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Concept Plan for Expansion of Marrickville Metro Retail Centre - Infrastructure and Hydrology Report

Submitted to:
AMP Capital Investors Pty Ltd

REPORT

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Report Number. 107626036-003-R-Rev2-Final Report

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1.0 INTRODUCTION

AMP Capital Investors Pty Ltd is seeking Concept Plan approval from the NSW Department of Planning for expansion of the Marrickville Metro Retail Centre. The Concept Plan envisages new / upgraded facilities on the existing Retail Centre site at 34 Victoria Road and new building development at 13-55 Edinburgh Road, Marrickville.

Golder Associates has been engaged by AMPCI through Bovis Lend Lease to prepare a report to accompany a Concept Plan Application under Part 3A of the *Environmental Planning and Assessment Act 1979* for the proposed redevelopment of the Marrickville Metro Shopping Centre. The development is being considered under Part 3A of the Act as it satisfies the criteria described in Schedule 1 of the Major Projects State Environmental Planning Policy (Major Projects SEPP).

This report has been prepared in general response to items 12 and 14 of the Director-General's Requirements (issued 3 March 2010) for consideration of the Concept Plan (Application No. MP 09_0191).

The relevant Director-General's Requirements are:

> *12. Drainage – The EA shall address drainage / groundwater / flooding issues associated with the development / site, including stormwater, drainage infrastructure and incorporation of Water Sensitive Urban Design measures.*
>
> *14. Utilities – In consultation with relevant agencies, address the existing capacity and requirements of the development for the provision of utilities including staging of infrastructure works*

Golder Associates has prepared an Infrastructure and Hydrology report for the Concept Plan in association with Northrop, who acted as sub-consultant to Golder Associates. The infrastructure assessment was primarily undertaken by Northrop whereas Golder Associates undertook the hydrological assessment.

This report addresses the drainage and flooding issues related to the proposed development. It also identifies various Water Sensitive Urban Design (WSUD) measures for the development. For utilities assessment, this report discusses the infrastructure requirements related to stormwater, water supply and sewerage for the proposed development.

2.0 EXISTING DEVELOPMENT

Marrickville Metro Shopping Centre is located at 34 Victoria Road, Marrickville. The existing shopping centre fronts Victoria Road to the north, Murray Street to the east and Smidmore Street to the south and is adjoined by single storey residential dwellings to the west. The shopping centre is predominantly a single level retail building and comprises major tenants being Kmart, Woolworths and Aldi as well as a range of speciality stores. Car parking is located at roof top level with existing vehicle ramp access via Smidmore Street and Murray Street.

The land at 13-55 Edinburgh Road is located to the south of Smidmore Street and is bounded by Edinburgh Road and Murray Street. This site is currently used as a warehouse with associated ground level car parking.

The shopping centre is located within an established residential and industrial precinct surrounded by small lot residential housing to the north and west, and predominantly industrial land comprising larger allotments and larger building scales to the south and east.

3.0 PROPOSED DEVELOPMENT

AMP Capital Investors (AMPCI) owns Marrickville Metro Shopping Centre and the land to the immediate south at 13-55 Edinburgh Road, Marrickville.

AMPCI proposes to upgrade and expand Marrickville Metro Shopping Centre to accommodate additional retail floor space, improved facilities and services, as well as enhance convenience and accessibility for the community.

The proposal has three key elements:

- An extension of retail floor area at first floor level above the existing shopping centre building with further additional roof top parking above;
- Redevelopment of the existing industrial land south of Smidmore Street (13-55 Edinburgh Road) to create a two level retail addition to the shopping centre with car parking above; and
- The closure of Smidmore Street between Edinburgh Road and Murray Street in order to create a new pedestrian plaza including a two storey retail link and car parking access.

The additional retail floor area will primarily accommodate a discount department store, supermarket, mini major and specialty retail space. The development will incorporate additional car parking as well as improved vehicle access and loading facilities.

The proposal will create a new urban plaza in Smidmore Street and will be complimentary to an enhanced public space fronting Victoria Road. The proposal will include works to the public domain in order to improve the pedestrian, cycling and public transport connections to and from the site and enhance pedestrian and patron safety.

4.0 CONSULTATION WITH SYDNEY WATER AND MARRICKVILLE COUNCIL

A preliminary consultation was undertaken with Sydney Water (SW) to determine the assessment requirements for the SW infrastructure that is likely to be impacted by the proposed development. The SW requirements have been taken into account in developing a preliminary concept of the services for the proposed development. The preliminary advice letter provided by SW is presented in Appendix A.

A similar consultation was undertaken with Marrickville Council to address the hydrology issues related to the development.

In this regard the two relevant Council documents used to guide this assessment are:

- "Stormwater and On-site Detention Code" (16 February 1999); and
- Development Control Plan (DCP) 32 "Energy Smart Water Wise" (5 November 2001).

Various hydrologic requirements presented in the above documents were addressed in assessing the impact of the proposed development.

5.0 INFRASTRUCTURE ASSESSMENT

The proposed expansion is likely to impact on the following SW infrastructure:

- Stormwater culvert under the existing shopping centre and the industrial building to the south (proposed location for the new building for the shopping centre);
- Sewer network; and
- Water supply network.

The potential impact on this infrastructure is from the following two scenarios:

- *Impact from Physical Building Works* – where infrastructure physically "conflicts" with the proposed development, mechanical protection and / or diversion will be required to avoid damage and enable on-going maintenance / integrity; and
- *Impact from Additional Demand or Loading on the Utility* – an increase in use on the site can lead to additional demand on stormwater, sewer and water infrastructure. This may result in SW requiring augmentation of the service to suit future demands of the proposed development (and surrounding

area). In addition Development Servicing Plan charges are generally applicable to new developments of this scale, to account for costs of on-going maintenance and upgrade of the local SW infrastructure.

The investigation work to undertake infrastructure assessment has included:

- Initial site inspection
- Assessment of available site survey data
- Review of Sydney Water asset records and utility plans
- Consultation and Feasibility Assessment with Sydney Water
- Coordination with stormwater drainage and flood assessments

Details of the assessment are presented below:

5.1 Existing Sydney Water Infrastructure

Appendix B provides a plan, which is an output from Sydney Water Hydra records. This plan provides the location of all recorded SW assets in the area of the proposed development. The following key assets have been identified, in relation to the respective development areas.

5.1.1 Existing Retail Centre (Victoria Road)

The following infrastructure services the existing retail centre:

- A stormwater drainage culvert (approx. 2.4m wide x 1.0m high) traverses north-south directly through the eastern portion of the site.
- Main trunk sewerage is located within the eastern boundary of the existing Marrickville Metro Retail Centre site. It diverts from the old alignment within the Victoria Road road reserve (draining east) and re-connects (draining west) within the Smidmore Street road reserve. The system comprises DN300 vitreous clay pipes.
- Water supply surrounds the site within Victoria Road, Murray Street and Smidmore Street. The system comprises DN150 water mains (DICL and uPVC).

5.1.2 Shopping Centre Addition Site (Edinburgh Road)

The following infrastructure services the proposed site for the new development on Edinburgh Road:

- A stormwater drainage culvert (approx. 2.4m wide x 1.0m high) traverses north-south generally through the middle of the site.
- Main trunk sewerage, passing around the existing Retail Centre (upstream), continues directly through the middle of the proposed development site. It is located parallel, and directly west of the stormwater drainage culvert. This main remains as a DN300 vitreous clay pipe.
- A DN225 sewer sideline connects to the main DN300 trunk sewer mid-way through the site from the western side. This sideline services the properties on the western side of the Edinburgh Road block.
- A DN225 sewer sideline connects to the main DN300 trunk sewer mid-way through the site from the eastern side. This services properties on the eastern side of the Edinburgh Road block and properties upstream to the intersection of Edgeware Road and Victoria Road.
- Water supply is located within Smidmore Road and Edinburgh Road. This system comprises DN150 water mains (CICL and DICL).

5.2 Proposed Development

The proposal constitutes new building work at the following locations:

- The existing Marrickville Metro Retail Centre site;
- Smidmore Street - building link and plaza area; and
- The street block bounded by Smidmore Street (north), Murray Street (east) and Edinburgh Road (south and west) – Shopping Centre Addition site.

5.2.1 Development over Existing Sydney Water Infrastructure

The following components of SW infrastructure have been identified to traverse portions of the proposed development areas.

- Stormwater Drainage Culvert in Existing Retail Centre Site
- Sewer Mains in Smidmore Street and the Shopping Centre Addition Site
- Water Mains in Smidmore Street
- Stormwater Drainage Culvert in Smidmore Street and the Shopping Centre Addition Site

5.3 Recommendations

The following considerations would be required for the respective components of SW infrastructure traversing the proposed development. These recommendations are based on the outcomes of a preliminary assessment of infrastructure and consultation with SW.

5.3.1 Stormwater Drainage Culvert within Existing Retail Centre Site

New building construction works in vicinity of the culvert will be subject to restrictions to building over and / or adjacent. Generally, this will limit filling in the vicinity of the culvert and require no structures or heavy machinery being used within the structural 'zone of influence' of the culvert – including piering to a minimum of 0.3m below the invert of the culvert.

We understand that all treatments with respect to structural integrity and flow capacity of the culvert passing through the existing retail centre site have been addressed as part of the previous development on the site.

5.3.2 Sewer mains within Smidmore Street and the Shopping Centre Addition Site

The existing sewer main should be diverted to be located outside proposed building areas. This includes providing existing mains connections outside the building area (i.e. for the existing eastern side-line from Edgeware / Victoria Road). A concept scheme for this is attached in Appendix C.

5.3.3 Water Mains within Smidmore Street

The existing water main within Smidmore Street should be terminated ('capped') either side of new construction to avoid potential need for an easement (refer Appendix C). In general it appears the SW network incorporates sufficient ring systems to enable this, while still maintaining redundancy in the local supply network.

5.3.4 Stormwater Drainage Culvert in Smidmore Street and the Shopping Centre Addition Site

The existing stormwater drainage culvert needs to have integrity for the life of the new building over. On this basis, the culvert will require dilapidation survey to assess the current condition and determine any rectification works necessary to achieve this. Consideration should also be given to providing points for access directly upstream and downstream of the proposed building.

New building construction works in vicinity of the culvert will be subject to restrictions imposed by Sydney Water "General Requirements for Building Adjacent to Stormwater Channel". Generally, this will limit filling in vicinity of the culvert and require no heavy machinery or structure within the 'zone of influence' of the culvert – including piering to a minimum of 0.3m below the invert of the culvert.

It should be noted that final requirements for treatment of SW infrastructure will be subject to determination by SW via a formal Section 73 Application initiated by the Conditions of Development Consent. This will include final advice on augmentation requirements of services to suit future demands of the proposed development (and surrounding area). The need for this has not been identified by SW at this stage. In addition, the Development Servicing Plan charges are generally applicable to new developments of this scale. These charges account for costs of on-going maintenance and upgrade of the local SW system.

6.0 HYDROLOGY ASSESSMENT

The hydrology assessment was undertaken to address the flooding and stormwater issues related to the proposed development. The analysis also included identification of Water Sensitive Urban Design (WSUD) measures to improve the stormwater runoff quality from the proposed development.

6.1 Flooding Assessment

The proposed development lies within a flood prone area in Marrickville LGA. The impact of the proposed development on existing flood behaviour was assessed as per the guidelines provided in Floodplain Development Manual (2005). The impact has been assessed in terms of change in existing flood levels and hydraulic hazard in the catchment. Measures have also been identified to decrease the existing flood risk at the current Marrickville Metro site.

6.1.1 Existing Infrastructure and Flood Behaviour

Marrickville Metro lies in the EC East Subcatchment, which is one of the catchment management areas designated by Marrickville Council within the Local Government Area. Development in the catchment consists of high-density residential terrace-housing, with very few free-standing homes. Sydney Water drainage infrastructure carries the floodwaters through the catchment, which ultimately discharges into the Eastern Channel. Figure 1 shows the layout of the catchment and major drainage lines relevant to the study area.

The major components of the drainage lines include pipe culverts along Murray Street and an open channel downstream of Edgeware Road and Alice Street intersection (Figure 1). Major diversion works have been carried out in the past to divert flow from the open channel into the pipe culverts near the Edgeware Road/Alice Street intersection. All piped drainage upstream of this location that used to discharge in to the open channel is now carried by the pipe culverts, which ultimately discharge to the Eastern Channel. This diversion has effectively reduced the size of the catchment that drains to the Marrickville Metro to a small local catchment between Edgeware Road/Alice Street intersection to Victoria Road. Consequently, the flooding associated with the main channel and SW culvert under the Marrickville Metro has reduced significantly.

The Edgeware Road/Alison Street intersection is a natural low point and in flood events of 2 year ARI and above, all surface overland flow from the upstream catchment arrives at this location. Part of this ponded water enters the open channel and drains towards the Marrickville Metro. However, majority of the flow is carried down Edgeware Road and then on to Victoria Road.

The street drainage at the intersection of Llewelllyn Street, Alice Street and Edgeware Road also discharges into the open channel. This channel is closed under the Marrickville Metro and continues as such further downstream under the industrial building (location of the proposed new building). It ultimately discharges to an open channel (a tributary of Eastern Channel) near Sydney Steel Road.

