

# Woodside Health Care Precinct

## Civil Design Report

**Prepared for:** Kerry Hill Architects

**Attention:** Dean Adams

**Date:** 3 June 2022

**Prepared by:** David North

**Approved by:**

**Ref:** 44700

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# Revision

| Revision | Date             | Comment                   | Prepared By | Approved By   |
|----------|------------------|---------------------------|-------------|---------------|
| 0        | 22 April 2020    | Concept Design Issue      | BC & DM     | Travis Demeza |
| 1        | 31 July 2020     | Schematic Design Issue    | BC & DM     | Travis Demeza |
| 2        | 2 October 2020   | Schematic Design Re-Issue | BC & DM     | Travis Demeza |
| 3        | 13 November 2020 | Schematic Design Re-Issue | BC & DM     | Travis Demeza |
| 4        | 3 May 2022       | Schematic Design Re-Issue | DN          |               |
| 5        | 8 May 2022       | Schematic Design Re-Issue | DN          |               |

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# 1. Executive Summary

Civil services will be undertaken in accordance with the relevant Australian Standards and Authority standards and codes.

The design intent for Civil works includes:

- Earthworks – provision of site levels and bulk earthworks to accommodate proposed Architectural layout, incorporating Geotechnical advice
- Roadworks – provision of pavement design for all crossovers, external to building roads and carparks; horizontal and vertical geometry design of crossovers, on-ground parking, basement parking and internal roads to suit design vehicles
- Stormwater – provision of drainage design to facilitate drainage of the site and provide protection of the property and built form, including stormwater pits, pipework, below ground infiltration storage, and overland flood routing for major events

The following key items have been identified for confirmation / review / action:

- Any future coordination of vehicle turning analyses (by Cardno)
- Coordination of landscape and stormwater designs to LGF Wellness Entry, GF Main Entry
- Coordination of structural footings and stormwater designs to LGF Wellness Entry and GF Main Entry
- Coordination of Hydraulic services and stormwater drainage within LGF and GF carparks
- Parameters for periodic drainage of potable water and fire water storage tanks to Civil stormwater infrastructure
- Local Authority stormwater drainage and crossover requirements

The following key items have been identified as risks to the proposed development:

- Additional services or location of existing services being different to those shown on DBYD information
- Potential for modification or relocation of existing sewer access chamber within property, or amendment of architectural layout to accommodate retention of chamber
- Local Authority advice or requirements extra-over or different to expectations
- Sub-surface limestone may constrain stormwater drainage design
- Earthworks and excavations in sub-surface limestone may impact construction program and development costs
- Potential to undermine adjacent properties during construction of LGF walls in cut along the northern and southern site boundaries

Preliminary Civil earthworks, roadworks and drainage design plans have been prepared, along with preliminary horizontal and vertical vehicle turning analyses sketches. These designs will be amended on an as needed basis during design development to incorporate changes to architectural layout and landscaping, and as coordination with the consultant team progresses.



## 2. Introduction

### 2.1 General

This Civil Design Report has been prepared for Kerry Hill Architects on behalf of Hall and Prior for the Civil works design of the Woodside Healthcare Precinct development, located at 18 Dalgety Street, East Fremantle.

This report sets out the parameters of Stantec's technical design and client service for the design and documentation of the above project.

This report serves as the benchmark which our services must achieve. We request you read this carefully so that you have a clear understanding of the scope of our work and that we have understood your project requirements.

We would welcome any comments or queries you may have on the information provided in this report so that it may be updated to suit during subsequent design phases.

### 2.2 Site Location

The proposed development site comprises an area of approximately 10,000m<sup>2</sup>, bordered by Dalgety Street to the west, Fortescue Street to the east and existing residencies to the north and south.

### 2.3 Safety in Design

Stantec operates a Safety in Design (SID) procedure based on "Code of Practice - Safe Design of Buildings & Structures 2008" published by the Commission for Occupational Safety & Health, Western Australia.

Compliance with this Code of Practice will ensure that all designs will be safe to install, operate, maintain and dismantle by appropriately experienced contractors.

Any hazards that cannot be eliminated by design will be identified and the appropriate work practices, protection and work methods required should be formulated by the contractor. The Civil SID report is attached within Appendix A.

### 2.4 Checking Procedures

This project falls into Category A as determined by Stantec's Quality Manual, accordingly all drawings and specifications will be reviewed by the Project Engineer prior to issuing.

### 2.5 Programme

We confirm that we can meet the proposed project programme as outlined by DCWC. Stantec will work with the consultant team as required to deliver the project successfully.



## 3. Civil Services

### 3.1 Objectives

- To provide innovative civil solutions to ensure that the development progresses in a cost efficient, time efficient and safe manner.

### 3.2 Design Standards, Site Conditions and Constraints

#### 3.2.1 Applicable Standards

The Civil services will be undertaken in accordance with the following documents:

- Australian Rainfall & Runoff – 1987
- Department of Water: - Stormwater Management Manual
- Australian Standards: - AS 2890.1:2004 – Parking Facilities, Part 1: Off-street car parking
- Australian Standards: - AS 2890.2:2002 – Parking Facilities, Part 2: Off-street commercial vehicle facilities
- Australian Standards: - AS 2890.6:2009 – Parking Facilities, Part 6: Off-street parking for people with disabilities
- AS3500.3 – Plumbing and Drainage – Stormwater Drainage
- Relevant Local Authority design codes

#### 3.2.2 Basis of Design Information

- Feature survey by MNG, drawing 102498-DE-001 Rev A, dated 9 September 2019
- Architectural, Landscape and other relevant consultant design files
- Geotechnical Investigation Report by CMW Geosciences, report PER2019-0395AB Rev 0, dated 2 April 2020
- Waste Assessment and Design Brief by Talis Consultants, report TW20067 Rev 1a, dated 3 July 2020
- Transport Impact Assessment by Cardno, report CW1120100 Rev E, dated 25 May 2022

#### 3.2.3 Site Description

The site grades gently from approximately RL 31.0m AHD on the northern boundary to approximately RL 32.9 in the centre of the site and down to approximately RL29.5 m AHD and RL 30.5m AHD respectively at the southwest and southeast corners of the site

Existing development within the site comprises four existing buildings situated over the central and eastern areas of the site, with two sealed carpark areas and interconnecting driveways accessed via two existing crossovers in Dalgety Street. The central building, Dalgety-Moore House, is proposed to be retained and refurbished, with the other existing buildings to be demolished as part of the proposed development works.

The balance of the site is grassed and vegetated including a number of significant trees, many of which are intended to be protected and retained or transplanted within the site.

