AGENDA ITEM 6

HERITAGE 30/4/24

This page is intentionally left blank.

AGENDA ITEM 7
HERITAGE 30/4/24

SWANSCOMBE AND GREENHITHE TOWN COUNCIL
"TAKING PRIDE IN OUR TOWN"

Planting in the Park

Community planting days

10:30am

8th & 9th May 2024

Swanscombe Heritage Park

Come along and help us to plant up some of the new wildlife features in the park.

Wednesday 8th May:
Planting aquatic plants into the restored wildlife pond.

Thursday 9th May:
Planting wildflowers in the picnic area and meadow.

For more details contact:

lucy.sawyer-boyd@kent.gov.uk

highways england

North West Kent COUNTRYSIDE
protect / explore / enjoy

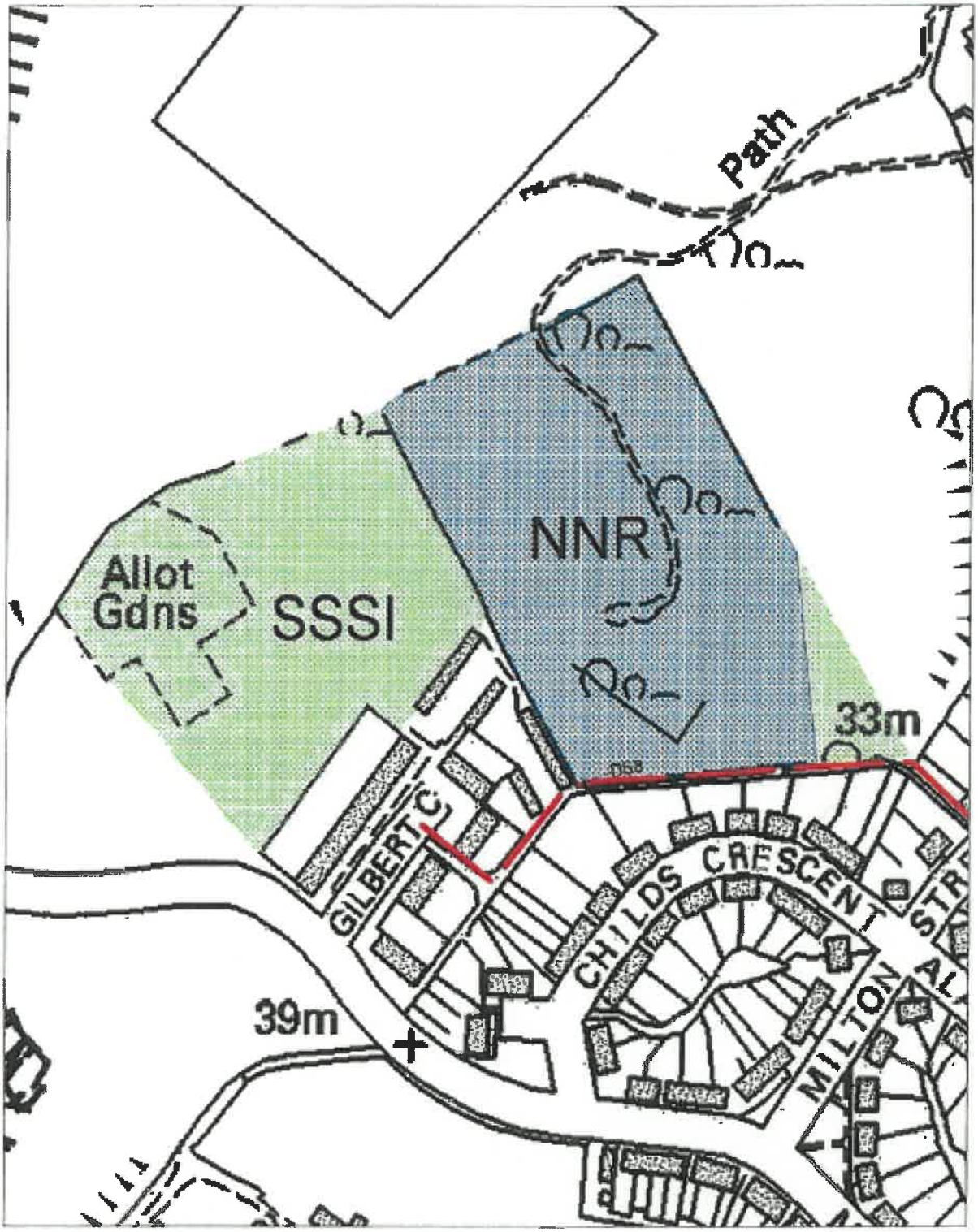
This page is intentionally left blank.

AGENDA ITEM 8

Hearnor 30/4/24

NATURAL ENGLAND

Map 2 Swanscombe Skull Site



Scale 1:5000 Map 1 of 1

0 100 200 300m
0 250 500 700ft

Drawn by: Lorraine Smith
Date: 4/11/2009
Ref: tq59757425
© Natural England 2009

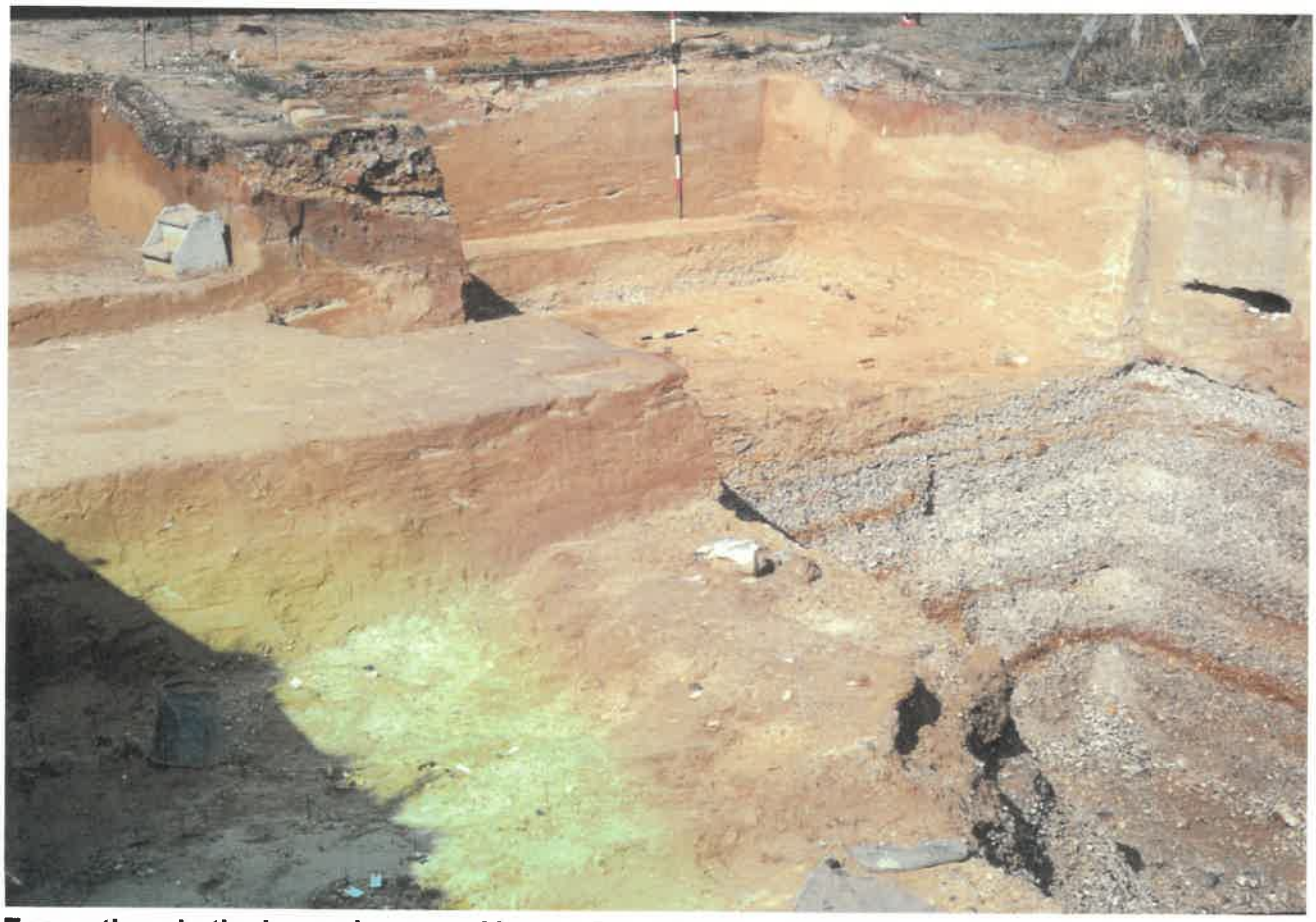
Grid North

Natural England
International House
Dover Place
Ashford
Kent
TN23 1HU

NNR
SSSI
PROW

This page is intentionally left blank.

Swanscombe Skull Site NNR
Management Plan
2024 - 2029



Excavations in the Lower Loam and Lower Gravel at Swanscombe.

Authorship:

Rob Carver (Group Co-ordinator, Kent National Nature Reserves, Natural England)
Eleanor Brown (Senior Specialist, Quaternary Geology and Landforms, Natural England)

Management Plan Review Consultees

Eleanor Brown (Senior Specialist, Quaternary Geology and Landforms, Natural England)
Lorraine Huggett (Manager, Natural England)
Rosemary Godfrey (Lead Adviser, Conservation Delivery Team, Kent, Natural England)
Sean Hanna (Senior Adviser, Land Use Planning, Kent, Natural England)

Martin Harding (Swanscombe and Greenhithe Town Council)

Contents

Site Description

1.1: Location

		Notes
Location	Lies in the centre of Swanscombe south of the railway line between Greenhithe and Swanscombe stations – see Map 1	
County	Kent	
District	Dartford	
Local Planning Authority	Dartford Borough Council	
National Grid Reference	TQ597 743	Centre of the site

1.2: Land tenure

	Area (ha)	Notes
Total Area of NNR	2.08	
Freehold	2.08	Donated to Nature Conservancy (NC), now Natural England (NE) by Associated Portland Cement Manufacturers Ltd, now Blue Circle, on 13 November 1953.
Leasehold	0	
S 35 Agreement	-	
S16 Agreement	-	
Other Agreements	Lease	21-year lease to Swanscombe and Greenhithe Town Council 1st April 2017 – 31 March 2038
Legal rights of access	□	Footpath – see Map 2 access
Other rights, covenants, etc	□	

