB2. PRIOR TO COMMENCING EXCAVATION VERIFY LEVELS OF ALL EXISTING SERVICES. IF ANY DISCREPANCIES CHECK WITH THE RELEVANT ENGINEER.
- TB3. BACKFILL ALL TRENCHES UNDER SLABS, PATHS AND ROADS BELOW SUB-BASE LEVEL WITH ORIGINAL GROUND OR COMPACTED IMPORTED FILL.
- TB4. IMPORTED FILL PROPERTIES :
- PASSING 50mm SIEVE - 100%
- PASSING 75micron SIEVE - LESS THAN 25%
- PLASTICITY INDEX - LESS THAN 15% BUT MORE THAN 2%
- TB5. ALLOW FOR 1 SUCCESSFUL COMPACTION TEST PER 20 METRES LENGTH OF TRENCH IN THE MIDDLE LAYER.

CHEMICAL ANCHORS

- CA01. ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH THE CURRENT EDITION OF ASS216.
- CA02. UNLESS NOTED OTHERWISE, CHEMICAL ANCHORS SPECIFIED IN THESE DRAWINGS REFER TO HILTI HIT-HY 200 WITH HAS-U A4 GALVANISED STEEL CHEMICAL INJECTION ANCHORS.
- CA03. ALTERNATIVE CHEMICAL ANCHORS MAY BE SUBSTITUTED WITH PRIOR PERMISSION FROM THE SUPERINTENDENT.
- CA04. MINIMUM EDGE DISTANCE AND SPACING SETOUT OF THE ANCHORS ARE SPECIFIED ON THESE DRAWINGS. IF THE INSTALLED DISTANCES ARE LESS THAN THAT SPECIFIED NOTIFY THE SUPERINTENDENT FOR INSTRUCTION.
- CA05. CHEMICAL ANCHORS ARE TO BE STIRCTLY INSTALLED TO MANUFACTURER'S INSTALLATION PROCEDURE.
- CA06. DIAMETER OF HOLES TO MANUFACTURER'S SPECIFICATION FOR NOMINATED BOLT/BAR DIAMETER. DRILL HOLES USING A ROTARY PERCUSSION DRILL. DO NOT CORE DRILL HOLES.
- CA07. CLEAN AND DEGREASE BOLT/BARS PRIOR INSTALLATION.
- CA08. ENSURE CHEMICAL IS ALLOWED TO FULLY CURE IN ACCORDANCE WITH MANUFACTURER'S DETAILS PRIOR TO LOADING BOLTS/BARS.

SAFETY IN DESIGN

- SID1. A SAFETY IN DESIGN REPORT HAS BEEN PREPARED BY NORTHPROP CONSULTING ENGINEERS FOR THIS PROJECT. IF YOU ARE NOT IN RECEIPT OF NORTHPROP CONSULTING ENGINEERS' SAFETY IN DESIGN REPORT RELATING SPECIFICALLY TO THESE DRAWINGS FOR THIS PROJECT (INCLUDING THE APPLICABLE DRAWING REVISION), PLEASE CONTACT US TO OBTAIN A COPY OF OUR CURRENT SAFETY IN DESIGN REPORT PRIOR TO UNDERTAKING THE CONSTRUCTION WORKS.

WORKPLACE HEALTH AND SAFETY

- WHS1. THE CONTRACTOR AND ALL SUBCONTRACTORS ARE RESPONSIBLE FOR CONSTRUCTING THE WORK IN ACCORDANCE WITH THE WORK HEALTH AND SAFETY (WHS) ACT 2011, WHS REGULATIONS 2017; RELEVANT CODES OF PRACTICE, AUSTRALIAN STANDARDS AND OTHER REGULATORY REQUIREMENTS. THE PRINCIPLE CONTRACTOR MUST INFORM ALL STAKEHOLDERS, INCLUDING NORTHPROP, OF NEW HAZARDS IDENTIFIED IN THE COURSE OF PLANNING AND UNDERTAKING THE WORKS.
- WHS2. DURING THE DESIGN OF THE STRUCTURE NORTHPROP HAS IDENTIFIED RESIDUAL HAZARDS RELATING TO THE DESIGN OF THE STRUCTURAL WORKS THAT WE CONSIDER TO BE UNUSUAL OR NON-TYPICAL. HAZARDS WHICH ARE NORMAL WORKPLACE HAZARDS, ARE TO BE MANAGED BY PERSONS IN CONTROL OF THE WORKPLACE THROUGH A WHS SYSTEM TO MANAGE THE NORMAL HAZARDS ASSOCIATED WITH CONSTRUCTION, USE AND MAINTENANCE OF THE STRUCTURE. THE RESIDUAL HAZARDS IDENTIFIED ON THE NORTHPROP DRAWINGS ARE NOT AN ENTIRE ASSESSMENT OF HAZARDS, AND DO NOT RELIEVE OTHER PARTIES OR STAKEHOLDERS OF THE THEIR RESPONSIBILITY UNDER THE WHS ACT 2011, WHS REGULATIONS 2017, AND THE CODE OF PRACTICE FOR SAFE DESIGN OF STRUCTURES.
- WHS3. TEMPORARY BRACING AND SUPPORT OF STRUCTURE IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE MAINTAINED DURING ALL STAGES OF CONSTRUCTION.
- WHS4. RESIDUAL HAZARDS ARE SHOWN ON THE NORTHPROP DRAWINGS.
IDENTIFIED BY:

ERECTION

- E1. THE MINIMUM STRENGTH OF CONCRETE LOAD-RESISTING ELEMENTS SHALL BE PROVEN PRIOR TO THEIR LOADING BY CONCRETE CYLINDER TESTING. CONCRETE LOAD-RESISTING ELEMENTS SHALL ACHIEVE THE MORE STRINGENT MINIMUM STRENGTH REQUIREMENTS OF THE DRAWINGS AND THE PROJECT SPECIFICATION.
- E2. THE CONSTRUCTION TEAM SHALL ARRANGE FOR ANY LIFTING ATTACHMENT WHICH IS NOT SHOWN ON THE DRAWINGS TO BE ENGINEERED AND INDEPENDENTLY VERIFIED.
- E3. THE ERECTION SEQUENCE SHOWN ON THE DRAWINGS SHALL NOT BE VARIED WITHOUT THE APPROVAL OF THE DESIGNER OF THE PERMANENT WORKS AND ALSO THE DESIGNER OF THE TEMPORARY WORKS/FALSEWORK AND THE APPLICABLE INDEPENDENT VERIFIERS.

ALUMINIUM DESIGN NOTES

- AD1. FABRICATE AND ERECT STRUCTURAL ALUMINIUM PROFILE IN ACCORDANCE WITH AUSTRALIAN STANDARD AS1664-1997.
- AD2. WELDING FABRICATION OF ALUMINIUM SHALL BE IN ACCORDANCE WITH AUSTRALIAN STANDARD AS1665-2004.
- AD3. STRUCTURAL ALUMINIUM MEMBERS SHALL BE EXTRUDED ALUMINIUM GRADE AS NOTED ON DRAWINGS WITH MATERIAL PROPERTIES PERAS1664-1997
- AD4. TYPICAL ALUMINIUM CONNECTIONS (UNLESS NOTED OTHERWISE):
- STAINLESS M16 CLASS 50
- ALL WELDS TO HAVE SXXX GRADE FILLER ALLOY
- NYLON WASHER SHALL BE USED TO PREVENT DIRECT CONTACT BETWEEN STAINLESS FASTENERS AND ALUMINIUM
- AD5. THESE DRAWINGS HAVE BEEN PREPARED TO INDICATE THE STRUCTURAL INTENT. THE SHOP DETAILER IS TO USE THESE DRAWINGS AS A BASIS FOR DIMENSIONAL COORDINATION WITH OTHER CONSULTANT'S DRAWINGS AND IS TO PREPARE DETAILED SHOP DRAWINGS. WHERE NECESSARY, THE SHOP DETAILER IS TO MAKE ASSUMPTIONS AND SUBMIT TO NORTHPROP CONSULTING ENGINEERS FOR RESOLUTION. SHOP DETAILER IS TO ALLOW TO RE-WORK SHOP DRAWINGS AS NECESSARY. FABRICATOR SHALL PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE BUILDER FOR THEIR APPROVAL. BUILDER SHALL LODGE TWO HARD COPIES OF APPROVED DRAWINGS TO NORTHPROP CONSULTING ENGINEERS FOR REVIEW PRIOR TO FABRICATION, (ALLOW 5 WORKING DAYS FOR REVIEW).
- AD6. APPLICATION OF FINISHES SHALL ONLY BE UNDERTAKEN AND WARRANTED BY LICENSED APPLICATORS UNDER FACTORYCONTROLLED CONDITIONS. SUBMIT EVIDENCE OF APPLICATOR MEMBERSHIP WITH THE QUALICOAT ORGANISATION.
- AD7. SURFACE TREATMENT (UNLESS NOTED OTHERWISE) MUST BE ANODIC OXIDATION WITH THICKNESS GRADE AA25 IN ACCORDANCE WITH THE REQUIREMENTS OF AS 1231
- AD8. THE FABRICATION AND ERECTION OF THE THE STRUCTURAL ALUMINIUM MEMBERS SHALL BE SUPERVISED BY A QUALIFIED PERSON EXPERIENCED IN SUCH SUPERVISION, IN ORDER TO ENSURE THAT ALL REQUIREMENTS OF THEDESIGN ARE MET.
- AD9. ALUMINIUM SHALL NOT BE PLACED IN DIRECT CONTACT WITH POROUS MATERIAL THAT ABSORBS WATER AND CAUSES CORROSION.
- AD10. ALL MEMBERS SHALL BE SUPPLIED IN SINGLE LENGTHS. SPLICES SHALL ONLY BE PERMITTED IN LOCATIONS SHOWN ON THE STRUCTURAL DRAWINGS.

PRELIMINARY - NOT FOR CONSTRUCTION

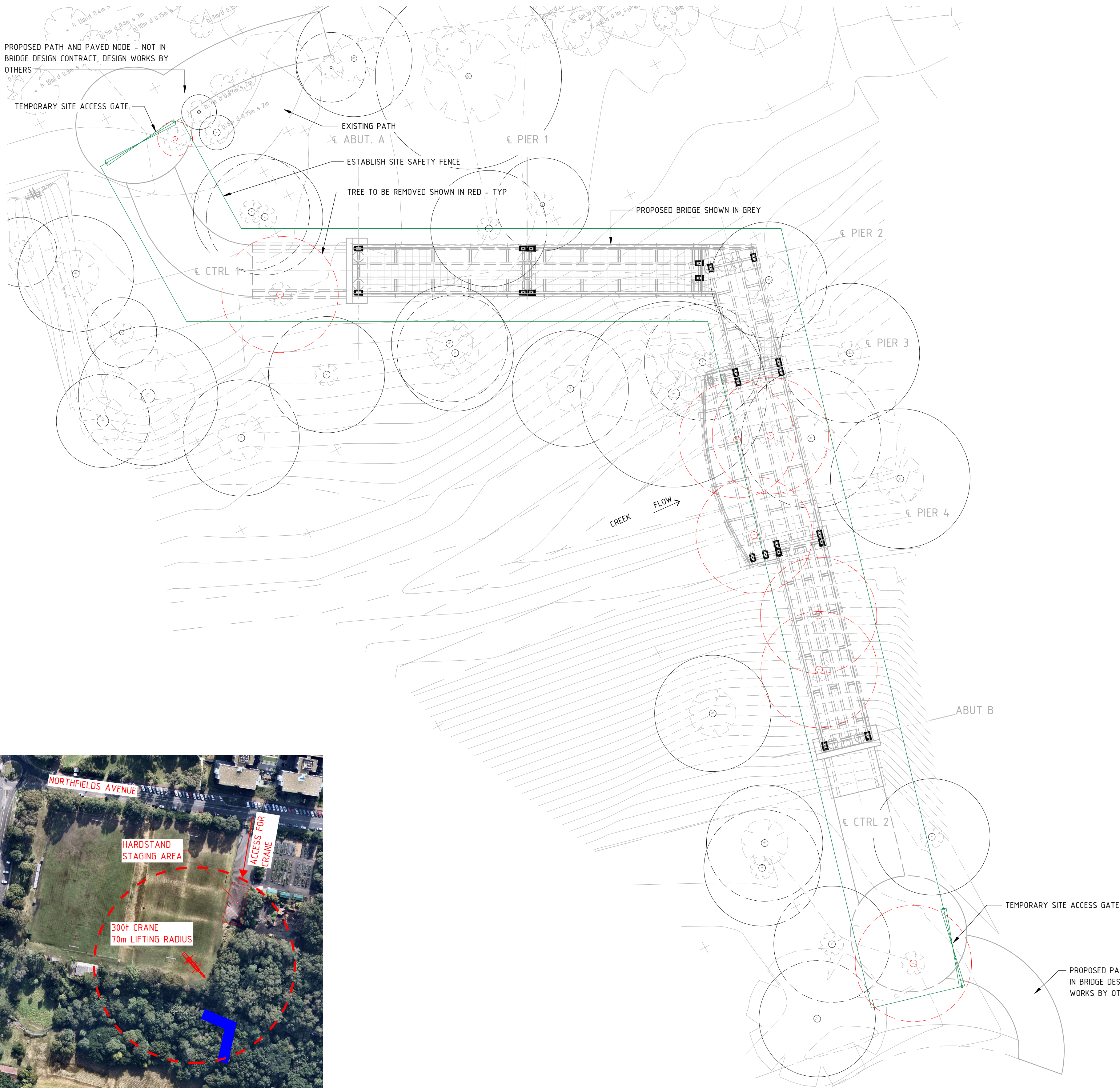
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



PJ-4420		A1 ORIGINAL
SHEET OF SHEETS DRAWING No.	SHEET No.	
221016	S00.02	1



INDICATIVE CRANE LIFTING STRATEGY

PLAN

NOTES



1. DETAILED CONSTRUCTION METHODOLOGY TO BE DEVELOPED BY AN EXPERIENCED, QUALIFIED CONTRACTOR.
2. CONSTRUCTION PLAN TO BE DEVELOPED IN ACCORDANCE WITH WOLLONGONG CITY COUNCIL (WCC) DEVELOPMENT CONTROL PLANS.
3. CONSTRUCTION TO BE IN ACCORDANCE WITH TNSW STANDARD (T-HR-CI-12003-ST) AND RELEVANT TNSW TECHNICAL QA SPECIFICATIONS (E.G., B,R,G AND Q SERIES).
4. THE CONSTRUCTION METHODOLOGY IS THE ASSUMED DELIVERY AND ASSEMBLY SEQUENCE. CONTRACTOR DOES NOT NEED TO STRICTLY FOLLOW THE OUTLINED SEQUENCE WHERE IT IS APPROPRIATE AND PRACTICAL TO DO OTHERWISE.

CONSTRUCTION SEQUENCE

STAGE 1 - SITE ESTABLISHMENT
PREPARE SITE FOR WORKS WITH CONSIDERATION TO THE FOLLOWING:
- REMOVAL AND RELOCATION OF TREES AND VEGETATION
- RESTRICTING ACCESS TO THE SITE
- SITE FENCING AND SIGNAGE TO LIMIT ACCESS AROUND SITE
- PREPARATION OF LAYDOWN AND STORAGE SPACES
- ENVIRONMENTAL CONTROLS ON SITE WORKS
- ANY CONSTRAINTS APPLIED BY SYDNEY WATER FOR ACCESS TO THE PARK BY HEAVY EQUIPMENT.

STAGE 2 - CONSTRUCTION OF FOUNDATIONS
FOOTBRIDGE FOUNDATIONS TO BE FORMED AND CONSTRUCTED INCLUDING THE FOLLOWING WORKS:
- EXCAVATION OF FOOTINGS TO ROCK AT CREEK LEVEL FOR CENTRAL SPAN FOOTINGS
- INSTALLATION OF ROCK ANCHORS
- FORM AND POUR CONCRETE FOOTINGS AT CREEK LEVEL WITH ENVIRONMENTAL CONTROLS
- PILING WORKS FOR FOOTINGS AT TOP OF BANK
- PILE CAP WORKS FOR FOOTINGS AT TOP OF BANK

STAGE 3 - CONSTRUCTION OF PIERS AND HEADSTOCKS
PIERS AND HEADSTOCKS TO BE FORMED AND CONSTRUCTED. CONSIDER PRECAST ALTERNATIVES TO LIMIT SITE WORKS (LIMITED BY EQUIPMENT CARRYING AND ERECTION CAPACITY)

STAGE 4 - INSTALLATION OF ALUMINIUM PRIMARY STRUCTURE
FOOTBRIDGE GIRDERS AND FLOOR JOISTS TO BE TRANSPORTED AND INSTALLED:

OPTION 1 - PREASSEMBLE SPANS AND CRANE INTO POSITION TO LIMIT SITE WORKS. APPROXIMATE WEIGHT FOR 10m SPAN IS 15t TO BE LIFTED 70m.

OPTION 2 - STICK BUILD BY TRANSPORTING MEMBERS INDIVIDUALLY TO THE SITE WITH SMALL EQUIPMENT FOR TRANSPORTATION AND LIFTING. APPROXIMATE WEIGHT FOR A 10m GIRDER IS 500kg.

STAGE 5 - INSTALLATION OF FOOTBRIDGE SECONDARY ELEMENTS
INSTALL DECKING, HANDRAILS, CLADDING AND OTHER FIT-OUT ITEMS.

STAGE 6 - PATH TIE-IN WORKS
TIE-IN WORKS TO PATH NODE SLABS

ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22

DATUM	SURVEYOR	DRAWN	DATE	APPROVED
AHD		A.CHESTERFIELD		(FOR COUNCIL USE ONLY)
AZIMUTH	FIELD BOOK	DESIGNED	DATE	SENIOR DESIGN ENGINEER
MGA		R.PUSCHARABOONYANON		STRUCTURAL/ARCHITECTURAL
RELATED PLANS		CHECKED	DATE	
		P.JAMESON		
			DATE	

	SCALES	NORTH POINT
	1:100	

PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG

WOLLONGONG BOTANIC GARDENS

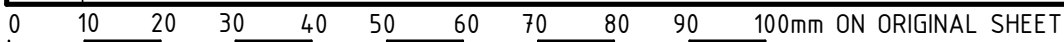
ELEVATED TREETOP CANOPY WALK

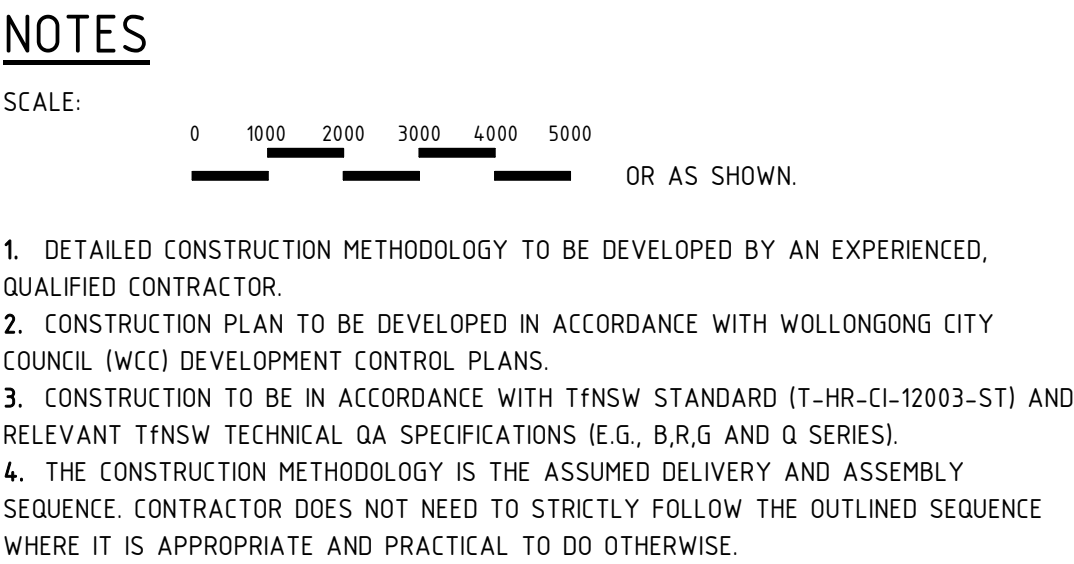
CONSTRUCTION SEQUENCE - SHEET 1

Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100

DESIGN & TECHNICAL SERVICES
Ph 02 42277111

PJ-4420	A1 ORIGINAL
SHEET OF SHEETS	ISSUE
DRAWING No. 221016	SHEET No. S07.01
	1

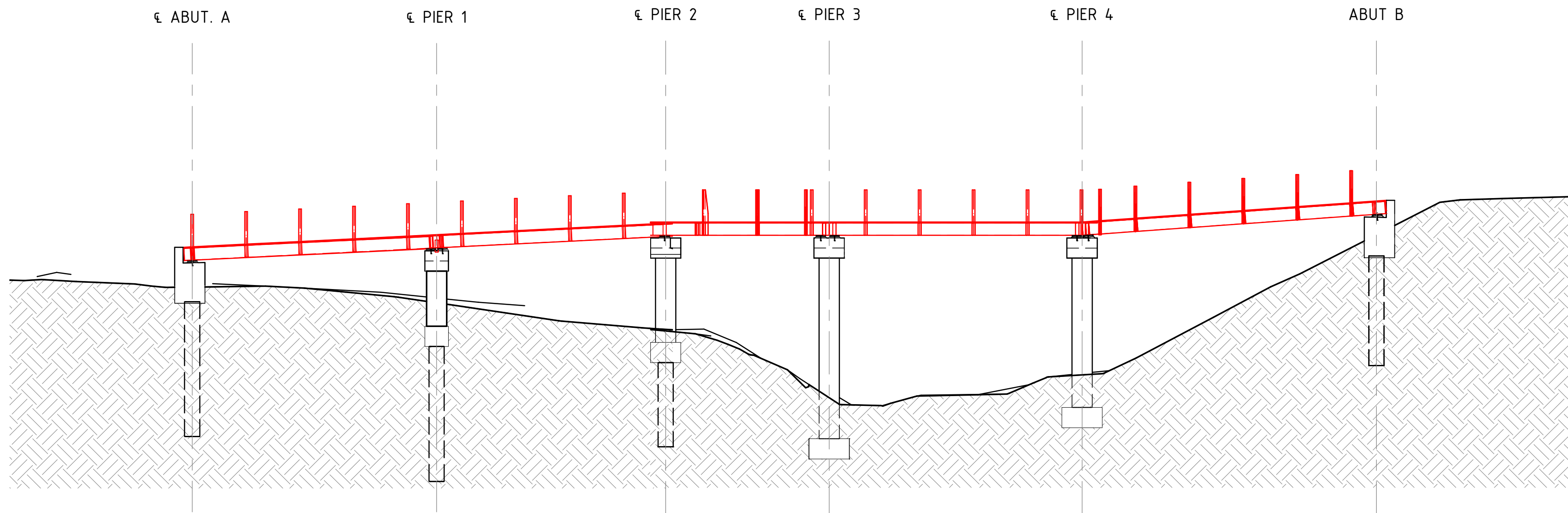




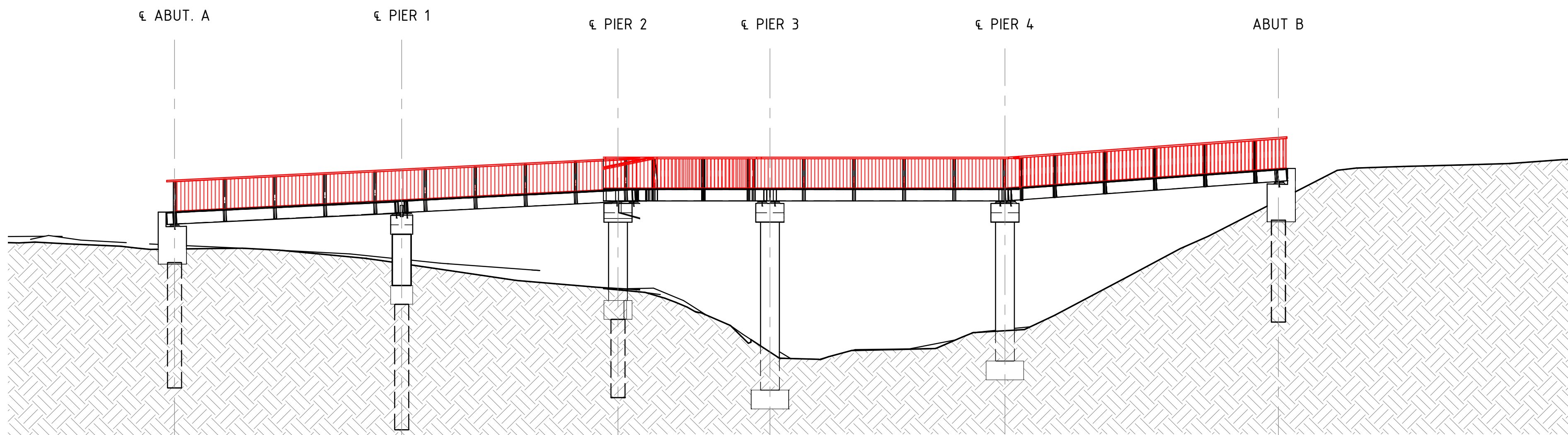
A cross-sectional diagram of a bridge structure. The diagram shows a ground profile with a hatched area representing the ground. Above the ground, there are several vertical structures: a small pier on the left, a larger pier labeled 'PIER 1', a pier labeled 'PIER 2', a pier labeled 'PIER 3', a pier labeled 'PIER 4', and a pier on the right labeled 'ABUT. B'. The piers are connected by a horizontal structure. The diagram is labeled with 'ABUT. A' on the far left, 'PIER 1', 'PIER 2', 'PIER 3', 'PIER 4', and 'ABUT. B' from left to right. The piers are shown in cross-section, with some having internal reinforcement or structural details indicated by hatching or lines. The ground profile is shown as a solid line with a hatched area below it.

