

Suttles Stone Quarries
Swanworth Quarry
Worth Matravers, Dorset

Consultation on the Bournemouth, Dorset &
Poole Minerals Site Allocation Plan
Swanworth Quarry Extension (PK16)
Preliminary Hydrological & Hydrogeological
Risk Assessment

16th December 2016

Appendices

Report Prepared For:



Suttles Stone Quarries
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Appendix 1: Data Sources, Guidance &
Calculation Methodologies

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Published Data Sources

- i. Topographic maps at scales of 1:50,000, 1:25,000 and 1:2,500, Ordnance Survey (OS);
- ii. Open-source digital data (Meridian2, Panorama and Terra50 data-sets), OS;
- iii. 1:50,000-scale solid geological mapping, sheet-no. 342 (Swanage), Solid & Drift , 2000, British Geological Survey (BGS);
- iv. Geoindex (<http://www.bgs.ac.uk/geoindex>), well details and borehole logs and On-line Lexicon of Named Rock Units (<http://www.bgs.ac.uk/lexicon>), November 2016, BGS;
- v. "A stratigraphical framework for the Lower Cretaceous of England", Research report RR/080/03, P M Hopson, I P Wilkinson and M A Woods, BGS, 2008.
- vi. Environment Agency (EA) , September to November 2016:
 - Source Protection Zone (SPZ) spatial mapping data;
 - Licensed abstractions;
 - Flooding spatial mapping data;
 - Register of Waste Disposal Sites;
 - Local rainfall data; and
 - Water Framework Directive Catchment Mapping, Cycle 2.
- vii. Spatial mapping & citation information for Designated Sites of ecological interest (Sites of Special Scientific Interest [SSSI's] & Special Areas of Conservancy [SAC's]), November 2016, Natural England (NE);
- viii. Spatial mapping and Register information, Dorset Environmental Records Centre, October 2016;
- ix. Register of deregulated abstractions, Dorset County Council, December 2016;
- x. "Flood Estimation Handbook CD-ROM, Version 3.0", Centre for Ecology and Hydrology (CEH; formerly the Institute of Hydrology [IoH]), 2009 and revised web-based successor service;
- xi. "Climate & Drainage", Technical Bulletin No. 34, Ministry of Agriculture Fisheries & Food (MAFF), September 1976.

Site Specific Data Sources

- i. "An Assessment of the Impact of the Proposed Additional Extraction and restoration on the Existing Hydrology and Hydrogeology in the vicinity of Swanworth Quarry, Dorset", Leake CC, Principal Hydrogeologist, Tarmac Quarry Products Limited, for Tarmac Roadstone (Southern) Limited, August 1993;
- ii. "Encombe Estate, Report on Survey of Water Supply", Martin & Boyland (1980) Limited, Agricultural & Domestic Water Engineers, August 1986.
- iii. "Swanworth Quarry, Proposed Extension Area, Application Area & Site Survey", Tarmac Quarry Products Limited (TQPL), March 1987, Drawing Ref. S46/104;
- iv. "Swanworth Quarry, Proposed Extension Area, Overburden Isopachytes", TQPL, March 1987, Drawing Ref. S46/105;
- v. "Swanworth Quarry, Proposed Extension Area, Geological Survey", TQPL, March 1987, Drawing Ref. S46/106;
- vi. "Swanworth Quarry, Proposed Extension Area, Phased Working & Restoration, Phase 1", TQPL, March 1987, Drawing Ref. S46/108;
- vii. "Swanworth, Base Plan", Tarmac Southern Limited (TSL), March 2003, Drawing Ref. S46/316;
- viii. "Swanworth Quarry, Landscape restoration Plan", Mott Macdonald (MM) for SQQ, May 2011, drawing ref. 286952AA04/EVT/RES/001;
- ix. "Swanworth Quarry, Site Plan and June 2014 Topographic Survey", QuarryDesign Limited (QDL) for SQQ, undated, drawing references 144-150607-01 & 03;
- x. "Swanworth Quarry, UAV Topo Survey, 19th January 2016", DroneSurv Limited (DSL) for SQQ, Drawing Ref. 00144 - 03v1;
- xi. "Swanworth Quarry, Site Plan and April 2016 Topographic Survey", QDL for SQQ, undated, Drawing Ref's 144-160612-01 & 02;
- xii. "Swanworth Quarry, Phase 1 Extraction & Progressive Restoration", QDL for SQQ, undated, Drawing Ref's 144-160612-03;
- xiii. "Swanworth Quarry, Phase 2 Extraction & Progressive Restoration", QDL for SQQ, undated, Drawing Ref's 144-160612-04;
- xiv. "Swanworth Quarry, Phase 3 Extraction & Progressive Restoration", QDL for SQQ, undated, Drawing Ref's 144-160612-05;
- xv. "Swanworth Quarry, Dorset, Combe Extension, Site Location (General Context), Mullin design Associates (MDA) for SSQ, November 2014;
- xvi. "Swanworth Quarry, Advanced Landscape – Establishment Phase", (MDA) for SSQ, June 2016;
- xvii. "Swanworth Quarry, Extraction Phase 1", (MDA) for SSQ, June 2016;
- xviii. "Swanworth Quarry, Extraction Phase 2", (MDA) for SSQ, June 2016;
- xix. "Swanworth Quarry, Extraction Phase 3", (MDA) for SSQ, June 2016;

- xx. "Swanworth Quarry, Final Restoration", (MDA) for SSQ, June 2016;
- xxi. "Swanworth Quarry Extension, 3D Development Views of Phased Extension", QDL for SQQ, April 2016;
- xxii. "Waste Recovery Plan for Swanworth Quarry", MM for SQQ, September 2011, Document Ref. EES/286952/B4/01C.
- xxiii. Preliminary walk over survey of the Site and its environs, BCL, October 2016, and;
- xxiv. Laboratory analysis of groundwater samples taken from the vicinity of the Site.

