Royal Randwick Racecourse
Alison Road, Randwick
NSW 2031

16 December 2013

J:\Jobs\113081\Admin\L131216_EIS_Response_WMAwater.docx

Attention: **Andrew Steventon**
Project Manager

Re: Review of Light Rail Environmental Impact Assessment
Comments Regarding Flooding

Following a qualitative assessment of the likely impacts, it is probable that construction of the Light Rail will have adverse flooding impacts on either the Royal Randwick Racecourse or the adjoining floodplain users. Alison Road is an overland flowpath conveying peak discharges of up to 8.5 m^3/s along it and 10.4 m^3/s across it between Prince Street and Darley Street in the 100 year ARI event (event commonly used in quantifying impacts). The current underground pipe capacity is in the order of a 1 year ARI event. Thus in larger events, significant runoff will occur along the road network and in places into private property. Mitigation measures to negate any adverse flooding impacts (such as increase in flood levels and extents or diversion of overland flowpaths) proposed in the EIS include:

- Increasing the downstream drainage capacity;
- Diverting upstream flows around or under the track formation;
- Providing stormwater detention under or adjacent to the track formation;
- Diverting the existing drainage; and
- Providing new drainage parallel to the Light Rail alignment.

While construction of these measures will assist in mitigating impacts, they are unlikely to be adequate in keeping them within an acceptable tolerance of +/- 0.01m which has been applied to obtain development approvals at Royal Randwick in the past. Similar issues are likely for the proposed alignment along Wansey Road.

Furthermore, achieving the design criteria of limiting track water depths to 0.015 m or less for whichever event is larger of a 10 year ARI or the design ARI of the adjacent road is improbable if the track levels are in accordance with the proposed design methodology of adopting rail levels similar to existing ground levels. Inundation depths in excess of 0.3 m are predicted along Alison Road in the 10 year ARI event. Similarly, flood depths of 0.3 m are approximated along Wansey Road for the 10 year ARI event. While depths of 0.05 m are tolerable for continued Light Rail operation (albeit at reduced speeds) the significantly larger depths along Alison and Wansey Roads will realistically require a raising of the track relative to the existing road levels. This will however, exacerbate flood risk along Alison and Wansey Roads through a combined loss of

conveyance and loss of flood storage. Flood levels are therefore likely to be higher as a result of the proposed works. This necessitates a detailed flood impact assessment which includes the proposed Light Rail alignment since current flood levels without the Light Rail are inadequate in informing track design levels.

Flood impacts are likely to be exacerbated nearby the proposed Randwick Light Rail Stabling Facility, the Royal Randwick Racecourse stop and the Wansey Road stop locations. Compensatory measures may need to be considered at these locations.

Volume 1A of the EIS Section 10.2.2 suggests that the Anson site ground levels (proposed location of Randwick Light Rail Stabling Facility) will be raised. The site is downstream of the Centennial Parklands from which flows of up to 50 m^3/s are estimated to originate in the 100 year ARI event. This will result in a significant reduction (in the order of 20 m^3/s at the peak) to the current flowpath which will be directed elsewhere and/or exacerbate impacts.

A significant flood storage loss and conveyance loss will occur if any filling is undertaken on the Anson site. Peak depths of 0.77 m are predicted over the Anson site for the 10 year ARI event rising to a peak depth of 1.38 m for the 100 year ARI event. This results in an approximate flood storage loss of 4000 m^3 if the site or entrance to the site is elevated to such a level as to achieve immunity for the 10 year ARI event. This increases to 14,000 m^3 if protection from the 100 year ARI event is desirable. Compensatory floodplain storage might be achieved by diverting flows from Alison Road to the racetrack area which can act as a retarding basin. Based on existing levels of storage in the racetrack of approximately 51, 000 m^3 and 90,000 m^3 for the 10 year and 100 year ARI events, diversion of the lost Anson site flood storage would result in manageable flood level increases over the racetrack of less than 0.1 m.

The proposed location of the Royal Randwick Racecourse stop experiences relatively lower peak flood depths (0.1 m and 0.13 m for the 10 year ARI and 100 year ARI events respectively) due to the elevated levels of the existing busway. However, proposed ground levels for the Royal Randwick Racecourse stop are lower than existing ground levels therefore higher flood depths will occur. Furthermore, the current high ground levels provide flood protection to the grandstand area of the Royal Randwick Racecourse, therefore, potential loss of flood immunity due to the lowering of ground levels needs to be investigated.

Peak flood depths of 0.87 m and 0.92 m are estimated for the 10 year and 100 year ARI events respectively within the platform area of the Wansey Road stop. This results in approximate flood storage losses of 63 m^3 and 76 m^3 respectively if flood immunity from these events is required for the Wansey Road platform stop.

The proposed site for the High Street Substation is flood affected by the overland flow path along Anzac Parade. Relocation of the substation will be required to prevent an exacerbation of flood risk.

While the Light Rail project is overwhelmingly beneficial the flood risk has not been adequately addressed in the EIS. The high level assessment of the likely impacts of the proposal is insufficient and a detailed assessment is required to satisfy requirements of the Floodplain Development Manual.

Yours Sincerely,
WMAwater

Dr Philip Conway
Water Engineer