2013

Attachment 1: Population and Mortality Analysis of the Liverpool Local Government Area



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Population and Mortality Analysis of Liverpool 2013

1.0 Introduction

The population of Sydney is both growing and ageing which places emphasis on ensuring sufficient burial space is provided. The Australian Bureau of Statistics (ABS) states the standardised death rate (SDR) for Australia is currently 5.6 deaths per 1000 persons. The standardised death rate for both NSW and Sydney is currently 5.7 deaths per 1000 persons; however, this is not true of the different regions of Sydney where discrepancies are noted. The Western Sydney region recorded the second highest standardised death rate of 6.5 deaths per 1,000 persons, with Central Northern Sydney having the lowest at 4.9 deaths, and Blacktown having the highest of 6.6 deaths (ABS, catalogue 33.02.0- Deaths, Australia, 2011).

2.0 Key Planning Issues for Burial Space

The Australian Bureau of Statistics provides annual population data for each Local Government Area which indicates that Liverpool's standardised death rate is significantly lower than Western Sydney and is that of 5.9 deaths per 1000 population as per the 2011 Census. Table 2 below describes the falling standardised death rate for Liverpool from 2001 to 2011. It should be noted that Liverpool's standardised death rate has fallen over this time; this trend is expected to continue with medical advances and lifestyle awareness programs.

Year	Scope	Estimated Residential Population	Number of Deaths Total	Standardised Death Rate (number of deaths per 1000 population)
2001	Australia	19,413,240	128,544	6.6
	NSW	6,575,217	44,552	6.6
	Sydney (Statistical Division)	4,128,272	25,000	6.6
	Liverpool LGA	159,046	600	7.5
2002	Australia	19,651,438	133,707	6.7
	NSW	6,628,951	46,384	6.7
	Sydney (Statistical Division)	4,163,892	26,130	6.4
	Liverpool LGA	162,968	676	7.0
2003	Australia	19,895,435	132,292	6.5
	NSW	6,672,577	46,111	6.5
	Sydney (Statistical Division)	4,192,689	25,554	6.2
	Liverpool LGA	164,882	688	6.6
2004	Australia	20,127,363	132,508	6.3
	NSW	6,707,189	46,440	6.4
	Sydney (Statistical Division)	4,217,342	26,003	6.2
	Liverpool LGA	166,652	670	6.6
2005	Australia	20,394,791	130,714	6.0
	NSW	6,756,457	44,894	6.1
	Sydney (Statistical Division)	4,247,556	24,706	6.0

Year	Scope	Estimated Residential	Number of Deaths	Standardised Death Rate Standardised Death Rate (number of deaths per
	Liverpool LGA	168,361	693	6.5
2006	Australia	20,697,880	133,739	6.0
	NSW	6,816,087	46,034	6.0
	Sydney (Statistical Division)	4,281,988	25,269	5.9
	Liverpool LGA	170,915	712	6.4
2007	Australia	21,072,452	137,854	6.0
	NSW	6,904,942	46,759	5.9
	Sydney (Statistical Division)	4,340,241	25,606	5.7
	Liverpool LGA	173,483	745	6.4
2008	Australia	21,498,540	143,946	6.1
	NSW	7,014,887	48,782	6.0
	Sydney (Statistical Division)	4,410,746	26,759	5.7
	Liverpool LGA	177,432	742	6.3
2009	Australia	21,951,736	140,760	5.8
	NSW	7,127,168	46,974	5.7
	Sydney (Statistical Division)	4,486,921	25,724	5.6
	Liverpool LGA	181,573	764	6.1
2010	Australia	22,297,515	143,473	5.7
	NSW	7,220,020	47,945	5.6
	Sydney (Statistical Division)	4,550,127	26,118	5.5
	Liverpool LGA	184,671	785	6.0
2011	Australia	22,618,294	146,932	5.6
	NSW	7,302,174	50,661	5.7
	Sydney (Statistical Division)	4,605,913	27,375	5.4
	Liverpool LGA	188,083	836	5.9

Table 1: Mortality Trends Comparisons Table

Source: Australian Bureau of Statistics, Catalogue 33.02.0- Deaths, Australia, 2011

Regardless of Liverpool's lower and declining standardised death rate at 5.9, this report has followed the South Western Sydney standardised death rate of 6.5 deaths per 1,000 persons as a worst case scenario, and given that the current population of Liverpool are approximately 191,142 persons, at its most extreme estimate it can be approximated that around 1,242 deaths occur in Liverpool annually, although as you can see in Table 1 the reality is far less. The ABS state that the number of cremations to the number of deaths is approximately two-thirds. Therefore, applying this rate equates to approximately 414 burials per year and 828 cremations annually in Liverpool.