Assessment & Calculation Methods

- i. "Hydrogeological Impact Appraisal for Dewatering Abstractions", Boak R, Bellis L, Low R, Mitchell R, Hayes P, McKelvey P, Neale S , EA Science Report SC040020/SR1, April 2007;
- ii. "The Calculation of Actual Evaporation and Soil Moisture Deficit over Specified Catchment Areas", Grindley J, November 1969, Hydrological Memorandum 38, Meteorological Office (MO), Bracknell, UK;
- iii. "Estimation of Open Water Evaporation, Guidance for Environment Agency Practitioners", R&D Handbook W6-043/HB, Finch JW and Hall RL, October 2001;
- iv. "Technical Management of Water in the Coal Mining Industry", National Coal Board (NCB), 1982;
- v. "Kinematic wave nomogram for times of concentration", American Society of Civil Engineers, Journal of the Hydraulics Division, Ragan RM, & Duru JO, 1972;
- vi. "Flood Studies Report, Volume II: Meteorological Studies", Natural Environment Research Council (NERC), 1975;
- vii. "Flood Estimation for Small Catchments (IH 124)", Institute of Hydrology, Report No.124, Marshall DCW & Bayliss AC, June 1994;
- viii. "Rainfall Runoff Management for Developments", joint DEFRA / Environment Agency (EA) Flood and Coastal Erosion Risk Management R&D Programme, Report SC030219, Kellagher R, October 2013, and;
- ix. "Greenfield Runoff Estimation for Sites", HR Wallingford (HRW), on-line calculation tool¹⁸, UK Sustainable Drainage, Guidance & Tools.

¹⁸ http://geoservergisweb2.hrwallingford.co.uk/uksd/greenfieldrunoff_js.htm

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Appendix 2: Citations for Statutorily Protected Sites

Report Prepared For:



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Registered in England & Wales. Registered Office: 33, Wolverhampton Road, Cannock

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COUNTY: DORSET SITE NAME: SOUTH DORSET COAST

DISTRICT: Purbeck, West Dorset, Weymouth and Portland

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981, as amended.

Local Planning Authority: PURBECK DISTRICT COUNCIL, West Dorset District Council, Weymouth & Portland Borough Council, Dorset County Council

National Grid Reference: SY 697816–SZ 040786 Area: 1760.9 (ha.) 4351.2 (ac.)

Ordnance Survey Sheet 1:50,000: 194, 195 1:10,000: SY 78 SW, SE; 87 NW; 88 SW, SE; 87 NE; 97 NE; SZ 07 NW

Date Notified (Under 1949 Act): 1952 Date of Last Revision: 1977

Date Notified (Under 1981 Act): 1986 Date of Last Revision: –

Other Information:

Formerly notified as Bowleaze Cove to Peveril Point SSSI. Within A.O.N.B. and part of the Dorset Heritage Coast. Parts are owned by the National Trust. Site amended by extension and deletion. More detailed geological and biological information is available on request.

Description

This stretch of coastline combines internationally important geological interest with a rich range of wildlife habitats supporting populations of several rare plants and animals.

The coastal cliffs are of international geological importance and expose a complete section through the Upper Jurassic and Cretaceous rock succession. The site includes the type localities for the Kimmeridge Clay, the Kimmeridgian Stage, the base of the Portlandian Stage and the Purbeck Beds as well as the standard reference section for the Oxfordian of southern England. Numerous features of great importance for studies of Palaeontology, sedimentology, stratigraphy and environments of rock formation are present and have been studied by geologists for well over 150 years. The site is also of national importance for its physiographic interest.

Most of the rock units are very fossiliferous and a number are of international significance for the assemblages of fossil vertebrates which they contain. In particular the Purbeck Beds of Durlston Bay are of special note since they have yielded one of the most important collections of Mesozoic mammals from anywhere in the world. Durlston is also the most important Late Jurassic–Early Cretaceous fossil insect site in Europe. Internationally important sites for fossil reptiles also occur in the Kimmeridge Clay at Gaulter Gap to Broad Bench and between Swyre Head and Chapmans Pool and in the Oxford Clay at Furzy Cliff.

The great range of rock types has given rise to a varied coastline of vertical cliffs, undercliffs and landslips which support an outstanding array of local and maritime species. Among the rare plants which occur here are the Carrot Broomrape *Orobanche maritima* and the strongest national populations of Wild Cabbage *Brassica oleracea*.

The majority of unimproved limestone grassland in Dorset falls within this site which also includes one of the main areas of unimproved chalk grassland in the county. The character of these calcareous grasslands is strongly influenced by their maritime location and also very locally there is 'chalk heath' on clay with flints over the chalk. Among the many scarce and localised plants and animals of the chalk and limestone are the largest national populations of two rare species -- Early Spider Orchid *Ophrys sphegodes** and Lulworth Skipper butterfly *Thymelicus acteon*.

Unimproved grassland, scrub and woodland typical of more neutral soils are found on the clays and sands of the Wealden, the Kimmeridge, Oxford and Gault Clays and the Reading Beds. Of the woodlands, those of the Tyneham Valley are especially notable for their lichen communities which include several rare species.

*This species is given special protection under Section 13 of the Wildlife and Countryside Act 1981.

County: Dorset **Site Name:** Blashenwell Farm Pit

District: Purbeck

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 (as amended).

Local Planning Authority: Purbeck District Council, Dorset County Council

National Grid Reference: SY 952805 **Area:** 11.4 (ha) 28.2 (ac)

Ordnance Survey Sheet 1:50,000: 195 **1:10,000:** SY 98 SE

Date Notified (Under 1949 Act): 1954 **Date of Last Revision:** –

Date Notified (Under 1981 Act): 1988 **Date of Last Revision:** –

Other Information:

A Geological Conservation Review Site. Site boundary amended by extension.

Description and Reasons for Notification:

The tufa deposit at Blashenwell Farm is important for Quaternary studies, providing a detailed record of molluscan biostratigraphy and environmental history during the early- and mid-Flandrian (mollusc assemblage zones b to d). It is particularly valuable for the length and continuity of the record and the dating potential provided by the presence of associated archaeological remains. Several radiocarbon dates are also available from the site.

Notified to the Secretary of State on 12 Feb 88

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COUNTY: DORSET SITE NAME: CORFE COMMON

DISTRICT: PURBECK

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981, as amended

Local Planning Authority: PURBECK DISTRICT COUNCIL

National Grid Reference: SY 960810 Area: 88.6 (ha.) 218.9 (ac.)

Ordnance Survey Sheet 1:50,000: 195 1:10,000: SY 98 SE

Date Notified (Under 1949 Act): 1972 Date of Last Revision: 1977

Date Notified (Under 1981 Act): 1984 Date of Last Revision: –

Other Information:

Registered as Common Land.

Reasons for Notification:

Lying immediately south of the village of Corfe Castle, and flanked to the south and west by a branch of the Corfe River, the Common is the only large remaining area of uncultivated land on the Purbeck Wealden Beds. It is of great botanical interest, the flora of the flushes being of particular richness.