#### 3.2.4 Geotechnical Site Conditions

Based on the Geotechnical Investigation and reporting undertaken by CMW Geosciences, the ground conditions encountered at the site, generally comprise of:

- Sandy topsoil, approximately 100mm thick, overlying



- Medium dense to dense, light brown, fine to coarse grained sand to approximately 2.3 to 3.1m depth (2.7m average), overlying
- Low/high strength, highly variable, variable pinnacle Limestone. Karstic features such as void, pinnacles, caprock, sand infilling between pinnacles and leached clayey sand layers may be present

The recommended earthworks and drainage parameters for the purposes of Civil design are as below:

- Soil permeability of 5m/day for in-situ sands
- CBR value of 12%
- A site classification of Class A

### 3.2.5 Groundwater

The Perth Groundwater Atlas October 1997 shows the maximum historical groundwater level within the vicinity of the site to be around RL 1.0m AHD. This is approximately 28.0m to 32m below current ground levels.

Based on the above findings, groundwater is unlikely to have an effect on the development, and subsoil drainage systems are not expected to be required.

### 3.2.6 Acid Sulfate Soils

An Acid Sulfate Soils (ASS) Investigation has not been completed for the site, however a desktop review of the Department of Water and Environmental Regulation's ASS risk mapping indicates the site has no known risk of ASS. The geology and soil types found during Geotechnical Investigation were consistent with low ASS risk.

Based on this we do not anticipate that an ASS Management Plan would be necessary for site development.

### 3.2.7 Existing Service Infrastructure

The following summary of existing services and infrastructure adjacent to the site has been obtained from GIS Software, the Water Corporation's ESinet mapping database, Dial Before You Dig enquiries, feature survey information and a review of aerial imagery. Pertinent GIS / DBYD information will be depicted in sketch format and included as part of the Schematic Design Report.

Existing Water Corporation wastewater infrastructure:

- DN150 VC (vitrified clay) gravity sewer reticulation main to the south of the site within the rear of adjacent residential lots, terminating at an existing access chamber located within the southern boundary of the site
- VC sewer connection to the site from the existing access chamber

Existing Water Corporation water infrastructure:

- 75mm CI (cast iron) water reticulation main and hydrant – west side of Dalgety Street
- 75mm CI water reticulation main and hydrant – east side of Fortescue Street
- Water connection to the site from mains in Fortescue Street, located mid-site

Existing ATCO gas infrastructure:

- 63 PE (polyethylene) MP (medium pressure) gas mains – west side of Dalgety Street
- 63 PE MP gas mains – east side of Fortescue Street
- 50 PVC abandoned connection to the site from main in Dalgety Street, located mid-site

Existing telecommunications infrastructure:



- Telstra conduits – west side of Dalgety Street
- Telstra conduits – west and east sides of Fortescue Street
- Telstra connection to the site from cables in Dalgety Street, located along southern boundary of site, including two internal pits
- Vocus conduits – east side of Dalgety Street (adjacent to southern half of site)
- Vocus connection to the site from cables in Dalgety Street, located mid-site, including one internal pit
- Pipe Networks telecommunications duct – west side of Dalgety Street (adjacent to southwest corner of site)

Existing Western Power infrastructure:

- Underground LV cables – west side of Dalgety Street
- Underground LV cables – east side of Dalgety Street (adjacent to northern half of site)
- Underground LV cables – east side of Fortescue St, including connection approximately mid-site
- Streetlight poles in Dalgety and Fortescue Streets

Existing Local Authority Drainage infrastructure:

- The site is located at a natural high point within the local terrain, with no existing LA stormwater drainage within the vicinity of the site
- Traditional pit and pipe stormwater drainage infrastructure is located within Dalgety and Fortescue Streets, further to the north and south of the site

In addition to the above Authority services, there are numerous existing valves, service pits, service meters, gully pits, light poles etc. within the site as depicted on the feature survey, associated with existing irrigation, stormwater drainage, water, electrical and other internal infrastructure servicing the existing carparks and buildings and surrounding garden areas.

## 3.3 Design Intent

The design intent for Civil earthworks, roadworks and stormwater drainage is outlined below. Amendments to the Civil design will be made to incorporate changes to architectural layout and landscaping on an as needed basis during the design development phase, as directed by the Project Manager during consultation meetings.

### 3.3.1 Earthworks Design

- Incorporation of advice from Geotechnical Investigation
- Site levels and bulk earthworks will be designed to accommodate the proposed Architectural design layout, and to provide satisfactory protection to the existing Dalgety-Moore House
- Earthworks levels will be provided to underside of structural slabs for proposed buildings and to underside of proposed carpark pavements and footpaths
- Grading of site access routes, on site carparking and roadways will be undertaken to ensure satisfactory overland flow and to mitigate surface ponding

The preliminary Earthworks and Drainage Plans showing preliminary finished surface levels for pavement areas are attached within Appendix B. These plans will be updated during design development to include finished surface levels for building and landscape areas.



### 3.3.2 Roadworks Design

- Preliminary horizontal and vertical analyses for the following pavement areas and design vehicle have been undertaken for the conceptual architectural layouts provided by Kerry Hill Architects. Preliminary turning analysis sketches are within the Cardno Transport Impact Assessment CW1120100.
- Provision has been made for hearse access to the Ground Floor Main Entry. Should access be required to an alternate entry, additional turning analyses will be undertaken
- The proposed crossover entrances and exits, on-ground parking, basement parking and internal roads horizontal and vertical geometry will be designed in accordance with the relevant Australian Standards and Local Authority design requirements
- We note that the width of the proposed crossover for the Lower Ground Floor Wellness Entry does not currently comply with Local Authority standards and may require amendment to obtain Local Authority approval
- “Layback” type kerbs have been included at all crossover entrances in Dalgety and Fortescue Streets, subject to Local Authority Approval
- Proposed parking bays within Fortescue Street road reserve will be designed in accordance with the relevant Australian Standards and Local Authority design requirements
- All external-to-building impervious surface areas will be suitably drained to suit local conditions
- Asphalt pavements within the development, vehicle crossovers and proposed carparking bays within Fortescue Street are expected to be 30mm red asphalt, on 7mm prime seal, on a 225mm thick basecourse. Pavement profiles will be confirmed during the detailed design stage to suit design vehicle loading parameters

The preliminary Roadworks Plan showing the preliminary road pavement, parking and crossover layouts is attached within Appendix B. The plan will be updated as design development progresses.

