Pell Frischmann

Teardrop

Land Contamination Desk Study

Preliminary Risk Assessment - Feasibility Stage

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Prepared for

U+I

7A Howick Place
London
SW1P 1DZ

Prepared by

Pell Frischmann

5 Manchester Square
London
W1U 3PD

U+I
REGENERATION RETHOUGHT

Pell Frischmann

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Executive Summary

Site name	Teardrop		
Location	Milton, Cambridgeshire, CB24 6AY. National Grid Reference: 547210, 262140		
Size	1.88 hectares		
Development proposals	Development of a new business park area to include commercial, office or industrial units.		
Site history	Historically, the site predominantly comprised agricultural land until construction of the A14 (formerly A45), A10 and the associate junction and slip-roads in the mid to late 1970s. Since the late 1970s the site has predominantly comprised an area of enclosed grassland until the present day, however aerial imagery between 2000 and 2020 indicates that the site was periodically used as a temporary works construction compound. Offsite, a landfill, infilled former gravel pits, former World War 2 military barracks, sewage treatment works, fuel station and industrial areas have been identified in the areas around the site.		
Geology and hydrogeology	Superficial:	River Terrace Deposits (sand and gravel)	Secondary A Aquifer with High aquifer vulnerability
	Bedrock:	Gault Formation (mudstone)	Unproductive strata
Hydrology	Nearest surface water course: Thirteenth Public Drain, which drains to the River Cam approximately 1.1km east-south-east of the site.		
Waste sites	The site is located within 250m of a landfill and potentially infilled former gravel pits therefore ground gas risks need to be considered as part of ongoing land contamination risk management.		
Unexploded ordnance	A former World War 2 military barracks has been identified in proximity to the site, including potentially encroaching on the western part of the site. Bomb risk maps for the area indicate a low potential bomb risk.		
Land contamination Preliminary Risk Assessment (PRA) summary	The Conceptual Site Model and Preliminary Risk Assessment a has identified nine potential Contaminant Linkages (CLs) six relate to the proposed end-use and three relate to the temporary construction phase. The risk ratings for these CLs range from low to moderate. Moderate risks have been identified with the likely presence of Made Ground onsite and potential ground gas risks associated with the landfill and infilled ground identified within 250m of the site boundary. Overall PRA risk ranking for the proposed development: **Low to Moderate**.		
Geotechnical preliminary appraisal	The desk study identified low to moderate geotechnical risks most notably in respect to the potential presence of buried obstructions, hydrostatic and soil heave pressures, flooding, services and aggressive ground and groundwater conditions that have the potential to underlie the site.		
Recommendations for further work	Is intrusive site investigation (SI) recommended: **Yes** (see Section 6.2.2) ➢ A combined land contamination SI and geotechnical ground investigation is recommended. ➢ Is groundwater monitoring recommended: **Yes** ➢ Is ground gas monitoring recommended: **Yes** The need for site specific ground gas monitoring has been identified as the site is located within 250m of a known landfill and potentially infilled former gravel pits. Is quantitative land contamination risk assessment recommended: **Yes** (see Section 6.2.3) ➢ The Land Contamination Risk Management (LCRM) process will need to progress to quantitative risk assessment for the proposed development (the developer should anticipate planning conditions to this affect). Is further geotechnical design and hazard assessment recommended: **Yes,** see Section 6.2.4.		

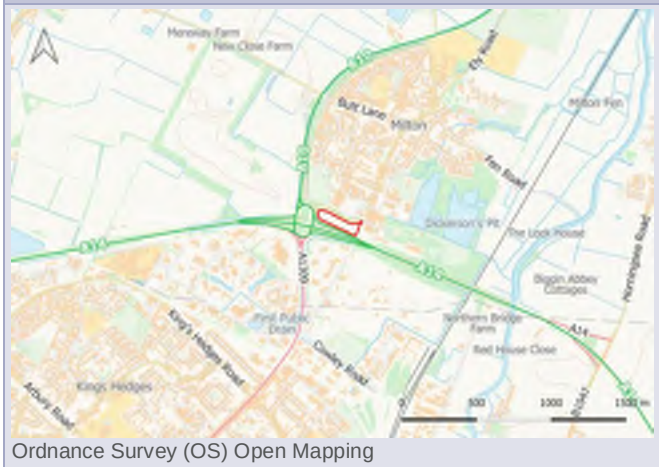
1 Introduction

1.1 Commission and proposed development

Pell Frischmann has been commissioned by U and I Group PLC (U+I) to prepare a Land Contamination Desk Study (LCDS) for the Teardrop site in Milton, as part of a pre-planning feasibility study. The Teardrop site lies to the northeast of junction 33 for the A14 and A10, approximately 4.2km northeast of the centre of Cambridge, as shown in Figure 1.

The overall aim of the LCDS is to identify potential land contamination risks and geoenvironmental constraints which could impact upon or restrict the future development of the site, with includes a combination of offices and industrial units. A selection of potential development layouts, taken from architect's feasibility study, are presented in Figure 1. A copy of the feasibility study is included in Appendix A.

Figure 1 Site location and development proposals

Site location	
	
Ordnance Survey (OS) Open Mapping	Google Satellite Image
Development proposals	
	
	

1.2 Land Contamination Risk Management

This LCDS has been undertaken in line with the Environment Agency Land Contamination Risk Management guidance (LCRM, 2020), which sets out the process that should be followed for managing the risk from land contamination; including within regulatory and site management contexts. For example, as part of due diligence assessments, planning applications and planning control, assessing liabilities, undertaking voluntary remediation and for sites that fall under the Part 2A contaminated land regime. The process of LCRM should be used to:

- *Identify and assess if there is an unacceptable risk*
- *Assess what remediation options are suitable to manage the risk*
- *Plan and carry out remediation*
- *Verify that remediation has worked*

LCRM includes three risk-based stages (1) risk assessment, (2) options appraisal and (3) remediation and verification. Each LCRM stage is broken down into three or four steps (or tiers), as outlined in Table 1.

Table 1 Land contamination risk management - stages and tiers

LCRM	Tier 1	Tier 2	Tier 3 (and 4)
Risk assessment Stage 1	Preliminary Risk Assessment (PRA)	Generic Quantitative Risk Assessment (GQRA)	Detailed Quantitative Risk Assessment (DQRA)
Options appraisal Stage 2	Identify reasonable remediation options	Do a detail evaluation of options	Select the final remediation option
Remediation Stage 3	Develop a remediation strategy	Remediate	(3) Produce a verification Report (4) Do long term monitoring and maintenance, if required

The guidance states that the LCRM process must *always* start with a preliminary risk assessment (LCRM, 2020). The main steps of a preliminary risk assessment are summarised in Figure 2.

Figure 2 LCRM - preliminary risk assessment

1.3 Scope of work

This land contamination desk study report summarises the Preliminary Risk Assessment (PRA) process outlined in Figure 2 and described below. Desk-based information has been reviewed and assessed to:

- identify potential '*sources*' of contamination in, on or under the land (this process includes identifying potentially contaminative past and present land-uses onsite and in the surrounding area),
- identify '*receptors*' that could be adversely affected by a contaminant, and
- identify exposure '*pathways'* – a route by which a receptor is or could be adversely affected by a contaminant.

The PRA process includes developing a Conceptual Site Model (CSM) for the proposed development summarising the identified 'source-pathway-receptor' Contaminant Linkages that may be relevant to the future end-use); each *potential* Contaminant Linkage is assigned a qualitative level of risk, before updating the CSM and considering what further action is needed. The CSM should be used as the basis upon which future intrusive site investigation activities are designed and land contamination risk assessment is undertaken.

Each of the currently proposed development layouts would align with a commercial land-use under land contamination risk management.

1.4 Previous reports

Table 2 summarises the previous report which have been shared with Pell Frischmann and considered as part of the desk-based review.

Table 2 Previous reports

Report title and reference	Source	Date
Teardrop Site, Cambridge, CB24 6AZ. Feasibility Study. (see Appendix A)	David Roden Architects	11-Feb-2021

The 2021 architect's feasibility report includes a series of proposed development layouts that have been considered as part of the preliminary risk assessment process.

2 The Site

2.1 Site Location and description

The Teardrop site lies to the northeast of junction 33 between the A14 and A10, approximately 4.2km northeast of the centre of Cambridge, as shown in Figure 1 (Page 1). The A14 passes south of the site running approximately east-west, the A10 (Milton Road) runs north-south to the west and the junction 33 roundabout lies less than 20m west of the site. Additional site details (location and size) are summarised in Table 3.

Table 3 Site information

Site information	Details
Size area	1.88 hectares
National Grid Reference (centre of the site) (NGR)	547210, 262140
Nearest (central) postcode	CB24 6AY

The 1.88 hectare site currently comprises a relatively flat area of enclosed grassland, that is bound by vegetated road embankments to the north, south and west and the Jane Coston Cycle Bridge to the east (see Figure 3). The bridge provides cycle and pedestrian access over the A14. The site is accessed via a gated entrance in the northeast corner. Beyond the adjacent roads, the site is surrounded by the following land-uses:

- North of the A14: a playing field, Tesco superstore and Tesco fuel station (north), an industrial estate (east) and a landfill site (northwest, beyond the A10).
- South of the A14: a Sewage Treatment works (southeast) and business parks (south and southwest). The North East Cambridge Area Action Plan area also lies immediately south of the A14.

Figure 3 View of the site facing west (circa 2017)

3D View to the west

Mapping indicates that the site is at an elevation approximately 10mAOD, as shown in Figure 4.

Figure 4 Site topography

2.2 Walkover Survey

A site walkover survey was excluded from the scope of work by the Client during the COVID 2021 travel restrictions. Prior to submitting the land contamination desk study for planning a walkover survey will need to be undertaken and the report updated.

The main aims of a walkover survey are to identify potentially contaminative land-uses onsite or adjacent to the site, to look for features of geoenvironmental significance, to observe the current site conditions (including ground cover) and to consider likely access options or restrictions for future site investigation equipment (if required).

3 Geoenvironmental Data Searches

3.1 Sources

The following 'desk-based' geoenvironmental data sources have selectively been reviewed with respect to the geoenvironmental setting of the site and its surroundings to aid in identifying potential land contamination sources-pathways and receptors:

- Historic and current Ordnance Survey maps,
- Historic and current aerial photographs (Google imagery and Envirocheck),
- British Geological Survey (BGS) maps and records,
- Environment Agency (EA) data,
- EA River Basin Management Plans (RBMPs),
- Commission specific geoenvironmental database search results (Envirocheck), and
- Relevant internet-based data sources (e.g. MAGIC).

Relevant information is presented and discussed in this report.

3.2 Envirocheck Report

As part of the data search an Envirocheck (Site Sensitivity) Report, Geology Report and a set of historic maps have been procured from Landmark Information Group (Landmark). Copies of the Landmark products (in the form of datasheets and maps) are included in Appendix B . Table 4 summarises key information topics included within the Envirocheck Report and Geology Datasheet.

Relevant information from the Landmark products has been considered in conjunction with the findings of the other desk study data sources and the collated findings are presented in the following sub-sections of this report chapter. Where Landmark information is referenced, the distances quoted to the identified features are from the nearest point on the subject site boundary, unless stated otherwise. The on-line Envirocheck Analysis tool has also been used to review, combine and extract relevant information from the Landmark products including several of the map extracts presented in this report.

