



***21-41 Canberra Avenue & 18-32
Holdsworth Avenue,
St. Leonards South, NSW***

DA Report

Revision: 03

Report Amendment Register

Rev. No.	Issue/Amendment	Author/Initials		Reviewer/Initials		Date
01	DA Issue	Youmna Khalid	YK	George K	GK	31/05/21
02	DA Issue	April Malabuyoc	AM	George K	GK	07/06/2021
03	DA Issue	Youmna Khalid	YK	George K	GK	08/06/2021

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1. INTRODUCTION

Meinhardt-Bonacci has been Commissioned by TOPSPRING to carry out civil and stormwater investigation and design of proposed residential development at 21-41 Canberra Avenue and 18-32 Holdsworth Avenue, St. Leonards, South, for the Development Application (DA). The proposed civil engineering works are comprised of design of stormwater drainage network for 5 new residential buildings, No 7, 8, 9, 10 and 11 and associated civil engineering works, footpaths, landscaped areas, and design of the new vehicle crossing and driveways.

Stormwater drainage plan(s) to document the additional new works, including On Site Detention and Stormwater Quality Control System, in compliance with Lane Cove Council requirements, with the intention to connect into existing Council stormwater pit and pipe network in Canberra Avenue. These include a Soil and Water Management Plan (SWMP) for the construction stage, specification notes, site works plans and stormwater drainage structures and the On-Site Detention tank (OSD) details.

By including OSD and stormwater Quality Treatment System, the proposed development will result in reducing stormwater flows and improving stormwater from the site in comparison to the existing conditions.

Councils Part O and C8 of LCDCP 2010, Australian Rainfall and Runoff (1987) and Australian Standard 3500.3 (2003) Part 3 Stormwater Drainage have been used in the design and analysis of the stormwater system.

2. SITE DESCRIPTION

2.1. Location

The site is located to the northwest of Canberra Avenue, St Leonards, as shown in Figure 1. The subject site is located on a hill slope and has an irregular shape. The site is bounded to the north and southwest by existing residential developments and to the northwest and the remaining directions by Holdsworth Avenue and Canberra Avenue, respectively.

Topographically, the site is located on a hill slope with a south easterly fall. The overall ground surface slopes in the region are about 10-20°. The accessible parts of the site and adjoining structures are assessed to be fair to good condition.

The external landscaping consists of short grass and some scattered trees and some concrete strips for the access driveways. The site drainage is assessed to be good due to the nature of the terrain.



Figure 1: Site Aerial Image (Source: Nearmaps)

The site is located within the Lane Cove Council Local Government Area (LGA).



Figure 2: Overall Site Plan (Source: Landscape Architectural Layout)

2.2. Existing Services

There are sewer lines identified in the survey plans that require relocation/decommissioning during demolition and construction phase. Existing Services connections for individual allotments within the site: gas, electricity, telecom and sewer will have to be disconnected and removed.

2.3. Existing Stormwater Network

No existing stormwater drainage infrastructure has been identified, servicing existing residential allotments, in the survey drawings, however any existing private stormwater drainage lines will have to be removed. Stormwater from the development site flows, generally, overland towards Canberra Avenue where it is captured by a number of stormwater drainage pits and flows into Council drainage network.

3. PROPOSED DEVELOPMENT

The proposed development consists of the construction of 5 new residential buildings, numbered: 7, 8, 9, 10 and 11 along with associated basement car parks, access driveway from Canberra Avenue and associated footpaths and landscaped areas.

3.1. Stormwater Drainage Strategy

The Council stormwater drainage system which will allow connection of the site stormwater drainage network is located in Canberra Avenue to the west of the site and it drains towards south. The strategic plan for the management of stormwater drainage is to reduce stormwater drainage flows from the site

and to improve stormwater quality by including On Site Detention and Stormwater Quality Treatment System in the internal stormwater drainage network.

In addition, construction of a Rainwater tank is proposed within the site. It is assumed in the Stormwater Reuse Strategy, that the roof drainage will be connected to the Rainwater Tank and water reused for irrigation of landscaped areas within the site.

An On-Site Detention (OSD) system is required for any developments with additional impervious surface area to ensure there is no adverse impact from increased stormwater runoff on the downstream properties as a result of new developments or redevelopments during all storm events up to and including the 100-year Annual Recurrence Interval (ARI) event.

On-site detention is proposed to reduce the post-development stormwater discharge as per Council standard requirements.

In accordance with Lane Cove Council, the Permissible Site Discharge (PSD) from all developments shall not exceed one hundred and forty litres per second per hectare (140l/s/ha) and the Site Storage Requirement (SSR) shall be designed to provide for 0.025m³ for each square metre of basin catchment. In line with the aforementioned guidelines, the total OSD volume provided for the proposed site is 322 m³.

3.1. Summary of OSD Calculations

- Permitted Site discharge rate (PSD): 166.66 L/S for site with proposed development area of 1.26ha
- Site storage required: 322.15 m³
- Orifice diameter: 278 mm

Refer to Figure 3 and Figure 4 for stormwater drainage and OSD calculations.

3.2. Point of Discharge

A single point of discharge is provided from project site into Council's Kerb Inlet Pit (KIP). The upstream invert level of the outlet pipe and the base of the OSD are well above the Council's KIP invert level and are not affected by water level in Council's stormwater drainage. DRAINS model will be provided to Council.

PART O - STORMWATER MANAGEMENT

Appendix 14 – OSD Calculation Sheet

ON-SITE DETENTION CALCULATION SHEET

DEVELOPMENT TYPE: Multi Occupancy Residential

ADDRESS: 21-41 Canberra Avenue, 18-32 Holdsworth Avenue, St Leonards, NSW



PART O: STORMWATER

Site Area (m ²)	12,633	(A)
Total Impervious Area (roofs, driveways, hardstand etc) (m ²)	8,060	(B)
Total Area draining to the Storage Facility (m ²) (impervious and pervious areas)	11,950	(C)
New Impervious Area bypassing the Storage Facility	45	(D)
$\frac{(B)+(D)}{(B)} =$	1.0055	(E)

cannot be greater than 1.25.

