Pell Frischmann

Land West of Ratby

Flood Risk Assessment

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S2	P02	Updated based on client comments	17/06/2024	T. Sturtridge	H. McColl	D. Allum-Rooney
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Ref. reference. Rev revision. Suit suitability.

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1 Introduction

1.1 Project Brief

1.1.1 Pell Frischmann has been appointed by Lagan Homes Ltd to undertake a Flood Risk Assessment (FRA) to support an Outline Planning Application for a site known as Land West of Ratby.

1.1.2 The purpose of this FRA is to review available information and assess the flood risk posed to the site and proposed development from a range of sources, now and in the future. The FRA has been carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG), in respect of flood risk and coastal change.

1.1.3 To complete the FRA, the following key stages of work have been undertaken;

- Collation of desk-based information and review of publicly available flood risk information including Environment Agency mapping and local data, policy, and guidance.
- A desktop review of other data that has been made available such as topographical surveys, utility plans and proposed development layout options.
- Consultation of relevant stakeholders to obtain further information on local risks and issues.
- Provision of advice on appropriate flood risk mitigation measures for the proposed development.

1.2 Sources of Information

1.2.1 A review of relevant information and guidance from a range of sources has been undertaken and includes the following key documents;

- National Planning Policy Framework (NPPF), December 2023,
- Planning Practice Guidance (PPG), August 2022,
- Environment Agency Flood Map for Planning and Risk of Flooding from Surface Water datasets from the DEFRA Spatial Data Catalogue,
- DEFRA MagicMap, 2024,
- British Geological Survey Geology of Britain Viewer, 2024,
- British Geological Survey GeoIndex, 2024,
- Hinckley & Bosworth Local Development Framework, December 2009,
- Hinckley & Bosworth Site Allocations and Development Management Policies DPD, July 2016
- Strategic Flood Risk Assessment Level 1 for Hinckley and Bosworth Borough Council, July 2019,
- Strategic Flood Risk Assessment Level 2 for Hinckley and Bosworth Borough Council, May 2020,
- Leicestershire County Council Preliminary Flood Risk Assessment, June 2011,
- Leicestershire County Council Local Flood Risk Management Strategy, February 2024.

1.2.2 A request for information was submitted to the Environment Agency and Leicestershire County Council to obtain any flood risk data they may hold for the area. The Environment Agency confirmed that they had no specific data for the area and Leicestershire County Council (as Lead Local Flood Authority) responded with advice contained within **Appendix A** of this document.

2 Background & Site Context

2.1 Site Location & Existing Use

2.1.1 The site is located to the west of Ratby, Leicestershire. A site location plan is included for reference as **Figure** 2.1. In total, the site covers approximately 33ha.

