Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

OVERLAND FLOW REPORT

PROPOSED COMMERCIAL DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

Prepared For:
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APPENDICES

1. INTRODUCTION

Costin Roe Consulting Pty Ltd (CRC) has been commissioned by Kaufland, via Willow Tree Planning, to prepare this Overland Flow Report in support of a planning application submission for the proposed development site. This report analyses flooding impacts to the existing commercial facility at 393 Pacific Highway, Belmont and a proposed redevelopment of the site. The 4.3 Ha parcel of land ("*Site*") comprises an existing Bunnings Warehouse. The "*Study Area*" will extend locally around this parcel of land extending upstream and downstream sufficient distance to understand the hydraulic conditions in and around the proposed development area.

The overland flow assessment has been completed to confirm flood planning requirements for the property and potential future development associated with the proposed modification of zoning (including building levels and overland flow management and safety), and that the development will not cause any adverse affectation to upstream, downstream or adjoining properties. Overland flow from the upstream contributing catchments must be conveyed through the site, with no effect on upstream and downstream properties.

The scope and primary objectives of the overland flow assessment, are as follows:

- Determine the 1% Annual Exceedance Probability (AEP) Flood design flow generated by the contributing external catchment. Hydrology would be based on the upstream catchment as defined by a hydrological RAFTS model;
- Assess the pre-development overland flow path & underground trunk drainage culverts through the development site for the 1% AEP storm event;
- Assess the post-development impact of development over the site on the underground trunk drainage culvert & overland flow swale through the development site for the 1% AEP storm event so that potential impacts on the development can be assessed and mitigated; and
- Confirm that there is an effect on upstream, downstream and adjacent properties as a result of the development.

The *Study Area* is located within the bounds of the *Lake Macquarie City Council* (LMCC). There is currently no formal council flood study completed on the Belmont region in which the site is located.

As noted, this study will accompany a proposed modification in zoning over the Site. The site is currently zoned *B7 Business Park pursuant to Lake Macquarie Local Environmental Plan 2014* (LMLEP2014) and comprises a Bunnings Warehouse. The objective of the project is to allow the redevelopment of the site for a Kaufland supermarket, being a retail/grocery chain stocking up to 60,000 product lines. In accordance with the LMLEP2014 land use definitions, Kaufland would constitute a 'Shop' (being a type of 'Retail Premises'). Shops are currently not approved on the site, and therefore it is proposed to introduce an *Additional Permitted Use* (APU) for Shops within the B7 zone. This would require a Planning Proposal to amend LMLEP2014 and this report has been prepared in support of this submission.

2. SITE CHARACTERISTICS

2.1. Site Description

The site at 393 Pacific Highway (being Lot 101 in DP 1021186) is approximately 4.3 Ha in area. The site is a 'battle-axe' parcel of land and roughly rectangular in shape as shown in **Figure 2.1**. The development footprint is approximately 4.0 Ha of the overall property area.

The site is bounded on the north by residential properties, on the south by industrial properties and the west by existing commercial properties and the Pacific Highway. Land to the east of the site is currently undeveloped.

Figure 2.1 Locality Plan

The existing Bunnings was approved by LMCC in 1999 under DC/99/01634/1M A. As part of this approval, a drainage and overland flow design was produced by Michael Lockley & Associates. This design was obtained by Costin Roe Consulting from LMCC (refer **Appendix C**) and used as reference as part of this assessment. The design drawings show a three-cell box culvert, each cell being 3.3m wide by 1.5m high (refer **Figure 2.2**), is present on the western side of the property. This culvert system conveys flows from a series of concrete lined open channels and associated upstream contributing catchments (approx. 237.8 Ha) from the north-west corner of the property to the south-west. A large trapezoidal open channel (refer **Figure 2.3**) is located adjacent to the southern boundary of the site, conveying flow from the box culvert system and runoff from Lots 100, 103, 104 and 105 in an easterly direction to bushland east of the property. A smaller overland flow swale is present on the north and east of the property (refer **Figure 2.4**). This channel provides a flow path for water which may overtop the box culvert system at the north-east corner of the property along the northern boundary toward bushland on the east.

Figure 2.2. Existing Box Culverts

Figure 2.3. Existing Open Channel (south of building)

Figure 2.4. Existing Overland Flow Path (north side of property).

2.2. Proposed Development

The proposed development is for the construction of a grocery retail shop for Kaufland.

An indicative layout of the development has been produced and can be seen in **Figure 2.2** below.

The development will include the following engineering components:

- Demolition of the existing Bunnings Warehouse building
- Earthworks to create flat pads for the proposed building.
- Stormwater drainage system based on a major/ minor design philosophy;
- Management of stormwater quality using a treatment train approach to pollutant loads on a developed catchment in accordance with councils load based pollutant reduction percentages; and
- Management of stormwater quantity by reducing post developed flow to pre-developed over the range of storms between the 20% AEP to the 1% AEP as per council policy by use/modification of the existing on-site detention basin.
- Maintenance of existing overland flow paths and trunk culvert system.

Figure 2.2 Architectural Plan

3. STUDY OBJECTIVES & METHODOLOGY

3.1. Study Objectives

The objectives of the Flood Study are to:

- Identify relevant flood-related information and requirements by searching all relevant data sources and council policy;
- Determine the likely extent and nature of flooding and identify potential hydraulic controls;
- Define existing catchment condition flood behaviours for mainstream flooding in the catchment with due consideration to upstream and downstream controls within the study area;
- Define design flood levels, and velocities for the catchment;
- Define the extent of flooding for the 1% AEP design storm;
- Confirm flood planning requirements for the development;
- Confirm the potential for cumulative effects of possible filling proposals in that area is minimal;
- Confirm the development potential of surrounding properties is not adversely affected by the filling proposal;
- Confirm the flood liability of buildings on surrounding properties is not increased; and
- Confirm no local drainage flow/runoff problems are created by the filling.

3.2. Study Methodology

A numerical hydraulic modelling tool developed a model to convert runoff hydrographs into water levels and velocities throughout the study area. The model simulates the hydraulic behaviour of the water within the study area by accounting for flow in the major channels as well as the potential for overland flow paths, which develop when the capacity of the channel is exceeded. It relies on boundary conditions which include the runoff hydrographs and appropriate downstream boundary level.

The modelling has been undertaken in two stages (as discussed below) and this report provides details and summary of the pre & post development stages of the modelling.

Stage 1 – Pre Development

- Build of a 2D hydrodynamic flood model of the existing overland flow channel & trunk drainage culverts through the proposed site for the existing scenario;
- Modelling has been performed using the TUFLOW modelling engine with the open channels and overbank areas being modelled in 2D, and the existing underground trunk drainage culverts modelled as 1D elements;
- Hydrology determined via rain on grid modelling;
- Modelling of the 1% AEP storm event for the existing site with validation being completed against the design flood levels as per the Michael Lockley & Associates design drawings for the existing Bunnings Facility;
- The Digital Terrain Model (DTM) used in the modelling will be based on survey information received from Positive Survey Solutions and ALS survey information.

Stage 2 – Post Development

- Revision of the Stage 1 model to include the proposed development;
- Post development scenario testing and analysis of differences in flood levels, velocity and general hydraulics against the pre development scenario; and
- Confirmation of the effect on surrounding properties as a result of development.

3.3. Report Format

Section 4 of the report discusses the content and source of relevant data which has been utilised in the study. This section describes relevant flood studies and available historical information and also provides details of the survey used to establish the DTM used in the analysis.

Section 5 discusses the catchment characteristics the hydrological information used in the study.

Section 6 discusses the development of the hydraulic model including establishment of the DTM, boundary conditions, validation, sensitivity analysis and subsequent use for design rainfall events and development scenarios.

Section 7 provides the results of the design flood estimation for the catchment.

Section 8 summarises the results of the assessment and provides discussion on the various aspects of the results while Section 8 provides concluding remarks to the overall study.

A number of figures are included in **APPENDIX A** to illustrate the study results.

APPENDIX B includes the existing site survey, **APPENDIX C** the civil designs included in the Bunnings development approval and **APPENDIX D** includes council flood information certificate.

4. REVIEW OF AVAILABLE DATA

Data has been obtained from a number of sources and includes information required for input to the numerical models, together with information required for validation of model results and the adequate representation and presentation of those results.

4.1. Survey

Survey is required to define the physical attributes of the floodplain topography including the creek cross sections and the associated floodplain levels.

The pre development scenario survey has been compiled based information ALS Survey compiled by the NSW Department of Land and Property Information, and survey information provided by Positive Survey Solution. The survey information has been used to define the existing overland flow path cross section and features.

The proposed site levels, as defined by the architectural layout were integrated into the Post Development model by inputting an inactive 2D area to simulate filling above the 1% AEP flood level.

These surveys and surfaces were used as the basis for the digital terrain model (DTM) used in the hydraulic modelling of the pre and post development scenario respectively.

4.2. Bunnings Design Drawings

The design drawings for the existing Bunnings facility including the design water levels for the 1% AEP flood level. The drawings completed by Michael Lockley and associates provide 1% AEP flood levels for the underground box culverts and southern drainage channel.

4.3. Council Flood Study

There is currently no formal council flood study for the Belmont region.

A flooding certificate was obtained from LMCC (refer **APPENDIX D**) however this did not provide any information relating to flooding in and around the site.

5. CATCHMENT INVESTIGATION & HYDROLOGY

5.1. Hydrological Assessment of Existing Catchment

There are three contributing catchments upstream to the north and west of the site that currently drain to the underground culvert system which runs through the property. A catchment plan has been prepared and included as **Figure 5.1,** and also included as drawing **CO13802.00-F07** in **Appendix A**. The three catchments have been broken up to smaller sub-catchments as shown in the figure and referenced below in **Table 5.1** to a total contributing upstream catchment of 237.8 Ha.

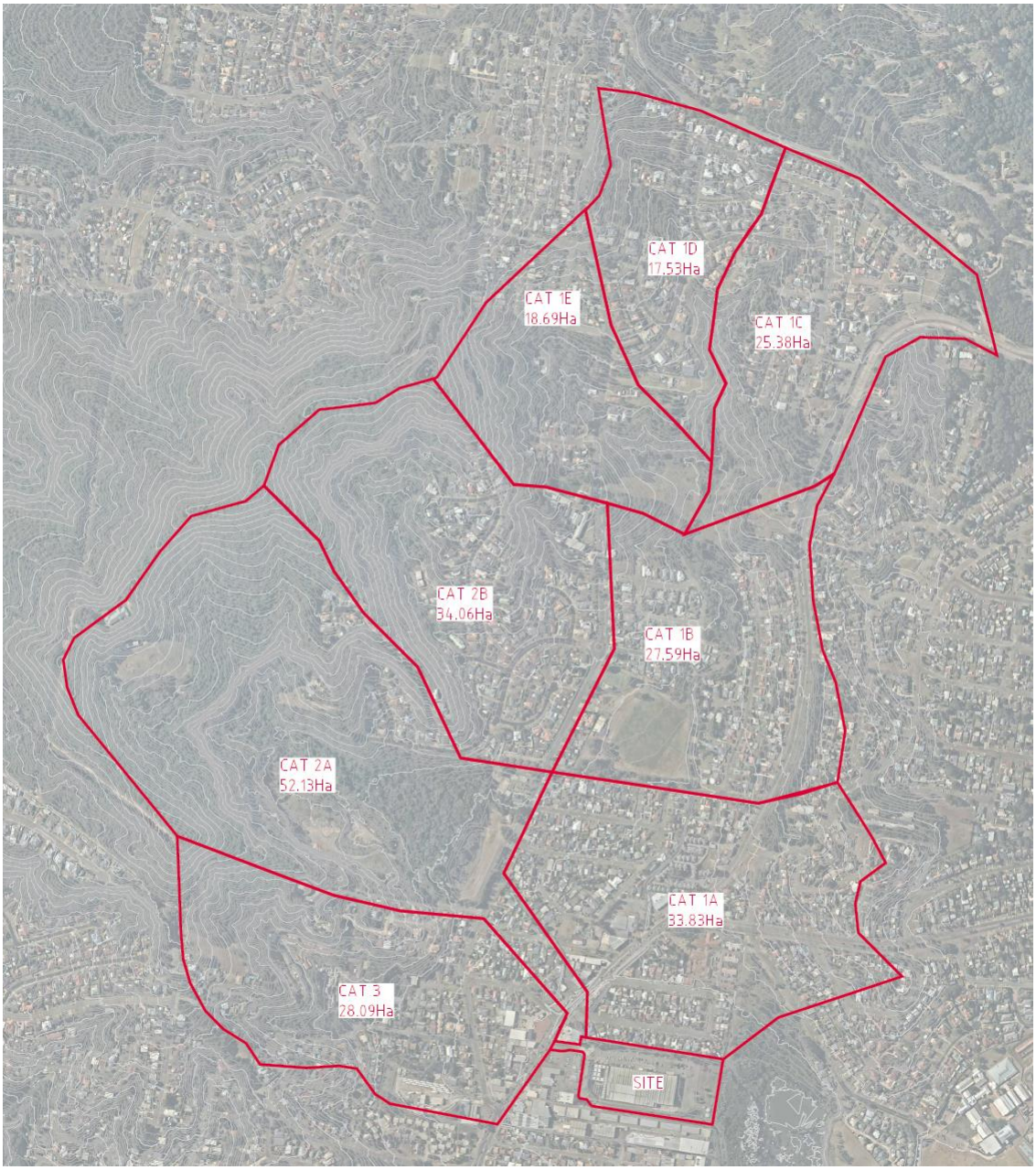

Figure 5.1. Upstream Contributing Catchment

Catchment Name	Area (Ha)
Cat1A	33.83
Cat1B	27.59
Cat1C	25.38
Cat1D	17.53
Cat1E	18.69
Cat1 Sub-total	**123.5**
Cat2A	52.13
Cat2B	34.06
Cat2 Sub-total	**86.2**
Cat3	28.09
Cat3 Sub-total	**28.09**
TOTAL CATCHMENT	**237.8**

Table 5.1. Catchment Areas

The contributing catchments comprise urban land and bushland. The urban land mainly comprising of low-density residential properties with surrounding dense bushland. The terrain is generally steep within undeveloped bushland areas, and moderate in developed areas. All areas are above the Lake Macquarie and Tasman Sea tidal flood level. Although the catchment is 237.8Ha, it would be considered reasonable small from a hydrological view meaning the catchment will be sensitive to short duration and high intensity storms, with overland flows similarly being short in duration and generally only present during and immediately after major rainfall events. This scenario is commonly referred to as flash flooding.

The Q100 Average Recurrence Interval (ARI) design peak flow, has been calculated using a conservative RAFTS model for the three main upstream catchments. The resultant hydrographs are shown in **Figures 5.2, 5.3 & 5.4.** The flows calculated have been used in both the pre-development and post development model scenarios noting that runoff directly from the site has not been included in the overland flow assessment as it is minor in nature with respect to the much larger upstream runoff and also noting that there will be no change in impermeable surfaces over the site. Hence in relation to flood affectation and overland flow the site run-off will have negligible effect on these assessments.

Rainfall intensities and temporal patterns were derived from the Bureau of Meteorology online IFD tool and Australian Rainfall and Runoff (1987). The assessment resulted in the following flood hydrographs of the 1% AEP storm event, **Figures 5.2, 5.3, & 5.4** for the upstream catchment being defined and used in the TUFLOW modelling. The critical storm duration adopted is 120 minutes.

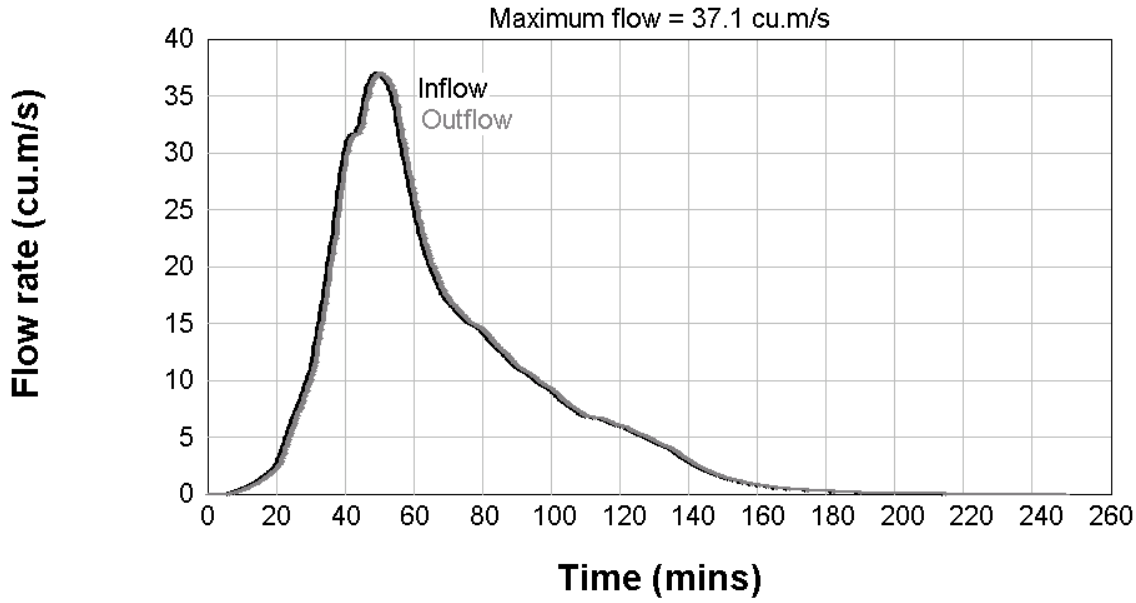

Figure 5.2. 1% AEP Hydrographs – Catchment 1

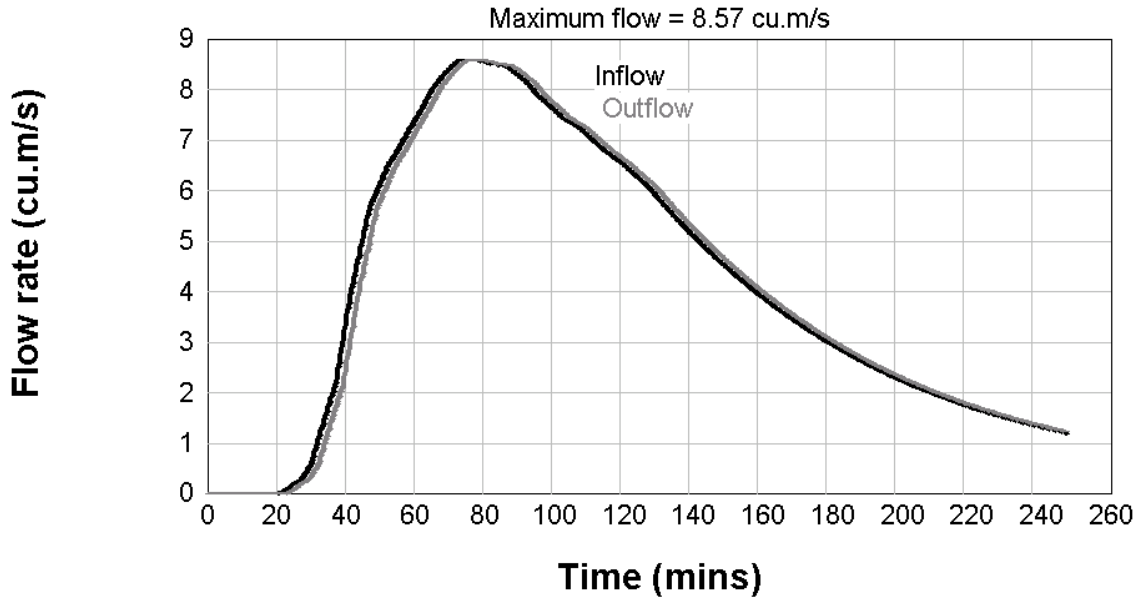

Figure 5.3. 1% AEP Hydrographs – Catchment 2

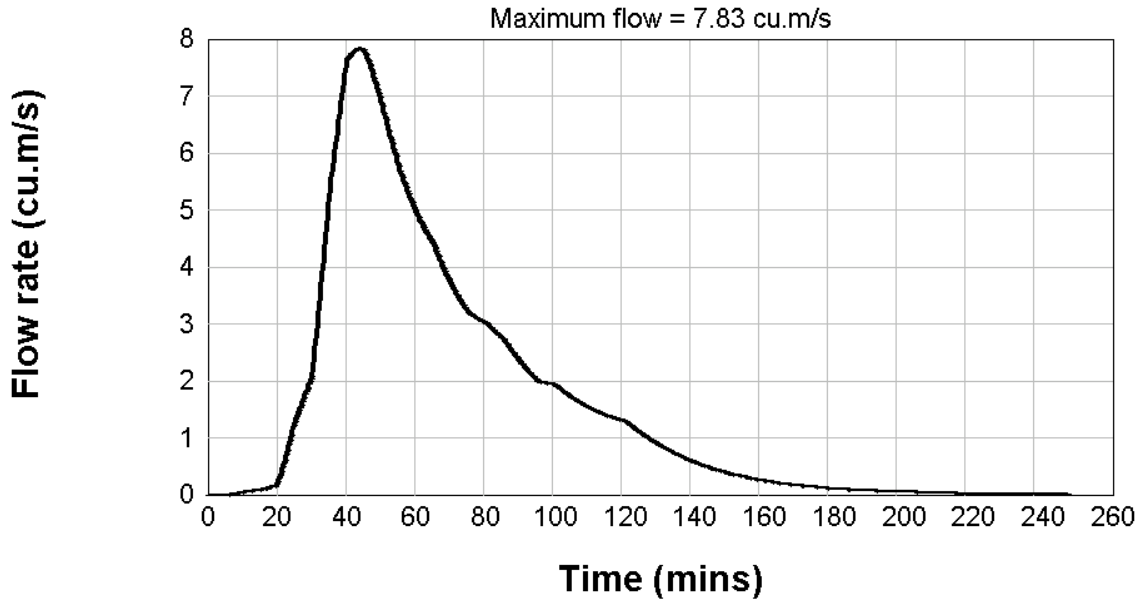

Figure 5.4. 1% AEP Hydrographs – Catchment 3

5.2. Post Developed Scenario Definition

A post development assessment has been completed. The post development conditions are based on the existing management measures approved for the existing Bunnings facility remain operational for the new shop. A summary of the measures has been provided below which is further detailing in **Section 7.2** of the report.

Management measures are as follows:

- Existing three cell box culverts remain;
- Existing open channel on the south of the development site remains; and
- The existing overland flow path on the north of the development site remains. The proposed development will need to ensure the levels of the new development are at least 400mm above the existing level of the flow path. This could be achieved through either filling of the site to the level as noted or providing a small wall or bund along the easement boundary line.

It is noted that the overland flow paths and systems described above will need to remain separate from any site stormwater management measures including site specific detention (OSD) measures and/ or water quality devices. It is noted that any site-specific stormwater management measures would be subject to a separate approval and stormwater management plan.

6. HYDRODYNAMIC MODEL DEVELOPMENT

6.1. Extent and Topography

Hydraulic modelling for this study was undertaken using the TUFLOW engine via the XPStorm-2D Software Platform. The modelled system is based on a 2D approach for the existing cases. The DTM was developed based on the ALS and site survey information & the proposed site design levels as discussed in Section 4 of this report.

The water levels and flows are resolved on a rectangular grid covering the area of interest. The TUFLOW model was set up with a 1m grid cell size, which is an appropriately small cell size to define overland flow behaviour, and more importantly, the difference in the behaviour between two modelled scenarios, through the area of interest.

The model extent is shown in **Figure 6.1**. Modelling has been completed along the study area, beginning approximately 100m upstream of the site and extending 100m to the south-east of the site.

6.2. Boundary Conditions

Inflow Boundaries

Design inflow hydrographs of upstream boundaries of the study area were based on hydrology as discussed in **Section 5** of this report.

The inflow boundaries have been positioned at distances of greater than 2.5 times the flow width from the subject property to ensure that any potential instabilities in the model that may be present at the inflow boundary entry point are resolved in the model prior to the study area. This is consistent with previously approved flooding applications and considered sufficient to produce accurate results for the effect of the development in relation to flooding of the study area.

Outflow Boundaries

The model extent has been continued for approximately 100m downstream of the study area to a point east of the study area. The downstream outflow boundary within the 2D domain has been modelled using the 'head-boundary' control to simulate continuous flow past the model extents, which is generally accepted practice in 2D flood modelling.

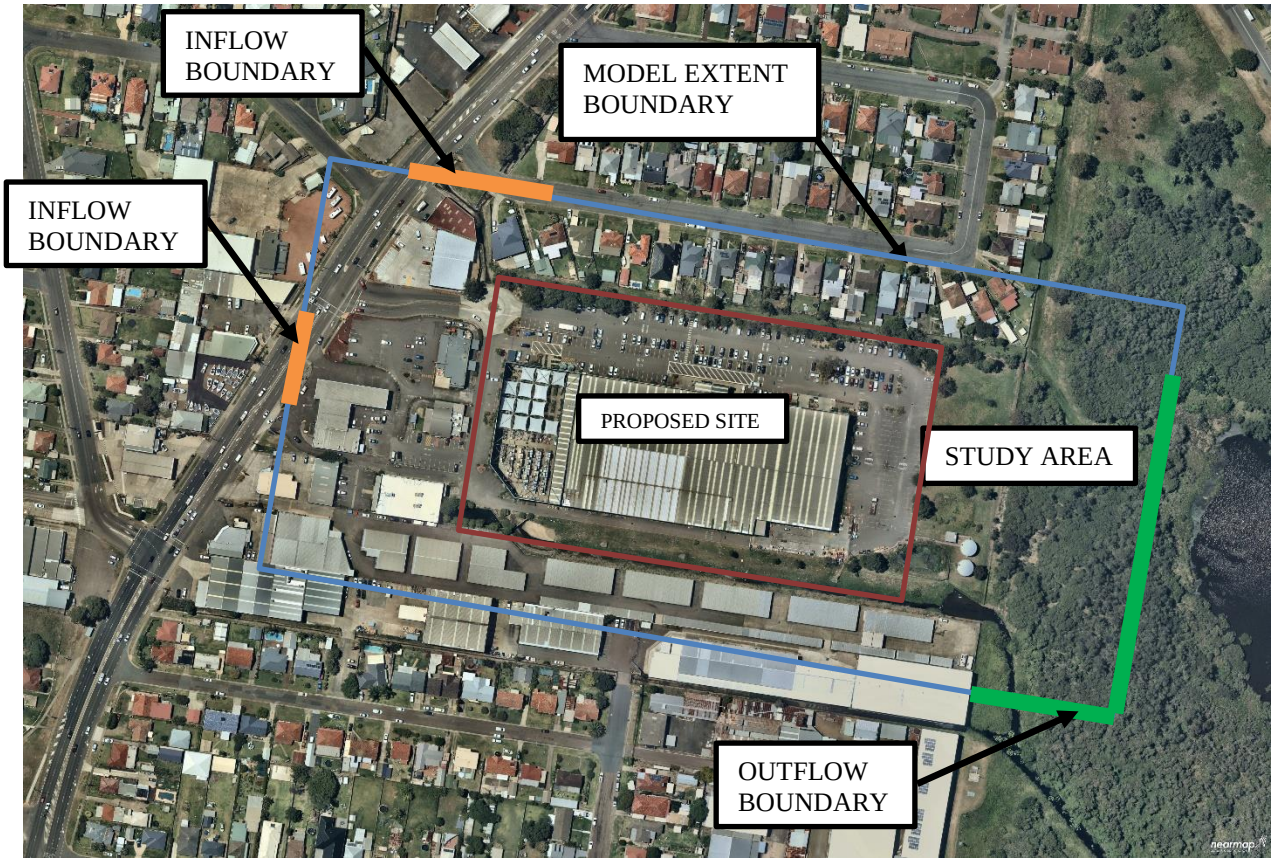

Figure 6.1. Model Extent and Model Boundary Locations

6.3. Channel and Floodplain Roughness

Roughness values adopted in the model are contained in **Table 6.1** below. These are consistent with typical Manning's 'n' values for respective land types.

Model Element	Description	Roughness Parameter Value
1	Grassed	0.040
2	Vegetated Channel	0.06
3	Roads	0.025
4	Dense Trees	0.080
5	Building	Inactive Area
6	Concrete Channel	0.012
7	Pond	0.001

Table 6.1. Adopted TUFLOW Element Roughness Values

A figurative representation of where the above roughness values are shown on **Figure 6.2** below.

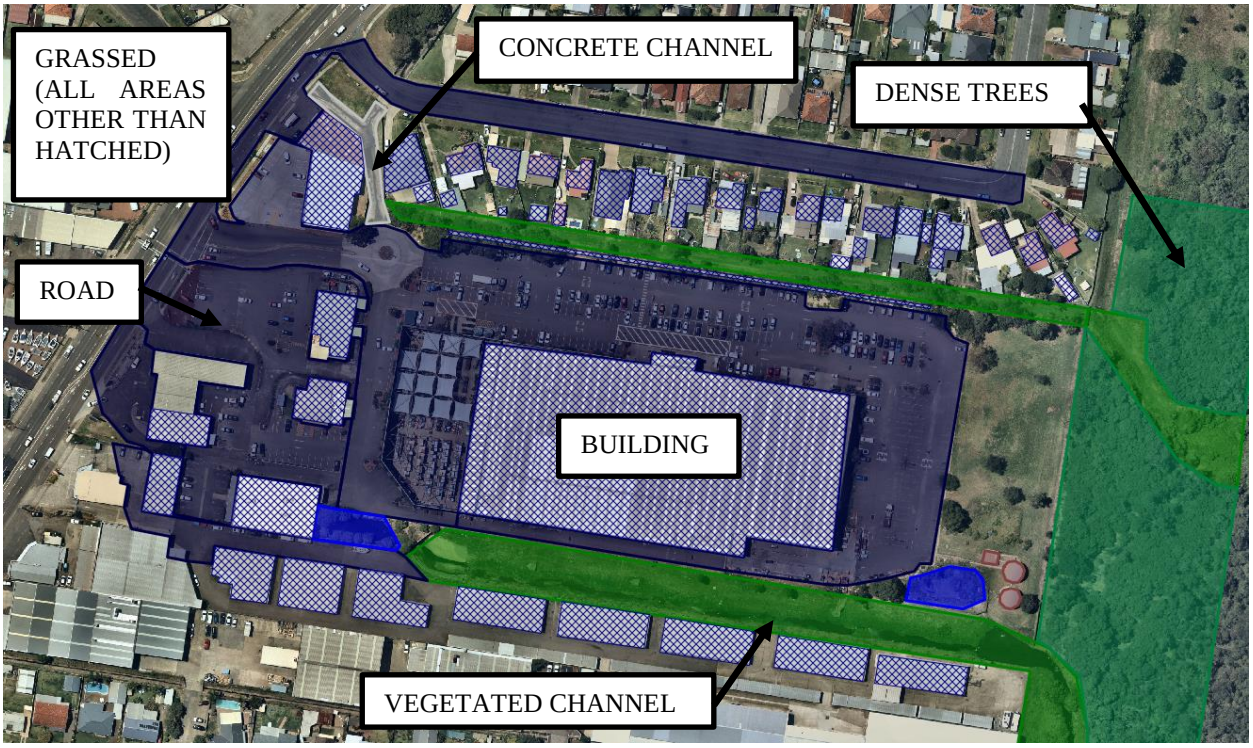

Figure 6.2. TUFLOW Element Roughness Locations

7. FLOOD MODELLING RESULTS

7.1. Pre Development Scenario Results

The predicted peak flood levels, depth and velocities were extracted from the hydrodynamic modelling and were used to generate water surface profiles and depth profiles for the 1% AEP storm event.

