TTW Structural Civil Traffic Façade

Soil and Water Management Plan.

Sydney Swan HQ and Community Centre.

Prepared for APP / 20 May 2019

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1. Executive Summary

Taylor Thomson Whitting (NSW) has been engaged by APP to provide civil engineering and stormwater drainage management systems designs for the Development at Royal Hall of Industries, Moore Park.

The Development consists of:

- Modification of Internal configuration of existing Royal Hall of Industries Building
- New covered building to the southern portion of the site,
- Associated works including landscaping, paths and associated services diversions

This report covers the civil infrastructure and stormwater aspects relevant to the site based on information known at the time of report production.

Items to be confirmed prior to final design:

- Existing stormwater layout
- Architectural drawings and levels

This report covers the water and soil aspects relevant to the site based on information known at the time of report production.

This report is to support the Environmental Impact Assessment which addresses Section 78A(8) of the Environmental Planning and Assessment Act and Schedule 2 of the Environmental Planning and Assessment Regulation 2000, both which are noted in the Secretary's Environmental Assessment Requirements (SEARS).

The SEARs requires the Environmental Impact Assessment to address the following specific matters:

- Contamination
    - Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55
- Sediment, Erosion and Dust Control
    - Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles.
- Drainage
    - Detail drainage associated with the proposal, including stormwater and drainage infrastructure
    - Detail measures to minimise operational water quality impacts on surface waters and groundwater
    - Respond to SEARS inputs from Council
- Flooding
    - Assess any flood risk on site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity.
- Ecologically Sustainable Development (ESD)
    - Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design and ongoing operation phases of the development
    - Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice
    - Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.
- Additional Requirements
    - Stormwater Concept Plan
    - Sediment and Erosion Control Plan

1.1 Introduction

Soil, Contamination and Water Management Plan report has been prepared on behalf of the Sydney Swans Limited in support of a State Significant Development (SSD) application for the proposed adaptive reuse of the Royal Hall of Industries for a high-performance sport and community facility. The facility will enable a range of land uses, including a new home for the Sydney Swans and NSW Swifts. It will accommodate a multi-purpose facility available for community uses, sporting, medical and rehabilitation areas, administration and office spaces and associated plant and store rooms.

1.2 Site

The site is located at 1 Driver Avenue, Moore Park and comprises a portion of two separate lots, legally described as Lot 3, DP861843 and Lot 52 of DP1041134. The site is owned by the Centennial Park and Moore Park Trust and is leased to the Sydney Swans for the purposes of the development.

The proposed application will relate to the Royal Hall of Industries (RHI) building, and the associated courtyard area to the immediate south of the building. The development area is located in the south-western corner of the Entertainment Quarter precinct and has a direct frontage to Driver Avenue to the west, Lang Road to the south and Errol Flynn Boulevard to the east, an access road within the Entertainment Quarter precinct.

The RHI has in recent times been utilised as an exhibition space. The building has a rectilinear plan form with symmetrically placed entrances on all four sides, four to the east and west, and two to each of the north and south facades. The building has a gross floor area of approximately 5,700sqm at ground level with basement toilets at the southern end of the building.

The courtyard to the south of the building currently accommodates loading and general plant services associated with the RHI building and storage sheds. The building and courtyard area is surrounded by a 6.95m high brick wall. The total area of the subject site extends to approximately 0.9ha and is illustrated at Figure 1 below.

Figure 1 – Site Location

1.3 Regional Context

The site is located within the southwestern corner of the Moore Park Showground Precinct, a major recreational area in the eastern suburbs of Sydney. Measuring approximately 28.7 hectares in area, the precinct includes a range of passive and active recreational areas with a focus on cultural, entertainment, and sporting uses. Key land uses include the Entertainment Quarter, Centennial Parklands Equestrian Centre and Fox Studios.

The location of the site is strategically significant due to its proximity to a number of key land uses within Sydney, including:

Royal Randwick Racecourse – 1.8km
UNSW and Prince of Wales Hospital – 3.7km
Sydney CBD – 4.5km
Sydney Airport – 11.9km

1.4 local Context

The site is located in the City of Sydney Local Government Area (LGA). The predominant character of the area is associated with entertainment, leisure and recreational land uses, with infrastructure changes associated with the CSELR (CBD and South East Light Rail) construction.