There is a central east-west ridge of Wealden Sandstone and the lower land is Wealden Clay bearing a series of flushes particularly along the western margin. The varied hydrology of the site and its long history as common land have contributed to the great variety and richness of its flora.

The sandstone ridge has swards dominated by bent grasses *Agrostis* spp. and stands of bracken *Pteridium*. Bristle Bent *Agrostis curtisii*, Bluebell *Hyacinthoides non-scriptus* and Saw-wort *Serratula tinctoria* are frequent and Ling *Calluna vulgaris* and Bell Heather *Erica cinerea* also occur. Lower ground supports close-grazed swards with Purple Moor-grass *Molinia caerulea* and Soft Rush *Juncus effusus* locally dominant. The flushes typically occupy short narrow valleys and their upper parts have a vegetation characterised by several species of pleurocarpus mosses, for example *Drepanocladus fluitans* and *Campylium stellatum*. Wherever drainage is impeded, communities dominated by a variety of *Sphagnum* species are found. Amongst the range of higher plants are Bog Asphodel *Narthecium ossifragum*, Bottle Sedge *Carex rostrata*, Bog Bean *Meneanthes trifoliata*, Cotton Grass *Eriophorum angustifolium*, Marsh Arrow Grass *Triglochin palustris* and Pale Butterwort *Pinguicula lusitanica*.

The wetter areas support an extremely varied and interesting fauna including a number of local and rare species. Notable among these are several beetles: the very local Tortoise Beetles *Cassida murraea* and *C. vibax*, the Water-Jewel

Beetle *Plateumaris discolor* and some uncommon leaf and ground beetles. Other noteworthy animals include three very scarce damselflies, the spider *Araneus redii* and the Silky Snail *Ashfordia granulata*.

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Appendix 3: Borehole Logs

Report Prepared For:



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Company Registration Number: 4043373
Registered in England & Wales. Registered Office: 33, Wolverhampton Road, Cannock

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Tarmac

PROJECT

SWANWORTH

BOREHOLE NO.

10

GROUND LEVEL

139.90 m AOD

CO-ORDINATES

963 E

DATE

787 N JANUARY 1989

SHEET

1 OF 1

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCR %	RQD %	lf mm		TYPE	DEPTH	RESULT		
SOIL				138.80										
PORTLAND LIMESTONE	Light brown thinly laminated sandy LIMESTONE with abundant CHERT nodules	0-10												
PORTLAND SAND	Grey thinly laminated fine to medium SANDSTONE with occasional SILTSTONE bands	10-40		105.17									40	
KIMMERIDGE CLAY	Dark grey thinly laminated MUDSTONE with occasional SST. and SILTSTONE bands	40-50		91.0									50	
KIMMERIDGE CLAY	Dark grey slightly clayey SILTSTONE	50-80		80.22									60	
	EOH 80-50 m			59.40										

EQUIPMENT				
DATE				
DEPTH ATTAINED				
CUTTING TOOL/BIT TO				
CASING DIA TO				

NOTES
 PIEZOMETER DETAILS: 3 x 3m slotted sections at 40, 50 and 60m approx with piezometer tip at 80m
 WATER LEVEL 90.03 m AOD on 20-1-89
 CORE BOX No. _____ TO _____

LOGGED BY
 BRO | TSH
 SCALE
 1:50
 FIG.

GROUND LEVEL 139.90m AOD	CO-ORDINATES 963 E 787	DATE N January 1989.	SHEET 1 OF 9
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DESCRIPTION	DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
				TCR %	SCR %	RQD %	# / m		TYPE	DEPTH	RESULT		
SOILS			138.8										
Light brown slightly weathered very thinly laminated dipping 20° fine to medium grained LIMESTONE moderately weak with clay very closely spaced very subhorizontal curvilinear, medium rough. Below 2.20m occasional thin discontinuous calcite veins <1mm. Below 2.20m joints are use to very closely spaced.	1.10												
Joints: 2.20m: 40° very rough, narrow, stained. 2.52m: 40° medium rough, narrow, stained. 2.55m: 20° medium rough, very wide, clay filling 2.73m: 80° medium rough, very wide, clay filling Below 2.88m 8 joints 10° medium rough, narrow, clean.	2.76												
Joints: 4.46m and 4.51m: 10° very rough, narrow clean 4.65 to 4.71m: 80° rough, narrow, stained. 4.74m: broken zone 4.76-4.85m: Vertical 8mm wide joint infilled with calcite and void	5.50												
Joint 5.09 10° rough, very wide, stained 5.27m, 20° rough, narrow, stained 5.70m, 10° rough, very narrow stained 5.83m, 10° medium rough, very narrow, clean 6.16m, 10° slightly rough, very narrow, clean 6.57m, 10° rough, narrow, stained 6.83m, 10° very rough, very narrow, stained													
7.10m 15° very rough, wide, stained 7.28m 40° medium rough, narrow, crystal filled 7.33 to 7.70m vertical very rough very wide, clay and crystal filled													
7.78m 10° rough, narrow, stained													
2.2m 10° very rough, narrow, stained													
Below 8.50m becomes slightly darker	8.50												
Joint 8.55m 10° rough, narrow, stained													
9.05m 60° medium rough, narrow, stained													
9.76m 40° medium rough, narrow, stained													
9.85m 60° rough, narrow, clean													
9.94m 20° rough, wide, stained													

EQUIPMENT				NOTES								LOGGED BY BRO	
DATE												SCALE	
DEPTH												FIG.	
STAINED													
CUTTING													
TOOLBIT				CORE BOX No.									
TO				TO									
CASING													
DIA													
TO													

