HEC
HAYES ENVIRONMENTAL CONSULTING

ABN 32 295 203 367

PUMP OUT WATER MANAGEMENT PLAN

STAGE 1 RESIDENTIAL DEVELOPMENT AT 14-18 BOONDAH ROAD, WARRIEWOOD NSW 2102

Hayes Environmental Consulting Pty Ltd
Report No. MP130 AC

28 July, 2011

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CONTENTS

1.0 INTRODUCTION

Hayes Environmental Consulting Pty Ltd (HEC) was engaged by Meriton Apartments Pty Ltd to develop a management plan for water to be pumped from the basement of the Stage 1 residential development at 14-18 Boondah Road, Warriewood, in New South Wales (henceforth referred to as 'the site').

At the time of completing this plan, the site was in the early stages of a major development, approved by the NSW Department of Planning. This development included:

- the construction of seven apartment buildings of three to five storeys;
- a common, stepped basement car parking facility underneath the apartment buildings (requiring bulk excavations to depths of 1-4.5m below ground level (BGL); *Ref.* Appendix A);
- roads joining MacPherson Street and Boondah Road;
- two bioretention basins for water quality purposes (identified as Basin A and Sediment Basin B); and
- the realignment of Fern Creek.

This document provides a plan for the on-going management of a proposed basement dewatering (pump out) system. It addresses the requests for additional information, made by the NSW Office of Water (*Ref.* ER20900; dated 7 July, 2011) and the NSW Office of Environment and Heritage (*Ref.* Doc11/29421; dated 14 July, 2011), in order to "assess the potential impacts of discharging potentially contaminated groundwater from the basement area to the Warriewood wetland".

The aim is to ensure that all related discharge will not adversely affect the Warriewood Wetland, both in terms of quantity and quality of water. It should be integrated with the existing water management plan for the site, entitled "*Water Management and Maintenance Plan, 14-18 Boondah Road, Warriewood NSW*", prepared by Martens and Associates Pty Ltd (*Ref.* P1002934JR02V01; dated February, 2011).

2.0 SITE DESCRIPTION

The Stage 1 site forms the north western portion of a greater site area, all of which is designated for development (*Ref.* Appendices A and B). The greater site is irregular in shape, covering an area of about 81,000m^2, and is bound by MacPherson Street to the north and Boondah Street to the east. The north eastern corner represents the point of greatest elevation and the land slopes down to the south and south west at 1-3°.

A Council constructed and maintained wetland area, identified as the Warriewood Wetland, is located beyond the southern site boundary. Medium density residential developments are located beyond the western site boundary and across MacPherson Street to the north. This area also includes drainage diversions and small dams, associated with flood control.

Sub-Surface Conditions

Geotechnical investigations of the site have been completed by Jeffery and Katauskas Pty Ltd (JK), as follows:

- "*Report to Karimbla Construction Services Pty Ltd on Hydrogeological Assessment for Proposed Residential Development (Stage 1) at 14-18 Boondah Avenue, Warriewood, NSW*" (*Ref.* 23540Zrpt3; dated 2 March, 2011); and

- "*Estimate of Groundwater Inflow into Basement; 14-18 Boondah Road, Warriewood*" (*Ref.* 23540Z Let4; dated 9 May, 2011).

Based on the findings from the hydrogeological assessment, the Stage 1 site was "underlain by a surficial topsoil/fill, over natural clayey soils then sandstone bedrock at relatively shallow depth". The groundwater table was found to occur at a relatively shallow level and have an overall slope down towards the south west of about 1.5-2°. Over the north east, groundwater was "located over the bedrock surface and/or within the upper weathered bedrock profile". Over the south west, where the bedrock level is much deeper, the groundwater was "located at increasing height above the bedrock". It was assumed that the groundwater "daylights some distance to the south west, which is consistent with the location of existing wetlands in that area".

JK concluded that "groundwater originating from the higher lying catchment to the north east flows down to the south west across the site and feeds the wetlands beyond". These wetlands are "also fed by Fern Creek which flows from the west and discharges across the south western corner of the site".

Potential Impacts by the Proposed Basement

The proposed basement will generally extend into bedrock and intersect the groundwater table (*Ref.* Appendix B). It could thus "act as a cut-off resulting in a build-up of uphill groundwater levels", leading to a change in the downslope groundwater flow regime.

In order to reduce this effect, JK recommended that a bypass system with downslope infiltration be provided, "so as to maintain the groundwater regime around the site and also the flow rates into the wetlands beyond the southern site boundary". The purpose of the system "is to collect all groundwater build-up along the upslope side of the basement, divert it around the basement, and then allow it to drain evenly by infiltration into the wetlands beyond". The system would be put in place following completion of the basement structure, by installing bypass pipes, otherwise known as a-lines, "onto a proposed bed with an even grade to the lines and levels indicated" (*Ref.* Appendix B).

JK stated that this system should result in "little or no build-up of uphill groundwater levels" and that "the groundwater will not be lowered or raised below historical levels (other than possibly locally immediately adjacent to the basement) and groundwater flow (both volume and concentration) towards the wetlands will be maintained". Hence, the relevant project approval conditions would be satisfied.

Estimate of Groundwater Inflow

JK provided an estimate of groundwater inflow into the proposed Stage 1 basement. This inflow would be derived "from the bedrock exposed by the bulk excavation", which "will not be cut off by the bypass system". Hence, most of the infiltration will be derived from the rock layer below the basement slab, forced upwards by via hydrostatic pressure.

Assuming a mass rock permeability of 10^{-7} m/sec, the total inflow rate of groundwater into the basement was determined to be 0.136 m^3/day. It was noted, however, that "even if the very low inflow rate which was estimated is significantly exceeded, the volume of groundwater flow into the basement from the underlying rock mass will still be relatively low".

For design purposes, JK recommend that "the estimated groundwater inflow be increased by one order of magnitude, and a total groundwater inflow rate into the Stage 1 basement of 1.5m^3/day be catered for". Some level of increase is indeed warranted, as in practice, other sources will contribute to the water that accumulates within the basement, including vehicle and surface runoff. Such sources may also contain contaminants, such as metals, petroleum hydrocarbon fuels and oils, and radiator and transmission fluids.

3.0 EXISTING MANAGEMENT SYSTEM

The existing water management plan, prepared by Martens and Associates Pty Ltd (*Ref.* P1002934JR02V01; dated February, 2011), identifies the key storm and groundwater related elements for the site and specifies maintenance, monitoring and management requirements for these elements. The elements which are to be managed and maintained include a series of stormwater quality improvement devices (SQIDs), more specifically (*Ref.* Appendix C):

- an integrated pit and pipe network;
- sedimentation (bioretention) basins (i.e. Basin A and Sediment Basin B);
- gross pollutant traps (GPTs); and
- outlet structures.

One of the development consent conditions stipulated by the NSW Department of Planning required groundwater sampling in the vicinity of the bioretention systems, to monitor nutrient concentrations. Consequently, groundwater wells were to be installed upslope and downslope of each sediment basin (four in total; *Ref.* Appendix C). Both groundwater levels and quality were to be monitored at the four bores, during the construction phase (monthly) and throughout the life of the development (monthly to quarterly). The recommended quality parameters included the nitrogen suite (total Kjeldahl nitrogen (TKN), ammonia and oxidised nitrogen (NO_X)) and total phosphorus (TP).

The sampling program devised by Martens and Associates Pty Ltd provided a practical framework for the monitoring and reporting of water and sediment quality. Mechanisms for enacting remedial measures, should non-compliance occur, were also presented. Both the SQIDs and wells were to be inspected during the sampling (monitoring) program, and maintained (or replaced) as required.

At the time of completing this basement pump out plan, a number of the proposed SQIDs had been installed / constructed across the site, including sections of the pit and pipe network, Basin A, some GPTs and various outlet structures. Two groundwater monitoring wells (MWA and MWB) were installed in

installed in the vicinity of Basin A by Environmental Investigation Services (EIS). MWA was located up-gradient of the basin, while MWB was located down-gradient (*Ref.* Appendix C). Two rounds of groundwater quality monitoring had been completed by EIS (in May and June, 2011), while analysis of surface water samples from Warriewood Wetland and Fern Creek had also been performed (in May 2011). It was understood that all tested samples were found to comply with the conditions of the dewatering bore licence, as well as the adopted water quality criteria.

4.0 MANAGEMENT PLAN

4.1 Overview

The primary aims of this management plan are to ensure that:

- all basement water is discharged to a receiving body in accordance with the requirements of the *Protection of the Environment Operations Act 1997*; and

- discharges derived from basement dewatering do not cause adverse impacts on the Warriewood Wetland, both in terms of quantity and quality of water.

This Management Plan (MP) describes the relevant procedures for proper containment and disposal of basement pump out water. Also presented are contingency measures that would be implemented should failures of the dewatering system be encountered.

4.2 Site Specific Compliance Issues

The dewatering shall be undertaken with due regard for the environment and in accordance with all relevant statutory requirements. In particular, all pump out water will comply with the requirements of the following NSW Acts:

- *Environmental Planning and Assessment Act 1979;*
- *Contaminated Land Management Act 1997*;
- *Protection of the Environment Operations Act 1997;*
- *Environmental Protection & Biodiversity Conservation Act 1999;*
- *Environmental Offences and Penalties Act 1997*;
- *Water Management Act 2000*; and
- *Occupational Health and Safety Act 2000.*

Meriton and its licensed contractor(s) will be responsible to ensure that basement dewatering also complies with the following relevant conditions:

1. No water containing suspended matter, or any other contaminants, is to leave the site in a manner which could pollute (as defined by the *Protection of the Environment Operations Act 1997*) nearby water courses, such as the Council's stormwater drains and the nearby Warriewood Wetland.

2. The pH of any discharge water is to be between 6.5 and 8.5, as per Condition 13(A) of the NSW Office of Water *Conditions Statement on Bore License 10BL604529*, and be in compliance with all conditions of this licence (*Ref.* Appendix D).

4.3 Methodology for Basement Dewatering

Summary

Drainage plans for the Stage 1 basement are presented in Appendix E. All water that accumulates in the basement will be collected and drained into two pits, each containing a functioning oil-water separator (located at grid references H16 and Y16 on plan H-02, *Hydraulic Services Basement 1 Inground Site Plan*; *Ref.* Appendix E). Treated water is then pumped into the local stormwater system, via a gross pollutant trap, to be released into Basin A. From Basin A there will be controlled percolation through the adjacent flood plain, prior to discharge into the nearby Warriewood Wetland.

