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WANDA SYDNEY PROJECT - CONTAMINATION ASSESSMENT

PTW Architects

Wanda Sydney Project

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Statement of Limitations

This report has been prepared in accordance with the agreement between PTW Architects and Greencap.

Within the limitations of the agreed upon scope of services, this work has been undertaken and performed in a professional manner, in accordance with generally accepted practices, using a degree of skill and care ordinarily exercised by members of its profession and consulting practice. No other warranty, expressed or implied, is made.

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Wanda Sydney Project - Contamination Assessment

PTW Architects

Wanda Sydney Project

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1 INTRODUCTION

1.1 Background

Greencap-NAA Pty Ltd (Greencap) was engaged by PTW Architects on behalf of Wanda Sydney to undertake a Detailed Site Investigation (DSI) of the following properties located in Circular Quay, Sydney, hereafter referred to as "the site" and indicated on **Figure 1**:

- Lot 1 in Deposited Plan (DP) 217877;
- Lot 1 in DP 220830;
- Lot 1 in DP 537286; and
- Lot 180 in DP 606866.

A Stage 2 Development Application is presently being prepared for submission to City of Sydney Council to for the redevelopment of the site.

As part of the Notice of Determination issued by Council (Reference: *Notice Of Determination – Approval D/2015/1049/A*) Condition 18 (a) states that:

A Detailed Environmental Site Assessment must be submitted for approval with the relevant Stage 2 development application. The Detailed Environmental Site Assessment must be carried out in accordance with the NSW EPA Contaminated Site guidelines, certifying that the site is suitable (or will be suitable, after remediation) for the proposed use.

To date the site has been dealt with as separate properties, and a number of assessments have been undertaken across the site by previous consultants. No comprehensive assessment of the site as a whole has been undertaken. The ability to undertake a full scale detailed site assessment at the site is severely limited by the fact that the footprint of the site is taken up by buildings (some of which have basement carparks) and the laneway to the south containing a number of underground services.

Due to these reasons, Greencap has not to date undertaken an intrusive assessment at the site. This report therefore consists of a data review of available reports and a contamination assessment based on these reports. We have prepared a conceptual site model discussing the source-pathway-receptor linkages at the site as to why a DSI would be better prepared once demolition is underway.

This report has been prepared with reference to the *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (2013 amendment)* and relevant guidance issued by the NSW EPA under the *Contaminated Land Management Act 1997.*

1.2 Objective

The objective of this assessment is to provide Council with a report discussion the potential for contamination at the site impacting upon the proposed redevelopment based on existing reports and other desktop sources.

2 SITE INFORMATION

Specific site details are included in Table 1, the site and regional context are indicated on **Figure 1**.

Table 1: Site Information

Item	Details
Lot and Deposited Plan (DP)	Lot 1 DP 217877; Lot 1 DP 220830; Lot 1 DP 537286 and Lot 180 DP 606866
Size	4,114 m^2
Site Owner	Wanda One Sydney Pty Ltd
Zoning	B8 Metropolitan Centre
Local Authority	City of Sydney Council
Parish and County	Parish of St Phillip, County of Cumberland
Locality and Site Map	Figure 1

2.1 Site Walkover

A site walkover was conducted by Greencap in October 2016. The walkover covered the extent of Goldfields House located at 1 Alfred Street as well as external roads, laneways and footpaths. Internals of Fairfax House and the Rugby Club were not included in the walkover. The following observations were made:

- The site is large and irregular in shape. It is generally flat with a very slight slope regionally to the north -east towards the Sydney Harbour.
- The site is bound to the north, east and west by Alfred Street, Pitt Street and George Street (respectively) and to the south by Rugby Place. Beyond this, the site is surrounded by:
  - High and low rise commercial buildings to the south, east and west; and
  - First Fleet Park to the north.
- The Sydney Harbour (Circular Quay) is situated approximately 120 m to the north-east of the site.
- The site itself comprises:
  - Goldfield House at the north of the site; a high rise building with two levels of basement car-parking.
  - Fairfax House at the south-east of the site; a high rise building with one level of basement parking;
  - The Rugby Club, a multi storey building with no basement; and
  - Rugby Place, an access laneway which runs along the southern portion of Fairfax House and the Rugby Club.
- Rugby Lane is a narrow laneway entirely covered in bitumen with a number of underground services running along its length (fibre optic, high pressure gas, water mains and electrical). The laneway contains the refuse collection bins for the surrounding buildings and is the access point for the loading dock for Jacksons on George (the western neighbouring building) and the Rugby Club loading dock. Grease traps were noted in the loading dock of the Rugby Club building. Localised staining from vehicles was noted on the bitumen surface. Two groundwater monitoring points were observed, one at the eastern end of the laneway and one at the western end.
- The Goldfields House inspection focussed mainly on the basement car park levels. Observations made include:

- The lower basement level of the car park was covered by painted concrete hardstand, in good condition. Some localised oil drips and very small stains were observed in the parking bays however these were not considered to have impacted the natural material beneath the slab.
- An aboveground diesel storage tank and pump were noted to be present in the western section of the lower basement level of the car park. The tank had been decommissioned, with fuel being removed in November 2013. The tank however had not been removed.
- The building manager told the Greencap representative that there was a second fuel tank at the site which has been removed. No information was available as to whether this was an underground or aboveground tank.
- A cleaners room was present on the lower basement level, some chemical storage was noted and MSDS sheets were considered appropriate. No staining or spillage was observed.
- Sewage pumps, grease traps and stormwater sub-pumps were also observed in the basement.
- Other areas of chemical storage were noted in the upper levels of the building (e.g. minor diesel storage in the fire control room on Level 27 and water treatment chemicals for the air conditioning system on Level 26), however due to the quantities stored and the distance from ground level these are considered to pose a negligible risk of soil or groundwater contamination.

2.2 Regional Meteorology

The following data was collected from the Bureau of Meteorology website for the weather station located at the Observatory Hill (station number 066062) which is located 1.3 km to the west of the site. Data for this station is available from 1859 to 2016.

- Mean maximum temperatures ranged from 25.9°C in January to 16.4°C in July;
- Mean minimum temperatures ranged from 18.8°C in February to 8.1°C in July; and
- Average rainfall over the period 1858 to 2016 ranged from 133.0 mm in June to 68.4 mm in September.

As the site is entirely covered by buildings, roads and pavements it is anticipated that any surface water run-off from precipitation events will flow into the stormwater drains at the site and out to the Sydney Harbour.

Local temperatures and wind speed at the site are likely to be influenced by the buildings, potentially leading to higher temperatures and wind speeds at the site than have been recorded at the weather station.

2.3 Geology, Soil and Topography

A review of the *Sydney Geological Series Sheet 9130 1:100 0000* indicates that the site is situated close to the border of the Hawkesbury Sandstone and man-made fill over Quaternary Alluvium.

The Hawkesbury Sandstone is a middle Triassic aged geological unit, and is described as a medium to coarse-grained quartz sandstone, with very minor shale and laminite lenses.

The man-made fill horizon is described as dredged estuarine sand and mud, demolition rubble and household waste, overlying the natural Quaternary Alluvium. The Quaternary Alluvium is described as silty to peaty quartz sand, silt and clay. Ferruginous and humic cementations in places with frequent shall layers.

The scale of the map is not small enough to confirm which geological unit the site is situated on, however as the majority of the footprint of the site incorporates basement car-parking it is assumed

that the depth of excavation (at least in the northern portion of the site) is such that any man-made fill horizons have already been removed (with the exception of engineered fill comprising gravels inferred to have been used in the construction of the basement).

Boreholes undertaken by Coffey in 2015 (Reference: *Wanda One Sydney Pty Ltd, Australia Sydney One Project, Geotechnical Investigation Report 2 October 2015*) indicate that fill material (silty sand) overlying alluvial material was encountered in a number of bores at the eastern boundary of the site, however bores drilled at the western boundary of the site encountered very little fill and were drilled into the sandstone. It is likely that the boundary of the two units is located underneath the site.

The *Sydney Soil Landscape Series Sheet 9130 1:100 000* indicates that the site is located on Disturbed Landscape, described as level to hummocky terrain, disturbed by human activity including complete disturbance, removal or burial of soil, removal of original vegetation and variable relief and slopes. The soils in this landscape are described as having been removed or highly modified with the addition of rock, building and waste materials.

Limitations of this landscape include sources of sediment and groundwater contamination, mass movement, low fertility and soil permeability and poor drainage.

The logs prepared by Coffey in 2015 indicate that the site conditions correlate with the desktop review, in that soils are either fill material or have been completely removed.

The site and its immediate surrounds are generally flat, with the harbour being the lowest point some 120 m to the north-east. Localised hills and ridges exist with distance from the harbour.

