PLANIX Projects
c/- Waterbrook

Preliminary Servicing Strategy – Proposed Seniors Living Development, Bayview Golf Course, Cabbage Tree Road, Bayview, NSW

martens consulting engineers

ENVIRONMENTAL

WATER

WASTEWATER

GEOTECHNICAL

CIVIL

PROJECT MANAGEMENT

P1404179JR01V01
July 2014

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1 Overview

1.1 Introduction

Martens and Associates Pty Ltd have been engaged by PLANIX Projects to develop a preliminary servicing assessment of water, sewer and power to support a proposed seniors living development at Bayview Golf Course, Cabbage Tree Road, Bayview, NSW. The investigation site is part of Lot 1 DP662920 and part of Lot 1 DP 19161 ('the investigation site'). The site boundaries are shown on Figure 1.

1.2 Proposed Development

We understand that the development consists of the following key elements:

1. 115 x 2, 3 and 4 bedroom senior living units with facilities building on a site area of approximately 1.99 Ha.
2. Internal access driveway with street access from Cabbage Tree Road.
3. Facilities building (approximately 3,048 m²) including:
    a. Foyer with lobby bar and tea lounge
    b. Reception and office administration
    c. Meeting rooms and business centre
    d. Restaurant and catering kitchen
    e. Library
    f. Café
    g. Tea house
    h. Spiritual centre
    i. Bar
    j. Technology centre
    k. Fitness / yoga centre / human movement centre

l. Indoor heated pool / water therapy centre

m. Hair and beauty salon

n. Cinema

o. Arts and craft centre

p. Games centre

q. Equipment store

4. Basement car park

5. Internal landscaping.

6. Internal site stormwater management system.

2 Sewer Servicing

2.1 Existing Sewer infrastructure

The proposed development site is not presently connected to the Sydney Water sewer network.

A sewer main is located on the western and south western portion of the site and services residential lots to the west and east, and the golf course to the south. The sewer main is a 300mm diameter vitrified clay (VC) main flowing south joining into a 375mm diameter VC main approximately mid-way along the western boundary of the site. This pipe joins a 525mm VC main along the southern boundary of the site as it crosses Cabbage Tree Road. Sections of these mains are concrete encased. Seven manholes are located along the sewer main within the western and southern boundaries of the site.

Existing Sydney Water sewer assets are identified on the attached plan (Attachment C) derived from a dial before you dig application.

The preferred connection point is located along the southern site boundary, close to the corner of Annam Road as shown in Attachment C.

2.2 Consultation with Sydney Water

Sydney Water conducted a feasibility assessment for the proposed development to determine engineering requirements for the sewer connection (see Attachment A).

2.3 Sewage Generation Rate

The proposed senior living units typically assume standard ET figures of 0.75 for a 2 bedroom unit, and 1.0 for a 3 or 4 bedroom unit. Design flows are given in Table 1.

Table 1: Sewage generation and discharge rates.

Element	Value	Units
Units	115	Each
Design Peak Population [1]	353.5	EP
ADWF [2,3]	0.74	L/s
PDWF [2,3]	4.64	L/s
Design sewer flow [3]	6.71	L/s

Notes

[1.] Based on 115 units.

[2] ADWF - Average dry weather flow, PDWF - Peak daily dry weather flow.

[3] Based on design flow calculations in accordance with Appendix B, Sewage Code of Australia, 2002.

2.4 Concept System Design

Sydney Water's engineering requirements indicate that a waste water main extension must be constructed to service the proposed development (see Sydney Water Feasibility Letter, Attachment A). The extension is likely to be in the order of 20 to 30 m, with manhole access onsite. Detailed designs of the sewer strategy will be completed as the development plans progress.

2.5 Operational Management

Subject to the approved sewer strategy, the following operational management components will need to be incorporated into the design.

2.5.1.1 Visual Impact

All tanks, pumps and lines will be below ground and therefore will have no visual impact.