Hence, all pump out water will be subjected to four levels of treatment (purification), prior to release into the local wetland:

- an oil-water separator; followed by
- a GPT; followed by
- a sedimentation (bioretention) basin (Basin A); followed by
- the flood plain.

Note that the local road network, both internal and external to the site, contributes substantial volumes (>>0.2 m^3/storm) of runoff into the wetland system. This water is largely untreated, and potentially more contaminated by oil, grease and metals etc., compared with the pump out water (most of which shall be clean, groundwater up-seepage).

Estimate of Daily Discharge

The total volume of water that will be discharged from the basement is expected to be very low, $\leq$0.2 m^3/day (i.e. $\leq$200 litres). In terms of quantity, such volume will have no, or minimal, impact on the Warriewood Wetland.

The main source of this water will be the inflow that is not cut off by the bypass system (i.e. up-seepage); however, there will also be contributions from vehicle and surface runoff (*Ref.* Section 2). In accordance with the recommendation of JK (*Ref.* 23540Z Let4; dated 9 May, 2011), the actual inflow rate should be monitored to confirm this estimate.

Pump Out Pits

Each concrete-lined pit (with oil-water separator) will be an industry standard device, designed to discharge groundwater that enters the basement via hydrostatic pressure within the building area. Once collected within a pit, the water is not pumped directly off-site. Rather, the pump is activated automatically, by an integrated float mechanism (or switch), once the pit fills to the designated capacity (which is about 25%). This allows a secondary level of purification (via gravity sedimentation).

The pump out pits on this site will have a combined holding capacity of approximately 24m^3, or 24,000L, which greatly exceeds that recommended by JK (*Ref.* Section 2). Note, however, that a pump would normally be activated well before the maximum (12m^3) is reached, to prevent an over-flow.

Visual inspections of the pump out pits and associated GPT are to be integrated into the existing sampling (monitoring) program, as part of the SQID maintenance (*Ref.* Section 3), with repairs to be performed as required. The surface water (effluent) in each pit is to be colourless and clear (i.e. transparent), indicating that the supernatant is suitable for off-site discharge. If the water is discoloured, the automatic switches are to be turned off until the water is colourless and clear.

All estimates of volume and inspection notes (including colour and appearance) are to be logged on the monitoring checklist. A copy of each checklist is to be submitted as part of the on-going (monthly), monitoring reporting. Further details relating to the measurement (quanitation) of pH and concentrations of suspended matter are provided in Section 2.6.

Contingency Measures

During operation of the system, water discharge will be monitored, as part of the water sampling and SQID maintenance program. Recommended check points include the pump out pit grates and the corresponding GPT release point, or stormwater drain. The information to be recorded shall include estimates of volume, colour and appearance. It is understood that the contracted environmental consultant (EIS) shall be responsible for this monitoring and record keeping.

Some $24m^3$ of pit storage capacity will be available within the Stage 1 basement (*Ref.* Appendix E). This will allow up to 30 days of storage, should a failure of the dewatering system occur, such that it requires temporary shut down until investigations and maintenance are completed.

In the event that a pit pump malfunctions, repairs would be conducted as soon as possible. The total capacity of the pits ($24m^3$) is considered to be sufficient to enable repairs without overflow; however, a back-up pump would be engaged where necessary, which may only be used subject to adoption of the procedure in this plan. Flexible containment bunds will be employed to contain any pit overflows, should they arise.

In the event of an increase in sediment load (i.e. observed discoloration or >50 mg/L TSS), discharge of water will cease for additional treatment be implemented. This may require diverting the water to an additional facility, such as a (baffle) holding tank, to hold excess turbid water before it can be treated/discharged.

Details of the system maintenance schedule are to be recorded, as part of the daily monitoring checklist. Each pump out pit and oil-water separator should be emptied and cleaned at least once per month whilst in use. The resultant sediment is to be removed and dried as best as practicable, before off-site disposal as solid waste. Pit cleaning water will be retained on-site and treated in a similar manner to the groundwater seepage.

4.4 Water Quality Monitoring Program

It is critical that the performance of the dewatering system is routinely monitored. The sampling program devised by Martens and Associates Pty Ltd provides a practical framework for the monitoring and reporting of water and sediment quality across the Stage 1 site (*Ref.* Section 3) and the following measures will be of particular relevance to the proposed system:

- completion of monthly inspections and monitoring checklists of the pump out pits (to confirm the inflow rate and check water clarity);
- monthly inspections of the GPT; and
- monthly water sampling and laboratory analysis.

Mechanisms for enacting remedial measures, should faults or non-compliance occur, are also presented in the management plan of Martens and Associates Pty Ltd and will apply to this dewatering system. The SQIDs are to be maintained (or replaced) as required.

Recommended Sampling Locations and Analysis

The two existing groundwater monitoring wells (MWA and MWB) allow assessment of any impacts on Basin A. The proposed GPT point has already been identified by Martens and Associates Pty Ltd as a suitable sampling location, to assess the surface water prior to its discharge into the bioretention basin. As all basement pump out will pass this GPT, this location will serve a dual monitoring purpose, once the system is in operation.

For each (monthly) sampling event, at least one representative discharge water sample is to be collected from the proposed GPT. The relevant, or key, parameters that should be tested (as a minimum) are:

- total filtered metals (arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel and zinc);
- C_6-C_{36} total petroleum hydrocarbobs (TPHs);
- polycyclic aromatic hydrocarbons (PAH)s;
- pH;
- EC (allowing calculation of total dissolved solids (TDS));
- total suspended solids (TSS);
- TKN;
- ammonia;
- oxides of nitrogen (i.e. dissolved nitrate and nitrate); and
- TP.

In order to capture (isolate) any impacts posed by the proposed dewatering system, additional locations are the pump out pits. Sampling at these pits would be necessary if quality breaches are identified at the downstream GPT.

Recommended Sample Containers

Discharge water 'grab' samples will be collected into laboratory-supplied, glass and plastic (HDPE) bottles.

Reporting

The results of the monthly water sampling and analysis must be included as part of the existing (site) reporting program.

4.5 Recommended Water Quality Criteria

In accordance with Condition 13(A) of the NSW Office of Water *Conditions Statement on Bore License 10BL604529*, the pH of any discharge water is to be between 6.5 and 8.5. As no further numerical standards are included in this statement, the corresponding ANZECC and ARMCANZ (2000) thresholds, or appropriate default criteria, should apply.

With respect to the ANZECC and ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, criteria relating to the protection of 95% of species in freshwater aquatic ecosystems and slightly disturbed lowland rivers in south-east Australia are considered the most appropriate for this site. Note that the latter provide the trigger values for nitrite, total nitrogen, total phosphorus, EC, turbidity and TSS (presented under Tables 3.3.2-3.3.3 of the publication).

For the purposes of this management plan, these criteria will be referred to as the *Discharge Acceptance Levels* (DALs). A summary of the DALs is presented in Table 1.

4.6 Contingency Measures Triggered by Failures of the Dewatering System

Only non-acidic / non-alkaline (i.e. pH 6.5-8.5), non-turbid (≤50 mg/L TSS) water will be discharged into the local drainage system. Should acidic (pH <6.5) or alkaline (pH >8.5) or turbid (>50 mg/L TSS) water be encountered, it will be retained within the pump out pit, or a holding tank (*Ref.* Section 4.4). It will then treated with lime or hydrochloric acid (HCl), respectively, to display a pH level of 6.5-8.5, prior to release.

Powdered lime will be added to the water by shovel and/or excavator bucket, then mixed. Liquid HCl will be poured into the tank, then mixed. Field pH and turbidity testing on representative samples will be performed to ensure that sufficient neutralisation and/or sedimentation has occurred.

If discharge water is found to contain significant levels of floating product, odour and/or (in)organic compounds (e.g. metals, TPHs and PAHs), the water will be pumped into a licensed liquid waste transporter and disposed at the Lidcombe Liquid Waste Plant, Hill Road, Homebush Bay (or an equivalent liquid waste facility).

Should there be non-compliance with a requirement of this Management Plan in relation to the discharge of water and its quality, corrective actions shall be immediately implemented:

- the discharge of basement water into the local drainage (stormwater) system shall immediately cease and not re-commence until water quality meets the DALs in Table 1 and the Environmental Health section of Pittwater Council has been notified by email or facsimile;

- an investigation will be undertaken by the relevant contractor/consultant, assisted by site management, to determine the cause of the problem;

- the work practices for the suspected activity shall be modified, as necessary, by recommendations made in writing to eliminate or reduce non-compliance, and those recommendations are to be adopted as if they form part of this plan;

Table 1. Summary of the recommended Discharge Acceptance Levels.

ANALYTE	DALs
Total Filtered Metals (µg/L)	
arsenic	13
cadmium	0.2
chromium (as CrVI)	1.0
copper	1.4
iron	300 [1]
lead	3.4
mercury	0.6
nickel	11
zinc	8.0
TPHs (µg/L)	
C_{10}-C_{14}	total 600 [2]
C_{15}-C_{28}	
C_{29}-C_{36}	
PAHs (µg/L)	
total PAHs	3.0 [3]
benzo(a)pyrene	0.05 [4]
pH	6.5-8.5 [5]
EC (µS/cm)	125-2200
TDS (mg/L)	500 [1]
Total Suspended Solids (mg/L)	≤50 [6]
Oxides of Nitrogen (mg/L)	
nitrate	0.7
nitrite	0.04
Ammonia (mg/L)	0.9
Total Nitrogen (mg/L)	0.5
Total Phosphorus (mg/L)	0.05

Footnotes:

Filtered metals correspond to the dissolved fraction (0.45µm membrane filtered sample)

TDS may be determined by calculation (i.e. 0.65 x EC value (in µS/cm))

Discharge Acceptance Levels (DALs) are the ANZECC & ARMCANZ (2000) *Trigger Values* for protection of 95% of species in marine ecosystems, or slightly disturbed lowland rivers in south-east Australia, unless otherwise indicated

[1] NHMRC & ARMCANZ (1996) *Australian Drinking Water Guideline* (aesthetic based)

[2] Netherlands (1994) *Groundwater New C (Intervention)* value for mineral oil, which includes the C_{10}-C_{36} fraction

[3] NEPC (1999) *Groundwater Investigation Level for Aquatic Ecosystems (Fresh Waters)*

[4] Netherlands (1994) Groundwater New C (Intervention) value

[5] as per Condition 13(A) of the NSW Office of Water *Conditions Statement on Bore License 10BL604529*

[6] TSS is referred to as suspended particulate matter in Table 3.3.3 of the ANZECC & ARMCANZ (2000) *Guidelines*

- if water containment structures or sediment control devices are not operating effectively, they will be repaired or replaced at the direction of the consultant;

- additional water quality monitoring will be undertaken, where required by the consultant, to establish efficacy of the corrective action; and

- Pittwater Council and the NSW Office of Water will be notified within 24 hours of the incident occurring.

