

be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc). Coffey notes that construction of the existing Sydney Entertainment Centre (SEC), which partially overlaps North Plot, is reasonably expected to have resulted in removal of waste materials which may present unacceptable foundation conditions.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep foundation excavation is required for construction, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E3.4 Remediation in the Construction Schedule

No specific remediation is warranted for the North Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented, and construction activity within the localised area of that incidence may be disrupted.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.3 of the RAP.

E3.5 Monitoring of Remediation Works and Validation

In Remediation Area 5, validation sampling and analysis will be used to demonstrate that unacceptable risk from concentrations of benzo(a)pyrene TEQ has been reduced. Validation procedures are described in Section 11.2 of the RAP.

Dust suppression will be employed in the remediation area to minimise the release of contaminants at the excavation point and on transfer of the impacted material to the trucks for disposal. Other environmental controls will be implemented during the remediation works as described in Section 13 of the RAP. Trucks will have covered loads to prevent release of dust along public roads between the Haymarket and the landfill.

The excavated areas will require restoration to construction design levels by use of fill material from other areas of the site (except from other Remediation Areas, or any other area identified during construction as warranting remediation), or by use of imported fill which will satisfy the definition of virgin excavated natural material (VENM) or met the requirements of the Excavated Natural Material Exemption (2012).

In addition to the warranted remediation and validation activity, if unanticipated contamination conditions emerge then appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E3.6 Remediation Result

Coffey considers that if remediation and validation is undertaken in accordance with relevant parts of this RAP, then the North Plot can be made suitable for the proposed development in that plot.

Coffey confirms that contamination assessment results reported contaminant concentrations, other than that in Remediation Area 5, generally below SILs and otherwise below RAC in and around the North Plot. On that basis, Coffey concludes that the North Plot can be made suitable for the proposed development and future uses through successful implementation of this RAP in relation to the North Plot.

E4 PLAN OF REMEDIATION FOR NORTH-EAST PLOT

E4.1 Outline of Development

Lend Lease Development describes the development of the North-East Plot to include:

- Site preparation works including demolition of site improvements;
- Staged construction of the podium element, including:
 - Retail and potential IQ hub floor space and residential lobbies on Ground Level;
 - Above ground parking; and
 - Residential apartments;
- Staged construction and use of residential buildings above the podium; and
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

Services to the upper floors of the building, in particular lift shafts and utility connections, may require localised excavation. The building footprint covers approximately 5,200m².

E4.2 Contamination Identified

With reference to Figures 4 and 5 in the Overarching RAP (Coffey Environments, March 2013b), intrusive investigations occurred at five locations in the footprint of the North-East Plot and an additional three locations were investigated in the Public Realm to the north. Contaminants exceeding Soil Investigation Levels (SILs, listed in Table 6.3 in the RAP) were TPH, Total PAHs and Benzo(a)pyrene.

Because the building footprint occupies the entire area of the North-East Plot, consideration of ecological values is not applicable.

One groundwater monitoring (MW12) well is in close proximity to the North-East Plot and is immediately down-gradient. Analytical results for groundwater samples collected in July 2011 indicated low concentrations of nickel and ethylbenzene, toluene and xylene which did not exceed GILs and concentrations of copper and zinc which were above GILs.

Acid sulfate soil associated with natural alluvium may be encountered for excavation of deep foundations.

E4.3 Remediation Action

Contaminants with reported concentrations above SILs did not have concentrations above RAC developed in the Human Health and Environmental Risk Assessment (EnRiskS (15 November 2013), summarised in Table 10.2 in the RAP). Consequently, no unacceptable human health risk was identified and remediation within the North-East Plot is not warranted.

Section 12 of the RAP describes data gaps, uncertainty and contingency planning with regard to contamination across the Haymarket Precinct. Disturbance of the ground as part of planned construction has the potential to uncover contamination presenting a potentially higher environmental risk than that indicated by the available information; or may uncover unexpected contamination.

