

Abercrombie Street Economics Precinct Development



PHASE 1 ENVIRONMENTAL ASSESSMENT

- Final
- 14 September 2010



The University of Sydney

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1. Introduction

1.1. Overview

This report outlines the results of the Phase 1 Environmental Site Assessment (Phase 1) undertaken by Sinclair Knight Merz Pty Ltd (SKM) for The University of Sydney (UoS) of the Abercrombie Street Economics and Business Precinct (The Precinct) on the UoS Campus.

This Phase 1 report has been completed by SKM in accordance with our proposal dated 16 August 2010. Limitations regarding the use of this report are provided in **Attachment A**.

1.2. Purpose and Objectives

The investigation has been undertaken in general accordance with the NSW EPA (November 1997) '*Guidelines for Consultants Reporting on Contaminated Sites*', as they pertain to a 'Stage 1 Preliminary Site Investigation' (PSI). The objectives of the investigation are to:

- Identify past and present potentially contaminating activities;
- Identify potential contamination types;
- Discuss the site condition;
- Provide preliminary assessment of site contamination; and
- Assess the need for further investigations to establish the suitability of the Precinct for the proposed development.

1.3. Scope of Works

In order to accomplish the objectives, SKM has been guided by the following Scope of Works:

- Review information held on the property by UoS;
- Review of publicly available data (e.g., aerial photographs, geological plans, topographical maps, groundwater resource maps);
- Review of land title information;
- Review of information held by State Government Departments including the Department of Environment, Climate Change and Water (DECCW); and
- Assessment of the data and preparation of a Phase 1 Environmental Assessment report.



2. Site Location and Description

2.1. Site Location

The Precinct is located in the Sydney suburb of Darlington. The Precinct is bound by Darlington Road to the north, Abercrombie Street to the south, Codrington Street to the east and Golden Grove Street to the west.

2.2. Zoning and Land Use

The Precinct falls within the zone 'Special Use (University)' and is currently owned and occupied by the UoS. Surrounding land uses to the south and west are predominantly residential, while sites to the north and east are occupied by the UoS.

A review of historical aerial photographs and a limited title search were undertaken as part of this investigation, as summarised in **Section 4.3**. These searches revealed that the majority of the Precinct was occupied by privately owned residential properties prior to occupation by the UoS.

The UoS owns most of the property in the Precinct apart from a small number of the Darlington Road terrace houses, Rose Street, Boundary and Darlington Lanes. It is understood that UoS is currently in negotiations with the City of Sydney (**Council**) to purchase Rose Street and Boundary Lane. These streets have been included in the assessment. Some areas of the Precinct are leased to third parties.

2.3. Site Features

The total size of the Precinct is approx. 35,000 m². The majority of the Precinct's surface is sealed or built up, consisting of hardstand areas, roads/laneways, buildings, with some areas of landscaped grass and vegetation (see **Section 5** for further detail).

2.3.1. Buildings and Structures

The Precinct is currently occupied by a number of buildings as shown in **Figure 1** and listed below:

- Traditional heritage listed terrace buildings (along Darlington Rd);
- Economics and Business Building (**H69**);
- Darlington House (**H66**);
- University Garage (**H07**);
- Clarke Building (**H12**);
- Joiners Shop (**H05**);
- Geology Temporary Buildings (**H11**);



- University Computing Centre (**H08**);
- Mandelbaum House (**H67**);
- Shepherd Centre (**H68**); and
- Boundary Lane Childcare Centre (**H09**).

SKM understands the UoS wishes to retain a number of buildings within the redevelopment. Although the exact buildings to be retained are yet to be confirmed, the following buildings are likely to remain during the redevelopment:

- (H69) Economics and Business Building;
- (H67) Mandelbaum House; and
- (H68) Shepherd Centre.

For completeness the above building numbers will be referred to within the report.