4.7 System Improvements

The integrity of the dewatering system will be maintained and improved by:

- the continuation of monthly system checks;
- recording the details of all system maintenance;
- retaining all contingency measures on-site;
- training site personnel, especially when new/additional methodology is to be implemented; and
- conducting regular water quality testing.

4.8 Conclusions

In summary, the total volume of water that will be pumped from the basement on a daily basis is expected to be very low ($\leq$0.2 m^3, or $\leq$200 litres). Prior to discharge into the nearby Warriewood Wetland, all such water will be subjected to four levels of treatment (purification), including a pit with an oil-water separator, a gross pollutant trap, a sedimentation (bioretention) basin and the flood plain. Sampling and testing shall be performed on a monthly basis, to monitor the performance of the dewatering system and trigger remedial measures, should a breach in quantity and/or quality be identified.

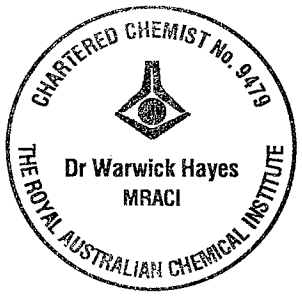
It is therefore expected that the proposed basement pump out system will not adversely affect the Warriewood Wetland, both in terms of quantity of water and potential impact on the quality of the receiving system.

5.0 STATEMENT OF LIMITATIONS

No warranties are made as to the information provided in this plan. All recommendations are the professional opinions of the HEC personnel involved with the project and while normal checking of the accuracy of data has been conducted, any circumstances outside the scope of this plan or which are not made known to HEC personnel and which may impact on those opinions are not the responsibility of HEC.

Should you require additional information or clarification regarding any aspect of this plan, please call the undersigned on (02) 9529 3344 or 0413 356 802.

For and on behalf of,
HAYES ENVIRONMENTAL CONSULTING PTY LTD



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APPENDIX A

PLAN OF THE PROPOSED BASEMENT
(supplied courtesy of Meriton Apartments Pty Ltd)

PARKING PROVISIONS

	GENERATION	
STUDIO	1.0 / unit	1
1 BED	1.0 / unit	25
2 BED	2.0 / unit	370
3 BED	2.0 / unit	30
VISITOR SPACES	1 per 5 units	46
	TOTAL	473
BICYCLE	0.1 / unit	23

PARKING PROVIDED		
single		65
stacked	182	364
vistors		46
total provided		475
bike parking		98

MACPHERSON STREET

SECTION 1-1 (TYPICAL SECTION)

NOTES
* Do not scale, figured dimensions take preference, at all times, if in doubt please ask.
* All services are indicative only, for accurate sizes and locations refer to relevant drawings. Any discrepancies to be confirmed with Design Imagery.
* Carpark fire stairs & lift shaft walls to have FRL 120/120/120.
* All walls between retail & residential to have FRL 180/180/180.
* Tower fire stair walls & lift shaft walls to have FRL 90/90/90.
* All ventilating, pipe & garbage shafts thru carpark levels to have FRL 120/120/120.

* All apartment dividing walls & walls bounding public areas & corridors to have FRL -/60/60 non-load bearing, 90/90/90 load bearing.
* All fire stair doors & apartment entry doors to have FRL -/60/30.
* Garbage room access door for typical floor to be 1hr fire rated construction.
* Doors to WC must comply with Part F2.5(b) of BCA.
* Electrical cupboards typical floors to be hollow core, lined on interior face with 13mm fire protective grade plasterboard and a perimeter smoke seal.

TACTILE INDICATORS
* All stairways, ramps and lifts used by the public, must have tactile indicators complying with section D3B of the BCA & be type B indicators in accordance with AS 1428.4

SMOKE DOORS
* Automatic closing, min 35mm thick solid core smoke doors fitted with smoke seals, leaves capable of resisting smoke at 200° for 30 minutes.

HORIZONTAL DISCHARGE ▪ ⊂▬
*denotes proposed location of horizontal discharge grille, in external wall of aluminium mullion as per window schedules. Contractor to confirm location complies with relevant codes prior to construction.

No	AMENDMENT	DATE
E	re-issued for co-ordination	30/03/11
D	re-issued for co-ordination issue	22/02/11
C	re-issued for co-ordination issue	24/01/10
B	drawn re-numbered	12/11/10
A	original issue	11/11/10

NORTH

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PROJECT
Proposed Residential Development.
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ADDRESS
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NSW
.

DESIGN IMAGERY
building concepts
In association with:
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DRAWN	GJG
DATE	February 11
plot date	8-Apr-11
SCALE	1:250
CAD FILE - PARKING LEVEL 01.DWG	

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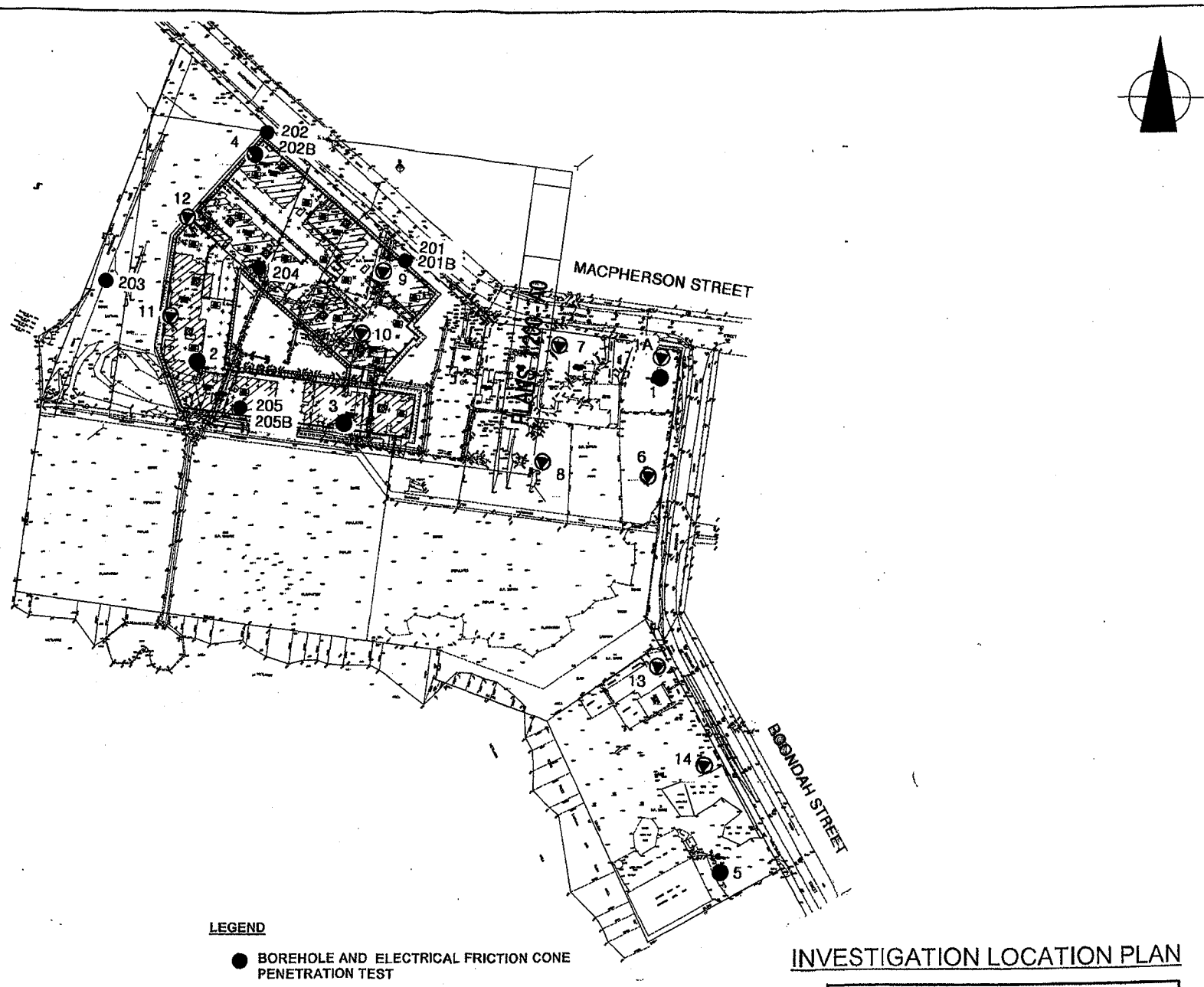
TITLE
Parking Level 1 - Overall plan