For the North-East Plot, Table 12.2 in the RAP lists TPH and PAHs in the subsurface at locations NBH29, BH10 and CBH11 (the northwest corner of North-East Plot) as identified contamination which may be associated with unacceptable levels of similar contamination within North-East Plot. Delineation of this contamination to the south was constrained by the presence of the SEC.

Groundwater quality may pose an unacceptable risk due to reported concentrations of copper and zinc for discharge to Cockle Bay if localised construction dewatering is required. The quality and quantity of any extracted groundwater would need to be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc). Coffey notes that construction of the SEC, which overlaps the North-East Plot, is reasonably expected to have resulted in removal of waste materials which may present unacceptable foundation conditions.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep foundation excavation is required for construction, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E4.4 Remediation in the Construction Schedule

No specific remediation is warranted for the North-East Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented, and construction activity within the localised area of that incidence may be disrupted.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.3 of the RAP.

E4.5 Monitoring of Remediation Works and Validation

No specific remediation is warranted for the North-East Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented and appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E4.6 Remediation Result

Coffey confirms that the contamination assessment results reported contaminant concentrations generally below SILs and otherwise below RAC in and around the North-East Plot and, on that basis, Coffey concludes that the North-East Plot can be made suitable for the proposed development and future uses.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented to reduce such risk to an acceptable level.

E5 PLAN OF REMEDIATION FOR SOUTH-EAST PLOT

E5.1 Outline of Development

Lend Lease Development describes the development of the South-East Plot to include:

- Site preparation works including demolition of site improvements;
- Staged construction of the podium element, including:
 - Retail and potential IQ hub floor space and residential lobbies on Ground Level;
 - Above ground parking; and
 - Residential apartments;
- Staged construction and use of residential buildings above the podium; and
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

Services to the upper floors of the building, in particular lift shafts and utility connections, may require localised excavation. The building footprint covers approximately 4,500m².

E5.2 Contamination Identified

With reference to Figures 4 and 5 in the Overarching RAP (Coffey Environments, March 2013b), intrusive investigations occurred at six locations in the footprint of the South-East Plot and an additional five locations were investigated in the Public Realm to the northwest. Contaminants exceeding the Soil Investigation Levels (SILs, listed in Table 6.3 in the RAP) were TPH, Total PAHs and benzo(a)pyrene. Presence of asbestos, as bonded ACM at BH119 and asbestos fines at BH13, was also identified.

Because the building footprint occupies the entire area of South-East Plot, consideration of ecological values is not applicable.

One groundwater monitoring well (MW13) is within South-East Plot. Analytical results for groundwater samples collected in July 2011 indicated a low concentrations of nickel which did not exceed the GIL and concentrations of arsenic, copper and zinc which were slightly above GILs.

Acid sulfate soil associated with natural alluvium may be encountered for excavation of deep foundations.

E5.3 Remediation Action

Bonded ACM and asbestos fines were found and concentrations of benzo(a)pyrene TEQ were reported above the RAC developed in the Human Health and Environmental Risk Assessment (EnRiskS (15 November 2013), summarised in Table 10.2 in the RAP). Consequently, an unacceptable human health risk was identified and remediation within the South-East Plot is warranted.

The extent of remediation required in the South-East Plot is designated as Remediation Areas 3 and 4 in Table 10.3 of the RAP, with Coffey's estimate of the impacted volume being in the range of 280m³ to 520m³ in Area 3 and 90m³ to 160m³ in Area 4. The preferred remediation option is hazard removal with disposal to an appropriately licensed landfill, which will require supervision by an appropriately licensed asbestos removal contractor and a NSW WorkCover permit for asbestos removal activity for Area 3. The sequence of remediation works is described in Section 10.8 of the RAP.

Section 12 of the RAP describes data gaps, uncertainty and contingency planning with regard to contamination across the Haymarket Precinct. Disturbance of the ground as part of planned construction has the potential to uncover contamination presenting a potentially higher environmental risk than that indicated by the available information; or may uncover unexpected contamination.

For the South-East Plot, Table 12.2 in the RAP lists hydrocarbon compounds in the subsurface at locations BH11 (the southwest corner of South-East Plot) as identified contamination which may be associated with unacceptable levels of similar contamination within South-East Plot.