Permitted Site Discharge (PSD) rate per m²

If (D) = 0 then PSD = 0.014 l/sec/m²

If (D) ≠ 0 then PSD = 0.014 x (E)^{-1.37} l/sec/m² 0.0139 (F)

PERMITTED SITE DISCHARGE (l/s) (C) x (F)

166 l/s

Storage Volume per m²

(G) = 0.0255 m³/m² for all Catchments

0.0255 (G)

SITE STORAGE REQUIREMENT (m³) ((C) + (D)) x (G)

322 m³

OUTLET CONTROL - using a Sharp Edged Orifice Plate

Height Difference between top water level and Centre of Orifice (m) 3 (H)

ORIFICE DIAMETER (mm)

$$210 \text{ mm} = 21.9 \sqrt{\frac{PSD}{\sqrt{H}}}$$

Should pipe and pit losses be used to control outflow, the calculations are to be attached.

Figure 3: Stormwater Drainage - OSD Calculations

PART O - STORMWATER MANAGEMENT

Appendix 13 – OSD Checklist for DA Submission

ON-SITE STORMWATER DETENTION CHECKLIST

This form is to be used to determine if OSD will be required for residential developments and must be completed before the submission of any application.



PART A. Address and type of proposed development

Street No. Street Name 21-41 Canberra Avenue, 18-32 Holdsworth Avenue, St Leonards, NSW
Lot No. DP No. Suburb

Type of development (tick relevant box).

- | | |
|--|---|
| ☐ Duplex Residential Building | ☒ Multiple Occupancy Residential (villa, flats etc) |
| ☐ Extensions | ☐ Single Residential |
| ☐ Commercial | ☐ Garages |
| ☐ Other | |

PART B. Exemption for discharge directly to Lane Cove River

Is the site within the designated exclusion zone along the foreshore of the Lane Cove River. (tick one only).
(Confirm with Council's Urban Services Division). PARTLY YES.

- ☐ No ☐ Yes

If yes, OSD is not required, If no go to part C

PART C. Exemption for minimum allowable size of site impervious area

(a) Site Area	12,633	m ²
(b) Existing impervious area to be removed	6,343	m ²
(c) Existing impervious to be retained	NONE	m ²
(d) Proposed new impervious area:		
(d1) Roof area	6,260	m ²
(d2) Driveways		m ²
(d3) Other paved area	1,760	m ²
(d4) Supplementary areas (i.e Pervious paving area x 25%)		m ²
(e) Total proposed NEW impervious area (d1) + (d2) + (d3) + (d4) - (b) =	1,720	m ²
(f) Total post development impervious area (c) + (d1) + (d2) + (d3) + (d4) =	8,060	m ²
(g) Post development impervious area (f) x 100 / (a) =	64%	%

OSD will not be required if one or more of the following are satisfied

- ☐ (e) is less than 50m² increase in site cover and (f) is less than 65% of the total site area.
(only applicable for alterations and additions)
- ☐ (g) is less than 35% of site area

Note: If OSD is not required, then the collected stormwater runoff is to be directed to a 600x600mm environmental pollution control pit with sediment collection sump and drainage filter, prior to discharging to an approved outlet. The control pit is to be designed as a gross pollutant trap to remove pollutants from the stormwater flow.

PART D. Special Consideration

Where the applicant believes that special consideration should be given for exemption from OSD, even though Parts A, B, C, or D are not satisfied, they may request exemption from OSD. Consideration may only be given on reasonable grounds and should be discussed with Council's Development Engineer.

Lane Cove Development Control Plan

Part O – Stormwater

Adopted on 22 February 2011 Amendment 2 – 9 December 2011

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PART O: STORMWATER

Figure 4: Stormwater Drainage – OSD Checklist

Catchment plans are shown in Figure 5 and 6, below.



Figure 5: Stormwater Catchment Plan Pre-Development Conditions (refer to catchment plans in Civil drawings set)



Figure 6: Stormwater Catchment Plan Post-Development (refer to catchment plans in Civil drawings set)

Table 1: Stormwater Drainage – Site Catchment Parameters

Catchment	Pre-Development	Post-Development
Impervious (ha)	0.6343	0.8064
Pervious (ha)	0.6290	0.4570
Total Catchment	1.2633	1.2634

Catchment	Pre-Development	Post-Development
Impervious (%)	50%	64%
Pervious (%)	50%	36%
	100%	100%

Proposed, internal, stormwater drainage network has been modelled using DRAINS computer programme. DRAINS model is shown in Figure 7 below and will be shared with the Council to provide information on input parameters and Hydraulic grade lines.