PROJECT No 3131
SHEET NO 0901
ISSUE E

Revised 18-7-2011

APPENDIX B

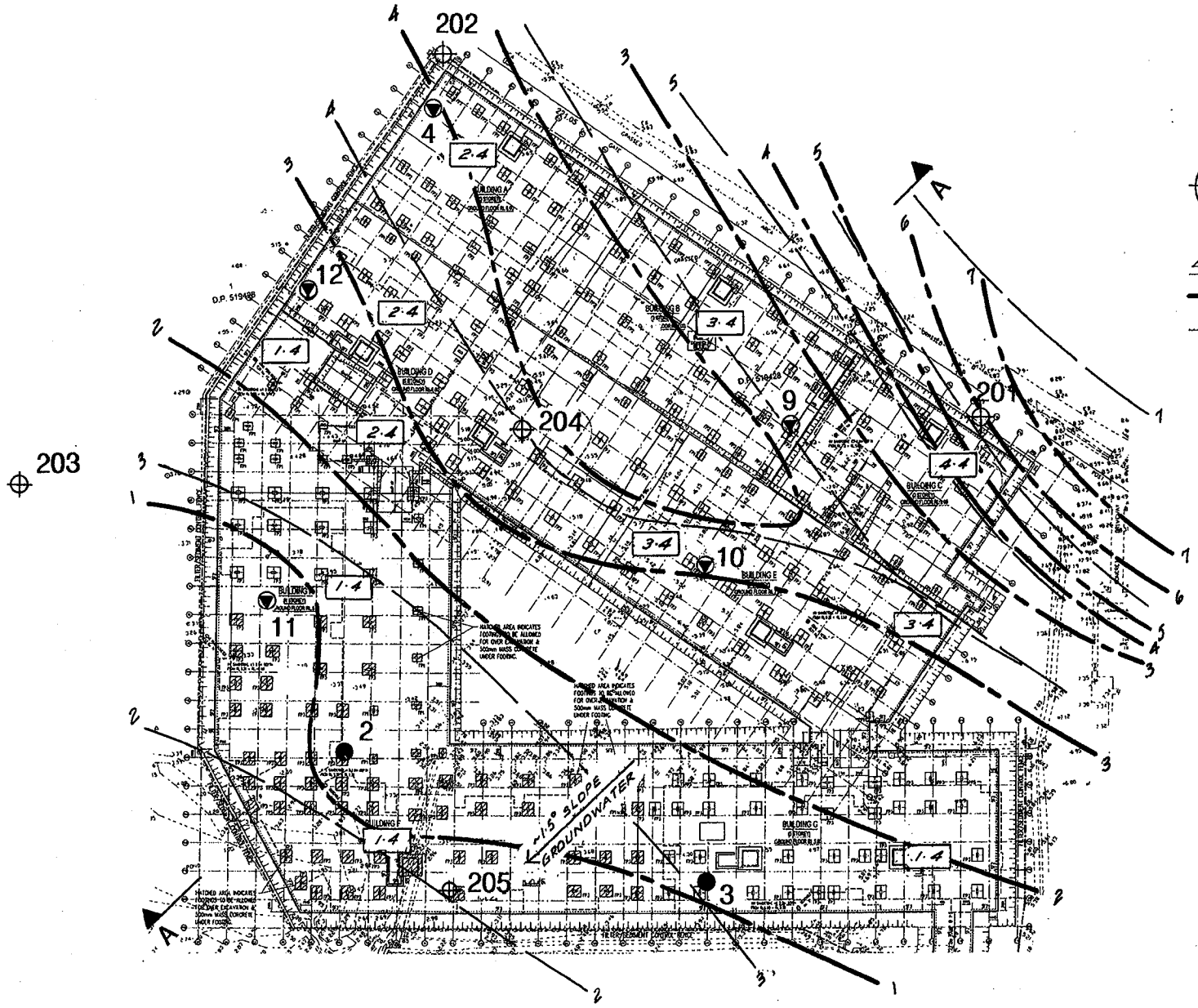
HYDROGEOLOGICAL PLANS
(supplied courtesy of Jeffery and Katauskas Pty Ltd)



INVESTIGATION LOCATION PLAN

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

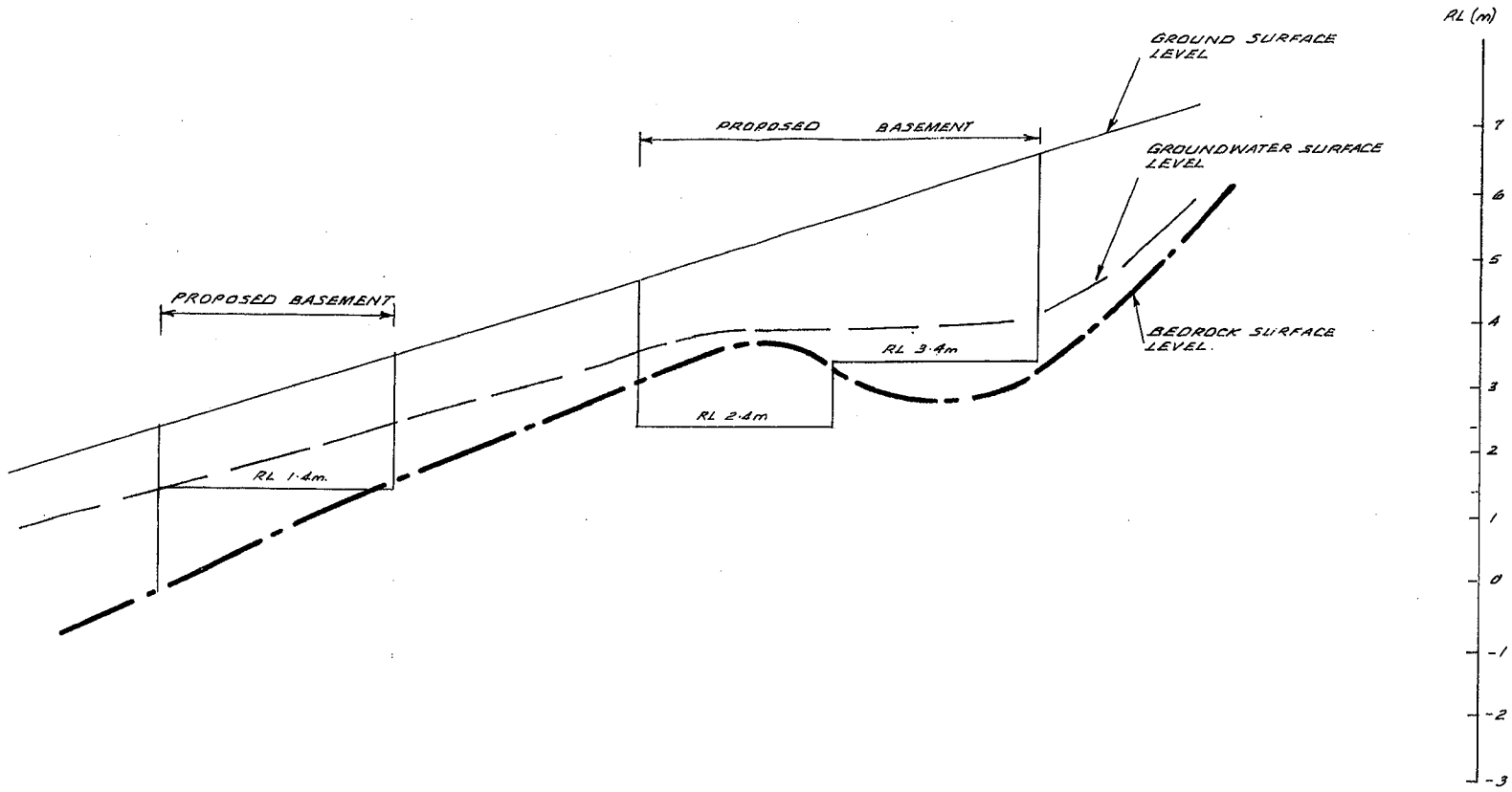
Report No. 23540Z Figure No. 1



SITE PLAN SHOWING ROCK AND GROUNDWATER SURFACE LEVELS

Jeffery and Katauskas Pty Ltd

Report No. 23540Z Figure No. 2

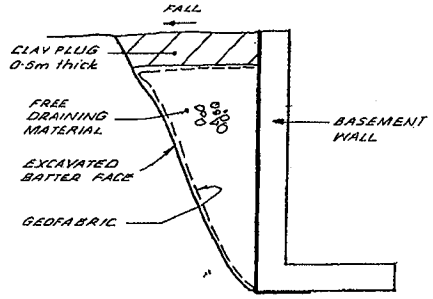


HYDROGEOLOGICAL CROSS SECTIONAL SKETCH A-A

HORIZONTAL SCALE (M)
0 30

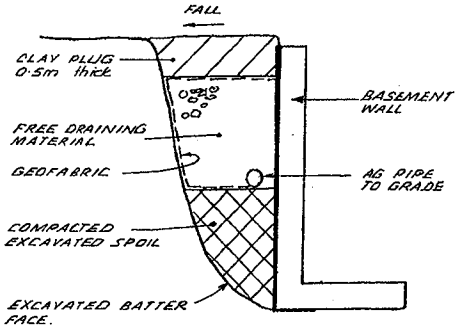
VERTICAL SCALE (M)
0 3

Jeffery and Katauskas Pty Ltd
Report No. 23540Z Figure No. 3



SECTION B–B

NOT TO SCALE



SECTION C–C

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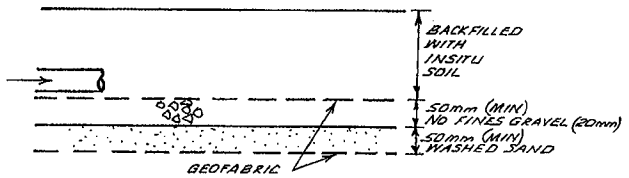
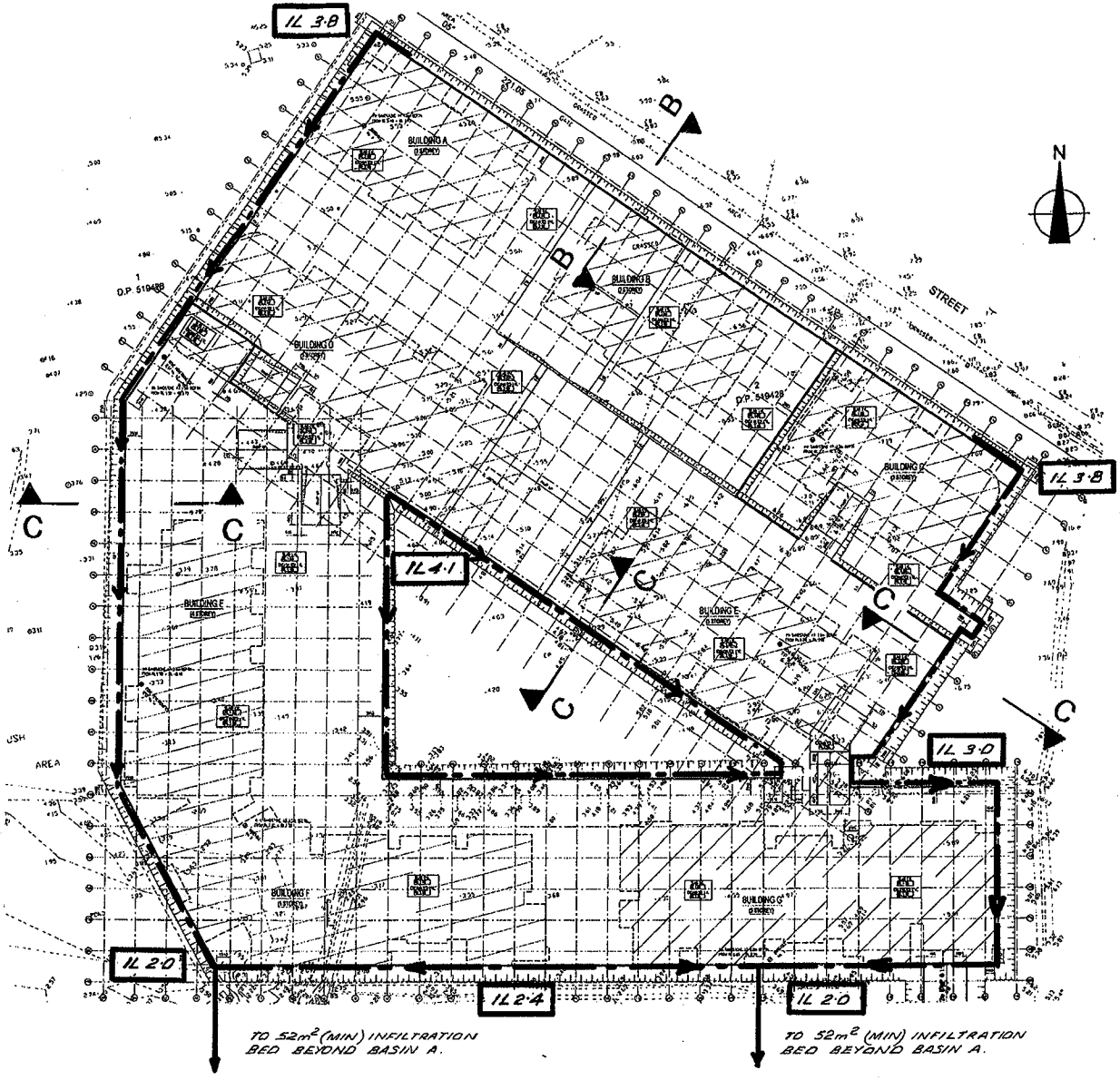


