



Harborough Cemetery: Site Assessment, Site 6: Land off Harborough Road

For: Harborough District Council

CRM.1287.002.P.R.003.A



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Harborough Cemetery: Site Assessment, Site 6: Land off Harborough Road

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Plans

Plan	Reference
Site location plan	CRM.1287.002.PL.D.004.1
Site boundary	CRM.1287.002.PL.D.004.2
Phase I Habitat Map	CRM.1287.002.EC.D.006
Landscape and Arboricultural Appraisal	CRM.1287.002.L.D.001
Visual Appraisal	CRM.1287.002.L.D.002

1 INTRODUCTION

1.1 Introduction

- 1.1.1 In April 2017, Enzygo Ltd were commissioned by Harborough District Council (HDC) to prepare detailed site assessments for four identified sites. The assessments were to evaluate the potential of each site for future development of a cemetery. The assessments took into account landscape and visual factors, highways and access factors, hydrological factors, ground conditions and ecological constraints.
- 1.1.2 An initial review of a larger number of sites was undertaken by HDC, and the outcome of this review identified four sites to be considered in further detail.
- 1.1.3 This report provides a detailed site assessment for 'site 6', referred to as 'Land off Harborough Road'. The site is located at postal code LE16 7QX, Grid Reference SP 72359 89239. Plans CRM.1287.002.PL.3.004.1 and CRM.1287.002.PL.D.004.2 show the location of the site.

1.2 Background









- 1.2.1 In 2016, Enzygo Ltd undertook a review of cemetery capacity within HDC. This considered the existing cemetery capacity within the District, along with the forecasted requirement within the forthcoming Local Plan period (until 2031), based on the forecasted population and mortality rate. The report identified that additional cemetery capacity would be required in a number Parishes and within Market Harborough.
- 1.2.2 Based on the report findings, HDC are currently seeking to find a suitable site to allocated as a cemetery site within the forthcoming Local Plan, to provide cemetery capacity for Market Harborough. HDC have undertaken an initial review of a large number of sites. This review considered the size of the site, the potential capacity, access, topography, potential visual and heritage impacts, management constraints, development costs, and the potential for the site to accommodate different religious denominations and non-conformists.
- 1.2.3 The initial review undertaken by HDC identified 4 potential sites. Enzygo Ltd have been tasked with looking at these four sites in more detail. The output of this will identify any further potential constraints, if these exist, which could preclude a cemetery development from coming forward within the site.

1.3 Methodology

1.3.1 Within each technical chapter of this report (Chapters 5-8), the methodology used to undertake the assessment is detailed. In most cases, this is based on a combination of a desk-top review, available data relating to the site, and where possible and necessary, a site visit.

1.4 Report format

1.4.1 This report has the following format:

-  Chapter 2 provides an overview of the findings, provided in a table format for clarity, and using a traffic-light grading system;
-  Chapter 3 provides a more specific introduction to the site being assessed;
-  Chapter 4 provides a planning review of the site. This includes a consideration of local and national planning policy, relevant designations, current land use, surrounding land use, historic land use, and planning history for the site.
-  Chapter 5 provides an ecological assessment of the site, based on both a desk-top review, and where possible, a site walkover.
-  Chapter 6 considers the landscape, visual and arboricultural effects of the development of a cemetery within the site.
-  Chapter 7 considers the effect of the development of a cemetery on hydrology, the water environment and flood risk.
-  Chapter 8 considers the potential highways, access, safety and sustainability effects of the development of a cemetery within the site.
-  Chapter 9 summarises the above information, and provides an overall conclusion

2 OVERVIEW OF FINDINGS

2.1 Introduction

2.1.1 This chapter provides an overview of the findings detailed within this report. For clarity, this is provided in a table format, using a traffic light system.

2.2 Overall findings

Assessment considerations	Beneficial	Neutral	Adverse
National Planning policy Current national planning policy			
Local Planning policy Current local planning policy designation, proposed designation			
Designations National/ local designations within/ adjoining the application site			
Current land use Current use of the land, impact of development on the current use of the site			
Surrounding land use Current use of the surrounding land, impact of the development on the surrounding land use			
Sensitive receptors Nearest residential and commercial receptors			
Historic land use Previous land uses within the site			
Planning history Planning history within the site. Details of any applications that have been refused, reasons for refusal			
Ecological constraints Current ecological value of the site and offsite ecological features.			
Landscape/ townscape Effects Impact on pattern/ density, tranquillity, culture and landcover/ layout.			
Arboricultural impacts Assessment of trees/ shrubs/ hedges within the site, and their quality			
Visual Effects Visual impacts on sensitive receptors within 1km of the site			
Water Environment – Groundwater Source Protection Zone (SPZ) 1			

Assessment considerations	Beneficial	Neutral	Adverse
Water Environment -Groundwater abstraction/wells/springs supplying water for human use.			
Water Environment -Soil/ Superficial Deposit thickness =>1.8m to give =>1m cover over coffin/body Graves should not be dug in bedrock			Not known
Groundwater Table: => 1 metre clearance between the base of the grave and the top of the water table – they shouldn't have any standing water in them when dug [water table depth should be =>2.8m]			Not known
Water Environment – Surface water The site is at least 30m from any spring or watercourse not used for human consumption			
Water Environment – Historic and current industrial land use			
Water Environment – Off site or perimeter ditch drainage: Burial sites should be at least 10 metres from any field drain, including dry ditches			Not known
Water Environment -Field/ditch drainage			Not known
Water Environment -Highway drainage			Not known
Water Environment -Artificial pathways: Groundwater movement along sewerage alignments e.g. coarse backfills.			Not known
Flood risk - Fluvial			
Flood risk - Surface Water			
Flood risk - Tidal			
Flood risk - Groundwater			
Flood risk - Artificial Drainage Systems			
Flood risk - Infrastructure Failure			
Flood risk - Site Drainage	Re. public foul sewer		Re. Surface water sewer
Highways Potential for significant highways impacts associated with development			
Access Existing access into the site and the suitability of this			
Sustainability lighting, bus facilities, footpaths, cycle routes,			

Assessment considerations	Beneficial	Neutral	Adverse
Highway Safety speed, parking on-street, lighting			

3 INTRODUCTION TO SITE

3.1 Introduction

3.1.1 This chapter provides an introduction into the site being assessed. Further detail regarding the site is provided within the following chapters, where relevant.

3.2 Site location

3.2.1 The site being considered within this report is located as postal code LE16 7QX, Grid Reference SP 72359 89239. Figures CRM.1287.002.PL.D.004.1 and CRM.1287.002.PL.D.004.2 show the location of the site.

3.2.2 The site is located approximately 2.1 miles north of the centre of Market Harborough, and approximately 0.9 miles north of the edge of the town.

3.2.3 The site lies to the east of Harborough Road (B6047), directly opposite a roundabout (figure 1). To the east and south of the site, the land is used for agricultural purposes. To the north of the site lies a gas compound. The eastern half of the site is used for grazing horses.

3.2.4 From the information available, it is not possible to determine whether there is any impact from the adjacent gas compound on the availability of land for development within the assessed site. Further investigation of the route of any underground infrastructure should be undertaken by HDC.

3.2.5 Figure 2 shows a view into the site from the western boundary.



Figure 1. Roundabout to the west of the site



Figure 2. View into the site from the southern boundary

- 3.2.6 The western and southern boundaries of the site comprise low hedgerows. The north and east of the site are enclosed by tall vegetation and trees (figures 3 and 4).



Figure 3. Low hedgerow to the south and west of the site.



Figure 4. Trees and vegetation to the north and east of the site

4 PLANNING REVIEW

4.1 Introduction

4.1.1 This chapter provides a review of the site from a planning perspective. This considers the impacts of planning policies on the development potential of the site for cemetery use. This includes a consideration of local and national planning policy; current land use; surrounding land use; historic land use; and previous planning applications submitted within the site.

4.1.2 The table at the beginning of this chapter provides a summary of the findings. Further detail to support the table is provided within the chapter.

4.2 Overview of findings

4.2.1 The table below provides a summary of the findings within this chapter. Further detail is provided within the text following the table.

Assessment considerations	Beneficial	Neutral	Adverse
National Planning policy Current national planning policy	The only direct reference to cemetery sites within national planning policy is not relevant to this site. Development within the site would not conflict with national planning policy. The development would constitute sustainable development, as is thus consistent with national policy, subject to the technical assessments		
Local Planning policy Current local planning policy designation, proposed designation	The site is not allocated within local policy for any specific use. The site currently comprises open land. Policy CS8 supports the		

Assessment considerations	Beneficial	Neutral	Adverse
	development of cemeteries and burial grounds in open space		
Designations National/ local designations within/ adjoining the application site		There are no relevant planning designations that would either support or preclude the development of a cemetery within the site	
Current land use Current use of the land, impact of development on the current use of the site			The development would result in the loss of grade 3 agricultural land. However, this is unlikely to preclude development
Surrounding land use Current use of the surrounding land, impact of the development on the surrounding land use		The development is unlikely to have either a negative or positive impact on surrounding land use. It would not preclude the use of, or development on, surrounding land	
Sensitive receptors Nearest residential and commercial receptors		The site is located within relatively close proximity to existing commercial receptors	
Historic land use Previous land uses within the site		Historic maps do not show historic development within the site	
Planning history Planning history within the site. Details of any applications that have been refused, reasons for refusal		Surrounding planning applications should not preclude development of a cemetery within the site.	

