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INTEGRATED WATER MANAGEMENT STRATEGY

**LOT 8, BRINGELLY ROAD,
HORNINGSEA PARK**

Prepared For and On Behalf of:

Commercial & Industrial Property Pty Limited



Report No **S.CIP-0112.ESD.R01.01**

Date **December 2017**

engineering sustainable environments

REPORT AUTHORISATION

PROJECT: Lot 8, Bringelly Road, Horningsea Park

REPORT NO.: S.CIP-0112.ESD.R01.01

Date	Rev	Comment	Prepared by	Checked by	Authorised by
18/12/2017	00	Draft	DAC	HM	PTJ
21/12/2017	01	Draft	DAC	HM	PTJ

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EXECUTIVE SUMMARY

Umow Lai have been engaged to prepare a Water Cycle Management Strategy on behalf of CIP to address the following State Significant Development – Secretary’s Environmental Assessment Requirements (SEARs) for Lot 8 within the Bringelly Road Business Hub.

This report addresses the following environmental issues relating to Water:

Water-related Infrastructure Requirements

- Determination of water service demands following servicing investigations and demonstrate that satisfactory arrangements for drinking water, wastewater, and recycled water (if required) services have been made.
- Ensure that the proposed development does not adversely impact on any existing water, wastewater or stormwater main, or other Sydney Water asset, including any easement or property.
- Satisfactory steps/measures have been taken to protect existing stormwater assets, such as avoiding building over and/or adjacent to stormwater assets and building bridges over stormwater assets.

Integrated Water Cycle Management

- Outline any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and demonstrate water sensitive urban design (principles are used), and any water conservation measures that are likely to be proposed.

Careful consideration has been given to the use of appropriately sourced potable and non potable water supply streams supplying the various end uses.

We would recommend that the proposed water management measures are in accordance with the current regulatory requirements and that the scheme should be adopted as an acceptable method of addressing the water management issues relevant to the site.



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1.0 REPORT OBJECTIVE

The aim of this report is to outline the strategy for water management for Lot 8, Bringelly Road, Horningsea Park.

This water management strategy has been prepared to identify:

- Site conditions and available infrastructure;
- Site water demands;
- Water efficiency measures;
- Available sources of potable and non potable water to meet site demands;
- A practical water management strategy for the site; and
- Waste water discharge.

The water management strategy has been prepared in consideration of relevant Sydney Water and local authority requirements.

This report should be read in conjunction with the following documents:

- DA Drawings
 - 2-319-277062-DA-000 Location Plan and Drawing List
 - 2-319-277062-DA-001 Masterplan
 - 2-319-277062-DA-002 Site Plan
 - 2-319-277062-DA-110 Office Floor Plans
 - 2-319-277062-DA-111 Warehouse Office Floor Plan
 - 2-319-277062-DA-200 Elevations - Overall
 - 2-319-277062-DA-201 Elevations - Office
 - 2-319-277062-DA-300 Sections
- Preliminary Environmental Impact Statement, Bringelly Road Business Hub Stage 1, Prepared by Ethos Urban dated 14th November 2017
- Civil Engineering Report, Prepared by Costin Roe Consulting Rev A



2.0 SITE DESCRIPTION

The Business Hub is located approximately 35km west of the Sydney CBD and approximately 2km east of the Leppington Major Centre. It is largely within the area identified as the Western Sydney Parklands under the *State Environmental Planning Policy (Western Sydney Parklands) 2009 (WSP SEPP)*, with a small portion in the south subject to the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*. The Site is in close proximity to the M7 and M5 Motorways and this provides excellent access to both the state and regional road network and surrounding key employment and industrial lands.