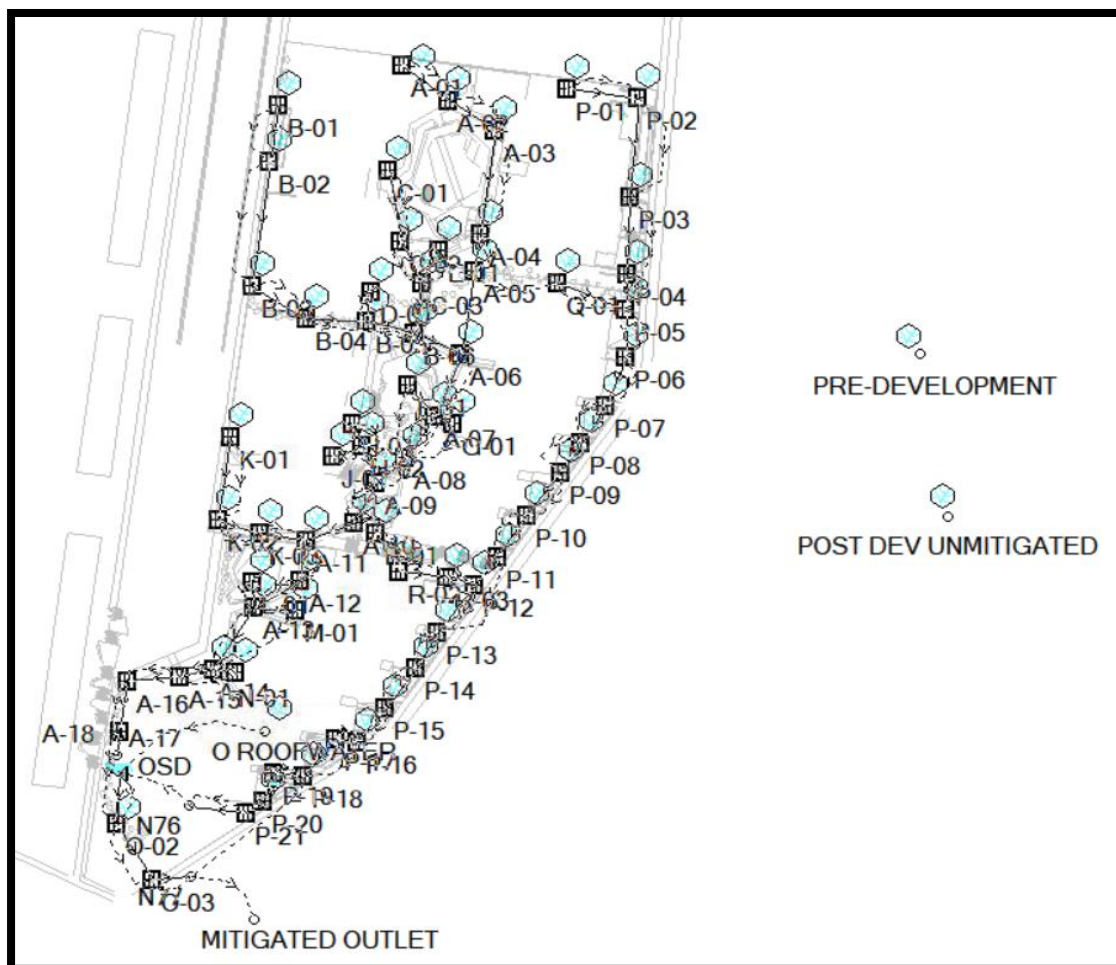


Figure 7: Stormwater Drainage – DRAINS computer model

DRAINS' modelling & analysis summary is shown in Table 2 & 3, below.

Table 2: Discharge Summary from DRAINS Analysis (Unmitigated)

Catchment	Peak Flow Rate for Average Recurrence interval (m3/s)				
	5 year	10 year	20 year	50 year	100 year
Existing	0.251	0.307	0.365	0.442	0.502
Unmitigated Developed	0.272	0.333	0.392	0.470	0.531
Difference	0.021	0.026	0.027	0.028	0.029
% Difference	8.4%	8.5%	7.4%	6.3%	5.8%

Table 3: Discharge Summary from DRAINS Analysis (Mitigated)

Catchment	Peak Flow Rate for Average Recurrence interval (m3/s)				
	5 year	10 year	20 year	50 year	100 year
Existing	0.251	0.307	0.365	0.442	0.502
Unmitigated Developed	0.272	0.333	0.392	0.470	0.531
Mitigated Developed	0.091	0.101	0.112	0.120	0.133
Non-worsening criteria	Passed	Passed	Passed	Passed	Passed

3.3. Stormwater Quality Management Strategy

To protect the existing ecology, new developments are required to satisfy the water quality treatment requirements over the full range of rainfall events to maintain the long-term protection of the pre-determined Environmental Values. The Council requires installation of a stormwater quality treatment system, Gross Pollutant Traps similar to CDS units. We proposed to install filtration system with superior stormwater quality treatment outcomes. The treatment efficiency of GPT is provided in the table below:

Pollutant / Items	Removal Efficiency	Independent Reference Source
Suspended Solids (TSS)	70 %	CRCCH Report 99/2 Feb 1999
Total Phosphorous (TP)	30 %	CRCCH Report 99/2 Feb 1999
Total Nitrogen (TN)	0 %	Scattered results
Gross Pollutants (>5mm)	98 %	CRCCH Report 98/3 Apr 1998
Sediments>0.215mm	95 %	Portland State Uni, Oregon Oct 02
Fine sediment> 75 microns	90 %	Louisiana State University 2004
Heavy Metals	80 %	Louisiana State University 2004
Hydrocarbons, Oils & Grease	82-94 %	UCLA Report 1998

The proposed filter system modelled in MUSIC provides 99.2% removal efficiency for TGP, 67% for Total Phosphorus (TP), 39% for total Nitrogen (TN) and 85% for Total Suspended Solids (TSS) making it superior to GPTs. The screenshot of the MUSIC Results' table is provided below highlighting percentage reduction in pollutant load. New stormwater drainage network is connected to the proposed OSD tank containing stormwater quality treatment devices, stormfilter cartridges. A Rainwater Tank has also been included in the model.

MUSIC - computer model has been developed to analyse the proposed Stormwater Quality Treatment system and demonstrate achieving of the standard stormwater quality treatment targets.

There are no reduction targets specified in LCDCP.

We ensured pollutants loads in stormwater flows of the post developed site are less than the pre-developed site values.

MUSIC Source Nodes

Catchment	Source Node (Surface Type)	Imperviousness (%)	Area (ha)
Existing Roof	Residential	100%	0.6343
Existing Outdoor	Residential	90%	0.6290
Roof Area	Residential	100%	0.6260
Landscape	Revegetated	30%	0.5688
Bypass Area	Revegetated	6%	0.0690

Stormwater Quality Treatment model is shown in Figure 8 and the results of analysis in Figure 9, below.

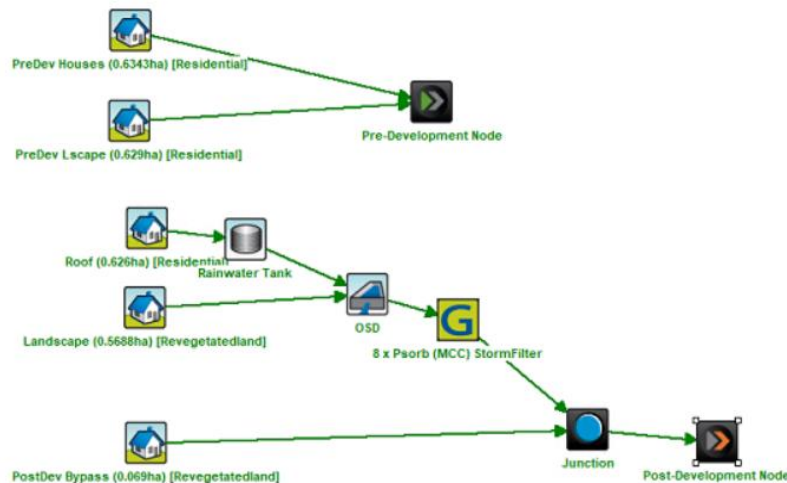


Figure 8: Music Computer Model

Treatment Train Effectiveness - Post-Development Node						
	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	11.9	12.9	11.9	12.6	0	2.33
Total Suspended Solids (kg/yr)	1920	1990	1920	296	0	85.1
Total Phosphorus (kg/yr)	3.17	3.52	3.17	1.16	0	67
Total Nitrogen (kg/yr)	25.1	27.3	25.1	16.7	0	38.8
Gross Pollutants (kg/yr)	246	302	246	2.42	0	99.2