The predicted flood extent and depths for the 1% AEP event has been presented on drawing **CO13802.00-F01** and below as **Figure 7.1**. Reference to **Appendix A** should be made for water surface profiles and flood depth estimates for the 1% AEP storm event.

Drawing **Co13802.00-F03** shows the pre-developed velocity output.

Figure 7.1. 1% AEP Flood Extent and Levels (pre-developed)

The predicted flood inundation can be seen to be generally consistent with the intention of the design by *Michael Lockley & Associates* included in the 1999 Bunnings Development Approval. The majority of the upstream flows being conveyed within the box culvert system to the southern open channel. A smaller overflow at the inflow to the box culverts activates the northern overland flow path where flow depths of 250-500mm are experienced. The existing facility is seen to be clear of the flood affectation and achieved flood immunity requirements.

Water levels in the channel to the south vary from RL 7.4m AHD at the west to RL 6.6m AHD on the east. Water levels through the northern overland flow path vary from RL 8.8m AHD on the west to RL 6.8m AHD at the east. It is noted that these levels are higher than the existing building (at RL 7.15m) however bunding to the channel has been made which achieved flood planning requirements hence the building level is not subject to the flood levels within the northern flow path.

Shallow flood water can be seen downstream of the property as a result of the confluence of flows and flat downstream constriction. These flows do not affect the existing or future facility.

It is noted that activation of the northern flow path is expected to occur in smaller intensity storms, including the 5% ARI. These flows are noted to be less than 250mm and to have DV factors well under general accepted minimum of 0.4.

Additional output for the 5% & 1% AEP storm events can also be found in **Appendix A**.

7.2. Post Development Scenario Results

At the time of writing, the detailed design and level grading through the site has not been completed. As such, the *Post Developed Scenario* has been modelled based on a block-out through the proposed development zone and maintaining the key overland flow measures as included in the current Bunnings development (i.e. box culverts, southern channel and northern overland flow path).

With reference to drawing **Co13802.00-F02 and Figure 7.2**, the post development flood extent and levels have been shown. Water level afflux (i.e. the change in water surface levels) has been shown on drawing **Co13802.00-F03** and **Figure 7.3**. Drawing **Co13802.00-F05** shows the pre-developed velocity output with velocity afflux on **Co13802.00-F06**.

The post-development flood output shows consistency between the pre and post development conditions. Minor afflux of 40-50mm is shown in an isolated area toward the north-east corner of the site within the easement on site and minor 10-20mm locally offsite. This minor increase is considered negligible in terms of affectation and generally within acceptable engineering change and modelling accuracy.

Overall the existing flow paths and flood management measures can be seen to effectively manage flows around the development and that the development has negligible impact on upstream downstream and adjoining properties.

Figure 7.2. 1% AEP Flood Extent and Levels (post-developed)

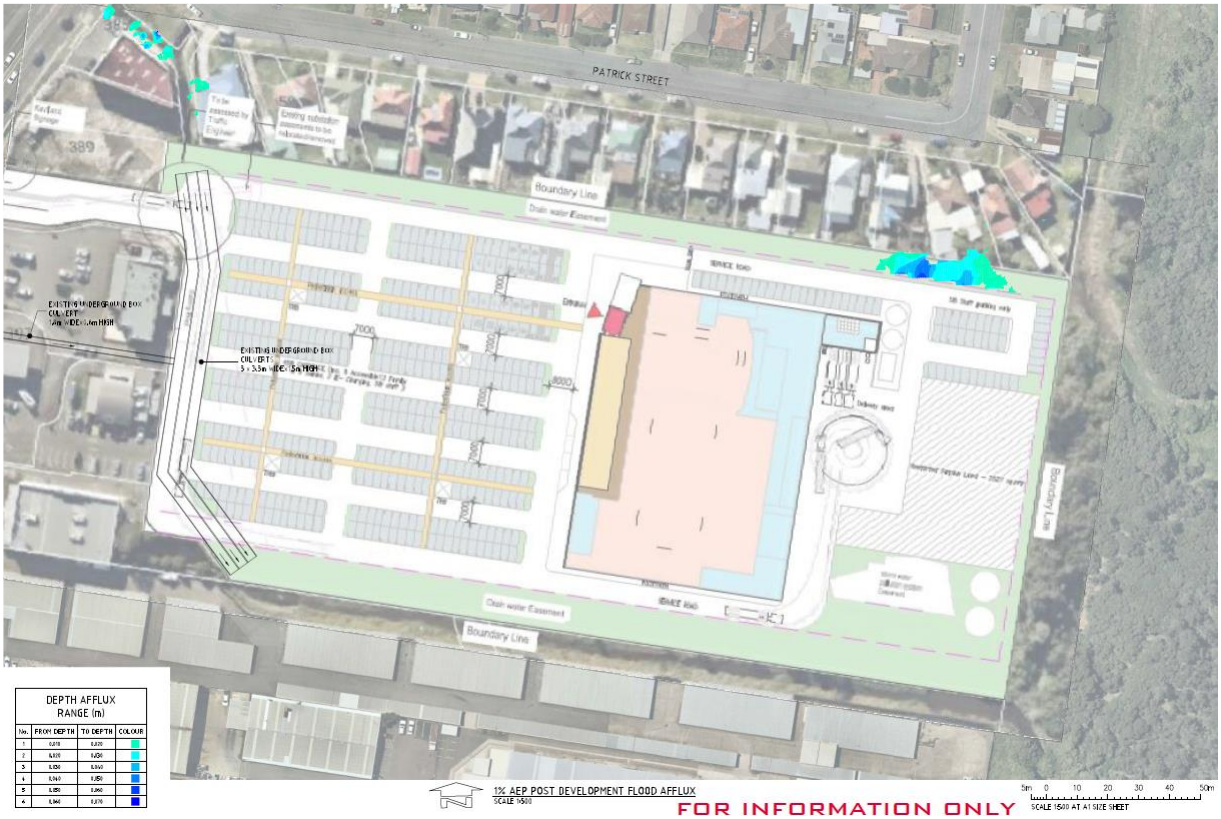

Figure 7.3. 1% AEP Flood Level Pre and Post development Afflux

Based on the current architectural layout, the floor level of the building will need to be set at a level of RL 7.5m to achieve 500mm freeboard to the 1% AEP flood level. Western parts of the site will need to be sited at RL 8.0m to achieve the required flood immunity or alternatively bunding to RL 8.0m could be provided.

As noted in previous sections of the report, a minimum bund or 400mm will be required on the north of the property to ensure the existing flow path achieved appropriate flood freeboard to the existing flow path post development.

Additional output for the 5% & 1% AEP storm events can also be found in **Appendix A**.

8. CONCLUSION

This *Overland Flow Report* has been prepared in support of a development at of 393 Pacific Highway Belmont North and associated planning application.

The Site has been identified by LMCC as being affected by flooding associated with overland flow from the upstream contributing catchments which total 237.8 Ha. Modelling has been undertaken to confirm that council's development control criteria has been met relating to the development of the land and the effect on the flooding as a result of the development. In particular the assessment focusses on the overflow at the existing culverts and surrounding flow paths.

A TUFLOW hydrodynamic flood model of the overland flow path was produced for the area surrounding the development for the purpose of scenario testing. The report provides a summary of the model build and results for the existing, pre-developed, and the proposed, post-developed condition over the land.

The development proposes to maintain existing flow management systems constructed as part of the Bunnings site in 1999. The report confirms these systems are able to convey the expected storm flows through and around the development site with negligible affectation to upstream, downstream and adjoining properties and meet LMCC DCP requirements.

Pre and post development flood elevation and flood depth plans have been produced to confirm the effect of the development on flooding. Comparison of the pre and post-development modelling (shown in the afflux plans) confirms that the development of the land can be made without adversely affecting upstream, downstream or adjacent properties.

Overall, the pre and post development flood scenario assessment provides favourable results which confirm there will be no effect on downstream or adjacent properties and the future development can move forward whilst achieving flood planning requirements and suitable freeboard to the expected 1% AEP flood level and extent.

9. REFERENCES

- Lake Macquarie City Council Development *Control Plan*.
- Landcom (2004). *Managing Urban Stormwater – Soils and Construction* – 4th Edition.
- NSW Government (2005). *Floodplain Development Manual.*

APPENDIX A

DRAWINGS AND FIGURES

(Figures represent predicted values at the peak of each event)

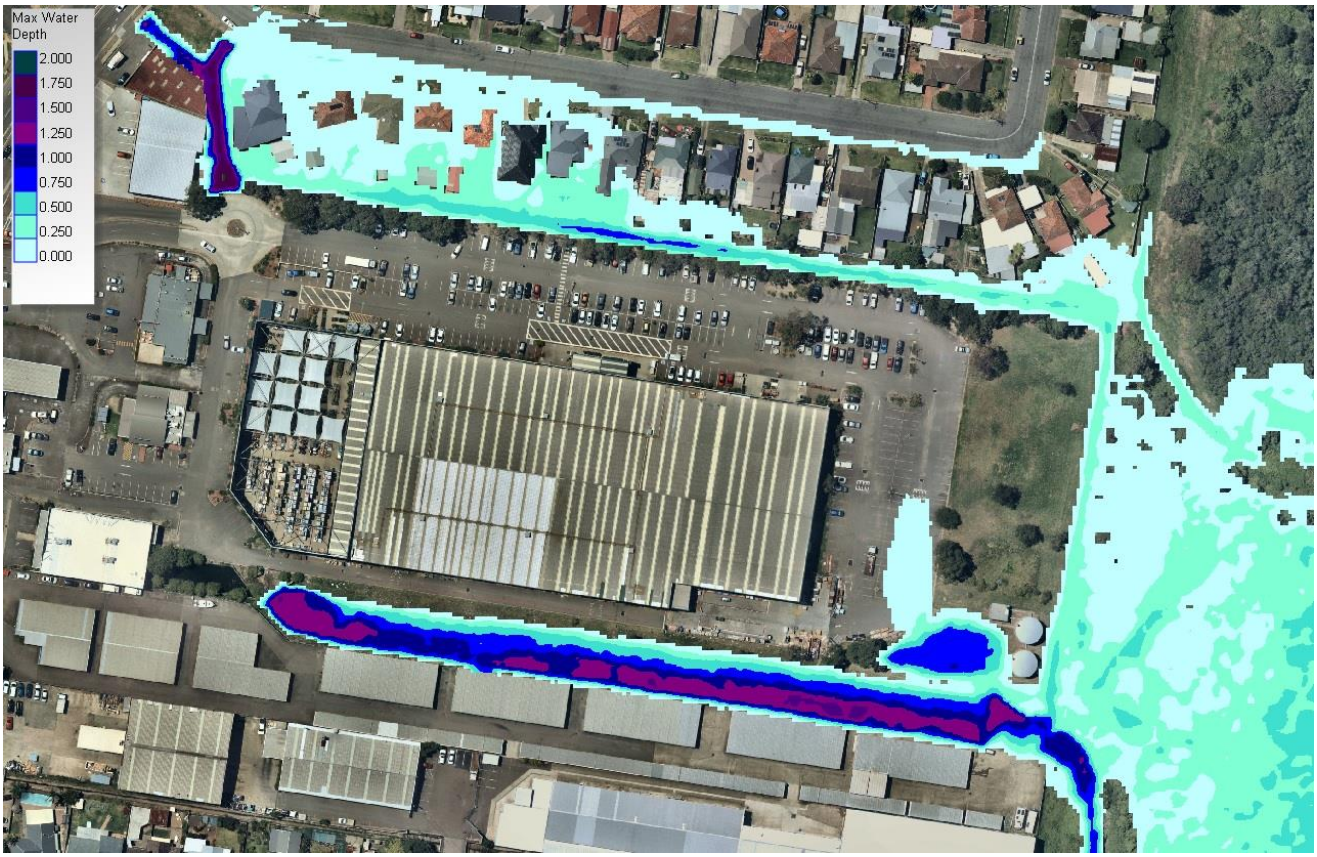

Figure A1 – 5% AEP Flood Depths (Pre-Development)

Figure A2 – 5% AEP Flood Levels (Pre-Development)

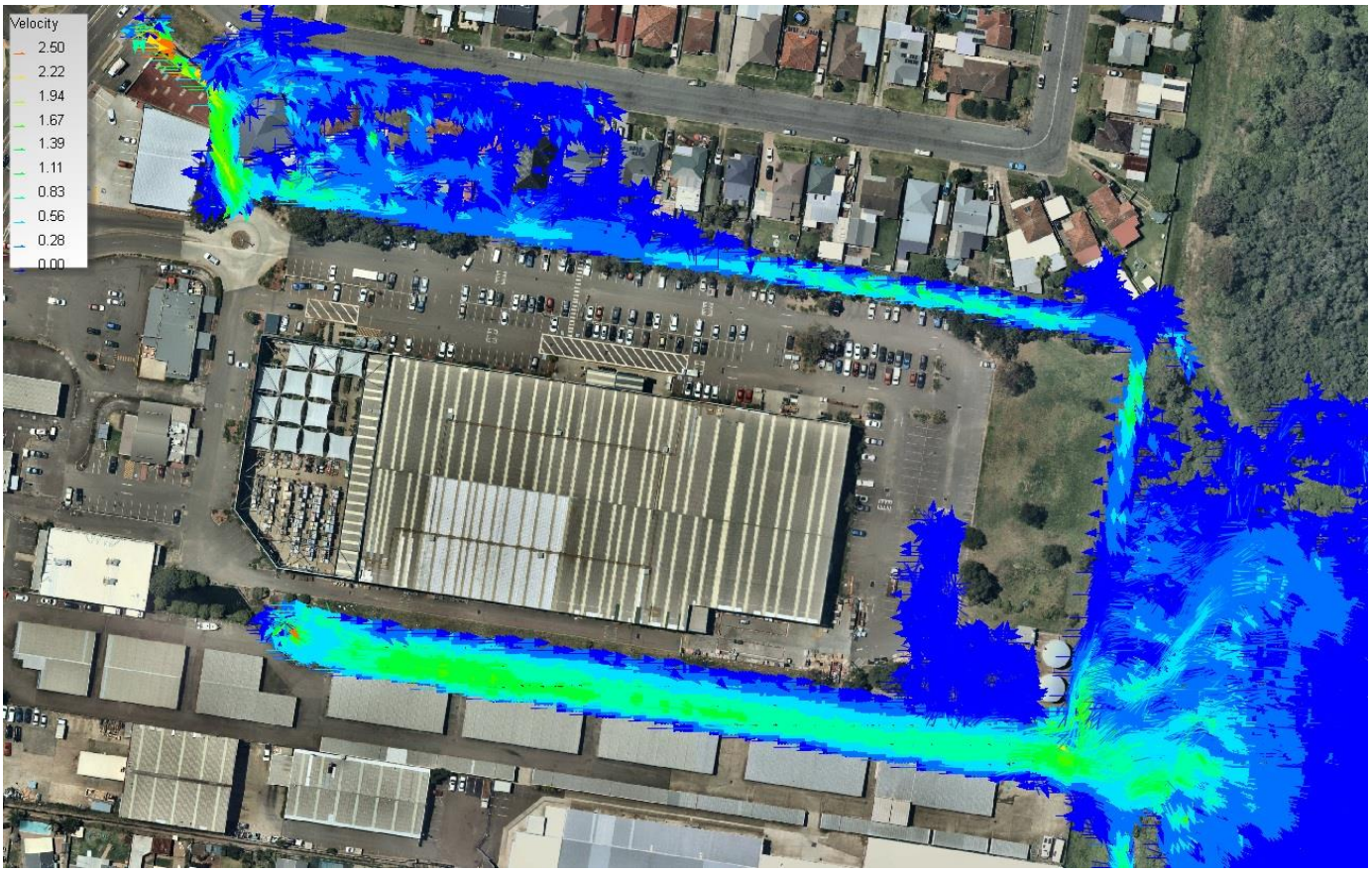

Figure A3 – 5% AEP Flood Velocity (Pre-Development)

Figure A4 – 5% AEP Flood Depth (Post Development)

Figure A5 – 5% AEP Flood Level (Post Development)

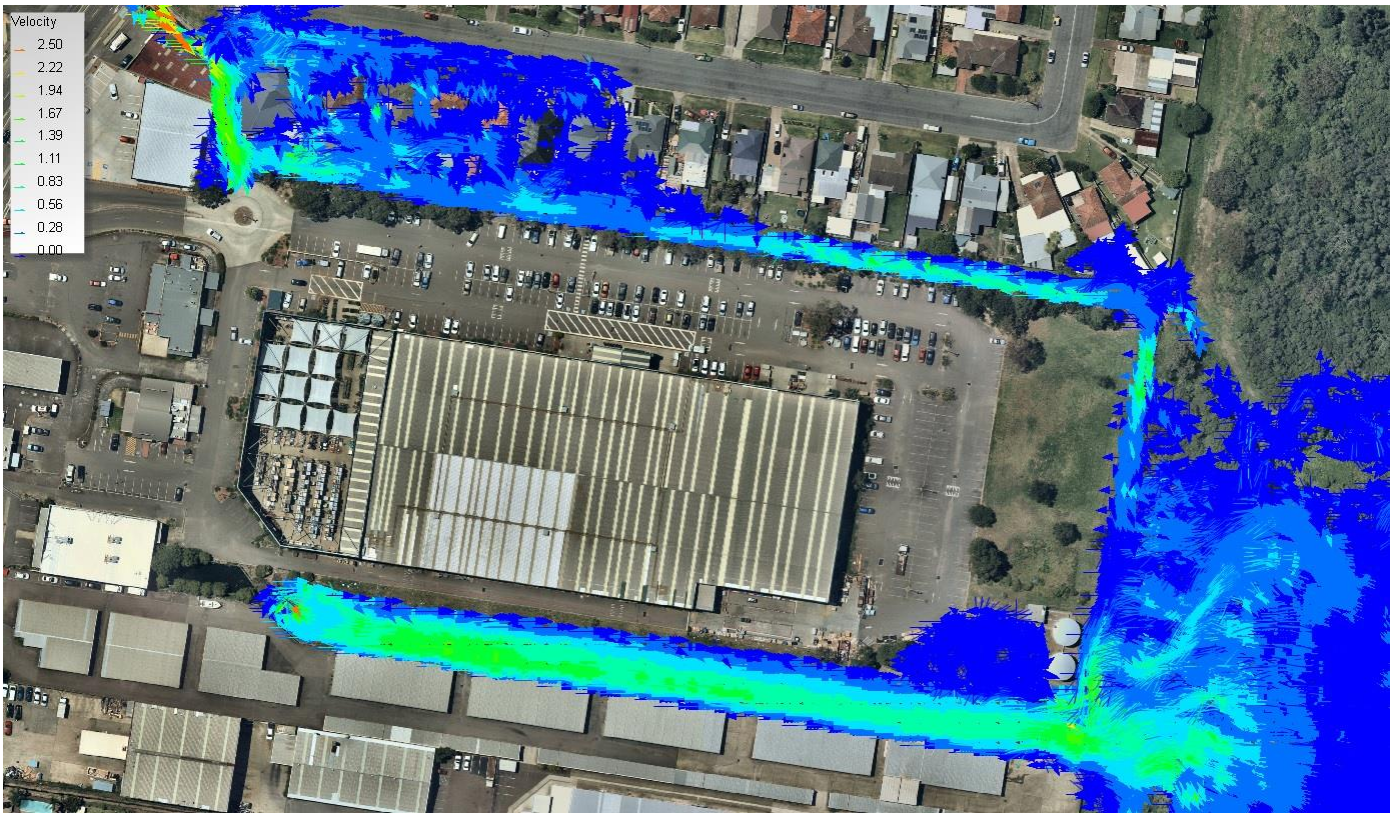

Figure A6 – 5% AEP Flood Velocity (Post Development)

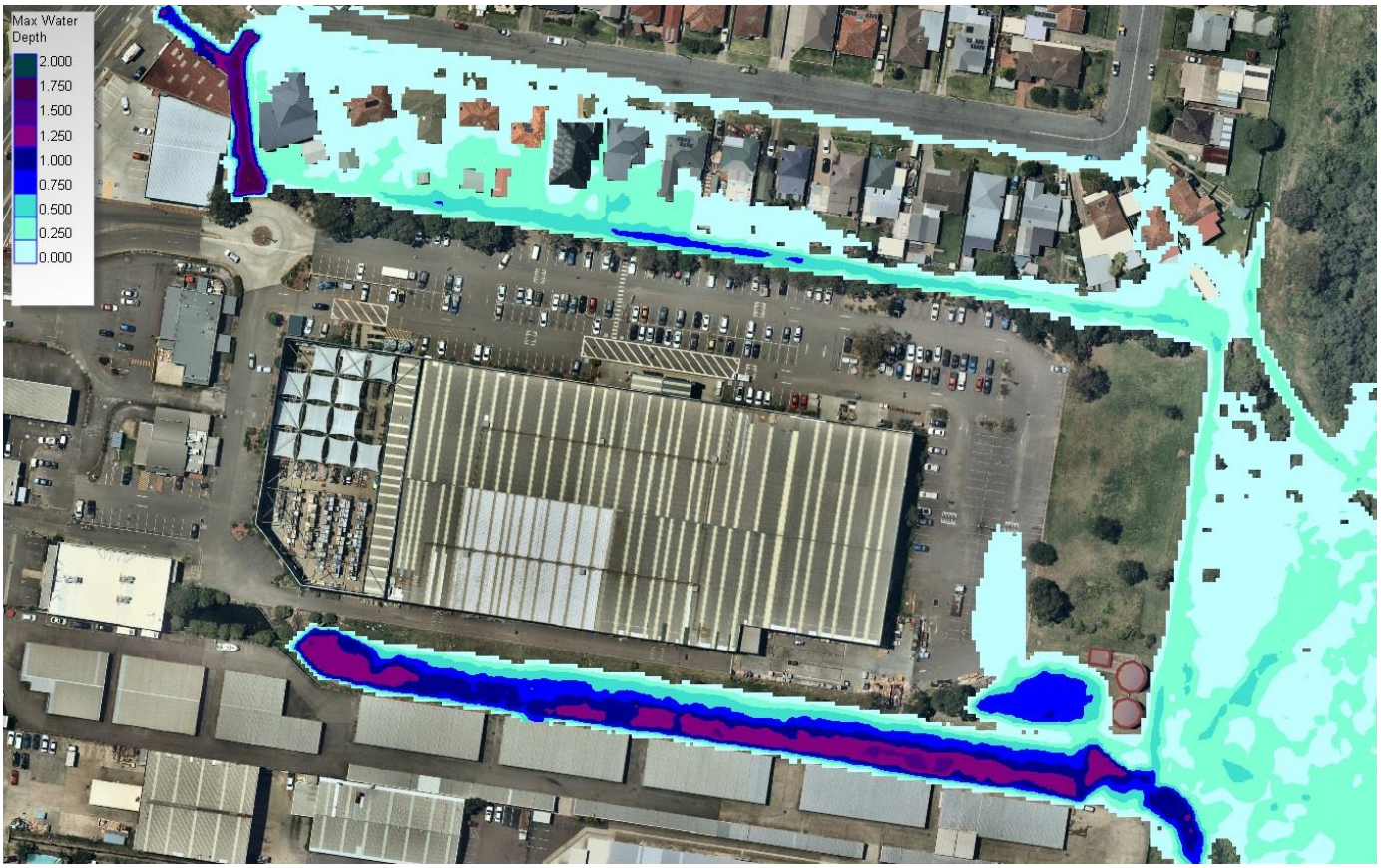

Figure A7 – 1% AEP Flood Depth (Pre-Development)

Figure A8 – 1% AEP Flood Level (Pre-Development)

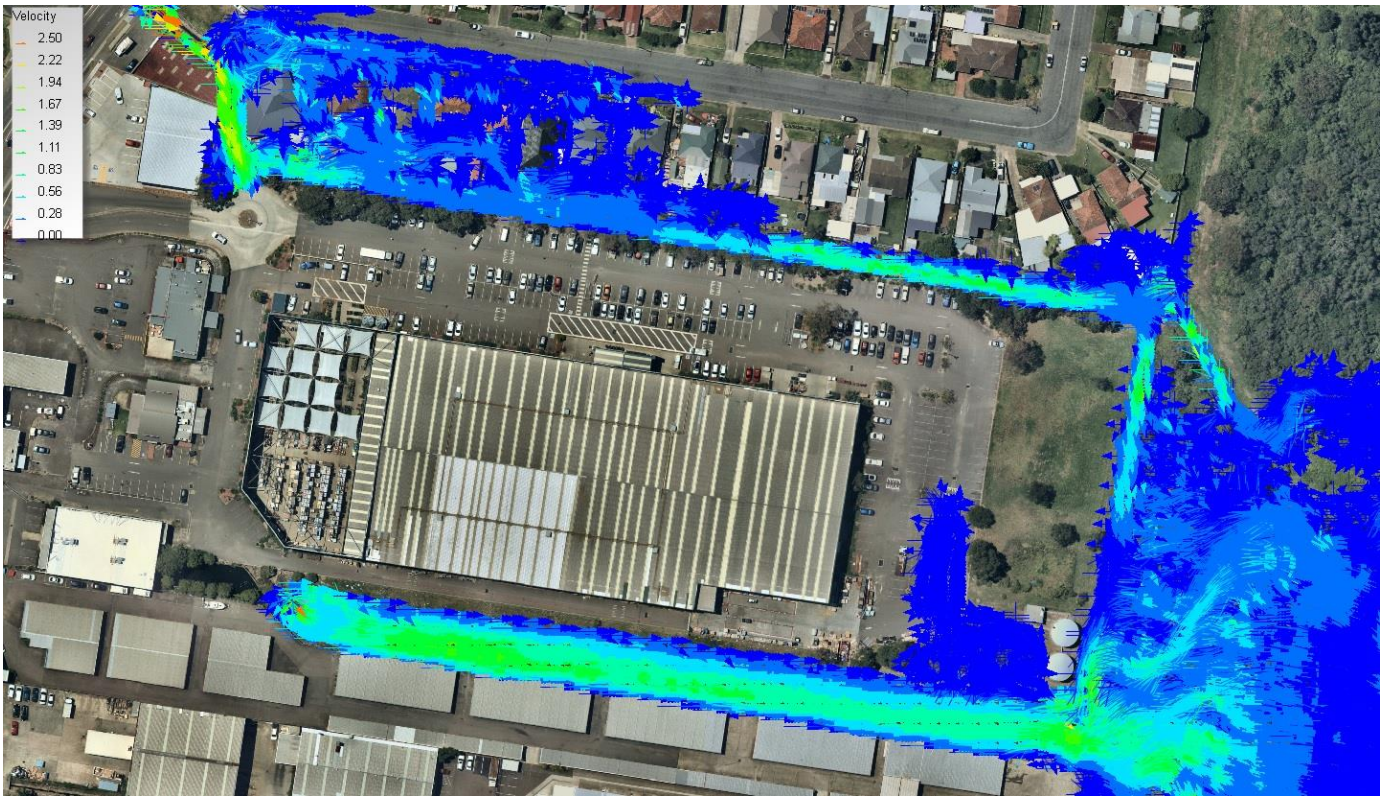

Figure A9 – 1% AEP Flood Velocity (Pre-Development)

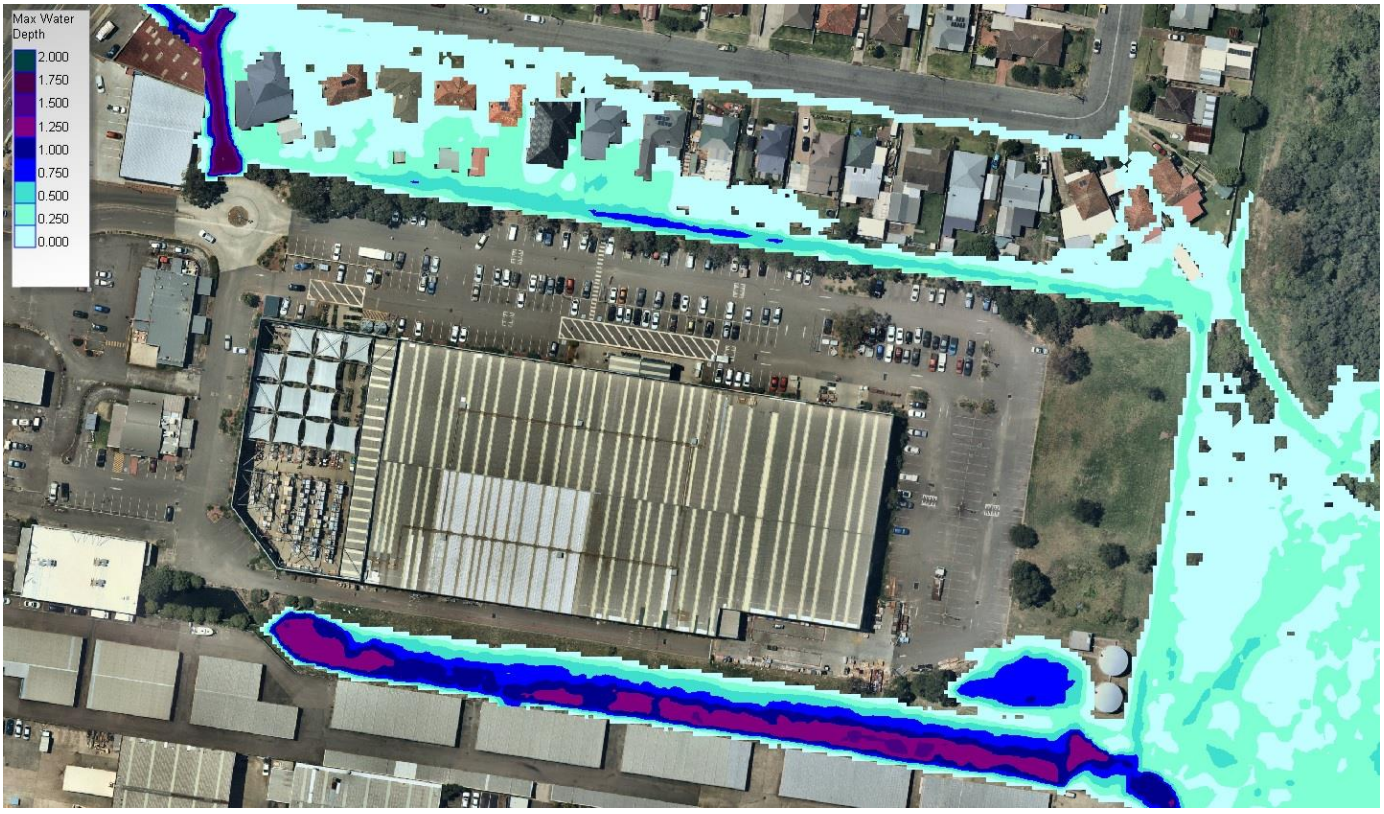

Figure A10 – 1% AEP Flood Depth (Post Development)