4.3 National Planning Policy

- 4.3.1 The National Planning Policy Framework (NPPF) sets out the national planning policy for the country. Within the NPPF, the only reference to cemetery sites is within paragraph 89. This states that ‘A local planning authority should regard the construction of new buildings as

inappropriate in Green Belt. Exceptions to this are... provision of appropriate facilities for outdoor sport, outdoor recreation and for cemeteries...'

- 4.3.2 Although this site is not within the Green Belt, and thus the above policy is not directly relevant, this paragraph does suggest that the development of cemeteries within open countryside is acceptable in principle.
- 4.3.3 Beyond this, the key focus of the NPPF is sustainable development. This must consider social, economic and environmental aspects of development. Environmental aspects are considered in detail within the following chapters of this report.
- 4.3.4 In terms of social impacts, an adequate supply of cemetery spaces is essential to ensure a sufficient supply of burial space for residents. The development of a cemetery within the site is unlikely to result in any adverse social impacts.
- 4.3.5 In terms of economic impacts, a good supply of burial space is essential to ensure residents can be buried or cremated within the local area. If there is insufficient burial space within the local area, residents are forced to bury their family/ friends further afield, which often results in significantly higher costs.
- 4.3.6 In addition, cemetery capacity supports other services which are dependent on cemeteries and burials for their business. This includes funeral directors, hearse providers and drivers, florists etc. As such, a good, local supply of cemetery capacity results in wider economic benefits. The development of a cemetery within the site is unlikely to result in any adverse economic impacts.
- 4.3.7 As such, the development of a cemetery within the application site would not conflict with national planning policy, and is considered to comprise sustainable development.

4.4 **Local Planning Policy**

- 4.4.1 The current adopted planning policy for Harborough District Council comprises the following:
 - The District Local Development Framework Core Strategy (2006-2028)
 - Retained policies from the Local Plan (2001)
- 4.4.2 Within the proposals map updated following the adopted of the Core Strategy, the site is not allocated for a specific use (see figure 5). Land to the west of the site, across Harborough Road is identified as Airfield Farm (Policy EM/11), shown as blue diagonal lines on figure 5.

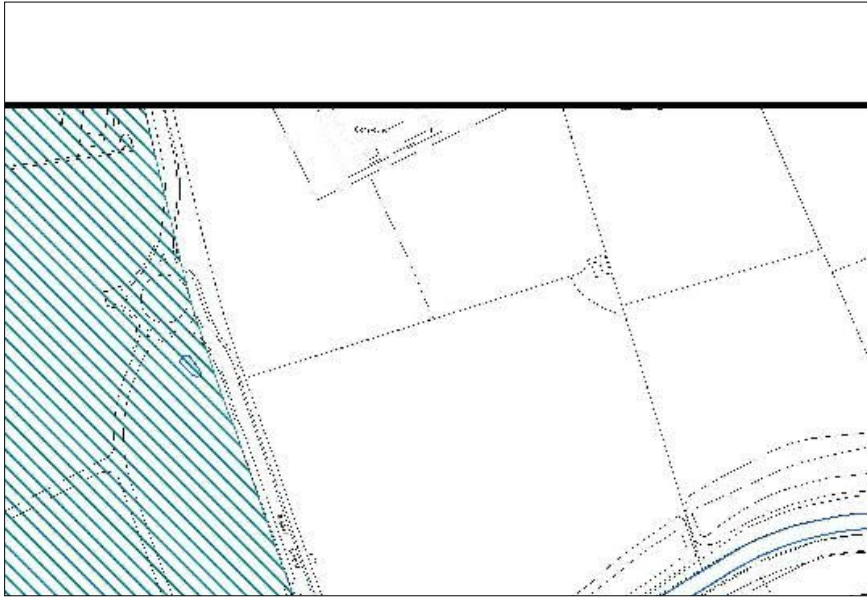


Figure 5. Site within the local policy proposals map

- 4.4.3 Policy EM/11 states that ‘...the district council will grant planning permission for a comprehensive scheme for classes B1 development, an agricultural showground, leisure uses and relocation of highway depot on land at airfield farm, Market Harborough as shown on the proposals map,...’ assuming a number of criteria are met.
- 4.4.4 As detailed later within this chapter, consent was granted in July 2016 for the erection of 30,700sqm of commercial buildings (B1, B2 and B8) on part of this land. In addition, a planning application is currently pending for the erection of 79 dwellings. This is part of a wider masterplan. Figure 6 below shows that land opposite the site is currently partly developed.



Figure 6. Developed land opposite the site

- 4.4.5 Although in close proximity to the site, given the low impacts associated with a cemetery site, the development of the site as a cemetery would not preclude development within Airfield Farm. In addition, development within the Airfield Farm allocation site should not prevent a cemetery being developed within the site being considered.

- 4.4.6 As the site itself is not allocated for any specific use, policy CS8 of the Core Strategy is relevant. This relates to ‘Protecting and Enhancing Green Infrastructure’. Section C of this policy (open space, sport and recreation assets) states that *‘The contribution that open space, sport and recreation facilities make to the District’s Green Infrastructure network and the well-being of communities will be strengthened by... Securing new provision to help address identified deficiencies in existing open space provision, including cemeteries and burial grounds, both in quantity and quality...’*.
- 4.4.7 Policy CS12 relates to ‘Delivering Development and Supporting Infrastructure’. This states that *‘...Other community facilities not referenced in the Infrastructure Schedule (including facilities for Burials and Cremation, Places of Worship, Arts and Culture) will be supported subject to compliance with transport and design policies (Policies CS5 and CS11)...’* Policy CS5 relates to ‘Providing Sustainable Travel’ and policy CS11 considers ‘Promoting Design and Built Heritage’
- 4.4.8 The above policies are considered within the transport and landscape chapters of this report respectively.
- 4.4.9 The emerging Harborough District Local Plan does not set out any policies or land use designations which would conflict with the proposed development of this site for cemetery use. Broad compliance with emerging local plan policies was a key part of HDC’s stage one site review for the identification of potential cemetery sites. **(MATTHEW – PLEASE CONFIRM)**

4.5 Relevant designation

- 4.5.1 A review of Defra’s Magic mapping tool has been undertaken. Relevant ecological and landscape designations will be considered within the relevant chapters of this report.
- 4.5.2 From a planning perspective, there do not appear to be any nationally designated constraints that would preclude development within the site.

4.6 Current and surrounding land use

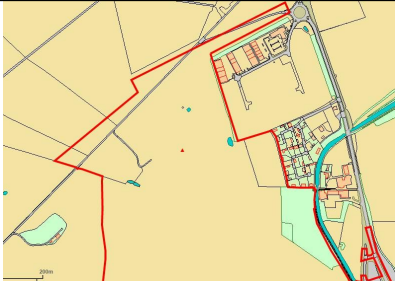

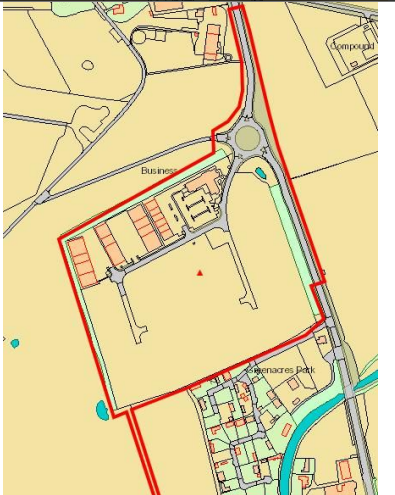
- 4.6.1 The land currently comprises agricultural land, with land to the east of the site currently been used for horse grazing. As detailed previously, land to the east and south of the site is used for agricultural purposes. A gas compound and agricultural land are located to the north of the site, and beyond this, Leicester Lane.
- 4.6.2 Harborough Road lies to the west of the site, and beyond this partly developed and partly undeveloped land. Figures 1-4 and 6 shows photos of the site and surrounding land.

4.7 Historic land use

4.7.1 A review of HDC’s planning application search shows a significant number of planning applications on land to the west of the site. The key applications are detailed within table 1.

4.7.2 Planning applications on land to the west of the site are unlikely to impact upon the development of a cemetery within the site. Cemeteries are commonly found in close proximity to residential and commercial receptors. Given the low impacts associated with cemeteries, the development of a cemetery within the site would not preclude development on land opposite the site coming forward.

Table 1. Historic and current planning applications within the site

Reference	Development	Decision	Red line
17/00177/REM	Erection of 79 dwellings (phase 1) (Reserved Matters of 11/00112/OUT including details of layout, scale, appearance and landscaping)	Pending consideration	
15/01609/OUT	Erection of up to 30,700 sq m of commercial buildings comprising uses falling within Classes B1, B2 and B8 (means of access to be considered)	Consented July 2016	
10/00165/ETF	Erection of a business park for B1 B2 and B8 employment uses (all matters reserved) (extension of time of 05/00987/FUL)	Consented May 2010	

4.8 Conclusion

- 4.8.1 The above chapter considers the suitability of the site for a cemetery development, from a planning perspective. The development of a cemetery within the site appears to be consistent with national and local planning policy, and there do not appear to be any designations that would preclude development within the site.
- 4.8.2 The site and surrounding land are currently used for agricultural purposes, although there appears to be an intention to develop land to the west of the site, across Harborough Road, for residential and commercial use.
- 4.8.3 Overall, there do not appear to be any planning constraints for the development of a cemetery within the site.

