



Rampion Offshore Wind Farm



ES Section 22 – Ground Conditions - Appendix 22.2

RSK Environment Ltd

Document 6.3.22ii

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APFP Regulation 5(2)(a)

Revision A

E.ON Climate & Renewables UK Rampion Offshore Wind Limited

West Sussex Local Geological Site (LGS) Survey 2010

Condition Monitoring Form for NI 197 Reporting



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1. Site Information							
Site Name & LGS ID		Shoreham Cement Works, Beeding Quarry TQ20/101					
Site Type		ED		Grid Reference		TQ202088	
Date of Visit		22/09/2010		Local Authority			
Surveyor		Peter Anderton		Landowner		Witheld	
1:50,000 BGS Sheet no.		318/333		1:25,000 OS Sheet no.		122	
LGS designation	Scientific	X	Educational	X	Aesthetic		Historical
Interest Feature(s): Large disused chalk quarry exposing sequence from lower Lewes Chalk to upper Seaford Chalk. The exposed sections of Lewes Chalk and Seaford Chalk are both about 50m thick. The quarry is 1km long and varies in width from 250-450m. Stratigraphy: lower Lewes Nodular Chalk Formation (Ringmer Beds) to upper Seaford Chalk Formation (basal Haven Brow Beds), White Chalk Subgroup, late Cretaceous in age (including the Turonian-Coniacian and Coniacian-Santonian boundaries). Key marker beds exposed are the Navigation Hardgrounds and Marls, Lewes Marl and Flint Bands, Cuckmere and Seven Sisters Flint Bands, Belle Tout and Shoreham Marls. Sedimentology: Lewes Chalk - rhythmic sequence of soft chalks, nodular chalks and hardground chalks with thin marls and regular seams of flints; Seaford Chalk - homogeneous white chalk with regularly spaced seams of large flints. The quarry shows an excellent range of the possible sedimentological variations in the Chalk. Deposited in relatively deep marine environments. Sedimentary structures: Lewes Chalk - 'Augen' (eye-shaped structures) seen at base of Bridgewick Marls. Extensive burrows and trace fossils are present. Interlaced (griotte) marl seams are visible in the lowest sections. Tubular flints extend down to about 3m below the Lewes Marl and dumbbell-shaped flints occur above it. Nodular horizons in the upper Lewes Chalk are often stained red with iron. Palaeontology: a wide variety of fossils have been found including zone fossils and unusual forms of some species which are important for correlation with other sites. Structural geology: rock fracture patterns are similar to Seaford Head. A conspicuous fault is visible on the eastern face, and inclined faults or shear planes are visible on the north and south faces. Downslope movement has developed overfold structures and gulls towards the Adur valley. Geomorphology: Faults and shear planes have been exploited by solution processes resulting in cavities and infilling by younger sediments.							
Previous management and dates (if any)							

2. Primary Factors

Bedrock feature	Is (are) the feature(s) exposed?	Y	If No, can it (they) practically be re-exposed?	
	Is (are) the feature(s) being affected by the following factors?			
	Factor	Y/N	Comments	
	Vegetation	N		
	Scree/Mass Movement	N		
	Flooding	N		
	Dumping/Landfill	N		
	Quarrying/Engineering Works	N	The lower part of the quarry is currently being used for recycling of construction material. This work only makes use of the quarry floor and does not seem to be affecting the exposures.	
	Development (housing/industrial)	N		
Others (please define) -	N			
Superficial deposit feature	Is (are) the feature(s) exposed?	N/A	If No, can it (they) practically be re-exposed?	
	Is (are) the feature(s) being affected by the following factors?			
	Vegetation (Trees or crop planting)			
	Agricultural practices (deep ploughing)			
	Quarrying/Engineering Works			
	Development (housing/industrial)			
	Others (please define) -			
Geomorphology feature	Is (are) the geomorphological feature(s) being allowed to evolve naturally?	N		
	Is (are) the feature(s) being affected by the following factors?			
	Vegetation	N		
	Sea Defences	N		
	River Management	N		
	Ground Stabilisation (slopes/sand dunes)	N		
	Water level change	N		
	Development (housing/industrial)	N		
	Others (please define) -	N		