PRELIMINARY - NOT FOR CONSTRUCTION
CITY OF WOLLONGONG
WOLLONGONG BOTANIC GARDENS
ELEVATED TREETOP CANOPY WALK
CONSTRUCTION SEQUENCE - SHEET 2

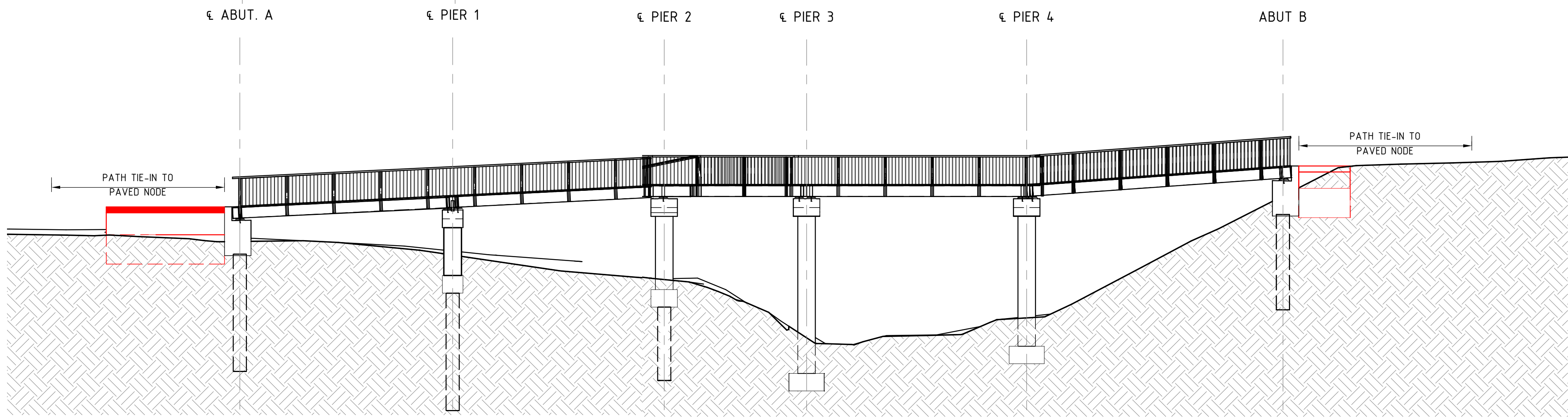
								DATUM AHD AZIMUTH MGA		SURVEYOR FIELD BOOK		DRAWN A.CHESTERFIELD		DATE		APPROVED (FOR COUNCIL USE ONLY) SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL				SCALES		NORTH POINT		CITY OF WOLLONGONG WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK CONSTRUCTION SEQUENCE - SHEET 2				P/J-4420 SHEET OF SHEETS DRAWING No. SHEET No.		A1 ORIGINAL ISSUE	
1				50% DESIGN - PRELIMINARY ISSUE				P.J.		30.11.22		RELATED PLANS				DATE				1:100											
ISSUE				DESCRIPTION		ISSUED		APPR'D		DATE						DATE															



CONSTRUCTION SEQUENCE 4 - INSTALLATION OF ALUMINIUM PRIMARY STRUCTURE



CONSTRUCTION SEQUENCE 5 - INSTALLATION OF FOOTBRIDGE FRP MESH AND BARRIERS



CONSTRUCTION SEQUENCE 6 - INSTALL SERVICES AND COMPLETE TIE IN WORKS

NOTES

SCALE: 0 1000 2000 3000 4000 5000 OR AS SHOWN.

1. DETAILED CONSTRUCTION METHODOLOGY TO BE DEVELOPED BY AN EXPERIENCED, QUALIFIED CONTRACTOR.
2. CONSTRUCTION PLAN TO BE DEVELOPED IN ACCORDANCE WITH WOLLONGONG CITY COUNCIL (WCC) DEVELOPMENT CONTROL PLANS.
3. CONSTRUCTION TO BE IN ACCORDANCE WITH TNSW STANDARD (T-HR-CI-12003-ST) AND RELEVANT TNSW TECHNICAL QA SPECIFICATIONS (E.G., B,R,G AND Q SERIES).
4. THE CONSTRUCTION METHODOLOGY IS THE ASSUMED DELIVERY AND ASSEMBLY SEQUENCE. CONTRACTOR DOES NOT NEED TO STRICTLY FOLLOW THE OUTLINED SEQUENCE WHERE IT IS APPROPRIATE AND PRACTICAL TO DO OTHERWISE.

CONSTRUCTION SEQUENCE

STAGE 1 - SITE ESTABLISHMENT
PREPARE SITE FOR WORKS WITH CONSIDERATION TO THE FOLLOWING:
- REMOVAL AND RELOCATION OF TREES AND VEGETATION
- RESTRICTING ACCESS TO THE SITE
- SITE FENCING AND SIGNAGE TO LIMIT ACCESS AROUND SITE
- PREPARATION OF LAYDOWN AND STORAGE SPACES
- ENVIRONMENTAL CONTROLS ON SITE WORKS
- ANY CONSTRAINTS APPLIED BY SYDNEY WATER FOR ACCESS TO THE PARK BY HEAVY EQUIPMENT.

STAGE 2 - CONSTRUCTION OF FOUNDATIONS
FOOTBRIDGE FOUNDATIONS TO BE FORMED AND CONSTRUCTED INCLUDING THE FOLLOWING WORKS:
- EXCAVATION OF FOOTINGS TO ROCK AT CREEK LEVEL FOR CENTRAL SPAN FOOTINGS
- INSTALLATION OF ROCK ANCHORS
- FORM AND POUR CONCRETE FOOTINGS AT CREEK LEVEL WITH ENVIRONMENTAL CONTROLS
- PILING WORKS FOR FOOTINGS AT TOP OF BANK
- PILE CAP WORKS FOR FOOTINGS AT TOP OF BANK

STAGE 3 - CONSTRUCTION OF PIERS AND HEADSTOCKS
PIERS AND HEADSTOCKS TO BE FORMED AND CONSTRUCTED. CONSIDER PRECAST ALTERNATIVES TO LIMIT SITE WORKS (LIMITED BY EQUIPMENT CARRYING AND ERECTION CAPACITY)

STAGE 4 - INSTALLATION OF ALUMINIUM PRIMARY STRUCTURE
FOOTBRIDGE GIRDERS AND FLOOR JOISTS TO BE TRANSPORTED AND INSTALLED:

OPTION 1 - PREASSEMBLE SPANS AND CRANE INTO POSITION TO LIMIT SITE WORKS. APPROXIMATE WEIGHT FOR 10m SPAN IS 15t TO BE LIFTED 70m.

OPTION 2 - STICK BUILD BY TRANSPORTING MEMBERS INDIVIDUALLY TO THE SITE WITH SMALL EQUIPMENT FOR TRANSPORTATION AND LIFTING. APPROXIMATE WEIGHT FOR A 10m GIRDER IS 500kg.

STAGE 5 - INSTALLATION OF FOOTBRIDGE SECONDARY ELEMENTS
INSTALL DECKING, HANDRAILS, CLADDING AND OTHER FIT-OUT ITEMS.

STAGE 6 - PATH TIE-IN WORKS
TIE-IN WORKS TO PATH NODE SLABS

PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG
WOLLONGONG BOTANIC GARDENS
ELEVATED TREETOP CANOPY WALK
CONSTRUCTION SEQUENCE - SHEET 3



Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



PJ-4420

SHEET OF SHEETS

DRAWING No. SHEET No.

221016 S07.03

A1

ORIGINAL

ISSUE

1

1	50% DESIGN - PRELIMINARY ISSUE	P.J.	30.11.22
ISSUE	DESCRIPTION	ISSUED	APPR'D DATE

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

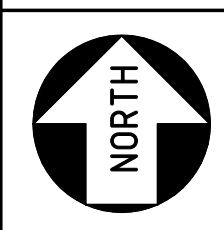
DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)
AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL
RELATED PLANS		CHECKED P.JAMESON	DATE	DATE

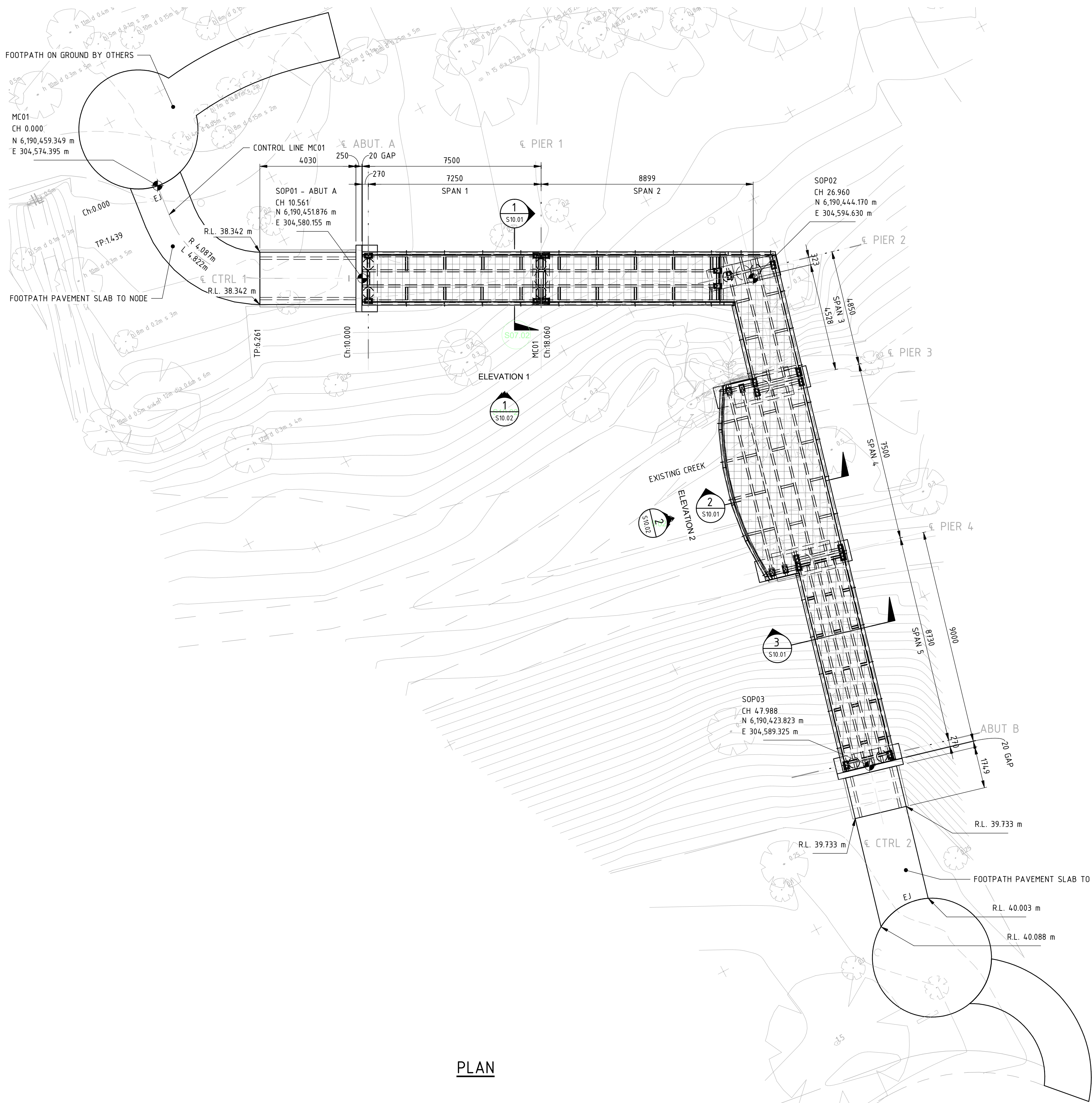


SCALES

1:100

NORTH POINT





PLAN

GENERAL NOTES

SCALE: (REFER TO DRG. SHEET BORDER SCALE OR AS SHOWN.)

DIMENSIONS IN MILLIMETRES.
CHAINAGES AND REDUCED LEVELS ARE IN METRES.
REDUCED LEVELS ARE RELATED TO AUSTRALIAN HEIGHT DATUM.
E DENOTES EXPANSION BEARING.
F DENOTES FIXED BEARING.
R DENOTES RESTRAINED BEARING.
EJ DENOTES EXPANSION JOINT.

FOR ADDITIONAL STRUCTURAL SPECIFICATION NOTES REFER TO DRAWINGS S00.01 TO S00.02.
THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE LATEST SURVEY AND CIVIL DRAWINGS AND ANY RELEVANT CONSULTANT'S/CONTRACTOR'S DRAWINGS. IT IS THE BUILDERS RESPONSIBILITY TO ENSURE THE LATEST REVISION OF ALL DRAWINGS ARE BEING USED ON SITE.

ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22

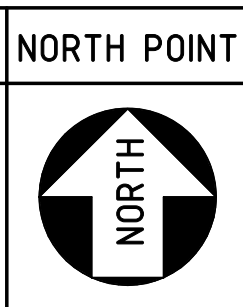
DATUM	SURVEYOR
AHD	
AZIMUTH	FIELD BOOK
MGA	
RELATED PLANS	

DRAWN	DATE
A.CHESTERFIELD	
DESIGNED	DATE
R.PUSCHARABOONYANON	
CHECKED	DATE
P.JAMESON	

APPROVED
(FOR COUNCIL USE ONLY)
SENIOR DESIGN ENGINEER
STRUCTURAL/ARCHITECTURAL
DATE



SCALES
1:100



PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG

WOLLONGONG BOTANIC GARDENS

ELEVATED TREETOP CANOPY WALK

GENERAL ARRANGEMENT PLAN

Wollongong

Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500

Ph (02) 4226 3333 Email: southcoast@northrop.com.au

ABN 81 094 433 100

DESIGN & TECHNICAL SERVICES

Ph 02 42277111

PJ-4420

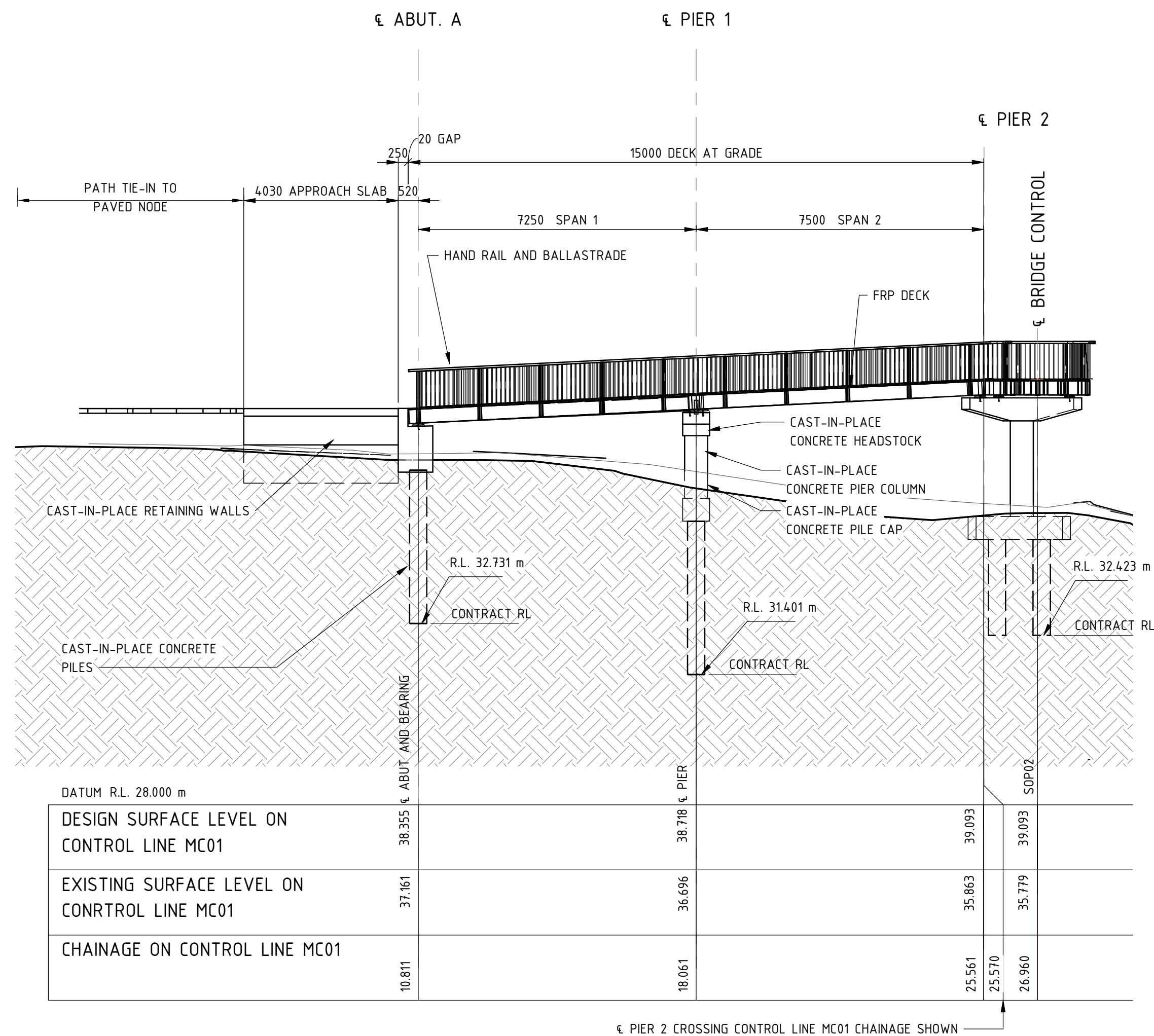
SHEET	OF	SHEETS
DRAWING No.		SHEET No.
221016		S10.01

A1 ORIGINAL

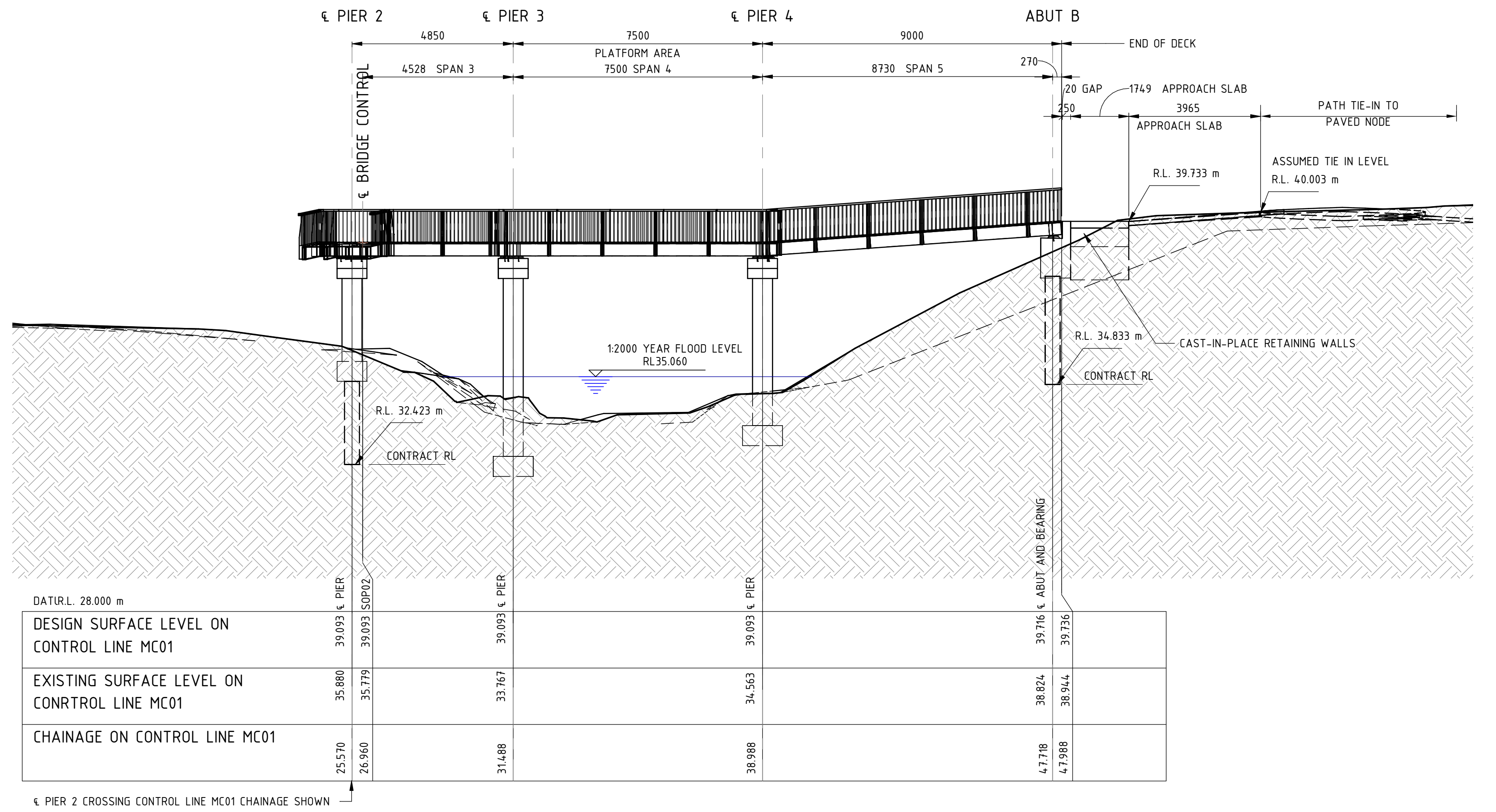
ISSUE

1

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



ELEVATION 1
S10.01



ELEVATION 2
S10.01

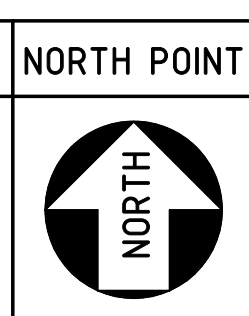
ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22

DATUM AHD	SURVEYOR	DRAWN	DATE
		R.SWIRAD	
AZIMUTH MGA	FIELD BOOK	DESIGNED	DATE
		R.PUSCHARABOONYANON	
RELATED PLANS	CHECKED	DATE	
	P.JAMESON		

APPROVED (FOR COUNCIL USE ONLY)	DATE
SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL	
DATE	