GROUND LEVEL 139.90 m AOD	CO-ORDINATES 963 E 787	DATE N JAN 1989	SHEET 2 OF 9
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DESCRIPTION	DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
				TCR %	SCR %	ROD %	H mm		TYPE	DEPTH	RESULT		
MAIN	DETAIL												
Joint 10.45m - 20° smooth, slickensides, narrow - clean Chert 10.45 - 10.52 chert nodule													
Chert 11.01 - 11.04 chert nodule 11.02m 20° very rough, wide, in chert nodule Chert 11.20 - 11.26 chert nodule 11.26m 10° rough, narrow clean Below 11.40m becomes fine grained Chert 11.46 - 11.48 chert nodule 11.54m 20° very rough wide clean Chert 11.54 - 11.59m chert nodule 11.77 - 11.90m Joint vertical medium rough and rough narrow - wide, stained	11.45			107	75	38	152						
Chert 12.07 - 12.08m chert nodule 12.26 - 12.30m chert nodule 12.27m Joint, 30° slightly rough, narrow, stained Chert 12.31 - 12.38m chert nodule 12.35m joint 20° very rough, wide stained Chert 12.48 - 12.49m chert nodule 12.50m joint 20° slightly rough, narrow, stained Chert 12.58 - 12.69m chert nodule 12.60m 30° slightly rough very narrow Chert 13.17 - 13.22m chert nodule 13.20 - 13.65 Shattered chert, vertical, smooth, clean. 13.34 - 13.45 chert nodule	13.73												
Chert 13.70 - 13.73 chert nodule Below 13.80m: thin recrystallized shally horizons. Chert 13.82 - 14.09m chert nodule 14.17m 30° very rough, narrow, clean Chert 14.17 - 14.19m chert nodule 14.23 - 14.64 chert nodule 14.44m 10° slightly rough, very narrow, clean 14.67m 20° slightly rough, very narrow, clean Chert 14.66 - 14.89m chert nodule 15.02 - 15.04m chert nodule 15.04m 30° slightly rough, narrow, clean. Chert 15.22 - 15.32m chert nodule 15.40m 10° slightly rough, narrow, stained 15.66m 20° slightly rough, narrow, clean 15.70 - 15.76m vertical curved, medium rough, narrow, stained 15.89m 20° rough, narrow, stained Chert 15.90 - 15.99m chert nodule 16.01m 10° slightly rough, narrow, 16.18 - 16.55m Light orange brown thinly laminated SANDY LIMESTONE moderately strong 16.45m 20° medium rough, narrow, clean 16.52m 50° medium rough, narrow 16.77 - 16.99m chert nodule	16.00			97	77	67	133						
Joint 17.23m 0° rough, wide, stained 17.56m 50° very rough, narrow clean 17.69m 20° very rough, narrow 17.83m 20° moderate rough, narrow, stained 17.83m 50° rough, narrow, clean 18.10m 10° slightly rough, narrow, clean 18.25m 20° very rough, wide, clean 18.40m 20° rough, narrow, clean 18.71m 20° rough, narrow, clean 18.96m 20° rough, narrow, clean	18.12			97	92	88	248						

EQUIPMENT	
DATE	
DEPTH	
STAINED	
CUTTING	
TOOLBIT	
TO	
CASING	
DIA	
TO	

NOTES	
CORE BOX No.	
TO	

LOGGED BY B.R.D.
SCALE
FIG.

GROUND LEVEL

CO-ORDINATES

DATE

SHEET

139.90

963

E 787

N JAN 1989

3 OF 9

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES		WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCR %	RQD %	# mm		TYPE	DEPTH		
Joint: 20.19m 20°, rough, narrow, stained													
20.50m 30°, very rough, wide, clean		20.50											
20.53m 70°, curved, very rough, wide, stained					100	73	67	97					
20.55-20.70m vertical, very rough, wide, stained													
20.72m 65°, rough, narrow, clean													
21.16-21.48m vertical, very rough, wide, stained													
21.62m 10°, slightly rough, narrow, clean													
21.85m 10°, slightly rough, narrow, clean													
22.17m 25°, slightly rough, narrow, clean													
22.22m 25°, rough, narrow, clean													
22.36m 80°, rough, wide, stained													
22.45m 10°, very rough, wide, stained													
22.50-22.65m vertical, smooth, narrow, crystals of calcite													
22.79m 10°, rough, narrow, calcite													
22.98-23.20m 85°, rough, narrow, calcite crystals													
23.60-23.89m vertical, slightly rough, narrow, calcite crystals		23.50			97	73	53	91					
24.16m horizontal, rough, wide, clean, chert nodule below													
Chert 24.16-24.23m Chert nodule													
Joint 24.25m 10°, slightly rough, narrow, clean													
Chert 24.59-24.76m Chert nodule													
Joint 24.77m 10°, rough, narrow, clean													
24.84-24.88m Very weak zone													
Joint: 24.84-24.88m 20°, slightly rough, narrow, clean													
24.96m 10°, slightly rough, narrow, calcite crystals													
24.96-25.16m vertical, medium rough, wide, stained													
Chert 25.50-25.65m 80° very rough, wide, calcite crystal													
25.58-25.62m Chert nodule													
Joint 25.80m 20° medium rough, narrow, stained													
Chert 26.00-26.14m Chert nodule													
Joints 26.07m 30° smooth and very rough, closed, clean													
26.30m 10°, slightly rough, narrow, clean													
Chert 26.35-26.62m Chert nodule													
Joints 26.50-26.65m vertical, smooth, narrow, calcite crystals		26.50			89	59	38	89					
26.65m 50°, slightly rough, narrow, clean													
27.00m 50° slightly rough, narrow, clean													
27.07m 20° slightly rough, narrow, clean													
27.30m 70°, smooth, narrow, calcite crystals													
27.50m horizontal, slightly rough, narrow, smooth													
27.70-28.03m 7 No. joints: 10-20° medium rough, narrow, clean													
Chert 27.84-27.90m Chert nodule													
28.24-28.42m Chert nodule		28.19			96	84	62	85					
Joints 28.51m 30°, rough, wide, calcite crystals													
28.80m 20°, rough, wide, clean													
29.03m 30°, slightly rough, wide, clean													
Chert 29.06-29.22m Chert nodule													
29.27m 20°, rough, wide, clean													
29.39m 20° slightly rough, wide, stained													
29.45m 70°, slightly rough, narrow, clean													
Chert 29.50-29.66m Chert nodule													
29.60m 80°, slightly rough, wide, calcite crystals													
29.82-29.96m 3 No. 10° slightly rough, narrow, clean													

EQUIPMENT

NOTES

LOGGED BY

DATE				
DEPTH GAINED				
CUTTING TOOL BIT				
TO				
CASING DIA.				
TO				

CORE BOX NO.													
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BRD
SCALE
FIG.