☒ Include Pre-Development

Pollutant	Pre-Developed Loads	Post-Developed Loads
Total Suspended Solids (TSS)	1920.00	296.00
Total Phosphorus (TP)	3.17	1.16
Total Nitrogen (TN)	25.10	16.70
Litter	246.00	2.42

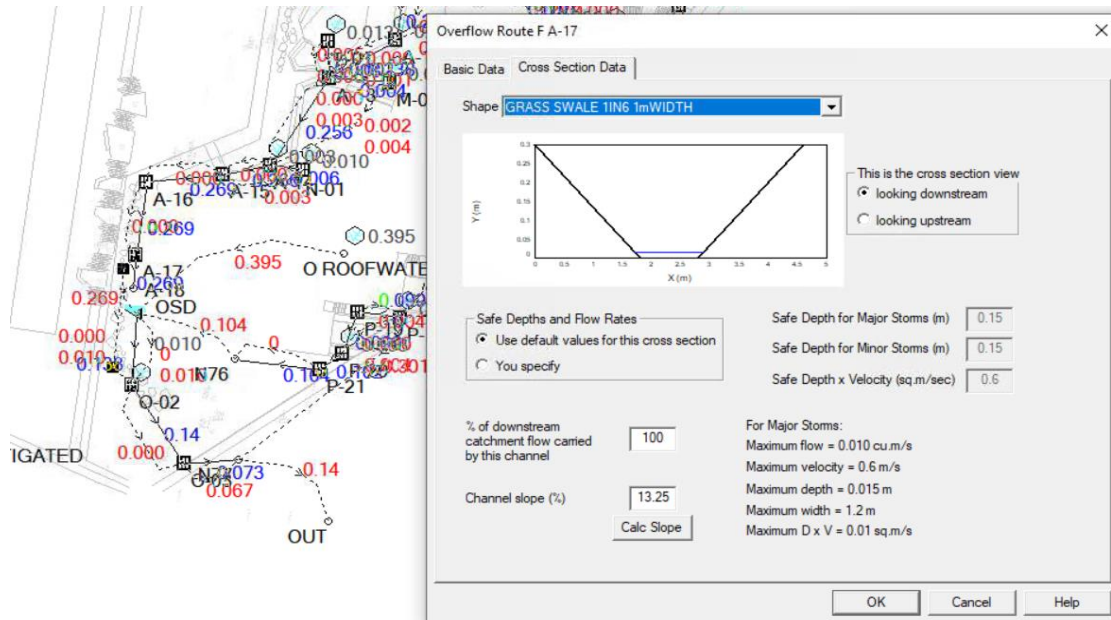
Figure 9: Results of Computer Modelling

4. OVERLAND FLOW PATHS

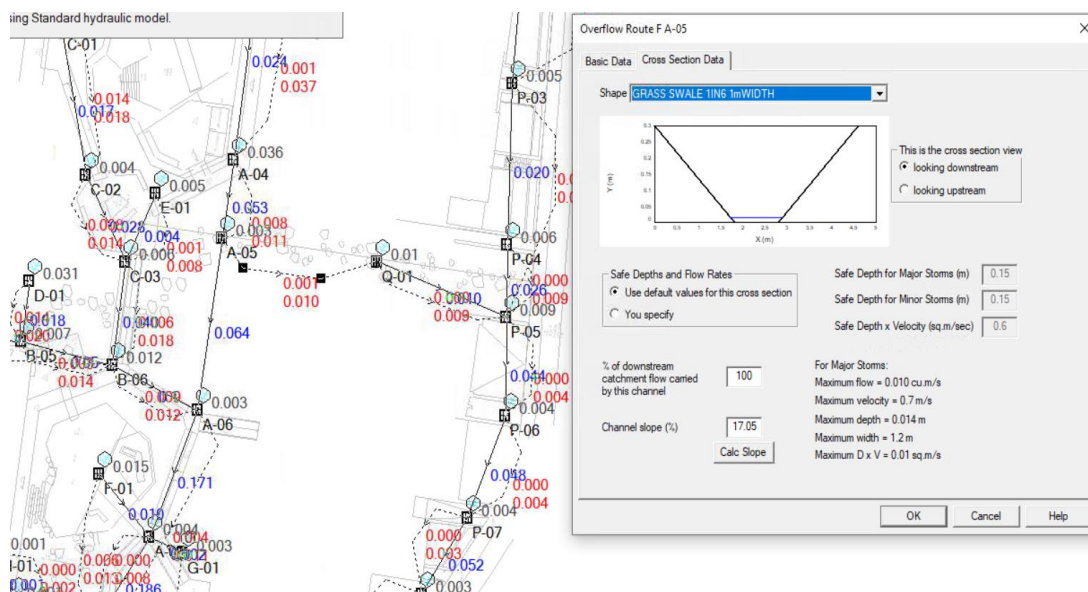
There is no significant Overland Flow for Each Internal Swale or Landscape Area.

Below are the results of DRAINS modelling:

Swale near OSD and Holdsworth



Swale Landscape between Building 9 and 7



5. EROSION & SEDIMENT CONTROL (DURING CONSTRUCTION)

The Soil and Water Management of the proposed site will be implemented during construction. The design of these measures is in accordance with the Landcom “Blue Book”.