A significant flow also travels along Victoria Road from the west and arrives at the low point on this road opposite the Marrickville Metro entrance. In addition some of the flow along Murray Street also diverts into Victoria Road from the east. Lastly, overtopping of the open channel at Victoria Road also contributes to flooding at that location. The ponded water at the low point overtops the street kerb in front of the Marrickville

Metro and runs down to the open area in front of the Marrickville Metro entrance. This overtopping flow from Victoria Street starts at a 2 year ARI event.

Smidmore Road has a raised elevation near the entrance to the Marrickville Metro. In a 100 year event, the floodwaters enter Smidmore Road from both east and west but generally pond in the street, without creating a flow/path between Murray Street and Edinburgh Road.

6.1.2 Model Update

A two-dimensional TUFLOW hydraulic model of the catchment has been prepared as part of the Eastern Channel East Subcatchment Management Plan (Golder, 2010) for Marrickville Council. The model is based on an Aerial Laser Scanning (ALS) elevation dataset. Residential and commercial premises within the catchment were represented in the model by raising the elevation of those land parcels approximately 5 m above ground level. Where applicable, stand-alone buildings and current open areas were considered separately.

The elevation dataset of the model was updated in the vicinity of the site using new survey obtained as part of this study (William L. Backhouse, 2010). The purpose of the new survey was to improve geometric definition of the model in the vicinity of the proposed development. The new survey consisted of road crown levels, kerb and gutter levels, as well as levels along property boundaries. Spot elevation heights were also obtained in open areas where existing definition required supplementary information. Level information was also obtained for the Smidmore St property and consisted of footpath and wall heights.

Following update of the geometry of the model, the 2 y and 100 y Average Recurrence Interval (ARI) design flood events were modelled considering the 30 min and 60 min storm events (critical duration for the site). The reported modelled flood depths are the maximum of these two storm events.

Figures 3a and 3b present the modelled maximum flood depth for the 2 y and 100 y ARI design flood events. Figures 4a and 4b present the modelled maximum provisional flood hazard for the 2 y and 100 y ARI design flood events.

6.1.3 Modelling of Proposed Development

The proposed development was incorporated into the model by blocking out the proposed building footprint to reflect the plaza component of the development along Smidmore St as well as the receiving dock on Smidmore St and Murray St. The extent of the proposed development and the location of the two existing delivery dock areas are shown in Figure 2.

The hydraulic model was then executed for the 2 y and 100 y design flood events using the 30 min and 60 min storm events. The difference in modelled flood depth and provisional flood hazard between existing conditions and the proposed development was then calculated.

6.1.4 Impact of Proposed Development

Figure 5 presents the change to modelled maximum flood depth for the 2 y and 100 y design flood events as a result of the proposed development. Figure 6 presents the change to modelled provisional flood hazard for the 2 y and 100 y design flood events.

From Figure 5, the modelled increase in flood depth in the 2 y and 100 y design flood events is less than 5 cm in the vicinity of the site, except for a very small area at the corner of Victoria Road and Murray St where the predicted increase in flood depth is more than 10 cm in the 100 y event.

From Figure 6, there is no change in modelled provisional flood hazard in the 2 y or the 100 y events.

6.1.5 Existing Capacity of the Channel under the Proposed Development

As discussed above, the Sydney Water culvert (circa 1911) that runs under Marrickville Metro consists of a covered channel (6'6'' wide by 3'3'' tall). Below Smidmore St, the channel is slightly wider (7'9'' wide by 3'3'' tall) to Edinburgh Road. That culvert then continues to Eastern Channel.

Hydraulic analysis, as reported in Golder (2010), indicates that the upper portion of this culvert does not flow full in the 10 y ARI design flood event. However, it does flow full in the 100 y event. The level of service of the upper portion of this culvert is therefore between 10 y and 100 y ARI. For the lower portion of this culvert, below Smidmore St, analysis indicates that it flows full in the 5 y event and above. The level of service of this part of the culvert is therefore between 2 y and 5 y ARI. Surface topography in the vicinity of the lower portion of the culvert, however, is flat and the low level of culvert service reflects impact of downstream levels within Eastern Channel.

As discussed in Section 6.1.1 the flow from majority of the catchment that drained to this culvert has been diverted in to pipe culverts laid under the Murray Street. As such any enhancement of the culvert under Marrickville Metro is not likely to provide significant flood mitigating benefits.

6.1.6 Improvement to Existing Flood Risk

The existing Marrickville Metro is affected by flooding from the Victoria Street entrance. Various options were identified to address the flood risk and hydraulic modelling undertaken to assess the impact of these options.

Initially, it was assumed that the flows up to the 100 year ARI flood event could be blocked from entering the Marrickville Metro and a model run was undertaken to assess its impact on the neighbouring properties. The model results indicated that such an arrangement would adversely impact on the neighbouring properties by increasing the flood levels. Hence this was not an acceptable solution.

To minimise the impact on the neighbouring properties it was estimated that the improvement in the flood risk may only be possible for a small magnitude event and hence a second model simulation was carried out to determine the impact of preventing flooding of the Marrickville Metro in a 2 y ARI event. This involved a minor increase in ground elevation (5 to 10 cm) of the footpath along Victoria Road to prevent overtopping during this flooding event.

Figure 7 presents the change in modelled maximum flood depth for the 2 y and 100 y design flood event as a result of the proposed development as well as the minor increase of ground elevation of the footpath along Victoria Road. Figure 8 presents the change to modelled provisional flood hazard for these same design events.

From Figure 7, the modelled increases in flood depths in the 2 y and 100 y design flood events are less than 5 cm in the vicinity of the site, again except for a very small area at the corner of Victoria Road and Murray St, where the predicted increase in flood depth is more than 10 cm in the 100 y event.

From Figure 8, there is no change in modelled provisional flood hazard in the 2 y or the 100 y events.

Hence the flood risk for the existing Marrickville Metro can only be improved to a 2 yr ARI event, without impacting the neighbouring properties.

Another option for flood risk improvement was identified by the Council during discussions. This option requires an overland flowpath along Victoria Street at the northern boundary of Marrickville Metro to convey the ponded water at the low point on Victoria Street eastward on to Murray Street. A preliminary investigation of this option indicated that it may not be feasible to construct a flowpath due to the constraints imposed by heritage listed wall and pavement (Graham Brooks, 2010) that exist along the northern boundary of Marrickville Metro. In addition there are services present along the flowpath and it may not be feasible to excavate to provide appropriate grades for the flowpath.

6.1.7 Recommended Floor Levels

The recommended floor levels were determined from the model simulation of the critical duration 100 y event, incorporating the proposed development and the proposed minor improvement works along Victoria Road. Figure 9 presents the recommended flood levels at various locations around the development. It is noted that a freeboard of 500 mm has been added to the recommended levels, consistent with Council's Flood Policy.

- Recommended floor level for Smidmore St Building (New Building) is greater than or equal to 5.90 mAHD
- Recommended floor level for Plaza (New Building) is greater than or equal to 5.90 mAHD
- Recommended floor level for Loading Dock 3 (Existing Building) is greater than or equal to 6.40 mAHD
- Recommended floor level for Loading Dock 1 (Smidmore St Building) is greater than or equal to 5.75 mAHD
- Recommended floor level for Service Dock 2 (On Smidmore St, New Building) is greater than or equal to 5.75 mAHD

The proposed floor level for the new building and plaza on Smidmore Street is 5.9 m AHD and therefore complies with the above requirements.

Critical infrastructure such as Electrical Substations and Electrical Control Rooms may require a higher level of protection.

6.1.8 Flooding of the Dock Areas

Modelled flood behaviour is discussed with respect to each of the dock areas.

Loading Dock 3 (Existing Building)

Modelled 100 y flood height at entrance to Loading Dock 3 is 5.87 mAHD. At the driveway entrance to the dock area there is a ramp commencing at 6.0 mAHD, rising to 6.6 mAHD. Modelled flood height including freeboard (6.40 mAHD) is less than proposed ground level at the top of the ramp. Therefore the driveway entrance to the dock area may be subject to ponded water in a 100 y event but the inner dock should remain flood free.

Floor level of the existing building is 6.6 mAHD, therefore potential refuge areas are available for employees whom happen to be working in the dock area at the time should the inner dock become flooded by another mechanism.

Loading Dock 1 (New Building)

Modelled 100 y flood height at entrance to Loading Dock 1 is 5.25 m AHD. At the driveway entrance to the dock there is a ramp commencing at elevation of 4.8 mAHD, rising to a maximum of 5.9 m AHD, being the proposed floor level for the Smidmore St (new) building. Modelled flood height, including freeboard, is 5.75 m AHD, therefore ponded water in the dock area (including freeboard) will range in depth from 0 cm inside the dock to 95 cm near the entrance.

Floor level of the Smidmore St building is 5.9 mAHD, therefore potential refuge is available for employees whom happen to be working in the dock area at the time.

Service Dock 2 (New Building)

Modelled 100 y flood height is 5.21 mAHD at entrance to Service Dock 2. Recommended floor level at this location is 5.75 mAHD incorporating 500 mm freeboard. A ramp to the Level 1 car park is located adjacent to this dock area, therefore a potential refuge area exists for employees whom happen to be working in that dock at the time.

7.0 WATER SENSITIVE URBAN DESIGN

Urban developments have significant impact on the local water cycle. WSUD principles provide the framework to implement measures for integrated urban water cycle management, which includes water supply, sewerage and stormwater management.

A number of measures have been identified for the proposed development to minimise its impact on the water environment. Various WSUD measures that are likely to fulfil SW and Marrickville Council requirements are discussed below:

7.1 On-site Detention

The purpose of on-site detention (OSD) is to maintain the stormwater discharge from the site to the pre-development conditions and minimise impacts on the downstream environment. The proposed development is located at the downstream end of a local catchment in the eastern parts of the Marrickville Local Government Area (LGA). The area surrounding the development is flood prone and has flooding depths of up to approximately1 m in a 100 year ARI event. As a general principle, provision of OSD is not warranted for such locations in a catchment. As an example, Wollongong City Council does not require an OSD for a development that lies within the 5 yr ARI flood extent or lies in the lower reaches of the catchment (Wollongong DCP 2009).

The change in the pre and post development landuse determines the size of the OSD for the site. The proposed development would be constructed on an existing industrial site, which is completely impervious. As such the proposed development, which has a lower level of imperviousness than the current conditions, would not generate additional stormwater runoff. Therefore, in principle, OSD is not required for the proposed development. Again, Wollongong City Council does not require an OSD where there is no change in the impervious areas.

In light of the above, provision of an OSD may not provide significant benefit and therefore not warranted for the proposed development.

7.2 Stormwater Quality Improvement

The majority of the runoff from the proposed development would originate from the car park provided at the roof of the new building. The possible contaminants are suspended solids, hydrocarbons and other trace elements such as zinc, copper and lead. Treatment of hydrocarbons would be of primary concern for the proposed development.

A low quantity of hydrocarbons can be treated in vegetated swales by continuous biological breakdown in the soils, without impacting the plants. However, given the size of the car park, it is likely that the load of hydrocarbons may not be treatable with vegetated swales alone and this may require more advanced treatment such as oil separators.

The proposed development incorporates some landscaped areas around the development. These areas would provide opportunity to treat the site runoff through bio-retention swales. Potential locations of bioswales are shown in the Landscape Design Package prepared by Site Image, Landscape Architects. These bioswales would need to be approved as part of the landscape design.

A detailed concept design for the treatment train required for improving the stormwater quality would be undertaken before seeking the construction certificate. In this regard, the relevant SW and Marrickville Council requirements for stormwater quality improvement would be taken into account.

7.3 Water Re-use

The stormwater runoff from the site can potentially be captured and re-used on-site.. This can include irrigation of landscaped areas, hosing of hard areas and possibly toilet flushing. However, given the quality of runoff (discussed above), treatment measures would be provided to achieve the desired quality. In addition, storage would also be provided to meet demand for various uses on site.

Another possible source for water re-use is the greywater generated on site. Preliminary estimates are that greywater could be available for re-use within the proposed development. Further assessment of this re-use option would be undertaken at a later stage.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the study results, the following conclusions can be drawn regarding the impact of the proposed development:

1) There is an insignificant impact on the existing flood levels due to the proposed development.

2) There is no change in the existing flood hazard due to the proposed development.

3) By raising the spill level (footpath level) along Victoria Street by 5-10 cm, the flooding of the existing low area near the entrance of Marrickville Metro can be prevented from a 2 yr ARI event. This can be achieved with insignificant impact on the surrounding properties.

4) The current culvert under the new building on Edinburgh Road can carry flow for approximately a 5 yr ARI event. Any augmentation of this culvert is likely to provide only a minor benefit due to the impact of other hydraulic controls (flat slope and backwater effect) in the drainage system.

5) The proposed levels for the dock within the existing building would provide an appropriate flood safety for a 100 yr ARI event. The proposed levels for the dock within the new building would allow floodwaters to enter the dock in a 100 yr ARI event. However the hazard within the dock would be low. In addition, refuge areas would be available within the dock for employees working in this managed area.

6) An OSD for the proposed development is likely to provide limited benefit due to various reasons as discussed in the report. Therefore the provision of an OSD is not warranted.

7) The landscaped areas provide opportunity to improve the stormwater quality runoff generated from the site.

