Figure 4.23 and Figure 4.24). Test excavation was recommended for any of the sites or PADs proposed to be impacted, in order to accurately assess their significance.

Further survey of this area was undertaken by ERM in 2004. This survey identified one flaked silcrete artefact at the northern edge of JMCHM's (2001b) PAD1. It was predicted that within the Middleton Grange landscape, the highest densities of Aboriginal stone artefacts would occur along the fourth order Hinchinbrook Creek (approximately 2.5km east of the current study area), where camping would have been the most intensive (see Figure 4.24). Camping would also have been frequent along the third order tributary of Hinchinbrook Creek (approximately 500m east of the current study area), with evidence of knapping floors predicted. Middle-low density deposits representing occasional food-gathering were predicted along the northern, central and southern second order creek tributaries, with background scatter present throughout the remaining area (ERM 2004).

Figure 4.23 Location of all sites and PADs identified by JMCHM (2001b:Figure 2) (see Volume 2 of the report).

Test excavations in the vicinity of the third order tributary, and the hill and slopes to the south (north of the central creek tributary) were subsequently undertaken by ERM (2005). This area had been recorded as PAD9 by JMCHM (2001b) and was renamed SH4 by ERM (2005). Although conducted within a relatively intact landscape, these excavations revealed lower densities of artefacts than had been predicted. No knapping floors were identified along the third order tributary, and artefact density was only slightly higher along this creek than on the slopes and crest of the hill. The artefacts were considered to represent low density archaeological deposit within 50m of the creek, and background scatter further than 50m from the creek. Based on these results, it was anticipated that archaeological deposit along the central and southern creek tributaries would be of low density, and would not make any important contribution to archaeological knowledge of Aboriginal occupation of the local area.

Further assessment of the area was undertaken for a Water Cycle Management Plan (ERM 2006). At this time it was recommended that monitoring and salvage of artefacts be undertaken for any impacts on SHMP1, SHMP2, SH4 and PAD1 (which was recommended to be reclassified as the boundary of site SH1).

Most recently, construction of a bridge across the central creek tributary involved impact to the area of inferred archaeological deposit associated with site SHMP1. As such, a Section 90 permit was obtained, and archaeological monitoring of topsoil stripping in this area was undertaken (ERM 2007). JMCHM (2001b) identified this area as likely to be associated with complex or extensive archaeological material, and it was predicted that if this was the case, artefacts would be found during monitoring. Based on subsequent investigations in the area, ERM (2007) anticipated a low density of archaeological material in this area, which may not be revealed by monitoring. It was anticipated that the results of the monitoring would be "useful in clarifying models of Aboriginal site location, specifically the association of Aboriginal sites with low order creek confluences, particularly where higher order creeks are present in the wider area" (ERM 2007:20). No archaeological deposits were identified during the monitoring, which supported the model predicting low density artefact distribution in this area.

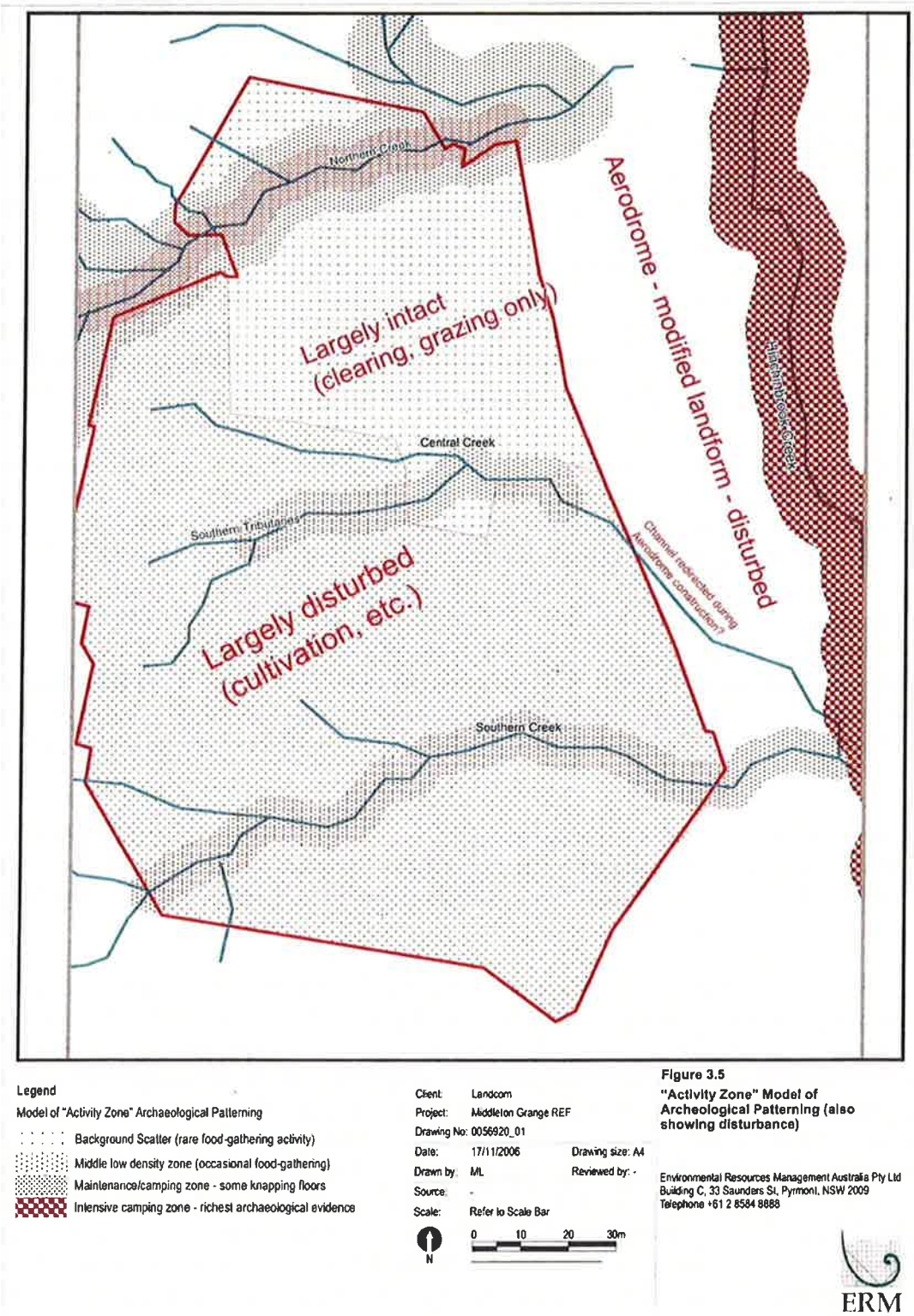

Figure 4.24 Predicted archaeological patterning in Middleton Grange (Source: ERM 2007:Figure 3.5).

AMBS (2008) also recently undertook a survey for the Middleton Grange Landscape Transition Zone (LTZ). Three stone artefact scatters were located during the survey (see Table 4.6 and Figure 4.25). Although sites LTZ2 and LTZ3 are within close proximity of each other (c.80m apart), they are located on separate landforms and are considered to have differing subsurface expressions, and therefore were recorded as separate sites. Site LTZ3 was considered to have the highest archaeological

sensitivity, given its visible surface expression, its relatively undisturbed state and its location on a raised area of land adjacent to (within 15m of) a second order creek tributary.

Table 4.6 Summary of Aboriginal heritage sites identified during AMBS LTZ survey.

Site Name	Type	Landform	Details
LTZ1	Stone Artefact Scatter	Ridge	2 artefacts recorded
LTZ2	Stone Artefact Scatter	Slope	2 artefacts recorded
LTZ3	Stone Artefact Scatter	Ridge	15 artefacts recorded

Figure 4.25 Study area and sites identified by AMBS (2008:Figure 6.2) (see Volume 2 of the report).

Hoxton Park

In 2005, AA undertook a field survey for SWC for the Hoxton Park Recycled Water Scheme. Changes were required for the Scheme and AA prepared a revised report in 2006 (AA 2006; see Figure 4.26). The initial survey identified three areas of PAD (F, D, and E) approximately 2km from the current study area, near minor tributaries of Maxwells Creek (Figure 4.27). During the survey of the revised route, seven additional areas of PAD (G, H, I, J, K, L and M) were identified between approximately 0.5km (PADs I and K) and 3km (PADs G and H) west of the current study area (Figure 4.28). PADs G, I, J and M were in the vicinity of Cabramatta Creek, with PAD L on a tributary of this creek. PAD H was located near a tributary of Maxwells Creek and PAD K was on a tributary of Hinchinbrook Creek (the southern creek, as per ERM's terminology). PADs J and L were considered to have the most potential for significant archaeological deposit, followed by PADs H, I and K. PAD M was not surveyed, but was estimated to have high potential based on available information (AA 2006:55-56). It was recommended that the PADs be avoided by the proposed development, or subject to test excavation if avoidance was not possible.

In August 2008, AA undertook field surveys for an updated report for the Hoxton Park Recycled Water Scheme (AA 2008a; see Figure 4.29). Eight survey units were delineated for fieldwork across the Hoxton Park/Glenfield region; however, no new Aboriginal sites were recorded by the survey teams.

Due to the high level of disturbance the 2008, the AA report concluded that the Hoxton Park/Glenfield site represented low archaeological potential. Of the survey units in closest proximity to the current study area (1 and 2), area 1 was described as having absent archaeological potential, while area 2, located near PAD L, was assessed as having low-moderate potential, and moderate/severe disturbance levels (AA 2008a:55).

In October 2008, AA mechanically excavated 12 1m x 1.2m test pits at PAD L, which was renamed HP PAD2 (AA 2008b; see Figure 4.27). A very low density of artefacts (33, manufactured predominantly on silcrete, tuff and quartz) was located on both sides of an unnamed first-order tributary of Cabramatta Creek, and it was concluded that insufficient artefacts were retrieved to "warrant further works or in-depth artefact analysis" (AA 2008b:ii-iii,5). The site was registered as an artefact scatter and renamed HP AD1 (AA 2008b:58), and a Section 90 AHIP was issued.

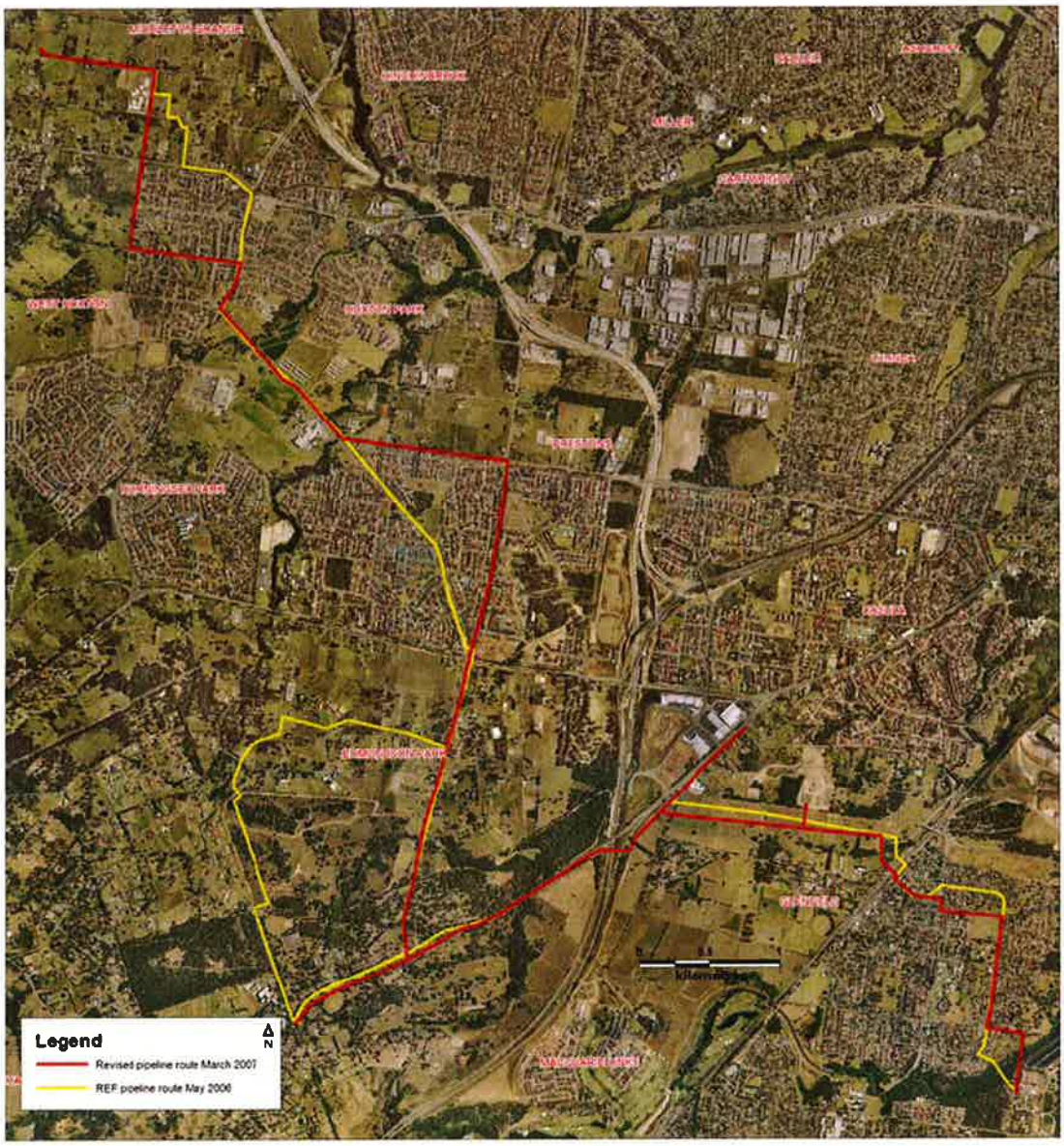

Figure 4.26 Location of original and revised recycled water routes assessed by AA (SWC 2007:14).

Figure 4.27 Location of PADs D, E and F, identified by AA (SWC 2007:20) (see Volume 2 of the report).

Figure 4.28 Location of PADs identified for the Hoxton Park Recycled Water Scheme by AA (AA 2006:Figures 5.2 and 5.3) (see Volume 2 of the report).

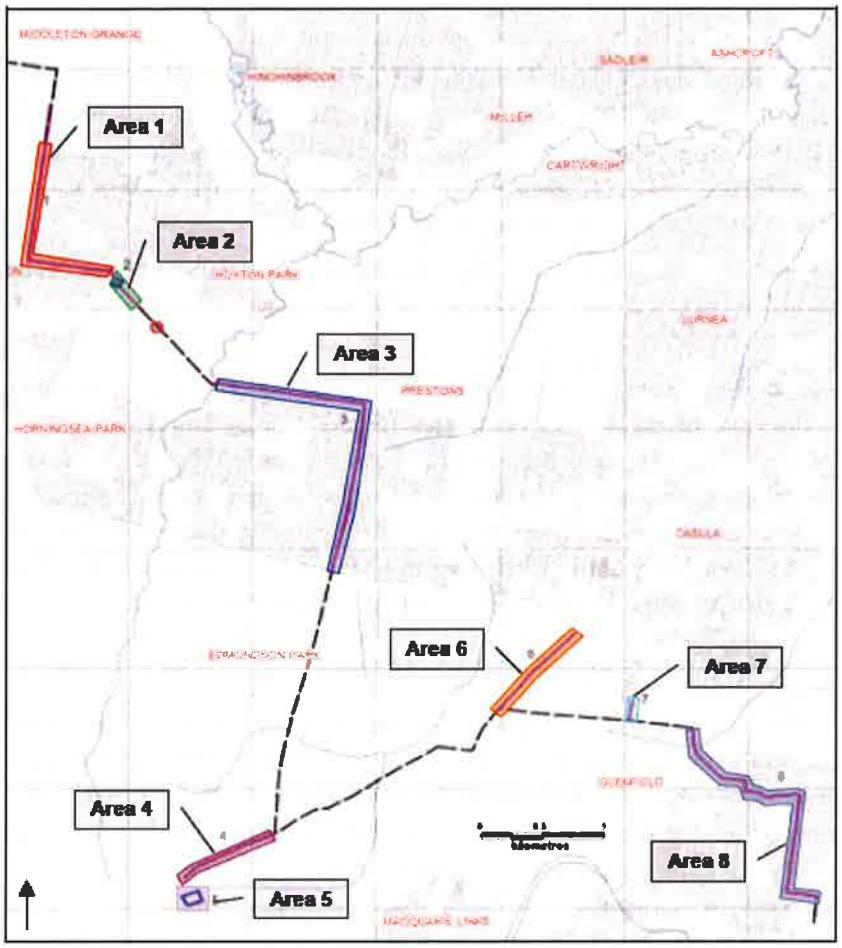

Figure 4.29 Additional areas surveyed by AA (2008a:Figure 15).

