APPENDIX 9 : FLOOD RISK AND SURFACE WATER DRAINAGE STRATEGY - VECTOS, SEPTEMBER 2019

Land off Junction 3 Shropshire – Masterplan Preliminary Appraisal

Flood Risk, Surface Water Drainage

2nd September 2019

173470

Introduction

1. A preliminary masterplan appraisal of flood risk and surface water drainage constraints and opportunities for Land off Junction 3, Shropshire, has been completed, with this having been informed by consultation with the Environment Agency (EA). The objective of this appraisal is to provide a background understanding of the potential constraints posed to the developability of the site by flood risk and surface water drainage and to demonstrate how the site is compliant with relevant planning policy.

2. This will inform the measures and approaches that can be incorporated into the scheme to help overcome or minimise the impact of these constraints. The aspiration is an approach that provides a positive influence on the community and wider environment.

Site Location and Description

3. The site is located on the M54/A5 strategic corridor, immediately north of Junction 3 and comprises approximately 700 hectares (ha) of largely agricultural land.

Planning Policy & Guidance

National Planning Policy Framework (NPPF)

4. The revised NPPF was published in February 2019 and sets out the Government's national policies for flood risk management in a land use planning context within England and how these are expected to be applied. This revised framework replaces the previous NPPF that was published in July 2018.

5. The NPPF states that developers and Local Planning Authorities (LPA's) should try to locate development in zones with the lowest probability of flooding. This should be achieved by application of the Sequential Test, which aims to ensure that a sequential approach is followed to steer new development to areas with the lowest probability of flooding.

6. The flood zones provide the basis for applying the Sequential Test. The aim is to steer new development to Flood Zone 1 (areas with a low probability of river or sea flooding). Where there are no reasonably available sites in Flood Zone 1, LPA's should consider reasonably available sites in Flood Zone 2 (areas with a medium probability of river or sea flooding), applying the Exception Test if required.

Shropshire Core Strategy

7. The Shropshire Core Strategy sets out the vision for Shropshire and guides future development and growth.

8. Core Strategy Policy CS18 is a specific policy related to Sustainable Water Management which states that new development should integrate measures to reduce flood risk, avoid an adverse impact on water quality and quantity, and provide opportunities to enhance biodiversity, health and recreation.

9. Core Strategy Policy CS6: Sustainable Design and Development Principles seeks to ensure that all new development is designed to a high quality using sustainable design principles, with this including the requirements for surface water management.

Drainage Guidance – Surface Water Management: Interim Guidance for Developers

10. Shropshire Council have produced interim guidance with respect to the management of surface water and flood risk within proposed development sites.

11. The document includes a SuDS Applicability Map which can be used to help plan the types of SuDS that may be suitable for managing surface water from developments. The map shows that the site is located in an area where infiltration is possible, but where treatment will be required. This is considered to be consistent with the ground conditions described in the following section.

Constraints and Opportunities

Ground Conditions

Geology and Soils

12. The British Geological Survey (BGS) maps indicate that the bedrock geology consists of the Wildmoor and Bromsgrove Sandstone Formations which are overlain by Till and Glaciofluvial superficial deposits.

13. Soilscapes information indicates that the majority of the site is underlain by freely draining sandy soils that drain to the groundwater across the southern portion of the site, with the remainder of the site comprising loamy and clayey soils with impeded drainage to the stream network.

14. Whilst no site investigation is available at this early stage, desktop information suggests that the ground conditions will allow some management surface water through infiltration.

Aquifer Designation

15. Aquifer designations are based on geological mapping provided by the BGS. This defines whether an area is underlain by a Principal or Secondary Aquifer.

16. The aquifer bedrock designation in the vicinity of the site is illustrated in Figure 1. In terms of the site, the majority of the site is classified as a Principal Aquifer, meaning that the rock layers or drift deposits in this area may support water supplies and/or river base flow on a strategic scale. The remainder of the site is classified as a Secondary B Aquifer (meaning that they may store and yield limited amounts of groundwater) and some localised areas of Secondary A Aquifer (meaning there are permeable layers capable of supporting local water supplies).

17. The Environment Agency (EA) have confirmed that this Principal Aquifer is of strategic importance to the water supply.

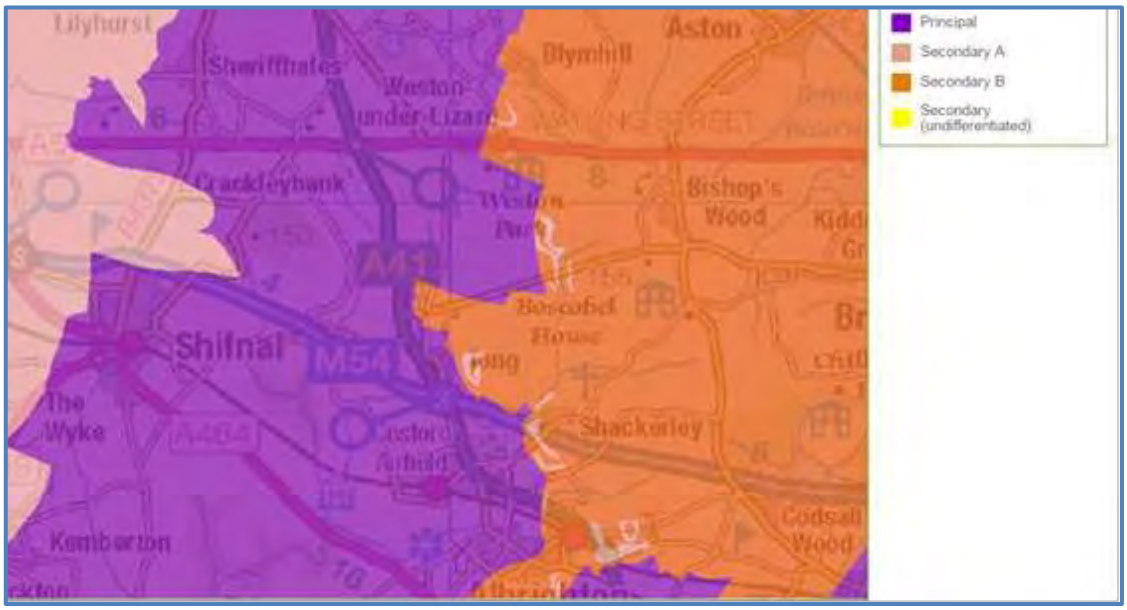

Figure 1 – Aquifer Bedrock Designation (BGS Aquifer Maps)

Groundwater Source Protection Zones

18. In addition to the aquifer bedrock designations, mapping is available that shows the extent of groundwater Source Protection Zones (SPZs), such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The maps show the extents of three main zones (inner shown in red (i.e. SPZ1), outer shown in green (i.e. SPZ2) and total catchment shown in blue (i.e. SPZ3)).

19. The groundwater SPZs in the vicinity of the site are illustrated in Figure 2. This shows the majority of the site, to the west of the A41, and some of the area to the east of the A41 to be classified as total catchment (SPZ3). Towards the centre of the site there are areas classified as SPZ1 and SPZ2.

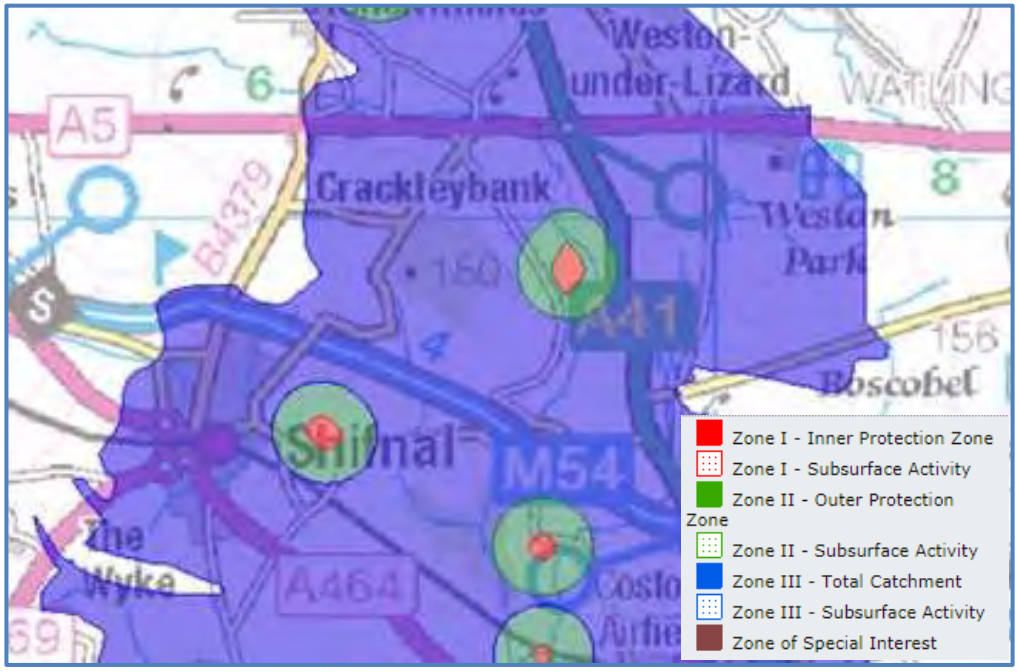

Figure 2 – Groundwater Protection Zone (Environment Agency)

20. The EA have confirmed that there are a number of public water supply abstraction boreholes within the total catchment, and that it is essential that these areas are afforded a high level of protection from any contamination.

21. Water quality of surface water runoff is a key consideration in a groundwater SPZ. Surface water drainage solutions for areas of development that potentially act as a source of contamination (i.e. roads and hardstanding areas) must therefore be sensitively defined. The surface water drainage solution can help control any adverse impact on water quality, through the use of Sustainable Drainage Systems (SuDS) that provide water quality improvements by reducing sediment and contaminants from runoff either through allowing settlement or by promoting the biological breakdown of pollutants.

22. In addition to the importance of water quality, it is also important to consider groundwater recharge. With the change of the land use to a developed surface, there can be concerns on the reduced recharge of the underlying aquifer that may result.

23. This has been considered as part of the conceptual Surface Water Drainage Strategy and is discussed in the relevant section of this document.

Hydrology

24. There are two watercourses that flow through the site boundary, the River Worfe and a tributary of the River Worfe. These are both classified as an Ordinary Watercourse.

25. It is likely that the existing drainage regime of the site is that greenfield runoff that does not infiltrate drains into one of these watercourses.

Fluvial and Tidal Flood Risk

26. The flood risk from fluvial and tidal sources to land areas in England are defined on the EA's Flood Map for Planning (FMfP). The extent and risk of flooding are defined as one of three Flood Zones, as summarised below:

- Flood Zone 1 (low risk) – land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Flood Zone 2 (medium risk) – land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year; or
- Flood Zone 3 (high risk) – land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

27. The FMfP is intended for land use planning, and is the starting point for determining which parts of the site are suited to which use. Given the elevation of the site, it is not susceptible to tidal flood risk.

28. The majority of the site is classified as Flood Zone 1 (areas with no shading), as shown in Figure 3. These are areas at a low level of risk from fluvial and tidal sources.

29. There are two corridors of Flood Zone 2 and 3 across the site, with these associated with the River Worfe and its tributary (areas with light blue and dark blue shading). These are areas associated with a medium and high level of risk from fluvial flooding.

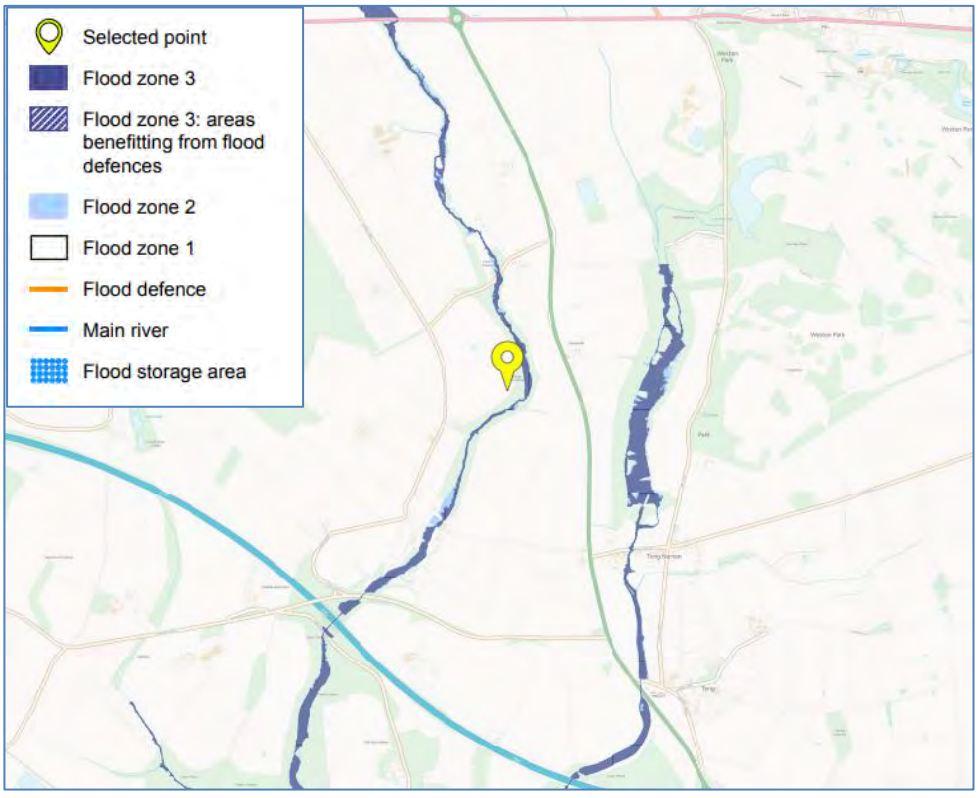

Figure 3 – EA Flood Map for Planning

Surface Water Flood Risk

30. The risk of flooding from surface water has become an important consideration of development proposals, with separate flood maps available to show where surface water runoff flows or ponds. Typically, the surface water flood maps show similar areas as being affected to those of the FMfP, but also additional areas such as the flooding from hillsides and minor watercourses or ditches.