### 3.3.3 Stormwater Design

The following drainage measures are proposed to facilitate drainage of the site and provide protection of the property and built form from stormwater run-off within the site:

- Stormwater runoff for the proposed buildings (by Hydraulic) and carpark areas (by Civil) will be designed in accordance with the Town of East Fremantle development guidelines and relevant Development Approval conditions. It is envisaged that the 1 in 20 year or 1 in 100 year ARI event will be required to be contained on site
- Based on an infiltration rate of 5m/day, as suggested within the geotechnical report for in-situ sands, approximately 165m<sup>3</sup> of below ground infiltration storage (via soakwells and/or drainage cells) will be required to contain the 1 in 20 year event. 160m<sup>3</sup> equates to approximately 170m<sup>2</sup> of triple stacked drainage cells. For the 1 in 100 year event, approximately 275m<sup>3</sup> of below ground infiltration storage will be required, which equates to approximately 285m<sup>2</sup> of triple stacked drainage cells. Our preliminary drainage calculations assume there will be sufficient separation from the underside of drainage cells to the sub-surface limestone to achieve the 5m/day infiltration rate. Should this not be the case, over-excavation of limestone, increased drainage areas or alternate drainage disposal methods may be required. This will be confirmed during design development
- Underground storage units will be located within landscaped areas, on-ground pavement areas and LGF carparking areas, with exact locations determined during the detailed design stage, in liaison with the Hydraulics, Landscape and Structural teams. The presence of sub-surface limestone may also influence the location of underground storage units
- Events greater than the design storm event will be flood routed to adjacent road reserves via non-destructive overland flow paths
- Existing drainage infrastructure servicing Dalgety-Moore House including pipework, soakwells and hydraulic connections will require demolition and reconfiguration to suit the proposed development layout. It is proposed that existing roof drainage and runoff from new roof areas will be piped to new below ground infiltration storage units



located below the basement carpark. This will be coordinated with the Hydraulics Consultant during design development and detailed design

- Regular maintenance will be required for all stormwater drainage pits and underground storage units. Access shafts have been incorporated in underground storage units for this purpose. Annual inspection and clean out prior to the onset of winter is recommended

The preliminary Earthworks and Drainage Plans showing preliminary pavement levels and drainage layout are attached within Appendix B. We have currently assumed underground storage units located within the main driveway entry pavement, the Wellness driveway entry pavement, the western lower ground floor entry pavement and the basement carpark, however locations and configurations are subject to review and coordination with the consultant team and further design. The plans will be updated as design development progresses.

## 3.4 Outstanding Information/Risk

The following items have been identified for review / action:

- Confirmation and coordination of landscape design within vicinity of proposed drainage arrays within Lower Ground Floor Wellness Entry and Ground Floor Main Entry pavement areas
- Confirmation and coordination of structural footings within vicinity of proposed drainage arrays within Lower Ground Floor Wellness Entry and Ground Floor Main Entry porte cochere areas, and within the basement carpark
- Confirmation and coordination of Hydraulic property sewer pipework and Civil stormwater drainage designs within basement carpark
- Confirmation of parameters for periodic draining of Hydraulic potable water storage tanks and fire water storage tanks to Civil underground stormwater drainage storage units in basement carpark
- Confirmation of Town of East Fremantle stormwater drainage requirements
- Confirmation of Town of East Fremantle crossover requirements
- Confirmation of cut-back of existing sewer main located above proposed southern carpark, and realignment of existing internal sewer by hydraulics

The following items have currently been identified as risks to the proposed development:

- Location of existing services being different to that obtained from DBYD information
- Presence of existing services additional to those shown on DBYD information
- Potential for requirement to protect, modify or relocate the existing sewer access chamber located near the middle of the southern boundary, or amend the Lower Ground Floor and Basement layouts to accommodate retention of the access chamber
- Local Authority advice or requirements with respect to crossovers or stormwater drainage extra-over or different to expectations
- Presence of sub-surface limestone (depth, extent and strength) may constrain stormwater drainage design, as noted above
- Potential for earthworks and excavations in sub-surface limestone which may impact construction program and development costs
- Potential to undermine adjacent properties during construction of proposed lower ground floor and basement walls in cut along the northern and southern site boundaries





# Appendix A Safety In Design



# Risk Rating

| Likelihood          | Consequence        |            |               |                  |            |
|---------------------|--------------------|------------|---------------|------------------|------------|
|                     | Insignificant<br>1 | Minor<br>2 | Moderate<br>3 | Significant<br>4 | Major<br>5 |
| Almost Certain<br>A | Moderate           | High       | Extreme       | Extreme          | Extreme    |
| Likely<br>B         | Moderate           | High       | Extreme       | Extreme          | Extreme    |
| Moderate<br>C       | Low                | Moderate   | High          | Extreme          | Extreme    |
| Unlikely<br>D       | Low                | Low        | Moderate      | High             | Extreme    |
| Rare<br>E           | Low                | Low        | Low           | Moderate         | High       |

**Extreme** Immediate attention required, cease activity

**High** Additional controls required to reduce the risk to moderate or below

**Moderate** Maximum acceptable level of risk. Additional controls may be implemented to improve.

**Low** Risks managed by routine procedures.

# Risk Management Report

## Code Compliance - Civil

Safety risks mitigated through compliance with relevant Australian Codes and Standards either in design or as required of the Contractor by virtue of referencing these standards in the project specification.