3. Secondary Factors

Factors that do not directly affect the feature(s) but may need to be managed in order for feature(s) to maintain a desirable condition

	Factor	Y/N	Comments
Site access	Are any of the following causing difficulties in accessing the site?		
	Physical obstacles	Y	The Lewes Chalk sequence is accessible at all levels from a series of benches. However, the Seaford Chalk is mostly exposed in the upper part of sheer high faces and relatively inaccessible. This is a hard hat area.
	Landowner permissions	N	
	Protected species/habitats	N	
	Other (please define)		
Furniture	Are any of the following in an undesirable condition?		
	Interpretation Boards	N	
	Benches/Fences/Gates	N	
	Earthworks	N/A	
	Other (please define)		
Other features	Are there any other features of interest that should be considered?		
	Biodiversity	Y	The quarry is currently a haven for wildlife. Peregrine falcons, ravens and partridges have taken up residence here.
	Historic Environment	N	
	Other (please define)		

4. Site Status

Overall, is the site in a desirable condition for use(s) of the feature(s) identified?

Yes / No / Uncertain

If Yes - what management is required (if any) for the feature(s) to maintain a desirable condition:

No management is needed at present. However the long term future of the site is uncertain. If it is eventually landscaped or infilled some exposures should be preserved.

For the above, is the management: *Being undertaken / Going to be undertaken / Not going to be undertaken / Not possible*

If Uncertain or No - what management is required for the feature(s) to reach and maintain a desirable condition:

For the above, is the management: *Being undertaken / Going to be undertaken / Not going to be undertaken / Not possible*

Are there any secondary factors that need further management?

Yes / No / Not applicable

Suggested management in order for the feature(s) to reach/maintain a desirable condition:



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Key to Map:

 LGS



Photos



1. Lowest exposures of the Lewes Chalk close to the quarry entrance. Face about 15m high. Grid ref. TQ20320878. Direction WSW.



2. Lower benches cut in Lewes Chalk. Each is about 6m high. Grid ref. TQ20320878. Direction NE.



3. Face cut in Lewes Chalk showing massive nodular chalk with little evidence of flints. Grid ref. TQ20290893. Direction north.



4. Benches of lower quarry with upper quarry in background. Grid ref. TQ20170896. Direction ESE.



5. Face cut in Lewes Chalk with layering defined by flint seams and marls. About 7m high. Grid ref. TQ20310898. Direction ENE.



6. Detail of chalk face in photo 6 showing scattered flints and a sheet flint band in the lower part. 1m pole for scale. Grid ref. TQ20380899. Direction north.



7. Northern face of the upper quarry cut mainly in Seafood Chalk. The prominent flint seam in the centre is probably the Seven Sisters Flint Band. The upper face shows numerous well developed flint seams. Grid ref. TQ20700906. Direction NE.



8. Northeast corner of the upper quarry cut mainly in Seafood Chalk. Grid ref. TQ20700906. Direction east.



9. Southeast corner of quarry. The main face at the back is cut mainly in Seaford Chalk. Grid ref. TQ20700906. Direction SE.



10. Northeast corner of quarry. The lower part of the face exposes the Belle Tout Beds below the Seven Sisters Flint Band. Above are the Cuckmere Beds with numerous flint seams and scattered flints. Note fault plane dipping to the right (south). Grid ref. TQ20850908. Direction ENE.



11. Southeast corner of quarry showing well-developed flint seams in the Cuckmere Beds. Note the fault or shear plane dipping to the right (west). Grid ref. TQ20900891. Direction ESE.



12. Detail of the base of the eastern face showing prominent flint band (Seven Sisters) towards the base of the higher bench. Flint seams in the underlying section are more diffuse. Grid ref. TQ20910897. Direction ENE.



13. Southern face of upper quarry. The boundary between the Lewes Chalk and Seaford chalk is beneath the lower of the two vertical faces. Grid ref. TQ20660898. Direction SW.



14. Southern face of lower quarry. The upper two faces are cut in Seaford Chalk and the lower faces in Lewes Chalk. Grid ref. TQ20530886. Direction SSW.



15. Southern face of lower quarry showing Lewes Chalk in lower benches and Seaford Chalk in upper two benches. Grid ref. TQ20450885. Direction SE.



