

Tony McLain Architects

Land Capability and Wastewater Management Options Assessment: Proposed Dwelling and Horse Stables, 113 Orchard Street, Warriewood, NSW



ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



P2108165JR05V01
February 2024

Copyright Statement

Martens & Associates Pty Ltd (Publisher) is the owner of the copyright subsisting in this publication. Other than as permitted by the Copyright Act and as outlined in the Terms of Engagement, no part of this report may be reprinted or reproduced or used in any form, copied or transmitted, by any electronic, mechanical, or by other means, now known or hereafter invented (including microcopying, photocopying, recording, recording tape or through electronic information storage and retrieval systems or otherwise), without the prior written permission of Martens & Associates Pty Ltd. Legal action will be taken against any breach of its copyright. This report is available only as book form unless specifically distributed by Martens & Associates in electronic form. No part of it is authorised to be copied, sold, distributed or offered in any other form.

The document may only be used for the purposes for which it was commissioned. Unauthorised use of this document in any form whatsoever is prohibited. Martens & Associates Pty Ltd assumes no responsibility where the document is used for purposes other than those for which it was commissioned.

Limitations Statement

The sole purpose of this report and the associated services performed by Martens & Associates Pty Ltd is provide a preliminary wastewater management assessment report in accordance with the scope of services set out in the contract / quotation between Martens & Associates Pty Ltd and Tony McLain Architects (hereafter known as the Client). That scope of works and services were defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

Martens & Associates Pty Ltd derived the data in this report primarily from a number of sources which may include for example site inspections, correspondence regarding the proposal, examination of records in the public domain, interviews with individuals with information about the site or the project, and field explorations conducted on the dates indicated. The passage of time, manifestation of latent conditions or impacts of future events may require further examination / exploration of the site and subsequent data analyses, together with a re-evaluation of the findings, observations and conclusions expressed in this report.


In preparing this report, Martens & Associates Pty Ltd may have relied upon and presumed accurate certain information (or absence thereof) relative to the site. Except as otherwise stated in the report, Martens & Associates Pty Ltd has not attempted to verify the accuracy of completeness of any such information (including for example survey data supplied by others).

The findings, observations and conclusions expressed by Martens & Associates Pty Ltd in this report are not and should not be considered an opinion concerning the completeness and accuracy of information supplied by others. No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings and conclusions are based solely upon site conditions, information and drawings supplied by the Client etc. in existence at the time of the investigation.

This report has been prepared on behalf of and for the exclusive use of the Client and is subject to and issued in connection with the provisions of the agreement between Martens & Associates Pty Ltd and the Client. Martens & Associates Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

© February 2024
Copyright Martens & Associates Pty Ltd
All Rights Reserved

Head Office
Suite 201, 20 George Street
Hornsby, NSW 2077, Australia
ACN 070 240 890 ABN 85 070 240 890
Phone: +61-2-9476-9999
Fax: +61-2-9476-8767
Email: mail@martens.com.au
Web: www.martens.com.au

Document and Distribution Status							
Author(s)		Reviewer(s)		Project Manager		Signature	
Robert Mehaffey		Gray Taylor Andrew Norris		Gray Taylor			
Revision No.	Description	Status	Release Date	Document Location			
				File Copy	Tony McLain Architects		
1	Wastewater Assessment	Draft	25/01/2024	1P	1P		
1	Final Report	Final	1/03/2024	1P	1P		

Distribution Types: F = Fax, H = Hard copy, P = PDF document, E = Other electronic format. Digits indicate number of document copies.

All enquiries regarding this project are to be directed to the Project Manager.

Contents

1 OVERVIEW.....	23
1.1 Background	23
1.2 Development Proposal	23
1.3 Aims and Objectives	23
1.4 Relevant Standards and Policy	24
2 SITE DESCRIPTION	25
2.1 Summary	25
2.2 Site Investigations	26
2.3 Sub Surface Conditions	26
2.4 Climate	27
2.5 Hydrogeological Data	27
3 WASTEWATER ASSESSMENT	28
3.1 Proposed Wastewater Management System	28
3.2 Land Capability Assessment for On-site Effluent Disposal	28
3.3 Soil Profile and Effluent Application Rates	29
3.4 Buffers and Setbacks to Effluent Management Area	29
3.5 Site Wastewater Generation Rates	30
3.6 Effluent Management Area Sizing and Location	31
3.7 Wastewater Management System	31
3.8 Construction Requirements	31
3.9 Inspection and Maintenance Schedule	32
4 REFERENCES	34
5 ATTACHMENT A: MAPSET AND FIGURES	35
6 ATTACHMENT B: DEVELOPMENT PLANS	36
7 ATTACHMENT C: SURVEY PLAN	37
8 ATTACHMENT D: BOREHOLE LOGS.....	38

Tables

Table 1: Site description summary.	25
Table 2: Summary of typical soil horizon characteristics.	26
Table 3: Meteorological data.	27
Table 4: Site suitability for on site effluent management systems, according to NSW Department of Local Government, (1998).	28
Table 5: Recommended setback distances in metres.	30
Table 6: Design wastewater loads for 113 Orchard Street, Warriewood, NSW. .	31

1 Overview

1.1 Background

Martens & Associates (MA) has prepared this wastewater assessment to support a development application (DA) for the construction of new dwelling and horse stables at 113 Orchard Street, Warriewood, NSW ('the site'). This report provides an assessment of onsite wastewater management requirements and land capability.

1.2 Development Proposal

Based on correspondence with the client, it is our understanding that the proposed development will involve:

- Demolition of existing dwelling and construction of new four bedroom dwelling.
- Construction of a new horse arena located in the eastern portion of the site.
- Construction of a horse stable for up to four horses with associated yards, wash bay and amenities.
- Construction of paddocks upslope (west) of the proposed stables.

Proposed development plans prepared by Tony McLain Architects (2021) are provided in Attachment B.

1.3 Aims and Objectives

The aims and objectives of this assessment are:

1. Characterise site effluent land capability and assess suitability and design loading for onsite effluent disposal.
2. Estimate site wastewater generation rates of the stables based on proposed site usage numbers provided by the Client.
3. Provide recommendations for appropriate onsite wastewater management system and outline effluent management requirements.

1.4 Relevant Standards and Policy

Guidelines and standards considered in this study include:

1. NSW Department of Local Government *et al.* (1998) *On-site Sewage Management for Single Households*.
2. NSW Health (2001) *Septic Tank and Collection Well Accreditation Guideline*.
3. Standards Australia (2012) *Australian /New Zealand Standard 1547: On-site domestic wastewater management*.

2 Site Description

2.1 Summary

A summarised site description is provided in Table 1 and site plan is provided in Map 01 (Attachment A).

Table 1: Site description summary.

Item	Description / Detail
Site address	113 Orchard Street, Warriewood, NSW.
Lot/DP ¹	Lot 6 DP749791.
Local Government Area (LGA) ¹	Northern Beaches Council (NBC).
Current land use ¹	RU2 Rural Landscape.
Proposed development	Demolition of existing dwelling and construction of new four bedroom dwelling, horse stables, arena and paddocks.
Site description	The site is a rural lot with an existing dwelling, grassed landscaped areas and bushland.
Surrounding land uses	The site is bordered by bushland to the west, bushland and rural lots to the north and south and Orchard Street and residential lots to the east.
Topography	<p>Site slopes range between 55% in the western portion of the site and 19% near the lower southeast portion of the site with an easterly aspect. Site elevation is approximately 18 mAHD near the southeast boundary, rising to 43 mAHD near the central west portion of the site (Source: Axiom Surveying, 2018).</p> <p>A survey map showing the topography of the site is presented in (Attachment C).</p>
Expected Geology and Soils	<p>The Sydney 1:100,000 Geological Series Sheet 9130 (1983) identifies the site as Hawkesbury Sandstone from the Wianamatta Group, consisting of medium to coarse grained quartz sandstone, very minor shale and laminate lenses.</p> <p>The NSW Environment and Heritage eSPADE website identifies the site as having soils from the Warriewood landscape consisting of deep well sorted, sandy humus podzols and dark, mottled siliceous sands, overlying acid peats in depressions with deep podzols and pale siliceous sands on sandy rises.</p>

Note:

¹. NSW Planning Portal

2.2 Site Investigations

MA completed the following site investigations on November 24, 2021:

- Walkover inspection to assess existing site conditions, local topography, geology, soil characteristics, hydrology and vegetation.
- Excavation and logging of four boreholes using hand operated hydraulic push tube to a maximum depth of 1.0 m below ground level (mbgl).
- Collection of representative soil samples from boreholes for future reference.

Borehole logs are provided in Attachment D.

2.3 Sub Surface Conditions

Soil characteristics encountered during borehole investigations in potential onsite effluent management areas (EMAs) consisted of sand, sandy loam and clayey sands topsoils to depths of approximately 400 mm overlying clay loams grading to light to medium clays at depth. The locations of the boreholes are shown in Map 02 (Attachment A).

Indicative depths based on borehole investigations are summarised in Table 2 with detailed borehole logs provided in Attachment D.

Table 2: Summary of typical soil horizon characteristics.

Layer	Depth (m)	Agricultural Classification	Soil Permeability Category ¹
Sandy LOAM	0.0 - 0.2	SL	2a
Sandy CLAY LOAM	0.15 - 0.4	SCL	4a
Light CLAY	0.3 - 1.0	LC	5b

Note:

¹ In accordance with Table 8 of NSW Department of Local Government et al. (DLG et al, 1998).

2.4 Climate

A summary of local meteorological data from the closest operational BOM Station with rainfall data (Mona Vale Golf Club - station 66149, 1969 to 2021) and mean daily evaporation (Prospect Reservoir - station 67019, 1965 to 2018) are provided in Table 3.

Table 3: Meteorological data.

Month	Mean Monthly Rainfall (mm)	Mean Daily Evaporation (mm)
January	107.3	5.5
February	128.4	4.7
March	128.7	3.9
April	111.0	2.9
May	98.3	2.0
June	124.6	1.6
July	64.5	1.7
August	73.8	2.5
September	61.0	3.6
October	72.0	4.4
November	91.7	5.0
December	72.0	5.6
Annual	1154.1	1342.8

2.5 Hydrogeological Data

Review of WaterNSW Real-time Water Data database indicated that no groundwater bores were located within 500 metres of the site.

No groundwater was encountered during onsite borehole investigations up to 1.0 mbgl.