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCA %	RQD %	# mm		TYPE	DEPTH	RESULT		
Chert	30.03-80.15m Chert nodule 30.15m 70° slightly rough, narrow, clean 30.22m 10° slightly rough, narrow, clean 30.34m 10° slightly rough, narrow, clean													
Chert	30.58-30.70m chert nodule													
Chert	30.78-30.86m horizontal, smooth, narrow, stained													
Chert	30.87-30.95m Chert nodule													
Chert	31.00-31.17m Chert nodule	31.00												
Joints	31.00-31.20m vertical, rough, wide, stained 31.34m horizontal, very rough, wide, stained 31.56m 10°, slightly rough, wide, stained.				98	88	76	108						
CAVITY NO RECOVERY		32.44		107.46	CAVITY NO RECOVERY									
33.77m 10°, medium rough, wide, stained		33.50		106.40	98	88	76	108						
34.20m 20°, slightly rough, narrow, calcite crystals		34.00			88	77	67	188						
34.62m 40° rough, narrow, clean 34.65m 20° slightly rough, narrow, clean		34.73		105.17										
34.73m Grey slightly weathered very thinly laminated fine to medium grained SANDSTONE moderately strong with some siltstone and mudstone bands. Joints														
34.78m 10°, smooth, narrow, clean 34.95m 20° smooth, wide, clay infill. 35.38m 10°, smooth, wide, clean.														
35.75-35.90m Brown very silty MUDSTONE weak to moderately weak														
35.90m 10°, smooth, narrow, clay infill														
36.20-36.60m SILTSTONE														
36.65-36.50m very clayey SILTSTONE 36.60m very silty MUDSTONE weak		36.45			100	94	56	119						
36.30m 10°, slightly rough, wide, clean.														
36.70m 10°, rough, wide, clay infill 36.85-37.78m 7NP joints 10°, smooth, narrow, clean														
37.0-37.50m Fine Sandy SILTSTONE moderately strong														
37.50-38.00m Brown very silty MUDSTONE weak to moderately weak														
38.00-38.07m SILTSTONE														
38.07-38.26m Brown very silty MUDSTONE weak to moderately weak.		38.00			88	82	65	206						
38.27m 70°, slightly rough, narrow, clean.														
38.55-38.60m Brown clayey SILTSTONE														
38.60-39.02m Black fresh clayey SILTSTONE moderately strong														
39.02-39.65m Black MUDSTONE moderately weak														
39.03m 30° smooth, very wide, clay. 39.29m 20° smooth, very wide, clay.														
39.65-39.80 Dark grey MUDSTONE weak														
39.80-40.20m Dark grey and light grey thinly laminated SILTSTONE and fine SANDSTONE		39.80		100.10										

EQUIPMENT moderately strong

NOTES

LOGGED BY

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SCALE

FIG.

DATE				
DEPTH				
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CORE BOX No.

70



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PROJECT

SWANWORTH EXTENSION

10

GROUND LEVEL

CO-ORDINATES

DATE

SHEET
5 OF 9

139.90

963 E 787 N

JAN 1989

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCR %	RQD %	# num		TYPE	DEPTH	RESULT		
As Above: Dark grey and light grey thinly laminated siltstone and fine sandstone moderately strong. Joints are subhorizontal closely spaced clean.														
From 41.50m light grey fine thinly laminated siltstone moderately weak to moderately strong. Joints unfilled with calcite		41.50		98.60	96	94	41	135						
41.70m 20° rough, narrow, clean														
42.05-42.25m 50° 40° smooth, narrow, clean														
42.55-43.00m 30°-80° smooth, narrow, stained														
From 43.12m light grey very thinly laminated clay siltstone with occasional laminae of fine sandstone. Joints are horizontal to 30°, smooth, planar, very narrow, fresh		43.12		96.78	100	96	83	199						
44.86-45.33m dark grey very clayey siltstone														
From 45.91m light grey very thinly laminated clayey siltstone moderately strong to strong. Joints are very closely to moderately spaced 30° smooth, planar very narrow, fresh		45.91		93.99	92	86	85	311						
46.81m 50° slightly rough, narrow, clean														
From 48.71m grey becoming dark grey very thinly laminated silty mudstone strong. Organic odour. Joints are 20°-30°, smooth, planar, narrow closely to moderately spaced		48.71		91.19	99	96	77	350						
49.27m 30° smooth, narrow, clean														
49.62m 70° smooth, narrow, clean														

EQUIPMENT

NOTES

LOGGED BY

BRO
SCALEDATE
DEPTH
OBTAINED
CUTTING
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CASING
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TO

CORE BOX NO.

FIG.

GROUND LEVEL

CO-ORDINATES

DATE

SHEET
6 OF 9

139.90

963 E

787 N

JAN 1984

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCR %	ROD %	# mm		TYPE	DEPTH	RESULT		
As Above.														
50.50-50.70m Silty horizon	50.17m 80°, smooth, narrow, clean 50.22m 10°, smooth narrow, clean 50.37m vertical, rough narrow, clean	50.50				100	71	45	120					
51.56-51.78m Light grey SANDSTONE strong														
52.15-52.50m Light grey SANDSTONE strong		53.5				94	78	45	123					
54.13-54.30m SANDSTONE	54.08m conjugate joints at 60° slightly rough, narrow 54.58m conjugate joints 30°, smooth, narrow, clay 60°, very rough, wide, clean													
56.20-56.65m SILTSTONE	55.56m 70°, smooth narrow clay 55.73m 60°, very rough, narrow, clay													
	56.69m 30° smooth, wide clean 56.77-56.85m vertical, smooth, narrow clay	56.44				100	93	76	245					
58.28-58.50m Very clayey SILTSTONE														
58.50-58.60m MUDSTONE	58.44m 80° slightly rough narrow stained.													
58.60-58.70m SILTSTONE														
58.70-58.87m MUDSTONE														
58.87-59.00m SILTSTONE														
59.00-59.62m MUDSTONE														
59.68m Dark grey very thick laminated slightly clayey SILTSTONE moderately strong to strong with very thin mudstone laminae		59.38		80.52		98	96	71	130					

EQUIPMENT			
DATE			
DEPTH			
TAIRED			
CUTTING			
TOOL/BIT			
TO			
CASING DIA			
TO			

NOTES									
CORE BOX No.									

LOGGED BY BRO
SCALE
FIG.