Horningsea Park, 2003

A survey for a proposed school site at Horningsea Park, approximately 500m north east of the current study area was undertaken by Hardy (Figure 4.30). Although no sites were identified during the survey, ground surface visibility was low. Given the location of the area c.500m from Cabramatta Creek and 100-200m from one of its tributaries, Hardy recommended that test excavation should be undertaken prior to development.

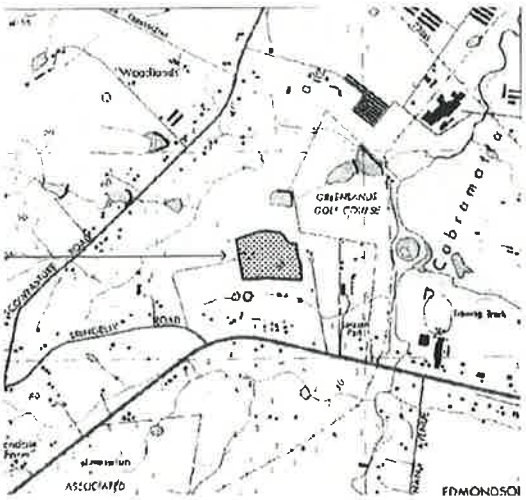

Figure 4.30 Study area (arrowed) investigated by Hardy (2003:Figure 1).

McCann Road, 2001

A survey for a proposed residential subdivision was undertaken by White, between Bringelly and McCann Roads, approximately 600m west of the current study area. White's study area was located on a ridge top between South and Kemps Creeks, and six isolated finds and one PAD were identified during the survey (Figure 4.31). The PAD was located on hillslopes adjacent to a creek, and test excavation was recommended prior to any impact in that area.

Figure 4.31 Study area and sites identified by White (2001:Figure 1) (see Volume 2 of the report).

Liverpool Release Areas, 1989

Smith surveyed approximately 2700ha in the Liverpool Release Areas, which includes land approximately 1km east of the current study area (Figure 4.30). Smith targeted a representative sample of landscape units, topographic features and land use areas (1989:22). Smith assessed the areas of highest archaeological potential to be within 50-100m of permanent creek lines and swamps, including the headwaters of permanent creeks, and relatively undisturbed areas along Maxwells Creek; with the banks of all temporary creeks considered to have moderate archaeological potential, and hill tops and slopes also having some archaeological potential (Smith 1989:70-71).

4.2.5 Aboriginal Heritage Site Prediction Modelling

On the basis of the registered archaeological sites in the region, and review of previous archaeological studies, the following conclusions can be drawn regarding the potential presence and location of Aboriginal heritage sites within the landscape of the study area:

- stone artefact sites are the most common site type occurring across the landscape, and are the most likely site type to be present in the study area. This site type usually appears as low density open artefact scatters or isolated finds, although high density scatters may also be present. Stone artefact sites are found in all environmental contexts, but are most readily identified in areas where vegetation is limited and ground surface is visible. Larger sites with higher densities of artefacts tend to be found close to stream confluences and permanent water sources, such as Kemps Creek; and
- sites situated on relatively undisturbed alluvial soils have the potential to be associated with stratified subsurface archaeological deposits. Excavations within the region indicate that high densities of artefacts can be present up to 250m from water sources, and that subsurface material may be much greater than indicated by surface numbers of artefacts.

On the basis of the archaeological sites registered in the region and review of previous archaeological studies, the following types of site are unlikely to be present in the study area:

- stone quarry sites, axe grinding grooves, stone engravings/art and shelter sites will not be found in the study area because of the lack of suitable stone outcrops;
- scarred or carved trees are unlikely to be present in the study area as the majority of the study area has been extensively cleared of vegetation for past agricultural practices, transport corridors and residential developments resulting in a lack of mature trees; and
- burials and ceremonial sites (including stone arrangements) are unlikely to be present in the area given the disturbance caused by early pastoralism, agriculture, roads and more recent development.

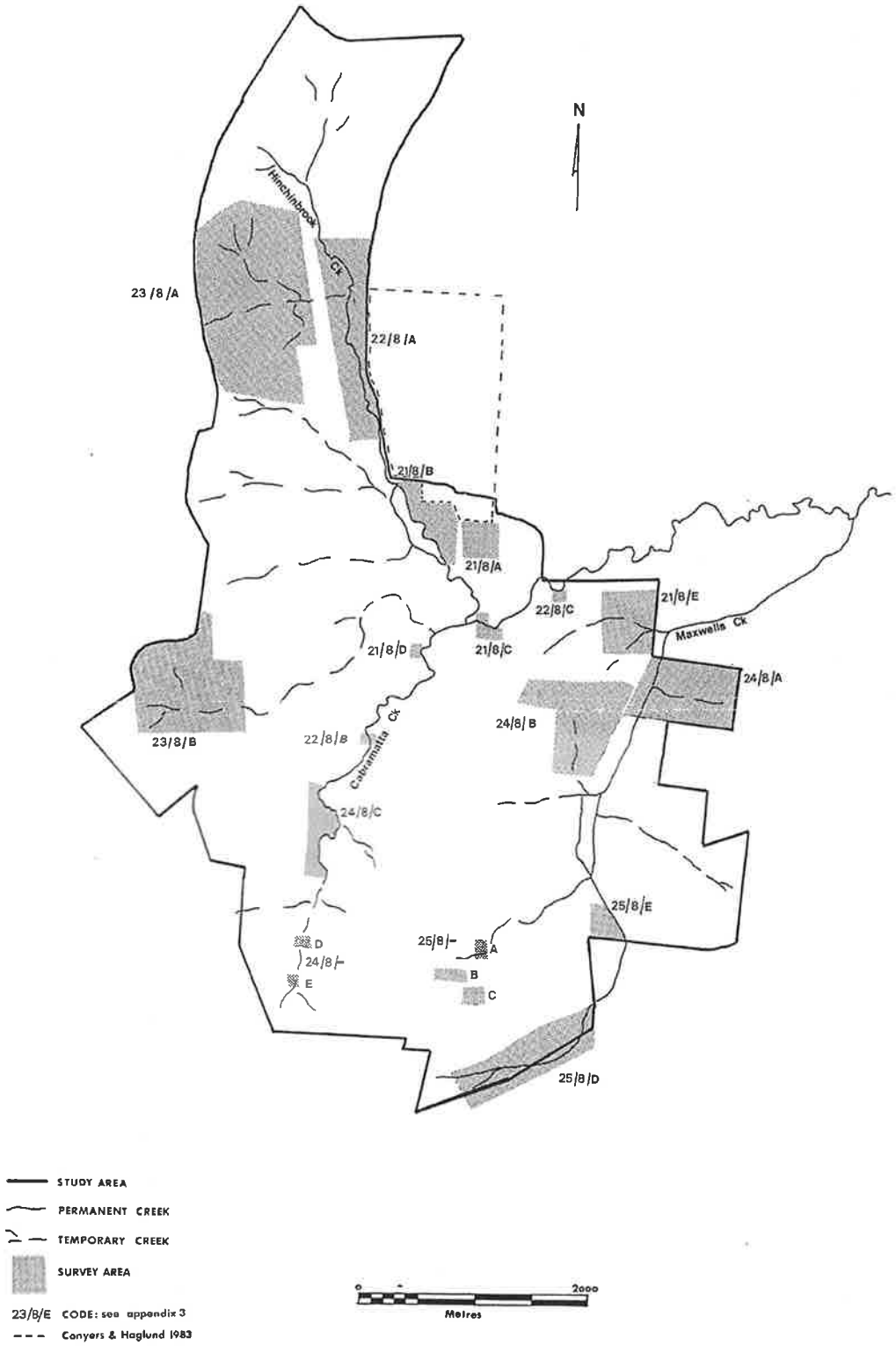

Figure 4.32 Areas surveyed by Smith (1989:Figure 4).

5 Field Survey

5.1 Survey Methodology

The field survey of the section of the study area to the north of Bringelly Road was undertaken on 1-6 December 2010. As the section of the study area to the south of Bringelly Road is within a different LALC boundary (Tharawal, rather than Gandangara), the field survey of this area was undertaken on 14 December 2010; however, a TLALC representative was unexpectedly unable to attend on this day.

The field survey was undertaken by AMBS archaeologists Jenna Weston and Deborah Farina, accompanied by Aboriginal community representatives (see Table 1.1). The field work methodology, overall project and available maps were discussed with, and reviewed by, the Aboriginal community representatives prior to, and during field work.

The Austral and Leppington North development is currently at the Precinct Planning stage, and given the area's large size and the lack of specific heritage impacts requiring assessment, the survey aimed to identify as many Aboriginal sites and areas of potential Aboriginal heritage sensitivity as possible. In order to achieve this, the survey methodology concentrated on areas of highest archaeological sensitivity: major creeks, ridges and high points. Within these locations, the focus was on areas of least disturbance and highest percentage of ground surface exposure, to allow the greatest opportunity of identifying sites. A map of existing land use, and aerial photography on the nearmap website (http://www.nearmap.com/ photography current to 15 July 2010 at the time of survey), were used to guide the assessment of disturbance and exposure levels.

However, the months subsequent to publication of the aerial photographs have been characterised by higher than average rainfall throughout the Sydney region. As a consequence, a majority of the properties within the study area were densely vegetated, particularly along creeklines. Therefore, the few remaining areas with greater ground visibility were surveyed, including areas not assessed as being of high archaeological sensitivity (for example, along the road verges). The survey was also hampered by access restrictions. The majority of properties are privately owned, and, although DP&I sent an initial letter, and follow-up letter, to property owners, many did not respond to the request for access. During the survey, access was requested directly of residents; however, where residents were absent or had not provided prior permission, properties were not accessed. Some of the property owners responded to the request for access providing that certain conditions were met; for example, several property owners requested that they be contacted beforehand so that they could be present on site during the survey. Some property owners refused access in response to the letters, and these properties were therefore not included in the survey. A map identifying the properties that were surveyed is provided in Figure 5.1 (those that were actually entered for survey are shown in Figure 5.2).

Photographs of the study area were taken using a Canon 300D digital camera and a Sony DSC-V3 digital camera. Track logs and Geocentric Datum of Australia (GDA94) site co-ordinates were recorded using a Garmin Oregon 300 handheld GPS. Where Aboriginal artefacts were encountered, notes were made regarding their type, size, and material; and descriptions of the site were recorded including the environmental setting and details of any disturbance to archaeological material in the site's vicinity. Where older mature native trees were observed within the study area, they were examined for the presence of Aboriginal cultural scarring.

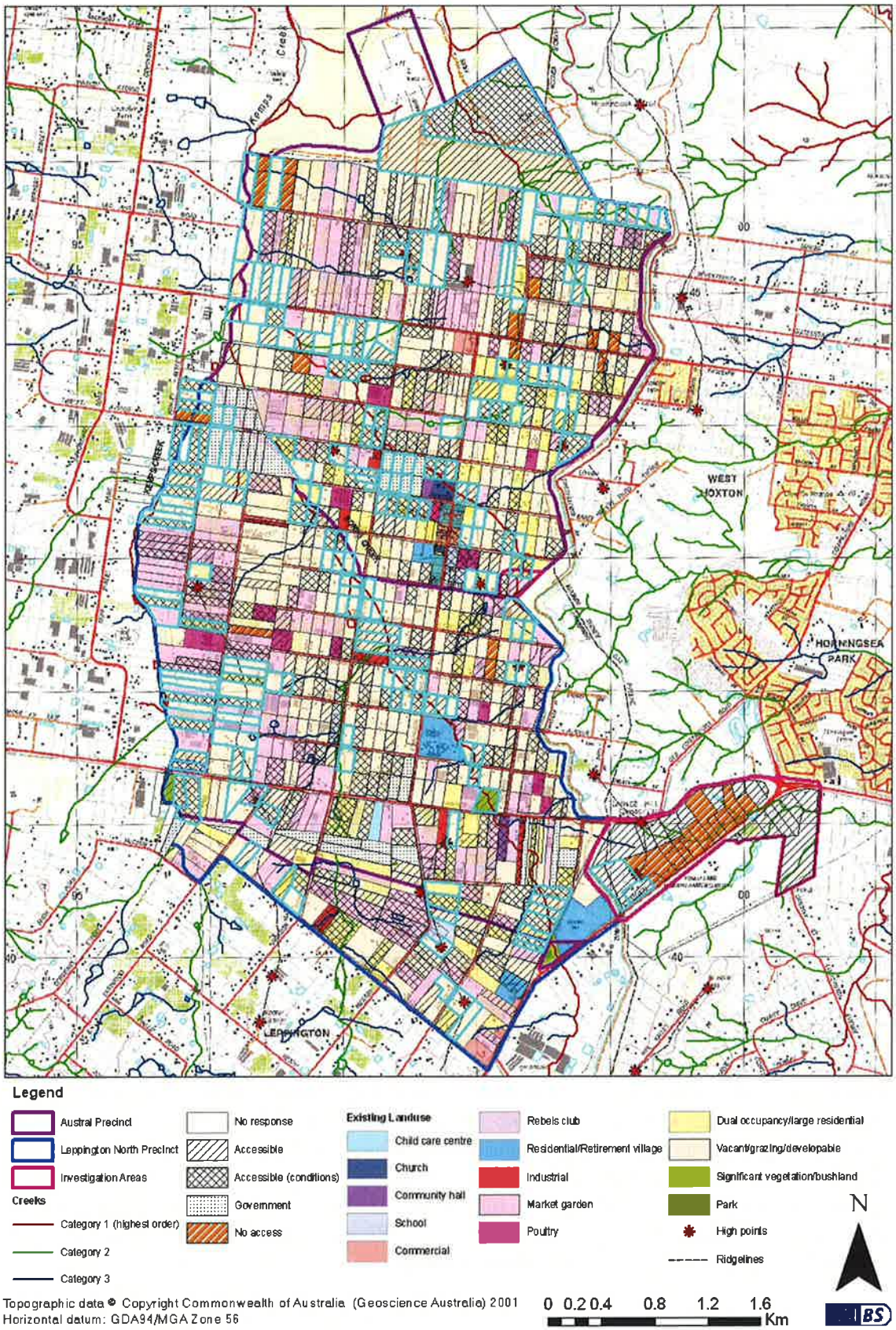

Figure 5.1 Properties subject to survey within the study area (outlined in blue). Due to lack of visibility, many properties were traversed only along the road verge (see Appendix B for details of pedestrian survey). The only properties entered for survey were 300-310 Bringelly Road; 20 Craik Ave; 485-495, 494-500 Fourth Ave; the western end of Sixth Ave; Craik Park Oval (Eleventh Ave); government land on Twelfth Ave; 95 Thirteenth Ave; 520 Fifteenth Ave; 55 Sixteenth Ave; 65-67 Seventeenth Ave; 21-27, 45, 71-85, 80-90 Eighteenth Ave; 5, 14, 20, 80, 205 Gurner Ave; and unoccupied land south-east of the Transgrid substation.