SCALES
1:100



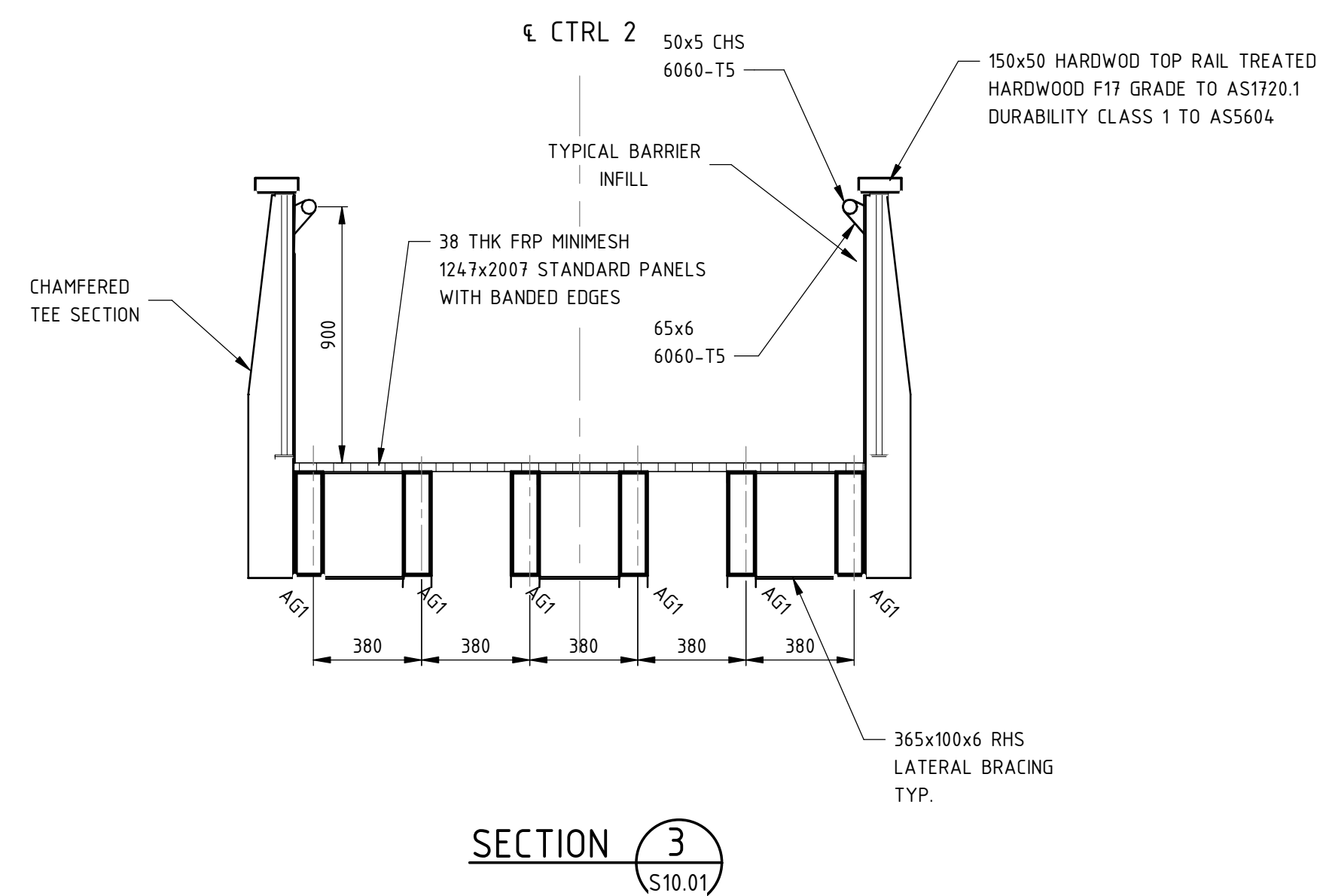
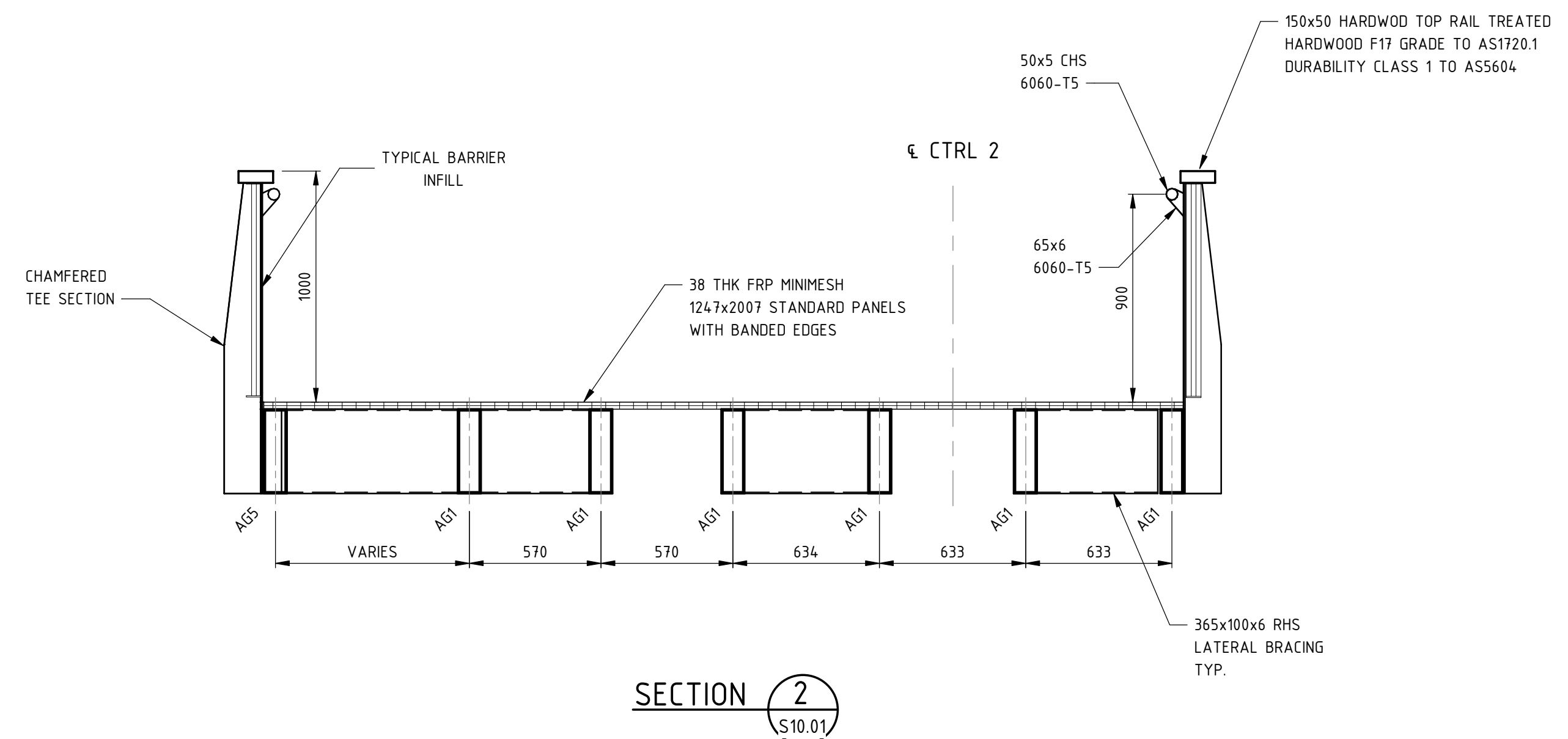
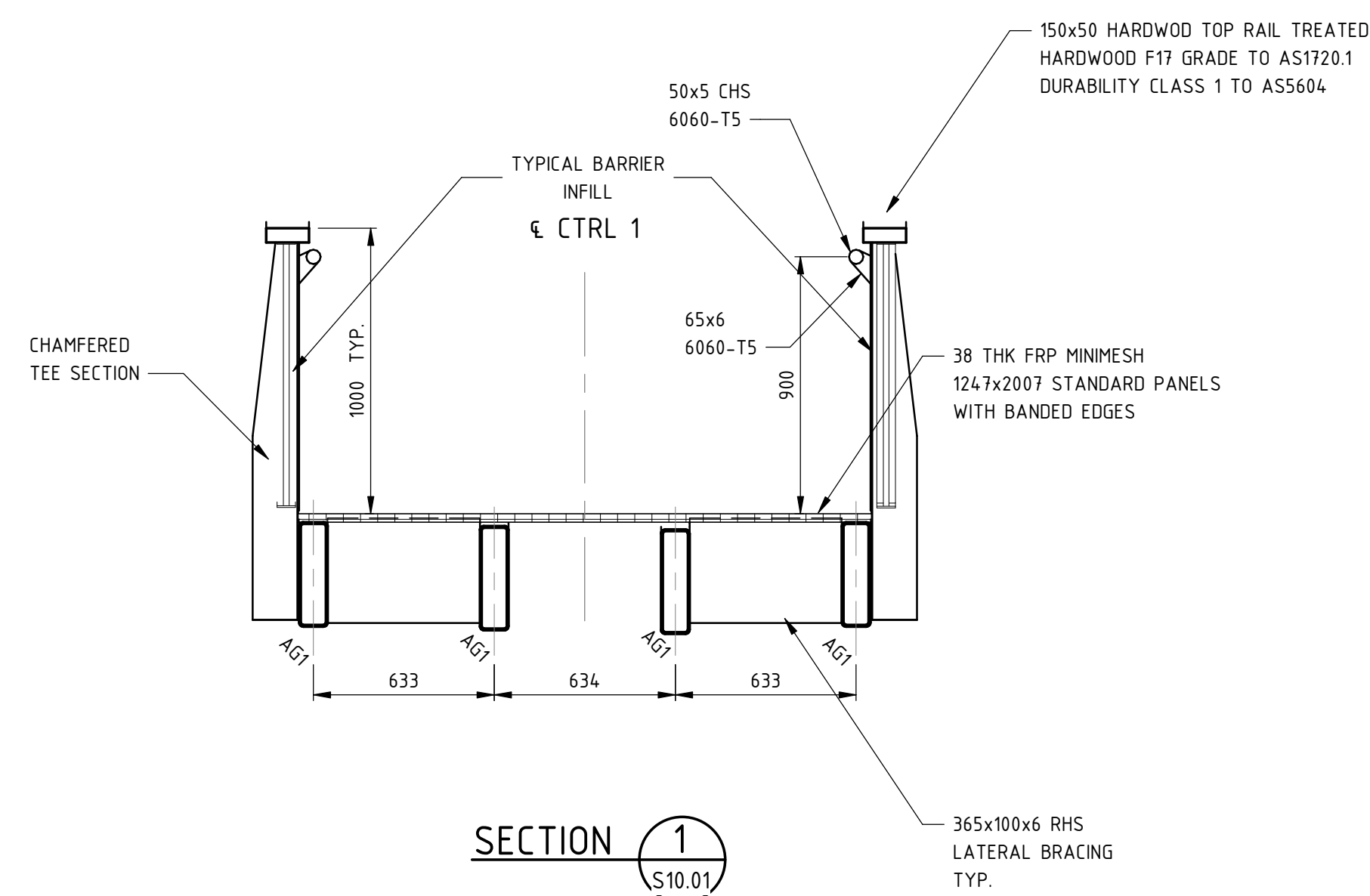
PRELIMINARY - NOT FOR CONSTRUCTION
CITY OF WOLLONGONG
 WOLLONGONG BOTANIC GARDENS
 ELEVATED TREETOP CANOPY WALK
 GENERAL ARRANGEMENT - ELEVATIONS

Wollongong
 Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
 Ph (02) 4226 3333 Email: southcoast@northrop.com.au
 ABN 81 094 433 100

DESIGN & TECHNICAL SERVICES
 Ph 02 42277111

PJ-4420	A1 ORIGINAL
SHEET OF SHEETS	ISSUE
DRAWING No. 221016	SHEET No. S10.02
	1

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG
WOLLONGONG BOTANIC GARDENS
ELEVATED TREETOP CANOPY WALK
GENERAL ARRANGEMENT - SECTIONS



Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



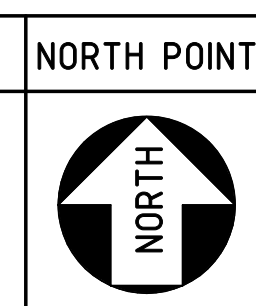
PJ-4420	A1
SHEET OF SHEETS	ORIGINAL
DRAWING No. 221016	SHEET No. S10.03
1	1

ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22

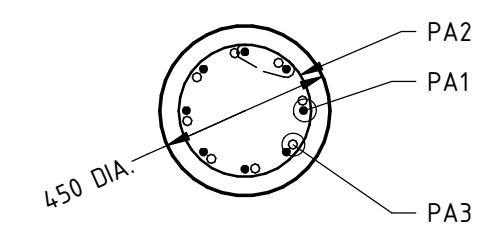
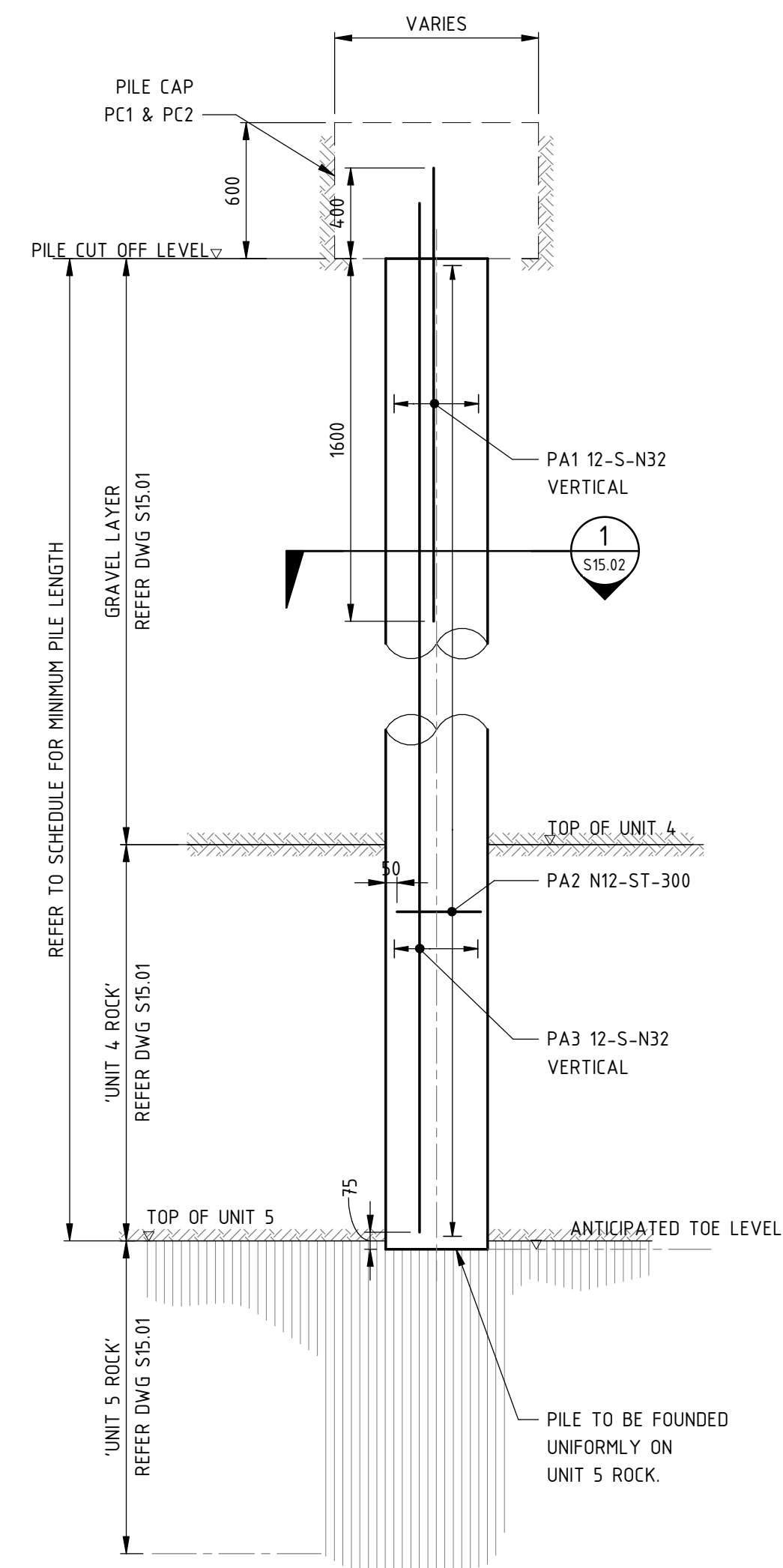
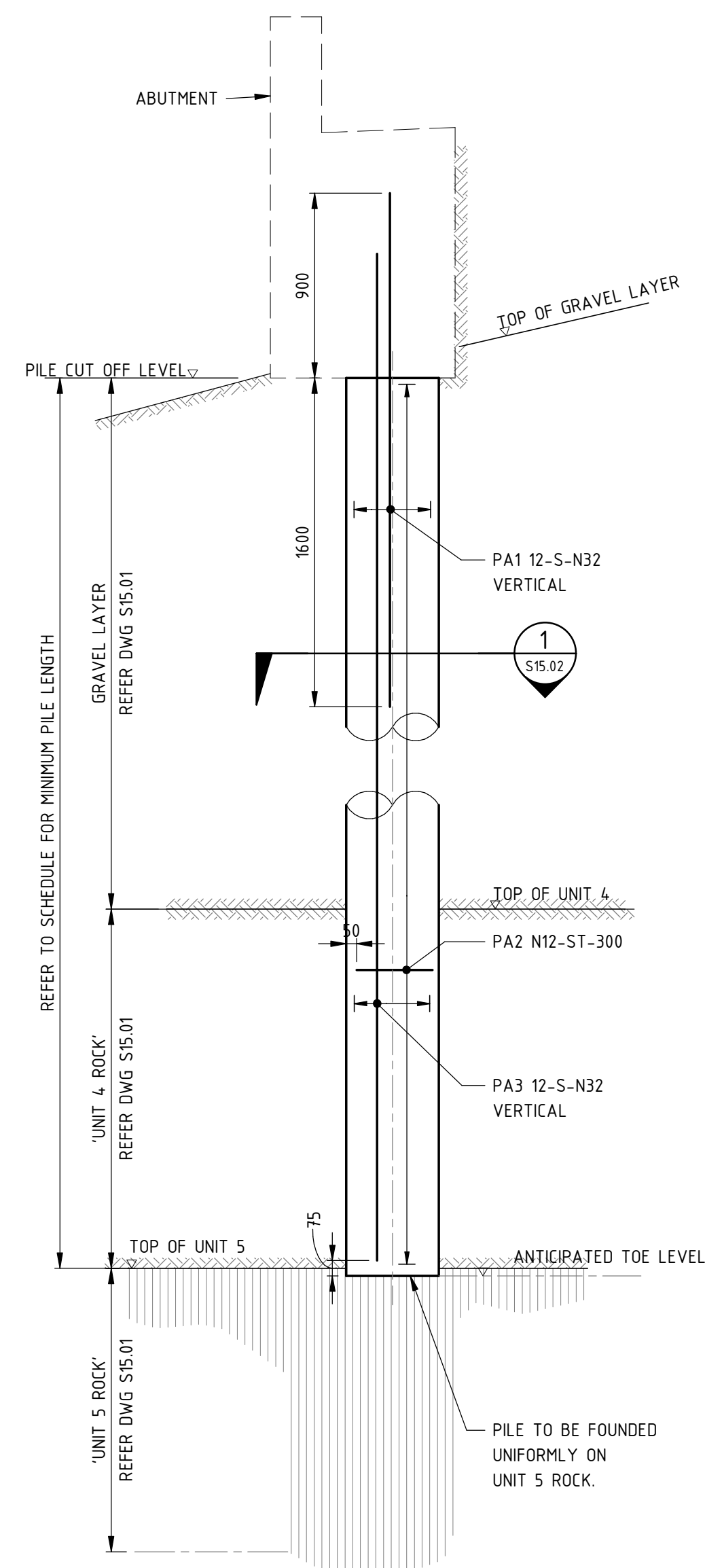
DATUM	SURVEYOR	DRAWN	DATE
AHD		A.CHESTERFIELD	
AZIMUTH	FIELD BOOK	DESIGNED	DATE
MGA		R.PUSCHARABOONYANON	
CHECKED	DATE	DATE	DATE
P.JAMESON			



SCALES
1:100



0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



SECTION 1
S15.02

1	50% DESIGN – PRELIMINARY ISSUE		P.J.	30.11.22
ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE

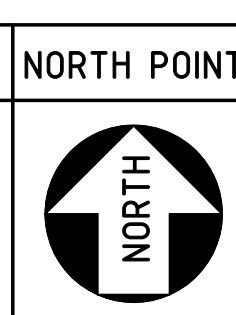
DATUM AHD	SURVEYOR
AZIMUTH MGA	FIELD BOOK
RELATED PLANS	

DRAWN	A.CHESTERFIELD	DATE
DESIGNED	R.PUSCHARABOONYANON	DATE
CHECKED	P.JAMESON	DATE

APPROVED
(FOR COUNCIL USE ONLY)
SENIOR DESIGN ENGINEER
STRUCTURAL/ARCHITECTURAL



SCALES
1:100



PRELIMINARY - NOT FOR CONSTRUCTION	
CITY OF WOLLONGONG	
WOLLONGONG BOTANIC GARDENS	
ELEVATED TREETOP CANOPY WALK	
PILE ELEVATIONS AND SECTION	