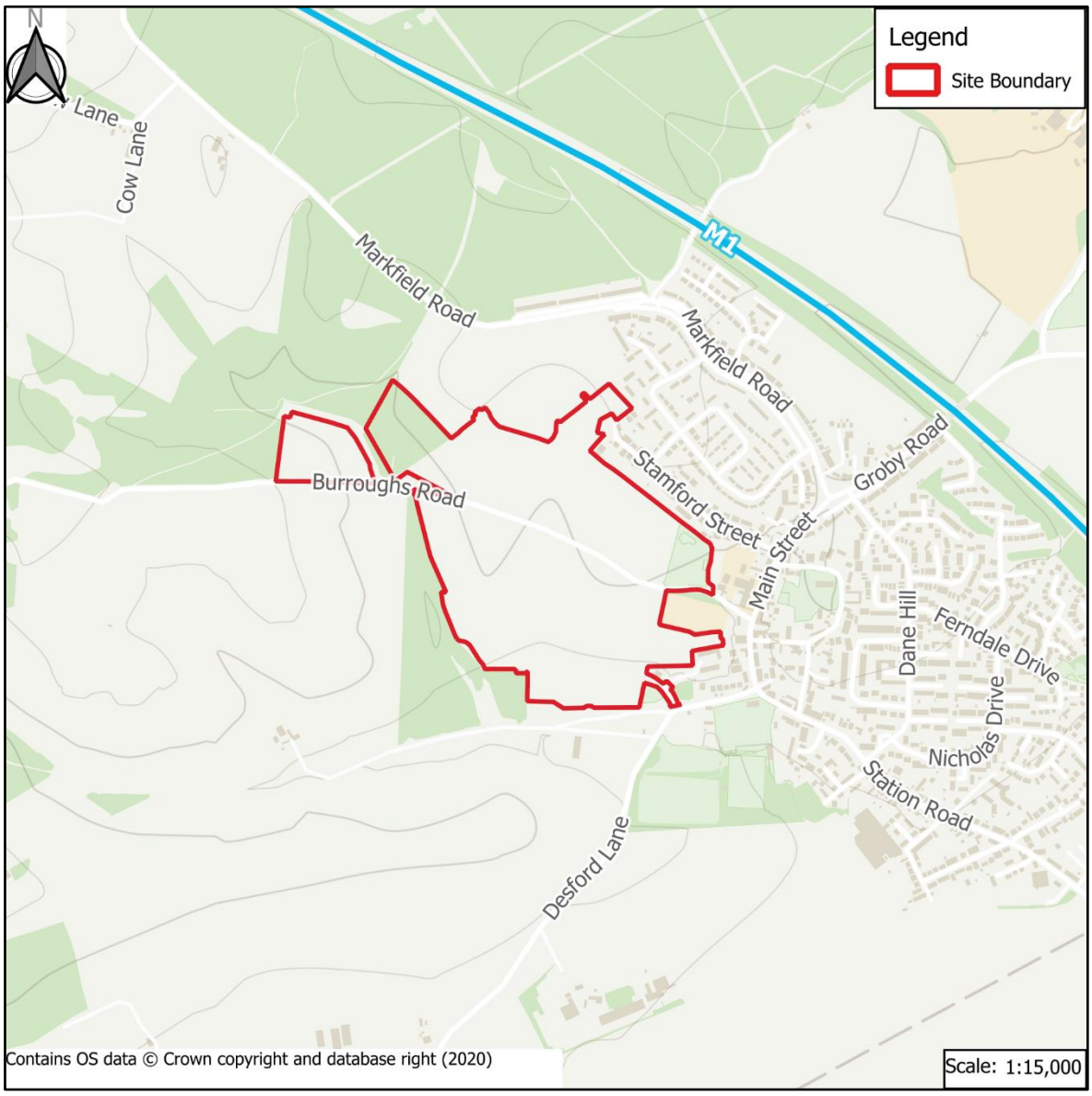

Figure 2.1 Site Location Plan

2.1.2 The site is bound to the north by Phases 1 and 2 of the wider development (of which Phase 1 is currently under construction), to the east by the village of Ratby, to the south by agricultural land, and to the west by agricultural land and Burrough's Wood.

2.1.3 Mapping shows the site to currently consist of predominantly agricultural land, with Burroughs Road passing through the centre of the site. However, due to the majority of the site being greenfield land, the site is considered to be subject to a natural regime of runoff and infiltration where ground conditions permit.

2.2 Local Watercourses

2.2.1 A review of the OS OpenRivers dataset shows several unnamed watercourses and agricultural drains within and around the site boundary. The watercourse within the site boundary is likely to be an existing

agricultural drain, with the watercourse along the western and southern boundary flowing eastwards where it connects to the Rothley Brook approximately 2km to the east of the site.

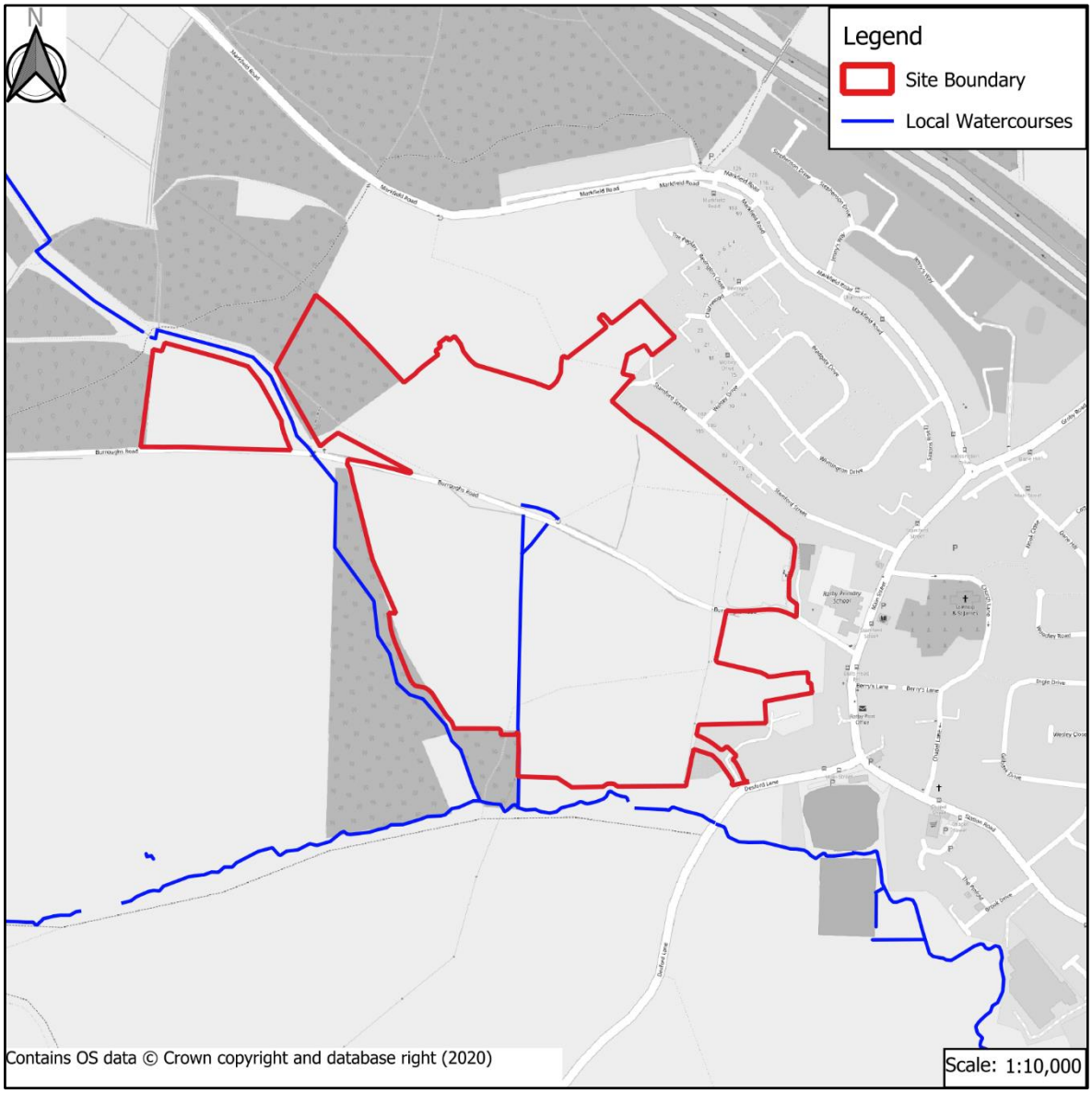

Figure 2.2 Local Watercourses

2.2.2 Internal Drainage Board (IDB) mapping suggests that the site and associated local watercourses are outside of any IDB catchment.

2.3 Topography

2.3.1 A review of the topographical survey, included as **Appendix B**, indicates that the site generally falls from north to south. Maximum elevations of approximately 112.20mAOD are found in the east of the site, falling to a minimum elevation of approximately 82.47mAOD in the south of the site.

2.3.2 It can be seen that there is a significant valley line running north to south through the centre of the site, immediately to the east of the existing field drain.