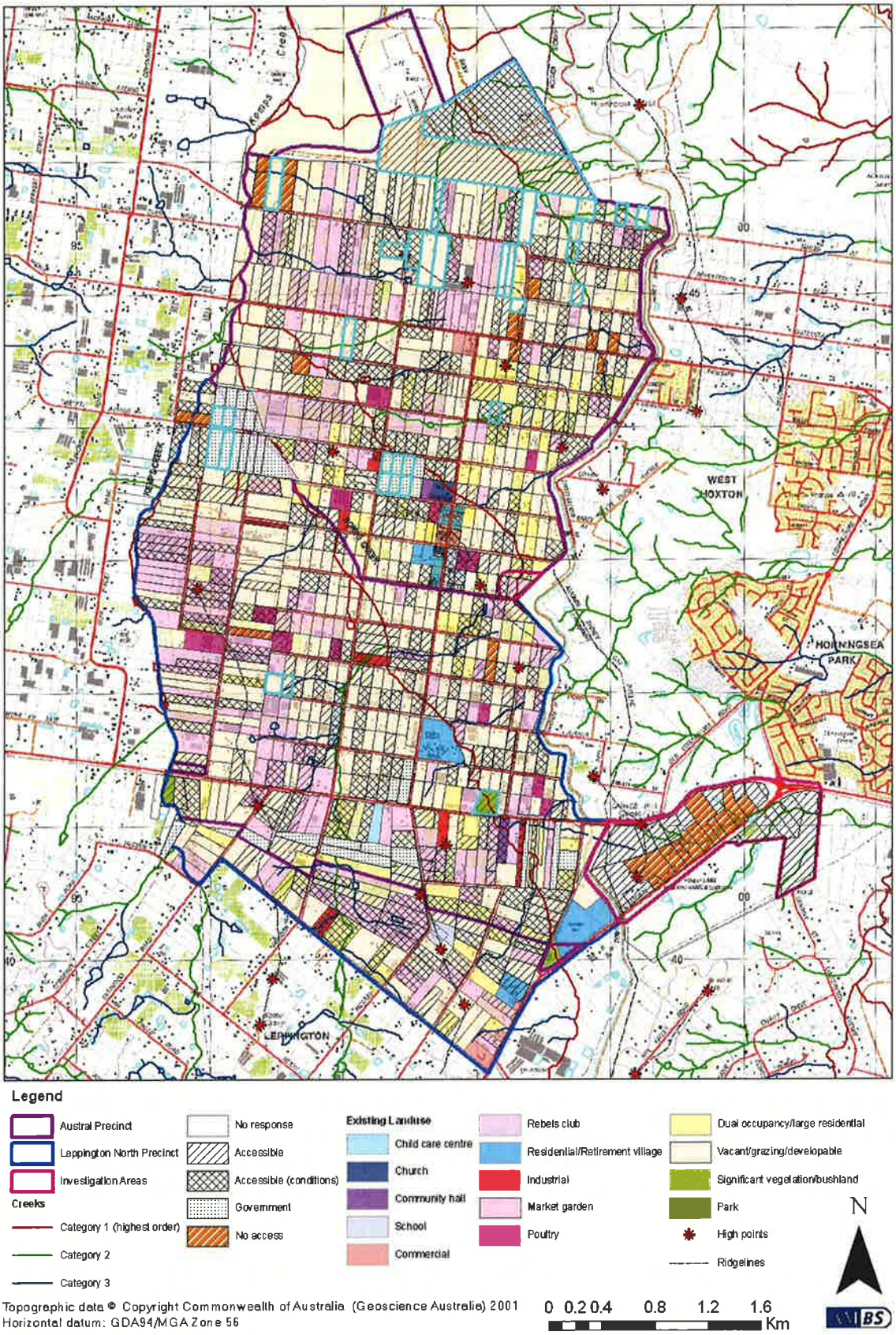

Figure 5.2 Properties entered for survey within the study area (outlined in blue).

5.2 Survey Results

Survey coverage data was gathered during the archaeological field survey to allow quantification of ground exposure and visibility, as adverse observation conditions can affect the detection of Aboriginal sites and material. This data does not reflect the extent of the area that was physically surveyed, but represents an estimate of the area of ground surface examined, and presents an estimate of the effectiveness of the survey, given environmental conditions and ground visibility. Survey coverage and disturbance data is presented in accordance with the OEH guidelines, in Appendix B, Table 5.1, Table 5.2 and Table 5.3. The area covered during the survey was considered adequate for the purposes of this preliminary heritage assessment, which is to feed into the precinct planning.

Table 5.1 Landform summary for sampled areas.

Landform	Landform sample area (m^2)	Sample area effectively surveyed (m^2)	% of landform sample effectively surveyed	Number of sites	Number of features
Creek flat	2955550	15262.755	0.52%	12 (4 new)	5 PADs; 5 isolated finds; 1 artefact scatter & PAD; 1 artefact scatter, PAD & cultural site
Slope	2488360	7228.638	0.29%	4* (2 new)	2 artefact scatter & PADs; 2 artefact scatters; 2 isolated finds
Ridge	169690	1228	0.72%	3* (no new)	2 artefact scatters; 1 artefact scatter & PAD

*The artefact scatter and PAD 2024-46 was present on both slope and ridge landforms

Table 5.2 Landform summary for total study area.

Landform	Estimated total landform area (m^2)	Landform sample area (m^2)	% of total landform area sampled	Sample area effectively surveyed (m^2)	% of total landform effectively surveyed
Creek flat	5303356	2955550	55.7%	15262.755	0.29%
Slope	14112107	2488360	17.6%	7228.638	0.05%
Ridge	584537	169690	29%	1228	0.2%

Table 5.3 Disturbance summary for total study area.

Landform	Estimated total landform area (m^2)	Estimated area with gross disturbance (m^2)	Estimated area with gross disturbance (%)	Estimated area with moderate disturbance (m^2)	Estimated area with moderate disturbance (%)	Estimated area with minimal disturbance (m^2)	Estimated area with minimal disturbance (%)
Creek flat	5303356	1490529	28.1%	442973	8.4%	3369854	63.5%
Slope	14112107	5817172	41.2%	1262307	8.9%	7032628	49.8%
Ridge	584537	234795	40.2%	65715	11.2%	284027	48.6%

5.2.1 Aboriginal Heritage Sites

Approximately 28% of the study area was surveyed for this assessment (5,605,350m^2 of approximately 20,000,000m^2). As discussed in Section 5.1 above, the properties chosen for this sample were considered to have the highest potential to contain Aboriginal heritage sites. It was considered that surveying the entire study area would not provide any more meaningful archaeological results, given the extreme lack of visibility (effective coverage being estimated at 0.42% of the properties chosen for survey).

The location of one previously recorded Aboriginal site (2014-46) was verified during the archaeological survey of the study area, and six new Aboriginal heritage sites (ALN-IF-01 to ALN-IF-06) were identified and recorded. Other previously recorded sites in the vicinity of the study area (see Section 5.2.2) are not addressed in this section, as no evidence of these sites was seen during the survey; nor was it expected that the sites would be verified, given the lack of visibility.

The new sites comprised six isolated stone artefacts. The six new sites are referred to in this report as AL-IF-01 to AL-IF-06, dependent upon the order in which they were recorded. A summary of sites identified during the survey is presented in Table 5.4 (in the order in which they were identified during the field survey), and their location relative to the study area is presented in Figure 5.3. Specific details on each site are provided below.

Table 5.4 Summary of Aboriginal heritage sites identified during survey (see Volume 2 of the report for full table).

Site	Type	Property	Landform	Details
AL-IF-01	Isolated find	205 Gurner Ave	Creek flat	1 chert retouched flake
2014-46	Artefact scatter and PAD	Lot 10 DP 771080 and Lot 15 DP 831988	Creek flat	2 artefacts previously recorded by AHMS (in prep.) 3 artefacts recorded during the current study
AL-IF-02	Isolated find	Property immediately east of Lot 15 DP 831988	Slope	1 silcrete retouched flake
AL-IF-03	Isolated find	Lot 15 DP 831988	Slope	1 silcrete proximal flake
AL-IF-04	Isolated find	Property immediately north of Lot 10 DP 771080	Creek flat	1 silcrete flake
AL-IF-05	Isolated find	5 Gurner Ave	Creek flat	1 silcrete medial flake
AL-IF-06	Isolated find	94 Boyd St	Creek flat	1 chert distal flake

Figure 5.3 Location of Aboriginal sites recorded during the survey (see Volume 2 of the report).

ALN-IF-01 – Isolated find

Landform: Creek flat
Site Size: N/A
Exposure: Unsurfaced vehicle/dirt bike track at back of property
Property: 205 Gurner Avenue (Lot 20 DP 3403)
Site description: This site, comprising an isolated chert retouched flake, is located c.60m north of an ephemeral tributary of Kemps Creek, and c.220m east of Kemps Creek, on a vehicle/dirt bike track at the back of the property at 205 Gurner Avenue, Austral (see Table 5.5, Figure 5.5). The property owner identified that the back of the property floods in heavy rain; and such flooding was present at the time of the survey (Figure 5.4). The back of the property has been disturbed by tree clearing, the construction of a dam, and use of the track area by vehicles and dirt bikes. The track had exposed the clay of the area, indicating a lack of potential artefact-bearing topsoil. Further, as the creek flat on which the artefact was found is quite low-lying and prone to flooding in heavy rain, with the creek being of low order, it is unlikely that the area was used extensively by past Aboriginal people. Rather, it is considered that more intensive use was made of Kemps Creek to the west.

Table 5.5 ALN-IF-01 artefact details.

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type
Chert	Cream/grey	30	20	10	Retouched flake

Figure 5.4 Exposure at ALN-IF-01, view to east.

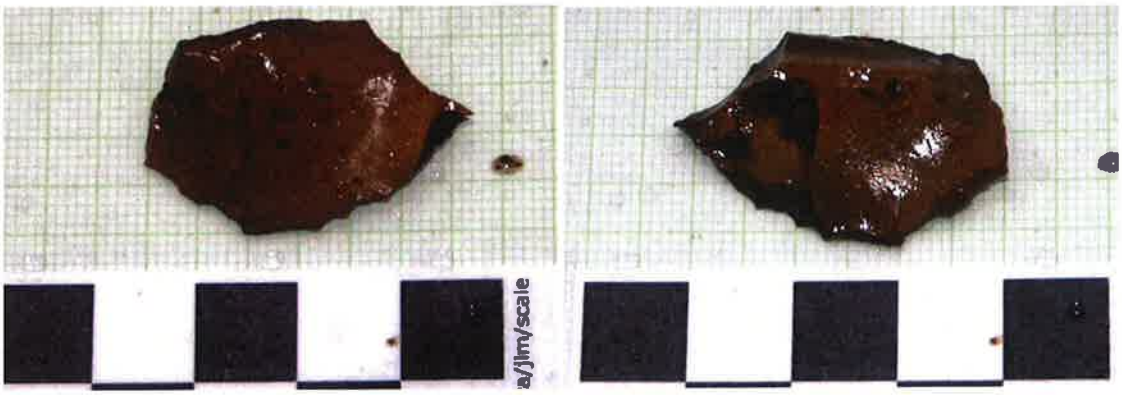

Figure 5.5 ALN-IF-01 chert artefact, ventral (left) and dorsal (right) surfaces.

2014-46 – Artefact scatter and PAD

Landform: Creek flat
Site Size: Approximately 100m x 30m
Exposure: Unsurfaced vehicle and walking tracks near gate and creek
Property: On boundary of Lot 10 DP 771080 and Lot 15 DP 831988
Site description: The site is approximately 20-50m north of a major tributary of Kemps Creek, on the boundary of Lot 10 DP 771080 and Lot 15 DP 831988 (see Figure 5.3, Figure 5.6). AHMS (in prep.) recorded site 2014-46 as comprising two small red silcrete pieces on an exposed track within a transmission line easement, with an adjacent area of PAD on either side of the track and easement. During the current survey, one chert and two silcrete artefacts were located on the same landform, in approximately the same location, on the track adjacent to the creek (Table 5.6, Figure 5.8). AHMS (in prep.:102-3) considered that the integrity, landform and soil profile at this site indicated a potential for additional buried material in an undisturbed context, with which AMBS concurs.

Table 5.6 2014-46 artefact details (see Volume 2 of the report for full table).

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type	Source of Information
Silcrete	Red	15	10	5	Flaked piece	AHMS (in prep.)
Silcrete	Red	10	10	5	Flaked piece	AHMS (in prep.)
Silcrete	Red	20	15	5	Proximal flake	Current survey
Silcrete	Cream	20	20	5	Flaked piece	Current survey
Chert	Orange	15	10	10	Medial flake	Current survey

Figure 5.6 View from location of silcrete artefacts, towards chert artefact to the south, at 2014-46.

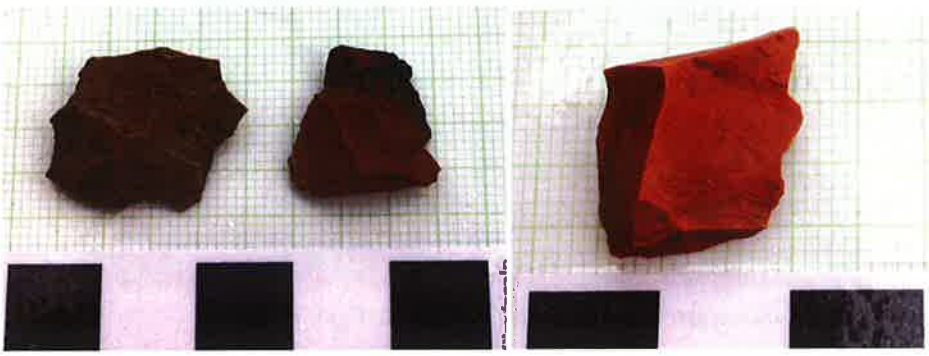

Figure 5.7 Site 2014-46 silcrete (left) and chert (right) artefacts, identified during AMBS survey.

Figure 5.8 Location of site 2014-46 as recorded by AHMS (in prep.) and identified during the current survey (see Volume 2 of the report).

ALN-IF-02 – Isolated find

Landform: Slope
Site Size: N/A
Exposure: Unsurfaced vehicle track between gas pipeline and Sydney Water Supply Upper Canal
Property: Property immediately east of Lot 15 DP 831988
Site description: This site, comprising an isolated silcrete retouched flake, is located on a track upslope, to the east of, a series of fenced structures associated with a gas pipeline, to the west of the Sydney Water Supply Upper Canal (see Table 5.7, Figure 5.10). It is located approximately 75m south of an unnamed tributary of Kemps Creek, and c.700m east of a major tributary of Kemps Creek (Figure 5.3, Figure 5.9). Given the slope landform and the eroded vehicle track on which the artefact is located, it is considered unlikely that the site has the potential to contain intact subsurface deposit. The location and nature of the site (an isolated artefact) is suggestive of sporadic camping or travel through the area, rather than frequent or recurring use of the place.

Table 5.7 ALN-IF-02 artefact details.

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type
Silcrete	Red/grey	20	20	5	Retouched flake

Figure 5.9 ALN-IF-02, view to north east.