INFILTRATION BED DETAIL

NOT TO SCALE



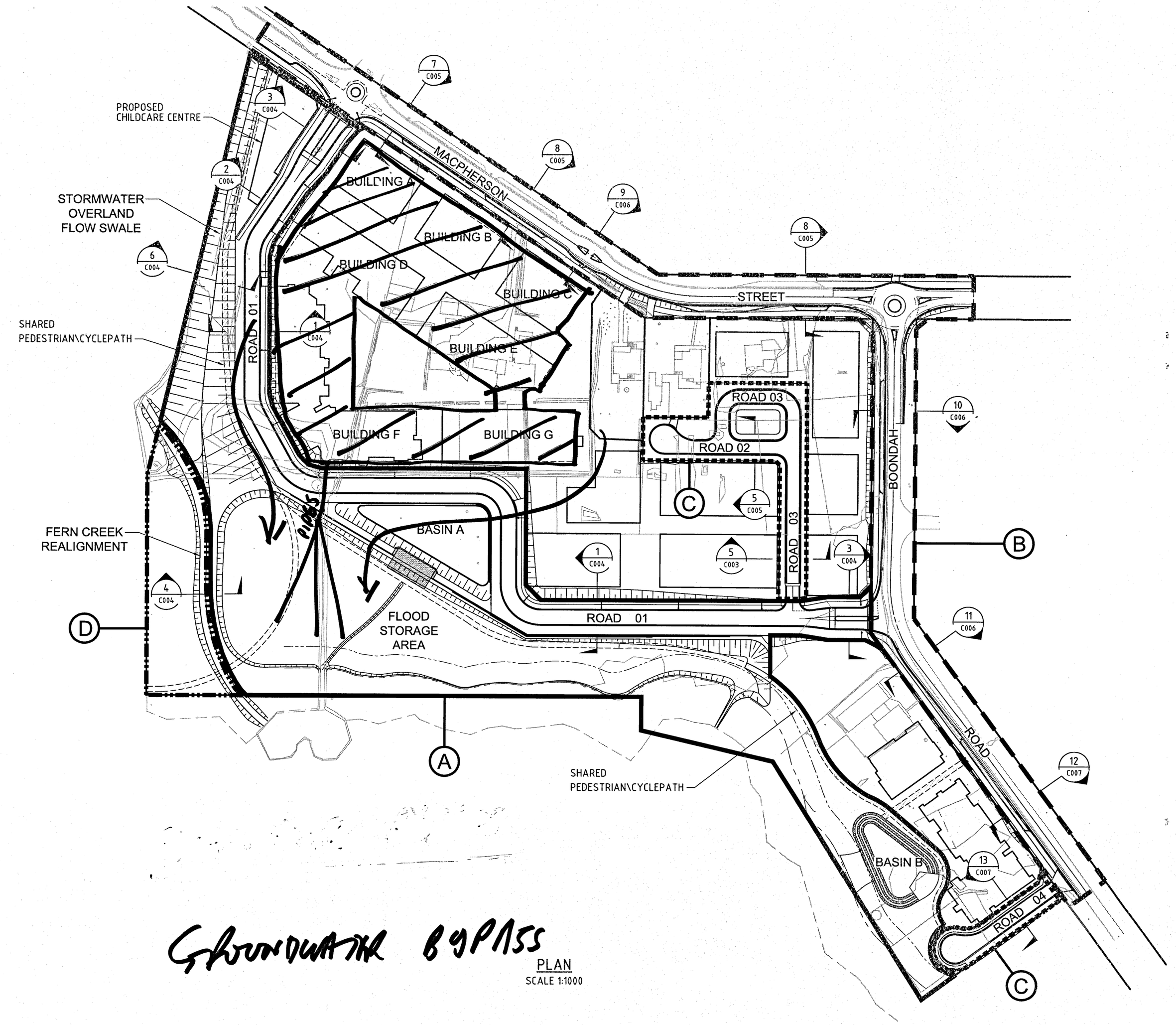
SCALE (M)

0 30

PROPOSED BYPASS LAYOUT

Jeffery and Katauskas Pty Ltd

Report No. 23540Z Figure No. 4



APPROVALS SCHEDULE

AREA 'A' - PRIVATE CERTIFIER FUTURE PUBLIC ROAD

AREA 'B' - SECTION 138 EXISTING COUNCIL ROAD

AREA 'C' - PRIVATE CERTIFIER PRIVATE ROAD

AREA 'D' - PITTWATER COUNCIL FERN CREEK

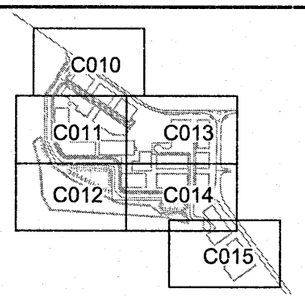
Groundwater bypass

PLAN
SCALE 1:1000

Issue	Description	Date
D	ISSUE FOR COUNCIL REVIEW	24/02/11
C	ISSUE FOR CC APROVAL - AREA 'A'	11/02/11
B	ISSUE FOR REVIEW	17/01/11
A	ISSUE FOR TENDER	29/10/10

108mm on Original

KEY PLAN



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Scales: 1 : 1000

Grid:

Height Datum: AHD

Drawn: TS
Designed: MM
Checked: AMc
Approved:

Project: 14-18 BOONDAH ROAD WARRIEWOOD

Title: GENERAL ARRANGEMENT PLAN

Civil Engineers and Project Managers
AT&L
Suite 702, 6A Glen Street
Milsons Point NSW 2061
ABN 96 130 882 405
Tel: 02 8920 2466
Fax: 02 9922 5102
www.atl.net.au
info@atl.net.au

Status: FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

A1

Drawing No.: C003
Project No.: 10-23
Issue: D

F:\10-23 Warriewood\Drgs\Civil\Final\C003-GENERAL-ARRANGEMENT-PLAN.dwg V1

EXISTING SERVICES

- G — EXISTING GAS
- T — EXISTING TELSTRA
- W — EXISTING POTABLE WATER
- S — EXISTING SEWER
- EXISTING SEWER MANHOLE
- SW — EXISTING STORMWATER
- EXISTING OVERHEAD ELECTRICAL

PROVIDE ø525 RCP-CLASS 2 PIPE STUB WITH END CAP FOR BUILDING CONNECTION

PROPOSED HEAVY DUTY DRIVEWAY

PROPOSED FOOTPATH 1.5m WIDE

PROPOSED 150x200x600 HIGH TIMBER BOLLARD PLACED AT 3m CENTRES (TYP.)

PROVIDE ø675 RCP-CLASS 2 PIPE STUB WITH END CAP FOR BUILDING CONNECTION

PROVIDE ø750 RCP-CLASS 2 PIPE STUB WITH END CAP FOR BUILDING CONNECTION

OVERLAND FLOW PATH SWALE

FERN CREEK RE-ALIGNMENT

ROAD 01

BUILDING B

BUILDING C

BUILDING D

BUILDING E

BUILDING F

BUILDING G

FROM BASEMENT PUMP PITS (INCLUDING OIL SEPARATORS)

COUNCIL S'WATER MH.

COUNCIL S'WATER MH

TO G.P.T.

Issue	Description	Date
D	ISSUE FOR CC APROVAL – AREA 'A'	11/02/11
C	ISSUE FOR REVIEW	17/01/11
B	STORMWATER DRAINAGE REVISED ISSUE FOR INFORMATION	11/11/10
A	ISSUE FOR TENDER	29/10/10

C010 C011 C012 C013 C014 C015

Client: MERITON APARTMENTS PTY LTD

Scale Bar: 0 5 10 15 20 25m — 1 : 250

Scales: 1 : 250

Grid:

Height Datum: AHD

Drawn	TS
Designed	MM
Checked	AMc
Approved	

Project: 14-18 BOONDAH ROAD WARRIEWOOD

Title: ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 2

Civil Engineers and Project Managers
AT&L
Suite 702, 6A Glen Street
Milsons Point NSW 2061
ABN 96 130 882 405
Tel: 02 8920 2466
Fax: 02 9922 5102
www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL | A1

Drawing No.	Project No.	Issue
C011	10-23	D

F:\10-23 Warriewood\Drgs\Civil\Final\C011-ROADWORKS-&-STORM-PLAN-SHT-2.dwg V1

100mm on Original

G.P.T.

