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Dear Mark

**Barangaroo South - Jemena Submission Response letter, Hickson Road Remediation DA (SSD 6617),
Hickson Road, Millers Point**

1.0 Introduction

AECOM Australia Pty Limited (AECOM) has prepared this letter for Lend Lease (Millers Point) Pty Ltd (Lend Lease) in response to Jemena's letter:

- Jemena, 2015. *Hickson Road, Millers Point Remediation Works (SSD 6617)*. 6 November 2015 (here after referred to as the Jemena submission).

In particular, this letter provides a response to the matters raised by Item a, b and d of the Jemena submission which relate to either the:

- *Declaration Site Human Health and Ecological Risk Assessment (HHERA)* (AECOM, 2011)¹;
- *VMP HHHERA* (AECOM, 2012)²; and/or the
- *VMP/Block 4 Remedial Action Plan (RAP)* (AECOM, 2013)³.

2.0 Item a)

2.1 Groundwater Dependent Ecosystems

The Jemena submission states that the

VMP HHHERA (AECOM 2012) identifies the nearest ecological receptor as being groundwater dependant ecosystems (GDEs) between the down gradient boundary of the Declaration Area and Darling Harbour. There is no evidence of GDEs in this area. AECOM provides the following response:

- Table 7 of the *VMP HHHERA* (AECOM, 2012) specifically identifies the "determination of the presence of groundwater dependant ecosystems" as a data gap and states that the:
...precautionary principle has been applied, in consultation with the NSW EPA, in the absence of scientific data to confirm the presence of groundwater dependant ecological systems and their novel fauna. According to the precautionary principle irrespective of whether there are groundwater ecosystems present at the Site currently or not, the level of protection is required to be the highest that is practicably achievable based on the protection of the potential for such ecosystems to occur in the future.
- Adoption of the precautionary principle and assessment of GDEs in the *VMP HHHERA* (AECOM, 2012) was considered compliant with the current NSW guidance and NSW EPA policy as follows:
 - The *Contaminated Land Management (CLM) Act* (1997), Section 9, which requires adoption of the precautionary principle where the lack of scientific certainty is not a reason for postponing measures.

¹ AECOM, 2011. Human Health and Ecological Risk Assessment, Declaration Site (Development Works) Remediation Works Area – Barangaroo. 9 June.

² AECOM. 2012. Human Health and Ecological Risk Assessment, VMP Remediation Works Area (Addressing the NSW EPA Remediation Site Declaration 21122, Millers Point). 25 October.

³ AECOM, 2013. *Remedial Action Plan NSW EPA Declared Remediation Site 21122 and Block 4 (Stage 1b) Development Works, Barangaroo, Millers Point, NSW*. 24 July.

With respect to the Site, this relates to the protection of groundwater dependant ecosystems down hydraulic gradient of the Site and the requirement for remediation to the extent practicable (even in the absence of data demonstrating the presence, or otherwise, of such ecosystems now, or in the future);

- The Department of Environment and Conservation NSW (now NSW EPA) *Guidelines for the Assessment and Management of Groundwater Contamination*, March 2007, reemphasise the requirements of the CLM Act (1997) requiring protection of groundwater ecosystems according to the precautionary principle;
- The ANZECC (2000) Water Quality Guidelines (Section 1) state that the protection of underground aquatic ecosystems and their novel fauna requires the highest level of protection.
- While the NEPM (1999⁴) does not include specific consideration of GDEs:
 - Schedule 5 states that Ecological Sustainable Development (ESD) aims to protect biodiversity and maintain ecological processes and functions and it is a central paradigm to both Australian and international environmental regulations and policies; and
 - *Schedule B(6)* states that determination of the point of use of groundwater is a jurisdictional matter and that the transfer of contaminated groundwater from a contaminated Site is not considered to be acceptable, even if the relevant guidelines are achieved at the point of use / discharge.
- In May 2012, the NSW Office of Water (NOW) and the Office of Environment and Heritage (OEH) developed *Risk assessment guidelines for groundwater dependent ecosystems* (NOW and OEH, 2012) to:

...provide methods to identify and value groundwater dependent ecosystems (GDEs) to assist reporting against the state-wide Target for Groundwater that:

'By 2015 there is an improvement in the ability of groundwater systems to support groundwater dependent ecosystems and designated beneficial uses', NSW Natural Resources Monitoring, Evaluation and Reporting Strategy 2010–2015.'

- It is therefore considered appropriate that consideration of GDEs was included in the *VMP HHERA* (AECOM, 2012) and that it is in accordance with both available guidance at the time the risk assessment was completed and current guidance.

2.2 Risk to the Intrusive Maintenance Worker

The Jemena submission states that

the risks to intrusive maintenance workers are able to be controlled by a site management plan in a similar way to the way the paved open space at 36 Hickson Road is currently managed by a site management plan authorised by a site auditor.

AECOM provides the following response:

- It cannot be assumed that an intrusive maintenance worker at the Site would wear appropriate PPE when conducting works, as this would require a Long Term Environmental Management Plan (LTEMP) for the Site. A LTEMP is inconsistent with the preferred order of options for remediation and management of contaminated sites described by the ANZECC (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* which states that leaving contaminated material in-situ is the least preferred of available remediation options. The conservative assumption of an “unprotected” intrusive maintenance worker was adopted to be protective of instances where works may be conducted without the implementation of an adequate management plan to prevent exposures;
- The approach of assuming an intrusive maintenance worker is “unprotected” is consistent with standard industry practice as per the CRC CARE (2011) Health Screening Level derivation; and
- Based on the above information, AECOM considers the approach conducted within the *VMP HHERA* (AECOM, 2012) to be appropriate given the scale and complexity of the Site, and that the exposure scenario of an unprotected intrusive maintenance worker is valid and provides an appropriately conservative assessment of potential risks to identified receptors.