2.4. Regulatory Constraints

Consideration of past and present activities at the Precinct resulted in the decision to undertake Council and WorkCover searches for two addresses within the Precinct, these being:

- Building H07 –2-10 Golden Grove St (Lot 1 D.P 65913); and
- Building H05 –222-224 Rose St (Lot A D.P 447221 & Lot 1214 D.P 1118976).

2.4.1. City of Sydney Council Records

The properties addressed 2-10 Golden Grove Street and 222-224 Rose Street is within the jurisdiction of the City of Sydney Council.

The Section 149 Certificates state that both properties fall within Zone No. 5 (the Special Uses Zone) under the provisions of the *South Sydney Local Environmental Plan 1998*.

Types of development permissible to be carried out with or without consent or prohibited in this zone are detailed in the certificates, which also list the local, State and regional planning controls which affect each property.

Both properties are located within a heritage conservation area under the *South Sydney Local Environmental Plan 1998*. Confirmation as to whether these properties are listed under the *Heritage Act 1977* may be obtained from the NSW Heritage Office.

Both properties are affected by the City of Sydney *Contaminated Land Development Control Plan 2004*, which may restrict the land if the potential for the risk of land contamination exists.



2.4.2. WorkCover Records

Of all the areas within the Precinct, the garage and Joiner's Shop are most likely to appear in WorkCover records due to the potential licensed storage of chemicals and/or presence of Aboveground or Underground Storage Tanks.

WorkCover documentation confirmed the following:

- **Building H05** –: Presence of a roofed store used for storage of 300 L of paint/lacquer/varnish and 30 L of paint thinner; and
- **Building H07** –: A letter from the UoS dated 8th December 1998 advises of the abandonment of two underground petroleum storage tanks in March 1998. The volumes of these tanks are listed as 10,000 L and 14,000 L. A certificate attached to the letter confirms that the tanks have been abandoned with sand and cement mixture in accordance with Australian Standard 1940-1993 (*Storage and Handling of Flammable and Combustible Liquids*). There is no further correspondence in relation to these tanks including environmental investigation or validation in areas immediately surrounding or underlying the tanks.

2.4.3. NSW DECC Records

A search of the NSW DECCW Public Register under Section 308 of the *Protection of the Environment Operations Act 1997* (the POEO Act) did not reveal any licences, approvals or notices that could be matched to the Abercrombie Street Precinct.



3. Environmental Setting

3.1. Regional Geology

Regional geological information was obtained from the Geological Survey of N.S.W map of Sydney, Geological Series Sheet S1 56-5, 1966. Geology in the local region is dominated by Bringelly and Ashfield shale with some sandstone beds (Minchinbury).

3.2. Topography

The Precinct slopes downwards from north-west to south-east, with an elevation ranging from approximately 41 m to 24 m Australian Height Datum (AHD).

3.3. Hydrogeology

A search with the NSW Department of Natural Resources (DNR) database identified no registered groundwater wells within the Precinct boundary. Five wells are registered within a 1 km radius of the Precinct. Details of the five wells are summarised in Table 1.

■ **Table 1 – Registered DNR Boreholes**

Borehole ID	Licence No.	Easting	Northing	Screened Depth (m)	Screened Lithology	Bore Usage
GW105317	10BL161846	331965	6247846	3.5 – 6.5 m	Silty clay	Monitoring Bore
GW105938	10BL162977	332733	6247637	No details	No details	Domestic Bore
GW106192	10BL164184	333418	6247611	No details	No details	Domestic Bore
GW109230	10BL602551	331802	6249055	No details	No details	Monitoring Bore
GW109231	10BL602551	331787	6249063	No details	No details	Monitoring Bore

3.4. Hydrology

The nearest watercourse, Johnston's Creek, is located approximately 1.7 km west of the Precinct. The creek flows in a northerly direction into Rozelle Bay. Blackwattle Bay is situated approximately 1.8 km to the north of the Precinct.