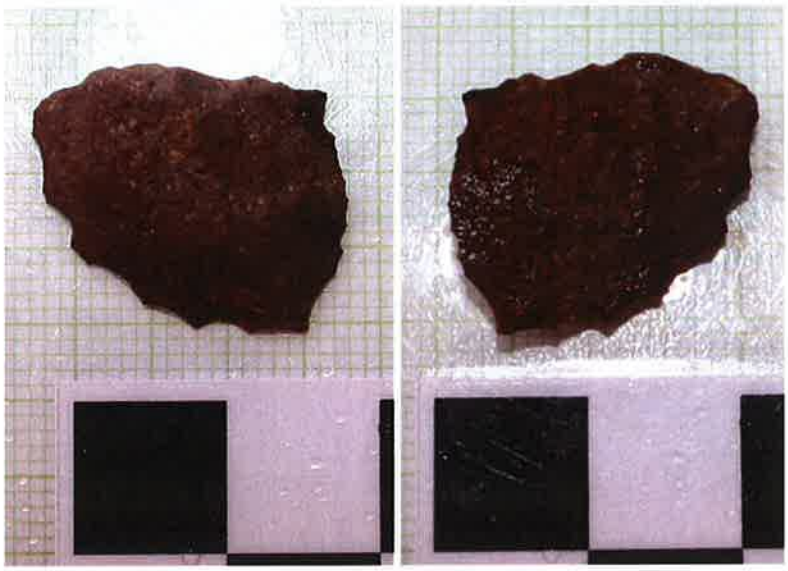

Figure 5.10 ALN-IF-02 silcrete artefact, ventral (left) and dorsal (right) surfaces.

ALN-IF-03 – Isolated find

Landform: Slope
Site Size: N/A
Exposure: Unsurfaced vehicle track between gas pipeline and gate near Kemps Creek tributary
Property: Lot 15 DP 831988
Site description: This site, comprising an isolated silcrete proximal flake, is located on a track upslope, to the east of, a gate near a crossing of a major tributary of Kemps Creek, on Lot 15 DP 831988 (see Table 5.8, Figure 5.12). The track follows a transmission line, and leads to a series of fenced structures associated with a gas pipeline (Figure 5.3, Figure 5.11). The site is located approximately 130m east of the major Kemps Creek tributary, and c.115m north west of an unnamed tributary of Kemps Creek. Given the slope landform and the eroded vehicle track on which the artefact is located, it is considered unlikely that the site has the potential to contain intact subsurface deposit. The location and nature of the site (an isolated artefact) is also suggestive of sporadic camping or travel through the area, rather than frequent or recurring use of the place.

Table 5.8 ALN-IF-03 artefact details.

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type
Silcrete	Red/cream	20	20	10	Proximal flake

Figure 5.11 ALN-IF-03, view to east.

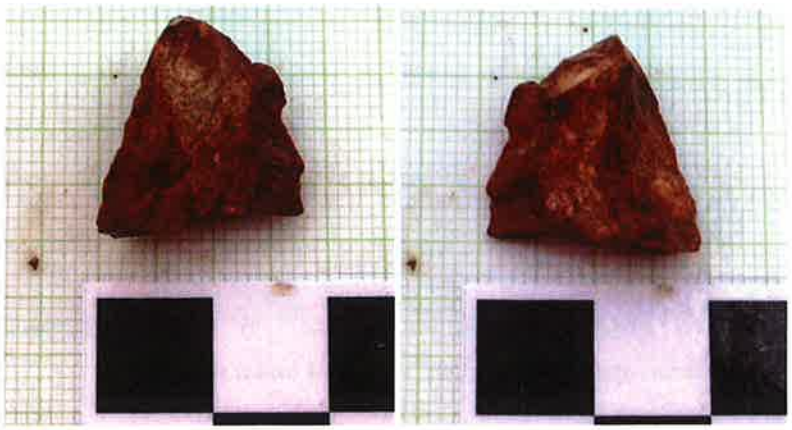

Figure 5.12 ALN-IF-03 silcrete artefact, ventral (left) and dorsal (right) surfaces.

ALN-IF-04 – Isolated find

Landform: Creek flat
Site Size: N/A
Exposure: Unsurfaced vehicle track along transmission line
Property: Property immediately north of Lot 10 DP 771080
Site description: This site, comprising an isolated silcrete flake, is located on a track c.70m east of a major tributary of Kemps Creek, along a transmission line easement, on the property immediately north of Lot 10 DP 771080 (see Table 5.9, Figure 5.2, Figure 5.13, Figure 5.14). Although the track and transmission line have caused some disturbance, the general area around the site is considered to have potential to contain intact subsurface deposit of some extent, given its location on the flats adjacent to a major creek tributary.

Table 5.9 ALN-IF-04 artefact details

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type
Silcrete	Cream/red	10	10	5	Flake

Figure 5.13 ALN-IF-04, view to south east.

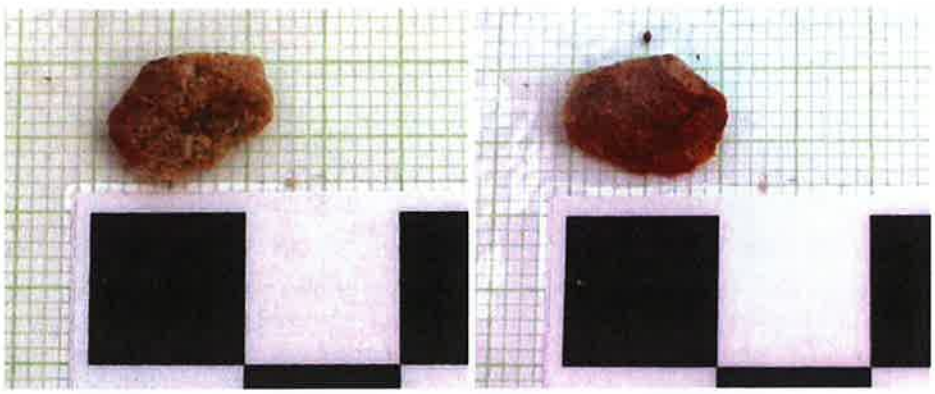

Figure 5.14 ALN-IF-04 silcrete artefact, ventral (left) and dorsal (right) surfaces.

ALN-IF-05 – Isolated find

Landform: Creek flat
Site Size: N/A
Exposure: Dam constructed at back of property
Property: 5 Gurner Avenue (Lot 1 DP 3403)
Site description: This site, comprising an isolated silcrete medial flake, is located adjacent to a recently constructed dam at the back of the property at 5 Gurner Avenue, Austral (Table 5.10, Figure 5.3, Figure 5.15, Figure 5.16). The site is c.75m south west of an unnamed tributary of Kemps Creek, and c.215m south east of a major tributary of Kemps Creek. The construction of the dam has severely impacted the site, and the artefact is unlikely to be *in situ*. However, the site is c.30m from the back of the property, which is adjacent to the relatively undisturbed land to the south east of the Transgrid substation. The proximity of a number of creeks in the vicinity suggests that this area may have been used with some frequency, for camping and travelling, by Aboriginal people in the past.

Table 5.10 ALN-IF-05 artefact details.

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type
Silcrete	Red	10	5	5	Medial flake

Figure 5.15 ALN-IF-05, view to north.

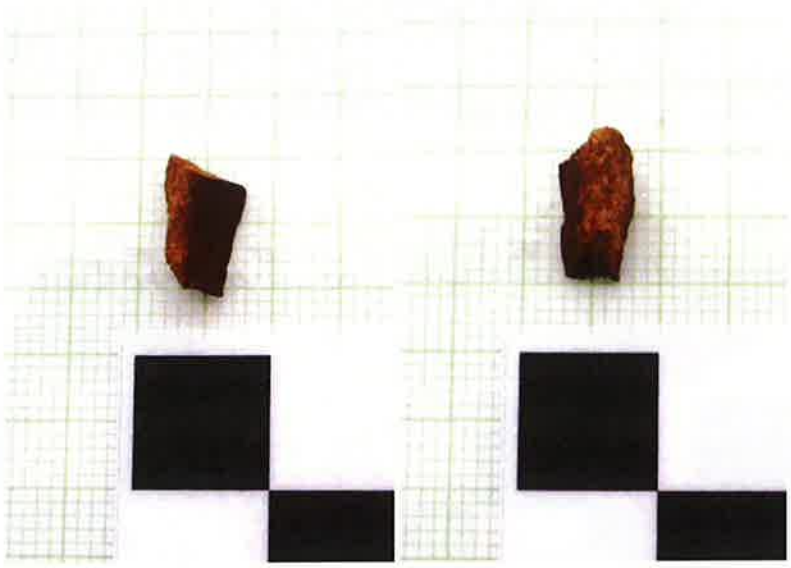

Figure 5.16 ALN-IF-05 silcrete artefact, ventral (left) and dorsal (right) surfaces.

ALN-IF-06 – Isolated find

Landform: Creek flat
Site Size: N/A
Exposure: Cutting for road
Property: 94 Boyd Street (Lot 87 DP 740973)
Site description: This site, comprising an isolated chert distal flake is located within a cutting for the creation of Boyd Street, in front of the property at 94 Boyd Street, Austral (see Table 5.11, Figure 5.3, Figure 5.17, Figure 5.18). The site is c.300m east of Kemps Creek. The construction of the road has severely impacted the site, and the artefact is unlikely to be *in situ*. Apart from cutting to form the road, the front of the property has been disturbed by tree clearing and the construction of fencing. Although it is considered that this area near Kemps Creek was used extensively by past Aboriginal people, the cutting has exposed the clay of the site area, indicating a lack of potential artefact-bearing topsoil. It is considered that the area closer to the creek, to the west, may have more deposit, but this also has been disturbed by the construction of a house, sheds and market gardens.

Table 5.11 ALN-IF-06 artefact details.

Material	Colour	Max. length (mm)	Max. width (mm)	Max. thickness (mm)	Artefact type
Chert	Cream	15	10	5	Distal flake

Figure 5.17 ALN-IF-06, view to south.

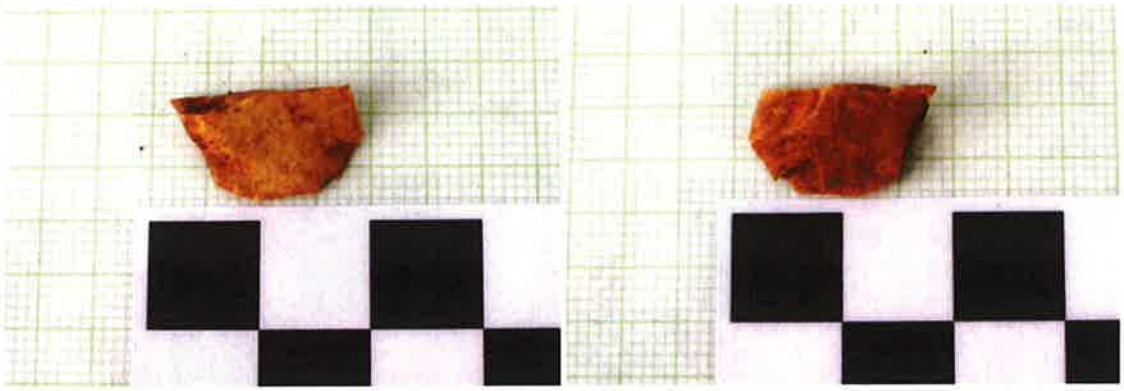

Figure 5.18 ALN-IF-06 chert artefact, ventral (left) and dorsal (right) surfaces.

5.2.2 Recorded Aboriginal Sites Not Located during the Current Survey

Sites that have been previously recorded within the current study area (of which there are 34, and two immediately adjacent), but which were **not** located during the current survey (of which there are 33 within and two immediately adjacent), are summarised in Table 5.12 below, with the sites located immediately adjacent to the study area but not seen during the survey summarised in Table 5.13.

Although no evidence of these 35 sites (33 within and two immediately adjacent) was seen during the survey, it was not expected that the sites would be verified, given the lack of visibility. Further, the majority of these sites have been recorded in the last year, and it therefore considered that the site location information, including GPS co-ordinates, provided on the AHIMS site cards and in the associated reports is up-to-date, and easily verifiable when visibility is greater.

Table 5.12 Sites previously recorded within the study area, not located during the current survey.

Site	AHIMS No./ Reference	Site Type	Location
2015-46	N/A AHMS (in prep.)	Artefact scatter and PAD	At back of properties at 35-45 Gurner Ave.
GLC2	45-5-2560	Open Camp Site (4 artefacts)	Concluded to be within the area of land south-east of Transgrid substation. Artefacts scattered on each side of small drainage line at base of hill, 0.5km north of 18th Ave, in existing gas pipeline easement.
2017-6	N/A AHMS (in prep.)	PAD	Along front of properties at 205-225 and 210 Gurner Ave.
2016-5	N/A AHMS (in prep.)	Isolated find	On corner of Fourth and Gurner Ave, on property at 95 Gurner Ave.
2018-6	N/A AHMS (in prep.)	PAD	At front of properties at 590-610 and 645-655 Fifteenth Ave.
2021-5	N/A AHMS (in prep.)	Isolated find	On property at 225 Tenth Ave.
2019-6	45-5-4018 AHMS (in prep.)	PAD	On properties at 140-150 Seventh Ave.
2020-6	45-5-4019 AHMS (in prep.)	PAD	On properties at 130-140 Seventh Ave.
BRP-IF-09	45-5-3858 AA (2010)	Isolated Find	On road verge in front of 431 Bringelly Road.
BRP-S-13	45-5-3868 AA (2010)	Open Camp Site (3 artefacts)	On road verge c. 115m east of the front of 431 Bringelly Road.
2024-46	45-5-4023 AHMS (in prep.)	Artefact scatter and PAD	At front of properties at 532-543 and 419 Bringelly Road.
BRP-S-12	45-5-3898 AA (2010)	Open Camp Site (2 artefacts)	In front yard of 419 Bringelly Road.
BRP-S-11	45-5-3897 AA (2010)	Open Camp Site (5 artefacts)	Between fence and 100m into property at 14 Eastwood Road.
BRP-S-10/ BRP-S-10 PAD (or BRP-PAD-01)	45-5-3887/ 45-5-3900 AA (2010)	Open Camp Site and PAD (32 artefacts)	On slope down to Bonds Creek at 444 Bringelly Road.
2032-6	45-5-4031 AHMS (in prep.)	PAD	At front of properties at 532-543 and 419 Bringelly Road.
BRP-IF-06	45-5-3855 AA (2010)	Isolated Find	Near tree 10m from road, 120m west of intersection of Bringelly Road and Edmondson Avenue.
BRP-IF-07	45-5-3856 AA (2010)	Isolated Find	Near tree opposite benches, 2m from fence of Scott Memorial Oval, 70m north of intersection of Bringelly Road and Edmondson Avenue.
BRP-IF-08	45-5-3857 AA (2010)	Isolated Find	In disused garden bed, 217 Bringelly Road (corner of Rickard Road).
SWRL Site 4	45-5-3536 AMBS (2010a)	Isolated Find	In soil from trenching for a gas pipeline; 40m south of Bringelly Road, 100m west of the Upper Canal, within Lot 18 DP19406.
SWRL Site 3	45-5-3537 AMBS (2010a)	Open Camp Site (8 artefacts)	Near old corral and property fenceline, 200m south of the junction of Camden Valley Way and Bringelly Road, within Lot 3 DP205472.
SWRL Site 12	45-5-3906 AMBS (2010a)	Isolated Find	Adjacent to a stand of trees, in a horse paddock, within Lot 1 D513403.
BRP-S-19	45-5-3874 AA (2010)	Open Camp Site (2 artefacts)	On access track 20m east of Upper Canal, 70m east of Cowpasture Road, 200m south of Bringelly

			Road.
SWRL Site 7	N/A AMBS (2010a)	Open Camp Site (4 artefacts)	On access track immediately east of Upper Canal.
TP25	N/A AMBS (2010b)	Open Camp Site (7 artefacts)	On grazing land at back of 50 Eastwood Road.
SWRL Site 9	45-5-3532 AMBS (2010a)	Open Camp Site (3 artefacts)	At base of electricity transmission line poles, 5m west of Kemps Creek, 200m north east of McCann Road, within Lot 102 DP736147.
SWRL Site 13	45-5-3907 AMBS (2010a)	Open Camp Site (7 artefacts)	On old vehicle tracks on gentle slope c.250-350m west of a small second order tributary of Kemps Creek, within Lot 2 DP1082805.
SW1	N/A Heritage Concepts (2006)	Isolated Find	On low slope of a closed depression.
LP-3	45-5-3946 KN (2010)	Isolated Find	On western side of Camden Valley Way, between Upper Canal and Bringelly Road.
SWRL Site 10	45-5-3903 AMBS (2010a)	Open Camp Site (14 artefacts)	In powerline easement adjacent to the end of Cassidy Street, and on track downslope into vegetated area.
2063-6	N/A AHMS (in prep.)	PAD	On back of properties at 61-71 Cowpasture Road.
TLC1	45-5-2559	Open Camp Site (2 artefacts)	400m north of Camden Valley Way; in existing gas pipeline easement. Artefacts on rise 200m south of narrow creek line.
LIF-1	45-5-3300 Navin Officer (2006)	Isolated Find	In horse paddock, north of Camden Valley Way, between Upper Canal and Cowpasture Road.
LP-4	45-5-3947 KN (2010)	Open Camp Site (2 artefacts)	In Lochie's Hotel carpark at corner of Ingleburn Road and Camden Valley Way.