5 ECOLOGICAL ASSESSMENT

5.1 Methodology

5.1.1 Desk study details were obtained from the following sources on the associated dates to provide background on ecological features in the vicinity of the site. Records over 10 years old for transient species and all species protected from sale only are excluded. In each case the search included the site and the specified area beyond the site boundary. The search radius was based on the professional judgement of the ecologist leading the appraisal, taking into account the scope of the proposed works and associated potential impacts, with reference to current guidelines for preliminary ecological appraisal (CIEEM, 2013). Records obtained included:

- European statutory sites within a 5km radius, national statutory sites within a 2km radius, and England HPI identified as requiring action in the UK BAP (JNCC, 2015) and Ancient Woodland within a 0.5km radius (Natural England GIS Digital Boundary Database and Natural England Site Designations, on 30th May 2017);

- TPOs and Conservation Areas within the immediate zone of influence (Leicestershire County Council, 30th May 2017);

- Waterbodies within a 0.5km radius (Online mapping sources including: Google Maps; MAGIC; and Ordnance Survey Street View, 30th May 2017); and

- Locally designated wildlife sites, Legally protected species, England SPI identified as requiring action in the UK BAP (JNCC, 2015), Local BAP Habitats/Species, any Notable species (which includes: Species of conservation concern and RDB species (JNCC, 2014a), BOCC (Eaton et al., 2015); and nationally rare and nationally scarce species (JNCC, 2014b)) and Invasive species within a 0.5km radius, and important hedgerows/veteran trees within the immediate zone of influence (Northamptonshire Biodiversity Records Centre, and Leicester and Rutland Environmental Records Centre, 31st May 2017).

5.1.2 The Extended Phase I Habitat Survey was undertaken on 18th May 2017 by a Consultant Ecologist from Enzygo (Kirsty Roger, MZool (Hons) Grad CIEEM) who satisfies all necessary field survey competencies as stipulated by the Chartered Institute for Ecology and Environmental Management (CIEEM). Weather conditions on the day of survey were dry, with 40% cloud cover, a light wind, and a temperature of 17°C.

- 5.1.3 Phase I Habitat Survey (JNCC, 2010) is a standard technique for obtaining baseline ecological information for large areas of land in which the main vegetation types present within the survey area are mapped using a standard set of habitat categories. In addition to mapping, each of the main habitats within the survey area was described; including details of component plant species abundances (recorded using the DAFOR scale: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare). Incidental observations of Legally protected species, England SPI /Local BAP Species, any Notable species (which includes: Species of conservation concern and RDB species; BOCC; and nationally rare and nationally scarce species) and Invasive species, and the potential for such species to occur on site (and in the surrounding landscape where relevant) were also noted; however, no specific species surveys were undertaken.
- 5.1.4 Potential ecological constraints to development have been identified from desk study and field survey data. Where ecological constraints to development are identified, further survey requirements and/or avoidance, mitigation, compensation measures that are proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed works are described.
- 5.1.5 The English names of flora and fauna species are given in the main text of this report.
- 5.1.6 This document does not contain a comprehensive list of botanical species on site. Only plant species characteristic of each habitat and incidental observations of notable plant species were recorded. In addition, many plant species are only evident at certain times of the year and so some plant species may have gone undetected. Data held by consultees may not be exhaustive. The absence of evidence, does not indicate evidence of absence. Enzygo cannot take responsibility for the accuracy of external data sources and as such discrepancies and inaccuracies may occur. Natural England do not hold information on ancient woodland less than 2ha in size.

5.2 Overview of findings

Assessment considerations	Beneficial	Neutral	Adverse
Ecological constraints Current ecological value of the site and offsite ecological features.		The site is of low ecological value with a low number of Phase II surveys required (IF impacts cannot be avoided) which could require subsequent mitigation. Minor additional fee expenditure required, and/or seasonal timing constraints could be applicable.	

5.2.1 Ecological features identified by the desk study and field survey are summarised along with any identified constraints in Table 2 below.

Table 2. Ecological features/constraints

Ecological Feature	Details	Constraint
Statutory sites designated or classified under international conventions or European legislation		
None	-	-
Statutory sites designated under national legislation (including IRZ)		
Great Bowden Borrowpit SSSI, 1.8km NE	Tall fen plant community with unusual marsh flora.	No (no aquatic runoff etc)
Locally designated wildlife sites		
Grand Union Canal Harborough Arm LWS	Canal with stands of emergent vegetation	No (off-site, no aquatic runoff etc)
England HPI, Local BAP Habitats, Ancient Woodland, Important Hedgerows, Veteran Trees, TPOs and Conservation Areas		
Deciduous Woodland HPI	Off-site to south and north-east	No (off-site)
Hedgerow HPI & Mature Trees (potentially Important)	Around site boundaries	Yes – AVOID impacts (need to retain and use existing gate) or survey required
Green/Blue Infrastructure & Dark Zones		
Hedge network	Boundary hedgerows form part of the wider hedger network/ green infrastructure	Yes – AVOID impacts (retain)
Protected and Notable Species		
Bats	Records of 6 species in area. No suitable buildings. Mature trees could contain Potential Roosting Features (PRFs). Boundary hedgerows provide low bat suitability (Collins, 2016)	Yes – AVOID impacts (retain) or survey required
Badger	No evidence observed	-

Dormouse	Potential within boundary hedgerows.	Yes – AVOID impacts (retain boundary hedgerows & trees) or survey required
Otter	None	-
Water Vole	None	-
Other Protected Mammals	None	-
Specially Protected Birds	None	-
All Other Birds	Records of 24 species in area. General nesting opportunities within hedgerows, trees and scrub.	Yes – AVOID impacts (clearance outside nesting period or ECoW checks)
Common Reptiles	Several records in area. Limited potential around field edges.	Yes – AVOID impacts (sensitive clearance of field boundaries under ECoW)
Great Crested Newt	Large number of records in area. EPS Licences in area around Harborough. Waterbodies within 500m radius, and suitable terrestrial habitat.	Yes – AVOID impacts (works to terrestrial habitats under PWMS) or survey and licence.
Other Protected Herpetofauna	None	-
White-clawed Crayfish	None	-
Fish/Marine	None	-
Protected Invertebrates	None	-
Protected Flora	None	-
England SPI/Local BAP and Notable species	None	-
Invasive Flora	None	-
Invasive Fauna	None	-

6 LANDSCAPE/ ARBORICULTURAL/ VISUAL EFFECTS

6.1 Introduction and Methodology

- 6.1.1 Any potential effects on the local landscape and the landscape of the site itself, the visual amenity and any arboricultural features on and around the site (trees and hedgerows) were examined in a desk study and during a visit of the site carried out on 11th May 2017.
- 6.1.2 The desk study established the type of land use and landscape character of the location and created a list of potential visual receptors which may be sensitive to any changing views of the site. The online Magic Map Application provided by the Department for Environment, Food and Rural Affairs (DEFRA) has also been checked for any landscape designations within a 1km radius of the site which may be influenced by development of the site.
- 6.1.3 To establish the legal status of any arboricultural features on site, i.e. trees, tree groups, woodland and hedgerows, Enzygo have liaised with Harborough District Council to confirm whether there are any Tree Preservation Orders (refer to *Town and Country Planning Act 1990* and the *Town and Country Planning (Tree Preservation) (England) Regulations 2012*) protecting any trees within or around the site boundary and whether there are any Conservation Areas (refer to *Section 211* of the *Town and Country Planning Act 1990*) affecting the site. It is further highlighted that hedgerows within and around the site may be protected (refer to *The Hedgerow Regulations 1997*).
- 6.1.4 Following the desk study, the site was visited to describe the landscape character of both the site and its surroundings using a number of parameters, including the landscape pattern and density, tranquillity, cultural aspects and landcover and layout of the site. The value and sensitivity of any arboricultural features to development were also assessed. As access into the site was not permitted at the time, the assessment was carried out from publicly accessible points along the site boundaries.
- 6.1.5 The findings of the desk-study and the site visits are shown in plans CRM.1287.002.L.D.001 and CRM.1287.002.L.D.002.
- 6.1.6 In a final step, the potential views established in the desk study were assessed for their potential sensitivity and quality by visiting visual receptors where access allowed this.
- 6.1.7 The assessments were broadly based on recommendations made in *Guidelines For Landscape And Visual Impact Assessment* by the Landscape Institute and British Standard *BS 5837:2012 Trees in relation to design, demolition and construction*.

6.2 Overview of findings

6.2.1 Based on the findings of both the desk-study and the site visit, the following broad assessments have been made of the effects the development would have on the local landscape, views, trees and hedgerows:

Assessment considerations	Beneficial	Neutral	Adverse
Landscape/ townscape Effects Impact on pattern/ density, tranquillity, culture and landcover/ layout.		Whilst it is expected that the change of land use from agricultural field to cemetery is considered to significantly change the character of the site, its effect on the wider landscape would be limited due to the mixed use of the surrounding landscape, which is a patchwork of agricultural and commercial use, intersected by the local road and waterways infrastructure. In addition, its flat topography and the extent by which the site is enclosed by tall vegetation limit the influence the site has on its surrounding landscape. The historic field boundaries both around and within the site can be improved and reinforced.	
Arboricultural impacts Assessment of trees/ shrubs/ hedges within the site, and their quality		There are only shrubs of low value located along the internal field boundary. There are mature hedgerows and early mature trees of moderate value along the northern site boundary. A low, managed hedgerow forms the south and east boundary and includes some scattered trees in the south. Sensitive design and construction methodologies along the boundaries can keep the impact on existing features to a minimum. Where possible, new hedgerow and tree planting within the site and along the boundary can improve the site.	
Visual Effects Visual impacts on sensitive receptors within 1km of the site		There is a very limited number of potentially sensitive visual receptors which may be affected by the proposed use of the site, including partial and glimpsed views from a short section of the canal towpath in the south which is not expected to deteriorate or improve due to the relative distance between the receptor and the site and the way the development and its associated planting proposal is expected to blend the site into its surrounding landscape.	