Figure A11 – 1% AEP Flood Level (Post Development)

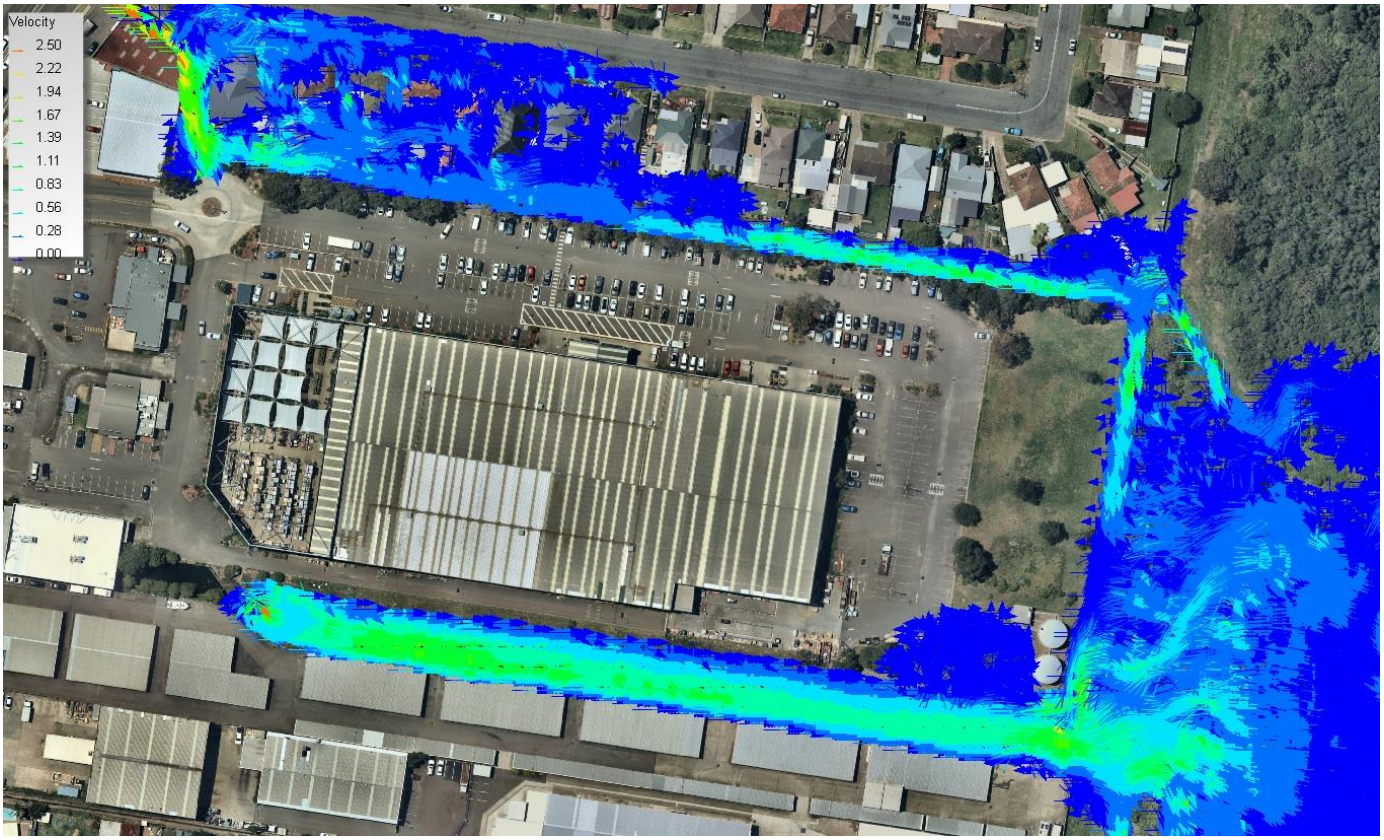

Figure A12 – 1% AEP Flood Velocity (Post Development)

PACIFIC HIGHWAY

PATRICK STREET

PEAK CULVERT
INFLOW 10.2m³/s

EXISTING UNDERGROUND BOX
CULVERT
1.8m WIDEx0.6m HIGH

EXISTING UNDERGROUND BOX
CULVERTS
3 x 3.3m WIDEx1.5m HIGH

EXISTING BUNNINGS
SITE

PEAK CULVERT
OUTFLOW 13.8m³/s

Swale Drain (Invert Not Accessible)

(BPCS) Drainage PIA (IN)

LOT 1
DP 1021186

LOT 105
DP 1021186

LOT A
DP 389480

LOT 1
DP 660520

LOT 20
DP 817865

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ALS SURVEY INFORMATION

7.00 - FLOOD LEVEL CONTOUR (MAJOR)
1.0m INTERVALS

6.80 - FLOOD LEVEL CONTOUR (MINOR)
0.2m INTERVALS

DEPTH RANGE (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.010	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.500	
6	1.500	2.000	

1% AEP PRE DEVELOPMENT FLOOD DEPTH

SCALE 1:500

5m 0 10 20 30 40 50m

SCALE 1:500 AT A1 SIZE SHEET

FOR INFORMATION ONLY

ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE

CLIENT: Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F01

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
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Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
1% AEP PRE DEVELOPMENT
FLOOD DEPTH

DRAWING No. C013802.00-F01

ISSUE A

PATRICK STREET

PEAK CULVERT
INFLOW 10.2m³/s

EXISTING UNDERGROUND BOX
CULVERT
1.8m WIDEx0.6m HIGH

EXISTING UNDERGROUND BOX
CULVERTS
3 x 3.3m WIDEx1.5m HIGH

PEAK CULVERT
OUTFLOW 13.8m³/s

SERVICE ROAD

EXISTING RUNNING SITE

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ALS SURVEY INFORMATION

7.00 - FLOOD LEVEL CONTOUR (MAJOR)
1.0m INTERVALS

6.80 - FLOOD LEVEL CONTOUR (MINOR)
0.2m INTERVALS

DEPTH RANGE (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.010	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.500	
6	1.500	2.000	

1% AEP POST DEVELOPMENT FLOOD DEPTH
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A1 SIZE SHEET

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A

CLIENT: Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F02

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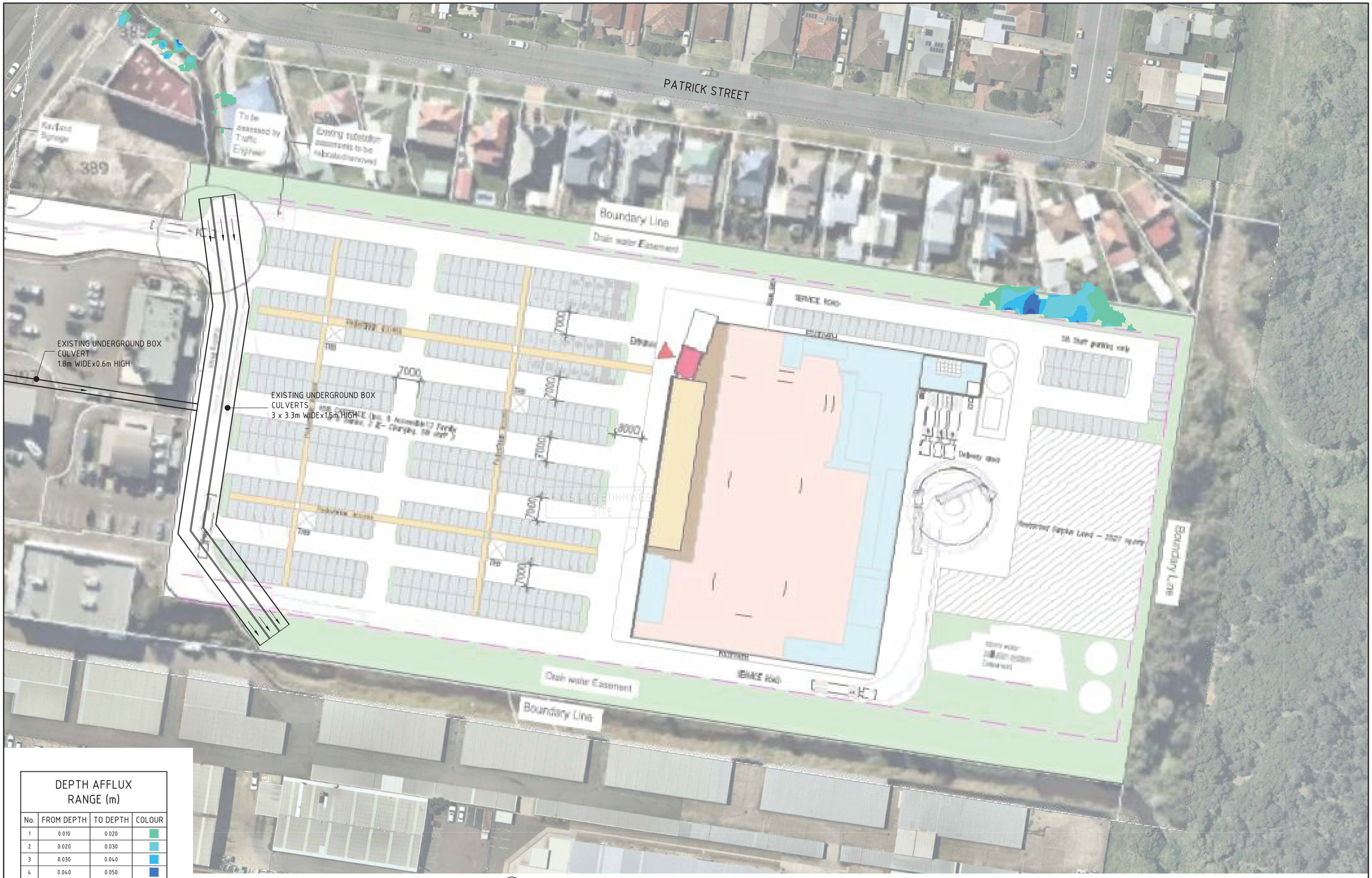
DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD DEPTH

DRAWING No C013802.00-F02

ISSUE B



DEPTH AFFLUX RANGE (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.010	0.020	
2	0.020	0.030	
3	0.030	0.040	
4	0.040	0.050	
5	0.050	0.060	
6	0.060	0.070	

1% AEP POST DEVELOPMENT FLOOD AFFLUX
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A1 SIZE SHEET

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
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ISSUED FOR INFORMATION	13.03.19	A

CLIENT: Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F03

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
1% AEP POST DEVELOPMENT FLOOD AFFLUX

DRAWING No. C013802.00-F03

ISSUE B

PACIFIC HIGHWAY

PATRICK STREET

PEAK CULVERT
VELOCITY 1.67m/s

EXISTING UNDERGROUND BOX
CULVERT
1.8m WIDEx0.6m HIGH

EXISTING UNDERGROUND BOX
CULVERTS
3 x 3.3m WIDEx1.5m HIGH

EXISTING BUNNINGS
SITE

PEAK CULVERT
VELOCITY 0.98m/s

LOT 1
DP 1021186

LOT 1
DP 660520

VELOCITY RANGE (m/s)			
No.	FROM VELOCITY	TO VELOCITY	COLOUR
1	0.010	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	1.750	
8	1.750	2.000	

1% AEP PRE DEVELOPMENT FLOOD VELOCITY
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A1 SIZE SHEET

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A

CLIENT
Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F04

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
1% AEP PRE DEVELOPMENT
FLOOD VELOCITY

DRAWING No C013802.00-F04

ISSUE B

VELOCITY RANGE (m/s)			
No.	FROM VELOCITY	TO VELOCITY	COLOUR
1	0.010	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	1.750	
8	1.750	2.000	

1% AEP POST DEVELOPMENT FLOOD VELOCITY
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A1 SIZE SHEET

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A

CLIENT: Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F05

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DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD VELOCITY

DRAWING No C013802.00-F05 ISSUE B

PATRICK STREET

Boundary Line

Drain water Easement

EXISTING UNDERGROUND BOX CULVERT
1.8m WIDEx0.6m HIGH

EXISTING UNDERGROUND BOX CULVERTS
3 x 3.3m WIDEx1.5m HIGH

Existing substation maintained to be relocated/removed

To be assessed by Traffic Engineer

Kaufland Signage

389

385

BRUCE ROAD

Driveway

Delivery Wall

Boundary Line

Drain water Easement

Boundary Line

LOT 1 DP 660520

LOT 1 DP 660520

LOT 1 DP 660520

VELOCITY AFFLUX RANGE (m/s)			
No.	FROM VELOCITY	TO VELOCITY	COLOUR
1	0.100	0.200	
2	0.200	0.300	
3	0.300	0.400	
4	0.400	0.500	
5	0.500	0.600	
6	0.600	0.700	
7	0.700	0.800	
8	0.800	0.900	
9	0.900	1.000	
10	1.000	1.500	
11	1.500	2.000	

1% AEP POST DEVELOPMENT FLOOD VELOCITY AFFLUX

SCALE 1:500

5m 0 10 20 30 40 50m

SCALE 1:500 AT A1 SIZE SHEET

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A

CLIENT: Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F06

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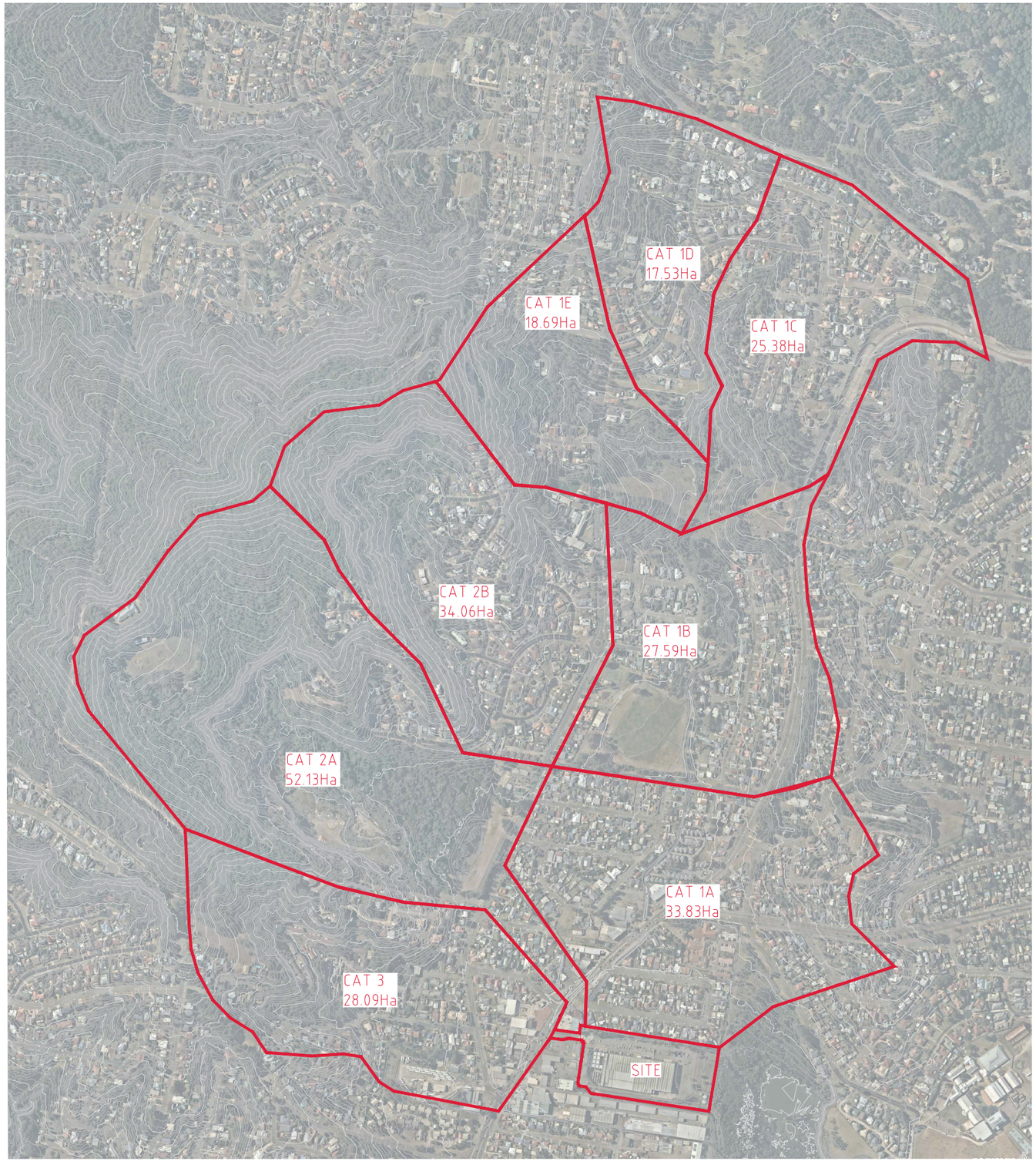
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
1% AEP POST DEVELOPMENT FLOOD VELOCITY AFFLUX

DRAWING No C013802.00-F06

ISSUE B



EXTERNAL CATCHMENT PLAN
SCALE 1:5000

50m 0 100 200 300 400 500m
SCALE 1:5000 AT A1 SIZE SHEET

FOR INFORMATION ONLY

ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE

CLIENT: Kaufland

PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F07

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: EXTERNAL CATCHMENT PLAN
DRAWING No: C013802.00-F07
ISSUE: A

APPENDIX B

EXISTING SITE SURVEY

51 GEORGETOWN ROAD
GEORGETOWN, NSW 2298
TEL: 61 2 4960 1111

BRETT WHITE
REGISTERED SURVEYOR
brett@psurveys.com.au
Mobile: 0425 288 179

NEWCASTLE OFFICE

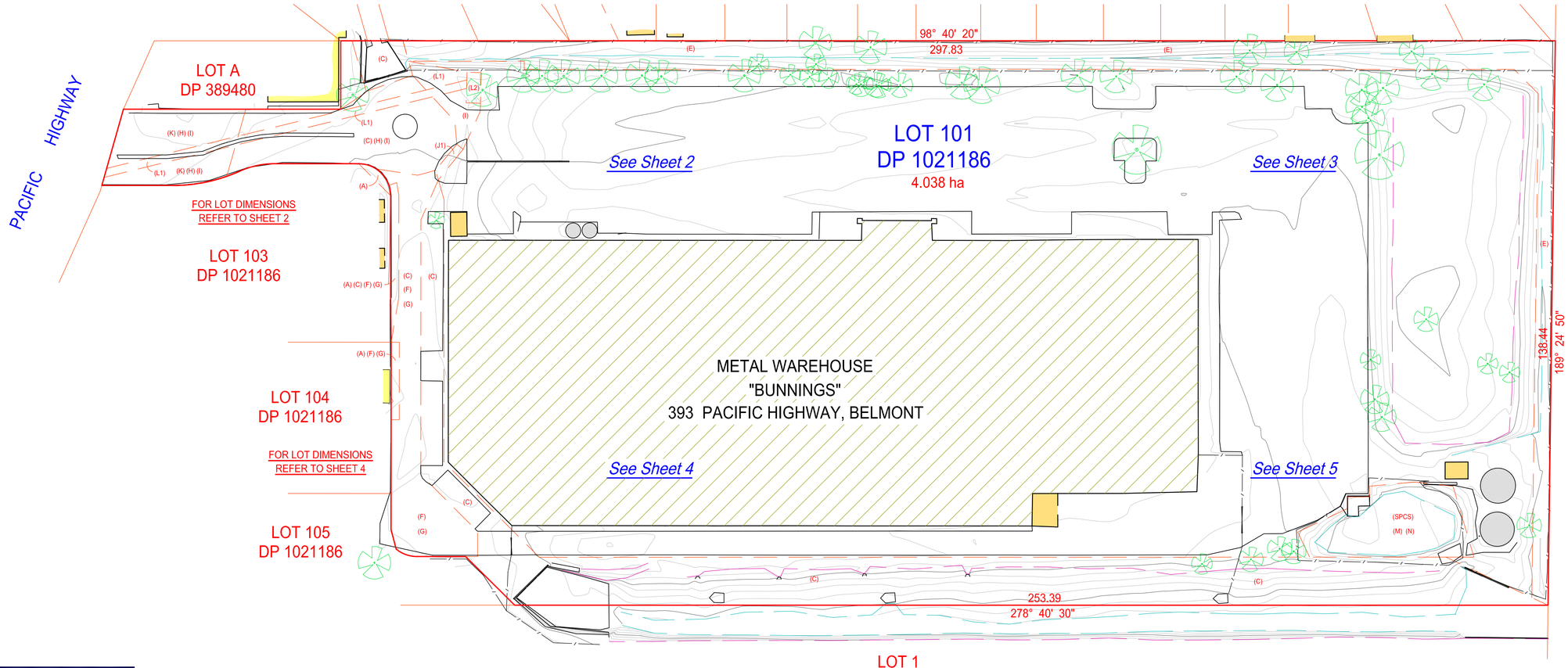
PROJECT MANAGEMENT

SURVEYING

N

MGA

DP 1021186



NOTES :

1. Only visible surface features have been surveyed and are shown to scale accuracy only.
2. This plan displays information suitable for detailed planning and design at the scales stated only. The plan may not be used for any other purpose or at any scales other than those stated.
3. The cadastre shown on this plan has been located to a standard of accuracy in accordance with Regulation 10 of the Surveying and Spatial Information Regulation 2017. The boundaries have not been marked by this survey.
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6. Any underground services shown on this plan are indicative only and do not represent the number, size or depth of cables, pipes or conduits, unless otherwise noted.
7. Prior to and during any demolition, excavation or construction the designer and/or contractor must obtain a current search from "Dial Before You Dig".
8. These notes are an integral part of this plan. Reproduction of this plan, or any part of it, without these notes included in full will render the information invalid and not suitable for use.

(A) - EASEMENT TO DRAIN WATER 1 AND 2 WIDE AND VARIABLE WIDTH (DP 1021186)
(B) - EASEMENT TO DRAIN WATER 6.15 WIDE AND VARIABLE WIDTH (DP 1021186)
(C) - EASEMENT TO DRAIN WATER 11.8, 12, 12.945 AND 13.08 WIDE AND VARIABLE WIDTH (DP 1021186)
(E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)
(F) - RIGHT OF CARRIAGEWAY 3.3, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
(G) - EASEMENT FOR SERVICES 2.0, 3.3, 6.0, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
(H) - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (DP 1021186)
(I) - EASEMENT FOR SERVICES VARIABLE WIDTH (DP 1021186)
(J1) - EASEMENT FOR SIGNAGE AND ELECTRICITY CABLES 0.45, 1, 3 AND 5 WIDE AND VARIABLE WIDTH (DP 1021186)
(K) - EASEMENT FOR PASSAGEWAY CARRIAGEWAY AND SERVICES VARIABLE WIDTH (DP 1021186)
(L1) - EASEMENT FOR UNDERGROUND ELECTRICITY CABLES AND ACCESS THERETO 2 WIDE (DP 1021186)
(L2) - EASEMENT FOR ELECTRICITY SUBSTATION AND ACCESS THERETO 3.5 WIDE (DP 1021186)
(M) - RESTRICTION ON THE USE OF LAND (DP 1021186)
(N) - POSITIVE COVENANT (DP 1021186)
(SPCS) - STORMWATER POLLUTION CONTROL SYSTEM (DP 1021186)

15 0 15 30 45 60

SCALE 1 : 600 (A1)

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

TITLE:	PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION:	No.393 PACIFIC HIGHWAY, BELMONT
CLIENT:	Kaufland

POSITIVE SURVEY SOLUTIONS

Amendment	Description	Date
A	INITIAL ISSUE	25.02.2019
B		
C		
D		

SCALE: 1 : 600 (A1)
DATE: 25.02.2019
DATUM: A.H.D.
ORIGIN: PM 22771 - RL 9.766
CONTOUR INTERVAL: 0.25 m
SURVEYOR: LT DRAWN: SD
DRAWING REF: 19113_DET_A
REVISION: A

JOB No: 19113

SHEET 1 OF 5

51 GEORGETOWN ROAD
GEORGETOWN, NSW 2298
TEL: 61 2 4960 1111

BRETT WHITE
REGISTERED SURVEYOR
brett@psurveys.com.au
Mobile: 0425 288 179

NEWCASTLE OFFICE

PROJECT MANAGEMENT

SURVEYING


Photograph 1

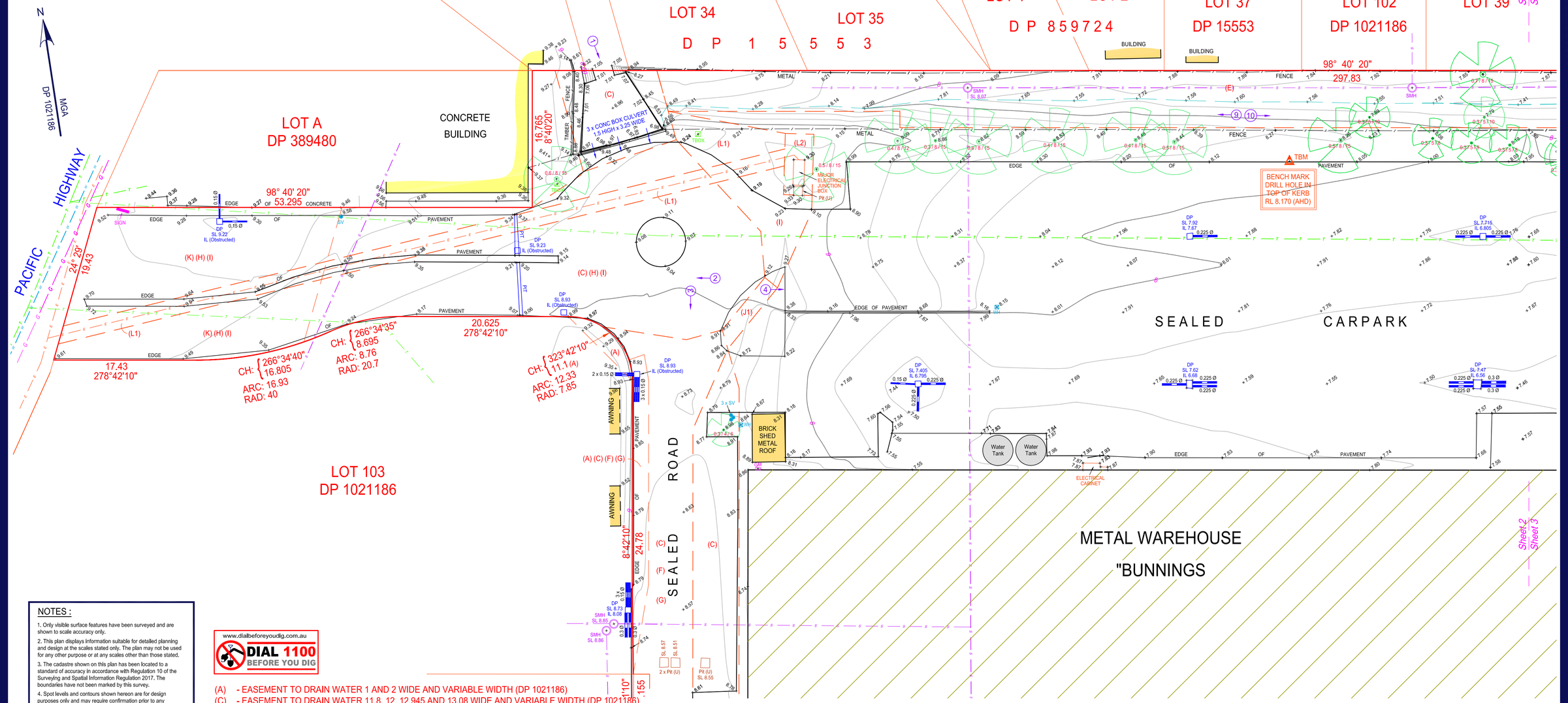

Photograph 2


Photograph 3


Photograph 4


Photograph 9


Photograph 10



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5 0 5 10 15 20 25
SCALE 1 : 250 (A1)
SCALE 1 : 500 (A3)

TREE DIAGRAM

LEGEND
UNDERGROUND SERVICES
NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY
SOURCE : DIAL BEFORE YOU DIG

- w — APPROXIMATE WATER MAIN LOCATION
- t — APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
- s — APPROXIMATE SEWER MAIN LOCATION
- e — APPROXIMATE LOCATION OF UNDERGROUND ELECTRICITY WIRES
- G — APPROXIMATE GAS MAIN LOCATION