| Scope of Risk Assessment  |  | Date       |             |             | Attending (Name and Position)   |                                |
|---|--|------------|-------------|-------------|---|--------------------------------|
| Hall & Prior - Woodside Health Care Precinct  |  | 02-Oct-20  |             |             | Project Engineer Travis Demeza  |                                |
| HAZARD IDENTIFIED/RELEVANT CODES  |  | LIKELIHOOD | CONSEQUENCE | RISK RATING | RESIDUAL RISK   | RESPONSIBILITY                 |
| <b>Dust / Erosion</b>   |  | D          | 4           | H           | Dust or erosion affecting safety of person as a result of extreme weather event not contemplated in design.   | Land Owner                     |
| Relevant Federal, State and Local Authority Environmental Guidelines  |  |            |             |             |   |                                |
| <b>Stormwater inundation of buildings or infrastructure</b>   |  | E          | 5           | H           | Persons injured as a result of flooding from extreme storm event not contemplated in design.  | Asset Owner                    |
| Australian Rainfall and Runoff / IPWEA / Local Authority Standards  |  |            |             |             |   |                                |
| <b>Roads unsafe or impassable due to flooding</b>   |  | E          | 5           | H           | Persons being trapped or injured by flooding over or within roads from extreme storm event not contemplated in design.  | Asset Owner                    |
| Australian Rainfall and Runoff / IPWEA / Local Authority Standards / relevant State Department of Main Roads  |  |            |             |             |   |                                |
| <b>Required maintenance works adjacent or beneath underground/overhead power</b>  |  | E          | 5           | H           | Electrocution as a result of poor work practises.   | Asset Owner                    |
| Relevant State Power Authority Guidelines / Local Authority Standards   |  |            |             |             |   |                                |
| <b>Pedestrian, cyclist and/or vehicle accident on a road way, cycleway or path</b>  |  | D          | 5           | E           | Injury to persons due to collision as result of negligence.   | Local Authority or Asset Owner |
| AustRoads / relevant State Department of Main Roads / Local Authority Standards / AS 1742: Manual of uniform traffic control devices (Parts 1-14) / AS 1743: Road Signs - Specifications / AS 3845: Road Safety Barrier Systems / AS 1428: Design for Access and Mobility (Parts 1 - 5) / AS 2890: Parking Facilities (Parts 1 - 6) / AS 2353: Pedestrian Push Button Assemblies / AS 5100.1: Bridge Design - Scope and General Principals. |  |            |             |             |   |                                |
| <b>Road pavement failure</b>  |  | D          | 5           | E           | Eventual traffic loading or volumes differ to that agreed and approved as part of design resulting in pavement failures and subsequently persons injured due to traffic accident. | Asset Owner                    |
| AustRoads / Local Authority Standards / IPWEA / relevant State Department of Main Roads / AS 3727 - Guide to Residential Pavements  |  |            |             |             |   |                                |
| <b>Earthworks and/or retaining structure failure</b>  |  | D          | 5           | E           | Building, batter or retaining failure due to loading, undermining or use not contemplated in design resulting in injury to persons.   | Land Owner                     |
| AS 3798: Guidelines on earthworks on commercial and residential developments / AS 4678-2002: Earth Retaining Structures / Local Authority Standards   |  |            |             |             |   |                                |
| <b>Residual Site Contamination</b>  |  | E          | 5           | H           | Remnant contaminated soils or groundwater not completely identified and addressed.  | Land Owner                     |
| Local Authority Standards / EPA Standards / AS 3798: Guidelines on earthworks on commercial and residential developments  |  |            |             |             |   |                                |
| <b>Drowning within stormwater device or infrastructure</b>  |  | E          | 5           | H           | Injury to persons due to unauthorised access or as a result of extreme storm event not contemplated in design.  | Asset Owner                    |

# Code Compliance - Civil

Safety risks mitigated through compliance with relevant Australian Codes and Standards either in design or as required of the Contractor by virtue of referencing these standards in the project specification.

| Scope of Risk Assessment   |  | Date       |             |             | Attending (Name and Position)                        |                |
|--|--|------------|-------------|-------------|--|----------------|
| Hall & Prior - Woodside Health Care Precinct   |  | 02-Oct-20  |             |             | Project Engineer Travis Demeza                       |                |
| HAZARD IDENTIFIED/RELEVANT CODES   |  | LIKELIHOOD | CONSEQUENCE | RISK RATING | RESIDUAL RISK  | RESPONSIBILITY |
| Australian Rainfall and Runoff / IPWEA / Local Authority Standards / relevant State Department of Main Roads   |  |            |             |             |  |                |
| <b>Access to civil stormwater chambers and infrastructure</b>  |  | D          | 5           | E           | Injury to persons due to unauthorised access or use. | Asset Owner    |
| Local Authority Standards / Local Sewer Authority Standards / WSAA Standards / IPWEA / relevant State Department of Main Roads / Australian Rainfall and Runoff / AS 3500.2 Sanitary Plumbing and Drainage / AS 3996: Access Covers and Grates |  |            |             |             |  |                |
|  |  |            |             |             |  |                |

# Risk Management Report

## Construction and Commissioning - Civil

| Scope of Risk Assessment<br>Hall & Prior - Woodside Health Care Precinct                            |                                  |                       | Date<br>02-Oct-20  | Attending (Name and Position)<br>Project Engineer Travis Demeza |                       |  |                |
|---|----------------------------------|-----------------------|--|---|-----------------------|--|----------------|
| HAZARD IDENTIFIED   | PRE-DESIGN RISK RATING           |                       | DESIGN MITIGATION  | POST-DESIGN RISK RATING   |                       | RESIDUAL RISK<br><small>(do not include specific mitigation strategies unless you are an expert in managing this sort of hazard)</small> | RESPONSIBILITY |
|   | MAYBE<br>UNCONVENTIONAL          | UNCONVENTIONAL        |  | CONVENTIONAL  | UNCONVENTIONAL        |  |                |
| <b>Hazardous substances specified or produced as part of works coming into contact with persons</b> |                                  |                       |  |   |                       |  |                |
| <b>Hazardous substances inherent in the site coming into contact with persons</b>                   |                                  |                       |  |   |                       |  |                |
| Conventional risks exist.   |                                  |                       |  | <input checked="" type="radio"/>                                | <input type="radio"/> |  | Contractor     |
| <b>Excavations work causing injury to persons.</b>  |                                  |                       |  |   |                       |  |                |
| Hazards may include one or combination of:  |                                  |                       |  |   |                       |  |                |
| - Adjacent structures   | <input checked="" type="radio"/> | <input type="radio"/> | Notification within design documentation.  | <input checked="" type="radio"/>                                | <input type="radio"/> | Injury to persons  | Contractor     |
| - Unstable ground conditions/pinnacled limestone / karstic features                                 | <input checked="" type="radio"/> | <input type="radio"/> | Notification within design documentation.  | <input checked="" type="radio"/>                                | <input type="radio"/> | Injury to persons  | Contractor     |
| - Depth of excavation exceeds 5m.   | <input checked="" type="radio"/> | <input type="radio"/> | Notification within design documentation.  | <input checked="" type="radio"/>                                | <input type="radio"/> | Injury to persons  | Contractor     |
| <b>Risk of injury due to noise or vibration</b>   |                                  |                       |  |   |                       |  |                |
| Hazards may include one or combination of:  |                                  |                       |  |   |                       |  |                |
| - Deep or high energy impact compaction.  | <input checked="" type="radio"/> | <input type="radio"/> | Notification within design documentation.  | <input checked="" type="radio"/>                                | <input type="radio"/> | Injury to persons  | Contractor     |
| - Compaction adjacent existing structures and/or brittle services.                                  | <input checked="" type="radio"/> | <input type="radio"/> | Notification within design documentation.  | <input checked="" type="radio"/>                                | <input type="radio"/> | Injury to persons  | Contractor     |
| <b>Risk of injury to person due to electrocution/explosion/fire</b>                                 |                                  |                       |  |   |                       |  |                |
| Conventional risks exist.   |                                  |                       |  | <input checked="" type="radio"/>                                | <input type="radio"/> |  |                |
| <b>Risk of injury due to vehicle impact for works adjacent highly trafficked area</b>               |                                  |                       |  |   |                       |  |                |
| Conventional risks exist.   |                                  |                       |  | <input checked="" type="radio"/>                                | <input type="radio"/> |  | Contractor     |
| <b>Risk of Injury due to modification of existing structures or services</b>                        |                                  |                       |  |   |                       |  |                |
| Conventional risks exist.   |                                  |                       |  | <input checked="" type="radio"/>                                | <input type="radio"/> |  | Contractor     |
| <b>Risk to safety during lifting and erection of materials</b>                                      |                                  |                       |  |   |                       |  |                |
| Conventional risks exist.   |                                  |                       |  | <input checked="" type="radio"/>                                | <input type="radio"/> |  | Contractor     |
| <b>Working in confined spaces</b>   |                                  |                       |  |   |                       |  |                |
| Conventional risks exist.   |                                  |                       |  | <input checked="" type="radio"/>                                | <input type="radio"/> |  | Contractor     |
| <b>Earthworks, preload, site influences, topography, location of site</b>                           |                                  |                       |  |   |                       |  |                |
| Unusual Geotechnical Conditions (unstable ground, pinnacled limestone, karstic features etc.).      | <input checked="" type="radio"/> | <input type="radio"/> | Reference to Geotechnical Reports within design documentation and inclusion of recommendations in design approach. | <input checked="" type="radio"/>                                | <input type="radio"/> | Safety of persons affected   | Contractor     |
| Interface with adjoining properties / risk of undermining or overloading existing structures.       | <input checked="" type="radio"/> | <input type="radio"/> | Undertake assessment or place a notification within design documentation.  | <input checked="" type="radio"/>                                | <input type="radio"/> | Safety of persons affected   | Contractor     |