Groundwater quality may pose an unacceptable risk due to reported concentrations of arsenic, copper and zinc for discharge to Cockle Bay if localised construction dewatering is required. The quality and quantity of any extracted groundwater would need to be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous

materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc). Coffey notes that construction of the SEC, which overlaps the South-East Plot, is reasonably expected to have resulted in removal of waste materials which may present unacceptable foundation conditions.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep foundation excavation is required for construction, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E5.4 Remediation in the Construction Schedule

As removal of asbestos materials and impacted fill must be under the supervision of an appropriately licensed contractor, and such works must be undertaken in a work zone which excludes any other remediation or construction activity, this remediation work would be undertaken after the demolition of the existing improvements and before the planned construction activities to reduce the potential disruption to the schedule and to reduce the potential for the spread of asbestos impacted material.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.3 of the RAP.

E5.5 Monitoring of Remediation Works and Validation

In Remediation Areas 3 and 4, validation sampling and analysis will be used to demonstrate that unacceptable risk from presence of forms of asbestos (Area 3) and concentrations of benzo(a)pyrene TEQ (Area 4) has been reduced. Validation procedures are described in Section 11.2 of the RAP.

Because removal of asbestos impacted fill from Area 3 has the potential to release asbestos fibres into the air, asbestos removal works will be monitored in accordance with relevant NSW WorkCover industry codes of practice.

Dust suppression will be employed in both areas to minimise the release of contaminants at the excavation point and on transfer of the impacted material to the trucks for disposal. Other environmental controls will be implemented during the remediation works as described in Section 13 of the RAP. Trucks will have covered loads to prevent release of dust along public roads between the Haymarket and the landfill.

The excavated areas will require restoration to construction design levels by use of fill material from other areas of the site (except from other Remediation Areas, or any other area identified during construction as warranting remediation), or by use of imported fill which will satisfy the definition of virgin excavated natural material (VENM) or met the requirements of the Excavated Natural Material Exemption (2012).

In addition to the warranted remediation and validation activity, if unanticipated contamination conditions emerge then appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E5.6 Remediation Result

Coffey considers that if remediation and validation is undertaken in accordance with relevant parts of this RAP, then the South-East Plot can be made suitable for the proposed development in that plot.

Coffey confirms that contamination assessment results reported contaminant concentrations, other than that in Remediation Areas 3 and 4, generally below SILs and otherwise below RAC in and around the South-East Plot. On that basis, Coffey concludes that the South-East Plot can be made suitable for the proposed development and future uses through successful implementation of this RAP in relation to the South-East Plot.

E6 PLAN OF REMEDIATION FOR SOUTH-WEST PLOT

E6.1 Outline of Development

Lend Lease Development describes the development of the South-West Plot to include:

- Staged demolition of existing site improvements, including the existing SEC, SEC car park, and part of the pedestrian footbridge connected to the SEC car park;
- Staged Construction of the podium element, including:
 - Retail and IQ hub floor space and residential lobbies on Ground Level;
 - Above ground parking; and
 - Residential apartments;
- Staged Construction and use of three residential buildings above the podium; and
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

Services to the upper floors of the building, in particular lift shafts and utility connections, may require localised excavation. The building footprint covers approximately 5,100m².

Coffey notes that the footprint of the existing SEC overlaps the North, North-East and South-East Plots and is immediately east of the South-West Plot. Lend Lease Development intends to demolish the existing SEC to existing slab level 2 years after improvements on the South-West Plot are demolished (as part of the Development Application for construction on the South-West Plot). That is, the ground to the east of the South-West Plot would not be disturbed during demolition activity described under the Plan for Remediation for the South-West Plot other than the area of the existing SEC that overlaps the proposed Boulevard (part of the Public Realm).

E6.2 Contamination Identified

With reference to Figures 4 and 5 in the Overarching RAP (Coffey Environments, March 2013b), intrusive investigations occurred at four locations in the footprint of the South-West Plot and an additional seven locations were investigated in the Public Realm to the east (4 locations) and west to northwest (3 locations). Contaminants exceeding Soil Investigation Levels (SILs, listed in Table 6.3 in the RAP) were TPH, Total PAHs, benzo(a)pyrene and lead.