The site has a direct frontage to Driver Avenue to the west, Lang Road to the south and Errol Flynn Boulevard to the east, an internal access road within the Entertainment Quarter precinct. Mature fig trees are located along Lang Road, Driver Avenue and Anzac Parade.
The land uses in the immediate surrounding area comprise the following:
The Hordern Pavilion is located to the immediate north of the site, which operates as a live music and entertainment venue with an associated pedestrianised forecourt area.
The Entertainment Quarter, to the immediate east of the site, is an entertainment, dining and leisure precinct with cinemas, restaurants, bars and an outdoor sporting, performance and event space. A 2,000-space car park is also provided.
To the immediate south of the site is the Centennial Parklands Sports Centre, comprising netball and tennis courts with a large area of open space.
The SCG and Allianz Stadium is located further north of the site. Allianz Stadium is currently undergoing demolition associated with the construction of a new sports stadium on the site, expected to be completed by mid-2022.
Moore Park is located on the west and east of Anzac Parade, and Centennial Park and Queens Park are located to the south-east of the site. Collectively known as the Centennial Parklands, the parks measure 360ha in area.

1.5 Overview of Proposed Development

This application seeks approval for the proposed adaptive reuse of the Royal Hall of Industries (RHI) for a high-performance sport and community facility. The development will maintain the structural integrity and façade of the RHI, whilst re-purposing the interior of the building to support a number of compatible uses and utilise the space effectively.

In addition to the repurposing of the RHI, an extension of the building will be constructed to the south of the building in the current service and courtyard area. The built form of the extension is consistent in height, scale and material with the RHI and will be largely concealed behind the existing courtyard wall.

The facility will include:

Home of the Sydney Swans;
Home of the NSW Swifts;
Multi-purpose indoor facility available for community use and public events such as junior club nights, school graduations, functions
An indoor netball court for the NSW Swifts Netball Team and netball community

Facilities for a Swans team in the AFL National women's competition
Player change areas, lockers and wet areas;
Wet recovery – pool and hot/cold hydrotherapy;
Go Foundation and Clontarf Foundation for indigenous education;
Australian Red Cross Blood Service Donation Centre;
Medical, rehabilitation and sport science areas;
Gymnasium, museum, media centre and auditorium
Back of house offices and café/canteen;
Entry foyer and retail/shop units;
Plant and store rooms; and
Sydney Swans Academy.

2. Flood Impact Assessment

The current City of Sydney Interim Floodplain Management Policy (approved May 2014) provides flood planning levels for the site. These flood planning levels are set out in Table 1.

Table 1 Flood Planning Levels

Area	Flood Planning Level
Business	Merits approach presented by the applicant with a minimum of the 1% AEP flood level.
Below-ground car parks and all other ingress points e.g. Lifts/stairs/exits	1% AEP flood level + 0.5 m or the PMF (whichever is the higher)

The 100-year ARI flood event map from the City of Sydney is shown in the Figure 2. The map contains results from Council's flood model proposed for the Centennial Park Catchment Flood Study.