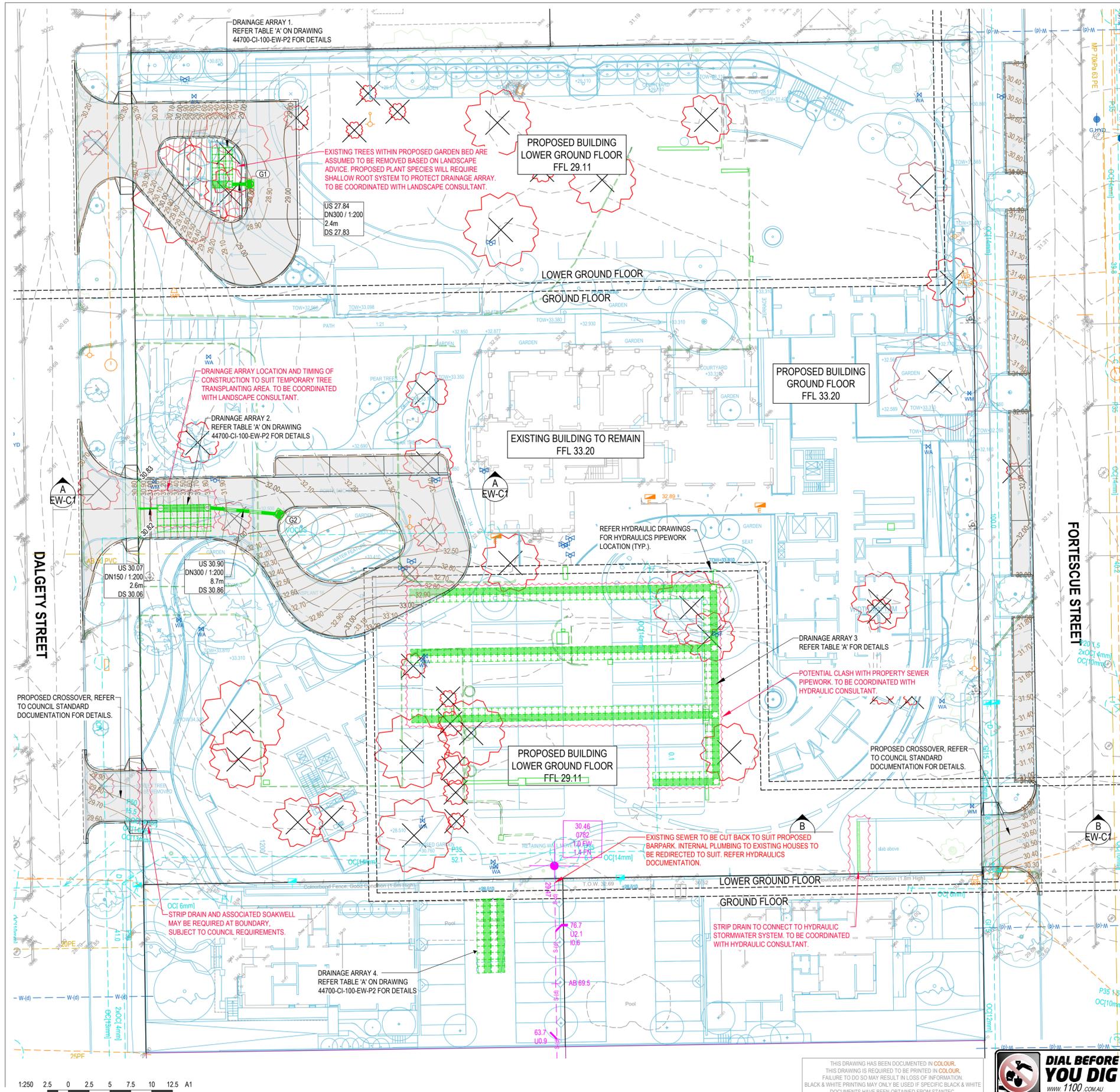
# Risk Management Report

## Residual Risk Report

| Scope of Risk Assessment                     | Date                           | Attending (Name and Position)   |                |
|--|--------------------------------|---------------------------------|----------------|
| Hall & Prior - Woodside Health Care Precinct | 02-Oct-20                      | Travis Demeza, Project Engineer |                |
| HAZARD IDENTIFIED                            | POST-DESIGN<br>RISK RATING     | RESIDUAL RISK                   | RESPONSIBILITY |
|  | RISK RATING/<br>UNCONVENTIONAL |                                 |                |