The Department of Planning and Infrastructure's population forecast (2010) indicates that Liverpool is to reach a population of 310,000 by 2031. Assuming the standardised death rate remains constant at 6.5 over this next 18 years to 2031, there will be an approximate total of 16,304 deaths resulting in 5,159 burials and 10,870 cremations. Figure 2 below depicts the increase in deaths, burials and cremations bi-annually until 2031.



Figure 2: Death, burial and cremation estimates of Liverpool 2013-2031. * Please note that these estimates do not take into account personal or family wishes to be moved or buried outside of the local area or fluctuations in the standardised death rate.

In the regional context, the draft Metropolitan Strategy for Sydney 2031 indicates that the South Western Region is to reach a population of 1,298,000 by 2031. Assuming that the standardised death rate remains constant at 6.5 per 1000 population, there will be approximately 48,000 deaths over the next 18 year period will occur. This is likely to result in 32,000 cremations and 16,115 burials.

The Liverpool LGA has approved 80,000 burial plots. Therefore the Liverpool LGA alone could easily accommodate all of the 48,000 deaths that are expected to occur within the entire South Western Region over the next 18 years, with a further 32,000 burial plots remaining. Given the cremation rate of approximately 2/3 and that sustainable burial practices and regulatory policies allow graves to be reused, it is very unlikely burial space within Liverpool will be needed over the next 30-50 year period.

3.0 Context of Western Sydney's Burial Space

Diagram 3 below denotes all cemeteries existing within Western Sydney, as can be seen there is a proliferation of cemeteries in this area. Given that 4 recent approvals of Cemeteries in the Liverpool LGA could accommodate all the expected deaths to occur in the entire Western Sydney Area over the next 20 years, and the multitude of cemeteries that exist, there is need to provide any more burial space or facilitate the development of new cemeteries on rural lands.



Diagram 3: Existing Cemeteries in Western Sydney and surrounding areas.

4.0 Context of Sydney's Burial Space

There are eight Crown cemeteries, around 100 local government cemeteries, eight private cemeteries, and 10 crematoria within the Sydney Metropolitan Area providing a combined total of 680,000 burial spaces.

The former Department of Lands' Sustainable Burials Discussion Paper (2008) estimated that by 2020, over 245,000 of these gravesites would be used (based on ABS projected population and death rates and cremation rates). This means around 435,000 burial spaces will still be available by 2020 in Sydney's existing cemeteries.

However, by 2035 all eight Crown land cemeteries are expected to be full. Additionally, in 2008 it was estimated that only 57 local government cemeteries in Sydney had more than 5 years burial space. As it is now 5 years since this data was released it is likely this number has declined.

While enough burial space exists to meet the short and medium term needs of Sydney's population, it is an issue which will need to be incorporated in the long-term

planning of Sydney. The former Department of Lands, in their Sustainable Burials Paper (2008), stated that Crown Land at Berkshire Park in Penrith has been set aside for a cemetery to service the future burial needs of Western Sydney.

5.0 Context of Liverpool's Burial Space

Since 2010, the local government area of Liverpool has been subject to the addition of 80,000 burial plots and two new crematoriums. The details of these individual development applications have been listed below for reference. All of these development applications have occurred on primary agricultural land and are within, or in proximity too, identified future growth areas. Additionally, all of these sites are in reasonable proximity to each other signalling the formation of what could be considered a 'cemeteries cluster'.