8) Rainwater re-use is proposed for this development.

The following recommendations are made for establishing floor levels for the proposed development.

1) The proposed floor level for the new building on Edinburgh Road is 5.9 mAHD. This level provides a freeboard of 500 mm above the 100 yr ARI event

2) The other recommended floor levels are

   a. Plaza (New Building) - 5.90 mAHD

   b. Loading Dock 3 (Existing Building) - 6.40 mAHD

   c. Loading Dock 1 (Smidmore St Building) - 5.75 mAHD

   d. Service Dock 2 (On Smidmore St, New Building) - 5.75 mAHD

9.0 QUALIFICATIONS

This report has been prepared for AMP Capital Pty Ltd for supporting the Concept Plan of Marrickville Metro Shopping Centre Extension as a component of Part 3A application to Department of Planning. The report is subject to following qualifications:

- Update of the elevation dataset within the model was based on survey information supplied by William L. Backhouse Pty Ltd (reference no. CH4331 RevB.dwg dated 14 April 2010.

- Proposed development footprint based on Drawing EA006 as provided by BLL (reference SK028.DWG received 27 April 2010).

- Proposed levels in Loading Dock 3 and Loading Dock 1 based on drawings provided by BLL (reference SK300 and SK305 received 30 April 2010).

- Pit and pipe information in the model is based on data supplied by Marrickville Council (issued to Golder Associates on 12 January 2009). Independent survey of relevant structures was not provided by BLL.
- Preliminary assessment has been carried out to identify the flood risk to existing shopping centre. Flood management measures have been proposed to alleviate some of this risk. A comprehensive flood risk assessment for the existing shopping centre has not been undertaken in this report nor have measures been identified to comprehensively manage this risk.

Further qualifications that apply to this report are presented in Appendix D.

References:

Golder Associates, 2010; "EC East Subcatchment Management Plan – DRAFT", A report prepared for Marrickville Council

Graham Brooks and Associates, 2010; "Marrickville Metro Shopping Centre – Concept Plan - Statement of Heritage Impact", A report prepared for AMP Capital Investors Pty Ltd

Report Signature Page

Habib Rehman
Principal Water Engineer

HR/LJ/hr

A.B.N. 64 006 107 857

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LEGEND

- Study Site
- Catchment Boundary

Note 1: Datum GDA94, Projection MGA94, Zone 56
Note 2: Image dated 20.01.2007 supplied by and sourced under license from Google Earth Pro on 07.05.2010.

Golder Associates

CLIENT	AMP Captial Investors Limited	PROJECT	MARRICKVILLE METRO
DRAWN	JRB	DATE	10-05-2010
CHECKED	HR*	DATE	10-05-2010
TITLE	SITE LOCATION AND CATCHMENT BOUNDARY		
SCALE	1:6,000	PROJECT No	107626036
FIGURE No	1	REV No	0
	A3		

File Location: R:\GIS_DATA\General\GIS_Templates\arcview\Copy of Arcview_93_Templates\A3_Portrait.mxt
Note: The * beside the typed initials denotes the original drawing issue was signed or initialled by that respective person.

Note. Downpipes from carpark area and top level of proposed buildings would be subejct to treatment before discharge into local drainage.

Golder Associates	CLIENT: AMP Captial Investors Limited		PROJECT: MARRICKVILLE METRO		
	DRAWN: JRB	DATE: 10-05-2010	TITLE: **PROPOSED DEVELOPMENT**		
	CHECKED: HR*	DATE: 10-05-2010			
	SCALE: 1:1,000		PROJECT No: 107626036	FIGURE No: 2	REV No: 0 A3

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Note: The * beside the typed initials denotes the original drawing issue was signed or initialled by that respective person.

MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM FLOOD DEPTH (m) EXISTING - 2 Y EVENT

LEGEND

Modelled Flood Depth (m)

- Up to 0.1 m
- 0.1 m to 0.2 m
- 0.2 m to 0.4 m
- 0.4 m to 1.0 m
- More than 1.0 m

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,527.11

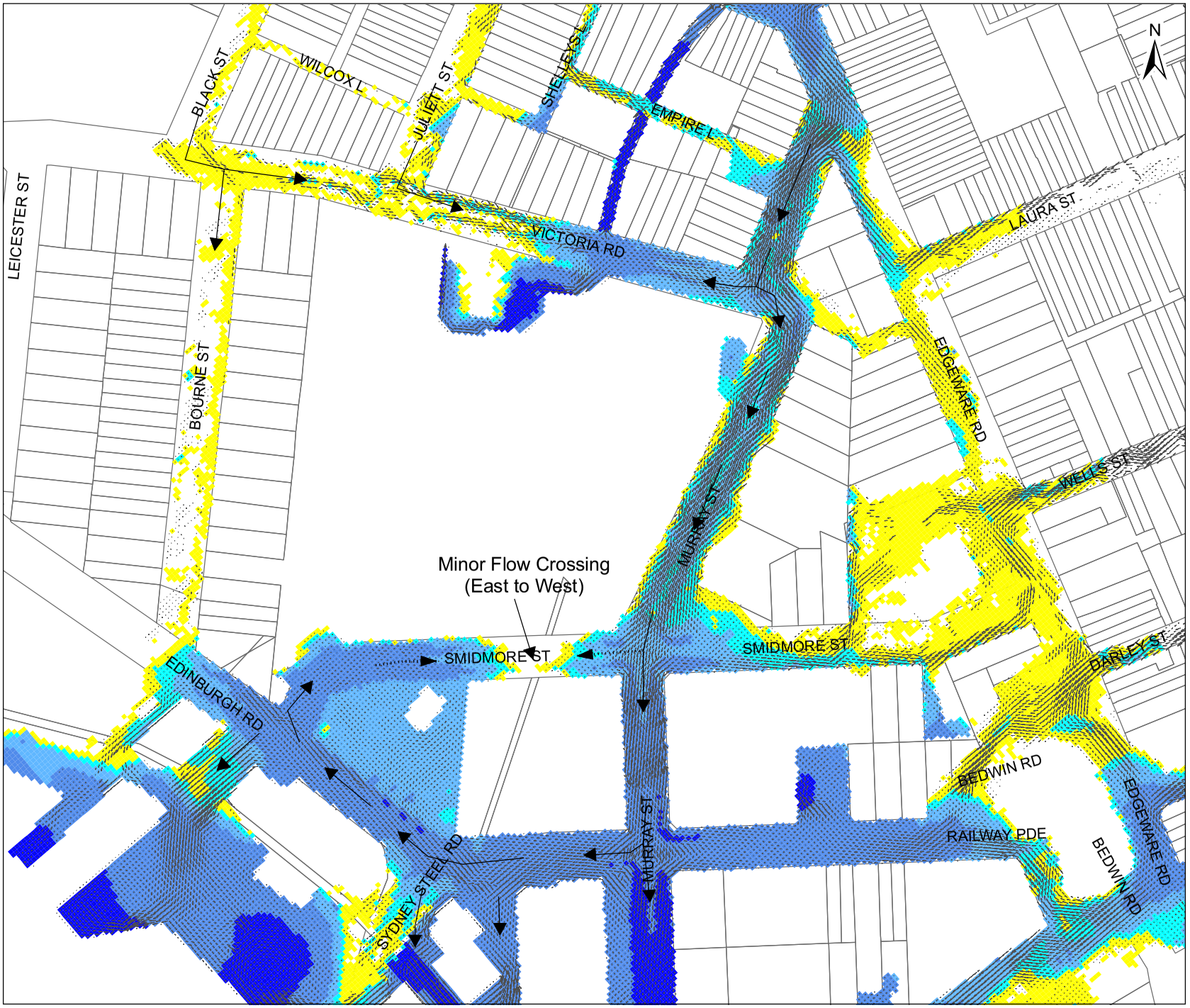
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **107626036**
DATE: **10 MAY 2010**
DRAWN: **JRB**
CHECKED: **HR**

FIGURE 3a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM FLOOD DEPTH (m) EXISTING - 100 Y EVENT

LEGEND

Modelled Flood Depth (m)

- Up to 0.1 m
- 0.1 m to 0.2 m
- 0.2 m to 0.4 m
- 0.4 m to 1.0 m
- More than 1.0 m

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,527.11

DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **107626036**
DATE: **10 MAY 2010**
DRAWN: **JRB**
CHECKED: **HR**

FIGURE 3b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\

MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM PROVISIONAL HAZARD EXISTING - 2 Y EVENT

LEGEND

Modelled Hazard

- Low
- Intermediate
- High

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

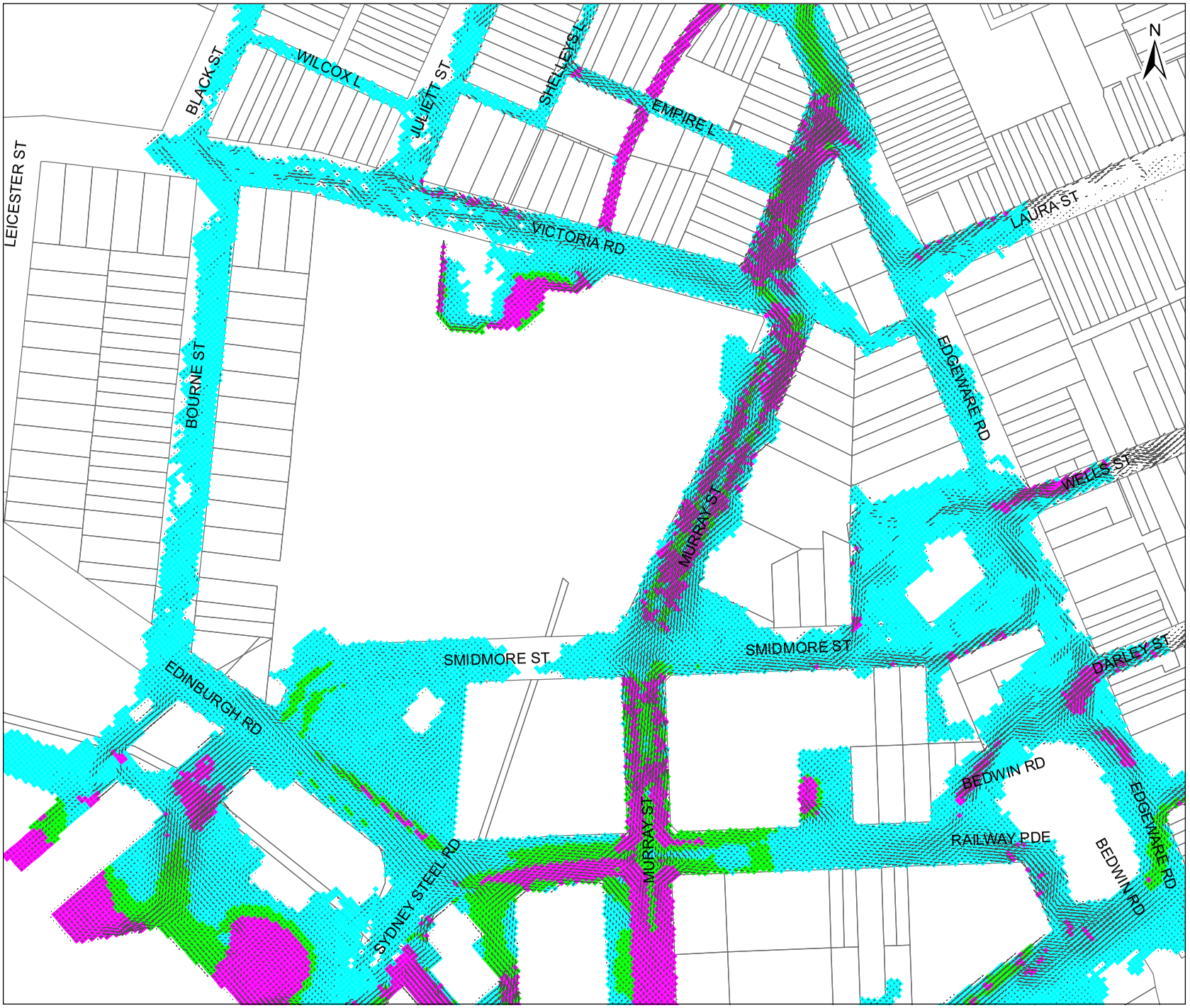
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 4a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM PROVISIONAL HAZARD EXISTING - 100 Y EVENT