- EJB - ELECTRICAL CABLE JUNCTION BOX
- SMH - SEWER MANHOLE
- PHOTO LOCATION & DIRECTION
- TOP OF BANK
- BOTTOM OF BANK
- FENCING
- CONTOUR
- WH - WATER HYDRANT
- DP - DRAINAGE PIT
- SV - STOP VALVE
- TBOX - TELSTRA BOX
- GM - GAS METER
- TPIT - TELSTRA PIT
- Pit (U) - PIT (UNKNOWN SERVICE TYPE)

TITLE: PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186

LOCATION: No.393 PACIFIC HIGHWAY, BELMONT

CLIENT: Kaufland

POSITIVE SURVEY SOLUTIONS

Amendment	Description	Date
A	INITIAL ISSUE	25.02.2019
B		
C		
D		

SCALE: 1 : 250 (A1) 1 : 500 (A3)
DATE: 25.02.2019
DATUM: A.H.D.
ORIGIN: PM 22771 - RL 9.766
CONTOUR INTERVAL: 0.25 m
SURVEYOR: LT DRAWN: SD

JOB No: 19113

SHEET 2 OF 5

DRAWING REF: 19113_DET_A
REVISION: A

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brett@psurveys.com.au
Mobile: 0425 288 179

NEWCASTLE OFFICE

PROJECT MANAGEMENT

SURVEYING

Photograph 5

N

MGA

DP 1021186

Sheet 2
Sheet 3

LOT 40 D | LOT 41 P | LOT 42 | LOT 43 1 | LOT 44 | LOT 45 5 | LOT 46 5 | LOT 47 | LOT 48 5 | LOT 49 3

98° 40' 20"
297.83

(E)

BUILDING

FENCE

METAL

EDGE OF PAVEMENT

SEALED CARPARK

METAL WAREHOUSE
"BUNNINGS

LOT 20
DP 817883

189° 24' 50"
138.44

SMH

WH

DP SL 7.48 IL 6.56

DP SL 7.36 IL 6.48

DP SL 7.19 IL 6.29

DP SL 7.005 IL 6.075

DP SL 7.135 IL 6.235

DP SL 6.82 IL 6.01

DP SL 6.76 IL 5.89

DP SL 6.675 IL 5.875

Sheet 2 | Sheet 3 | Sheet 4 | Sheet 5

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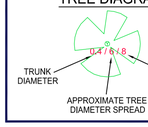
(E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)

5 0 5 10 15 20 25
SCALE 1 : 250 (A1)
SCALE 1 : 500 (A3)

TREE DIAGRAM



LEGEND
UNDERGROUND SERVICES
NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY
SOURCE : DIAL BEFORE YOU DIG

- APPROXIMATE WATER MAIN LOCATION
- APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
- APPROXIMATE SEWER MAIN LOCATION
- APPROXIMATE LOCATION OF UNDERGROUND ELECTRICITY WIRES
- APPROXIMATE GAS MAIN LOCATION

EJB - ELECTRICAL CABLE JUNCTION BOX
SMH - SEWER MANHOLE
PHOTO LOCATION & DIRECTION
TOP OF BANK
BOTTOM OF BANK
FENCING
CONTOUR
WH - WATER HYDRANT
DP - DRAINAGE PIT
SV - STOP VALVE
TBOX - TELSTRA BOX
GM - GAS METER
TPIT - TELSTRA PIT
PIt (U) - PIT (UNKNOWN SERVICE TYPE)

TITLE: PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186

LOCATION: No.393 PACIFIC HIGHWAY, BELMONT

CLIENT: Kaufland

POSITIVE SURVEY SOLUTIONS

Amendment	Description	Date
A	INITIAL ISSUE	25.02.2019
B		
C		
D		

SCALE: 1 : 250 (A1) 1 : 500 (A3)
DATE: 25.02.2019
DATUM: A.H.D.
ORIGIN: PM 22771 - RL 9.766
CONTOUR INTERVAL: 0.25 m
SURVEYOR: LT DRAWN: SD

JOB No: 19113

SHEET 3 OF 5

DRAWING REF: 19113_DET_A
REVISION: A

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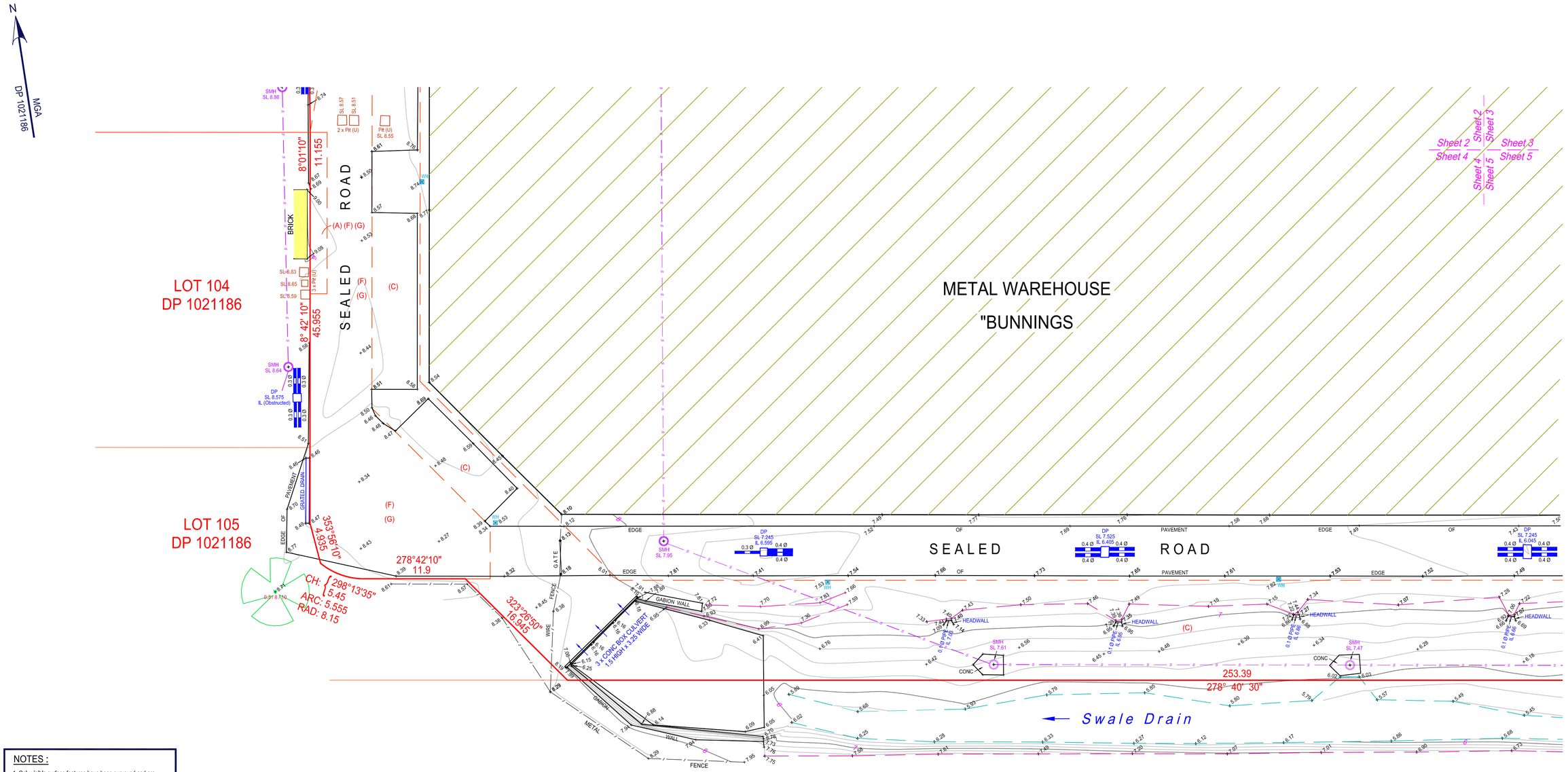
PROJECT MANAGEMENT

SURVEYING



NOTES :

1. Only visible surface features have been surveyed and are shown to scale accuracy only.
2. This plan displays information suitable for detailed planning and design at the scales stated only. The plan may not be used for any other purpose or at any scales other than those stated.
3. The cadastre shown on this plan has been located to a standard of accuracy in accordance with Regulation 10 of the Surveying and Spatial Information Regulation 2017. The boundaries have not been marked by this survey.
4. Spot levels and contours shown hereon are for design purposes only and may require confirmation prior to any excavation or construction. Contours have been derived from the spot levels shown and as such are indicative only.
5. Services shown hereon have been located by field survey of visible features only, unless otherwise noted.
6. Any underground services shown on this plan are Indicative only and do not represent the number, size or depth of cables, pipes or conduits, unless otherwise noted.
7. Prior to and during any demolition, excavation or construction the designer and/or contractor must obtain a current search from "Dial Before You Dig".
8. These notes are an Integral part of this plan. Reproduction of this plan, or any part of It, without these notes included in full will render the information invalid and not suitable for use.

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

(A) - EASEMENT TO DRAIN WATER 1 AND 2 WIDE AND VARIABLE WIDTH (DP 1021186)
(C) - EASEMENT TO DRAIN WATER 11.8, 12, 12.945 AND 13.08 WIDE AND VARIABLE WIDTH (DP 1021186)
(F) - RIGHT OF CARRIAGEWAY 3.3, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
(G) - EASEMENT FOR SERVICES 2.0, 3.3, 6.0, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)

5 0 5 10 15 20 25
SCALE 1 : 250 (A1)
SCALE 1 : 500 (A3)

TREE DIAMETER
TRUNK DIAMETER
APPROXIMATE TREE HEIGHT
APPROXIMATE TREE DIAMETER SPREAD

LEGEND
UNDERGROUND SERVICES
NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY
SOURCE : DIAL BEFORE YOU DIG

- APPROXIMATE WATER MAIN LOCATION
- APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
- APPROXIMATE SEWER MAIN LOCATION
- APPROXIMATE LOCATION OF UNDERGROUND ELECTRICITY WIRES
- APPROXIMATE GAS MAIN LOCATION

- EJB - ELECTRICAL CABLE JUNCTION BOX
- SMH - SEWER MANHOLE
- PHOTO LOCATION & DIRECTION
- TOP OF BANK
- BOTTOM OF BANK
- FENCING
- CONTOUR
- WH - WATER HYDRANT
- DP - DRAINAGE PIT
- SV - STOP VALVE
- TBOX - TELSTRA BOX
- GM - GAS METER
- TPIT - TELSTRA PIT
- Pit (U) - PIT (UNKNOWN SERVICE TYPE)

TITLE:	PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION:	No.393 PACIFIC HIGHWAY, BELMONT
CLIENT:	Kaufland

POSITIVE SURVEY SOLUTIONS

Amendment	Description	Date
A	INITIAL ISSUE	25.02.2019
B		
C		
D		

SCALE: 1 : 250 (A1) 1 : 500 (A3)
DATE: 25.02.2019
DATUM: A.H.D.
ORIGIN: PM 22771 - RL 9.766
CONTOUR INTERVAL: 0.25 m
SURVEYOR: LT DRAWN: SD

JOB No: 19113

SHEET 4 OF 5

DRAWING REF: 19113_DET_A
REVISION: A

51 GEORGETOWN ROAD
GEORGETOWN, NSW 2298
TEL: 61 2 4960 1111

BRETT WHITE
REGISTERED SURVEYOR
brett@psurveys.com.au
Mobile: 0425 288 179

NEWCASTLE OFFICE

PROJECT MANAGEMENT

SURVEYING

N

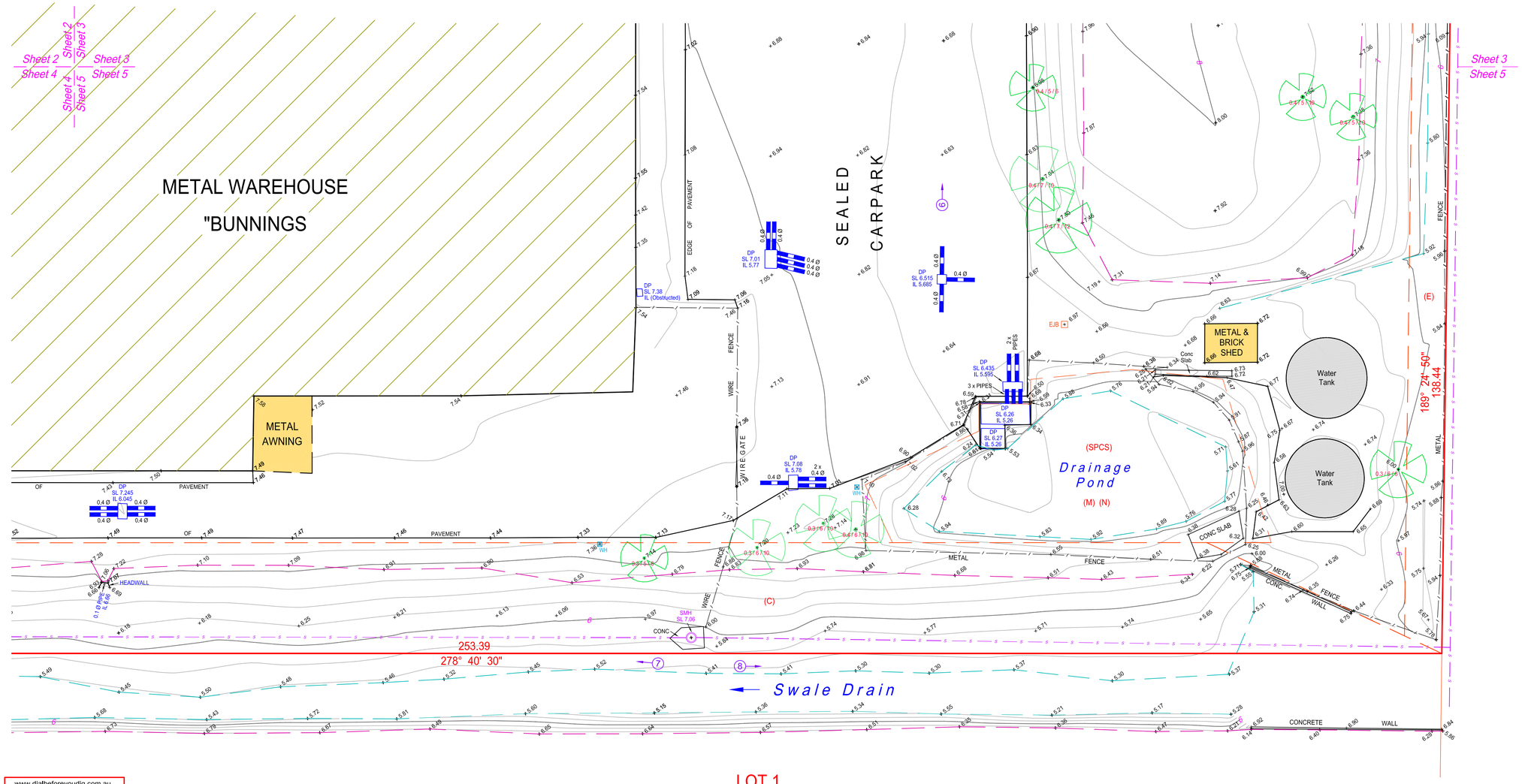
MGA

DP 1021186

Photograph 6

Photograph 7

Photograph 8



NOTES :

1. Only visible surface features have been surveyed and are shown to scale accuracy only.
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6. Any underground services shown on this plan are indicative only and do not represent the number, size or depth of cables, pipes or conduits, unless otherwise noted.
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8. These notes are an integral part of this plan. Reproduction of this plan, or any part of it, without these notes included in full will render the information invalid and not suitable for use.

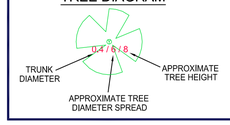
www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

(E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)
(M) - RESTRICTION ON THE USE OF LAND (DP 1021186)
(N) - POSITIVE COVENANT (DP 1021186)
(SPCS) - STORMWATER POLLUTION CONTROL SYSTEM (DP 1021186)

LOT 1
DP 660520

5 0 5 10 15 20 25
SCALE 1 : 250 (A1)
SCALE 1 : 500 (A3)

TREE DIAGRAM



LEGEND
UNDERGROUND SERVICES
NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY
SOURCE : DIAL BEFORE YOU DIG

- w — APPROXIMATE WATER MAIN LOCATION
- t — APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
- s — APPROXIMATE SEWER MAIN LOCATION
- e — APPROXIMATE LOCATION OF UNDERGROUND ELECTRICITY WIRES
- G — APPROXIMATE GAS MAIN LOCATION

- EJB - ELECTRICAL CABLE JUNCTION BOX
- SMH - SEWER MANHOLE
- PHOTO LOCATION & DIRECTION
- TOP OF BANK
- BOTTOM OF BANK
- FENCING
- CONTOUR
- WH - WATER HYDRANT
- DP - DRAINAGE PIT
- SV - STOP VALVE
- TBOX - TELSTRA BOX
- GM - GAS METER
- TPIT - TELSTRA PIT
- PIt (U) - PIT (UNKNOWN SERVICE TYPE)

TITLE: PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186

LOCATION: No.393 PACIFIC HIGHWAY, BELMONT

CLIENT: Kaufland

POSITIVE SURVEY SOLUTIONS

Amendment	Description	Date
A	INITIAL ISSUE	25.02.2019
B		
C		
D		

SCALE: 1 : 250 (A1) 1 : 500 (A3)
DATE: 25.02.2019
DATUM: A.H.D.
ORIGIN: PM 22771 - RL 9.766
CONTOUR INTERVAL: 0.25 m
SURVEYOR: LT DRAWN: SD

JOB No: 19113

SHEET 5 OF 5

DRAWING REF: 19113_DET_A
REVISION: A

APPENDIX C

CIVIL ENGINEERING DESIGN for DC/99/01634/1M-A
(MICHEAL LOCKLEY & ASSOCIATES SH1 to SH12)

ADJOINS SHEET 3

ADJOINS SHEET 2

LEGEND:

- OVERLAND FLOWPATH
- DIRECTION OF FALL
- eg 3% GRADE
- S EXISTING SEWER
- SW PROPOSED STORMWATER
- eg 7.47 DESIGN SURFACE LEVEL
- FL REFERS TO FLOOR LEVEL
- I.L REFERS TO INVERT LEVEL
- SILT FENCE

W/B COTTAGE No. 50 RIDGE RL 13.80 | BK. COTTAGE No. 48 RIDGE RL 13.80 | W/B COTTAGE No. 46 RIDGE RL 13.80 | W/B COTTAGE No. 44 RIDGE RL 13.80 | W/B COTTAGE No. 40 RIDGE RL 13.80 | W/B COTTAGE No. 38 RIDGE RL 13.80 | W/B COTTAGE No. 36 RIDGE RL 13.80 | W/B COTTAGE No. 34 RIDGE RL 13.80 | W/B COTTAGE No. 32 RIDGE RL 13.80 | CLAD COTTAGE No. 30 RIDGE RL 13.80 | W/B COTTAGE No. 28 RIDGE RL 13.80 | W/B COTTAGE No. 26 RIDGE RL 13.80 | W/B COTTAGE No. 24 RIDGE RL 13.80 | W/B COTTAGE No. 22 RIDGE RL 13.80 | W/B COTTAGE No. 20 RIDGE RL 13.80 | CLAD COTTAGE No. 18 RIDGE RL 13.80

1 | 2 | 37 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50

15.240 | 32.735 | 32.745 | 94.025 | 5.240 | 188.395

150mm DIAM SEWER | LANDSCAPED AREA | CENTRE OF OVERLAND FLOW PATH | 2.2m ACOUSTIC FENCE | SEWER MANHOLE TOP R.L7.88 I.L6.75 | SEWER I.L7.22 | (SEWER)

150mm KERB | PARKING | SPEED HUMP | CROSSING | MAIN ENTRY | COUNTER SERVICE

225ø | 300ø | 2X225ø | 2X300ø | 4 X 300ø | 3 X 300ø | 2X375ø

S.L7.87 I.L6.84 | S.L7.48 I.L6.70 | S.L7.11 I.L6.43 | S.L6.935 I.L6.25 | S.L6.74 I.L6.05 | S.L6.935 I.L6.09 | I.L7.15 | I.L6.85 | I.L6.42

3 X 1.50HIGH X 3.3(MIN) WIDE UNDER-GROUND CONCRETE BOX SECTION CHANNELS FROM CH36.07 TO CH173 AT 0.475% NEW DRAINAGE EASEMENT TO BE CREATED

SEWER MANHOLE TOP R.L7.62 I.L5.72 & 5.92

INDOOR NURSERY | PLAY-GROUND | AMENITIES | WAREHOUSE F.L 7.35 | TIMBER YARD 1620 Sqm | DISABLED TOILET | LINE OF ROOF OVER SHOWROOMS | 100mm KERB

SEWER DIVERTED | PROPOSED MANHOLE | I.L6.41 | I.L6.50 | I.L6.33 | IL 5.93 | IL 5.60 | IL 5.58

SECURITY GATE | EXTERNAL PALLET STORE | OIL TRAP | Trolley Bay

EDGE OF WIDENED CHANNEL | DRAINAGE EASEMENT OVER WIDENED CHANNEL | LANDSCAPED AREA | 375mm DIA CONC SEWER | ROCK GABIONS | PROPOSED MANHOLE | I.L6.251 | 348.315 | 279° 40' 55"

SEWER MANHOLE TOP R.L7.52 I.L5.22 | SEWER MANHOLE TOP R.L7.11 I.L4.95 | SEWER MANHOLE TOP R.L6.20 | I.L4.833

4.30 x 2.15m GROSS POLLUTANT TRAP TO COUNCIL PLAN No3213-1(1/1)

METAL SHED | METAL SHED | METAL SHED | "KENNARDS SELF STORAGE" | (TO BE REMOVED) | ROCK GABIONS WITHIN EASEMENT

APPROXIMATE CENTRELINE OF EXISTING BOUNDARY | GRASS | CONCRETE SURFACE | CHANNEL | BOUNDARY | OVERLAND FLOW PATH | 2.0 WIDE

CHANNEL TO HAVE CONCRETE FLOOR AND VERTICLE CONCRETE WALLS FROM CH 405 TO CH 426.248

EASEMENT TO BE EXTENDED WITHIN LOT 1 D.P.660520

PROVIDE GAP AT BASE OF FENCE FOR OVERLAND FLOW

ERECT SILT FENCE ALONG EAST BOUNDARY

MANHOLE TOP R.L6.94

NUTRIENT POND IN ACCORDANCE WITH COUNCIL'S "NUTRIENT PONDS IN SUBDIVISIONAL WORKS-DESIGN GUIDELINES" AREA OF PERMANENT WATER=157m²

20 D.P. 817883

SEE NOTE 11 ON SHEET 2

RENO MATTRESS OR SIMILAR FOR ENERGY DISSIPATOR FROM CH 426.248 TO CH438.615

PROVIDE STRAW BALE BARRIER

BUSHLAND

ERECT STRUCTURE ADJACENT TO MANHOLE DESIGNED FOR FORCES FROM FLOW AND FLOATING OBJECTS

ERECT SILT FENCE. FENCE TO BE MOVED DEPENDING ON THE LOCATION OF THE WORKS SO THAT NO SILT CAN TRAVEL INTO CHANNEL.

FENCING ALONG TOP OF CHANNEL SUITABLE TO PREVENT ENTRY TO CHANNEL

SEE NOTES 11,12 & 13 ON SHEET 2

ERECT STRUCTURE ADJACENT TO MANHOLE DESIGNED FOR FORCES FROM FLOW AND FLOATING OBJECTS

Ø EASEMENT TO DRAIN WATER 7.62, 6.09 & 3.05 WIDE AND VARIABLE WIDTH VIDE TR K486923.

Ø EASEMENT TO DRAIN WATER 9.145 WIDE VIDE TR M376530

"SEE SHEET 2 FOR NOTES"

0 5 10 20 30

DATE: 20/01/00 | AMENDMENT: REVISED SITE LAYOUT REF: 24225

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

MLA

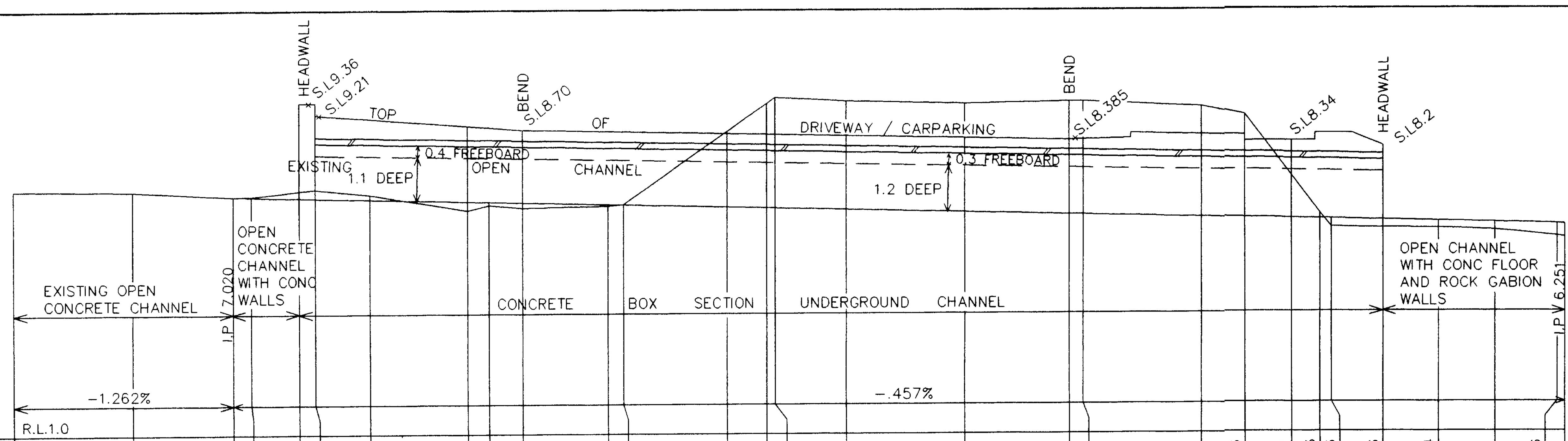
MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET GLADESVILLE, 2111
(P.O. BOX 400) DX 554 SYDNEY
P.H. 9879 6077

DATE: 6-5-99
R.R.: 1: 400
DATUM: A.H.D
SITE AREA:
SHEET 4 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD

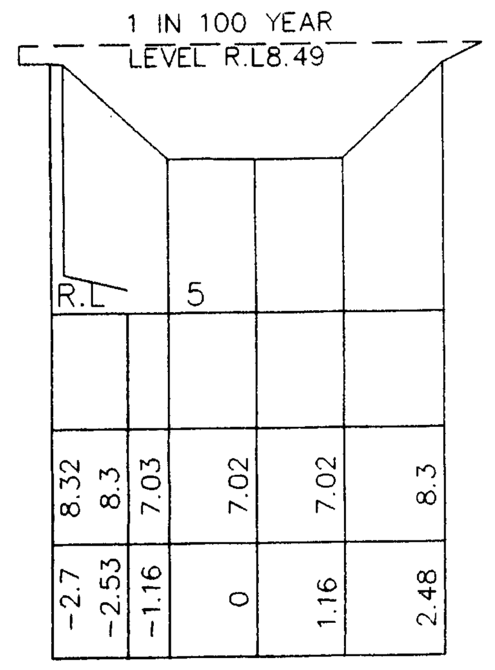
STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
DETAIL PLAN

LGA: LAKE MACQUARIE

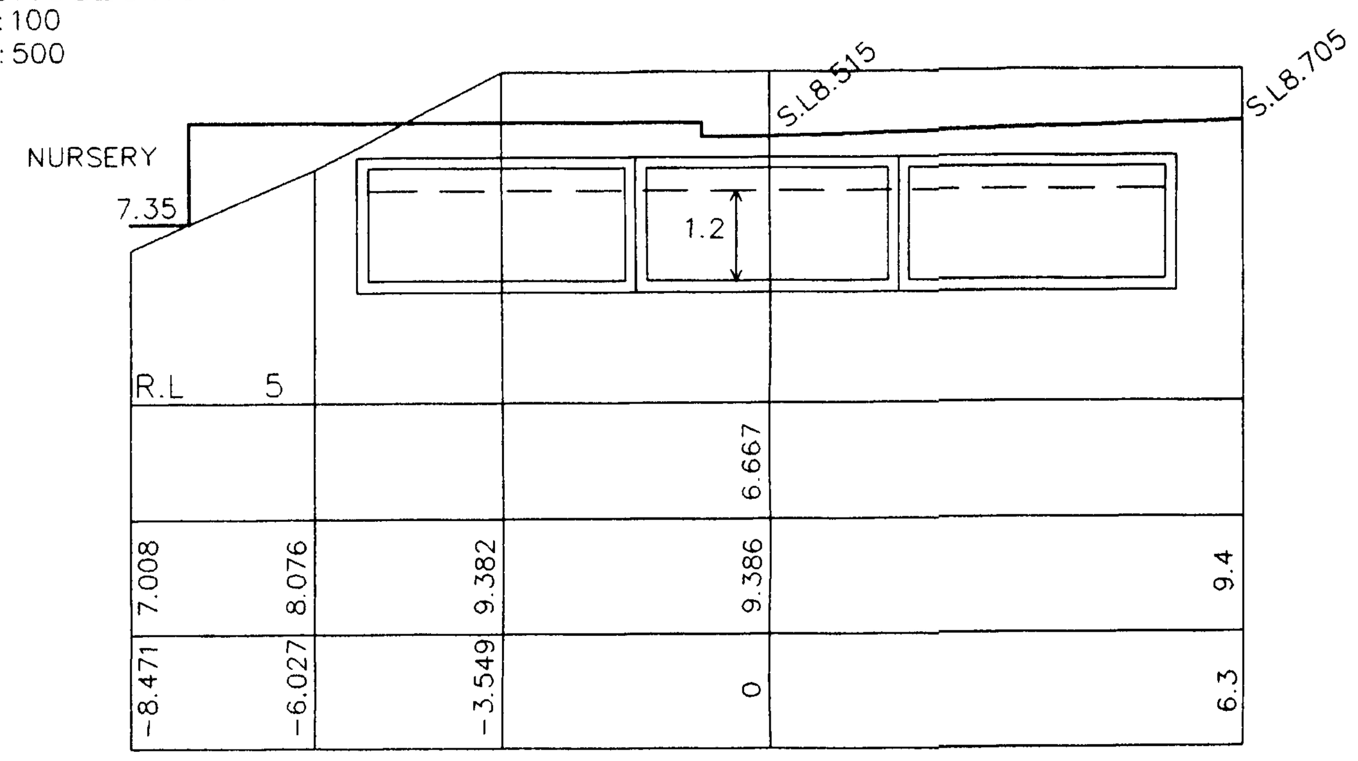


CHANNEL FLOOR DESIGN LEVEL			7.02	7.01	6.982	6.973	6.941	6.885	6.872	6.853	6.804	6.795	6.735	6.713	6.708	6.667	6.598	6.538	6.53	6.461	6.436	6.409	6.393	6.386	6.356	6.324	6.291	6.256	6.251
EXISTING LEVEL	7.177	7.154	7.02	7.026	7.151	7.193	7.057	6.659	6.793	6.724	6.767	6.799	8.618	9.315	9.474	9.386	9.316	9.362	9.368	9.226	9.008	7.47	6.534	6.181	6.152	6.145	5.8	5.73	5.7
CHAINAGE	0	15	27.7	30	36.07	38.07	45	57.311	60	64.237	75	76.943	90	95	96.038	105	120	133.211	135	150	155.461	161.4	165	166.444	173	180	187.141	195	196