Because the building footprint occupies the entire area of South-West Plot, consideration of ecological values is not applicable.

Three groundwater monitoring wells are in proximity to South-West Plot, with two wells being cross-gradient (MW30 to the east and MW25 to the west, sampled and analysed in July 2011, August 2012 and January 2013) and the third well (MW120, sampled and analysed in January 2013) is down-gradient and within the North-West Plot. Analytical results for groundwater samples collected from these wells indicated:

- Cross-gradient wells MW25 and MW30 – low concentrations of some metals which were not reported consistently for the three monitoring events and very low concentrations of PAHs which were below GILs; and
- Down-gradient well MW120 – reported a concentration of cadmium below the GIL and concentrations of arsenic and copper marginally above the GILs. A very low concentration of TPH C₆-C₉ was also reported.

Acid sulfate soil associated with natural alluvium may be encountered for excavation of deep foundations.

E6.3 Remediation Action

Contaminants with reported concentrations above SILs did not have concentrations above RAC developed in the Human Health and Environmental Risk Assessment (EnRiskS (15 November 2013), summarised in Table 10.2 in the RAP). Coffey notes that the elevated concentration of lead was reported in a sample for which field observations noted the presence of metal fragments which were considered to be the origin of the lead impact rather than another source of impact in the fill material. Consequently, no unacceptable human health risk was identified and remediation within the South-West Plot was not warranted.

Section 12 of the RAP describes data gaps, uncertainty and contingency planning with regard to contamination across the Haymarket Precinct. Disturbance of the ground as part of planned construction

has the potential to uncover contamination presenting a potentially higher environmental risk than that indicated by the available information; or may uncover unexpected contamination.

For the South-West Plot, Table 12.2 in the RAP lists hydrocarbon compounds, PAHs and metals in the subsurface at location BH121A (middle of the eastern part of South-West Plot) as identified contamination which may be associated with unacceptable levels of similar contamination within South-West Plot.

Groundwater quality may pose an unacceptable risk due to reported low and inconsistent concentrations of certain metals, and a very low concentration of TPH C₆-C₉, for discharge to Cockle Bay if localised construction dewatering is required. The quality and quantity of any extracted groundwater would need to be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc). Coffey notes that construction of the SEC Car Park, which overlaps South-West Plot, is reasonably expected to have resulted in removal of waste materials which may present unacceptable foundation conditions.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep foundation excavation is required for construction, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E6.4 Remediation in the Construction Schedule

No specific remediation is warranted for the South-West Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented, and construction activity within the localised area of that incidence may be disrupted.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.3 of the RAP.

E6.5 Monitoring of Remediation Works and Validation

No specific remediation is warranted for the South-West Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented and appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E6.6 Remediation Result

Coffey confirms that contamination assessment results reported contaminant concentrations generally below SILs and otherwise below RAC in and around the South-West Plot and, on that basis, Coffey concludes that the South-West Plot can be made suitable for the proposed development and future uses.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented to reduce such risk to an acceptable level.

E7 PLAN OF REMEDIATION FOR NORTH-WEST PLOT

E7.1 Outline of Development

Lend Lease Development describes the development of the North-West Plot to include:

- Site preparation works including demolition of SEC Car Park, minor excavation;
- Construction and use of a mixed use commercial building comprising:
 - ground level active (retail/commercial/television studio) uses and loading dock;
 - public car park (above ground);
 - ancillary commercial office parking (above ground); and
 - commercial office space; and
- Extension and augmentation of physical infrastructure / utilities as required.

Services to the upper floors of the building, in particular lift shafts and utility connections, may require localised excavation. The building footprint covers approximately 5,200m².

E7.2 Contamination Identified

With reference to Figures 4 and 5 in the Overarching RAP (Coffey Environments, March 2013b), intrusive investigations occurred at seven locations in the footprint of the North-West Plot and an additional ten locations were investigated in the Public Realm to the east (3 locations), northwest (2 locations) and west (5 locations). Contaminants exceeding Soil Investigation Levels (SILs, listed in Table 6.3 in the RAP) were TPH, Total PAHs and benzo(a)pyrene. Contamination may extend to the north beyond the plot boundary.