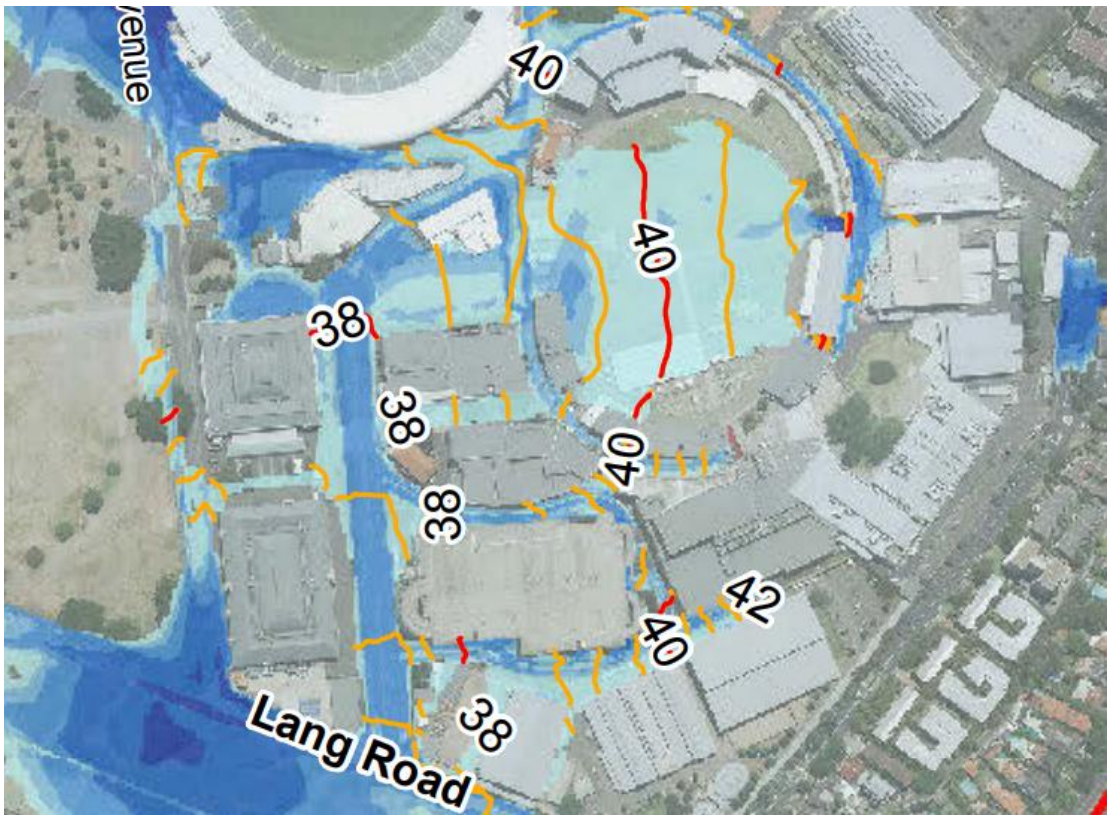

Figure 2 100-year ARI flood map

The PMF flood map is shown in Figure 3.