Notes		Copies of the leases and deeds are held by Natural England's Land Agent

1.3: Site status

Designation	Area (ha)	Date	Notes
SAC	-	**Designation:**	
SPA	-	**Designation:**	
Ramsar	-	**Designation:**	
NNR	2.08	**Declaration(s):** No 1: 9th March 1954	
SSSI	3.9	**Notification (1981 Act):** January 1951 (1949 Act) 11th January 1988 (1981 Act)	National Parks and Access to the Countryside Act 1949 Wildlife and Countryside Act 1981
GCR			Swanscombe – Barnfield Pit (Quaternary of the Thames) GCR No. 2052 Barnfield Pit (Pleistocene Vertebrata) GCR No. 1200
Other designations (site):	□		Part of Swanscombe Heritage park
Wider designations:	□		

1.4: Physical features

The Swanscombe Skull Site, near Swanscombe village in North-West Kent, is one of the most famous and most important Ice Age (Pleistocene – 2.58 million years ago to 11.7 thousand years ago) localities in Britain. It is of great importance for recording evidence of environmental change through its stratigraphy (layers of sediment), palaeontology (fossils)

and Palaeolithic (Old Stone Age) archaeology. The site is internationally renowned for the discovery, on separate occasions, of three fragments found to be from the same human skull, deemed to be about 400,000 years old, the second oldest human remains found in Britain. The site is also of great importance for the rare occurrence of different Stone Age Industries, one above the other – Acheulian above Clactonian. Swanscombe's once well preserved and fossil-rich deposits, especially containing mammal and mollusc rich assemblages, combined with the complex sedimentary record, makes this a key reference site not only within Britain, but also throughout Europe. The site is notified as a geological SSSI and it contains two Geological Conservation Review (GCR) sites, one notified for its Pleistocene Vertebrates (in the Pleistocene Vertebrata GCR block) and the other for the Quaternary sediments within the Quaternary of the Thames GCR block. The GCR is the scientific audit which provides the evidence base for the geological SSSI series in Great Britain.

The Swanscombe Skull

The NNR lies between 23 metres and 35 metres above O.D. to the north of Childs Crescent, Swanscombe, about 1.2 kilometres south of the Thames. It occupies part of the former Barnfield Pit which was in operation for 60 years, quarrying for sand and gravel, from 1887 until operations terminated in 1947. The Associated Portland Cement Manufacturers Ltd gave the freehold of Barnfield Pit to the Nature Conservancy and it became the first geological National Nature Reserve that is still in existence. The site was also one of the first geological Sites of Special Scientific Interest, notified in 1951. The quarry excavated into loam and gravel beds that overlay the chalk here. It was during archaeological work at the site in 1935 that the dentist and amateur archaeologist, Alvan T Marston, discovered part of a human skull. Nine months later, in 1936, Marston found a second piece, with a third piece being unearthed in 1955 by the archaeologist John J Wymer. Incredibly these fitted together and were three different pieces of the same skull – The Swanscombe Skull.

The three pieces of the skull were found within an area of about 125 square metres. The occipital bone (the rear wall and base of the skull) was the first piece to be found, with the left parietal bone (the left side wall of the skull) being found second. The third piece to be found was that of the right parietal bone. Despite excavations being continued for a further five years, no further skull fragments were found. Together the pieces form the back half of the skull of what is believed to belong to a young adult, as the sutures connecting the bones were still open as is seen in young individuals, but the bones are too large and thick to be considered those of a child. Although the skull is colloquially called the "Swanscombe Man", muscle markings and other surface features of the bones suggest the Swanscombe skull may possibly be that of a woman. The Swanscombe Skull, is now on permanent display at the Natural History Museum, London, and a replica can be seen within the Swanscombe Leisure Centre, near the NNR. The photo below shows the Swanscombe Skull:

The Swanscombe Skull (Natural History Museum, London – reproduced with permission)

Geology of Swanscombe

The underlying geology for the Swanscombe area is Upper Chalk, overlain by Thanet Sand (oldest), Woolwich Beds, Blackheath Beds and London Clay (youngest). These are overlain with more recent Pleistocene (Ice Age) deposits of the Boyn Hill/Orsett Heath Formation. At the Swanscombe Skull site, these sands, gravels and loams are underlain by Thanet Sands. The sediments were deposited the early River Thames when it flowed at a level 22 to 33 metres higher than present day. This was during the Pleistocene period, (2.58 million

years ago to 11,700 years ago), during which there were a number of climatic fluctuations ranging from extreme cold (glacial) to temperate (interglacial) conditions, similar, and sometimes perhaps warmer, than the present day. During the early part of the Pleistocene period, the lower Thames had a different course to its present one. The diversion of the Thames to its present course was because of large ice sheets that covered Britain during a major glacial period, the Anglian Glaciation (in Marine Isotope Stage 12) that occurred around 450,000 years ago. These ice sheets diverted the River Thames from its former course through the Vale of St Albans through the Goring Gap in the Chilterns to a new course close to its present day position. The sands and gravels at Swanscombe represent a complex record of deposition by the Thames during an interglacial 'warm' period and subsequent cooling phase that occurred about 380,000 to 420,000 years ago in the Middle Pleistocene. This is known as the Hoxnian Interglacial in Britain (Marine Isotope Stage 11), named after a site (SSSI) at Hoxne in Suffolk.

The Pleistocene sediments found at Swanscombe comprise gravels, sands and loams with a maximum thickness of 14.5 metres, reaching an altitude of 35.5 metres O.D. The deposits are divided into three stages, the lower two (I and II) are predominately river sediments laid down in a temperate climate, whilst the upper (III) are mainly sediments laid down on land in a cool or cold climate. The complete sedimentary sequence at Barnfield Pit, Swanscombe, is shown in the table below.

Stages		Members (beds)	Thickness	Notes
Stage III	IIIe	Higher Loams	Up to 1 m	
	IIId	**Upper Gravel**	2 m	
	IIIc	**Upper Loam**	1 m	
	IIIb	Channel deposits	0 – 2 m	
	IIIa	Soliflucted clay	0 – 1 m	
Stage II	IIb	**Upper Middle Gravel**	1.5 – 3 m	Location of the Swanscombe Skull
	IIa	**Lower Middle Gravel**	0.5 – 2 m	
Stage I	Id	**Lower Loam**	2 – 2.5 m	Mammal footprints
	Ic	'Midden' complex	0 – 0.75 m	
	Ib	**Lower Gravel**	Up to 5 m	
	Ia	Basal gravels	0 – 0.5 m	
		Thanet Sand		

The Upper Middle Gravel (Stage II) deposits at Swanscombe, excavated in 2015 for the visit of members of the European Society of Human Evolution (photo: Simon Lewis, University of London – reproduced with permission).

The deposits at Swanscombe show evidence of some of the climatic and environmental changes that took place in the Thames valley about 400,000 years ago. The Lower Gravel consists of 2 – 5 metres of horizontally-bedded sandy gravel, which has yielded land and freshwater snails, animal bones, tusks and teeth, indicating a temperate climate. Above this, the Lower Loam comprises 2 – 2.5 metres of variable muddy sediments, silty sands and silty clays. Within this there is evidence of former land surfaces with fossil footprints,

which are extremely rare. Analysis of the footprints suggests they were created by mammals including members of the deer family and possibly elephant and rhinoceros (Davis and Walker, 1996). Fossil snails found within the Lower Loam indicate a temperate climate. Between the Lower Gravel and Lower Loam is an accumulation which was initially interpreted as a 'midden' – a rubbish dump in a muddy hole into which the hunters threw food and debris and discarded implements – although this interpretation has almost certainly been rejected. It is now thought to be a fossiliferous channel fill deposit.

Stage II, found above the Lower Loam, consists of the Lower Middle Gravel and Upper Middle Gravel, the first of which consists of horizontally-bedded sandy gravels with large cobbles at the base, varying in thickness from 0.5 to 2 metres. The flora and fauna indicates a temperate climate. The latter bed within Stage II consists of cross-bedded sands 1.5 – 3 metres thick with occasional lenses of gravel and thin layers of clay. Snail remains were not plentiful but abundant mammalian remains were found, at times in association with stone tools. The occurrence of Norway lemming suggests a period of cooling climate. It was within this bed, about 1 metre above the base of the Upper Middle Gravel, that the three pieces of human skull were found.

The Upper Loam, Stage IIIc, rests on cold climate deposits laid down in river channels (IIIb) cut into the Upper Middle Gravel during a very cold climate. The Upper Loam comprises horizontally-bedded loamy sands about 1 metre thick, with several thin clay layers. This bed has produced no animal remains, but pollen indicates a temperate climate. Above this, the Upper Gravel consists of angular pebbles in a tough sandy clay with a thickness of 2 metres. This bed is not a river deposit but was formed in a cold climate by the downslope sludging of the surface deposits, saturated with water through seasonal thawing, over a deeply frozen sub-soil. Animal remains are rare, but the lower part has yielded musk-ox.

Acheulian and Clactonian industries

Swanscombe is one of a very few British localities to yield two distinct Palaeolithic industries in stratigraphical superposition (one on top of the other). These discoveries are associated with a complex succession of gravels, sands and silts, containing abundant faunal remains, and form part of the terrace record of one of Britain's major rivers, the Thames.

At an early stage, researchers noted associations between particular stone tool assemblages and where they were found within the sediments. Stone tools of the Clactonian industry have been found throughout the Lower Gravel (Ib) and Lower Loam (Id) beds, consisting mainly of flint flakes and 'cores' (flint 'nodules' from which the flakes have been removed). Within the Lower Gravel Layer these finds have shown varying degrees of rolling and wear. Swanscombe is one of very few British sites preserving Clactonian material in primary context.

Stage II and III has yielded many hundreds of hand-axes associated with the Acheulian industry. Within the Lower Middle Gravel (IIa) a rich industry of pointed Acheulian handaxes and flakes are present, all of which are slightly rolled. Scattered Acheulian implements also

occur throughout the Upper Middle Gravel (IIb), being more common in the lower part. It was within this layer that the three skull fragments were found about 1 metre above the base of the Upper Middle Gravel, associated with pointed Acheulian hand-axes.

Distinctions were noted between the shape of the hand-axe assemblages recovered from Stage II and Stage III deposits, with finds from the latter bring of a more ovate form. Towards the bottom of the Upper Loam (IIIc) archaeological material in the form of oval Acheulian hand-axes have been found. The top of this layer has yielded flint-working debris in a sharp condition, together with oval hand-axes which are twisted in section. Archaeological material has also been recovered from the lower part of the Upper Gravel (IIId), comprising twisted oval hand-axes, probably derived from the upper part of the Upper Loam.

Palaeolithic artefacts from Barnfield Pit, Swanscombe (Natural History Museum, London – reproduced with permission)

Professor Mark White (Durham) showing an ovate hand axe to members of the 2019 International Union for Quaternary Research (INQUA) Field Meeting visit to Swanscombe (Photo: Eleanor Brown, Natural England).