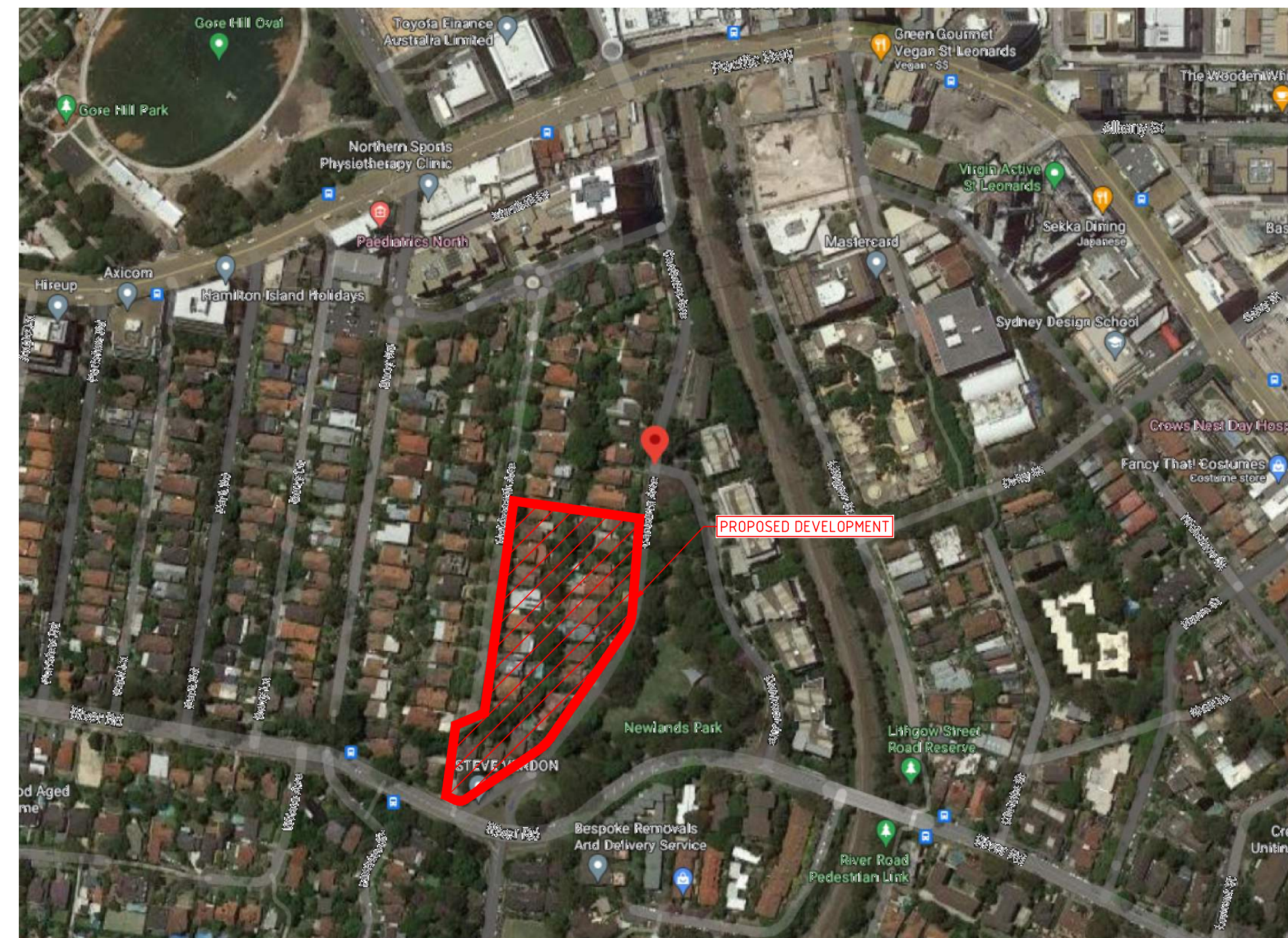
In general, where there is less than 150m³ per year of soil loss, the building of a sediment retention basin can be considered unnecessary (Section 6.3.2 “The Blue Book”). Additionally, the following measures are provided to minimize the risk of sediments being washed into neighbouring properties and roads and erosion of the site.

- *A sediment fence/catch drain (or diversion bund) around the site*
- *Sandbag/Geotextile pit filters to be placed at stormwater inlet pits*
- *Temporary access to site with shaker pad*
- *An indicative stockpile area with sediment fence around it during construction. The stockpile must be located out of water flow paths (and be protected by earth banks/drains as required)*
- *Straw bales,*
- *Sediment fences around stockpile areas*

Parts of the excavations for the construction of the Basement Levels will require construction of the temporary storage pits and collected stormwater will have to be treated on site and pumped out to the external stormwater drainage system or pumped to waste disposal tankers and removed from site in accordance with Council’s requirements.

1292501C - TOPSPRING
21-41 CANBERRA AVE. & 18-32 HOLDSWORTH AVE, ST. LEONARDS
CIVIL & STORMWATER

DRAWING No.	DESCRIPTION
12925-01-C0001	DRAWING REGISTER AND LOCALITY PLAN
12925-01-C0002	GENERAL NOTES
12925-01-C0003	GENERAL ARRANGEMENT PLAN
12925-01-C0004	SEDIMENT & EROSION CONTROL PLAN - SHEET 1
12925-01-C0005	SEDIMENT & EROSION CONTROL DETAILS
12925-01-C0030	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 1
12925-01-C0031	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 2
12925-01-C0032	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 3
12925-01-C0033	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 4
12925-01-C0034	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 5
12925-01-C0035	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 6
12925-01-C0036	SITWORKS AND STORMWATER DRAINAGE PLAN LEVEL 7
12925-01-C0041	PRE-DEVELOPMENT CATCHMENT PLAN
12925-01-C0042	POST-DEVELOPMENT CATCHMENT PLAN
12925-01-C0050	SITWORKS AND STORMWATER DRAINAGE DETAILS - SHEET 1
12925-01-C0051	SITWORKS AND STORMWATER DRAINAGE DETAILS - SHEET 2
12925-01-C0052	ON SITE DETENTION DETAILS