31. The surface water flood map, shown in Figure 4, identifies the flood risk associated with surface water flooding. This shows that the majority of the site is unaffected by this source of flood risk. However, some minor flow paths are identified outside of the main river corridors.

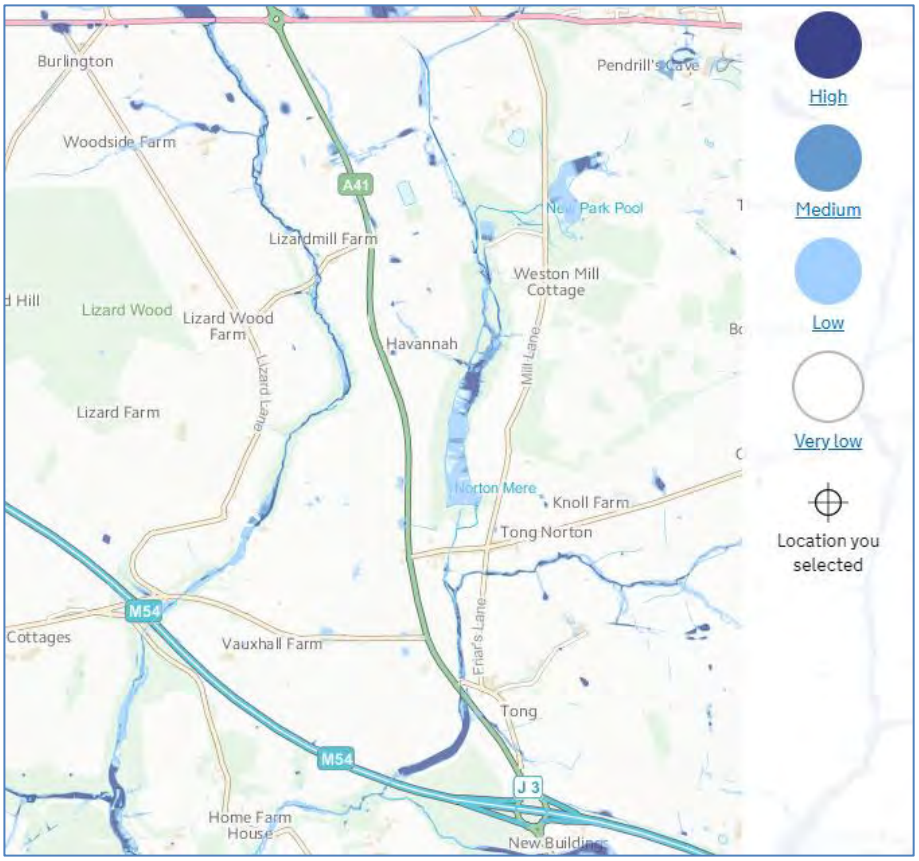

Figure 4 – Risk of Flooding from Surface Water Map

Constraints Mapping and Illustrative Masterplan Evolution

32. Various constraints have been identified on site and in the surrounding area. These consist of a groundwater SPZ, two Ordinary Watercourses, fluvial flood zones and some minor surface water flooding. A constraints plan has been produced and is provided as Appendix A, which presents all of these constraints.

33. The Illustrative Masterplan has evolved in a way that all of these various constraints have been considered in a way that is compliant with planning policy, guidance and EA advice.

34. The Illustrative Masterplan has steered all new development into Flood Zone 1 and away from the two Ordinary Watercourses. No built development has been located in Flood Zone 2 or 3. This is compliant with the requirements of the NPPF and application of the Sequential Test as part of the allocation is not necessary.

35. The risk from surface water has introduced a number of minor additional areas that are susceptible to flooding. The Illustrative Masterplan has steered new development away from this potential source of flooding.

36. It is well understood that one of the effects of development is typically to reduce the permeability of a site and consequently change its response to rainfall. Therefore, the effective management of surface water runoff is required to ensure that there is no detrimental impact over the site or surrounds as a result of a proposed development. This must also consider the groundwater SPZ, which is discussed in the following section.

Conceptual Surface Water Drainage Strategy

37. In accordance with Lead Local Flood Authority (LLFA) guidance, surface water will be managed based on the principles of SuDS. A SuDS strategy has therefore been used to inform the masterplan for the site.

38. For a site of this scale, an appropriate SuDS strategy must consider source control measures for local rainfall management, and site control measures to convey and release surface water runoff from the developed areas to appropriate discharge receptors, with these considered in accordance with the sustainable drainage hierarchy.

Discharge Receptor

39. The LLFA SuDS guidance refers to the sustainable drainage hierarchy, as outlined in the Building Regulations. The preference of the drainage hierarchy is for the discharge of surface water to the ground via infiltration, wherever practical and possible. Where this is not practical, discharge into a watercourse, or sewer, can be considered.

40. A desktop investigation into the geology and soils, along with the Shropshire Council SuDS Applicability Map, indicates that infiltration is likely to be a practical means of surface water disposal. However, in parts of the site, it may also be appropriate to dispose surface water to the adjacent Ordinary Watercourse.

Groundwater Source Protection Zone Consideration

41. The Environment Agency's approach to groundwater protection allows infiltration of clean roof water both within and outside SPZ1. However, where infiltration is to be used for surface water run-off from roads, car parks or other public or amenity areas in SPZ1, they should be suitably designed and should use a SuDS management treatment train to ensure there is no unacceptable risk of pollution to the groundwater.

42. However, given the size of the site, the EA have advised that all new development should be steered out of SPZ1. This has been achieved in the Illustrative Masterplan and given that there is no development proposed within SPZ1, there will be no drainage strategy associated with this part of the development. This therefore provides a robust solution to the protection of groundwater.

Indicative Surface Water Drainage Strategy

43. It is proposed that the drainage solution will be delivered as a series of sub-strategies based on topography. This will consist of a series of storage basins for each neighbourhood. These basins have been designed to offer both infiltration and attenuation with an outfall the adjacent watercourse, where appropriate. Indicative locations of the basins are shown on the preliminary surface water drainage strategy, provided as Appendix B.

44. The basins have been calculated to provide storage for up to and including the 1 in 100 year event, including a 40% allowance for climate change in line with latest guidance. All of the basins have been steered outside of SPZ1 and outside of the floodplain.

45. The basins will be supplemented with wider SuDS, such as bio-retention, permeable paving and swales, which will provide further attenuation and water quality benefits.

Biodiversity and Landscape

46. A sustainable drainage solution incorporated into the masterplan is an approach that ideally provides significant environmental and community benefits. In addition to flood risk management, these can include green corridor connectivity; benefits to biodiversity and ecology; improvements to water resources and water quality; the addition of recreational uses; visual and landscape value and educational benefits, as Figure 5 illustrates. An integrated surface water drainage strategy therefore adds to the vision of the scheme.

Figure 5 – Opportunities delivered by SuDS (Community and Environmental Benefits)

47. The surface water basins and wider SuDS will provide an opportunity to create high value habitat and contribute an important biodiversity, visual and recreational function for the site.

48. The surface water drainage strategy outlined above demonstrates that the proposed site can meet national and local requirements, but will be subject more detailed design consideration in the future.

Summary

49. Whilst there are areas of the site that are affected by fluvial and surface water flooding, these are relatively limited. However, the Illustrative Masterplan has been prepared which has steered all built development outside of the floodplain, in accordance with the NPPF and local planning policy.

50. The EA have confirmed that the site is underlain by a Principal Aquifer of strategic importance to water supply. In addition, the site falls within a groundwater SPZ. Protection of the associated public water supply abstraction boreholes from contamination are a critical requirement of the EA. This has been achieved by steering all built development and drain age infrastructure outside of SPZ1.

51. Surface water runoff from areas of built development will be managed using SuDS, which will offer a combination of infiltration and attenuation, to mimic the existing greenfield regime of the site, and to achieve a balance between protection of groundwater quantity and quality.

52. Through the appropriate layout of the Illustrative Masterplan, in accordance with the flood extents and the incorporation of features to mitigate and manage the surface water runoff, the constraints identified have been overcome.

53. Moreover, additional environmental and community benefits are available from a well-integrated surface water drainage strategy would have a positive influence on the settlement, with benefits to connectivity, biodiversity, ecology, water resources, water quality, recreation, visual and landscape value and education. A well-integrated surface water drainage strategy is therefore a key deliverable of the overall vision of the scheme.

APPENDIX A – FLOOD RISK AND DRAINAGE CONSTRAINTS

NOTES:-

1. A NUMBER OF SOURCES HAVE BEEN USED TO COMPILE THIS PLAN, WHILST VECTOS BELIEVE THEM TO BE TRUSTWORTHY; VECTOS IS UNABLE TO GUARANTEE THE ACCURACY OF THE INFORMATION THAT HAS BEEN OBTAINED FROM OTHERS;
2. THIS PLAN IS BASED ON INFORMATION AVAILABLE AT THE TIME OF PREPARATION. CONSEQUENTLY, THERE IS POTENTIAL FOR FURTHER INFORMATION TO BECOME AVAILABLE. THESE CHANGES MAY LEAD TO FUTURE ALTERATIONS TO THE CONCLUSIONS FOR WHICH VECTOS CANNOT BE HELD RESPONSIBLE.

KEY:-

- SITE BOUNDARY
- GROUNDWATER SOURCE PROTECTION ZONE 1
- GROUNDWATER SOURCE PROTECTION ZONE 2
- GROUNDWATER SOURCE PROTECTION ZONE 3
- FLOOD ZONE 2
- FLOOD ZONE 3
- SURFACE WATER FLOOD EXTENT (1 IN 30)
- SURFACE WATER FLOOD EXTENT (1 IN 100)
- SURFACE WATER FLOOD EXTENT (1 IN 1000)

REV.	DETAILS	DRAWN	CHECKED	DATE
B	UPDATED DRAWING TEMPLATE	JE	NB	02/09/19
A	RED LINE BOUNDARY AND MASTERPLAN AMENDED	JE	NB	30/08/19

STATUS:

INFORMATION ONLY

CLIENT:

BRADFORD RURAL ESTATES LTD

PROJECT:

LAND OFF JUNCTION 3

DRAWING TITLE:

FLOOD RISK AND SURFACE WATER DRAINAGE CONSTRAINTS PLAN

SCALES:

NTS @ A1

DRAWN:	CHECKED:	DATE:
JE	NB	JULY 2019

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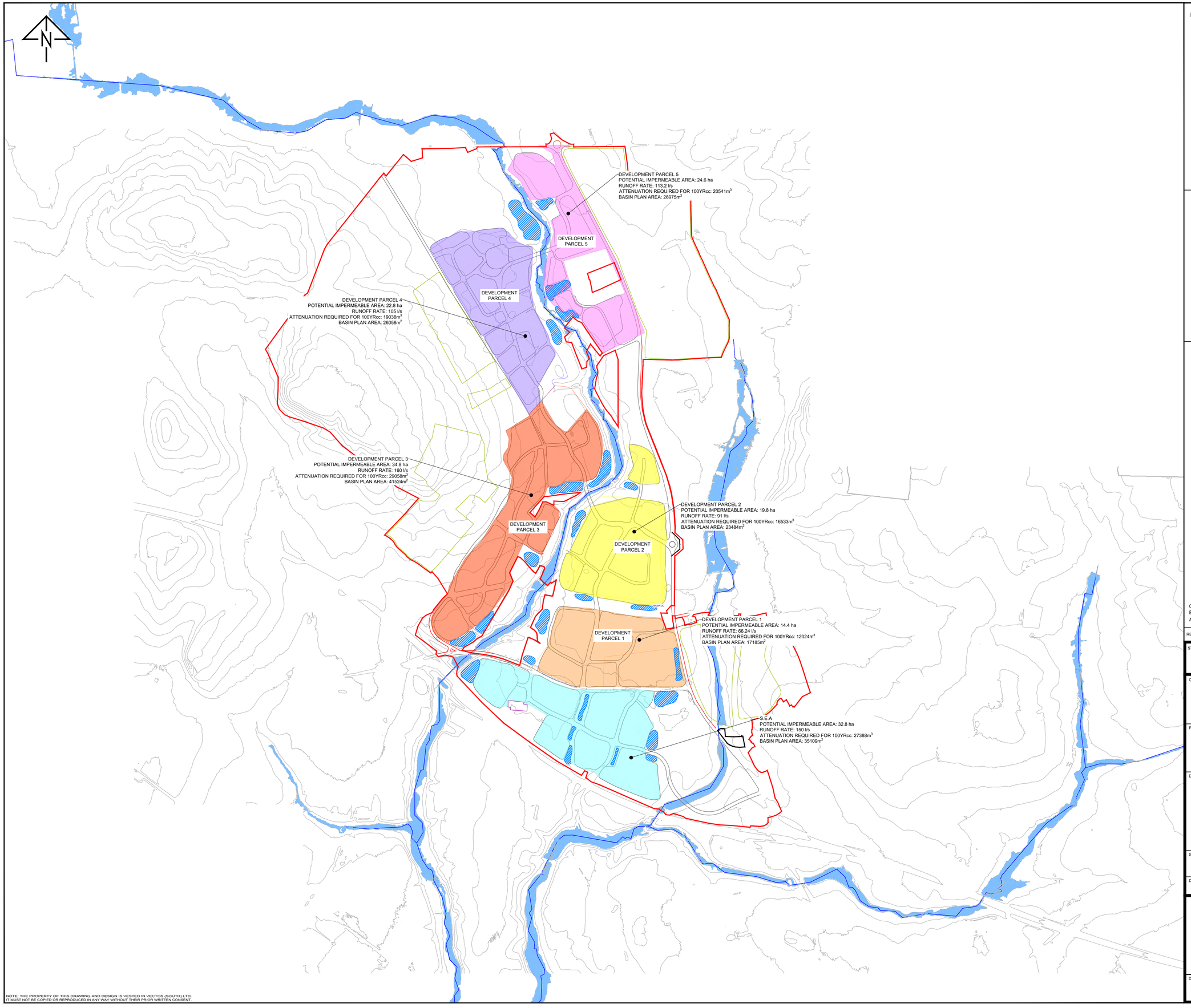
DRAWING NUMBER: 173470_C_01

REVISION: B

APPENDIX B – PRELIMINARY SURFACE WATER DRAINAGE STRATEGY



NOTES:-

1. SURFACE WATER DRAINAGE STRATEGY IS BASED ON 100YEAR PLUS 40% CLIMATE CHANGE EVENT IN LINE WITH LATEST GUIDANCE;
2. THE CURRENT STRATEGY IS BASED ON PROVIDING ATTENUATION PRIOR TO A RESTRICTED DISCHARGE TO THE EXISTING WATERCOURSES WITHIN THE SITE;
3. THE RESTRICTED RATE IS BASED ON THE LOWEST QBAR FOR THE POTENTIAL IMPERMEABLE AREAS OF THE SITE;
4. A CONSERVATIVE ALLOWANCE FOR INFILTRATION HAS ALSO BEEN CONSIDERED WITHIN THE DRAINAGE CALCULATIONS. WHERE POSSIBLE, INFILTRATION WILL BE UTILIZED TO ENCOURAGE GROUNDWATER RECHARGE AND BASEFLOW TO THE WATERCOURSES;
5. LOCATION OF BASINS SUBJECT TO CHANGE FOLLOWING TOPOGRAPHIC SURVEY, GROUND INVESTIGATION AND FURTHER DESIGN;
6. IT IS PROPOSED TO PROVIDE SWALES AND PERMEABLE PAVING WITHIN THE DEVELOPMENT PARCELS TO OFFER FURTHER ATTENUATION AND WATER QUALITY BENEFITS;
7. ALL INFORMATION SHOWN IS INDICATIVE AND SUBJECT TO FURTHER INVESTIGATION.