References:

- Ashton, N., McNabb, J. and Bridgland, D.R. 1995. Barnfield Pit, Swanscombe. In Bridgland, D.R., Allen, P. and Haggart, B.A. (eds) The Quaternary of the Lower Reaches of the Thames – Field Guide. Quaternary Research Association, London. 129 - 141
- Bridgland, D.R. 1994. Quaternary of the Thames. Geological Conservation Review Series, No. 7.
- Bridgland, D.R. 2013. The conservation of Quaternary sites and interests. Proceedings of the Geologists' Association, 124, 612 - 624
- Bridgland, D.R., White, T.S., Schreve, D.C. and White, M.J (2014) Swanscombe. In Bridgland, D.R., Allen, P. and White, T.S. (eds) The Quaternary of the Lower Thames and Eastern Essex – Field Guide. Quaternary Research Association, London 138 – 151
- Bridgland, D.R., White, T.S., Schreve, D.C., White, M.J., Wenban-Smith, F. and Brown, E.J. 2019. Swanscombe Heritage Park (Barnfield Pit and Skull Site Nature Reserve). In Bridgland, D.R., Briant, R.M., Allen, P., Brown, E.J. and White, T.S. (eds) The

Quaternary Fluvial Archives of the Major English Rivers – Field Guide. Quaternary Research Association, London. 97 - 107

- Conway, B.W. and Waechter, J. De A. 1977. Guidebook for excursion A5. South-East England and the Thames Valley. Ed. Shephard-Thorn and Wymer, J.J. INQUA. Congress
- Conway, B., McNabb, J. and Ashton, N. (eds) 1996. Excavations at Barnfield Pit, Swanscombe, 1968-72. Occasional Paper No. 94, British Museum, London. 266p.
- Davis, P. and Walker, A. (1996) The Footprint Surfaces at Barnfield Pit, Swanscombe. In Conway, B., McNabb, J. and Ashton, N. (eds) 1996. Excavations at Barnfield Pit, Swanscombe, 1968-72. Occasional Paper No. 94, British Museum, London. 169 - 185
- Dewey, H and Smith, R.A. 1914. The Palaeolithic sequence at Swanscombe, Kent. Proceedings of the Geologists' Association 25, 90 - 97
- Duff, K.L. 1985. The Story of the Swanscombe Man.
- English Nature. 1992. Geological Brief for Swanscombe Skull Site
- English Nature. 2000. Swanscombe Skull Site NNR. Management Plan.
- Glasser, NF. 1995. Conservation of the Swanscombe site. In Bridgland, D.R., Allen, P. and Haggart, B.A. (eds) The Quaternary of the Lower Reaches of the Thames – Field Guide. Quaternary Research Association, London. 144 - 145
- Groundwork Kent and Medway. [no date]. Conservation Management Plan for Swanscombe Heritage Park.
- Kemp, R.A. 1985. The Decalcified Lower Loam at Swanscombe, Kent: a buried Quaternary soil. Proceedings of the Geologists' Association 96, 343-356
- Kemp, R.A. 1995. Soil formation on the Swanscombe Lower Loam. In Bridgland, D.R., Allen, P. and Haggart, B.A. (eds) The Quaternary of the Lower Reaches of the Thames – Field Guide. Quaternary Research Association, London. 142 - 143

Kerney, M.P. 1971. Interglacial deposits at Barnfield Pit, Swanscombe, and their molluscan fauna. Journal of the Geological Society of London 127, 69 – 93

Marston, A.T. 1937. The Swanscombe Skull. Journal of the Royal Anthropological Society of Great Britain and Ireland 67, 339 - 406

Oakley, K.P. 1939. Field meeting at Swanscombe, Kent. Proceedings of the Geologists' Association 50, 357 – 361

Oakley, K.P. 1952. Swanscombe Man. Proceedings of the Geologists' Association 63, 271 - 300

- Schreve, D.C. (2004) The mammalian fauna of Barnfield Pit, Swanscombe. In Schreve, D.C. (ed) The Quaternary Mammals of Southern and Eastern England – Field Guide. Quaternary Research Association, London. 29 - 48

Smith, R.A. and Dewey, H. 1913. Stratification at Swanscombe: report on excavations made on behalf of the British Museum and H.M. Geological Survey. Archaeologia 64, 177 – 204.

Wymer, J. 1964. Excavations at Barnfield Pit, 1955 – 1960. In Ovey, C. (ed) The Swanscombe Skull, A Survey of Research on a Pleistocene Site. Royal Anthropological Society of Great Britain and Ireland Occasional Paper No. 20. 19 – 61.

1.5: Climate change

The UKCP 2018 climate change projections for the South East Region suggest that by 2080 we may see an increase of winter mean temperature of 2.5^{O}C and an increase in summer mean temperature of 3.9^{O}C and a change in precipitation distribution, with a decrease of 27% in summer and increase of 19% in the winter throughout the Southeast (central estimate under a medium emissions scenario, UKCP09). UK projections also include the likelihood of more extreme events such as droughts, rainfall events and heatwaves, and increased variability in rainfall and temperature patterns between years. Potential effects of these changes include:

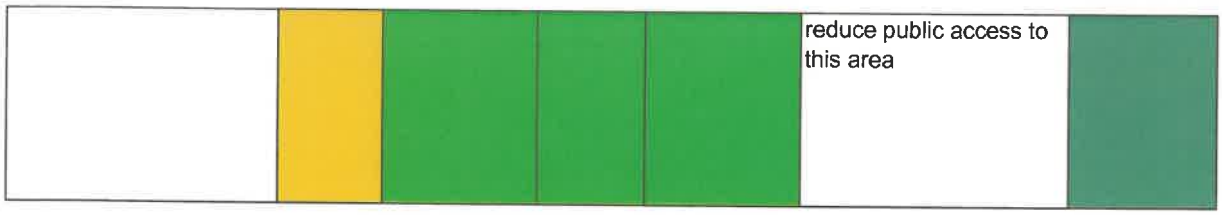
- Alteration of woodlands, including change in woodland composition as a result of hotter, drier summers, with competition from invasive species and loss of beech as a result of dieback due to soil moisture stress and wind blow due to increased storminess. Climate change may result in increased pressure from introduced pests and tree diseases.
- Appearance of species adapted to new climatic conditions.
- An increase in flash flooding events.
- Pressure upon the water supply due to summer drought exacerbated by increased demand for abstraction.
- Increase in severity of any fires (see https://www.metoffice.gov.uk/public/weather/fire-severity-index/)

These effects have the potential to impact on the notified geological interest of the reserve, as outlined in the table below:

Climate change vulnerability assessment: add archaeology and fossils in narrative:

Feature name	Rainfall	Temperature	Extreme Events	In Combination	Reasoning	Confidence

Sediments of the Thames River Boyn Hill/Orsett Heath terrace, with their notified fossil content	M	L	L	M	Increased winter rainfall and increased summer temperatures may disturb the surface soils, leading to increased exposure of sediments and archaeological layers. This would led to degradation and potentially decalcification. The fossils could deteriorate and become more fragile or even disappear completely. Increased winter rainfall could cause the sections to become waterlogged and this, in combination with freeze-thaw and drying in summer, could cause the sections to become unstable and degraded.	M
Neutral grassland with scrub and secondary woodland in some places.	M	L	L	L	Stressed trees more at risk from pests/diseases and increased risk of trees failing and potentially causing disturbance to sediments by rootplate heave. The increases in temperature could lead to increased vegetation growth during the spring and summer, which could obscure the sections. Where there is no cover this would lead to increased root damage in areas of sensitive geology where important deposits are at or just below the ground surface.	M
Estate Assets	L	L	L	L		H
Community Involvement	L	L	L	L		H
Education	L	L	L	L	Increased winter rainfall could cause waterlogging of the sections subsequently making them unavailable for research.	H
Public Access	M	L	L	L	Increased winter rainfall could increase extent of wooded/scrub area flooded when pond overtops and further	H



1.6: Biological features

Flora

Not applicable to the special interest of the SSSI (which is entirely geological) but the site supports a mixture of grassland and scrub/woodland habitats. The woodland is a mixture of species typical of fairly acid soils and of early woodland colonisation, with birch *Betula pendula*, willow *Salix*, predominant with other more interesting species such as aspen *Populous temula*, oak *Quercus* and blackthorn *Prunus spinosa* also common.

Having a suitable mix of vegetation in the right areas is important for the conservation of the notified geological interest. This must include keeping certain areas as grassland and avoiding build-up of trees and scrub, as per the Visual Management Plan (VMP) for the reserve. Allowing trees and scrub to develop will both prevent access to the geology and could damage it via root penetration.

Fauna

Extensive data is not available, but the site is likely to support a range of common woodland edge birds and invertebrates, but the urban location will preclude species susceptible to disturbance.

Clearing areas of encroaching scrub and trees would provide additional habitat for grassland invertebrates.

Communities

The site comprises a mixture of three principle habitat types. These are secondary woodland, scrub and grassland. Secondary woodland comprising of Ash *Fraxinus excelsior* – Field maple *Acer campestre* – *Mercurialis perennis* NVC community type W8d is located along the western edge of the NNR. With secondary woodland comprising Grey willow *Salix cinerea* – Downy birch *Betula pubescens* – Common reed *Phragmites australis* NVC community type W2a with an Alder *Alnus glutinosa* – *Filipendula ulmaria* sub community found in a small area around the winter wet pond in the northern part of the site. In addition,

scrub comprising of Hawthorn *Crataegus monogyna* – Ivy *Hedera helix* NVC community type W21 is also found along the western edge of the NNR.

Rough grassland comprising of False oat-grass *Arrhenatherum elatius* NVC community type MG1 is found throughout the main areas of the NNR. With fixed dune grassland comprising red fescue *Festuca rubra* – Ladys bedstraw *Galium verum* NVC community type SD8 being found in an area towards the south of the site, as well as a very small area in the very north of the NNR.

Survey Data

Additional survey work is scheduled to be undertaken between 2023 to 2025 across the entire Swanscombe Heritage Park site, including the Swanscombe NNR as part of a funded project between Swanscombe and Greenhithe Town Council and Northwest Kent Countryside Partnership.

1.7: Cultural features

Landscape Character Joint Character Area 113 - North Kent Plain
NCA Profile:113 North Kent Plain - NE357 (naturalengland.org.uk)

Lying within the North Kent Plain Character Area, Swanscombe is typical of sites along the estuary having a history of industrial use and now partially surrounded by housing giving it an urban setting. The natural landforms both on and in the vicinity of the site has been substantially modified by activities associated with chalk and gravel extraction, which took place throughout much of the late 19th century and the first half of the 20th century, and the subsequent in-filling in the 1950's and 1960's, creating a complex combination of natural and superimposed manmade landforms. The main features of the landform on the NNR and its immediate surrounds are as follows:

- Craylands Gorge – aligned north-east to south-west. This is a steeply sided, man-made gorge created to accommodate a tramway during the backfilling in the 1950's and 1960's.