Because the building footprint occupies the entire area of North-West Plot, consideration of ecological values is not applicable.

Three groundwater monitoring wells are in proximity to North-West Plot, with two wells being cross-gradient (MW1 to the west which was sampled and analysed in July 2011, and MW6 to the northwest, which was sampled and analysed in August 2012 and January 2013) and the third well (MW120, sampled and analysed in January 2013) is within the North-West Plot. Analytical results for groundwater samples collected from these wells indicated:

- Well MW1 to the west – reported concentrations of 7 metals (mercury not detected) of which concentrations of copper, lead and zinc were above GILs;
- Well MW6 to the northwest - reported low concentrations of cadmium and copper which were below GILs; and
- Well MW120 within the plot – reported a concentration of cadmium below the GIL and concentrations of arsenic and copper marginally above the GILs. A very low concentration of TPH C₆-C₉ was also reported.

Acid sulfate soils associated with the natural alluvium may be encountered during the excavation of deep foundations.

E7.3 Remediation Action

Concentrations of Benzo(a)pyrene TEQ, naphthalene and TPH C₁₅₊ were reported above RAC at location EB1 in the middle of the north of the North-West Plot. RAC were developed in the Human Health and Environmental Risk Assessment (EnRiskS (15 November 2013), summarised in Table 10.2 in the RAP). Consequently, an unacceptable human health risk due to the presence these organic compounds was identified and remediation within the North-West Plot is warranted.

The extent of remediation required in the North-West Plot is designated as Remediation Area 1 in Table 10.3 of the RAP, with Coffey's estimate of the impacted volume being in the range of 2,380m³ to 4,420m³. The preferred remediation option is hazard removal with disposal to an appropriately licensed landfill, because the expense of establishing a treatment plant on the plot for a relatively small volume would be prohibitive. The sequence of remediation works is described in Section 10.8 of the RAP.

Because contamination may extend to the north beyond the plot boundary, site specific controls would be provided to reduce potential for risk of unacceptable impact from residual off-site impact to the north. The

northern boundary of the North-West Plot appears to coincide with the Haymarket Precinct boundary which precludes extension of remediation works to the north.

Section 12 of the RAP describes the data gaps, uncertainty and contingency planning with regard to contamination across the Haymarket Precinct. Disturbance of the ground as part of the planned construction has the potential to uncover contamination presenting a potentially higher environmental risk than that indicated by the available information; or may uncover unexpected contamination.

For the North-West Plot, no localised contamination was identified in the subsurface to indicate potential for unacceptable levels of similar contamination within the plot. Table 12.2 in the RAP describes such localised contamination within the Haymarket Precinct.

Groundwater quality may pose an unacceptable risk due to reported concentrations of arsenic, copper, lead and zinc for discharge to Cockle Bay if localised dewatering for remediation or construction is required. Groundwater level was observed at 1.9mbgl which is slightly above the target remediation excavation depth of 2m. On this basis, Coffey considers it unlikely that dewatering of the remediation excavation will be required. The quality and quantity of any extracted groundwater would need to be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc). Coffey notes that construction of the SEC Car Park, which overlaps North-West Plot, is reasonably expected to have resulted in removal of waste materials which may present unacceptable foundation conditions.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep foundation excavation is required for construction, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E7.4 Remediation in the Construction Schedule

The nature of contamination requires impacted materials to be separated from other construction materials, but remediation works would be able to be integrated with other construction earthworks for an optimal construction schedule. Removal of up to 4,420m³ of contaminated fill could take 2 weeks, allowing for constraints on truck movements due to peak hour traffic.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.3 of the RAP.

E7.5 Monitoring of Remediation Works and Validation

In Remediation Area 1, validation sampling and analysis will be used to demonstrate that unacceptable risk from presence of certain organic compounds has been reduced. Validation procedures are described in Section 11.2 of the RAP. Environmental controls would be used during the remediation works as described in Section 13 of the RAP. Trucks will have covered loads to prevent release of dust along public roads between the Haymarket and the landfill.