Based on the Precinct topography, the overall groundwater flow direction is expected to be to the south east



4. Historical Site Assessment

4.1. General

Details of the historical ownership and usage of the site were obtained from a review of the following available records:

- Land Titles (both current and cancelled);
- Historical aerial photographs;
- Local council records (i.e. Zoning); and
- Previous reports.

The following sections document the results of the review.

4.2. Title Search

Consideration of information obtained from the aerial photographs resulted in a decision to undertake land title searches for two addresses within the Precinct, these being:

- Building H07 (Lot 1 D.P 65913); and
- Building H05 (Lot A D.P 447221 & Lot 1214 D.P 1118976).

A review of the historical land title information is summarised in **Table 2**.

■ Table 2 – Summary of Title Deeds

Date	Owners	Occupation / Site Use	Site identifier
Lot 1 D.P. 65913, Building H07			
28.04.1910	Harry Buckland	School Master	Vol 2051 Fol 241
19.07.1910	May Blanch Mary Alger	Married Woman	Vol 2051 Fol 241
19.02.1912	Albert Edmund Bates	Architect	Vol 2051 Fol 241
15.10.1914	Charles William Hobson	Gentleman	Vol 2051 Fol 241
18.09.1916	Herbert Bradley	Carriage Builder	Vol 2051 Fol 241
04.03.1920	Harold George Parkin Roland Lindsay Parkin	Plumber's Assistant Painter	Vol 4389 Fol 217 & Vol 4389 Fol 218
27.09.1934	Arthur Hedley George Wogan-Browne	Freeholder	Vol 4658 Fol 116
18.05.1936	H. Jones and Company (Sydney) Limited (Now H. Jones and Company (Sydney) Pty Limited)		Vol 4658 Fol 116
10.08.1973	University of Sydney#		1/65913



Date	Owners	Occupation / Site Use	Site identifier
Lot 1214 D.P. 1118976 – Building (H05)			
26.11.1908	Alexander Brown	Delivery Clerk	Book 869 No. 624
07.04.1922	Wheels Limited		Book 1257 No. 143
22.06.1934	James Thorpe Joseph Armstrong Angus	Manufacturer Manufacturer	Book 1691 No. 823
27.03.1939	Angus & Co Pty Limited	Ink Paste & Gum Manufacturer	Book 1851 No. 93
24.06.1942	Charles Augustus Brissaker James Victor Brissaker Frederick Augustus Jullian	Plumber Plumber Contractor	Book 1911 No. 366
18.07.1947	Charles Augustus Brissaker	Plumber	Book 2029 No. 924
30.11.1956	University of Sydney#		1214/1118976
Lot A D.P. 447221 – Building (H05)			
11.11.1912	Percy Frank Goodin	Estate Agent	Book 981 No. 481
17.02.1913	Trustees of the Estate of Stephen White, Grazier		Book 988 No. 908
22.04.1926	Trustees of the Estate of Stephen White, Grazier		Book 1429 No. 101
20.07.1926	Samuel William Gray	Cadet Surveyor	Book 1435 No. 978
03.10.1952	Henry Herbert Hale (and his deceased estate)	Bag Merchant	Book 2232 No. 743
26.09.1958	Crispin Joseph John Borg Carmela Borg	Real Estate Agent Married Woman	Book 2469 No. 782
17.02.1964	Florence May Goodwin	Widow	Book 2691 No. 172
01.07.1976	Albert Claude Goodwin	Managing Butcher, now retired	Book 329 No. 879
16.12.1982	University of Sydney#		A/447221

Note:

Current registered proprietor

The historical search reveals that the sites now occupied by Buildings H07 and H05 have been owned by a variety of private individuals and some commercial/industrial organisations.



The following property owners may have some association to industrial operations, although in some cases details of their activities at the Precinct are not known:

Building H07:

- H. Jones & Company (Sydney) Limited.

Building H05:

- Wheels Limited; and
- Angus & Co. Pty Ltd.

Copies of historical land title searches are included in **Appendix B**.