16. Lower exposures of Lewes Chalk showing nodular chinks with flint and marl seams. Grid ref. TQ20480877. Direction east.



17. Eastern end and southeast corner of upper quarry, showing well-developed flint seams in upper face (Cuckmere Beds). Grid ref. TQ20860913. Direction SSE.



18. Overview of southern face of upper quarry. Grid ref. TQ20890911. Direction SW.



19. Overview from head of quarry. Grid ref. TQ20890911. Direction WSW.



20. Northern face from head of quarry, showing upper face (Cuckmere Beds) with prominent flint seams and lower face (Belle Tout Beds) with less visible flints. Grid ref. TQ20890911. Direction WSW.

Sussex RIGS Designation Form

SUSSEX RIGS NUMBER

TQ21/01

Name and Address of Site	Grid Ref.	Parish, District, County
Horton Clay Pit Small Dole	TQ210126 to TQ209124	Upper Beeding Horsham West Sussex

Current Designation				Ownership Name and Address
SSSI	*	NNR		Haul Waste Malling House Townhill, West Malling, Kent
SNCI		GCR		
AONB				

Location Map	1 : 10000	1 : 25000	6 inch	

Scientific Details & Site Description (including Dimensions)**Stratigraphy**

This quarry is in the Gault Clay Formation within the Lower Cretaceous.

Sedimentology

The sedimentology consists of dark clay, with phosphatic nodules, marlstone concretions, and sand.

Sedimentary Structures

Cone-in-cone structures have been found.

Palaeontology

Abundant fossils have been found including; ammonites, belemnites, fish teeth, fish otoliths, lobsters, shark teeth, reptile bones, corals, bivalves, gastropods, crabs and brachiopods.

Historical Background

This site has been a source of fossils for over 50 years while it was an active quarry. There is now only small scale working; a corner of what was once more extensive and the rest is being landfilled.

Educational value

This quarry is of great scientific and educational value as it shows the thickest and the stratigraphically most important Lower Gault Formation sequence in the country. It is also a very important site for fossil collecting and it is the type locality of the Horton Wood Clay of *regularis* Subzone age which is a local and unusual development of the upper part of the Folkestone Formation.

Access details: safety and facilities (including Ownership)

The site is situated on the west side of the A2037 Henfield to Upper Beeding Road, and approximately 0.5km south of Henfield, in the village of Small Dole. This site is an active landfill site, and permission must be obtained from the owners in order to gain access. Safety advice should be sought from the site foreman, and followed. The clay can be very slippery, sticky and dangerous pools may occur after rain.

Note: No responsibility can be taken for personal injury or damage to property by persons visiting a site recorded on this form. Public liability and personal insurance cover must be provided before visits to sites are made and permission for each visit sought from the owner.

Published information

Hancock JM et al, 1965, The Gault of the Weald, PGA 76, 243-260
 Kirkaldy, JF, 1940, Field meeting at Steyning and Henfield, PGA 51, 72-76
 Kirkaldy, JF, 1948, A traverse across the Weald, PGA 59, 77-79
 Kirkaldy, JF, 1976, The Weald, GA Guide no 29
 Milbourne, RA, 1961, Field meeting in the Gault at Small Dole, near Henfield, Sussex, PGA 72, 135-137
 Osborne White HJ, 1924, The geology of the country near Brighton and Worthing,
 Owen, HG, 1963, Some sections in the Lower Gault of the Weald, PGA 74, 35-53
 Owen, HG, 1975, The stratigraphy of the Gault and Upper Greensand of the Weald
 Young B, Lake RD, 1988, Geology around Brighton and Worthing, BGS Memoir

Management

This is an active landfill site, which is likely to feature prominently in the future waste strategy for this part of Sussex. Should any restoration be envisaged, the preserved corner which is the SSSI would be appropriate for preservation. Any operations which may lead to an increase in the level of exposure should not immediately be opposed. Visits for research or collecting to this corner of the quarry are not expected to cause any damage.

More information required

Designation details

Proposal form considered at Panel meeting : (date)

Approved at Panel meeting : (date)

Signed on behalf of the RIGS Panel

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.....