6.3 The Landscape/ Arboricultural/ Visual Effects

6.3.1 The site is relatively flat and comprises two arable fields which form part of a traditional pattern of agricultural fields and straight natural (planted) field boundaries. Whilst the internal

field boundary is rudimentary, it creates two sections of different character. The western section is only enclosed by low hedgerows in the west and south, making it open to the commercial character of the Airfield Business Park and the busy Harborough Road to the west of the site. On the other hand, the eastern section is enclosed by tall vegetation and trees in the north, east and south with little influence from the surrounding landscape, making it the quieter section of the site.

- 6.3.2 No landscape or cultural designations affect the site. Great Bowden Hall, a Grade II Listed Building, is located approximately 700m east of the site, but its setting is not expected to be affected by any development on the site. The same applies to the Grand Union Canal Conservation Area
- 6.3.3 The continuous dense boundary vegetation along the northern and eastern boundary, including the early mature trees along the gas valve compound site to the north, is in good and healthy condition. It is predominantly native; however, a small number of non-native species may be present along the north boundary. The south and west boundary is formed by a hawthorn hedgerow which is managed at 1.2- 1.5m height. A small number of semi-mature trees in fair condition and of low value are scattered along the Harborough Road boundary in the south-west. There are no Tree Preservation Orders on site and no Conservation Area designations affect any part of it.
- 6.3.4 Whilst the site is located within a predominantly rural landscape, views of the site are limited due to the tall vegetation surrounding the eastern part of the site and a 2m earth mound located between the site and Harborough Road. The main potentially sensitive receptor within the 1km radius of the site are the Grand Union Canal and its towpath in the south, both of which are lined with tall vegetation only allowing glimpsed and distant views of the site. Partial views of the site only exist from a very short section immediately adjacent to Harborough Road. Views of the site from the Public Right of Way in the south west are blocked by Airfield Business Park. Whilst the site cannot be viewed from Leicester Lane due to tall vegetation, views from Harborough Road are generally open and only occasionally blocked by semi-mature trees and a 2m earth mound adjacent to the roundabout. Receptors along this main road are not considered to be sensitive.

7 HYDROLOGY/ WATER ENVIRONMENT AND FLOOD RISK

7.1 Introduction

7.1.1 This chapter provides a qualitative assessment of the site’s baseline hydrology, flood risk and drainage characteristics and assesses the risk of the proposed cemetery development to groundwater and groundwater-fed surface waters. The appraisals have been undertaken through desk-based study and site walkover surveys. This includes a qualitative appraisal to understand the risk of flooding to the Site and the potential impacts the development may present to risks of flooding onsite and/or offsite if flooding is not effectively managed.

7.2 Overview of findings




7.2.1 The table below provides a summary of the findings within this chapter.

Assessment considerations	Beneficial	Neutral	Adverse
Water Environment – Groundwater Source Protection Zone (SPZ) 1	The Site is outside SPZ 1 and any other designated SPZ.		
Water Environment - Groundwater abstraction/wells/springs supplying water for human use.	The Site is more than 250m away from any well, borehole or spring.		
Water Environment - Soil/ Superficial Deposit thickness =>1.8m to give =>1m cover over coffin/body Graves should not be dug in bedrock			Soil thickness is only estimated from BGS borehole records adjacent site. This does not preclude cemetery development but further Tier 2 investigation is required.
Groundwater Table: => 1 metre clearance between the base of the grave and the top of the water table – they shouldn’t have any standing water in them when dug [water table depth should be =>2.8m]			Groundwater table depth not known. This does not preclude cemetery development but further Tier 2 investigation is required.



Water Environment – Surface water The site is at least 30m from any spring or watercourse not used for human consumption	The Site is more than 30m from any spring or watercourse.		
Water Environment – Historic and current industrial land use	The historic and current land uses of the site and surrounding area are unlikely to have introduced significant pollution.		
Water Environment – Off site or perimeter ditch drainage: Burial sites should be at least 10 metres from any field drain, including dry ditches			On site drainage not known. Further investigation is required.
Water Environment -Field/ditch drainage			Distance from field drains/dry ditches not known.
Water Environment -Highway drainage			Off-site highway drainage into site not known.
Water Environment -Artificial pathways: Groundwater movement along sewerage alignments e.g. coarse backfills.			Artificial subsurface pathways (e.g. land drains) not known.
Flood risk - Fluvial	The Site is over 30m from the nearest watercourse and is within Flood Zone 1 and at low risk of fluvial flooding		
Flood risk - Surface Water			Sections of the access route and approximately 40% of the Site is at risk of surface water flooding
Flood risk - Tidal	The Site is at negligible risk of tidal flooding		
Flood risk - Groundwater	The Site is at negligible risk from groundwater flooding		

Flood risk - Artificial Drainage Systems	There are no reports of sewer flooding incidents at or near to the Site in the SFRA		
Flood risk - Infrastructure Failure	There are no reports of infrastructure failure causing flooding at the Site in the SFRA		
Flood risk - Site Drainage	The Site is within 100m of a public foul sewer network		<p>There is no on-Site drainage and the Site is underlain by slowly permeable seasonally wet soils. The bedrock is of low to moderate permeability. Surface water flooding may indicate poor drainage within the Site.</p> <p>There is no nearby public surface water sewer network</p>

7.2.2 The flood risk at the Site is qualitatively assessed based on a desktop review including:






-  Review of available flood mapping, sewer asset plans, the Strategic Flood Risk Assessment (SFRA), and any other relevant data and documentation;
-  Assessment of flood risk from all sources, including; tidal, fluvial, surface water, groundwater, sewer, and infrastructure failure;
-  Assessment of flood risk against NPPF/PPG ID:7 guidance documents.

7.2.3 The objectives of the Tier 1 groundwater risk assessment are to:

-  Provide information on the environmental quality of the ground present on the site; and
-  To assess the potential environmental risks posed by the site to the groundwater.

7.2.4 The risk of pollution to groundwater at the Site is assessed by following Environment Agency Guidance on groundwater risk assessments for cemeteries and burial sites (14 March 2017¹) which supersedes all previous guidance.

¹ <https://www.gov.uk/guidance/cemeteries-and-burials-groundwater-risk-assessments>

- 7.2.5 The assessment follows the recommended tiered approach. This means that the greater the risk of groundwater pollution, the more detailed assessment is required. The risk assessment can be stopped at any stage should enough information be obtained to demonstrate that the activity does not pose a pollution risk to groundwater.
- 7.2.6 This assessment is a Tier 1 assessment comprising qualitative risk screening to investigate what the risks are, whether more detailed assessment is needed, and what that assessment would need to focus on (risk prioritisation).
- 7.2.7 The Tier 1 assessment is undertaken in view of the Environment Agency’s groundwater position statement² L 1- *Locating cemeteries close to a water supply used for water supply for human consumption*, which is that the Environment Agency will normally object to the locating of any new cemetery or the extension of any existing cemetery, within SPZ1, or 250 metres from a well, borehole or spring used to supply water that is used for human consumption, whichever is the greater distance.
- 7.2.8 Position Statement L3: *Cemeteries: protecting groundwater in highly sensitive locations* also places a high priority on protecting groundwater within principal aquifers and groundwater catchments used for drinking water supply, and new larger cemetery developments in such areas might not be appropriate.
- 7.2.9 *Cemeteries and burials guidance on preventing groundwater pollution*³ provides more detail, in that to meet minimal groundwater protection a burial site must be:
-  outside a source protection zone 1 (SPZ1);
 -  at least 250 metres from any well, borehole or spring supplying water for human consumption or used in food production – for example at farm dairies;
 -  at least 30 metres from any spring or watercourse not used for human consumption or not used in food production; and
 -  at least 10 metres from any field drain, including dry ditches.
- 7.2.10 All graves must:
-  have at least 1 metre clearance between the base of the grave and the top of the water table – they shouldn’t have any standing water in them when dug;

² The Environment Agency’s approach to groundwater protection March 2017 Version 1.0

³ <https://www.gov.uk/guidance/cemeteries-and-burials-prevent-groundwater-pollution>

■ not be dug in bedrock or areas susceptible to groundwater flooding; and

■ be deep enough so at least 1 metre of soil will cover the top of the coffin or body.

7.2.11 Proposals for new cemetery developments for greater than 100 burials per year are considered high-risk even in a lower sensitivity groundwater scenario. Such proposals will only be agreed by the Environment Agency where a developer can demonstrate through detailed risk assessment that, given the site-specific setting and the engineering methods proposed, groundwater pollution will be avoided.

7.2.12 It is noted that that all cemetery developments and burials must maintain an unsaturated zone below the level of the base of the grave(s). The Environment Agency will work with local authorities to identify alternative site and burial options where necessary.

7.2.13 It is noted that Market Harborough Council assume a rate of 3000 burials per ha (25% full burials and 75% ashes burials) and that deaths per annum for the Market Harborough population is estimated as 177⁴.