4.3. Aerial Photograph Review

Aerial photographs, held at the NSW Department of Lands were sourced as part of the Phase 1. The photographs reviewed were from 1930, 1951, 1961, 1970, 1982 and 1991. Additional photographs from 2000, 2003, 2005 and 2007 were obtained from internal SKM files.

The aerial photographs are presented in **Appendix C**.

Table 3 – Aerial Photograph Review identifies the historical activities conducted at the Precinct and includes disturbances and terrain changes across the identified area since 1930.



■ **Table 3 - Aerial Photograph Review**

Date of Aerial Photograph	Subject Site	Surrounding Area
1930	The Precinct is well developed. The part of the Precinct which fronts onto Darlington Rd appears to contain terrace housing. A laneway and more buildings are present behind these, extending to Rose St; however their appearance is not clearly defined in the photograph. The portion of the Precinct between Rose St and Abercrombie St is also built up, and appears to be divided in half by a lane which extends from Codrington St to Golden Grove St. Again, the buildings cannot be clearly defined in the photograph however the Precinct mostly appears to contain small buildings. There is also a large building present in the southern half of the Precinct facing Rose St, corresponding with the site of the current-day Joiner's Shop.	Sites to the north, south, east and west of the Precinct are also developed. To the south and west the buildings predominantly appear to be residential (terrace housing). A railway corridor is located further to the south of the Precinct. Various buildings (possibly residential and commercial/industrial) are located to the east. The triangular-shaped site to the north is less built up, with some areas of grass and other vegetation surrounding the buildings. Sports fields are located further to the north of this area.
1943	The Precinct does not appear to have changed significantly, however a large building is now located on the Precinct of the current-day garage (facing Golden Grove St).	No significant changes are noted since the previous photograph, although some new buildings have been constructed in the vicinity of the sports oval located to the north of the Precinct.
1951	The Precinct does not appear to have changed significantly. More detail is visible, showing that the Precinct largely consists of terrace housing. A large building is located on the Precinct in the area of the current-day garage (facing Golden Grove St).	No significant changes are noted since the previous photograph.
1961	No significant changes are noted since the previous photograph.	No significant changes are noted since the previous photograph.
1970	No significant changes are noted since the previous photograph.	New buildings and onsite parking areas have been constructed on the triangular portion of land to the north of the Precinct. Several buildings have been removed from two sites located opposite the north eastern corner of the subject site. One of these sites (on the corner of Butlin Ave and Maze Crescent) is being utilised for car parking.



Date of Aerial Photograph	Subject Site	Surrounding Area
1982	A number of buildings have been demolished, including a building on the north western corner of the Precinct, and most of the terrace houses with the exception of those fronting Darlington St. The garage and Joiner's Shop remain, and the Precinct now occupied by Darlington Primary School has been redeveloped. One large building has been constructed on the Abercrombie St side of the Precinct, near the intersection with Codrington St. Areas of the Precinct that have been cleared appear mainly to be grassed or used for car parking.	Buildings to the west of the Precinct between Darlington St and Abercrombie St have been demolished. New buildings have been constructed on the Precincts to the north-east of the subject site, and are most likely associated with the University. Areas to the south of the Precinct appear largely unchanged.
1991	A large building has been constructed in the centre of the Precinct (on the southern side of Rose St). The building now occupied by Boundary Lane Childcare Centre is also visible.	New buildings have been constructed to the west of the Precinct and further development appears to have taken place to the east of the Precinct.
2000	Very few buildings appear to remain in the area of the Precinct bounded by Rose St and Darlington Lane. Two new buildings are visible at the Precinct of the current-day Shepherd Centre and Mandelbaum House.	Buildings to the east of the Precinct appear to have been extended. No other significant changes are noted.
2003	A large new building (Economics & Business Building) has been constructed in the area between Rose St and Darlington St. Some smaller structures are visible to the west of this building in the area now occupied by the Recycling Centre.	No significant changes are noted since the previous photograph.
2005	No significant changes are noted since the previous photograph.	No significant changes are noted since the previous photograph.
2007	New buildings (currently associated with the Geology Department) are visible to the east of the Joiner's Shop.	No significant changes are noted since the previous photograph.