LEGEND

Modelled Hazard

- Low
- Intermediate
- High

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

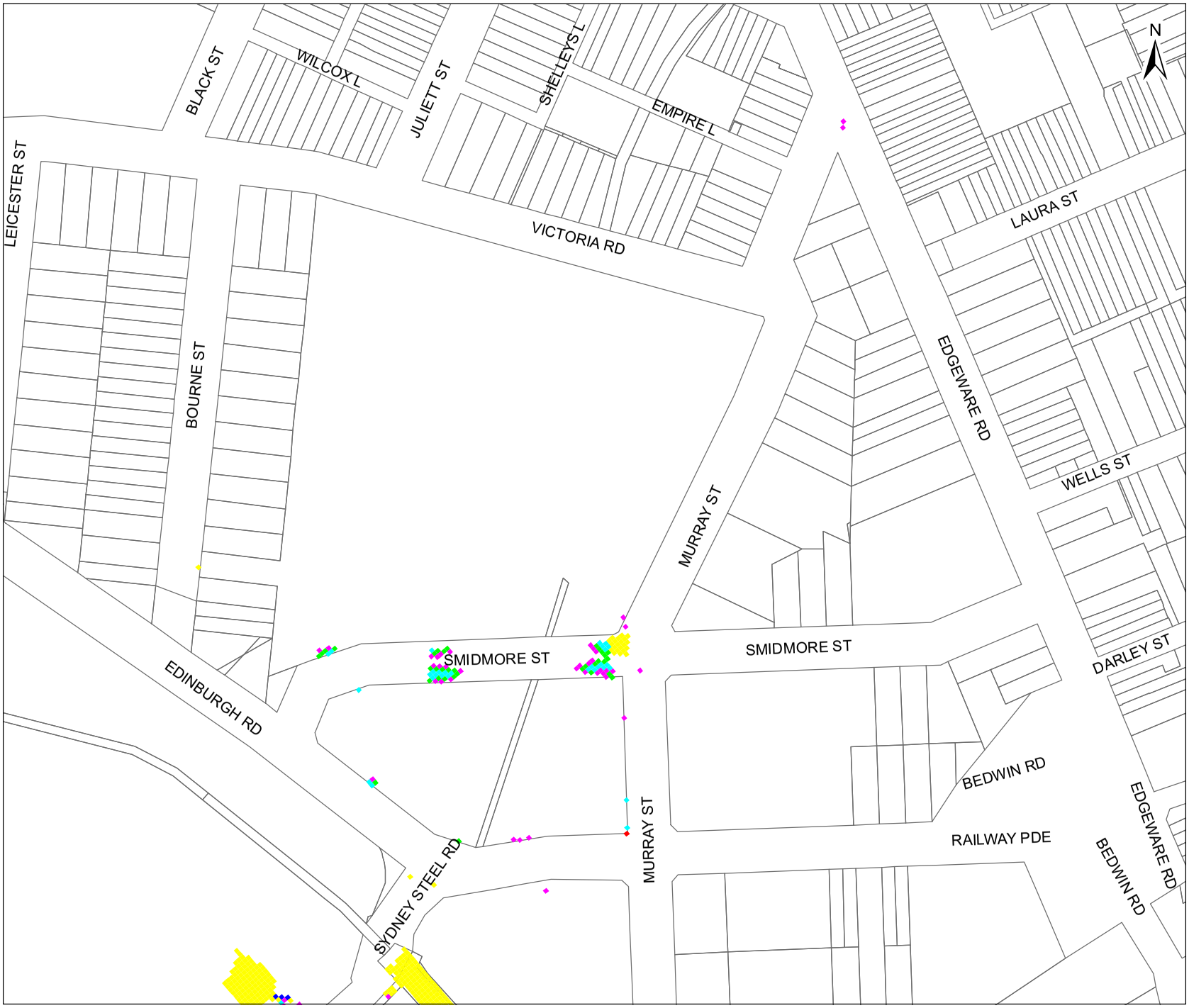
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 4b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD DEPTH 2 Y EVENT

LEGEND

Change to Depth (m)

- Less than -10 cm
- -10 cm to -5 cm
- -5 cm to -1 cm
- +1 cm to + 5 cm
- +5 cm to +10 cm
- More than +10 cm

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

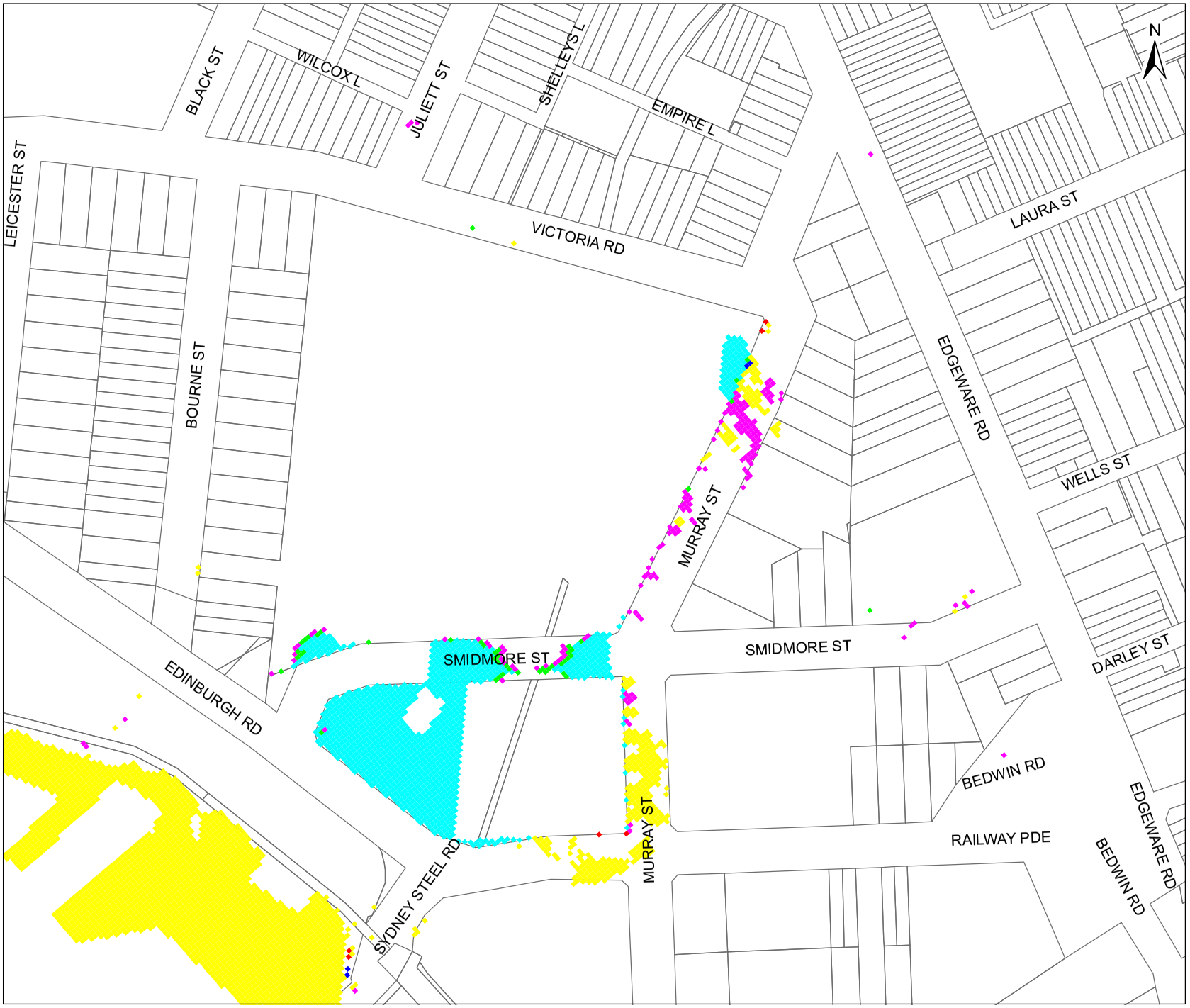
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 5a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD DEPTH 100 Y EVENT

LEGEND

Change to Depth (m)

- Less than -10 cm
- -10 cm to -5 cm
- -5 cm to -1 cm
- +1 cm to + 5 cm
- +5 cm to +10 cm
- More than +10 cm

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

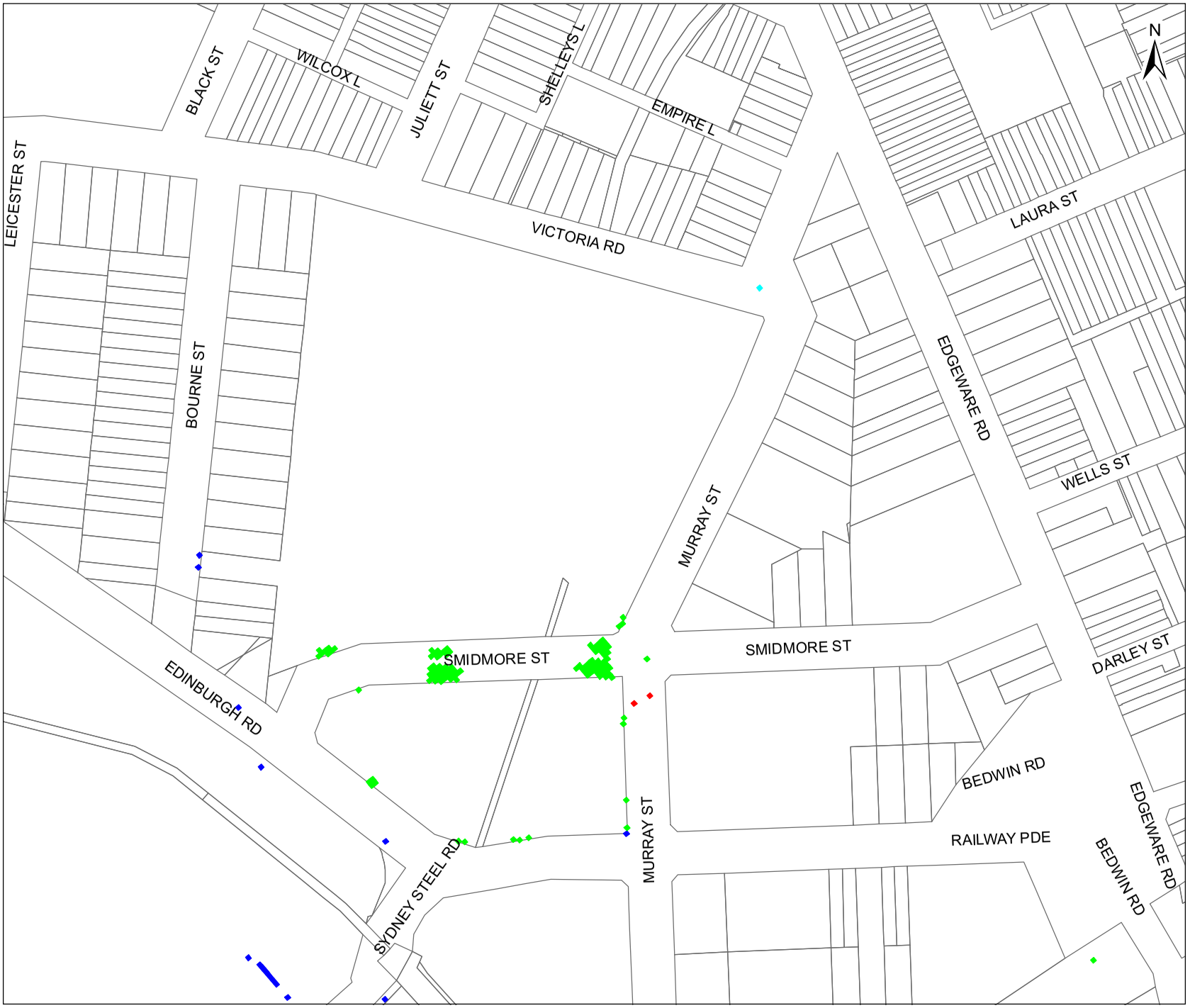
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **107626036**
DATE: **10 MAY 2010**
DRAWN: **JRB**
CHECKED: **HR**

FIGURE 5b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD HAZARD 2 Y EVENT

LEGEND

Change to Hazard

- <all other values>
- -3 Classes
- -2 Classes
- -1 Class
- +1 Class
- +2 Classes
- +3 Classes