2.5.1.2 Noise Considerations

Where required, wastewater transfer pumps will be submersible pumps (ie. operate below water level). Impact assessment for the operation required pumps are as follows:

1. Pumps will not generate nuisance noise to any nearby buildings due to pumps being submersed and encased in a sealed tank below ground.

2. Pumps are not expected to generate excessive nuisance noise levels impacting on either proposed dwellings or existing adjacent residential dwellings.

2.5.1.3 Odour Considerations

A vent with attached scrubber is to be located to the south west of the site away from dwellings to reduce likelihood of nuisance odours.

2.5.1.4 Emergency Response

Where the system requires pumping to sewer the system will have a holding capacity of generated sewer volumes from the following:

- 24 hours storage of normal sewer flows from Peak daily dry weather flows (PDWF).
- 10 hours storage of rainfall dependent inflow and infiltration, peak daily dry weather flow and groundwater infiltration into the onsite sewer network (PWWF).

The proposed holding tank provides adequate reserve storage volume and therefore time to respond to possible emergencies.

In the event of equipment failure, extended power failure or excessive flows to the onsite sewer system, provision is to be made allowing pump out of the holding tank or emergency maintenance. The proposed tank location is to allow for a 3.0m wide access way accommodating a medium rigid vehicle (MRV) for emergency and maintenance purposes.

2.6 Conclusion

Sydney Water requires a waste water main extension to service the development. Details of the proposed design will be submitted at the DA stage.

3 Water Servicing

3.1 Water Servicing Strategy

A 100mm cast iron cement lined pipe connected to Sydney Water's network runs along the southern boundary of the site. The preferred connection point is located along the southern site boundary, close to the corner of Annam Road. Refer to Attachment C for existing water main location and preferred connection point.

The attached Sydney Water Statement of Available Pressure and Flow indicates the following:

- Sydney Water has an existing 100mm water main in Cabbage Tree Road, running along the north side of the road.
- This water main is available for connection.
- Appropriate backflow prevention is required.

3.2 Water Demand Rates

3.2.1 Residential Units Demand

Water demand for the residential units is summarised in Table 2.

Table 2: Residential units water demand rates.

Element	Value	Units
Maximum demand rate per dwelling[1]	1.39	L/s
Maximum hour/maximum day ratio [2]	6.95	L/s
Maximum day/average day ratio [3]	0.73	L/s

Notes

1. Based on group housing calculations, Table 2.1 (WSA 03, 2009).

2. Based on peak hour factor of 5 (WSA 03, 2009).

3 Based on group housing calculations, Table 2.1 (WSA 03, 2009).

A connection will be required to service the proposed development. This will involve applying to Sydney Water via Quick Check agent once a hydraulic layout and a list of all fixtures and fittings are known. These details are to be confirmed at the detailed design stage.

3.2.2 Fire Services Demand

An internal fire hydrant service will be provided to service the proposed development.

Hydrant performance [attack hydrant] specification is 10 L/s at 25 m residual head pressure (ie. 250 KPa) in accordance with AS 2419 (2005). Hydrants should be positioned to ensure that all buildings may be reached by a 10m jet of water from a 60m length of hose attached to a hydrant.

The Sydney Water Statement of Available Pressure and Flow, dated 10 June 2014 (Attachment A), indicates an expected water mains pressure at the connection point of:

1. 106m head (maximum pressure)
2. 90m head (minimum pressure)

3.3 Capacity Assessment

Based on a peak hourly demand of 10 L/s for firefighting, advice from Sydney Water is that there is likely to be adequate capacity to service the site (see Attachment A, Sydney Water correspondence). The potential decrease in pressure head of 3 m at peak demand is still well above the maximum permissible flow required by Sydney Water.

3.4 Preliminary System Design

A preliminary water supply scheme will include the following elements:

1. New water connection to existing 100mm with provision of appropriate backflow prevention.
2. Potable and fire supply main(s) to the development.
3. Hydrants serviced from the fire supply main.