3 Wastewater Assessment

3.1 Proposed Wastewater Management System

A new wastewater treatment and disposal system is to be constructed at the site to service a new four bedroom dwelling and horse stable at the site. It is understood that horses are to be washed outside of the stables, and that stable bedding will be regularly changed and will absorb horse urine.

Based on the above, a new wastewater treatment and disposal system is proposed to manage wastewater from the following development elements:

- The new four bedroom dwelling.
- Toilet for stable users.

To service the above elements, it is recommended that a new NSW DOH accredited aerated wastewater treatment system (AWTS) and onsite surface drip irrigation system be installed to manage wastewater from the proposed development.

3.2 Land Capability Assessment for On-site Effluent Disposal

Landform and soil constraints for onsite wastewater management in the proposed EMA are summarised, in Table 4, in accordance with NSW DLG *et al.* (1998).

Table 4: Site suitability for on site effluent management systems, according to NSW Department of Local Government, (1998).

Feature	Details of Irrigation Areas	Limitation Rating
Flood potential	Above 1 in 20 years	Minor
Sun and wind exposure	Moderate	Minor
Slope (%)	>20 %	Major ¹
Landform	Convex side slope	Minor
Erosion potential	None – low erosion potential	Minor
Site drainage	No visible signs of dampness	Minor
Fill	No Fill	Minor
Rock outcrop	<10%	Minor
Geology	No major discontinuities	Minor
Depth to bedrock (m)	> 1.0 ¹	Moderate / Minor
Depth to water table (m)	>1.0 m	Minor

Feature	Details of Irrigation Areas	Limitation Rating
Soil permeability category	Topsoil 2a / 4a Subsoil 5b	Minor Moderate
Coarse fragments (%)	Generally, 0 – 20%	Minor

Note:

¹Assumes sub surface drip irrigation system in proposed EMA based on BH101 and BH102.

Land and soils capability assessment indicate the majority of site features pose a minor limitation to disposal of effluent. Features with moderate to major limitations are:

- Depth to bedrock – effluent application rates are reduced from those recommended in AS/NZS 1547 (2012) based on soil texture, to account for this limitation.
- Subsurface irrigation in upper 400 mm of soil (i.e., topsoil) addresses limitation of subsoil permeability.
- Slope – slope across the site varies locally. Areas within the proposed EMA have slopes between 20 - 30% and therefore a reduction of 50% of the AS/NZS 1547 (2012) effluent application rates are to be adopted to account for limitations posed by the slope.

3.3 Soil Profile and Effluent Application Rates

Site investigations within the proposed EMA (BH101 and BH102) identified a consistent soil profile of sandy loam overlying sandy clay loam to 0.4 mbgl. Based on observed soil texture and assuming a subsurface LPED irrigation system, a DIR of 3.5 mm/day is recommended by AS/NZS 1547 (2012). To account for the shallow soil profile and slopes, this rate is reduced by 50%. The adopted DIR for the site is therefore 1.75 mm/day for onsite irrigation.

3.4 Buffers and Setbacks to Effluent Management Area

Relevant setbacks have been assessed against NSW DLG *et al.* (1998) guidelines (Table 5). Site analyses determine that setbacks to the proposed effluent management area (EMA) are generally achieved. While no setback is specified a 1.0 m setback is provided to the internal horse track.

Table 5: Recommended setback distances in metres.

Site Feature	Distance (m) NSW DLG <i>et al.</i> (1998)
Natural waterbodies (rivers, creeks, lakes, etc.)	100
Other waters (farm dams, intermittent streams, etc.)	40
Domestic well used for household water supply	250
Buildings, driveways, swimming pools and boundaries	6 / 3 ¹

Notes:

¹ Upslope / downslope buffer.

3.5 Site Wastewater Generation Rates

3.5.1 Dwelling

Dwelling generation rates are based on a reticulated water supply and 150 L/person/day in accordance with Table H1 of AS/NZS1547 (2012). Occupancy rates are based on two people in the first bedroom and one additional occupant per extra bedroom.

3.5.2 Stables

Stables are expected to be used by site residents only. The use of the amenities is likely to be occasional and minor (residents are more likely to use amenities in the dwelling), a conservative value of one 'staff' is assumed for design.

AS/NZS 1547 (2012) does not provide commercial wastewater flow allowances for Australia, therefore the New Zealand standard of rural factories 50 L/person/day (Table H4) has been used which is considered the most appropriate design flow allowance for the horse stables. Typically, generation rates for comparable New Zealand situations are higher in the standard than for corresponding Australian situations, therefore Table H4 values may be adopted as a conservative design approach. Design flow rate for toilet use within the stables is calculated as 50 L/day.

We are advised that all horse washdown will be completed outside of the stables and that all horse urine will be absorbed by stable bedding. As such, no additional wastewater load will be generated by these elements.

We have assumed reticulated water supply to the site with design hydraulic load for the development presented in Table 6.

Table 6: Design wastewater loads for 113 Orchard Street, Warriewood, NSW.

Development Element	Design Occupants	Wastewater Generation Rate L/d	Design Wastewater Load (L/d)
Residents	5	150 L/day ¹	750
Stable 'staff'	One staff (daily)	50 L/day ²	50
Design			800

Note:

¹ Based on Table H1 AS/NZS 1547 (2012).

² Based on Table H4 'Rural Factories' AS/NZS 1547 (2012).

3.6 Effluent Management Area Sizing and Location

The effluent management area is sized based on the design wastewater load of 800 L/day. Using the adopted DIR of 1.75 mm/day (Section 3.3), a minimum 458 m² EMA is required for irrigation.

Site plans in Attachment A demonstrate an available EMA located in the southeastern portion of the site, to the south of the proposed new dwelling.

3.7 Wastewater Management System

It is recommended that a new NSW DOH accredited AWTs be installed at the site to treat generated wastewater. The AWTs is to be sized to treat the peak flow of 800 L/day.

It is recommended that effluent application in the proposed EMA be via a covered surface drip irrigation (in accordance with Figure M1 of AS/NZS 1547 (2012)) to minimise impact to tree roots in the area.

3.8 Construction Requirements

Minimum requirements for the wastewater management system are summarised as:

- A new, suitably sized (min. 800 L/day) NSW DOH approved AWTs is to be installed to treat site wastewater.
- The EMA is to be a covered drip irrigation field and be constructed in accordance with Figure M1 of AS/NZS 1547 (2012).

- Driplines are to be pressure compensating 13 mm netafim lines installed above ground, pegged in (minimum 150 mm long staples) and covered with mulch to avoid surface pooling.
- It is recommended that additional vegetation planting be undertaken within the EMA around driplines to increase nutrient uptake.
- Minimum area of EMA to be 458 m². EMA area is to exclude any rock outcropping.
- Effluent transfer and flushing mains to be HDPE.
- Flushing main to be connected to the AWTS and have manual valve to allow for periodic flushing of the driplines.
- No stormwater disposal upslope or within EMA. All upslope stormwater to be diverted around EMA with minimum buffer of 2 m from edge of EMA for all stormwater associated infrastructure.
- Irrigation areas identified on the report plans are indicative only. Final location of all system elements is to be confirmed on site and to be subject of a Section 68 application to install.

3.9 Inspection and Maintenance Schedule

The proposed wastewater treatment and effluent management systems are to be designed and installed, then inspected and certified by a person acceptable to Northern Beaches Council prior to system commissioning.

Installation, operations and maintenance for the system is summarised as follows:

- Prior to installation a Section 68 approval to install shall be obtained from Northern Beaches Council.
- Prior to operation a Section 68 approval to operate shall be obtained from Northern Beaches Council.
- The new wastewater management system shall be maintained by a suitably qualified person or persons. As a minimum this shall include periodic inspection and maintenance of all system components including all pumps, plumbing, float switches and alarm system.
- Periodic solids management will be required for the AWTS, with all waste transported to a suitable off site facility for treatment and

disposal. Frequency of solids management depends on use and occupation of the site, but tends to be of the order of once every 3 - 5 years for a system such as this.

- Regular visual inspection of the EMA by owner should be undertaken to verify that the irrigation areas are operating satisfactorily. All leaks and signs of system malfunction are to be remediated as soon as practical with licenced plumber's assistance as required.
- Periodic flushing of irrigation driplines will be required at a minimum of once every 3 months or in accordance with the manufacturer's specifications.

4

References

Australian / New Zealand Standard 1547 (2012), *On-site domestic wastewater management*.

Axiom Surveying (2018) Plan showing Detail and Levels over Lot 6 in DP749791 Being No. 113 Orchard Street, Warriewood, For Design Purposes and to Support a Development Application.

Department of Local Government, NSW Environment Protection Authority, NSW Health Department, NSW Department of Land and Water Conservation and the NSW Department of Urban Affairs and Planning (1998), *Environment and Health Protection Guidelines - On-site Sewage Management for Single Households*, Referenced a DLG et al, 1998.

Pennsylvania State University (PSU) (2000) *Horse stable manure management*.

NSW Department of Primary Industries (1983) - Sydney 1:100,000 Geological Series Sheet 9130.

NSW Department of Local Government et al. (1998) *On-site Sewage Management for Single Households*.

NSW Health (2001) *Septic Tank and Collection Well Accreditation Guideline*.

Standards Australia (2012) *Australian /New Zealand Standard 1547: On-site domestic wastewater management*.

Tony McLain (2021) *Pre-DA Site Plan - Proposed Horse Arena and Facilities and Additions to Existing Dwelling. Lot 6 DP749791. 113 Orchard St., Warriewood*.

5 **Attachment A: Mapset and Figures**

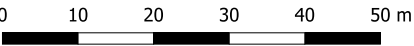
Legend

Site boundary

Map 03 viewport



Map	Title
Map 01	Site Location Map
Map 02	Borehole Location Map
Map 03	Proposed Effluent Management Area (EMA)



1:1000 @ A3
Viewport
Source of Aerial Photo: Nearmap.

Map Title / Figure:
Site Location Map

Map 01	Map
113 Orchard Street, Warriewood, NSW.	Site
Proposed Dwelling and Stables	Project
Wastewater Assessment	Sub-Project
Tony Mclain Architects	Client
02/02/2024	Date



1:1000 @ A3

Viewport

Source of contour lines: ELVIS Lidar.
Source of Aerial Photo: Nearmap.