2.4 Hydrogeology and Hydrology

The closest water body is the Sydney Harbour, 120 m to the north-east. However the harbour is also located some 875 m to the west (Darling Harbour) and 800 m to the east (Mrs Macquarie's Chair). There are no natural surface drainage lines or natural water bodies present within close proximity to the site. It is expected that any pre-existing drainage systems flowing to the harbour have been infilled or culverted with the development of the city (for example the Tank Stream to the south of the site).

Regionally the groundwater flow is anticipated be towards the harbour, however as the site is situated on a small peninsula and is heavily built up, local groundwater flow may have been affected by development and flow direction may be variable. The groundwater in the sandstone is unlikely to be tidally influenced.

A groundwater bore search of the NSW Office of Water records indicated that there were no registered bores within 500 m of the site. It is assumed that the bores which were sighted in Rugby Place have been installed very recently and the relevant information has not yet been updated with the NSW Office of Water. The main water bearing zone (aquifer) beneath the site is expected to be within the Hawkesbury Sandstone. As the basement levels of the site have been excavated well into this geological unit it is expected that the hydraulic head of the aquifer is higher than the level of the deepest basement. There may be some localised perched water within the man–made fill at the site, however this is likely to be limited due to the lack of areas for surface water infiltration.

2.5 NSW EPA Database Search

The NSW EPA Contaminated Land Database (which contains information pertaining to sites notified to or by EPA as well as Records of Notice) was reviewed to assess if the site or surrounding properties have been declared as contaminated. It should be noted this database is not a comprehensive list of all contaminated land in NSW as this database only lists sites regulated under the *Contaminated Land Management Act, 1997*.

EPA Contaminated Land: Record of Notices

Sites are placed on this list only if the EPA has issued a regulatory notice in relation to the site under the *Contaminated Land Management Act 1997.*

There currently are no notices issued for the site or properties immediately surrounding the site.

Contaminated Sites notified to the NSW EPA

Sites on this list indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA.

The search did not indicate that the site or properties immediately surrounding the site have not been notified to the NSW EPA.

2.6 Previous Investigations

There have been a number of investigations undertaken at the site to date. Some of the reports have been made available to Greencap and are summarised in Table 2.

Table 2: Summary of Existing Reports

Report	Summary
Coffey – Geotechnical Investigation Report October 2015	Desktop review of historical documents and past reports as well as a limited intrusive assessment of soil, bedrock and groundwater in six locations to final depths of 18-25 m BGL and installing two of these as groundwater monitoring wells. Investigation was undertaken in the Goldfields House area of the site. Report findings included: • Fill material to a maximum depth of 3 m BGL was encountered at the site (deepest fill in BH02 at the south-eastern corner of the site (eastern point of Rugby Lane) and consisted of sandy gravel and silty sand. • Limited chemical testing of the soil indicated that concentrations of analytes were below adopted criteria for commercial/industrial land use as listed in the NEPM 1999 (2013 amendment) and that likely waste classification would be general solid waste (following TCLP testing for lead and benzo(a)pyrene). • Groundwater analysis indicated low levels of petroleum hydrocarbon contamination and some heavy metal impact. • Acid sulfate soil potential exists at the site based on the location of the site as well as limited sampling undertaken.
Coffey – Environmental Phase 1 Site Assessment June 2015	Desktop review of historical documents, site walkover and assessment of potential for contamination to exist. Report concluded that some areas of potential concern pertaining to contamination were present, mainly: • Imported fill underneath ramps and slabs in the basements; • Leakage from existing transformers and historical leakage from fuel storage tanks and oil pits; • Localised impact from stained walls and cleaning products being used on site; and • Asbestos used in building materials.

Report	Summary
	The report recommended sampling of fill materials beneath the site be undertaken.
Coffey Geotechnics - Stage 1 Preliminary Site Contamination Assessment 2010	Desktop review of historical documents, site walkover and assessment of potential for contamination to exist. Report concluded that some areas of potential concern pertaining to contamination were present, mainly: • Potential contamination of the site soil and groundwater from the stains observed in the grease trap room; • Fill material is likely to have been excavated during the construction of the existing basement however a low probability for fill to be present beneath the ramp to the car park and any unexpected areas of the site was noted; and • Potentially contaminated fill material and contaminated groundwater, if present is unlikely due to the lack of exposure pathways.