3.5 Rainwater Tanks and Usage

The development will include a rainwater storage tank to supply garden and other non-potable water usages. This will reduce the predicted daily demand from potable water source.

3.6 Conclusion

The investigation site has the ability to connect to a town water supply.

4 Electricity Supply

4.1 Electricity Servicing Strategy

Overhead lines to Ausgrid's network runs along the southern boundary of the site, on the north side of Cabbage Tree Road.

The preferred connection point is located along the southern site boundary, close to the corner of Annam Road.

4.2 Electricity Demand Rates

Electricity demand for the residential units is summarised in Table 3.

Table 3: Electricity site demand rates.

Element	Value	Units
Annual average dwelling demand [1]	11,111.1	kWh/dwelling/year
Daily average dwelling demand	30.5	kWh/dwelling/day
Peak dwelling demand [2]	5.1	kWh/hour
Peak site demand [3]	513.1	kWh/hour
Average site demand [4]	128.3	kWh/hour

Notes

1. Average annual energy (electricity and gas) per dwelling based on 40,000 MJ/dwelling/year (Energy Australia, 2005).
2. Calculated on apartment comparisons at 75% of peak kWh for dwelling (Energy Australia, 2005).
3. Calculated on 101 ET for site for 115 units, including air conditioning.
4. Peak site demand divided by peak demand factor of 4 times.

4.3 Conclusion

There will be requirement for design of the electricity system as part of the construction certificate process and it is likely based on our discussions with H. Wang, Engineering Officer at Ausgrid, that there will be some power amplification requirements within or near the site. Discussions are currently underway with Ausgrid to formalise the electricity requirements.

5 References

Australian Standard 2419 (2005) *Fire Hydrant Installations.*

Marchese Partners (2014) *Waterbrook Bayview: Senior Living Facility, Site Masterplan, 25.06.2014*

Sydney Water (2012) Average Daily Water Use By Property Development Type, viewed 30 November 2012, http://www.sydneywater.com.au/BuildingDeveloping/SupplierInformation/eDeveloper/Average_Daily_Water_Use_Table.pdf

Troy, P., Holloway, D. and Randolph, B. (2005) *Water Use and the Built Environment: Patterns of Water Consumption in Sydney, University of NSW City Futures Research Centre Research Paper No. 1*

Water Services Association of Australia (2002) *Sewerage Code of Australia – Sydney Water Edition Version 3.*

Water Services Association of Australia (2011) *Water supply Code of Australia – Sydney Water Edition Version 3.1.*

Water Services Association of Australia (2009) *Water supply Code of Australia – Sydney Water Edition Version 2.2.*

Water Directorate (2005) *Section 64 Determinations of Equivalent Tenements Guidelines.*

6 Attachment A – Sydney Water Feasibility Letter, and Statement of Available Pressure and Flow

Case Number: 139155

2 July 2014

Martens & Associates
c/- Qalchek Pty Ltd

FEASIBILITY LETTER

Developer:	**Martens & Associates**
Your reference:	**PM 12558**
Development:	**Lot 1 DP662920 Cabbage Tree Rd, Bayview**
Development Description:	**Proposed Seniors Living Development including 102 Apartments and Facilities Building**
Your application date:	**27 May 2014**

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed) or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/ site layout, after today, the requirements in this Letter could change when you submit your new application; and

- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting www.sydneywater.com.au > Building and Developing > Developing Your Land.

1. **Obtain Development Consent from the consent authority for your development proposal.**

2. **Engage a Water Servicing Coordinator (Coordinator).**

   You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

   For a list of authorised Coordinators, either visit www.sydneywater.com.au > Building and Developing > Developing Your Land or call **13 20 92.**

   The Coordinator will be your point of contact with Sydney Water. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including Sydney Water costs).