Table 5.13 Sites previously recorded immediately adjacent to the study area, not located during the current survey.

Site	AHIMS No./ Reference	Site Type	Location
2005-846	N/A AHMS (in prep.)	Artefact scatter, PAD & cultural site	Adjacent to north western edge of study area, on Kemps Creek, at back of property at 225 Gurner Ave.
SWRL Site 11	45-5-3905 AMBS (2010a)	Isolated Find	Adjacent to south eastern section of study area. On dirt track adjacent to old property boundary fenceline, next to BMX bike jumps, within Lot 7 DP205472.

5.2.3 *Areas of Potential Aboriginal Archaeological Sensitivity*

Given the lack of ground surface visibility and resulting difficulty in identifying Aboriginal heritage sites during the archaeological survey, an archaeological sensitivity map has been developed to facilitate a clearer understanding of the constraints and opportunities associated with the Austral and Leppington North Precincts.

The results of the field survey and previous archaeological investigations have informed an estimate of potential Aboriginal archaeological sensitivity for landforms within the study area, which is presented in Figure 5.19 (and see also Figure 5.21). This estimate considers both the predictive model for Aboriginal heritage and the recorded Aboriginal sites. For the purposes of this assessment, which is intended to provide a guide for the precinct planning, archaeological sensitivity is defined as areas in which sites are known to occur, or which have the potential to contain undetected buried Aboriginal archaeological deposits. Definitions of levels of archaeological sensitivity are presented in Table 5.14. Note that areas that have not been identified as having moderate or high sensitivity may contain Aboriginal sites, but these sites are more likely to represent background scatter, rather than extensive or *in situ* sites.

Table 5.14 Definition of levels of archaeological sensitivity.

Level	Definition
Moderate Sensitivity	Artefacts in detectable densities known to occur in the area, or in similar environmental/ landscape contexts within the region
High Sensitivity	Artefacts known to occur in high densities in the area, or are consistently identified in similar environmental/landscape contexts, and are highly likely to be detected and disturbed during ground disturbance works and archaeological excavations

An estimate of previous disturbance has also been made, based on the existing landuse mapping (Figure 5.22; see also Figure 5.22). Areas identified as having gross disturbance include road corridors, underground gas pipelines, dams, and properties classified as child care centres, churches, commercial, community halls, industrial, market gardens, poultry, Rebels club, residential/retirement village and schools, as well as the SWRL corridor which will be constructed in the near future. Areas identified as having moderate disturbance include transmission lines and properties classified as dual occupancy/large residential. Areas identified as having minimal disturbance include properties classified as parks, significant vegetation/bushland, and vacant/grazing/developable.

Figure 5.19 Identified Aboriginal sites and areas of archaeological sensitivity (see Volume 2 of the report).

Figure 5.20 Level of disturbance impacting upon archaeological sensitivity within the study area. NB. Minimal disturbance is considered not to impact upon the sensitivity; moderate disturbance has some impact; and gross disturbance has a major impact, effectively cancelling (or "whiting-out") sensitivity (see Volume 2 of the report).

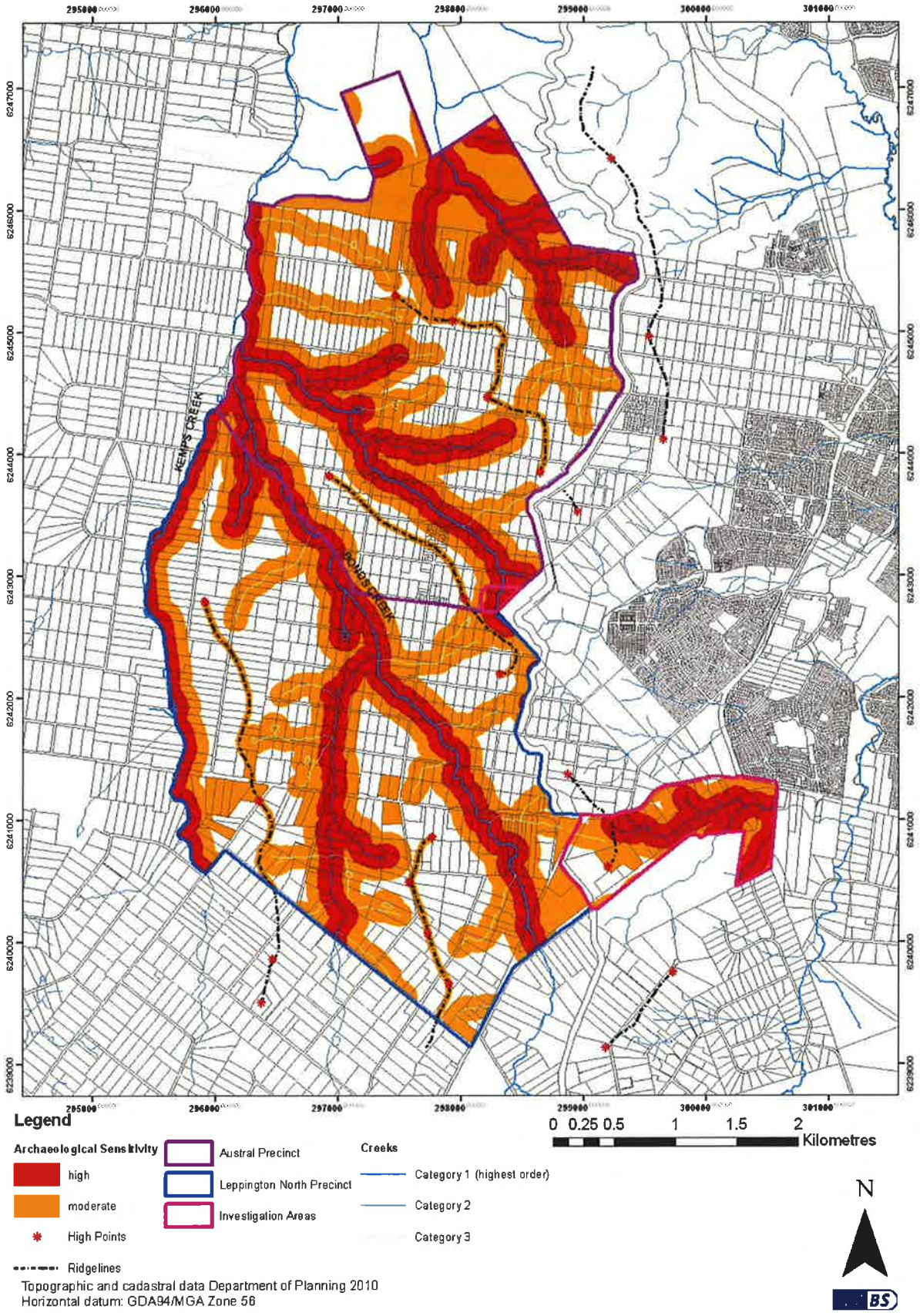

Figure 5.21 Identified areas of archaeological sensitivity for public exhibition.

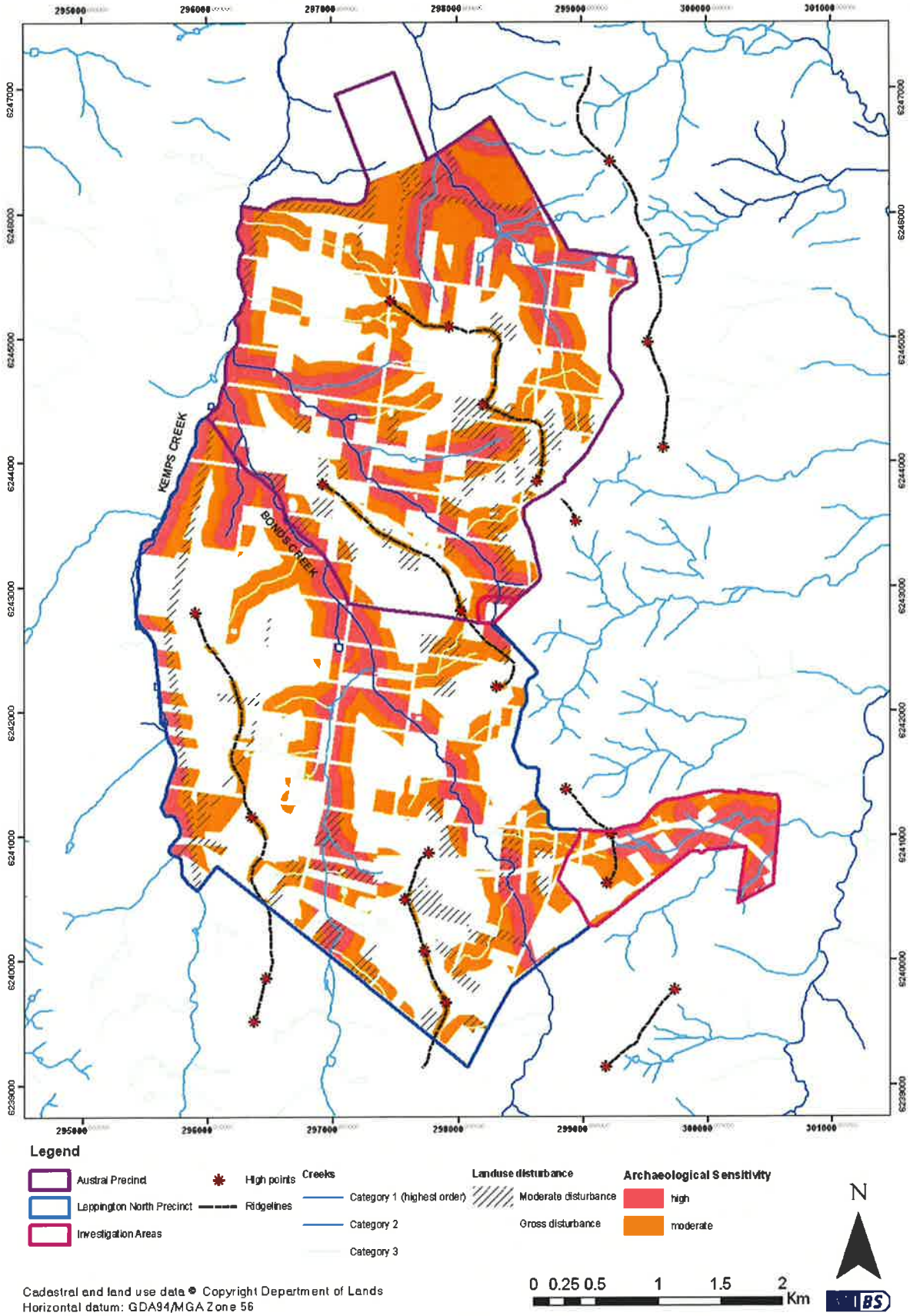

Figure 5.22 Level of disturbance impacting upon archaeological sensitivity (suitable for public exhibition) within the study area. NB. Minimal disturbance is considered not to impact upon the sensitivity; moderate disturbance has some impact; and gross disturbance has a major impact, effectively cancelling (or "whiting-out") sensitivity.

6 Assessing Heritage Significance

6.1 Preamble

The assessment of Aboriginal cultural heritage significance has been undertaken in accordance with OEH guidelines. The criteria for assessing Aboriginal significance are derived from the Burra Charter criteria of aesthetic, historic, scientific, social or spiritual value for assessing cultural significance for past, present and future generations.

Not all sites are equally significant and not all are worthy of equal consideration and management. The significance of a site is not fixed for all time; what is considered as significant at the time of assessment may change as similar items are located, more research is undertaken and community values change. This does not lessen the value of the heritage approach, but enriches both the process and the long-term outcomes for future generations as the nature of what is conserved and why also changes over time (Pearson and Sullivan 1995:7).

6.2 Aboriginal Heritage Significance

6.2.1 OEH Aboriginal Heritage Significance Criteria

OEH professional guidelines for the assessment of significance of Aboriginal sites, objects and places identify two types of significance: cultural significance and archaeological significance (*NPWS Aboriginal Heritage Guidelines* 1997:5-11).

Cultural Significance

This area of assessment concerns the value(s) of a site or feature to a particular community group – in this case the local Aboriginal community or communities. Aspects of social significance are relevant to sites, items and landscapes that are important, or have become important, to the local Aboriginal community. This importance involves both traditional links with specific areas as well as an overall concern by Aboriginal people for sites and landscapes generally and their continued protection. Aboriginal cultural significance may include social, spiritual, historic and archaeological values. Aboriginal cultural significance assessments can only be made by the relevant Aboriginal communities.

This area of assessment is consistent with *Criterion d* of the Heritage Branch guidelines, which includes any or all aspects of social, cultural or spiritual values held by a community or group.

Scientific Significance

Scientific significance is assessed using criteria to evaluate the contents of a site, state of preservation, integrity of deposits, representativeness of the site type, rarity/uniqueness and potential to answer research questions on past human behaviour (NPWS 1997:5). The 1997 OEH guidelines recommend the following criteria for assessing archaeological significance:

- *Archaeological Research Potential* – significance may be based on the potential of a site or landscape to explain past human behaviour. It can incorporate the intactness, stratigraphic integrity or state of preservation of a site, the association of the site to other sites in the region or a datable chronology. This area of assessment is consistent with *Criterion e* of the Heritage Branch guidelines;
- *Representativeness* – all sites are representative of those in their class (site type/subtype); however, this issue relates to whether particular sites should be conserved to ensure that a representative sample of the archaeological record is retained. Representativeness is based on an understanding of the regional archaeological context in terms of site variability in and around the Study Area, the resources already conserved and the relationship of sites

across the landscape. This area of assessment is consistent with *Criterion g* and aspects of *Criterion a* of the Heritage Branch guidelines; and

- *Rarity* – defines how distinctive a site may be, based on an understanding of what is unique in the archaeological record and consideration of key archaeological research questions (i.e. some sites are considered more important due to their ability to provide scientific or cultural information). It may be assessed at local, regional, state and national levels. This area of assessment is consistent with *Criterion f* and aspects of *Criterion a* of the Heritage Branch guidelines.