Lots 8 is the eastern most lot within the Business Hub

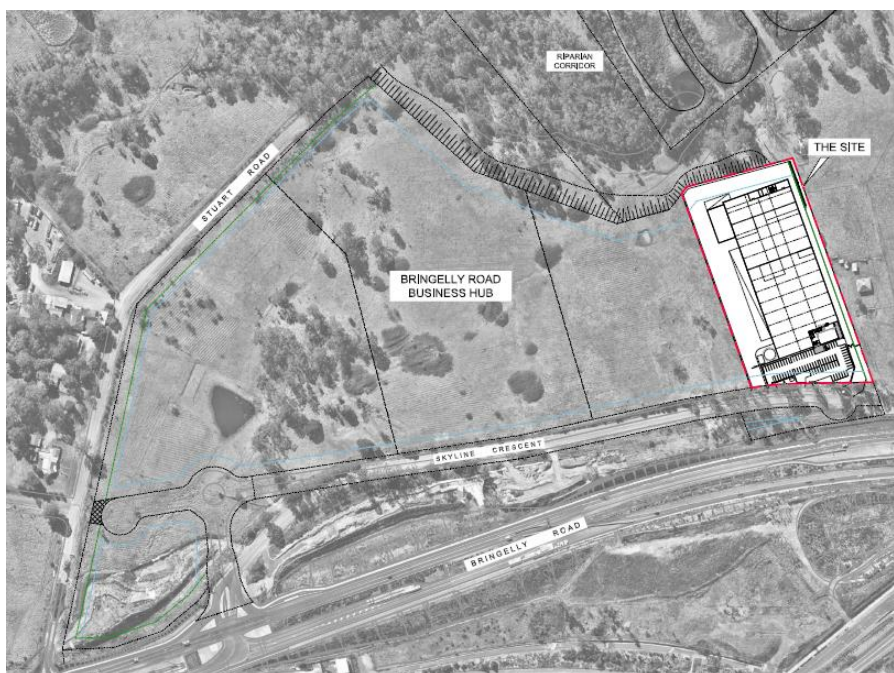


Figure 1 Existing Site Plan

2.1 PROPOSED DEVELOPMENT

The proposed development is for a light industrial warehouse facility with Ancillary office space, accommodating approximately 10,530m².

The proposed operation include the preparation of motor oil products for future retail off-site, including:

- Bulk fluid delivery and storage;
- Blending;
- Bottling and packaging;
- Storage;
- Dispatch and distribution; and
- Ancillary office administration.

The proposed warehouse comprises a large single level warehouse building with ancillary office space on the south-east corner of the building. Truck loading areas and circulation hardstand are located on the western side of the building and parking on the south. Fire access has also been provided around the full perimeter of the building.



3.0 WATER INFRASTRUCTURE

An analysis of the Water Infrastructure has been undertaken by Costin Roe Consulting and is included within the Civil Engineering Report (Co11994.01). Please refer to the civil report for full details of the stormwater infrastructure.

The site is located on an undeveloped parcel of land bounded by an existing waterway to the north, undeveloped land to the east, the undeveloped Lot 6 of the proposed Bringelly Business Hub to the west, and Old Bringelly Road to the south. Access to the site is available along Bringelly Road.

3.1 EXISTING INFRASTRUCTURE

The property currently comprises undeveloped land with no formal drainage system. Runoff from the site currently flows north-east to the existing natural waterway to the north of the site, and a minor catchment to the south-east towards Bringelly Road.

3.2 PROPOSED STORMWATER

The proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event.

The major system will be designed to cater for storms up to an included the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

3.2.1 PROPOSED SITE DRAINAGE

Discharge from the site is proposed at on the north-western corner of the property boundary.