4.4. Summary of Areas of Environmental Interest

Areas of environmental interest (i.e. Areas of potential contamination) identified from the aerial photographs were as follows:

- The 1943 photograph shows the first appearance of the Building H07 on Golden Grove St. It is possible that fuel, oil, lubricants and other chemicals may have been stored in this building during the period in which it was used;
- Building H05 appears in all photographs and may represent another area of chemical storage within the Precinct; and
- The 1982 photograph showed that a number of buildings which were present onsite since the 1930 photograph had been demolished. No information is known with respect to the age of these buildings, their construction materials (ie. If they contained hazardous building materials such as asbestos and/or lead based paints), or the method by which demolition rubble was disposed.

4.5. Previous Reports

4.5.1. University Garage Stage 2 Investigation – Aecom 2009

SKM understands a Stage 2 Contamination Assessment was undertaken by Aecom at the University Garage building (identified in **Figure 1**). A copy of the report was unavailable at the time of writing the Phase 1 report. It is recommended that a review of the Aecom Stage 2 Investigation Report be undertaken prior to, or in parallel with, any additional contamination assessment being undertaken with the Precinct.

It should be noted that the university garage area may potentially be excluded from the proposed Precinct development, although this could not be confirmed at the time of writing this report.



5. Site Inspection

A site inspection was conducted by two members of SKM's contaminated land team on 9th October 2008. A follow-up walkover was conducted on 30th August 2010 to identify any obvious changes to the site from a contamination perspective. The main findings from the inspections were as follows:

- The majority of the Precinct's surface is sealed or built up, consisting of hardstand areas, roads/laneways, buildings, with some areas of landscaped grass and vegetation;
- Embankments representing potential areas of fill were identified near the south western corner of Building H68 and between the Building H05 and Building H12. Fill material may surround several other buildings on site as a consequence of previous development;
- A small hardstand compound behind Building H07 contained several oil/fuel containers, with some staining evident on the ground surface. The surface slope suggested that any spills in the area could flow into Darlington Lane and in the direction of Codrington St;
- A shed within the Recycling Centre (Darlington Lane) carried signage indicating the storage of chemicals. Discussion with a member of ground staff confirmed that fertilisers were stored in this shed. A second member of staff indicated that a stockpile of fill material (containing soil, vegetation, timber, stone, glass and plastic) found within the Centre was sourced from around the wider site area;
- Building H05 contained supplies of wood, metal and plastic and represented another potential site of chemical storage (e.g. glue and solvents);
- A fenced-off compound to the north of the turning circle at the end of Rose St contained several discarded hot water cylinders and other white goods;
- No visual evidence of potential asbestos contamination was noted on site. There may be a risk of potential asbestos contamination due to the past demolition of older buildings within the Precinct; however it is thought that these buildings may have pre-dated the period in which asbestos was commonly used for construction. However, the use of other hazardous building materials such as lead based paints in the construction of these buildings cannot be precluded;
- Two transformers/substations were noted on site, one located between Mandelbaum House and the Computing Centre, and the other on the western side of the Economics building;
- A generator was noted in the park area to the east of the Computing Centre. There were no visual indications of hydrocarbon staining from leaked fuels/oils or distressed vegetation in this part of the Precinct.
- A member of staff from the Campus Infrastructure Services Team advised that the maintenance team had recently relocated to the garage building, which has ceased its former function.



- The Precinct inspection confirmed that buildings H05 and H07 are potential areas of environmental interest due to past and present activities and the likely storage of chemicals.



6. Qualitative Risk Assessment (QRA)

For a particular contaminant to present a risk to receptors, three components must be present:

- **Source** An entity or action which releases contaminants into the environment.
- **Pathway** A mechanism by which receptors can become exposed to contaminants.
- **Receptors** The human or ecological component at risk of experiencing an adverse response following exposure to a contaminant.