- INDICATIVE ATTENUATION BASIN
- DEVELOPMENT PARCEL 1
- DEVELOPMENT PARCEL 2
- DEVELOPMENT PARCEL 3
- DEVELOPMENT PARCEL 4
- DEVELOPMENT PARCEL 5
- S.E.A
- CONTOURS (mAOD)

REV.	DETAILS	DRAWN	CHECKED	DATE
C	UPDATED DRAWING TEMPLATE	JE	NB	02/09/19
B	AMENDED RED LINE BOUNDARY	JE	NB	30/08/19
A	AMENDMENTS TO BASIN LOCATIONS	JE	NB	16/07/19

STATUS:
INFORMATION ONLY

CLIENT:
BRADFORD RURAL ESTATES LTD

PROJECT:
LAND OFF JUNCTION 3

DRAWING TITLE:
PRELIMINARY SURFACE WATER DRAINAGE STRATEGY

SCALES:
NTS @ A1

DRAWN:	CHECKED:	DATE:
JE	NB	JULY 2019

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DRAWING NUMBER: 173470_PDL_01
REVISION: C

APPENDIX 10 : LAND QUALITY TECHNICAL BRIEFING NOTE - WSP, SEPTEMBER 2019

MEMO

TO	Bradford Estates Limited	**FROM**	George Baggott, Principal Consultant, Ground Risk & Remediation
DATE	04 September 2019	**REFERENCE**	70057223-L01
SUBJECT	**Land at J3 – Land Quality Technical Briefing Note**		

1.0 INTRODUCTION

1.1 Authorisation

Bradford Estates Limited (the Client) commissioned WSP UK Limited (WSP) to prepare a baseline assessment of Land North of Junction 3 of the M54, also known as 'Land at J3'. The site location is shown on **Figure 1** in **Appendix A**. The purpose of the assessment is to provide baseline information on ground conditions and provide an initial assessment of the potential ground risk constraints that are likely to require consideration at the site.

This report should be read in conjunction with the Argyll Environmental Report, dated 25 March 2019 (**Appendix B**) and the Claverton Associates Report, dated 16 August 2019 (**Appendix C**). It should be noted that the Argyll Environmental Report is based on a larger site area than that proposed for development at Land at J3. However, all of the land proposed for development at Land at J3 is included within the land assessed within the Argyll Environmental Report.

1.2 Proposed Development

Land north of Junction 3 of the M54 is currently identified in the Shropshire Local Plan Review: Consultation on Strategic Sites (July 2019) document as a potential strategic site for a strategic employment site of around 50ha of employment, accompanied by around 3,000 homes, and a local centre to provide services, facilities and infrastructure, as part of a planned settlement. An emerging illustrative masterplan has been prepared by Bidwells LLP on behalf of the Client and is attached at **Appendix A**.

2.0 SITE DESCRIPTION AND CURRENT LAND USE

2.1 Current Site Description

The Study Area is approximately 700ha area located approximately 7km east of Telford in a predominantly agricultural setting. The southern boundary is marked by the M54 Motorway, with Junction 3 located at the southeast corner of the boundary. Agricultural land is present to the west of the site, with the B4379 comprising the northwest boundary. The northern boundary of the Study Area comprises the A5. To the east, the A41 runs from M54 Junction 3 northwards, through Tong village until encountering the A5.

Relevant features discussed below are depicted on a site features plan as **Figure 2** in **Annex A**.

The majority of the Study Area comprises agricultural land in arable or pastoral use. Monarch's Way is a public footpath which traverses the central farmland area of the Study Area. Features excluded from the red

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line boundary area, but within close proximity to the site boundary, include the village of Tong located in the southeast, Tong Forge in the southwest and a plant ard truck hire business in the west of the site. Two farms are located in the centre towards the east (Lizard Mill Farm) and to the south (Vauxhall Farm) of the study area.

Surface water features present on site include Church Pool to the south-east and Neachley Brook to the south-west. Eight un-named surface water drainage ditches are also shown within the site boundary.

2.2 Site History

Publicly-available historical maps were reviewed to identify potentially contaminative former land uses which may have been present in the study area, and with the exception of construction of the M54 motorway, other significant development was not noted since the earliest maps reviewed (dated 1882).

The map from 1882 recorded gravel pits in the northwest and to the southwest of the Study Area. The map dated 1957 no longer recorded either gravel pits, indicating that they were likely to have been backfilled by this date. In addition, the maps indicated that in the 1940s a pond (called The Lodge Lake) partially within the south of the Study Area (adjacent to the south of Vauxhall Farm) was drained and backfilled. The surface water course which supplied the pond was also partially backfilled. The approximate location of the former pond and water course are shown on **Figure 2** in **Appendix A**.

3.0 SITE ENVIRONMENTAL SETTING

3.1 Hydrology

The site is located in the Severn River Basin District, within the Severn Middle Worcestershire Operational Catchment. Surface water features both within the site boundary and in the vicinity (within 500m) of the site are summarised in **Table 1.**

Table 1 - Summary of Hydrological Features within 500m of the Study Area

Surface Water Features	Quality*	Distance	Direction	Flow Direction
Church Pool	N/A	On-site	On-site	None
Un-named ponds (5)	N/A	On-site	On-site	None
Un-named drainage ditches (8)	N/A	On-site	On-site	Various
Neachley Brook	Ecological: Moderate Chemical: Good	On-site	On-site	South
Burlington Pool	N/A	20m	North	None
Norton Mere	N/A	215m	North	None
New Park Pool	N/A	485m	East	None
Un-named pond	N/A	500m	South-East	None

**Taken from the Environment Agency Catchment Data Explorer, accessed July 2019*

A single surface water abstraction is recorded to the south of Church Pool (south of the Study Area) and is shown with the **Figure 2** in **Appendix B**. The site is also within Surface Nitrate Vulnerable Zones.

3.2 Geology and Hydrogeology

The British Geological Survey (BGS) online map viewer indicates the geological sequence summarised in **Table 2** to underlie the site and immediate surrounds. The published geology summarised below is shown

on **Figures 3** and **4** presented in **Annex A.** The Environment Agency is responsible for Aquifer designation status.

Table 2 - Summary of Anticipated Geological Strata ard Aquifer Status

	Unit and BGS Description	Aquifer Designation
Superficial Deposits	**Glaciofluvial Deposits** Sand and gravel, locally with lenses of silt, clay or organic material; of glaciofluvial origin.	Secondary A Aquifer
	Devensian Till Variable lithology, usually sandy, silty clay (possibly chalky in southeast England) with pebbles, but can contain gravel-rich, or laminated sand layers.	Secondary (Undifferentiated) Aquifer
	Alluvium Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel.	Secondary A Aquifer
Bedrock	**Helsby Sandstone Formation** Fine- to medium-grained, locally micaceous, cross-bedded and flat-bedded sandstones, weathering to sand near surface.	Principal Aquifer
	Bridgnorth Sandstone Cross bedded aeolian sandstones, mainly brick red, soft, medium-grained.	Principal Aquifer
	Enville Member - Sandstone and Sandstone with Subordinate Conglomerate, Siltstone and Mudstone Red mudstone and red-brown, fine to coarse-grained sandstone, locally pebbly, and lenticular beds of conglomerate.	Secondary A Aquifer
	Mercia Mudstone Group – Mudstone and Halite Dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas.	Secondary B Aquifer
	Wildmoor Sandstone Member Sandstones, generally silty or argillaceous, fine- to medium-grained, bright orange-red to dark brick-red, with subordinate siltstone and mudstone.	Principal Aquifer
	Chester Formation – Sandstone and Conglomerate Interbedded conglomerates and sandstones, with sandstone and pebbly sandstone predominant.	Principal Aquifer

Made Ground may be present in isolated areas where buildings have been demolished or in areas of localised material burial, however, Made Ground areas on-site have not been confirmed as part of this study.

Superficial deposits are generally recorded in the northwest and in the southern parts of the Study Area, comprising Glaciofluvial Deposits, Devesian Till and thin bands of Alluvium, principally recorded adjacent to water courses. No superficial deposits are recorded in the eastern portion of the site to the north of Tong Village.

Solid geology predominantly comprises sandstone for majority of the Study Area, with a limited portion in the south-east indicated to be underlain by Mercia Mudstone Group. Mercia Mudstone Group has the potential to contain halite deposits, which can be subject to dissolution leaving natural cavities.

Several BGS borehole records in the central and southern areas indicate that bedrock is <5m from surface, while two boreholes recorded in the northeast part of the site indicate bedrock to be present at 21m and up to 31m deep.

A fault occurs in the centre of the site with a northeast southwest direction. To the west of the Study Area, three faults are also present in an approximate east-west orientation. Similarly, an east-west orientation fault is present in the southeast.

The sandstone aquifers, underlying the majority part of the site and are classified as Principal Aquifers, which are considered by the Environment Agency to be the most sensitive from a land contamination perspective given the local and often regional use for water supply. A total of 11 groundwater abstraction wells are located within the Study Area, as shown in the Argyll Environmental Report within **Appendix B**. The majority of these are located to the northwest and in the centre of the site. Three of these abstractions are for general agriculture (spray irrigation) while two are for general farming and domestic. The remaining six are for potable water supply. The approximate locations of the abstractions are shown on **Figure 2** in **Appendix A.**

A Groundwater Abstraction point located approximately 220m east of Lizard Mill Farm (indicated on Ordnance Survey Maps as 'Pp Ho'), is surrounded by Zones 1, 2 and 3 of an Environment Agency groundwater Source Protection Zone. Details of the groundwater abstractions can be found with the Argyll Environmental Report, **Appendix B**.

The site is also within a Groundwater Nitrate Vulnerable Zone.

3.3 Sensitive Environmental Receptors

The Multi-Agency Geographical Information for the Countryside (MAGIC) website was reviewed to determine whether environmentally-sensitive features are present with the vicinity of the site. The site does not lie within 500m of one of the following sensitive sites: Site of Special Scientific Interest (SSSI), National Nature Reserve, Ramsar Site, Special Area of Conservation, Special Protection Area or World Heritage Site.

4.0 REGULATORY INFORMATION

4.1 Flood Risk

The Environment Agency website indicates that the majority of the study area is located within Flood Zone 1 and has a low probability of flooding, which is defined as land having a less than 1 in 1,000 annual probability of river or sea flooding. However, areas surrounding the un-named drainage ditches are within Flood Zone 2, which the Environment Agency defines as '*land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding*' and Flood Zone 3, which the Environment Agency defines as land having a greater than 1 in 100 probability of flooding.

This is not a formal assessment of flood risk at the study area, which is beyond the scope of this review.

4.2 Coal Authority

A review of the Coal Authority website indicates that the western boundary of the site is within a 'Coal Authority Coal Mining Reporting Area'. This indicates that a coal mining report may be required for the western portion of the site before any development to assess potential past mining activities in this area. In addition, the BGS online map viewer indicates that deep coal (50m and 1200m deep) is present across the site.

4.3 Radon

The Public Health England website has been reviewed to determine whether the site represents a potential radon risk. The website indicated that the site is within an area where <1% of homes are above the action level for radon gas. As such, risks from radon are considered to be low.

4.4 UXO

The Zetica Regional Unexploded Bomb Risk Map indicates that the risk from unexploded ordnance (UXO) in the study area is 'Low' which is defined by Zetica as '*those with a bombing density of up to 10 bombs per 1000 acres. These areas are considered to have a significant but low UXB risk*'.

4.5 Discharge Consents

The Agyll Environmental Report, **Appendix B,** identified five discharge consents within the site boundary, with two located toward to the north, discharging fluid type recorded 'Sewage Discharges', with effective date recorded from 1977 and 1984. No revocation dates are supplied. The remaining three discharge consents are recorded in the southeast part of the site, also showing 'Sewage Discharges' as the fluid type, with effective date recorded from 1979 and 2010. Similarly, no revocation dates are supplied. The approximate locations of the discharge consents are shown within **Figure 2** in **Appendix A**.

4.6 Pollution Incident

The Agyll Environmental Report recorded a single substantiated pollution incident to the west part of the site, dated May 2007, indicating asbestos waste as pollutant type. A category 1 (Major Incident) has been assigned for land impact. The approximate location is shown within **Figure 2** in **Appendix A.** No further details regarding de-contamination are provided.