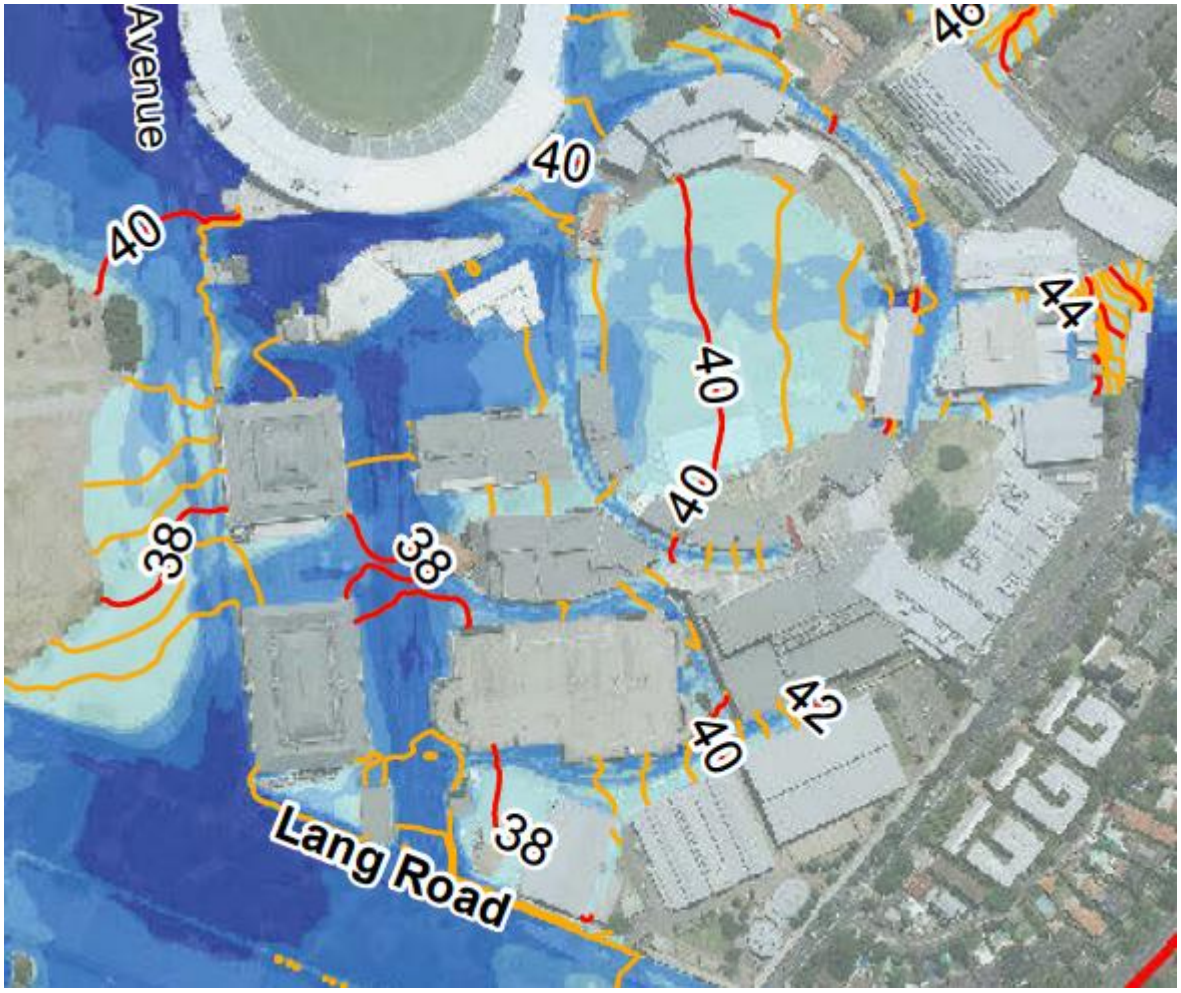

Figure 3 PMF Flood Map

2.1 Flood Management

The Finish Floor Level of proposed building is 37.55 which is higher than PMF level (37.50) and 1% AEP flood level (max 36.90) and comply with City of Sydney requirements.

The existing building FFL's are 37.40 at the Northern east edge of building (services hub floor) and 37.55 at other parts of building which are higher than 1% AEP flood level (max 37.40). The only basement entry which is located at southern edge of RHI building is above the PMF level (37.5) and 1% AEP flood level + 0.5 m or the PMF (37.40) and comply with City of Sydney requirements.

3. Stormwater

This section responds to the City of Sydney DCP:

- Ensure an integrated approach to water management across the city through the use of water sensitive urban design principles.
- Encourage sustainable water use practices.
- Assist in the management of stormwater to minimise flooding and reduce the effects of stormwater pollution on receiving waterways.
- Ensure that development manages and mitigates flood risk, and does not exacerbate the potential for flood damage or hazard to existing development and to the public domain.

3.1 Relevant Documents

The following documents have been reviewed in preparing this document:

- DCP, Section 3, General Provisions, City of Sydney 2012.
- Interim Floodplain Management Policy, City of Sydney 2014 (216277).
- On-site Stormwater Detention Guide, Sydney Water 2014
- City of Sydney Stormwater Drainage Connection Manual 2017.
- Centennial Park Catchment Flood Study 2016.
- Architectural drawings prepared by Populous (11/04/2019)

3.2 Stormwater Quantity

TTW undertook a stormwater assessment for the site with the aim of minimising the detrimental impacts on the existing stormwater network. The total site area is approximately 9,691 m2 consisting of 7,391 m2 refurbishment and 2,300 m2 new roof area and hard surface as shown in Figure 4.