If one of these three components is missing from an exposure scenario, then there can be no risk.

The following section outlines the potential sources, pathways and receptors relevant to this site and assesses the risks associated with the most likely exposure scenarios.

6.1. Areas of Environmental Interest

6.1.1. Fill Material

Potential areas of fill material were identified within parts of the Precinct, represented by embankments which are inconsistent with the Precinct's overall topography. The most notable areas of potential fill were located between building H12 and building H05, and also to the west of the Building H69, the Recycling Centre. The source of this material (e.g. on- or off-site) is not known, however it is possible that the embankments may have been constructed from material that was displaced during the demolition or construction of buildings within the Precinct.

6.1.2. Building H05 - Joiner's Shop

Building H05 appears to have been present on-site since at least 1930, however the University advised that its activities would cease from late October 2008 and its contents would be relocated or disposed of. It is likely that chemical contaminants such as solvents and glue could have previously been stored within this building.

6.1.3. Building H07 –University Garage

Building H07 is no longer in use except as a base for University maintenance staff. However a hardstand area behind this building was observed to contain several oil/fuel drums. It is possible that similar chemicals may have been stored within the building (e.g. in aboveground or underground storage tanks) in the past. It should be noted that a Stage 2 Investigation of building H07 was undertaken by Aecom in 2009. The report was unavailable for review by SKM at the time of writing this Phase 1 report.



6.1.4. Recycling Centre

The Recycling Centre contains a shed which has been identified as a site of fertiliser storage. The shed appeared to have been constructed within the last ten years.

6.1.5. Transformers and Generator

Two transformers were identified on-site during the site inspection, between building H11 and building H08, and also to the west of building H69 near Darlington Lane. Depending on the age of these transformers, it is possible that they represent a source of polychlorinated biphenyls (PCBs).

A generator was located within the grassed area to the east of the building H08, which feeds Building H08 as a backup.

Figure 2 shows the areas of environmental interest (i.e. possible contamination) identified above.

6.2. Potential Contaminants of Concern

The potential contaminants of concern associated with these on-site sources are summarised in **Table 4**.

■ **Table 4 - Potential Contaminants of Concern**

Source	Heavy metals	TPH & BTEX	PAHs	Phenols	OCPs & OPPs	Asbestos	PCBs
Fill Areas	✓	✓	✓	✓	✓	✓	✓
Joiner's Shop	✓		✓				
Garage	✓	✓	✓				
Recycling Centre	✓				✓		
Transformers	✓	✓	✓				✓
Generator	✓	✓	✓	✓			

6.3. Potential Contaminant Migration Pathways

The pathways by which the contamination discussed above could reach potential receptors are described below.

6.3.1. Human Contact

Dermal contact, inhalation and ingestion of contaminants may occur when the ground is uncovered e.g. during building works or excavations. Parts of the Precinct, such as the potential fill areas, may contain contaminants at shallow depth; however no surface contamination was noted during the site walkover.

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6.3.2. Migration via Groundwater

The groundwater flow direction is expected to be to the southeast. Contaminants originating from the fill areas, former and current Underground Storage Tanks (USTs), transformers or the generator may have the capacity to migrate down-gradient from the Precinct via groundwater.

6.3.3. Migration via Airborne Dust

Disturbance of the fill areas may produce dust containing elevated levels of contaminants, particularly asbestos fibres or lead. No asbestos-containing materials were noted at the surface during the site visit.

6.3.4. Migration via Surface Water Flow

Contaminants which spill or leak, particularly onto hardstand areas, may be transported across the Precinct and into storm water drains via surface water flow.

6.3.5. Potential Receptors of Concern

From the information presented in Sections 1 and 2, the potential receptors of contamination arising from on-site sources are considered to be:

- Personnel working within the Precinct including grounds maintenance staff;
- Students and general public entering the Precinct;
- Groundwater;
- Receiving water bodies at the point of storm water discharge; and
- Flora and fauna habitats present within the Precinct.