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Revisions :
(Dates)

1

2

3

4

Circulation:

Dates:

Sussex RIGS Designation Form

SUSSEX RIGS NUMBER

TQ21/58

Name and Address of Site	Grid Ref.	Parish, District, County
Golding Barn Quarry Upper Beeding	TQ209105	Upper Beeding Horsham West Sussex

Current Designation				Ownership Name and Address
SSSI		NNR		
SNCI		GCR		
AONB	*			

Location Map	1 : 10000	1 : 25000	6 inch	

Scientific Details & Site Description (including Dimensions)**Stratigraphy**

This active quarry spans an excellent section including the whole of the Plenus Marls and the Melbourn Rock and just the lowest beds of the Holywell Nodular Chalk. Although this section is also seen at Washington (TQ121121) and Steyning (TQ169106) and Newtimber (TQ275136) there are facies changes and the four sites combined show how the Chalk changes along the Pycombe Anticline.

Sedimentology

The Chalk varies from massive, white to nodular and marly. There are also abundant marl seams (Plenus Marls). Pyrite nodules are also present.

Palaeontology

This site spans the junction of the zones of *Terebratulina lata* and *Sternotaxis (Holaster) planus*. A number of chalk fossils have been found including, nautiloids, belemnites, Inoceramids and other bivalves.

Structural Geology

This quarry is on the Pycombe anticline and there is a facies change as one moves eastwards towards Lewes.

Educational value

This quarry has an excellent section of the Lower/Middle Chalk boundary (Cenomanian/Turonian boundary) and a zone fossil boundary. It also exhibits a facies difference compared with other nearby sites (Newtimber, Steyning, Washington), and is therefore, of great importance for palaeoenvironmental studies.

Access details: safety and facilities (including Ownership)

As this is a working quarry, permission from the owners is required and care is needed when approaching the faces.
The site lies just east off the A2037 at Upper Beeding, approximately 4km north of Shoreham.

Note: No responsibility can be taken for personal injury or damage to property by persons visiting a site recorded on this form. Public liability and personal insurance cover must be provided before visits to sites are made and permission for each visit sought from the owner.

Published information

Gaster CTA. 1937. The stratigraphy of the Chalk of Sussex, PGA 48, 356-373
Kirkaldy JF, Bull AJ, 1940, Field meeting at Steyning and Henfield, PGA 51, 72-76
Mortimore RN, 1986, Controls on Upper Cretaceous sedimentation in the South Downs, with particular reference to flint distribution. in: Eds; Sieveking GDE, Hart MB, The Scientific study of flint and chert.
Whitaker W, Reid C, 1899, Water supply of Sussex BGS
White HJO, 1924, The geology of the country near Brighton and Worthing.
Young B, Lake RD, 1988, Geology around Brighton and Worthing, BGS

Management

As this is a working quarry, management advice would be inappropriate, however when it is no longer worked consideration should be given to preserve certain faces.

Designation details

Proposal form considered at Panel meeting : (date)

Approved at Panel meeting : (date)

Signed on behalf of the RIGS Panel

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Revisions :
(Dates)

1

2

3

4

Circulation:

Dates:

West Sussex Local Geological Site (LGS) Survey 2010



Condition Monitoring Form for NI 197 Reporting

Woods Mill, Henfield, West Sussex BN5 9SD. Tel: 01273 497521
Email: sxbrcl@sussexwt.org.uk Website: www.sxbrcl.org.uk

1. Site Information			
Site Name & LGS ID	Beeding Small Quarry TQ21/68		
Site Type	ED	Grid Reference	TQ213103 (revised)
Date of Visit	24/06/2010	Local Authority	
Surveyor	Peter Anderton	Landowner	
1:50,000 BGS Sheet no.	318/333	1:25,000 OS Sheet no.	122
LGS designation	Scientific	X	Educational
		X	Aesthetic
			Historical
Interest Feature(s): Disused chalk quarry with rock face about 50m long and 20m high. Stratigraphy: base of Lewes Nodular Chalk, White Chalk Subgroup, Chalk Group, Late Cretaceous in age Sedimentology: thick chalk limestone beds with marl seams and flint bands, deposited in a relatively deep marine environment. Sedimentary structures: well-developed nodular form Structural geology: the beds dip at about 20 degrees to the south on the southern limb of the Pyecombe anticline Note: the original designated location TQ212101 is not correct. At this location there is only a shallow, mostly filled and overgrown chalk pit.			
Previous management and dates (if any)			