6 Attachment B: Development Plans



***PROPOSED
RESIDENCE***

Client: *A & S Simpson + N & J Hunter*
Site: *113 Orchard Street*
Warriewood NSW 2102
Lot 6, DP 749791

AA	Front Page
A01	Location Plan
A02	Site Plan - Site Anaysis
A03	Ground Floor Plan
A04	First Floor Plan
A05	Elevations
A06	Elevations
A07	Cross Section & Driveway levels
A08	Water Management Plan
A09	Shadow Diagram
A10	Ground Floor Electrical Plan
A11	First Floor Electrical Plan
A12	Gas Plan
A - A	Wet Area Details
A - B	Wet Area Details

Site Details	
Site Area:	9598.8m ²
Roof Area:	240.9m ²
Harvested Roof Area:	As per BASIX
Total Garden & Lawn Area:	200m ²

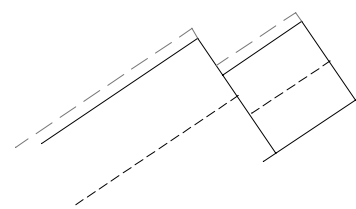
Issue A1

BASIX NOTES

1. **All showerheads**
to have a minimum 3 star rating
(>7.5 but < 9 L/min)
- 2 **All flushing toilets**
to have a minimum 4 star rating
- 3 **Kitchen taps** and all **Basin Taps**
to have a minimum 4 star rating
- 4 **Install a rainwater tank**
minimum 5000 litres (to be collected from 241 m2 of roof area)
Rainwater tank to be connected to all toilets , the laundry
cold water tap and one outdoor tap
5. **Pool**
volume < 10 kilolitres . Pool to be outdoors.
No heating . Install pool pump with timer
- 6 **Hot water** .
Gas instantaneous minimum 5 star rating
7. Install **Photo voltaic system** .
Minimum generating capacity 1.5 peak kilowatts
Installation to angle North . Angle between 10 – 25 degrees
- 8 **Kitchen.**
Install gas cooktop and electric oven. Install skylight
- 9 **Bathroom**
to have an external window
- 10 **Artificial lighting**
100% of light fixtures to be fluorescent , compact fluorescent
or LED . All to be IC/ICF rated.
- 11 **Cooling**
Living area and 1 bedroom to have air-conditioning
Total dwelling Cooling load < 18(MJ/m2)
12. **Heating**
Living area and 1 bedroom to have air-conditioning
Total dwelling Heating load < 25(MJ/m2)
13. **Ventilation**
1 bathroom and kitchen to have an individual fan ducted
to the façade or roof. Manual on/off switch
Laundry to have natural ventilation only

**SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD**

Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
<p>PROPOSED HORSE ARENA AND AND FACILITIES AND ADDITIONS AND NEW DWELLING LOT 6 DP749791</p>		
Address		
113 Orchard St , Warriewood		
Title		
TULIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631		
Mob 0402223665		
mclaintony@gmail.com		
Scale 1:1 @ A1	Date	MAY 2023
Project No.	Drawing No.	Rev.
1826	22	



ORCHARD



MAYFIELD MKII

1. **All showerheads**
to have a minimum 3 star rating
(>7.5 but < 9 L/min)
- 2 **All flushing toilets**
to have a minimum 4 star rating
- 3 **Kitchen taps** and all **Basin Taps**
to have a minimum 4 star rating
- 4 Install a **rainwater tank**
minimum 5000 litres (to be collected from 241 m² of roof area)
Rainwater tank to be connected to all toilets , the laundry
cold water tap and one outdoor tap
5. **Pool**
volume < 10 kilolitres . Pool to be outdoors.
No heating . Install pool pump with timer
- 6 **Hot water .**
Gas instantaneous minimum 5 star rating
7. Install **Photo voltaic system .**
Minimum generating capacity 1.5 peak kilowatts
Installation to face North . Angle between 10 – 25 degrees
- 8 **Kitchen.**
Install gas cooktop and electric oven. Install skylight
- 9 **Bathroom**
to have an external window
- 10 **Artificial lighting**
100% of light fixtures to be fluorescent , compact fluorescent
or LED . All to be IC/ICF rated.
- 11 **Cooling**
Living area and 1 bedroom to have air-conditioning
Total dwelling Cooling load < 18 (MJ/m²)
12. **Heating**
Living area and 1 bedroom to have air-conditioning
Total dwelling Heating load < 25 (MJ/m²)
13. **Ventilation**
1 bathroom and kitchen to have an individual fan ducted
to the façade or roof. Manual on/off switch
Laundry to have natural ventilation only

00/00/00	#	REVISION

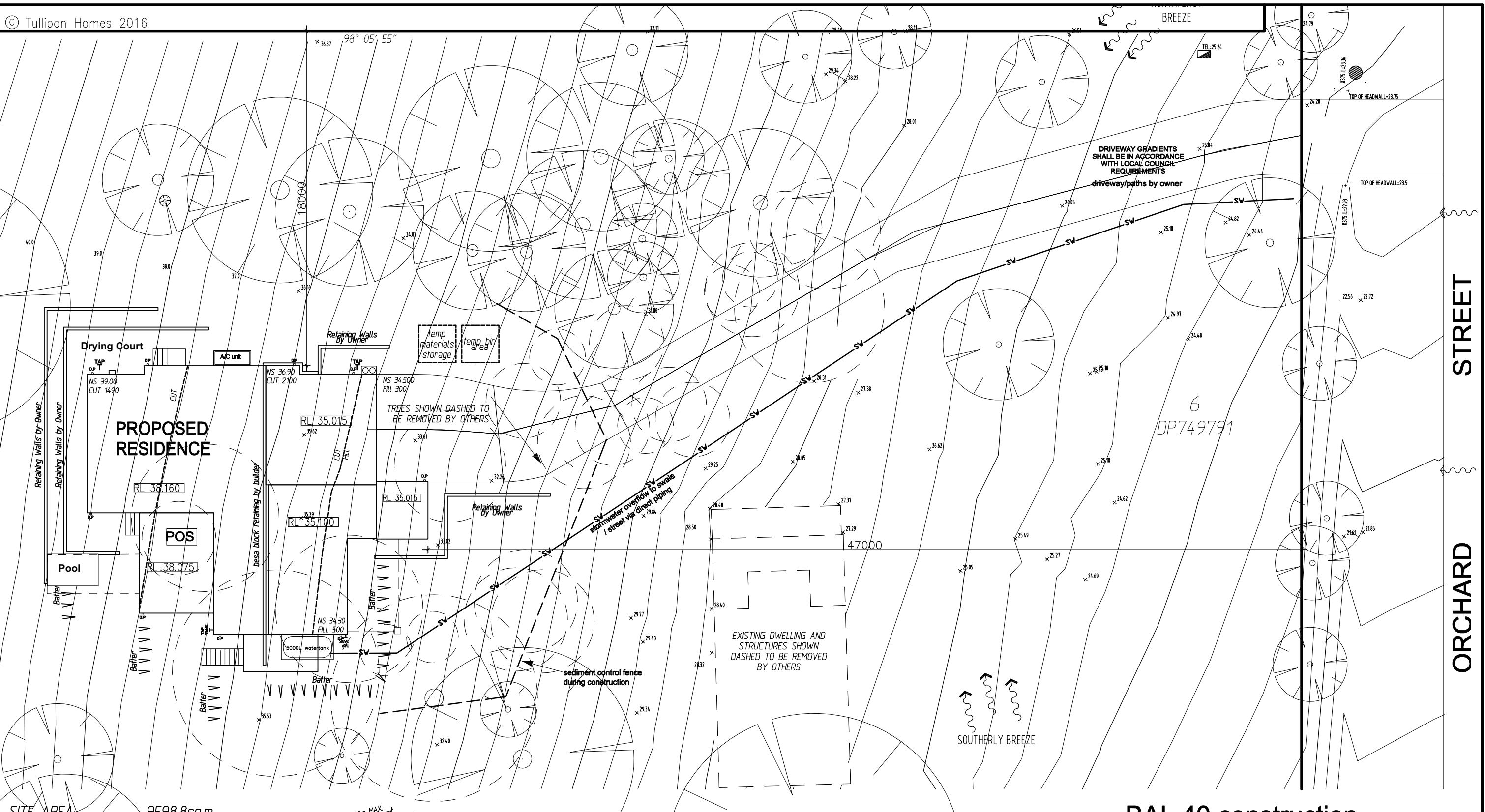
CLIENT A & S Simpson + N & J Hunter		
JOB Proposed Residence		
LOCATION 113 Orchard Street Warriewood NSW 2102		
- BUILDER TO CHECK ALL DETAILS AND DIMENSIONS PRIOR TO CONSTRUCTION. - FIGURED DIMENSIONS TAKE PREFERENCE OVER SCALE.		
SHEET 1 of 12	DATE 23/06/2022	DWG. No. 7873-wd4

plan prepared by
TULLIPAN HOME



Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
PROPOSED HORSE ARENA AND AND FACILITIES AND ADDITIONS AND NEW DWELLING LOT 6 DP749791		
Address		
113 Orchard St , Warriewood		
Title		
TULIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631 Mob 0402223665 mclainltony@gmail.com		
Scale 1:1 @ A1	Date	MAY 2023
Project No. 1826	Drawing No. 23	Rev. J

© Tullipan Homes 2016




SITE AREA: 9598.8sq.m
Site Cover: 198.3sq.m
Drive/paths: 185.2sq.m
Open space: 96%

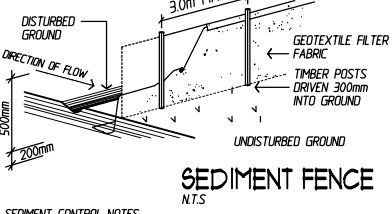
CAUTION:

1. UTILITY SERVICES SHOWN HEREON HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. IF NOT ABLE TO BE LOCATED, SERVICES HAVE BEEN PLOTTED FROM THE RECORDS OF RELEVANT AUTHORITIES WHERE AVAILABLE. PRIOR TO EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR CONFIRMATION OF LOCATION OF SERVICES. **** CALL BEFORE YOU DIG (CALL 1100) ****

2. THE BOUNDARIES SHOWN HEREON ARE APPROXIMATE ONLY. FOR ANY CONSTRUCTION ACTIVITIES PROPOSED IN CLOSE PROXIMITY TO THE BOUNDARIES, IT IS RECOMMENDED THAT THOSE BOUNDARIES BE MARKED TO AVOID POSSIBILITY OF ENCROACHMENT.