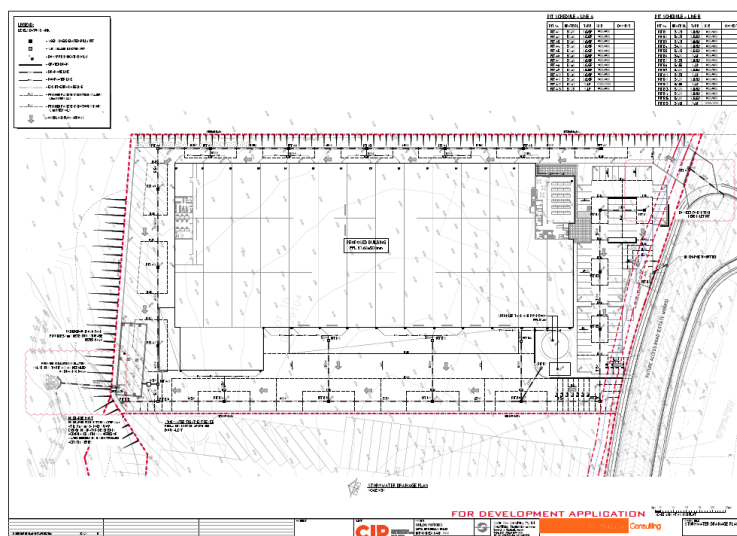


Figure 3 Site Drainage Plan



3.2.2 STORMWATER QUALITY

Stormwater Quality Management will be provided to limit the runoff discharge from private property into the underground piped drainage system to pre-developed flow and to assist in mitigating the increased stormwater runoff as detailed in the table below

ARI	Pre Development Flow (m ³ /s)	Post Development Attenuated Flow (m ³ /s)	Storage (m ³)
5	0.555	0.349	260
20	0.625	0.412	370
100	0.930	0.768	480

Table 2 Onsite Stormwater Detention (OSD) Tank and Flow Arrangement

In accordance with the principles of Water Sensitive Urban Design (WSUD), stormwater treatment measures are to be implemented based on a treatment train approach as follows:

- Primary treatment to parking, hardstand & roof areas is to be performed via an appropriately sized Gross Pollutant Trap located on site;
- Tertiary treatment is to be made off-lot, via the Bedwell Park Wetland located to the north of the estate. The Bedwell Park Wetland will provide treatment of nutrients and sediments as set out in the Northrop Report quoted above. Stormwater discharge to the Bedwell Park Wetland is via an existing flow path to the north of the site.

In accordance with Liverpool City Council (LCC) Development Control Plan (DCP) 2008, stormwater shall meet the following annual percentage pollutant reductions on a catchment wide basis:

Gross Pollutants	90%
Total Suspended Solids	80%
Total Phosphorus	65%
Total Nitrogen	45%
Total Hydrocarbons	90%

3.2.3 RAINWATER HARVESTING

Rainwater harvesting is proposed for the development for re-use of non-potable applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the non potable water demand for the individual future developments in the range of 50-80%.



4.0 WATER DEMAND

4.1 SITE WATER DEMAND ASSESSMENT

The following water demands suitable for the development have been considered for the proposed facility:

- Staff and administration; kitchen, staff change room toilets and ablutions;
- Heating ventilation and air conditioning demand;
- Fire Systems testing water; and
- Landscape Irrigation.

4.2 AMENITIES

It has been assumed that all fixtures and fittings will be specified to comply with watermark licence and be 4 star Water Efficiency Labelling Scheme (WELS) rated.

Description	WELS rating	Flow Rate
WC's	4 star	4 L/flush
Urinals	4 star	2.5 L/flush
Basins Taps	4 star	7.5 L/m
Showers	3 star	9 L/m
Dishwashers	3 star	16 L/cycle

Table 3 Fixtures and Fittings Schedule

The following assumptions have been made

- Three visits to the WC a day
 - 60/40 male/female split
 - 2:1 ration for male urinal visits
 - 10 second hand washing
- 1 shower per 100 employees used once a day for 8 mins
- 1 dishwasher per kitchen facility within main office space used once a day

4.3 HVAC DEMANDS

For the purpose of this report we have assumed the following:

- The warehouse area, inclusive of Bulk Storage, is naturally ventilated with mechanical exhaust for potential smoke and exhaust fumes;
- Main office (800m²) is served by an air cooled system for cooling and heating, with no water demand.

Based on the above scenario the HVAC system will make no demand on water infrastructure.



4.4 FIRE WATER

A fire water tank will be provided to the site. Sprinklers, Hydrants and Hose reels will be served via the fire tank. Fire test water will be utilised recirculated from the sprinkler tank, making no demand on infrastructure. Minor losses will be incurred from sprinkler zone switch testing (approx. 1kL/month)

4.5 LANDSCAPING AND IRRIGATION

An allowance of 750m² irrigated plant space has been made using a drip irrigation system.