3. **Developer Works Deed**

   After the Coordinator has submitted your new application, they will receive the Sydney Water Notice and Developer Works Deed. You and your accredited Developer Infrastructure Providers (Providers) will need to sign and lodge both copies of the Deed with your nominated Coordinator. After Sydney Water has signed the documents, one copy will be returned to the Coordinator.

   The Deed sets out for this project:

   - your responsibilities;
   - Sydney Water's responsibilities; and
   - the Provider's responsibilities.

   You must do all the things that we ask you to do in that Deed. This is because your development does not have sewer services and you must construct and pay for the following works extensions under this Deed to provide these services.

   Note: The Coordinator must be fully authorised by us for the whole time of the agreement.

4. **Water and Sewer Works**

4.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

Sydney Water has assessed your application and found that:

- The drinking water main available for connection is the 100mm main on the Northern side of Cabbage Tree Road.

4.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

Sydney Water has assessed your application and found that:

- **You must construct a waste water main extension to serve your development**. The terms of the Deed define this extension as 'Major Works'.

5. Ancillary Matters

5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

5.3 Costs

Construction of these **future** works will require you to pay project management, survey, design and construction costs **directly to your suppliers**. Additional costs payable to

Sydney Water may include:

- water main shutdown and disinfection;
- connection of new water mains to Sydney Water system(s);
- design and construction audit fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation;
- creation or alteration of easements etc; and
- water usage charges where water has been supplied for building activity purposes prior to disinfection of a newly constructed water main.

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Stamping and approval of your building plans

Please note that your building plans must be stamped and approved. This can be done at a Quick Check agency. For an agency list visit www.sydneywater.com.au > Building and Developing > Quick Check or call 13 20 92.

This is not a requirement of the Certificate but the approval is needed because construction/ building works may impact on existing Sydney Water assets (e.g. water and sewer mains). In any case, these works MUST NOT commence until Sydney Water has granted approval.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994.*

Backflow Prevention Water supply connections

A backflow prevention containment device appropriate to the property's hazard rating must be installed at the property boundary. The device is to be installed on all water supplies entering the property, regardless of the supply type or metering arrangements. It is needed to reduce the risk of contamination by backflow from these supplies.

A licensed plumber with backflow accreditation can advise you of the correct requirements for your property. To view a copy of Sydney Water's Backflow Prevention Policy and a list of backflow accredited plumbers visit www.sydneywater.com.au > Plumbing, building & developing > Plumbing > Backflow prevention.

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Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Other fees and requirements

The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements. These include:

- plumbing and drainage inspection costs;
- the installation of backflow prevention devices; and
- council fire fighting requirements. (It will help you to know what the fire fighting

requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END

Sydney WATER

Statement of Available Pressure and Flow

Martens & Associates
6 / 37 Leighton Pl
Hornsby, 2077

WMS No: **342571**
Contact No: 02 8849 3531
Fax No: 02 8849 3071

Attention: Gray

Date: 10/06/2014

Pressure & Flow Application Number: 8782532
Your Pressure Inquiry Dated: Tue May 27 2014
Property Address: Lot 6 Cabbage Tree Rd Bayview 2104

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Cabbage Tree Rd	Side of Street: North
Distance & Direction from Nearest Cross Street	100 metres West from Annam Rd
Approximate Ground Level (AHD):	3 metres
Nominal Size of Water Main (DN):	100 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	106 metre head
Minimum Pressure	90 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	90
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20	91 89 86 81
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5 10 15 20	89 87 84 79
Maximum Permissible Flow	26	72

(Please refer to reverse side for Notes)

E-MAIL
11.06.2014
Cx

Robert Wickham
Principal Planner
Urban Growth – Asset Services

General Notes

This report is provided on the understanding that (i) the applicant has fully and correctly supplied the information necessary to produce and deliver the report and (ii) the following information is to be read and understood in conjunction with the results provided.

1. Under its Act and Operating Licence, Sydney Water is not required to design the water supply specifically for fire fighting. The applicant is therefore required to ensure that the actual performance of a fire fighting system, drawing water from the supply, satisfies the fire fighting requirements.