# Appendix B Preliminary Civil Plans





- NOTES**
- DEMOLITION
    - REFER TO ARCHITECTURAL DOCUMENTATION FOR SITE DEMOLITION REQUIREMENTS.
  - TREE PROTECTION
    - TREE PROTECTION MEASURES SHALL BE IN ACCORDANCE WITH AS4970 AND THE ARBORIST REPORT.
    - NO EXCAVATION SHALL OCCUR WITHIN THE TREE PROTECTION ZONE (AS DEFINED BY ARBORIST REPORT) OF ANY TREES TO BE RETAINED UNLESS OTHERWISE NOTED.
  - EXISTING SERVICES
    - THE CONTRACTOR SHALL OBTAIN DIAL BEFORE YOU DIG INFORMATION PRIOR TO COMMENCEMENT OF ANY WORKS ON SITE.
    - THE CONTRACTOR SHALL ACCURATELY LOCATE ANY EXISTING SERVICE THAT MAY POTENTIALLY INHIBIT THE PROPOSED WORKS TO AVOID IMPACTING THE PROGRAM.
    - THE CONTRACTOR SHALL NOTIFY THE SUPERINTENDENT IMMEDIATELY SHOULD ANY EXISTING SERVICE PREVENT OR INHIBIT THE PROPOSED WORKS AND AWAIT FURTHER INSTRUCTION PRIOR TO PROCEEDING, UNLESS NOTED OTHERWISE.
    - THE RELEVANT AUTHORITY STANDARDS SHALL BE ADHERED TO AND CAUTION SHALL BE EXERCISED DURING WORKS IN THE VICINITY OF LIVE AUTHORITY SERVICES.
  - MODIFIED WORK PRACTICES
    - THE CONTRACTOR SHALL UTILISE MODIFIED WORK PRACTICES WHERE NECESSARY:
      - IN THE VICINITY OF LIVE UNDERGROUND SERVICES IN ACCORDANCE WITH AUTHORITY STANDARDS.
      - IN THE VICINITY OF OVERHEAD POWER LINES IN ACCORDANCE WITH AUTHORITY STANDARDS.
      - IN THE VICINITY OF EXISTING STRUCTURES IN ACCORDANCE WITH ADVICE TO BE OBTAINED FROM A GEOTECHNICAL ENGINEER AT THE CONTRACTOR'S EXPENSE.
      - IN THE VICINITY OF TREES TO BE RETAINED IN ACCORDANCE WITH ARBORICULTURALIST ADVICE.
      - IN THE VICINITY OF SENSITIVE LAND USES IN ACCORDANCE WITH THE SPECIFICATION, AS NECESSARY.
  - REINSTATEMENTS
    - THE CONTRACTOR SHALL REINSTATE ANY DAMAGE CAUSED TO EXISTING AREAS TO EXISTING STANDARD PRIOR TO PRACTICAL COMPLETION.
    - DUST CONTROL & STABILISATION DURING THE CONTRACT PERIOD
    - THE CONTRACTOR SHALL ALLOW FOR DUST CONTROL MEASURES IN ACCORDANCE WITH THE SPECIFICATION.
    - FINAL STABILISATION
    - THE FINISHED SURFACE, INCLUDING ANY AREAS OUTSIDE OF THE SITE AREA EXPOSED BY THE CONTRACTOR DURING THE WORKS, SHALL BE STABILISED AS SPECIFIED WITHIN LANDSCAPE DOCUMENTATION.
  - GENERAL
    - REFER TO THE 'EARTHWORKS DETAILS' DRAWING FOR DETAILS REFERENCED ON THIS PLAN.
    - LEVELS
    - PROPOSED LEVELS SHOWN SHALL BE ON THE FINISHED SURFACE, INCLUDING TOPSOIL / LANDSCAPING TREATMENTS, WHERE SPECIFIED.
    - CLEARING
    - THE CONTRACTOR SHALL CLEAR VEGETATION AND DEBRIS FROM WITHIN THE SITE BOUNDARY IN ACCORDANCE WITH THE SPECIFICATION, EXCEPT FOR VEGETATION SHOWN AS RETAINED.
    - VEGETATION TO BE RETAINED SHALL BE PROTECTED IN ACCORDANCE WITH THE SPECIFICATION.
    - ALL EXCESS MATERIAL SHALL BE RE-USED OR DISPOSED OFF-SITE AS PER SPECIFICATION.
  - TOPSOIL
    - TOPSOIL SHALL BE STRIPPED FROM THE SITE AS SPECIFIED.
    - TOPSOIL SHALL BE SCREENED AND RE-SPREAD AS PER LANDSCAPE DOCUMENTATION.
  - GENERAL EARTHWORKS
    - THE CONTRACTOR SHALL CUT, PROOF ROLL, AND FILL THE SITE IN ACCORDANCE WITH THE SPECIFICATION AND GEOTECHNICAL REPORT BY CMW GEOSCIENCES, REF: PER0219/03648
    - ALL BATTERS SHALL BE AT 1 IN 6 UNLESS NOTED OTHERWISE.
    - GEOTECHNICAL VERIFICATION
    - THE CONTRACTOR SHALL ENGAGE A GEOTECHNICAL ENGINEER TO PERFORM THE FOLLOWING TASKS:
      - INSPECT AND PROVIDE VERIFICATION OF ADEQUATE TOPSOIL STRIPPING.
      - INSPECT AND PROVIDE VERIFICATION OF ADEQUATE PROOF ROLLING.
      - INSPECT AND PROVIDE VERIFICATION THAT EARTHWORKS HAVE BEEN PERFORMED IN ACCORDANCE WITH THE WORD AND INTENT OF THE CONTRACT DOCUMENTS UPON COMPLETION OF EARTHWORKS.
  - ALL GEOTECHNICAL VERIFICATION SHALL BE SUBMITTED TO AND APPROVED BY THE SUPERINTENDENT PRIOR TO PRACTICAL COMPLETION.
  - PIPEWORK
    - RUBBER RING JOINTED CLASS 2 REINFORCED CONCRETE PIPES SHALL BE UTILISED UNLESS NOTED OTHERWISE.
    - PIPE ALIGNMENTS SHALL BE AS SHOWN, HOWEVER THE CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO ALIGNMENTS TO ENSURE ADEQUATE PIPE ENTRIES INTO ACCESS CHAMBERS WHERE NECESSARY FOR MULTIPLE PIPE ENTRIES.
    - ACCESS CHAMBERS (INCLUDING GULLY PITS AND SOAKWELLS)
      - ACCESS CHAMBERS SHALL BE LOCATED AS SHOWN ON THE PLAN, REGARDLESS OF PIPE LENGTHS.
      - ACCESS CHAMBERS LOCATED WITHIN THE ROAD PAVEMENT, OR OTHER TRAFFICABLE AREAS, SHALL BE CLASS D HEAVY DUTY TRAFFICABLE COVERS.
      - ACCESS CHAMBER COVERS SHALL BE SET TO FINISH FLUSH WITH THE FINISHED SURFACE LEVEL UNLESS NOTED OTHERWISE.
    - DRAINAGE CELL ARRAYS
      - PROPOSED DRAINAGE CELL ARRAYS SHALL BE GRAF ECOBLOC MAXX OR GRAF ECOBLOC INSPECT FLEX (OR EQUIVALENT AS APPROVED BY THE CIVIL ENGINEER).
      - DRAINAGE CELL ARRAYS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES AND SPECIFICATIONS, INCLUSIVE OF AIR VENTING, INLET CHAMBERS, PERIMETER ACCESS, MAINTENANCE REQUIREMENTS, GEOFABRIC SURROUNDS AND BACKFILL REQUIREMENTS.
      - EACH DRAINAGE CELL ARRAY SHALL BE FULLY WRAPPED IN PERVIOUS GEOTEXTILE, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES.
      - GRAF VARIO 800 FLEX SHAFTS (OR EQUIVALENT AS APPROVED BY THE CIVIL ENGINEER) SHALL BE INSTALLED AS SHOWN. COVERS SHALL BE AS SHOWN ON THE DRAWINGS (OR EQUIVALENT AS APPROVED BY THE CIVIL ENGINEER) AND SET TO FINISH FLUSH WITH THE FINISHED SURFACE, UNLESS NOTED OTHERWISE.
    - STRIP DRAINS
      - PROPOSED STRIP DRAINS SHALL BE ACO KLASSIKRAIN K2500 WITH CUSTOM CLASS D 643Q CAST IRON 5 STAR HEELSFACE ANTI-SLIP LIDS UNLESS NOTED OTHERWISE.
      - STRIP DRAINS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES, SPECIFICATIONS AND INSTALLATION MANUAL.
      - JOINTS ON ALL STRIP DRAIN CURVES AND BENDS SHALL BE MITRE CUT IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES TO PROVIDE A FLUSH CHANNEL JOINT WITH ZERO GAP.
    - CLASHES WITH OTHER SERVICES
      - THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF PROPOSED DRAINAGE WITH ALL OTHER SERVICES AND ROADWORKS. IN THE EVENT OF ANY CLASH THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE SUPERINTENDENT AND SEEK FURTHER DIRECTION PRIOR TO PROCEEDING.