ROCK FILLED GABION RETAINING WALL FOR DETAILS REFER DWG C110

PROPOSED HEAVY DUTY DRIVEWAY

BIO-RETENTION BASIN A
(FOR DETAILS REFER DWG C040 & C042)

PROPOSED FOOTPATH 1.5m WIDE

ROAD 01

RTA TYPE 1 PEDESTRIAN FENCE FOR DETAILS REFER RTA MODEL DRAWING MD.R70.A21

GROSS POLLUTANT TRAP

SHARED PATH REFER LANDSCAPE ARCHITECT DRAWINGS

ROCK FILLED GABION RETAINING WALL FOR DETAILS REFER DWG C110

PROPOSED 200x200x600 HIGH TIMBER BOLLARD PLACED AT 3m CENTRES (TYP)

FERN CREEK RE-ALIGNMENT

FLOOD STORAGE AREA

SHARED PATH REFER LANDSCAPE ARCHITECT DRAWINGS

PROVIDE OPEN SWALE DRAIN TO DIRECT STORMWATER TO OUTLET

ROCK FILLED GABION RETAINING WALL

10m BUFFER ZONE

RIPARIAN ZONE

PLANTATION

POPULATED

WETLANDS

POND

FALL

CH 60 CH 80 CH 100 CH 120 CH 140 CH 160

CT 74.775 TC 94.453

D.P. 1049982 502 D.P. 1049982 229 915

EXISTING SERVICES

- G — EXISTING GAS
- T — EXISTING TELSTRA
- W — EXISTING POTABLE WATER
- S — EXISTING SEWER
- EXISTING SEWER MANHOLE
- SW — EXISTING STORMWATER
- EXISTING OVERHEAD ELECTRICAL

RAINWATER DRAINAGE.

a) IN 3 PER TANK (UNDERSLAB SEEPAGE) + CARWASH POWER PUMPS INTERMITTENTLY TO COUNCIL STORMWATER.

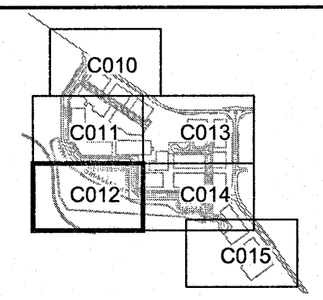
b) COUNCIL (ROAD) STORMWATER TO G.P.T.

c) GPT TO BIORETENTION BASIN.

Issue	Description	Date
E	RE-ISSUE FOR CC APROVAL - AREA 'A'	16/02/11
D	ISSUE FOR CC APROVAL - AREA 'A'	11/02/11
C	ISSUE FOR REVIEW	17/01/11
B	STORMWATER DRAINAGE REVISED ISSUE FOR INFORMATION	11/11/10
A	ISSUE FOR TENDER	29/10/10

100mm on Original

KEY PLAN



Client: MERITON APARTMENTS PTY LTD

Scale Bar: 0 5 10 15 20 25m — 1 : 250

Scales: 1 : 250

Grid:

Height Datum: AHD

Drawn	TS
Designed	MM
Checked	AMc
Approved	

Project: 14-18 BOONDAH ROAD WARRIEWOOD

Title: ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 3

Civil Engineers and Project Managers
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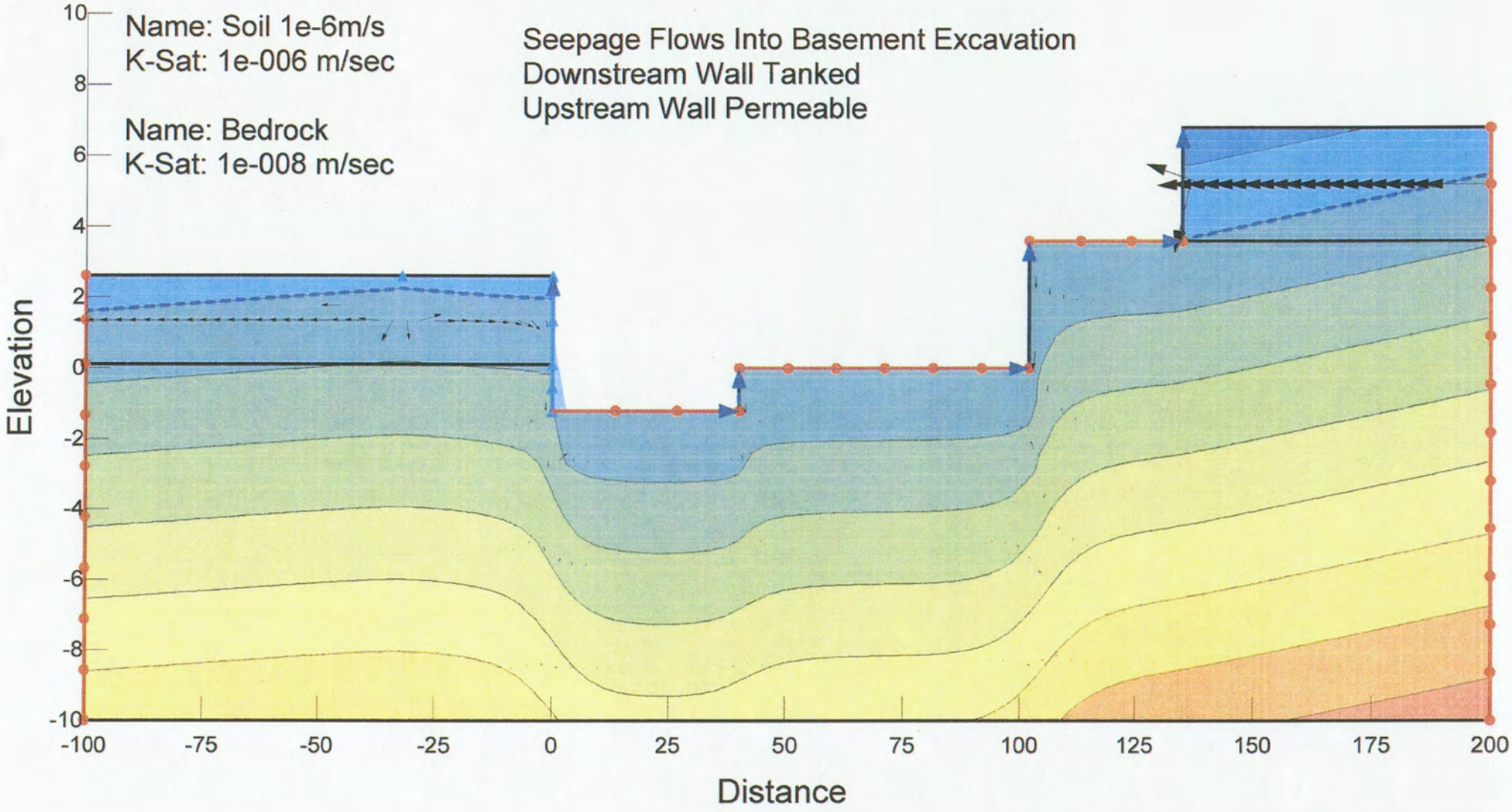
Suite 702, 6A Glen Street
Milsons Point NSW 2061
ABN 96 130 882 405
Tel: 02 8920 2466
Fax: 02 9922 5102
www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL — A1

Drawing No.	Project No.	Issue
C012	10-23	E

F:\10-23 Warriewood\Drgs\Civil\Final\C012-ROADWORKS-&-STORM-PLAN-SHT-3.dwg V1



Jeffery and Katauskas Pty Ltd

Report No. 23540Z Figure No. 6

APPENDIX C

SITE PLAN WITH SQUID AND WELL LOCATIONS

(supplied courtesy of Martens and Associates Pty Ltd and Jeffery and Katauskas Pty Ltd)

NOTE: PROPOSED SITE DEVELOPMENT LAYOUT PREPARED AND PROVIDED BY AT & L PTY LTD

martens

N
W E
S

Martens & Associates Pty Ltd ABN 85 070 240 890		**Environment | Water | Wastewater | Geotechnical | Civil | Management**	
Drawn:	MLB	**SQID AND GROUNDWATER WELL MONITORING LOCATIONS 14 - 18 BOONDAH ROAD, WARRIEWOOD, NSW.**	Drawing No.: **ATTACHMENT A**
Approved:	JF		
Date:	09.02.2001		
Scale @A4:	NOT TO SCALE	6/37 Leighton Place, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 Email: mail@martens.com.au Internet: http://www.martens.com.au	Job No.: P1002934JD01V01

N

NOTES:
Figure 2 has been recreated from image provided by Karimbla Construction Services. Image has not been scaled.

MW locations are approximate and should not be construed as survey points.

Reference should be made to the report text for a full understanding of this plan.

LEGEND:

MW A — Approximate monitoring well location well identification

ENVIRONMENTAL INVESTIGATION SERVICES	Project Number: E23540KB	Title: MONITORING WELL LOCATION PLAN
	Figure: 2	Address: 14-18 BOONDAH ROAD, WARRIEWOOD, NSW

APPENDIX D

DEWATERING BORE LICENSE
(issued by the NSW Office of Water)

NSW GOVERNMENT | Office of Water

Contact: Mr Wayne Conners
Phone: (02) 9895 7814
Fax: (02) 9895 7255
Email: wayne.conners@water.nsw.gov.au

Our ref: 10BL604529

Meriton Property Management Pty Limited
Level 1, 528 Kent Street,
SYDNEY, NSW. 2000.

Attention: Mr Andrew Coleman

16th March, 2011.

Dear Mr Coleman,

Dewatering Bore Licence
14 – 18 Boondah Road, Warriewood – Lot 20 DP1080979

Please find enclosed your license. Your attention is drawn to the nature and description of the work, terms, limitations and conditions under which the license is issued.

Condition (8) requires that you maintain records of the actual volume of water pumped and that this be supplied to the Department upon completion of dewatering.

Your attention is drawn to the fact that the attached licence is valid for a specified duration only and that pumping of groundwater is **not authorised** from the subject property after expiration of the identified time period.

A water analysis is required by the Department. Please fill a clean glass container (rinsed with the water to be sampled) with at least 1 litre of water taken after water has been pumped for a least 2 hours. The water sample may be tested at our Arncliffe Laboratory, (02) 9597 4444 or an independent analysis may be obtained with the results forwarded to the Department.

Yours sincerely

Wayne Conners
Natural Resource Project Officer
Water Access - Licensing South

NSW Office of Water

Sydney South Coast Region
P O Box 3720
10 Valentine Ave
Parramatta NSW 2124
Phone: (02) 98957814

BORE LICENSE CERTIFICATE **10BL604529**
UNDER SECTION 115 OF THE WATER ACT, 1912

Office of Water

Meriton Property Management Pty Limited
Att:- Andrew Coleman
Level 1, 528 Kent Street
Sydney NSW 2000

LICENSE NUMBER
10BL604529
DATE LICENSE VALID FROM
16-Mar-2011
DATE LICENSE VALID TO
15-Mar-2012
FEE
$0.00

ABN 47661556763 GST NIL

LOCATION OF WORKS

Portion(s) or Lot/Section/DP	PARISH	COUNTY
20//1080979	Narrabeen	Cumberland

TYPE OF WORKS: Excavation - Groundwater

PURPOSE(S) FOR WHICH WATER MAY BE USED: Dewatering (groundwater)

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water

CONDITIONS STATEMENT REFERRED TO ON 10BL604529 ISSUED UNDER PART V OF THE WATER ACT, 1912 ON 16-Mar-2011

(1) WATER SHALL NOT BE PUMPED OR EXTRACTED FROM THE WORK(S) AUTHORISED BY THIS LICENSE FOR ANY PURPOSE OTHER THAN TEMPORARY CONSTRUCTION DEWATERING.

