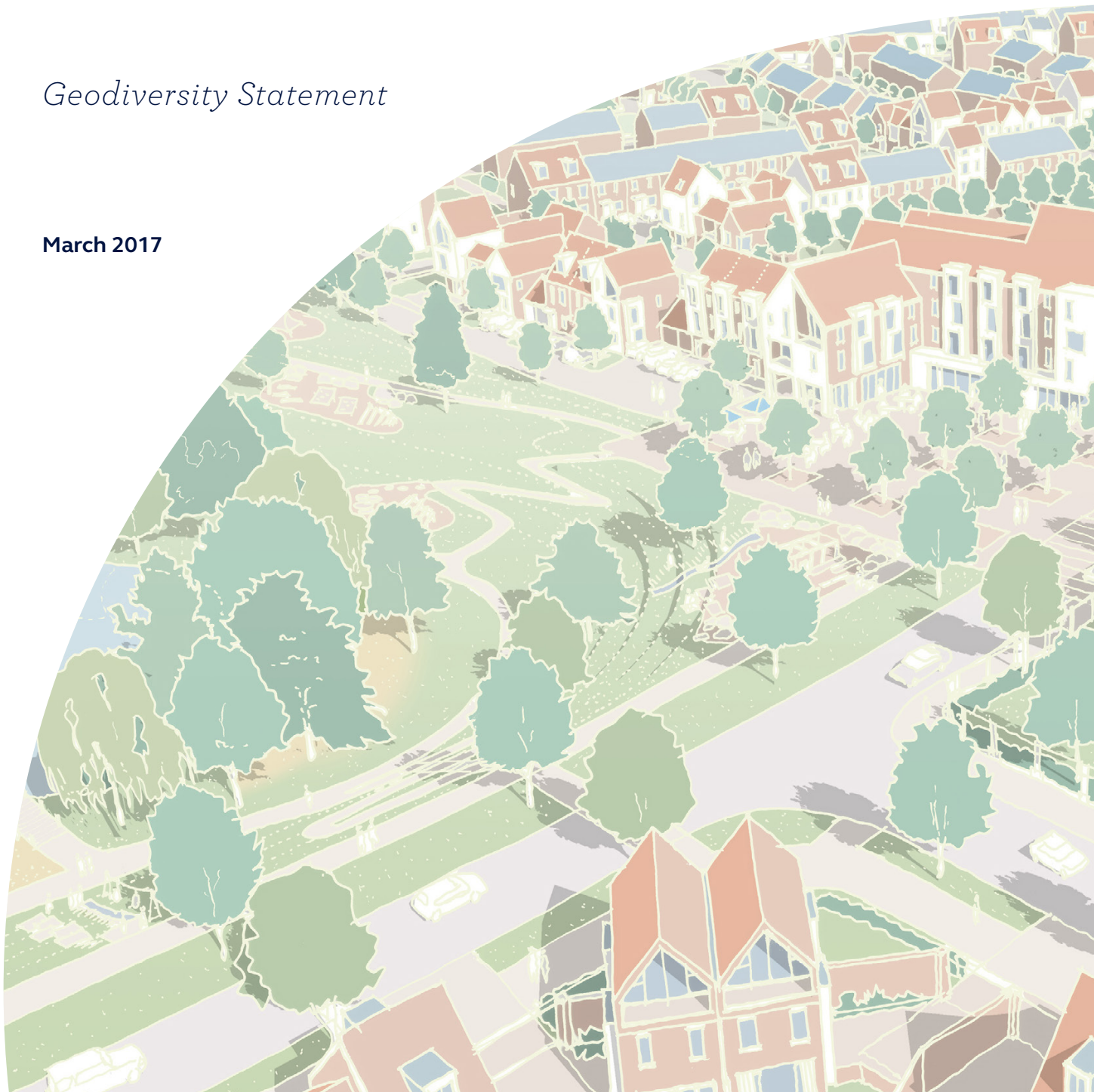
CARLYLE LAND
LIMITED

Land south and east of Adastral Park

Suffolk

Geodiversity Statement

March 2017



HARRISON GROUP ENVIRONMENTAL LIMITED

Document: **Statement of Geodiversity**

Project: **Land South and East of Adastral Park-**

Walderingfield Pit SSSI

Reference No.: **GN20809_GS**

Date: **March 2017**

Prepared For: **Carlyle Land Ltd c/o CEG**

REPORT STATUS:

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LAND SOUTH AND EAST OF ADASTRAL PARK, SUFFOLK -

GEODIVERSITY STATEMENT

(WALDERINGFIELD PIT SSSI)

1 STATEMENT OF GEODIVERSITY

1.1 Introduction

This geodiversity statement allows for the consideration of importance of the exposure of soil at this location, its conservation throughout the proposed development of the wider site area and management considerations for the future.