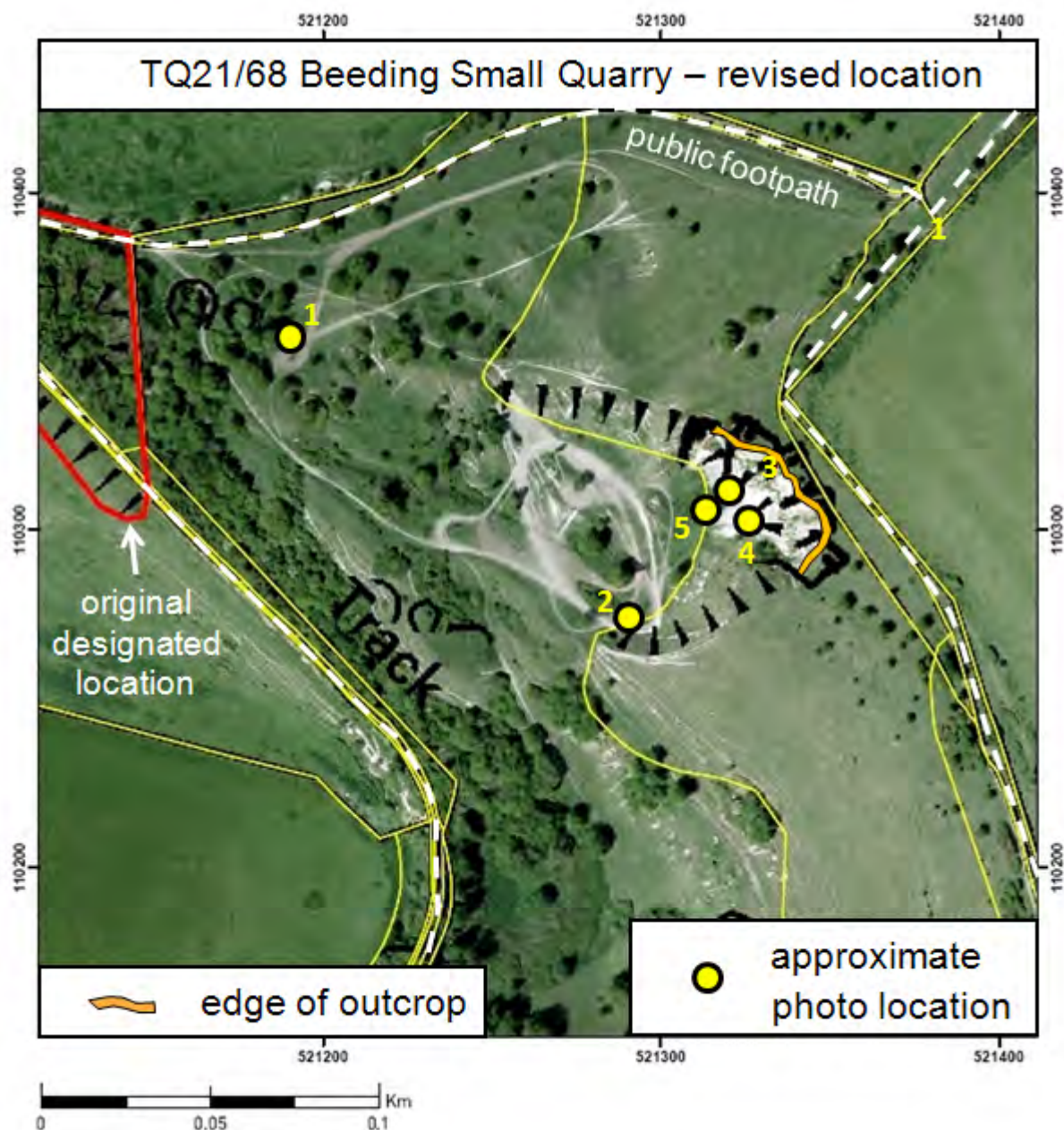
2. Primary Factors			
Bedrock feature	Is (are) the feature(s) exposed?	Y	If No, can it (they) practically be re-exposed?
	Is (are) the feature(s) being affected by the following factors?		
	Factor	Y/N	Comments
	Vegetation	Y	Vegetation growth is starting to obscure the central part of the face but most of the exposure is very visible.
	Scree/Mass Movement	N	
	Flooding	N	
	Dumping/Landfill	N	
	Quarrying/Engineering Works	N	
Superficial deposit feature	Is (are) the feature(s) exposed?	N/A	If No, can it (they) practically be re-exposed?
	Is (are) the feature(s) being affected by the following factors?		
	Vegetation (Trees or crop planting)		
	Agricultural practices (deep ploughing)		
	Quarrying/Engineering Works		
	Development (housing/industrial)		
	Others (please define) -		