Table 4 Landmark topics

Envirocheck Report	Geology Report
➢ Environment Agency records, ➢ Hydrology and hydrogeology, ➢ Waste, ➢ Hazardous substances, ➢ Geological, ➢ Industrial land uses, and ➢ Sensitive land uses	➢ Artificial ground and landslip map, ➢ Superficial geology map, ➢ Bedrock and faults map, and ➢ Combined geology map

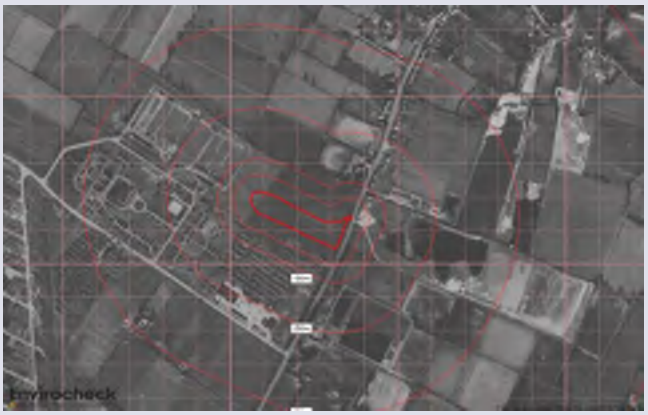
3.3 Site history

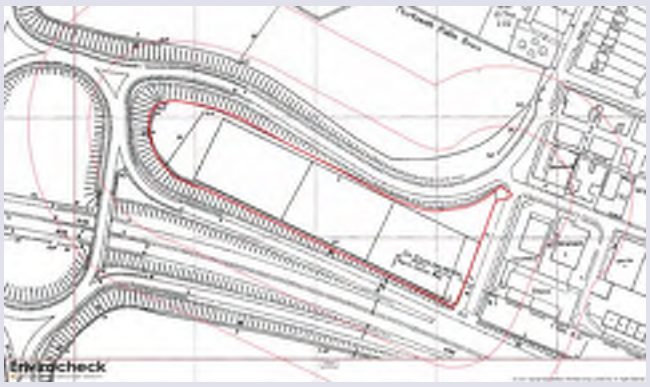
In order to provide an overview of the site's history and to help identify potentially contaminative historic land uses both onsite and in the immediately surrounding area, the following historic records have been reviewed:

- Historic County Series and Ordnance Survey (OS) map editions (source: Landmark) and
- Historic and recent aerial photographs (source: Google & Landmark).

A summary of the Site's history is presented in Figure 5 including a selection of historic maps and aerial photograph extracts, in date order. In some cases, the text in the table describes features from several map editions or images spanning many years, in these cases the date range is shown, and the year of the selected map or image included in the table is highlighted in blue. (Note: all distances quoted are approximate).

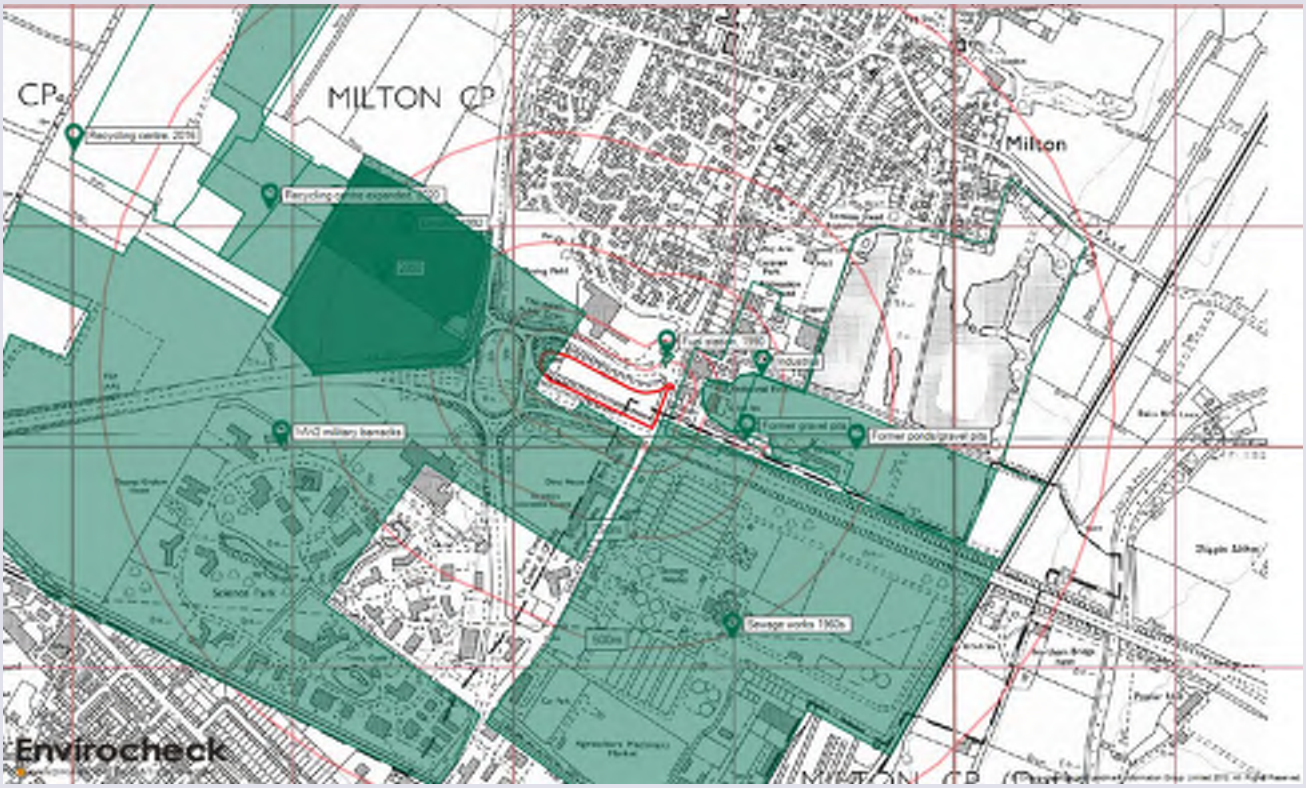
Figure 5 Site history

Historic maps and aerial photographs review	
	
1887-**1909**: onsite: the earliest maps from 1887 indicate that the site comprised agricultural fields, with most of the site within a single field adjacent to an un-named road along the eastern boundary. The western end of the site was located within a separate field. Offsite: the village of Milton is shown (850m NNE). Several surface water ditches are shown the nearest is labelled "Thirleenth Public Drain' flowing NW to SE (93m N). Benet Farm (120m N) and Rectory Farm (460m SW) are also shown. By 1903, a sewage farm is shown (160m SE) and the drain has been re-named Thirteenth Public Drain.	**1927**-**1952**: onsite: no notable changes Offsite: the Sewage Farm had extended to within 20m SW by 1927 and new buildings are shown 85m NE opposite Benet Farm (1927) A tile works (160m NE) and a note indicating 'Romano-British Pottery/Skeleton found AD 1903' (600m SE, within the sewage farm footprint) are shown in the 1938 map. By 1952, several potential 'gravel pits' are shown to the E (130m) and NE (350m).
	
1948: onsite: the western tip of the site appears to lie within a World War 2 military barracks, however no notable changes are shown within the site boundary. Offsite: a substantial military barracks including railway sidings is shown to the SW and several 'ponds' likely gravel pits are shown to the E and NE. The sewage Farm is also visible to the SE.	**1959**-**1966**: onsite: no notable changes. Offsite: the military barracks are first shown on the 1959 map and 'Old Gravel Pits' are now labelled to the NE. The village of Milton is extending S towards the site and potential residential houses are also shown in plots to the S of the site.

Historic maps and aerial photographs review	
	
1971/1972-1974: onsite: no notable changes. Offsite: The road immediately E of the site is labelled 'Milton Road'. Several warehouses and industrial type buildings (and a laundry) are shown E of Milton Road. A potential 'gravel pit'/pond (75m E) is no longer shown (possibly infilled). The former tile works (160m NE) is simply labelled 'works'. Buildings on the former military barracks site are no longer shown, two round tanks are labelled within the former barracks site.	**1979-1982**: onsite: main roads, a new junction and associated slip roads have been developed around the site to the north, south and west. The site appears to be shown as three land parcels and a drain is shown crossing the western part of the site and along the southern boundary. Offsite: the A45 (now A14) main road is shown running W-E to the S; the A10 main road is shown running N-S to the W and the new junction roundabout is shown immediately W of the site.
	
1990-1992: onsite: the western end of the site is labelled 'allotment gardens' and a track is shown along the northern boundary between the allotments and site access in the NE. Offsite: a 'refuse tip' is labelled less than 200m NW (1990). A new superstore, fuel station and roundabout are shown to the north (by 1992). The industrial estate to the E continues to expand (1990 and 1992).	**1999-2000**: onsite: no notable changes Offsite: parts of the landfill closest to the site are labelled 'tip disused' (2000), further west landfilling continued through 2000 and 2006 towards the area labelled 'recycling centre' 858m NW.
	
2003: onsite: the eastern part of the site appears to form part of a temporary works areas (January 2003), possibly associated with construction of the Jane Coston Bridge which opened in May 2004.	**2003**: onsite: the temporary works area has expanded by October 2003.

Historic maps and aerial photographs review	
 **2005**: onsite: approximately 60% of the site appears to be in use with areas of hardstanding and temporary buildings to the east, vehicles parked on site and storage areas to the west (January 2005).	 **2006**: onsite: the majority of the site is in use, potentially as a temporary works area associated with road/junction improvements which are in construction to the NW side of junction 33 on the A10. Several stockpiles are shown across the central and western parts of the site. Additional storage/temporary buildings are also shown in the east (October 2006)
 **2007**: onsite: the site appears to have been recently cleared with bare soil and vehicle track marks visible across most of the site (January 2007).	 **2017**: onsite: the site appears to comprise open grassland again (May 2017).
 **2020**: onsite: the site appears to have been recently cleared with bare soil visible across most of the site (May 2020).	 **2021**: onsite: No notable changes. Offsite: the surrounding area has largely been developed, except for the landfill/former landfill site to the NW.

Historic maps and aerial photographs review



The locations of the WW2 millitary barracks (W and SW), the evolving landfill (W and NW) the Sewage Works (SE), likely infilled gravel pits (E) and ponds (former gravel pits, NE), industrial area (E) and fuel station (N) have been identified as potentially contaminative land-uses in proxity to the site. The outlines of the areas are summarised the constraints plan above, with the most significant sites shaded in green.