2. Due to short-term unavoidable operational incidents, such as main breaks, the regular supply and pressure may not be available all of the time.

3. To improve supply and/or water quality in the water supply system, limited areas are occasionally removed from the primary water supply zone and put onto another zone for short periods or even indefinitely. This could affect the supply pressures and flows given in this letter. This ongoing possibility of supply zone changes etc, means that the validity of this report is limited to one (1) year from the date of issue. It is the property owner's responsibility to periodically reassess the capability of the hydraulic systems of the building to determine whether they continue to meet their original design requirements.

4. Sydney Water will provide a pressure report to applicants regardless of whether there is or will be an approved connection. Apparent suitable pressures are not in any way an indication that a connection would be approved without developer funded improvements to the water supply system. These improvements are implemented under the Sydney Water 'Urban Development Process'.

5. Pumps that are to be directly connected to the water supply require approval of both the pump and the connection. Applications are lodged through Quick Check Agents (List available on Sydney Water Website - www.sydneywater.com.au). Where possible, on-site recycling tanks are recommended for pump testing to reduce water waste and allow higher pump test rates.

6. Periodic testing of boosted fire fighting installations is a requirement of the Australian Standards. To avoid the risk of a possible 'breach' of the Operating Licence, flows generated during testing of fire fighting installations are to be limited so that the pressure in Sydney Water's System is not reduced below 15 metres. Pumps that can cause a breach of the Operating Licence anywhere in the supply zone during testing will not be approved. This requirement should be carefully considered for installed pumps that can be tested to 150% of rated flow.

Notes on Models

1. Calibrated computer models are used to simulate maximum demand conditions experienced in each supply zone. Results have not been determined by customised field measurement and testing at the particular location of the application.

2. Regular updates of the models are conducted to account for issues such a urban consolidation, demand management or zone change.

3. Demand factors are selected to suit the type of fire-fighting installation. Factor 1 indicates pressures due to system demands as required under Australian Standards for fire hydrant installations. Factor 2 indicates pressures due to peak system demands.

4. When fire-fighting flows are included in the report, they are added to the applicable demand factor at the nominated location during a customised model run for a single fire. If adjacent properties become involved with a coincident fire, the pressures quoted may be substantially reduced.

5. Modelling of the requested fire fighting flows may indicate that local system capacity is exceeded and that negative pressures may occur in the supply system. Due to the risk of water contamination and the endangering of public health, Sydney Water reserves the right to refuse or limit the amount of flow requested in the report and, as a consequence, limit the size of connection and/or pump.

6. The pressures indicated by the modelling, at the specified location, are provided without consideration of pressure losses due to the connection method to Sydney Water's mains.