GROUND LEVEL 139.90	CO-ORDINATES 963 E 787 N	DATE JAN 1989	SHEET 7 OF 9
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DESCRIPTION MAIN	DESCRIPTION DETAIL	DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
					TCR %	SCR %	ROD %	# mm		TYPE	DEPTH	RESULT		
As ABOVE occasional white shell fragments and also sedimentary structures like disturbance or slump structures. Joints are closely spaced 10 to 30° s mark.														
60.40-60.72m Grey thin laminated silt, mudstone.	61.13 70° rough, stained													
61.80-62.10m slightly sandy	62.25m 70° rough, wide, stained.	62.50			100	89	61	110						
	63.23m 70° smooth, narrow, clay infill 63.46m 80° smooth, narrow, clay infill 63.74m 30° smooth,	64.26			100	96	78	211						
	64.65m 70° rough, narrow clean													
	67.22m 20° rough, wide, clean	67.00			97	95	92	245						
	68.79m 50° slightly rough, wide, clean													
		69.94												

EQUIPMENT					NOTES					LOGGED BY BRO				
DATE										SCALE				
DEPTH										FIG.				
RETAINED CUTTING TOOL/BIT TO														
CASING DIA TO														
					CORE BOX No.									

GROUND LEVEL 139.90	CO-ORDINATES 963 E 787 N	DATE JAN 1989	SHEET 8 OF 9
------------------------	-----------------------------	------------------	-----------------

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCR %	ROD %	# mm		TYPE	DEPTH	RESULT		
AS ABOVE						99	99	95	294					
70.56-70.80m Thin black carbonaceous laminae														
		72.88				99	92	87	150					
		75.88				97	89	89	240					
Below 76.00m becomes more sandy with no bloturbation.														
		78.04				100	94	73	91					
78.10m 70° smooth, clean 78.30m 30° slightly rough, wide, clean 78.40m 40° smooth, narrow 78.76m 30° joints 70° rough, narrow, clean														
Below 79.5m Disturbation 79.5m														

EQUIPMENT					NOTES					LOGGED BY BRO	
DATE										SCALE	
DEPTH OBTAINED										FIG.	
CUTTING TOOL/BIT TO											
CASING DIA TO											
					CORE BOX No.						

GROUND LEVEL 139.90	CO-ORDINATES 963 E 787 N	DATE JAN 1989	SHEET 9 OF 9
------------------------	-----------------------------	------------------	-----------------

DESCRIPTION		DEPTH AND THICKNESS	LEGEND	REDUCED LEVEL	CORE INDICES				WEATHERING	STRENGTH INDICES			WATER DEPTH m	CASING DEPTH m
MAIN	DETAIL				TCR %	SCR %	ROD %	H mm		TYPE	DEPTH	RESULT		
END OF BOREHOLE		80.50		59.60										

EQUIPMENT				NOTES								LOGGED BY BRD	
DATE												SCALE	
DEPTH ATTAINED												FIG.	
CUTTING TOOL/BIT TO													
CASING DIA TO													
				CORE BOX No.									

MINERAL EVALUATION BOREHOLES IN THE
PORTLAND LIMESTONE

<u>Depth</u> <u>(Metres)</u>	<u>Description</u>
<u>BH1/93</u>	
0 to 0.5	Made ground
0.5 to 3.46	Light grey fine grained non-porous limestone. Some fossils.
3.46 to 12.09	Light grey medium grained slightly porous limestone. Abundant fossils to common <u>chert bands</u> .
12.09 to 19.76	Pale grey and pale brown fine grained slightly porous oolitic limestone.
19.76 to 32.05	Pale brown fine grained porous oolitic limestone and pale grey non porous crystalline limestone. Thinly bedded.
32.05 to 36.28	Light brown muddy limestone in hard crystalline limestone. Thinly bedded.
36.28 to 41.00	Light brown muddy limestone with hard crystalline limestone.
41.00 to 42.08	Light to very dark grey calcereous mudstone.
End of borehole 42.08m.	

Depth
(Metres)

Description

BH2/93

0.0 to 0.7

Made ground.

0.7 to 9.5

Light grey fine grained non-porous limestone.

9.5 to 13.4

Pale grey fine/medium grained porous oolitic limestone.

13.4 to 24.5

Pale grey fine grained porous limestone with common chert bands - thinly bedded.

24.5 to 33.70

Interbedded pale grey crystalline limestone and pale brown porous granular limestone.

33.70 to 36.50

Pale grey to mid grey muddy limestone/calcerous mudstone.

End of borehole 36.50m.

Depth
(Metres)

Description

BH3/93

0 to 3.24

Buff brown, grey predominantly medium grained oolitic limestone, thinly bedded with occasional thin bands of finer grained - darker grey chert and muddy limestone. 2.05 - 2.15m, laminated brown soft shaley, mudstone band.

3.24 to 6.54

Buff brownish grey, homogenous, fine grained, micritic limestone medium bedded with moderately spaced joints at 45 degrees. Joint surfaces moderately weathered, rough with some iron staining, syolitic texture common throughout.

6.54 to 20.38

Buff, creamy brown, relatively homogenous, limestone commonly well bedded, with at vertical joints to 60 degrees, widely spaced. Sparite infill. Darker clay beds from 11.74 - 12.50 and 18.90 - 19.18m

20.38 to 28.24

INTERBEDDED fine oolitic limestone with grey chert bands. Predominantly buff, brownish cream, fine grained hard oolitic limestone interbedded with medium grey, very fine crystalline cherty limestone beds, very hard. Surface medium bedded throughout with thin sandy laminations from 24.53m. Jointing widely spaced, sub vertical with brown coating on joint surfaces.

28.24 to 32.04

Buff, grey, fine grained occasionally medium, massively bedded, hard, oolitic limestone with common bivalves and some fossil debris, core has medium to closely spaced joints, sub vertical to 45 degrees with sandy coating on weathered joints.

32.04 to 40.56

Interbedded predominantly fine grained crystalline limestone with grey muddy limestone bands. Interbedded with fine grained crystalline, lighter grey blocks; medium bedded with widely spaced, sub vertical joints, less common set at 45 degrees. 37.76m medium to fine grained oolitic limestone with closely spaced joints.

40.56 to 43.05

Medium grey oolitic, fine grained, soft calcareous silty mudstone. Bedding medium with more closely spaced joints, commonly at 45 degrees, oolitic.

End of borehole 43.05m.

Depth
(Metres)

Description

BH4/93

0 to 0.87

Made ground.

0.87 to 4.96

Buff grey, medium grained, slightly porous oolitic limestone, predominantly medium bedded, with widely spaced joints at 43 degrees, commonly moderately weathered with clay veneer. 1.80 - 2.21 medium grey crystalline hard chert bands with calcite sparite infilling and crystallisation. 3.90 - 3.93 - clay infill of joints, brown, soft clay.