Key: N north, E east, S south, W west. NE northeast NNE north of north east etc

In summary, the historic maps and images indicate the following:

- The site predominantly remained as agricultural fields, south of the village of Milton, between the earliest mapping (1887) and the mid-1970s. Although a World War 2 military barracks is shown immediately west and within the same field at the western part of the site (between 1948 and 1959) no notable changes are shown within the site boundary during this time.
- Several sizeable gravel pits are shown to the east and northeast of the site, the closest former gravel pits to the east appears to have been infilled between 1959 and the early 1970s, the former pits to the northeast appear to remain as open water lakes within the present day Milton County Park.
- The area immediately east of the site (beyond the former Milton Road, now Cambridge Road) has been occupied by an industrial area/estate - starting with a tile works (developed between 1927 and 1948), additional buildings and units were added by the early 1970s and continued to expand eastwards through the late 1970s and early 1990s and to the present day. During this time the village of Milton also expanded south towards the site.
- A large Sewage Farm/Work is shown to the southeast and within 20m of the site boundary by 1927 and is still present today (to the south of the A14).
- The site surroundings changed significantly when the A45 (now A14) and A10 were constructed in the mid to late 1970s enclosing the site to the north, south and west. A supermarket, fuel station and associated access roundabout were developed to the north between 1984 and 1990.
- Onsite there are few notable changes up until the early 1990s (although it is anticipated that temporary works associated with the A45/A10 construction will have taken place within the site boundary in the mid to late 1970s, through this has not been captured by the available historic maps and photographs). Between 1992 and 2000, the western part of the site is labelled as allotments.
- Between 2003 and 2021 the site appears to have been used several times as a construction compound and temporary works area.

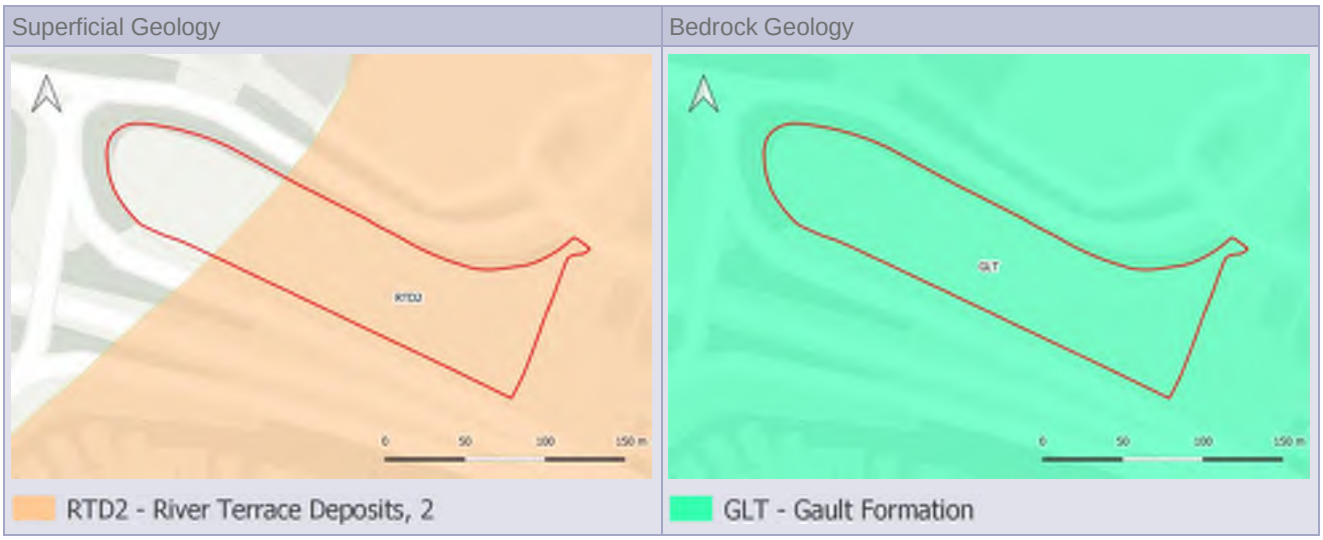
- A landfill is shown approximately 195m NW in the 1992 map (not shown in the earlier 1982 map). The 2000 and 2006 maps indicate that the landfill activities expanded southwest and then west, with eastern parts of the landfill progressively showing as 'Tip disused'. Landfilling activities, likely following mineral excavation, continued to move westwards towards the area labelled "recycling centre" through 2016 and 2020. Recent aerial photographs indicate that a gas extraction system may be present across the eastern parts of the landfill.

3.4 Geology

3.4.1 Published geology

The published geology of the area is shown on the geological map for Cambridge (Sheet 188), scale 1:50,000), published by the British Geological Survey (BGS), see Figure 6. Derivatives of the BGS mapping are included in the Geology Report (Landmark) and further geological information has also been obtained from the BGS website.

Figure 6 Published geology



The geological mapping indicates that the site is underlain by the following sequence of superficial deposits and bedrock strata (the descriptions for each stratum are taken from the BGS):

- River Terrance Deposits (superficial deposits): comprising 'sand and gravel' are shown across the eastern two-thirds of the site. No superficial deposits are shown in the western part of the site.
- Gault formation (bedrock): "pale to dark grey or blue-grey clay or mudstone, glauconitic in part with a sandy base. Discrete bands of phosphatic modules (commonly preserving fossils) some pyrite and calcareous nodules".

There are no BGS mapped records of artificial ground onsite.

3.4.2 Borehole records

The BGS maintains an archive of historic boreholes, the locations of the closest borehole records are shown in

Figure 7. There are two records of historic boreholes within the site boundary, and an additional 11 records within 100m of the site (non-confidential records). The on-site borehole records indicate that in 1971 the site was underlain by up to 0.5m of topsoil over a medium-dense orange/grown ‘sand and gravel’ between 1.1 and 2.2m thick over ‘stiff blue/grey mottled fissured silty clay’. These descriptions concur with the BGS recorded geology.

Figure 7 Historic borehole records

3.4.3 Ground stability and mining

The Landmark Envirocheck and Geology Reports indicate that there is a moderate risk of shrinking or swelling clay onsite, but the remaining natural ground stability hazardous onsite range from very low to no hazard, as summarised in Table 5. The hazard potential ratings in the table relate to the mapped geology. More than one hazard potential rating is provided where different geological formations are mapped beneath the site or where the rating for a formation varies across a site.

Table 5 Ground stability hazards

Natural ground stability hazard	No hazard	Very low	Low	Moderate	High
Collapsible deposits		✓			
Compressible deposits	✓				
Ground dissolution	✓				
Landslide		✓			
Running sand	✓				
Shrinking or swelling clay				✓	
Natural cavity records	No records within 1km				
Man-made cavities	No records within 1km				
Non-coal mining areas	No hazard				
Coal mining affected areas	'in an area that might not be affected by coal mining'				
BGS mineral sites (within 500m)	*Bennet Farm Tile Works* (Gault formation, opencast, ceased) 215m east. *Milton Gravel Pits* (River terrace deposits, opencast, ceased) ➢ three records within 500m ranging from 259 to 485m east ➢ [four additional records >500m <700m, ranging from 537 to 678m east] Note: these records correlate with the historic map review findings.				

3.4.4 Radon

Reference to the Public Health England interactive 'UK maps of radon' (www.ukradon.org) and the Envirocheck Report indicates that the site is within a lower probability radon area where 'less than 1% of homes are at or above the road Action Level' based on 1km squares.

Subsequent reference to BRE report B211 for Radon indicates that the site is within an area were '*no radon protection measures are necessary in the construction of new buildings or extensions'*.

3.5 Hydrology and Hydrogeology

3.5.1 Hydrology

The nearest surface water features and active licenced surface water abstractions and discharges are summarised in Table 6.

Table 6 Surface water features, abstractions and discharges

Hydrology information	Records
Nearest surface watercourse	Thirteenth Public Drain 46m north, which in turn drains to the River Cam approximately 1.1km east-south-east of the site.
Licenced surface water abstractions	No active abstractions recorded within 1km.
Surface water discharge consents	None recorded within 1km.

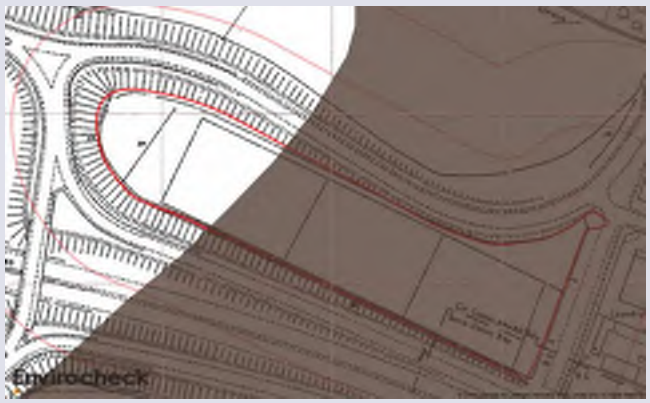
3.5.2 Hydrogeology

The hydrogeological classifications for the underlying superficial deposits and solid bedrock and the associated groundwater vulnerability information for these strata are summarised in Table 7.

- In summary, the River Terrace Deposits are classified as a Secondary A Aquifer and the superficial aquifer on the eastern part of the site is recorded as having a high groundwater vulnerability.

Table 7 Hydrogeological classifications and groundwater vulnerability

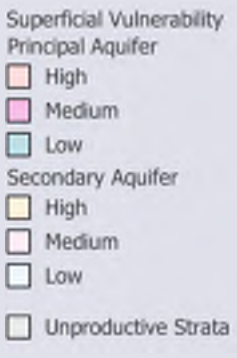
Stratum	Aquifer designation	Hydraulic characteristics
River Terrace Deposits (superficial)	Secondary A aquifer	"permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers."
Galt Formation (bedrock)	Unproductive strata	"These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow."
Aquifer designations and vulnerability		



Superficial aquifer classifications

Bedrock aquifer classifications

Principal | Secondary A | Secondary B | Secondary Undifferentiated | Unproductive Strata



Superficial vulnerability:

High

Areas able to easily transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits.

3.5.3 Groundwater abstraction and use

Table 8 summarises the available records relating to groundwater abstraction and use within the local site area including active licenced groundwater abstractions and discharges (based on Environment Agency (EA) data from the Envirocheck Report).

Table 8 Groundwater source protection zones and abstractions

Hydrology information	Records
Source Protection Zone (SPZ)	The site is not within a SPZ and there are no SPZ within 1km of the site.
Licenced groundwater abstractions	There are four active groundwater abstractions within 1km. All are located to the south-west of the site between 378 and 825m from the site boundary. ➢ The closest relates to abstraction from the underlying Greensand (at depth) 378m SW, ➢ The remaining 3 relate to the abstraction of groundwater from 'Lakes A', 'B' and 'C', the lakes area located within the fluvial sand and gravel and the single point abstractions are recorded at 613m, 758m and 825m south-west respectively. Abstraction use is classified as 'General Farming and Domestic'
Groundwater discharge consents	There are no active discharges within 500m.

It is anticipated that groundwater is likely to flow towards the east towards the River Cam.

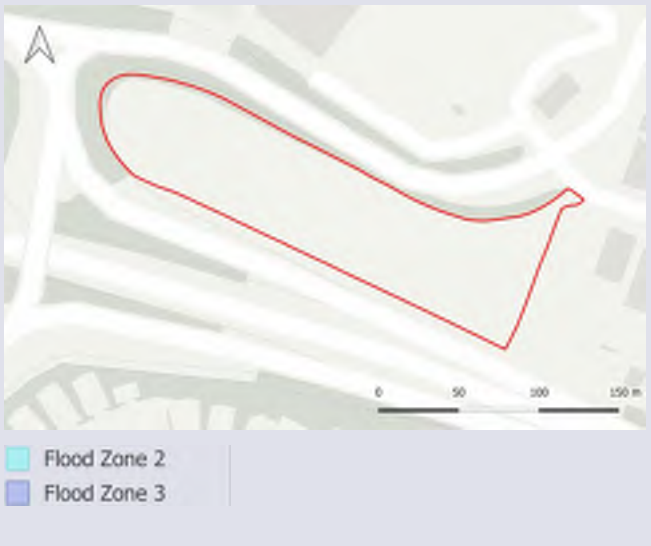
3.5.4 Surface water and groundwater flood risk

The surface water flood risk maps (see Figure 8) indicates that there is a low to medium risk from surface water flooding towards the site perimeter adjacent to the toe of the road embankments. The site is not within an area benefiting from flood defences. The Envirocheck records indicate that the site is outside Flood Zones 2 and 3 (Figure 8).