As mentioned previously in this report, the mortality projection for the entire South West Sydney over the next 18 years will equate in approximately 48,000 deaths, regardless of cremation rates and personal wishes to be buried elsewhere all of these burials could be absorbed within Liverpool's recent development approvals with a further 32,000 burial spaces remaining. It is very unlikely that burial space within Liverpool will be needed over the next 30-50 year period. For these reasons Council wishes to seek the progression of a planning proposal to guide the development of cemeteries and crematoria within Liverpool and ensure they only occur in appropriate locations. A brief description of recent cemetery approvals has been provided below.

Description of Development Application	Number of Burial plots (number of interments)	Number of Crematoria (ash interments)
321 Greendale Road, Greendale. DA-1133/2010. Approved by JRPP 23 August 2012. Crematoria and Cemetery.	60,000 single depth burial plots	10,000 ash receptacles
992 Greendale Road, Greendale DA 1291/2010. Approved by JRPP 28 April 2011. Memorial Gardens	NA	10,000 ash receptacles
41 Greendale Road, Bringelly DA-394/2011. Approved under appeal by the Land & Environmental Court 27 February 2013 Staged Application for Crematoria and Cemetery. Stage 1 approved Stage 2: Under Assessment DA-790/2013	19,212 burial plots/internments	25,100 ash interments
Alterations to Forest Lawn Memorial Cemetery. Approved 22 December 2010.	168 burial crypts	NA
31 Greendale Rd, Bringelly. DA-957/2010 REFUSED by Land and Environment Court 13 June 2013. Cemetery	6,150 burial plots	NA

Liverpool.

6.0 New South Wales Cemeteries & Crematoria Legislative Context

The recently released Draft Cemeteries and Crematoria Bill gives effect to Cemetery and Crematoria NSW (the Cemeteries Agency) as the responsible authority for the development and regulation of burial lands and practices. The Agency works with the NSW Department of Trade & Investments Crown Lands who is responsible for working with local councils, trusts and community groups to manage past, present, and future needs of our public cemetery requirements.

6.1 NSW Cemeteries & Crematorium Board

In September 2013, it was announced that the overarching NSW Cemeteries & Crematoria Board with statutory functions and powers will be established under a consolidated Cemeteries and Crematoria Bill covering all NSW cemeteries. The function of the new legislation are to ensure that no faith is disadvantaged in the reform agenda, the shortage of burial space is addressed, that sustainable practices and processes are implemented, and accountable financial, governance and operational system are established to ensure Trust funds and assets are managed efficiently and transparently. Please see Attachment 4 for a copy of the draft Bill.

6.2 Applicable State Legislation

The following is a list of NSW legislation that currently governs the planning, operation and management of burials, cremation and cemeteries:

- Public Health Act 1991 and Public Health (Disposal of Bodies) Regulation 2002.
- Occupational Health and Safety Act 2000 and Occupational Health and Safety Regulation 2001.
- Workers Compensation Act 1987 and Workplace Injury Management and Workers Compensation Act 1998
- Fair Trading Act 1987 and Fair Trading General Regulations 2002.
- Funeral Funds Act 1979 and Funeral Funds Regulation 2001.
- Local Government Act 1993, Local Government (Orders) Regulation 1999, and Local Government (Approvals) Regulation 1999.
- Environmental Planning and Assessment Act 1979 and Environmental Planning and Assessment Regulation 2000;
- Conversion of Cemeteries Act 1974;
- Crown Lands Act 1989, Crown Lands Amendment (Sustainable Burials) 2011 and Crown Lands (General Reserves) By-law 2001;
- Rookwood Necropolis Act 1901 and other Acts relating to individual cemeteries and or crematoria in NSW.
- Coroners Act 1980
- Birth, Deaths, and Marriages Registration Act 1995.

It is also worth mentioning that if contamination of the air, land or water occurs as a result of cemeteries or crematoria uses, it will be regulated under the Protection of the Environment (Operations) Act 1997 which will generally hold the land owner or

consenting authority responsible for compensation and rehabilitation/restoration costs.