Geomorphology feature	Is (are) the geomorphological feature(s) being allowed to evolve naturally?		N/A
	Is (are) the feature(s) being affected by the following factors?		
	Vegetation	N	
	Sea Defences	N	
	River Management	N	
	Ground Stabilisation (slopes/sand dunes)	N	
	Water level change	N	
	Development (housing/industrial)	N	
	Others (please define) –	N	

3. Secondary Factors			
Factors that do not directly affect the feature(s) but may need to be managed in order for feature(s) to maintain a desirable condition			
	Factor	Y/N	Comments
Site access	Are any of the following causing difficulties in accessing the site?		
	Physical obstacles	Y	The main cliff is vertical and presents some danger from falling blocks as shown by several large fresh boulders on the scree slopes below. However, most of the section can be accessed from the sides of the quarry.
	Landowner permissions	N	
	Protected species/habitats	N	
	Other (please define)		
Furniture	Are any of the following in an undesirable condition?		
	Interpretation Boards	N/A	
	Benches/Fences/Gates	N	
	Earthworks	N/A	
	Other (please define)		
Other features	Are there any other features of interest that should be considered?		
	Biodiversity	Y	The site is now part of an SSSI designated for its calcareous grassland habitat
	Historic Environment	N	
	Other (please define)		

4. Site Status	
Overall, is the site in a desirable condition for use(s) of the feature(s) identified?	<u>Yes</u> / No / Uncertain
If Yes - what management is required (if any) for the feature(s) to maintain a desirable condition:	
The site is currently in good condition. The aerial photo map shows evidence of previous use for motor bike scrambling but this is no longer visible. As the site is now part of an SSSI it seems likely that sympathetic management will continue.	
For the above, is the management: <i>Being undertaken</i> / <i>Going to be undertaken</i> / <i>Not going to be undertaken</i> / <i>Not possible</i>	
If Uncertain or No - what management is required for the feature(s) to reach and maintain a desirable condition:	
For the above, is the management: <i>Being undertaken</i> / <i>Going to be undertaken</i> / <i>Not going to be undertaken</i> / <i>Not possible</i>	
Are there any secondary factors that need further management?	Yes / <u>No</u> / Not applicable
Suggested management in order for the feature(s) to reach/maintain a desirable condition:	

5. Supplementary Information – Natural England
Beeding Small Quarry is part of Beeding to Newtimber Hill SSSI designated by Natural England. The SSSI citation is for its biological and geological value and it is classified by Natural England as a geological site. However the geological citation is for Devil's Dyke and Saddlescombe Pit, not for Beeding Small Quarry. Beeding Small Quarry is located in Unit 3 of the SSSI.