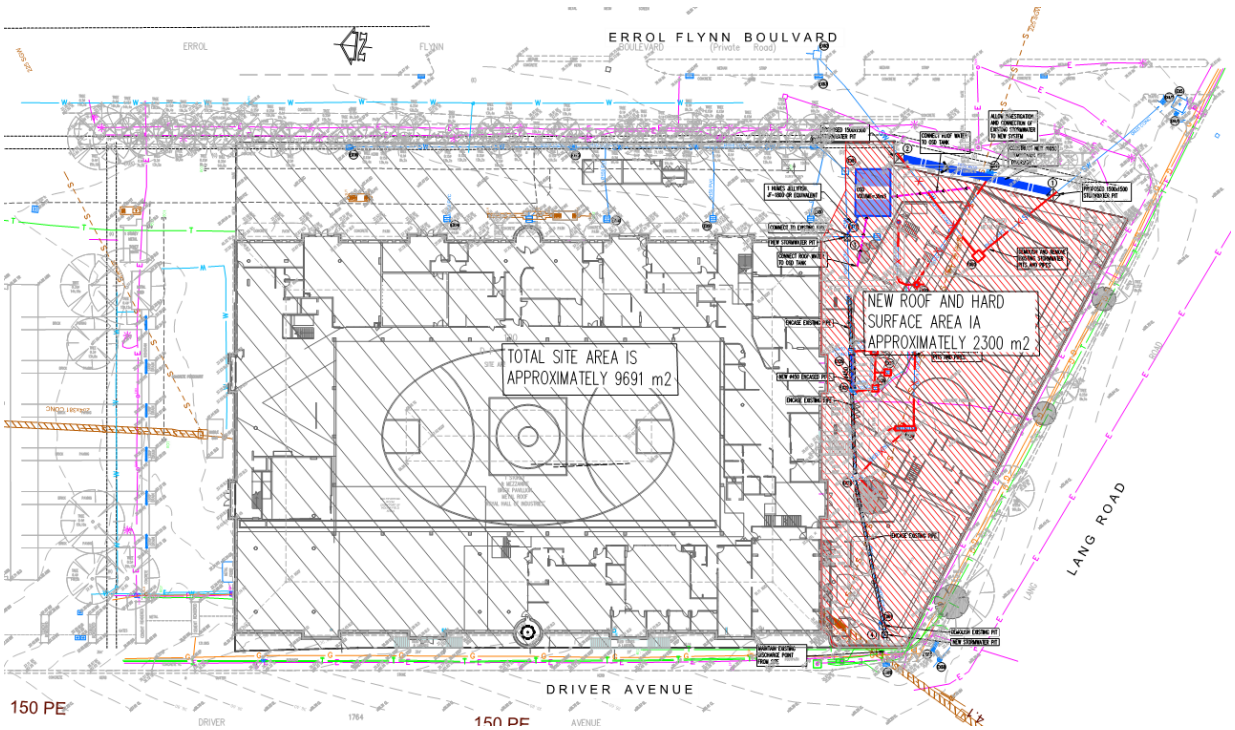

Figure 4 Total site area and total impervious area

Contacting with Sydney Water regarding on-site detention tank requirements, resulted in following response from the Senior Capability Assessor, Stormwater, Sydney Water:

> *Generally, Sydney Water would not provide On Site Detention requirements for the development which involves refurbishments and alterations until such time you obtain the DA approval.*
>
> *You may use following guide make a reasonable estimation for the On Site Detention:*
>
> - *As part of the refurbishment, if you are changing the roof, you need to provide On Site Detention for that building.*
> - *If you are adding additional floors to the existing building, then you need to provide On Site Detention for that building.*
> - *If you are changing or replacing the external drainage system to the existing building, then you need to provide On Site Detention for that building.*
> - *If you are making new connection, then you need to provide On Site Detention for the catchment area involved in that new connection.*
> - *All new buildings required On Site Detention*
> - *As a thumb rule you can use 16 cubic meters of On Site Detention for every 1000 square meters of the site area and Permissible Site DiscHharge of 37 L/s for every 1000 square meters of the site area at this location.*

To comply with Sydney Water requirements, the on-site detention tank is required for new roof and hard surface area with the volume of 36 m3 and the on-site detention tank is not required for refurbishment work with area of 7,391.

Indicative location and dimension of on-site detention tank for new roof and hard surface area shown in Figure 5 below. Final details to be confirmed after confirmation of the location, sizes and invert levels of existing stormwater system. Overflows from this OSD tank and internal stormwater system will be diverted to Erol Flynn Drive and away from the Royal Hall of Industries and the proposed new building.

The proposed new roof and hard surface area is deemed 100 % impervious with the stormwater discharge to the on- site detention tank. The stormwater will then discharge to an existing stormwater system on the hard surface area and then will flow to City of Sydney stormwater pit at Driver Avenue at the south west of the site.

Part of existing stormwater pipes and pits will be relocated as they run through the proposed building location and also part of these will diverted by 450mm stormwater pipe as indicated in Figure 6. The existing stormwater pipe which runs under the proposed building and pool will be concrete encased to provide maintenance free long term solution. A new stormwater pit or a blind pit (concrete encased below ground) will be included at the western end of the pool to remove a potential clash with the pool and current stormwater location.