7.3 Sources of Information

7.3.1 The following information was used in preparation of the hydrology/flood risk assessment:

■ Ordnance Survey 1:25,000 mapping (Explorer 223 Northampton & Market Harborough);

■ Environment Agency online flood maps ((Flood Map for Planning⁵, Long Term Flood Risk Assessment for Locations in England⁶ and Environment Agency – What’s in Your Backyard?⁷);

■ Harborough District Strategic Flood Risk Assessment (SFRA) and associated mapping;

■ National Soils Resources Institute: Soilscales online mapping⁸;

■ British Geological Survey [BGS] online mapping: Geology of Britain Viewer⁹;

■ Landmark Promap: Flood Data Package: Additional flood mapping;

⁴ A site assessment study for the Market Harborough new cemetery

⁵ <https://flood-map-for-planning.service.gov.uk/>

⁶ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

⁷ http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

⁸ <http://www.landis.org.uk/soilscales/>

⁹ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

■ Geosmart 1 in 100-year groundwater flood risk map;

■ Anglian Water Asset Plans.

7.3.2 The following information was used in the preparation of the Tier 1 Qualitative Groundwater Risk Assessment:

■ Environment Agency – What’s in Your Backyard? – online resources; (Groundwater Source Protection Zones, BGS Aquifer Maps, Groundwater Vulnerability Maps)³;

■ National Soils Resources Institute: Soilscales online mapping⁴;

■ British Geological Survey (BGS) online map resources⁵;

■ Environment Agency guidance on preventing hazardous and non-hazardous substances from entering groundwater¹⁰;

■ Cemeteries groundwater pollution guidance^{11,12};

■ Groundsure MapInsight, GeolInsight and EnviroInsight reports (www.emapsite.com)¹³;

■ Consultation with the local authority on any private or unlicensed wells boreholes within 1km.

7.4 Site Walkover

7.4.1 Enzygo staff conducted a walkover of the Site on the 11th May 2017, during which a photographic record was made.

7.4.2 The Site is currently used as an agricultural field for crop cultivation.

7.4.3 Historically the Site has always been an open agricultural field.

7.5 Catchment Hydrology

7.5.1 Environment Agency online mapping (Figure 8) and Ordnance Survey mapping shows no ‘main rivers’ or ‘ordinary watercourses’ within or near to the Site.

7.5.2 The Grand Union Canal flows around the Site. Flow direction was unable to be determined.

¹⁰ <https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/>

¹¹ <https://www.gov.uk/guidance/cemeteries-and-burials-prevent-groundwater-pollution>

¹² <https://www.gov.uk/guidance/cemeteries-and-burials-groundwater-risk-assessments>

¹³ www.emapsite.com

7.6 Water Assets

- 7.6.1 Anglian Water asset plans (Figure 7), show no sewer assets within the Site boundary. The closest sewer asset is a private surface water sewer within Wellington Way approximately 80m west of the Site. There is also a public foul sewer network 100m to the west of the Site within Wellington Way.

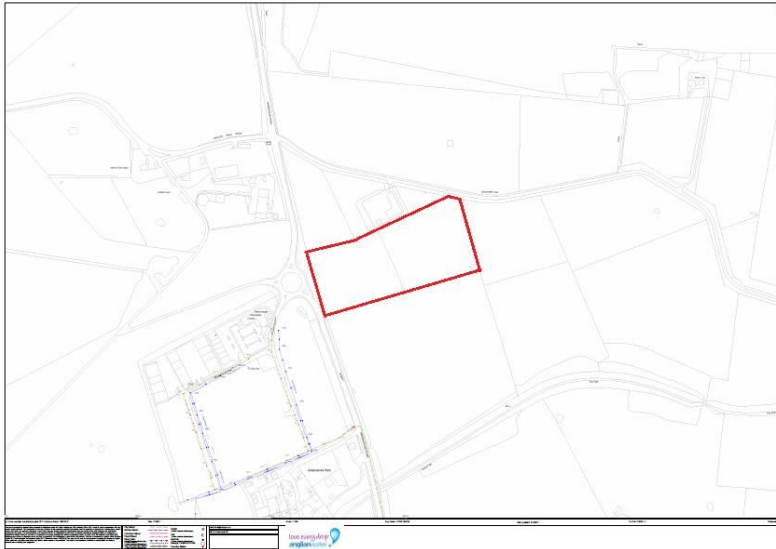


Figure 7. Anglian Water asset plans

7.7 Hydrogeology

Soils

- 7.7.1 The site is underlain by 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils'.

Superficial Deposits

- 7.7.2 BGS mapping does not record superficial deposits on, or within 400m of the Site.

Bedrock

- 7.7.3 The Dyrham Formation bedrock is predominantly clays and silts. It forms a Secondary (undifferentiated) aquifer unit, assigned where it is not possible to assign category A or B to a rock type. In general, these layers have been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

7.7.4 The overall Site bedrock permeability is assessed as Low to Moderate, and of ‘Mixed’ flow type.

7.7.5 There are no permeable aquifer units within 400m of the site.

Surface and groundwater abstractions

7.7.6 Environment Agency online mapping shows there are no groundwater Source Protection Zones (SPZ) within 500m of the site.

7.7.7 There are no groundwater or potable water abstractions within 500m of the Site, according to EA records. The Local Authority (Harborough District Council) was consulted as to the presence of private groundwater abstraction/supply, but no further information was available.

7.7.8 The only surface watercourse within 500m of the site is the Grand Union Canal, 250m south-east.

7.7.9 The nearest BGS borehole to the site is approximately 80m to the south-east. The log of BH no: SP78NW97 shows 1.6m of firm to stiff sandy clay (Middle Lias), with 1.3m+ of laminated brown mudstone/grey fissured clay (Middle Lias).

7.7.10 Groundwater levels at Site are controlled by the permeability of the bedrock, which decreases with depth. Flow is likely to occur in the fissured clay mudstone that occurs at 2-3m depth, and following the Site topography which falls slightly south and south-eastward.

7.8 Historical Sources of Contamination

7.8.1 Table 3 records potential sources of historical ground contamination from 1:2,500 and 1:10,000 scale mapping, aerial photography and online resources, both on site and within 250m.

Table 3. Potential Contaminative Historical Land Use/Ground Working Features

Map/Imagery Date and scale	On Site	Surrounding Area (within 250m)
1885 (1:10,000)	The site is used as agricultural fields, with internal hedgerow divisions. Five no. ponds exist on the site, on the western boundary, on the eastern boundary, in the south-eastern corner, and two centrally. Leicester Lane runs just to the north of the northernmost point of the site.	Ponds 55m north-east, 215m north-west and 217m south, Unspecified Ground Workings 192m south, Grand Union Canal 221m south-east.
1886 (1:2,500)	No significant changes.	No significant changes.

1901-1902 (1:10,000)	No significant changes.	No significant changes.
1904 (1:2,500)	No significant changes.	No significant changes.
1928 (1:10,000)	No significant changes.	No significant changes.
1929 (1:2,500)	No significant changes.	Pond 235m north-west.
1950 (1:10,000)	No significant changes.	No significant changes.
1958 (1:10,000)	No significant changes.	No significant changes.
1960 (1:2,500)	No significant changes.	No significant changes.
1967-1968 (1:10,000)	No significant changes.	Depot and associated buildings 222m north-west.
1973 (1:2,500)	Internal hedgerows on-site removed and all ponds on-site backfilled.	Gas Valve Compound 35m north of site.
1974 (1:10,000)	No significant changes.	Unspecified Heap 185m south-east.
1976 (1:10,000)	No significant changes.	No significant changes.
1983 (1:10,000)	No significant changes.	Further building around Depot and 222m north-west, Depot 345m south-west.
1993 (1:2,500)	No significant changes.	No significant changes.
2002 (1:10,000)	No significant changes.	No significant changes.
2010 (1:10,000)	No significant changes.	Airfield Business Park constructed ~100m west of site, roundabout 15m west of site, with A spur road (Harrison Road) off it.
2011 (aerial imagery)	No significant changes.	New buildings (CL First Aid Training) constructed off Harrison Road.
2014 (1:10,000)	No significant changes.	No significant changes.

- 7.8.2 There are unlikely to be any significant sources of contamination, based on the historical land use. Gas valve compounds are not normally a source of contamination, unless it is part of a pre-existing gas works.
- 7.8.3 There are a number of current industrial land uses in the area surrounding the site; including: vehicle components, vehicle hire and rental, electrical component manufacturers, business park/industrial estate, animal feed suppliers, printer/publisher and packaging manufacturer. All of these land uses are located on the Airfield Business Park ~120m west of the site.
- 7.8.4 There is also a balancing pond 37m west of the site, an electricity substation 175m south-west and a generic industrial tank 205m south.
- 7.8.5 All current land uses pose a very low risk of contamination to the site.
- 7.8.6 There is a current inert waste and excavation waste transfer station 365m to the north of the site. This poses a negligible contamination/ground gas risk to the site.

7.8.7 Overall it is unlikely that any contamination from off-site has migrated into the site.

7.9 Flood Risk Appraisal (Hydrology)

Environment Agency Flood Map

7.9.1 The Environment Agency flood map (Figure 8) shows the entire Site is located within Flood Zone 1; outside the extent of the 1 in 1000-year (0.1% AEP) risk of fluvial (river) and tidal (sea) flooding, and therefore at 'low' risk of fluvial flooding.