2.3.3 LiDAR mapping, provided by DEFRA, shown in **Figure** 2.3, shows the elevations across the site in the context of the wider environment. This mapping shows the site and wider area to fall from north to south.

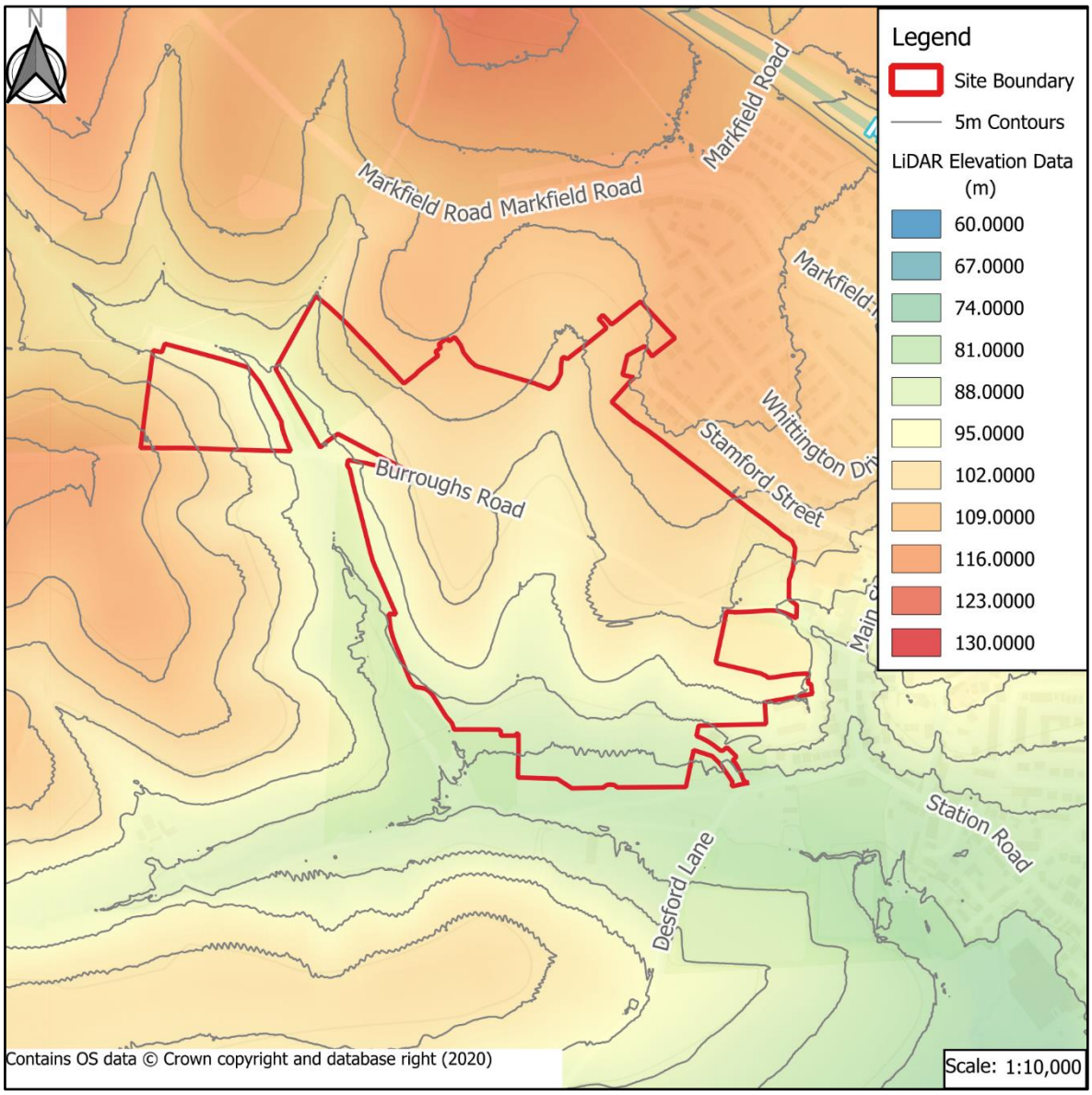

Figure 2.3 LiDAR Elevation Data

2.4 Geology

2.4.1 British Geological Survey (BGS) mapping suggests the site is underlain by a mixed superficial geology comprising limited areas of Thrussington Member in the northwest and northeast corners, with areas identified as comprising Alluvium and River Terrace Deposits found to the south and east following the approximate routes of the unnamed watercourses. The remainder of the site is shown to have no recorded superficial geology. An extract of the BGS superficial geology mapping is included as **Figure** 2.4.