The excavated area will require restoration to construction design levels by use of fill material from other areas of the site (except from Remediation Area 2, or any other area identified during construction as warranting remediation), or by use of imported fill which will satisfy the definition of virgin excavated natural material (VENM) or meet the requirements of the Excavated Natural Material Exemption (2012).

In addition to warranted remediation and validation activity, if unanticipated contamination conditions emerge then appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E7.6 Remediation Result

Coffey considers that if remediation and validation is undertaken in accordance with relevant parts of this RAP, then the North-West Plot will be made suitable for the proposed development of that plot.

Coffey confirms that contamination assessment results reported contaminant concentrations, other than that in Area 1, generally below SILs and otherwise below RAC in and around the North-West Plot. On that basis, Coffey concludes that the North-West Plot can be made suitable for the proposed development and future uses through successful implementation of this RAP in relation to the North-West Plot.

E8 PLAN OF REMEDIATION FOR WESTERN PLOT (DARLING DRIVE)

E8.1 Outline of Development

Lend Lease Development describes the development of the Western Plot to include:

- Site preparation works including demolition of existing site improvements;
- Staged construction and use of two residential buildings within the Western Plot, to be used for student accommodation purposes;
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

Services to the upper floors of the building, in particular lift shafts and utility connections, may require localised excavation. The building footprint covers approximately 1,800m² of the plot area of 2,160m².

E8.2 Contamination Identified

With reference to Figures 4 and 5 in the Overarching RAP (Coffey Environments, March 2013b), intrusive investigations occurred at four locations in the footprint of the Western Plot and an additional eight locations were investigated in the Public Realm to the east (6 locations) and south to southeast (2 locations). Contaminants exceeding Soil Investigation Levels (SILs, listed in Table 6.3 in the RAP) were TPH, Total PAHs and benzo(a)pyrene. 2-naphthylamine, a semi-volatile organic compound, and Lindane, an organochlorine pesticide, were detected at depth at location BH124 at the northern end of Western Plot.

The footprint of the two buildings occupies approximately 85% of the area of Western Plot, and consequently, ecological values need to be considered. Open space is located between the two buildings, represented by investigation locations BH 123 and BH123A, and at the southern end of the plot, represented by investigation locations BH 122 and BH122A. The latter location is just outside the plot boundary. With reference to the Ecological Investigation Levels (EILs) listed in Table 6.4 in the RAP, reported concentrations of benzo(a)pyrene were slightly above the EIL in a layer at 1m below ground surface in the middle of the plot and in a layer at 1.5m below ground surface at the southern end of the plot. Coffey notes that the ground surface at the investigation boreholes was a landscaped mound adjacent to Darling Drive situated above the existing road level by approximately 1m. Consequently, the benzo(a)pyrene impacted layer may be near the ground surface after proposed construction. Coffey also notes that deep rooted trees are present on the landscaped mound and do not appear to be stressed or have growth otherwise affected. Concentrations of PAHs in samples from adjacent groundwater monitoring wells (MW1 and MW25) were below laboratory reporting limit, which varied between 0.01µg/L and 1µg/L. Given only slight exceedance of the EIL for benzo(a)pyrene, Coffey considers that remediation due to potential for adverse ecological impacts is not warranted.

Three groundwater monitoring wells are in proximity to Western Plot, with one down-gradient well (MW1 to the north, sampled and analysed in July 2011), one cross-gradient well (MW25 to the east, sampled and analysed in July 2011, August 2012 and January 2013) and the third well (MW124) is within the plot at the northern end, but was observed to be dry after installation in January 2013. Analytical results for groundwater samples collected from these wells indicated:

- Cross-gradient wells MW25 – low concentrations of some metals which were not reported consistently for the three monitoring events and very low concentrations of PAHs which were below GILs; and
- Down-gradient well MW1 – reported concentrations of 7 metals (mercury not detected) of which concentrations of copper, lead and zinc were above GILs.