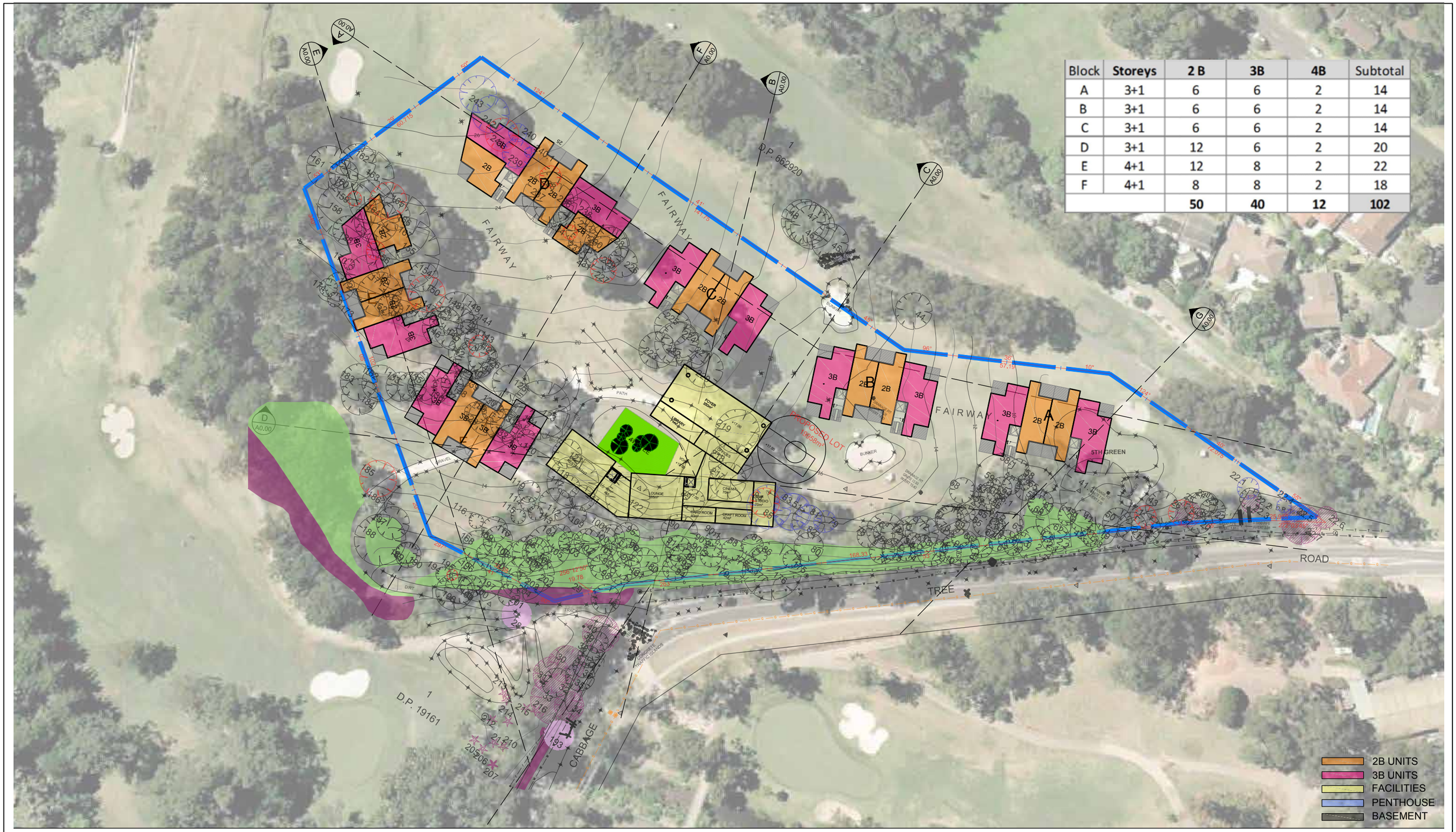
7 Attachment B – Concept Development Plans

N

Key

Investigation Area

Martens & Associates Pty Ltd ABN 85 070 240 890		**Environment | Water | Wastewater | Geotechnical | Civil | Management**	
Drawn:	CS	**Site Location** **Cabbage Tree Road, Bayview, NSW** **Source: Nearmap 2013**	**FIGURE 1**
Approved:	GT		
Date:	25.06.2014		
Scale:	Not to Scale		Job No: P1404179JR01V01



Block	Storeys	2 B	3B	4B	Subtotal
A	3+1	6	6	2	14
B	3+1	6	6	2	14
C	3+1	6	6	2	14
D	3+1	12	6	2	20
E	4+1	12	8	2	22
F	4+1	8	8	2	18
		50	40	12	102