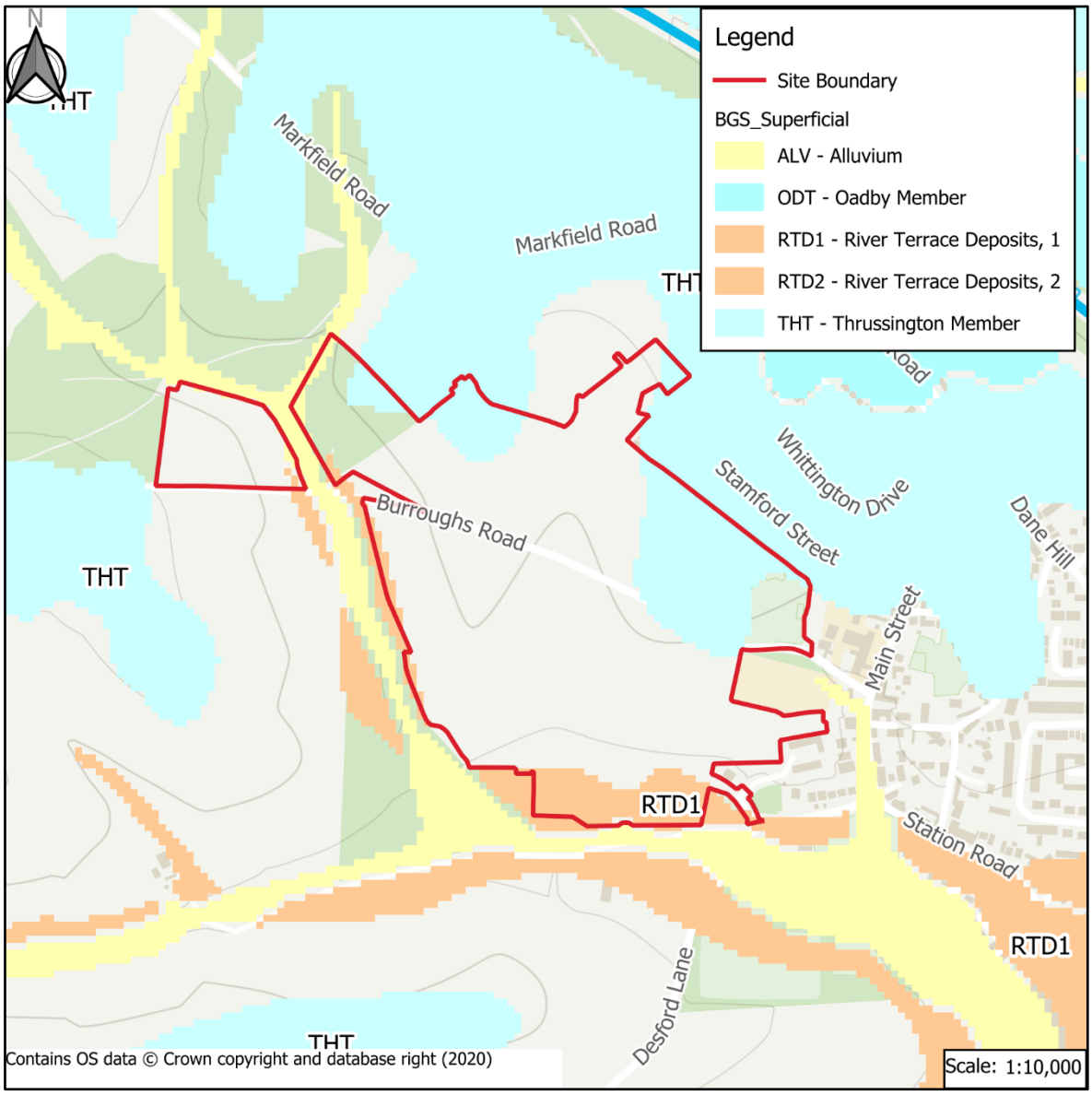

Figure 2.4 BGS Superficial Geology

2.4.2 BGS mapping shows the site to be underlain by a mixed bedrock geology comprising Gunthorpe Member, Cotgrave Sandstone Member and Edwalton Member. An extract of the BGS bedrock geology mapping is included as **Figure** 2.5.