It is recommended that Water tolerant plant species are selected to minimize water and irrigation demand and minimize water loss and evaporation. This includes the use of native plant species, using mulch deeply around garden beds, watering during the coolest parts of the day and using a drip irrigation system.

Irrigation shall be carried out in accordance with the following schedule

Season	Irrigation Requirements
Summer	3 times per week
Autumn	2 times per week
Winter	1 time per week
Spring	2 times per week

Table 4 Irrigation Schedule



5.0 WATER SUPPLY

5.1 RAINWATER COLLECTION AND STORAGE

Rainwater harvesting involves the collection, storage and re-use of rainwater from the roof areas of a development for internal and external uses. In relation to the proposed development site, harvested rainwater could potentially be used for toilet and urinal flushing and irrigation of landscaped areas.

Rainwater harvesting contributes to the conservation of drinking quality water, improves the reliability of our water supplies, frees up water for the environment and reduces the potential export of pollutants into the natural environment downstream.

The following measures will need to be adhered to with respect to the rainwater tank installation:

- Tanks to be installed and maintained to prevent cross connection with the potable mains water supply, including provision of a backflow prevention device at water meters;
- Provision of a low-level potable water top-up switch or tank bypass facility to ensure continual supply during drier periods;
- All rainwater services to be clearly labelled “Non-Potable Water” with appropriate hazard identification;
- Pipe work used for rainwater services to be coloured lilac in accordance with AS1345. All valves and apertures to be clearly and permanently labelled with safety signs to comply with AS1319.

It is assumed that rainwater will be collected from a portion of the warehouse roof (2,500m²). A roof coefficient of 0.8 has been allowed for a flat roof collection area and rainwater tank losses. Calculations have been based on Rainfall collection data obtained from the Bureau of Meteorology (BOM) for Weather Station 067119 Horsley Park Equestrian Centre AWS NSW, located 10km from the proposed site.

We have assumed a 20kL Rainwater collection and storage tank, to allow in excess of 20 days potable water storage.

Month	Average Monthly Rainfall (mm)	Average Monthly Production, inclusive of tank losses (KL/month)
January	78.6	157.2
February	108.7	217.4
March	80.6	161.2
April	76.3	152.6
May	45.1	90.2
June	77.1	154.2
July	37.5	75
August	39.2	78.4
September	34.1	68.2
October	54.6	109.2
November	78.5	157
December	64.6	129.2



Table 5 Average Monthly Non-Potable Water Production



6.0 SITE WATER BALANCE

A water balance model has been undertaken to assess a suitable volume of rainwater storage to adequately meet the projected non potable water demand.

The water balance assumed the roof rainwater catchment area to be 2,500 m² and the total rainwater tank volume of 20 kL.

The water balance modelled daily rainfall vs. consumption utilising over ten years of daily rainfall data supplied from the Bureau of Meteorology (BOM).

6.1 WATER BALANCE ASSESSMENT

The water demands best suited to rainwater supply include toilet and urinal flushing, and landscape irrigation. A breakdown of the site water demand assessment follows, noting the resulting potable and non potable demands.

Month	Non Potable Supply (Rainwater Harvesting) (KL/month)	Non Potable Demand Met (kL/month)	Non Potable to Storage (KL/month)	Potable Demand (kL/month)	Revised Potable Demand (kL/month)
January	157.2	138.7	18.6	20.6	20.6
February	217.4	116.7	100.7	18.5	18.5
March	161.2	87.8	73.4	20.6	20.6
April	152.6	73.6	79.0	19.9	19.9
May	90.2	66.9	23.3	20.6	20.6
June	154.2	48.9	105.3	19.9	19.9
July	75.0	50.6	24.4	20.6	20.6
August	78.4	53.1	25.3	20.6	20.6
September	68.2	73.6	-5.4	19.9	25.3
October	109.2	87.8	21.4	20.6	20.6
November	157.0	96.7	60.3	19.9	19.9
December	129.2	138.7	-9.5	20.5	30.0