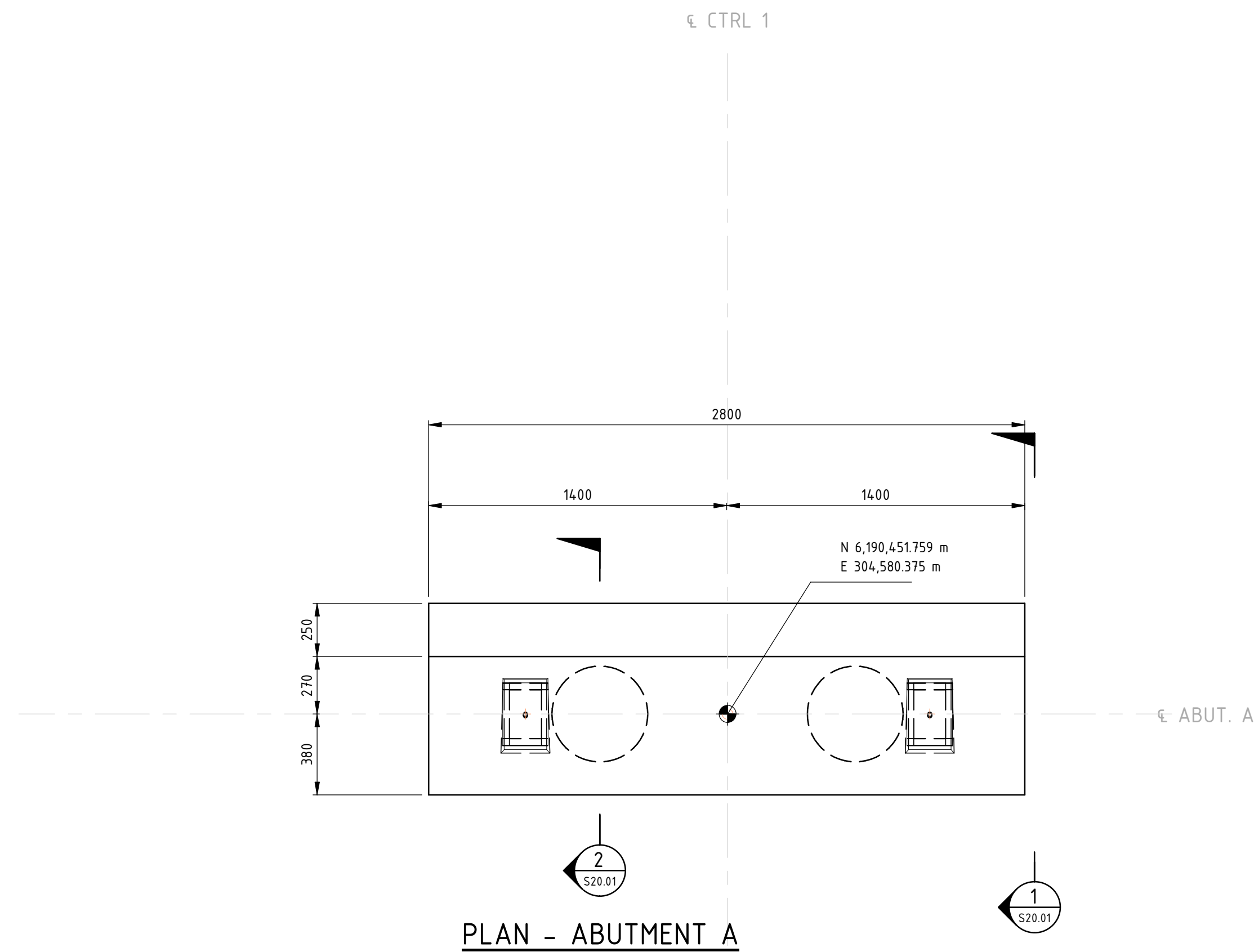


Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100

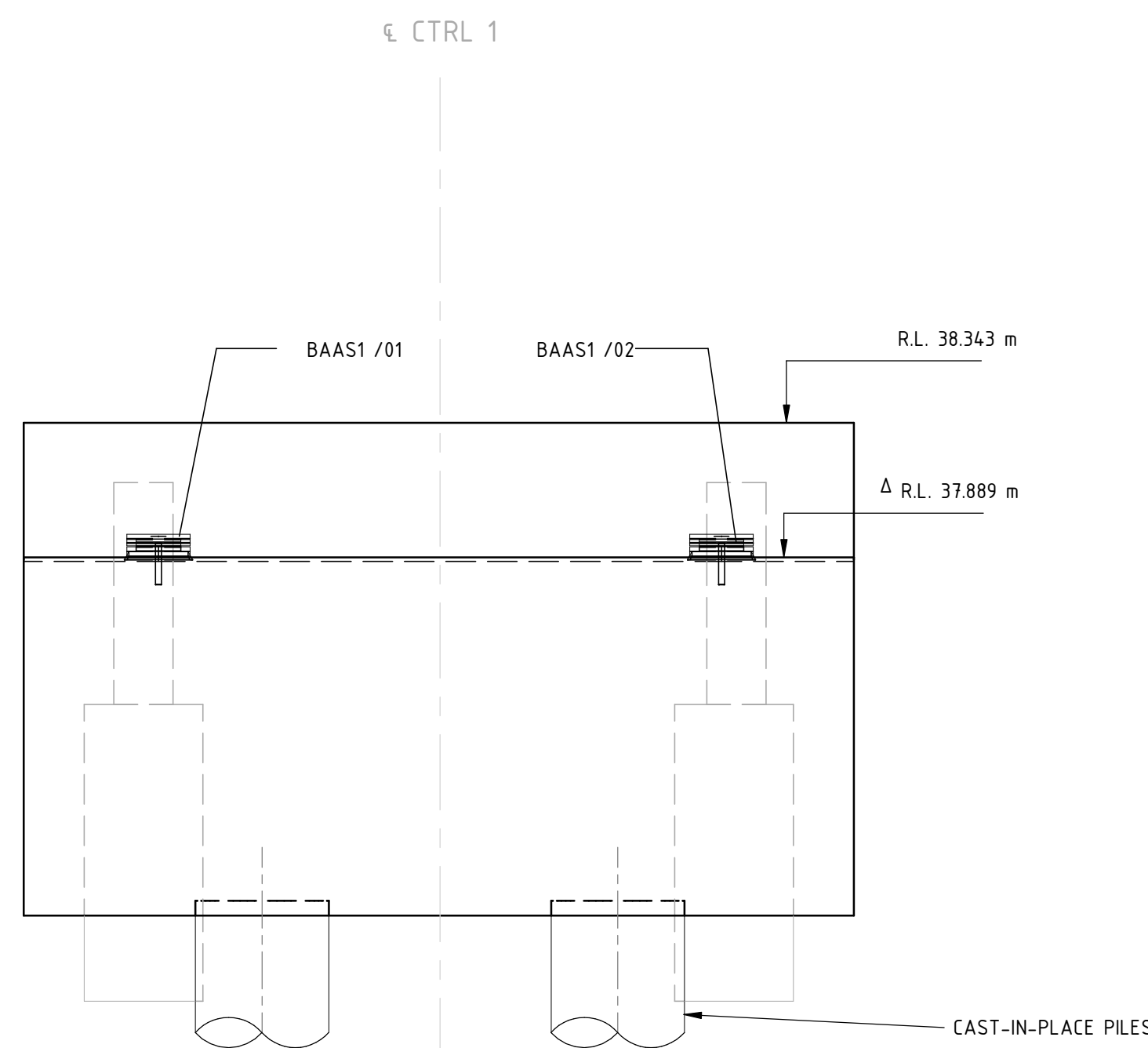


P.J-4420		A1 ORIGINAL
SHEET	OF SHEETS	
DRAWING No.	SHEET No.	ISSUE
221016	S15.02	1

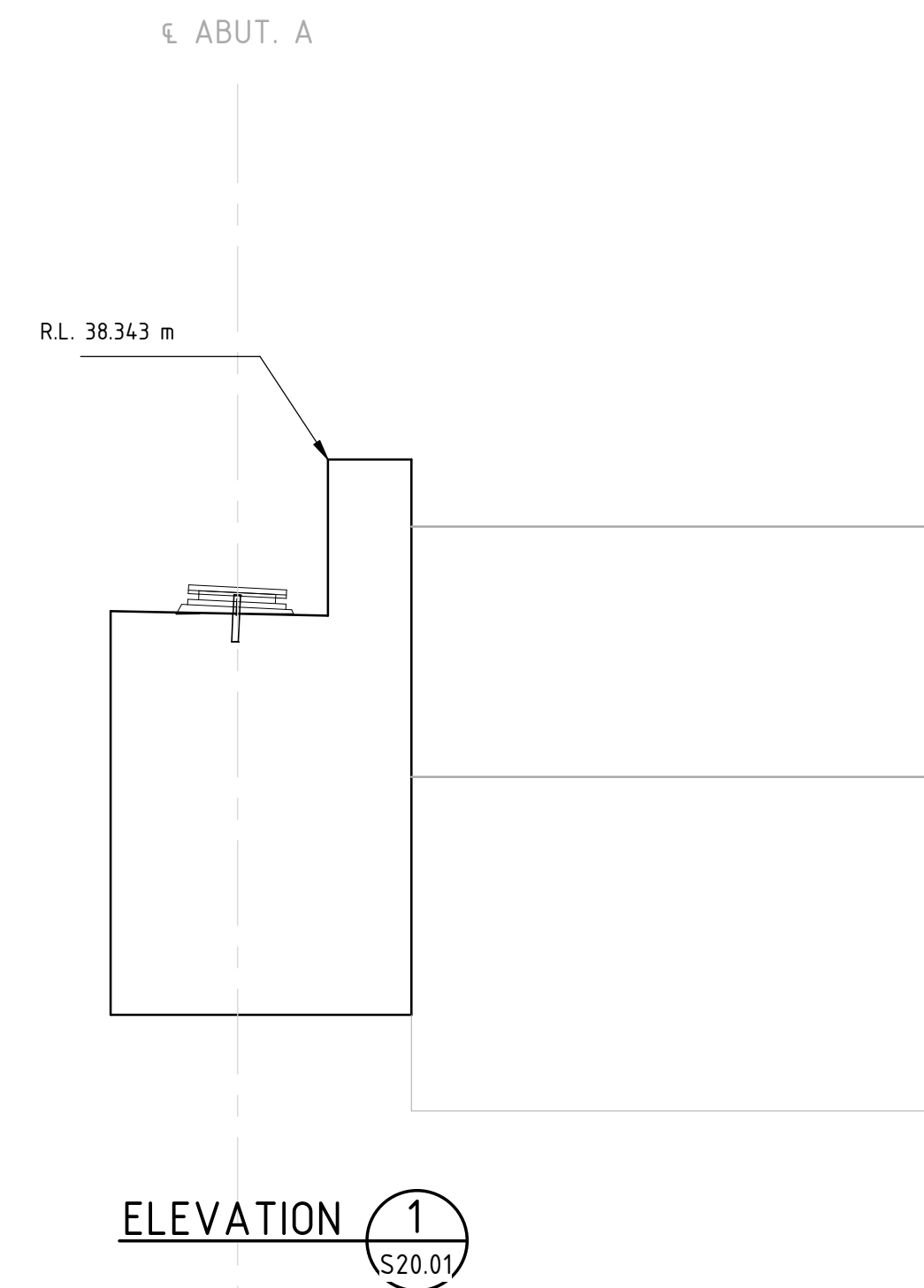
0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



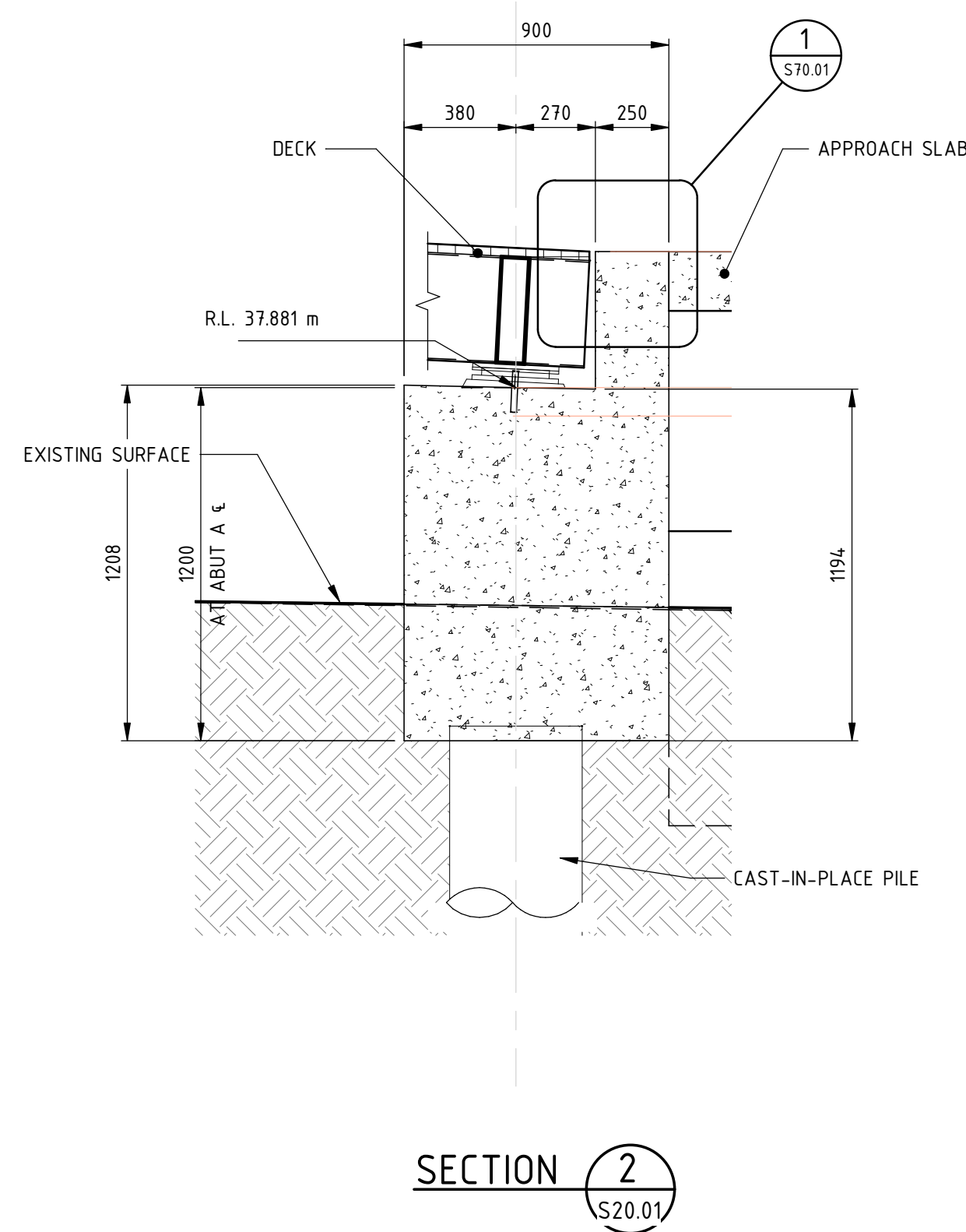
PLAN - ABUTMENT A



ELEVATION



ELEVATION 1



SECTION 2

NOTES

SCALE: 0 200 400 600 800 1000 OR AS SHOWN.

REFER TO SHEET S00.01 AND S00.02 FOR GENERAL NOTES

CONCRETE EXPOSURE CLASSIFICATION: B2

CONCRETE MIX SHALL BE IN ACCORDANCE WITH TNSW B80 SPECIFICATION

MIN 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa

CHAMFER EDGES 20x20 AND FILLETRE-ENTRANT ANGLES 20x20 U.S.O.

NCF DENOTES NO CHAMFER OR FILLET

BOLTING CATEGORY 8.8/s TO AS5100.6 U.S.O.

Δ DENOTES REDUCED LEVELS AT FRONT FACE OF ABUTMENT

					DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES	NORTH POINT	CITY OF WOLLONGONG	PJ-4420	SHEET DRAWING No.	OF SHEETS	A1 ORIGINAL
					AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL		1:100		WOLLONGONG BOTANIC GARDENS		221016	S20.01	1
					RELATED PLANS		CHECKED P.JAMESON	DATE					ELEVATED TREETOP CANOPY WALK ABUTMENT A CONCRETE - SHEET 1				
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22													
ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE													

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

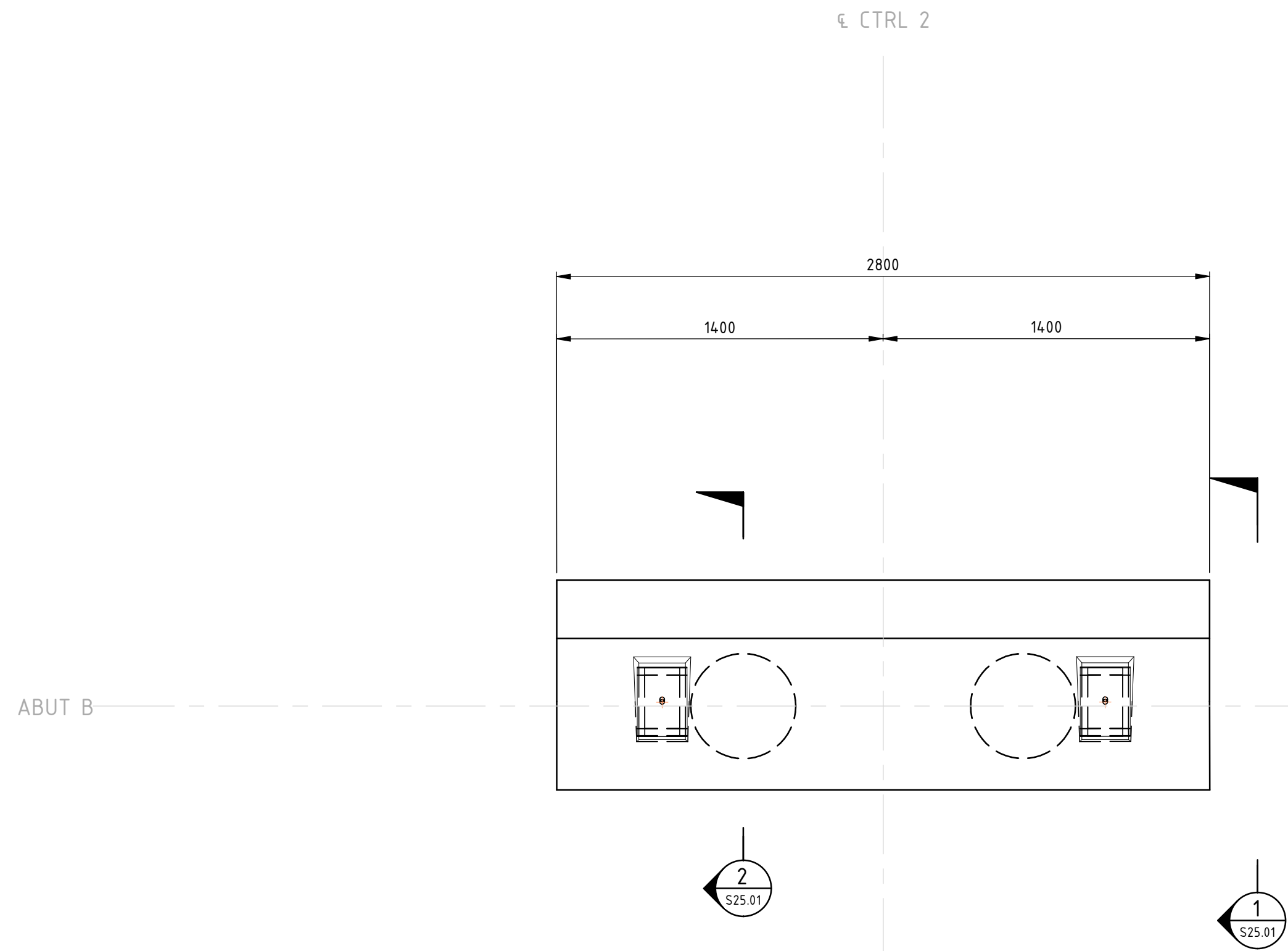
PRELIMINARY - NOT FOR CONSTRUCTION



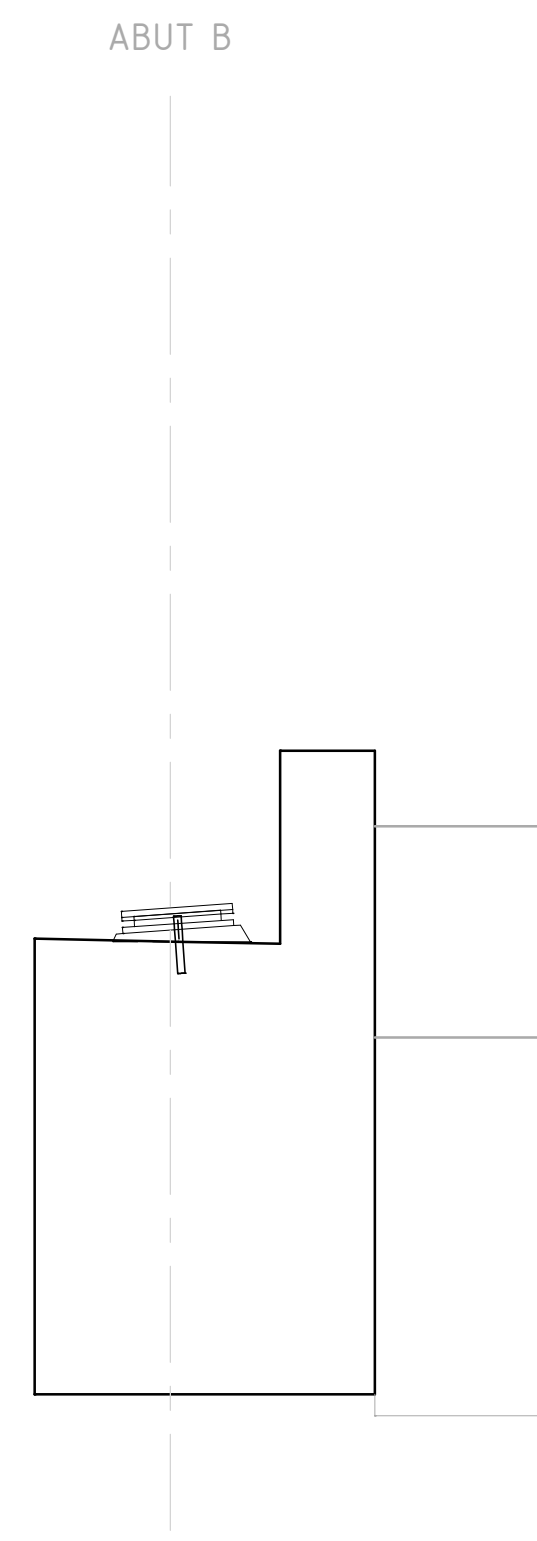
Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



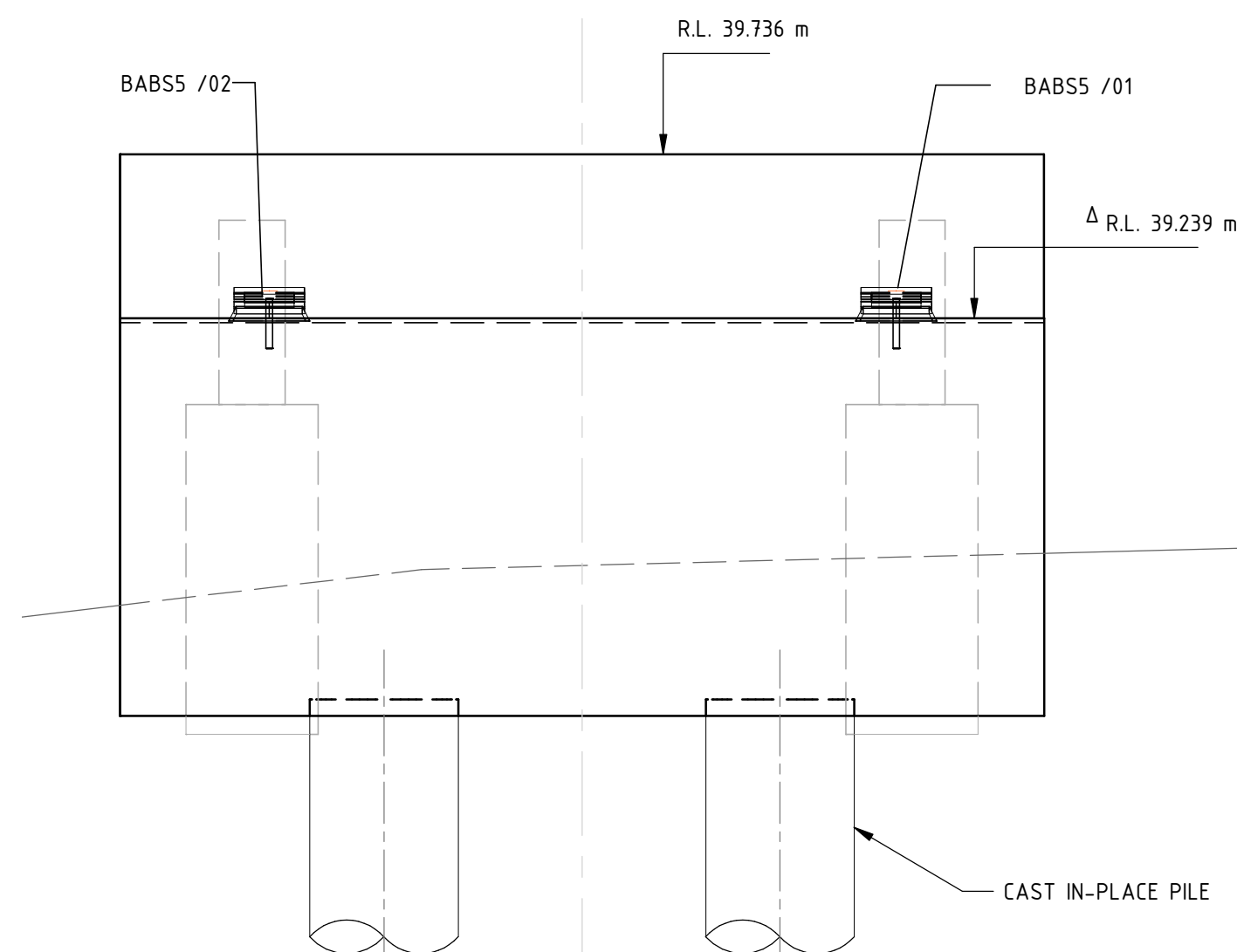
DESIGN & TECHNICAL SERVICES
Ph 02 42277111



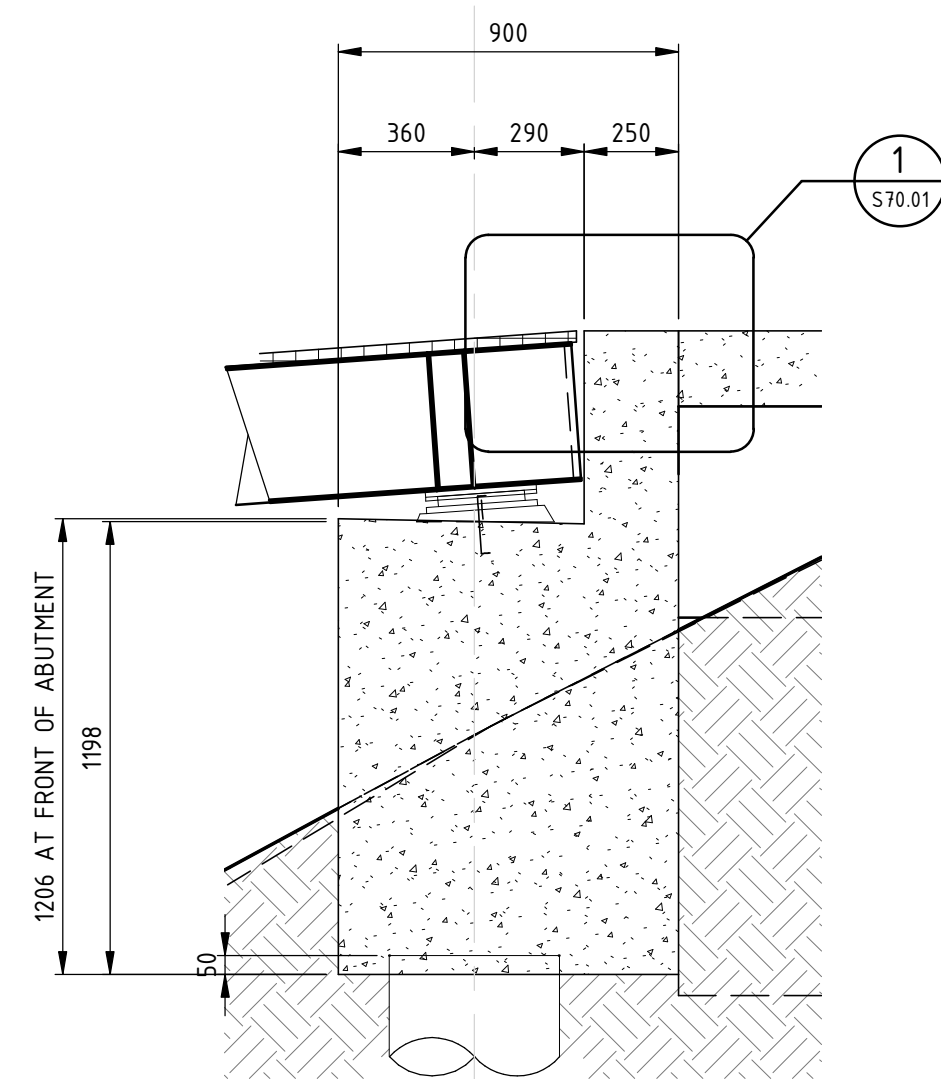
PLAN - ABUTMENT B



ELEVATION 1



ELEVATION - ABUT B - CONCRETE



SECTION 2

NOTES

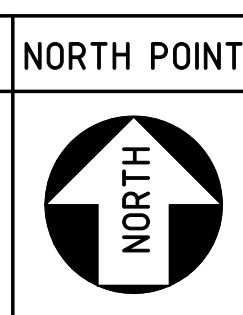
- SCALE: 0 200 400 600 800 1000 OR AS SHOWN.
- REFER TO SHEET S00.01 AND S00.02 FOR GENERAL NOTES
CONCRETE EXPOSURE CLASSIFICATION: B2
CONCRETE MIX SHALL BE IN ACCORDANCE WITH TfNSW B80 SPECIFICATION
MIN 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa
CHAMFER EDGES 20x20 AND FILLETRE-ENTRANT ANGLES 20x20 U.S.O.
NCF DENOTES NO CHAMFER OR FILLET
BOLTING CATEGORY 8.8/s TO AS5100.6 U.S.O.
Δ DENOTES REDUCED LEVELS AT FRONT FACE OF ABUTMENT

ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22

DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)
AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL
RELATED PLANS		CHECKED P.JAMESON	DATE	DATE



SCALES
1:100



PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG

WOLLONGONG BOTANIC GARDENS

ELEVATED TREETOP CANOPY WALK

ABUTMENT B CONCRETE - SHEET 1

NORTHROP

Wollongong

Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500

Ph (02) 4226 3333 Email: southcoast@northrop.com.au

ABN 81 094 433 100

DESIGN & TECHNICAL SERVICES

Ph 02 42277111

PJ-4420

SHEET OF SHEETS

DRAWING No. 221016

SHEET No. S25.01

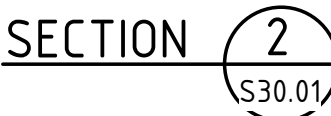
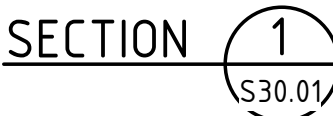
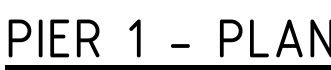
1