4.7 Potentially Infilled Land

The Agyll Environmental Report identified three potential areas of infilled land within the site. A single one located to the east, described as 'Unknown Filled Ground (Pit, quarry etc.)', and the remaining two located to the south-east and to the west part of the site. Both described as 'Unknown Filled Ground (Pond, marsh, river, stream, dock etc.)'. The approximate locations of these areas are shown on **Figure 2** in **Appendix A.**

4.8 Potentially Contaminative Land Uses

The Agyll Environmental Report recorded three potental contaminative current land uses on / nearby the site. An active pest and vermin control site and an inactive engineering machine service are located within the west and south-west of the site. A petrol filling station is located adjacent to the east as shown on **Figure 2** in **Appendix A.**

4.9 Natural and Mining Related Hazards

The Agyll Environmental Report classified the site as 'Very Low' risk for collapsible ground stability hazards and shrinking or swelling clay subsidence, while 'Low' risk classification is indicated for landslide and running sand ground stability. A 'Moderate' risk has been assigned for compressive ground stability.

5.0 CLAVERTON ASSOCIATES REPORT

The Claverton Associates report (**Appendix C**) provides factual and interpretative assessment of a ground investigation undertaken adjacent to the Tong Gulf Services Filling Station. The filling station adjoins the eastern site boundary (marked by the A41) and is reported as including underground storage tanks.

The investigation comprised two boreholes to a maximum depth of 8.00m bgl. Geology encountered comprised topsoil / Made Ground (to maximum depths of 0.20m bgl and 0.80m bgl respectively) underlain by sand and gravel deposits.

Six soil samples were obtained from the boreholes and analysed for total petroleum hydrocarbons and BTEX[1] (which are considered appropriate for an initial assessment of hydrocarbon migration). No soil leachate or groundwater sampling / analysis were carried out as part of the ground investigation. Soil analytical results did not record concentrations of contamination which exceeded the applied assessment criteria.

The ground investigation undertaken does not record soil contamination from the adjacent petrol filling station, which indicates that the petrol filling station is unlikely to have impacted the site, however, the assessment does not take account of whether hydrocarbon contamination-impacted groundwater is present. The investigation did not encounter any visual or olfactory evidence of hydrocarbon contamination in groundwater, but groundwater sampling and chemical analysis would be required in order to confirm the absence of fuel-related contamination. Although very low, the potential risk to groundwater from the petrol filling station cannot be discounted entirely.

6.0 POTENTIAL CONSTRAINTS IDENTIFIED

A review of the information provided above indicates that the following potential contamination and geotechnical development constraints are pertinent to the Study Area:

6.1 Potential Contaminated Land Constraints

Potential contamination-related constraints to the proposed development may include:

- Made Ground present from potential former building and areas of localised burial (none confirmed from the study);
- The potential identified backfilled areas including the Lodge Lake, the drainage ditch and the gravel pits represent potential sources of contamination and ground gas, dependent on the backfill materials used;
- Contamination from agricultural activities (including herbicides, pesticides and potential hydrocarbon leaks / spillage from machinery or fuel storage), engineering machine services, pest and vermin control site and the plant and truck hire company within the site;
- Possible asbestos contamination and fly-tipping;
- Ground gas migration from Alluvium (dependent on composition), Made Ground (if present), adjacent petrol filling station (as vapour) and former backfilled ponds, gravel pits and un-named and drainage ditch; and
- Potential contamination migration onto the site from the roadways and adjacent motorway to the south.

6.2 Geotechnical Constraints

The principal geotechnical constraints which have been identified at this preliminary review stage are as follows:

- Presence of variable thickness and composition of superficial deposits across the site. Shallow foundations may not be suitable in areas where increased thicknesses of superficial deposits are present (and potentially Made Ground). The variability in the shallow deposits may also result in differential settlement where foundations cross strata boundaries;
- The areas potentially backfilled including the Lodge Lake, the drainage ditch, gravel pits and the infilled water bodies represent a potential for soft and poorly compacted ground, likely to be unsuitable for shallow foundations;
- Potential for shallow groundwater which may result in seepage and collapse of shallow excavations. Also potential for softening of ground and reduced bearing capacities and impacts on potential drainage options;
- Mercia Mudstone Group may be subject to dissolution features from the presence of evaporates such as gypsum and halite;

[1] BTEX compounds comprise benzene, toluene, ethylbenzene and xylenes.

- Potential for Made Ground and superficial deposits to contain elevated sulphate concentrations leading to aggressive ground conditions;
- The Study Area is located within a coal mining report area (western part), which may indicate the presence of underground coal mining; and
- Ground heave effects on foundations and infrastructure from the removal of mature trees within clay rich materials.

A Preliminary Development Constraints Risk Matrix is included in **Table 3** below.

Table 3 – Preliminary Development Constraints Matrix

ITEM	CONSTRAINT	CONSEQUENCE	QUALITATIVE RISK LEVEL	POSSIBLE MITIGATION(S)
1	Unknown groundwater conditions	Instability of excavations Risk of injury to site personnel	Medium	The presence of granular deposits at the site and several surface water features may give rise to shallow groundwater in some areas. **Mitigation options:** Intrusive ground investigation and groundwater monitoring would characterise groundwater conditions and reduce uncertainty. Instability of excavations can be mitigated by appropriate planning of activities prior to them being undertaken, and mitigation measures being applied. In extreme cases dewatering of excavations may be required.
2	Shrinking / swelling clays	Damage to foundations / structures More costly engineering solutions Financial implications	Low	Areas of Devensian Till and Mercia Mudstone Group may be affected by shrinking / swelling of clays. Vegetation and mature trees are noted in field boundaries and areas of woodland at the site (mainly to the west). If existing trees are removed, or new trees are planted, this can result in shrinking or swelling of clay, which may damage foundations. **Mitigation option:** An assessment of tree species and potential root depths (if proposed as part of the development plan) should be undertaken and the potential effects assessed using NHBC guidance[2]. A ground investigation would provide characterisation of the superficial deposits and bedrock, which would reduce potential uncertainty.
3	Variable superficial deposits / Made Ground	Financial implications Structural instability	Medium	Superficial deposits are recorded on published geological mapping and Made Ground may be present in isolated areas. Glaciofluvial Deposits, Alluvium and Devensian Till are recorded as present on-site, and in some areas superficial deposits are absent. The variable thickness and composition of the superficial deposits and Made Ground may mean that shallow foundations are not suitable and deep foundations are required. Where foundations cross strata boundaries, there may be a risk of differential settlement. **Mitigation option:**

[2] NHBC Standards (January 2018 – no reference)

ITEM	CONSTRAINT	CONSEQUENCE	QUALITATIVE RISK LEVEL	POSSIBLE MITIGATION(S)
				Intrusive ground investigation and geotechnical assessment to characterise the superficial deposits and reduce risks / uncertainties.
4	Hard digging in shallow bedrock	Programme delays Financial implications	Medium	Hard digging within shallow bedrock (indicated to be <5m and up to 31m) may result in programme delays and additional costs if not managed effectively. **Mitigation option:** Ground investigation will provide information on potential areas of hard digging, which can be mitigated by programme management and acquisition of specialist equipment for excavation.
5	Potential for UXO	Risk of injury to site personnel Risk of injury to public Financial implications Programme delays	Low	Preliminary desk study research indicates a low risk of potential UXO presence at the site. **Mitigation option:** Site personnel should be briefed on the potential for UXO and actions to take as part of induction processes during development. Characterisation of the potential for UXO could be achieved by procurement of a specialist UXO assessment for the study area.
6	Contamination in Made Ground (if present) and unidentified localised contamination from agricultural use and potentially contaminative sites	Risk of harm to human health Programme delays due to contamination management requirements. Insufficient information on ground and groundwater conditions. Requirement for soil, gas and groundwater remediation.	Low to medium	Made Ground may be present at the site, although none is confirmed. If Made Ground is encountered, then potential contamination may be present which may represent potential risks to future residents. **Mitigation option:** Ground investigation would confirm the presence / absence of Made Ground and allow for sampling of Made Ground to assess the potential for contamination. Completion of a human health and controlled waters risk assessment to confirm level of risks posed. Incorporation of suitable thickness of clean cover / hard-standing / hard to dig layer to break exposure pathway to human health. Mitigation measures to be agreed with the Local Authority. Incorporation of appropriate ground gas and vapour protection. Installation of appropriate level of water supply pipes and clean service corridors.

ITEM	CONSTRAINT	CONSEQUENCE	QUALITATIVE RISK LEVEL	POSSIBLE MITIGATION(S)
		Financial implications. Reputational damage. Risk to controlled waters and structures.		Should controlled waters or human health risk assessment confirm an unacceptable risk, excavation of impacted soil should be undertaken, along with removal/treatment of impacted groundwater. Liaison with the Local Authority and Environment Agency to determine specific issues.
7	Potential contamination within backfilled Lodge Lake, drainage ditch, gravel pits and potentially infilled areas	As Item 6	Medium	The backfilled Lodge Lake, drainage, gravel pits and potentially infilled areas represent a particular source of contamination dependent on the backfill material used. The potential for contamination is unknown at present, as information on the backfill composition was not available as part of this study. **Mitigation option:** Undertake targeted ground investigation within the former Lodge Lake area to characterise potential risks and provide recommendations for construction related mitigation.
8	Buried utilities	Risk of injury to site personnel and public Programme delays	Medium	Buried utilities may represent potential financial implications and risk of injury if struck during excavations works. Larger scale services with stand-off would reduce developable area. **Mitigation option:** Buried utility plans should be utilised as part of proposed excavation works and breaking ground to reduce risks. Ensure all services are demarcated prior to excavation. Completion of a utilities assessment to allow revision of development proposals
9	Mercia Mudstone Group – dissolution features	Financial and programme implications. Additional design cost Programme delays	Low to Medium	Completion of ground investigation may characterise bedrock beneath the site and provide information on the likelihood of dissolution features to be present. **Mitigation option:** Procurement of a Natural Cavities search report may provide some evidence on the likelihood of natural cavities to be present at the site. Ground investigation would characterise potential risks further.

ITEM	CONSTRAINT	CONSEQUENCE	QUALITATIVE RISK LEVEL	POSSIBLE MITIGATION(S)
10	Retaining walls	Failure of retaining walls Additional design cost Programme delays	Low	If existing retaining walls are present or new retaining walls are proposed, there is the potential for failure of the structures if ground and groundwater conditions are not suitably characterised. **Mitigation option:** If retaining walls are required as part of the earthworks design, ground investigation and subsequent stability assessments could be undertaken to confirm the requirement for retaining walls prior to earthworks and reduce potential risks associated with retaining wall construction.
11	Sign-off of reports and assessments by Highways England where in proximity to highways	Programme delays Financial implications	Low	The proposed development may require review by Highway England to check whether there are areas within the development which may affect the adjacent highways. **Mitigation option:** Engage with Highways England early in the development process to ensure that any requirements are established prior to ground investigation being undertaken.
12	Sensitive aquifers and water abstractions	Risk to site personnel Financial and programme implications. Reputational Risk	Low	The presence of sensitive aquifers and groundwater abstractions may require further management during construction and would be a sensitive receptor should land contamination be identified. **Mitigation option:** Engage with Environment Agency and Local Authority as part of the ground investigation process to determine any specific concerns or requirements for aquifer protection.
13	SUDS / soakaways	Programme implications Re-design costs should drainage features not be effective	Medium	If SUDS or soakaway drainage is to be proposed, there is a potential risk of these features being ineffective if ground conditions are not suitable for their placement **Mitigation option:** Complete ground investigation and soakaway infiltration testing to establish the ground and groundwater conditions to allow for appropriate design and recommendations for SUDS features. Engage with Environment Agency to ascertain any specific requirements for aquifer protection from proposed soakaway drainage features.

ITEM	CONSTRAINT	CONSEQUENCE	QUALITATIVE RISK LEVEL	POSSIBLE MITIGATION(S)
14	Coal Mining	Damage to foundations / structures More costly engineering solutions Financial and programme implications Additional design cost Programme delays	Medium	Coal mining may be present to western part of the site causing a potential risk to development and site personnel. **Mitigation option:** Request a coal mining report to assess the extent of potential coal mining activities carried out on the Study Area. Ground investigation would ascertain risk of mining further.

7.0 CONCLUSIONS

Whilst potential development constraints have been identified, given the history of the site (predominantly agricultural) and surrounding land use, **the potential for contamination and Made Ground beneath the site is considered to be low** on the basis of currently-available information. Potential on-site sources are likely to be limited to localised hydrocarbon spillages from farm machinery / fuel storage, refuelling points, areas where former buildings were located, areas identified as potentially infilled due to prior recorded pits and ponds, the backfilled former Lodge Lake (with associated backfilled surface water course) and areas where identified potentially contaminative site operates (or inactive) including the pest and vermin control site. The principle off-site source is considered to be the adjacent petrol filling station in Tong Norton, however, a ground investigation undertaken indicates no significant impact is present in soil on-site.

The presence of a variable thickness of superficial deposits may result in the requirement for deep foundations or piles taken into the Mercia Mudstone Group or the Sandstone bedrock below. Ground investigation would inform the ground model and the magnitude of ground-related constraints to be established. Mercia Mudstone Group may be subject to potential dissolution features, which would require increased foundation design considerations.

Shallow Devensian Till and Mercia Mudstone Group may also present a risk due to shrinking and swelling clays where mature trees are either removed or new trees planted within the vicinity of proposed structures. It is possible that shallow groundwater may be present in the superficial deposits. Other geotechnical constraints include the potential for buried services and UXO at the site.