**DIAL 1100
BEFORE YOU DIG**

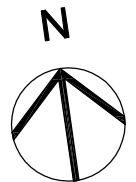


SETOUT NOTE
BOUNDARY DIMENSIONS AND LOCATION OF DWELLING TO BE CONFIRMED AND SETOUT BY SURVEYOR PRIOR TO COMMENCEMENT OF WORK. BUILDER TO BE PRESENT TO CONFIRM PREFERENCE TO LOCATION.

COUNCIL NOTES:
- NO WATERWAYS, WATERCOURSES OR EXISTING DRAINAGE PROBLEMS
- EASEMENTS SHOWN ON SITE PLAN
- EXISTING VEGETATION SHOWN ON SITE PLAN
- STORMWATER DISPOSED OF TO COUNCIL'S REQUIREMENTS

BOUNDARY NOTE
BOUNDARY INFORMATION SUPPLIED BY BUILDER. CONFIRM ALL BOUNDARY INFORMATION PRIOR TO COMMENCEMENT OF WORK.

BAL 40 construction
SITE PLAN / ANALYSIS
SCALE 1:200




LEGEND

-  NOISE FROM ROAD TRAFFIC
-  VEHICULAR SITE ENTRY
-  PRIVATE OPEN SPACE
-  PREVAILING WINDS

CLIENT	A & S Simpson + N & J Hunter		
JOB	Proposed Residence		
LOCATION	113 Orchard Street Warriewood NSW 2102		
- BUILDER TO CHECK ALL DETAILS AND DIMENSIONS PRIOR TO CONSTRUCTION. - FIGURED DIMENSIONS TAKE PREFERENCE OVER SCALE.			
SHEET	DATE	DWG No.	
2 of 12	23/06/2022	7873-wd4	

plan prepared by
TULLIPAN HOMES



Lic. No. 131446C

PH 02 4353 8644
FAX 02 4353 8655
www.tullipanhomes.com.au
www.applivehomes.com.au

Mariners Building
Level 4, Suite 410
1 Bryant Drive
Tuggerah NSW 2259
PO Box 5148
CHITTAWAY BAY NSW 2261

BASIX NOTES

- All showerheads**
to have a minimum 3 star rating
(>7.5 but < 9 L/min)
- All flushing toilets**
to have a minimum 4 star rating
- Kitchen taps** and all **Basin Taps**
to have a minimum 4 star rating
- Install a **rainwater tank**
minimum 5000 litres (to be collected from 241 m2 of roof area)
Rainwater tank to be connected to all toilets , the laundry cold water tap and one outdoor tap
- Pool**
volume < 10 kilolitres . Pool to be outdoors.
No heating . Install pool pump with timer
- Hot water** .
Gas instantaneous minimum 5 star rating
- Install **Photo voltaic system** .
Minimum generating capacity 1.5 peak kilowatts
Installation to face North . Angle between 10 – 25 degrees
- Kitchen.**
Install gas cooktop and electric oven. Install skylight
- Bathroom**
to have an external window
- Artificial lighting**
100% of light fixtures to be fluorescent , compact fluorescent or LED . All to be IC/ICF rated.
- Cooling**
Living area and 1 bedroom to have air-conditioning
Total dwelling Cooling load < 18(MJ/m2)
- Heating**
Living area and 1 bedroom to have air-conditioning
Total dwelling Heating load < 25(MJ/m2)
- Ventilation**
1 bathroom and kitchen to have an individual fan ducted to the façade or roof. Manual on/off switch
Laundry to have natural ventilation only

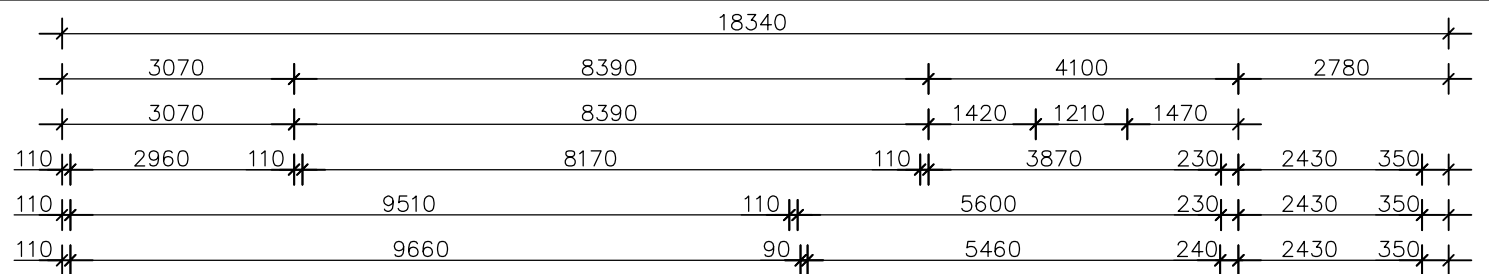
SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD

Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
PROPOSED HORSE ARENA AND AND FACILITIES AND ADDITIONS AND NEW DWELLING		
LOT 6 DP749791		
Address		
113 Orchard St , Warriewood		
Title		
TULIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631 Mob 0402223665 mclaintony@gmail.com		
Scale 1:1 @ A1	Date	MAY 2023
Project No.	Drawing No.	Rev.
1826	24	J

© Tullipan Homes 2016

FIXING LEGEND	
TOWEL RAIL	—
TOILET ROLL	■

BULKHEAD AND STACK LOCATION
TO BUILDERS DISCRETION

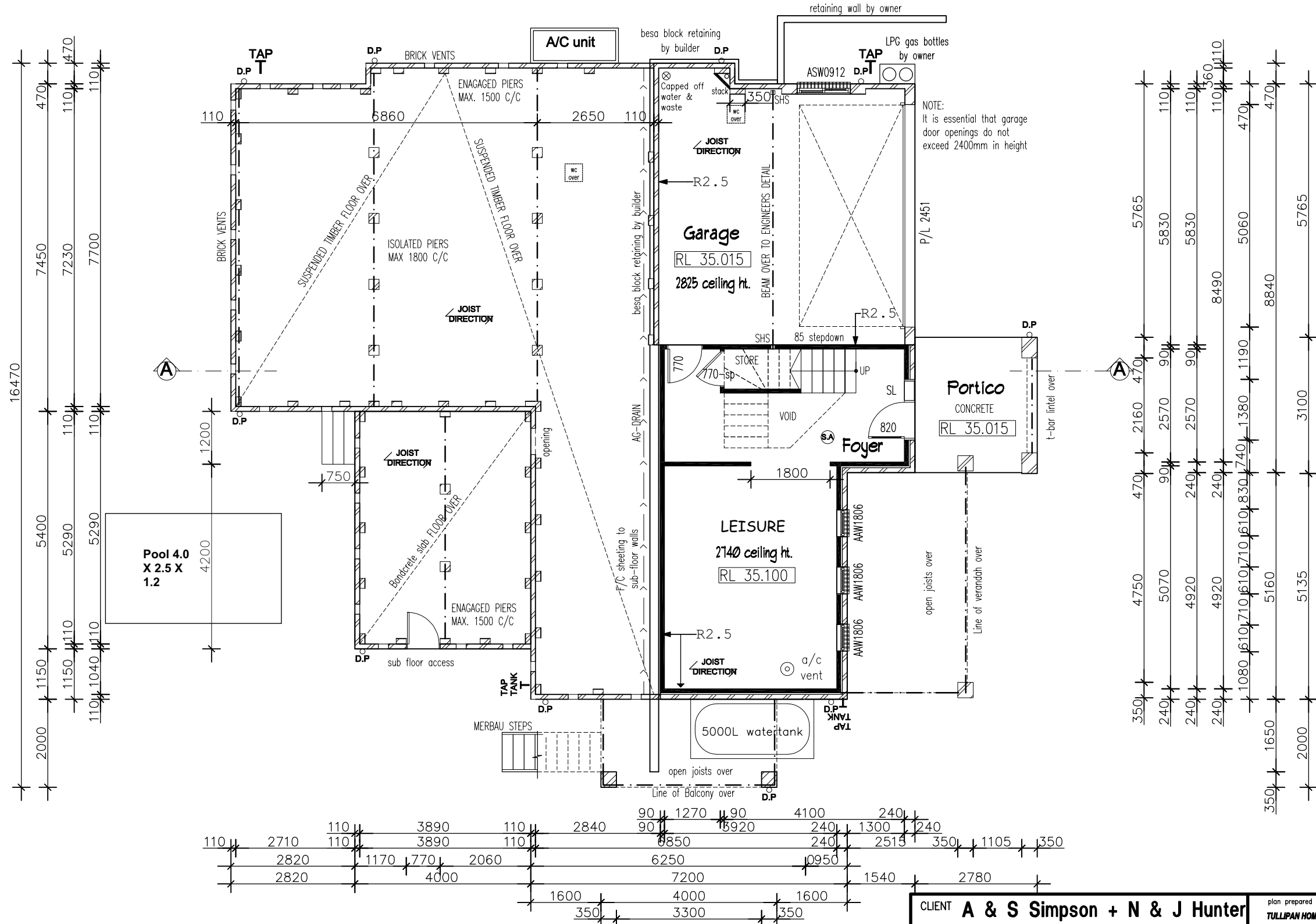


MAYFIELD MKII

A/C
VENT

NOTE: AC VENTS MUST NOT
BE POSITIONED WITHIN 500mm
OF KITCHEN ISLAND BENCH

BAL 40 construction



AREAS:

Portico:	8.6m ²
Ground Floor:	38.7m ²
Garage:	36.1m ²
First Floor:	169.2m ²
Verandah:	21.3m ²
Alfresco:	21.6m ²
Balcony:	8.0m ²

TOTAL: 303.5m²

air conditioning locations, "locations are intended, however may vary if the home structure dictates otherwise", this applies to all air conditioning details signed off by clients.

GROUND FLOOR PLAN
SCALE 1:100

© Tullipan Homes 2016

Copyright: All Tullipan Homes designs, plans, drawings, and sketches are protected by the Commonwealth Copyright Act 1968 and any attempt to copy, use or reproduce the same, in whole or in part, will result in legal proceedings.