2.7 Summary of the Site History

Based on the review of the various Coffey reports, the following site history relevant to site contamination has been surmised:

- No dangerous goods are recorded as having been stored at the site. However, Greencap notes that there is a disused above ground diesel tank in the Goldfields House basement, and anecdotal records of a second tank existing.
- Title documents show that the site was privately owned and used for a combination of residential and commercial premises from the late 1800's to the early 1930's at which point it was acquired by the State Rail Authority. The State Rail Authority owned and/or leased the site until the late 1980s. The site has been used for commercial purposes since then. No industrial processes appear to have been undertaken at the site.
- The site and its immediate surrounds have been used for a variety of residential and commercial/industrial uses since Sydney's development in the late 1800's, aerial photography dating back to the 1930s confirms this.

3 CONCEPTUAL SITE MODEL

Based on the information available to date we have prepared a Conceptual Site Model for the site which details the source of potential contamination, the receptors at and adjacent to the site, and the pathways for exposure. As the site stands currently, we do not consider there to be a risk to the current site users as there is not a complete source-pathway-receptor linkage.

3.1 Proposed Site Development

The current development plans for the site include demolition of the current site buildings and construction of two towers, each with multiple storeys. The development will also include a common six level basement which will extend to approximately RL -12mAHD. The proposed landuse is a mixed use consisting of residential, light commercial/retail and a hotel.

3.2 Summary of Identified Contamination

To date, some limited assessment of the site has been undertaken with regard to contamination. Soil samples collected from the northern portion of the site indicate that shallow to medium depths of fill material exist in the eastern parts of the site (along Rugby Lane), however there is no information on the rest of the site.

The fill material identified consists of sandy, gravelly clay and silt and is likely to have been placed at the site during development. No inclusions were noted on the available logs which indicate the presence of domestic and building waste. Soil sample analysis undertaken on a limited number of samples indicates that concentrations of heavy metals and organic compounds are within acceptable limits for an industrial/commercial landuse. Large parts of the site (Goldfields House and Fairfax House) have been excavated into the Hawkesbury Sandstone to form basement carparks and as such any man-made fill present in these areas will have been removed at the time of construction. It is anticipated that any material brought onto the site for localised filling or ramp construction during construction was of sufficient quality to not pose a risk to the receptors at the site.

Based on the data collected to date, there does not appear to be any significant soil contamination in the fill material. Some localised impact may be present beneath Rugby Place and the Rugby Club, however this is likely to be limited and able to be dealt with during construction as it is anticipated that any fill material will be removed during construction.

The sandstone beneath the car park surface is not expected to be contaminated.

Groundwater at the site has been shown to have some impact from heavy metals (cobalt, iron, manganese and zinc), this is typical of groundwater in the Sydney Basin and is not considered to be sourced from the site.

Some hydrocarbon impact was noted during one round of sampling conducted a year ago. The source of this contamination was attributed by Coffey to impacted surface run-off due to the high traffic flow in the area. However it is expected that the well construction was of sufficient quality to prevent ongoing surface inflow to the groundwater. It is possible that poor environmental practices during the drilling and well construction and/or groundwater sampling (e.g. use of greases and oils on the drilling rig, cross contamination of well installation materials and groundwater sampling equipment) may have resulted in some localised impact to the groundwater. Further testing would be required to assess the water quality in this regard.

3.3 Site Receptors and Contaminant Pathways

3.3.1 Receptors – Ecological

The closest ecological receptor for the site is considered to be the Sydney Harbour. Groundwater beneath the site has been shown to have been impacted by low levels of petroleum hydrocarbons however it is unclear as to the source of this contamination as no impact was noted in the overlying soils.

It is possible that surface water run-off from high traffic areas has entered the groundwater well at the time of drilling; however standard well construction should be sufficient to prevent this from occurring. Impact may also have been introduced from poor drilling practices or from poor sample handling technique.

Impact in the groundwater wells is considered to be indicative of the general area and not necessarily sourced from the site itself. Impact to the Sydney Harbour from the groundwater at the site is not considered to pose a significant risk, the low hydrocarbon levels would likely attenuate naturally before reaching the Harbour.

3.3.2 Receptors – Current Human Site Use

Currently, the site is used for commercial purposes, with the below ground levels at Goldfields and Fairfax House used for basement car-parking. The ground level of the Rugby Club is a commercial premises and does not include residential use. The current receptors at the site are therefore considered to include:

- Car-park attendant staff, workers at the Rugby Club and Goldfields House and Fairfax House;
- Customers parking cars at the basement car parks;
- Customers using the retail areas of the ground levels of the buildings of the site.