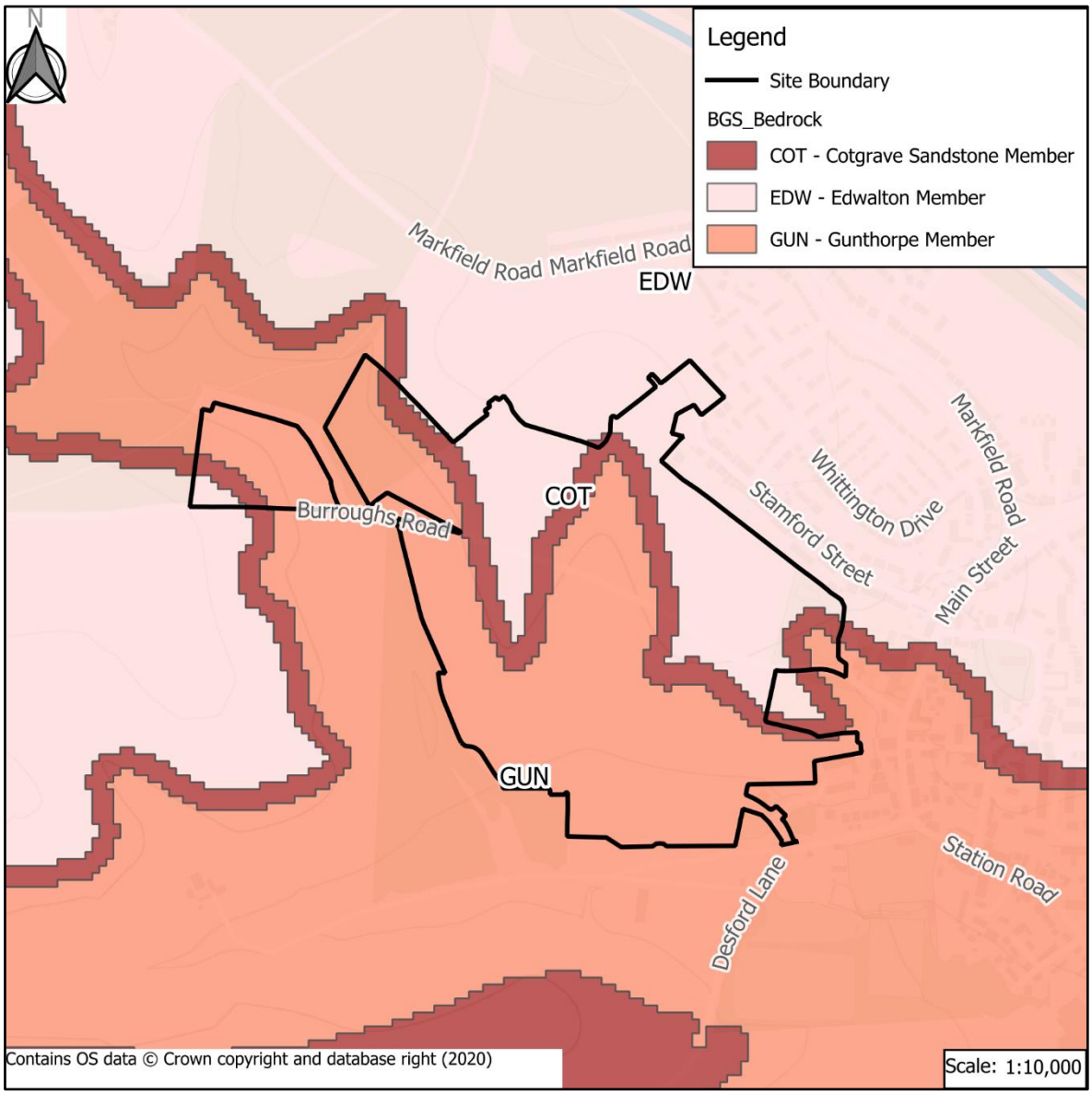

Figure 2.5 BGS Bedrock Geology

2.4.3 There are no freely available borehole records found within the site boundary available on the BGS borehole GeoIndex, with the nearest borehole drilled to the south of the site (borehole reference: SK50SW463) to a depth of 45m bgl in July 2012. Groundwater was reported to be encountered at a depth of 16m bgl suggesting groundwater was relatively deep in the area at the time of investigation.

2.4.4 Aquifer designations by DEFRA show the superficial drift classification to be Secondary A in the south and west of the site, following approximately the route of the watercourses in the area. This is defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an importance source of base flow to rivers, with the remainder of the site shown to be underlain by an Unproductive classification.

2.4.5 The bedrock strata has been wholly classified as Secondary B. This is defined as predominantly lower permeability layers or drift deposits with lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as diffuse, thin permeable horizons, and weathering.

2.4.6 The site does not fall within a Source Protection Zone (SPZ), with the nearest Zone III – Total Catchment found approximately 7km to the northwest of the site.

2.5 Development Proposals

2.5.1 Development proposals comprise Outline planning application (with all matters reserved apart from access) for a phased, mixed-use development comprising about 470 dwellings (Use Class C3) or, in the alternative, about 450 dwellings and care home (Use Class C2). Provision of land for community hub (Use Class F2); provision of land for 1FE primary school (Use Class F1); and associated operations and infrastructure including but not limited to site re-profiling works, sustainable urban drainage system, public open space, landscaping, habitat creation, internal roads/routes, and upgrades to the public highway.

3 Policy Context

3.1 National Planning Policy Framework

3.1.1 The National Planning Policy Framework[1] (NPPF) was first published by the Ministry of Housing, Communities, and Local Government, with the most recent update being made in December 2023 by the Department for Levelling Up, Housing, and Communities.

3.1.2 The NPPF is the primary source of national planning guidance in England, setting out the Government's planning policies for England, and how they are expected to be applied by local council.

3.1.3 'Chapter 14: Meeting the challenge of climate change, flooding, and coastal change' outlines the guiding principles for managing flood risks as part of the planning process, notably paragraphs 159-169.

3.1.4 The Planning Practice Guidance[2] (PPG) sets out the vulnerability to flooding of different land uses. It encourages development to be in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment and states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing a Flood Risk Assessment.

3.1.5 The Planning Practice Guidance includes a series of tables that define Flood Zones, the flood risk vulnerability classification of development land uses, and 'compatibility' of development within the defined Flood Zones.

3.1.6 Therefore, this FRA has been completed in line with the guidance and requirements for the NPPF and associated PPG.

3.2 Local Plan Policies

3.2.1 The Hinckley and Bosworth Local Development Framework[3] (LDF) was adopted in December 2009 and sets out how land within the Borough can be used and developed, providing the policies the council use to determine applications and regeneration activities.

3.2.2 The plan aims to oversee how the council will manage future growth, encourage sustainable development, and ensure changes are appropriate to local need now, and in the future.

3.2.3 More generally the Local Plan lists policies that influence the design and principles of all development within the district. Those relevant to this FRA are as follows:

- Policy 20: Green Infrastructure
- Policy DM7: Preventing Pollution and Flooding
- Policy DM8: Key Rural Centres Relating to Leicester

3.2.4 Alongside this, Hinckley and Bosworth Council published the Site Allocations and Development Management Policies DPD in July 2016. This document outlined allocated sites within Ratby and surrounding villages and for what purpose they have been allocated. Two allocated parcels of land fall within the site boundary, both allocated for Open Space, Sport, and Recreation and both in the east of the site. These include;

- RAT05
- RAT08

[1] UK Government (December 2023); *National Planning Practice Guidance*; prepared by UK Government.
[2] UK Government (August 2022); *Planning Practice Guidance*; prepared by UK Government
[3] Hinckley & Bosworth Borough Council (December 2009) *The Hinckley & Bosworth Local Development Framework*; prepared by HBBC

3.2.5 These allocations relate to Policy DM8: Key Rural Centres Relating to Leicester of the Hinckley and Bosworth Local Development Framework

3.3 Local SFRA

3.3.1 The Hinckley & Bosworth Level 1 Strategic Flood Risk Assessment[4] (SFRA) was published in July 2019. The SFRA was prepared to provide an appropriate evidence base for local policymaking, a summary of flood risk issues across the area and to support the application of the sequential test for suitability of allocated sites.

3.3.2 The SFRA also includes relevant background flooding data and a summary of flood risk within the Borough and so appropriate references will be made throughout this site-specific FRA.

3.4 Local PFRA

3.4.1 The Leicestershire County Council Preliminary Flood Risk Assessment[5] (PFRA) was published in June 2011. The PFRA was prepared to assist the council meet their duties to manage local flood risk and deliver any legal requirements placed on them as the LLFA under the Flood Risk Regulations 2009.

3.4.2 The PFRA also identifies the past and future flood risk for the County and includes an assessment of where within the County flooding, including overland flow and direct rainfall, will occur along with the number of properties potentially at risk.