21ST MAY 2014

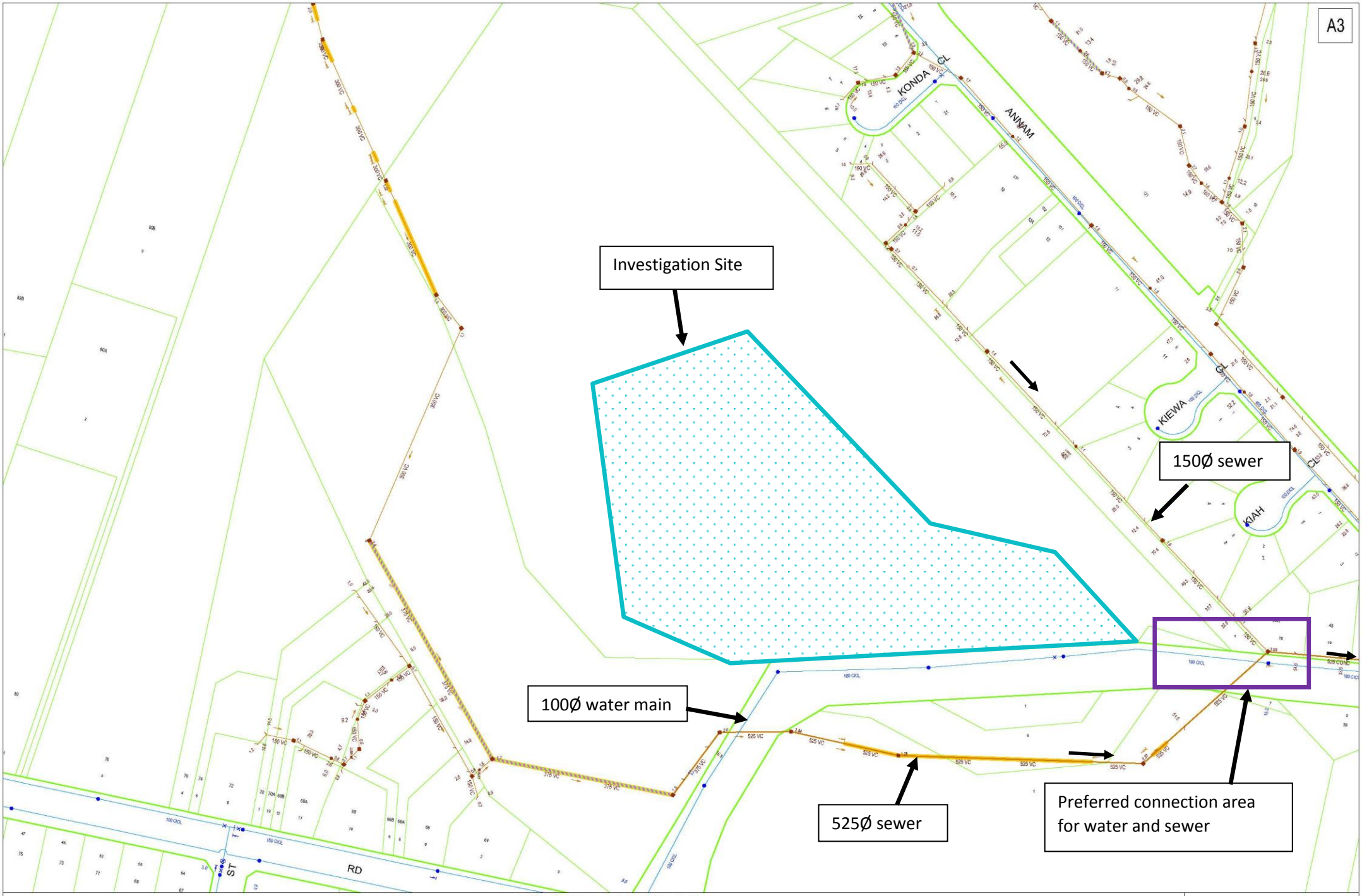
PRELIMINARY

OPTION 1: **TYPICAL LEVEL - UNITS** | SCALE 1:1000

WATERBROOK BAYVIEW

marchesepartners

8 Attachment C – Sydney Water Sewer and Water Asset Map



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Bayview NSW 2104

DBYD Job No: 7417989

DBYD Sequence No: 33997324

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SYDNEY WATER CORPORATION

Scale: 1:1500

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