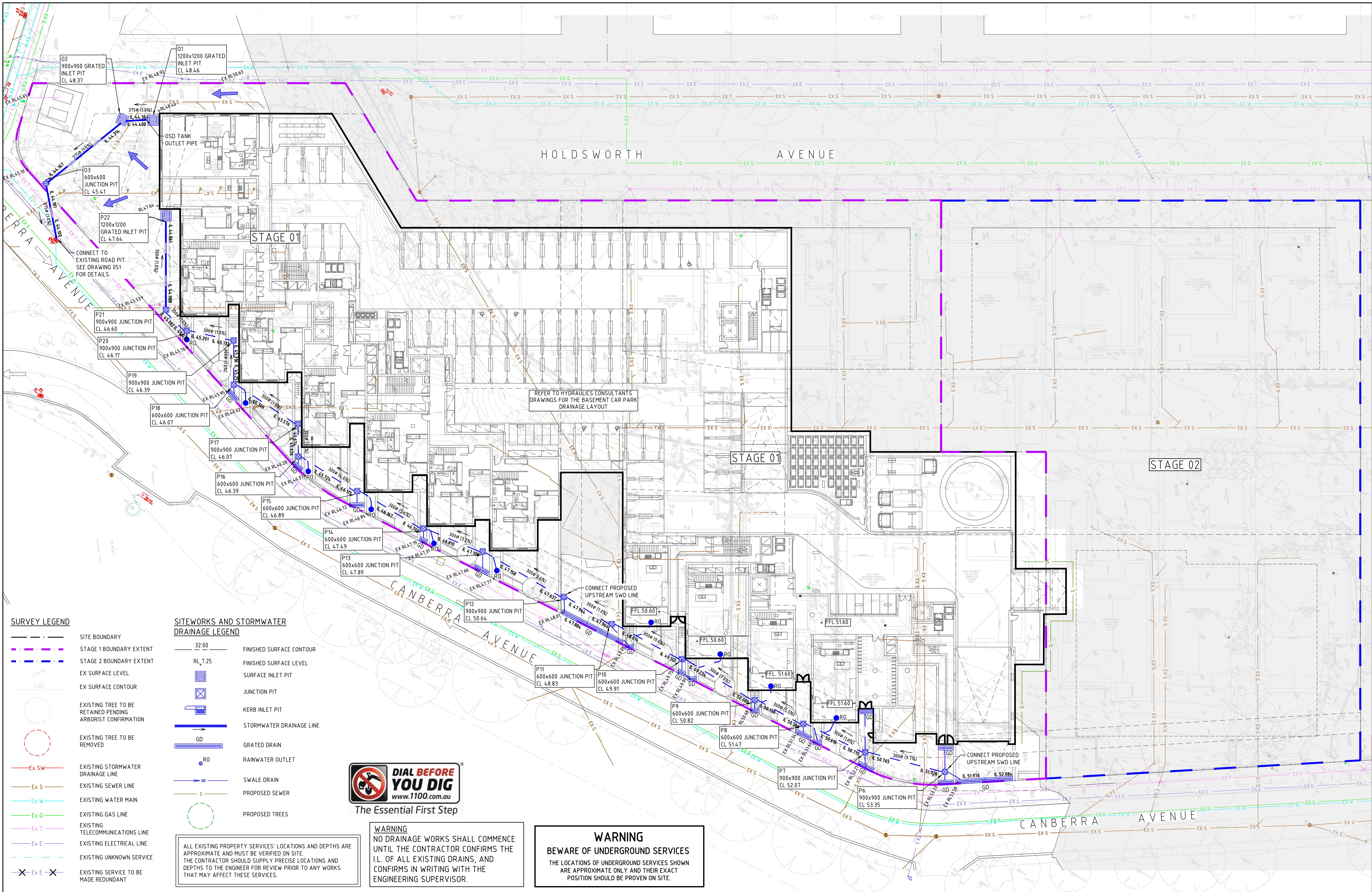


LOCALITY PLAN
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	Drawing Title DRAWING REGISTER AND CONSTRUCTION NOTES	Designed AM	Approved	Date	North
		Drawn MD			
		Scale -	Project Ref	Drawing No	Rev
	Date MAY 2021				
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SURVEY LEGEND

- SITE BOUNDARY
- - - STAGE 1 BOUNDARY EXTENT
- - - STAGE 2 BOUNDARY EXTENT
- EX SURFACE LEVEL
- EX SURFACE CONTOUR
- EXISTING TREE TO BE RETAINED PENDING ARBORIST CONFIRMATION
- EXISTING TREE TO BE REMOVED
- EX SW EXISTING STORMWATER DRAINAGE LINE
- EX S EXISTING SEWER LINE
- EX W EXISTING WATER MAIN
- EX G EXISTING GAS LINE
- EX T EXISTING TELECOMMUNICATIONS LINE
- EX E EXISTING ELECTRICAL LINE
- EX E EXISTING SERVICE TO BE MADE REDUNDANT

SITWORKS AND STORMWATER DRAINAGE LEGEND

- 32.00 FINISHED SURFACE CONTOUR
- RL 7.25 FINISHED SURFACE LEVEL
- SURFACE INLET PIT
- JUNCTION PIT
- KERB INLET PIT
- STORMWATER DRAINAGE LINE
- GRATED DRAIN
- RO RAINWATER OUTLET
- SWALE DRAIN
- PROPOSED SEWER
- PROPOSED TREES

ALL EXISTING PROPERTY SERVICES' LOCATIONS AND DEPTHS ARE APPROXIMATE AND MUST BE VERIFIED ON SITE. THE CONTRACTOR SHOULD SUPPLY PRECISE LOCATIONS AND DEPTHS TO THE ENGINEER FOR REVIEW PRIOR TO ANY WORKS THAT MAY AFFECT THESE SERVICES.



WARNING
NO DRAINAGE WORKS SHALL COMMENCE UNTIL THE CONTRACTOR CONFIRMS THE I.L. OF ALL EXISTING DRAINS, AND CONFIRMS IN WRITING WITH THE ENGINEERING SUPERVISOR.