3.5 Local Flood Risk Management Strategy

3.5.1 The Leicestershire County Council Local Flood Risk Management Strategy[6] (LFRMS) was published in March 2015 and was produced to comply with Section 9 of the Flood and Water Management Act 2010 and aims to provide a framework for meeting their requirements to develop, maintain, apply, and monitor a local strategy for flood risk management.

3.5.2 The LFRMS provides further information regarding surface water runoff, groundwater and sewer flooding and flood risk around the County and the introduction of flood risk alleviation scheme at various scales, including SuDS.

3.6 Surface Water Management Plan

3.6.1 The Leicester Surface Water Management Plan[7] (SWMP) was published in October 2013. The SWMP was produced to understand the flood risks that can arise from local flooding, identifying where flood risk issues are, what impact they have, how they can be managed, as well as providing a full flood history of the plan area. This will provide a baseline for how Leicestershire County Council aim to manage and improve surface water flood risks within the Borough.

[4] Hinckley & Bosworth Borough Council (July 2019); *Level 1 Strategic Flood Risk Assessment*; prepared by JBA Consulting
[5] Leicestershire County Council (June 2011); *Preliminary Flood Risk Assessment*; prepared by LCC
[6] Leicestershire County Council (August 2015); *Local Flood Risk Management Strategy*; prepared by LCC
[7] Leicestershire County Council (October 2013); *Leicestershire Surface Water Management Plan*; prepared by URS

4 Assessment of Flood Risk

4.1 Desk-Based Information

4.1.1 The NPPF states that all potential sources of flood risk must be identified and appraised. Flooding can occur from a variety of sources individually, or in combination and can result from both natural and artificial processes.

4.1.2 **Table** 4.1 provides an initial desk-based review of the level of flood risk from all sources, which are then assessed in further details where the risk is considered significant and merits further investigation.

Table 4.1 Desk-Based Assessment of Flood Risk

Sources of Flood Risk	Degree of Risk			Comments
	Significant	Moderate	Low	
Fluvial			X	The Site is wholly within Flood Zone 1.
Coastal & Tidal			X	The Site is removed from the extent of tidal flooding, now and in the future.
Groundwater			X	Low potential susceptibility to groundwater flooding across the area.
Surface Water		X		A significant flow path can be seen running through the site.
Sewers			X	Limited extent of sewers in the immediate vicinity with low risk from sewers along road.
Canals			X	None nearby.
Reservoirs & Waterbodies			X	Low risk posed.

4.2 Fluvial Flood Risk

4.2.1 The Environment Agency has produced a resource known as the Flood Map for Planning, which identifies areas at risk of flooding from Main Rivers and the sea. An extract of this mapping is included for reference as **Figure** 4.1.

4.2.2 The mapping shows the site to be entirely within Flood Zone 1 (Low Probability), which is defined in the NPPF as land having less than 0.1% annual probability of river or sea flooding. The nearest extents of Flood Zones 2 and 3 (Medium and High Probability respectively), are found immediately to the south of the site associated with the unnamed watercourse. This Flood Zone extent does not encroach into the site boundary.

4.2.3 As such, the site is considered to be at low risk of flooding from fluvial sources and local watercourses.

Figure 4.1 Flood Map for Planning

4.3 Coastal & Tidal

4.3.1 The site is located within Flood Zone 1 (Low Probability) and is sufficiently removed from the floodplain extent, which would include tidal influences.

4.3.2 Therefore, the risk of flooding from coastal or tidal related events is negligible.

4.4 Groundwater

4.4.1 Groundwater flooding occurs when the water table rises above ground elevations. It is most likely to happen in low lying areas underlain by permeable geology. This may be regional scale chalk or sandstone aquifers, or localised deposits of sands and gravels underlain by less permeable strata such as that in a river valley.

4.4.2 Previously mentioned boreholes to the south of the site recorded groundwater to be struck approximately 16m bgl suggesting groundwater in the area is low. Alongside aquifer designations Secondary A and Unproductive for the superficial geology and Secondary B for the bedrock geology, this suggests the overall groundwater level within the area is low.

4.4.3 The PFRA provides an Areas Susceptible to Groundwater Flooding Map (**Figure 5-2** of the PFRA), which suggests the site is within an areas of Leicestershire shown to have a <25% susceptibility to groundwater emergence at the surface.

4.4.4 The site is not within a SPZ, with the nearest Zone III – Total Catchment found approximately 8km to the northwest of the site.

4.4.5 Overall, considering the aquifer designations, underlying geology and information on groundwater provided within local documentation, the risk of flooding from groundwater is considered to be low.

4.5 Surface Water (Pluvial)

4.5.1 The risk of flooding from surface water has been mapped by the EA on a strategic scale to understand areas that may be susceptible to ponding or significant overland flow of surface water during periods of extreme rainfall. An extract of the latest mapping is included for reference as **Figure** 4.2.

4.5.2 The mapping indicates the site to generally be at a low risk of flooding from surface water. Despite this, a surface water flow route is identified through the centre of the site, following the approximate route of the valley line running north to south. This is adjacent to an existing field drain which is channelling water through the site. This flow path will require consideration through masterplanning design.

4.5.3 It should be noted, the mapping used by the EA to provide the risk of flooding from surface water does not take into account continual losses to the ground through infiltration. Whilst infiltration rates are likely to be low due to the underlying geologies. It is likely there would be some loss, resulting in a reduction of the flows through the centre of the site.

4.5.4 Due to the above, the risk posed to the site from surface water flooding is considered to be moderate and thus mitigation will be required.

Figure 4.2 Surface Water Flooding

4.6 Sewers

4.6.1 Flooding from sewers typically results from the network capacity being exceeded or blockage of key elements. Flooding usually occurs by way or surcharging manholes, gullies or other features that allow water from sewers to reach the surface, resulting in overland flows that can affect nearby properties.