Table 6 Average Monthly Water Balance



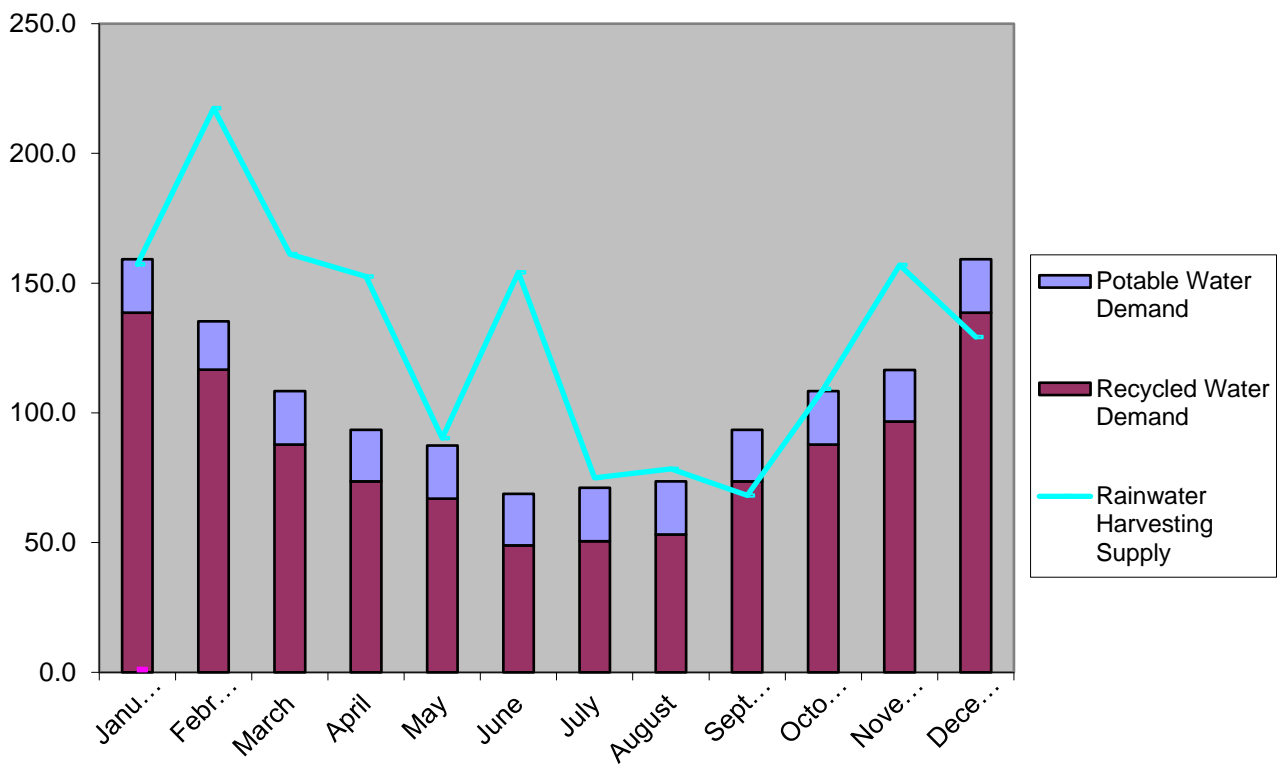


Figure 4 Site Water Balance



7.0 SUMMARY AND RECOMMENDATIONS

The report addresses the water management requirements of the proposed development.

The major water management results and recommendations for the proposed development are as follows:

- Efficient fixtures and fittings will be installed throughout the facility to minimise site water consumption
- A minimum 20kL rainwater harvesting system to be provided for the site. Due to the large catchment area, the rainwater harvesting system will provide a significant contribution to the non potable water demands for the site, reducing the potable water demands by 80%
- Water demand and discharge for the site is generally consistent throughout the year, due to the nature of the site.