CHANNEL LONGSECTION
VERT 1:100
HORZ 1:500



27.7
END OF CONC CHANNEL



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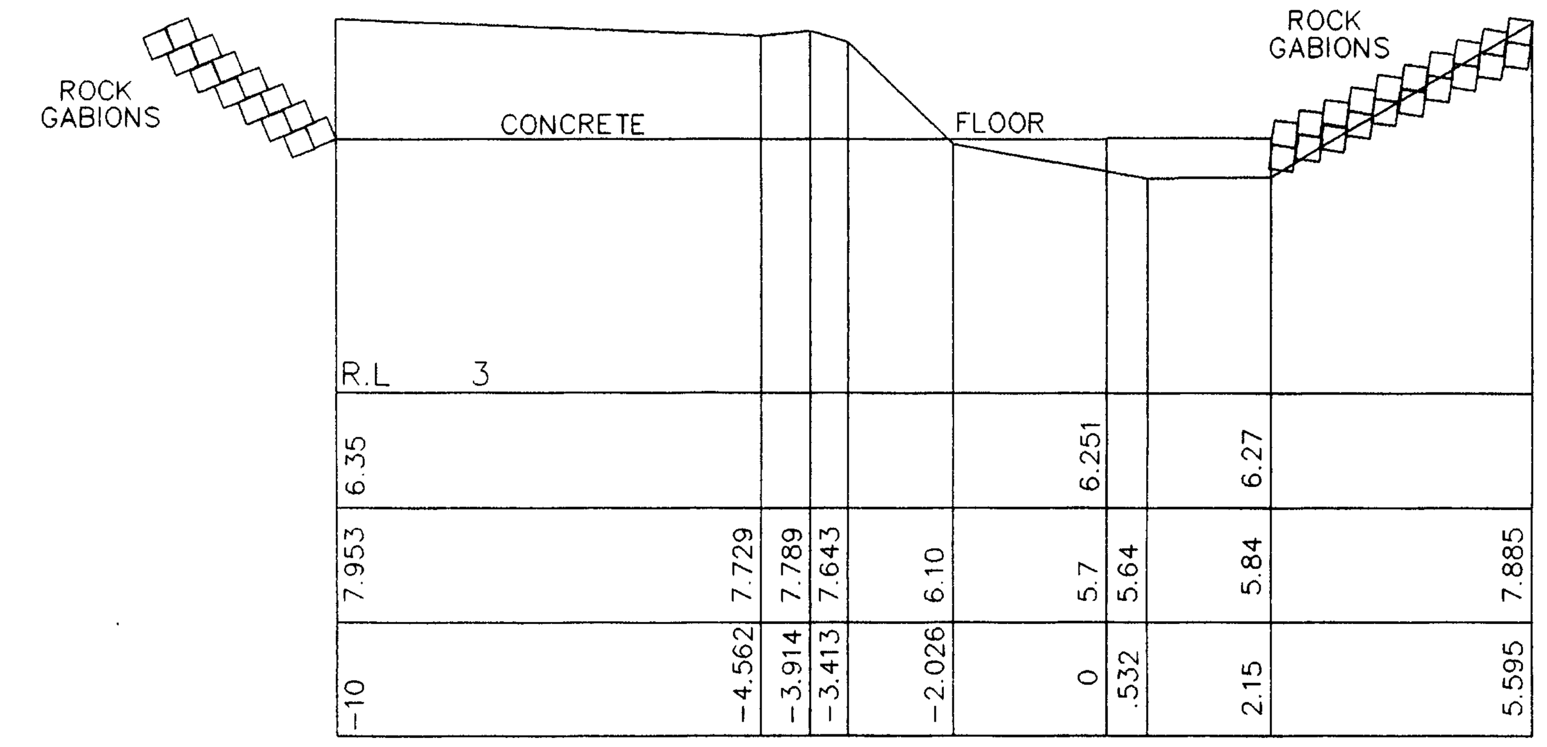
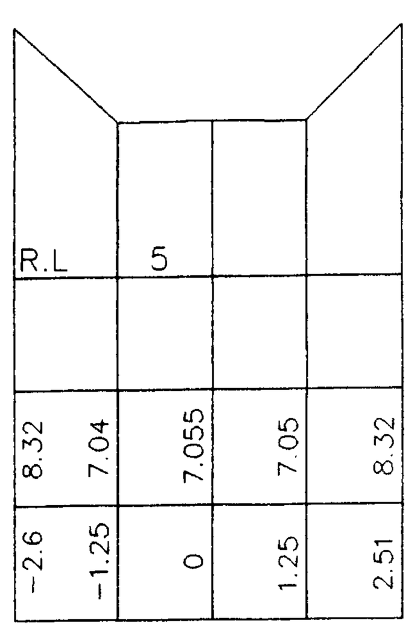
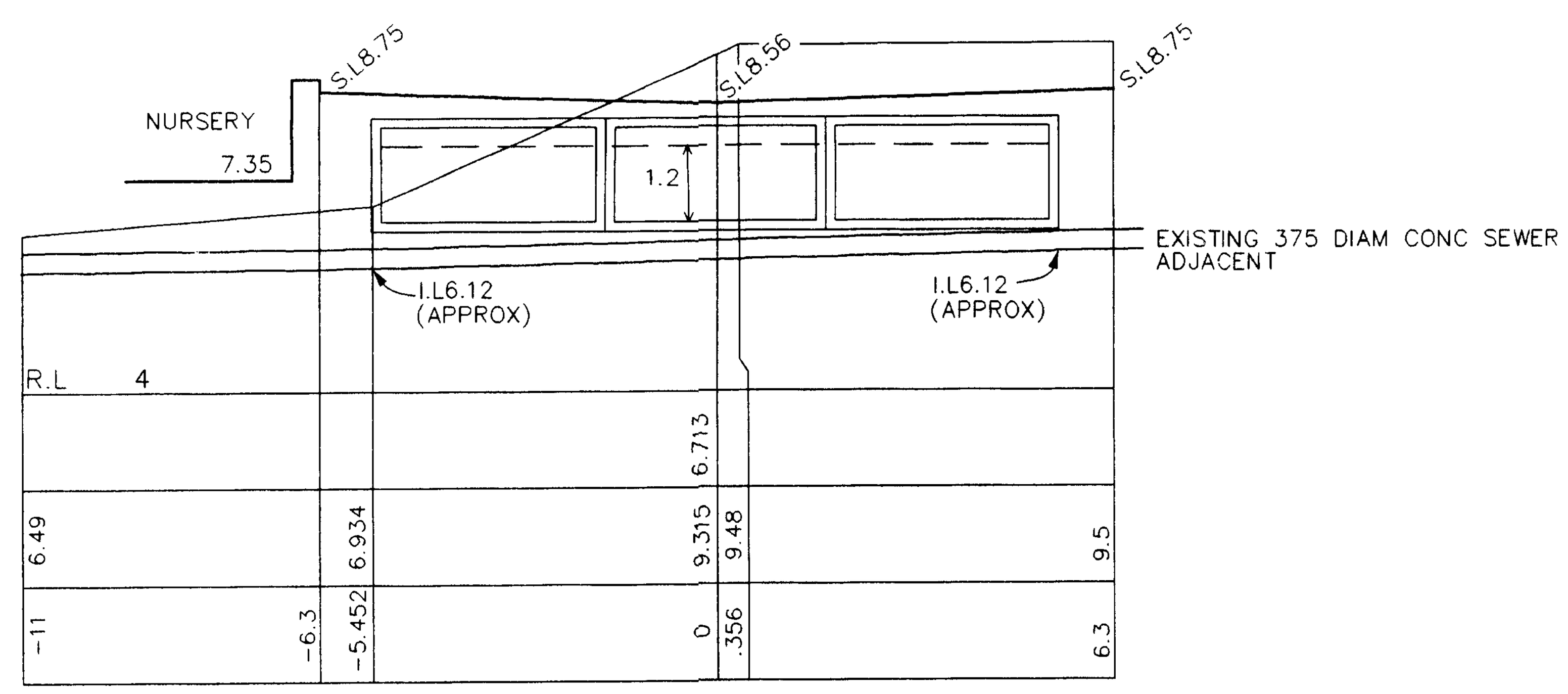


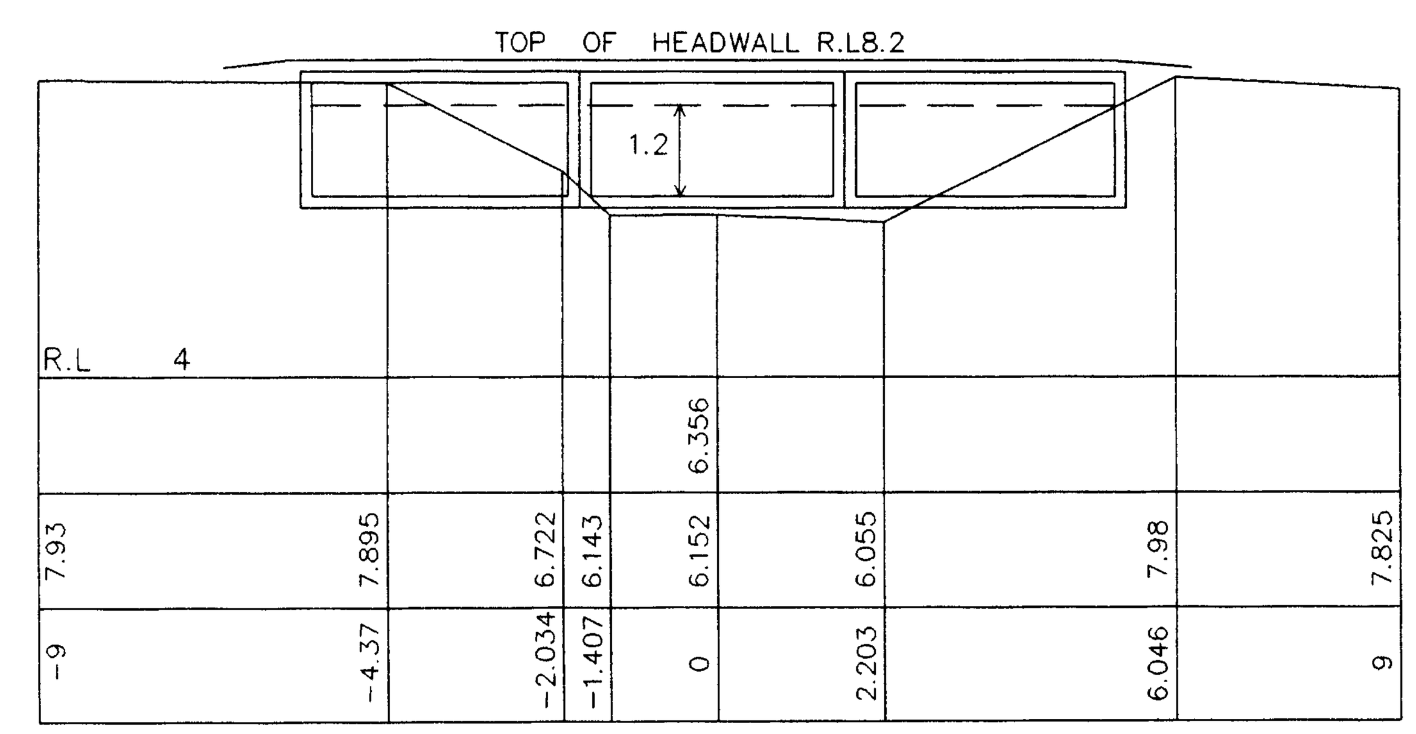
196
END OF OPEN CONCRETE CHANNEL



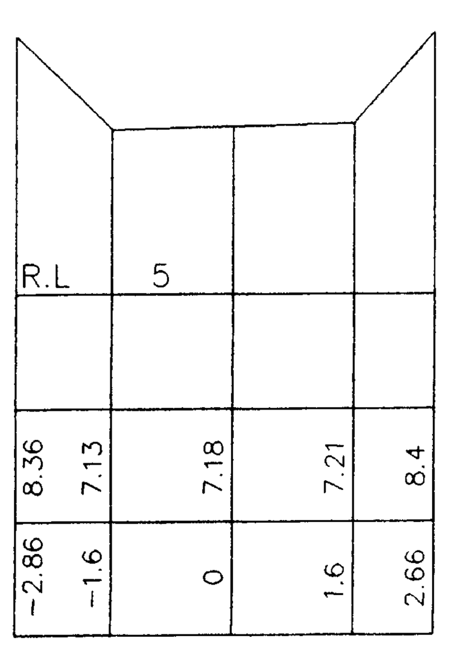
25
EXISTING CONC CHANNEL



95

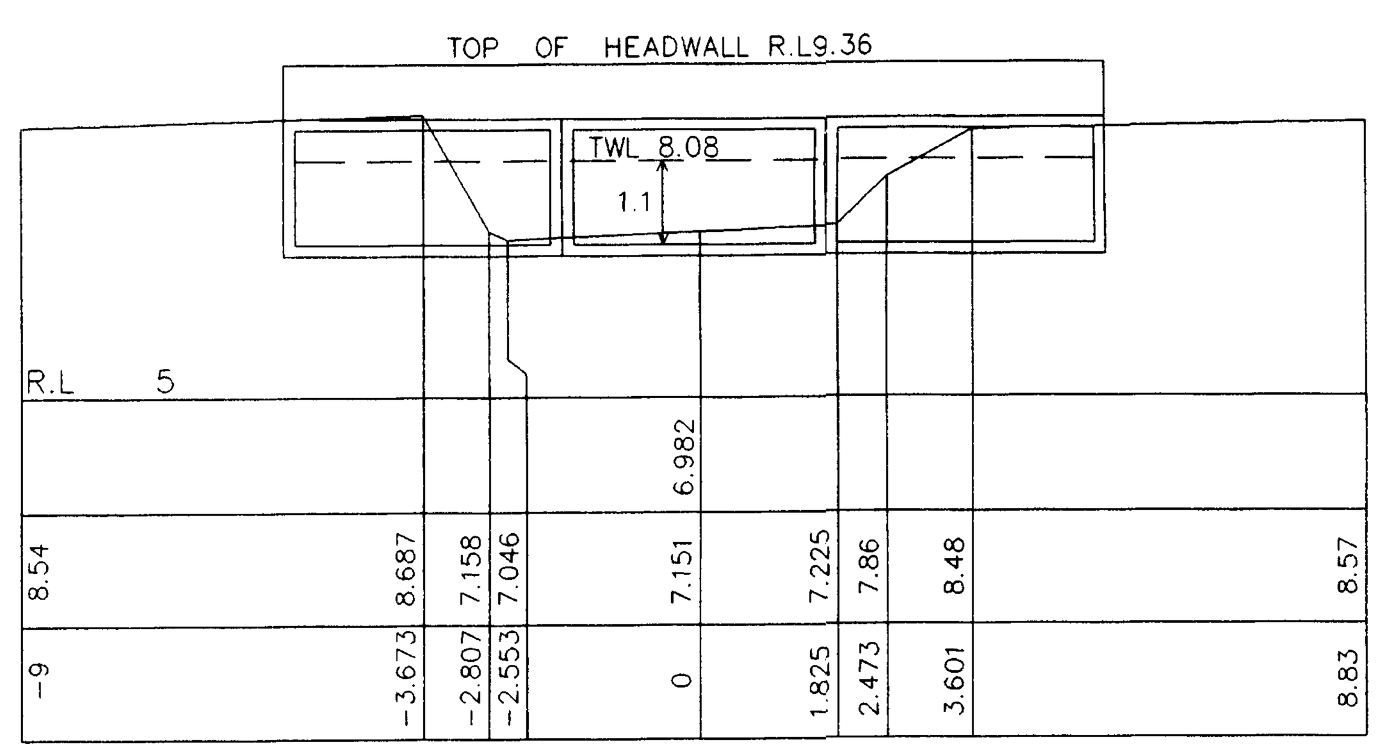


173
HEADWALL AT END OF
UNDERGROUND CHANNEL

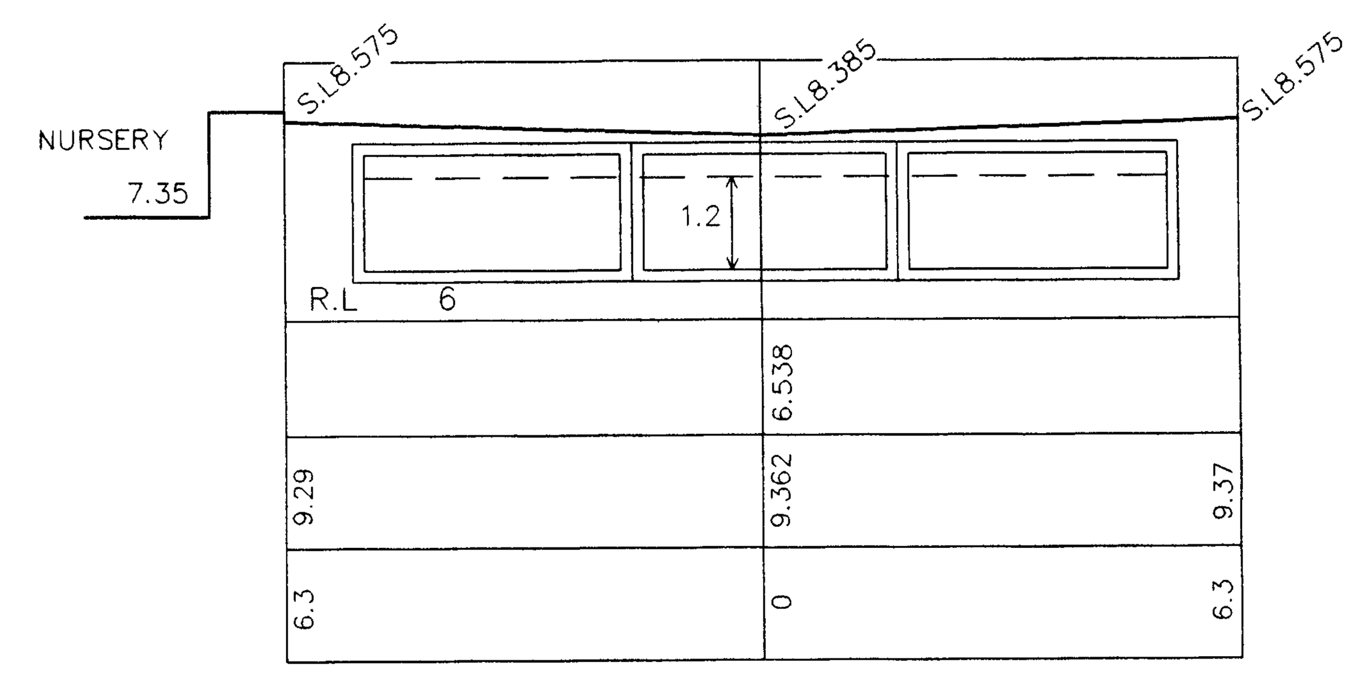


15
EXISTING CONC CHANNEL

NOTE: EACH CONCRETE BOX SECTION IS 3.30m WIDE AND 1.5 DEEP



36.07
HEADWALL AT START OF
UNDERGROUND CHANNEL



133.211
BEND

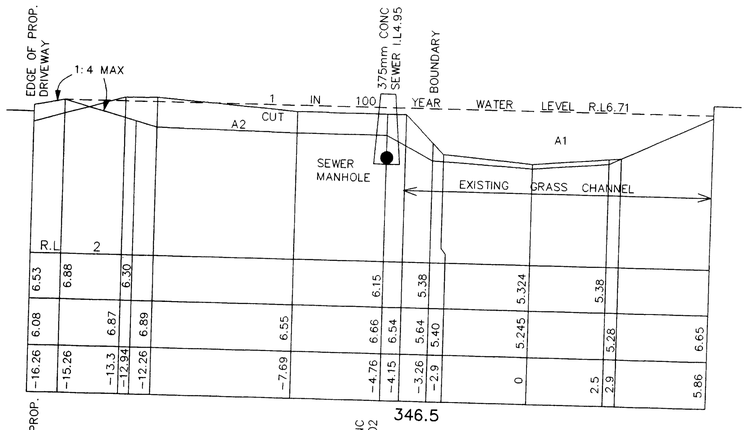
DATE: 20/01/00	AMENDMENT: REVISED SITE LAYOUT REF: 24225	

THIS IS THE PLAN REFERRED TO IN MY LETTER
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

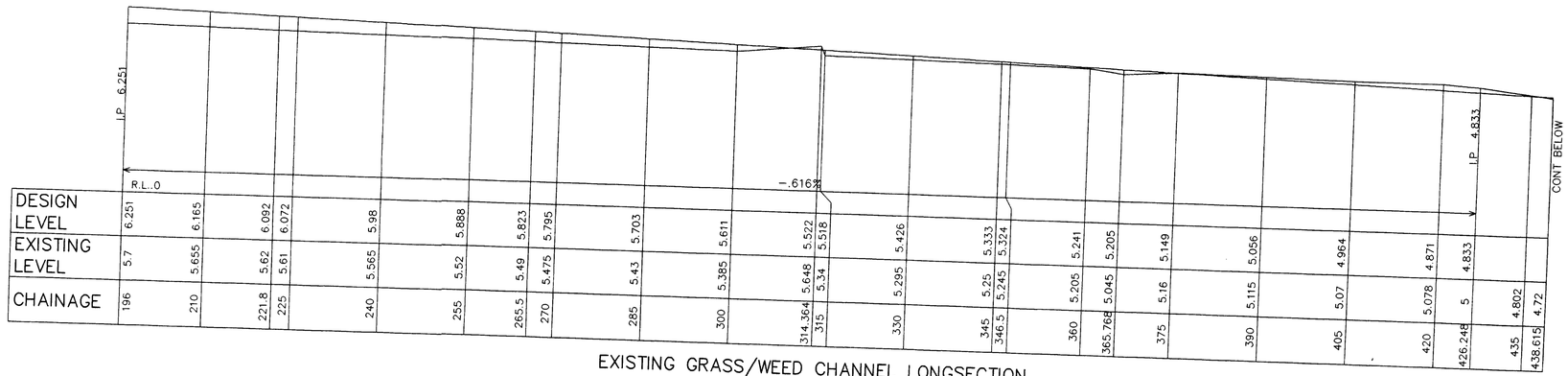
MLA

MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
(P.O. BOX 400) GLADESVILLE, 2111
P.H. 9879 6077 DX 554 SYDNEY

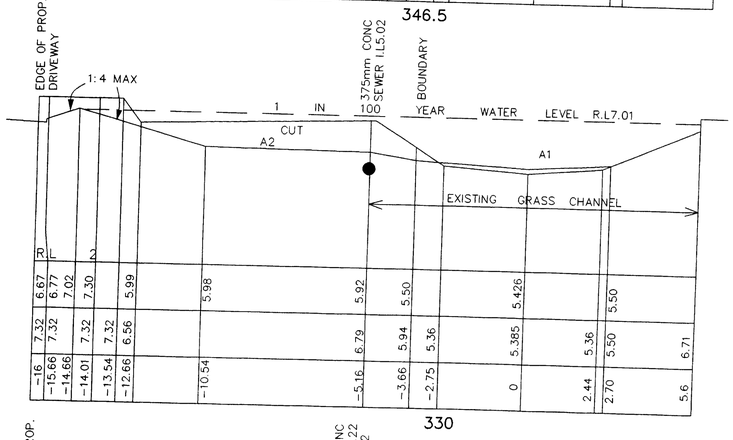
DATE: 6-5-99	CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
R.R.: AS SHOWN	EXISTING & PROPOSED CONCRETE CHANNELS AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
DATUM: A.H.D	
SITE AREA:	
SHEET 5 OF 12 SHEETS	LGA: LAKE MACQUARIE



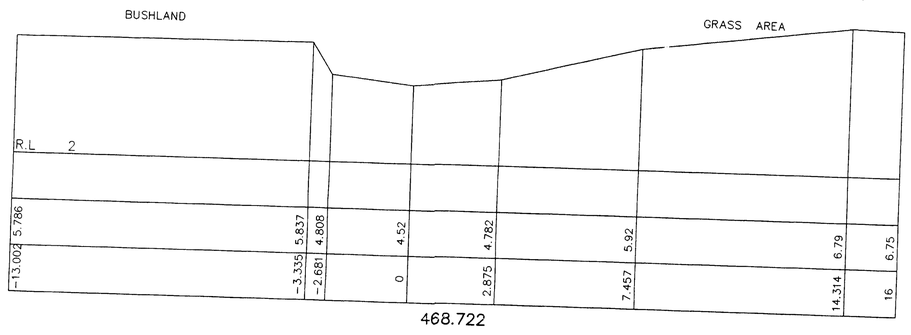
346.5



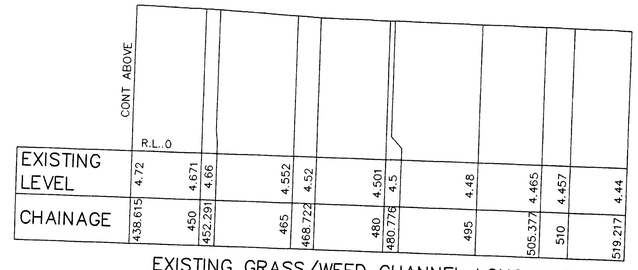
EXISTING GRASS/WEED CHANNEL LONGSECTION
(APPROXIMATE CENTRELINE)
1:100 VERT
1:500 HORZ



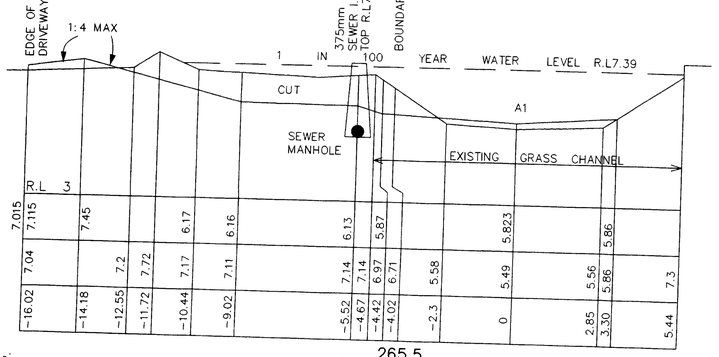
330



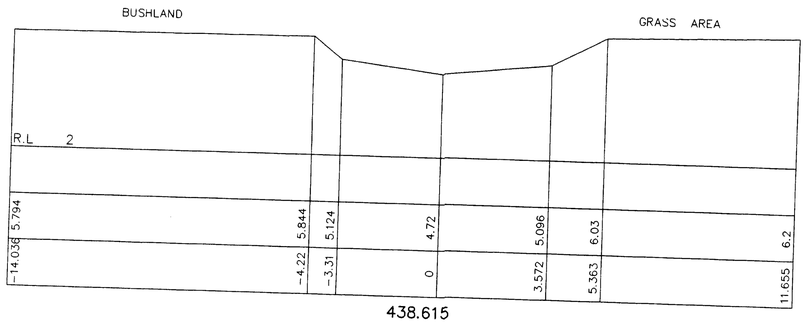
468.722



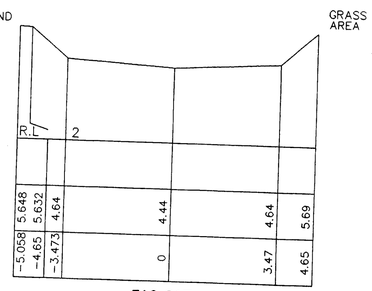
EXISTING GRASS/WEED CHANNEL LONGSECTION
(APPROXIMATE CENTRELINE)
1:100 VERT
1:500 HORZ