4.6.2 Sewer asset records (shown in **Appendix C**) suggest there are no public surface or foul water sewers present within the site boundary. The nearest surface and foul sewers are found within Ratby to the east of the site.

4.6.3 Records do not show private sewer infrastructure and Severn Trent Water are unable to rule out the existence of a private sewer network within the site boundary. It is, however, unlikely that a network of private foul and surface sewers serve the site in its current form.

4.6.4 Given the above, the site is considered to be at low of flooding from sewers.

4.7 Canals

4.7.1 There are no canals present that pose a risk to the site, as such the risk of flooding from this source is considered to be negligible.

4.8 Reservoirs

4.8.1 The EA has produced strategic scale mapping showing the potential risk of flooding from the failure of large waterbodies and reservoirs, if the relevant impounding structure were to fail.

4.8.2 This mapping confirms the site to be far removed from the extent mapping to be at risk of flooding from this source.

4.8.3 Therefore, the risk of flooding from reservoirs or large waterbodies is considered to be low.

4.9 Impact of the Proposed Development

4.9.1 The site is not within defined floodplains or nearby watercourses and is unlikely to detrimentally affect floodplain volumes or conveyance routes.

4.9.2 The introduction of an increased impermeable footprint on site would give rise to an increase in the rates and volumes of water being discharged if not managed appropriately. This could result in increases in flood risk downstream and would require suitable mitigation.

5 Flood Risk Mitigation

5.1 Sequential Arrangement

5.1.1 All types of development are considered acceptable uses within Flood Zone 1 (Low Probability) in line with the Sequential Test guidance included within the NPPF and PPG.

5.1.2 The site is inherently sequentially preferable due to its location within Flood Zone 1 and concluded to be at low risk from other sources and therefore passes the requirements of the Sequential Test.

5.1.3 It is proposed that the levels design of any site development plateaus should be designed to convey exceedance flows through the site using the highway corridor and away from proposed dwellings. This will likely include directing overland flow to converge on the field drain running southwards through the site.

5.2 Development Levels

5.2.1 There are no specific requirements for finished floor levels to address the low risk of fluvial flooding. However, it is recommended that appropriate design of external levels and their relation to building thresholds considers the residual risk from groundwater flooding and overland flows.

5.2.2 In particular, finished floor levels should be designed so there is a nominal threshold above surrounding ground levels, in accordance with the relevant building regulations and external levels should be designed so any surface flows shed away from buildings and towards positively drained areas.

5.3 Surface Water Drainage Strategy

5.3.1 A surface water drainage strategy has been prepared for the submitted scheme, and details are provided as part of the Sustainable Drainage Report by Pell Frischmann (report ref: 109003-PEF-ZZ-XX-RP-CD-000001).

5.3.2 The strategy is based on discharging surface water runoff from the site at the equivalent greenfield rate, with the additional volume stored within attenuation features before being discharged to the watercourses in, and adjacent to, the site.

5.3.3 Additional SuDS features are recommended to complement the strategic attenuation basins, and could include features such as permeable paving, rainwater butts, tree pits and rain gardens. These will act as source control measures by capturing and managing runoff close to its source, while providing amenity and biodiversity improvements, as well as improving the quality of runoff.

5.3.4 It is therefore considered that the development will not have an adverse impact on the flood risk elsewhere subject to the suitable management of surface water generated by the proposed development.

6 Conclusions & Recommendations

6.1.1 This Flood Risk Assessment has been written to support an outline planning application for the development known as Land West of Ratby, Leicestershire. The development is considered more vulnerable due to its land use and is considered a suitable development within Flood Zone 1.

6.1.2 To summarise the findings of the FRA:

- The site is wholly within Flood Zone 1 (Low Probability) with the nearest extent of Flood Zones 2 and 3 found to the south and west of the site associated with the unnamed watercourses.
- Local documentation and geology suggests the site is at low risk of groundwater flooding. However, a residual risk may remain from elevated groundwater levels in areas close to the watercourse to the south.
- The site is considered to be at moderate risk of flooding from surface water, with a surface water flow route identified through the centre of the site. Mitigation is proposed in the form of sequential arrangement, steering development away from the lower areas associated with this flow route.
- There are no identified public surface or foul sewers within the site boundary, with asset plans provided by Severn Trent showing the closest to be within the village of Ratby to the east.
- There are no canals nearby to the site that would pose a risk of flooding, therefore the risk of flooding from this site is negligible.
- Mapping provided by the EA suggests the site falls outside of any modelled flood extents from reservoir flooding and as such is at a negligible risk of flooding from this source.

6.1.3 Recommendations are made in respect of appropriate consideration of finished floor levels and external level design to manage the residual risk of overland flows by conveying water away from buildings and towards positively drained areas.

6.1.4 In accordance with the requirements of the National Planning Policy Framework (NPPF), this FRA has demonstrated that development could proceed without being subject to significant flood risk and complies within relevant local plan policies.

6.1.5 Furthermore, the development will not result in increased flood risk to third parties if there is suitable management of surface water runoff.

Appendix A Leicestershire County Council Pre-Application Advice

Henry McColl

From: Jack Harriman <Jack.Harriman@leics.gov.uk>
Sent: 21 December 2023 15:48
To: Henry McColl
Subject: RE: Ratby Phases 3/4 Pre-App advice

Categories: Red Category

Hi Henry,

Thank you for request for pre-application advice. Following review of the submitted documents, I can confirm the following.

Leicestershire County Council's Infrastructure Planning (Flood Risk Management) team records of the following flooding incidents within close proximity to the site.

- Markfield Road – Highway flooding – March 2014 and November 2019

It is advised that not all instances of flooding are reported to Leicestershire County Council and as such, there may be a history of flooding for which we have no record.

All sources of flood risk including (but not limited to) fluvial, pluvial, groundwater, canals, reservoirs, sewers, etc. should be considered as part of any forthcoming planning application. The LLFA would recommend reviewing the relevant Strategic Flood Risk Assessment for this area which may contain additional flood risk details.