The SWGC guidelines detailed in the *Precinct Assessment Method for Aboriginal Cultural Heritage in the Sydney Growth Centres* (Context 2006:17-19), require that assessments of significance are undertaken in accordance with the SHR criteria as defined in *Assessing Heritage Significance* (NSW Heritage Office 2001). The 2010 OEH *Code of Practice for Aboriginal Investigation of Aboriginal Objects in New South Wales*, states that archaeological values should be identified and their significance assessed using criteria reflecting best practice assessment processes as set out in the Burra Charter. The SHR criteria reflect the Burra Charter assessment criteria, and are consistent with the OEH 1997 guidelines.

6.3 Assessment against Criteria

The following assessment of heritage values against the Heritage Branch criteria is informed by the results of the background and environmental review, the predictive model for Aboriginal sites in the region, and the results of the Aboriginal heritage field assessment and assessment of archaeological potential. The significance of sites within the study area which have been recorded and assessed previously, but which were not verified during the current survey, are not included in this assessment.

The following is an assessment of the Aboriginal archaeological heritage significance.

Criterion a) an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)

Aboriginal stone artefact sites identified during the survey are representative of similar Aboriginal sites across the Cumberland Plain and of NSW, and as such, do not meet the threshold for inclusion for this criterion.

Criterion b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area)

Aboriginal stone artefact sites identified during the survey are representative of activity by the local Darug/Tharawal/Gandangara people. Although such deposits retain cultural significance, a sense of place, and heritage value for the local Aboriginal people, and are representative of the daily lives of their ancestors, individually they are not rare at a local or regional level; and as such, do not meet the threshold for inclusion for this criterion.

Criterion c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)

Aboriginal stone artefact sites identified during the survey are representative of similar Aboriginal sites across the Cumberland Plain and the rest of NSW, and as such, do not meet the threshold for inclusion for this criterion.

***Criterion d) an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.* (Complies with OEH's criterion for Cultural Significance)**

Aboriginal communities consulted with throughout this project have indicated that, while all Aboriginal heritage sites recorded contain intrinsic cultural significance, there are no further specific cultural significances attached to the sites which were identified during the current survey. As such, the Aboriginal stone artefact sites identified during the survey do not meet the threshold for this Criterion.

***Criterion e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).* (Complies with OEH's criterion for Scientific Significance –Archaeological Research Potential)**

The Aboriginal cultural deposits located in the Austral and Leppington North precincts have archaeological research potential. Key research questions to be addressed have the potential to add insight into the cultural history of the Darug/Tharawal/Gandangara people. The levels of potential for in situ archaeological deposits to be present at Aboriginal stone artefact sites identified during the survey are summarised below.

ALN-IF-01

ALN-IF-01 is an isolated artefact on a vehicle/dirt bike track on the creek flat of an ephemeral stream, over 200m from Kemps Creek. The creek flat is flood-prone, the creek is of low order, and clay was exposed on the track, indicating a lack of potential artefact-bearing topsoil. As such, the site is considered to have low potential for *in situ* subsurface deposit, and therefore has **low** research potential.

2014-46

Creek lines in the region are likely to contain evidence of past Aboriginal activity. Although the number of surface artefacts identified at this site is comparatively low, the creek is a major water source, and the flat is relatively undisturbed and is likely to contain *in situ* archaeological deposit. Further, the site is located in one of the least disturbed sections of the Precincts. As such, this site is considered to have **high** research potential.

ALN-IF-02 and ALN-IF-03

ALN-IF-02 and ALN-IF-03 are two isolated artefacts located on infrastructure access tracks on slopes. The location and disturbance of the sites indicates that the landforms are unlikely to contain undisturbed *in situ* archaeological deposits. In addition, the number and type of artefacts recorded at these sites is not indicative of complex archaeological deposits. As such, the sites are likely to represent incidental, background Aboriginal activity within the region. However, the sites are located in one of the least disturbed sections of the Precincts, and this section has the potential to reveal use of the landscape in this area, on the slopes and flats around a number of Kemps Creek tributaries. Assessed within this context, these sites are considered to have **moderate** research potential.

ALN-IF-04

Creek lines in the region are likely to contain evidence of past Aboriginal activity. Although this site contained one surface artefact, the surrounding area was heavily vegetated, and this is likely to have prevented identification of further artefacts. Further, the creek is a major water source, and although the track and transmission line have caused some disturbance, the general area around the site is considered to have potential to contain intact subsurface deposit of some extent. As such, this site is considered to have **moderate** research potential.

ALN-IF-05

ALN-IF-05 is an isolated artefact adjacent to a dam, and is unlikely to be *in situ* or have undisturbed archaeological deposit in the immediate area. As such, the site is considered to have **low** research potential. Conversely, the area to the north of the property at the back is one of the least disturbed sections of the Precincts and is contains numerous creeks, and is likely to have more archaeological potential.

ALN-IF-06

ALN-IF-06 is an isolated artefact located in the cutting adjacent to Boyd Street, 300m from Kemps Creek. The construction of the road and a fence has severely impacted the site, and the artefact is unlikely to be *in situ*. The cutting has exposed the clay of the site area, indicating a lack of potential artefact-bearing topsoil. As such, the site is considered to have low potential for *in situ* subsurface deposit, and therefore has **low** research potential.

***Criterion f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).* (Complies with OEH's criterion for Scientific Significance – Rarity)**

The Aboriginal stone artefact sites identified during the survey may be regarded as being relatively common in the local region. Such sites are the most common site type both locally and regionally, and are therefore not considered to have archaeological rarity.

***Criterion g) an item is important in demonstrating the principal characteristics of a class of NSW's Cultural or natural places or environments (or in the local area).* (Complies with OEH's criterion for Scientific Significance –Representativeness)**

Aboriginal stone artefact sites identified during the survey are representative of similar Aboriginal sites across the Cumberland Plain and the rest of NSW. Stone artefact sites are the most common type of site previously recorded in the local region. Such site types represent a continuity of use of water resources across the study area. It is considered likely that a background scatter of such artefacts is present throughout similar landforms in the region. Sites ALN-IF-01–ALN-IF-03 and ALN-IF-05–ALN-IF-06 are likely to represent such incidental, background Aboriginal activity in the region, while sites 2014-46 and ALN-IF-04 are likely to represent archaeological deposits of some complexity, though still representative of Aboriginal use of the area. All identified sites are considered to be representative of the local archaeology, although sites ALN-IF-01 and ALN-IF-05–ALN-IF-06 have low site integrity. As such, Aboriginal stone artefact sites identified during the survey do not meet the threshold for this Criterion.

6.3.1 Summary Statement of Significance

Aboriginal stone artefact sites identified during the survey are representative of similar Aboriginal sites across the Cumberland Plain and the rest of NSW.

Site 2014-46 has potential to contain in situ subsurface archaeological deposits, and is therefore considered to be of high local significance due to its research potential. Isolated artefact sites identified during the survey have potential to contain disturbed subsurface archaeological deposits, and are therefore of low to moderate local significance due to their research potential. Aboriginal communities consulted throughout this project have indicated that, while all Aboriginal heritage sites recorded contain intrinsic moderate cultural significance, there are no further specific cultural significances attached to the identified sites.

The current evidence indicates that Aboriginal stone artefact sites ALN-IF-01 and ALN-IF-05–ALN-IF-06 have **low significance**. Sites ALN-IF-02–ALN-IF-04 are regarded as being of **moderate significance** due to their location within one of the least disturbed sections of the Precincts and their potential to reveal a continuity of use of this landscape as a part of a complex of sites. Site 2014-46 is considered to have **high significance**. A summary of the assessed levels of archaeological significance for identified sites is presented in Table 6.1 below.

Table 6.1 Assessed levels of significance for identified sites.

Assessed Site	Archaeological Research Potential			Representativeness	Rarity	Overall Significance
	Low	Moderate	High			
ALN-IF-0 1	✓			Local	No	Low
2014-46			✓	Local	No	High
ALN-IF-0 2		✓		Local	No	Moderate
ALN-IF-0 3		✓		Local	No	Moderate
ALN-IF-0 4		✓		Local	No	Moderate
ALN-IF-0 5	✓			Local	No	Low
ALN-IF-0 6	✓			Local	No	Low

A summary of the significance of all known Aboriginal archaeological sites within the study area (of which there are 37) is provided in Table 6.2 below, with the significance of sites immediately adjacent to the study area (of which there are two) summarised in Table 6.3. As discussed in Section 5.2.2 above, due to the lack of visibility, the majority of these sites could not be verified during the current survey. Therefore, the significance of these sites reflects the indicated significance contained in the relevant archaeological assessment reports; or where these are unavailable, significance has been inferred from information provided in the AHIMS site card.

Table 6.2 Overall significance of all known sites recorded within the study area.

Site	AHIMS No.	Site Type	Source of Assessment	Significance
2014-46	45-5-3969	Artefact scatter and PAD (5 artefacts)	AHMS (in prep.) Current report	**High**
ALN-IF-03	45-5-3965	Isolated find	Current report	**Moderate**
2015-46	N/A	Artefact scatter and PAD	AHMS (in prep.)	**High**
ALN-IF-01	45-5-3963	Isolated find	Current report	**Low**
ALN-IF-05	45-5-3967	Isolated find	Current report	**Low**
GLC2	45-5-2560	Open Camp Site (4 artefacts)	Site card (report not available)	Site disturbed by construction of pipeline and vehicle access. No significance defined, but considered **low-moderate** given the presence of a backed blade.
2017-6	N/A	PAD	AHMS (in prep.)	**Moderate**
2016-5	N/A	Isolated find	AHMS (in prep.)	**Low**
2018-6	N/A	PAD	AHMS (in prep.)	**Moderate**
2021-5	N/A	Isolated find	AHMS (in prep.)	**Low**
ALN-IF-06	45-5-3968	Isolated find	Current report	**Low**
2019-6	45-5-4018	PAD	AHMS (in prep.)	**Moderate**
2020-6	45-5-4019	PAD	AHMS (in prep.)	**Moderate**
BRP-IF-09	45-5-3858	Isolated Find	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
BRP-S-13	45-5-3868	Open Camp Site (3 artefacts)	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
2024-46	45-5-4023	Artefact scatter and PAD	AHMS (in prep.)	**Moderate**
BRP-S-12	45-5-3898	Open Camp Site (2 artefacts)	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation

				was recommended.
BRP-S-11	45-5-3897	Open Camp Site (5 artefacts)	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
BRP-S-10/ BRP-S-10 PAD (or BRP-PAD-01)	45-5-3887/ 45-5-3900	Open Camp Site and PAD (32 artefacts)	Site card (AA 2010 report not available)	No significance defined, but considered **moderate-high** given that test excavation was recommended.
2032-6	45-5-4031	PAD	AHMS (in prep.)	**Moderate**
BRP-IF-06	45-5-3855	Isolated Find	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
BRP-IF-07	45-5-3856	Isolated Find	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
BRP-IF-08	45-5-3857	Isolated Find	Site card (AA 2010 report not available)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
SWRL Site 4	45-5-3536	Isolated Find	AMBS (2010a)	**Low**
SWRL Site 3	45-5-3537	Open Camp Site (8 artefacts)	AMBS (2010a)	**Low**
SWRL Site 12	45-5-3906	Isolated Find	AMBS (2010a)	**Low**
BRP-S-19	45-5-3874	Open Camp Site (2 artefacts)	AA (2010)	No significance defined, but considered **low** given that no further archaeological investigation was recommended.
SWRL Site 7	N/A	Open Camp Site (4 artefacts)	AMBS (2010a)	**Low**
TP25	N/A	Open Camp Site (7 artefacts)	AMBS (2010a)	**High**
SWRL Site 9	45-5-3532	Open Camp Site (3 artefacts)	AMBS (2010a)	**Moderate**
SWRL Site 13	45-5-3907	Open Camp Site (7 artefacts)	AMBS (2010a)	**Low**
SW1	N/A	Isolated Find	Heritage Concepts (2006)	No significance defined, but considered **low** given nature of artefacts.
SWRL Site 10	45-5-3903	Open Camp Site (14 artefacts)	AMBS (2010a)	**Low**
LP-3	45-5-3946	Isolated Find	KN (2010)	**Low**
2063-6	N/A	PAD	AHMS (in prep.)	**Moderate**
TLC1	45-5-2559	Open Camp Site (2 artefacts)	Site card (report not available)	Site disturbed by construction of pipeline. No significance defined, but considered **low** given nature of artefacts.
LIF-1	45-5-3300	Isolated Find	Navin Officer (2006)	**Low**
LP-4	45-5-3946	Open Camp Site (2 artefacts)	KN (2010)	**Low**

Table 6.3 Overall significance of all known sites immediately adjacent to the study area.

Site	AHIMS No.	Site Type	Source of Assessment	Significance
2005-846	N/A	Artefact scatter, PAD & cultural site	AHMS (in prep.)	**Very high** (cultural values)
SWRL Site 11	45-5-3905	Isolated Find	AMBS (2010a)	**Low**

7 Conclusion

7.1 Preamble

As part of the NSW government's land release program, the DP&I is carrying out precinct planning to inform the rezoning of the Austral and Leppington North Precincts in the South West Growth Centres. The aim of the Aboriginal heritage assessment is to inform the Urban Form Analysis and land use planning regarding constraints and opportunities associated with Aboriginal heritage.

A number of large infrastructure developments are currently proposed in the study area and surrounds (such as the Bringelly Road and Camden Valley Way upgrades, the South West Rail Link, and water infrastructure for the South West Growth Centres and Edmondson Park precinct), although at this stage the timing for delivery of some of this infrastructure has yet to be determined. Should additional archaeological investigations, including excavation, be undertaken in the local area, their results may assist in refining constraints and recommendations during future detailed assessments for the Austral and Leppington North Precincts, and should be considered during any major future planning for the Project.

The following recommendations are based on the results of the background research, Aboriginal community consultation, archaeological field survey, and significance assessment as described in this report. Given the area's large size and the lack of ground surface visibility during the survey, these recommendations have been based on a landscape-based model of past Aboriginal use of the study area, and identify preliminary Aboriginal heritage constraints.

Conservation or avoidance of identified Aboriginal sites and areas of moderate and high archaeological sensitivity is the preferred heritage option. As precinct planning is essentially rezoning the land within the precincts and establishing new development controls, there is an opportunity to avoid impact to some areas or sites identified as having archaeological sensitivity when further detailed site planning is conducted at the Development Application stage. Where this is not possible due to design or engineering constraints, other mitigation measures may be appropriate; such as archaeological test excavations under OEH's *Code of Practice for Aboriginal Investigation of Aboriginal Objects in New South Wales* (Code of Practice) in areas of moderate and high archaeological sensitivity, and an application for an AHIP to allow direct impacts to identified Aboriginal heritage sites. However, it is anticipated that individual development proposals within the Precincts will be required to comply with the Development Application process, which will include preparation of detailed Aboriginal heritage impact assessments. Site specific recommendations to mitigate and offset proposed impacts to Aboriginal heritage would be included in these heritage assessments.

7.1.1 Cumulative Impacts

The Austral and Leppington North Precincts are part of the South West Growth Centres (Figure 7.1). The first release precincts of the SWGC, Edmondson Park, Oran Park and Turner Road, are currently being developed, as is the South West Rail Link. Thirteen other precincts are planned to be released for Precinct Planning progressively. In total, the SWGC is approximately 17,000 hectares and has capacity for around 110,000 new dwellings for 300,000 people (although it must be noted that these dwelling numbers are approximate and will be confirmed during Precinct Planning). Although it is understood that development of the SWGC is to take into consideration Aboriginal heritage (among other environmental issues) in its broad scale planning, the eventual urban development of these Precincts, along with the remainder of the SWGC and associated developments, will have a cumulative negative impact on Aboriginal heritage of South West Sydney and the South West Cumberland Plain (Figure 7.1).