⁴ NEPC. 1999. *National Environment Protection (Assessment of Site Contamination) Measure*, National Environmental Protection Council. The NEPM was later amended in 2013 and was not in existence at the time the *VMP HHERA* (AECOM, 2012) was prepared.

3.0 Item b)

The Jemena submission states that:

the nearest ecological receptor to Hickson Road is Darling Harbour. It is more than 100 metres to the west of Hickson Road. It is currently mostly reclaimed land with fill.

The Jemena submission notes the basement retention walls that will be constructed as part of the proposed Barangaroo development works and states that:

these works will create a hydraulic barrier between Hickson Road and Darling Harbour and there is no technical evidence presented in the EIS that suggests that any contaminants are migrating into Darling Harbour in excess of the marine water quality criteria.

And:

it is not clear from the EIS how the specific remediation works in Hickson Road, when taken in conjunction with the installation of the perimeter groundwater retention walls being installed on the broader site, will improve aquatic ecosystems in Darling Harbour.

AECOM provides the following response:

- The nearest sensitive ecological receptor is considered to be the potential GDEs located between the down gradient boundary of the Declaration Area and Darling Harbour for the reasons discussed in **Section 2.1** and not Darling Harbour (as asserted by the Jemena submission).
- The Hickson Road portion of the Declaration Area cannot be considered in isolation from the rest of the Declaration Area. On this basis, it is appropriate to establish the point of compliance on the down hydraulic gradient boundary of the Declaration Area. As discussed in **Section 2.1** this approach was considered compliant with the current NSW guidance and NSW EPA policy.
- The remediation works proposed for the Hickson Road portion of the Declaration Area are limited to the VMP Remediation Works (only) as the current land use (public roadway) is not proposed to be changed. As described by Section 1.1.1 of the *VMP/Block 4 RAP* (AECOM, 2013), the VMP Remediation Works are those works required to
facilitate removal of the NSW EPA Declaration based on potential risks to human health and the environment from the existing land uses within the Declaration Area.
- In developing the scope of the VMP Remediation Work it was not appropriate to consider the presence of any potential development because it was intended that the scope of the VMP Remediation Work should be independent of any future development at Barangaroo (refer to Section 1.2 of the *VMP/Block 4 RAP* (AECOM, 2013)).
- Consequently, in developing the scope of the VMP Remediation Works, the proposed development works on the adjacent Block 4 and Block 5 of the Barangaroo site were not considered.

4.0 Item d)

The Jemena submission states that

the contamination under Hickson Road is able to be managed to address the human health and environmental risks arising from the use of the land as a public road and potential risks to the surrounding areas in a less environmentally intrusive manner (eg cap and contain) which would be more consistent with the principles of ecologically sustainable development.

As per Section 11.4 of the *VMP/Block 4 RAP* (AECOM, 2013), two remediation strategies are considered for Hickson Road. The preferred strategy is surfactant-enhanced *in situ* chemical oxidation which is recommended for a variety of reasons including, but not limited to, it being considered a more ecologically sustainable solution for the reasons detailed in Section 11.4.2 of the *VMP/Block 4 RAP* (AECOM, 2013) and paraphrased following:

- In situ chemical oxidation is considered an innovative and sustainable solution to the in situ remediation of Hickson Road, whereas the ex situ remediation of tar associated with former gas works would be resource intensive and costly;
- It minimises earthworks, materials handling, separation, dewatering and drying requirements, therefore minimising emissions from diesel operated equipment and machinery and the overall carbon footprint for the development;

- It minimises fugitive emissions and odours from handling of contaminated material, therefore minimising the risk of adverse stakeholder concerns. This is a particular concern given the proximity of Block 4 to residences and office buildings;
- It minimises the quantities of material that requires off-site disposal to landfill;
- It will directly remediate both soil and groundwater contamination. Ex situ remediation technologies will remove the source soil contamination and rely on natural attenuation and/or other amendments/active remediation to improve groundwater quality; and
- Resources required to implement in situ chemical oxidation are generally limited to power and water. This is particularly relevant with respect to some other in situ remediation technologies which require a large energy input (for example steam stripping or thermal conductive heating).

The alternative remediation strategy is ex situ remediation works.

The management of contamination present under Hickson Road (including gasworks waste and tar) using a cap and contain approach, as suggested by the Jemena submission, would:

- require the ongoing implementation of a LEMP; and
- not provide a hydraulic barrier to the future migration of groundwater contamination from the gasworks waste and tar currently present beneath Hickson Road.

As described by **Section 2.2**, AECOM considers that adoption of an unprotected intrusive maintenance worker exposure scenario (i.e. assuming that an LEMP would not be in place) by the *VMP HHERA* (AECOM, 2012) is appropriate given the scale and complexity of the Site and provides an appropriately conservative assessment of potential risks to identified receptors.

Yours faithfully,



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5.0 References

AECOM, 2011. *Human Health and Ecological Risk Assessment, Declaration Site (Development Works) Remediation Works Area – Barangaroo*. 9 June.

AECOM 2012. *Human Health and Ecological Risk Assessment, VMP Remediation Works Area (Addressing the NSW EPA Remediation Site Declaration 21122, Millers Point)*. 25 October.

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NEPC, 2013. *National Environment Protection (Assessment of Site Contamination) Amendment Measure*.

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