CLIENT A & S Simpson + N & J Hunter		
JOB Proposed Residence		
LOCATION 113 Orchard Street Warriewood NSW 2102		
— BUILDER TO CHECK ALL DETAILS AND DIMENSIONS PRIOR TO CONSTRUCTION. — REQUIRED DIMENSIONS TAKE PREFERENCE OVER SCALE.		
SHEET 3 of 12	DATE 23/06/2022	DWG No. 7873-wd4

plan prepared by
TULLIPAN HOMES



Lic. No. 131446C

PH 02 4353 8644
FAX 02 4353 8655
www.tullipanhomes.com.au
www.aprillevelhomes.com.au

**TULLIPAN
HOMES** PTY LTD

Mariners Building
Level 4, Suite 410
1 Bryant Drive
Tuggerah NSW 2259
PO Box 5148
CHITWAW BAY NSW 2261

SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD

Revision Date Remarks

J 11.5.23 FOR DA
Revision Date Remarks

Project
PROPOSED HORSE ARENA AND
AND FACILITIES AND ADDITIONS AND
NEW DWELLING
LOT 6 DP749791

Address
113 Orchard St , Warriewood

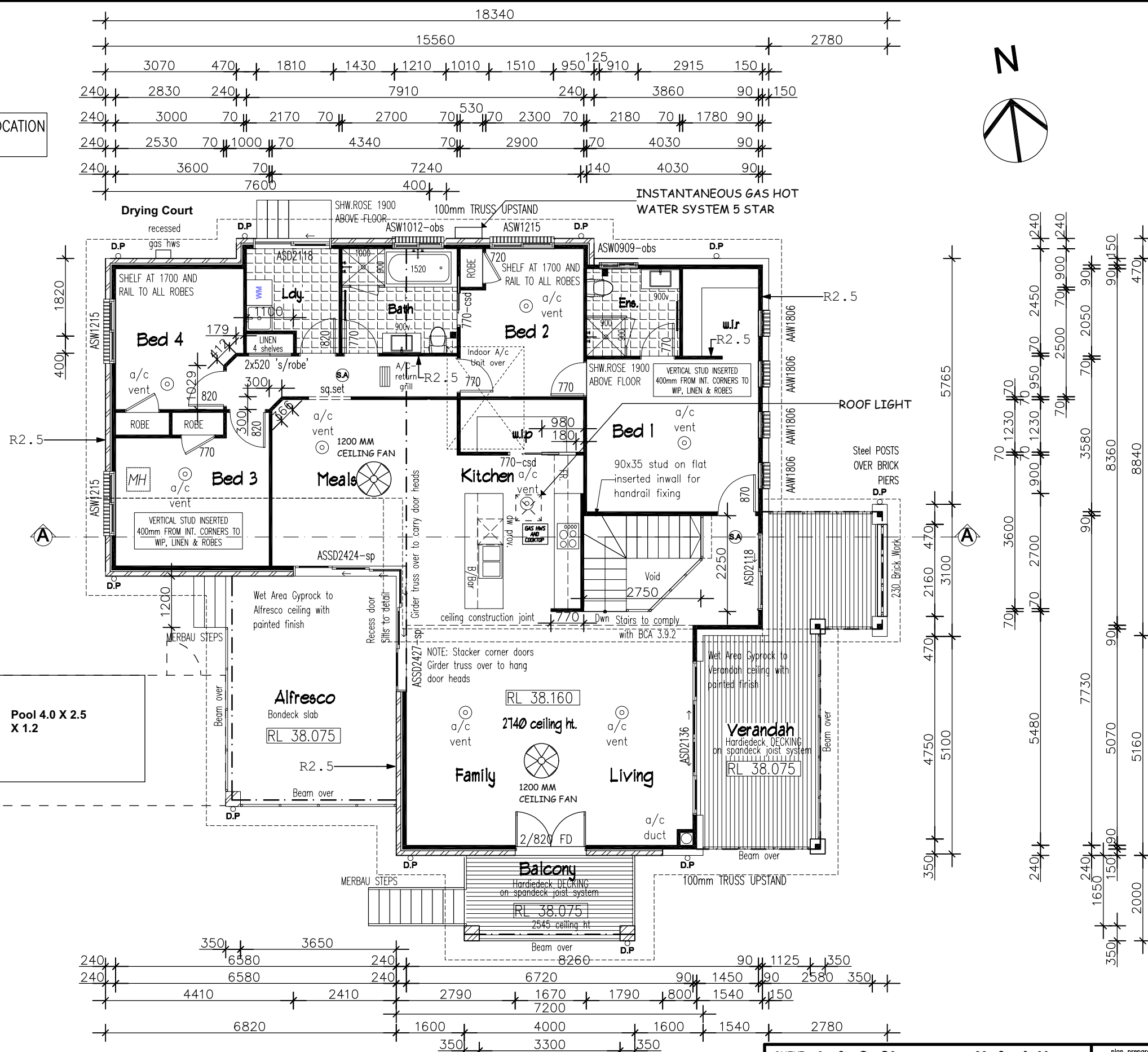
Title
TULLIPAN RESIDENCE

Tony McLain Architect (Reg. No. 4291)

Tel 98108631
Mob 0402223665
mclaintony@gmail.com

Scale 1:1 @ A1 Date MAY 2023
Project No. 1826 Drawing No. 25 Rev. J

FIXING LEGEND
TOWEL RAIL —
TOILET ROLL ■



air conditioning locations, "locations are intended, however may vary if the home structure dictates otherwise", this applies to all air conditioning details signed off by clients.

Copyright: All Tullipan Homes designs, plans, drawings, and sketches are protected by the Commonwealth Copyright Act 1968 and any attempt to copy, use or reproduce the same, in whole or in part, will result in legal proceedings.

FIRST FLOOR PLAN
SCALE 1:100

NOTE: AC VENTS MUST NOT BE POSITIONED WITHIN 500mm OF KITCHEN ISLAND BENCH

BAL 40 construction



00/00/00	#	REVISION

TULLIPAN HOMES PTY LTD

Lic. No. 1314460

FX 02 4353 8644
FAH 02 4353 8655

www.tullipanhomes.com.au
www.splitelivehomes.com.au

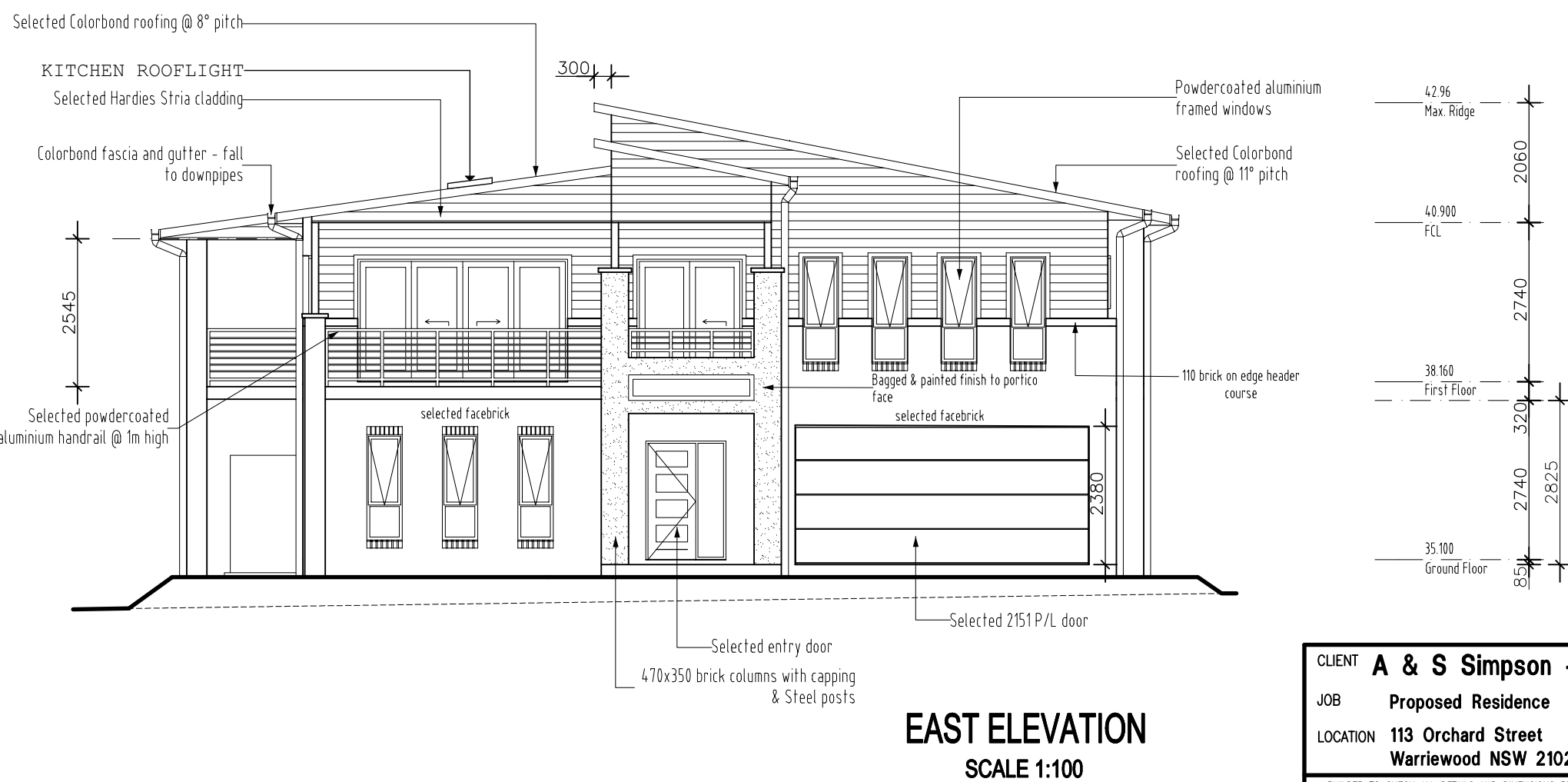
Mariners Building
Level 4, Suite 410
1 Bryant Drive
Tuggerah NSW 2259
PO Box 518
CHITMANBY, NSW 2261

1.	Walls		
	Garage, bath and laundry internal walls		R 2.5
	All external walls excluding the garage		R 2.5
2.	Floors		
	Floors over sub floor spaces and garage		R 4.0
3.	Ceilings		
	Plasterboard		R 6.0
4	Roof		
	Colorbond	Anticon blanket	R 1.3
	Seal all penetrations		
5	Concrete slab		
	50 mm slab edge insulation (excluding the garage)		

**SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD**

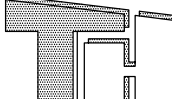
Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
PROPOSED HORSE ARENA AND AND FACILITIES AND ADDITIONS AND NEW DWELLING LOT 6 DP749791		
Address		
113 Orchard St , Warriewood		
Title		
TULIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631		
Mob 0402223665		
mclaintony@gmail.com		
Scale 1:1 @ A1	Date	MAY 2023
Project No.	Drawing No.	Rev.
1826	26	

© Tullipan Homes 2016
Copyright: All Tullipan Homes designs, plans, drawings, and sketches are protected by the Commonwealth Copyright Act 1968 and any attempt to copy, use or reproduce the same, in whole or in part, will result in legal proceedings.