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

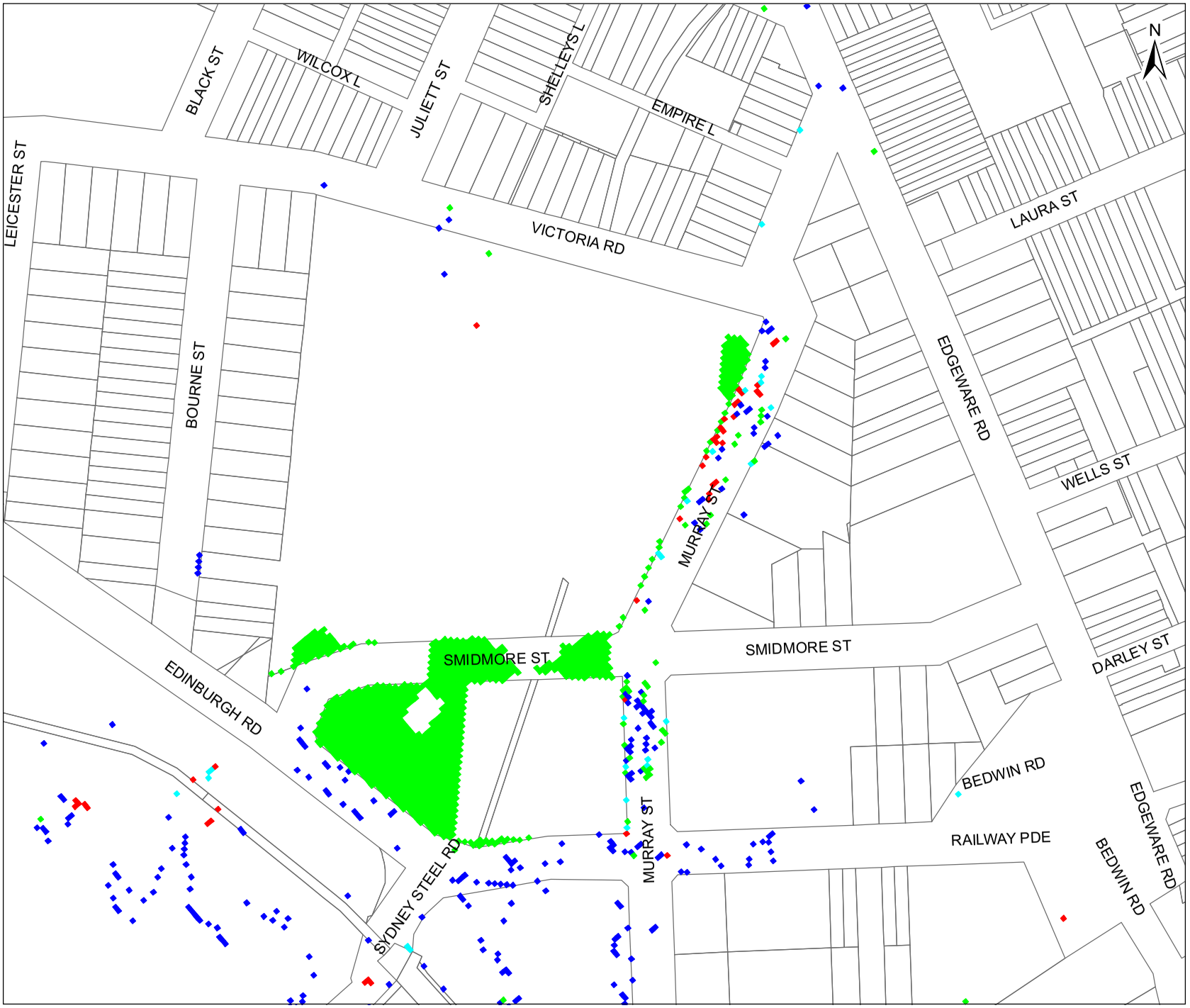
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **107626036**
DATE: **10 MAY 2010**
DRAWN: **JRB**
CHECKED: **HR**

FIGURE 6a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD HAZARD 100 Y EVENT

LEGEND

Change to Hazard

- -3 Classes
- -2 Classes
- -1 Class
- +1 Class
- +2 Classes
- +3 Classes

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

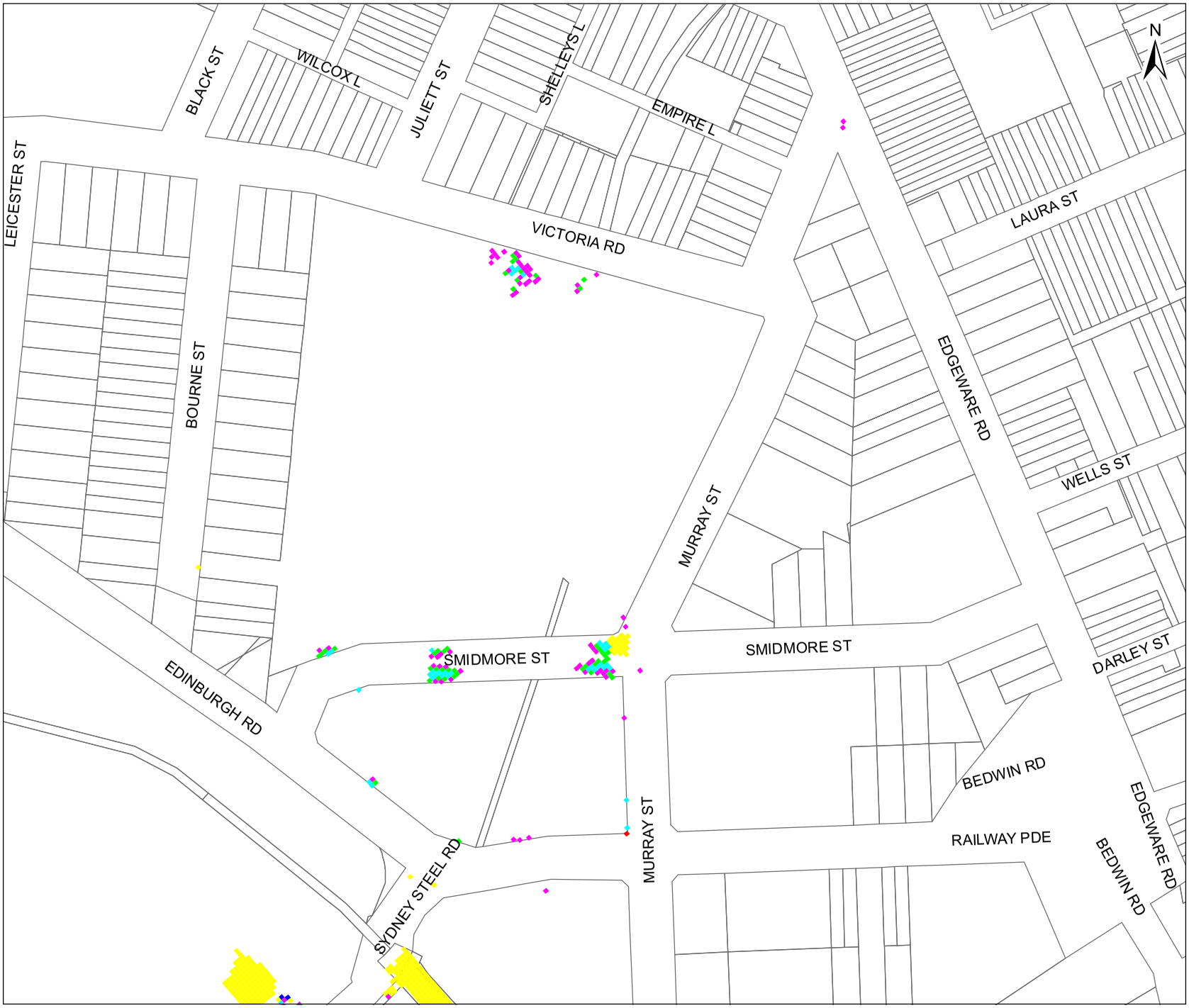
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 6b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD DEPTH VICTORIA ROAD 2 Y EVENT

LEGEND

Change to Depth (m)

- Less than -10 cm
- -10 cm to -5 cm
- -5 cm to -1 cm
- +1 cm to + 5 cm
- +5 cm to +10 cm
- More than +10 cm

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

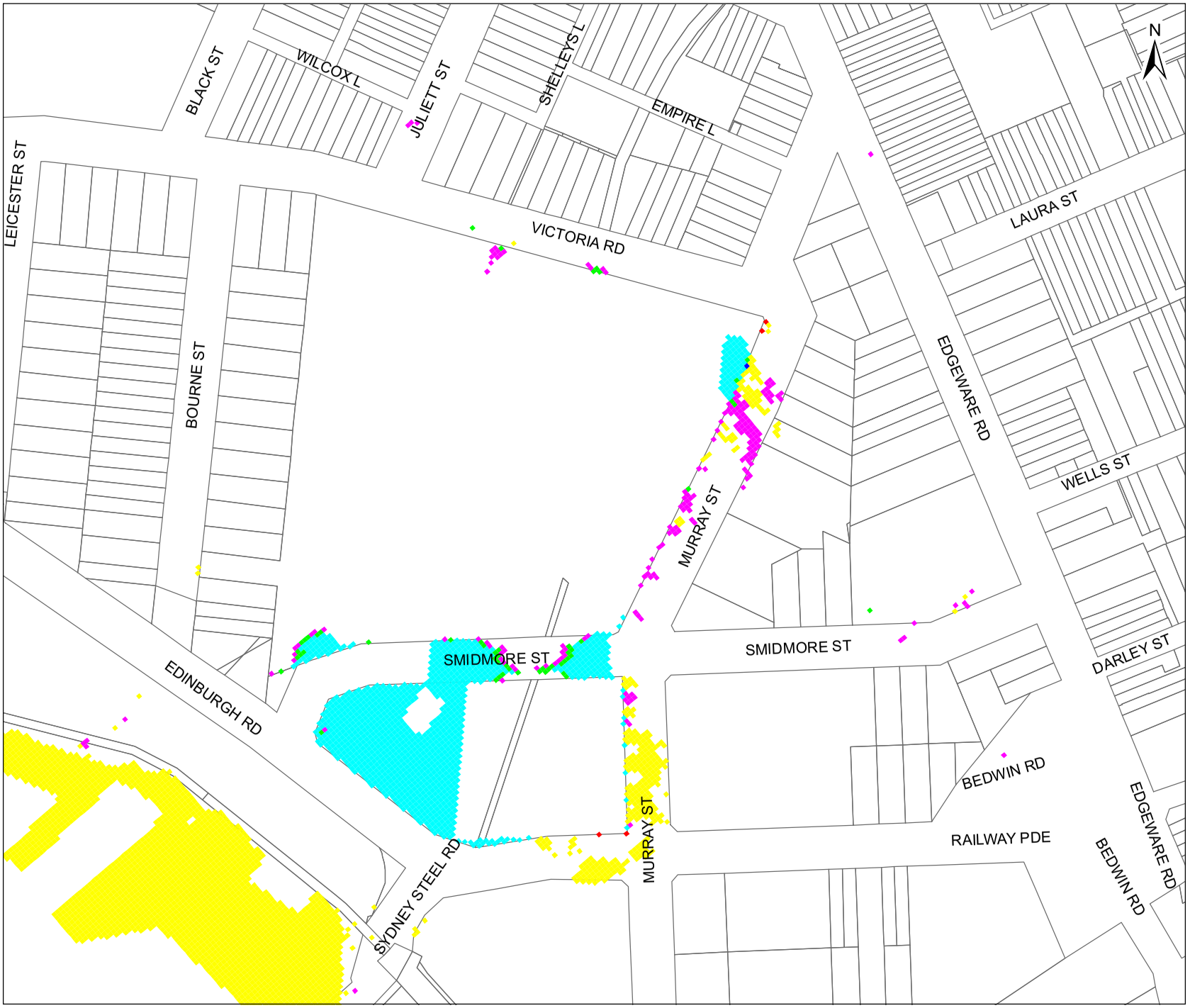
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **107626036**
DATE: **10 MAY 2010**
DRAWN: **JRB**
CHECKED: **HR**

FIGURE 7a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD DEPTH VICTORIA ROAD 100 Y EVENT

LEGEND

Change to Depth (m)

- Less than -10 cm
- -10 cm to -5 cm
- -5 cm to -1 cm
- +1 cm to + 5 cm
- +5 cm to +10 cm
- More than +10 cm

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

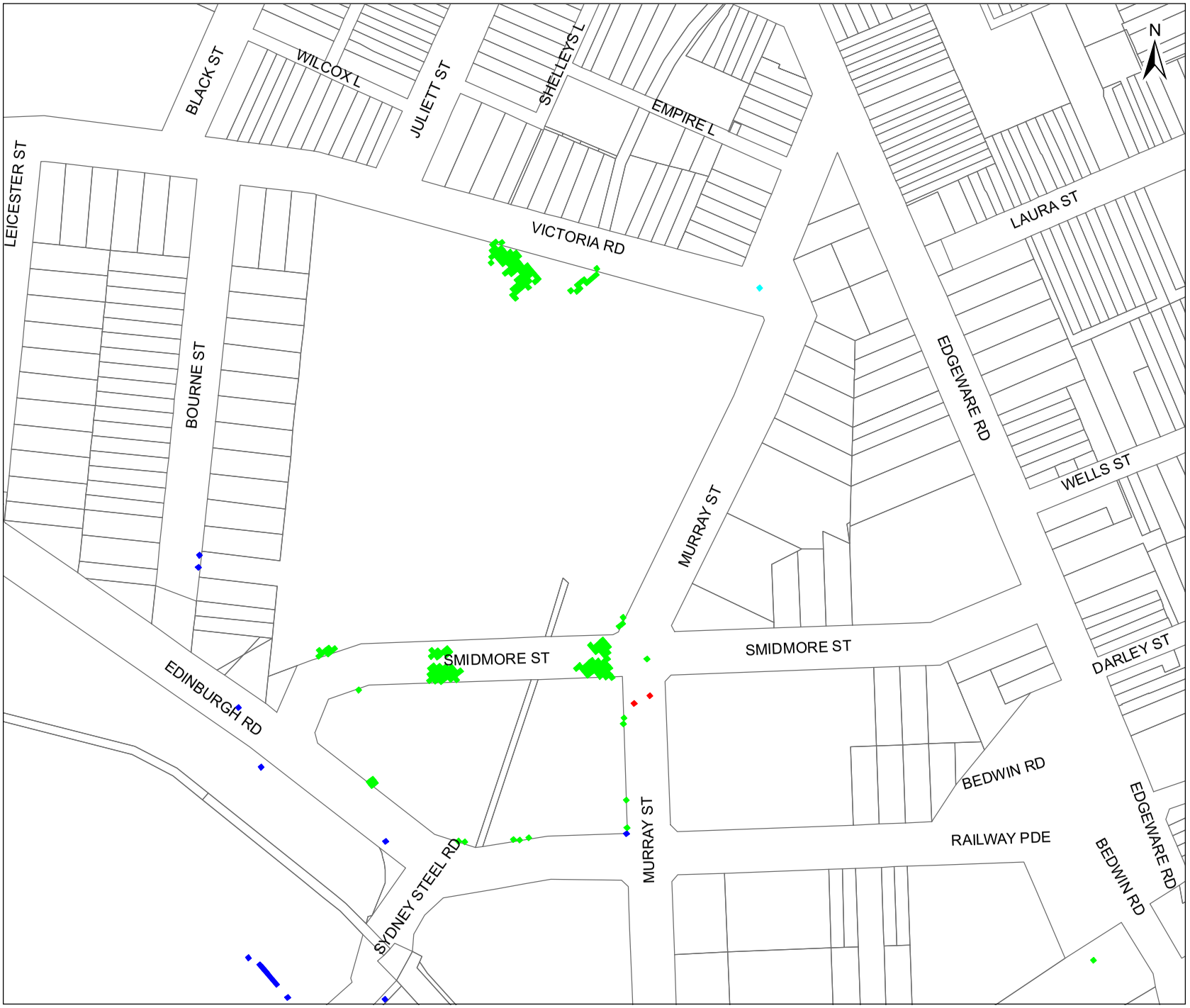
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 7b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD HAZARD VICTORIA ROAD 2 Y EVENT

