



# Robert **Bird** Group

## Services Infrastructure Report

### Darling Walk Redevelopment Darling Harbour, Sydney

Prepared For: Bovis Lend Lease

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### Robert Bird Group Drawings:

07739-RD03007 In-Ground Services Plan – Proposed Building Ground Floor

### Arup Drawings:

SD030070 Bridging Structures over Existing Energy Australia in-Ground Services – Layout  
SD030010 Bridging Structures over Existing In-Ground Services – Layout  
SD030011 Bridging Structures over Existing In-Ground Services – Details

### Warren Smith & Partners Drawings:

Case No 111060WW Darling Harbour Sub-main – Adjustment of Darling Harbour Sub-main, City of Sydney Sheet 1 of 3

### Bovis Lend Lease Drawings:

116273-ASK100 Plan of Proposed New Railcorp Joining Pit  
116273-ASK103 Detail Section 01 – Proposed New Railcorp Joining Pit

## REFERENCES

1. Robert Bird Group [2007] “Report on Existing Services and Site Constraints for Redevelopment of Darling Walk, Darling Harbour, Sydney” prepared for Sydney Harbour Foreshore Authority, Report No 03329-S1 Revision 6, 15 August 2007

## 1.0 Introduction

The Darling Walk precinct site at Darling Harbour is to be redeveloped by Lend Lease Developments. As part of the requirements of the Department of Planning, this report has been prepared to identify the impact of the proposed development on existing services infrastructure in the area.

A previous report on services infrastructure in the Darling Walk area was prepared by Robert Bird Group for Sydney Harbour Foreshore Authority in August 2007. That report [Ref. 1] is appended to this report for reference, as it describes the existing infrastructure in detail. This report will focus primarily on works undertaken to confirm services location, correspondence with services authorities, proposed measures to avoid clashes with existing services, and proposed alterations to services.

## 2.0 Sydney Water Corporation

Site investigations confirmed the location of services corresponded reasonably well with the information provided by Sydney Water Corporation. At a number of sewer maintenance holes, actual surface and invert levels (which were missing from Sydney Water data) were measured by survey. Lids to stormwater access chambers have been located and opened to confirm culvert levels. The location and levels of the James Street stormwater main was adjusted to reflect field survey.

### 2.1 Stormwater Diversion

As indicated in Ref 1, the James Street Stormwater Channel traverses the site, and would need to be relocated to accommodate the proposed development.

The proposed diversion route is shown on the Robert Bird Group drawing RD03007 in the Appendix to this report. The route has been selected to minimise works within Harbour Street and to avoid clashes with existing services as much as possible. In particular, the route has been determined to avoid existing 11kV cables near the existing substation below the southern pedestrian walkway west of Liverpool Street.

The size of the diverted culvert has been determined by Warren Smith and Partners, and has been submitted to Sydney Water for approval. The size has been increased from existing, to allow for the increased length of the diverted channel and the head losses at additional bends in the channel.

Preliminary concept approval was obtained from Sydney Water on 14 May 2008, and detailed design for final submission is currently in progress.

### 2.2 Sewer Alteration

A sewer maintenance chamber is located within the building footprint. This chamber is located on the 750mm diameter Darling Harbour Submain.

It is proposed to seal off this chamber, and to construct a new chamber to replace it, outside the building footprint. Drawings for the proposed alteration have been prepared by Warren Smith and Partners and submitted to Sydney Water for approval. The layout plan (sheet 1 of 3 for Case No 111060WW) showing the existing and proposed chamber is included in the Appendix to this report.

## 2.3 Water Main Alteration

The proposed diversion of the James Street Stormwater Channel will clash with an existing 200mm diameter water main in the zone between the elevated walkways west of Liverpool Street.

It is proposed to temporarily seal off this main and reinstate the main on completion of the stormwater diversion. Preliminary advice has been received from Sydney Water that this would be feasible, and detailed documentation is in progress.

## 2.4 Services Clearances

Several potential clashes between proposed structural piles and Sydney Water services have been noted. These are generally shown on Arup drawing SD030010 in the appendix to this report. Of particular note are potential clashes of structural piles with the Hay-Lackey stormwater channel (3.07m and 3.9m wide x 2.21m high culverts), and the 750mm diameter Darling Harbour Sub-main sewer.

It is proposed to bridge over these services using beams spanning over the services and supported on piles on either side of the services. Typical details are shown on Arup drawing Sd030011 in the Appendix to this report.

This procedure is in accordance with previous accepted practice on the site. Similar bridging beams were constructed to support structures over Sydney Water services for the existing Sega World buildings.

In addition, a 200mm diameter water main crosses beneath the proposed building at the north-eastern corner. This water main is concrete encased, and preliminary advice from Sydney Water has indicated that it will be permissible to build over the main.

## 3.0 Energy Australia

As noted in Ref 1, discrepancies were found between Energy Australia's plotted position of 11kV cables along the western side of Harbour Street and their actual location. Cable tracing indicated that the cables were located within the associated electrical easements, rather than outside the easement as indicated on Energy Australia's drawings.