Figure 8 Flood risk mapping (Envirocheck)

Risk of flooding from surface water

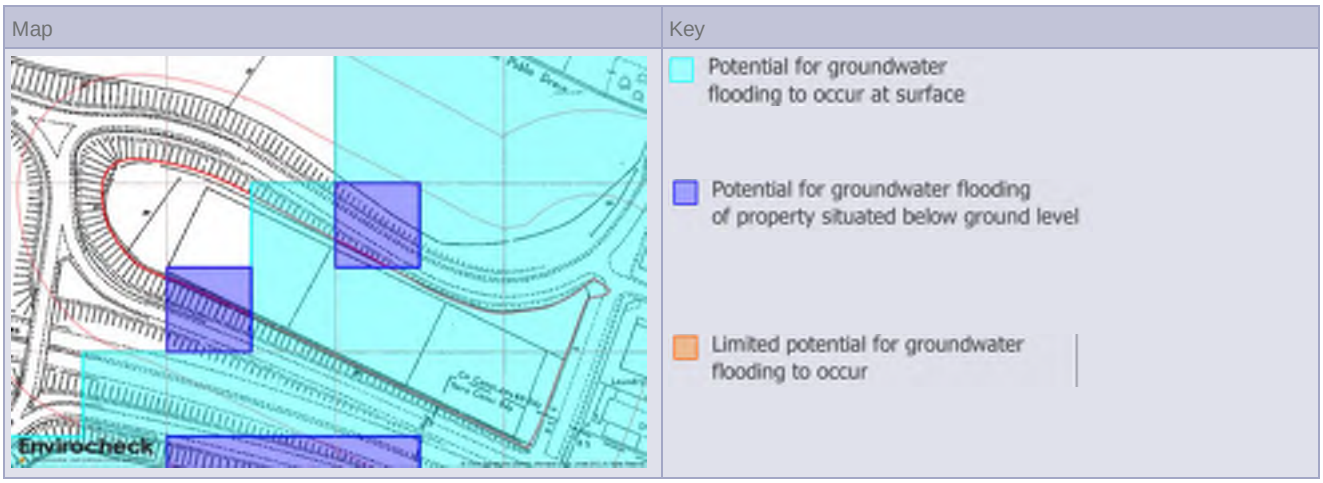
Flood zones



The groundwater flooding risk maps (Figure 9) indicate that the majority of the site is within an area where groundwater flooding may occur as surface and more limited parts of the site are in an area at risk of groundwater flooding 'for properties situated below ground level. The western area of the site does not have a groundwater flooding classification.

Further consideration of flood risk is beyond the scope of this report.

Figure 9 Groundwater flooding risk



3.6 Waste records

The historic map review identified a landfill site (offsite) to the northwest of the site and potentially infilled former mineral extraction gravel pits (offsite) to the east. Reference to the 'waste records' within the Envirocheck report indicate the following:

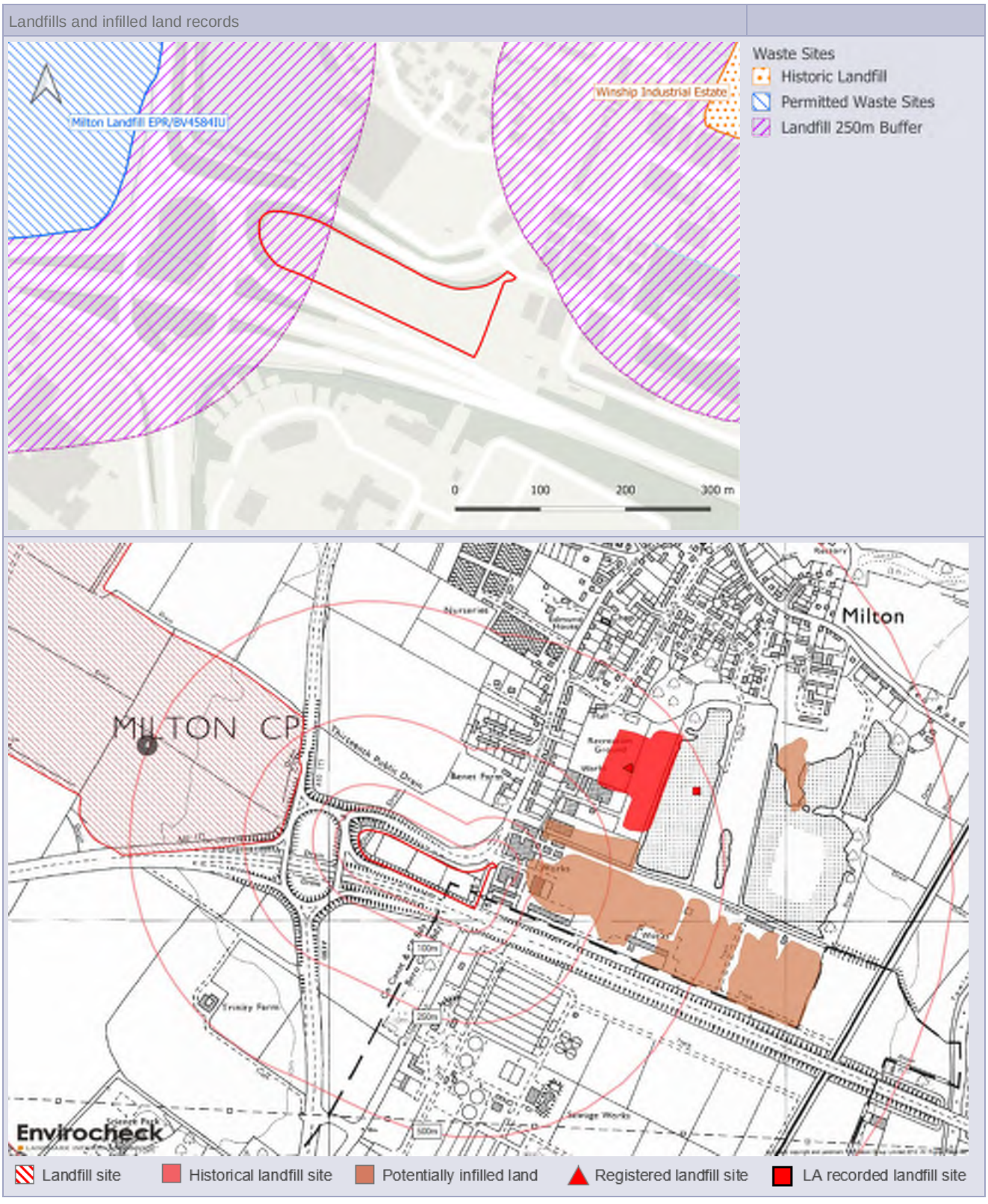
Milton Landfill, Butt Lane, Milton, CB24 5DQ: several records relating to the Milton Landfill have been identified, these records indicate the following:

- 1 June 1989 (503m N, licence holder Cambridgeshire County Council) this record relates to an extension to the landfill which includes a landfill with a civic amenity function able to accept inert, semi-inert, household putrescible waste, difficult waste, asbestos and 'leachate produced in-situ'.
- 20 December 1992 (165m W) and 1 June 1996 (503m NW, Licence holder East Waste Ltd) these records indicate that the site is a 'large landfill' able to accept between 75,000 and 250,000 tonnes of waste per year including inert, household, difficult (non-special), certain clinical waste and contaminated materials.
- 18 April 2016 (169m W, licence holder East Waste Ltd) this record indicates that the licence is still operational and that the site category records that the landfill can accept greater that 10 tonners per day with a capacity to accept over 25,000 tonnes excluding inert waste.
- The western part of the site lies within 250m of this landfill as shown by the 250m purple hatched buffer in the first map in Figure 10.

Potentially infilled former gravel pits: the 'potentially infilled land' Envirocheck records align with the potentially infilled land identified in the historic map review (note the Envirocheck records are also based on historic mapping). These areas are shaded brown in the second map in Figure 10, the closest point is 67m east of the site boundary.

The Registered landfill site record (358m NE) and 'Historical Landfill Sites' record (287m NE): both relate to a 'very small', historic closed landfill, accepting 'less than 10,000 tonnes of water per year' between 31 December 1974 and 31 December 1980 and able to accept hardcore, inert waste, inert builders waste and subsoil. The licence holder was 'Lavender & Bateman (1837) Ltd' and the landfill was located within the Winship Industrial Estate, Cambridge Road, Milton. The registered landfill site record dated 20-May-1977 indicates that the licence was "lapsed/cancelled/defunct/not applicable/surrendered or cancelled". These records are shown shaded red and with a red tringle in the second map in Figure 10. A fourth record, represented by a red square in Figure 10, relates to a closed Local Authority Recorded Landfill Site. The point is currently recorded within a lake in the location of a former gravel pit, which may indicate that part of this area has been infilled, however the records are located at an accuracy of 'within 100m'. The historic Lavender & Bateman landfill is shown less than 70m to the west of this point. These records are more than 250m from the site boundary and subsequently are less likely to represent a significant potential contamination source with respect to the site, and therefore will not be considered further as part of this assessment.

Figure 10 Historic landfills



In addition, to the landfill records summarised above a single former household, commercial and industrial waste transfer station has been identified within 250m of the site (37m east). The record relates to a surrendered licence for Rentokil that existed between 2006 and 2010.

3.7 Background geochemistry

British Geological Survey maps of estimated background soil geochemistry concentrations for arsenic, cadmium, chromium, lead and nickel are included in the Envirocheck datasheets (see Appendix B). Table 9 summarises the estimated background concentration ranges for these determinands onsite.

Table 9 Estimated background concentrations

Determinand	Concentration ranges mg/kg						
Arsenic	<15	15-25	25-35	35-45	45-60	60-120	>120
	✓	✓					
Cadmium	<1.8	1.8-2.2	2.2-3.0	>3.0			
	✓						
Chromium	<20	20-40	40-60	60-90	90-120	120-180	>180
			✓				
Lead	<100	100-200	200-300	300-600	600-1,200	>1,200	
	✓						
Nickel	<15	15-30	30-45	45-60	60-80	80-100	>100
	✓	✓					

3.8 Additional geoenvironmental records

3.8.1 Onsite

The Envirocheck Report indicates that the site is not on the Contaminated Land Register (i.e. the site is not within land determined as 'contaminated land' under Part 2A of the Environmental Protection Act 1990). Review of the Envirocheck Report did not identify additional records of geoenvironmental significance onsite.