It is understood that the design proposals around the SSSI include:

- for up to 2,000 homes
- an employment area of c0.6ha (use class B1)
- primary local centre (comprising use classes A1, A2, A3, A4, A5, B1, C3, D1 and D2)
- secondary local centre (comprising possible use classes A1, A3, A5 and D2)
- a school
- green infrastructure (including Suitable Accessible Natural Greenspace (SANGs),
- outdoor play areas
- sports ground and allotments / community orchards)
- public footpaths and cycleways
- vehicle accesses and associated infrastructure.

This statement is intended for submission with an application for outline planning, and does not allow for the consideration of detailed conservation risk mitigation measures and site design.

This geodiversity statement is written in conjunction with guidance provided in *"National Planning Policy Framework, Department of Communities and Local Government, 2012 "* and *'Planning Practice Guidance, 2016".*

1.2 Site Location and Designation

The area of study within the statement is currently a Site of Special Scientific Interest (SSSI) which is notified under section 28 of the Wildlife and Countryside act 1981. The SSSI is recorded as Walderingfield Pit, referring to an area located within an active quarry currently operated by Brett Aggregates. The quarry is located to the south east of Ipswich (IP10 9BL) within the Suffolk Coastal District. The location of the SSSI can be identified by National Grid Reference TM260449 or Ordnance Survey Grid Reference 626000, 244900 as per figure 1.2 below. This site covers an outcrop of granular soils which form a cutting within the quarry pit and covers a relatively small area of approximately 774m^2. The outcrop is approximately 100m in length by 8m in height. It is understood that following the proposed development the site will be bordered by formal recreation areas (to the south beyond the toe of the cutting) and to the north (above the crest of the cutting) residential housing.

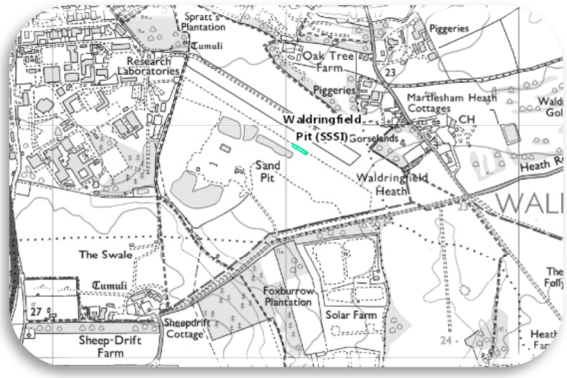

Fig. 1.2: Study Area Location Plan

The Natural England Site of Special Scientific Interest (SSSI) citation for the site can be found at: https://necmsi.esdm.co.uk/PDFsForWeb/Citation/1002231.pdf. The site is denoted as live and is managed under the responsibility of Vicky Wight.

The site code is currently designated as “EA”, the site type referring to active quarries and pits.

It should be noted the Environment Agency have permitted Brett Aggregates to landfill non-biodegradable wastes within the site area under Environmental Permit: EAEPR\EA/EPR/CP3195NW/V003.

1.3 Site History

Prior to any recent development the site and surrounding area was shown on historical ordnance survey mapping to be heathland. Extraction of sand and gravel to the south of the study area was first noted in the 1960s. It is not clear as to when quarrying within the study area first occurred although it is likely that this was during the 1990s. Since this time very little change has occurred to the study site, with vegetation and trees encroaching onto the site.

1.4 Exposed Geology and Its Importance

The site was visited by a Harrison Group Environmental (HGE) Geotechnical Engineer on the 13th February 2017 to allow HGE to initially view the outcrop for quality and to assess the material types present. The outcrop can be seen in image 1.4a below. The exposed outcrop provides a good display of a range of Pliocene, Pleistocene and more recent deposits which are summarised in the table 1.4 below. The materials present were deposited under a range of climate conditions covering a number of ice ages. The top 1-2m of these deposits are of particular interest due to the presence of periglacial involutions. Table 1.4 below provides general geological descriptions of the materials denoted in the SSSI citation, based upon British Geological Survey Data (and other pertinent research) and from site observations, but not detailed site descriptions at this stage.