Acid sulfate soil associated with natural alluvium may be encountered for excavation of deep foundations.

E8.3 Remediation Action

Concentrations of TPH C10-C14 and TPH C15+ were reported above RAC developed in the Human Health and Environmental Risk Assessment (EnRiskS (15 November 2013), summarised in Table 10.2 in the RAP). However, consideration of occurrence of this contamination at a depth of approximately 3m and more below the surface, as discussed in Section 10.5.2 of the RAP, the health risk from vapour intrusion due to identified contamination was shown by EnRiskS to be acceptable. Consequently, no unacceptable human health risk was identified and remediation within the Western Plot was not warranted.

Section 12 of the RAP describes data gaps, uncertainty and contingency planning with regard to contamination across the Haymarket Precinct. Disturbance of the ground as part of planned construction has the potential to uncover contamination presenting a potentially higher environmental risk than that indicated by the available information; or may uncover unexpected contamination.

For the Western Plot, Table 12.2 in the RAP lists hydrocarbon compounds, PAHs and semi-volatile organic compounds (specifically, 2-naphthylamine and Lindane) in the subsurface at location BH124 (northern end of Western Plot) as identified contamination which may be associated with unacceptable levels of similar contamination within Western Plot.

Groundwater quality may pose an unacceptable risk due to reported low and inconsistent concentrations of certain metals, and a very low concentration of TPH C₆-C₉, for discharge to Cockle Bay if localised construction dewatering is required. The quality and quantity of any extracted groundwater would need to be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc). Coffey notes that below-ground cooling water intake conduits associated with the former Ultimo Power Station passed to the north of the Western Plot. This infrastructure may have provided a preferential pathway for movement of contamination from the former power station..

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep foundation excavation is required for construction, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E8.4 Remediation in a Construction Schedule

No specific remediation is warranted for the Western Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented, and construction activity within the localised area of that incidence may be disrupted.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.3 of the RAP.

E8.5 Monitoring of Remediation Works and Validation

No specific remediation is warranted for the Western Plot. However, if unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented and appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E8.6 Remediation Result

Coffey confirms that contamination assessment results reported contaminant concentrations generally below SILs and otherwise below RAC in and around the Western Plot and, on that basis, Coffey concludes that the Western Plot can be made suitable for the proposed development and future uses.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented to reduce such risk to an acceptable level.

E9 PLAN OF REMEDIATION FOR PUBLIC REALM

E9.1 Outline of Development

Lend Lease Development describes the development of the Public Realm to include:

- Tree removal and replanting;
- Realignment and upgrade of Darling Drive (part);
- Provision of 'The Boulevard' - a pedestrian boulevard linking Quay Street to Darling Harbour (part) and a new Square;
- provision of part of a new east-west pedestrian laneways,
- provision of Macarthur Place located at the termination of The Goods Line;
- Modification of the retained portion of the pedestrian footbridge and the provision of lift and stair access to 'The Goods Line';
- Provision of a new landscaped verges and WSUD; and
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

Darling Drive is intended for vehicular traffic with other areas intended for pedestrian use with occasional service vehicle use.

E9.2 Contamination Identified

With reference to Figure 5 in the Overarching RAP (Coffey Environments, March 2013b), intrusive investigations occurred at twenty-two (22) locations in the Public Realm. Contaminants exceeding Soil Investigation Levels (SILs, listed in Table 6.3 in the RAP) were TPH, Total PAHs and benzo(a)pyrene.

The Public Realm will support landscaped areas as well as roads and paved pedestrian areas, consequently, consideration of ecological values is applicable.

Eight groundwater monitoring wells exist within the Haymarket Precinct. Groundwater quality with reference to concentrations of chemical stressors which are protective of aquatic species was impaired at a low level, most frequently by the presence of one or more heavy metals. Given that the water table is typically 2m below ground surface, the likelihood that construction in the Public Realm should interfere with groundwater is remote, except for the provision of sewerage or stormwater drainage, which is common to all plots and the Public Realm.

Acid sulfate soil associated with natural alluvium is unlikely to be encountered for development of the Public Realm.