A1 ORIGINAL

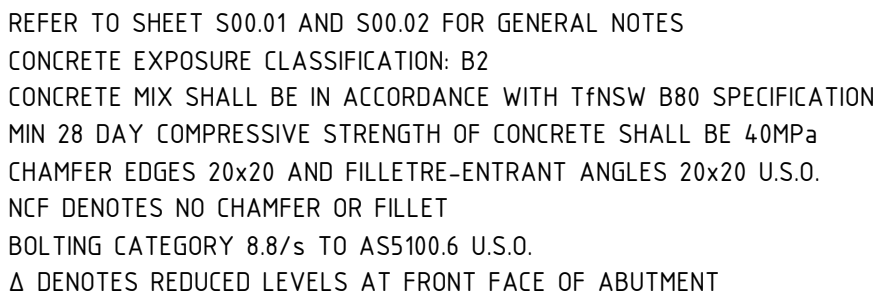
ISSUE

1

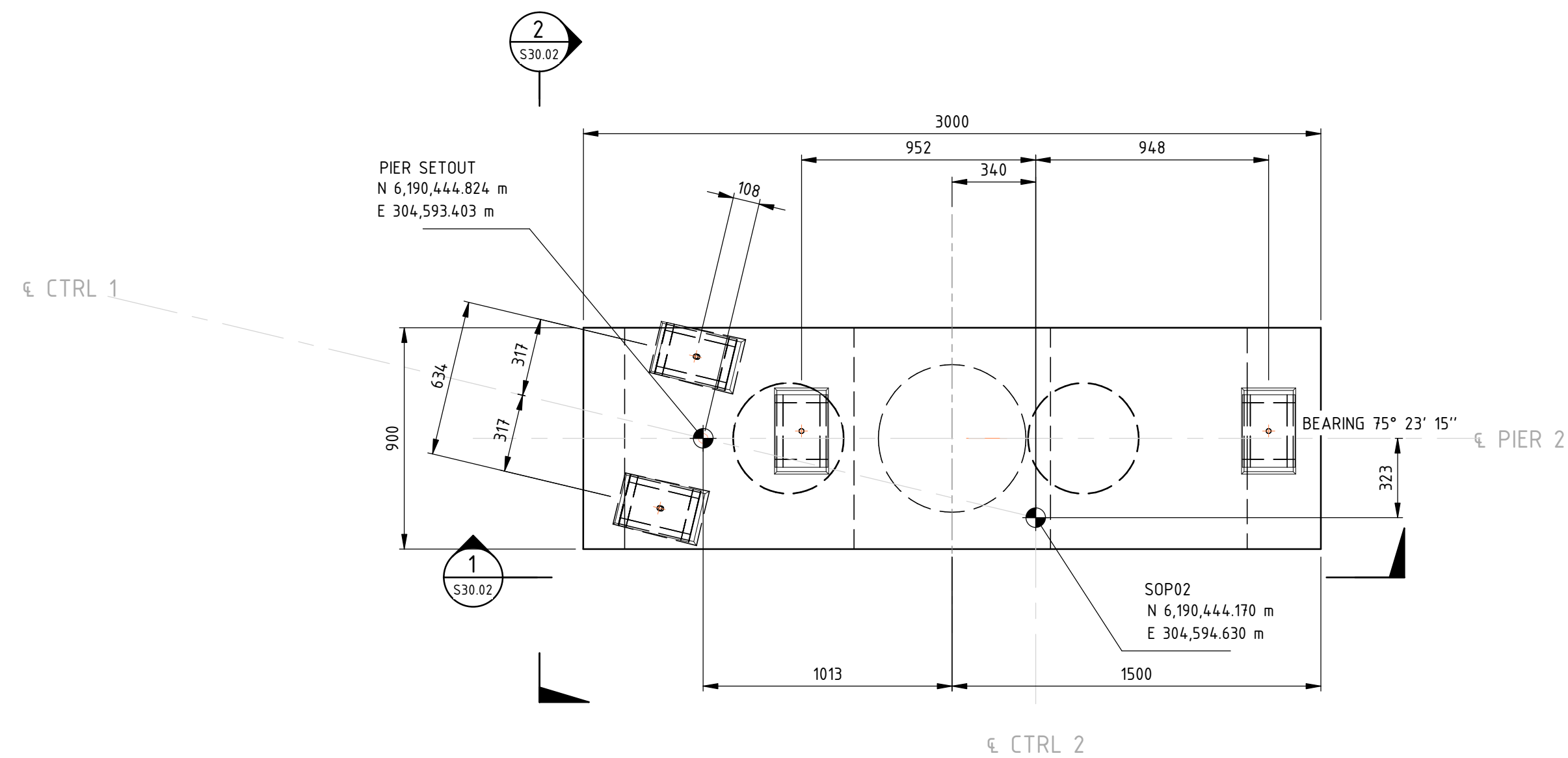
0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



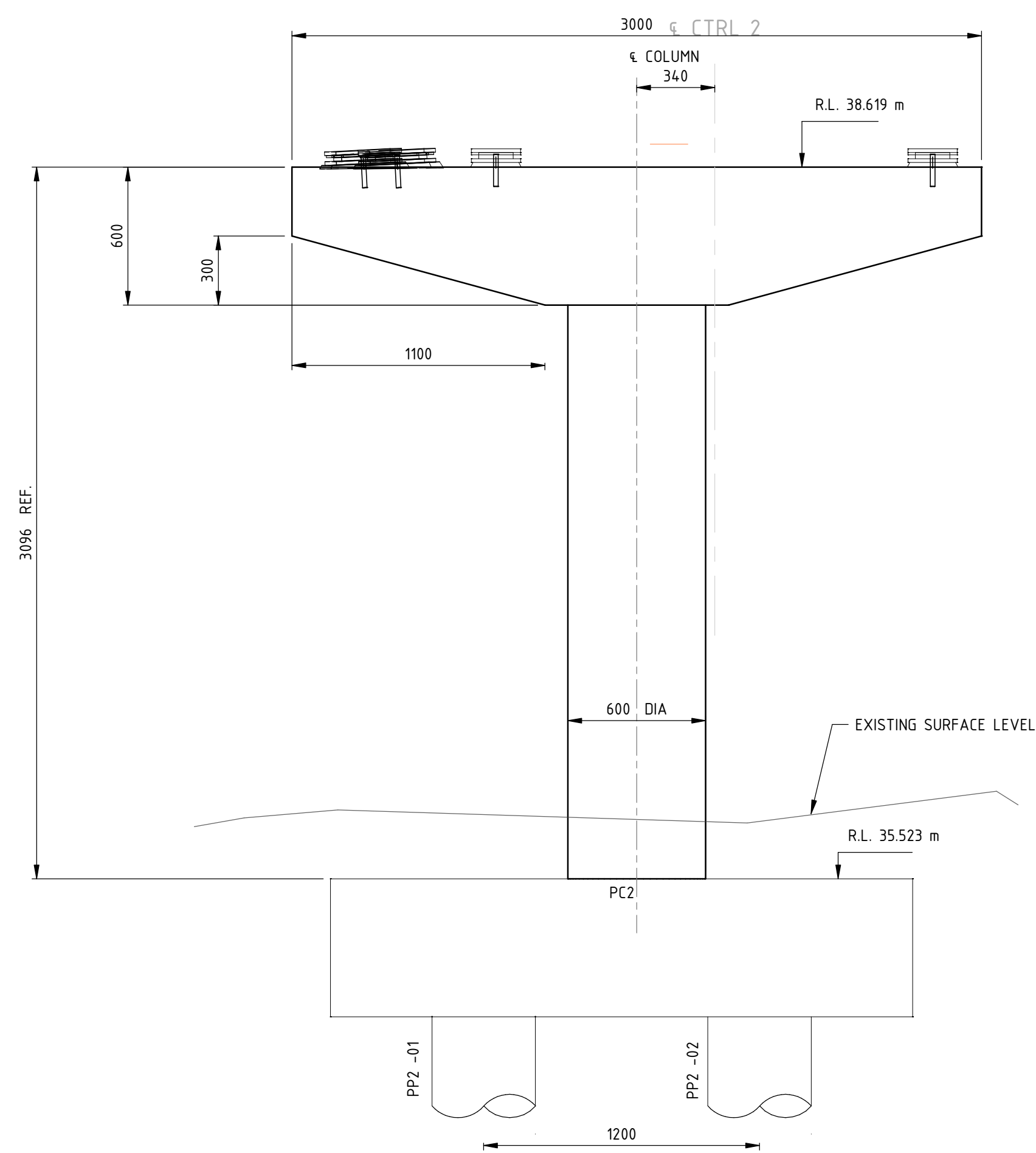
SCALE:



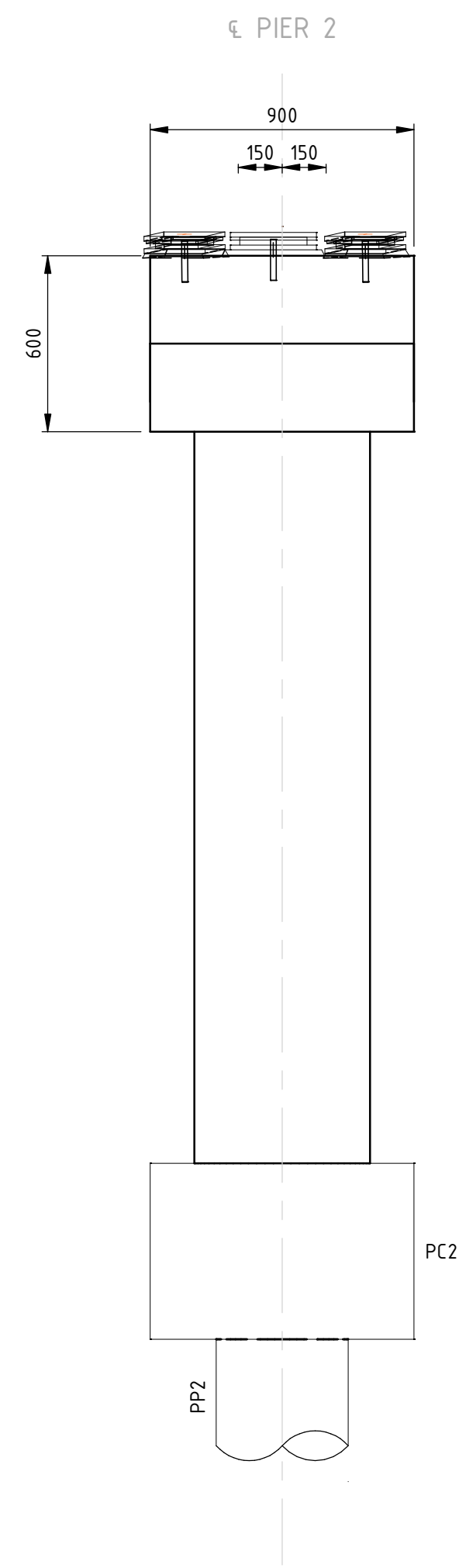
A1 ORIGINAL
ISSUE 1



PIER 2 - PLAN



SECTION 1



NOTES

SCALE: 0 200 400 600 800 1000 OR AS SHOWN.

REFER TO SHEET S00.01 AND S00.02 FOR GENERAL NOTES
CONCRETE EXPOSURE CLASSIFICATION: B2
CONCRETE MIX SHALL BE IN ACCORDANCE WITH T1NSW B80 SPECIFICATION
MIN 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa
CHAMFER EDGES 20x20 AND FILLETRE-ENTRANT ANGLES 20x20 U.S.O.
NCF DENOTES NO CHAMFER OR FILLET
BOLTING CATEGORY 8.8/s TO AS5100.6 U.S.O.
Δ DENOTES REDUCED LEVELS AT FRONT FACE OF ABUTMENT

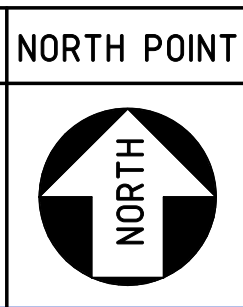
ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE

DATUM	SURVEYOR	DRAWN	DATE
AHD		R.SWIRAD	
AZIMUTH	FIELD BOOK	DESIGNED	DATE
MGA		R.PUSCHARABOONYANON	
RELATED PLANS	CHECKED	DATE	
	P.JAMESON		

APPROVED	DATE
(FOR COUNCIL USE ONLY)	
SENIOR DESIGN ENGINEER	DATE
STRUCTURAL/ARCHITECTURAL	

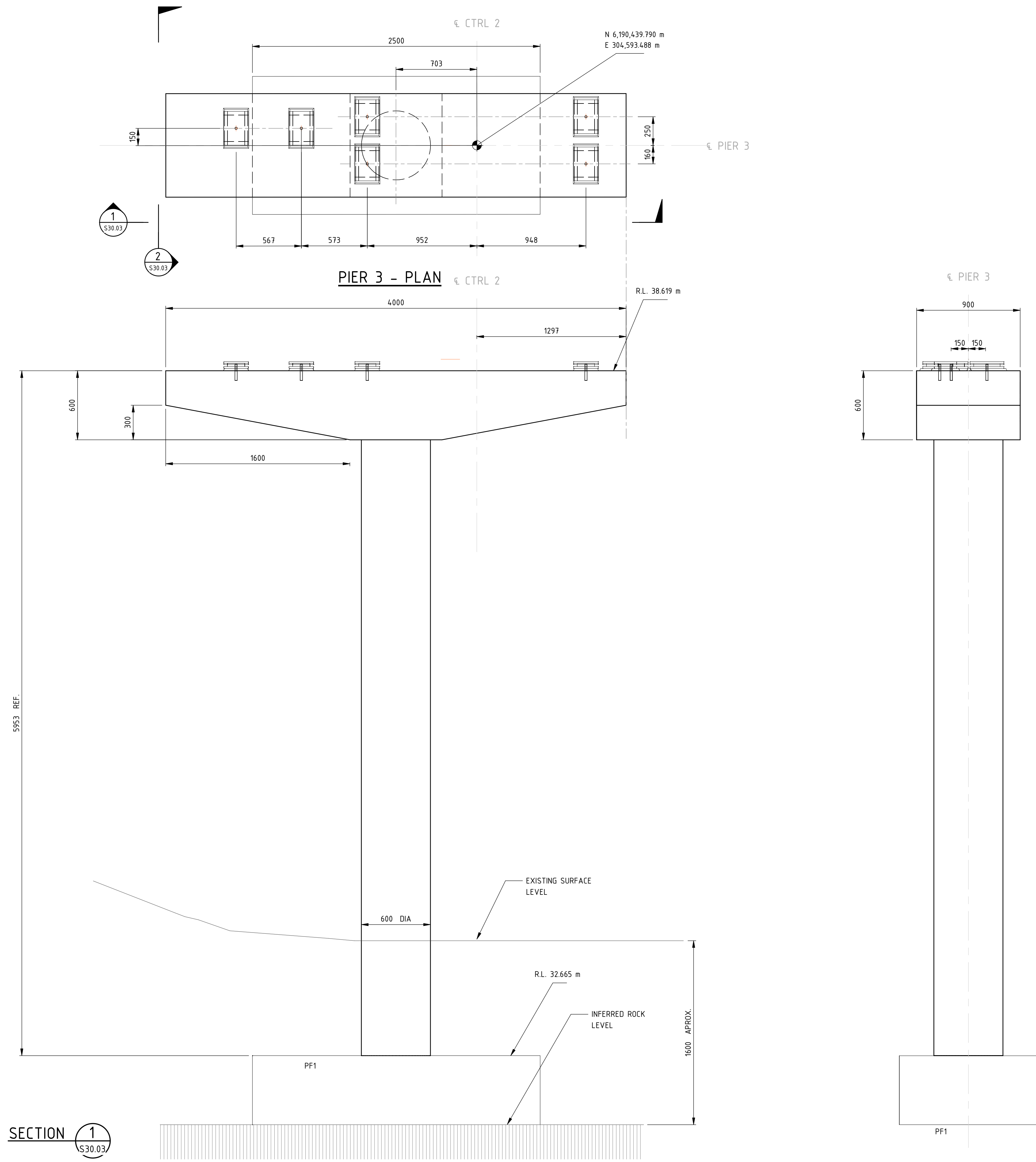


SCALES
1:100



CITY OF WOLLONGONG
POINT STREET FOOTBRIDGE DETAIL DESIGN WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK PIER 2 CONCRETE - DETAILS

DESIGN & TECHNICAL SERVICES	Ph 02 42277111	PJ-3765	OF	SHEETS	A1
		220746		S30.02	ORIGINAL
					ISSUE
					1



NOTES
SCALE:
0 200 400 600 800 1000 OR AS SHOWN.

REFER TO SHEET S00.01 AND S00.02 FOR GENERAL NOTES
CONCRETE EXPOSURE CLASSIFICATION: B2
CONCRETE MIX SHALL BE IN ACCORDANCE WITH TNSW B80 SPECIFICATION
MIN 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa
CHAMFER EDGES 20x20 AND FILLETRE-ENTRANT ANGLES 20x20 U.S.O.
NCF DENOTES NO CHAMFER OR FILLET
BOLTING CATEGORY 8.8/s TO AS5100.6 U.S.O.
Δ DENOTES REDUCED LEVELS AT FRONT FACE OF ABUTMENT

				DATUM AHD	SURVEYOR	DRAWN R.SWIRAD	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES	NORTH POINT	CITY OF WOLLONGONG POINT STREET FOOTBRIDGE DETAIL DESIGN WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK PIER 3 CONCRETE - DETAILS	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ-3765		A1 ORIGINAL
				AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL		1:100				SHEET DRAWING No.	OF SHEETS	ISSUE
				RELATED PLANS		CHECKED P.JAMESON	DATE	DATE						220746	S30.03	1
ISSUE	DESCRIPTION			ISSUED	APPR'D	DATE										

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

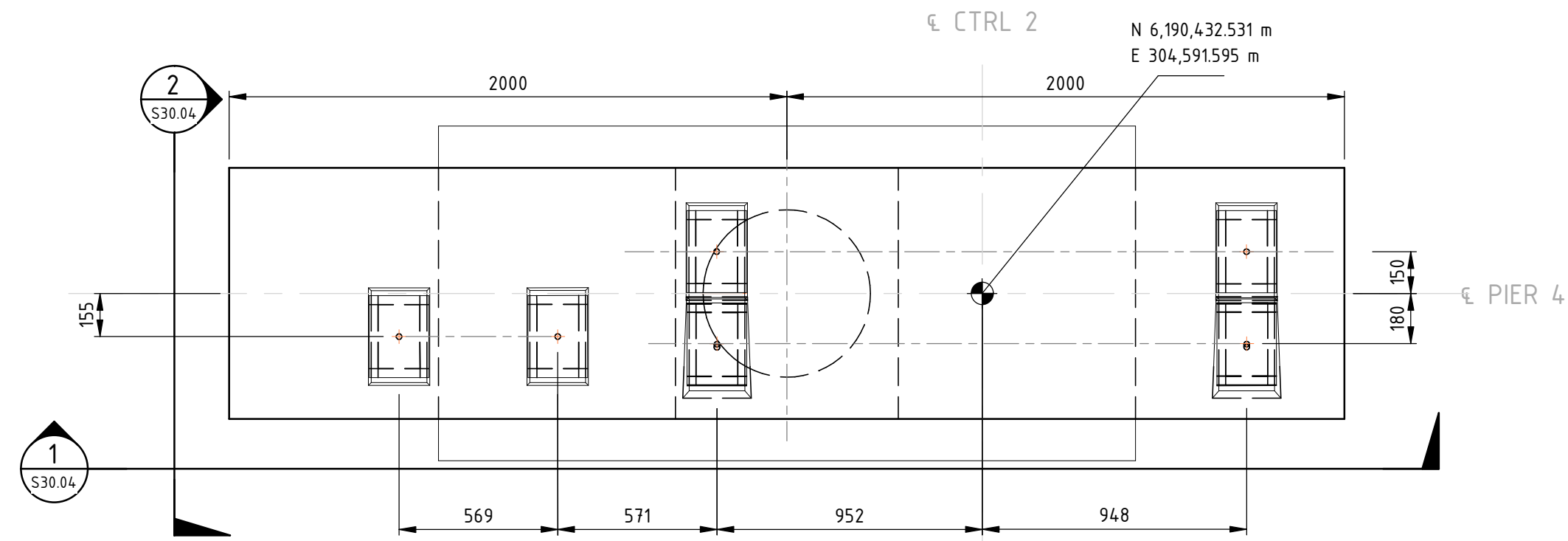
PRELIMINARY - NOT FOR CONSTRUCTION



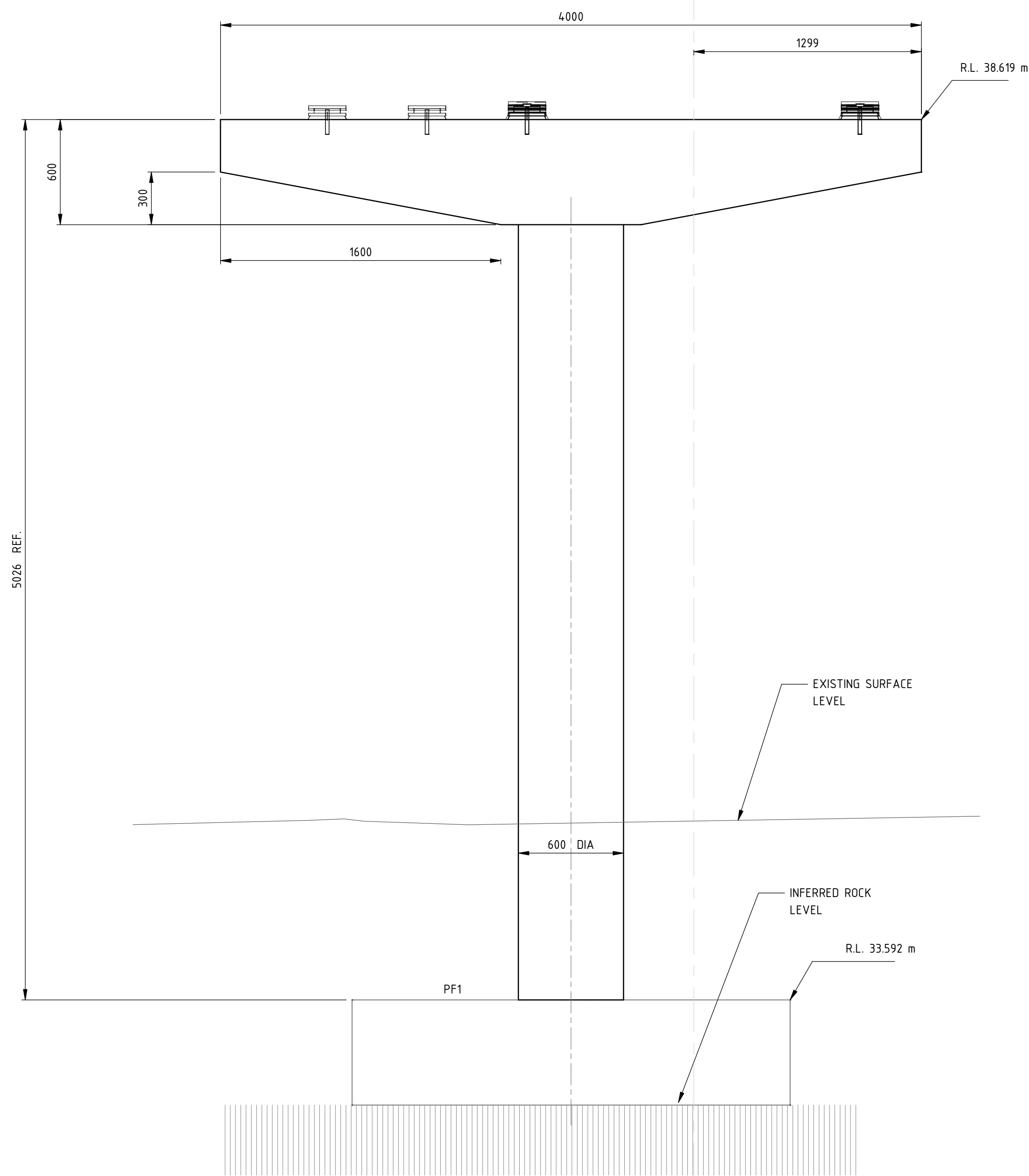
Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



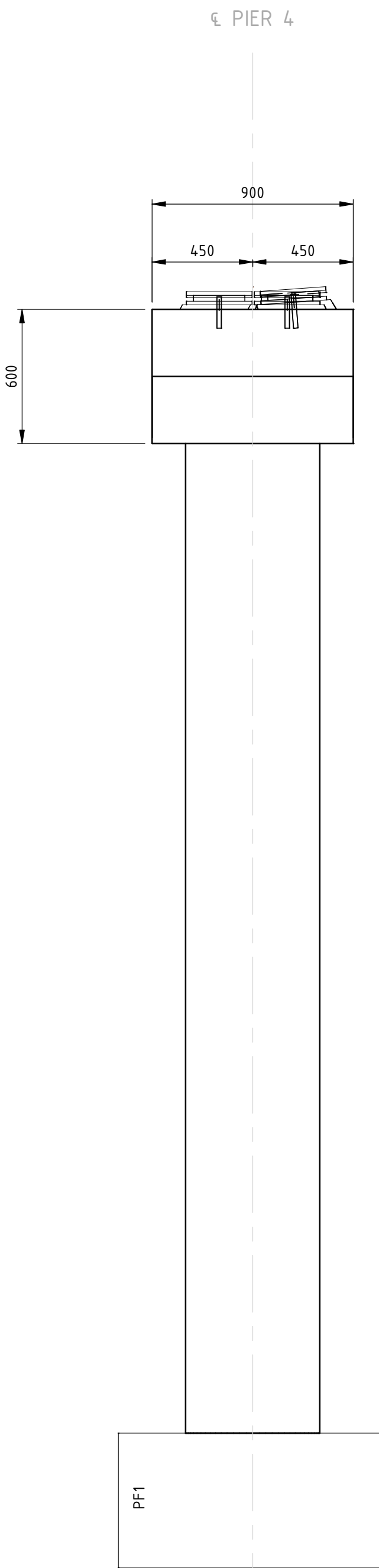
PJ-3765		A1 ORIGINAL
SHEET DRAWING No.	OF SHEETS	
220746	S30.03	1



PIER 4 - PLAN



SECTION 1



SECTION 2

NOTES

SCALE: 0 200 400 600 800 1000 OR AS SHOWN.