Parent Unit	Strata	Age	Description
N/A	Cover Sands	Late Pleistocene and Holocene (0.0117-0Ma)	Largely a recent aeolian sand laid down and subsequently reworked during various cold climate events.
Kesgrave Catchment Subgroup	The Barham Periglacial Palaeosol-Kesgrave Formation	Pleistocene Epoch, Tarantian Age (0.126-0.0117Ma)	Water-laid sands laid down by the proto-River Thames drainage system including gravels and silts of variable character. They are poorly sorted, with high clay matrix, which is commonly strongly oxidised to hues of red and orange. The deposits commonly contain more nodular and freshly broken flint, and proportionally less quartz and quartzite.
	The Valley Farm Palaeosol-Kesgrave Formation		Deposited during warm climatic conditions this clay rich layer is around 1 to 2m thick and shows reddening normally associated with subtropical soils. Lenses of temperate organic material have been found within some of the terrace sequences.
	Walderingfield Gravels – Colchester Formation	Pleistocene Epoch, Ionian and Tarantian Age. (0.9- 0.45Ma)	The formation encompasses fluvial, lacustrine and organic deposits of the proto-river Thames. These are fluvial gravels, with sedimentary structures indicating deposition by a braided river. The gravels of the formation are characterised by quartz and quartzite from the Triassic, Carboniferous and Devonian rocks of the West Midlands, Welsh borderland and possibly southwestern Pennines, and felsic volcanic rocks from northern Wales. The fluvial gravels occupy terrace levels. The members comprise bodies of cross-bedded and massive, moderately sorted sand and gravel. Intraformational ice wedge casts and pollen indicate periglacial, cool temperate and warm temperate climates throughout this period.
Crag Group	Red Crag Formation	Pliocene Epoch Piacenzian Age (2.58-3.6Ma)	Generally these deposits are coarse-grained, poorly sorted, cross-bedded, abundantly shelly sands. Dark green and glauconitic when unoxidised, but typically oxidised to yellow or reddish brown with ferruginous concretions (iron pan). These deposits were laid down during warm climatic conditions. A gravelly sand dominated by various bioclasts, these bioclasts and micro fossils present represent a method of palaeodating the Piacenzian age. The sedimentary features (such as crossbedding, fining up sequences as well as more abundant bioclastic beds) gives geological evidence of fluctuating sea levels which proves a sea level higher than that of present, representative of a marine regression. Both carbonate and oxygen isotope dating can also have the potential to research climates of these periods.

Table 1.4: Geological Summary of the Exposed Materials Present

Image 1.4a: Panoramic Photograph of a Partial Section of the Exposed Quaternary Deposits

The importance of this exposure is that these soils are rarely exposed as an outcrop naturally and are usually only viewed through borehole evidence or earthworks such as quarrying. These soils are nationally, if not globally unique in the fact that onshore records of quaternary paleoclimatology are rare and that this section can be studied to provide relatively detailed information on the climate during the ages of the materials denoted in table 1.4.

This exposure is important to academia and the general public for the value of educational purpose, study (for amateurs and professionals alike), advances in earth science knowledge, events and human impact on our planet e.g. climate change. The section also has aesthetic value in the landscape, promoting public awareness and appreciation of earth sciences.

1.5 Current Threats/ Issues and Mitigation Measures

There are two main management principles for active quarries. The first is to maintain exposure of the geological features during the end of the working life of the quarry and to be accessible to anyone who wishes to view or study it. The second is to ensure that representative sections of exposure are retained once works have ceased. Exposure is usually maintained when the quarry is active as a natural consequence of the extraction process. However, positive management during the working life of the quarry may be required to ensure that important sections are not concealed by, for example, quarry waste or buildings. In addition to the above recommendations, Natural England have provided suitable and detailed hazard assessment in regard to preserving the exposure (reference OLD1002231) which is summarised below. These should be considered throughout the remaining life of the quarry to avoid degradation of the feature.