There is not considered to be a risk to the current site users as there are no pathways for exposure to any contamination which may exist at the site.

Pathways for exposure to sub-surface soil and groundwater contamination are not considered to exist for the following reasons:

- There is no direct access to the soil at any part of the site therefore dermal exposure and ingestion pathways are not considered a risk to site users.
- There is not considered any beneficial re-use of the groundwater at the site for potable, recreational or agricultural use.
- Risk to site users from vapour ingress at the site is considered to be negligible based on the data collected to date and based on the site history (commercial rather than industrial/manufacturing uses).

3.3.3 Receptors – Future Human Site Use

During and post development the receptors at the site may include:

- Construction workers;
- Utilities maintenance workers; and
- Workers and residents once the site development is complete.

Pathways for exposure will include dermal and ingestion pathways during construction, however as there is not considered to be any major soil contamination and as any works will be undertaken under a Construction Environmental Management Plan (which will detail correct PPE requirements) these pathways are not considered to pose a risk to the receptors.

There is not considered to be any beneficial reuse of the groundwater at the site either during development, or following completion. The site is connected d to the municipal water supply and no irrigation or recreational use is proposed.

Following demolition works, it is expected that any fill material is either removed or validated as being suitable to remain on site, and the accessible soil at the site will be covered with hardstand thus removing any source-receptor linkage

4 CONCLUSIONS AND RECOMMENDATIONS

Greencap was engaged to undertake a Detailed Site Investigation at the Wanda Sydney site, encompassing Goldfields House, Fairfax House, the Rugby Club and the laneway Rugby Place.

Due to the following reasons, a DSI was not undertaken:

- Lack of accessible soil and suitable areas for placement of soil sampling locations (a site of this size requires 11 soil sampling locations as per NSW EPA(1995) *Sampling Design Guidelines)*:
  - Large areas of the site comprise basements. These are excavated into the natural rock (Hawkesbury Sandstone) therefore the risk of contamination being present at these depths is unlikely.
  - Furthermore, the hydraulic head of the aquifer is currently above the basement floor, which resulted in the basement car parks flooding and damage to lift mechanisms being incurred during a previous assessment. The risk of this occurring again was deemed high and puncturing the basement tanking with a second round of drilling was considered unnecessary given the low potential for contamination in the Hawkesbury Sandstone.
  - Rugby Place has a number of high risk services (water, gas, communications and power) running along its length. The risk of damaging services was considered high.
- A comprehensive assessment of the entire site footprint can be undertaken once demolition and construction begins, rather than a limited assessment while the buildings are in use. The results which would be gained by waiting until construction begins will be more reliable and allow further development of the Conceptual Site Model (CSM) than results gathered from small areas of the site should the investigation be undertaken at this stage.
- There is not considered to be a complete source-pathway-receptor linkage at the site to warrant an assessment of risk to current site users. Risk to future site users can be managed at the construction phase through ongoing assessment, or management of contamination at the construction phase through appropriate site practices and an ongoing site validation process.
- Based on the information to date it appears there is a low likelihood of significant contamination being present. Fill material to date appears to consist of sandy gravelly fill, likely placed during construction and groundwater impacts appear limited. It is considered that the site can be made suitable for its intended use.

We recommend the following be undertaken:

- Preparation of a Sampling Analysis and Quality Plan for a DSI to be undertaken at the site. The DSI should be undertaken once tenants have left the premises and local services have been disconnected, and preferably once access to the entire footprint is available.
- Assessment of fill material in areas where no basement exists once demolition has occurred.
- Assessment of the groundwater at the site by a suitably qualified contaminated land scientist from the existing wells at the site.
- Preparation of an unexpected finds protocol which can be enacted at all stages of the sites development in order to deal with any contamination which may be encountered.

5 REFERENCES

Bureau of Meteorology website (www.bom.gov.au)

Coffey (2015) *Wanda One Sydney Pty Ltd Australia Sydney One Project Environmental Phase 1 Site Assessment 15 June 2015*

Coffey (2015) *Wanda One Sydney Pty Ltd Australia Sydney One Project Geotechnical Investigation Report 2 October 2015*

Coffey (2010) *Stage 1 Preliminary Site Contamination Assessment 1 Alfred Street, Sydney NSW*

National Environmental Protection (Assessment of Site Contamination) Measure 1999 (2013 Amendment)