REFER TO SHEET S00.01 AND S00.02 FOR GENERAL NOTES
CONCRETE EXPOSURE CLASSIFICATION: B2
CONCRETE MIX SHALL BE IN ACCORDANCE WITH TNSW B80 SPECIFICATION
MIN 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa
CHAMFER EDGES 20x20 AND FILLETRE-ENTRANT ANGLES 20x20 U.S.O.
NCF DENOTES NO CHAMFER OR FILLET
BOLTING CATEGORY 8.8/s TO AS5100.6 U.S.O.
Δ DENOTES REDUCED LEVELS AT

ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE

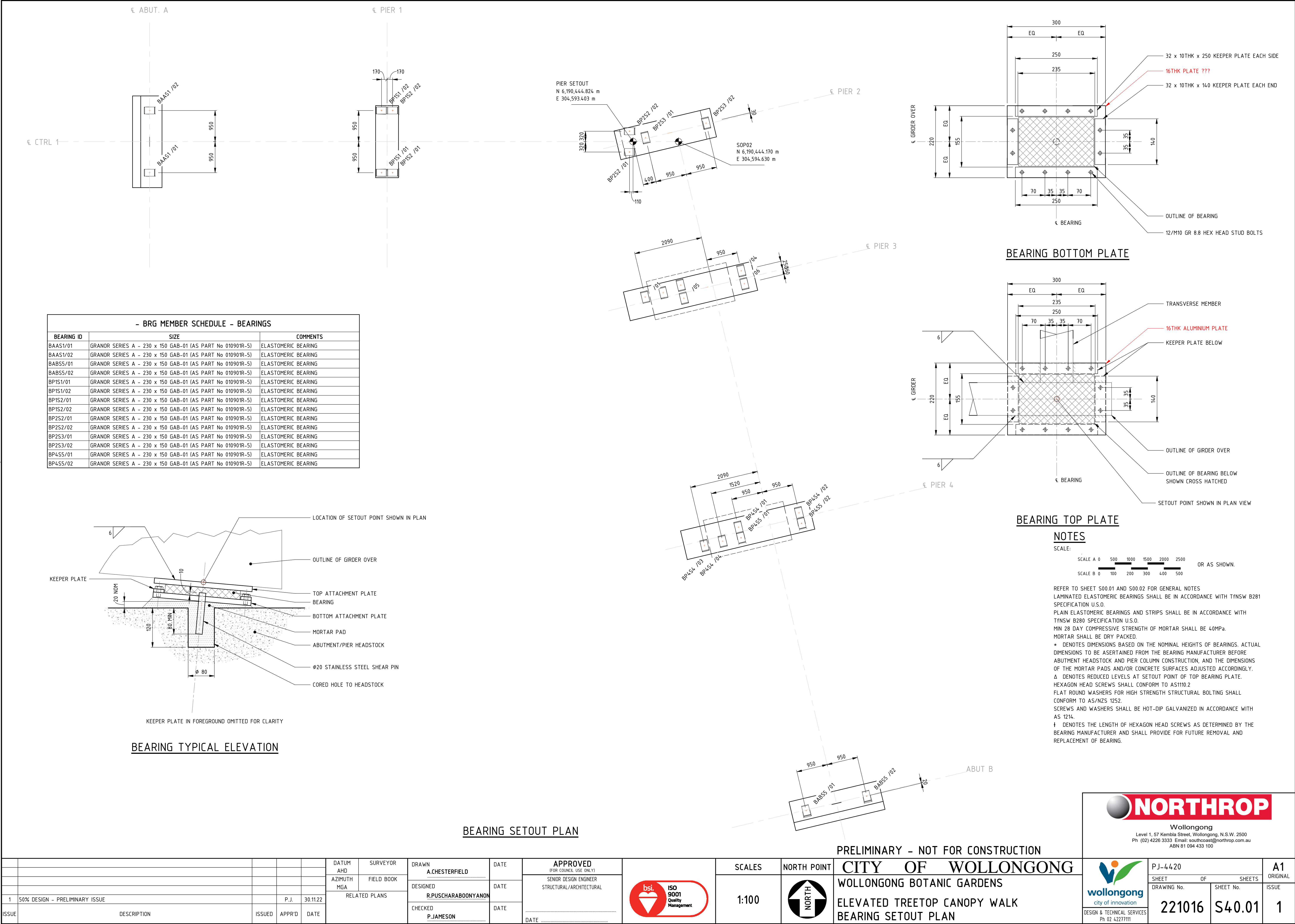
DATUM	SURVEYOR	DRAWN	DATE
AHD		R.SWIRAD	
AZIMUTH	FIELD BOOK	DESIGNED	DATE
MGA		R.PUSCHARABOONYANON	
RELATED PLANS		CHECKED	DATE
		P.JAMESON	

APPROVED	ISO 9001
(FOR COUNCIL USE ONLY)	Quality Management
SENIOR DESIGN ENGINEER	
STRUCTURAL/ARCHITECTURAL	
DATE	

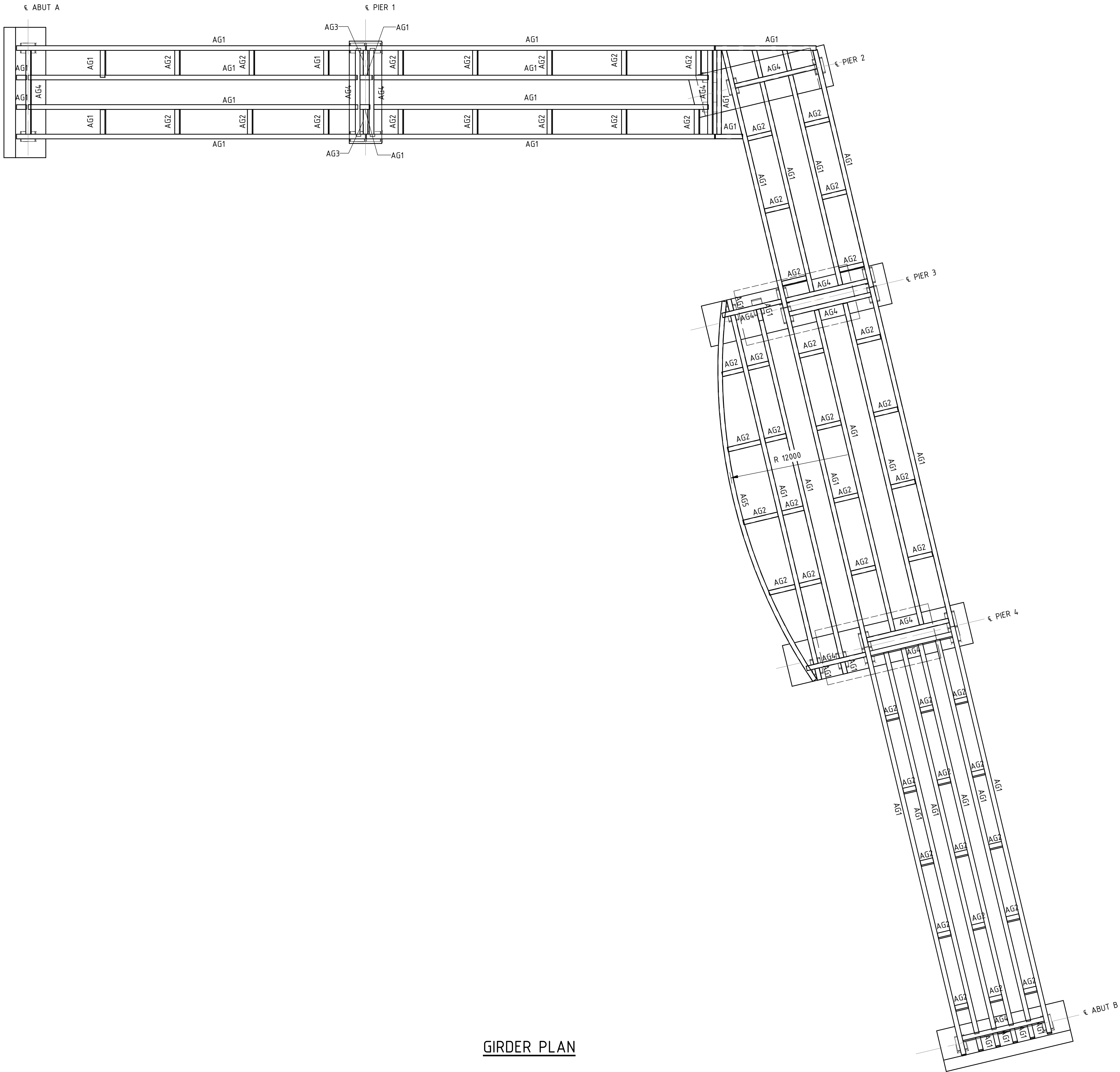
SCALES	NORTH POINT	CITY OF WOLLONGONG
1:100		POINT STREET FOOTBRIDGE DETAIL DESIGN WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK PIER 4 CONCRETE - DETAILS

	Wollongong Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500 Ph (02) 4226 3333 Email: southcoast@northrop.com.au ABN 81 094 433 100	PJ-3765	A1 ORIGINAL
	DESIGN & TECHNICAL SERVICES Ph 02 42277111	SHEET OF SHEETS DRAWING No. 220746 SHEET No. S30.04	ISSUE 1

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

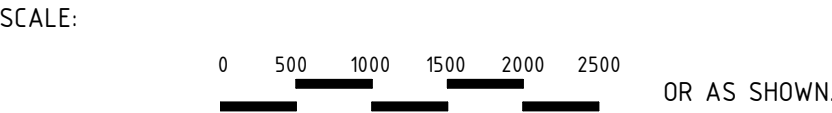


- BRG MEMBER SCHEDULE - BEARINGS		
BEARING ID	SIZE	COMMENTS
BAAS1/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BAAS1/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BABS5/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BABS5/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP1S1/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP1S1/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP1S2/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP1S2/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP2S2/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP2S2/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP2S3/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP2S3/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP4S5/01	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING
BP4S5/02	GRANOR SERIES A - 230 x 150 GAB-01 (AS PART No 010901R-5)	ELASTOMERIC BEARING



GIRDER PLAN

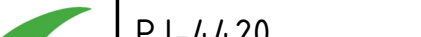
NOTES



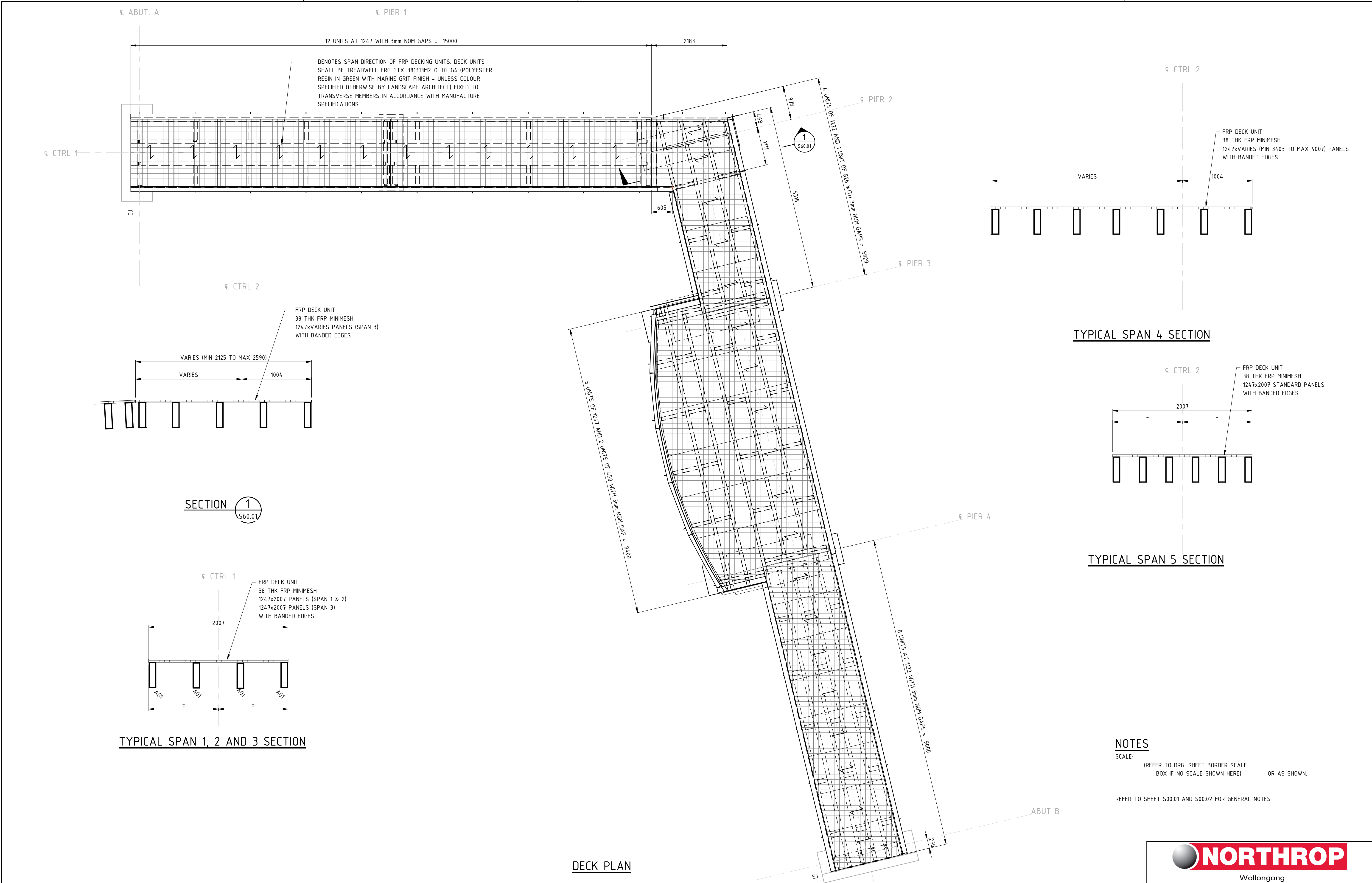
REFER TO SHEETS S00.01 AND S00.02 FOR GENERAL NOTES
ALUMINIUM MEMBERS SHALL CONFORM TO AS/NZS 1664.1
ALUMINIUM DECK FRAMING MEMBERS SHALL BE IN ACCORDANCE WITH TfNSW QA B245 SPECIFICATION.
ALL ALUMINIUM WORK SHALL BE ERECTED IN ACCORDANCE WITH TfNSW QA B261 SPECIFICATION.
FILLET EDGES OF ALL MEMBERS WITHOUT MANUFACTURER FILLETS TO A RADIUS OF 3mm WHERE A APPLIED PAINT FINISH IS REQUIRED U.S.O. (UNPAINTED MEMBERS DO NOT REQUIRE A FILLET).
THE WELD CATEGORY SHALL BE IN ACCORDANCE WITH AS/NZS 1665 U.S.O.
ALL BOLTS IN CONTACT WITH ALUMINIUM MEMBERS SHALL BE STAINLESS STEEL U.S.O.
STAINLESS STEEL BOLTS SHALL BE SEPARATED FROM DIRECT CONTACT WITH ALUMINIUM MEMBERS FOR ELECTROLYTIC PURPOSES BY APPLICATION OF ANTI-CORROSIVE JOINTING COMPOUND (EG "DURALAC" OR APPROVED EQUIVALENT).
APPLIED FINISHES TO ALUMINIUM WORKS SHALL CONFORM TO TfNSW QA ??? SPECIFICATION.
TEMPORARY BRACING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

- BRG MEMBER SCHEDULE - GIRDERS		
MARK	SIZE	COMMENTS
AG1	365 x 100 x 6.0 RHS 6005A-T5	GIRDER
AG2	365 x 100 x 6.0 RHS 6005A-T5	GIRDER LATERAL BRACING
AG3	365 x 100 x 6.0 RHS 6005A-T5	GIRDER BEARING RESTRAINT
AG4	365 x 100 x 6.0 RHS 6005A-T5	GIRDER CROSS BEARER
AG5	365 x 100 x 6.0 RHS 6005A-T5	GIRDER ROLLING RADIUS 12m

PRELIMINARY - NOT FOR CONSTRUCTION

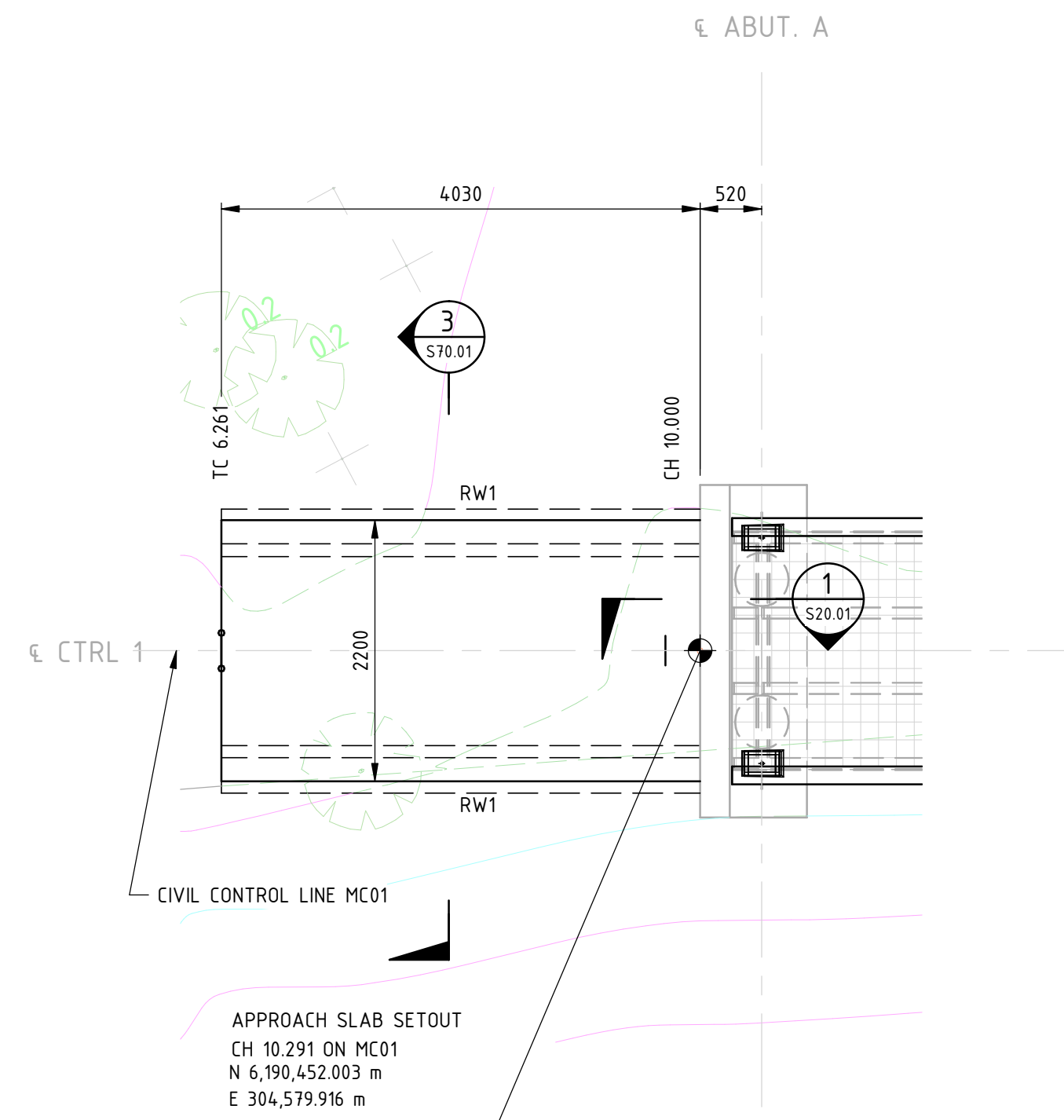
				DATUM AHD	SURVEYOR	DRAWN R.SWIRAD	DATE	APPROVED (FOR COUNCIL USE ONLY) SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL		SCALES 1:100		CITY OF WOLLONGONG WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK GIRDER PLAN	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ-4420		A1 ORIGINAL	
				AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE							SHEET OF SHEETS			ISSUE
				RELATED PLANS		CHECKED P.JAMESON	DATE							DRAWING No. SHEET No.			
1	50% DESIGN - PRELIMINARY ISSUE				P.J.	30.11.22											
ISSUE	DESCRIPTION			ISSUED	APPR'D	DATE											

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

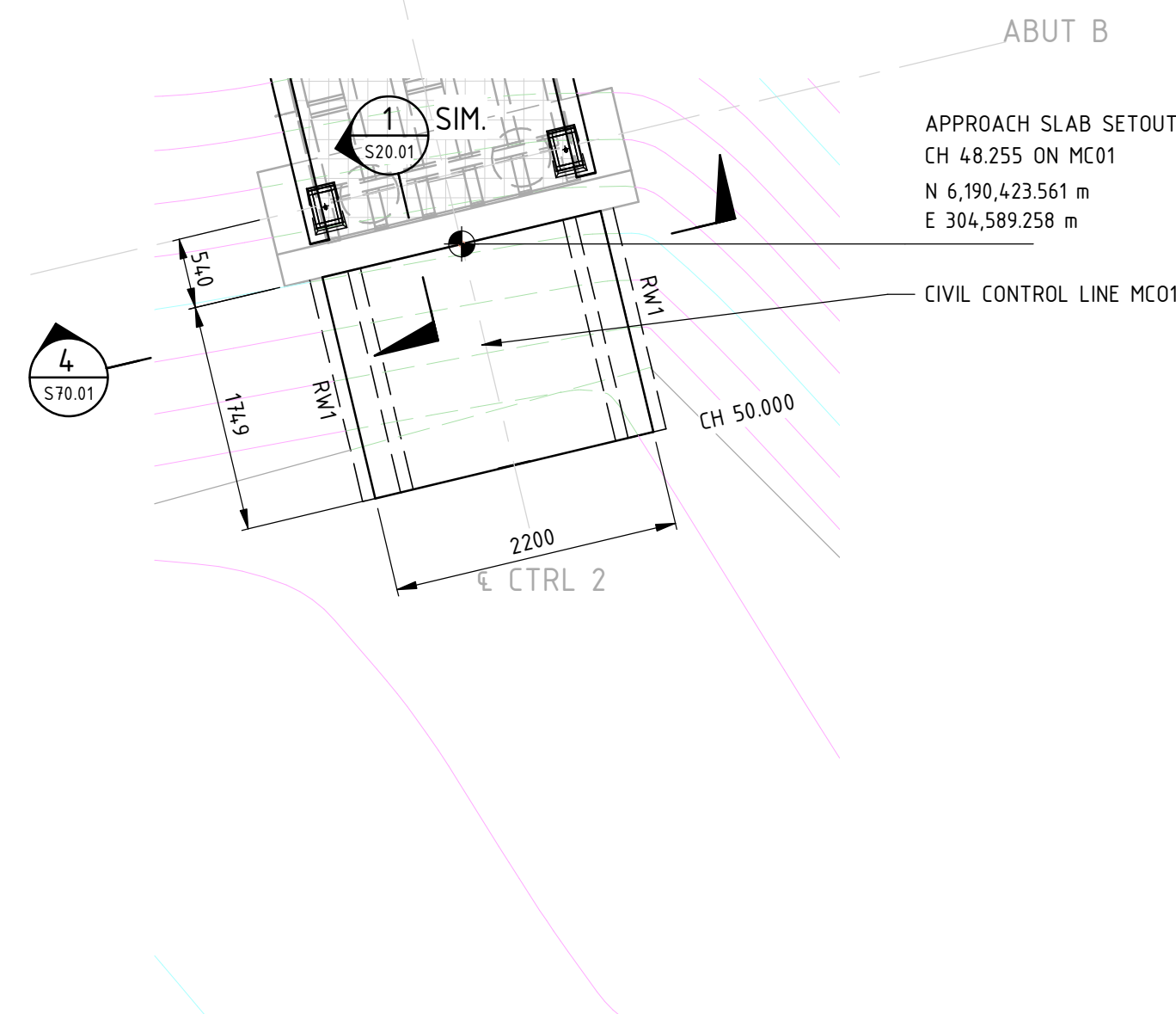


				DATUM AHD	SURVEYOR	DRAWN R.SWIRAD	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES 1:100	NORTH POINT 	CITY OF WOLLONGONG WOLLONGONG BOTANIC GARDENS ELEVATED TREETOP CANOPY WALK DECK - FRP PANELS LAYOUT	 DESIGN & TECHNICAL SERVICES Ph 02 42277111	PJ-4420		A1 ORIGINAL
				AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL						SHEET OF SHEETS	ISSUE	
				RELATED PLANS		CHECKED P.JAMESON	DATE	DATE						DRAWING No. SHEET No.		
1	50% DESIGN - PRELIMINARY ISSUE				P.J.	30.11.22										
ISSUE	DESCRIPTION			ISSUED	APPR'D	DATE										

