

22.0 Environmental Management

22.1 Contamination Issues

The contamination study and assessment undertaken by URS Australia Pty Ltd has been prepared in accordance with the requirements of State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55).

The primary objective of this investigation was to identify and document the existing environmental and geotechnical site conditions in preparation for development planning.

The investigation works included;

- a review of the available environmental and geotechnical information;
- a Phase One Environmental Site Assessment (ESA) – Preliminary Environmental Investigation including a desk-top study of existing and previous land uses;
- a Phase Two Environmental Site Assessment (ESA)– Detailed Environmental Investigation including drilling, sampling and analysis across the site; and
- geotechnical investigations and analysis including bore logs, foundation analysis and recommendations report that was combined with the environmental drilling and testing.

Environmental Investigations

In 2003 a Phase 1 Environmental Site Assessment (ESA) was undertaken. The investigation determined that the site has been subject to contaminating activities in the past associated with storage and handling, vehicle maintenance and fuel storage electrical substations, historical industrial uses, use of lead-based paints and asbestos. Twenty five (25) areas of potential contamination (APOCs) were identified.

A Phased Stage 2 ESA was also undertaken in 2003. The purpose of the phase two ESA was to assess the nature and extent of soil and groundwater contamination associated with the identified APOCs.

Soil Condition

The investigation showed the presence of fill material covering most of the site. Some contamination hot spots were affected by petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs) at concentrations exceeding high density residential land use criteria. Excluding identified hot spots statistical analysis of the data showed the concentrations to be generally acceptable for high density residential land uses. Further soil sampling and selective remediation will be required to ensure that soil and fill material in all areas of the site meet the criteria for the relevant land uses. Preliminary sampling indicated that the majority of fill and superficial natural soil beneath the site would be classified as inert or Solid Waste for the purpose of disposal to landfill.

Ground water condition

The Phase 2 ESA showed the presence of some groundwater contamination, in the form of localised dissolved phase TPH. Some remedial work may be required in areas that will not be excavated for construction of basements, including removal of any remaining buried tanks and associated soil and groundwater contamination.

Elevated concentration of chlorinated solvents consisting of perchlorethene (PCE) and degradation by products were detected on groundwater beneath the south eastern part of the site. Subsequent investigations have indicated the presence of a plume of PCE and degradation by-products in groundwater migrating onto the site from offsite sources. The plume is migrating in groundwater predominantly in the weathered zone of the sandstone bedrock, typically at a depth of between 5 to 7m below ground level. The plume apparently extends up to 180metres north west onto the site following the general direction of groundwater flow. The source of PCE contamination is associated with historic chemical spillage and disposal in offsite buildings on the southern side of Wellington Street. Remediation of the on-site PCE plume to the extent practicable, combined with a range of risk management measures will be an essential and critical component of the remediation strategy.

Remediation Strategy

The Remediation Strategy has been designed to ensure that the site is decontaminated in a safe and environmentally sound manner, taking into consideration the distribution and extent of contamination, nature of the development and the interests of the stakeholders and surrounding community. The design of the remediation strategy is intended to ensure the health and safety of the future occupants and protection of the environment.

Important features of the development that influence the strategy are;

- Planned mix of commercial and high density residential land use, combined with a defined area of landscaped public recreational open space occupying the southern central section of the development. Smaller landscaped areas will also be located in other areas such as the building and site frontages.
- The buildings will incorporate deep multilevel basement car parks which will occupy approximately 50% of the site.
- Certain Heritage buildings will be retained, including the ovoid drain.
- The development will include a stormwater collection system which will accept and store runoff from sealed and unsealed surfaces for beneficial re-use purposes.

The remedial works will be conducted in accordance with regulatory criteria set by NSW Department of Environment and Conservation (DEC). Where predefined regulator criteria are not applicable, a human health risk based approach will be used to determine remediation criteria based on site specific criteria.

Soil Remediation

Key features of the strategy for soil remediation are:

- Fill material in all proposed basement areas will be excavated, stockpiled and sampled to confirm the waste classification. Fill material will be exported offsite to an appropriately licensed land fill. Excavation of basement level depths to 20m will then proceed in the underlying uncontaminated sandstone bedrock.
- Further soil/fill sampling will be conducted in the main area proposed for recreational open space and other proposed landscaped areas. Sampling results will be assessed to determine the acceptability of the fill material and groundwater for open space land use, taking into consideration the stormwater re-use plans and deep planting of trees. Unacceptable material will be excavated, stockpiled and sampled to confirm the waste classification. Fill material will be exported offsite to an appropriately licensed land fill.
- Further soil/fill sampling will be conducted in other sealed areas outside the basements. Sampling will be performed when access is possible after demolition of existing buildings and pavements. Sampling will be assessed to determine the acceptability of the fill material for sealed areas with medium to high density residential land use, taking into consideration the stormwater re-use plans. Unacceptable material will be excavated, stockpiled and sampled to confirm the waste classification. Fill material will be exported offsite to an appropriately licensed land fill.
- Areas beneath heritage buildings and other areas deemed impractical to access due to existing infrastructure (e.g. around the oviform drain) will be sampled as practicable to determine the nature and extent of contamination, but will not be excavated. The sampling will be used to develop an appropriate Environmental Management Plan (EMP) to enable the management of any residual contaminated material.