NSW EPA (1995) *Sampling Design Guidelines*

NSW EPA (2014) *Waste Classification Guidelines Part 1: Classifying Waste*

Wanda Sydney Project - Contamination Assessment

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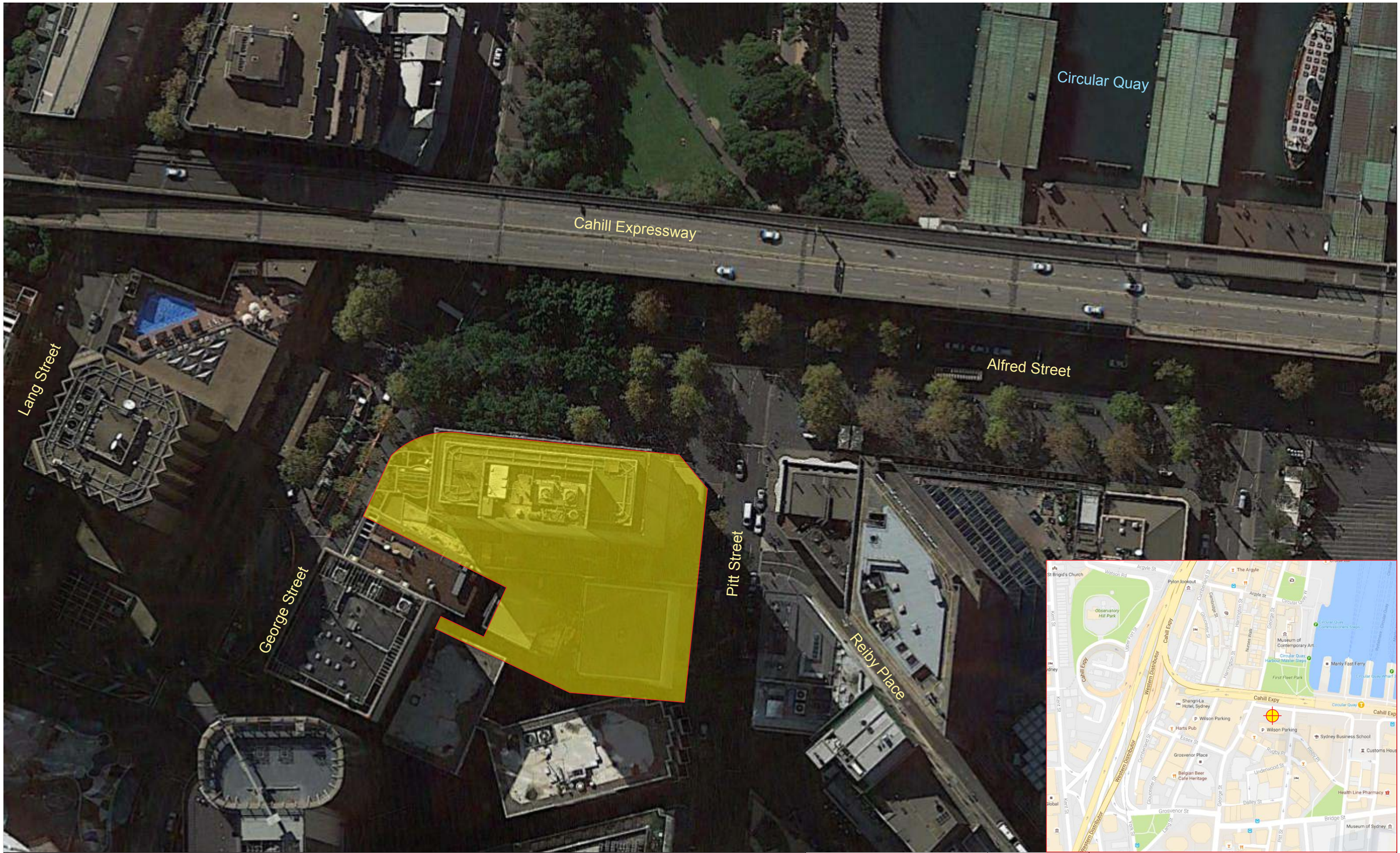
Figures



Legend:

- Site Boundary
- Site Location

Metres
0 25 50

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Client Name:	PTW Architects				
Client Number:	C108692	Project Number:	J147115		
Project Description:	Preliminary Site Investigation				
Address:	1 Alfred St; 19-31 Pitt St; 31A Pitt St Sydney, NSW				
Prepared:	EL	Reviewed:	NL	Date:	06/10/2016
Figure 1	Site Location and Regional Context				