- Plateau/terrace – this rises from Alkerden Lane in the south and is a reclaimed tip filled to levels similar to unquarried land adjacent to the site. The terrace is bisected by a cutting aligned northwest – southeast. Near the centre of the plateau, the landform has been levelled to accommodate fenced pitches. The plateau offers panoramic views of the surrounding area including the River Thames.

- Skull site – a network of banks and hollows left undisturbed after geological and archaeological excavations but has been affected by unauthorised digging to create cycle tracks and jumps as well as problems with tree and scrub encroachment. This is

now being managed in selected areas for the geology. The area is enclosed by steep banks that rise to the original ground levels at the site boundary.

- Picnic area – partly filled reclaimed quarry.

- Allotment site – natural landform. This is where undisturbed Pleistocene sediments can be found in situ within the SSSI and as such is a critical area for future geoconservation of the notified geological interest and crucially its fossil record.

Land-Use History and Sociological Use

The site is also of interest for its industrial archaeology. Barnfield Pit was originally excavated to provide materials for the Swanscombe Cement Works which was the first works to achieve reliable and fully understood production of Portland Cement. At its peak it was the country's largest producer and exporter of Portland Cement. In the 1950s and 60s the quarry was partly backfilled so creating Craylands Gorge. A tramway ran along the bottom of the gorge connecting Western Cross Quarry (later part of Eastern Quarry) to the south with the cement works further north. The tracks of the tramway have been long removed, with only the tunnels and gorge indicating the line of the structure but industrial archaeology features from the last century survive in the form of a cast iron footbridge and pipes, some of which may still be in use for de-watering. Although individually the industrial features and landforms are likely to have only local value, as a group they can are of high value as a remainder of the historically important and quickly vanishing industrial landscape of Swanscombe.

The site is also used for informal recreation. The NNR forms part of the Swanscombe Heritage Park, which includes the remaining area of SSSI outside the NNR, the Swanscombe Leisure Centre (leisure centre), football fields and open grassland, Craylands Gorge, Alkerden Lane Pit and Nursery school grounds. The Heritage Park is designated Public Open Space, with the majority of the site, including the gorge, used informally as open space and also for pedestrian access. The Heritage Park (excluding the NNR) was designated as a Site of Nature Conservation Interest (now known as a Local Wildlife Site (LWS)) in 1992 by the Kent Wildlife Trust.

The importance of the Heritage Park as a cultural, archaeological, educational and recreational resource has been recognised at a local and national level, although the use of the Park as a resource in these areas is underused at present. The Swanscombe Heritage Park Action Group (SAG) was established in 2001 and consisted of key stakeholders and landowners concerned with the management of the park. Group members include: Dartford Borough Council, Groundwork Kent and Medway, Friends of Swanscombe Heritage Park Group,
KCC Heritage, Kent Wildlife Trust, Land Securities, Natural England, Swanscombe and Greenhithe Town Council. The Group undertook improvements to the site but currently only functions via the Town Council sub-committee.

Education

The site has previously been used for educational purposes but is not currently used and limited facilities are available. Groundwork Kent and Medway have produced an information pack for Craylands Gorge and Swanscombe aimed at raising and developing the awareness of the site as an educational resource. However, this pack is now out of date and needs reviewing.

Events have been held at the site to promote its importance as part of the Festival of NNR's. Whilst this focused on the ecology of the site as a whole it has helped to raise awareness and future events are hoped when funding can be sourced to deliver them.

In addition, the site is used approximately every few years for field trips in connection with academic conferences where sections through the geology are exposed for viewing, discussing, and sampling.

Interpretation and display facilities are available, however upgrading these would improve the interpretive facilities of the reserve. The educational facilities also need to be upgraded.

Research Use

Swanscombe NNR is a nationally and internationally important site for research. The site hosts national and international field meetings from the research community, including:

1977 - International Union for Quaternary Research (INQUA) meeting
1995 - Quaternary Research Association (QRA), Quaternary of the Thames meeting
2004 - QRA Quaternary Mammals of Southern and Eastern England field meeting 2014 - QRA/Essex Field Club Quaternary of the Lower Thames and Eastern Essex field meeting.
2015 - Geologists' Association (GA)
2015 - European Society for the Study of Human Evolution (ESHE)
2019 – International Union for Quaternary Research (INQUA) meeting

This site is the only Quaternary (Ice Age) NNR in England and is viewed as a flagship site for scientific research, education and interpretation by the QRA and its members.

Demonstration

Swanscombe Skull Site NNR is used for various demonstrations, of science and of geoconservation. The site is a very well used research and teaching site and is visited every several years by national and international research associations. Recent scientific demonstrations include sampling for electron spin resonance (ESR) dating from the Lower Loam and Lower Gravel, and optically stimulated luminescence dating from the Upper Loam.

The site is also extremely important for demonstrating and testing geoconservation techniques, which has been possible due to its NNR status and collaboration between geoarchaeological scientists, Swanscombe and Greenhithe Town Council and Natural England. The original GCR2 geoarchaeological section (exposure of sediments), which was originally opened in 1982, was covered with geotextile. It has since been reopened in 1995 and 2003. Ongoing monitoring shows that the geotextile has prevented large shrubs and trees from growing, and thus prevented damage from root ingress. This technique has been used at other geological sites. In developing the Visual Management Plan in conjunction with Natural England, Swanscombe and Greenhithe Town Council trialled the use of brash generated from vegetation management to cover geoarchaeological sections where public access needed to be excluded. Again, this has proved to be a workable method of restricting potentially damaging access by people and bikes from important sections, but also allowing access to the sediments using a digger when required for scientific research or field meetings. The demonstration of this technique at Swanscombe has enabled it to be proposed at other geological and archaeological sites.

Sampling Section 4 (Upper Loam) for OSL dating at Swanscombe, July 2019 (Photo: Eleanor Brown, Natural England)

1.8: Access & visitor facilities

Visitor Appeal and Suitability for Access

The Swanscombe skull site and surrounding Heritage Park is a key area of local greenspace within an urban setting. At present the NNR is used for informal recreation, forming part of the Swanscombe Heritage Park. An Audience Development Plan, commission by Swanscombe & Greenhithe Town Council as support for their application for a HLF Heritage Project Grant, identified that the most popular uses for people visiting the Park were walking, using the children's play area and the heritage interest. However, the location of the reserve within an urban environment makes it prone to inappropriate activities such as vandalism, digging to create sandpits and creation of bike tracks and jumps.

The area immediately adjacent to the reserve is earmarked for development as part of the Ebbsfleet Garden City proposals. The reserve sits on the edge of the Eastern Quarry proposed development and the Council have previously announced aspirations to incorporate the reserve in the greenspace provision of the development.

A full refit of the existing play area was undertaken in 2021 to improve the longevity of the equipment and improve public interest.

Improvements have been made to the pond area within the site, including a new pathway, level decking and a fence. The lining of the pond, along with planting is planned from funding secured over 2023 – 2024.

The Town Council has pledged to invest further in pathway improvements to the site as a whole to improve accessibility. This would include a new gate to the southeast of the site to help alleviate some of the access issues with anti-social vehicles.

Interpretation

Interpretation regarding the geological and archaeological importance of the site was installed as part of the 'Walk into History' project. Five interpretative panels have been installed that reflect different aspects of interest, including past wildlife, the important archaeology, and the geological sequences. In addition, commemorative boulders show the actual location of the Swanscombe Skull finds and there are also NNR signs provided by Natural England. All of these interpretative elements suffer vandalism on a regular basis and so are in a dilapidated state. The plaques which explain some of the interpretative structures are missing which means understanding their meaning is challenging for visitors. The development of an Interpretive Plan by Natural England and Swanscombe and

Greenhithe Town Council would help to plan renewal of interpretation using suitable techniques for the setting, visitors and use of the site, and also to help apply for funding.

Funding is currently being sought to produce vinyl overlays to the etched interpretation. This will enable them to be treated against graffiti, easily replaced and also provide a colour feature to the site. If successful, this style of interpretation can be incorporated into the wider park.

Access Provision

The site is adjacent to the Swanscombe Leisure Centre in Craylands Lane, Swanscombe, and is accessed from the Centre's car park.

Accessed by car is via minor roads from the B259 (Stanhope Road) and A226 (London Road).

The nearest railway station is Swanscombe (approximately 1 km away) on the London to Gillingham line, and is served by South Eastern Trains.

The nearest bus stop is at Child's Crescent where Arriva Kent Thameside services run from Sevenoaks to Bluewater and Gravesend to Dartford.

There is a Public Right of Way (footpath DS8) that runs along the southern boundary of the site. In addition, there is a way-marked path linking the entrance feature to the NNR, which was installed in 2005 as part of the 'Walk into History' project.

In 2014 the Swanscombe Skull Site NNR was dedicated by Natural England for access on foot under Section 16 of the CROW Act 2000.

Vehicular access onto and around the reserve itself is permitted only for authorised vehicles undertaking management or research activities.

Visitor Facilities

Toilet and refreshment facilities (including facilities for the disabled) are available at the Swanscombe Leisure Centre. The Centre also hosts a small display about the site. There is a short way marked path to the NNR and interpretation panels provide information on the reserve's areas of interest.

A replica of the Swanscombe Skull on display in Swanscombe Leisure Centre (Photo: Eleanor Brown, Natural England).

Evaluation, Formulation of Vision and Site Objectives 2.1: Site analysis

2.1.1: Site Strengths

Geology/archaeology

- One of only 2 sites in the UK to yield unquestionable Lower Palaeolithic human remains.
- One of the richest Palaeolithic sites in the world.
- High geological value – is one of the most famous and most important sites in the British Pleistocene and is used by researchers for scientific research and for national/international field meetings.
- Is of great importance for stratigraphy, palaeontology and Palaeolithic archaeology.
- One of the richest Pleistocene vertebrate localities in Britain.
- One of the richest sites attributed to the Hoxnian Interglacial 400,000 years ago.

Tenure

- The whole NNR is owned by Natural England and leased to Swanscombe and Greenhithe Town Council.

Visitor appeal

- For local people it is an important area of green space adjacent to an urban area.

Community involvement

- Forms part of the Swanscombe Heritage Park.
- Local support from the community
- Importance as a cultural, geological, archaeological, educational and recreational resource recognised at a local and regional level.
- Is adjacent to the Ebbsfleet Garden City proposed development.