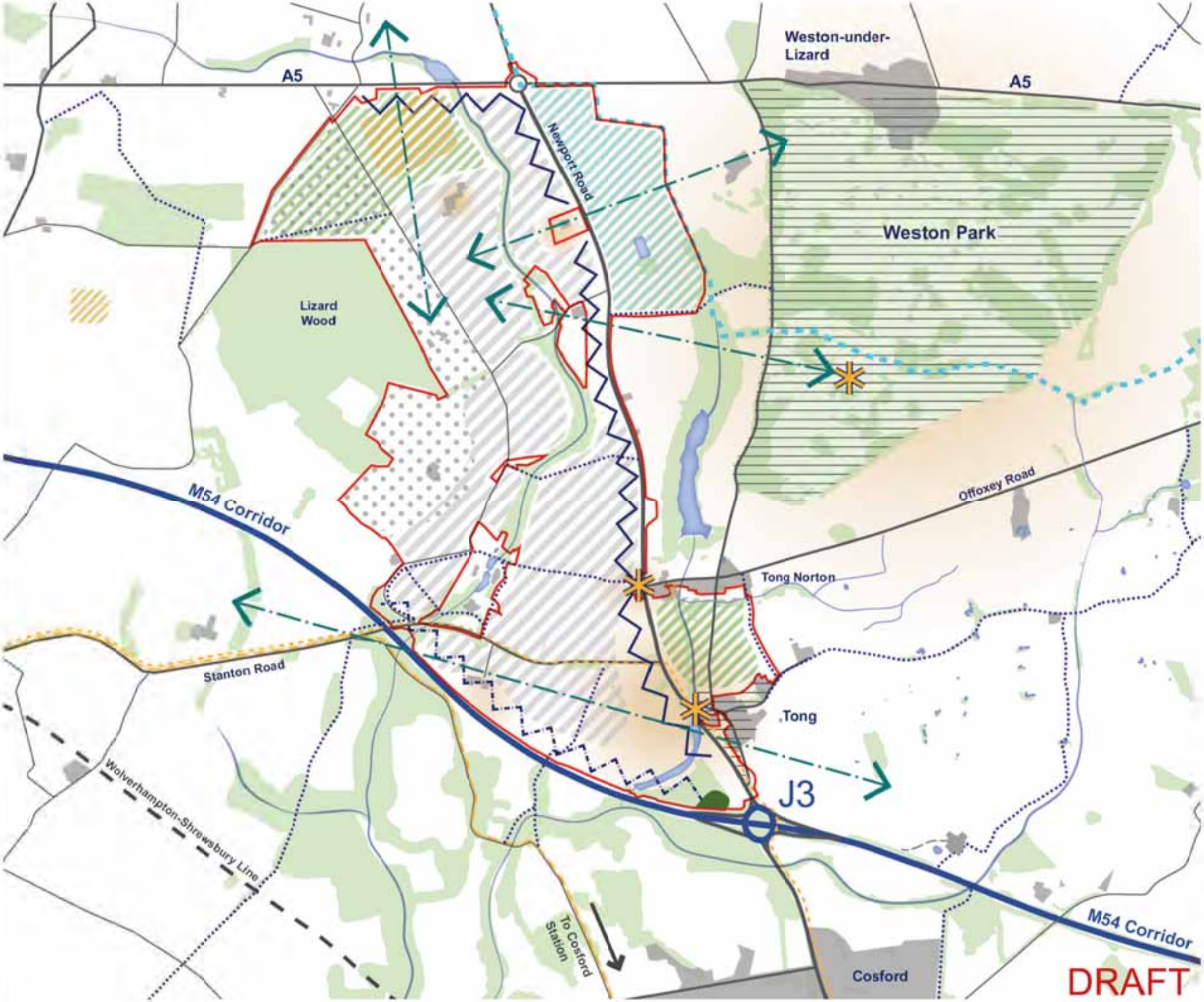
Based on existing information, it is considered unlikely that the potential contaminated land or geotechnical hazards identified will represent a significant constraint to development of the site provided adequate intrusive ground investigation is carried out and the characteristics of the ground are taken into consideration at design stage.

Further assessment work will be required in due course to support any potential planning application.

8.0 CLOSING

The comments and assumptions made within this report are based on a preliminary desk-based data review of readily-available information sources which has been prepared without the benefit of a site walkover or purchase of additional mapping or other data. No formal masterplan has been made available, and no agreed planning permission reviewed. It should therefore be noted that the findings of this summary may change once details of the emerging scheme are available and additional review is commissioned.

ANNEX A : FIGURES



KEY

- Site Boundary
- M54
- Highways
- Roundabout
- Railway line
- Existing built form
- County boundary
- PRoW
- National Cycle Route 81
- Bus routes
- Waterbodies
- Watercourses
- Major vegetation
- Ancient woodland
- Conservation Area
- Key heritage asset
- Setting of heritage features
- Scheduled Ancient Monument
- Visible high ground within site
- Site intervisibility
- Opportunity for landscape feature to mitigate intervisibility
- Green Belt improvement focus areas
- Development opportunity area
- Potential Green Belt boundary enhancements
- Boundary with M54

Rev Date Details

Do not scale from this drawing. All dimensions to be checked on site. This plan is to be read with all accompanying documentation. © Bidwells 2019

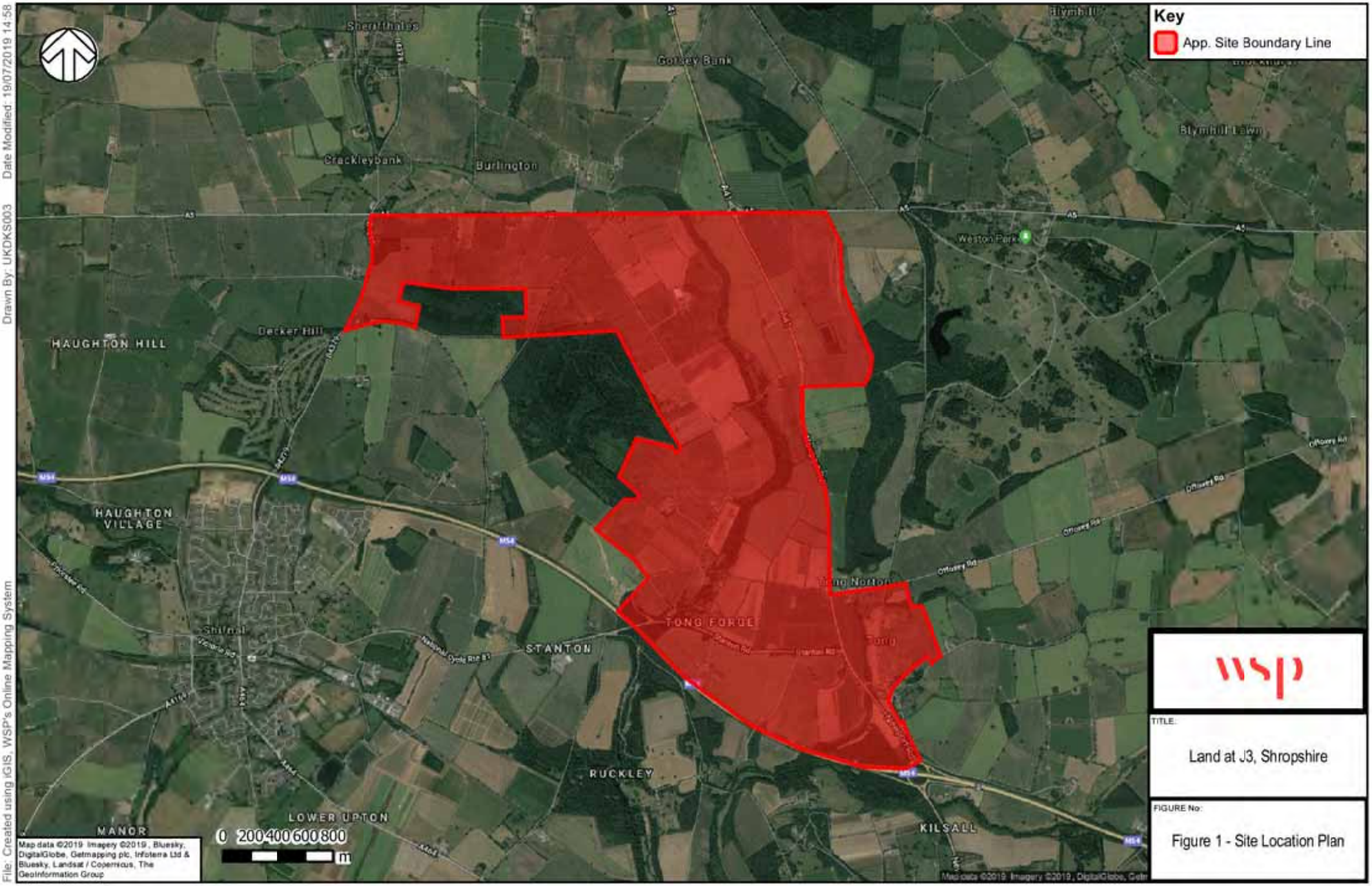
Bradford Estates
Bradford Estate Office, Weston-under-Lizard, Shifnal, Shropshire TF11 8AJ

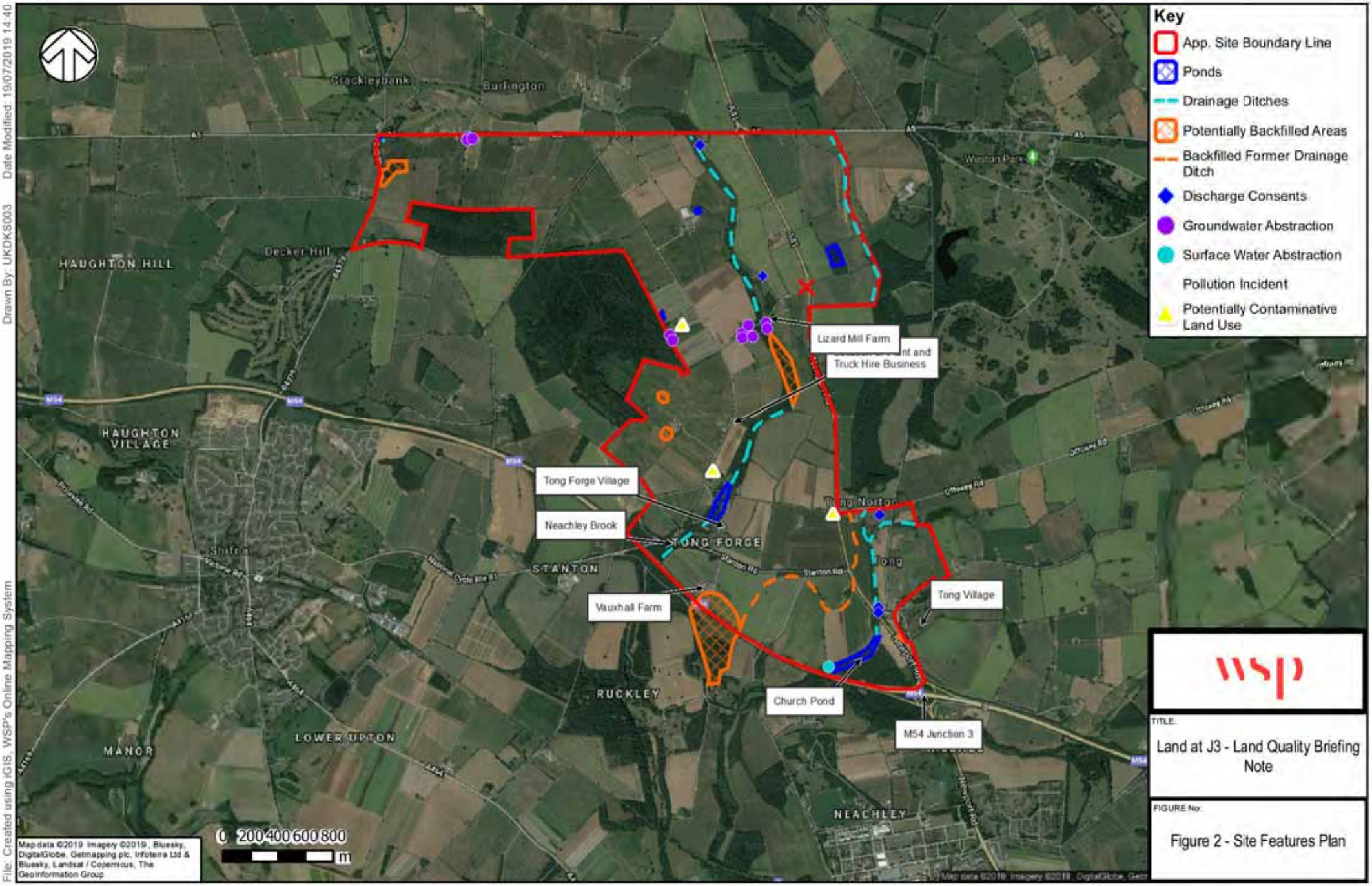
Urban Design
Bidwell House, Trumpington Road, Cambridge CB2 9LD

JUNCTION 3: M54

OPPORTUNITIES + CONSTRAINTS PLAN

Job Code: 44025
OS License Number: 100017734
Drawing Scale: NTS
Date: 26.06.19
Drawn By: JG
Checked By: DP
Drawing Number: UDS44025-A3-0110
Revision: -


Key
App. Site Boundary Line
HAUGHTON HILL
HAUGHTON VILLAGE
STANTON
RUCKLEY
LOWER UPTON
MANOR
KILSALL
TONG FORGE
Burlington
Decker Hill
Weston Park
Blymhill Lawn
Tong Norton
Shifnal
0 200 400 600 800
m
Map data ©2019 Imagery ©2019, Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Landsat / Copernicus, The GeoInformation Group
wsp
TITLE:
Land at J3, Shropshire
FIGURE No:
Figure 1 - Site Location Plan
File: Created using iGIS, WSP's Online Mapping System
Drawn By: UKDKS003
Date Modified: 19/07/2019 14:58