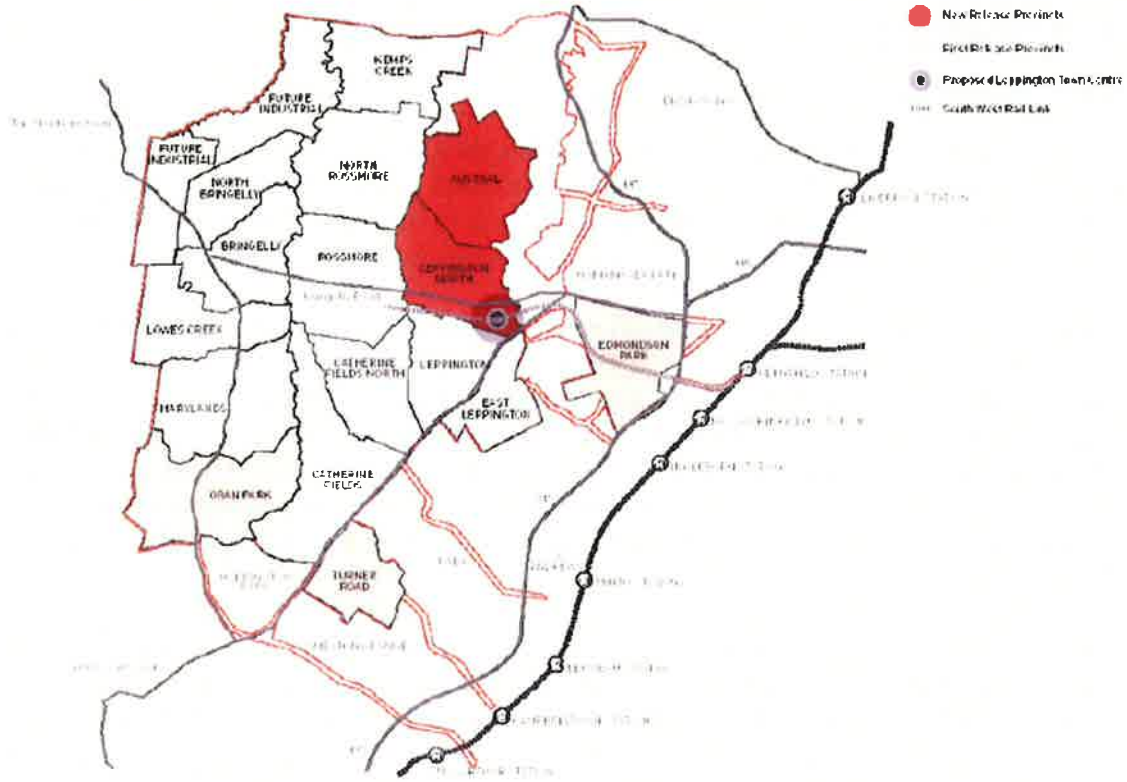

Figure 7.1 Indicative map of the SWGC precincts.

AMBS' predictive modelling outlined in Section 4.2.5 identifies stone artefact sites as the most common Aboriginal heritage site type occurring in the local landscape. A review of the environmental and historic context of the local area suggests that the majority of such sites are likely to have been previously impacted and disturbed by past land clearing, development, construction and agricultural practices. As such, is has been determined that there is a low likelihood that *in situ* stone artefacts are present in the local region. This means that areas of archaeological sensitivity in areas that have been subject to minimal previous disturbance are of increasing value, and worthy of conservation.

Current and future developments in the local area are likely to impact primarily upon previously disturbed stone artefact sites, as well as PADs with varying degrees of previous disturbance, where it is not possible to avoid such impacts within their development planning and methodology. Recommendations discussed below take into account the scientific significance of similar site types identified within and adjacent to the Precincts, and make appropriate recommendations based upon the cumulative impacts of associated developments and regional rarity and representativeness.

7.2 Areas of Potential Archaeological Sensitivity

As discussed in Section 5.2.3 and presented in Figure 5.21 and Figure 5.22, an estimate of potential Aboriginal archaeological sensitivity for landforms within the study area has been developed. These estimates of sensitivity relate to the potential for sites to be present or absent, and are not closely related to site integrity, archaeological research potential, or the archaeological or cultural significance of the sites, which would need to be the subject of future assessments; however, Figure 5.22 provides a preliminary consideration of the effects of disturbance. For example, some of the previously recorded sites which are present within areas of high or moderate sensitivity have been previously assessed as having low significance, due to disturbance of the site or a lack of remaining topsoil. Nevertheless, it must be noted that this is merely an estimate of previous disturbance, based on the existing landuse data; it is not a detailed estimate of disturbance, as would be gained from extensive pedestrian survey.

7.2.1 Areas of Moderate and High Archaeological Sensitivity

Areas of moderate and high archaeological sensitivity are located in areas which have the potential to contain sub-surface Aboriginal archaeological deposits; but which may have no archaeological exposure or visibility. The majority of the previously recorded sites in the study area are located in these areas; the remainder of the sites, which are not located in these areas of sensitivity, are sites with few artefacts, most likely representing background scatter.

Avoidance of impacts to areas of moderate and high archaeological sensitivity is recommended, through their incorporation into conservation corridors, particularly riparian areas. This may be feasible for areas of high archaeological sensitivity, which are generally aligned along major creeklines; however, it is noted that Sydney Water are currently undertaking assessments for installation of pipelines along many of these creeklines (Figure 7.2 includes indicative locations of the pipeline infrastructure, and the potential resulting impact upon the areas of sensitivity). This gives greater importance to conserving as much as possible of the remainder of the sensitive areas. Where this is not possible due to design or engineering constraints, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and archaeological test excavations under the Code of Practice may be required to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

Recommendation 1

Areas of moderate and high archaeological sensitivity should be incorporated into conservation zones where possible, particularly areas outside of Sydney Water's proposed pipelines. Where this is not possible, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and archaeological test excavations under the Code of Practice may be required, to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

An Indicative Layout Plan (ILP), drafted 16 June 2011, indicates many of the areas identified as being sensitive as being within riparian corridors/open space. Areas for conservation of Aboriginal cultural heritage must be considered as part of the future development of the Precinct, and these conservation areas should be within areas of high and moderate sensitivity, preferably within the less disturbed parts of these areas (see Figure 7.2, Figure 5.19 and Figure 5.20). It should be noted that there may be impacts in the areas designated as riparian corridors/open space, arising from works such as the installation of Council stormwater and detention infrastructure along creeks, development of sporting fields, and other open space facilities such as footpaths, benches, play equipment, landscaping etc. These will adversely impact on the conservation of sensitive areas.

Where any such impacts will occur within areas of sensitivity, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken. Archaeological test excavations under the Code of Practice may be required to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas. Conservation of these areas for their Aboriginal cultural heritage values, without such impacts, should be considered as part of the future development of the Precinct.

Recommendation 2

Areas for conservation of Aboriginal cultural heritage must be considered as part of the future development of the Precinct. Conservation areas should be within areas of high and moderate sensitivity, preferably within the less disturbed parts of these areas. Impacts to these conservation areas (e.g. drainage infrastructure, sporting fields, footpaths and other facilities/landscaping) should be avoided.

Recommendation 3

Where impacts will occur in areas of moderate and high archaeological sensitivity within riparian corridors/open space, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken. Archaeological test excavations under the Code of Practice may be required, to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

7.2.2 Areas without an ascribed Archaeological Sensitivity

As discussed in Section 5.2.3, areas that have not been identified as having moderate or high sensitivity may still contain Aboriginal sites, but these sites are more likely to represent background scatter, rather than extensive or *in situ* sites. As all Aboriginal heritage is protected under the *National Parks & Wildlife Act* 1974 (Amended 2010) and *National Parks & Wildlife Amendment Regulation* 2010, Aboriginal heritage assessment of specific proposed development in accordance with OEH guidelines should be undertaken in these areas, to identify any surface sites which may not have been visible during the current survey, and to identify appropriate mitigation strategies for the proposed development.

Recommendation 4

For any specific proposed development to areas without an ascribed archaeological sensitivity, assessment of Aboriginal heritage should be undertaken in accordance with the National Parks & Wildlife Act 1974 (Amended 2010) and National Parks & Wildlife Amendment Regulation 2010, as per the OEH guidelines.

7.3 Sites with Low or Low-Moderate Significance

As summarised in Table 6.2 and Table 6.3, there are 26 identified Aboriginal sites within the study area and its immediate vicinity, which are considered to have low archaeological significance, and one site considered to have low-moderate archaeological significance. These are sites ALN-IF-01, ALN-IF-05–ALN-IF-06, 2016-5, 2021-5, BRP-IF-06–BRP-IF-09, BRP-S-11–BRP-S-13, BRP-S-19, SWRL Sites 3–4, SWRL Site 7, SWRL Sites 10–13, SW1, LP-3–LP-4, TLC1, LIF-1 and GLC2.

7.3.1 Sites ALN-IF-01, ALN-IF-05–ALN-IF-06, SWRL Sites 3–4, SWRL Sites 11–12, LP-3, TLC1 & GLC2

There are 26 sites with low or low-moderate significance within the study area and its immediate vicinity, ten of which were not to be impacted by previous developments, and which therefore should not yet have been destroyed. These are sites ALN-IF-01, ALN-IF-05–ALN-IF-06, SWRL Sites 3–4, SWRL Sites 11–12, LP-3, TLC1 and GLC2. Impact to these sites should be avoided as a first option in the Precinct Planning. However, where this is not possible due to design or engineering constraints, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, in accordance with the Code of Practice, and an AHIP for the sites may be required prior to impact.

Recommendation 5

Impact should be avoided to sites ALN-IF-01, ALN-IF-05–ALN-IF-06, SWRL Sites 3–4, SWRL Sites 11–12, LP-3, TLC1 and GLC2. Where this is not possible, detailed Aboriginal heritage impact assessment, in accordance with the Code of Practice, should be undertaken for any specific proposed development in the vicinity of these sites, and an AHIP may be required.

The ILP currently identifies the following land uses for the areas in which these sites are located: active open space (ALN-IF-01); passive open space (GLC2); drainage (SWRL Site 3); road easements (ALN-

IF-06, TLC1); environmental living (ALN-IF-05, SWRL Site 12, LP-3); and environmental conservation (SWRL Site 4 and 11). Thus, it may be possible to conserve seven of these ten sites; however, it should be noted that there may be impacts in these areas arising from open space development including footpaths, benches, play equipment, landscaping and rural land uses. Where any such impact will occur within these areas, and to the other four sites in this category, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

Recommendation 6

Where impacts are likely to occur to sites ALN-IF-01, ALN-IF-05–ALN-IF-06, SWRL Sites 3–4, SWRL Sites 11–12, LP-3, TLC1 and GLC2, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

7.3.2 Sites 2016-5, 2021-5, BRP-IF-06–BRP-IF-09, BRP-S-11–BRP-S-13, BRP-S-19, SWRL Site 7, SWRL Site 10, SWRL Site 13, SW1, LP-4 & LIF-1

There are 26 sites with low or low-moderate significance within the study area and its immediate vicinity, 16 of which may be impacted by other developments. These are sites 2016-5, 2021-5, BRP-IF-06–BRP-IF-09, BRP-S-11–BRP-S-13, BRP-S-19, SWRL Site 7, SWRL Site 10, SWRL Site 13, SW1, LP-4 and LIF-1. As such, some or all of these sites may have been destroyed prior to the current study being undertaken; and others may be destroyed in the near future, as part of other developments in the study area. This should be determined during detailed Aboriginal heritage impact assessment of specific proposed developments.

In the event that sites have not been destroyed by previous development works, impact to these sites should be avoided as a first option in the Precinct Planning. However, where this is not possible due to design or engineering constraints, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, in accordance with the Code of Practice, and an AHIP for the sites may be required prior to impact.

Recommendation 7

Should sites 2016-5, 2021-5, BRP-IF-06 – BRP-IF-09, BRP-S-11 – BRP-S-13, BRP-S-19, SWRL Site 7, SWRL Site 10, SWRL Site 13, SW1, LP-4 and LIF-1 not have been destroyed by other developments, impacts to these sites should be avoided. Where this is not possible, detailed Aboriginal heritage impact assessment, in accordance with the Code of Practice, should be undertaken for any specific proposed development in the vicinity of these sites, and an AHIP may be required for those sites that have not yet been destroyed by other development.

The ILP currently identifies the following land uses for the areas in which these sites are located: road easements (BRP-IF-06, BRP-IF-09, BRP-S-11, SW1, LIF-1, LP-4, part of 2016-5); drainage (2021-5); low density residential (part of 2016-5); civic precinct (BRP-IF-07 – BRP-IF-08); commuter carparking (SWRL Site 13); light industrial (BRP-S-12 – BRP-S-13); Canal land (BRP-S-19, SWRL Site 7); and environmental conservation (SWRL Site 10). Thus, it may be possible to conserve three of these 16 sites; however, it should be noted that there may still be impacts in these areas, arising from open space developments including footpaths, benches, play equipment, landscaping and Canal land uses. Where any such impact will occur within these areas, and to the other 13 sites in this category, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

Recommendation 8

Where impacts are likely to occur to sites 2016-5, 2021-5, BRP-IF-06 – BRP-IF-09, BRP-S-11 – BRP-S-13, BRP-S-19, SWRL Site 7, SWRL Site 10, SWRL Site 13, SW1, LP-4 and LIF-1, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

7.4 Sites with Moderate or High Significance

As summarised in Table 6.2 and Table 6.3 there are nine identified Aboriginal sites considered to have moderate archaeological significance, one site considered to have moderate-high archaeological significance, and three sites considered to have high archaeological significance, within the study area and its immediate vicinity. These are sites ALN-IF-03, 2014-46, 2015-46, 2017-6, 2018-6, 2019-6, 2020-6, 2024-46, 2032-6, 2063-6, BRP-S-10/BRP-S-10 PAD/BRP-PAD-01, SWRL Site 9 and TP25.

7.4.1 Sites ALN-IF-03 & SWRL Site 9

There are 13 sites with moderate or high significance within the study area and its immediate vicinity, of which earlier assessments had identified two which were not to be impacted by development, and which therefore should be extant. These are sites ALN-IF-03 and SWRL Site 9. Impact to these sites should be avoided as a first option in the Precinct Planning. However, where this is not possible due to design or engineering constraints, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and archaeological test excavations under the Code of Practice may be required to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

Recommendation 9

Impact should be avoided to sites ALN-IF-03 and SWRL Site 9. Where this is not possible, detailed Aboriginal heritage impact assessment, in accordance with the Code of Practice, should be undertaken for any specific proposed development in the vicinity of these sites, and archaeological test excavations under the Code of Practice may be required, to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

The ILP currently identifies that rural land use will be retained at site ALN-IF-03, with drainage and environmental conservation at SWRL Site 9. Thus, it may be possible to conserve all or part of these two sites; however, it should be noted that there may still be impacts in these areas from rural land uses, and from drainage. Where any such impact will occur within these areas, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

Recommendation 10

Where impacts are likely to occur to sites ALN-IF-03 and SWRL Site 9, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

7.4.2 Sites 2014-46, 2015-46, 2017-6, 2018-6, 2019-6, 2020-6, 2024-46, 2032-6, 2063-6, BRP-S-10/BRP-S-10 PAD/BRP-PAD-01 & TP25

There are 13 sites with moderate or high significance within the study area and its immediate vicinity, of which 11 may already have been impacted by development. These are sites 2014-46, 2015-46, 2017-6, 2018-6, 2019-6, 2020-6, 2024-46, 2032-6, 2063-6, BRP-S-10/BRP-S-10 PAD/BRP-PAD-01 and TP25. As such, some or all of these sites may have been destroyed prior to the current study

being undertaken; and others may be destroyed in the near future, as part of other developments in the study area. This should be determined during detailed Aboriginal heritage impact assessment of specific proposed developments, and recommendations developed accordingly.