Additionally there are two community associations which provide guidelines on the management of cemeteries and crematoria, they are:

- 1) The national body is the Australasian Cemeteries and Crematoria Association (ACCA) and is a non-profit professional organisation that exists to provide leadership, professional services and communication to the cemetery and crematorium industry.
- The State body is the NSW Cemeteries and Crematoria Association (CCA) established in 1965, a trade association, represent the interests of Cemeteries and Crematoria in NSW

They endorse the following list of guidelines regarding the planning and management of cemeteries and crematoria:

- NSW Health Guidelines for the Funeral Industry published in September 2004 that provides advice to the industry on following the Public Health (Disposal of Bodies) Regulation 2002;
- Office of Fair Trading booklet A Consumer's Guide to Funerals published in November 2004 to provide advice to consumers on organise a funeral;
- Safe Working Practices in Cemeteries & Crematoria in NSW;
- Service Standards in Cemeteries and Crematoria;
- Guidelines on Above Ground Interment in NSW;
- Guidelines for Planning an Exhumation including Removal of Coffin from Cemetery;
- Policy for Above Ground Interment;
- Policy for Compressed Cement Sheeting Liners for Reduced Depth Liners;
- Guidelines on Cemetery Ornamentation; and
- Guidelines on Burial or Cremation of Pathological Samples in NSW.

All new proposals for the development of cemeteries and crematoria demonstrate their compliance to the above listed guidelines and legislation.

7.0 Literature Review of Cemeteries and Crematoria Summary Table

The basis of this report's planning principles and best-practice guidelines have been formulated from a thorough literature review regarding cemeteries and crematoria. Some of these documents were hundreds of pages long and have been collated into the table below for ease of reference.

Literature Review Summary Table			
Literature References	Identified Risks of Cemetery/Crematoria	Planning Recommendations	
A. Ucisik & Rushbrook, P. 1998 'The Impacts of Cemeteries on	If cemetery is located in a porous soil type, such as sand or gravel, movement of seepage can be rapid and mix easily with the groundwater beneath the site. This could	Cemeteries could be planted with deep- rooting trees that consume large volumes of groundwater which will not only collect degradation products but also reduce the water table levels.	

	Literature Review Summary Table		
Literature	Identified Risks of	Planning Recommendations	
References	Cemetery/Crematoria	-	
the Environment	conceivably be a cause of local		
and Public	epidemics from waterborne diseases.	A cemetery should not be located in the	
Health- An		lowest part of an area where water	
Introductory	The location of Cemeteries if in the	collects. The base of all burial pits at	
Briefing', the	lowest part of an area where	cemeteries should be above the highest	
World Health	rainwater collect would permit more	natural water table to minimise seepage.	
Organisation	decomposition products to be carried	indiara water table to minimize seepage.	
(WHO) Regional	into groundwater, water courses, and	Surface drains should be used to intercept	
Office for Europe,	the land environment.	most surface runoff water entering the site	
Copenhagen. Pp		before contamination can take place.	
1-11	The surface velocity of run-off water	before containination can take place.	
	need to be controlled so that retained	The base of all burial pits on the site must	
	viruses do not escape from the soil	maintain a minimum of one (1) metre	
	and move into groundwater.	clearance above the highest natural water	
	and move into groundwater.	table. Any variability in the water table	
	Plants can remove some viruses and	should be taken into account.	
	bacteria from the soil. Additionally the	should be taken into account.	
	movement of bacteria and viruses is	Humon or opinal remains must pat be	
	restricted physically by the root	Human or animal remains must not be	
	system of plants.	buried within 250 metres of any well,	
	system or plants.	borehole or spring from which potable	
	An unsaturated call lover has been	water supply is drawn.	
	An unsaturated soil layer has been found in past studies to be the most	The place of interment - headle headle at the set	
		The place of interment should be at least	
	important line of defence against the	30 metres away from any other spring or	
	transport of degradation products into	watercourse and at least 10 metres from	
	aquifers. It acts as both a filter and an absorbent.	any field drain.	
	absolbert.	All burning with a with a site second so starts to	
	The most useful cell time to require	All burial pits on the site must maintain a	
	The most useful soil type to maximise	minimum of one (1) metre of subsoil below	
	retention of degradation products is a	the bottom of the burial pit (i.e. the base of	
	clay-sand mix of low porosity, and a	the burial must be at least one metre	
	small to fine grain texture.	above solid rock).	
	Ideally, coffins should be made of	The planting of trace and be also be at	
	materials that decompose rapidly and	The planting of trees and border plants	
		should be encouraged around cemeteries	
	do not release persistent chemical by-	to help decrease the movement off-site of	
	products.	bacteria and viruses in seepage water and	
Dent, B. 2002	The inumdation of succession of the in	rain water.	
Леп, Б. 2002 The	The inundation of graves and vaults is	The location of a cemetery on a floodplain	
	to be avoided so that the spread of	subject to near-term inundation is	
Hydrogeological	disease, uplift of the coffin, impacts on	undesirable.	
Context of	the compaction of grave fill, repair of		
Cemetery	the site and its infrastructure,	Need to keep cemeteries away from	
Operations and	destruction of drainage networks,	swampland or other natural phenomena or	
Planning	clogging of subsoils drains, damage	waterways or lakes.	
Australia',	to monuments and grave property,		
Jniversity of	and relocation and possibly scattering	No operating cemetery should be located	
echnology,	of interred cremated remains.	on any land likely to be subject to	
Sydney. Pp 1-		inundation within 100 year; the 1 in 100	
73.	On-site ponds, lakes or water features	year flood level.	
	may collect high concentrations of		
	pollutants and seep into natural	For cemeteries adjacent to waterways or	
	groundwater.	swampland than a buffer of at least 20	
		metres is to be used.	
	The best soils for cemeteries in order		
	to favour decomposition and with	The scattering of ashes should not occur	
	good decay product attenuation are	on land of which overland flow is likely to	