CLIENT	A & S Simpson + N & J Hunter		
JOB	Proposed Residence		
LOCATION	113 Orchard Street Warriewood NSW 2102		
-- BUILDER TO CHECK ALL DETAILS AND DIMENSIONS PRIOR TO CONSTRUCTION. -- FIGURED DIMENSIONS TAKE PREFERENCE OVER SCALE.			
SHEET	DATE	DWG No.	
5 of 12	23/06/2022	7873-wd4	

00/00/00	#	REVISION	



TULLIPAN HOMES PTY LTD

Lic. No. 131446C

PH 02 4353 8644

FAX 02 4353 8655

Mariners Building
Level 4, Suite 410
1 Bryant Drive
Tuggerah NSW 2259
PO Box 5146
CHITTAWAY BAY NSW 2261

www.tullipanhomes.com.au

info@tullipanhomes.com.au

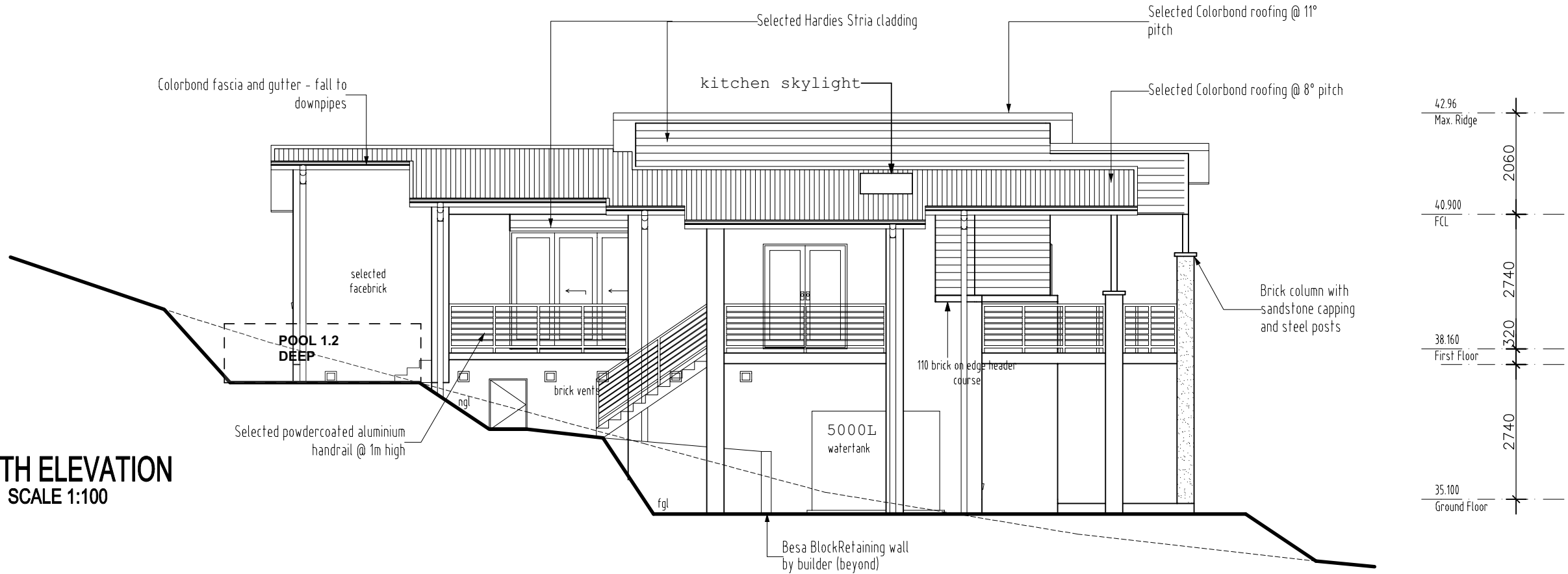
1.	Kitchen/meals/Family/Living glazing	High performance double with Low-E
2.	All other windows (excluding Garage. Laundry , Bath)	Double glazing with Low-E
3.	Glazing Values	
	Opening Type	U- Value
	Glazing Type.	SHGC
	Awning	DG + Low-E
	Fixed	DG + Low-E
	Sliding windows.	Single glazed
	Sliding windows.	DG + Low-E
	Sliding doors	Single glazed
	Sliding doors	DG + Low -E
	Hinged doors	DG + Low-E

**SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD**

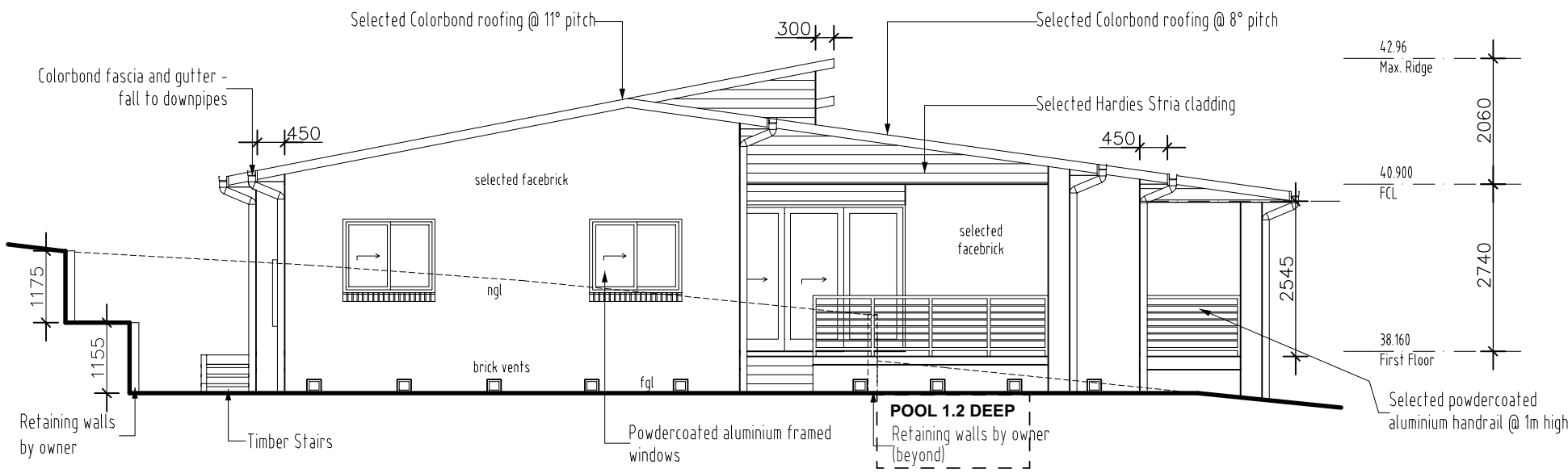
Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
PROPOSED HORSE ARENA AND AND FACILITIES AND ADDITIONS AND NEW DWELLING		
LOT 6 DP749791		
Address		
113 Orchard St , Warriewood		
Title		
TULIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631 Mob 0402223665 mclaintony@gmail.com		
Scale 1:1 @ A1	Date	MAY 2023
Project No.	Drawing No.	Rev.
1826	27	J

BAL 40 construction **MAYFIELD MKII**

SOUTH ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100



CLIENT A & S Simpson + N & J Hunter		
JOB Proposed Residence		
LOCATION 113 Orchard Street Warriewood NSW 2102		
- BUILDER TO CHECK ALL DETAILS AND DIMENSIONS PRIOR TO CONSTRUCTION. - REQUIRED DIMENSIONS TAKE PREFERENCE OVER SCALE.		
SHEET 6 of 12	DATE 23/06/2022	DWG No. 7873-wd4

plan prepared by
TULLIPAN HOMES



Lic. No. 131446C

PH 02 4353 8644
FAX 02 4353 8655
www.tullipanhomes.com.au
www.aprillevelhomes.com.au

**TULLIPAN
HOMES** PTY LTD

Mariners Building
Level 4, Suite 410
1 Bryant Drive
Tuggerah NSW 2259
PO Box 5148
CHITWAY BAY NSW 2261

BASIX GLAZING NOTES

- Kitchen/meals/Family/Living** High performance double glazing with Low-E
- All other windows** (excluding Garage, Laundry, Bath) Double glazing with Low-E
- Glazing Values**

Opening Type	Glass Type.	U- Value	SHGC
Awning	DG + Low-E	3.6	0.47
Fixed	DG + Low-E	3.6	0.54
Sliding windows.	Single glazed	6.7	0.7
Sliding windows.	DG + Low-E	3.6	0.54
Sliding doors	Single glazed	6.7	0.7
Sliding doors	DG + Low -E	2.18	0.4
Hinged doors	DG + Low-E	2.17	0.39

SEE ALSO BASIX NOTES ON SITE PLAN

SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD

Revision Date Remarks

J 11.5.23 FOR DA
Revision Date Remarks

Project
**PROPOSED HORSE ARENA AND
AND FACILITIES AND ADDITIONS AND
NEW DWELLING**
LOT 6 DP749791

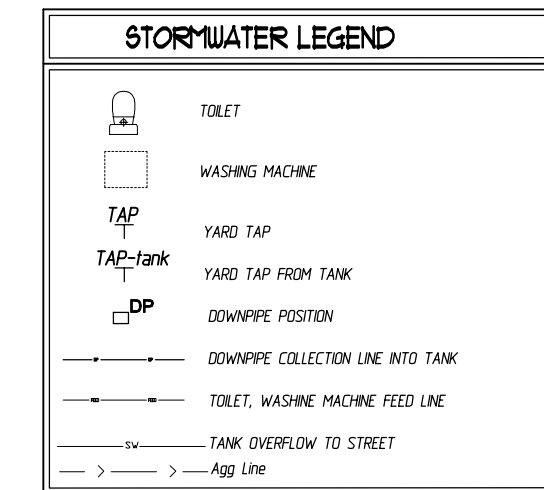
Address
113 Orchard St , Warriewood

Title
TULLIPAN RESIDENCE

Tony McLain Architect (Reg. No. 4291)