**TABLE 'A'**

1 IN 100 YEAR STORM EVENT - BUILDING ROOF AREA AND EXTERNAL TO BUILDING IMPERVIOUS AREAS

|                   | DRAINAGE ARRAY 1                 | DRAINAGE ARRAY 2                      | DRAINAGE ARRAY 3   | DRAINAGE ARRAY 4  |
|-------------------|----------------------------------|---------------------------------------|--|---|
| CATCHMENT AREA    | 270m <sup>2</sup>                | 500m <sup>2</sup>                     | 548m <sup>2</sup>  | 670m <sup>2</sup>   |
| NUMBER OF MODULES | 54 (6 ROWS x 3 LINES x 3 LAYERS) | 98 (8 ROWS x 4 LINES x 3 LAYERS)      | 1020 (3 x 44 ROWS x 2 LINES x 3 LAYERS + 30 ROWS x 2 LINES x 3 LAYERS + 8 ROWS x 2 LINES x 3 LAYERS) | 123 (2 ROWS x 21 LINES x 3 LAYERS)  |
| BASE AREA         | 11.52m <sup>2</sup>              | 20.48m <sup>2</sup>                   | 217.60m <sup>2</sup>   | 26.20m <sup>2</sup>   |
| STORAGE VOLUME    | 11.49m <sup>3</sup>              | 20.43m <sup>3</sup>                   | 217.06m <sup>3</sup>   | 26.20m <sup>3</sup>   |
| BASE RL           | 27.55m                           | 29.25m                                | 27.25m   | 27.25m  |
| TOP RL            | 28.60m                           | 30.30m                                | 28.30m   | 28.30m  |
| SHAFT TYPE        | VARIO 800 FLEX SHAFT             | VARIO 800 FLEX SHAFT                  | VARIO 800 FLEX SHAFT   | VARIO 800 FLEX SHAFT  |
| COVER TYPE        | MAXI TELESCOPIC DOME SHAFT COVER | CAST IRON TELESCOPIC DOME SHAFT COVER | MACRETE PRECAST DN600 CIRCULAR DUCTILE IRON GRATE AND FRAME CLASS D SHAFT COVER                      | MACRETE PRECAST DN600 CIRCULAR DUCTILE IRON GRATE AND FRAME CLASS D SHAFT COVER |
| LOADING           | PEDESTRAIN                       | HEAVY DUTY TRAFFICABLE                | HEAVY DUTY TRAFFICABLE   | HEAVY DUTY TRAFFICABLE  |
| SHAFT TYPE        | FLUSH WITH FSL                   | FLUSH WITH FSL                        | FLUSH WITH FSL   | FLUSH WITH FSL  |

**LEGEND**

- 30.3 --- EXISTING CONTOURS -0.1m INTERVAL
- 29.0 --- PROPOSED CONTOURS -0.1m INTERVAL
- EXISTING ROAD KERB
- PROPOSED BARRIER KERB
- PROPOSED SEMI-MOUNTABLE KERB
- PROPOSED FLUSH KERB
- EXISTING RETAINING WALL
- PROPOSED SAWCUT LINE
- PROPOSED GULLY PIT
- EXISTING TREES TO REMAIN AND TO BE PROTECTED
- EXISTING TREES TO BE REMOVED

**NOTATION**

- 150'4" PIPE DIA. & CLASS 200 PIPE GRADE
- 2.0 LENGTH
- US=27.65 300/186 D=9.3 DS=27.60
- UPSTREAM INVERT LEVEL PIPE DIA. & CLASS/PIPE GRADE LENGTH OF PIPE DOWNSTREAM INVERT LEVEL
- 0900 PROPOSED GULLY DIAMETER
- G1 PROPOSED GULLY NOMENCLATURE (NOT FOR SETOUT)
- 1.1 PROPOSED DEPTH TO INVERT

THIS DRAWING HAS BEEN DOCUMENTED IN COLOUR. THIS DRAWING IS REQUIRED TO BE PRINTED IN COLOUR. FAILURE TO DO SO MAY RESULT IN LOSS OF INFORMATION. BLACK & WHITE PRINTING MAY ONLY BE USED IF SPECIFIC BLACK & WHITE DOCUMENTS HAVE BEEN OBTAINED FROM STANTEC.



| REV | DESCRIPTION       | DRAWN | APPD | DATE       |
|-----|-------------------|-------|------|------------|
| C   | PRELIMINARY ISSUE | SCL   | DP   | 04/05/2022 |
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**HALL & PRIOR**