4.96 - 10.19

Very clayey. Broken limestone.

Buff brown, fine grained, variable, medium to finely bedded oolitic limestone interbedded with medium grey cherty bands with frequent closely spaced joints. Joints are rough, commonly high angled, sub vertical, filled with orange brown friable soft-firm clay rock. Clay infill up to 10cm's thickness. Broken and recemented clastic limestone beds common from 7.88 also clay bands. Sub vertical, clay infilled joints between 9.17 - 10.03m.

10.19 to 15.79

Buff brown, medium grained, slightly porous, medium to massively bedded, relatively fresh, hard oolitic limestone with widely spaced sub vertical and 45 degrees joints, weakened and clay surface joints at 11.30 2mm irregular calcite growth. 11.39 - 11.43m - Clayey bands. Orange brown, dry, friable soft clay.

15.79 to 24.41

Interbedded cherts and limestones.

Buff creamy brown, oolitic limestone interbedded with clay and chert bands up to 40cm thick. 17.80 -18.30 brown weathered sand. Joints medium spaced, sub vertical and more frequent, 45-70 degrees rough faces, irregular, fresh with mineral growth. 24.20 - 24.41m - Band of recemented clastic fragments.

24.41 to 27.50

Greyish brown, oolitic limestone, and greeny grey, fine grained, medium to thinly bedded silty mud, soft and friable with widely spaced deep orange joints at 45 - 60 degrees. 26.05m rock changes to dark grey, less weathered.

End of borehole 27.50m.

From (m)	To (m)	Description
0.00	0.18	Dark brown, fine, limey LOAM.
0.18	0.28	Light buff, very fine, limey LOAM, with 10% buff, fine grained Limestone fragments.
0.28	0.90	Variegated, dry, powdery, very stiff CLAY, predominantly buff with pale orange to dark brown laminae. Well defined varve banding. Occasional buff, fine grained Limestone fragments..
0.90	1.25	Light grey to buff, fine grained, well cemented, massive, fossiliferous (small crinoids) LIMESTONE. Sub horizontal (5°) bedding, displaying very thin (sub mm) laminae. Rare barren cavities of up to 8 mm diameter.
1.25	3.15	Buff to light grey, extremely fine grained, well sorted, calcitic MUDSTONE. Tight bedding planes at 10° to 15° from the horizontal. Occasional oxidised partings. Common carbonized vegetation (small shard like leaves and roots). Occasional small channel infill with dark grey mudstone.
3.15	3.22	Dark Grey, laminated calcitic MUDSTONE, extremely sharp contact with leucocratic material above and below. Plasticises when wet.
3.22	4.25	Generally buff, occasionally dark grey, crumbly, calcitic MUDSTONE.
4.25	5.78	Predominantly buff to tan yellow, very stiff, plastic, variegated CLAY. Common dark grey to black horizons of up to 10 cm thick. Banding at 20° to 25° from horizontal. Darker material a stiff clay.
5.78	5.94	Light grey to orangy yellow (oxidised), very damp, plastic, soft, slightly silty CLAY. Occasional siltstone nodules of up to 2 mm diameter.
5.94	6.14	Dark grey to black, soft, slightly silty, wet CLAY. Common siltstone nodules.

6.14	6.51	Light grey to buff, very well cemented, calcitic SILTSTONE. Predominant closed fracture set observed at 30° from the horizontal. Common black siltstone bands, very thin and discontinuous.
6.51	8.43	As above, less well cemented - calcitic MUDROCK.
8.43	8.79	Buff and dark grey, variegated, interbedded, well cemented, calcitic SILTSTONE and damp, silty, firm CLAY.
8.79	8.95	Buff, well rounded SILTSTONE FRAGMENTS (> 2 cm) in a buff, wet, soft CLAY matrix.
8.95	11.65	Dark grey, laminated (at approx. 5° from the horizontal) coherent, well cemented, calcitic SILTSTONE. 11.00 m: Calcite infilled fracture at 40° from the horizontal. Calcite appears powdery.
11.65	14.65	Buff to medium grey, commonly oxidised orange, firm to stiff, dry, silty CLAY. Well laminated at 30° from the horizontal.
14.65	14.90	Buff to light grey, fine grained, well cemented, massive ARGILLACEOUS LIMESTONE.
14.90	15.20	Light buff, dry, silty, broken CLAY.
15.20	15.78	Buff to light grey, fine grained, well cemented, massive ARGILLACEOUS LIMESTONE.
15.78	16.69	Light grey to buff, dry, broken calcitic SILTSTONE. Occasional argillaceous limestone fragments of up to 2 cm diameter.
16.69	27.24	Light buff to orangish grey, interbedded, stiff, damp CLAY and dry, coherent calcitic SILTSTONE. 22.49 - 22.70: Light grey, coherent, massive, fine grained ARGILLACEOUS LIMESTONE. 26.05 - 26.30: Light grey, coherent, massive, fine grained ARGILLACEOUS LIMESTONE.

End of borehole 27.24m.

Suttles Stone Quarries
Swanworth Quarry
Worth Matravers, Dorset

Consultation on the Bournemouth, Dorset &
Poole Minerals Site Allocation Plan
Swanworth Quarry Extension (PK16)

Preliminary Hydrological & Hydrogeological
Risk Assessment

16th December 2016

Appendix 4: Greenfield Runoff Rate

Report Prepared For:



Suttles Stone Quarries
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Worth Matravers, Swanage
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BH19 3LE

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web: <http://www.bclhydro.co.uk>

Company Registration Number: 4043373
Registered in England & Wales. Registered Office: 33, Wolverhampton Road, Cannock

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Site name: Swanworth Quarry
Site location: Nr. Worth Matravers, Dorset

Site coordinates
Latitude: 50.60738° N
Longitude: 2.05001° W

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Reference: gbyxckg1r73u / 12.97
Date: 2 Dec 2016

Site characteristics

Total site area	12.97	ha
Significant public open space	0	ha
Area positively drained	12.97	ha

Methodology

Greenfield runoff method	IH124
Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
SOIL type	1
HOST class	N/A
SPR	0.10