There is record of two highways culverts in the vicinity of the site. To the south of the site under the track to Holywell Farm (coordinates 450828, 305674) and to the southeast of the site under Desford Lane (45095,305646). An ordinary watercourse crosses Burroughs Road however there is no culvert here and the crossing takes the form of a ford intersecting the highway and the unnamed ordinary watercourse.

I can confirm no watercourse modelling commissioned by the LLFA in the vicinity of the site. Should the results of fluvial and pluvial flood risk maps provided by the EA be contested then the applicant should evidence this in any forthcoming planning application.

Regards

Flood Risk Management
Environment & Transport Department
Leicestershire County Council
Tel: 0116 305 0001

www.flooding@leics.gov.uk

www.leicestershire.gov.uk/planning-and-environment/flooding-and-drainage

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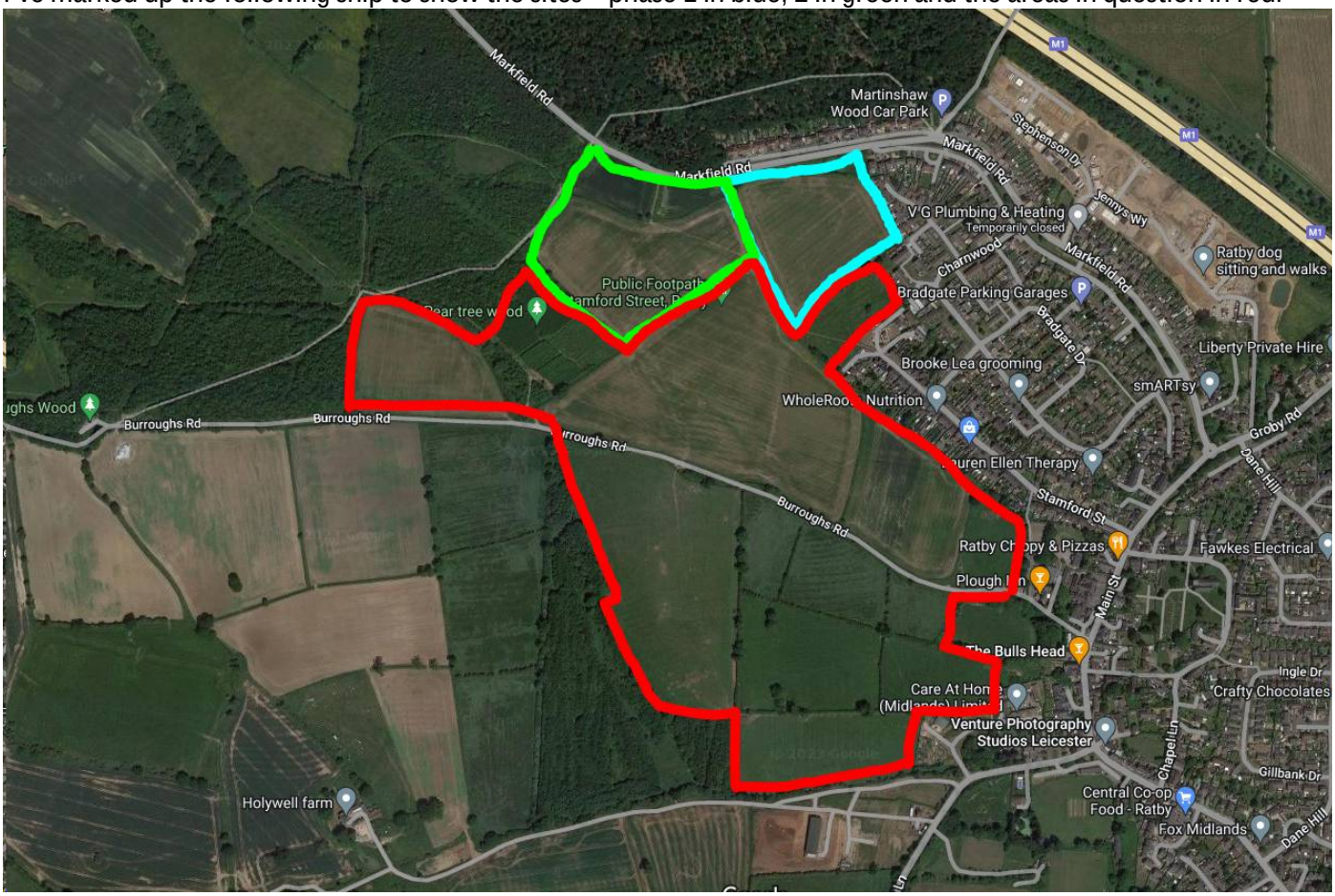
From: Henry McColl <HMcColl@pellfrischmann.com>
Sent: 27 November 2023 16:08
To: Flooding <Flooding@leics.gov.uk>
Subject: Ratby Phases 3/4 Pre-App advice

Afternoon Leicestershire Flood Risk Team,
I'm emailing on behalf of a client regarding some pre-app advice for a site adjacent to Ratby;
Following on from the first two phases at the top of the site accessed off Markfield Road, we're now looking at the next few phases stretching to the south,
I've marked up the following snip to show the sites – phase 1 in blue, 2 in green and the areas in question in red.



As a starting point, the questions I've got are along the lines of:

- Are you aware of existing flooding in the site either related to the watercourses within the site, or the EA mapped surface water flood route?
- Are there any inherent hydrological modelling requirements in place for the site for any of the requirements, or is it the generally held position that the flood zones and surface water mapping for the area represent a reliable model?
- Are there any culverted watercourses in the area you're aware/records of the watercourse crossing Burroughs Road that you're able to illuminate?

I appreciate, as always, that the answers won't be straight forward but I think it would be worth engaging early for such a large site to avoid any game breaking scenarios later on down the line,
If you think it's worth a teams meeting to talk through the site, constraints and expectations, please let me know,
Thanks very much

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Appendix B Topographical Survey