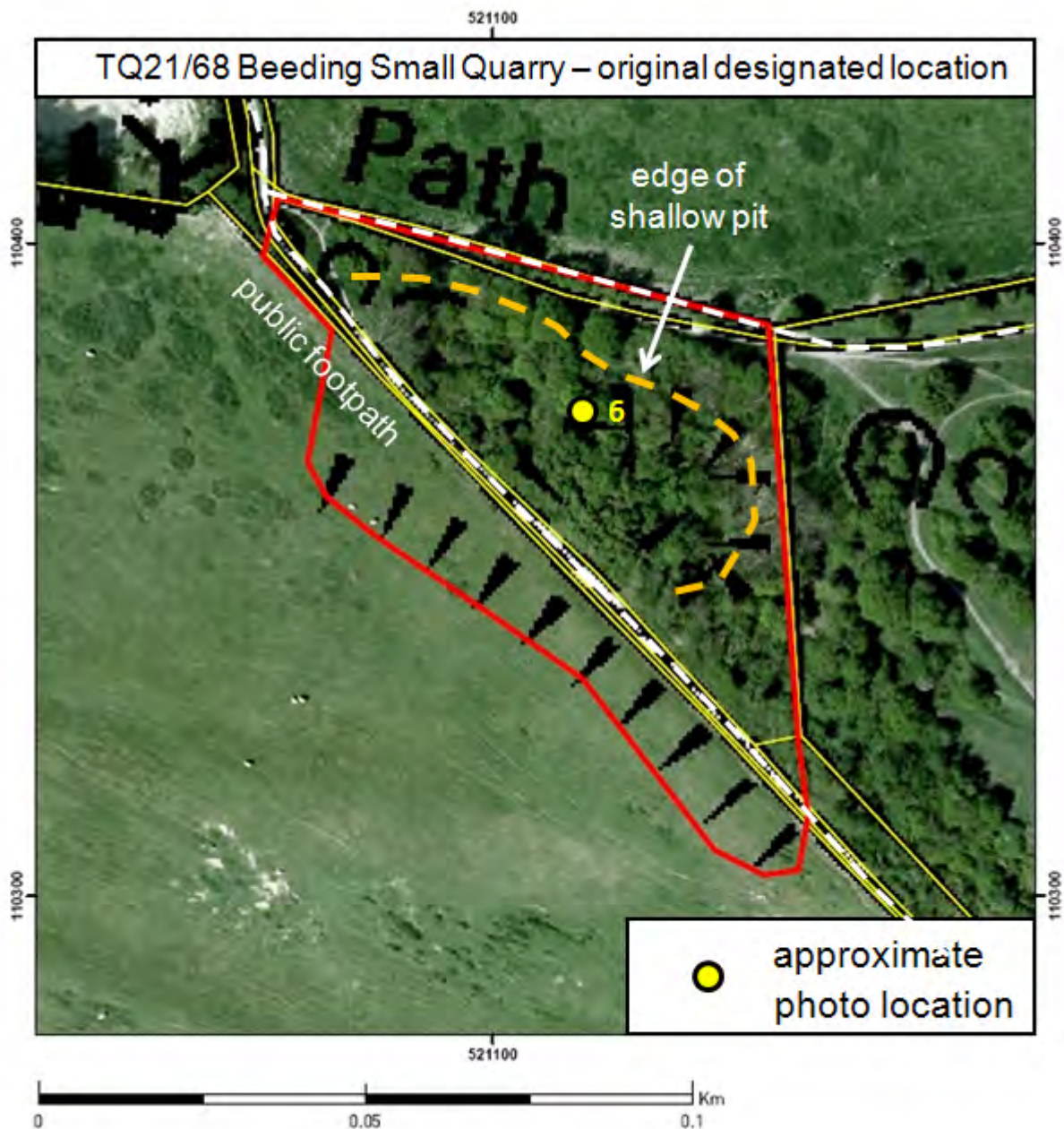
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Key to Map:

 LGS





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Key to Map:

 LGS





1. Quarry approach from the west. Grid ref. TQ21191036. Direction ESE.



2. Chalk face at head of quarry showing dip to south at about 20 degrees. Grid ref. TQ21291027. Direction NE.



3. Left side of quarry face showing Lewes Nodular Chalk with flint bands and marl seams. The prominent parting half way up the cliff probably marks the Southerham Marl horizon. Grid ref. TQ21321031. Direction NE.



4. Right side of quarry face provides access to higher zones of the Lewes Nodular Chalk. Grid ref. TQ21331030. Direction ENE.



5. Fresh boulder of nodular chalk below main face. Scale length 30cm.
Grid ref. TQ21311030.



6. Shallow chalk pit at original designated location. Overgrown and heavily eroded
by rabbits. Grid ref. TQ21111037. Direction NW.