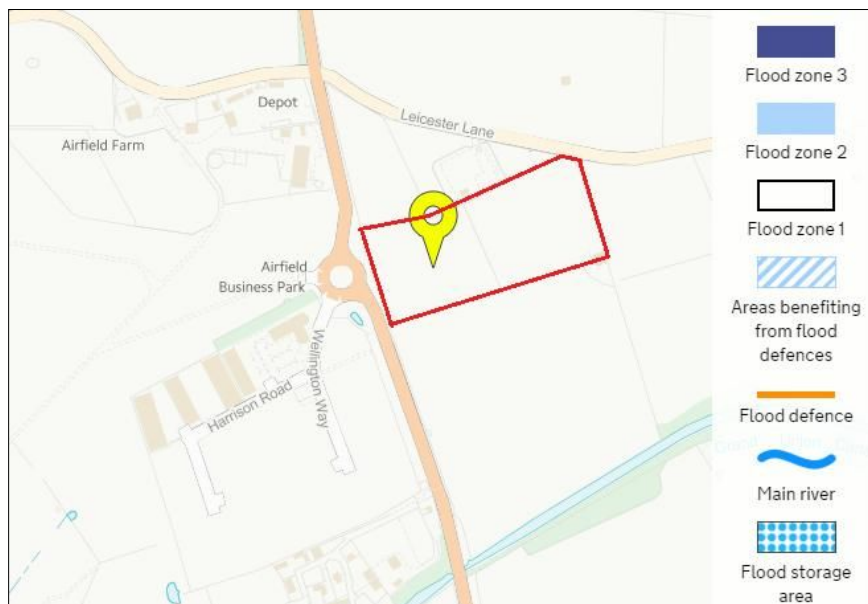


Figure 8. Fluvial Flooding

7.9.2 The Environment Agency online surface water flood map (Figure 9) shows that there is a surface water flow pathway bisecting the centre of the Site associated with 1 in 75-year, 1 in 200-year and 1 in 1000-year surface water flooding.

7.9.3 Surface water flooding also poses risk to the access to the Site. A 1 in 75-year surface water flow pathway associated with the Grand Union Canal causes flooding upon a small section of Harbrough Road, a potential access road to the Site. A 1 in 1000-year surface water flow pathway causes flooding across Leicester Lane, a second potential access road to the Site.

7.9.4 There is also a small area of surface water ponding within the south-western extent of the site associated with 1 in 1000-year surface water flooding.

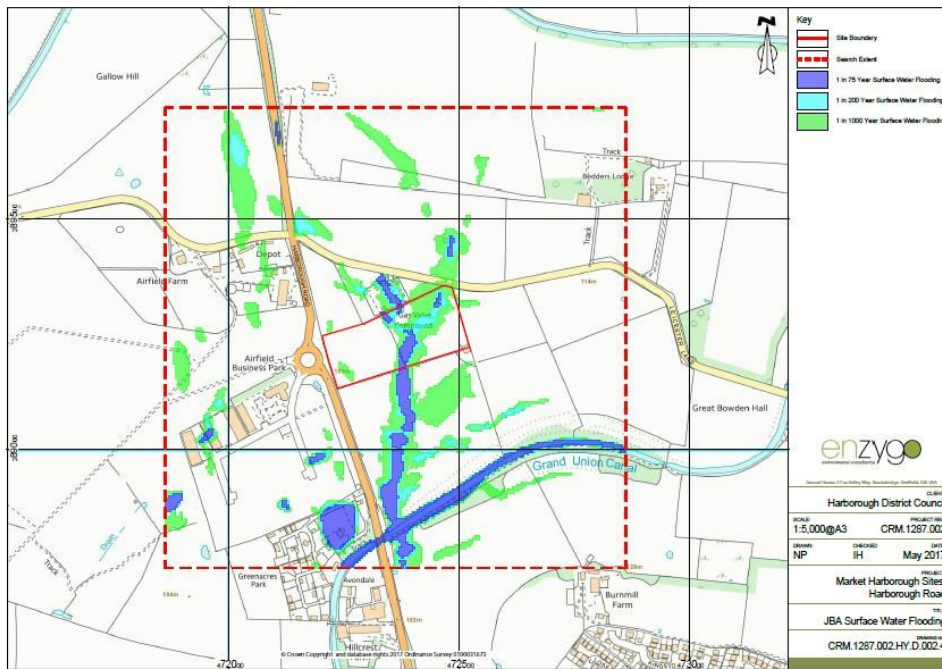


Figure 9. Surface Water Flooding

Tidal Flooding Sources

7.9.5 The Site is not located close to any tidally affected flooding sources. Therefore, flooding from this source is considered negligible.

Flooding from Rising / High Groundwater

7.9.6 Groundwater flooding tends to occur sporadically in both location and time. It tends to affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers) at outcrop or near-surface.

7.9.7 The BGS Groundwater Flooding Susceptibility Map (Figure 10) indicates that the Site is not susceptible to groundwater flooding.

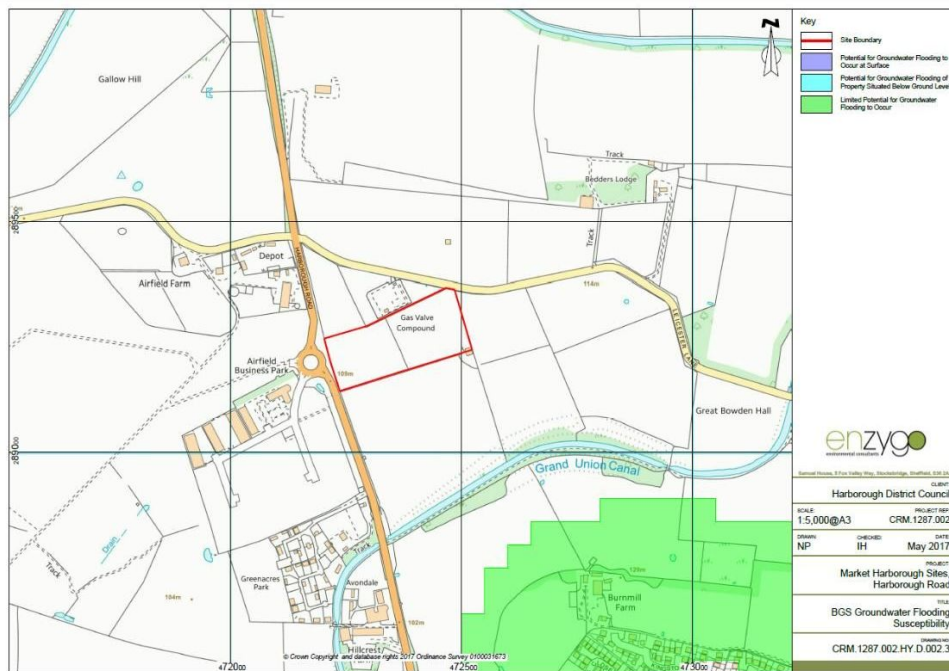


Figure 10. Groundwater Susceptibility Map

7.9.8 The SFRA states that no records of groundwater flooding were found. However, this does not mean that groundwater flooding does not occur within the area, more that it has not been reported. Following periods of sustained rainfall, there may be potential for groundwater flooding to occur, which should be considered in the planning process of any new developments within the district.

Flooding from Artificial Drainage Systems

7.9.1 Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur due to blockages in the network or where inflows exceed flow capacity.

7.9.2 Modern sewers are built to the guidelines within Sewers for Adoption¹⁴. These sewers have a design standard to the 1 in 30-year flood event and therefore most sewer systems will surcharge during rainstorm events with a return period greater than 30 years (e.g. 100 years).

7.9.3 Anglian Water is responsible for the disposal of waste water within the area. Information with regards to sewer and water main flooding contained within the SFRA has been reviewed as part of this FRA together with their statutory DG5 Flood Register of properties/areas which are at risk of flooding from public sewerage.

¹⁴ WRC (2012) Sewers for Adoption 7th Edition.

7.9.4 There are no sewer assets located within the Site boundary. The closest sewer asset is a network of private surface water sewers within Wellington Way 80m to the west of the Site. There is also a network of public foul sewers within Wellington Way approximately 100m west of the Site. Based on a review of the SFRA, there are no recorded sewer flooding incidents located within or to the immediate vicinity of the Site.

Flooding from Infrastructure Failure

i. Highway Drainage

7.9.5 Based on the SFRA, there have been no recorded historic highway flooding incidents within the vicinity of the Site.

ii. Reservoir

7.9.6 Based on a review of the Environment Agency online flood mapping, the Site is not at risk of reservoir flooding.

7.10 Tier 1 Qualitative Risk Assessment

Contaminant Source-Pathway-Receptor Model

7.10.1 To constitute an environmental risk, there must exist a source of contamination, a receptor or receptors (such as a groundwater body/aquifer, or river); and a pathway (pollutant linkage) for contaminants to travel along linking the source and receptor.

On-site Sources of Contamination

7.10.2 The undeveloped site is considered uncontaminated.

7.10.3 The proposed development is a cemetery for the burial of human remains. This activity can result in the variety of substances and micro-organisms being released into local ground, and potentially into groundwater/ groundwater-fed rivers. These pollutants are typically dissolved and gaseous organic compounds and ammoniacal nitrogen, along with other nitrogenous compounds. There is also the potential for elevated pH locally because of high calcium levels.