3.8.2 Offsite

The following offsite potentially contaminative land-uses or geoenvironmental records are considered noteworthy with respect to the preliminary land contamination risk assessment:

- Two fuel station entries are recorded within 1km of the site. The closest record relates to the Tesco fuel station (60m NE) previously identified in the historic map review, the second entry relates to a historic fuel station at Benet Garage, Cambridge Road, Milton (245m NE) of the site.
- Two cement (blending, packing, loading and packaging bulk cement) works have been identified within 250m the closest is recorded 100m SW of the site.
- There are no records of 'Contaminated Land Register Entries' within 1km.

3.9 Unexploded Ordnance (UXO)

Parts of the United Kingdom were heavily bombed during World War 2, a significant number of bombs did not detonate on impact and some of these bombs may still be in the grounds. As an initial step towards a preliminary UXO risk assessment (in line with CIRIA report C681, 2009), a non-specialist screening exercise has been carried out for the site.

- A historic World War 2 military based has been identified from the site history review (Section 3.3) immediately west and southwest of the site.
- A UXB risk map for the site classifies the site and the surrounding area with a potential low bomb risk (an extract of the map is included in Figure 11 and a copy of the risk map from Zetica is included in Appendix C).

Figure 11 UXO screening information

UXO Screening information

3.10 Potential ecological system receptors

Table 10, summarises whether the site is within a location or proximity to a location where potential ecological system receptors may be present with respect to 'Contaminated Land' in line with "*The Environmental Protection Act 1990: Part 2A, Contamination Land Statutory Guidance (Department for Environment Food and Rural Affairs, Defra, 2012*)".

The records indicate that the site is not within an area where significant ecological system receptors have been identified.

Table 10 Ecological system receptors

Receptor	Onsite	Offsite 0-250m	251-500m	501-1,000m
Marine nature reserves or European marine site	0	0	0	0
Nature reserve (local or national)	0	0	0	0
Ramsar site	0	0	0	0
Site of Special Scientific Interest (SSSI)	0	0	0	0
Special Area of Conservation (SACs)	0	0	0	0
Candidate Special Areas of Conservation (cSACs)	0	0	0	0
Special Protection Areas (SPAs)	0	0	0	0
Potential Special Protection Areas (pSPAs)	0	0	0	0
Geoenvironmental constraint rather than land contamination receptor				
Areas of outstanding natural beauty	0	0	0	0
World Heritage Sites	0	0	0	0

4 Land Contamination - Preliminary Risk Assessment

4.1 Introduction

The desk-based review, summarised in Section 3, has been undertaken to identify potential land contamination and geoenvironmental constraints, which may impact upon or restrict the future development of the Site and to inform the Preliminary Risk Assessment process. At the time of writing several commercial/industrial development layouts are under consideration and the PRA has been undertaken on this basis.

The Preliminary Risk Assessment includes the development of an 'initial', 'outline' or preliminary Conceptual Site Model (CSM) for the future commercial/industrial development. A Conceptual Site Model shows the possible relationships between contaminants, pathways and receptors based on the source-pathway-receptor (S-P-R) approach, as shown in Figure 12.

Figure 12 Contaminant Linkages (S-P-R)

Contaminant Linkage - Source-Pathway-Receptor relationships

Term	Definition
Source	A contaminant that is in, on or under the land and has the potential to cause harm or pollution
Pathway	A route by which a receptor is or could be affected by a contaminant
Receptor	Something that could be adversely affected by a contaminant for example a person, controlled waters, an organism, an ecosystem or Part 2A receptors such as buildings, crops or animals.
Contaminant Linkages	The presence and relationship between contaminants, pathways and receptors.

All three elements (S-P-R) of a contaminant linkage must be present for a land contamination risk to exist, i.e. even if a contaminant has been identified if there is no receptor or no pathway then the S-P-R linkage is incomplete and there is not a risk - "*A contaminant linkage must be present for there to be a S-P-R relationship. Without a linkage, there is not a risk – even if a contaminant is present*" (LCRM, 2020).

The CSM is an iterative process that needs to be updated as a project progresses through Land Contamination Risk Management. During the risk assessment stage, the term '*potential* contaminant linkage' is used until the CLs have been confirmed. As states in the LCRM guidance the CSM should be used to "*inform the basis of your initial assessment and all future decisions as you progress through Land Contamination Risk Management*" (LCRM, 2020). The preliminary CSM has also been used to summarises uncertainties and gaps in information and includes recommendations for further investigation and assessment to address them, which may include intrusive site investigation and monitoring followed by quantitative risk assessment.

Note: from the remediation options appraisal stage onwards the term 'relevant contaminant linkage' is used to describe the linkages where quantitative risk assessment indicates that remediation is required to address unacceptable risks.

The Preliminary Risk Assessment process is based on the available data presented in this report and has been progressed using qualitative judgement only.

4.2 Potential sources

Table 11 summarises the potential contaminant sources and potentially contaminative land-used that have been identified onsite and in proximity to the site.

Table 11 Potential sources

Onsite	Offsite
Made Ground (including localised elevated heavy metal and hydrocarbon concentrations) associated with former temporary works uses onsite. Potential former military land-uses on the western side of the site.	Landfill site (potential landfill ground gas source) (<170m west) Potentially infilled land (potential ground gas source) (<70m east) Former military land-uses to the west and southwest. Fuel station (60m NE)

Based on the potentially contaminative land-uses summarised above the following contaminants should be considered when compiling future geochemical laboratory analysis suites:

- Heavy metals/metalloids (including but not limited to arsenic, cadmium, chromium vi, copper, lead, mercury, nickel, selenium, vanadium and zinc),
- asbestos, sulphate/sulphide, and
- hydrocarbons (including total petroleum hydrocarbons and polycyclic aromatic hydrocarbons).
- Analysis suites should also include supporting information/determinands including pH, total organic carbon and loss on ignition.

4.3 Potential receptors

Table 12 summarises the potential receptors that have been identified with respect to the site and the proposed development, in line with the contaminated land statutory guidance (Part 2A, 2012). Where the future end-uses are known and when changes to the end-uses are likely to result from the proposed development of the site, it is important that these future receptors are also considered within the Conceptual Site Model.

Table 12 Potential receptors

Receptor	Current & Future receptors	Temporary receptor*
Human health of end users	Yes	-
Human health during site preparation and construction	-	Yes
Controlled waters - Surface water - Groundwater	 Yes (River Cam via Thirteenth Public Drain) Yes (superficial deposits)	 - -
Buildings and structure (ground gas only)	Yes	-
Ecological systems	No	-

* During site preparation and construction

4.4 Conceptual Site Model

A Conceptual Site Model can be presented as a written description, a tabular or matrix description, a drawing/ diagrammatic illustration, or any combination of these formats. The preliminary Conceptual Site Model for the proposed development summarising the *potential* contaminant linkages is presented in a tabular format in Table 15. In total,

- Six *potential* contaminant linkages have been identified with respect to the proposed future development, and
- Three temporary *potential* contaminant linkages have been identified with respect to site preparation and construction.

4.5 Qualitative risk assessment

As part of the Preliminary Risk Assessment, a potential risk rating has been assigned for each *potential* contaminant linkage. The risk rating is based on the available data presented in this report and qualitative judgement and considers the product of the 'severity of the consequence' and the 'probability of the likelihood' (as shown in Table 13). The risk matrix is based on guidance from the CIRIA good practice guide (C552, 2001).

Table 13 Risk matrix

Risk = probability x consequence		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high	High	Moderate	Low
	Likely	High	Moderate	Low	Very low
	Low likelihood	Moderate	Low	Low	Very low
	Unlikely	Low	Very low	Very low	Very low
	No linkage	No risk	No risk	No risk	No risk

The resulting qualitative risk ratings for each contaminant linkage are presented in the Conceptual Site Model see Table 15. Based on these initial risk ratings an overall low to moderate preliminary land contamination risk rating has been assigned for the proposed future development, as summarised in Table 14.

Table 14 Contaminant linkage risk ranking summary

Risk Rating	Number of contaminant linkages			Overall risk rating
	Future end-use	Temporary (in construction)	Totals	
Very high	-	-	-	Low to Moderate
High	-	-	-	
Moderate	2	1	3	
Low	3	2	5	
Very low	1	-	1	
Number of CLs	6	3	9	

Site investigation and further qualitative risk assessment will be required to further evaluate the potential risks, to enable the CSM to be updated and to identify 'relevant contaminant linkages' that require remediation and therefore will progress into Stage 2 of the Land Contamination Risk Management process: remediation options appraisal (Environment Agency, 2020).

Table 15 Preliminary Conceptual Site Model and Preliminary Risk Assessment

Source/s	Pathway/s	Receptor/s	Prob	Cons	Risk	Comments
Contaminants within Made Ground onsite	Ingestion, inhalation and dermal contact	Health of end users	Likely	Medium	Moderate	Several temporary land-uses have been identified onsite likely associated with construction of local roads and bridges between the late 1970s and the present day. It is anticipated that a thickness of Made Ground is likely to be present on site including re-worked natural soils. **Recommend**: intrusive site investigation, soil sampling and analysis followed by Generic Quantitative Risk Assessment (GQRA).
		Health and safety of site preparation and construction workers	Likely	Medium	Moderate	
Asbestos containing soils (ACSs)	Inhalation of liberated respirable fibres	Health of end users	Low likelihood	Medium	Low	As summarised above, several temporary land-uses have been identified onsite and it is anticipated that a thickness of Made Ground is likely to be present on site including re-worked natural soils. **Recommend**: intrusive site investigation, soil sampling and analysis followed by Generic Quantitative Risk Assessment.
		Health and safety of site preparation and construction workers	Low likelihood	Medium	Low	
Ground gas (landfill site to the west and potential infilled former gravel pits to the east)	Inhalation of indoor air	Health of end users	Likely to low likelihood	Medium	Low	Two potential sources of ground gas have been identified within 250m of the site. The Town and County Planning (General Development Procedure) Order 1995 (as amended) requires the planning authority to consult the Environment Agency before granting planning permission for development within 250m of land which is or has been used for the deposit of waste in the past 30-years. **Recommend**: intrusive site investigation, install ground gas monitoring wells, ground gas monitoring followed by ground gas risk assessment.
	Inhalation of outdoor air within trenches	Health and safety of site preparation and construction workers	Likely to low likelihood	Medium	Low	
	Migration and accumulation	Buildings and structures	Likely to low likelihood	Severe	Moderate	
Contaminants within the Made Ground	Leaching or migrating through the unsaturated zone	Surface water drains discharging the River Cam	Unlikely	Medium	Very low	As summarised above, several temporary land-uses have been identified onsite and it is anticipated that a thickness of Made Ground is likely to be present on site including re-worked natural soils. **Recommend**: intrusive site investigation, soil sampling and analysis followed by Generic Quantitative Risk Assessment.
Contamination within Made Ground or superficial deposits	Migration through the unsaturated zone	Underlying groundwater Secondary A aquifer within superficial deposits	Low likelihood	Medium	Low	As summarised above, several temporary land-uses have been identified onsite and it is anticipated that a thickness of Made Ground is likely to be present on site. (Note: two off-site fuel stations have been identified within 250m of the site). **Recommend**: intrusive site investigation, install groundwater monitoring wells, geochemical analysis followed by GQRA.
Hydrocarbon contamination within Made Ground	Migration through water supply pipes	Potable water consumed by onsite end-users	n/a	n/a	n/a	As summarised above it is anticipated that a thickness of Made Ground is likely to be present on site, even low concentrations of hydrocarbons can impact on standard water supply pipes. This linkage has been included to highlight the need for further consideration, but risk ratings have not been applied as potable supply pipes sits outside the contaminated land regime. **Recommend**: intrusive site investigation, soil sampling and analysis to inform water supply material selection.