Key
App. Site Boundary Line
Ponds
Drainage Ditches
Potentially Backfilled Areas
Backfilled Former Drainage Ditch
Discharge Consents
Groundwater Abstraction
Surface Water Abstraction
Pollution Incident
Potentially Contaminative Land Use
Lizard Mill Farm
Truck Hire Business
Tong Forge Village
Neachley Brook
Vauxhall Farm
Church Pond
Tong Village
M54 Junction 3
HAUGHTON HILL
HAUGHTON VILLAGE
TONG FORGE
STANTON
RUCKLEY
LOWER UPTON
MANOR
NEACHLEY
Burlington
Crackleybank
Decker Hill
Weston Park
Tong Norton
Tong
Shifnal
0 200400600800
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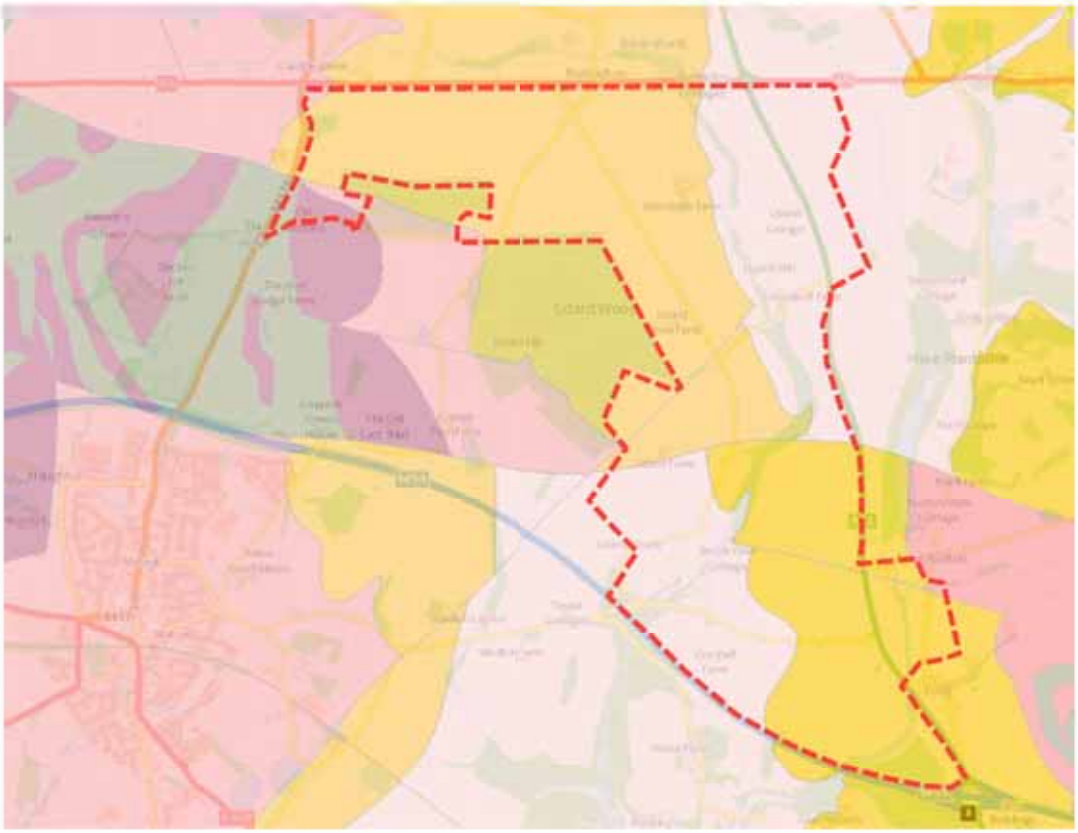
Map data ©2019 Imagery ©2019, Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Landsat / Copernicus, The GeoInformation Group
File: Created using iGIS, WSP's Online Mapping System
Drawn By: UKDKS003
Date Modified: 19/07/2019 14:40
TITLE:
Land at J3 - Land Quality Briefing Note
FIGURE No:
Figure 2 - Site Features Plan

Figure 3: BGS mapping extract – superficial deposits

Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- GLACIOLACUSTRINE DEPOSITS, DEVENSIAN - CLAY AND SILT
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- RIVER TERRACE DEPOSITS, 1 - SAND AND GRAVEL
- PEAT - PEAT

Figure 4: BGS mapping extract – bedrock deposits



Bedrock geology 1:50,000 scale

- WILDMOOR SANDSTONE MEMBER - SANDSTONE
- LITTLE WENLOCK BASALT MEMBER - BASALT
- PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- ETRURIA FORMATION - MUDSTONE, SANDSTONE AND CONGLOMERATE
- MERCIA MUDSTONE GROUP - SILTSTONE, DOLOMITIC
- BRIDGNORTH SANDSTONE FORMATION - SANDSTONE
- HALESOWEN FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- HELSBY SANDSTONE FORMATION - MUDSTONE
- MERCIA MUDSTONE GROUP - MUDSTONE AND HALITE-STONE
- ALVELEY MEMBER - MUDSTONE AND SANDSTONE
- ENVILLE MEMBER - SANDSTONE
- MERCIA MUDSTONE GROUP - SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- LYDEBROOK SANDSTONE FORMATION - SANDSTONE
- CHESTER FORMATION - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- PENNINE LOWER COAL MEASURES FORMATION - SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE
- HELSBY SANDSTONE FORMATION - SANDSTONE, PEBBLY (GRAVELLY)

ANNEX B : ARGYLL ENVIRONMENTAL REPORT

argyll ENVIRONMENTAL

EstateSolutions Farm

Contaminated Land
FURTHER ACTION

Flooding
PASSED ✔

Argyll's Overview

Contaminated Land :
The property poses a sufficiently serious environmental risk to require further investigation. Please refer to the recommendations on page 4.

Flood Risk :
Moderate - The Site is susceptible to flooding from one or more sources. A prudent purchaser should ask the vendor whether there has been any historical flooding and confirm the availability of building and contents insurance. You may also want to carry out further assessment and explore options for managing flood risk (see pages 3 & 4).

Environmental Hazards :
The following other Environmental Hazards have been identified in the immediate vicinity of the Site: Ground Instability Hazard, Mining Instability, Coal Mining, and Infilled Land

Report on:

Land adjacent to junction 3 of the M54, Shropshire, TF11 8PW

Report prepared for:
X-Press Legal Services

Client Reference:

Report Reference:
AEL-4775-PSF-967436

National Grid Reference:
379618,307423

Report date:
25th March 2019

Site Location

Report prepared on

Land adjacent to junction 3 of the M54, Shropshire, TF11 8PW

Site Area (hectares)

940.4341

Current Use

Agricultural

Proposed Use

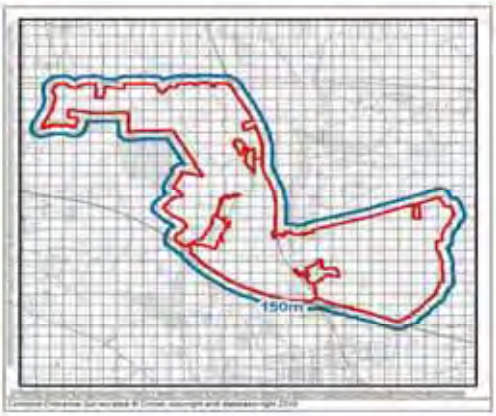
Development land

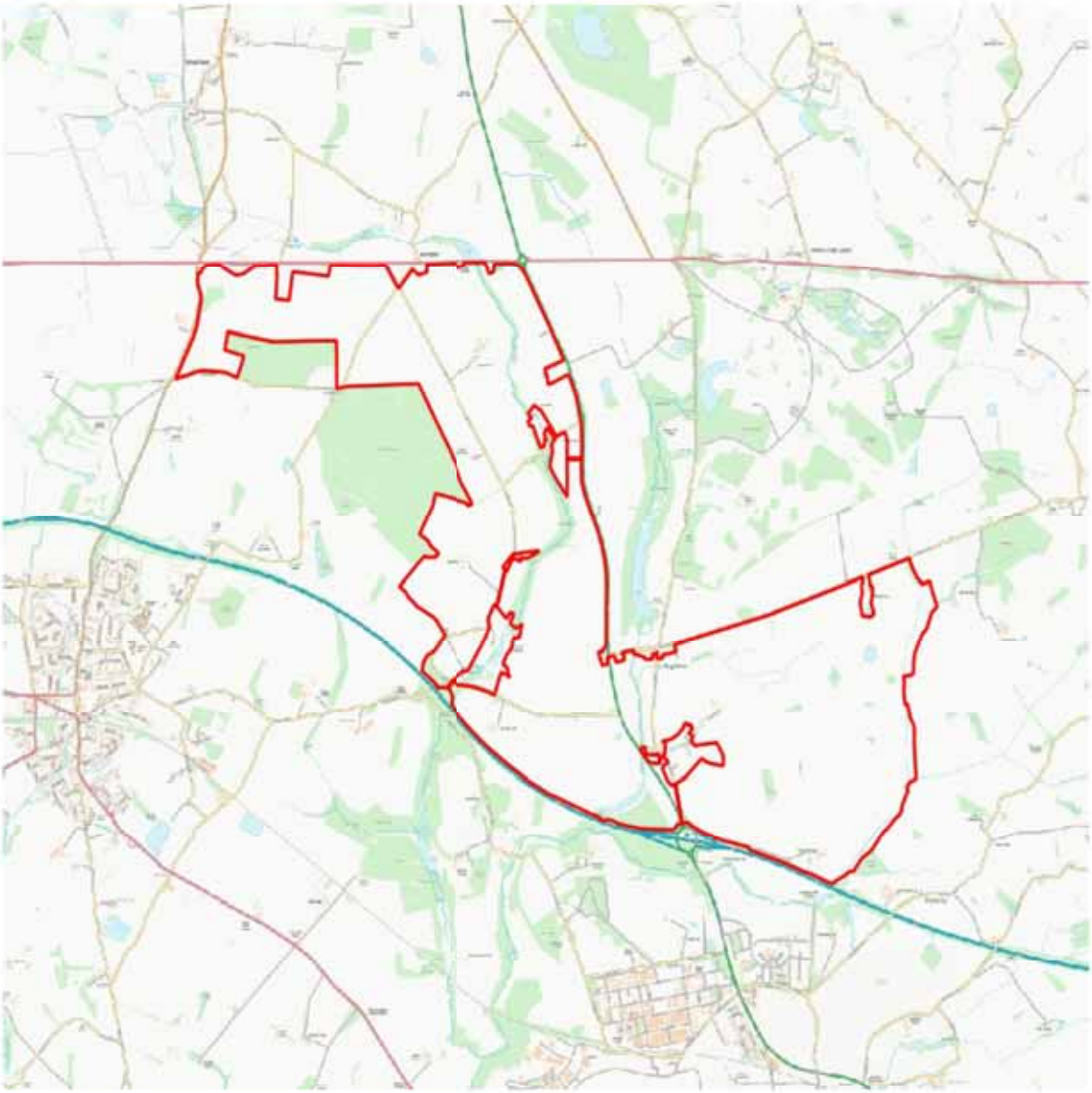
Report Prepared For

Assumed purchase

Report Author

Tessie Hendry
Telephone: 0845 458 5250
E-mail: orders@argyllenviro.com





Summary of Liabilities and Risk

Issue	Evaluation

Contaminated Land Liability Assessment

FURTHER ACTION

What is the pollution risk from within the property?	Moderate
What is the pollution risk from the surrounding area?	High
What is the sensitivity of this area to pollution?	High
What is the overall liability risk of this property?	Moderate

Within the scope of this assessment potential liabilities have been identified at the farm. We recommend that you undertake more detailed investigation to better quantify these risks. Please see our recommendations for details.

PASSED

Flood Risk Summary

What is the overall risk of flooding at the farm, assuming flood defences are operational?

Moderate (see recommendations below)

Additional Considerations Summary

Asbestos		Ground Instability		Mining Hazard	
Radon		Coal Mining		Nitrate Vulnerability	
Brine Compensation		Historic Rights of Way		Sensitive Land Uses	
Water Abstractions		Sewage Discharges		Stewardship Schemes	
Unexploded Ordnance		Soil Chemistry		Telecommunication Base Stations / Transmission Lines	
COMAH Sites		Listed Buildings			

Please refer to the Additional Considerations section for further details for those considerations that have been flagged by the report.

Contaminated Land Recommendations

FURTHER ACTION

There is an elevated risk of contamination at the Site, due to former depot on-site, old gravel pits, and an adjacent petrol filling station (see locations in the body of report). As the Site is being redeveloped, Planning Conditions will be used as a mechanism to remediate the Site to an acceptable standard.

The Planning Authority will require a phased risk assessment, and must be consulted at each stage. This may begin with a Phase 1 Assessment, but will most likely lead on to a targeted Phase 2 Intrusive Investigation close to the areas identified above. The Phase 2 will involve a combination of soil, gas and groundwater sampling. Please note, this investigation may well highlight a requirement to remediate.

We would be happy to corfirm with the Planning Authority that this approach is acceptable. If you would like a quote for an appropriate phased approach, please contact your report writer on 0845458 5250.

Flood Risk Recommendations

PASSED

1. Under planning policy (NPPF) a Flood Risk Assessment (FRA) will need to accompany any planning application. The FRA should demonstrate how flood risk will be managed so the development will remain safe throughout its lifetime. The scope of the FRA will be dependent on the nature of the risk and sensitivity of the development.

2. The Planning Authority may require you consider Sustainable Drainage systems (SuDS) as part of the development. If this is the case we can carry out a Sustainable Drainage Strategy to submit with the planning application. We would be happy provide a proposal for this work.

3. You should ask the seller whether flooding has occurred in the area before. If it has, please contact us for advice.

4. Finally, establish the terms of buildings and contents insurance before exchanging contracts.

Please contact us on 0845 458 5250 if you would like to discuss any aspect of this recommendation.