265.5

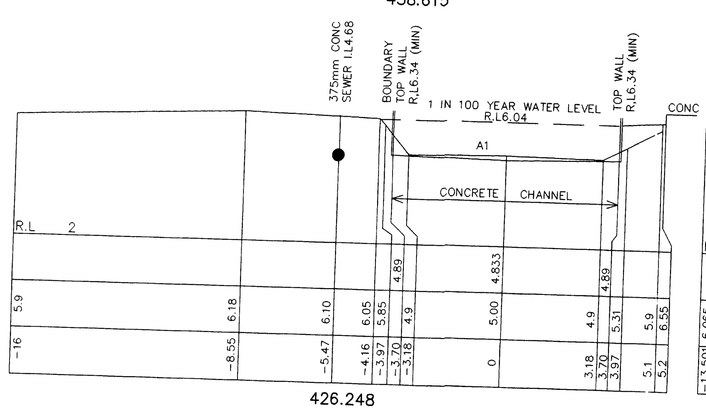


438.615

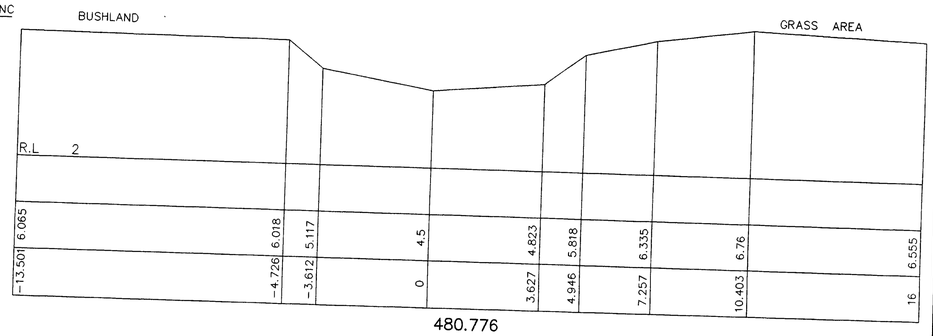


519.217

221.8



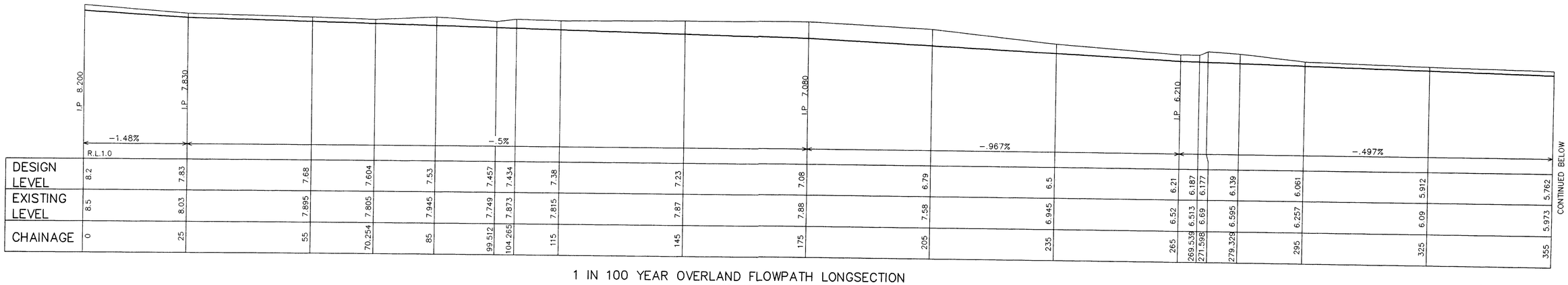
426.248



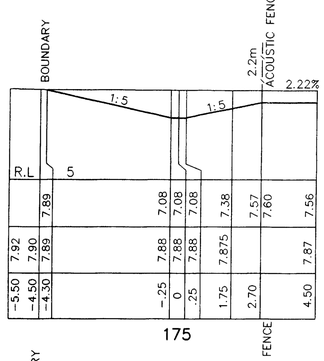
480.776

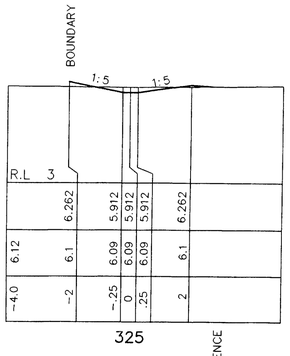
210
CROSS SECTIONS
RR 1:100 NATURAL

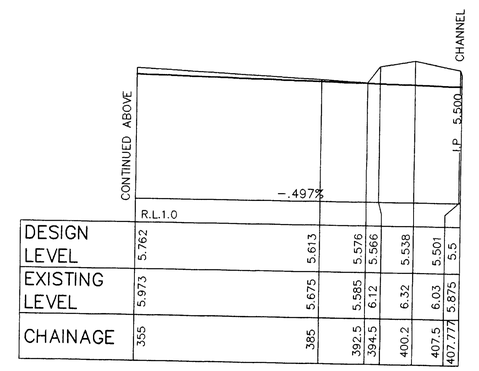
THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99	MLA	MICHAEL LOCKLEY & ASSOCIATES CONSULTING SURVEYORS & PLANNERS No.3 COWELL STREET (P.O. BOX 400) GLADESVILLE, 2111 P.H. 9879 6077 DX 554 SYDNEY	DATE: 6-5-99	CLIENT: AUSTEXX DEVELOPMENTS PTY LTD	
JOB REF: 23521			R.R.: AS SHOWN	EXISTING GRASS CHANNEL LONGSECTION AND CROSS SECTIONS AND WORK REQUIRED TO EXISTING GRASSED CHANNEL ADJACENT TO 397 PACIFIC HIGHWAY, BELMONT NORTH.	
CAD REF: 23521			DATUM: A.H.D		
REG'D SURV. NSW			SITE AREA:		
DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225			SHEET 6 OF 12 SHEETS	LGA: LAKE MACQUARIE	

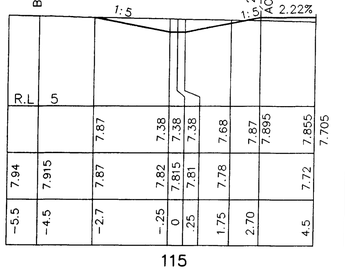


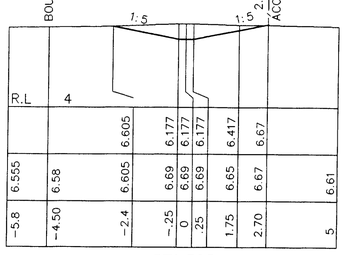
1 IN 100 YEAR OVERLAND FLOWPATH LONGSECTION
VERT 1:100
HORZ 1:500

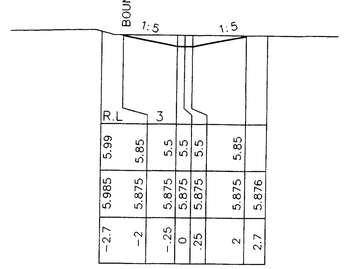


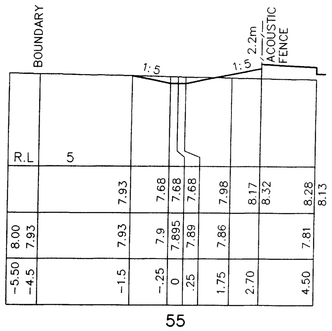


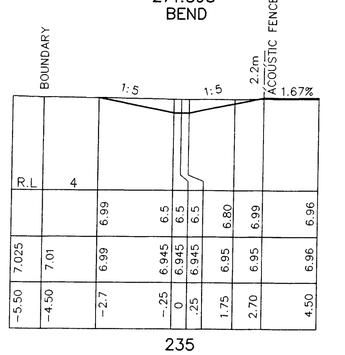


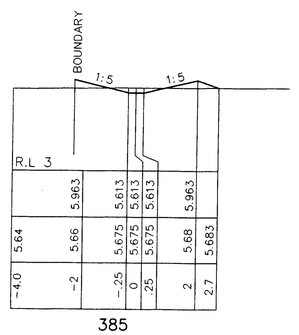




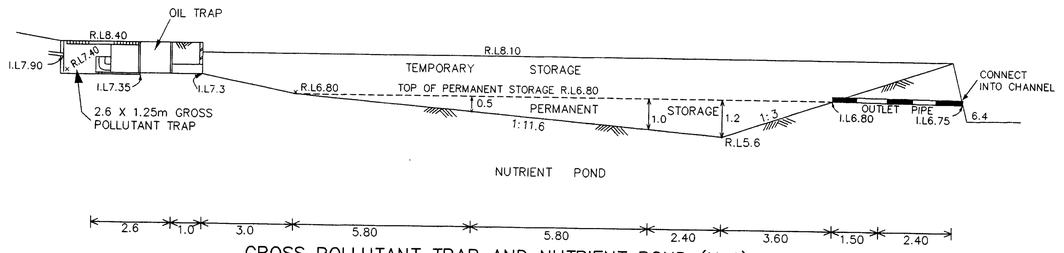




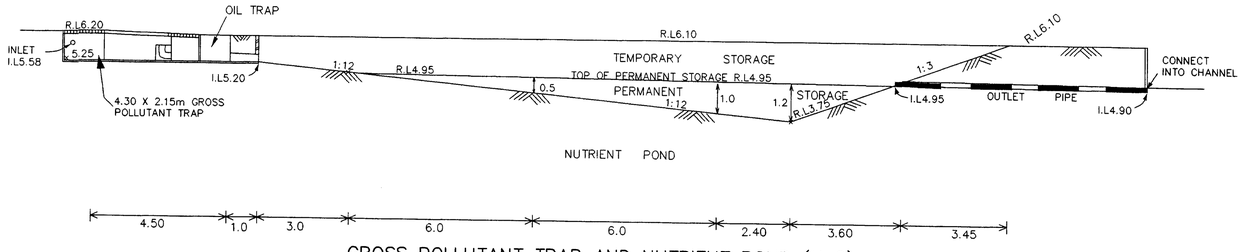




CROSS SECTIONS
1:100 NATURAL



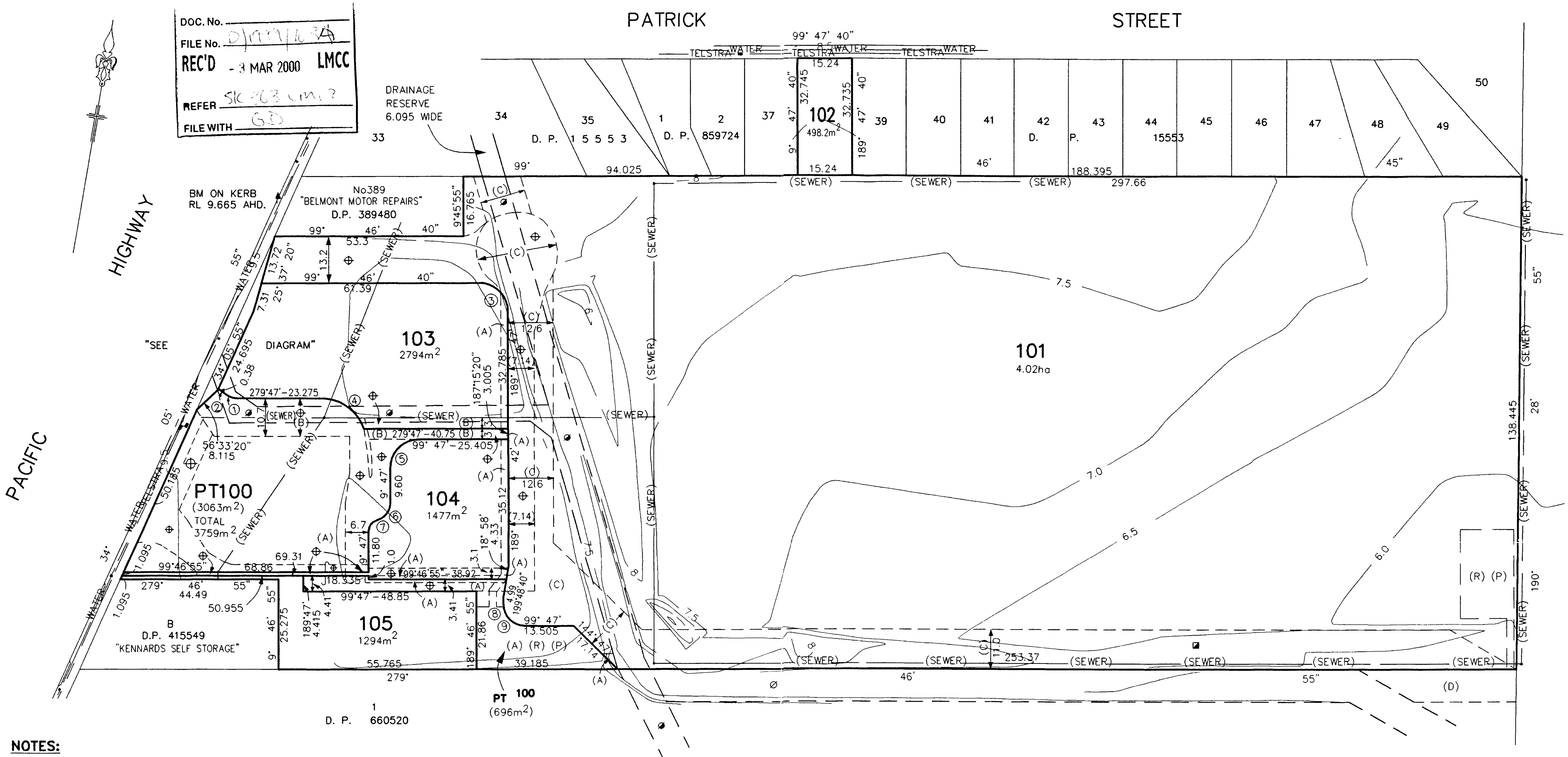
GROSS POLLUTANT TRAP AND NUTRIENT POND (No1)
SECTION Ⓧ – Ⓧ
RR 1:100
AREA OF PERMANENT WATER = 0.5% X 11930 = 60m^2



GROSS POLLUTANT TRAP AND NUTRIENT POND (No2)
SECTION Ⓨ – Ⓨ
RR 1:100
AREA OF PERMANENT WATER = 0.5% X 31390 = 157m^2

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99	MLA	MICHAEL LOCKLEY & ASSOCIATES CONSULTING SURVEYORS & PLANNERS No.3 COWELL STREET GLADESVILLE, 2111 (P.O. BOX 400) DX 554 SYDNEY P.H. 9879 8077	DATE: 6-5-99 R.R.: AS SHOWN DATUM: A.H.D SITE AREA: 2 SHEET 7 OF 12 SHEETS
JOB REF: 23521 CAD REF: 23521 REG'D SURV. NSW			CLIENT: AUSTEXX DEVELOPMENTS PTY LTD FLOWPATH LONGSECTION AND CROSS SECTIONS GROSS POLLUTANT TRAP AND NUTRIENT POND DETAILS. LGA: LAKE MACQUARIE

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225



NOTES:

1) NO BOUNDARIES HAVE BEEN MARKED OR SURVEYED.
2) ALL AREAS AND DIMENSIONS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE AT THE LAND TITLES OFFICE AND ARE SUBJECT TO FINAL SURVEY.
3) ORIGIN OF LEVELS ON AHD IS TAKEN FROM PM 22771 RL 9.766
4) CONTOUR INTERVAL 0.5 METRE.
5) CONTOURS ARE INDICATIVE OF GROUND FORM ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.

Ø EASEMENT TO DRAIN WATER 7.62, 6.09, & 3.05 WIDE & VARIABLE WIDTH VIDE TR K486923.
(TO BE RELEASED THROUGH SUBJECT PROPERTY)
Ø EASEMENT TO DRAIN WATER 9.145 WIDE VIDE TR M376530.

(A) EASEMENT TO DRAIN WATER 1 WIDE, 2 WIDE AND VARIABLE WIDTH (PROPOSED)
(B) EASEMENT TO DRAIN WATER 3 WIDE, 10.7 WIDE AND VARIABLE WIDTH (PROPOSED)
(C) EASEMENT TO DRAIN WATER 11 WIDE, 12.6 WIDE AND VARIABLE WIDTH (PROPOSED)
(D) EASEMENT TO DRAIN WATER 9.15 WIDE AND VARIABLE WIDTH (PROPOSED IN LOT 1 IN D.P.660520)
⊕ (E) RIGHT OF CARRIAGEWAY 1, 3, 3.1, 3.41, 4.41, 6.7, 7.14, 10.7 AND 13.2 WIDE AND VARIABLE WIDTH (PROPOSED)
⊕ (F) EASEMENT FOR SERVICES 1, 3, 3.1, 3.41, 4.41, 6.7, 7.14, 10.7 AND 13.2 WIDE AND VARIABLE WIDTH (PROPOSED)
(G) EASEMENT FOR ELECTRICITY CABLES 1 WIDE (PROPOSED)
(H) EASEMENT FOR SIGNAGE AND ELECTRICITY CABLES 2 WIDE (PROPOSED)
(P) POSITIVE COVENANT
(R) RESTRICTION ON USE OF LAND

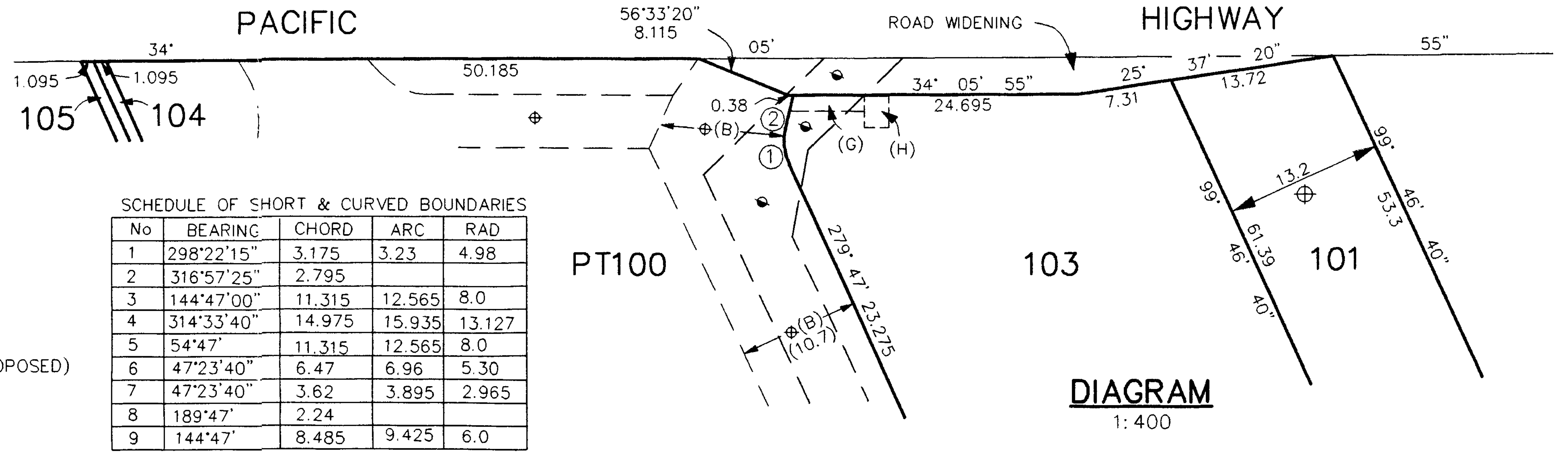


DIAGRAM
1: 400

SCHEDULE OF SHORT & CURVED BOUNDARIES

No	BEARING	CHORD	ARC	RAD
1	298°22'15"	3.175	3.23	4.98
2	316°57'25"	2.795		
3	144°47'00"	11.315	12.565	8.0
4	314°33'40"	14.975	15.935	13.127
5	54°47'	11.315	12.565	8.0
6	47°23'40"	6.47	6.96	5.30
7	47°23'40"	3.62	3.895	2.965
8	189°47'	2.24		
9	144°47'	8.485	9.425	6.0

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 10-2-00
JOB REF: 24227
CAD REF: 24227PS
REG'D SURV. NSW

MLA

MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
(P.O. BOX 400) GLADESVILLE, 2111
P.H. 9879 6077 DX 554 SYDNEY

DATE: 10-2-00
R.R.: 1:800
DATUM: AHD
SITE AREA: AS SHOWN
SHEET 1 OF 1 SHEETS

CLIENT: AUSTEXX PTY LTD.
PLAN SHOWING PROPOSED SUBDIVISION OF LOTS 1 & 2 IN D.P. 534081 BEING No.397 PACIFIC HIGHWAY, BELMONT NORTH.
LGA: LAKE MACQUARIE

INDEX

SHEET

1. THIS SHEET
2. DETAIL PLAN
3. DETAIL PLAN
4. DETAIL PLAN
5. EXISTING AND PROPOSED CONCRETE CHANNELS
6. EXISTING GRASS CHANNEL LONGSECTION AND CROSS SECTIONS AND WORK REQUIRED TO EXISTING GRASSED CHANNEL
7. FLOWPATH LONGSECTION AND CROSS SECTIONS GROSS POLLUTANT TRAP AND NUTRIENT POND DETAILS.
8. DRAINAGE LONGSECTIONS LINES 1 TO 9
9. DRAINAGE LONGSECTIONS LINES 10 TO 14
10. SOIL AND WATER MANAGEMENT DETAILS
11. DRAINAGE CALCULATION SHEETS
12. CATCHMENT PLAN

LEGEND:

- OVERLAND FLOWPATH
- DIRECTION OF FALL
- eg 3% GRADE
- —— S —— EXISTING SEWER
- —— SW —— PROPOSED STORMWATER
- eg 7.47 DESIGN SURFACE LEVEL
- FL REFERS TO FLOOR LEVEL
- I.L REFERS TO INVERT LEVEL
- SILT FENCE
- Ø EASEMENT TO DRAIN WATER 7.62, 6.09 & 3.05 WIDE AND VARIABLE WIDTH VIDE TR K486923.
- Ø EASEMENT TO DRAIN WATER 9.145 WIDE VIDE TR M376530

"SEE SHEET 2 FOR NOTES"

SEE NOTES 11, 12 & 13 ON SHEET 2

SEE NOTE 11 ON SHEET 2

0 10 20 40 60

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

DATE: 20-1-2000 AMENDMENT: REVISED SITE LAYOUT REF: 24225

MLA

MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
(P.O. BOX 400) GLADESVILLE, 2111
P.H. 9879 6077 DX 554 SYDNEY

DATE: 6-5-99
R.R.: 1:600
DATUM: A.H.D
SITE AREA:
SHEET 1 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD

STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
OVERALL SITE PLAN

LGA: LAKE MACQUARIE

I.S.G

NOTES

1. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND CONTRACT PLANS FOR EACH SITE AND TO COUNCIL SPECIFICATIONS AND REQUIREMENTS.

2. ORIGIN OF LEVELS ON A.H.D IS TAKEN FROM PM 22771 R.L 9.766 A.H.D.

3. ALL LEVELS ARE TO BE TAKED FROM ESTABLISHED BENCH MARKS.

4. MAKE SMOOTH JOINS WITH EXISTING FORMATIONS.

5. SERVICES HAVE BEEN PLOTTED FROM SURFACE INVESTIGATION AND FROM PLANS SUPPLIED BY SERVICE AUTHORITIES. LARGE TELSTRA CABLES AND LARGE AND SMALL WATERMAINS ARE LOCATED UNDERGROUND IN PACIFIC HIGHWAY ADJACENT TO THE SITE. THE CONTRACTOR IS TO ASCERTAIN THE EXACT POSITION AND LEVEL OF ALL SERVICES PRIOR TO COMMENCEMENT OF WORK AND ANY CONFLICT WITH THE DESIGN SHOULD BE NOTIFIED TO MICHAEL LOCKLEY & ASSOCIATES IMMEDIATELY.

6. SERVICES ARE TO BE ADJUSTED OR RELOCATED AS REQUIRED. ADJUSTMENTS TO SERVICES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT AUTHORITIES.

7. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS AND APPROPRIATE SAFETY SIGNS ARE TO BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE WORK. A SIGN MUST BE ERECTED IN A PROMINENT POSITION STATING THAT UNAUTHORISED ENTRY TO THE WORK SITE IS PROHIBITED AND SHOWING THE NAME OF THE PERSON IN CHARGE OF THE WORK SITE AND A TELEPHONE NUMBER AT WHICH THAT PERSON MAY BE CONTACTED OUTSIDE WORKING HOURS.

8. TRAFFIC MANAGEMENT MUST BE COMPLIANCE WITH AS 1742.3 1985 (TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS AND RTA "TRAFFIC CONTROL AT WORK SITES").

9. SOIL AND WATER MANAGEMENT PRACTICES MUST BE EMPLOYED IN ACCORDANCE WITH THIS PLAN AND AS DIRECTED BY THE SITE SUPERINTENDENT.

10. THE AREA IS COVERED BY LAKE MACQUARIE CITY COUNCIL TREE PRESERVATION POLICY.

11. NO WORK WITHIN ADJOINING PROPERTIES AND EASEMENTS TO BE UNDERTAKEN WITHOUT WRITTEN PERMISSION FROM THE OWNERS OR RESPONSIBLE AUTHORITY AND AT LEAST 7 DAYS NOTICE OF INTENTION TO COMMENCE WORK MUST BE MADE.

12. WHERE EXCAVATION IS BELOW THE LEVEL OF THE BASE OF THE FOOTINGS OF A BUILDING ON AN ADJOINING ALLOTMENT OF LAND AND WITHIN 10 METRES OF THE BUILDING, THE OWNERS OF THE ADJOINING ALLOTMENT OF LAND MUST BE GIVEN AT LEAST 7 DAYS NOTICE OF INTENTION TO DO SO AND FURNISHED WITH PARTICULARS OF THE EXCAVATION WORK.

13. A DILAPIDATION REPORT MUST BE SUBMITTED TO THE SUPERINTENDENT AT LEAST 7 DAYS PRIOR TO INTENTION TO COMMENCE WORK. THE REPORT MUST INCLUDE DETAILS OF WORK TO BE DONE, METHOD OF CONSTRUCTION, METHODS OF SUPPORT, ETC.

14. CONSTRUCTION OF ALL MAJOR STRUCTURES TO BE SUPERVISED BY A PRACTISING QUALIFIED STRUCTURAL ENGINEER AND CERTIFIED UPON COMPLETION. COPIES OF REPORTS TO BE PROVIDED TO COUNCIL.

15. SUBSURFACE DRAINAGE IS TO BE PLACED UNDER KERB AND GUTTER AS DIRECTED BY THE ENGINEER SUPERVISING THE WORKS.

16. ALL KERB INLET PITS TO BE TO COUNCIL'S STANDARD.

17. ALL PITS OVER 1.2 METRES IN DEPTH ARE TO BE DESIGNED BY A STRUCTURAL ENGINEER AND CERTIFIED TO COUNCIL'S SATISFACTION.

18. PITS GREATER THAN 1.2 METRES DEEP TO HAVE STEP IRONS.

19. STORMWATER DRAINAGE PITS TO BE PRECAST CONCRETE COMPLETE WITH HEAVY DUTY COVERS OR GRATES TO SUIT INCLUDING PRECAST SURROUNDS.

20. STORMWATER DRAINAGE PIPES TO BE U.P.V.C SEWER QUALITY WITH SOLVENT WELDED JOINTS UNLESS NOTED OTHERWISE.

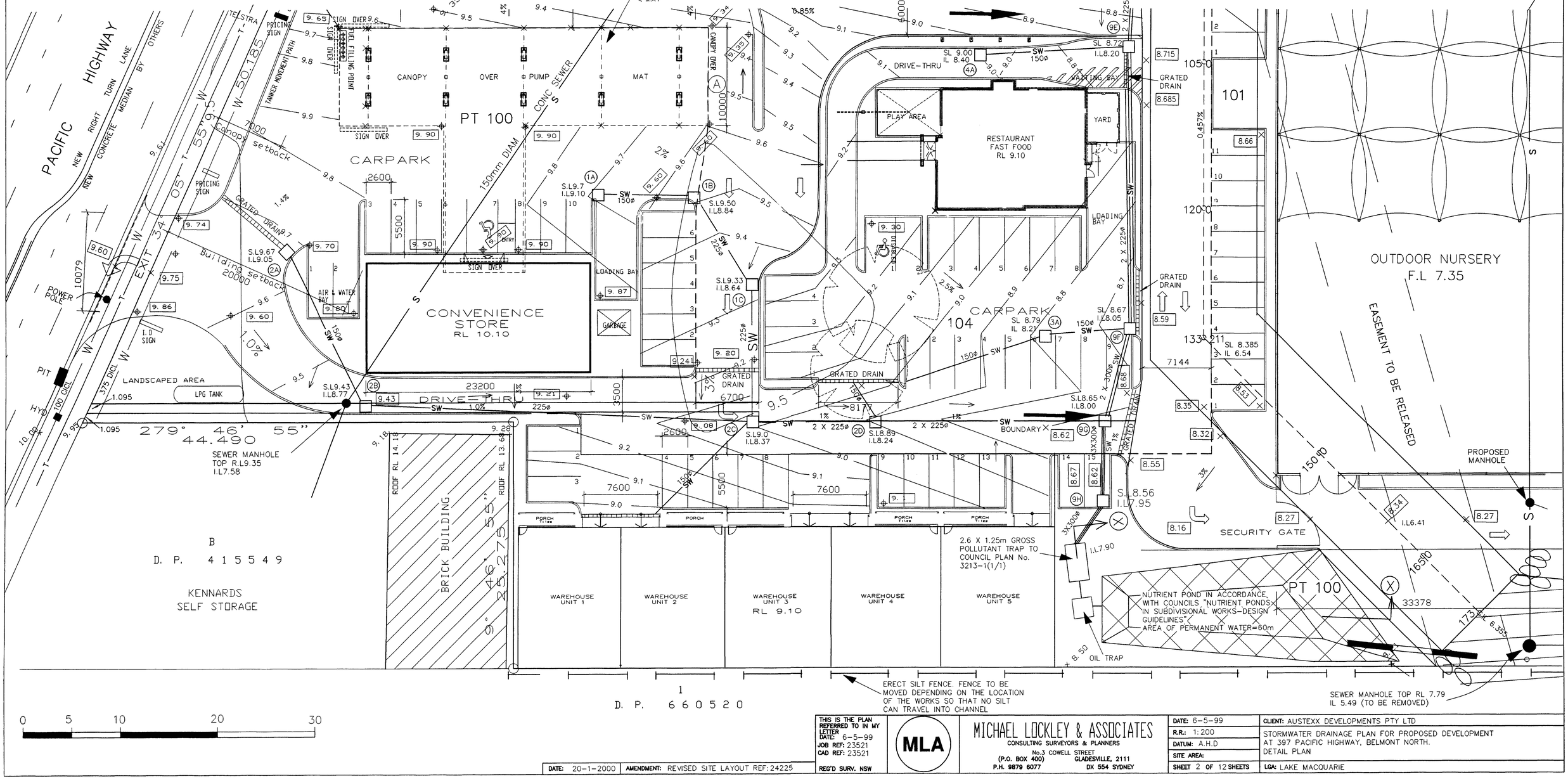
21. ALL ON-SITE CAR PARKING TO BE SUITABLY LINEMARKED TO THE SATISFACTION OF COUNCIL.

22. BOX GUTTERS : 600 X 150 d
DOWNPIPES : 120 X 120 galv

23. PAVEMENT:
PAVEMENT TO BE TO THE REQUIREMENTS OF THE CONTRACT PLAN FOR EACH SITE.

BUNDING AREA UNDER CANOPY ONLY. FILLING AREA TO BE BUNDED TO PREVENT CONTAMINATION OF CLEAN RUNOFF. WATER FROM THIS AREA MUST BE DIRECTED TO AN OIL/GRIT SEPARATOR (TO BE DESIGNED BY OTHERS) PRIOR TO DISCHARGE FROM SITE.