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

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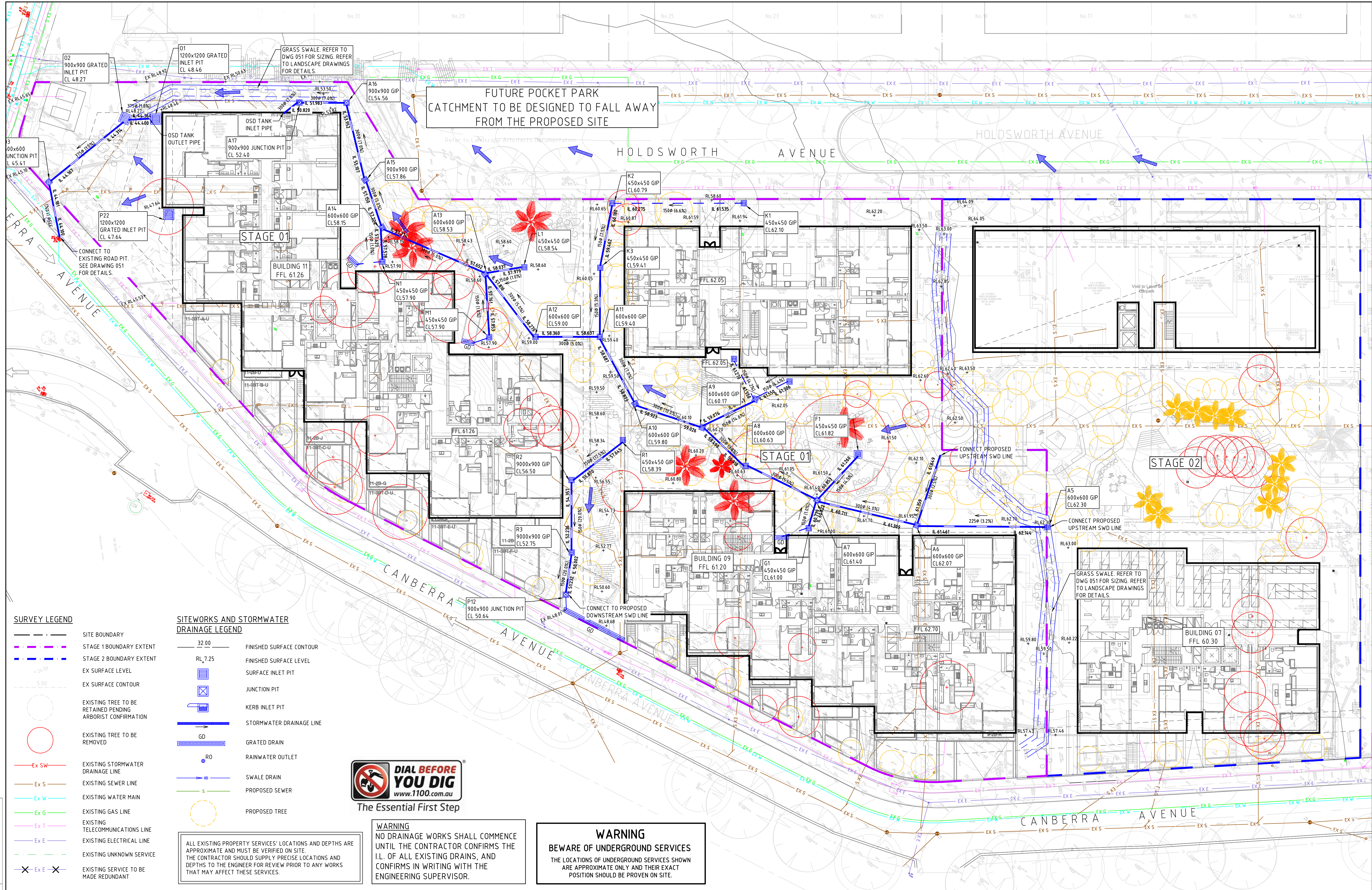
Project Name
**21-41 CANBERRA AVE.
18-32 HOLDSWORTH AVE
ST. LEONARDS SOUTH**

Drawing Title
**SITWORKS AND STORMWATER
DRAINAGE PLAN - LEVEL 2**

DEVELOPMENT APPLICATION

Designed	AM	Approved	Date	North
Drawn	MD			
Scale	1:250			
Date	MAY 2021	Project Ref	Drawing No	Rev
Sheet	A1	12925 01	C0031	P2

DEVELOPMENT APPLICATION					
Designed	AM	Approved	Date		North
Drawn	MD				
Scale	1:250				
Date	MAY 2021	Project Ref	Drawing No	Rev	
Sheet	A1	12925 01	C0032	P2	



- SURVEY LEGEND**
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 - Ex S EXISTING SEWER LINE
 - Ex W EXISTING WATER MAIN
 - Ex G EXISTING GAS LINE
 - Ex T EXISTING TELECOMMUNICATIONS LINE
 - Ex E EXISTING ELECTRICAL LINE
 - Ex E EXISTING UNKNOWN SERVICE
 - Ex E EXISTING SERVICE TO BE MADE REDUNDANT

- SITWORKS AND STORMWATER DRAINAGE LEGEND**
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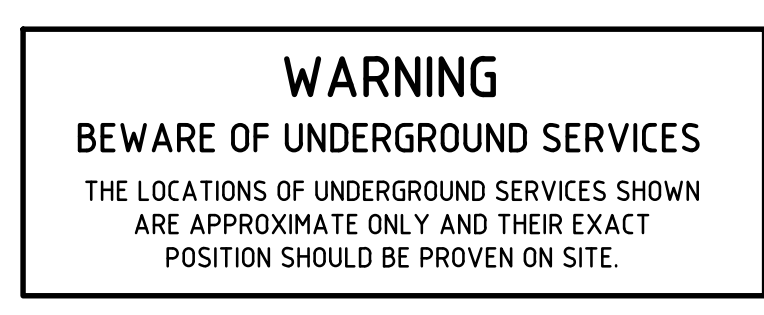
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Project Name
**21-41 CANBERRA AVE.
18-32 HOLDSWORTH AVE
ST. LEONARDS SOUTH**