6.3.6. Evaluation of Likely Exposure Scenarios

This section evaluates risks under the current site usage. The assessment incorporates:

- Off-site migration of contaminants;
- Receptors at risk;
- Reasonable protection of the general public from on-site hazards; and
- Protection of the workforce during their daily activities and during possible remediation work.

The important exposure scenarios are summarised in **Table 5**, overleaf.



■ Table 5 - Qualitative Risk Assessment

Sources	Pathway	Receptor	Comments	Relative Risk
Fill material	Dermal contact / ingestion	General public / site users / trespassers	No asbestos-containing materials were noted at the surface during the site visit.	Medium
	Dust inhalation	General public / site users / trespassers	No asbestos-containing materials were noted at the surface during the site visit.	Medium
	Groundwater & surface water flow	Off-site water bodies	No visible surface contamination or odours were noted during the site visit.	Low
Garage	Dermal contact / ingestion	General public / site users / trespassers	The garage is no longer used for this purpose. Oil/fuel drums were noted in a locked compound to the rear of the building, with some evidence of surface staining nearby.	Medium
	Groundwater & surface water flow	Off-site water bodies	The storage area behind the garage has a hardstand surface and is unbunded. Some surface staining was visible.	Medium
Joiner's Shop, Recycling Centre	Dermal contact / ingestion	General public / site users / trespassers	The Joiner's Shop has recently been closed. The Recycling Centre is fenced off to prevent access outside of working hours and chemicals are stored in a secure shed of relatively recent construction.	Low
	Dust inhalation	General public / trespassers / site users	The Joiner's Shop has recently been closed and any chemicals present will be disposed of or moved.	Low
	Groundwater & surface water flow	Off-site water bodies	The Joiner's Shop has recently been closed and any chemicals present will be disposed of or moved. Chemicals stored at the Recycling Centre are kept in a secure shed.	Low
Transformers, Generator	Dermal contact / ingestion	General public / site users / trespassers	Both transformers and the generator are new with locked casings and appeared to be in sound condition.	Low
	Groundwater & surface water flow	General public / site users / trespassers	Both transformers and the generator appeared to be in sound condition.	Low



6.4. Summary

The following are based on the review of available information, site visit and the QRA:

- The vast majority of the Precinct appears to have been used for residential purposes until at least 1970. Significant development, involving the demolition and replacement of buildings, appears to have occurred after this time;
- With the exception of fertilisers stored within the Recycling Centre and oil/fuel drums located behind the University Garage (Building H07), no other chemicals of significant quantity were identified on site. Any chemicals associated with the previous use of the Joiner's Shop are likely to have been removed;
- Potential sources or causes of contamination identified at the Precinct include:
 - Fill areas around the borders of existing buildings, including larger areas identified to the west of the building H69 and between building H12 and building H05;
 - Building H07 (University Garage);
 - Building H05 (Joiners Shop);
 - Chemical storage in the Recycling Centre shed;
 - A generator located to the east of building H08; and
 - Transformers located between Buildings H67 and the H08, and also to the west of the Building H69 near Darlington Lane.
- According to the QRA, the highest contamination risks are believed to be associated with:
 - Fill areas, possibly containing construction waste materials from previous development within the Precinct; and
 - The University Garage, due to the possibility of leaks and spills from current or previous fuel/oil storage.
- The Joiners Shop, Recycling Centre, generator, and transformers are considered to represent lower risks with respect to contamination.

Current and historical activities conducted within the Precinct may have contaminated soil and groundwater beneath the Precinct. However, it is unlikely that the levels of contamination, if present, would prevent the proposed development. Further Stage 2 investigations would be required to confirm this preliminary conclusion.