7.10.4 A typical human corpse comprises 64% water, 20% protein, 1% carbohydrate, 5% mineral salt and ~10% fat. The composition in terms of elements is summarised in Table 4:

Table 4. Elemental components of a typical human body “Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref: SCHOO404BGLA-E-A, April 2004”.

Element	Mass (g)	Element	Mass (g)
Oxygen	43,000	Chlorine	95
Carbon	16,000	Magnesium	19

Hydrogen	7,000	Iron	4.2
Nitrogen	1,800	Copper	0.07
Calcium	1,100	Lead	0.12
Phosphorous	500	Cadmium	0.05
Sulphur	140	Nickel	0.01
Potassium	140	Uranium	0.00009
Sodium	100	Total Body Mass	70,000

7.10.5 A summary of the main decomposition products of the decay of human remains is summarised in the Environment Agency (EA) guidance ¹⁵. A typical human corpse, approximately 70kg in weight, normally decays completely within 10-12 years.

7.10.6 It is estimated that over half of the pollutant load leaches within the first year and reduces by half in each subsequent year, so that less than 0.1% of the original pollutant loading remains after 10 years. Details are shown in Table 5 below:

Table 5. Potential contaminant release (kg) from a single 70kg burial “Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref: SCHOO404BGLA-E-A, April 2004”.


Year	TOC	NH ₄	Ca	Mg	Na	K	P	SO ₄	Cl	Fe
1	6.00	0.87	0.56	0.010	0.050	0.070	0.250	0.210	0.048	0.020
2	3.00	0.44	0.28	0.005	0.025	0.035	0.125	0.110	0.024	0.010
3	1.50	0.22	0.14	0.003	0.013	0.018	0.063	0.054	0.012	0.005
4	0.75	0.11	0.07	0.0001	0.006	0.009	0.032	0.027	0.006	0.003
5	0.37	0.05	0.03	<0.001	0.003	0.004	0.016	0.012	0.003	0.001
6	0.19	0.03	0.02	<0.001	0.002	0.002	0.008	0.006	0.002	<0.001
7	0.10	0.01	0.01	<0.001	0.001	0.001	0.004	0.003	<0.001	<0.001
8	0.05	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
9	0.02	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
10	0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

7.10.7 Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs), and heavy metals may also result from the interment of cremated remains (review in Mari & Domingo, 2010).


¹⁵ *Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref.: SCHOO404BGLA-E-A, April 2004).*

7.10.8 Formaldehyde may result from the embalming process and from the burial of certain types of coffin.


7.10.9 According to EA guidance¹⁵, the following hazardous substances must not be allowed to enter groundwater:

-  Some pesticides;


-  Oils;

-  Petrol and diesel;

-  Solvents;

-  Arsenic;

-  Mercury;

-  Chromium VI.

7.10.10 Non-hazardous substances should be limited so that they do not cause groundwater pollution. A non-hazardous pollutant is defined as ‘any pollutant other than a hazardous substance’, and includes ammonia and nitrates.

7.10.11 The mudstone bedrock has a low-moderate permeability and will therefore significantly retard pollutant transport, the significant clay content will attenuate certain pollutants through cation exchange processes. Its permeability is typically low, ranging from 9.4E-06m/day to 6.9E-04m/day in limited pump tests across England¹⁶

7.10.12 The historic land uses on, and within 250m of the site, pose a very low risk of contamination. The historic ponds that were on site have been backfilled a considerable time ago (approx. 50 years), and therefore any putrescible material which was originally present has, in all likelihood, decayed away.

7.10.13 Contaminants are only likely to be present as a because of the use of plant and machinery and will most likely relate to small spillages. Such substances can include: petroleum hydrocarbons, PAH, Volatile Organic Compounds (VOC) and Semi-Volatile Organic Compounds (SVOCs) and BTEX.

7.11 Potential Off-site Sources of Contamination

¹⁶ The physical properties of minor aquifers in England and Wales, EA R&D Publ. 68, 2000, Table 6.2

7.11.1 There is a very low risk of fuel-based pollution (petroleum hydrocarbons, PAH, Volatile Organic Compounds VOC, SVOCs, BTEX) in runoff entering the site from the B6047 roadway immediately west of the site, as any pollutants running off the roadway are likely to be significantly attenuated in the low-permeability subsurface. There are very low risks of contamination from other off-site sources (the businesses on Harborough Airfield Business Park), as it is considered that hardstanding will break the pollutant linkage, and also that bunded tanks/spill kits will be used to ensure that hazardous substances do not enter the ground.

7.12 Potential Pathways for Contaminant Migration





7.12.1 The permeability of the soil beneath the Site is assessed as low to moderate, based on the Groundsure data procured for the site.

7.12.2 Anthropogenic (artificial) pathways for contaminant migration may be present on-site in the form of land drains. However, as there are no obvious significant sources of potential contamination identified from mapping and other resources, the risk to nearby receptors is considered very low.

7.12.3 The only significant pathway for contaminant migration from this site is near surface groundwater flow with the topography south and south eastward.

7.13 Potential Receptors

7.13.1 A burial site must be:

-  outside a source protection zone 1 (SPZ1).
-  at least 250 metres from any well, borehole or spring supplying water for human consumption or used in food production – for example at farm dairies.
-  at least 30 metres from any spring or watercourse not used for human consumption or not used in food production.
-  at least 10 metres from any field drain, including dry ditches.

7.14 Groundwater Risk Assessment



7.14.1 The site is located on unproductive moderate to low permeability bedrock (former 'non-aquifers').

- 7.14.2 EA records show that the site is not within any defined Groundwater Source Protection Zone (SPZ) and so is outside SPZ 1.
- 7.14.3 The site is more than 250 metres from any recorded well, borehole or spring.
- 7.14.4 The nearest surface watercourses are more than 30 m from the Site (Grand Union Canal 250m south-east of the site).
- 7.14.5 It is not known whether or not there are dry ditches within or on the perimeter of the site, based on the walkover photos.
- 7.14.6 It is also not known whether or not there are field drains within or passing through the site.

7.15 Recommendations/Tier 2 Assessment Objectives

- 7.15.1 This section outlines the potential development constraints that will require further investigation should the site be taken forward.
- 7.15.2 Soil thickness, based on adjacent BGS borehole records is ~0.2m.
- 7.15.3 Groundwater inflow rates not known and therefore grave excavations left open prior to inhumation may part fill with water.
- 7.15.4 Present field drainage if any is not known. This does not preclude development as standoff of 10m can be designed but may constrain number of burial plots.

7.16 Ground contamination

- 7.16.1 An intrusive investigation should be considered to ascertain whether or not potential contaminants of concern are present within the soils underlying the site. On the basis of the Tier 1 Risk Assessment, the following contaminants of concern have been identified:
 -  Organic pollutants: Ammonia, TOC, Calcium, Magnesium, Nitrogen, Potassium, Phosphorous, Sulphate, Chlorine and Iron.
 -  Semi-metals and heavy metals including; Arsenic, Cadmium, Chromium (including Chromium VI), Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc.
- 7.16.2 This does not imply that these chemicals are present on-site, or that they are likely to cause contamination; rather that their presence is a possibility based on the information in the Tier 1 Risk Assessment. The sampling and testing strategy must be conducted in accordance with current applicable standards.

7.17 Groundwater:

7.17.1 At least three groundwater monitoring boreholes should be drilled and installed on the site, so as to allow groundwater level monitoring.

7.17.2 An intrusive investigation should also be considered to ascertain whether or not potential contaminants of concern are present within the groundwater underlying the site. On the basis of the Tier 1 Risk Assessment the following contaminants of concern have been identified:

- Organic pollutants: Ammonia, TOC, Calcium, Magnesium, Nitrogen, Potassium, Phosphorous, Sulphate, Chlorine and Iron.

- Semi-metals and heavy metals including; Arsenic, Cadmium, Chromium (including Chromium VI), Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc.

7.18 Recommendation/Tier 2 Objectives – Cemetery Pollution Prevention:

7.18.1 The Tier 1 Risk Assessment has indicated that across most of the site comprises bedrock of the Dyrham Formation (siltstone and mudstone). It is important to determine the depth and extent of any soils and superficial/weathered deposits overlying the bedrock.

7.18.2 Interments within the Dyrham Formation will pose a low risk to water receptors.

7.18.3 It will be necessary to confirm whether any changes occur within the Dyrham Formation with depth. In areas where burials are proposed there is a requirement for 1.0m of non-permeable material below burials with a maximum 1.7m burial depth. It is recommended that rising head tests are undertaken in trial pits to target depth to ascertain whether groundwater poses a risk to interment practices.

7.19 References

7.19.1 1. Mari, M. & Domingo, J. L. (2010). Toxic emissions from crematories: A review. Environment International 36, pp. 131-137.

8 HIGHWAYS, ACCESS, SAFETY AND SUSTANABILITY

8.1 Introduction

- 8.1.1 The investigation into potential traffic impacts at the potential cemetery site was based on a combination of a desk-top review of the site, previous similar development experience, available data relating to the site and a site visit.
- 8.1.2 The potential impact of the proposed development, particularly in terms of highway safety and traffic impact, has been estimated through site observation and also by interrogating previous planning history of developments in the vicinity of the proposed site. This investigation was to identify if the new development will be of any detriment to the local highway network.
- 8.1.3 Site access feasibility has been undertaken to determine if a safe and suitable access to the site can be achieved for all modes, and if transport infrastructure improvements could/would be necessary to serve the new development, in order to allow existing transport networks to continue to perform their identified functions.
- 8.1.4 The desk study explored background information to determine the availability and frequency of public transport services to and from the proposed development site, if wider sustainability and health choices can be promoted, and if people are provided with a real choice on how they travel. The study also identified if the proposed development location includes appropriate provision for pedestrians (including those with special access and mobility requirements) and cycling, in addition to public transport.