References Cemetery/Crematoria well drained clayey sands. well drained clayey sands. New sites and extensions should be property evaluated goescientifically the following are not suitable areas: Floodplains; occur – protection of this area by bund levees is advised. Swamps; Clifff lines; well waterways. An ideal cemetery situation is one where the site is only capt, solid with an intermediate range of properties such as a clayey sand or sandy clay, with a steep gradient a regional water table which is always at least 1.0 metres below the invert level of any grave and which will not be flooded. Recommends buffer zones are to be created around the whole of the site at 0.0 metres below the invert level of any grave and which will not be flooded. Recommends the use of deep-rooting vegetation to absorb impurities and groundwater as well as to reducer unc. Rease no separate issues for burials without coffins; however, plastic coffins liners and body bags should be disallo. No burials should leid and prove of users in clayey soils. 20 metres of metres in clayey soils. 20 metres of metres in sandy soils. The invert of a grave and hence the deepest burial depth, must be at least metre above any level to which a wate table fluctuates- more in clean or cours sandy or gravelly soils. Drainage areas to lakes and water as well as to reduce runc. Recommends the use of deep-rooting vegetation to absorb impurities and groundwater as well as to reduce runc. No burials should be at least metre above any level to which		Literature Review Summ	
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Literature Review Summary Table			
Literature References	Identified Risks of Cemetery/Crematoria	Planning Recommendations	
Guidelines for Crematoria and Cremators (2009), published by the Australasian Cemeteries and Crematoria Association (ACCA). Pp 1-24.	activities are best thought of as an industrial activity. States that the burial of cremated remains within the grounds of a crematorium classifies that land as a cemetery.	 largely included in Attachment 1 – Proposed DCP controls thus there is no need to replicate the text here. However, the principle below does need to be addressed. In line with other state environmental protection authority guidelines, a buffer zone of the order of 200 metres (depending on the nature of prevailing winds and the natural topography of the site) between the emission stack and neighbouring residences is desirable. In any case a buffer zone of not less than 100metres is recommended, 	

Table 5: Cemeteries and Crematoria Literature Review

8.0 Best Practice Design and Environmental Impacts

Historically, most existing cemeteries were sited without thought being given to potential risks to the local environment and local community. The impact of degradation products from seepage waters from cemeteries and crematoria has only been studied by a few researchers, in fact, over the last 100 years there have only been 12 sampling based studies published worldwide.

The aim of this planning proposal is to establish a set of basic design criteria for the location and construction of new cemeteries. In addition, more careful consideration has to be given to find the most suitable soil types in which to bury human remains so as to minimise the impact of seepage on the environment and public health.