5 Preliminary Geotechnical Appraisal

Hazard	Impact to proposed development	Mitigation measures	
Ground conditions		Preliminary risk rating	Moderate
Unknown ground conditions: Unknown strength of underlying soils which leads to unknown foundation type and formation depth. Poorly compacted and variable thickness Made Ground may result in excessive settlement of foundations.	Conservative design solutions: Unable to cover a large range of design solutions due to the lack of information. An over conservative design may be produced thus impacts the foundation solutions. Potential structural damage: Aggressivity of the ground may damage the foundation materials. Impact to Cost and Programme: Unforeseen ground conditions may cost delays and cost implications to the programme.	Undertake a detailed ground investigation where: Boreholes of appropriate depth are carried out with associated in-situ and lab geotechnical testing in order to determine the strata on site and parameters for design Analyse soil samples for potentially aggressive geochemical components followed by quantitative assessment.	
Unknown physical and chemical properties: Fine grained soils with seasonal volume change potential which may lead to ground movement resulting in subsidence or heave. Attack on buried concrete by aggressive ground conditions the development site may contain unknown Made Ground and potentially sulphate bearing soils.			
Groundwater		Preliminary risk rating	Low
Unknown groundwater conditions: This will impact on the potential design solutions for the development.	Conservative design solutions: Impact on the sub-structure designs. Potential structural damage: Aggressivity of the groundwater may damage the foundation materials. impact to cost and programme: Unforeseen ground conditions and groundwater. Delays and cost implications to the programme.	Characterise groundwater regime during site specific ground investigation and carry out sampling and laboratory analysis to characterise the aggressivity of the groundwater. Where high ground water table is present dewatering might be required and managed during the construction process	
Unknown chemical properties: The aggressivity of groundwater needs to be determined.			
Unexploded ordnance		Preliminary risk rating	Low
Risk to Workers and End Users: Encountering UXO during works. Site is identified as low risk based on initial assessment.	Health and Safety: Health and safety issues during construction. Impact to Cost and Programme: Unforeseen UXO may cause delays and cost implications to the programme.	Undertake an assessment by specialist company prior to any intrusive investigation, excavation and piling works.	
Existing Infrastructure (including underground structures)		Preliminary risk rating	Low
Damage to existing infrastructure and embankments: The site is surrounded by existing public highways and transport routes on embankments above the site and a bridge structure along the eastern boundary which may be impacted as a result of the temporary or permanent works.	Conservative Design Solutions: Restrictions on construction techniques due to the proximity to existing infrastructure. Limitations on potential foundation types and extent of works due to clashes with existing features such as embankments and adjacent bridge.	Construction sequences and techniques to be assessed with regards to their impact to nearby infrastructure as part of the construction environmental management plan (CEMP).	

Hazard	Impact to proposed development	Mitigation measures	
Existing infrastructure continued	Impact to Cost and Programme: Unrecorded and / or unforeseen obstructions/ structures may cause serious delays and cost implications to the programme.		
Access		Preliminary risk rating	Low
Whilst the proposed development is yet to be finalised, for safety reasons, it is likely that construction routes will need to be separated from public access.	Health and Safety implications for construction workers and the public during construction.	Early planning to determine the most suitable construction techniques, H&S measures and delivery times, to be accounted for within the Construction Logistics Plan.	
Services		Preliminary risk rating	Moderate
Risk to workers, end users and services assets: Damage to existing and proposed utilities and services. Services including a below ground sewer have been identified onsite and other services including telecoms, power and water have been identified crossing the site at the entrance to Cambridge Rd.	Health and Safety implications for construction workers and general public if service strike occurs during construction. Impact to Cost and Programme: cause delays and cost implications to the programme especially if damage to third party services assets occurs.	Obtain all the latest existing service drawings and liaise with service providers to understand constraints and requirements from service providers. Undertake an assessment of proposed works (temporary and permanent) on third party assets. Develop monitoring and mitigation proposals.	
Excavation		Preliminary risk rating	Low
Damage to existing structures, substructures and their foundations and embankments may be affected by excavation works. .	Impact to cost and programme: restriction of constructions techniques to limit the excavation works and potential impact on adjacent structures or embankments. Liabilities through damage third party structures.	Any excavation in the vicinity of embankments, structures or services to be assessed to determine the best approach in terms of constructions works, techniques and potential permanent impact on the existing structures. Excavated arisings destined for disposal will need to be classified in accordance with the waste regime and Waste classification, guidance on the classification and assessment of waste, Technical Guidance WM3, TGWM3 (Environment Agency, 2021), prior to disposal.	
Flooding		Preliminary risk rating	Moderate
Risk of groundwater and surface water flooding. This will impact on the potential design solutions for the development	Potential Structural damage: Uplift forces induced by highwater tables at the site from groundwater flooding has the potential to affect the bearing capacity of buried structures and foundations if is not considered in the design	Undertake a flooding Risk Assessment to assess the actual risk of flooding in determination of the minimum ground floor levels Water level and associated uplift pressures to be considered based on FRA	
Shrinkable soils		Preliminary risk rating	Moderate
Damage to new structures: risk of shrink and swell behaviour. after construction, the shrink/swell of soils may damage the structures	Potential Structural damage: ground movements may cause damage to the structures post-construction	A pre-construction tree survey should be undertaken. The plasticity of the cohesive deposits should be confirmed and the shrinkage potential identified.	

6 Conclusions and Recommendations

6.1 Conclusions

In conclusion, the land contamination desk study and preliminary risk assessment has assigned a low to moderate preliminary land contamination risk rating to the proposed commercial/industrial development onsite. In particular moderate risks have been identified associated with potential contaminants within the Made Ground associated with temporary construction works activities on site and potential risks associated with ground gas as part of the site is within 250m of a known landfill.

In terms of geotechnical risk the main concerns are risks associated with the presence of buried obstructions, hydrostatic and soil heave pressures, flooding, underground services, aggressive ground and groundwater conditions that have the potential to underlie the site.

Further investigation and assessment including intrusive site investigation and quantitative risk assessment is recommended as outlined in Sections 6.2.2 and 6.2.3 below.

6.2 Recommendations

6.2.1 Introduction

As described in Section 4, a preliminary Conceptual Site Model has been developed to communicate and convey the *potential* Contaminant Linkages identified by the Land Contamination Desk Study (LCDS). The *preliminary* CSM will need to be updated as the proposed development progresses through the Land Contamination Risk Management (LCRM) process. Figure 13 presents a simplified summary of the LCRM process. Intrusive site investigation information is needed to 'test and refine' the CSM and monitoring can be used 'to validate' the CSM during the quantitative risk assessment stage of LCRM (3: land contamination risk assessment in Figure 13).

Figure 13 Land Contamination Risk Management process - simplified

6.2.2 Site investigation recommendations

Table 16 summarises the site investigation activities that are currently recommended to provide suitable information to consider uncertainties and gaps in information and to enable qualitative risk assessments to be undertaken in line with LCRM (Environment Agency, 2020).

Ground gas monitoring well installation, gas monitoring and ground gas risk assessment is recommended as the site lies within 250m of a landfill and infilled gravel pits, in line with the Town and County Planning Order 1995 (as amended) that requires the planning authority to consult the Environment Agency before granting planning permission for development within 250m of land which is or has been used for the deposit of waste in the past 30-years.

Geotechnical ground investigation and land contamination site investigation fieldwork activities are typically combined into a single package of work as a practical and cost-effective option that can be undertaken by a single ground investigation contractor.

Table 16 Site investigation recommendations

Site investigation item	Recommended
Exploratory Holes (fieldwork)	
Boreholes (cable percussive or rotary)	Yes
Window or windowless sampling	Groundwater and ground gas wells could be installed in boreholes or dynamic sampling boreholes.
Trial Pits	Yes
Monitoring installations (fieldwork)	
Groundwater monitoring wells	Yes
Ground gas monitoring wells	Yes
Sampling and analysis (post initial fieldwork)	
Geotechnical soil sampling and laboratory testing	Yes
Geochemical soil sampling and laboratory analysis	Yes
Geochemical groundwater sampling and laboratory analysis	Yes
Geochemical surface water sampling and laboratory analysis	No
Monitoring	
Groundwater level monitoring	Yes
Surface water level monitoring	No
Ground gas monitoring	Yes
Factual reporting	
Factual data including exploratory hole logs, monitoring data and laboratory analysis data.	Yes

6.2.3 Risk assessment recommendations

The findings of the site investigation fieldwork, monitoring and laboratory analysis will be required to progress LCRM into Generic Quantitative Risk Assessment, including but not limited to:

- Identifying potential Contaminants of Concern,
- Indicating where further information or detailed quantitative risk assessment (DQRA) may be required,
- Updating the Conceptual Site Model and the risk ratings for each of the potential contaminant linkages, and
- Where appropriate updating the status of the contaminant linkage including assessing whether any of the CLs should be considered '*relevant contaminant linkages'* i.e. likely to require remediation.

Note: *Relevant contaminant linkages* represent Source-Pathway-Receptor relationships where potentially unacceptable risks are identified. These linkages could be considered for Detailed Quantitative Risk Assessment (DARA) or may progress directly into Remediation Options Appraisal (i.e. Stage 2 of the Land Contamination Risk Management process (LCRM, 2020).

A flood risk assessment (FRA) is required as the site is over 1 hectare in size and much of the site has been identified as being susceptible to groundwater flooding both at surface and below ground. The FRA should include specific consideration of the risks from groundwater flooding.

Based on the preliminary risk assessment results it is currently anticipated that land contamination risk assessment (as summarised in Table 17) will need to be undertaken after the site investigation recommendations have been implemented.

Table 17 Land contamination risk assessment next step

Land Contamination Risk Assessment	Yes, No, or Maybe
Human health GQRA	Yes
Controlled water GQRA	Yes
Ground gas GQRA	Yes
Ecological receptors GQRA	No
Geologically sensitive sites (SSSI)	No

6.2.4 Geotechnical design recommendations

The foundation options considered at the time of writing this report consist of shallow conventional strip footings, raft, pad foundations sitting on natural strata or piled foundations for the more significant structures. The natural soils and underlying strata are all generally capable of supporting conventional pad/spread foundations. For heavier structures piles extending into the mudstone would provide suitable foundation solution.

7 Limitations and Liabilities

This report has been prepared by Pell Frischmann with reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the Client in accordance to the agreed scope of services.

This report has been prepared to provide pre-development geoenvironmental and land contamination information for the Teardrop site, Milton, Cambridge. The report contents should only be used in that context and Pell Frischmann disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

The report details the findings of work carried out by Pell Frischmann during a study period from February to March 2021. The report has been prepared on the basis of available information obtained during that study period. Information provided by the referenced third parties has been used in good faith and is taken at face value; however, Pell Frischmann cannot guarantee its accuracy or completeness.

Although every reasonable effort has been made to gather all relevant information within the context of the agreed scope of work, all potential environmental constraints or liabilities associated with the site may not have been revealed. Should additional Information become available (including new legislation and changed practices), after the date of the report submission, Pell Frischmann reserves the right to reconsider the recommendations and alter the report accordingly.

Notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds such as Japanese knotweed, this report does not constitute a formal or specific survey of these potential development hazards. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance.

Appendix A Architects Feasibility Study

References from AAP Draft Consultation Document

2013 – 2014	Early plan preparation work
2014 – 2015	Consultation on Cambridge Northern Fringe East AAP Issues and Options
Spring 2019	Consultation on North East Cambridge AAP Issues and Options
27 July – 5 October 2020	Consultation on Draft Area Action Plan
	Proposed Submission Consultation
	Submission to the Secretary of State
	Examination period
	AAP Adoption
	Review and Monitoring

Figure 5: Ward boundaries in North East Cambridge

Figure 6: Land ownership within the Area Action Plan boundary

References from AAP Draft Consultation Document

Development Area	Residential Units	Employment M²	Retail M²	Community & Cultural M²	Industrial M²
Anglian Water / Cambridge City Council Site	5,500	23,500	3,700	5,700	0
Cambridge Business Park	500	68,000	1,500	0	0
Cambridge Science Park	0	70,000	1,000	100	1,150
Chesterton Sidings	730	36,500	1,000	100	8,800
St John's Innovation Park	0	35,000	100	0	0
Trinity Hall Farm Industrial Estate	0	1,500	0	0	0
Nuffield Road Industrial Estate	550	0	0	0	0
Cowley Road Industrial Estate	500	0	0	0	17,500
Merlin Place	120	0	0	0	0
Milton Road Car Garage	100	0	0	0	0
Cambridge Regional College	0	0	0	0	0
TOTAL	**8,000**	**243,500**	**7,300**	**5,900**	**27,450**

Figure 47: Delivery Summary within the North East Cambridge Area Action Plan during the Plan Period (Net)

We want North East Cambridge to be an inclusive, walkable, low-carbon new city district with a lively mix of homes, workplaces, services and social spaces, fully integrated with surrounding neighbourhoods.

Figure 21: Building heights considered suitable for North East Cambridge

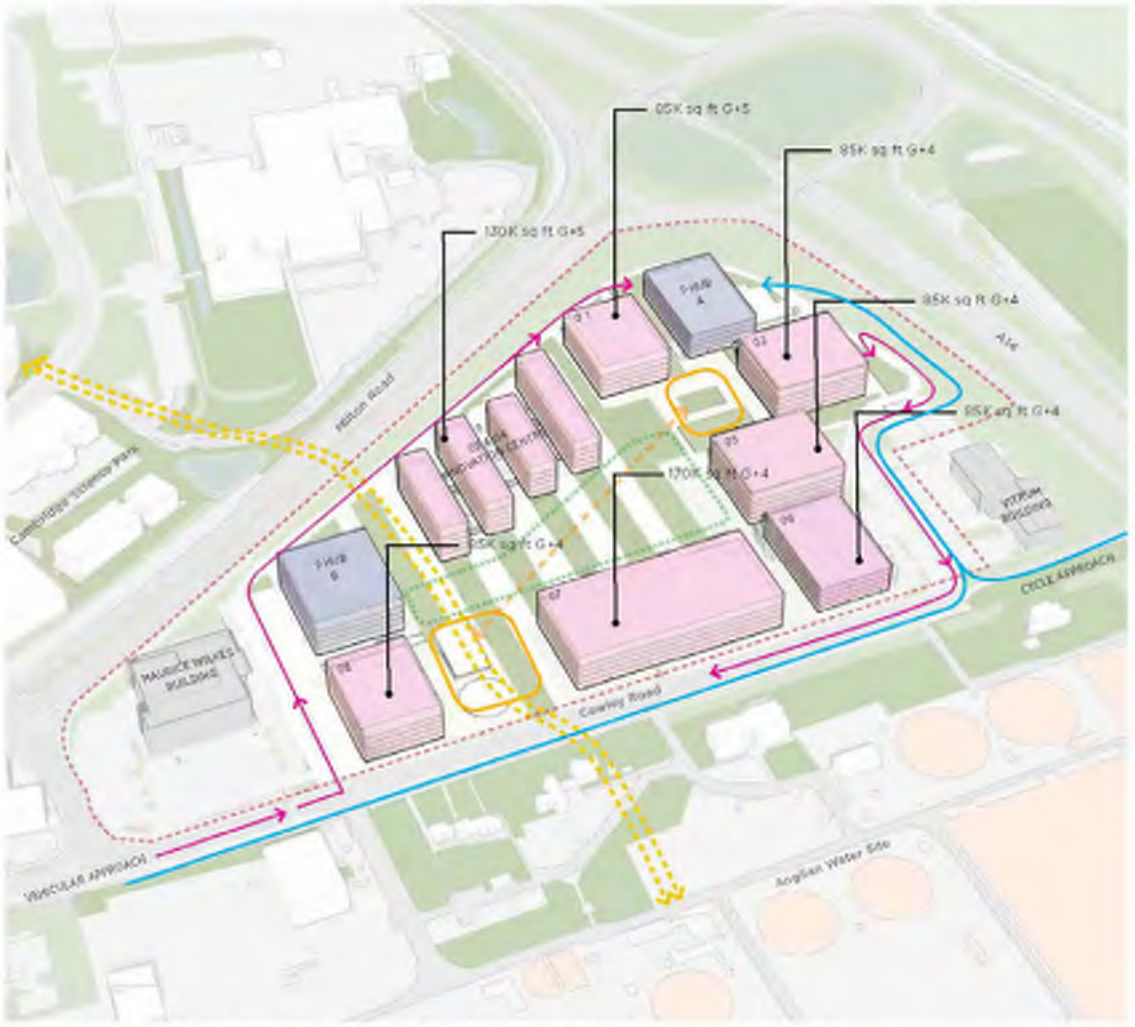
TURNSTONE & ST JOHNS INNOVATION PARK

HEIGHT AND DENSITY

The masterplan proposal trebles the density on the site increasing the net area from 247,651 sq. ft / 23,000 sq. m to approx 768,776.00 sq. ft / 71,000 sq. m. The area is provided by a range of building types that increase from G+4 along Cowley road to G+5 along the Milton Road.

Further to discussion with both Councils, the buildings along Cowley Road have been elongated and brought forward to provide enclosure while buildings along the western boundary have become taller to provide increased prominence from Milton Road.

A new Innovation Centre proposed at phase 2 of the masterplan is to be the focal point of the site. This building will distinguish itself from the others on the site providing a series of centralised functions for the site including a new restaurant and conferencing facilities.



Indicative Building Heights. Note Transport Hub B is located in SCDCs preferred position for the purpose of this diagram