Further investigation in Sydney Harbour Foreshore Authority archives uncovered "work-as-executed" drawings of the cable route which noted the plan position of the cables to ISG coordinates and levels to Australian Height Datum. The coordinates were converted to Australian Mapping Grid and the position plotted, confirming the cable locations within the electrical easements.

Energy Australia's services plans showed 33kV cables to the north-east of the site. Energy Australia has advised that all previously-documented 33kV cables within the site are now inactive, and no diversions will be required.

Detailed discussions and site inspections have been held with Energy Australia personnel in order to obtain access to major cable pits and confirm their location and purpose.

### 3.1 Substation Alterations

An existing substation is located within the Darling Walk footprint, and services the site. Discussions with Energy Australia confirmed that the substation can be decommissioned and replaced with a new substation in a different location within the site.

A previous substation shown on Energy Australia services drawings had already been removed with the earlier Darling Walk development, and is non-existent.

### **3.2 Cable Clearances**

Preliminary building design indicated a potential clash between proposed structural piles and 11kV cables within the electrical easement. Accordingly, the building position was altered so that piles are now located well outside the easement. Only one pile now clashes with an existing Energy Australia pit (Pit No 115). It is proposed to bridge over this pit with a beam supported on piles on either side of the pit, as shown on Arup drawing 8D030070 in the Appendix to this report.

### **3.3 Energy Australia Services Augmentation**

Energy Australia proposes to tunnel-bore a new 4m diameter cable tunnel beneath the site. This tunnel will be at considerable depth below the building (approx RL -28m AHD), and geotechnical advice has been sought into its impact on building piles. The advice received confirms that there would be no impact on pile design.

Energy Australia also proposes to complete the 132-kV ductline between their vaults 8C and 20, to the north of the proposed building. This proposed ductline is outside the proposed building footprint.

## **4.0 Telstra Corporation**

Cable ducts belonging to Telstra Corporation traverse the site and pass within the proposed building footprint at the north-western corner. The cable locations have been verified by electronic location methods except where they pass under existing buildings.

Insofar as cable locations have been confirmed to date, no clashes are noted between Telstra cables and structural piles. However, further investigation to confirm cable locations within the existing building footprint will be carried out following building demolition.

Telstra Corporation has indicated that the cables can remain in their current position, subject to confirmation of cable location wherever the cables are in close proximity to proposed structural piles. Cables will be exposed by hand excavation in the presence of a Telstra representative following demolition of the existing building.

The proposed diversion of the James Street stormwater channel will cross Telstra cables west of Liverpool Street. It is proposed that these cables will be supported across the trench excavation. A detailed methodology for the cable support is being prepared for submission to Telstra as part of detailed design of the diversion works.

Further Telstra cable ducts are located generally along the western kerblines of Harbour Street. These are not affected by the proposed building works.

## **5.0 Agility (Alinta)**

Alinta own gas mains to the north of the site (generally under the Western Distributor) and east of the site (generally within or near Harbour Street). A gas connection services the existing building at the northern end of the site. This connection will be terminated prior to demolition of the existing buildings, and a new connection provided to the proposed new buildings.

No other clashes or potential alterations have been noted.

Bovis Lend Lease is currently in coordination with Alinta, also looking into possible gas distribution main routes with them.

## **6.0 RailCorp (Rail Corporation NSW)**

Power cables belonging to RailCorp traverse the northern portion of the site. A major cable jointing pit is located within the building footprint. A gassing station (which provides gas for older gas-filled cables) is located near the north-eastern corner of the site. Small diameter gas lines and pilot cables have been located by surface electronic detectors, but this has been made difficult by the existence of buried metal structures which have distorted the plotted locations. Further investigation will be carried out following demolition of the existing buildings.

Detailed discussions including site inspections have been held with RailCorp personnel to determine the methodology for protection of these vital services.

### **6.1 Joining Pit Alterations**

The existing cable joining pit cannot be removed or relocated. RailCorp has advised that access to the pit must be maintained for maintenance purposes.

Field investigations reveal that the pit is constructed with brick walls and a poorly formed base. Concerns have been raised as to the ability of the pit to withstand construction traffic, vibration and loading, and also the feasibility of modification of the pit surface levels to suit new building levels.

It is proposed that the pit be partly demolished and extended in reinforced concrete. The pit would be enlarged and deepened, and access to the pit would be provided from outside the building rather than from inside the building, as surface access would be extremely disruptive to building activities.

Plan and sectional details of the proposed modified and enlarged jointing pit are shown on Bovis Lend Lease drawings ASK-100 and ASK-103, in the Appendix to this report. These details were submitted to RailCorp on 23 May 2008.

### **6.2 Cable Clearances**

It is proposed that all RailCorp cables will remain in their current position.

Potential clashes have been identified between proposed structural piles and RailCorp cables, as noted on Arup drawing SD030010 in the Appendix to this report.

It is proposed to bridge over these services using beams spanning over the services and supported on piles on either side of the services. Typical details are shown on Arup drawing SD030011 in the Appendix to this report.

Minor gassing lines and pilot cables from the gassing station to the Jointing Pit may require minor relocation during construction. This will be confirmed following careful excavation to confirm their exact position.



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## **APPENDIX**