For the purposes of this report there were three comprehensive scientific reports evaluated which provided vital recommendations for the planning of cemeteries and crematoria. The summary table is available as Attachment 4 of this report. The main recommendations were:

- A minimum buffer zone of 100 metres between the emission stack of a crematorium and neighbouring residences.
- A separation zone along the perimeter of the cemetery between 10-20 metres of landscaped area with deep-rooting trees and border plants to provide visual screening and absorb impurities from runoff water and soils, and also helps regulate groundwater levels.
- The siting of cemeteries should never occur on land that is subject to 1 in 100 year flood level, near water courses, swamps, or in a catchment area.
- The invert between the lowest points of the burial pit should always be 1 metre from the water table and should take into account any fluctuations thereof.

Generally speaking it was concluded that cemeteries have little contamination impact on the environment provided that they are correctly sited and operated; the greatest potential threat is the off-site migration of pathogenic bacteria or viruses. The management practices of Australian cemeteries are largely in accordance with the correct practices and policies and hence satisfy the requirements of public health and good interaction with the environment. However, the planning of cemeteries and crematoria in regards to location and site design has often been less than ideal. Although management practices have been instituted to mitigate any nil effects, it simply would have been better if these uses were not located in undesirable locations in the first place (i.e. near water sources, on flood plains, or in land with porous soils).

To align with the Metropolitan Strategy 2031 and the South West Subregional Strategy as well as best practice guidelines, a number of amendments are proposed to Liverpool's planning controls to ensure that future cemeteries and crematoria are appropriately sited and designed.

9.0 Community Sentiment

In addition to the planning arguments for reviewing the most suitable locations for future cemeteries and crematoria, there has been strong community resistance to them in rural areas.

Previously, the three recent development applications which were approved for the construction of new cemeteries and crematoria around the Bringelly and Greendale area were met with substantial community resistance. Two of these developments were approved by the Joint Regional Planning Panel and one by the NSW Land and Environment Court under appeal. A total of 509 opposing submissions were received for these applications.



Figure 6: Community Backlash after the approval of a cemetery and crematoria in 2012 sourced from The Southern Weekly Newspaper.

The following links also demonstrate community forums and local news reports which objected to the three development applications approved. It is therefore expected that the community will strongly support the progression of this planning proposal. http://noluddenhamcemetery.blogspot.com.au/2010/12/residents-of-luddenhamwallacia-and.html

http://www.southernweekly.com.au/story/371117/cemetery-plan-approved-residentsfurious-as-government-rejects-council-stance/

http://www.dailytelegraph.com.au/its-gravely-concerning-greendale-road-to-becomea-necropolis-for-four-cemeteries/story-e6freuy9-1225976414690

http://www.smh.com.au/nsw/cemeteries-plan-brings-out-spectre-of-pollution-20130316-2g7fs.html

http://smartmoneyguide.blogspot.com.au/2011/02/say-no-to-luddenham-greendaleand.html

10.0 Conclusion

This investigation found that Liverpool City LGA now has approved surplus burial space to meet its needs until well past 2031. The *Draft Cemeteries and Crematoria Bill 2013* released on 2 September 2013, states that the NSW Cemetery Agency and Board is the responsible authority to which- amongst other responsibilities- is to ensure that sufficient land is acquired and allocated for current and future generations to have equitable access to interment services. The Agency is to exercise its functions through the NSW Planning Minister and Crown Lands Authority. As the Cemetery Agency is the responsible authority will have impetus providing advice to local government and Joint Regional Planning Panels decisions-making processes in regards to the development of new cemeteries.

Liverpool Council looks forward to working with the Cemetery Agency and will provide information and feedback on any consultation required. Given that the responsible agency for cemeteries is in the preliminary stages of identifying where space may be needed, and that Council's strategic study has identified an oversupply of burial space within Liverpool, it is appropriate that Council enforce these draft DCP controls and proposed LEP amendments to manage, restrict, and ensure that any future development applications for cemeteries and crematoria in Liverpool are situated in appropriate locations, and that all environmental impacts are addressed.