(2) THE LICENSEE SHALL WITHIN TWO (2) MONTHS OF COMPLETION OR AFTER THE ISSUE OF THE LICENCE IF THE WORK IS EXISTING, FURNISH TO NSW OFFICE OF WATER:-

(A) DETAILS OF THE WORK AS SET OUT IN THE FORM "A" (MUST BE COMPLETED BY A DRILLER, DULY LICENSED IN NEW SOUTH WALES).

(B) A PLAN SHOWING ACCURATELY THE LOCATION OF THE WORK IN RELATION TO PORTION AND PROPERTY BOUNDARIES,

(C) DETAILS OF ANY PUMPING TESTS CARRIED OUT,

(D) DETAILS OF ANY WATER ANALYSIS.

(3) THE LICENSEE SHALL ALLOW NSW OFFICE OF WATER OR ANY PERSON AUTHORISED BY IT, FULL AND FREE ACCESS TO THE WORKS, EITHER DURING OR AFTER CONSTRUCTION, FOR THE PURPOSE OF CARRYING OUT INSPECTION OR TEST OF THE WORKS AND ITS FITTINGS AND SHALL CARRY OUT ANY WORK OR ALTERATIONS DEEMED NECESSARY BY THE DEPARTMENT FOR THE PROTECTION AND PROPER MAINTENANCE OF THE WORKS, OR THE CONTROL OF THE WATER EXTRACTED AND FOR THE PROTECTION OF THE QUALITY AND THE PREVENTION FROM POLLUTION OR CONTAMINATION OF SUB-SURFACE WATER.

(4) (A) THE LICENSEE SHALL NOTIFY NSW OFFICE OF WATER IF A FLOWING SUPPLY OF WATER IS OBTAINED. THE BORE SHALL THEN BE LINED WITH CASING AND CEMENTED AND A SUITABLE CLOSING GEAR SHALL BE ATTACHED TO THE BOREHEAD AS SPECIFIED BY NSW OFFICE OF WATER.

(B) IF A FLOWING SUPPLY OF WATER IS OBTAINED FROM THE WORK, THE LICENSEE SHALL ONLY DISTRIBUTE WATER FROM THE BORE HEAD BY A SYSTEM OF PIPE LINES AND SHALL NOT DISTRIBUTE IT IN DRAINS, NATURAL OR ARTIFICIAL CHANNELS OR DEPRESSIONS.

(5) IF A WORK IS ABANDONED AT ANY TIME THE LICENSEE SHALL NOTIFY NSW OFFICE OF WATER THAT THE WORK HAS BEEN ABANDONED AND SEAL OFF THE AQUIFER BY:-

(A) BACKFILLING THE WORK TO GROUND LEVEL WITH CLAY OR CEMENT AFTER WITHDRAWING THE CASING (LINING); OR

(B) SUCH METHODS AS AGREED TO OR DIRECTED BY NSW OFFICE OF WATER.

(6) TAILWATER DRAINAGE SHALL NOT BE ALLOWED TO DISCHARGE ONTO ADJOINING ROADS, CROWN LAND OR OTHER PERSONS LAND, OR INTO ANY RIVER AS DEFINED UNDER THE WATER ACT, OR ANY GROUNDWATER AQUIFER, BY SURFACE OR SUB-SURFACE DRAINS OR PIPES OR ANY OTHER MEANS.

(7) WORKS USED FOR THE PURPOSE OF CONVEYING, DISTRIBUTING OR STORING WATER FROM THE WORK AUTHORISED BY THIS LICENSE SHALL NOT BE CONSTRUCTED OR INSTALLED SO AS TO OBSTRUCT THE FREE PASSAGE OF FLOODWATERS FLOWING IN, TO OR FROM A RIVER OR LAKE.

(8) THE LICENSEE SHALL MAINTAIN A RECORD OF THE ACTUAL VOLUME OF GROUNDWATER PUMPED (IN KILOLITRES OR MEGALITRES) FROM THE DEWATERING WORKS, THE DISCHARGE RATE (IN LITRES PER SECOND) AND DURATION OF PUMPING (NUMBER OF DAYS OR WEEKS) AND PROVIDE THIS

INFORMATION TO THE DEPARTMENT ON AN AGREED BASIS, AT THE COMPLETION OF CONSTRUCTION, OR UPON REQUEST FROM THE DEPARTMENT.

(9) THE LICENSEE SHALL MAINTAIN A RECORD OF THE ACTUAL VOLUME AND QUALITY OF ANY TAILWATER GENERATED BY THE DEWATERING, INCLUDING TESTING OF THE PH OF THE WATER PRIOR TO THE COMMENCEMENT OF PUMPING AND TWICE DAILY THEREAFTER FOR THE PERIOD OF OPERATION, AND PROVIDE THIS INFORMATION TO THE DEPARTMENT ON AN AGREED BASIS, AT THE COMPLETION OF CONSTRUCTION, OR UPON REQUEST FROM THE DEPARTMENT.

(10) THE LICENSEE SHALL MAINTAIN A DAILY RECORD OF THE GROUNDWATER LEVELS BENEATH AND AROUND THE CONSTRUCTION SITE THROUGHOUT THE DURATION OF THE DEWATERING AND FOR A PERIOD OF AT LEAST 2 MONTHS FOLLOWING CESSATION OF THE REQUIRED PUMPING, AND PROVIDE THIS INFORMATION TO THE DEPARTMENT ON AN AGREED BASIS, AT THE END OF THE MONITORING PERIOD, OR UPON REQUEST FROM THE DEPARTMENT.

(11) THE LICENSEE SHALL PROVIDE ALL RAW MONITORING DATA TO THE DEPARTMENT WITHIN 6 MONTHS OF COMPLETION OF THE PUMPING AUTHORISED BY THIS LICENSE IN AN ELECTRONIC FORMAT THAT IS COMPATIBLE WITH MICROSOFT OFFICE AND ADOBE ACROBAT SOFTWARE.

(12) THE WORK AUTHORISED BY THIS LICENSE SHALL BE MANAGED AND OPERATED IN ACCORDANCE WITH ANY ACID SULPHATE SOIL OR OTHER GROUNDWATER-RELATED MANAGEMENT PLAN FOR THE SITE INCLUDING PLANS DEVELOPED UNDER THE PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997 OR THE CONTAMINATED LAND MANAGEMENT ACT 1997.

(13) THE LICENSEE SHALL NOT ALLOW THE DISCHARGE OF WATER FROM THE SITE UNLESS:-
(A) THE PH OF THE DISCHARGE WATER IS BETWEEN 6.5 AND 8.5 AND NO OTHER CONTAMINANTS ARE PRESENT; OR
(B) THE DISCHARGE WATER HAS BEEN TREATED TO BRING THE PH TO A LEVEL BETWEEN 6.5 AND 8.5 AND REMOVE ANY CONTAMINANTS PRIOR TO DISCHARGE; OR
(C) THE WATER IS BEING DISCHARGED TO A RECEIVING WATER BODY IN ACCORDANCE WITH THE CONDITIONS OF A LICENSE GRANTED UNDER THE PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997; OR
(D) THE WATER IS BEING DISCHARGED TO SEWER UNDER A WRITTEN AGREEMENT WITH THE RELEVANT AUTHORITY.

(14) THE TERM OF THIS LICENSE SHALL BE 12 MONTHS.

(15) WATER SHALL NOT BE PUMPED OR EXTRACTED FROM THE WORK(S) AUTHORISED BY THIS LICENSE AFTER COMPLETION OF CONSTRUCTION, AFTER THE ISSUE OF AN OCCUPANCY CERTIFICATE BY THE RELEVANT CONTROLLING AUTHORITY, OR AFTER THE TERM OF THIS LICENSE HAS EXPIRED.

(16) LOCATION OF LAND ON WHICH WATER MAY BE USED:-

LOT/DP: LOT 20 DP1080979
PARISH : NARRABEEN
COUNTY : CUMBERLAND

(17) THE VOLUME OF GROUNDWATER EXTRACTED FROM THE WORKS AUTHORISED BY THIS LICENSE SHALL NOT EXCEED 0.5 MEGALITRES FOR THE TERM OF THIS LICENSE.

End Of Conditions

APPENDIX E

BASEMENT HYDRAULIC DRAINAGE PLANS
(supplied courtesy of Meriton Apartments Pty Ltd)

drawing status

SERVICES ON THIS DRAWING ARE SHOWN OUT OF THE STRATA U.N.O.

quality control

QUALITY CONTROL

DATE:

DISCIPLINE	DWG No	REV	DATE
ARCHITECTURAL	N/A	N/A	
STRUCTURAL	N/A	N/A	
MECHANICAL	N/A	N/A	
ELECTRICAL	N/A	N/A	
HYDRAULIC	N/A	N/A	
FIRE	N/A	N/A	

NAME

SIGNED

revisions

no	desc	date
P01	PRELIMINARY ISSUE	21/07/11
P02	PRELIMINARY ISSUE	25/07/11

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DIAGRAMMATIC

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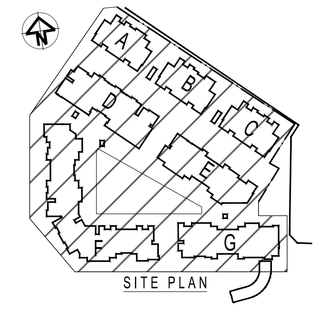

project

14-18 BOONDAH ROAD
WARRIEWOOD
STAGE 1

client

Meriton Apartments Pty. Ltd.
Builders & Developers
Level 11, 528 Kent Street, Sydney NSW 2000 Email: rl@design.meriton.com.au
Tel: (02) 9287 2888 Fax: (02) 9287 2777 Internet: http://www.meriton.com.au

architects

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20 NERANG STREET
NERANG QLD 4211
T 07 5596 3023
F 07 5596 3453

hydraulic

ILIAS DESIGN GROUP ™
HYDRAULIC AND FIRE PROTECTION CONSULTANTS
6-10 TOORONGA TERRACE BEVERLY HILLS NSW 2209
T 02 9554 4188 F 02 9554 4688 E info@iliasdesign.com.au
Web www.iliasdesign.com.au

for & behalf of

K Mac Hydraulic Plumbing Service P/L
18 CARRINGTON RD
RANDWICK NSW 2031
Email - office@kmacplumbing.com.au
ph. 02 9399 9330 fax. 02 9399 9334

drawing

drawing title
HYDRAULIC SERVICES
BASEMENT 1 INGROUND
SITE PLAN

job no:	1111	drawn by:	TW
date:	July, 2011	scale:	1:250 @ A0
drawing no	H-02	revision	P02