The State Significant Development – Secretary’s Environmental Assessment Requirements (SEARs) have been met as follows

Requirement	Compliance
Water-related Infrastructure Requirements	
Determination of water service demands following servicing investigations and demonstrate that satisfactory arrangements for drinking water, wastewater, and recycled water (if required) services have been made.	A full determination has been undertaken as outlined in Section 4
Ensure that the proposed development does not adversely impact on any existing water, wastewater or stormwater main, or other Sydney Water asset, including any easement or property.	Infrastructure methodology has been explored within the Civil report and summarised in Section 3
Satisfactory steps/measures have been taken to protect existing stormwater assets, such as avoiding building over and/or adjacent to stormwater assets and building bridges over stormwater assets.	Infrastructure methodology has been explored within the Civil report and summarised in Section 3
Integrated Water Cycle Management	
Outline any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and demonstrate water sensitive urban design (principles are used), and any water conservation measures that are likely to be proposed.	Efficient Fixtures and Fittings will be utilised to reduce amenity demand throughout the development as detailed within Section 4. Water tolerant plant species shall be selected along with water sensitive irrigation (drip feed) to reduce the water demand as detailed in Section 4. Rainwater will be harvested and collected to reduce potable water demand as detailed within Section 5.

Table 7 SEARs Compliance



We recommend that the design philosophy detailed in this report be accepted as an appropriate approach to addressing the water management issues relevant to the proposed development.



Appendix A – Authority Correspondence

As required by the SEARs SSD8900, we have consulted with the following authorities;

- Water NSW
- Sydney Water

Refer to attached correspondence with these Authorities.



From: Mark Griffiths <mgriffiths@ciproperty.com.au>
Sent: Wednesday, 20 December 2017 10:19 AM
To: lulu.huang@sydneywater.com.au
Cc: Paul Jewiss; Paul Jacobsen; Davina Clark
Subject: SSD 8900 - Nulon Motor Oils - Bringelly Road - SEARs
Attachments: 171219 Integrated Water Management Plan Rev 0.pdf; SSD 8900 Bringelly Road Nulon Oils - SEARs signed.pdf

Hi Lulu,

Further receiving SEARs SSD8900 (attached) from Department of Planning & Environment including Sydney Water input to SEARs for Nulon Motor Oils dated 27 November 2017.

The Department of Planning & Environment require the proponent to consult with the relevant authorities and services providers in accordance during the preparation of the EIS.

Please see attached Integrated Water Management Strategy addressing the above.

If you have any queries, please do not hesitate to contact me.

Kind Regards,

Mark Griffiths
Development Manager

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From: Mark Griffiths <mgriffiths@ciproperty.com.au>
Sent: Thursday, 21 December 2017 11:38 AM
To: alison.kniha@waternsw.com.au
Cc: Paul Jewiss; Paul Jacobsen; Davina Clark
Subject: RE: SSD 8900 - Nulon Motor Oils - Bringelly Road - SEARs - Water NSW
Attachments: SSD 8900 Bringelly Road Nulon Oils - SEARs signed.pdf

Hi,

Further receiving SEARs SSD8900 (attached) from Department of Planning & Environment, the proponent is to consult with the relevant authorities and services providers in accordance during the preparation of the EIS.

Please could you advise who the appropriate person is to contact regarding the attached application.

If you have any queries, please do not hesitate to contact me.

Kind Regards,

Mark Griffiths
Development Manager

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From: Mark Griffiths

Sent: Wednesday, 20 December 2017 10:24 AM

To: 'Customer.Helpdesk@waternsw.com.au' <Customer.Helpdesk@waternsw.com.au>

Cc: Paul Jewiss (pjewiss@ciproperty.com.au) <pjewiss@ciproperty.com.au>; Paul Jacobsen <paul.jacobsen@umowlai.com.au>; Davina Clark <davina.clark@umowlai.com.au>

Subject: SSD 8900 - Nulon Motor Oils - Bringelly Road - SEARs - Water NSW

Hi,

Further receiving SEARs SSD8900 (attached) from Department of Planning & Environment, the proponent is to consult with the relevant authorities and services providers in accordance during the preparation of the EIS.

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