Contaminated Land Risk Analysis

Investigation	Risk Commentary
Farm description	The farm is approximately 940 hectares and is formed of arable land, pasture land and small areas of woodland. The Site is traversed by the River Worfe in the west, and several drains in the east, with numerous small ponds also scattered across the eastern area. There are several farmhouses with agricultural barns and buildings identified across the Site, most notably Woodside Farm in the north-west, Lizard Farm at the centre, Vauxhalll Farm centre-south, Tonghill Farm and Church Farm centre-east, and Tong Park Farm south-east. The majority of these farms appear to be in equestrian use, with nearby sand schools observed in aerial photography. Recent aerial imagery also indicates that buildings at Woodside Farm are in use for steel manufacture. A Discharge Consent was point-located on-Site, however, as this is addressed to Burlington Cottages and is therefore believed to relate to properties adjacent north. Furthermore, a Substantiated Pollution Incident was identified on-Site in October 2002, which involved the spiling of diesel oils, which caused a significant water impact and minor impact to the land. This appears to relate to an area near Tong Park Farm yard. We have been informed by the client that the Site is to be redeveloped, which we have assumed to be for residential use.
Farm History	The farm was generally similar in 1882, with extensions and alterations noted at the farmyards throughout historical mapping. Minor old gravel pits are evident in the north-west in earlier mapping, with old clay pits and earthworks noted in the south-east. A depot was identified south-west of Tong in the Castle Wood area from c.1954; labelled as disused c.1964-1980, potentially related to military activities. Electrical substation facilities are noted at Church Farm c.1980-2019, and a slurry pond at Woodside Farm c.1993-2019.
Argyll's Comment	As a result of the historical and current use of the Site, there is a **moderate risk** of contaminants being present.
Surrounding area description	The farm is almost entirely surrounded by arable land or grassland, with areas of woodland and and several farmyards adjacent north and east. The Site is bounded by Watling Street in the north, and the M54 in the south. Depots are noted off-Site at Tong Forge, and a filling station with an associated trade directory and Local Authority Pollution Prevention and Control for petrol filling is located adjacent east at Tong Norton. In addition the following licences, consents and authorisations of note were identified: a Substantiated Pollution Incident 37m east which involved waste materials such as tyres, containers and asbestos, and caused a major impact to the land.
History of Surrounding Area	The area was extremely similar in the late 1800s, with alterations in footprints in the surrounding area noted throughout historical mapping. An adjacent graveyard and old quarries are identified at Tong from c.1882, with the graveyard remaining throughout mapping and the disused quarry until c.1903. The petrol filling station adjacent east was developed sometime between 1965 and 1980, while the depots at Tong Forge are labelled from the 1988 map edition. Furthermore, a Historical Landfill Site and Local Authority Recorded Landfill Site at Tong Quarry from 63m east under reference EAHLD30450.
Argyll's Comment	The historical and current use of the surrounding area is therefore considered to present a **high risk** of affecting the Site.
Water resources and sensitive habitats	With reference to Environment Agency data, the superficial hydrogeology underlying the Site is classified as a Secondary (Undifferentiated) Aquifer (deposits with variable/limited permeability), and a Secondary (A) Aquifer (deposits with moderate permeability). The bedrock hydrogeology is classified as a Secondary (A) Aquifer (deposits with moderate permeability), a Secondary (B) Aquifer (formations with limited permeability), and a Principal Aquifer (highly permeable formations). According to the Environment Agency the Site lies within a Zone I Source Protection Zone (SPZ). An SPZ is a protection zone placed around a well or borehole that supplies groundwater of potable quality. There are numerous abstraction licences located within 500m. The closest of these are located on-site, including a groundwater abstraction for public potable water supply, and

	general farming and domestic use, and also a surface water abstraction for general agriculture. We have been informed the Site will be developed, therefore ground workers and end usersare considered sensitive receptors. Residential properties are located on Site. The general area appears to be largely in agricultural use. The nearest water features are located on Site. No designated eco-receptors were identified within a 500m radius of the Site.
Argyll's Comment	Overall, the Site is therefore considered to have a **high environmental sensitivity**.
Additional Sources of Information	The following additional historical map packs were used to produce this report. • Envirocheck Ref: 198406512 centred on 379618, 307423. • Envirocheck Ref: 198406818 centred on 379618, 307423. • Envirocheck Ref: 198406993 centred on 379618, 307423. • Envirocheck Ref: 198407418 centred on 379618, 307423.

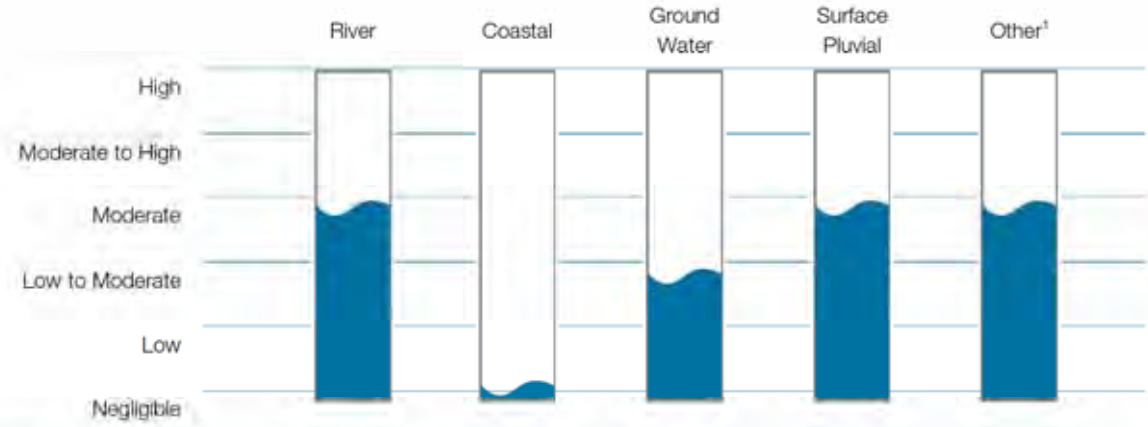
Flood Risk Screening

Flood Analysis of Whole Farm

What is the overall risk of flooding at the farm, assuming defences fail or are absent or over-topped? **Moderate**

Flood Defences

Are there existing flood defences that might benefit the Site? **No**



Flood Analysis of Buildings

Are the main farm buildings at significant risk of flooding? No

Riparian Ownership

Is there a water feature located within or adjacent to the Site? **Yes**

Argyll's Comment

A riparian owner describes anyone who owns a property where there is a watercourse within or adjacent to the boundaries of their property.

Under common law, a riparian owner has rights and responsibilities relating to the stretch of watercourse that falls within or beside the boundaries of their land. Their primary responsibility is to keep the watercourse free of any obstructions that could hinder normal water flow. If the riparian owner fails to carry out their responsibilities, this could result in civil action.

A riparian owner should also check before carrying out any works near to the edge of a river, as such works may be subject to byelaws. If infringed, this could lead to enforcement action by the Environment Agency.

There is a presumption that the boundary between properties abutting a watercourse is the centre line of that watercourse. To confirm whether this is the case, a solicitor should check the deeds or the Index Map.

The Environment Agency has published useful guidance "Living on the edge" for owners of land or property alongside a watercourse. Sometimes, the Environment Agency or other organisations managing flood risk, may have statutory rights of access to properties which adjoin a watercourse. This may be for for maintenance, repair or rebuilding of any part of the watercourse or for access to or repair of monitoring equipment.

Development Control

Is there a water feature located within 250m of the Site? **Yes**

Argyll's Comment

Sites which lie close to (but do not adjoin) a watercourse, may be subject to planning controls should redevelopment be considered. The Environment Agency and Internal Drainage Boards are normally consulted regarding any development within 50m of a Main River or drainage channel. Navigation authorities are normally consulted regarding any development within 250m of a canal, although this varies on a site by site basis. Please see The Environment Agency website to check if there is a Main River within 20m of your property.

Dam and Reservoir Failure

Could the Site be affected by dam or reservoir failure? **No**

Argyll's Comment

The answer is based on detailed models provided by JBA Risk Management. These predict the areas liable to flood around approximately 1700 key dams and reservoirs across England and Wales (if that dam or reservoir were to fail).

[1]Other factors influencing flood risk include historic flood events, geological indicators of flooding, proximate surface water features and elevation above sea level.

Recommendations

1. Under planning policy (NPPF) a Flood Risk Assessment (FRA) will need to accompany any planning application. The FRA should demonstrate how flood risk will be managed so the development will remain safe throughout its lifetime. The scope of the FRA will be dependent on the nature of the risk and sensitivity of the development.

2. The Planning Authority may require you consider Sustainable Drainage systems (SuDS) as part of the development. If this is the case we can carry out a Sustainable Drainage Strategy to submit with the planning application. We would be happy provide a proposal for this work.

3. You should ask the seller whether flooding has occurred in the area before. If it has, please contact us for advice.

4. Finally, establish the terms of buildings and contents insurance before exchanging contracts.

Please contact us on 0845 458 5250 if you would like to discuss any aspect of this recommendation.

Additional Considerations

Item	Summary	Suggested Action
Asbestos (Commercial)	If the buildings at the Site were constructed or renovated during the period between 1950 and 1999, then the fabric of these buildings may contain asbestos in a variety of forms.	Check Asbestos Register and Management Plan
Historic Rights of Way	A review of historic mapping indicates there may be former rights of way on the farm. It is possible that these could be re-instated by Natural England under the Discovering Lost Ways project within England. This project aims to identify former rights of way (pre-1949) which have disappeared from local authority maps and statements. Similar projects exist for Scotland and Wales. Argyll recommends contacting the relevant authority for further advice and discussion on the implications for a property owner.	Contact either Natural England, Scottish Natural Heritage, or Natural Resources Wales for further information
Listed Buildings	The following listed buildings have been identified on Site: remains of tong castle at ngr sj 7916 0696, barn approximately 50 metres to west of vauxhall farmhouse, fowl house approximately 10 metres to west of vauxhall farmhouse, stable wing adjoining church farmhouse to west, wall approximately 10 metres to north of byre with hayloft at tong norton farm, byre with hayloft approximately 10 metres to north of tong norton farmhouse, tong park farmhouse, church farmhouse, former north gates and gatepiers to tong castle and flanking retaining walls and bollards, approximately 30 metres to south west of the old post office, and durant headstone, approximately 3 metres to north of chancel of church of st bartholomew.	Contact Historic England, Historic Environment Scotland or the Welsh Historic Environment Service (Cadw) or your local Planning Department for further information
Nitrate Vulnerable Zones	The farm is located within a Nitrate Vulnerable Zone. Nitrate Vulnerable Zones are designated areas of land draining into waters assessed to be polluted by nitrates. As the farm lies within a designated zone the land owner will need to comply with the requirements of the Nitrates Action Programme regulated by DEFRA and the Environment Agency.	Contact the Environment Agency for further information
Soils	BGS soil chemistry data for the Site indicates 15 - 25 mg/kg of arsenic,<15 mg/kg of arsenic, <1.8 mg/kg of cadmium, 60 - 90 mg/kg of chromium,40 - 60 mg/kg of chromium, <100 mg/kg of lead, 15 - 30 mg/kg of nicke,<15 mg/kg of nickel.	None required
Agricultural Land Classifications	The farm is located within a Grade 3 classification (good). The classification system forms part of the planning system in England and Wales. Agricultural land is classified into five categories according to versatility and suitability for growing crops. The top three grades 1, 2 and 3a are considered the best and most versatile land, 3b - 5 are considered moderate to very poor.	Contact Natural England for further information
Environmental Stewardship Agreements	Data indicates the farm has been identified within an Entry Level plus Higher Level Stewardship Agreement of which further information on the scheme is available from Natural England. It would be prudent for the purchaser to verify whether the current occupier is affiliated to any Environmental Stewardship schemes administered by Natural England. The current occupier may have bound the farm into a contract which the new owner will be obliged to follow or face penalties.	Contact Natural England for further information
Water Abstractions	Groundwater and surface water abstractions have been identified at the Site. It would be prudent to check the terms of these licences to ensure that there have been no breaches of licence conditions and that continued abstraction is compliant with the permitted rates for the specified use(s). It should be noted that The Water Act 2003 changes how water abstraction is regulated, and there may be implications for the current licence holder.	Contact the Environment Agency for further information

Ground Instability Hazard	As a potential ground instability hazard was identified, you may wish to consult a local RICS accredited surveyor and/or review any available geotechnical surveys.	Contact RICS accredited Surveyor for further guidance
Mining Instability	As the Site lies in an area subject to mining instability, you may wish to consult a local RICS accredited surveyor and/or review any available geotechnical surveys. Further information may be available from the minerals and waste officer at the County Council and the local Building Controls Officer. British Geological Survey GeoHazard reports (www.bgs.ac.uk/georeports) may also provide more detailed information.	Contact RICS accredited Surveyor
Coal Mining	As the Site lies within a Coal Mining area, it is recommended that a Commercial Coal Mining Report is obtained from the Coal Authority.	Contact the Coal Authority for further guidance
Telecommunication Base Stations	One or more telecommunication base stations are located within 50m of the Site (please refer to the Current Land Use maps to determine specific locations). Telecommunications equipment emits electromagnetic fields which may have adverse health affects. Further information is available from www.hpa.org.uk and www.sitefinder.ofcom.org.uk	Contact the Public Health England for further information

Generic Guidance

Item	Summary	Suggested Action
Energy Performance Certificate	Under the Energy Performance of Buildings (England and Wales) Regulations 2012 and the Energy Performance of Buildings (Scotland) Regulations 2008, there is a requirement for all buildings to have an Energy Performance Certificate (EPC) upon their construction, sale or lease (and in some cases when the building is modified).	Check EPC or conduct energy assessment
Electrical Equipment	Prior to 1986 Polychlorinated Biphenyls (PCBs) were used as a fire retardant in cooling oils for electrical equipment. Under the Environmental Protection (Disposal of PCB and other Dangerous Substances) Regulations 2000, PCB containing equipment has been banned.	Confirm removal of PCBs or test equipment
Silage, Slurry, Oil, Storage (Farms)	Under the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991, silage, slurry or fuel storage facilities constructed after March 1991 have to be designed and built to minimum standards to prevent the pollution of Controlled Waters.	Compliance Audit
Above and Below Ground Storage	It is common for agricultural premises to store a variety of substances in above ground and underground storage tanks (ASTs and USTs). Most commonly red diesel, heating oil and occasionally petrol on larger estates. There is no reliable database of underground storage tanks nor are all above ground tanks marked on historical maps.	Check all tanks and surrounding land for signs of leaks or spills, such as stained ground or vegetation die-back
Tree Preservation Orders / Hedgerows	The objective of a TPO is to protect trees that make a significant impact on their surroundings (important feature within the local landscape or an historical association within the local area). If a tree has an associated TPO then it is an offence to cut down, prune, uproot, wilfully damage or destroy it. Under The Town and Country Planning (Tree Preservation) (England) Regulations 2012, the existing regulations have continued for England and Wales. Farms situated in Wales will follow guidance regulated by the Welsh Assembly Government.	Contact the Local Planning Authority for further information

Item	Summary	Suggested Action
Hedgerow Regulations 1997	The Hedgerow Regulations came into force in 1997 to protect the most important hedges in the countryside from being removed. The regulations apply to hedges which are more than 20 metres long or which meet another hedgerow at either end. If you remove a hedgerow without permission you are liable to an unlimited fine and may have to replace the hedgerow.	Contact the Local Planning Authority for further information
Change of Use Redevelopment	Proposed changes in land use require permission from the Local Authority and are subject to conditions as part of the statutory planning process.	Contact local planning authority or speak with planning consultant

Whilst this assessment is primarily a desktop assessment of potential soil and groundwater liabilities, the above potential liability considerations that fall outside the scope of the Risk Analysis Methodology have been identified.