SITE VISIT – PHOTOS









SITE VISIT – PHOTOS

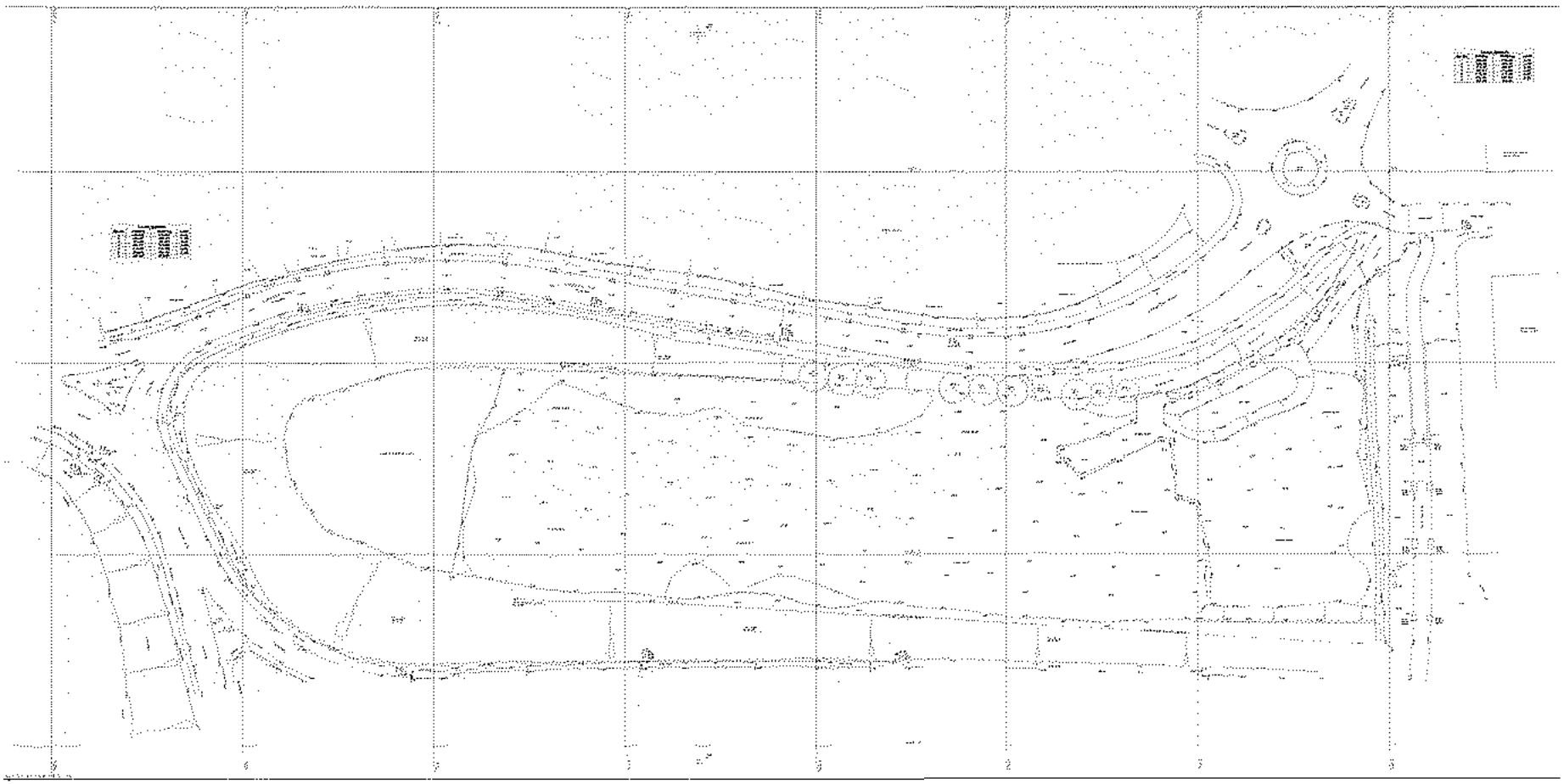




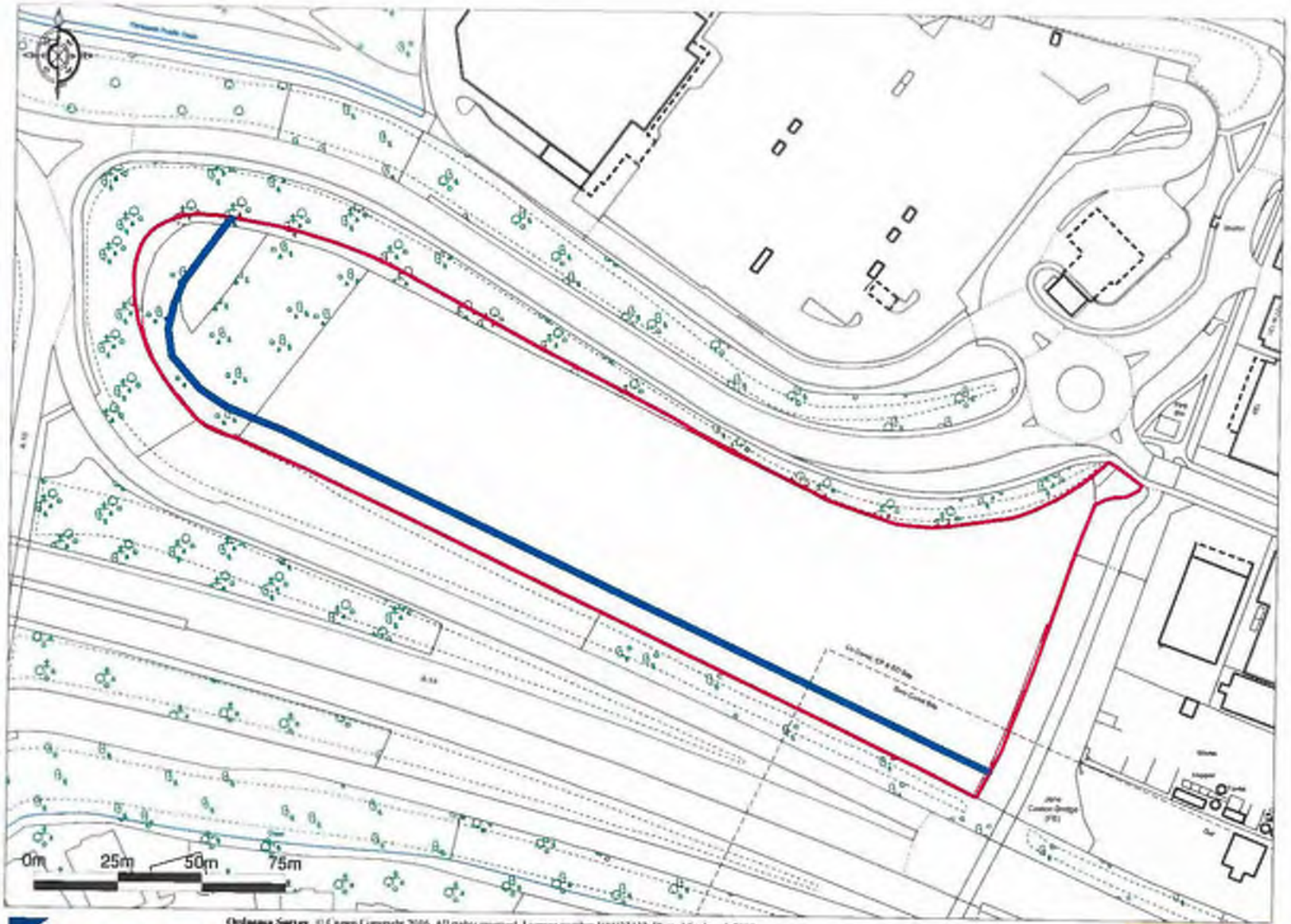




SURVEY INFO



LAND TITLE



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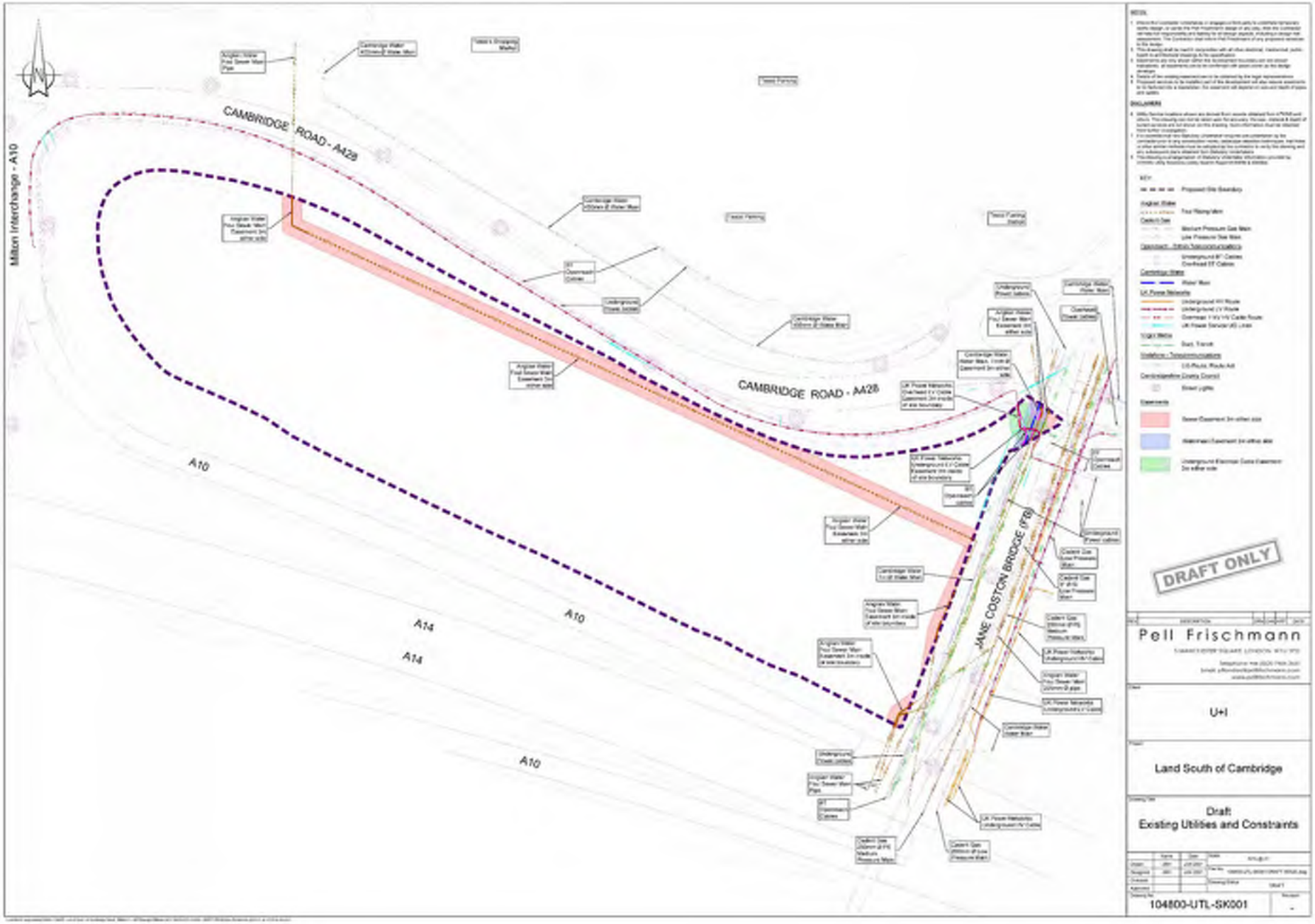
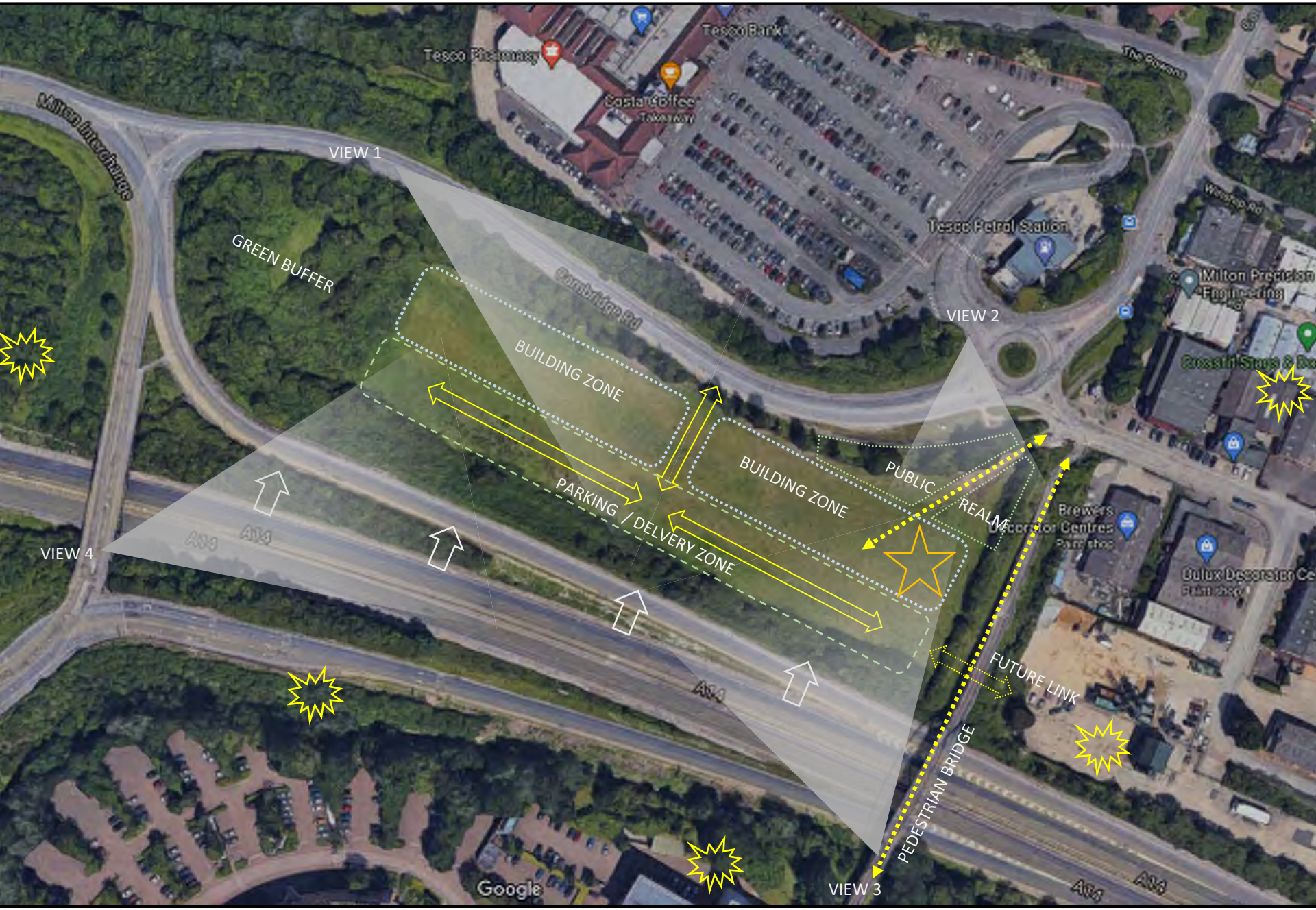

Milton Interchange - A10
CAMBRIDGE ROAD - A428
CAMBRIDGE ROAD - A428
A10
A14
A14
A10
A10
JANE COSTON BRIDGE (FB)
DRAFT ONLY
Pell Frischmann
U+I
Land South of Cambridge
Draft
Existing Utilities and Constraints
104800-UTL-SK001


VIEW 1
VIEW 2
VIEW 3
VIEW 4
GREEN BUFFER
BUILDING ZONE
BUILDING ZONE
PARKING / DELVERY ZONE
PUBLIC REALM
FUTURE LINK
PEDESTRIAN BRIDGE
A14
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