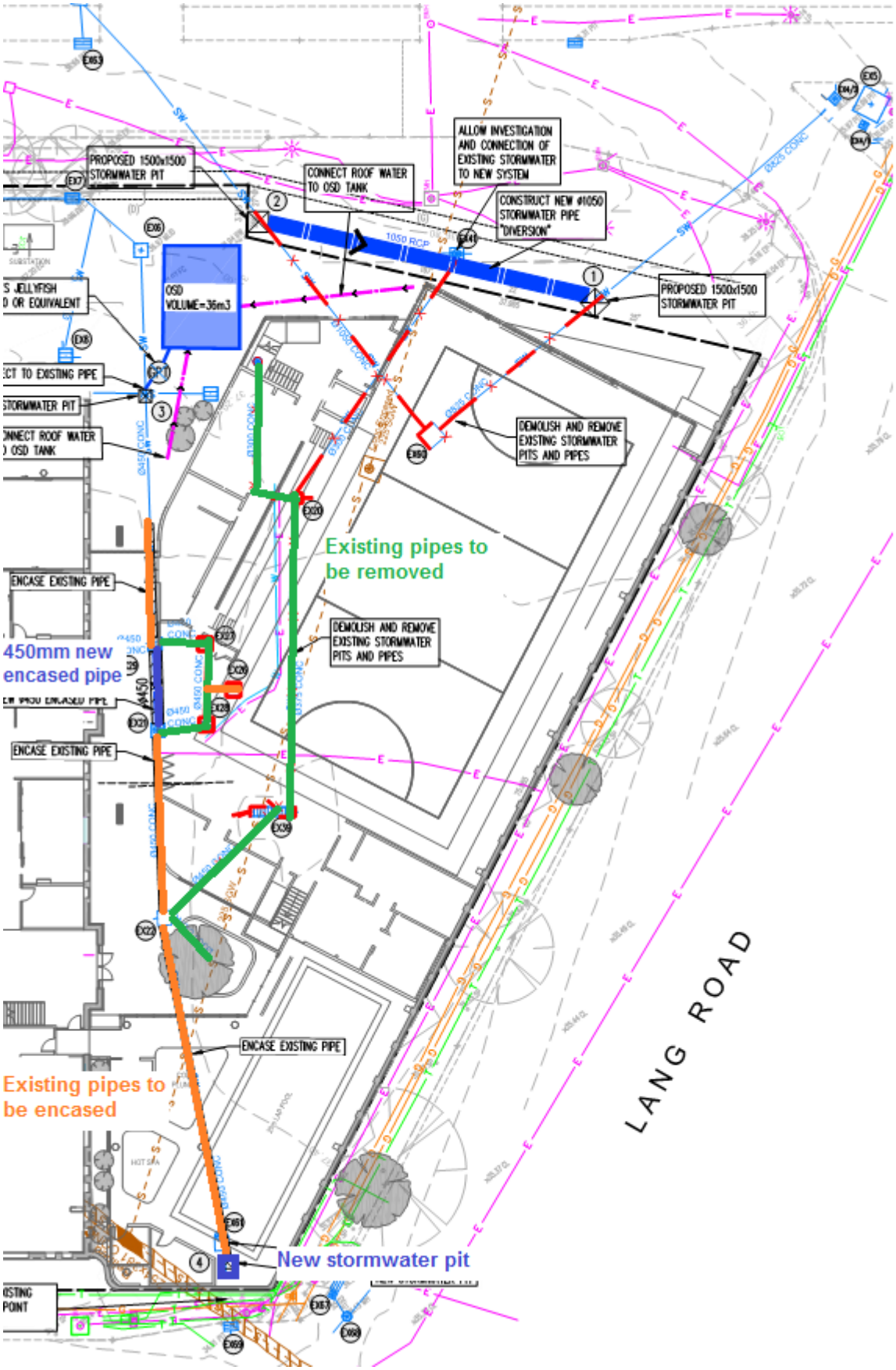

Figure 5 **Proposed stormwater works**

3.3 Stormwater Diversion

Part of the existing Sydney Showgrounds stormwater system runs through the forecourt and proposed building area, and will be required to be relocated with new stormwater pits and pipe system. This diversion is as indicated in Figure 9.