Tel 98108631
Mob 0402223665
mclainTony@gmail.com

Scale 1:1 @ A1	Date MAY 2023	Rev.
Project No. 1826	Drawing No. 28	J

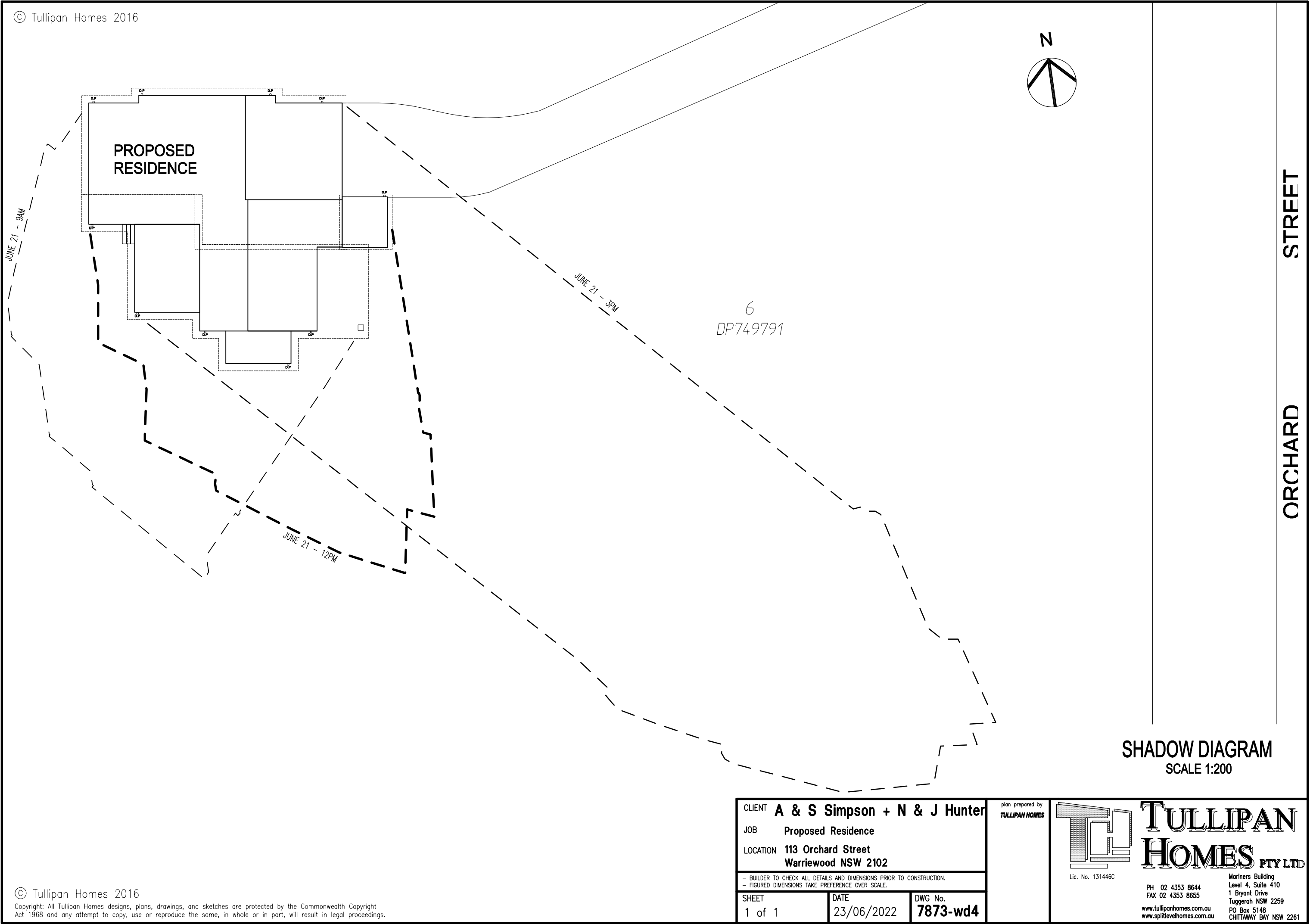


stormwater overflow to swale
/ street via direct piping

SCALE 1:100

CLIENT	A & S Simpson + N & J Hunter		plan prepared by TULLIPAN HOMES	 <p>TULLIPAN HOMES PTY LTD</p> <p>Lic. No. 131446C</p> <p>PH 02 4353 8644 FAX 02 4353 8655 www.tullipanhomes.com.au www.spilveelhomes.com.au</p> <p>Mariners Building Level 4, Suite 410 1 Bryant Drive Tuggerah NSW 2259 PO Box 5148 CHITMAN BAY NSW 2261</p>
JOB	Proposed Residence			
LOCATION	113 Orchard Street Warriewood NSW 2102			
- BUILDER TO CHECK ALL DETAILS AND DIMENSIONS PRIOR TO CONSTRUCTION. - FIGURED DIMENSIONS TAKE PREFERENCE OVER SCALE.				
SHEET	DATE	DWG No.		
8 of 12	23/06/2022	7873-wd4		

Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
PROPOSED HORSE ARENA AND AND FACILITIES AND ADDITIONS AND NEW DWELLING LOT 6 DP749791		
Address		
113 Orchard St , Warriewood		
Title		
TULIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631 Mob 0402223665 mclainTony@gmail.com		
Scale 1:1 @ A1	Date	MAY 2023
Project No.	Drawing No.	Rev.
1826	30	J

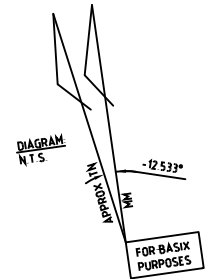
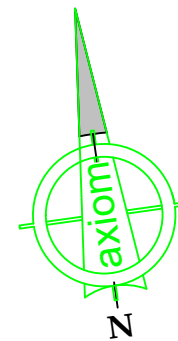
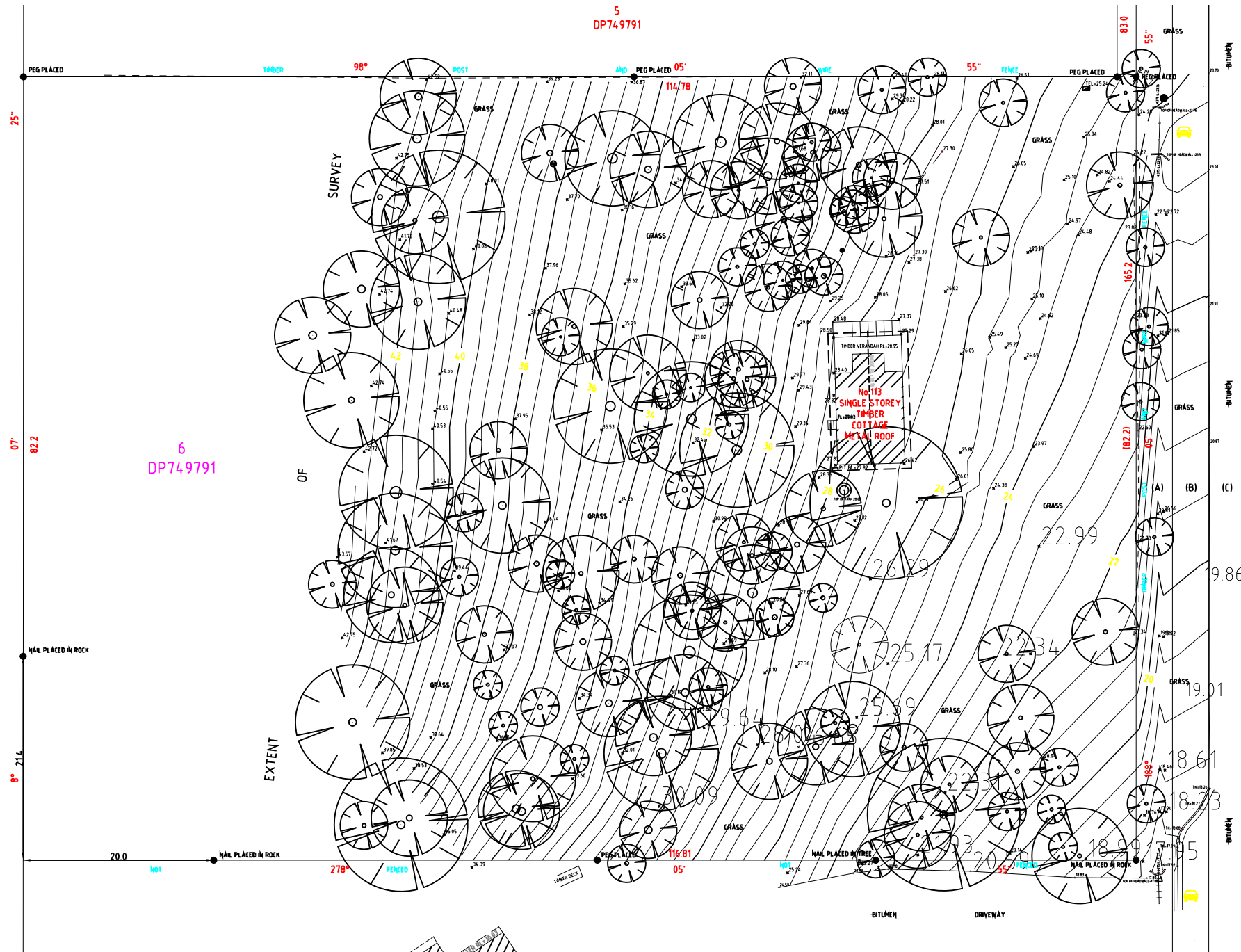


SEE DA DRAWINGS No 1826 (1-10) .Issue J
PROPOSED HORSE ARENA AND FACILITIES
AND NEW RESIDENCE
113 ORCHARD ST, WARRIEWOOD

Revision	Date	Remarks
J	11.5.23	FOR DA
Revision	Date	Remarks
Project		
PROPOSED HORSE ARENA AND FACILITIES AND ADDITIONS AND NEW DWELLING		
LOT 6 DP749791		
Address		
113 Orchard St , Warriewood		
Title		
TULLIPAN RESIDENCE		
Tony McLain Architect (Reg. No. 4291)		
Tel 98108631		
Mob 0402223665		
mclaintony@gmail.com		
Scale 1:1 @ A1		Date MAY 2023
Project No.	Drawing No.	Rev.
1826	31	J