8.2 Overview of findings

- 8.2.1 The following table summarises the findings of the assessment:

Assessment considerations	Beneficial	Neutral	Adverse
Highways Potential for significant highways impacts associated with development		It is predicted that the highest cemetery vehicle trips will not impact on the peak hour highway flows although the junction immediately to the north of the site could need minor mitigation measures due to increased flows on the network. The development is	

		likely to have a moderate impact on the surrounding highway network. However, there is the ability to accommodate the traffic generated with minor infrastructure modifications.	
Access Existing access into the site and the suitability of this			It is seen that the most viable access would be gained from the B6047 Harborough Road roundabout. There is no existing access but there is scope to develop a new access relatively easily. Although a new access would require a significant amount of development
Sustainability lighting, bus facilities, footpaths, cycle routes,		Footways are provided that connect to Market Harborough and villages further north of the site. Bus services are available at B6047 Harborough Road roundabout The site is moderately accessible using sustainable modes of transport.	
Highway Safety speed, parking on-street, lighting	Due to the deflection of the roundabout and collision history of the highway in the vicinity of the proposed site, the site can be safely accommodated from a highway safety perspective		.

8.3 Site Location

8.3.1 The proposed site is located on the northern side of Market Harborough off Harborough Rd, Market Harborough, LE16 7QX within Harborough District Council. The site lies approximately 28km north of Northampton, 21km south-east of Leicester, 17km west of Corby and 18km east of Lutterworth.

8.3.2 The site, which is rectangular in shape, is approximately 3.6 hectares and primarily comprises arable land. The site is bound to the north by a gas compound. A number of motor/engineering services are situated within an estate directly to the south-west of the site including ‘Harborough Innovation Centre’. The site is bounded to the west by a hedgerow adjacent to the B6047 Harborough Road. The eastern and southern sides of the site are bounded by hedgerows with agricultural fields beyond.

8.3.3 The landscape is an area of open flat land partially screened by trees and vegetation from Harborough Rd and Leister Ln. The plot appears to be used for agricultural use associated with farm buildings situated within the wider locality. The nearest residential properties are situated 1.0km to the south of the proposed site on Leicester Lane adjacent to St. Luke’s Hospital.

8.4 Highway Impact

8.4.1 Peak hour flows to and from the cemetery site typically fall on a Sunday. The highest cemetery vehicle trips therefore will not impact on the peak hour highway flows which are assumed to be during the hours of 08:00 – 09:00 and 17:00 – 18:00 Monday to Friday.

8.4.2 Traffic flows along B6047 Harborough Road are predicted to be relatively high and with low levels of traffic from the cemetery site predicted, a minimal impact is anticipated on the B6047 Harborough Road. Impact from the proposed cemetery site upon the existing highway would be minimal.

8.4.3 A planning search of the site revealed historical planning applications for: The erection of Harborough Innovation Centre (use class B1 office and adjoining complementary workspace buildings (use class B1, B2, and B8) together with associated car parking, service areas, landscaping and new highway access (reserved matters of 05/00987/OUT). For this application, it appears that there is no historical supporting traffic information.

8.4.4 Planning application for a site to the east in the village of Great Bowden has been submitted (planning reference: 16/01942/OUT). This application was for erection of up to 50 dwellings with public open space, associated landscaping and sustainable drainage system (SuDS) and vehicular access point from Leicester Lane (all matters reserved except for means of access) on land North of Leicester Lane, Great Bowden, Leicestershire. As part of the application, development trips of 26 No. trips in the 2 way AM and PM Peak periods were predicted for the committed development. Assessments of local junctions were undertaken in the

Transport Assessment prepared by Prime Transport Planning dated November 2016, to determine the capacity of these junctions. One of the junctions assessed was Harborough Road / Gallow Field Road / Leicester Lane crossroads 250m north of the proposed cemetery site. Assessments show that Gallow Field Road is predicted to reach 0.83 RFC in 2021 in the AM peak period with and without the proposed development (16/01942/OUT) flows.

- 8.4.5 This could be a concern for the proposed cemetery site at this location and mitigation measures could be a possibility. Therefore, the development is likely to have a moderate impact on the surrounding highway network. However, there is the ability to accommodate the traffic generated with small infrastructure modifications.
- 8.4.6 Therefore overall, the development is likely to have a moderate impact on the surrounding highway network. However, there is the ability to accommodate the traffic generated with small infrastructure modifications.

8.5 Access

- 8.5.1 There are currently no formal access points into the site from B6047 Harborough Road or Leicester Lane. A single farm track enters the south-westerly corner of the site from the adjacent field which has a single access point from Harborough Road approximately 155m south of the site.
- 8.5.2 The site could be potentially accessed via the roundabout to the west on B6047 Harborough Road, as visibility and highway safety should not be a major concern from this location. Leicester Lane would not be a viable option for a potential access point as it has a national speed limit with no footways, footpaths or cycleways present, and visibility would be unachievable at this point from the proposed site due to the alignment of Leicester Lane. Access would be preferential off the roundabout to the west of the proposed site rather than Leicester lane due to visibility constraints.
- 8.5.3 There is scope to develop a new access from the eastern edge of the existing roundabout on B6047 Harborough Road, although this would require a significant amount of development. It is assumed that the land required for this development is adopted highways Land. Street lighting would need to be repositioned, a culvert would have to be accommodated and land to the eastern edge of the roundabout would need to be levelled and re-landscaped in order to position the access of the eastern edge of the roundabout.

8.5.4 There is scope to develop a new access relatively easily, although development of a new access would require a significant amount of development.

8.6 Sustainability

8.6.1 The B6047 Harborough Road provides a link to Market Harborough approximately 2.3km south of the site where local amenities and facilities are accessible. B6047 Harborough Road is approximately 6.5m in width and has cycle lanes in addition to this, in both the northbound and southbound directions from the proposed site. A shared footway/cycleway is provided along the east and westbound side of the carriageway around the roundabout, creating a safe junction for cyclists and pedestrians to utilise.

8.6.2 Footways are provided on both sides of the B6047 Harborough Road south of the proposed site location, and on the eastern side to the north of the site. Footways on Harborough Road connect to footways on Leicester Road which provides a link to a continuous and well paved footway network in Market Harborough. The majority of nearby junctions benefit from dropped kerbs to facilitate pedestrian movement, some of which also benefit from tactile paving. Street lighting is provided around the roundabout to the west of the site and footways are in good condition. As a result, there are existing footways which provide safe, sustainable access into the centre of Market Harborough.

8.6.3 There are no footways on Leicester Lane to the north of the proposed site, there are no footpaths or cycleways in the vicinity of the proposed cemetery site and Market Harborough Train Station lies 2.7km to the south east of the proposed cemetery site.

8.6.4 Two bus stops are located 40m south of the site and a further two stops 170m north of the site. Two services are accessible from these locations. The X3 operated by Arriva, provides service from Leicester to Market Harborough every 30 minutes Monday to Saturday and hourly on a Sunday. Service 44 from Foxton to Fleckney is operated by Centrebus and provides and hourly service from Monday to Saturday.

8.6.5 The site is moderately accessible using sustainable modes of transport.

8.7 Highway Safety

8.7.1 Highway safety at along B6047 Harborough Road is good with only one recorded collision in the vicinity of the proposed site access location in the last 5 years. The collision was of slight

severity and occurred at the crossroads junction of Harborough Road, Leicester Lane and Gallow Field Road 250m north of the roundabout.

- 8.7.2 It is predicted that the introduction of a new access off the eastern edge of the roundabout will not exacerbate any highway safety issues. This is due the angle of deflection and low speeds on the approach to the existing roundabout.
- 8.7.3 The proposed site access location is well lit and in good condition. It is recommended that signage be installed to notify road users of the new development.
- 8.7.4 The site can be safely accommodated from a highway perspective.

9 CONCLUSION

9.1 Conclusion

- 9.1.1 This report considers the potential for the development of a cemetery site at 'Land off Harborough Road'. HDC have previously considered the development potential based on the size of the site, capacity, access, topography, potential visual and heritage impacts, management constraints, development costs, and the potential for the site to accommodate different religious denominations and non-conformists.
- 9.1.2 This report provides a more detailed consideration of potential planning constraints; ecological constraints; landscape/ visual/ arboricultural constraints; hydrological/ flood risk constraints; and highways/ access constraints.
- 9.1.3 From a planning perspective, there are no significant constraints within the site.
- 9.1.4 In terms of ecology, the site is of low ecological value, although a small number of additional surveys would be required as part of a planning application.
- 9.1.5 In terms of landscape/ visual and arboricultural constraints, the development of a cemetery is considered to have neutral impacts.
- 9.1.6 In terms of hydrological/ flood risk constraints, the site is located outside of SPZ, and is situated away from groundwater extraction points. The site is located outside of areas of flood risk.
- 9.1.7 In terms of highway impacts, overall, the development is considered to have neutral impacts. However, it should be noted that a new access road would be required, and although a suitable access location has been identified, this would require a significant amount of development.



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