LEGEND

Change to Hazard

- -3 Classes
- -2 Classes
- -1 Class
- +1 Class
- +2 Classes
- +3 Classes

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

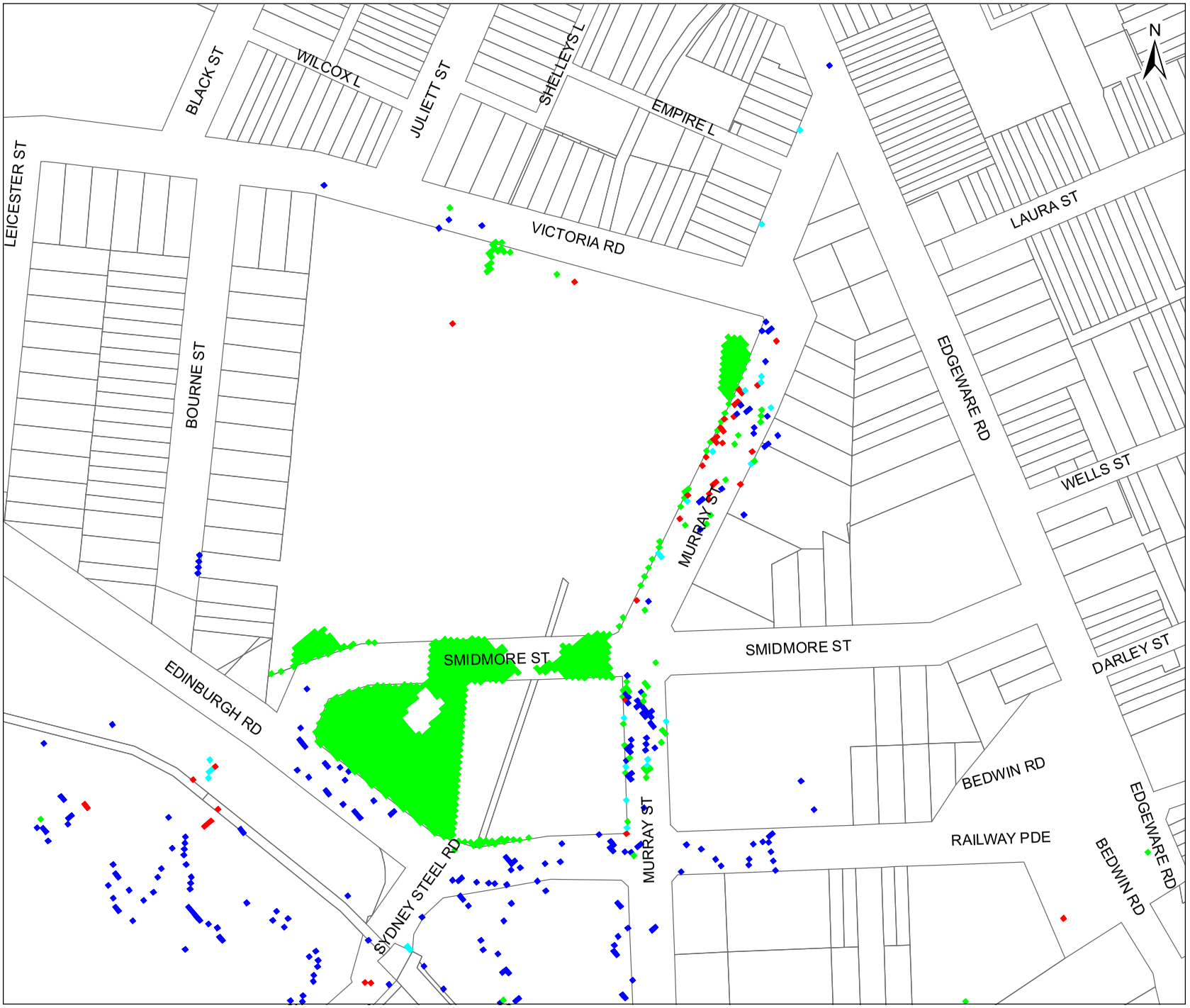
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: **107626036**
DATE: **10 MAY 2010**
DRAWN: **JRB**
CHECKED: **HR**

FIGURE 8a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED CHANGE TO FLOOD HAZARD VICTORIA ROAD 100 Y EVENT

LEGEND

Change to Hazard

- -3 Classes
- -2 Classes
- -1 Class
- +1 Class
- +2 Classes
- +3 Classes

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

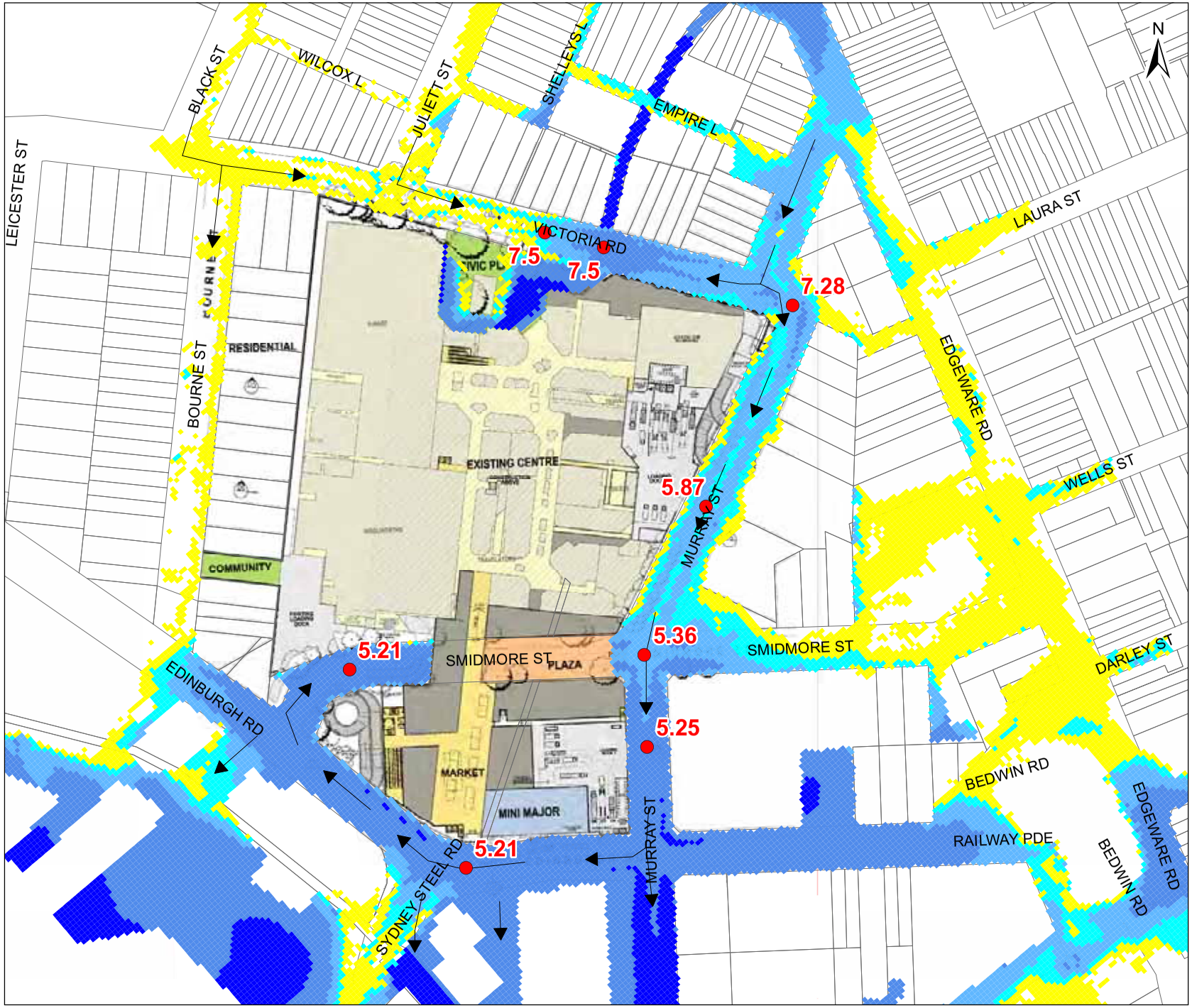
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 8b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM FLOOD HEIGHT (mAHD) DEVELOPED - 100 Y EVENT

LEGEND

- Modelled Height (mAHD)

Modelled Flood Depth (m)

- Up to 0.1 m
- 0.1 m to 0.2 m
- 0.2 m to 0.4 m
- 0.4 m to 1.0 m
- More than 1.0 m

NOTES

Preliminary information only.

0 5 10 20 30 40 50 metres

SCALE (at A4) 1:2,500

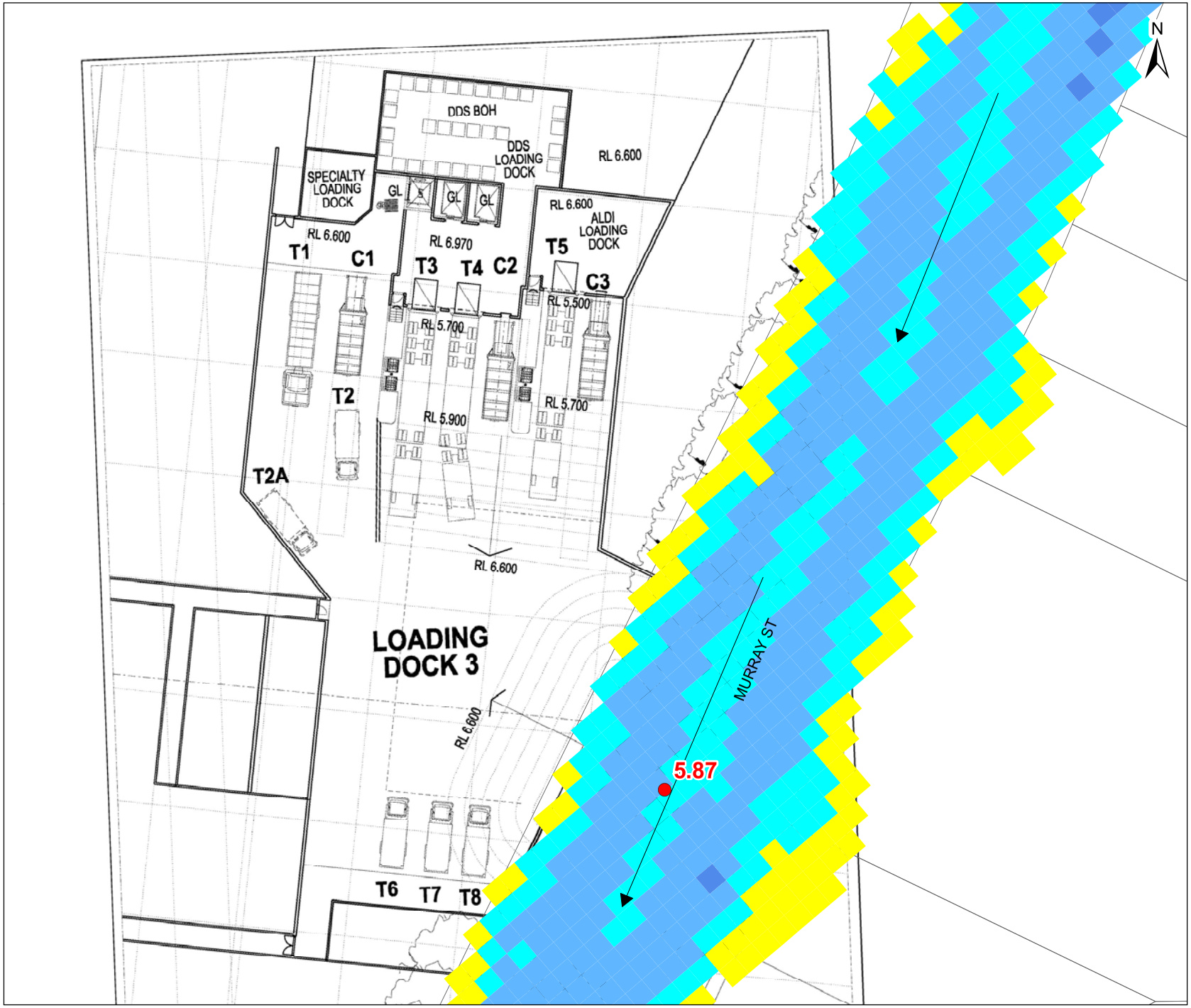
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 9a

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM FLOOD HEIGHT (mAHD) DEVELOPED - 100 Y EVENT

LEGEND

- Modelled Height (mAHD)

Modelled Flood Depth (m)

- Up to 0.1 m
- 0.1 m to 0.2 m
- 0.2 m to 0.4 m
- 0.4 m to 1.0 m
- More than 1.0 m

NOTES

Preliminary information only.