E9.3 Remediation Action

Concentrations of benzo(a)pyrene TEQ were reported above RAC developed in the Human Health and Environmental Risk Assessment (EnRiskS (15 November 2013), summarised in Table 10.2 in the RAP). Consequently, an unacceptable human health risk was identified and remediation within the Public Realm is warranted around the middle of The Boulevard, indicated as Stage 5G in Figure 2.

The extent of remediation required in the Public Realm is designated as Remediation Area 2 in Table 10.3 of the RAP, with Coffey's estimate of the impacted volume being in the range of 35m³ to 65m³. The preferred remediation option is hazard removal with disposal to an appropriately licensed landfill, because the expense of establishing a treatment plant on the plot for a relatively small volume would be prohibitive. The sequence of remediation works is described in Section 10.8 of the RAP.

Section 12 of the RAP describes data gaps, uncertainty and contingency planning with regard to contamination across the Haymarket Precinct. Disturbance of the ground as part of planned construction has the potential to uncover contamination presenting a potentially higher environmental risk than that indicated by the available information; or may uncover unexpected contamination.

For the Public Realm, Table 12.2 in the RAP lists TPH, Total PAHs and benzo(a)pyrene in the subsurface at locations CBH10 and NBH29 (north of North-East Plot) as identified contamination which may be associated with unacceptable levels of similar contamination within that part of the Public Realm.

Groundwater quality may pose an unacceptable risk due to reported concentrations of certain heavy metals for discharge to Cockle Bay if localised construction dewatering is required. The quality and quantity of any extracted groundwater would need to be verified as suitable before release, and any relevant regulations or consent conditions would need to be satisfied.

Based on the history of the site, unexpected finds of contamination within the Haymarket Precinct may include asbestos impact, demolition waste, ash or slag layers, pipes or containers holding hazardous materials, hydrocarbon compounds (fuels or oils) and other chemical substances and wastes with high organic content (such as timber, vegetation, animal wastes etc).

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be used.

If deep excavation for sewerage or stormwater drainage is required, then an appropriate Acid Sulfate Soil Management Plan will be prepared and implemented by the contractor.

E9.4 Remediation in a Construction Schedule

The nature of contamination requires impacted materials to be separated from other construction materials, but given the relatively small volume of fill material expected to be removed, remediation works should be able to be integrated with other construction earthworks for an optimal construction schedule.

If unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented, and construction activity within the localised area of that incidence may be disrupted.

Management of possible asbestos impact in fill material, which is not associated with other unexpected contamination, will follow the process described in Section 12.4.4 of the RAP.

E9.5 Monitoring of Remediation Works and Validation

In Remediation Area 2, validation sampling and analysis will be used to demonstrate that unacceptable risk from presence of certain organic compounds has been reduced. Validation procedures are described in Section 11.2 of the RAP. Environmental controls would be used during the remediation works as described in Section 13 of the RAP. Trucks will have covered loads to prevent release of dust along public roads between the Haymarket and the landfill.

The excavated area will require restoration to construction design levels by use of fill material from other areas of the site (except from other Remediation Areas, or any other area identified during construction as warranting remediation), or by use of imported fill which will satisfy the definition of virgin excavated natural material (VENM) or met the requirements of the Excavated Natural Material Exemption (2012).

If unanticipated contamination conditions emerge then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented and appropriate monitoring of conditions and validation of any remediation work required would occur. The appointed Site Auditor would be informed of such incidences and Auditor review of reports, action plans and monitoring plans would be undertaken.

E9.6 Remediation Result

Coffey considers that if remediation and validation is undertaken in accordance with relevant parts of this RAP, then the Public Realm will be made suitable for the proposed development of that area.

Coffey confirms that contamination assessment results reported contaminant concentrations, other than that in Area 2, generally below SILs and otherwise below RAC in and around the Public realm. On that basis, Coffey concludes that the Public Realm can be made suitable for the proposed development and future uses through successful implementation of this RAP.

If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Unexpected Finds Procedure, listed in Section 12.2.3 of the RAP will be implemented to reduce such risk to an acceptable level.