Public access

- Open public access.
- Access to the site is good, both on foot, road and public transport.
- There is an interpretation trail that leads the visitor to the find site.

Potential for strategic links e.g. geo NNRs forming a geological walk through time - education, academic, partnerships)
Potential for additional designations e.g. LNR and expansion of NNR

2.1.2: Site Weaknesses

Geology/archaeology

- The site is very sensitive as the sediments, and fossils within them, are a finite resource which is threatened by unchecked vegetation growth, unsuitable recreational activities and potentially degradation of fossiliferous material by decalcification.
- Features are close to the ground surface and can therefore be damaged by weathering and disturbance.
- Features are subject to damage by vegetation (tree and shrub) cover and encroachment.
- Site vulnerable to damage from vandalism and inappropriate recreational activities, including off-road bikes/vehicles.
- If exposed in the future, the sediments, fossils and archaeological material could be at risk of illegal collecting. Local promotion and interpretation of the fossil collecting code or ultimately restricted access may be required.

- Lack of wardens to manage/maintain the site.

Interpretation

- Interpretation boulders and signs vulnerable to vandalism/theft.
- The boulders with the interpretation panels are gneiss, a non-local rock and therefore don't completement the geology of the site.
- Lack of an overall interpretive plan. A new interpretive master plan is a priority action.

Public Access

- As area around the find site is enclosed with trees and scrub there is a feeling of isolation when visiting the site. Vulnerability in terms of personal security.
- Ebbsfleet Garden City development will cause an increase in visitor pressure on the reserve.

Links to strategic documents:

EIP/25 Year Plan: Environmental Improvement Plan 2023 - GOV.UK (www.gov.uk)

GI Framework: Green Infrastructure Home (naturalengland.org.uk)

NE Action Plan: Natural England action plan 2022 to 2023 - GOV.UK (www.gov.uk)

2.1.3: External Opportunities

Geology/archaeology

- Surveying the site to accurately map the remaining un-dug reserve to add to the mapped location of previous research excavations.
- Monitoring potential degradation of fossiliferous material and putting in suitable protection if this would be beneficial.
- Update Visual Management Plan to continue with and refine vegetation management to improve condition and access to frequently used sections.
- Continue trialling and monitoring the implementation of geoconservation techniques, and to share good practice, for example by publishing articles in Earth Heritage Magazine.

Access and Interpretation

- Improved/increased educational access/visits e.g. Forest Schools, school and university groups.

- Development of Interpretation Plan to facilitate improved interpretation using interpretive techniques and media that are suitable for the urban setting and target audiences. This could include all forms of interpretation e.g. onsite, virtual, art/sculpture, events and the display in the Swanscombe Leisure Centre.
- Potential for linking with other greenspace in the area, including cycle paths, footpaths.
- Potential to explore the creation of a local skate/BMX park to avoid locals digging on the reserve to create bike ramps.
- Improved links with research associations to support outreach and interpretation.
- Improved links with museums which house collections of fossils and artefacts from Swanscombe.
- Liaising with the Earth Science Teachers Association (ESTA) to explore the potential for expanding educational opportunities linked to the national curriculum at Swanscombe.

Community involvement

- Greater engagement with the local community through volunteer activities in line with the site wide improvements being made in partnership with North West Kent Countryside Partnership.
- Potential for volunteer groups to assist with daily management.

Partnership working

- Potential for partnership working with local, regional, national, and international geological/archaeological community, including the QRA, Geologists' Association, GeoConservation Kent and Historic England.
- Partnership working facilitated through Ebbsfleet Garden City.
- Partnership working with other geological NNRs in an urban setting e.g. Wren's Nest NNR.
- Partnership working with the Natural History Museum (where the skull is housed), British Museum (where the Palaeolithic artefacts are housed), Dartford Borough Museum (which holds archaeological material from Swanscombe and the surrounding areas in its collections) and local heritage groups.
- Partnership working with local community groups and the North West Kent Countryside Partnership, who provide support and funding for community, conservation and biodiversity related projects across the NNR and wider Swanscombe Heritage Park.

Links to Strategic documents:

NNR Strategy The Strategy for England's National Nature Reserves - NE807 (naturalengland.org.uk) Kent's National Nature Reserves - GOV.UK (www.gov.uk)

BNG: Understanding biodiversity net gain - GOV.UK (www.gov.uk)

Research

- Improved access to sediments for research and field meetings.
- Improved protection of the geological and archaeological interest for future research.
- Facilitation of the application of new techniques e.g. dating.
- Use of the site by geoarchaeological students.
- Stronger links between the site and museum which house collections from Swanscombe.

2.1.4: External Challenges

Geology/archaeology

- Preventing future vandalism, fly tipping and fire setting.
- Monitoring and controlling vegetation growth in agreed areas to enable research access, as per the VMP.
- Preventing unauthorised off-road biking/access and creation of ramps by digging.
- Addressing wider social issues that have an adverse impact on the condition of the NNR.
- Liaising with local planning authorities and developers on land surrounding the NNR and SSSI

Funding

- Securing funding for future site management works and to enable improvement of interpretation and education facilities and facilitation of community engagement.

- Securing funding for geoconservation and upgrading interpretation, e.g. from the Quaternary Research Association Geoconservation Fund and Outreach Fund and the Geologists' Association Curry Fund.

Community involvement

- Ensuring sufficient support from volunteers/members of the community.
- Ensuring sufficient support for scientific, education and interpretation from the geoarchaeological research and museum community.

Management

 Ensuring that the site is managed to an appropriate standard by the leaseholder and that the SSSI is kept in favourable condition to facilitate research access and conservation of the geological interest in situ.

Links to Strategic documents:

NSIPS

Ebbsfleet Garden City

- Dartford - Ebbsfleet Valley Strategic Site (Policy CS5)
- Gravesham - Policy CS06: Ebbsfleet (Gravesham) Opportunity Area

LTC

- Lower Thames Crossing | National Infrastructure Planning (planninginspectorate.gov.uk)

Local Plans

Dartford District/ Dartford Borough Council

- Policies map
- Adopted local plans
- Policy DP25: Nature Conservation and Enhancement
- Policy CS 14: Green Space

Gravesham Local Plan Core Strategy - September 2014 - Google Drive

2.2: Site management policy

Geological and archaeological interest

The overriding importance of the site is its geological and archaeological interest. Management should seek to maintain the interest features of the site in a favourable condition. Although the geological and archaeological interest lies buried, there is evidence of ongoing deterioration in the quality of environmental indicators, particularly faunal remains, within the surviving deposits. The cause of this may be the removal of overlaying sediments, causing rainfall to percolate deeper into the deposits which leads to leaching and decalcification of fragile fossil remains (eg. shell and bone). During the life of this plan it

will be necessary to conduct surveys and determine a long term strategy to identify the scale of this problem and see if there is any potential to minimise it.

The previous plan was concerned with the extent to which the more recent research excavations have become degraded and overgrown, this has now largely been addressed through the Visual Management Plan. Although the SSSI has been monitored by a Natural England contractor, very little invasive assessment and monitoring of the sediments has taken place in recent years to determine whether there is any ongoing deterioration due to the past gravel extraction workings which removed the overlying material. The deterioration envisaged is anticipated to be caused by the movement of rainwater downwards into the site causing a change to the conditions below ground level. Floral and faunal remains and artefacts could be suffering damage by decalcification, which leads to degradation of shells and bones and ultimately their loss. Controlling the growth of trees to reduce damage from tree roots is constructive but regular monitoring should be employed to determine whether a greater degree of protection should be investigated and acted on when priorities allow and finances are available. Anecdotal evidence suggests that the geotextile covering section GCR2 has prevented the development of deep-rooted vegetation, including trees, but this will need to be checked. The Visual Management Plan (VMP) for vegetation control of key areas will need to be reviewed and updated. Three further projects have been proposed to enhance our knowledge of the undug reserve, subject to funding being secured. The first would be to undertake a field survey to map surface distribution of sediments within the NNR and Craylands Gorge, to assess current condition of surface deposits and vulnerability to erosion, root growth, damage by digging and bike-riding. The second project would investigate the condition of the geological and archaeological resource in key horizons (Upper Middle Gravel, Lower Middle Gravel, Lower Loam and Lower Gravel), to assess any deterioration in the condition of the resources, particularly the fossils. The third project would be to conduct a parallel study to check preservation in the area of SSSI outside the NNR (Barnfield Pit), which is currently used as allotments. These projects would then propose suitable mitigation to prevent further damage, thereby informing future management for the site. Should funding not be available, the site should be protected in the shorter term from digging and from disturbance by roots of trees and shrubs by controlling vegetation in the areas indicated on the VMP. Opening up excavations for research purposes, along with sampling and fossil collecting, is strictly controlled via applications for consent to Natural England.

Regular management of the site should include targeted vegetation management of the embankments in areas where scientific access is required (see VMP), especially trees and shrubs with deep root systems that will disturb the gravels. This work will be directed by Natural England using the VMP and informed by discussions with relevant academic communities. Access to the site should be maintained, ensuring paths are mown annually. Site furniture, including commemorative stones and information panels, picnic tables and litter bins should be maintained.

Biological Interest

Conservation of the biological interest of the site is of significantly less importance than that of the geological and archaeological aspects. Nevertheless, the biological interest, within the context of the location of the site adjacent to high density housing, and considering the free public access and high use by local residents for recreational purposes, is of local importance. The biological diversity for such a small site is quite high and should be maintained and enhanced, without impacting negatively on the geological interest or condition of the reserve.

Soft sediment sites are important for invertebrates and so undertaking a survey will enable identification of resident fauna species and populations.

Public Access

The reserve is used by large numbers of local people for informal recreation. Low key recreation on the reserve will not detract from the geological, archaeological, or biological interest of the site and should be permitted. The definition of low-key recreation would include walking; dog walking; study of natural history; picnics and similar activities. However, it would exclude horse riding; use of any motor vehicles or cycles; camping; lighting fires; moving sediment or spoil; geological or archaeological specimen collecting or any activity that might damage the archaeological, geological or biological interest of the site.

2.3: Vision

A 50 Year Vision for Swanscombe Skull Site National Nature Reserve

Combined with the rest of the Heritage Park the NNR is a key local greenspace for the community of Swanscombe and the surrounding towns. Community involvement with the park engenders a spirit of community ownership and a desire to protect and maintain the park for future generations. The site provides visitors the opportunity to learn about the extraordinary Story of the Swanscombe Skull, which evidence suggests may have belonged to a young woman.