Natural England Reference	Description
7	Dumping, spreading or discharge of any materials.
12	The introduction of tree or woodland management.
14	The changing of water levels and tables and water utilisation (including irrigation, storage and abstraction from existing water bodies and through boreholes).
20	Extraction of minerals, including sand and gravel, topsoil and subsoil.
21	Construction, removal or destruction of roads, tracks, walls, fences, hardstands, banks, ditches or other earthworks, or the laying, maintenance or removal of pipelines and cables, above or below ground
22	Storage of materials against pit faces.
23	Erection of permanent or temporary structures, or the undertaking of engineering works, including drilling.
24	Modification of natural or man-made features, clearance of large stones, loose rock, scree or spoil and battering, buttressing, grading or seeding rock-faces, outcrops and cuttings, infilling of pits and quarries.
27	Recreational or other activities, including motor cycle trials riding, likely to damage pit faces.

Table 1.5: Hazards posed to the SSSI which require to be avoided during and at the end of the current use.

1.6 Future Threats/Issues and Mitigation Measures – During and Post Development

In planning restoration and after-use of the quarry, it is important to consider geological conservation at an early stage. After-use should include the maintenance of exposures which are sufficiently extensive to demonstrate the important geological interest.

It is recommended that future site management to preserve the SSSI should be detailed in a site management plan which should be developed at the detailed planning stage. This would allow consultation with the stakeholders and consider how the specific development design may be undertaken with appropriate consideration of conservation. The following paragraphs describe potential future threats and mitigation measures that will need to be considered in a site management plan.

- Development at the base of quarry would likely be compatible with the conservation of the exposure assuming that public access to the exposure is maintained. The development should of course be at a safe distance from the base of the slope, on the basis of slope stability material movement.

- Development above the quarry face should consider a safe standoff distance to ensure structural stability is maintained without the need for slope stabilising works (retaining walls, geotextile membranes etc.), which may otherwise obscure physical access and the extent of the exposure.

- Due to natural weathering processes, the slope would be expected to slowly regress. The slope may also suffer future instability, which could require reprofiling, also effectively regressing the slope backward.

- Without a specific slope stability investigation an initial stand-off distance of 10m at the exposure toe and crest could be initially assumed. The stand-off distance should be fenced during construction.

This stand-off distance should be better assessed through a slope stability assessment and through consideration of the viewshed of the exposure.

- Vegetation coverage was variable, including areas of dense brambles and sparse mature trees. Vegetation encroachment could increase without appropriate management. It should be noted that conversely removal of existing trees is not recommended without thorough assessment, as these likely aid the current slope stability. A programme of vegetation management/clearance will be necessary to ensure clean exposure of the deposits is maintained. Planting trees within the stand-off area at the slope toe should also be avoided to prevent obscuring the view.

- Paths and trails to the SSSI should be encouraged to allow access, although fencing at least 5m from the toe of slope may be appropriate to prevent unrestricted access onto steeper slopes for health and safety reasons and to prevent footfall from disturbing some of the cleaner and more vertical exposures. It is recommended that a permanent information board is produced and installed during site development, which should be designed by a professional person to provide interpretation of the features present, in full view of what the board is describing.

- Natural weathering will obscure some of the more important sections over time. It is recommended that the site management plan consider key sections of the exposure that can be hand or machine excavated to expose the key sequence of materials present but are located in safe and accessible areas.

1.7 Conclusion

In conclusion it is recommended that at the detailed planning stage, a Slope Stability Report and Site Management Plan should be produced from which the specific conservation measures can be documented. We understand that the client suggests the imposition of a condition which would require the submission of the aforementioned Slope Stability Report and Site Management strategy prior to, or concurrently, with the submission of any reserved matters application for development on land within 10m of the SSSI. The Site Management Plan should be undertaken in line with the Planning Practice Guidance. The Site Management Plan should also state how conservation would be monitored and audited during the proposed site development process. In conclusion, assuming that above recommendations are adhered to, we would consider that the proposed development would not have an adverse effect on Walderingfield Pit SSSI.

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REFERENCES

Natural England *SSSI Citation* https://necmsi.esdm.co.uk/PDFsForWeb/Citation/1002231.pdf

British Geological Survey GeoIndex Onshore - http://mapapps2.bgs.ac.uk/geoindex/home.html

British Geological Survey*. 1:50,000 Sheet 207 Ipswich (England and wales).*

Department of Communities and Local Government, *2012, National Planning Policy Framework*

Mathers, S J, Woods, M A, and Smith, N J P, 2007, *Geology of the Ipswich District – A brief explanation of the geological map. Sheet Explanation of the British Geological Survey. 1:50,000 Sheet 207 Ipswich (England and wales),* including references within*.*

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