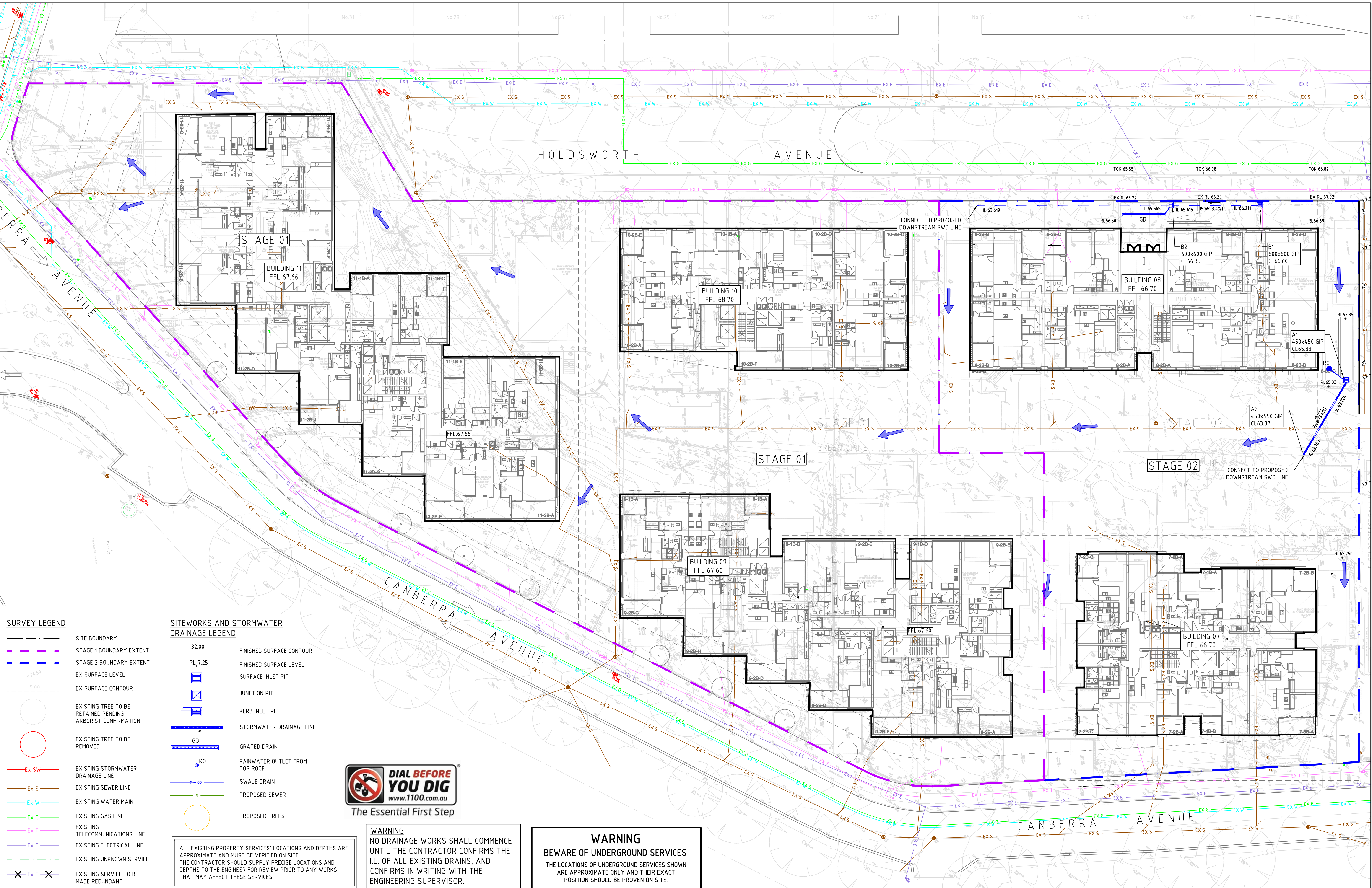
Drawing Title
**SITWORKS AND STORMWATER
DRAINAGE PLAN - LEVEL 5**

DEVELOPMENT APPLICATION			
Designed	AM	Approved	Date
Drawn	MD		
Scale	1:250	Project Ref	Drawing No
Date	MAY 2021		Rev
Sheet	A1	12925 01	C0034 P2



DEVELOPMENT APPLICATION				
Designed	AM	Approved	Date	North 
Drawn	MD	Project Ref	Drawing No	Rev
Scale	1:250			
Date	MAY 2021			
Sheet	A1	12925 01	C0035	P2

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By: Hilg Manning



- SURVEY LEGEND**
- SITE BOUNDARY
 - - - STAGE 1 BOUNDARY EXTENT
 - - - STAGE 2 BOUNDARY EXTENT
 - EX SURFACE LEVEL
 - EX SURFACE CONTOUR
 - EXISTING TREE TO BE RETAINED PENDING ARBORIST CONFIRMATION
 - EXISTING TREE TO BE REMOVED
 - Ex SW EXISTING STORMWATER DRAINAGE LINE
 - Ex S EXISTING SEWER LINE
 - Ex W EXISTING WATER MAIN
 - Ex G EXISTING GAS LINE
 - Ex T EXISTING TELECOMMUNICATIONS LINE
 - Ex E EXISTING ELECTRICAL LINE
 - Ex E EXISTING UNKNOWN SERVICE
 - Ex E EXISTING SERVICE TO BE MADE REDUNDANT

- SITWORKS AND STORMWATER DRAINAGE LEGEND**
- 32.00 FINISHED SURFACE CONTOUR
 - RL 7.25 FINISHED SURFACE LEVEL
 - SURFACE INLET PIT
 - JUNCTION PIT
 - KERB INLET PIT
 - STORMWATER DRAINAGE LINE
 - GD GRATED DRAIN
 - RO RAINWATER OUTLET FROM TOP ROOF
 - SWALE DRAIN
 - S PROPOSED SEWER
 - PROPOSED TREES

ALL EXISTING PROPERTY SERVICES' LOCATIONS AND DEPTHS ARE APPROXIMATE AND MUST BE VERIFIED ON SITE. THE CONTRACTOR SHOULD SUPPLY PRECISE LOCATIONS AND DEPTHS TO THE ENGINEER FOR REVIEW PRIOR TO ANY WORKS THAT MAY AFFECT THESE SERVICES.



WARNING
NO DRAINAGE WORKS SHALL COMMENCE UNTIL THE CONTRACTOR CONFIRMS THE I.L. OF ALL EXISTING DRAINS, AND CONFIRMS IN WRITING WITH THE ENGINEERING SUPERVISOR.

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

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P2	ISSUE FOR DA	08.06.21	HM	-					
P1	ISSUE FOR DA	07.06.21	HM	-					
Rev	Description	Date	By	App	Rev	Description	Date	By	App



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Project Name
21-41 CANBERRA AVE.
18-32 HOLDSWORTH AVE
ST. LEONARDS SOUTH

Drawing Title
SITWORKS AND STORMWATER
DRAINAGE PLAN - LEVEL 7

DEVELOPMENT APPLICATION

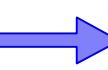
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Scale	1:250	Project Ref	Drawing No	Rev
Date	MAY 2021	12925 01	C0036	P2
Sheet	A1			

FUTURE POCKET PARK CATCHMENT
TO BE DESIGNED TO FALL AWAY
FROM THE PROPOSED SITE.

ROOF AREA = 0.626Aha
HARDSCAPE AREAS = 0.1804ha
TOTAL IMPERVIOUS AREA = 0.8064ha

PERVIOUS
AREA = 0.4570ha

CATCHMENT LEGEND

-  BUILDING ROOF CATCHMENT AREA
-  HARDSCAPE CATCHMENT AREA
-  PERVIOUS CATCHMENT AREA
-  CATCHMENT FLOW DIRECTION

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Project Name
21-41 CANBERRA AVE. &
18-32 HOLDSWORTH AVE.
ST. LEONARDS
Drawing Title
POST DEVELOPMENT
CATCHMENT PLAN

DEVELOPMENT APPLICATION

Designed	AM	Approved	Date	North
Drawn	MD			
Scale	1:250	Project Ref	Drawing No	Rev
Date	MAY 2021	12925 01	C 0042	P1
Sheet	A1			



SCALE 1:10



SCALE 1:10

SCALE 1:20