The site continues to be a nationally and internationally important location for scientific research into climate and environmental change during the Quaternary, and for Palaeolithic archaeology. The reserve is nationally and internationally seen as an exemplar for soft sediment geoconservation, and conservation of the Palaeolithic. This has been communicated via publication in international geoconservation journals and magazines. University groups use the reserve regularly for educational field visits and flagship research meetings visit the site periodically and sections of the geology are opened when they visit for viewing and sampling.

The geological and archaeological interest in the NNR is monitored and suitably protected from degradation and vegetation encroachment. During survey and clearance works on the reserve, new excavations were carried out which have provided further information and knowledge on the site. Evidence of this is displayed locally.

Educational visits provide students with the opportunity to learn the Story of the Swanscombe Skull in a unique outdoor classroom. An Education Pack, developed in collaboration with museums and research associations, allows these visits to fit clearly within the national curriculum.

The wider Heritage Park provides an excellent outdoor venue for recreational use by the public, with picnic and wildlife areas as well as suitable interpretation and education provision and self-guided walks. Improved public access to the reserve allows more people to visit, and improved security, provided through CCTV and wardens, creates a feeling of public safety. The scientific community (including research associations and museums) are involved in outreach and interpretation at the site and external funding is obtained for specific outreach projects.

Problems with areas of sensitive geological interest being used for off-road biking have been solved with a purpose-built area constructed not far from the site. This has given local children a safe area to play, whilst preventing further damage to the geology.

The existing NNR and Heritage Park are linked with a new 'Northern Park' in the Eastern Quarry development, which provides footpath links and a new Heritage Centre. This is an important area to ensure that visitor pressures are not concentrated on the NNR potentially damaging the site. The Heritage Centre provides a valuable resource for educational visits as well as being a museum for the many important heritage artefacts found in the area to be homed.

25-year goals - Strategic Review

- Survey work looking at the condition of the geological and archaeological resources has been carried out and a Visual Management Plan has been developed and kept up to date to inform the methodology used to protect the heritage. This survey work has informed regular vegetation control in key areas to maintain favourable condition and allow regular scientific access.

- National and international geological and archaeological research organisations take an active interest in the conservation of the site and support outreach activities.

- With new and improved visitor facilities, educational resources and interpretation within the Heritage Park, the site provides for a wide range of visiting groups.

- The new Friends Group, which has an increasing number of volunteers, runs regular family focussed events at the site throughout the year. In addition, volunteer wardens lead guided walks at weekends and during the school holidays to educate and inform people

about the importance of the site and its management. The volunteering at the site has expanded to form a core group of 'voluntary wardens' who organise and run regular conservation work party days on the site carrying out management tasks such as scrub clearance and other habitat improvements. More open areas on the reserve improve the feeling of public safety. Academic volunteers are also involved in the reserve, through engagement with museums, the Geologists' Association and the QRA.

- Wider heritage park designated as a Local Nature Reserve (LNR).

Feature List

Feature: 1 - Geological & archaeological notified features

Feature: 2 - Neutral grassland with scrub and secondary woodland

Feature: 3 - Estate assets

Feature: 4 - Community Involvement

Feature: 5 - Education

Feature: 6 - Public Access

Feature: 1 - Geological & archaeological notified features

Feature description

Barnfield Pit, Swanscombe, the site in the UK to yield the second oldest Palaeolithic human remains, is probably the most famous and arguably the most important site in the British Pleistocene. In addition to its palaeoanthropological interest the site is of great importance for stratigraphy, palaeontology, and Palaeolithic archaeology. For example, it is one of the very few sites in Britain which shows evidence of a Clactonian culture stratigraphically below an Acheulian culture and it therefore provides the basis for Lower Palaeolithic chronology in this country. The palaeontological record (molluscs, mammals and, somewhat controversially, pollen) provides evidence of climatic change, with at least one major interglacial represented. Within the sequence a major hiatus is recognised; the upper part of the beds below this level show the development of a fossil soil, which represents a further important aspect of the stratigraphic evidence at Swanscombe.

The site contains one of the richest Pleistocene vertebrate localities in Britain, and by far the richest locality attributable to the Hoxnian Interglacial. The extreme rarity of faunas of equivalent (Holsteinian) age from Continental Europe makes Swanscombe a site of considerable importance, quite apart from the world-famous human skull. The faunas include 26 mammalian taxa (eg man, macaque, lion, straight-tusked elephant, 2 extinct rhinos, horse, several deer, aurochs and small mammals) and many birds.

A horizon of fossil footprints, extremely rare in the British Pleistocene, occurs immediately on top of the Lower Loam.

Objective description

To maintain the features of geological and archaeological interest on the NNR in favourable condition.

Rationale

The principle of conservation for the reserve is to maintain and protect the geological and archaeological interest features in an undisturbed condition that permits access for excavation when required for research and scientific field meetings.

- Planned site assessment to be undertaken to identify location of geological interest features where trees and large shrubs should be removed to prevent damage to gravels by roots. Review and update visual management plan as needed following site monitoring to show areas where trees and shrubs should be cut to ground level and stumps treated and left in situ. Regrowth of trees and shrubs in these areas and across the site should be prevented.

- Assess the performance of the geotextile used to cover sections.

- Prevent erosion/dumping/extraction/litter.
- Prevent digging and unconsented geological and archaeological specimen collecting.
- Prevent/reduce and eliminate other damaging human activities.
- Investigate moving the footpaths away from important sections to protect the deposits e.g. GCR1, Section 2.

Important sediments survive close to the surface in parts of the NNR, but the exact extent of survival of sensitive geological and archaeological deposits at the site is not well understood.

- Planned non-invasive survey work to be undertaken to map the surface distribution of sediments and indicate where further investigations are needed to determine the condition of the geological and archaeological resource. The survey work will identify sensitive areas and suggest suitable management e.g., covering sensitive and vulnerable deposits with an appropriate protective layer to prevent further deterioration.
- Results from the survey will also be used to inform future management works such as scrub and tree removal.

Attribute:	**Extent** – character that's monitored

Target: No net loss in the current resource, other than agreed scientific collection (with SSSI consent).

Projects

RV11/1 - FIXED POINT PHOTOGRAPHY

RP22/2 - MAP SURFACE DISTRIBUTION OF SEDIMENTS

MU1+/1 - DEVELOP VISUAL MANAGEMENT PLAN

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AI00/1 - INTEGRATED SITE ASSESSMENT

Attribute:	**Exposure of feature of interest** - monitored

Target: The gravels in the disused gravel pit can be practically re-exposed if required.

Projects

RV11/1 - FIXED POINT PHOTOGRAPHY

AI00/1 - INTEGRATED SITE ASSESSMENT

Attribute:	**Vegetation**

Target: There are no large trees or deep-rooted shrubs growing where they are likely to damage the geological and archaeological interest features.

Projects

RP22/2 - MAP SURFACE DISTRIBUTION OF SEDIMENTS

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AI00/1 - INTEGRATED SITE ASSESSMENT

Attribute:	**Damage to exposures**

Target: No significant damage to any exposures.

Projects

RV11/1 - FIXED POINT PHOTOGRAPHY

RP22/2 - MAP SURFACE DISTRIBUTION OF SEDIMENTS

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AI00/1 - INTEGRATED SITE ASSESSMENT

Management: Scrub control defined areas will be different

Trees and large shrubs should be removed from the geological interest features to prevent damage to gravels by roots. Trees and shrubs should be cut to ground level and stumps treated and left in situ. Regrowth of trees and shrubs in these areas and across the site should be prevented.

Projects

MH0+/1 - MANAGE WOODLAND AND SCRUB IN GEOLOGICALLY SENSITIVE AREAS

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Management: Wardening of site

Wardening the site should, amongst other Health and Safety requirements, prevent inappropriate activities such as:

- Erosion, dumping, extraction and littering
- Digging and collecting

Projects

ME30/1 - CONTROL EROSION

ME32/1 - CONTROL EXTRACTION AND SPECIMEN COLLECTING

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AI30/2 - HEALTH AND SAFETY DOCUMENTATION

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Feature: 2 - Neutral grassland with scrub and secondary woodland

Feature description

Mixture of grassland and scrub/woodland habitats of local interest. However, due to the nature of this site, grassland is the preferred habitat type for areas of geological interest.

Objective description

To enhance the biological interest of the site through appropriate management, with regard to the geological interest of the site.

Rationale

The biological diversity of the site should be maintained and enhanced:

- Grassland should be managed to create a mosaic of short and rough grass.
- Paths and edges of paths should be mown annually.
- Scrub present in geologically non-sensitive areas should be maintained by rotational cutting to prevent establishment of secondary woodland and to maintain small glades. Scrub is a valuable habitat for breeding birds and a range of invertebrates. Once scrub reaches a certain age it loses it value for these species.
- In geologically sensitive areas deep-rooted trees and shrubs will be cut and remaining stumps treated, and the areas restored to grassland. This will be undertaken in a phased approach.
- Trees and shrubs should not be planted on the reserve.
- The winter wet pond should be maintained and enhanced.

Attribute: Extent

Target: Maintain grassland throughout the main area of the NNR.

Target: Maintain shallow-rooted scrub in areas away from the geological interest features in geologically non-sensitive parts of the NNR.

Projects

RV11/1 - FIXED POINT PHOTOGRAPHY
RA9/1 - INVERTEBRATE SURVEY

AI00/1 - INTEGRATED SITE ASSESSMENT

Management: Grassland management

Grassland should be managed to create a mosaic of short and rough grass. This should be achieved by mowing different sections to create a mosaic of grassland habitats, whilst ensuring frequency of mowing is enough to prevent scrub establishing. Cutting should occur in late summer to ensure the flowering and seeding of wildflowers within the grassland. The path edges should be mown annually, where required.

Projects

ME40/1 - MOW PATHS

MH12/1 - MOWING GRASSLAND MOSAIC

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Management: Scrub control

Rotational cutting of scrub in non-sensitive geological areas will prevent establishment of secondary woodland and maintain small glade areas.

In geologically sensitive areas deep-rooted trees and shrubs will be cut and remaining stumps treated, and areas restored to grassland. Visual Management Plan to be kept under review and updated.

No planting should take place on the reserve.

Projects

MH14/1 - SCRUB CONTROL

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Management: Pond management

The winter pond should be enhanced and maintained.

Projects

MH6+/1 - MAINTAIN & ENHANCE WINTER WET POND

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Feature: 3 - Estate Assets

Feature description

Current interpretation regarding the archaeological importance of the site was installed as part of the 'Walk into History' project. There are currently five interpretative panels installed that reflect different aspects of interest, including past wildlife, the important archaeology, and the geological sequences. Two commemorative boulders showing the location of the Swanscombe Skull finds replace the original commemorative stones. There is also a Natural England branded headboard panel at the pedestrian entrance to the reserve from the car park.