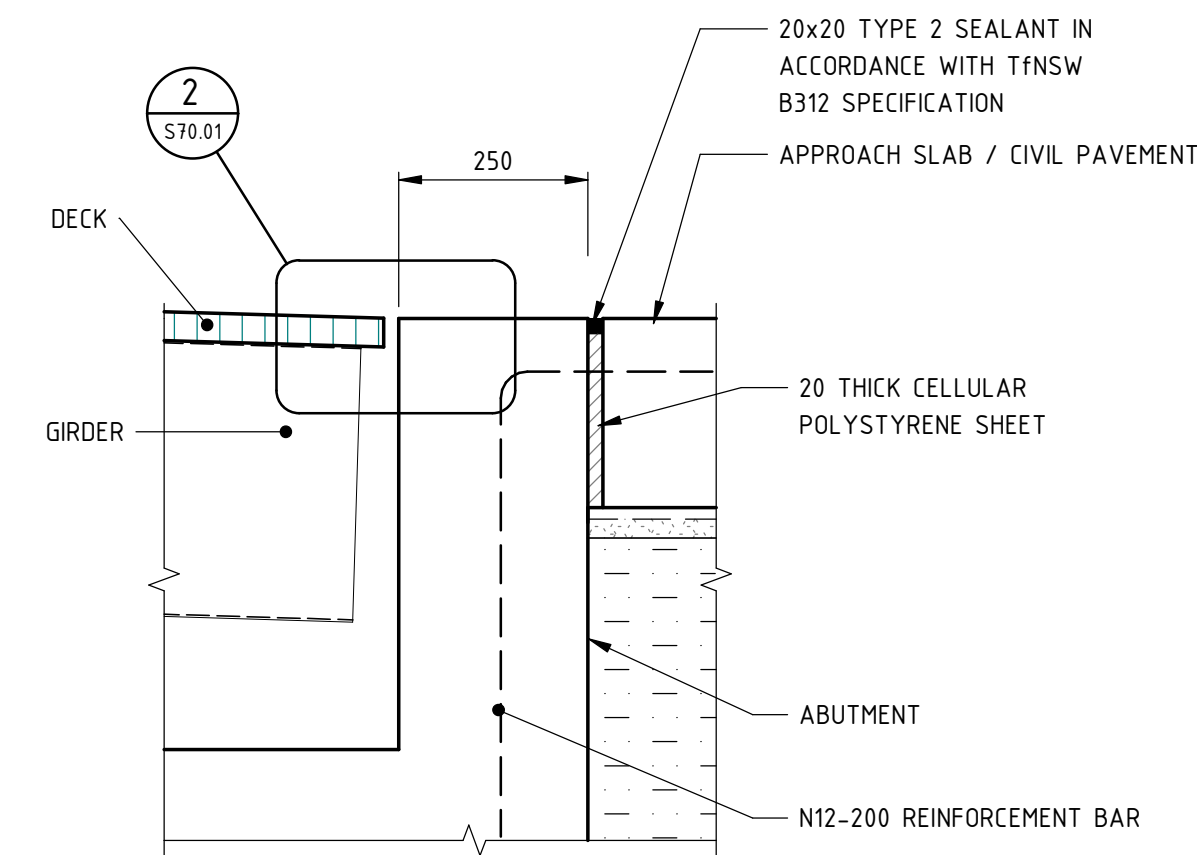
0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



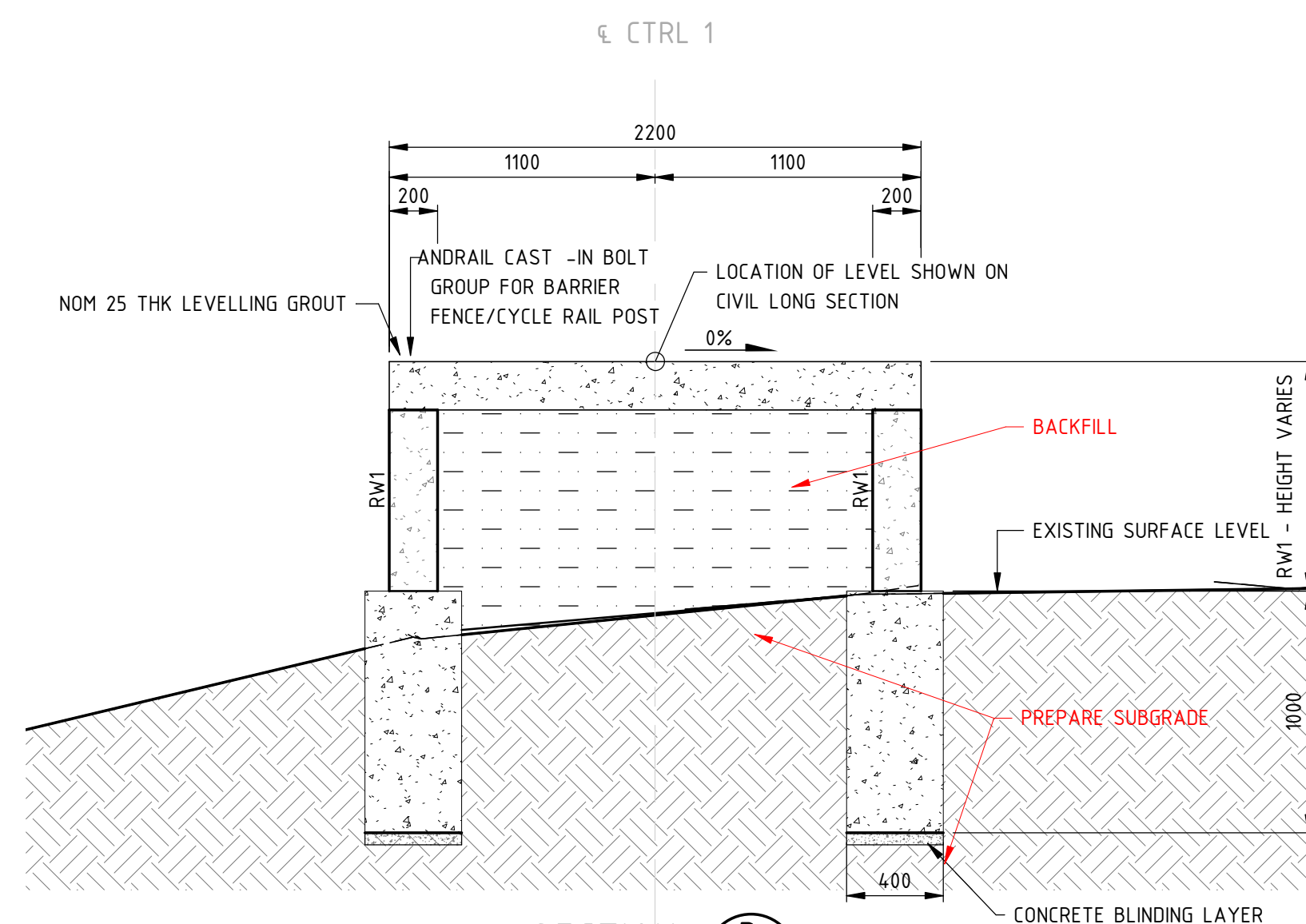
PLAN - ABUTMENT A



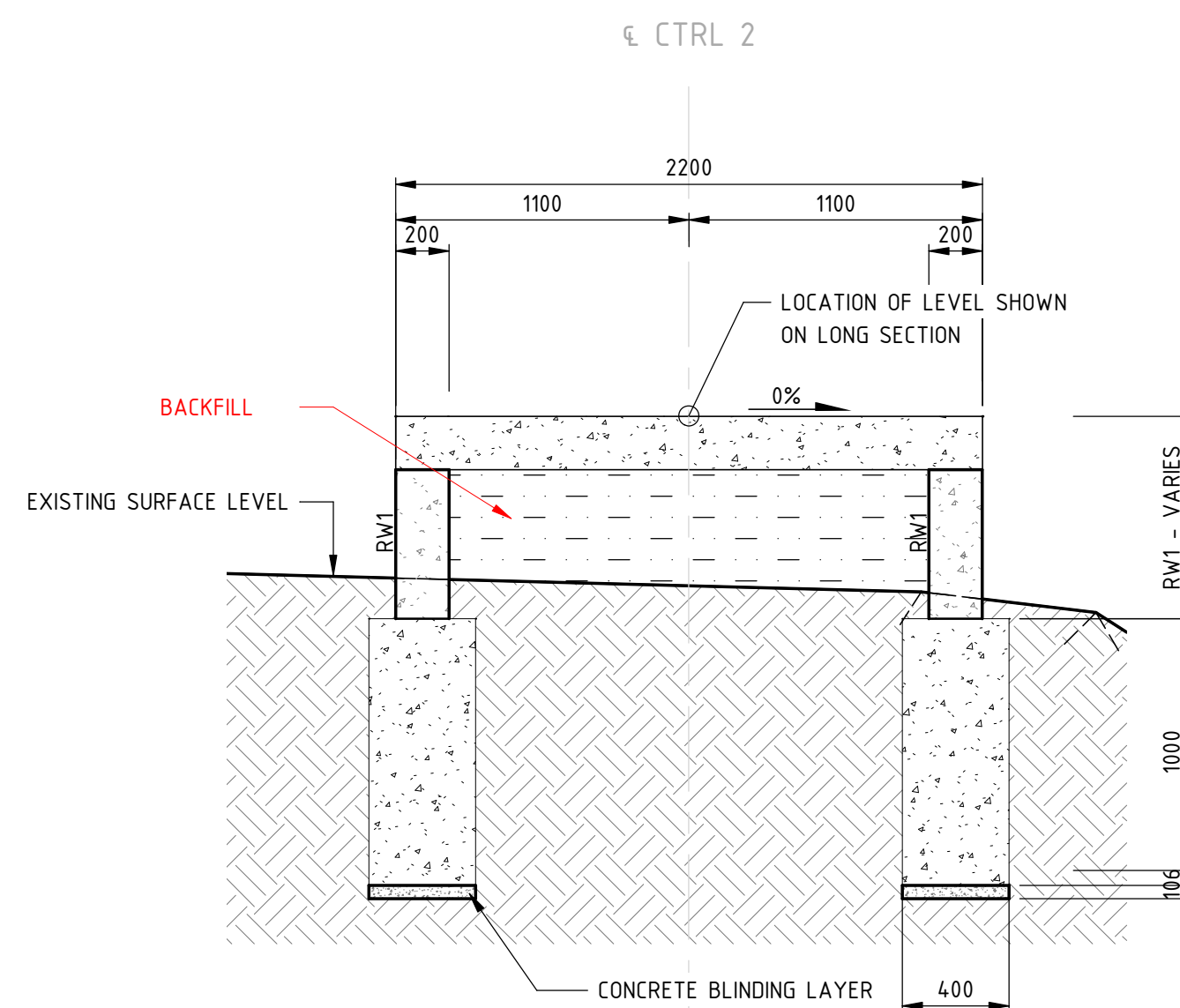
PLAN - ABUTMENT B



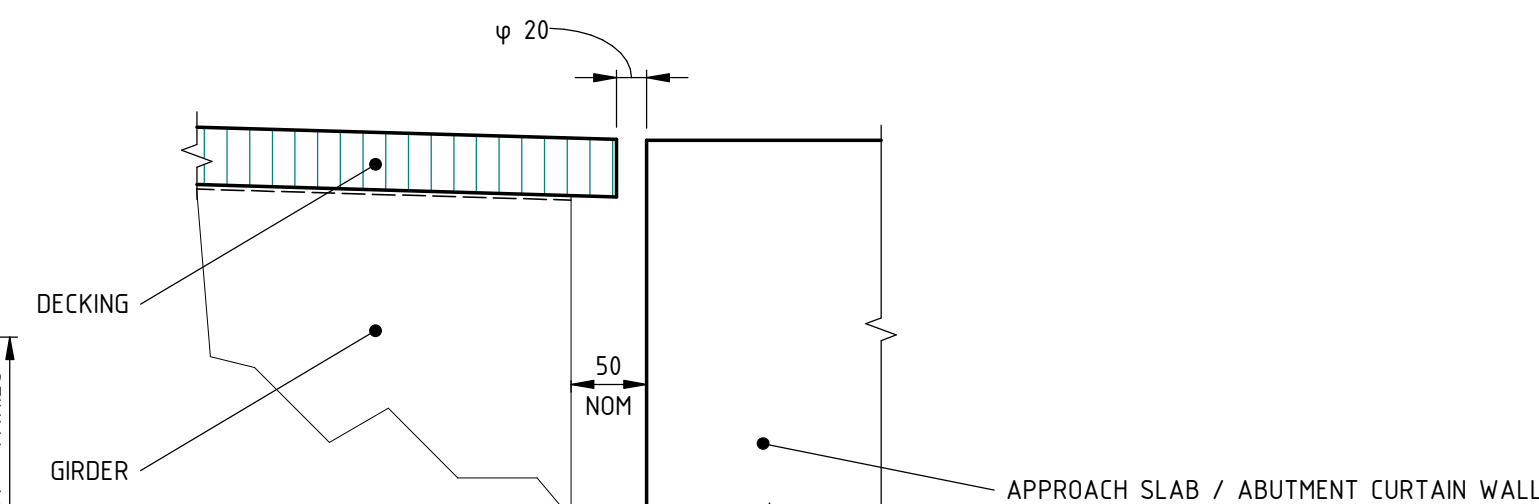
SECTION 1



SECTION 3



SECTION 4



DETAIL 2



NOTES

SCALE:
SCALE A 0 500 1000 1500 2000 2500
SCALE B 0 250 500 750 1000 1250
OR AS SHOWN.

REFER TO SHEET S00.01 FOR GENERAL NOTES
CONCRETE EXPOSURE CLASSIFICATION: B2
CONCRETE MIX SHALL BE IN ACCORDANCE WITH TNSW B80 SPECIFICATION
MIN 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa
CHAMFER EDGES 20x20 AND FILLETRE-ENTRANT ANGLES 20x20 U.S.O.
NCF DENOTES NO CHAMFER OR FILLET
BOLTING CATEGORY 8.8/s TO ASS100.6 U.S.O.

PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG
WOLLONGONG BOTANIC GARDENS
ELEVATED TREETOP CANOPY WALK
APPROACH SLAB PLAN SECTIONS AND DETAILS



Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



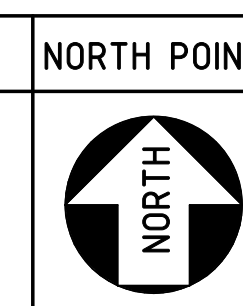
PJ-4420	A1 ORIGINAL
SHEET OF SHEETS	ISSUE
DRAWING No. 221016	SHEET No. S70.01
1	1

1	50% DESIGN - PRELIMINARY ISSUE	P.J.	30.11.22
ISSUE	DESCRIPTION	ISSUED	APPR'D DATE

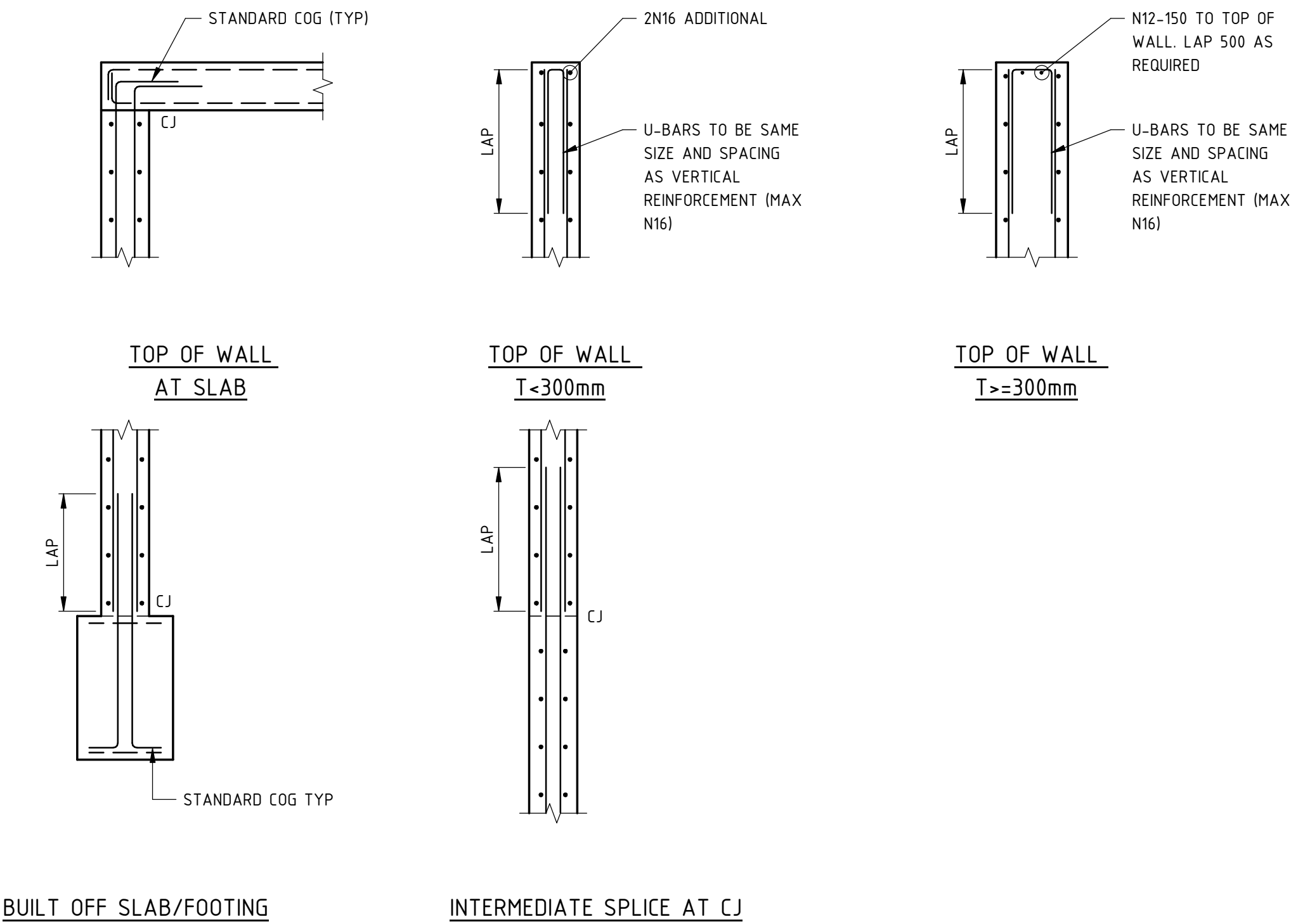
DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE
AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE
RELATED PLANS	CHECKED P.JAMESON	DATE	DATE



SCALES	1:100
--------	-------



0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET



--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

PRELIMINARY - NOT FOR CONSTRUCTION

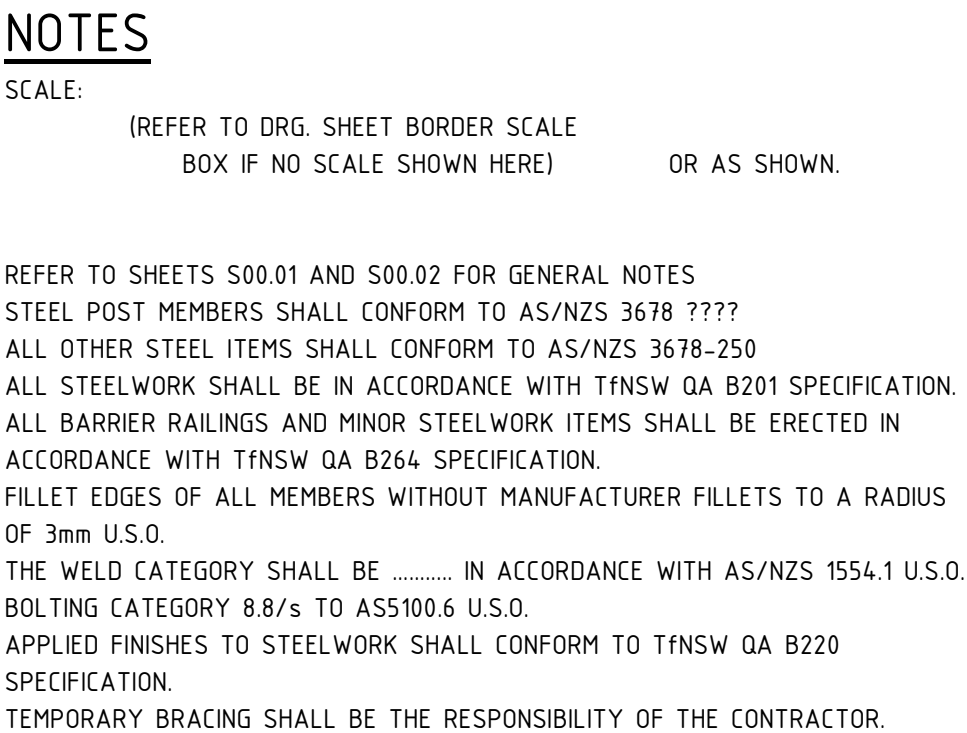


Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



PJ-4420
SHEET OF SHEETS
DRAWING No. 221016 SHEET No. S70.02
ISSUE 1

A1
ORIGINAL



- BRG MEMBER SCHEDULE - DECK		
MARK	SIZE	COMMENTS
HR1	150 x 50 F17 TREATED HWD DURABILITY CLASS 1	BALLUSTRADE
HRP1	163 x 80 x 4 TEE SECTION - CHAMFERED	BALLUSTRADE

PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG
WOLLONGONG BOTANIC GARDENS
ELEVATED TREETOP CANOPY WALK
BALUSTRADE LAYOUT PLAN

NORTHROP

Wollongong

Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100

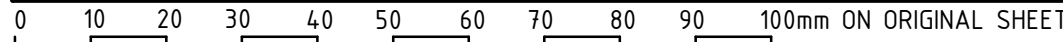
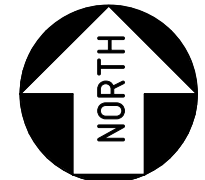
 wollongong city of innovation	PJ-4420		A1
	SHEET OF SHEETS		ORIGINAL
	DRAWING No.	SHEET No.	ISSUE
DESIGN & TECHNICAL SERVICES Ph 02 42277111	221016	S80.01	1

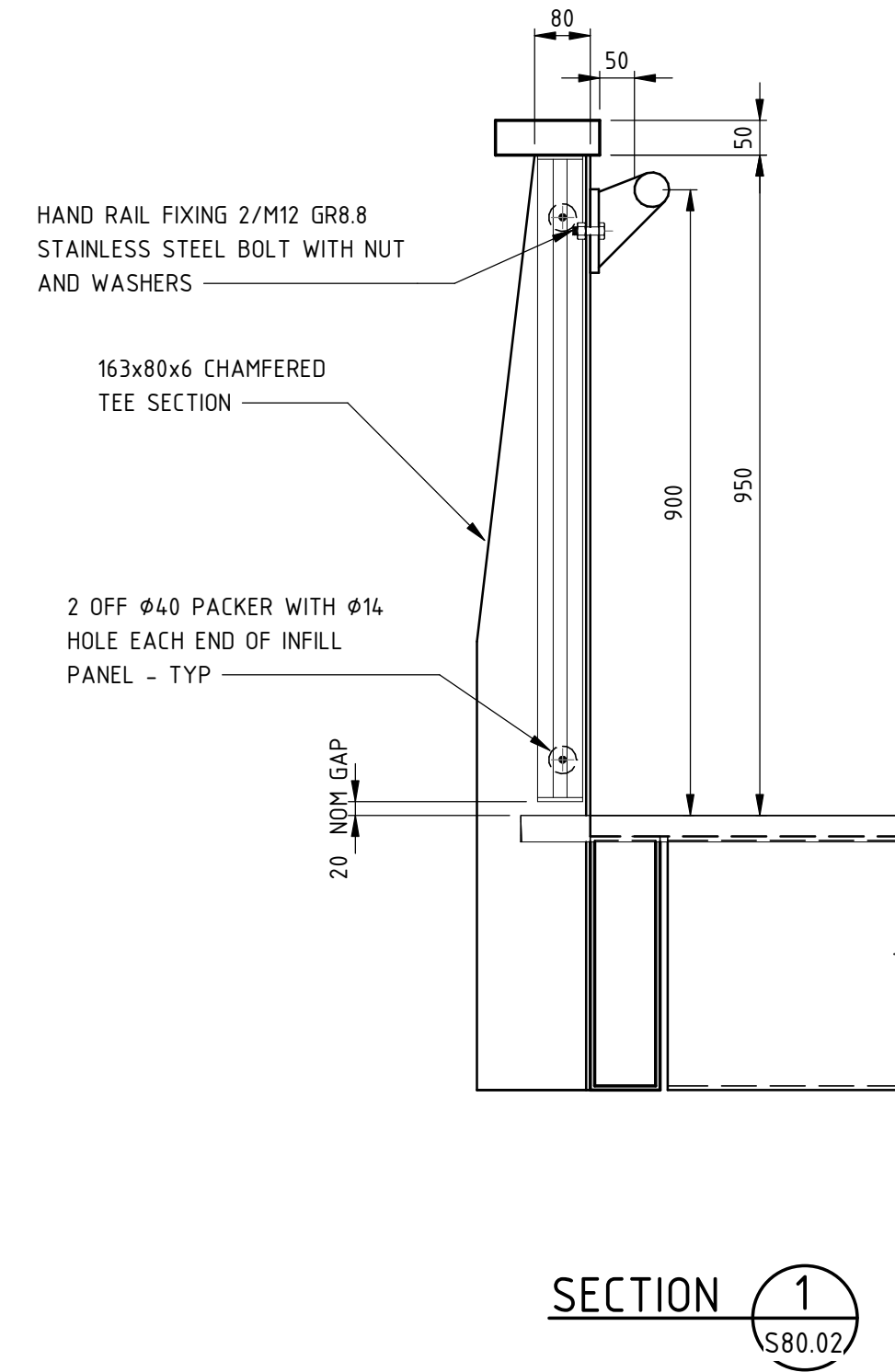
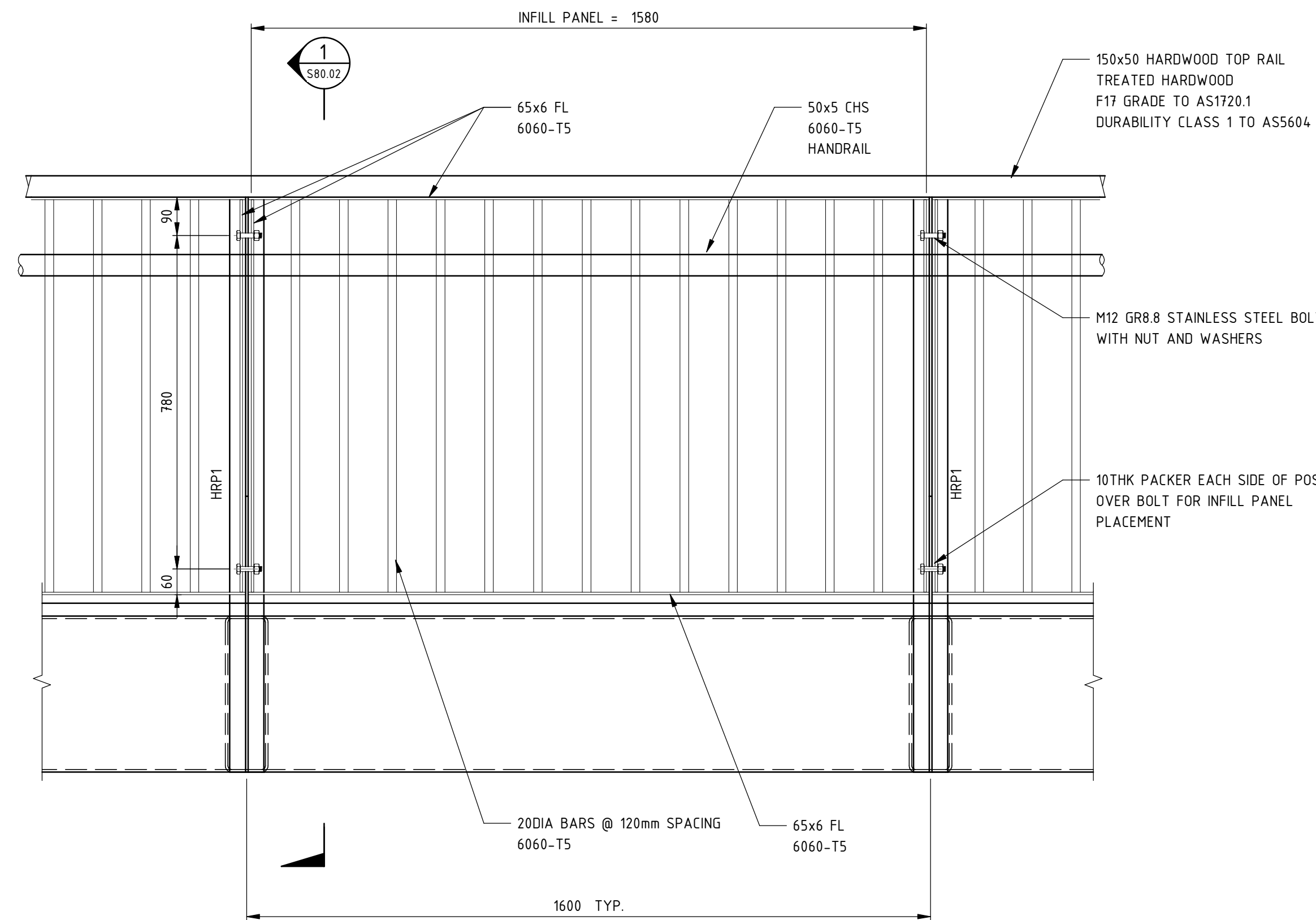
						DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)
						AZIMUTH MGA	FIELD BOOK	DESIGNED	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL
1	50% DESIGN - PRELIMINARY ISSUE				P.J.	30.11.22	RELATED PLANS			
ISSUE	DESCRIPTION				ISSUED	APPR'D	DATE	CHECKED P.JAMESON	DATE	DATE