7. Conclusions and Recommendations

7.1. Conclusions

Following a review of the site environmental setting, available historical and government records, a site inspection, and QRA, areas and/or sources of potential contamination (areas of environmental interest) identified for the Precinct include:

- Fill areas around the borders of existing buildings, including larger areas identified to the west of Building H69 and between Buildings H12 and H05;
- Building H07 (University Garage);
- Building H05 (Joiners Shop);
- Chemical storage in the Recycling Centre shed;
- A generator located to the east of Building H08; and
- Transformers located between Buildings H67 and H08, and to the west of Building H69 near Darlington Lane.

According to the QRA undertaken for the Precinct, potential fill areas associated with past redevelopment of the site, and the potential leaks and spills associated with the storage of chemicals within the University Garage (Building H07), are considered to present a medium relative level of risk with respect to contamination. No areas and/or sources of potential contamination were considered to present a high level of risk due to contamination. However, based on the limited amount of data and unavailability of environmental investigations previously undertaken at the site, SKM recommends intrusive Stage 2 investigations are conducted at the site in order to further define the potential risks associated with contamination at the site.

7.2. Recommendations

SKM recommends intrusive Stage 2 investigations be undertaken at the site in order to further define potential contamination present, if any, at the site prior to commencing redevelopment. SKM recommends conducting Stage 2 investigations in accordance with the NSW DECCW endorsed *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995). These guidelines provide a description of the statistical aspects of sampling, with specific advice regarding sampling patterns and densities for site characterisation.

For the Stage 2 investigations, SKM recommends using a combination of systematic and judgemental sampling at the Precinct in order to obtain general characterisation and to target key areas of environmental interest with respect to contamination. According to the *Sampling Design Guidelines* (NSW EPA, 1995), the approximate sampling density required for a site the size of the Abercrombie Precinct (3.6 ha) is 13 sample locations per hectare, or 47 total sample locations.



Figures



GDA 1994 | MGA 56

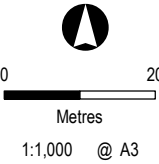


- Legend**
- Study Area
 - Garage
 - Joiner's Shop
 - Potential Fill Areas
 - Recycling Centre
 - Transformers
 - Generator

Data Sources

Imagery: AUSIMAGE 2007

Sinclair Knight Merz does not warrant that this document is definitive nor free of error and does not accept liability for any loss caused or arising from reliance upon information provided herein.





Attachment A – Report Limitations

The sole purpose of this report is to present the findings of a Phase one Environmental Assessment carried out by SKM for the Client in connection with the Abercrombie Street Economics Precinct Development. This report was produced in accordance with and is limited to the scope of services set out in the contract between SKM and the Client. That scope of services, as described in this report, was developed with the Client.

The scope of services was not intended to provide a definitive or quantitative investigation of the environmental impacts, performance and compliance of the subject sites. Environmental conditions may exist at the sites that are beyond the scope of our investigations and this report.

The findings presented in this report are professional opinions based solely upon information and data provided or made available by the Client or otherwise available in the public domain between September 2008 and September 2010 including

- (a) visual observations of each site and its vicinity,
- (b) interviews with site personnel and
- (c) documentation made available by UoS

SKM has relied upon and presumed that this data is accurate and representative of the environmental conditions at the sites. Except as otherwise stated in the report, SKM has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete, or if site conditions change beyond the above dates then it is possible that our conclusions as expressed in this report may change.

SKM has prepared this report in accordance with the usual care and thoroughness of the consulting profession and by reference to applicable auditing procedures and practice at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report.

Except as specifically stated in this report, SKM make no statement or representation of any kind concerning the suitability of the sites for any purpose or the permissibility of any use. Use of the site for any purpose may require planning and other approvals and, in some cases, EPA (or DECCW) and accredited site auditor approvals. SKM offer no opinion as to the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental investigations and/or works.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by SKM for use of any part of this report in any other context.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in accordance with the contract between SKM and the Client. SKM accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.



Appendix A Land Titles within Abercrombie Precinct

Appendices included in CD 1



Appendix B Historical Land Titles Searches

Appendices included in CD 1



Appendix C Aerial Photographic Records

Appendices included in CD 1