In the event that one or more of these sites has not been destroyed by previous development works, impact to these sites should be avoided as a first option in the Precinct Planning. However, where this is not possible due to design or engineering constraints, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and archaeological test excavations under the Code of Practice may be required to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

Recommendation 11

Should sites 2014-46, 2015-46, 2017-6, 2018-6, 2019-6, 2020-6, 2024-46, 2032-6, 2063-6, BRP-S-10/BRP-S-10 PAD/BRP-PAD-01 and TP25 not have been destroyed or excavated by other developments, impacts to these sites should be avoided. Where this is not possible, detailed Aboriginal heritage impact assessment, in accordance with the Code of Practice, should be undertaken for any specific proposed development in the vicinity of these sites, and archaeological test excavations under the Code of Practice may be required, to determine the artefactual assemblages that are present and the nature of Aboriginal activities in these areas.

The ILP currently identifies the following land uses for the areas in which these sites are located: road easements (part of 2014-46, part of 2015-46, part of 2017-6, part of 2018-6, part of 2024-46, part of 2032-6, part of 2063-6); environmental conservation (part of 2014-46, part of 2018-6); low density residential (part of 2015-46); rural (part of 2014-46, part of 2017-6, part of 2018-6); active open space (part of 2019-6); drainage (part of 2019-6, 2020-6, part of 2063-6); medium density residential (part of 2024-46, BRP-S-10/BRP-S-10 PAD/BRP-PAD-01); light industrial (part of 2024-46, part of 2032-6); substation (part of 2032-6) and the SWRL corridor (TP25). Thus, it may be possible to conserve part of four of these 11 sites; however, it should be noted that there may still be impacts in these areas, arising from the installation of Council stormwater and detention infrastructure along creeks, rural land uses, developing sporting fields, and other open space development including footpaths, benches, play equipment and landscaping. Where any such impact will occur within these areas, and to the other sites and parts of sites in this category, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

Recommendation 12

Where impacts are likely to occur to sites 2014-46, 2015-46, 2017-6, 2018-6, 2019-6, 2020-6, 2024-46, 2032-6, 2063-6, BRP-S-10/BRP-S-10 PAD/BRP-PAD-01 and TP25, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and AHIPs may be required.

7.5 Site 2005-846

Site 2005-846 was assessed by AHMS (in prep.) as having very high significance, given the cultural values associated with the site. The site is located immediately adjacent to the north western part of the current study area, on the western side of Kemps Creek, and north of Gurner Avenue. Given that the site is not within the Austral and Leppington North Precincts, avoidance of impact to the site should be achievable, which is the preferred option for the Precinct Planning. Should this is not be possible due to design or engineering constraints, detailed Aboriginal heritage impact assessment of specific proposed development should be undertaken, and appropriate mitigation strategies will need to be determined in consultation with the relevant local Aboriginal community groups.

Recommendation 13

Impact to site 2005-846 should be avoided. Where this is not possible, detailed Aboriginal heritage impact assessment, in accordance with the Code of Practice, should be undertaken for any specific proposed development in the vicinity of this site, and appropriate mitigation strategies will need to be determined in consultation with the relevant local Aboriginal community groups.

7.6 Sites ALN-IF-02 & ALN-IF-04

Sites ALN-IF-02 and ALN-IF-04 were identified during the current survey, but are located outside of the current study area. As such, no recommendations need to be made, because there should be no impact to these sites as a result of the Precinct Planning.

Recommendation 14

There should be no impact to sites ALN-IF-02 and ALN-IF-04 as a result of the Precinct Planning.

7.7 Summary of Constraints

A summary of constraints, comprising the 38 sites that have been identified within the study area, including their assessed significance and mitigation recommendations (previously, or as part of the current assessment), is provided in Table 7.1 below. The two additional sites identified during the current survey which are outside the study area are also included in this table, as they have not previously been assessed in any other report. Constraints for the two sites that have been identified immediately adjacent to the study area, and which should be considered during future assessments for the Austral and Leppington North Precincts, are summarised in Table 7.2. Constraints for the areas of archaeological sensitivity within the study area, identified in this report, are summarised in Table 7.3. This information is presented visually in Figure 5.19 and Figure 5.20 (and see also Figure 5.21 and Figure 5.22).

The ILP currently identifies the conservation of 11, and part of four, of the 38 sites within the study area, and portions of the areas of high and moderate sensitivity. A map of sites and areas of archaeological sensitivity, overlain on the ILP, is provided in Figure 7.3.

Table 7.1 Summary of constraints – sites within the study area (and sites identified during the current survey).

Site	AHIMS No.	Site Type	Assessed Archaeological Sensitivity of Surrounding Area	Significance and Recommendations	Proposed impact in ILP
ALN-IF-01	45-5-3963	Isolated find	Moderate	Significance assessed in current report as low. Avoid impact; otherwise an AHIP may be required prior to impact.	Active open space
ALN-IF-02	45-5-3964	Isolated find	N/A (outside study area)	Significance assessed in current report as moderate when considered in context of area of low disturbance within the Precincts. Site is outside of the current study area and therefore should not be impacted.	N/A (outside study area)
ALN-IF-03	45-5-3965	Isolated find	Moderate	Significance assessed in current report as moderate when considered in context of area of low disturbance within the Precincts. Avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Rural transition

ALN-IF-04	45-5-3966	Isolated find	N/A (outside study area)	Significance assessed in current report as moderate when considered in context of area of low disturbance within the Precincts. Site is outside of the current study area and therefore should not be impacted.	N/A (outside study area)
ALN-IF-05	45-5-3967	Isolated find	High	Significance assessed in current report as low. Avoid impact; otherwise an AHIP may be required prior to impact.	Environmental living
ALN-IF-06	45-5-3968	Isolated find	None ascribed	Significance assessed in current report as low. Avoid impact; otherwise an AHIP may be required prior to impact.	Road easement; adjacent to environmental living
2014-46	45-5-3969	Artefact scatter and PAD (5 artefacts)	High	Significance assessed by AHMS (in prep.) as high. No recommendations available from AHMS (in prep.). Significance assessed in current report as high when considered in context of area of low disturbance within the Precincts. In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Environmental conservation with environmental protection overlay, road easement, rural transition
2015-46	N/A	Artefact scatter and PAD	Moderate	Significance assessed by AHMS (in prep.) as high. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Road easement, low density residential
2016-5	N/A	Isolated find	Moderate	Significance assessed by AHMS (in prep.) as low. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed by the pipeline works, avoid impact; otherwise an AHIP may be required prior to impact.	Road easement, low density residential
2017-6	N/A	PAD	Moderate-high	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Road easement, rural transition

2018-6	N/A	PAD	Moderate-high	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Road easement, rural transition, environmental conservation with environmental protection overlay
2019-6	45-5-4018	PAD	High	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Active open space, drainage (partly with environmental protection overlay)
2020-6	45-5-4019	PAD	High	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Drainage (with environmental protection overlay)
2021-5	N/A	Isolated find	High	Significance assessed by AHMS (in prep.) as low. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed by the pipeline works, avoid impact; otherwise an AHIP may be required prior to impact.	Drainage (with environmental protection overlay)
2024-46	45-5-4023	Artefact scatter and PAD	Moderate	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Road easement, medium density residential, light industrial
2032-6	45-5-4031	PAD	Moderate	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Road easement, light industrial, substation

2063-6	N/A	PAD	High	Significance assessed by AHMS (in prep.) as moderate. No recommendations available from AHMS (in prep.). In the event that the site has not been destroyed or excavated by the pipeline works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Drainage (mostly with environmental protection overlay), road easement
BRP-IF-06	45-5-3855	Isolated Find	None ascribed	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Road easement
BRP-IF-07	45-5-3856	Isolated Find	None ascribed	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Civic precinct
BRP-IF-08	45-5-3857	Isolated Find	None ascribed	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Civic precinct
BRP-IF-09	45-5-3858	Isolated Find	None ascribed	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Road easement; adjacent to light industrial

BRP-S-10/ BRP-S-10 PAD (or BRP-PAD-01)	45-5-3887/ 45-5-3900	Open Camp Site and PAD (32 artefacts)	Moderate	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered moderate-high given that test excavation was recommended to clarify the archaeological potential of the site, if area to be disturbed. In the event that the site has not been destroyed or excavated by the upgrade works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Medium density residential
BRP-S-11	45-5-3897	Open Camp Site (5 artefacts)	Moderate	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Road easement
BRP-S-12	45-5-3898	Open Camp Site (2 artefacts)	Moderate	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Light industrial
BRP-S-13	45-5-3868	Open Camp Site (3 artefacts)	None ascribed	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Light industrial; adjacent to road easement
BRP-S-19	45-5-3874	Open Camp Site (2 artefacts)	None ascribed	AA (2010) report not available. AHIMS site card does not provide level of significance, but it is considered low given that no further archaeological investigation was recommended. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Canal land; adjacent to SWRL corridor

SWRL Site 3	45-5-3537	Open Camp Site (8 artefacts)	High	Significance assessed by AMBS (2010a) as low. No recommendation, as site was not to be impacted by the proposed development. Avoid impact; otherwise an AHIP may be required prior to impact.	Drainage with environmental protection overlay
SWRL Site 4	45-5-3536	Isolated Find	Moderate	Significance assessed by AMBS (2010a) as low. No recommendation, as site was not to be impacted by the proposed development. Avoid impact; otherwise an AHIP may be required prior to impact.	Environmental conservation
SWRL Site 7	N/A	Open Camp Site (4 artefacts)	None ascribed	Significance assessed by AMBS (2010a) as low. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the SWRL works, avoid impact; otherwise an AHIP may be required prior to impact.	Canal land; adjacent to SWRL corridor
SWRL Site 9	45-5-3532	Open Camp Site (3 artefacts)	High	Significance assessed by AMBS (2010a) as moderate. Site was outside the impact area, and test excavation of the property behind the site was recommended to clarify the archaeological potential of the area. Avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	Drainage, environmental conservation with environmental protection overlay
SWRL Site 10	45-5-3903	Open Camp Site (14 artefacts)	High	Significance assessed by AMBS (2010a) as low. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the SWRL works, avoid impact; otherwise an AHIP may be required prior to impact.	Environmental conservation (mostly with environmental protection overlay)
SWRL Site 12	45-5-3906	Isolated Find	High	Significance assessed by AMBS (2010a) as low. No recommendation, as site was not to be impacted by the proposed development. Avoid impact; otherwise an AHIP may be required prior to impact.	Environmental living
SWRL Site 13	45-5-3907	Open Camp Site (7 artefacts)	High	Significance assessed by AMBS (2010a) as low. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the SWRL works, avoid impact; otherwise an AHIP may be required prior to impact.	Commuter carparking

SW1	N/A	Isolated Find	High	Heritage Concepts (2006) does not provide level of significance, but it is considered low given the nature of the artefacts. Recommended collection and relocation of surface artefacts if site to be disturbed. In the event that the site has not been destroyed by the SWRL works, avoid impact; otherwise an AHIP may be required prior to impact. Artefact unlikely to be relocated for collection.	Road easement
LP-3	45-5-3946 KN (2010)	Isolated Find	None ascribed	Significance assessed by KN (2010a) as low. Site was able to be avoided by the impact. Avoid impact; otherwise an AHIP may be required prior to impact.	Environmental living
LP-4	45-5-3947 KN (2010)	Open Camp Site (2 artefacts)	None ascribed	Significance assessed by KN (2010a) as low. An AHIP for the site was recommended prior to impact. In the event that the site has not been destroyed by the upgrade works, avoid impact; otherwise an AHIP may be required prior to impact.	Road easement
TP25	N/A	Open Camp Site (7 artefacts)	Moderate	Significance assessed by AMBS (2010b) as high. Recommended further test/salvage excavation. In the event that the site has not been destroyed or salvaged by the SWRL works, avoid impact; otherwise further investigation of the area may be required in accordance with OEH's Code of Practice, prior to impact.	SWRL corridor
GLC2	45-5-2560	Open Camp Site (4 artefacts)	Moderate	No previous report available. AHIMS site card does not provide level of significance, but it is considered low-moderate given the presence of a backed blade. Site card identifies that the site had been disturbed by the construction of the pipeline and vehicle access, but would not be impacted by construction of the new pipeline. Avoid impact; otherwise an AHIP may be required prior to impact. Artefacts unlikely to be relocated for collection.	Passive open space
TLC1	45-5-2559	Open Camp Site (2 artefacts)	None ascribed	No previous report available. AHIMS site card does not provide level of significance, but it is considered low given the nature of the artefacts. Site card identifies that the site had been disturbed by the construction of the pipeline, but would not be impacted by construction of the new pipeline. Avoid impact; otherwise an AHIP may be required prior to impact. Artefacts unlikely to be relocated for collection.	Road easement; adjacent to low density residential

LIF-1	45-5-3300	Isolated Find	Moderate	Significance assessed by Navin Officer (2006) as low. Recommended collection and relocation of the artefact if Aboriginal community wishes to do so. In the event that the site has not been destroyed by the redevelopment works, avoid impact; otherwise an AHIP may be required prior to impact.	Road easement; adjacent to low density residential

Table 7.2 Summary of constraints – sites previously recorded immediately adjacent to the study area.

Site	AHIMS No.	Site Type	Significance and Recommendations	Proposed impact in ILP
2005-846	N/A	Artefact scatter, PAD & cultural site	Significance assessed by AHMS (in prep.) as very high (cultural values). No recommendations available from AHMS (in prep.). Avoid impact; otherwise appropriate mitigation strategies will need to be determined during future assessments, in consultation with the relevant local Aboriginal community groups.	N/A; adjacent to environmental conservation/ drainage with environmental protection overlay
SWRL Site 11	45-5-3905	Isolated Find	Significance assessed by AMBS (2010a) as low. No recommendation, as site was not to be impacted by the proposed development. Avoid impact; otherwise an AHIP may be required prior to impact.	N/A; adjacent to environmental conservation with environmental protection overlay

Table 7.3 Summary of constraints – areas of archaeological sensitivity within the study area.

Area	Recommendations	Proposed impact in ILP
Areas of high archaeological sensitivity	Incorporate these areas into conservation corridors and avoid impact; otherwise further investigation of these areas may be required in accordance with OEH's Code of Practice, prior to impact.	Various
Areas of moderate archaeological sensitivity	Incorporate these areas into conservation corridors and avoid impact; otherwise further investigation of these areas may be required in accordance with OEH's Code of Practice, prior to impact.	Various

Figure 7.2 Level of disturbance impacting upon archaeological sensitivity within the study area, including potential impact of proposed Sydney Water infrastructure. NB. Minimal disturbance is considered not to impact upon the sensitivity; moderate disturbance has some impact; and gross disturbance (including the potential Sydney Water infrastructure) has a major impact, effectively cancelling (or "whiting-out") sensitivity (see Volume 2 of the report).

Figure 7.3 Aboriginal sites and areas of archaeological sensitivity, overlain on the ILP (see Volume 2 of the report).

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Appendix A

Aboriginal Community Consultation

See Volume 2 of the report.

Appendix B

Effective Coverage Table

See Volume 2 of the report.