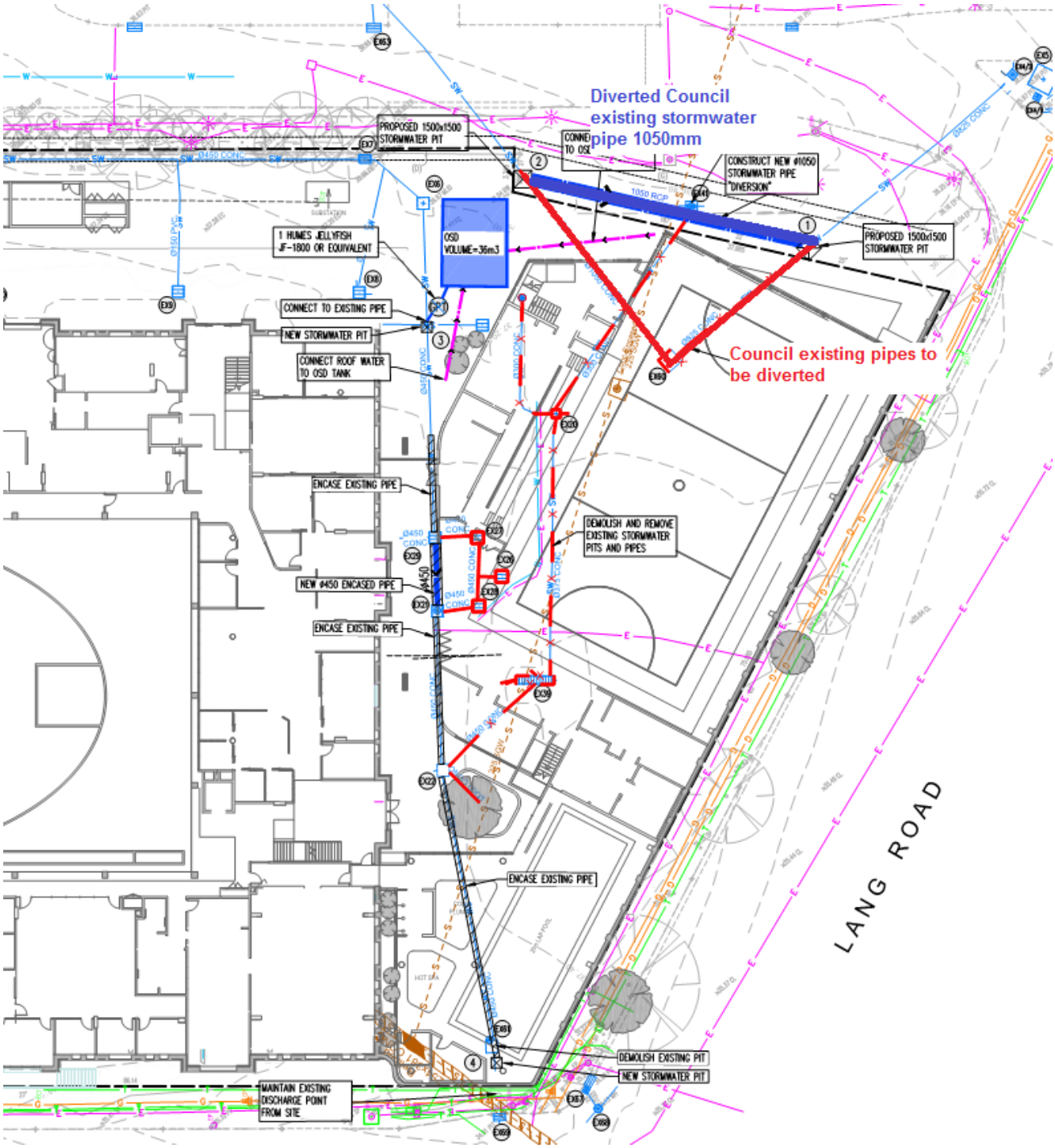

Figure 6 **Existing stormwater diversion at forecourt**

3.4 Stormwater Quality

Stormwater quality analysis was undertaken in accordance with City of Sydney DCP, Section 3 General Provision, Section 3.7.3: Stormwater Quality

The proposed new roof and hard surface area have been modelled in MUSIC to demonstrate that the proposed stormwater treatment devices achieve the stormwater treatment targets outlined in the policy:

- 85% removal of total suspended solids;
- 65% removal of total phosphorus; and
- 45% removal of total nitrogen.
- 90% Gross Pollutants

The stormwater treatment train for the proposed development includes:

- 1x Humes Jellyfish JF-1800 or equivalent cartridge filtration system within the proposed on site detention tank.

Table 2 Stormwater quality

Pollutant	Load	Residual Load	Load reduction (%)	Target (%)
Total Suspended Solids (kg/yr)	**645**	**37.6**	**94.2**	**85**
Total Phosphorus (kg/yr)	**1.23**	**0.253**	**79.4**	**65**
Total Nitrogen (kg/yr)	**8.65**	**3.75**	**56.6**	**45**
Gross Pollutants (kg/yr)	**71.1**	**0**	**100**	**90**

In addition to above, the DCP encourages the capture re-use of rainwater where possible. This should be investigated by the hydraulic engineer as the design progresses.

4. Construction Phase Stormwater Management

Construction works to be carried out in accordance with the “Blue Book” erosion and sediment control requirements. The exact controls will vary depending on construction methodology and timing, but typically consist of:

- Sediment fences;
- A sediment basin;
- Sediment trap;
- Vehicle shaker grid and wash down; and
- Sand bags surrounding existing pits.

A conceptual erosion and sediment control plan will be included in the civil drawing set.

5. Soil and Contamination

Refer to Assessment by Geotechnical Engineer.

6. Total Water Cycle

Refer to hydraulic engineering report for details on alternate water source, water recycling and storage.

7. Natural Water Courses

There are some natural water courses and wetland areas which located at the down stream of the site as shown in Figure 7 and Figure 8. The proposed works have no direct impact on the natural water courses. With the water quality and quantity treatments proposed as part of this development, there will be no impact on these downstream water courses.

