

Jonathan Durnell  
Wood & Grieve Engineers

Via email: Jonathan.durnell@wge.com.au

Ref: 17066 L04

29 April 2019

Dear Jonathan,

**Groundwater disturbance  
Proposed Site Development Works  
St Aloysius College, Kirribilli NSW 2061**

Cavvanba Consulting Pty Ltd (Cavvanba) was engaged by Wood & Grieve Engineers Pty Ltd (WGE) to prepare environmental reports for the proposed site development. These reports are being updated following comments from the Department of Planning.

The previous investigations identified contaminated fill material on-site which is proposed to be excavated as part of the site development. In addition, groundwater contamination was identified as discussed further in Section 2.0.

This letter should be read in full, including Cavvanba's attached *General limitations to environmental information*.

## **1.0 Previous reports**

The following environmental reports have been prepared for the site:

- Cavvanba (2018a) *Preliminary Site Investigation, St Aloysius College, Kirribilli, NSW* (Ref. 17066 R01);
- Cavvanba (2018b) *Detailed Site Investigation – Development Area, St Aloysius College, Kirribilli, NSW* (Ref. 17066 R02); and
- Cavvanba (2018c) *Remedial Action Plan – Development Area, St Aloysius College, Kirribilli, NSW* (Ref. 17066 R03).

These reports have been updated to take into account the following discussion.

## **2.0 Groundwater contamination**

Groundwater contamination identified appears to be characterised as containing low concentrations of dissolved metals, volatile petroleum hydrocarbons (i.e. total petroleum hydrocarbons (TRH) C6-C9) and benzo(a)pyrene, and it is limited to the main campus. No point sources related to this contamination were identified in the PSI.

- The UST on the main campus was used to store diesel, which is characteristically semi-volatile (i.e. > TRH C10);
- Heavy metals and benzo(a)pyrene were detected in fill material, and it is common for this to result in some associated elevation of concentrations in groundwater, but this is characteristically a diffuse and widespread source.

Cavvanba considers that while groundwater contamination is present, it is unlikely to make the site unsuitable because it does not pose an unacceptable risk to users of the site.

The groundwater contamination should be addressed during construction, as detailed in the following section.

### 3.0 Groundwater disturbance

The anticipated groundwater disturbance is summarised in Table 1 below.

**Table 1: Summary of anticipated groundwater disturbance**

	Junior School	Senior School	Main Campus
Groundwater encountered (Mac Geo, 2018)	3.9 m	Groundwater not investigated on Senior School property.  Shallow footings will be founded on rock.	No free ground water observed
Stabilised groundwater depth (January 2018)	5.2 m		1.9 m (groundwater considered to be under confined conditions in Sandstone Fracture / Bed)
Proposed excavation and depth and activity	6 m – 7 m for basement.		1.5 m footings
Proposed building type	Underground enclosed building	Enclosed building	Enclosed building
Groundwater disturbance likely?	Potential, but likely to be limited to during construction.	-	Unlikely, due to shallow footings and groundwater likely confined.
Heavy metals in groundwater	Dewatering poses a potential pathway for exposure and requires discharge to the environment.	-	Low risk. Unlikely to be in direct contact.
Volatile hydrocarbons in groundwater	Treatment prior to discharge may be necessary.  Dewatering may also mobilise or exacerbate unknown sources of contamination.	-	Low risk. Unlikely to be in direct contact.

Based on the information in Table 1, it is understood that groundwater will potentially be disturbed as part of the proposed development. The extent of disturbance is likely to be minor, and limited to the construction phase only. Considerations for management of water during construction works and dewatering requirements will be incorporated into the RAP and also incorporated into the previous reports.



Thank you for your time in regard to this matter. Please do not hesitate to contact the undersigned on (02) 6685-7811 if you require additional information or clarification.

Yours sincerely  
Cavvanba Consulting Pty Ltd

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Ross Nicolson  
Senior Environmental Scientist

A handwritten signature in black ink, appearing to read 'B. Wackett', with a long horizontal stroke extending to the right.

Ben Wackett  
Principal Environmental Scientist

## General limitations to environmental information

The findings of this reporting are based on the objectives and scope of the services provided. Cavvanba Consulting performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties or guarantees, expressed or implied, are made.

Cavvanba's review/assessment is strictly limited to identifying the environmental conditions associated with the subject property in regard to site contamination, and does not seek to provide an opinion regarding other aspects of the environment not related to site contamination, or to the suitability of the site in regard to: landuse planning and legal use of the land; and/or regulatory responsibilities or obligations (for which a legal opinion should be sought); and/or the occupational health and safety legislation; and/or the suitability of any engineering design. Reviews of such information are only in relation to the contaminated land aspects of any project or site. If specialist technical review of such documents is required, these should be obtained by an appropriate specialist.

The reporting and conclusions are based on the information obtained at the time of the assessments. Changes to the subsurface conditions may occur subsequent to the investigation described, through natural processes or through the intentional or accidental addition of contaminants, and these conditions may change with space and time.

Field monitoring, sampling and chemical analysis of environmental media and structures are based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate, based on regulatory requirements, site history, and the proposed landuse, not on sampling and analysis of all media, at all locations, for all potential contaminants.

Limited field monitoring, and environmental sampling and laboratory analyses, were undertaken as part of the investigations reviewed or conducted by Cavvanba, as described. Ground conditions, contaminants, and material types/composition can vary between sampling locations, and this should be considered when extrapolating between sampling locations. Except at each sampling location, the nature, extent and concentration of contamination is inferred only.

Furthermore, the test methods used to characterise the contamination at each sampling location are subject to limitations and provide only an approximation of the contaminant concentrations. Monitoring and chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

The absence of any identified hazardous or toxic materials at the site should not be interpreted as a warranty or guarantee that such materials do not exist at the site. Therefore, future work at the site which involves subsurface excavation or removal of structures or parts thereof, should be conducted based on appropriate management plans. These should include, *inter alia*, environmental management plans, including unexpected findings protocols, hazardous building materials management plans, and occupational health and safety plans.

If additional certainty is required, then additional site history information should be obtained, or additional exploration and sampling and analysis should be conducted. This decision should be made by the user of this information based on an appropriate risk management process, and the user should commission additional services if required.