7 Attachment C: Survey Plan

L.G.A. : NORTHERN BEACHES
PARISH : NARRABEEN
COUNTY : CUMBERLAND



AREA LOT 6
VIDE DP 749791: 9766 m²
BY CALC: 9765 m²

ORIGIN OF LEVELS:
PM 55214 RL=25.74 (AHD) FOUND NEAR THE
END OF ORCHARD STREET AND LOT 702
ACCURACY OF ORIGIN: ± 0.001m

LEGEND

POWER POLE	WATER MAIN
ELECTRICAL PILLAR	TELSTRA PIT
POWER LIGHT POLE	SEWER LAMPHOLE
LIGHT POLE	STORMWATER GRATE
HYDRANT	SURFACE INLET PIT
WATER METER	UNTEL-KERB INLET PIT WITH GRATE
STOP VALVE	CLOTHES LINE
GAS METER	
GAS DIRECTION MARKER	
SEWER MANHOLE	
STREET SIGN	TREE: Ø DIAMETER S SPREAD
PRAM CROSSING	
VEHICLE CROSSING	
	— E — OVERHEAD ELECTRICITY LINE
	— T — OVERHEAD TELECOM LINE
	— S — SEWER LINE

WARNING

- THIS DRAWING REMAINS THE PROPERTY OF AXIOM SURVEYING Pty Ltd AND SHOULD NOT BE REPRODUCED IN PART OR IN WHOLE WITHOUT WRITTEN CONSENT FROM AXIOM SURVEYING Pty Ltd
- THE BEARINGS AND DISTANCES OF THE BOUNDARIES SHOWN HAVE BEEN COMPILED FROM THE INFORMATION SUPPLIED BY THE DEPARTMENT OF LANDS AND THEREFORE THE DIMENSIONS, AREA AND LOCATION OF EASEMENTS ARE SUBJECT TO A FINAL SURVEY
- VISIBLE SERVICES ONLY HAVE BEEN SHOWN WHICH WERE VISIBLE AT THE TIME OF SURVEY. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION, THE RELEVANT AUTHORITIES SHOULD BE CONTACTED TO LOCATE ANY POTENTIAL UNDERGROUND SERVICES WHICH MAY BE PRESENT
- THE CONTOUR INTERVAL IS 0.5 m
- THE RIDGE HEIGHTS, ROOF LINE, WINDOWS AND GUTTER HEIGHTS HAVE BEEN LOCATED BY INDIRECT MEANS AND ARE APPROXIMATE ONLY
- PRIOR TO ANY CONSTRUCTION WORK AN ACCURATE BOUNDARY SURVEY SHOULD BE CONDUCTED AND MARKS PLACED TO DEFINE THE POSITION OF ANY NEW CONSTRUCTION
- THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN WHICH ARE NOT TO BE REMOVED

- (A) RIGHT OF CARRIAGEWAY, EASEMENT FOR SERVICES & EASEMENT TO DRAIN WATER 3.805 WIDE & 10 WIDE
(B) RIGHT OF CARRIAGEWAY, EASEMENT FOR SERVICES & EASEMENT TO DRAIN WATER 3.81 WIDE
(C) EXISTING RIGHT OF CARRIAGEWAY 3.81 WIDE VIDE AD794085, EXISTING RIGHT OF CARRIAGEWAY 3.81 WIDE VIDE AD794084 & EASEMENT FOR ACCESS 3.81 WIDE


axiom
ABN 20 683 949 027
c/- PO Box 166, SUTHERLAND NSW 1499
MOB 0420 333 275
Email: day@axiomsurveying.com.au

PLAN SHOWING DETAIL & LEVELS
OVER LOT 6 IN DP749791
BEING No 113 ORCHARD STREET
WARRIEWOOD, FOR DESIGN
PURPOSES AND TO SUPPORT A
DEVELOPMENT APPLICATION


JOB No.	2987	YOUR REF.		Rev.	Amendments	Date
DRAWING No.	2987CO	CLIENT:	JILL HUNTER			
SCALE:	1:250 (A1)	SURVEYED	K.D.	DRAWN	K.D.	
DATUM:	AHD	DATE:	16.02.2018	DATE:	22.02.2018	
SHEET:	1 OF 1					

8 **Attachment D: Borehole Logs**


MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P2108165BH101-104V01.GPJ <<DrawingFile>> 06/02/2022 15:25 10/02/2004 D:\git\Lab and In Situ Tool - DGD [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13]

CLIENT	Tony Mclain Architects			COMMENCED	24/11/2021	COMPLETED	24/11/2021	REF BH101						
PROJECT	Wastewater Assessment			LOGGED	RM	CHECKED	GT	Sheet 1 OF 1						
SITE	113 Orchard Street, Warriewood, NSW.			GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass	PROJECT NO. P2108165						
EQUIPMENT	Hydraulic push tube			LONGITUDE		RL SURFACE	28.1 m	DATUM	AHD					
EXCAVATION DIMENSIONS	ø100 mm x 1.00 m depth			LATITUDE		ASPECT	East	SLOPE	20 - 30%					
Drilling			Sampling		Field Material Description									
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
PT		Not Encountered	28.10	0.0-0.1/S/1 D 0.00-0.10 m			SP	Sand LOAM; dark grey / brown.					RESIDUAL SOIL	
			0.20											
			27.90						CL	Sandy CLAY LOAM; brown / grey; moderate structure.				
			0.3-0.4/S/1 D 0.30-0.40 m											
			0.4											
			0.60					CL	Light CLAY; pale brown; moderate structure.					
			27.50											
			0.8											
			0.90											
			27.20						Trace sandstone / ironstone gravels.					
			1.00						Hole Terminated at 1.00 m				1.00: Hand push tube refusal on extremely low strength sandstone.	
			1.2											
			1.4											
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS														
 MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St. Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au						Engineering Log - BOREHOLE								


MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P2108165BH101-104V01.GPJ <<DrawingFile>> 06/02/2022 15:25 10/02/2004 D:\git\Lab and In Situ\Tool - DGD [Lib: Martens 2.00 2016-11-13 Pjg: Martens 2.00 2016-11-13]

CLIENT	Tony Mclain Architects		COMMENCED	24/11/2021	COMPLETED	24/11/2021	REF BH102										
PROJECT	Wastewater Assessment		LOGGED	RM	CHECKED	GT	Sheet 1 OF 1										
SITE	113 Orchard Street, Warriewood, NSW.		GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass	PROJECT NO. P2108165										
EQUIPMENT	Hydraulic push tube		LONGITUDE		RL SURFACE	28 m	DATUM	AHD									
EXCAVATION DIMENSIONS	ø100 mm x 1.00 m depth		LATITUDE		ASPECT	East	SLOPE	20 - 30%									
Drilling			Sampling		Field Material Description												
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS				
PT			28.00					SP	Sand LOAM; dark grey / brown.				RESIDUAL SOIL				
			0.15 27.85				CL	Sandy CLAY LOAM; brown / grey; moderate structure.									
			0.2														
			0.4	0.40 27.60				CL	Light CLAY; pale brown; moderate structure.								
			0.6														
			0.8														
			1.0	1.00					Hole Terminated at 1.00 m (Target depth reached)								
			1.2														
			1.4														
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																	
 (C) Copyright Martens & Associates Pty. Ltd.										MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St. Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au				Engineering Log - BOREHOLE			

MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P2108165BH101-104V01.GPJ <<DrawingFile>> 06/02/2022 15:25 10/02/2004 D:\git\Lab and In Situ Tool - DGD [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13]

CLIENT	Tony Mclain Architects			COMMENCED	24/11/2021	COMPLETED	24/11/2021	REF BH103						
PROJECT	Wastewater Assessment			LOGGED	RM	CHECKED	GT	Sheet 1 OF 1						
SITE	113 Orchard Street, Warriewood, NSW.			GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass	PROJECT NO. P2108165						
EQUIPMENT	Hydraulic push tube			LONGITUDE		RL SURFACE	39.4 m	DATUM	AHD					
EXCAVATION DIMENSIONS	ø100 mm x 0.90 m depth			LATITUDE		ASPECT	East	SLOPE	20 - 30%					
Drilling			Sampling		Field Material Description									
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
PT		Not Encountered	39.40	0.0-0.1/S/1 D 0.00-0.10 m			SP	Sand LOAM; dark grey / brown.					RESIDUAL SOIL	
			0.20											
			39.20					CL	Sandy CLAY LOAM; brown / grey; moderate structure.					
			0.30											
			39.10					CL	Light CLAY; pale brown; moderate structure.					
			0.4											
			0.6		0.5-0.6/S/1 D 0.50-0.60 m									
			0.8											
			0.90											
			1.0						Hole Terminated at 0.90 m (Target depth reached)					
			1.2											
			1.4											
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS														
 MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St. Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au						Engineering Log - BOREHOLE								

MARTENS 2.00 LIB.GLB Log MARTENS BOREHOLE P2108165BH101-104V01.GPJ <<DrawingFile>> 06/02/2022 15:25 10/02/2004 D:\git\Lab and In Situ\Tool - DGD\ [Lib: Martens 2.00 2016-11-13 Proj: Martens 2.00 2016-11-13]

CLIENT	Tony Mclain Architects			COMMENCED	24/11/2021	COMPLETED	24/11/2021	REF BH104						
PROJECT	Wastewater Assessment			LOGGED	RM	CHECKED	GT	Sheet 1 OF 1						
SITE	113 Orchard Street, Warriewood, NSW.			GEOLOGY	Hawkesbury Sandstone	VEGETATION	Grass	PROJECT NO. P2108165						
EQUIPMENT	Hydraulic push tube			LONGITUDE		RL SURFACE	39 m	DATUM	AHD					
EXCAVATION DIMENSIONS	ø100 mm x 0.80 m depth			LATITUDE		ASPECT	East	SLOPE	20 - 30%					
Drilling			Sampling		Field Material Description									
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / SCSS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
PT		Not Encountered	39.00					SP	Sand LOAM; dark grey / brown.				RESIDUAL SOIL	
			0.20											
			38.80						CL	Sandy CLAY LOAM; brown / grey; moderate structure.				
			0.30											
			38.70					CL	Light CLAY; pale brown; moderate structure.					
			0.4											
			0.6											
			0.8	0.80					Hole Terminated at 0.80 m (Target depth reached)					
			1.0											
			1.2											
			1.4											
EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS														
 (C) Copyright Martens & Associates Pty. Ltd.						MARTENS & ASSOCIATES PTY LTD Suite 201, 20 George St. Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au				Engineering Log - BOREHOLE				