Additional sources of information may be available for the Site. These sources could include previous environmental reports (including audits, contaminated land investigation and remediation reports), valuation reports (including property observation checklists), a Land Quality Record, and property deeds. Argyll Environmental would be pleased to review any reports that are available and revise this report accordingly. This may entail additional fees depending upon the volume and complexity of information available. Please contact us for further information.

Contents of the Data Section

Section	Description
Tabular Summary	This section presents a tabular summary of information found for the Site and surrounding area. The data is presented in three buffer zones for ease of reference: data found at the Site, from 1-250m and from 251-500m. If a database has been searched the number of records found will be displayed under the relevant search band. If a database is not available or has not been searched, this will be represented by the abbreviation N/A under the relevant search band.
Current Land Use Mapping	This section provides information on current land uses and is divided into three sections, statutory information, waste and current industrial uses. It is preceded by two maps.
Statutory Information	This section presents detailed statutory information for the Site and surrounding area (up to 500m depending upon dataset). The Map ID of each feature is indicated (where applicable) followed by specific information on each feature and its distance and direction from the Site. If no data is identified then the section will be omitted.
Waste	This section presents detailed information on waste and landfill sites for the Site and surrounding area (up to 500m depending upon dataset). The Map ID of each feature is indicated (where applicable) followed by specific information on each feature and its distance and direction from the Site. If no data is identified then the section will be omitted.
Current Industrial Land Use	This section presents detailed information on current land use for the Site and surrounding area (0-250m). The Map ID of each feature is indicated (where applicable) followed by specific information on each feature and its distance and direction from the Site. If no data is identified then the section will be omitted.
Historical Land Use Mapping	The Historical Land Use Map presents 1:10,000 scale and selected 1:2,500 scale (tanks and energy facilities) historical land use information within 250m of the Site boundary.
Historical Land Use	This section presents selected information on historical land use for the Site and surrounding area (0-250m). The Map ID of each feature is indicated (where applicable) followed by specific information on each feature and its distance and direction from the Site. If no data is identified then the section will be omitted.
Aquifer Designations and Geology	This section is preceded by two maps that present information relating to the aquifer designations beneath the Site. The first of these maps indicates the designation of the Superficial geology. The second map presents the aquifer designation of the solid geology. These maps are followed by detailed information in relation to aquifer designations/groundwater vulnerability and geology at the Site and surrounding area (0-500m). If no data is identified then the section will be omitted.
Environmental Sensitivity	This section presents detailed information on the environmental sensitivity of the Site and surrounding area (up to 500m depending upon dataset) and is preceded by two maps. The first shows areas with statutory designations, the second shows source protection zones. The Map ID of each feature is indicated (where applicable) followed by specific information on each feature and its distance and direction from the Site. If no data is identified then the section will be omitted.
Natural and Mining Related Hazards	This section contains information on natural and mining related hazards which may affect the Site. These include subsidence, radon and mining. If no data is identified then the section will be omitted.

Farm Specific Issues	This section firstly presents data relating to designated features and areas that may be present on or in proximity to a farm and could affect or restrict farming operations (e.g. listed buildings, heritage sites etc.). If no data is identified then the section will be omitted.
Soil Chemistry	This section is preceded by five maps that present information relating to the concentrations of Arsenic, Cadmium, Chromium, Lead and Nickel within soils beneath the farm and surrounding area. The maps are immediately followed by the detailed data. If no data is identified then the section will be omitted.
Flooding Risk Information	This section presents information relating to the four main types of flooding – River flooding, Coastal/tidal flooding, surface water flooding and groundwater flooding. Some of this data will be preceded by an associated map.

Tabular Summary 1

Statutory Information

Authorisations	On-site	1-250m	251-500m
Local Authority Pollution Prevention and Controls	0	0	N/A
Local Authority Integrated Pollution Prevention and Controls	0	0	N/A
Integrated Pollution Controls	0	0	N/A
Integrated Pollution Prevention And Control	0	0	N/A
Registered Radioactive Substances	0	0	N/A
Discharges	**On-site**	**1-250m**	**251-500m**
Discharge Consents	1	2	N/A
Water Industry Act Referrals	0	0	N/A
Control of Major Accident Hazards Sites	0	0	0
Explosive Sites	0	0	0
Notification of Installations Handling Hazardous Substances	0	0	0
Planning Hazardous Substance Consents	0	0	0
Contraventions	**On-site**	**1-250m**	**251-500m**
Contaminated Land Register Entries and Notices	0	0	N/A
Local Authority Pollution Prevention and Control Enforcements	0	0	N/A
Enforcement and Prohibition Notices	0	0	N/A
Planning Hazardous Substance Enforcements	0	0	0
Substantiated Pollution Incident Register	0	1	0
Prosecutions Relating to Authorised Processes	0	0	N/A
Prosecutions Relating to Controlled Waters	0	0	N/A

Waste

Waste/Landfill Sites	On-site	1-250m	251-500m
BGS Recorded Landfill Sites	0	0	0
Integrated Pollution Control Registered Waste Sites	0	0	N/A
Licenced Waste Management Facilities (Landfill Boundaries)	0	0	N/A
Licenced Waste Management Facilities (Locations)	0	0	0
Local Authority Recorded Landfill Sites	0	0	0
Registered Landfill Sites	0	0	0
Registered Waste Transfer Sites	0	0	N/A
Registered Waste Treatment or Disposal Sites	0	0	N/A
Historical Landfill Sites	0	0	0

Current Land Use

Current Potentially Contaminative Uses	On-site	1-250m	251-500m
Contemporary Trade Directory Entries	2	2	N/A
Fuel Station Entries	0	0	N/A
Other Features	**On-site**	**1-250m**	**251-500m**
Telecommunication Base Stations	0	0[2]	N/A
Overhead Transmission Lines	0	0	N/A

Historical Land Use

Historical Potentially Contaminative Uses	On-site	1-250m	251-500m

[2]Telecommunication base stations are only searched to a radius of 100m from the Site boundary.

Historical Land Use

Potentially Contaminative Industrial Uses (Past Land Use)	1	1	N/A
Historical Tanks And Energy Facilities	0	0	N/A
Potentially Infilled Land	**On-site**	**1-250m**	**251-500m**
Former Marshes	0	0	N/A
Potentially Infilled Land (Non-Water)	1	1	N/A
Potentially Infilled Land (Water)	0	3	N/A

Groundwater Vulnerability

Hydrogeology	**On-site**	**1-250m**	**251-500m**
Superficial Aquifer Designations	6	8	0
Bedrock Aquifer Designations	3	1	0
Geology	**On-site**	**1-250m**	**251-500m**
BGS 1:625,000 Solid Geology	4	N/A	N/A

Environmental Sensitivity

Environmental Sensitivity	**On-site**	**1-250m**	**251-500m**
Areas of Outstanding Natural Beauty	0	0	N/A
Environmentally Sensitive Areas	0	0	N/A
Forest Parks	0	0	N/A
Local Nature Reserves	0	0	0
Marine Nature Reserves	0	0	0
National Nature Reserves	0	0	0
National Parks	0	0	N/A
National Scenic Areas	0	0	N/A
Nitrate Sensitive Areas	0	N/A	N/A
Nitrate Vulnerable Zones	2	N/A	N/A
Ramsar Sites	0	0	0
River Quality Biology Sampling Points	0	0	N/A
River Quality Chemistry Sampling Points	0	0	N/A
Nearest Surface Water Feature	1	0	N/A
Sites of Special Scientific Interest	0	0	0
Special Areas of Conservation	0	0	0
Special Protection Areas	0	0	0
Water Abstractions	3	12	2
Source Protection Zones	3	0	N/A

Natural and Mining Related Hazards

Subsidence	**On-site**	**1-250m**	**251-500m**
Collapsible Ground Stability Hazards	1	0[3]	N/A
Compressible Ground Stability Hazards	1	0	N/A
Ground Dissolution Stability Hazards	1	0	N/A
Landslide Ground Stability Hazards	1	0	N/A
Running Sand Ground Stability Hazards	1	1	N/A
Shrinking or Swelling Clay Subsidence Hazards	1	1	N/A
Non-Coal Mining Hazards	0	0	N/A
Radon	**On-site**	**1-250m**	**251-500m**

[3]Ground stability hazards are only searched to a radius of 50m from the Site boundary.

Natural and Mining Related Hazards

Radon Potential	1	N/A	N/A
Radon Protection Measures	1	N/A	N/A
Mining	**On-site**	**1-250m**	**251-500m**
Brine Compensation Areas	0	N/A	N/A
Coal Mining Affected Areas	1	N/A	N/A
Natural and Mining Cavities	0	0	N/A
Mining Instability	1	0	N/A
BGS Recorded Mineral Sites	2	1	N/A

Farm Specific Issues

Farm Specific Issues	**On-site**	**1-250m**	**251-500m**
Listed Buildings	10	24	9
World Heritage Sites	0	0	0
Scheduled Monuments	3	1	1
Historic Battlefields	0	0	0
Historic Landscapes	0	0	2
Country Parks	0	0	0
Ancient Woodlands	2	1	1
Soils	**On-site**	**1-250m**	**251-500m**
BGS Soil Chemistry Arsenic	2	0	0
BGS Soil Chemistry Cadmium	1	0	0
BGS Soil Chemistry Chromium	2	0	0
BGS Soil Chemistry Lead	1	0	1
BGS Soil Chemistry Nickel	2	0	0

Flooding

Current Flood Risk	**On-site**	**1-250m**	**251-500m**
Flooding From Rivers or Sea	1	0	0
Flooding From Rivers or Sea (in an Extreme Event)	1	0	0
Areas Benefiting from Flood Defences	0	0	0
Flood Water Storage Areas	0	0	0
Flood Defences	0	0	0
Risk of Flooding from Rivers and Sea	3	0	0
Groundwater Flood Risk	2	0	0
Surface Water Flooding (1:75 year rainfall event)	3	0	0
Surface Water Flooding (1:200 year rainfall event)	3	0	0
Surface Water Flooding (1:1,000 year rainfall event)	3	0	0
Dam or Reservoir Failure	0	0	0
Historical Flooding	**On-site**	**1-250m**	**251-500m**
Historical Flood Events	0	0	0
Geological Indicators of Flooding	1	0	0
Other Flood Information	**On-site**	**1-250m**	**251-500m**
Surface Water Feature	22	19	20
MasterMap Water Network	75	73	35

Tabular Summary Explanation

Argyll has carefully selected a range of datasets which are considered appropriate for the intended use of this report. Each dataset is searched to a set radius from the

Site boundary and the tabular summary is divided into different search bands accordingly. If a database is searched and information is found, then the number of records available are detailed in the table above. If the database was searched and no data was found, then a zero will be present. If a database was not searched then the abbreviation N/A will be found, indicating this information was not available at the radius searched.

Landfill Site Information

Registered landfill site boundaries (where available), are shown on the map as a red diagonal hatched polygon and referred to in the map legend as Registered Landfill Sites. At present no complete national dataset exists for landfill site boundaries, therefore a point grid reference provided by the data supplier is used for some landfill sites. The point grid references supplied provide only an approximate position, and can vary from the site entrance to the centre of the site. A point cannot properly define landfill boundaries therefore Landmark constructs a 250 metre or 100 metre "buffer" zone around the point to warn of the possible presence of landfill. The "buffer" zone is shown on the map as an orange crosshatched area and is referred to in the map legend as Potential Landfill Buffer.
Local Authority landfill data is sourced from individual local authorities that were able to provide information on sites operating prior to the introduction of the Control of Pollution Act (COPA) in 1974. Appropriate authorities are listed under Local Authority Landfill Coverage with an indication of whether or not they were able to make landfill data available. Details of any records identified are disclosed. You should be aware that if the local authority had landfill data but passed it to the relevant Environment Agency office, it does not necessarily mean that local authority landfill data is now included in our other Landfill datasets. In addition if no data has been made available for all or part of the search area, you should be aware that a negative response under 'Local Authority Recorded Landfill Sites' does not necessarily confirm that no local authority landfills exist.

Subsidence Hazards

Information on subsidence hazards is provided by the British Geological Survey (BGS). Information present within 250m of the Site is reported under Natural and Mining Related Hazards. Due to the level of detail of this data and the complexities of the real world, the BGS recommends a precautionary approach when using this information and advises taking the worst reading noted for each dataset within the vicinity of a property. Therefore, Argyll reports the presence of a ground stability or non-coal related mining hazard in the Risk Analysis section based on the highest reading found within 50m of the Site boundary.