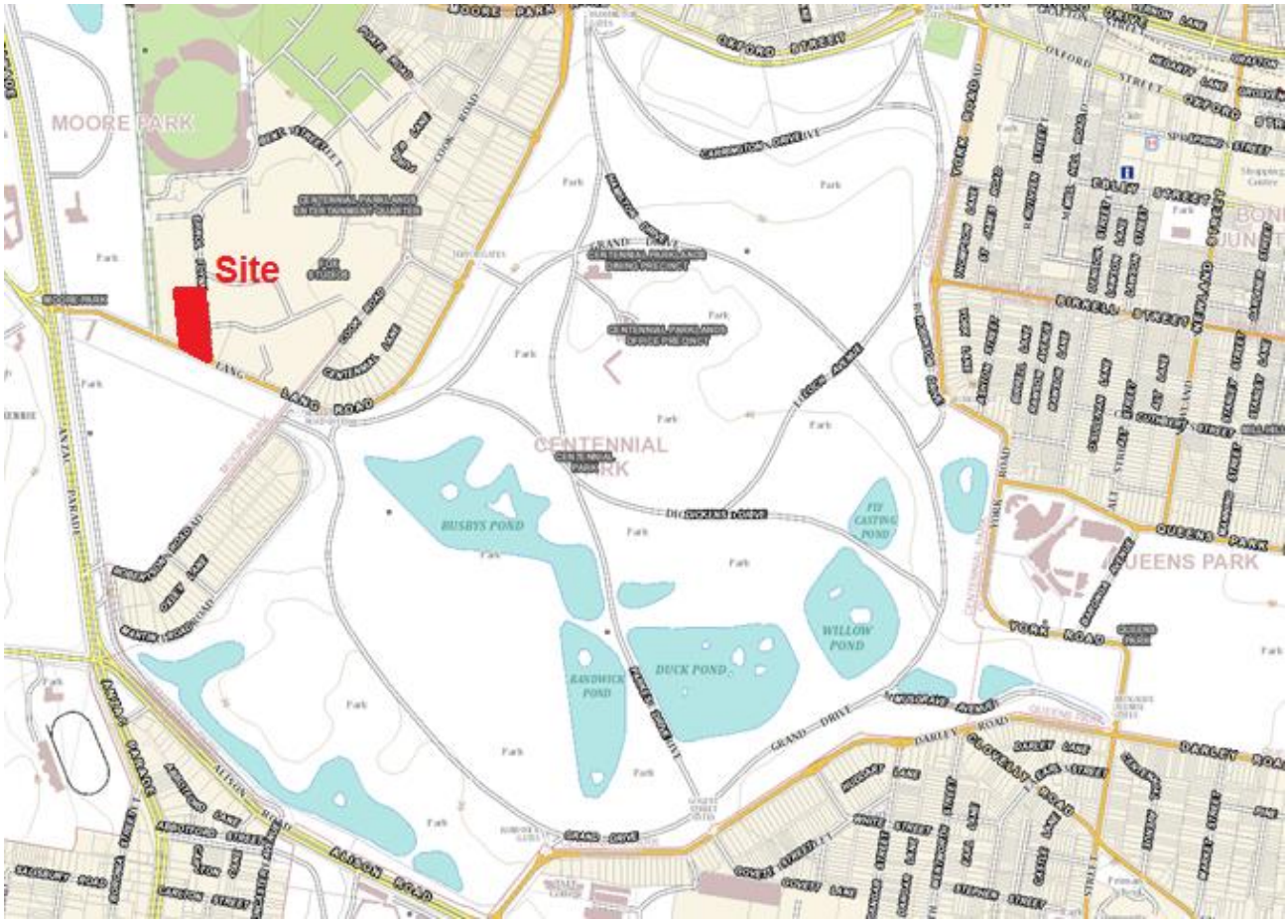

Figure 7 Location of ponds at downstream of the site

Figure 8 Location of ponds at downstream of the site

8. Earthworks

Excavation for pools, lift pits, services, stormwater works and building footings will be undertaken with all soil excavated to be done in accordance with the requirements of the Geotechnical report. The proposed facility and finished surface levels external to the building will be constructed to suit the existing ground level and adjacent RHI Building.

9. Sediment, Erosion and Dust Control

A Sediment and Erosion Control Plan has been prepared for the works, and provides for sediment controls at inlets to stormwater pits. As the site is minimal in site, and has no external catchments drawing through, erosion of soils during construction will be minimal and controlled by covering disturbed earth surfaces as soon as is practicable.

The area of the site that will have disturbed earth surfaces is situated immediately adjacent the Royal Hall of Industries building on the northern side, and surrounded on the western and southern. The existing brick wall at the eastern site boundary proposed to be removed and some protections should be provided to minimise risk of wind erosion and dust. If during earthworks operations visible dust is observed, control measures such as water sprays will be required to limit operation producing dust.