The interpretative material on the reserve has suffered repeated vandalism over a number of years. An interpretation master plan for the site needs to be developed which encompasses the use of more innovative interpretative methods.

Within the site there are steps and picnic benches.

Objective description

To maintain estate fabric and reserves' interpretative signs and structures in a good and serviceable condition.

Rationale

The interpretative materials have suffered vandalism over the years and are currently in a dilapidated state which does not aid visitor appeal of the reserve. Specialist advice (from a member of the Association for Heritage Interpretation) is needed on suitable interpretive media and techniques given the problems of vandalism in the past and the reserve's urban setting.

Improvements to step access into the reserve would make the site more welcoming and increase safety.

Attribute: Estate fabric condition

Target: Maintain in good serviceable condition

Projects

AI30/1 - SAFETY AUDITS AND INSPECTIONS

AI30/2 - HEALTH AND SAFETY DOCUMENTATION

Management: Wardening of site

Regular inspections should take place of signage, interpretation panels, footpaths and steps. Any defects identified should be made-good as soon as practicable.

Projects

ME00/1 - MANAGE SITE INFRASTRUCTURE

MI50/1 - NNR SIGNS

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AI30/1 - SAFETY AUDITS AND INSPECTIONS

AI30/2 - HEALTH AND SAFETY DOCUMENTATION

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Feature: 4 - Community Involvement

Feature description

An increase in community interest and involvement in the reserve could help to combat antisocial behaviour on the reserve and assist with habitat management.

Objective description

To develop and support partnerships within the local community to facilitate their involvement in the reserve.

To develop and support partnerships with the academic community to facilitate their involvement in the interpretation, conservation and management of the reserve.

Rationale

The Friends of Swanscombe Group disbanded during the pandemic, so a new volunteer effort is needed to run events throughout the year aimed at raising the profile of the site and encouraging more people to visit.

Either through a Warden post or the recruitment of additional volunteers to undertake practical conservation management tasks, would improve the condition of the reserve.

Attribute: Volunteer numbers

Target: Support and encourage the Friends of Swanscombe Group

Management: Public engagement

Establish a volunteer group to enable the local community to get involved with the conservation management and wardening of the reserve.

Projects

MI00/1 - UPDATE WEB-SITE INFORMATION

MI50/2 - RESERVE PUBLICATIONS

ML50/1 - LIAISE, LOCAL COMMUNITY GROUPS, MUSEUMS, GEOCONSERVATION/RESEARCH GROUPS

AF01/1 INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Feature: 5 - Education

Feature description

An education pack for Swanscombe NNR and surrounding Heritage Park was produced by Groundwork Kent and Medway, aimed at raising and developing the awareness of the area as an educational resource. This pack is now out of date.

Objective description

To develop low-key educational use of the reserve.

To create an up-to-date education pack. Potential grants available from: Earth Science Teachers Association – Supporting Earth Science Teaching through Geology, Geography & the Sciences in the UK (earth-science-teachers.uk)

Rationale

Reviewing the Education Pack and making it relevant to the current National Curriculum is key to enabling its use as an outdoor classroom.

Attribute: Availability

Target: Encourage use of the NNR as an educational resource

Management: Update education provision

An education pack for Swanscombe NNR and surrounding Heritage Park was produced by Groundwork Kent and Medway, aimed at raising and developing the awareness of the area as an educational resource. However, this pack is now out of date and needs reviewing.

Projects

MI00/1 - UPDATE WEB-SITE INFORMATION

MI20/1 - UPDATE EDUCTION PACK

MI50/2 - RESERVE PUBLICATIONS

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AL00/1 - RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 MANAGEMENT PLAN STATUS

Feature: 6 - Public Access

Feature description

The reserve currently has good pedestrian access and an access audit undertaken in 2014 did not highlight the need for any additional access provision.

Objective description

To encourage low key public access to the reserve that is compatible with the conversation requirements of the site.

To discourage recreational activities likely to damage the site or detract from visitors' enjoyment.

Rationale

Open public access to the reserve is currently provided via a network of footpaths which should be maintained in a passable condition and routinely checked for health and safety.

Attribute: Visitor numbers

Target: Encourage low-key public access to the reserve that is compatible with the conservation requirements of the site.

Projects

RH34/1 - VISITOR NUMBERS

Management: Public engagement

Organise and deliver a programme of events e.g. guided walks looking at the biodiversity, industrial, archaeological and geological interest of the reserve, flint knapping demonstrations etc.

Projects

MI00/1 - UPDATE WEB-SITE INFORMATION

MI50/2 - RESERVE PUBLICATIONS

MI60/1 - NNR EVENTS

AF01/1 - INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

AL00/1 RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

AP20/1 - MANAGEMENT PLAN STATUS

Project Register

AF01/1 INVESTIGATE EXTERNAL FUNDING OPPORTUNITIES

Grants could be applied for:

- To improve access to and within the Heritage Park. This will build on the earlier access improvement work undertaken as part of the 'Walk into History' project and will open up access to a wider area of the park.
- To protect the important Palaeolithic archaeology and geology through enabling surveys to take place and covering sensitive areas to prevent further deterioration.
- To enhance the biodiversity value of the site through the implementation of conservation management.
- To increased understanding of the Palaeolithic archaeology and geology, industrial heritage and biodiversity value of the site through interpretation and education activities.
- To address issues of site security and antisocial behaviour through the employment of Park Wardens.

Other opportunities for external funding applications to assist with research, management, interpretation and community involvement should also be investigated. The Geologists' Association curry Fund or QRA Outreach Fund could be potential sources of funding.

Earth Science Teachers Association – Supporting Earth Science Teaching through Geology, Geography & the Sciences in the UK (earth-science-teachers.uk)

AI00/1 INTEGRATED SITE ASSESSMENT

A monitoring assessment of the NNR was carried out on 08/11/21 by Dr Barbara Silva. The findings of the survey are that:

- Vegetation control needs to be continued and the Visual Management Plan needs to be slightly updated to reflect the findings of the monitoring survey
- Some footpaths are very close to or on top of important geoarchaeological sections, options for moving the footpaths or stopping their widening need to be considered;
- Some of the interpretation needs updating.

AI30/1 SAFETY AUDITS AND INSPECTIONS

Undertake programme of safety audits and inspections listed below, in accordance with regional and corporate standards. Project report should state where completed inspection data is held.

Site safety inspection - undertake inspections in April and October each year:

Estate / infrastructure audit (gates, fencing etc)
Rights of Way, paths, and track surfacing and maintenance
Tree safety – dangerous tree inspections and assessments
Parking provision and maintenance

These audits and inspections are the responsibility of the current leaseholder until the lease expires in March 2038.

AI30/2 HEALTH AND SAFETY DOCUMENTATION

Prepare/revise all health and safety documentation (including safety statements, guidance for visitors and permit holders and risk assessments) in accordance with regional and organisational timetables. Project report should confirm that revisions have been undertaken or identify shortfalls.

All health and safety documentation is the responsibility of the current leaseholder until the lease expires in March 2038.

AL00/1 RENEW LEASE ARRANGEMENTS FOR MANAGEMENT OF RESERVE BY THIRD PARTY

Current reserve management lease with Swanscombe and Greenhithe Town Council expires in 2038.

AP20/1 MANAGEMENT PLAN STATUS

Management Plan to be reviewed in 2027/8.

ME00/1 MANAGE SITE INFRASTRUCTURE

Regular inspection of interpretative structures, steps, handrails and footpaths. All infrastructure should be maintained in a safe and serviceable condition.

Inspection and maintenance work is the responsibility of the current leaseholder until the lease expires in March 2038.

ME30/1 CONTROL EROSION

Ensure any activities undertaken on site do not cause any further erosion. Supervise any third party activities.

This is the responsibility of the current leaseholder until the lease expires in March 2038.

ME32/1 CONTROL EXTRACTION AND SPECIMEN COLLECTING

Ensure unconsented extraction and specimen collecting does not take place on the site.

This is the responsibility of the current leaseholder until the lease expires in March 2038.

ME40/1 MOW PATHS

Paths and edges of paths should be mown annually. The mowing regime may need to be altered within the life of this Plan in light of the outcomes of the invertebrate survey.

Mowing is the responsibility of the current leaseholder until the lease expires in March 2038.

MH0+/1 MANAGE WOODLAND AND SCRUB IN GEOLOGICALLY SENSITIVE AREAS

Following the details within the Visual Management Plan, trees and shrubs should be cut to ground level and stumps left in situ and treated with herbicide. Periodic management should be undertaken on regrowth.

Management work will be guided by Natural England via the VMP but undertaking the work is the responsibility of the current leaseholder until the lease expires in March 2038.

MH12/1 MOWING GRASSLAND MOSAIC

Mowing of different sections to create a mosaic of grassland habitats should be undertaken, with a mowing frequency suitable to ensure scrub does not establish. Cutting should occur in late summer to ensure the flowering and seeding of wildflowers within the grassland.

The mowing regime may need to be altered within the life of this Plan in light of the outcomes of the invertebrate survey.

Mowing is the responsibility of the current leaseholder until the lease expires in March 2038.

MH14/1 SCRUB CONTROL

Scrub present in geologically non-sensitive areas should be rotational cut, following the details within the Visual Management Plan from Natural England.

Scrub management is the responsibility of the current leaseholder until the lease expires in March 2038.

MH6+/1 MAINTAIN & ENHANCE WINTER WET POND

Maintain and enhance winter wet pond to conserve and enhance the nature conservation value. In particular refurbishing redundant lining, removing fallen timber and rubbish accumulations need addressing.

This is the responsibility of the current leaseholder until the lease expires in March 2038.

MI00/1 UPDATE WEB-SITE INFORMATION

Ensure suitable and appropriate information is available to members of the public and visitors to the reserve. This is undertaken by Natural England and the leaseholder until the lease expires in 2038.

MI20/1 UPDATE EDUCTION PACK

Design and trial an education pack for local schools, linked to the national curriculum.

Undertake an oral history project focused on the industrial heritage of the area.

This work could either be delivered by the current leaseholder, 'Friends of' group or by partner organisations/groups.

MI50/1 **NNR SIGNS** update interpretive plan, renew interpretation

Erect and maintain entrance headboards, interpretation panels and waymark signs. Record when signs were installed/replaced and any significant maintenance.

Due to the level of vandalism these structures encounter on this site, specialist advice should be sought and more innovative means of interpretation utilised in the future.

Inspection and maintenance work is the responsibility of the current leaseholder until the lease expires in March 2038.

MI50/2 RESERVE PUBLICATIONS

Where appropriate, provide reserve leaflets/information booklet. Record publication type, publication date and print run. Revise/reprint as appropriate and make available online.