0 1 2 4 6 8 10 metres

SCALE (at A4) 1:500

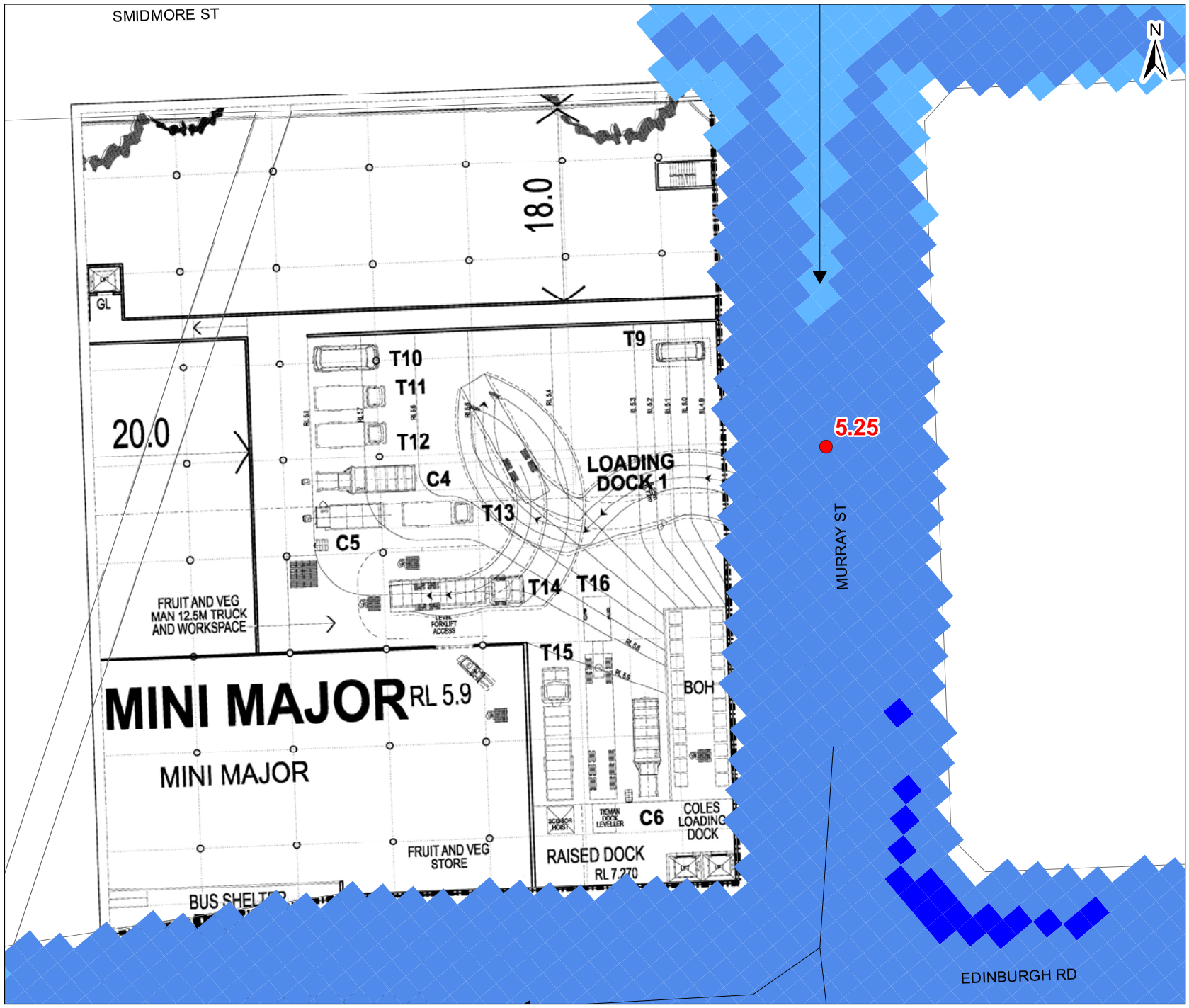
DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 9b

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\



MARRICKVILLE METRO

AMP CAPITAL INVESTORS LIMITED

MODELLED MAXIMUM FLOOD HEIGHT (mAHD) DEVELOPED - 100 Y EVENT

LEGEND

- Modelled Height (mAHD)

Modelled Flood Depth (m)

- Up to 0.1 m
- 0.1 m to 0.2 m
- 0.2 m to 0.4 m
- 0.4 m to 1.0 m
- More than 1.0 m

NOTES

Preliminary information only.

0 1 2 4 6 8 10 metres

SCALE (at A4) 1:500

DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 107626036
DATE: 10 MAY 2010
DRAWN: JRB
CHECKED: HR

FIGURE 9c

Golder Associates

File Location: J:\hyd\2010\107626036_LendLease_MarrickvilleMetro\

APPENDIX A

SYDNEY WATER PRELIMINARY ADVICE

Sydney WATER

Case Number: 119121

20 April 2010

BOVIS LEND LEASE
c/- NORTHROP ENGINEERS PTY LTD

FEASIBILITY LETTER

Developer:	**BOVIS LEND LEASE**
Your reference:	**10330 - 106**
Development:	**13-55 Edinburgh Rd, Marrickville**
Development Description:	**Concept plan for 12000m2 of expansion to the existing 35000m2 Marrickville Metro Retail centre.**
Your application date:	**19 March 2010**

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 Works Agreement (Agreement); 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, e.g. 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.

You have made an application for specific information. Sydney Water's possible requirements are:

What You Must Do To Get A Section 73 Certificate

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 Developing and Plumbing > 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 Developing and Plumbing > 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. **Major Works Agreement**

   After the Coordinator has submitted your new application, they will receive the Sydney Water Notice and Works Agreement. You will need to sign and lodge **both originals** of that Agreement with your nominated Coordinator.

   The agreement sets out for this development:
   - your responsibilities;
   - Sydney Water's responsibilities; and
   - the Coordinator's responsibilities.

   You must do all the things that we ask you to do in that Agreement. This is because your development impacts on the existing water, sewer and storm water services and you must construct and pay for the following works extensions under this Agreement to provide these services.

   After Sydney Water has signed the documents, one of them will be returned to your Coordinator.

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

4. **Water, Sewer and stormwater 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 water main available for connection is the 150mm main located in Edinburgh Road.

- Your water servicing coordinator has advised that you may acquire a portion of Smidmore Street as part of your development. Should this occur the existing 150 mm water main in Smidmore Street may need to be disused and a link main between Smidmore St and Edinburgh Rd constructed. Final requirement can only be determined upon final and formal application.
  Note: All/any services affected will need to be reconnected.

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 divert/relocate the existing sewer main outside your proposed development as required.

4.3 Stormwater

Sydney Water believes there is an adverse impact on our stormwater assets with the proposed development that needs to be addressed.

4.3.1 Flooding adjacent to Major Trunk Drainage

The proposed development is located over to Sydney Water's Marrickville Valley SWC 66 major trunk drainage. It is possible that Sydney Water's stormwater channel might overflow from time to time during heavy rain. Sydney Water believes that a flood investigation is required to assess the 1 in 100 year flow behaviour at the site. The development should take the opportunity to restore overland flow paths for the safety of Marrickville Metro users and the local area/ community or upgrade the culvert to accept greater flows and meet current community standards.

4.3.2 Reconstruction of Existing Channel

The section of Sydney Water Channel within 13-55 Edinburgh Road and within the Smidmore Street section if sold by Council, will need to be upgraded at the developer's cost to ensure the lifespan of the culvert will match or exceed the lifespan of the development. The culvert is to be designed to be maintenance friendly and incorporate a minimum increase of 1 culvert size from existing to allow for sleeving the culvert in the future. Depending upon the results of the overland flow and flood investigation the culvert size may need to be enlarged further to allow for various flow considerations. The placement of other conditions, or the extent of reconstruction of

the existing Sydney Water Culvert on the existing Metro Site will be dependent upon the study and final extent of works.

4.3.3 Provision of Drainage Easement

Where the Smidmore roadway is sold by Council a drainage easement in favour of Sydney Water will be required over the existing Sydney Water culvert, together with a restriction to user and positive covenant.

4.3.4 General Requirements

- No filling should be carried out within 3m from the outside edge of the channel without the prior written approval of Sydney Water.
- Any structure within the zone of influence of the stormwater channel requires Sydney Water approval and should comply with “General Requirements for Building Adjacent to Stormwater Channel” including piering to a minimum of 0.3 m below the invert of the conduit.
- Any landscaping work within the zone of influence of the channel should consider the structural condition of the stormwater channel.
- No machinery should be used within the zone of influence of stormwater channel that could affect the structural integrity of the stormwater channel.
- If the stormwater channel is damaged as part of the proposed development work or landscaping work, then you are responsible for the cost of repairs to the channel.
- A pre and post dilapidation report will need to carried out by a suitable company and submitted to Sydney Water for comment at the appropriate times.
- Formal and any revised final applications may incur additional requirements.

4.3.5 Stormwater Discharge via On-Site Detention

On-site detention will be required for the development by Sydney Water including the existing site if detention was not previously provided. Where on-site detention is also required by Council, the authority requiring the greater volume will apply. An application can be made to Sydney Water with the appropriate fee to obtain Sydney Water’s on-site detention requirements.

A positive covenant is required over the on-site detention system in favour of Sydney Water or Council to ensure ongoing maintenance and repair to the system.

4.3.6 Stormwater Connection to Sydney Water Conduit

Sydney Water would have no objection to the connection of stormwater drainage from the proposed development into the Sydney Water channel providing that the following conditions are fulfilled:

- Only surface water and roof water are to be drained through the connection.
- The last pit before both connections is to be sealed and contain a reflux valve to prevent backflow from the Sydney Water system.

- The owner of the new development is to supply a positive covenant to maintain the reflux valve for discharge from the development site and acceptance of responsibility for any damage that may result to his property from surcharge (backflow) through the connection.
- An approved pit with silt arrestor and screen (or gross pollutant trap) sized to treat the design flows is required within the owner's property upstream of the reflux valve, a detailed sketch of same, and of the stormwater drain, is to be submitted with the application for approval by Sydney Water for the discharge from the on-site detention system. It is the owner's responsibility to maintain any silt arrestors and screen. The pit is to be grated or alternate measures provided to allow safe surcharge of stormwater from the system during a large event or due to a blockage.
- The inlet into the stormwater channel is to be constructed at an angle not exceeding 30° to the line of flow in the channel. The connection is to conform to Sydney Water's standard inlet conditions.
- The invert of the inlet into a stormwater box channel shall be close to, but not less than 150mm above the toe of the wall at the point of entry.
- Supervision of the actual inlet into the stormwater channel is to be carried out by Sydney Water's supervisor. The applicant shall carry out all excavation, backfill and restoration and supply all pipes necessary for the work.
- Construction of the silt arrestor and screened pit and the reflux valve is only to be made by, or under the direct supervision of a licensed drainer, to the satisfaction of Sydney Water's Field Services Inspector.
- 48 hours notice of intention to commence the silt arrestor and/or gas seal, and the stormwater drain, is given to the Field Services Inspector.
- No work is to be commenced until approval to proceed has been granted by Sydney Water.
- An application fee of $368.80 is payable to Sydney Water until 30 June 2010. Where payment is made after 30 June 2010 the amount will be in accordance with Sydney Water's fees and charges.
- All costs associated with the proposal are at the applicant's expense.

4.3.7 Water Quality

The proposed development should meet contemporary water quality discharge requirements. As a minimum, the 1997 NSW Environment Protection Authority guidelines should apply.

Pollutant	Requirement
Suspended Solids	80% reduction of the average annual load
Total Phosphorous	45% reduction of the average annual load
Total Nitrogen	45% reduction of the average annual load
Litter	Retention of litter greater than 50mm for flows up to 25% of the 1 year ARI peak

	flow
Coarse Sediment	Retention of sediment coarser than 0.125mm for flows up to 25% of the 1 year ARI peak flows
Oils and Grease	In areas with concentrated hydrocarbon deposition, no visible oils for flows up to 25% of the 1 year ARI peak flow

NSW EPA – Managing Urban Stormwater – Council Handbook 1997

More details of how this will be achieved are required before approval.

4.3.8 Rainwater Tank

It is not clear from the information currently submitted whether there will be any roof area with the new development or simply all car parking. Where possible roof water should be collected and reused on site for non-potable uses such as toilet flushing.