ARCHITECT/CIENT

**WOODSIDE CARE PRECINCT**

EARTHWORKS AND DRAINAGE PLAN

SHEET 1

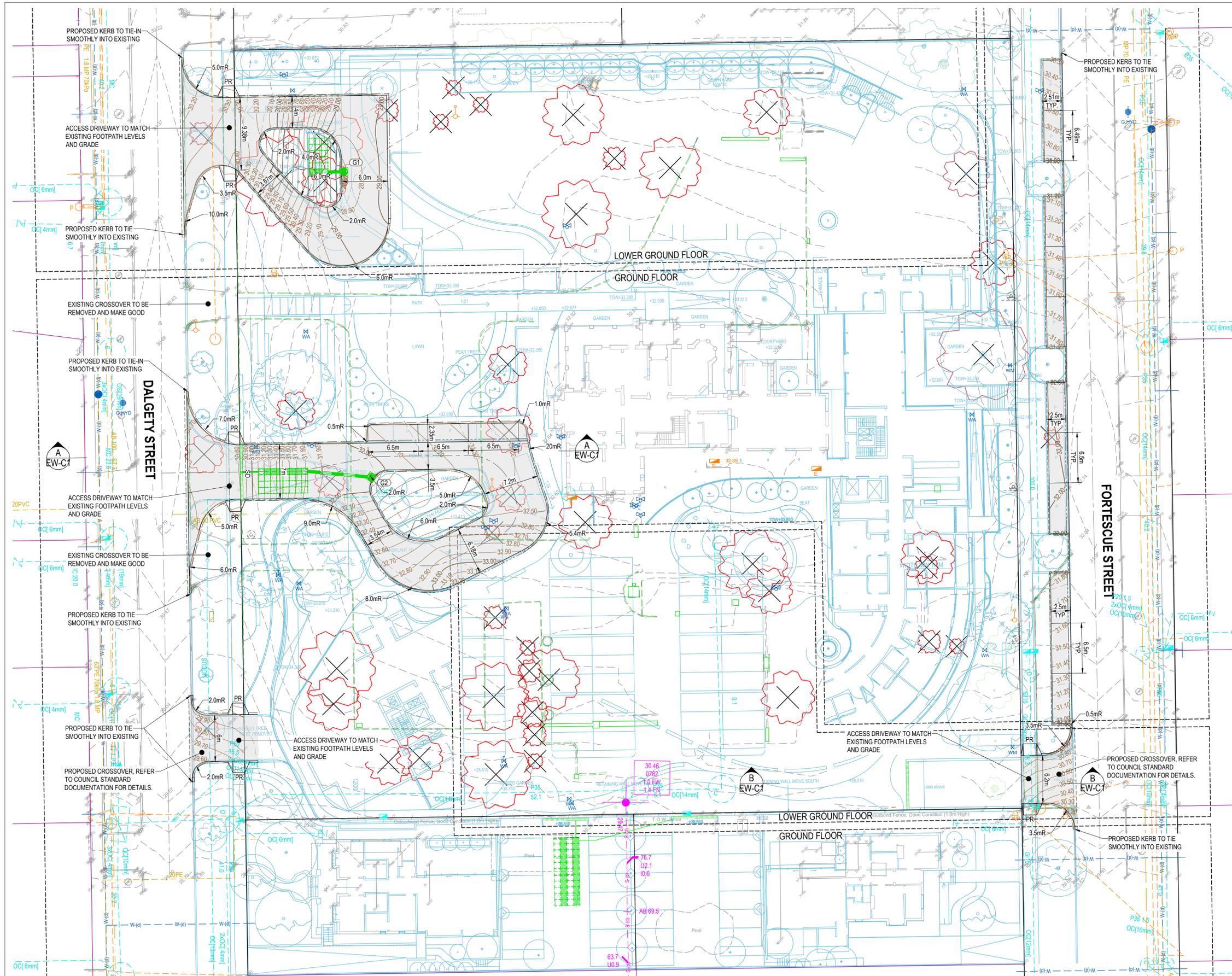
PROJECT/TITLE

**Stantec**

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CIVIL

|        |       |            |            |              |     |
|--------|-------|------------|------------|--------------|-----|
| PCG-94 | mAHD  | 1 : 250    | 44700      | CI-100-EW-P1 | C   |
| COORDS | DATUM | SCALE @ A1 | PROJECT No | DRAWING No   | REV |

CAD FILE: 44700-CI-100-EW-P1.DWG



- NOTES**
- GENERAL
  - LEVELS ARE REDUCED FROM A.H.D.
  - THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL DRAWINGS IN THIS SET AND THE SPECIFICATION.
  - THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND MANPOWER TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION ON SITE.
  - ROADWORKS
    - ALL CORNER SWEEPS SHALL BE 12m RADIUS UNLESS OTHERWISE SHOWN.
    - ALL KERBS SHALL BE MOUNTABLE UNLESS OTHERWISE SHOWN.
    - PAVEMENT WIDTH SHALL BE AS SHOWN ON THE DRAWING AND SHALL BE MEASURED BETWEEN KERBS.
    - CONTRACTOR TO SAW CUT EXISTING PAVEMENT PRIOR TO CONSTRUCTION OF PROPOSED ADJACENT SLIP LANE WORKS.
  - SERVICE INSTALLATION
    - THE CONTRACTOR SHALL LIAISE WITH THE ATCO GAS SECTION FOR THE TIMELY INSTALLATION OF ANY ROAD CROSSINGS.
    - THE CONTRACTOR SHALL LIAISE WITH TELSTRA FOR TIMELY INSTALLATION OF ANY ROAD CROSSINGS.
    - THE CONTRACTOR IS TO PROVIDE A 100mm DUCT ROAD CROSSING (U.N.O) AT LOCATION INDICATED ON THE ROADS PLAN FOR IRRIGATION PROPOSED.
    - THE DUCTS ARE TO EXTEND A MINIMUM OF 1.0m PAST THE FACE OF KERB OR ADJACENT PATH.

- LEGEND**
- EXISTING ROAD KERB
  - EXISTING ROAD TO BE REMOVED
  - PROPOSED BARRIER KERB
  - PROPOSED SEMI-MOUNTABLE KERB
  - PROPOSED FLUSH KERB
  - PROPOSED LINEMARKING
  - PROPOSED SAWCUT LINE
  - PROPOSED ASPHALT PAVEMENT
  - PROPOSED PRAM RAMP SHOWN INDICATIVELY
  - PROPOSED GULLY PIT
  - PROPOSED GRAF CAST IRON TELESCOPIC DOME SHAFT COVER (OR EQUIVALENT)
  - PROPOSED STRIP DRAIN



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**HALL & PRIOR**

ARCHITECT/CIENT

**WOODSIDE CARE PRECINCT ROADWORKS PLAN**

PROJECT/TITLE

**PRELIMINARY**  
NOT FOR CONSTRUCTION  
CIVIL

**Stantec**

PCG-94    mAHD    1 : 250    44700    CI-400-RD-P1    C

COORDS    DATUM    SCALE @ A1    PROJECT No    DRAWING No    REV



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