Any remaining underground fuel storage tanks will be removed and impacted soils will be excavated and treated on site and/or exported off site for disposal depending on concentrations. On site treatment of petroleum hydrocarbon contaminated soil will be performed using land farming techniques.

Ground Water remediation

Remediation of the on-site PCE plume is a critical component of the strategy. Most of the PCE plume is effectively contained within the proposed basement of Development Block 11 fronting Wellington Street. .

Remediation of most of the on-site plume will be accomplished by mass excavation of the overlying fill material, clay, sand and sandstone bedrock containing the contaminated ground water. Seepage of contaminated groundwater is likely to occur during excavation. This groundwater will be collected in sumps, treated or removed.

Excavation stockpiling and 'landfarming' operations for PCE contaminated soil will be managed carefully to ensure that the surrounding community is not adversely affected.

Low concentrations of PCE and degradation by products are present below the proposed park. Residual PCE contamination in this area will be remediated if there is any unacceptable risk to human health or environment. This could involve excavation of impacted fill and sandstone if necessary and backfilling with clean material – or in-situ groundwater treatment.

Remedial measures are also required to manage onsite migration of residual PCE contamination from the source. The basement of block 11 will incorporate an impermeable structural cut-off wall extending below the highly weathered upper bedrock into sound sandstone at a depth of 9m AHD. During excavation of the basement for block 11 there is potential for some seepage of PCE. Therefore the

basement structure below the cut-off wall will incorporate a 'dry wall', of concrete liner with a membrane impermeable to water and vapour. Bedrock quality assessment indicates that long term contaminated seepage flows from below the cut-off wall in the critical section of Wellington Street are likely to below.

Further details of site management plans will be contained in the Remediation Action Plan, as required by SEPP 55.

Conclusions

The report concludes that the CUB site can be remediated for the proposed land uses in a safe and environmentally sound manner. The proposed strategy addresses the nature and extent of contamination and the key features of the proposed development. The strategy is reasonably straightforward, practical and achievable. The remedial works will be performed in accordance with the regulatory requirements of the DEC and the Department of Natural Resources. Accordingly the Remediation Strategy, the RAP and the subsequent remedial works will be subject to review by the EPA Accredited Site Auditor for the project. On completion of remediation, appropriate Site Audit Statements will be issued for the relevant land uses.

22.2 Ecologically sustainable development and water management

The redevelopment of CUB presents an opportunity to implement best practice techniques in ecologically sustainable design (ESD). Water and energy have the largest ecological impact on the site and are in the forefront in the community's attitude to environmental conservation and resource management.

An Ecologically Sustainable Development (ESD) report has been prepared by Arup and is included at **Appendix U**. The report addresses the ESD opportunities for the CUB site which have been incorporated into the Concept Plan. The ESD Report recommends the following targets which have been adopted by the proponent and included in the draft Statement of Commitments.

For residential development:

- A 40% reduction on the BASIX energy consumption benchmark.
- A 4.5 average star comfort rating using NatHERS or equivalent as well as each apartment being required to achieve specified load maximums and whole building average maximum heating and cooling loads.

For commercial development:

- A minimum 4.5 stars ABGR energy performance (In line with the PCA 2006 Grade A building guidelines and Sydney City Council requirements for any commercial building design)
- Buildings should achieve 4 star Green Star rating.
- Buildings should achieve a 4 star NatHERS rating.

For retail development will comply with any future compulsory rating tool provided by the Australian Building Greenhouse Rating Scheme.

All development:

- All refrigerants and insulation should be specified to have an ODP of zero.
- Any external lighting should not be directed beyond the site boundary or upwards.

A Water Sensitive Urban Design Strategy has been prepared by Ecological Engineering and is included at **Appendix T**. The report also identifies a series of WSUD targets for the proposed provision of water, wastewater and potable water systems, which are summarised in Table X:

An Infrastructure Report addressing the management of stormwater and ground water impacts has been prepared by Robert Bird and is included at **Appendix P**, also recommends targets similar to those recommended by Ecological Engineering.

In summary, the Water Conservation Targets, as adopted and included in the draft Statement of Commitments are:

- Residential development to be consistent with the BASIX Scheme in providing a 40% reduction of potable mains water used.
- Commercial developments to be fitted with water efficient fittings and appliances that achieve at least a 3 star rating.
- 80% of the irrigation demand of public open space be made up from on-site collection and reuse.

Stormwater Quality targets are:

- 45% reduction in the mean annual load of Total Nitrogen (TN) in stormwater leaving the site.
- 45% reduction in the mean annual load of Total Phosphorus (TP) in stormwater leaving the site.
- 80% reduction in the mean annual load of Total Suspended Solids (TSS) in stormwater leaving the site.
- For flows up to the 3 month ARI peak flow, litter greater than 50 mm in size to be extracted from stormwater leaving the site.
- For flows up to the 3 month ARI peak flow, no visible oils or grease to be present in stormwater leaving the site.

On-site detention standards are:

Provide detention volume as advised by Sydney Water of 20 m³ for every 1,000 m² of developed site area. Consultation with Sydney Water prior to the final design of the detention system will be required.