NO STORMWATER TO FLOW UNDER CANOPY MAT



THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99 JOB REF: 23521 CAD REF: 23521 REG'D SURV. NSW	MLA	MICHAEL LOCKLEY & ASSOCIATES CONSULTING SURVEYORS & PLANNERS No.3 COWELL STREET GLADESVILLE, 2111 (P.O. BOX 400) P.H. 9879 6077 DX 554 SYDNEY	DATE: 6-5-99 R.R.: 1:200 DATUM: A.H.D SITE AREA: SHEET 2 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD

STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT AT 397 PACIFIC HIGHWAY, BELMONT NORTH. DETAIL PLAN

LGA: LAKE MACQUARIE

DATE: 20-1-2000 AMENDMENT: REVISED SITE LAYOUT REF: 24225

I.S.G

TO NEWCASTLE

HIGHWAY

BM ON KERB
RL 9.665 AHD.

No389
"BELMONT MOTOR REPAIRS"

ROOF RL 13.72

PROVIDE FENCING

CONSTRUCT OPEN CONCRETE CHANNEL WITH CONCRETE WALLS (OR EQUIVALENT) TO STRUCTURAL ENGINEERS DETAILS

D.P 389480

99° 46' 40" 53.300

99° 46' 45" 94.025

16.765

55"

45'

9° 45'

CONSTRUCT RETAINING WALL TO STRUCTURAL ENGINEERS DESIGN

100mm WATER

375ø DICL WATER

NEW TRAFFIC LIGHTS BY OTHERS

LMMC MANHOLE TOP R.L9.45

NEW FULL MOVEMENT LINK

KERB

ACCESS ROAD

GRATED DRAIN

S.L9.23
I.L8.58

S.L8.99
I.L8.50

JUNCTION PIT
S.L8.42
I.L8.42

S.L9.21
I.L6.973

S.L8.79
I.L6.853

CARPARK

S.L9.30
I.L8.70

S.L9.29
I.L8.66

S.L9.28
I.L8.74

S.L9.20
I.L8.68

S.L9.16
I.L8.65

S.L9.20
I.L8.54

S.L9.40
I.L8.85

SERVICE YARD

MECHANICAL EQUIPMENT YARD

DRIVE THRU

DUTDOOR AREA

R.L9.50

FLANGROUND

GRATED DRAIN

S.L8.75
I.L8.25

1.8m x 0.6 DEEP BOX SECTION
I.L6.86

S.L8.72
I.L8.20

"ADJOINS SHEET 4"

"ADJOINS SHEET 2"

HIGH POINT

HIGH POINT

101

103

PT100

PROVIDE 1m WIDE GAP IN KERB AND MEDIANS FOR OVERLAND FLOW

3 X 1.50HIGH X 3.3(MIN) WIDE UNDER-GROUND CONCRETE BOX SECTION CHANNELS FROM CH36.07 TO CH173 AT 0.475% NEW DRAINAGE EASEMENT TO BE CREATED

LANDSCAPED AREA

F.L7.35

SEWER MANHOLE TOP R.L7.62 I.L5.72 & 5.92

LANE

MEDIAN

POWER POLE

TURN

375mm WATER

CONC

PACIFIC HIGHWAY

I. L8. 14

PIT TO BE MODIFIED TO HAVE "V" SHAPED GRATING. TO RTA SATISFACTION BY OTHERS

FIRST 12m OF BOX SECTIONS TO BE LAID BY OTHERS

REMOVE 600mm PIPE AND REPLACE WITH 1.8m WIDE X 0.6 DEEP BOX SECTIONS

END OF NEW BOX SECTIONS BY OTHERS

ENTRY

RIGHT

CONCRETE

NEW

SEWER MANHOLE TOP R.L9.44 I.L6.95

TELSTRA

PRICING SIGN

SIGN OVER

DIESEL FILLING POINT

100ø CICL

375mm DIAM CONC SEWER

150 DIAM CONC SEWER

APPROX I.L7.34

0.85%

REMOVE EXISTING PIT AND CONSTRUCT NEW PIT WITH HEAVY DUTY GRATE TO ACCOMMODATE BOX SECTIONS TOP GRATE R.L9.43

SEWER MANHOLE TOP R.L9.43 I.L6.58 & 6.80

TOP OF SEWER MANHOLE TO BE ADJUSTED TO NEW LEVEL TO HUNTER WATER APPROVAL AND REQUIREMENTS.

PROVIDE 1m WIDE GAPS IN KERB AND MEDIAN AT 1m SPACING FOR OVERLAND FLOW

0 5 10 20 30

DATE: 20-1-2000 AMENDMENT: REVISED SITE LAYOUT REF:24225

THIS IS THE PLAN REFERRED TO IN MY LETTER
DATE: 6-5-99
JOB REF: 23521
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REG'D SURV. NSW

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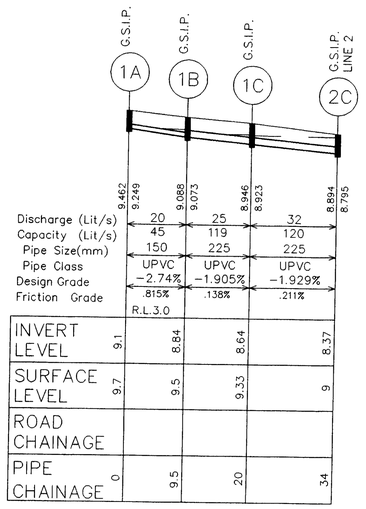
(P.O. BOX 400) GLADESVILLE, 2111
P.H. 9879 6077 DX 554 SYDNEY

DATE: 6-5-99
R.R.: 1:200
DATUM: A.H.D
SITE AREA:
SHEET 3 OF 12 SHEETS

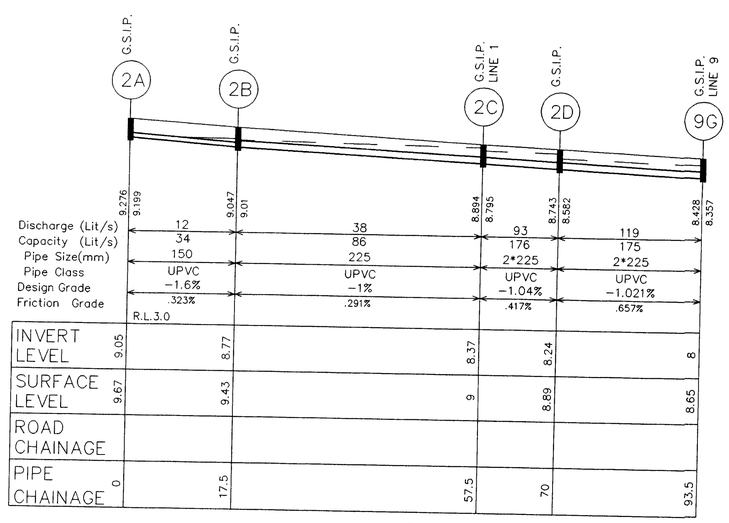
CLIENT: AUSTEXX DEVELOPMENTS PTY LTD

STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
DETAIL PLAN

LGA: LAKE MACQUARIE



LINE.1



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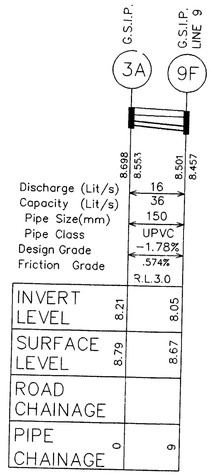
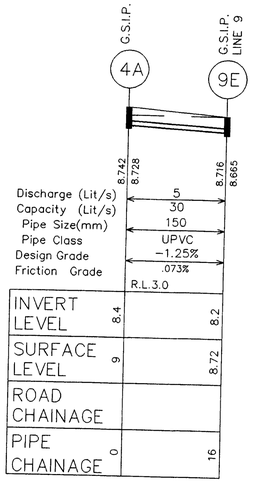


LINE.3



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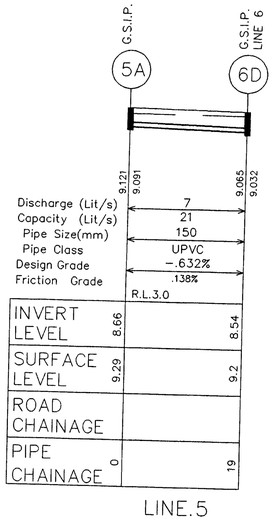

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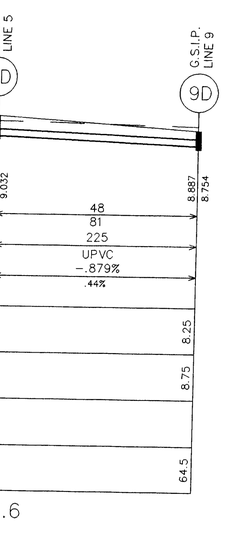

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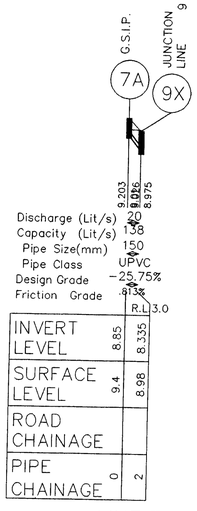

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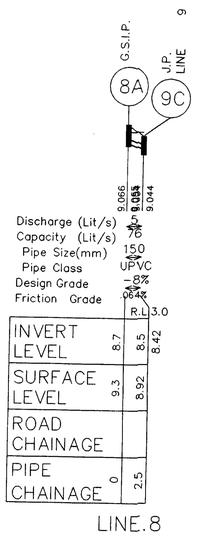
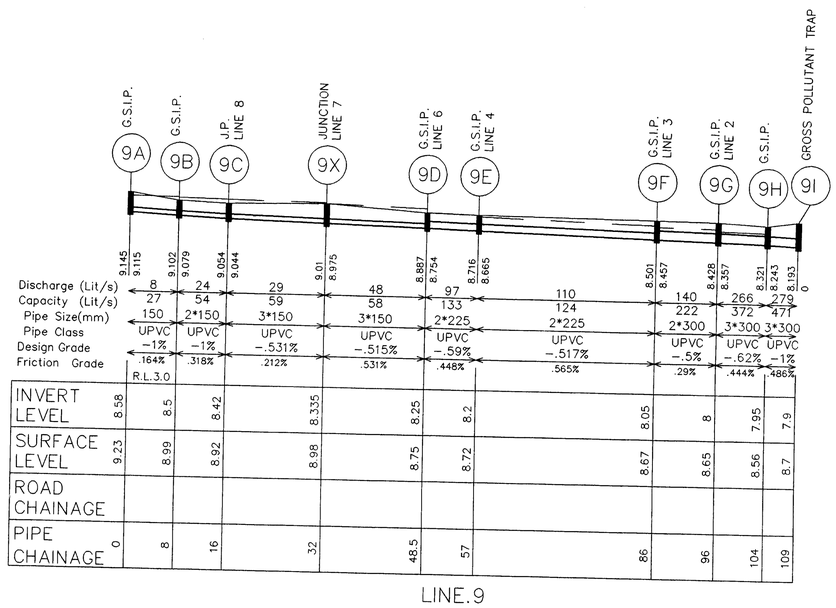


LINE.8



LINE.9

DRAINAGE LONG SECTIONS

VERT 1:100
HORIZ 1:500

UPVC DENOTES SEWER GRADE EXTRA HEAVY PVC PIPE
RCP DENOTES REINFORCED CONCRETE PIPE
G.S.I.P. DENOTES GRATED SURFACE INLET PIT
J.P. DENOTES JUNCTION PIT
NOTE: ALL PITS IN DRIVEWAYS TO HAVE HEAVY DUTY GRATE OR COVER
EG. 3 X 150 DENOTES THREE (3) 150mm DIAMETER PIPES

MINIMUM PIT SIZE DIMENSIONS

MINIMUM DIMENSIONS (mm)	PIT NUMBERS
450 X 450	1A 2A 3A 4A 5A 6A 6B 6C 7A 8A 9A 9B
600 X 600	1B 1C 2B 2C 6D 9C
900 X 600	2D 9D 9E 9F
1200 X 900	9G 9H

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225

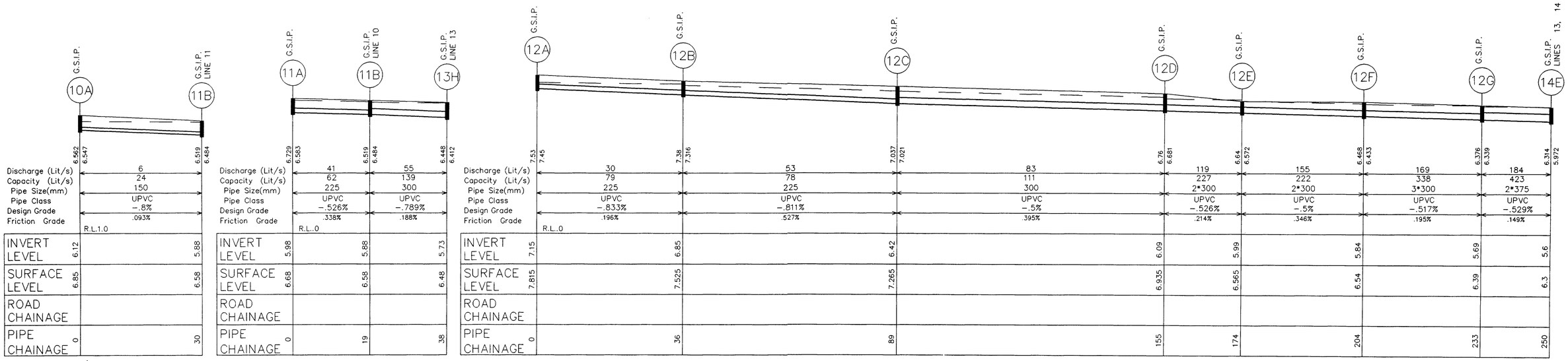
THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

MLA

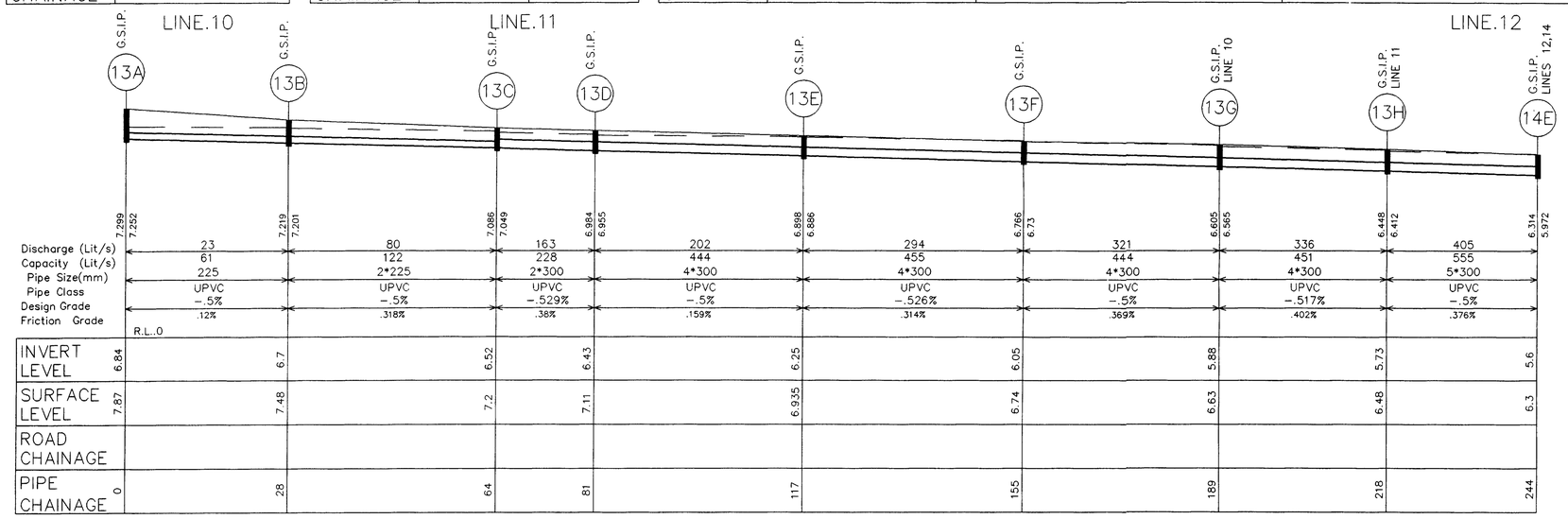
MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.19 MASSEY STREET, GLADESVILLE 2111
P.O. BOX 400 GLADESVILLE, 1675
P.H. (02)9879 6077 FAX (02)9879 7143

DATE: 6-5-99
R.R.: N/A
DATUM: AHD
SITE AREA: N/A²
SHEET 8 OF 12 SHEETS

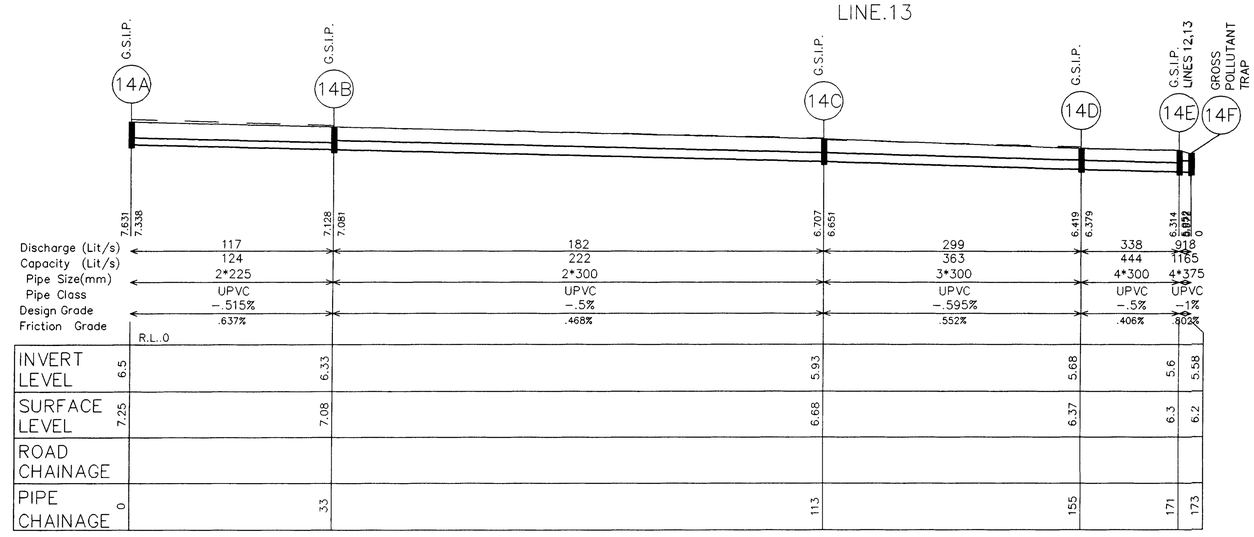
CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
DRAINAGE LONG SECTIONS
LGA: LAKE MACQUARIE



LINE.10 LINE.11 LINE.12



LINE.13



LINE.14

UPVC DENOTES SEWER GRADE EXTRA HEAVY PVC PIPE
RCP DENOTES REINFORCED CONCRETE PIPE
G.S.I.P. DENOTES GRATED SURFACE INLET PIT
J.P. DENOTES JUNCTION PIT
NOTE: ALL PITS IN DRIVEWAYS TO HAVE HEAVY DUTY GRATE OR COVER
EG. 3 X 150 DENOTES THREE (3) 150mm DIAMTER PIPES

MINIMUM PIT SIZE DIMENSIONS

MINIMUM DIMENSIONS (mm)	PIT NUMBERS
600 X 600	10A 11A 11B 12A 12B 12C 13A 13B
900 X 600	12D 12E 13C 14A
1200 X 900	12F 12G 14B
1500 X 900	13D 13E 13F 13G 13H 14C 14D
2000 X 900	14E

DRAINAGE LONG SECTIONS

VERT 1:100
HORIZ 1:500

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

MLA

MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.19 MASSEY STREET, GLADESVILLE 2111
P.O. BOX 400 GLADESVILLE, 1675
P.H. (02)9879 6077 FAX (02)9879 7143

DATE: 6-5-99
R.R.: AS SHOWN
DATUM: AHD
SITE AREA: N/A²
SHEET 9 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
DRAINAGE LONGSECTION LINES 10 TO 14
LGA: LAKE MACQUARIE

SOIL AND WATER MANAGEMENT

GENERAL NOTES

1 THIS PLAN IS TO BE READ IN CONJUNCTION WITH OTHER ENGINEERING PLANS AND ANY WRITTEN INSTRUCTIONS THAT MAY BE ISSUED

2 ALL SEDIMENT AND EROSION CONTROL DEVICES ARE TO BE INSTALLED AS SHOWN AND AS DIRECTED BY THE SITE SUPERVISOR THEY ARE TO BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION, ARE TO BE EFFECTIVELY MAINTAINED IN GOOD WORKING ORDER AND ARE TO BE REMOVED ONLY AFTER THE AREA HAS BEEN SATISFACTORILY REHABILITATED

3 THE POSITION AND EXTENT OF SOIL AND WATER MANAGEMENT DEVICES AS SHOWN IS INDICATIVE ONLY AND THE FINAL LOCATIONS SHALL BE DECIDED ON SITE VARIATIONS ARE PERMITTED IN ORDER TO BEST SUIT THE CIRCUMSTANCES

4 TOPSOIL FROM CONSTRUCTION AREAS IS TO BE STRIPPED AND STOCK-PILED FOR LATER REUSE IN SITE RESTORATION

5 ALL STOCKPILES OF ERODABLE MATERIAL ARE TO BE SURROUNDED BY STRAWBALES STAKED INTO THE GROUND

6 THE EXTENT OF CLEARING OF VEGETATION IS TO BE KEPT TO AN ABSOLUTE MINIMUM NECASSARY TO EFFECT THE WORKS

7 AREAS BEYOND WHICH DISTURBANCE WILL NOT BE PERMITTED SHALL BE SECURED WITH EXCLUSION FENCING

8 REVEGETATION MUST BE APPLIED TO ALL DISTURBED AREAS AS SOON AS PRACTICAL AFTER COMPLETION OF EARTHWORKS OR AS DIRECTED BY COUNCIL

9 ALL EXCAVATED TRENCH MATERIAL IS TO BE STOCKPILED ON THE UPHILL SIDE OF THE TRENCH

10 PROVIDE SEDIMENT BARRIERS (ie SANDBAGS OR STRAW BALES) UPSTREAM OF STORMWATER INLET PITS PRIOR TO THE ROAD SURFACE BEING PAVED AND THE LAND UPSLOPE BEING REHABILITATED
PROVIDE KERB INLET SEDIMENT TRAPS AROUND ALL KERB INLET PITS ON FORMED ROADS

11 THE CONSTRUCTION ACCESS MUST BE KEPT FREE OF DEBRIS AND SPOIL

12 CONFORMITY WITH THIS PLAN WILL IN NO WAY REDUCE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT AGAINST WATER DAMAGE DURING THE COURSE OF CONSTRUCTION

13 PROVIDE A STRIP OF TURF BEHIND ALL KERBS ONCE CONSTRUCTED

14 REASONABLE STEPS ARE TO BE TAKEN TO ABATE ANY DUST NUISANCE CAUSED BY CONSTRUCTION ALL HAUL ROADS AND CONSTRUCTION AREAS SHALL BE REGULARLY WATERED

STRAW BALE CONSTRUCTION DETAILS

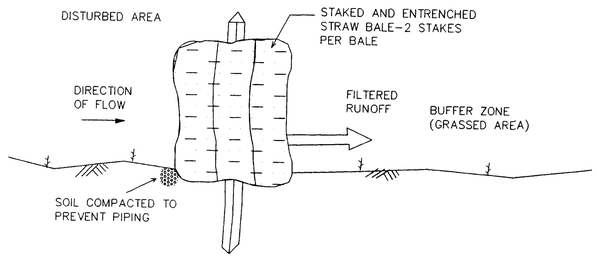
WHERE USED ENSURE THEY ARE:

BOUND WITH WIRE OR PLASTIC RATHER THAN TWINE

PLACED LENGTHWISE IN ROWS, SINGLE OR TWIN, WITH STRAWS PARALLEL TO THE GROUND SURFACE

EMBEDDED INTO THE SOIL TO A DEPTH ON THE UPSLOPE SIDE OF AT LEAST 0.1 METRES

ANCHORED SECURELY TO THE GROUND BY TWO STAKES OR PICKETS DRIVEN THROUGH THE CENTRE



NOTE:

SEE DETAIL PLANS AND SITE PLAN FOR LOCATION OF DEVICES

SILT FENCE CONSTRUCTION DETAILS

SILT FENCES ARE TO BE CONSTRUCTED AS FOLLOWS:

EXCAVATE A SMALL (150 TO 200 mm DEEP) TRENCH ALONG THE LINE OF THE FENCE,ENSURING ANY LOOSE SPOIL IS DEPOSITED ON THE UPSLOPE SIDE

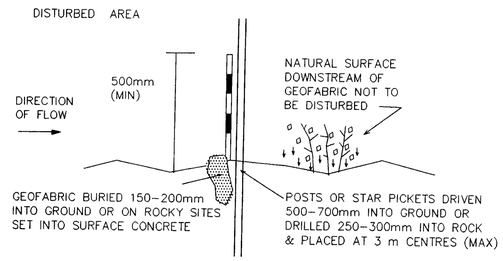
INSTALL A PLAIN WIRE FENCE DOWNSLOPE OF THE TRENCH, WITH POSTS (OR STAR PICKETS) A MAXIMUM OF 2 METRES APART AND DRIVEN AT LEAST 500 TO 700 mm INTO THE GROUND

WHERE NECESSARY FOR ADDITIONAL FABRIC SUPPORT, STAPLE WIRE MESH TO THE FENCE

ATTACH GEOFABRIC TO THE FENCE ENSURING:
- THE BASE IS BURIED AT LEAST 200 mm IN THE GROUND ON THE UPSLOPE SIDE
- HEIGHT ABOVE THE GROUND LESS THAN 700 mm
- ANY JOINTS OVERLAP A MINIMUM 300 mm AND ARE EITHER SEWN OR SECURELY ATTACHED TO A POST (OR STAR PICKET), AND
- THE ENDS ARE SECURELY FASTENED TO A POST (OR STAR PICKET)

SUITABLE GEOFABRIC:
TYPAP 3207
TERRAM 500
BIDIM U14
PRO-PEX 4545
NON-WOVEN (FELT)

POLYWEAVE F - WOVEN



DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

MLA

MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
(P.O. BOX 400) GLADESVILLE, 2111
P.H. 9879 6077 DX 554 SYDNEY

DATE: 6-5-99
R.R.: AS SHOWN
DATUM: A.H.D
SITE AREA: 2
SHEET 10 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
SOIL & WATER MANAGEMENT DETAILS
LGA: LAKE MACQUARIE

HYDROLOGICAL DESIGN SHEET

PIT	LAND USE	FLOW LENGTH	SLOPE	"n"	TIME	TIME	INTENSITY	FRACTION IMPERVIOUS	COEFF	AREA	C.A	SUM AREA	Q	BY PASS	TOTAL FLOW	GUTTER SLOPE	FLOW WIDTH	PIT TYPE	LINTEL	INFLOW	BY FLOW	BY PIT	KINEMATIC MIN TIME 5 MAX TIME 20 LAKE MACQUARIE REMARKS
		m	%		min	min	mm/h			ha	ha	ha	L/s	L/s	L/s	%	m		m	L/s	L/s		
1A	1	10	2	.011	.637	5	158 10Yr	-.950	.876	.006	.006	.006	3		3			4		3		1B	
1B	1	18	2	.011	.929	5	158 10Yr	-.950	.876	.013	.011	.011	5		5			4		5		1C	
1C	1	15	2	.011	.825	5	158 10Yr	-.950	.876	.018	.016	.016	7		7			4		7		2C	
2A	1	20	1	.011	1.247	5	158 10Yr	-.950	.876	.032	.028	.028	12		12			4		12		2B	
2B	1 2	25 5	1 4	.011 .250	2.272	5	158 10Yr	-.950 -.2	.876 .519	.023 .009	.020 .005	.025	11		11			4		11		2C	
2C	1	40	1	.011	1.982	5	158 10Yr	-.950	.876	.066	.058	.058	25		25			4		19	7	2D	
2D	1	15	3	.011	.725	5	158 10Yr	-.950	.876	.019	.017	.017	7	7	14			4		14		9G	
3A	1	28	2	.011	1.239	5	158 10Yr	-.950	.876	.044	.039	.039	17		17			4		17		9F	
4A	1	25	1	.011	1.446	5	158 10Yr	-.950	.876	.014	.012	.012	5		5			4		5		9E	
5A	1	16	2	.011	.860	5	158 10Yr	-.950	.876	.020	.018	.018	8		8			4		8		6D	
6A	1	23	2	.011	1.089	5	158 10Yr	-.950	.876	.035	.031	.031	13		13			4		13		6B	
6B	1	23	2	.011	1.089	5	158 10Yr	-.950	.876	.024	.021	.021	9		9			4		9		6C	
6C	1	23	2	.020	1.618	5	158 10Yr	-.950	.876	.020	.018	.018	8		8			4		8		6D	
6D	1	23	2	.011	1.089	5	158 10Yr	-.950	.876	.029	.025	.025	11		11			4		11		9D	
7A	1	9	1	.011	.743	5	158 10Yr	-.950	.876	.003	.003	.003	1		1			4		1		9D	
8A	1	19	1	.011	1.206	5	158 10Yr	-.950	.876	.013	.011	.011	5		5			4		5		9B	
9A	1	43	1	.011	2.081	5	158 10Yr	-.950	.876	.022	.019	.019	8		8			4		8		9B	
9B	1	50	1	.011	2.305	5	158 10Yr	-.950	.876	.042	.037	.037	16		16			4		16		9D	
9C						5	158 10Yr											5					
9X						5	158 10Yr											5					
9D	1	10	5	.011	.479	5	158 10Yr	-.950	.876	.005	.004	.004	2		2			4		2		9E	
9E	1	15	2	.011	.825	5	158 10Yr	-.950	.876	.006	.005	.005	2		2			4		2		9F	
9F	1	24	2	.011	1.119	5	158 10Yr	-.950	.876	.034	.030	.03	13		13			4		13		9G	
9G	1	25	1	.011	1.446	5	158 10Yr	-.950	.876	.030	.026	.026	12		12			4		12		9H	
9H	1	6	1	.011	.575	5	158 10Yr	-.950	.876	.003	.003	.003	1		1			4		1		9I	