4.3.9 Stormwater Reuse

The site will have extensive hard paved car parking area that will generate large volumes of runoff. There is the opportunity to collect and treat this stormwater for reuse for landscape watering, water features and subject to a risk assessment, cooling tower make up water.

If the proposed development is required to discharge stormwater into Sydney Water's stormwater channel, then a separate application is to be forwarded to Sydney Water.

All stormwater connections should comply with Sydney Water's On-Site Detention policy and connection requirements. For further details please contact Sydney Water's Stormwater Team on (02) 8849 4459 (or fax (02) 8849 3063)

Sydney Water has assessed your application and found that:

- You must construct Stormwater 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.

6. Stamping and Approval of your Building Plans

You must have your building plans stamped and approved **before the Certificate can be issued. Building construction work MUST NOT commence until Sydney Water has granted approval.** Approval is needed because construction/building works may affect Sydney Water's assets (e.g. water and sewer mains).

Your Coordinator can tell you about the approval process including:

- Your provision, if required, of a "Services Protection Report" (also known as a "pegout"). This is needed to check whether the building and engineering plans show accurately where Sydney Water's assets are located in relation to your proposed building work. Your Coordinator will then either approve the plans or make requirements to protect those assets before approving the plans;
- Possible requirements, Costs and Timeframes.

You can also find information about this process (including technical specifications) if you either:

- visit www.sydneywater.com.au > Building and Developing > Building and Renovating. Here you can find Sydney Water's *Guidelines for Building Over/Adjacent to Sydney Water Assets*; or call 13 20 92.

Notes:

- **The Certificate will not be issued until the plans have been approved and, if required, Sydney Water's assets are altered or deviated;**
- **You can only remove, deviate or replace any of Sydney Water's pipes using temporary pipework if you have written approval from Sydney Water's Development Operations Branch. You must engage your Coordinator to arrange this approval; and**
- **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*.**

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.

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 NSW Code of Practice for Plumbing and Drainage (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a Sydney Water plumbing and draining inspector. After Sydney Water's inspector 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.

Trade Waste Information

Should this development generate trade wastewater, this notice of requirements does not guarantee the applicant that Sydney Water will accept the trade wastewater to its sewerage system**.** In the event trade wastewater is generated, the property owner is required to submit an application for permission to discharge trade wastewater to the sewerage system before business activities commence. A boundary trap will be required for all developments that discharge trade wastewater where arrestors and special units are installed for trade waste pre-treatment.

If this development type is "***Industrial***" then the property may be part of sewerage catchment subject to a wastewater reuse scheme. This may impact the level of pollutants such as Total Dissolved Solids (TDS) that Sydney Water will accept from the property to the sewerage system. Businesses wishing to discharge wastewater (other than domestic sewage) should first contact a Sydney Water Trade Waste Office.

Prospective Purchasers should be made aware of the above situation under the requirements of vendor disclosure.

For further information please visit the Sydney Water website at: http:// www.sydneywater.com.au/OurSystemsAndOperations/Tradewaste/

To contact a Trade Waste Customer Service Representative please see below for Local Government Areas and their relevant contact number.

For the following LGA's the contact number for a Trade Waste Customer Representative is (02) 9551 4620:

Ashfield, Bankstown, Botany Bay, Burwood, Camden, Campbelltown, Canada Bay, Canterbury, Fairfield, Hurstville, Kiama, Kogarah, Leichhardt, Liverpool, Marrickville, Randwick, Rockdale, Shellharbour, Strathfield, Sutherland, Wingecarribee, Wollondilly, Wollongong

Backflow Prevention Information

All properties with a connection to the water supply, must install a backflow prevention containment device. All containment devices must be installed on the outlet side of each master water meter/ s supplying the property. In circumstances where there is no master meter/s the backflow prevention containment device shall be installed on the water supply where it enters the property boundary.

Separate hydrant and sprinkler fire services, require the installation of a testable double check detector assembly. The device must be installed close to where the water service crosses the property boundary, upstream of any component of the fire service.

The backflow prevention containment device must be installed as a condition of continued use of the water supply. Failure to install and maintain the device may result in disconnection of the water service. A copy of Sydney Water's Backflow Prevention Policy is available on the Sydney Water Website at:
http://www.sydneywater.com.au/Plumbing/BackflowPrevention/

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.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through any Quickcheck agent and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connection

A water main will be available, once you have completed your drinking water main construction

to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with a Quick Check Agent or at a Sydney Water Customer Centre. You, or your hydraulic consultant, may need to supply the following:

A plan of the hydraulic layout;
A list of all the fixtures/fittings within the property;
A copy of the fireflow pressure inquiry issued by Sydney Water;
A pump application form (if a pump is required);
All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

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 NSW Code of Practice for Plumbing and Drainage (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a Sydney Water plumbing and draining inspector. After Sydney Water's inspector has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

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:

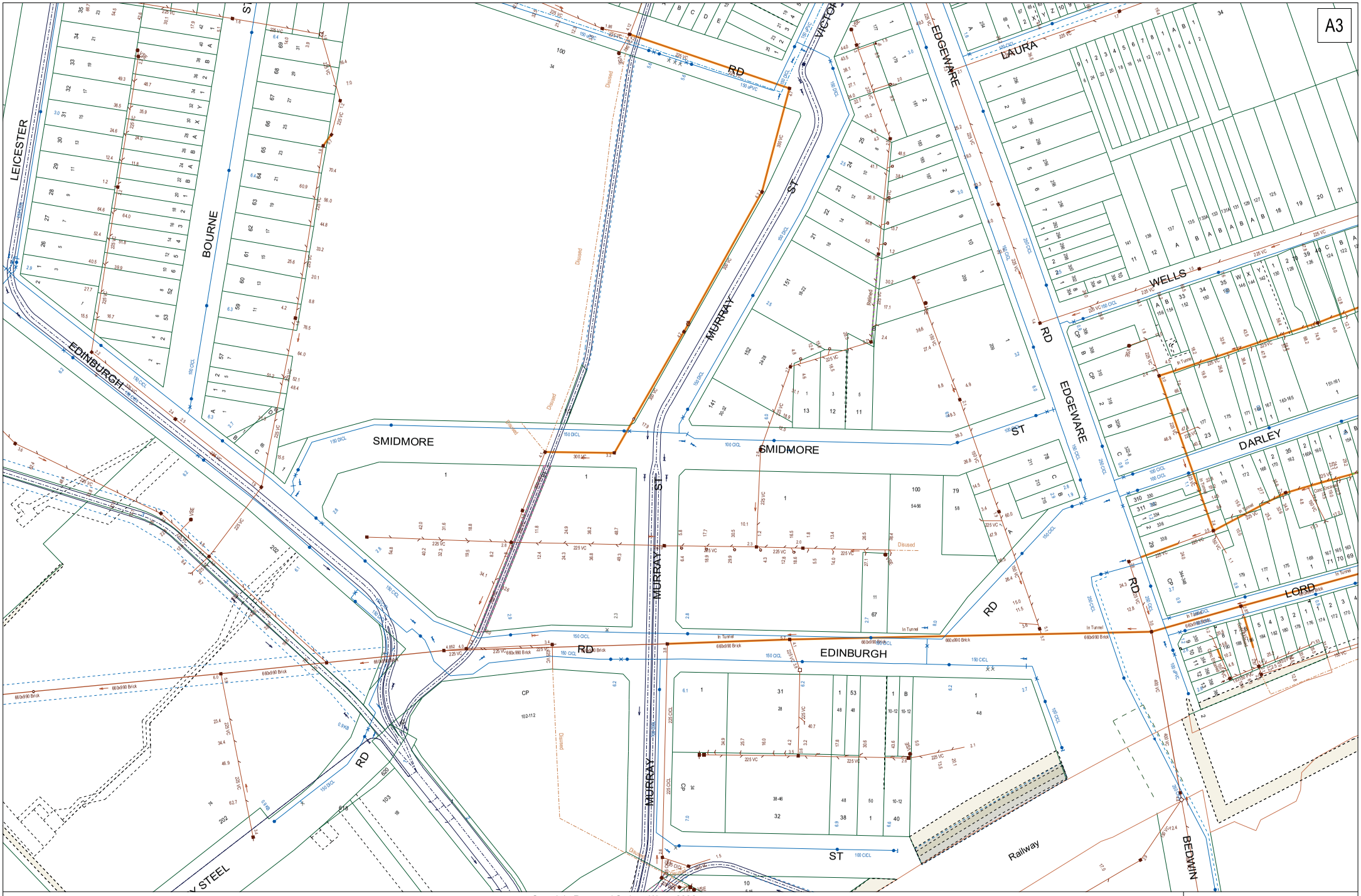
- plumbing and drainage inspection costs;
- the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your 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

APPENDIX B

SYDNEY WATER HYDRA OUTPUT PLAN



DBYD Address:
Smidmore St
Marrickville NSW 2204

DBYD Job No: 182703

DBYD Sequence No: 17193508

Scale: 1:1500

Date of Production: 20/11/2009

Plan 1 of 1

N

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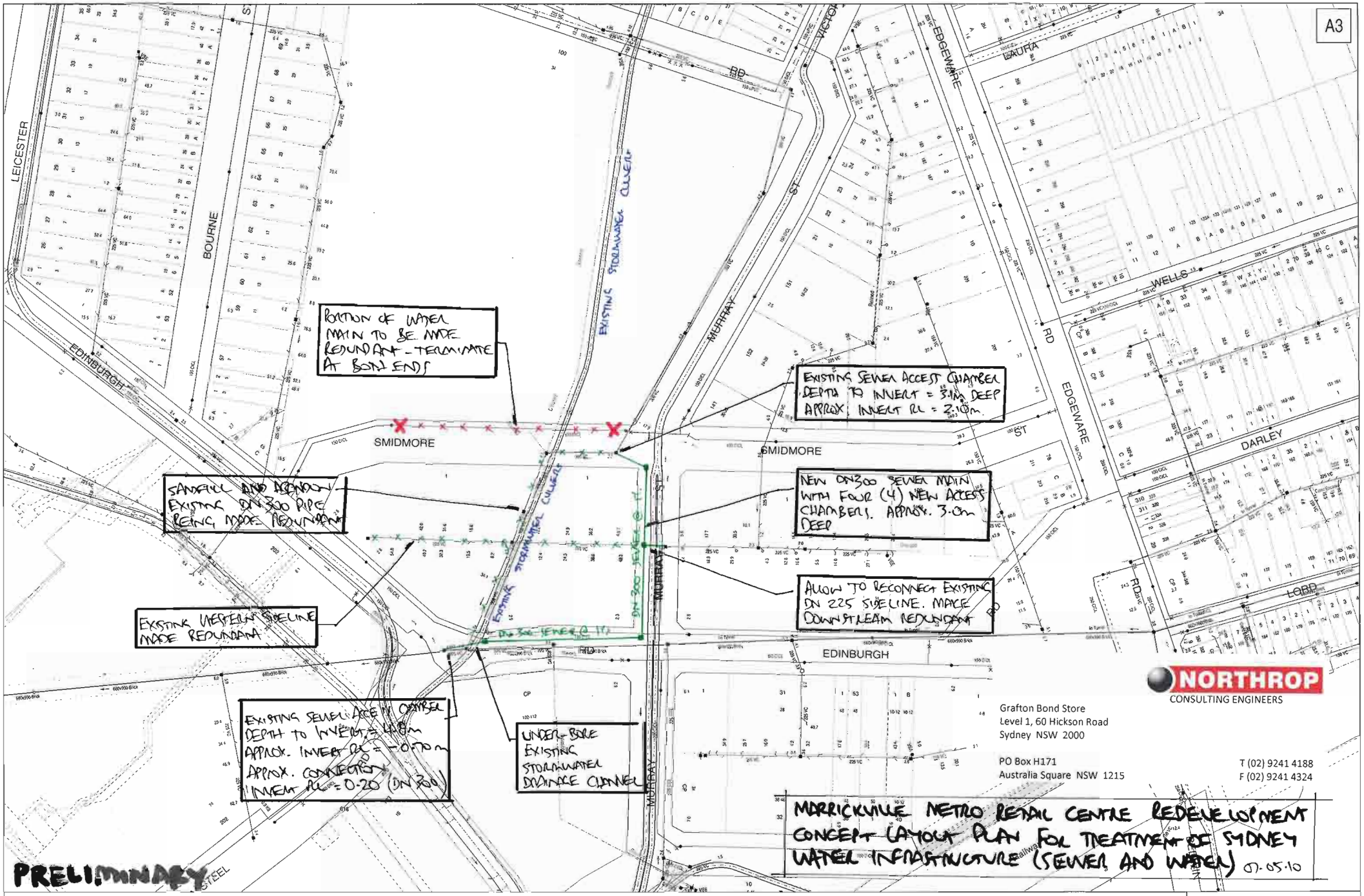
APPENDIX C

CONCEPT LAYOUT PLAN FOR TREATMENT OF SYDNEY WATER INFRASTRUCTURE (SEWER AND WATER)



DBYD Address:
Smidmore St
Marrickville NSW 2204

DBYD Job No: 182703

DBYD Sequence No: 17193508

SYDNEY WATER CORPORATION

Scale: 1:1500

Date of Production: 20/11/2009

Plan 1 of 1

0m 9m 18m 27m 36m

APPENDIX D

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