MI60/1 NNR EVENTS

Organise and deliver a programme of events eg guided walks looking at the biodiversity, industrial, archaeological, and geological interest of the site.

Organise specific youth-focused events as a means of educating locals and reducing antisocial behaviour on the reserve.

Events could either be delivered by the current leaseholder, volunteers/new volunteer group or by partner organisations.

ML50/1 LIAISE, LOCAL COMMUNITY GROUPS, MUSEUMS, GEOCONSERVATION/RESEARCH GROUPS Eleanor can provide advice

Support and encourage the Friends of Swanscombe Heritage Park group and other volunteer groups at the site.

This is the responsibility of the current leaseholder until the lease expires in March 2038.

MU1+/1 DEVELOP VISUAL MANAGEMENT PLAN

2015 Visual Management Plan (VMP) to be updated as more detailed surveys are produced. The findings of the monitoring survey in 2021 need to be incorporated. The VMP summarises Natural England's advice on the work that's needed to protect and improve the condition of the site. Consent will be needed from Natural England to agree methods for carrying out the work identified in the VMP.

RA9/1 INVERTEBRATE SURVEY

A non-invasive survey of invertebrates should be undertaken by relevant specialists as soft sediment sites are important for invertebrates.

RH34/1 VISITOR NUMBERS

Record annual numbers of visitors to the NNR. This work should be undertaken by the current leaseholder until the lease expires in 2038.

RP22/2 MAP SURFACE DISTRIBUTION OF SEDIMENTS

Non-invasive survey to map the surface distribution of sediments.

Survey results to identify whether a more invasive survey is required to investigate the condition of the geological and archaeological resource and determine whether any particularly sensitive areas need to be covered with an appropriate protective layer to prevent further deterioration. If further work is identified, it will need to be consented separately.

Natural England remains responsible for this work.

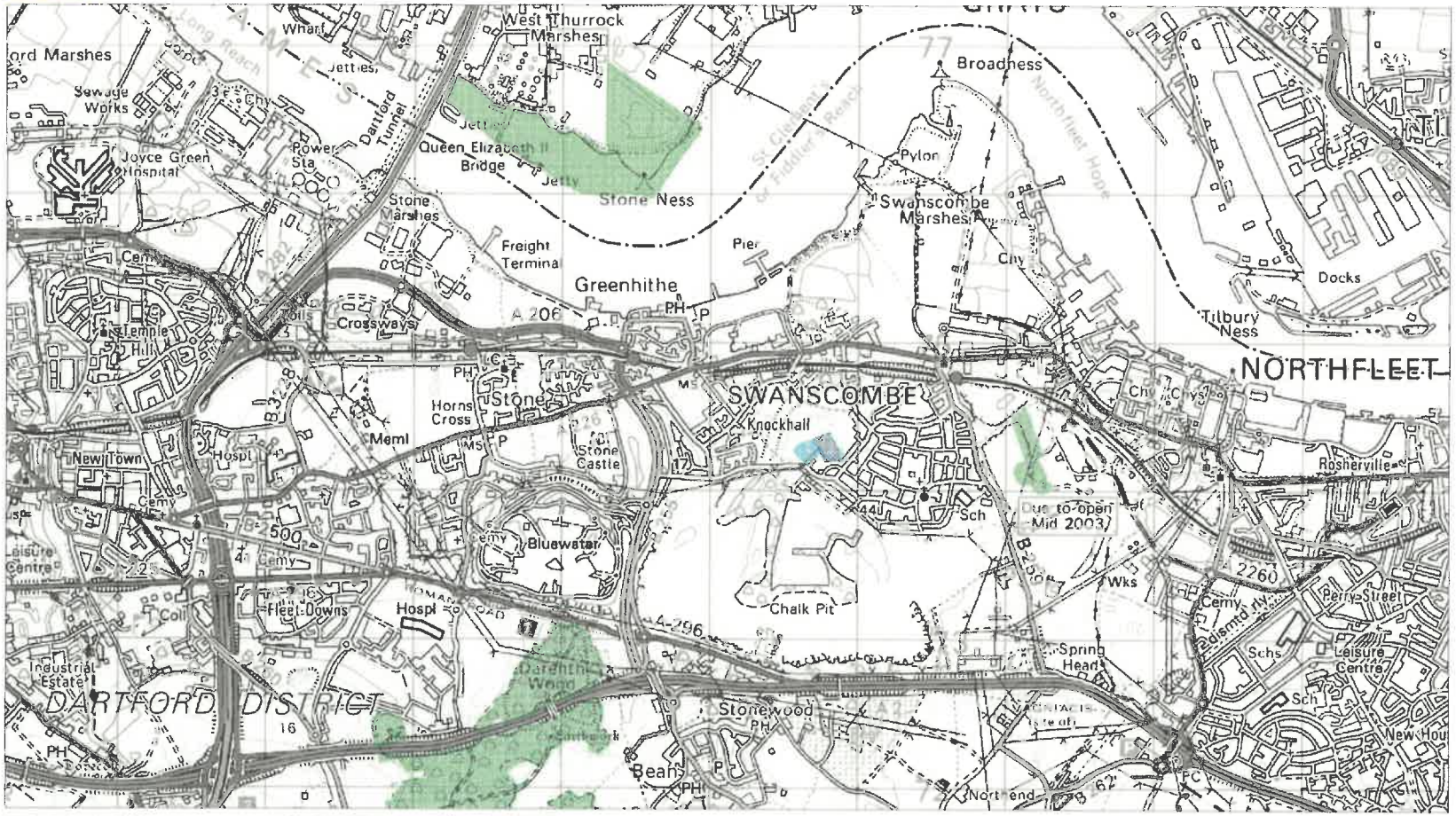
RV11/1 FIXED POINT PHOTOGRAPHY

Establishment of a series of non-invasive fixed point photography points would enable collation of a visual record of habitat changes.

This work would be the responsibility of Natural England.

Map 1

Location map



Scale 1:25000 Map 1 of 1

Drawn by: Lorraine Smith
Date: 14/12/2009
Ref: tq59117456
© Natural England 2009

Grid North

Natural England
International House
Dover Place
Ashford
Kent
TN23 1HU

- Swanscombe NNR
- Swanscombe SSSI
- Surrounding SSSIs

APPENDIX 1

Swanscombe NNR Visual Management Plan January 2016 (to be updated to incorporate findings from monitoring survey in 2021)

Swanscombe NNR DRAFT Visual Management Plan

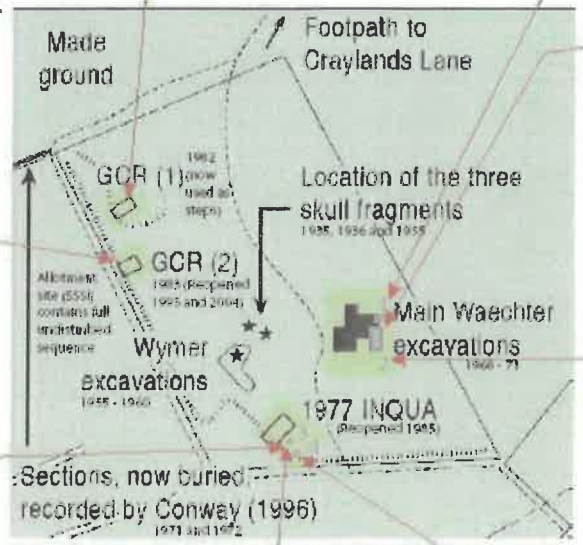
In order to maintain access for scientists and diggers to the sediments at Swanscombe NNR, management of the vegetation is needed around the regularly used sections (excavations). Several sections are needed to access the whole geological sequence at Swanscombe. Sections 1 - 4 were opened in 2014 and extended in 2015. The GCR sections were first opened in the 1980's and GCR2 has been re-opened on occasions since. Sections 1 - 4 and GCR2 were protected by geotextile prior to backfilling.

Priority areas for vegetation management are shaded in yellow on the map below. The sections and their immediate surroundings need to be maintained with a light covering of herbaceous vegetation. Trees and shrubs should not be allowed to establish as their roots will disrupt the very shallow and internationally important geology. Stumps must be cut, treated with herbicide, and left in the ground to decay in situ and not ripped out. Cut material can be stacked in habitat piles on the site well away from the areas highlighted in yellow. Any burning of arisings must take place outside the NNR/SSSI. Sections 1-4 are the first priority for management, followed by GCR1 and GCR2.

Section GCR1 is adjacent to the steps. Although the section itself is fairly clear, vegetation clearance around the section is needed to improve access.

Digger access for **Sections 1 and 2**. These sections are within the large depression created by the Waechter excavations in the late 1960's and early 1970's. They provide access to the Lower Gravel and Lower Loam. This area should be managed as grassland to ensure access is maintained for scientists and diggers.

Section GCR2 is protected by a geotextile which has prevented deep rooted shrubs and trees from establishing. The scrub development at this section needs to be controlled periodically and trees should be cleared from within 2 metres of the section.



Barnfield Pit, Swanscombe showing location of excavations, adapted from Bridgland (1994). This is a schematic map. A more accurate map will be produced in early 2016 following a site survey.

2014/15 Sections
1 – Lower Gravel
2 – Lower Loam
3 – Upper Middle Gravel
4 – Upper Loam
Protected by geotextile

There are steps leading up to a footpath to the SE of Section 4

GCR 2 is protected by geotextile

Vegetation clearance needed around 2014 sections, GCR1 and GCR2

Waechter excavations covered by veneer of spoil/made ground

Section 1. This was exposed in 2015 using a digger. Vegetation is starting to encroach. Regular cutting of the surrounding area will help keep access clear for diggers and scientists.

Section 3 shows the layers of sand and gravel that scientists want to study at Swanscombe. Vegetation is overhanging the top of the section so it has to be exposed by hand. The lower part of the section was exposed by using a digger. The whole section needs to be made more accessible for scientists and diggers by clearing scrub and trees within 2m.

Delegates from the European Society of Human Evolution Meeting in September 2015 viewing **Section 1. Section 2** can be seen in the background. At present this area is relatively clear but again it needs to be kept free of trees and scrub. Regular management is needed to maintain a light covering of herbaceous vegetation.

Looking towards **Sections 3 and 4**. Section 4 is fully surrounded by vegetation. Access to this area needs to be improved by removing some of the large trees and regularly cutting the understory to avoid development of scrub and trees.

Opening up the lower part of **Section 3** using a digger. The upper part of the section is obscured by trees and scrub which should be cleared periodically, as should the area around the section to improve access.

Section 4. Digger access was not possible so it was cleaned by hand. There are a number of trees disrupting access which should be removed, as well as the trees within 2m of the section.

Version 2 January 2016
Eleanor Brown, Natural England
eleanor.brown@naturalengland.org.uk