PRELIMINARY

I:\1111 - Warriewood\AH-B01-ING.dwg

A0

Grid A
setout - 1

SERVICES ON THIS DRAWING
ARE SHOWN OUT OF THE STRATA U.N.O.

drawing strata

QUALITY CONTROL

quality control

DISCIPLINE	DWG No	REV	DATE
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STRUCTURAL	N/A	N/A	
MECHANICAL	N/A	N/A	
ELECTRICAL	N/A	N/A	
HYDRAULIC	N/A	N/A	
FIRE	N/A	N/A	

NAME

SIGNED

DATE:

revisions

no	desc	date
P01	PRELIMINARY ISSUE	21/07/11
P02	PRELIMINARY ISSUE	25/07/11

CONTINUES ON SHEET 2

CONTINUES ON SHEET 3

CONTINUES ON SHEET 3

CONTINUES ON SHEET 2

SITE PLAN

project
14-18 BOONDAH ROAD
WARRIEWOOD
STAGE 1

client
Meriton
Apartments Pty. Ltd.
Builders & Developers
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Tel: (02) 9287 2888 Fax: (02) 9287 2777 Internet: http://www.meriton.com.au

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hydraulic
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Web www.iliasdesign.com.au

for & behalf of
K Mac Hydraulic Plumbing Service P/L
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RANDWICK NSW 2031
Email - office@kmacplumbing.com.au
ph. 02 9399 9330 fax. 02 9399 9334

drawing
drawing title
HYDRAULIC SERVICES
BASEMENT 1 INGROUND
SHEET 1 OF 4
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date July, 2011 scale 1:100 @ A0
drawing no H-03 revision P02

PRELIMINARY

A0

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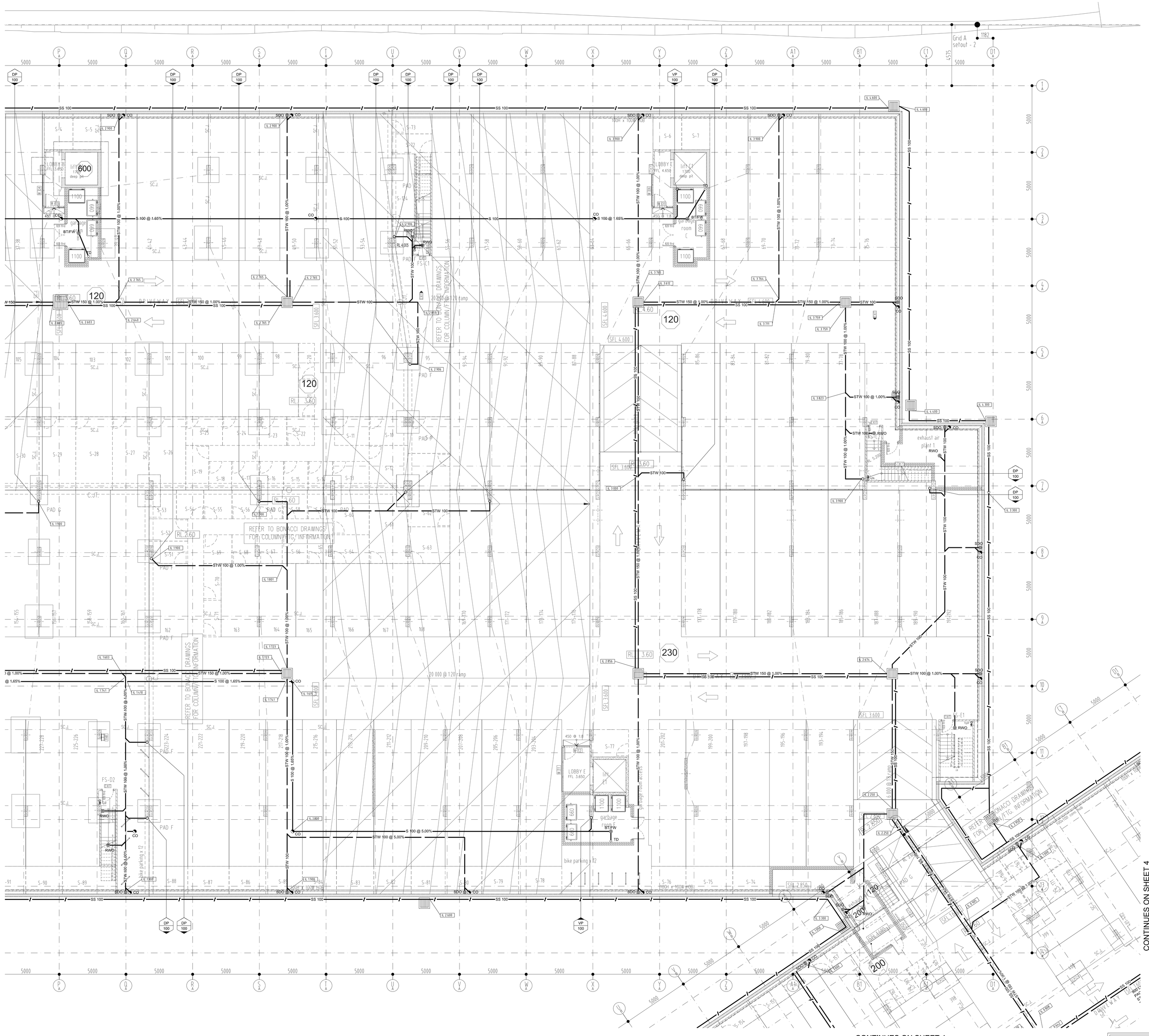

drawing status

SERVICES ON THIS DRAWING ARE SHOWN OUT OF THE STRATA U.N.O.

quality control

QUALITY CONTROL

DATE:			
DISCIPLINE	DWG No	REV	DATE
ARCHITECTURAL	N/A	N/A	
STRUCTURAL	N/A	N/A	
MECHANICAL	N/A	N/A	
ELECTRICAL	N/A	N/A	
HYDRAULIC	N/A	N/A	
FIRE	N/A	N/A	
NAME			
SIGNED			

revisions

no	desc	date
P01	PRELIMINARY ISSUE	21/07/11
P02	PRELIMINARY ISSUE	25/07/11

project

14-18 BOONDAH ROAD
WARRIEWOOD
STAGE 1

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for & behalf of

K Mac Hydraulic Plumbing Service P/L
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drawing

drawing title
HYDRAULIC SERVICES
BASEMENT 1 INGROUND
SHEET 2 OF 4

job no.	1111	drawn by	TW
date	July, 2011	scale	1:100 @ A0
drawing no	H-04	revision	P02

PRELIMINARY

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CONTINUES TO VIEW TO THE RIGHT

CONTINUES ON SHEET 1

CONTINUES ON SHEET 4

CONTINUES ON SHEET 4

CONTINUES TO VIEW TO THE LEFT

CONCRETE PUMPOUT TANK NO. 1
COMPLETE WITH DUAL
SUBMERSIBLE CLASS 1 ZONE 2
STORMWATER PUMPS
DUTY 10 L/S @ 10 M/H
REFER TO DIAGRAMMATIC ON
SITE PLAN

1000 LITRE GENERAL PURPOSE
OIL SEPARATOR PIT

900 LITRE WASTE WATER
PACKAGED POLY PUMPS
STATION COMPLETE WITH GAS
TIGHT LID &
DUAL SUBMERSIBLE PUMPS
DUTY 0.5 L/S @ 10 M/H

CONNECT SUBSOIL RISING MAIN
TO KERB INLET PIT

CONCRETE PUMPOUT TANK NO. 1
COMPLETE WITH DUAL
SUBMERSIBLE CLASS 1 ZONE 2
STORMWATER PUMPS
DUTY 10 L/S @ 10 M/H

PRELIMINARY

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SITE PLAN

project
14-18 BOONDAH ROAD
WARRIEWOOD
STAGE 1

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drawing
drawing title
HYDRAULIC SERVICES
BASEMENT 1 INGROUND
SHEET 3 OF 4

job no	1111	drawn by	TW
date	July, 2011	scale	1:100 @ A0
drawing no	H-05	revision	P02

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CONTINUES ON SHEET 2

CONTINUES ON SHEET 2

CONTINUES ON SHEET 3

CONTINUES ON SHEET 3

CONTINUES ON SHEET 3

WATER
PUMPS
TE WITH GAS
LE PUMPS
I MH.

RISING MAIN

IRRIGATION STORAGE
NET VOL = 142
2700 deep - volume = 600ltr approx
IRRIGATION TANK

LOBBY F3
FFL 1.650

LOBBY G1
FFL 1.650

LOBBY G2
FFL 1.650

full M mechanical plenum

irrigation pump room

bike parking x 14

supply air plant 3

managers store

maintenance store

PAD F

PAD G

RWQ exhaust air plant 3

RWQ

DRIVEWAY

CONCRETE PUMPOUT TANK NO.2
COMPLETE WITH DUAL
SUBMERSIBLE CLASS 1 ZONE 2
STORMWATER PUMPS
DUTY 10 L/S @ 10 M/H

1000 LITRE GENERAL PURPOSE
OIL SEPARATOR PIT

900 LITRE WASTE WATER
PACKAGED POLY PUMPS
STATION COMPLETE WITH GAS
TIGHT LID &
DUAL SUBMERSIBLE PUMPS
DUTY 0.5 L/S @ 10 M/H

RISE TO HIGH
LEVEL IN CARPARK

CONNECT SUBSOIL RISING MAIN
TO KERB INLET PIT

REFER FONACCI DRAWINGS
FOR GUTTER/ETC. INFORMATION

Grid F
setout - 2

14.4% ext grade approx

15.4% ext grade approx

14.7 ext grade approx

1.8 int grade

110.7 int grade

113.25 ext grade

3890 @ 145

Ø750

Ø525

IL3.21

IL3.27

IL3.36

IL3.43

IL339

IL336

CT 306.732

CT 300

E/1

E/2

E/3

E/4

SITE PLAN

PRELIMINARY

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drawing
drawing title
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BASEMENT 1 INGROUND
SHEET 4 OF 4

job no:	1111	drawn by:	TW
date:	July, 2011	scale:	1:100 @ A0
drawing no:	H-06	revision:	P02

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