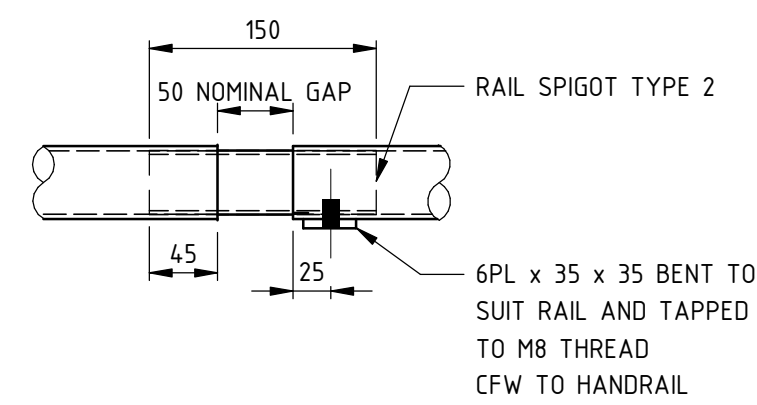
SCALES

1:100

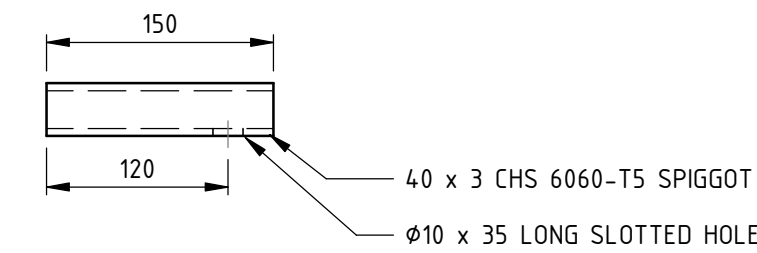




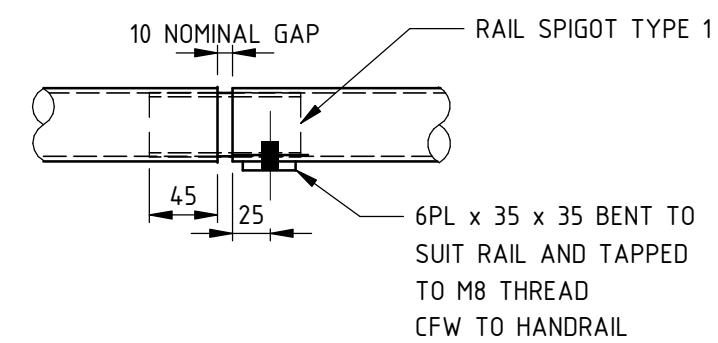
TYPICAL BARRIER INFILL DETAILS



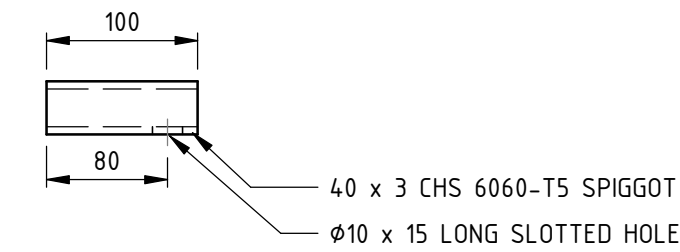
RAIL EXPANSION CONNECTION



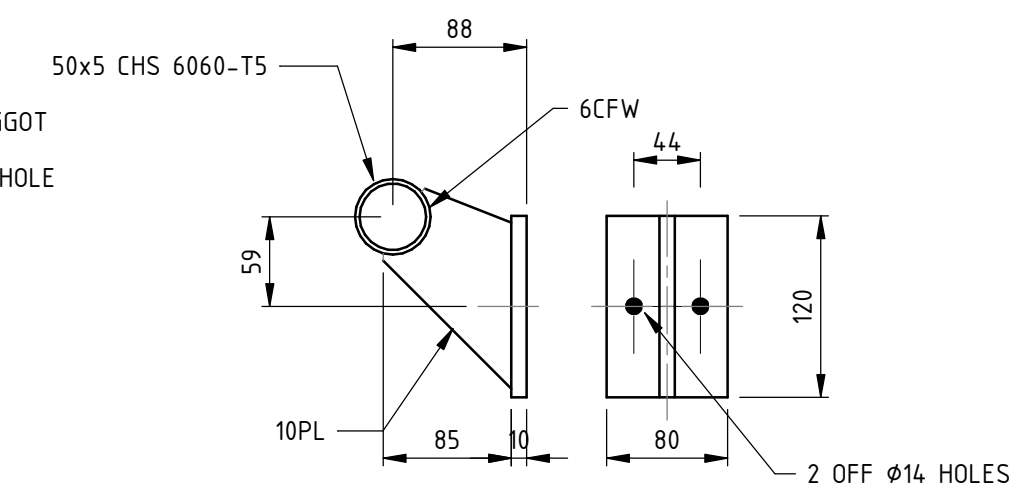
SPIGGOT CONNECTOR - TYPE 2



RAIL CONNECTION JOINT



SPIGGOT CONNECTOR - TYPE 1



HAND RAIL CLEAT

PRELIMINARY - NOT FOR CONSTRUCTION

CITY OF WOLLONGONG
WOLLONGONG BOTANIC GARDENS
ELEVATED TREETOP CANOPY WALK
MISC DETAILS



Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



PJ-4420	A1
SHEET OF SHEETS	ORIGINAL
DRAWING No. 221016	SHEET No. S80.02
1	1

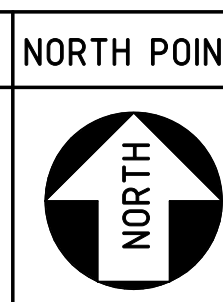
ISSUE	DESCRIPTION	ISSUED	APPR'D	DATE
1	50% DESIGN - PRELIMINARY ISSUE		P.J.	30.11.22

DATUM AHD	SURVEYOR	DRAWN	DATE
		A.CHESTERFIELD	
AZIMUTH MGA	FIELD BOOK	DESIGNED	DATE
		R.PUSCHARABOONYANON	
RELATED PLANS	CHECKED	DATE	
	P.JAMESON		

APPROVED	DATE
SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL	
DATE	



SCALES	NORTH POINT
1:100	



0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

SHAPE CODE	AUSTRALIAN STANDARD SHAPE	SHAPE CODE	AUSTRALIAN STANDARD SHAPE	SHAPE CODE	AUSTRALIAN STANDARD SHAPE	SHAPE CODE	AUSTRALIAN STANDARD SHAPE
S		LL		VL		CC	
SH		XT		H		VV	
CT		V		HH		HT	
L		JJ		J		LH	
SP		RC		R		F	
T		A		U		LJ	

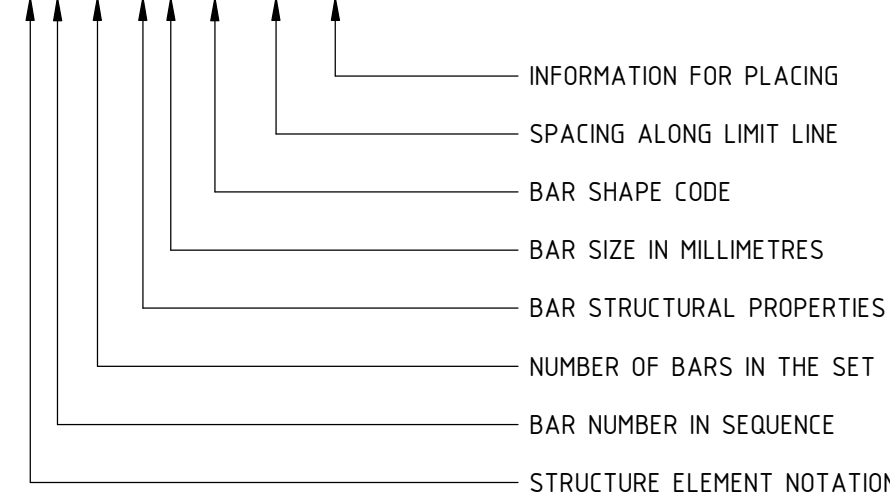
SHAPE CODE	NON STANDARD SHAPE TfNSW CODE	SHAPE CODE	NON STANDARD SHAPE TfNSW CODE	SHAPE CODE	NON STANDARD SHAPE TfNSW CODE	SHAPE CODE	NON STANDARD SHAPE TfNSW CODE
LF		AV		TT		XH	
LA		LG		PT		ST	
AA		KH		QT		VF	
KL		GT		KF		AF	

SHAPE CODE	NON STANDARD SHAPE	SHAPE CODE	NON STANDARD SHAPE
AZ		CZ	
BZ		DZ	

BAR MARKING LEGEND

THE METHOD USED TO LABEL REINFORCEMENT ON THE DRAWINGS IS AS FOLLOWS:

AA1 20-N12-S-300 EF



STRUCTURE ELEMENTS NOTATIONS:

AA - ABUTMENT A
AB - ABUTMENT B

AS - APPROACH SLAB
BA - BARRIER ABUTMENT A
BB - BARRIER ABUTMENT B
BD - BARRIER DECK

CP - CAST-IN PLACE PILE
DP - DRIVEN PILE

G1 - PRESTRESSED GIRDER (No.)
(Gx DENOTES MULTIPLE LOCATIONS)

HA - HEADSTOCK ABUTMENT A
HB - HEADSTOCK ABUTMENT B
H1 - HEADSTOCK PIERS (NO's EG. 1, 2 & 3)
(Hx DENOTES MULTIPLE LOCATIONS)

P1 - PIER (No.1)
(Px DENOTES MULTIPLE LOCATIONS)

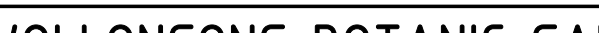
WA - WING WALL ABUTMENT A
WB - WING WALL ABUTMENT B

REINFORCEMENT NOTES

- AUSTRALIAN STANDARD BAR SHAPES ARE IN ACCORDANCE WITH AS 1100.501.
- BAR SIZE IS THE NOMINAL DIAMETER IN MILLIMETRES OR THE AS/NZS 4671 FABRIC NUMBER.
- THE GRADE OF REINFORCEMENT, IF NOT STATED ON THE DRAWINGS SHALL BE DEFORMED BAR D500N TO AS/NZS4671.
R DENOTES PLAIN BAR GRADE R250N TO AS4671.
RL AND SL DENOTES WELDED REINFORCING FABRIC, RECTANGULAR AND SQUARE RESPECTIVELY.
- DIMENSIONS SHOWN ON THE BAR SHAPE DIAGRAMS ARE MEASURED FROM THE OUTSIDE FACES OF THE BARS AND ARE IN MILLIMETRES.
- THE INCLUDED ANGLE OF ANY BEND SHALL BE A RIGHT ANGLE IF NO DIMENSION IS SHOWN.
- BARS OF DIAMETER GREATER THAN 24mm SHALL NOT BE REBENT.
- BAR BENDING AND HOOK DETAILS SHALL BE IN ACCORDANCE WITH SECTION 5.13 OF AS 5100-BRIDGE DESIGN.
- NON STANDARD SHAPE TfNSW HAVE BEEN OBTAINED FROM TfNSW RMS STANDARD DRAWING B0013 REV 2 DATED DEC 2018.

WELDING OF REINFORCEMENT

- WELDING IS REQUIRED TO DEVELOP FULL STRENGTH LAPS TO AS1554.3 SECTION 3.2 AND TABLE F4.
- WELD MATERIAL E48xx, W50x or w50xx MINIMUM.
- THROAT DEPTH IS MINIMUM AND INCLUDES "S" PLUS REINFORCEMENT, FOR "S" AND "W" REFER TO AS1554.3.
- TESTING - 100% VISUAL, INSPECT EACH LAYER OF MULTI PASS WELDS.

							DATUM AHD	SURVEYOR	DRAWN A.CHESTERFIELD	DATE	APPROVED (FOR COUNCIL USE ONLY)		SCALES	NORTH POINT	CITY OF WOLLONGONG		PJ-4420	A1							
							AZIMUTH MGA	FIELD BOOK	DESIGNED R.PUSCHARABOONYANON	DATE	SENIOR DESIGN ENGINEER STRUCTURAL/ARCHITECTURAL		1:100		WOLLONGONG BOTANIC GARDENS	ELEVATED TREETOP CANOPY WALK BAR SHAPES DIAGRAMS	DESIGN & TECHNICAL SERVICES Ph 02 42277111	SHEET OF SHEETS	ISSUE						
1	50% DESIGN - PRELIMINARY ISSUE					P.J.	30.11.22	RELATED PLANS																	
ISSUE	DESCRIPTION				ISSUED	APPR'D	DATE	CHECKED P.JAMESON	DATE	DATE															

0 10 20 30 40 50 60 70 80 90 100mm ON ORIGINAL SHEET

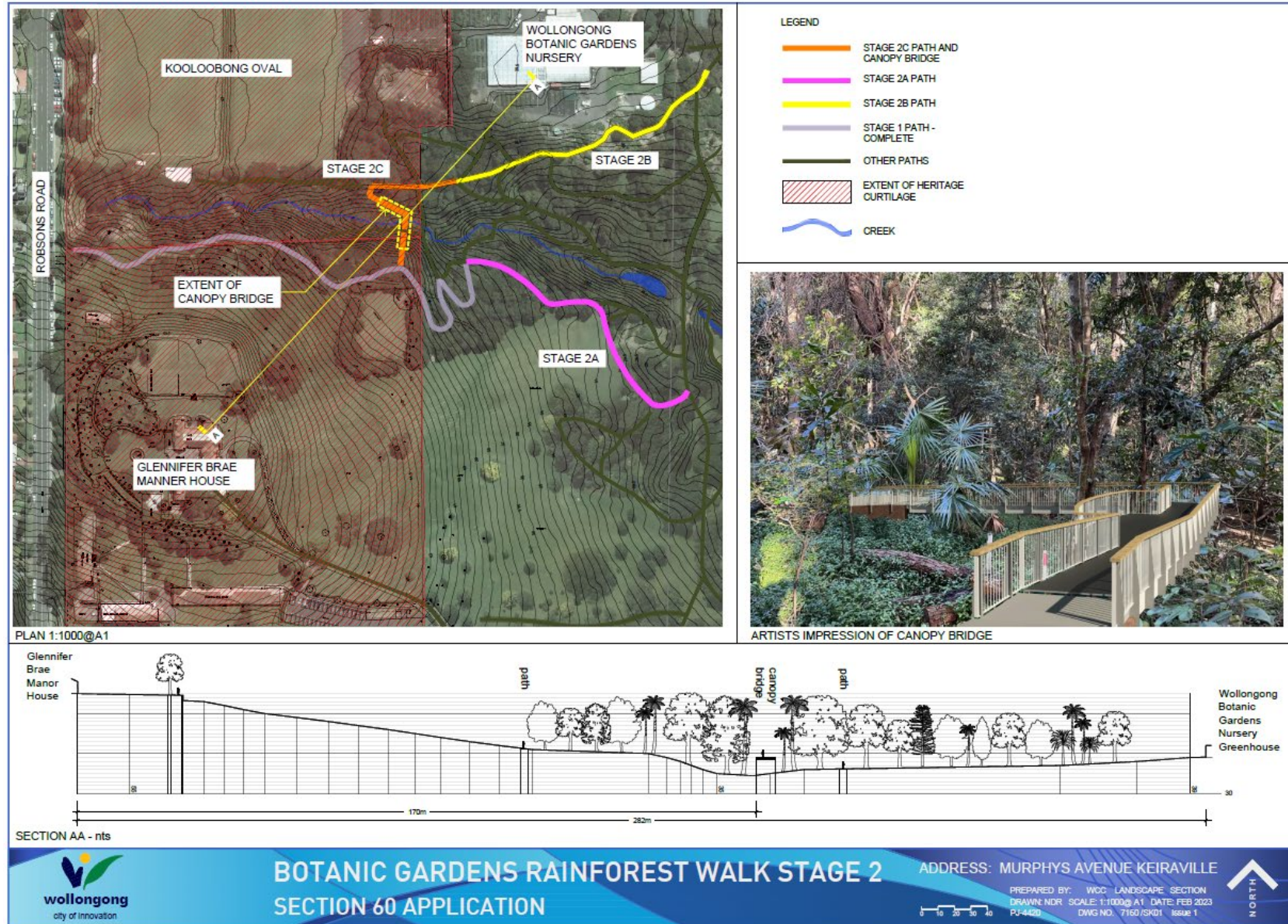


Wollongong
Level 1, 57 Kembla Street, Wollongong, N.S.W. 2500
Ph (02) 4226 3333 Email: southcoast@northrop.com.au
ABN 81 094 433 100



DESIGN & TECHNICAL SERVICES
Ph 02 42277111

Appendix H: Consultation Plan Section 60 Application



Appendix I: Heritage Section 60 Approval

Ms Annette Williams
Wollongong City Council
COUNCIL CHAMBERS 41 BURELLI ST
WOLLONGONG NSW 2500

By email: awilliams@wollongong.nsw.gov.au

Dear Ms Williams

APPLICATION UNDER SECTION 60 OF THE HERITAGE ACT 1977

Gleniffer Brae

STATE HERITAGE REGISTER N^o 00557

Address: Murphys Avenue, KEIRAVILLE NSW 2500
Proposal: Construction of Stage 2c of the Botanic Gardens Rainforest Walk including pathway upgrades, landscaping and elevated canopy walkway

Section 60 application no: HMS ID 2603, received 5/04/2023

As delegate of the Heritage Council of NSW (the Heritage Council), I have considered the above Section 60 application. Pursuant to section 63 of the *Heritage Act 1977*, approval is granted subject to the following conditions:

APPROVED DEVELOPMENT

1. All work shall comply with the information contained within:
 - a) Architectural drawings, prepared by Wollongong Council as listed below:

Dwg No	Dwg Title	Date	Rev
Project Name: Rainforest Walk Stage 2			
LD00	Cover sheet and location plan	03/23	2
LD01	Notes and general arrangement	03/23	2
LD02	Existing trees and demolition plan- northside	03/23	2
LD03	Existing trees and demolition plan- southside	03/23	2
LD04	Environmental management plan	03/23	2
LD05	Landscape plan 1	03/23	2
LD06	Landscape plan 2	03/23	2
LD07	Landscape plan 3	03/23	2
LD08	Landscape plan 4	03/23	2
LD09	Landscape plan 5	03/23	2
LD10	Landscape plan 6	03/23	2
LD11	Landscape plan 7	03/23	2
LD12	Landscape details	03/23	2

- b) SOHI titled Stage 2- Botanic Garden Rainforest Walk, prepared by Joel Thompson, Wollongong City Council, dated March 2023.
 - c) CMP Gleniffer Brae by Architectural Projects dated July 2022

- d) Draft Review of Environmental Factors by Wollongong City Council
- e) Draft Wollongong Botanic Garden Masterplan by Clouston Associates, Revision O dated 10/08/2017]

EXCEPT AS AMENDED by the conditions of this approval:

SITE PROTECTION

- 2. Significant built and landscape elements are to be protected during site preparation and the works from potential damage. Protection systems must ensure significant fabric, including landscape elements, is not damaged or removed.

Reason: To ensure significant fabric including vegetation is protected during construction

UNEXPECTED FINDS

- 3. The Applicant must ensure that if substantial intact archaeological deposits and/or State significant relics or any other buried fabric, are discovered, work must cease in the affected area(s) and the Heritage Council of NSW must be notified. Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.

Reason: All significant fabric within a State Heritage Register curtilage should be managed according to its significance. This is a standard condition to identify to the applicant how to proceed if historical archaeological relics, or other unexpected buried discoveries such as works are identified during the approved project.

ADVICE

Aboriginal Archaeology

The proponent is reminded of their responsibility to comply with Part 6 of the National Parks and Wildlife Act 1974. If Aboriginal objects are present, or likely to be present, and the proposed activity will harm those objects, an Aboriginal Cultural Heritage Assessment Report must be prepared. This assessment should inform appropriate management and mitigation measures, which may include the requirement for an Aboriginal Heritage Impact Permit (AHIP).

The HIS recommends that consideration should be given to incorporation of interpretation material for the project area in consultation with the local Aboriginal community to identify cultural values associated with the Rainforest ecosystem and location of the Botanic Gardens at the foothill of Mt Keira.

It is noted that consultation with the Aboriginal community in accordance with the with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 has not been carried out.

It is strongly recommended that the identification of cultural values is guided by Heritage NSW's Aboriginal cultural heritage assessment process, as best practice. This should include full consultation with the Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.

Information on the Aboriginal cultural heritage assessment process and requirements, including AHIPs, is available on the Department of Planning and Environment website: <https://www.environment.nsw.gov.au/topics/heritage/apply-for-heritage-approvals-and-permits/aboriginal-objects-and-places>.

Should any Aboriginal objects be uncovered by the work which is not covered by a valid Aboriginal Heritage Impact Permit, excavation or disturbance of the area is to stop immediately and Heritage NSW is to be informed in accordance with the *National Parks and Wildlife Act 1974*. Works affecting Aboriginal objects on the site must not continue until Heritage NSW has been informed and the appropriate approvals are in place. Aboriginal objects must be managed in accordance with the *National Parks and Wildlife Act 1974*.

Section 148 of the *Heritage Act 1977* (the Act), allows people authorised by the Minister to enter and inspect, for the purposes of the Act, with respect to buildings, works, relics, moveable objects, places or items that is or contains an item of environmental heritage. Reasonable notice must be given for the inspection.

Right of Appeal

If you are dissatisfied with this determination appeal may be made to the Minister for Heritage under section 70 of the Act.

It should be noted that an approval under the Heritage Act is additional to that which may be required from other Local Government and State Government Authorities in order to undertake works.

Stamped documents

Any stamped documents (e.g. approved plans) for this application are available for the Applicant to download from the Heritage Management System at <https://hms.heritage.nsw.gov.au> under 'My Completed Applications.'

If you have any questions about this correspondence, please contact Rajat Chaudhary, Senior Assessments Officer, at Heritage NSW on 02 9873 8521 or Rajat.Chaudhary@environment.nsw.gov.au.

Yours sincerely



Rajeev Maini
Manager, Assessments Team 3
Heritage NSW
Department of Planning & Environment
As Delegate of the Heritage Council of NSW

12 May 2023

cc: Wollongong City Council