HYDROLOGICAL DESIGN SHEET

PIT	LAND USE	FLOW LENGTH	SLOPE	"n"	TIME	TIME	INTENSITY	FRACTION IMPERVIOUS	COEFF	AREA	C.A	SUM AREA	Q	BY PASS	TOTAL FLOW	GUTTER SLOPE	FLOW WIDTH	PIT TYPE	LINTEL	INFLOW	BY FLOW	BY PIT	KINEMATIC MIN TIME 5 MAX TIME 20 LAKE MACQUARIE REMARKS
		m	%		min	min	mm/h			ha	ha	ha	L/s	L/s	L/s	%	m		m	L/s	L/s		
10A	1	20	1	.011	1.247	5	158 10Yr	-.950	.876	.016	.014	.014	6		6			4		6		11B	
11A	1	50	1	.011	2.305	5	158 10Yr	-.950	.876	.108	.095	.095	42		42			4		19	23	11B	
11B	1	30	1	.011	1.633	5	158 10Yr	-.950	.876	.024	.021	.021	9	23	32			4		19	13	13H	
12A	1	50	1	.011	2.305	5	158 10Yr	-.950	.876	.080	.070	.07	31		31			4		19	12	12B	
12B	1	36	.8	.011	1.990	5	158 10Yr	-.950	.876	.061	.053	.053	24	12	36			4		19	17	12C	
12C	1	53	.5	.011	3.037	5	158 10Yr	-.950	.876	.087	.076	.076	34	17	50			4		19	32	12D	
12D	1	65	.5	.011	3.494	5	158 10Yr	-.950	.876	.110	.096	.096	42	32	74			4		19	55	12E	
12E	1	35	.5	.011	2.289	5	158 10Yr	-.950	.876	.107	.094	.094	41	116	157			4		19	138	12F	
12F	1	27	.5	.011	1.921	5	158 10Yr	-.950	.876	.049	.043	.043	19	138	157			4		19	138	12G	
12G	1	30	.5	.011	2.062	5	158 10Yr	-.950	.876	.052	.046	.046	20	138	158			4		19	140	14E	
13A	1	24	.5	.011	.832	5	158 10Yr	-.950	.876	.061	.053	.053	24		24			4		19	5	13B	
13B	1	28	1.5	.011	1.363	5	158 10Yr	-.950	.876	.070	.061	.061	27	5	32			4		19	13	13C	
13C	1	36	.8	.011	1.990	5	158 10Yr	-.950	.876	.090	.079	.079	35	13	48			4		19	29	13D	
13D	1	17	.5	.011	1.409	5	158 10Yr	-.950	.876	.043	.038	.038	17	29	45			4		19	27	13E	
13E	1	36	.5	.011	2.333	5	158 10Yr	-.950	.876	.090	.079	.079	35	27	61			4		19	43	13F	
13F	1	38	.5	.011	2.420	5	158 10Yr	-.950	.876	.095	.083	.083	37	43	79			4		19	60	12E	
13G	1	28	.5	.011	1.968	5	158 10Yr	-.950	.876	.061	.053	.053	24		24			4		19	5	13H	
13H	1	30	.5	.011	2.062	5	158 10Yr	-.950	.876	.070	.061	.061	27	18	45			4		19	26	14E	
14A	1	34	3.5	.011	1.171	5	158 10Yr	-.950	.876	.027	.024	.024	10		10			4		10		14B	
14B	1	33	.5	.011	2.199	5	158 10Yr	-.950	.876	.023	.020	.02	9		9			4		9		14C	
14C	1	80	.5	.011	4.035	5	158 10Yr	-.950	.876	.056	.049	.049	22		22			4		19	3	14D	
14D	1	42	.5	.011	2.591	5	158 10Yr	-.950	.876	.127	.111	.111	49	3	52			4		19	33	14E	
14E	1	23	.5	.011	1.724	5	158 10Yr	-.950	.876	.051	.045	.045	20	199	219			4		19	200	14F	

HYDRAULIC DESIGN SHEET

PIT	TIME	INTENSITY	AREAS	FLOW	LENGTH	DIAMETER	GRADE	H.G.L.GRADE	VEL Q/A	K	HEAD LOSS	VEL CAP	PIPE VEL	PIPE CAP	PIPE TIME	C.W.= .0000 MAX TIME 20 LAKE MACQUARIE BY PASS=Q AREA=SUM.CA REMARKS
	min	mm/hr	ha	L/s	m	mm	%	%	m/s		m	m/s	m/s	L/s	min	
LINE 1 1A-1B	5	158 10Yr	.047 X.041	21	9.5	149	2.737	.815	1.179	3	.213	2.582	2.52	45	.06	
1B-1C	5.1	157 10Yr	.058	25	10.5	233	1.905	.138	.597	.8	.015	2.808	2.22	120	.08	
1C-2C	5.1	156 10Yr	.074	32	14	233	1.929	.211	.755	.8	.023	2.825	2.39	120	.1	
LINE 2 2A-2B	5	158 10Yr	.028	12	17.5	149	1.6	.323	.708	3	.077	1.974	1.81	34	.16	
2B-2C	5.2	156 10Yr	.088 X.035	38	40	233	1	.291	.9	.9	.037	2.034	1.97	87	.34	
2C-2D	5.5	153 10Yr	.22	94	12.5	233 X2	1.04	.417	1.097	1.6	.098	2.075	2.1	177	.1	
2D-9G	5.6	152 10Yr	.283 X.047	120	23.5	233 X2	1.021	.657	1.405	1.6	.161	2.056	2.21	175	.18	
LINE 3 3A-9F	5	158 10Yr	.039	17	9	149	1.778	.574	.973	3	.145	2.081	2.04	36	.07	
LINE 4 4A-9E	5	158 10Yr	.012	5	16	149	1.25	.073	.31	3	.015	1.745	1.31	30	.2	
LINE 5 5A-6D	5	158 10Yr	.018	8	19	149	.632	.138	.442	3	.03	1.24	1.13	22	.28	
LINE 6 6A-6B	5	158 10Yr	.031	13	9	149	.667	.379	.774	3	.092	1.274	1.33	22	.11	
6B-6C	5.1	157 10Yr	.052	23	4	149	.75	.967	1.295	.6	.051	1.352	1.53	24	.04	
6C-6D	5.2	156 10Yr	.069	30	18.5	233	.595	.188	.707	2.2	.056	1.569	1.52	67	.2	
6D-9D	5.4	154 10Yr	.112	48	33	233	.879	.44	1.13	.5	.033	1.907	1.98	81	.28	
LINE 7 7A-9X	5	158 10Yr	.047 X.044	21	2	149	25.75	.813	1.177	2.5	.177	7.919	5.68	138	.01	
LINE 8 8A-9C	5	158 10Yr	.011	5	2.5	149	8	.064	.288	2.5	.011	4.414	2.49	77	.02	
LINE 9 9A-9B	5	158 10Yr	.019	8	8	149	1	.164	.487	2.5	.03	1.561	1.37	27	.1	
9B-9C	5.1	157 10Yr	.056	25	8	149 X2	1	.318	.703	.9	.023	1.561	1.52	54	.09	
9C-9X	5.2	156 10Yr	.067	29	16	149 X3	.531	.212	.561	.6	.01	1.137	1.13	60	.24	
9X-9D	5.4	153 10Yr	.114	49	16.5	149 X3	.515	.531	.933	.8	.036	1.12	1.25	59	.22	
9D-9E	5.6	151 10Yr	.231	97	8.5	233 X2	.588	.448	1.14	2	.133	1.56	1.7	133	.08	
9E-9F	5.7	151 10Yr	.263 X.015	110	29	233 X2	.517	.565	1.294	.6	.051	1.463	1.65	125	.29	
9F-9G	6	148 10Yr	.341 X.01	141	10	293 X2	.5	.29	1.043	.8	.044	1.647	1.74	222	.1	
9G-9H	6.1	147 10Yr	.651	267	8	293 X3	.625	.444	1.318	.8	.071	1.841	2	372	.07	
9H-9I	6.2	146 10Yr	.686 X.032	280	5	293 X3	1	.486	1.383	.8	.078	2.329	2.42	471	.03	

1 IN 10 YEAR DESIGN STORM USED FOR CALCULATIONS

PIT TYPE 4=GRATED SURFACE INLET PIT

PIT TYPE 5=JUNCTION PIT

HYDRAULIC DESIGN SHEET

PIT	TIME	INTENSITY	AREAS	FLOW	LENGTH	DIAMETER	GRADE	H.G.L.GRADE	VEL Q/A	K	HEAD LOSS	VEL CAP	PIPE VEL	PIPE CAP	PIPE TIME	C.W.= .0000 MAX TIME 20 LAKE MACQUARIE BY PASS=Q AREA=SUM.CA REMARKS
	min	mm/hr	ha	L/s	m	mm	%	%	m/s		m	m/s	m/s	L/s	min	
LINE 10 10A-11B	5	158 10Yr	.014	6	30	149	.8	.093	.354	2.4	.015	1.396	1.16	24	.43	
LINE 11 11A-11B	5	158 10Yr	.095	42	19	233	.526	.338	.977	3	.146	1.476	1.57	63	.2	
11B-13H	5.4	153 10Yr	.13	55	19	293	.789	.188	.822	1	.034	2.069	1.95	140	.16	
LINE 12 12A-12B	5	158 10Yr	.07	31	36	233	.833	.196	.724	3	.08	1.857	1.74	79	.34	
12B-12C	5.3	154 10Yr	.124	53	53	233	.811	.527	1.246	.8	.063	1.832	1.97	78	.45	
12C-12D	5.8	150 10Yr	.2	83	66	293	.5	.395	1.237	.2	.016	1.647	1.8	111	.61	
12D-12E	6.4	144 10Yr	.296	119	19	293 X2	.526	.214	.884	2	.08	1.69	1.7	228	.19	
12E-12F	6.6	143 10Yr	.39	155	30	293 X2	.5	.346	1.151	1	.068	1.647	1.78	222	.28	
12F-12G	6.9	141 10Yr	.433	170	29	293 X3	.517	.195	.839	1	.036	1.675	1.67	339	.29	
12G-14E	7.2	138 10Yr	.478	185	17	372 X2	.529	.149	.849	1	.037	1.95	1.88	424	.15	
LINE 13 13A-13B	5	158 10Yr	.053	24	28	233	.5	.12	.552	3	.047	1.439	1.34	61	.35	
13B-13C	5.3	154 10Yr	.188 X.073	81	36	233 X2	.5	.318	.947	.4	.018	1.439	1.53	123	.39	
13C-13D	5.7	150 10Yr	.39 X.123	163	17	293 X2	.529	.38	1.211	.5	.037	1.695	1.84	229	.15	
13D-13E	5.9	149 10Yr	.488 X.061	203	36	293 X4	.5	.159	.751	1	.029	1.647	1.6	444	.38	
13E-13F	6.3	146 10Yr	.725 X.158	294	38	293 X4	.526	.314	1.091	.2	.012	1.69	1.79	456	.35	
13F-13G	6.6	143 10Yr	.808	321	34	293 X4	.5	.369	1.191	.5	.036	1.647	1.79	444	.32	
13G-13H	6.9	140 10Yr	.862	337	29	293 X4	.517	.402	1.248	.5	.04	1.675	1.83	452	.26	
13H-14E	7.2	138 10Yr	1.053	405	26	293 X5	.5	.376	1.202	.5	.037	1.647	1.79	555	.24	
LINE 14 14A-14B	5	158 10Yr	.268 X.244	118	33	233 X2	.515	.637	1.382	3	.292	1.46	1.66	125	.33	
14B-14C	5.3	154 10Yr	.425 X.137	183	80	293 X2	.5	.468	1.356	.5	.047	1.647	1.83	222	.73	
14C-14D	6.1	147 10Yr	.73 X.256	300	42	293 X3	.595	.552	1.482	.5	.056	1.797	2	363	.35	
14D-14E	6.4	144 10Yr	.841	338	16	293 X4	.5	.406	1.255	.5	.04	1.647	1.81	444	.15	
14E-14F	7.4	136 10Yr	2.417	919	2	372 X4	1	.802	2.114	1.5	.342	2.68	2.96	1165	.01	

DATE: 20/01/20 | AMENDMENT: REVISED SITE LAYOUT REF: 24225

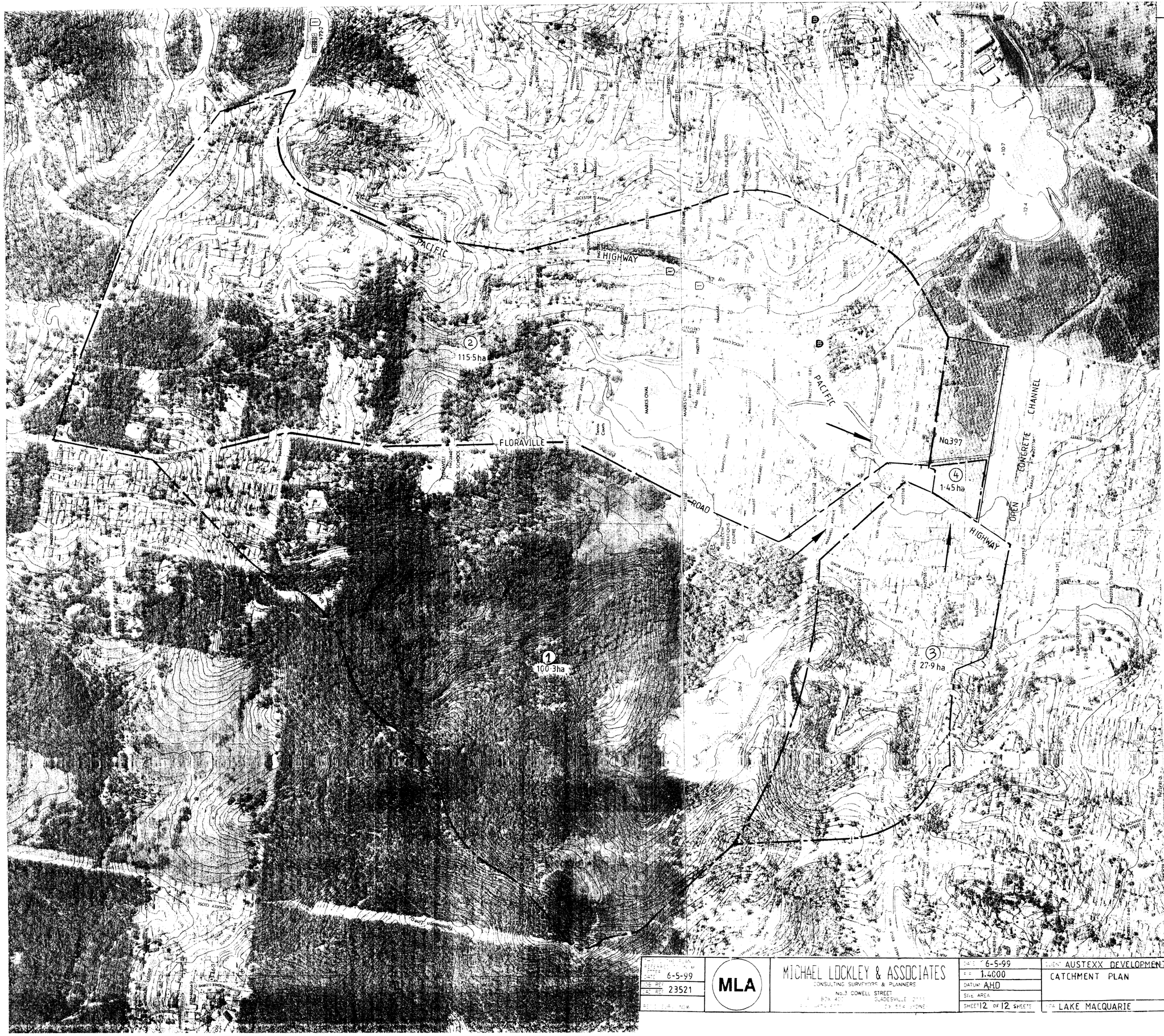
THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW

MLA

MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.19 MASSEY STREET, GLADESVILLE 2111
P.O. BOX 400 GLADESVILLE, 1675
P.H. (02)9879 6077 FAX (02)9879 7143

DATE: 6-5-99
R.R.: N/A
DATUM: AHD
SITE AREA: N/A²
SHEET 11 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
DRAINAGE CALCULATION SHEETS
LGA: LAKE MACQUARIE



THIS PLAN IS A COPY OF THE 1:4000 ORTHOPHOTOMAPS U5442-9 AND U5442-6

DATE 20-1-2000
AMENDMENT REF 24225

DATE 6-5-99	MLA	MICHAEL LOCKLEY & ASSOCIATES CONSULTING SURVEYORS & PLANNERS No.3 COWELL STREET, GLADESVILLE	DATE 6-5-99
JOB REF. 23521			SCALE 1:4000
A.L.P. REF.			DATUM AHD
			SITE AREA
			SHEET 12 OF 12 SHEETS

CLIENT AUSTEXX DEVELOPMENTS

CATCHMENT PLAN

LGA LAKE MACQUARIE

APPENDIX D

COUNCIL FLOOD CERTIFICATE

Ref: 1352, Dated: 19 December 2018

Lake Macquarie City Council

19 December 2018

Maria Sereti
c/- COSTIN ROE CONSULTING PTY LTD
Level 1, 8 Windmill St
WALSH BAY NSW 2000

Our Ref: 1352
Your Ref:
ABN 81 065 027 868

FLOOD CERTIFICATE

Fee Paid: 520.00

Receipt No: 10157920

DESCRIPTION OF LAND

Address:	Bunnings Hardware, 393 Pacific Highway, BELMONT NORTH NSW 2280
Lot Details:	Lot 101 DP 1021186
County:	Northumberland

G D Jones
Senior Sustainability Officer (Natural Disaster Management)

For: MORVEN CAMERON
CHIEF EXECUTIVE OFFICER

126-138 Main Road Speers Point NSW 2284
Box 1906 Hunter Region Mail Centre NSW 2310
ABN: 81 065 027 868
T 02 4921 0333
F 02 4958 7257
E council@lakemac.nsw.gov.au
www.lakemac.com.au
www.facebook.com/lakemaccity
www.twitter.com/lakemac

The following information is provided from the records of the Council pursuant to the Local Government Act 1993 in response to your request for details relating to affectation of the above land by flooding.

Levels shown are in metres on Australian Height Datum (AHD). Refer to attached Flood Information Sheet attached for information on the AHD.

Likelihood of land being flooded

The likelihood of the land and buildings thereon being flooded can be assessed from the following information:-

1. **Highest observed flood over or adjacent to the land:**

   Not applicable

NOTE: Applicants are advised that where highest observed historic flood levels are stated, this data may not have been observed by Council, but may be the result of local information and, therefore applicants may consider it advisable to carry out their own investigations.

2. **Information derived from Flood Study (where available):**

   Note: Site development was controlled by an approved Strormwater Management Plan for the site via development application consent No. 1634/1999

   Council Reference: Old TCS/Legacy Document TCS1722612 D 99/1634 Prop Subdivision & Site Fill & Drainage Plans Psrt 2 - 23/02/2000

1 in 100 year probable flood level ...	See above
1 in 20 year probable flood level ...	N/A
Probable Maximum Flood level (PMF)	N/A

3. **Existing ground levels at site:**

   See Detail Survey Plan on page 7 below.

4. **Existing Bunnings Warehouse building floor level:** ... 7.56m AHD

5. **Existing Garden Centre floor level:** ... 7.47m AHD

Flood Planning Levels

Flood Planning Levels and floor height requirements in areas affected by flooding (Council resolution dated 20 August, 1984) excluding those properties shown affected in the *Lake Macquarie Waterway Flood Study* and *Flood Risk Management Study and Plan (June 2012).*

Development Type (including extensions)	Minimum Height Requirements
Dwellings	
Habitable rooms	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Non-habitable rooms and garages	1 in 20 year probable flood level **or** at the highest observed flood level if no probable flood level is available.
Carports, boat sheds, garden sheds, and other ancillary structures (excluding garages)	No requirement.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Medium and High Density residential development	
Habitable rooms	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Non-habitable rooms and garages	1 in 20 year probable flood level **or** at the highest observed flood level if no probable flood level is available.
Carports, boat sheds, garden sheds, and other ancillary structures (excluding garages)	No requirement.
Basement car parking	Constructed to preclude entry of floodwater at levels up to the 1 in 100 year probable flood level plus 500mm freeboard. Additional requirement for basement levels to implement a failsafe means of evacuation, and a pump-out system to remove floodwaters.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.

Development Type (including extensions)	Minimum Height Requirements
Commercial and Retail -	
* NOTE: Flood Planning Levels for "Commercial and Retail" also apply to places of public worship, restaurants, clubs, entertainment facilities, warehouses, and bulky goods showrooms, etc.	
Internal floor height	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Basement car parking.	Constructed to preclude entry of floodwater at levels up to the 1 in 100 year probable flood level plus 500mm freeboard. Additional requirement for basement levels to implement a failsafe means of evacuation, and a pump-out system to remove flood waters.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Mixed Use development	
Internal floor height	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Basement car parking	Constructed to preclude entry of floodwater at levels up to the 1 in 100 year probable flood level plus 500mm freeboard. Additional requirement for basement levels to implement a failsafe means of evacuation, and a pump-out system to remove flood waters.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.
Industrial	
Internal floor height	At or above the 1 in 100 year probable flood level **or** at the highest observed flood level if no probable flood level is available.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard **or** 500mm above the highest observed flood level if no probable flood level is available.

Development Type (including extensions)	Minimum Height Requirements
Sensitive Uses (Residential care facilities, hospitals, etc.)	
Internal floor height	Probable maximum flood level.
Unsealed electrical installations	Probable maximum flood level.

6. Applications for approval of/consent to major additions, or relocation of existing buildings, will be required to observe the relevant floor height (Flood Planning Level) adopted by Council at the time the development proposal is considered by Council.

   Applications for minor additions or alterations to existing development will be assessed on the merits of the situation, having regard to meeting an acceptable level of risk of flood damage.

7. **Filling**

   Filling the subject land would require Council's consent.

   Filling of flood affected land may have an impact on the nature and extent of flooding downstream or on neighbouring land and generally is not favoured as a planning response on flood prone land.

   Any use of fill associated with development must not substantially impede flow of floodwaters and must not contribute to flooding or ponding of water on any other property.

8. **Exempt and complying development in the Flood Planning Area**

   Development on a flood control lot would need to comply with conditions as defined in SEPP (Exempt and Complying Development) 2008.

9. **Other development conditions and approvals**

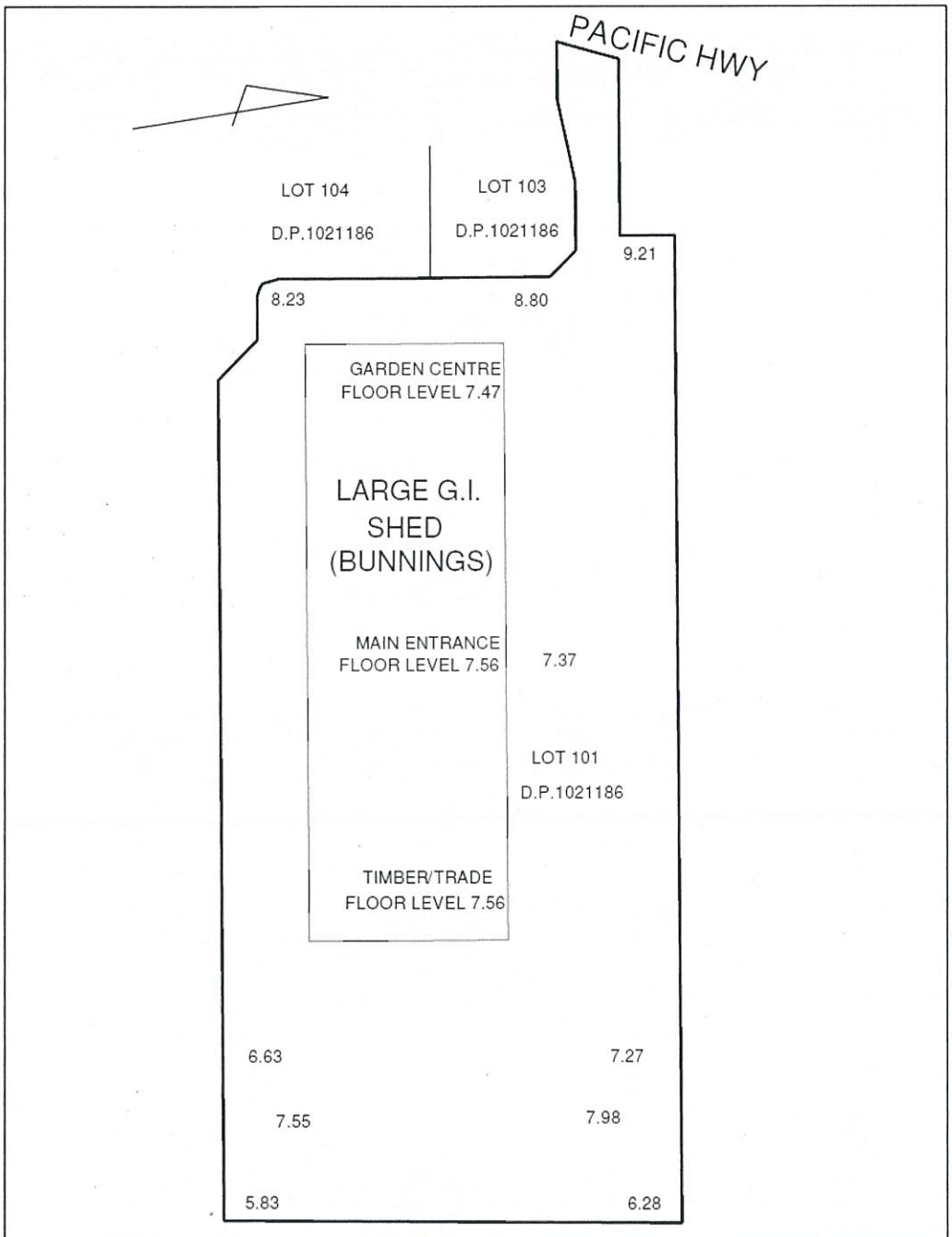
   Development approval/consent for this property is dependent on a range of issues, including compliance with all relevant provisions of Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014), Lake Macquarie Development Control Plan (LMDCP) 2014, as well as Lake Macquarie Development Control Plan 2014 – Revision 19, adopted by Council 25 June 2018.

   Copies of these documents and further information in regard to development on this property can be obtained from Council's website. Compliance with these flood requirements does not guarantee Council will approve development on this property.

10. Development where 100 year probable ARI levels are not available, and which could be flood liable, must be designed to meet an acceptable level of risk from flood damage. This may require the preparation of a Local Flood Study that considers cumulative impact issues, and demonstrates negligible impacts on other lands.

Further Information

11. This certificate considers the relevant flood and flood planning levels for the specific property. There may be other issues to do with flooding, sea level rise, filling, and emergency access and egress that are not addressed in this document.



CLIENT: Lake Macquarie City Council	PREPARED BY: 126- 138 MAIN ROAD SPEERS POINT	CITY PROJECTS ~ SURVEY ~ PHONE (02)49210 333	PROJECT NAME: No. 393 PACIFIC HIGHWAY BELMONT NORTH LOT 101 D.P. 1021186
ORIGIN OF LEVEL PM 22757 R.L. : 11.102		NOT TO SCALE	DRAWN BY: B.GERARDI SURVEYED BY: C.ROGERS VERIFIED BY: R.TIDEY DATE: 14/12/2018
LEVEL BOOK: CMR 18	SHEET: 1 OF 1 SHEETS	HEIGHT DATUM: AHD	ORIG. SHEET SIZE: A4

Attachment to Certificate - Flood Explanation Sheet

1 in 100 year Probable Flood Level

The 1 in 100 year flood is one that has a 1% chance of occurring in any year, or has the chance of occurring once every 100 years. The term "100-year flood" is a statistical probability designation stating there is a 1-in-100 chance that a flood this size will happen during any year. Another interpretation could be the "1-in-100 chance flood". The I in 100 year flood does not mean that if a location floods one year, it will definitely not flood for the next 99 years. Nor, if it has not flooded for 99 years, will it necessarily flood this year. Some parts of Australia have received more than one 1 in 100 year flood in one decade. Lake Macquarie waterway (the Lake) has not experienced a 1 in 100 year flood since written records began 150 years ago.

The 1 in 100 year flood is a serious but infrequent event, and is used widely as the risk threshold for flood planning.

1 in 20 year Probable Flood Level

The 1 in 20 year flood is one that has a 5% chance of occurring in any year, or has the chance of occurring once every 20 years. This is a statistical probability, and does not mean that if a location floods one year, it will definitely not flood for the next 19 years.

The 1 in 20 year flood is less serious but more frequent than the 1 in 100 year flood.

Flood Planning Level (FPL)

The Flood Planning Level is the risk threshold set for new buildings in flood-affected areas, and is usually applied as a minimum floor level. It is commonly based on the 1% (1-in-100 year) flood level plus 'freeboard' (see below).

Freeboard

Freeboard is included in the Flood Planning Level to allow a safety margin for unpredictable factors such as waves, localised hydraulic effects, blockages, flood debris, and uncertainties in the computer flood modelling. A freeboard of 500mm is typically applied to the 1-in-100 year flood for residential / commercial developments (see page 3 – Flood Planning Levels).

Probable Maximum Flood (PMF)

The Probable Maximum Flood is the largest flood that could feasibly occur. However, it is an extremely rare event. Despite this, some floods in Australia have approached the PMF. Council provides the PMF level on this Flood Certificate, if it is available, to indicate the full extent of risk, even if the chance is very small. Essential services (such as hospitals) and retirement housing, are required to locate above the PMF to avoid any risk from flooding.

Australian Height Datum (AHD)

Australian Height Datum refers to the elevation relative to a reference point. In Australia this reference point approximates mean sea level, which is taken as 0.00metres AHD. Flood levels, ground levels, floor levels, and flood planning levels are shown in metres AHD.