Hydrological characteristics

	Default	Edited	
SAAR	837	837	mm
M5-60 Rainfall Depth	17	17	mm
'r' Ratio M5-60/M5-2 day	0.3	0.3	
FEH/FSR conversion factor	0.76	0.76	
Hydrological region	7	7	
Growth curve factor: 1 year	0.85	0.85	
Growth curve factor: 10 year	1.62	1.62	
Growth curve factor: 30 year	2.3	2.3	
Growth curve factor: 100 year	3.19	3.19	

Greenfield runoff rates

	Default	Edited	
Qbar	2.69	2.69	l/s
1 in 1 year	2.28	2.28	l/s
1 in 30 years	6.18	6.18	l/s
1 in 100 years	8.57	8.57	l/s

Please note that a minimum flow of 5 l/s applies to any site

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Suttles Stone Quarries
Swanworth Quarry
Worth Matravers, Dorset

Consultation on the Bournemouth, Dorset &
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Preliminary Hydrological & Hydrogeological
Risk Assessment

16th December 2016

Appendix 5: Groundwater Level Data for
the Portland Sandstone

Report Prepared For:



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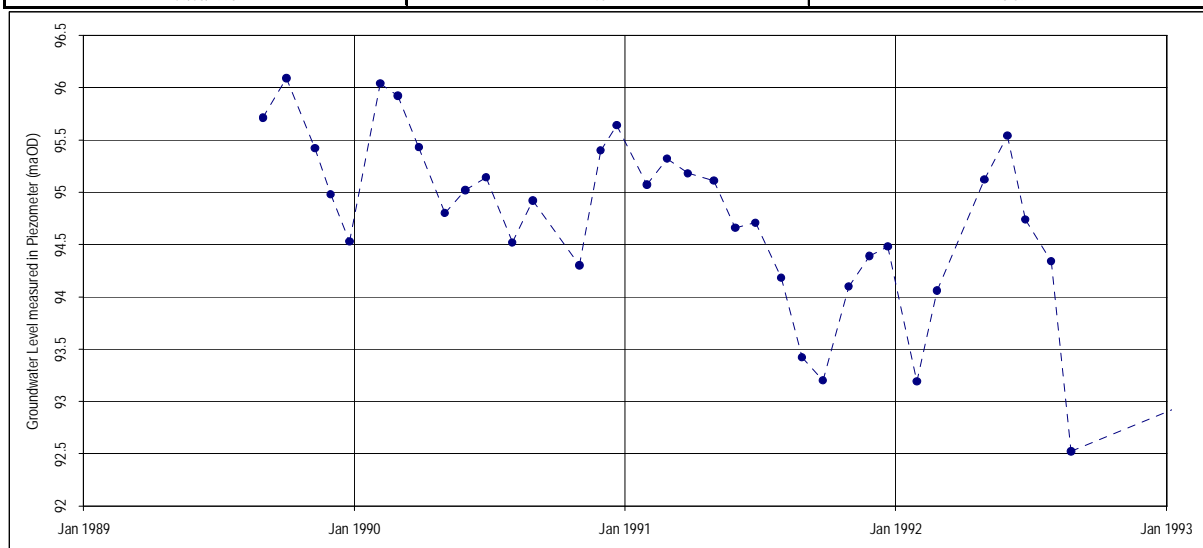
Consultant Hydrogeologists Limited

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Historical groundwater level measurements within BH10.		
Date	GWL (mbGL)	GWL (maOD)
20/01/1989	49.87	90.03
01/09/1989	44.19	95.71
03/10/1989	43.81	96.09
10/11/1989	44.48	95.42
01/12/1989	44.92	94.98
27/12/1989	45.37	94.53
06/02/1990	43.86	96.04
02/03/1990	43.98	95.92
30/03/1990	44.47	95.43
04/05/1990	45.1	94.8
01/06/1990	44.88	95.02
29/06/1990	44.76	95.14
03/08/1990	45.38	94.52
31/08/1990	44.98	94.92
02/11/1990	45.6	94.3
30/11/1990	44.5	95.4
22/12/1990	44.26	95.64
01/02/1991	44.83	95.07
28/02/1991	44.58	95.32
28/03/1991	44.72	95.18
02/05/1991	44.79	95.11
31/05/1991	45.24	94.66
27/06/1991	45.19	94.71
01/08/1991	45.72	94.18
29/08/1991	46.48	93.42
26/09/1991	46.7	93.2
31/10/1991	45.8	94.1
28/11/1991	45.51	94.39
23/12/1991	45.42	94.48
31/01/1992	46.71	93.19
27/02/1992	45.84	94.06
01/05/1992	44.78	95.12
01/06/1992	44.36	95.54
25/06/1992	45.16	94.74
30/07/1992	45.56	94.34
26/08/1992	47.38	92.52
10/07/1993	46.45	93.45
23/07/1993	45.36	94.54
09/08/1993	46.21	93.69



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Suttles Stone Quarries
Swanworth Quarry
Worth Matravers, Dorset

Consultation on the Bournemouth, Dorset &
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Swanworth Quarry Extension (PK16)
Preliminary Hydrological & Hydrogeological
Risk Assessment

16th December 2016

Appendix 6: Groundwater Chemistry
(Portland Sandstone)

Report Prepared For:



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Worth Matravers, Dorset

Consultation on the Bournemouth, Dorset &
Poole Minerals Site Allocation Plan
Swanworth Quarry Extension (PK16)

Preliminary Hydrological & Hydrogeological
Risk Assessment

16th December 2016

Appendix 7: Fluids Handling Procedures

Report Prepared For:



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Introduction

Inappropriate storage and handling of fuels and oils can result in contamination of ground, ground water and surface water.

This procedure covers

Bulk storage of fuels and oils, including waste oil
Filling of bulk storage tanks
Storage and handling of drums
Refuelling operations
Procedure for emptying bunded areas
Fuel and oil spills

Bulk storage of fuels and oils, including waste oil

1. All fuels and oils in bulk shall be kept in bunded storage, the location of which shall be identified on a site plan.
2. The walls and floor of storage bunds must be impervious to oil.
3. Tank filling points shall be inside the bunded area.
4. Delivery lines shall be overhead or, if underground, sleeved.
5. Delivery nozzles shall be stored inside the bund and locked when not in use.
6. Bund drain valves, where fitted, shall be designed so that they can only be removed by key or hand held tool, except when emptying the bund under controlled conditions.
7. All bulk storage tanks shall be appropriately labelled with contents and capacity.
8. Spill kits shall be provided close to hand.
9. Bunded areas shall be checked weekly for build up of oil residues, rainwater or debris.
10. The inside of the bund shall have a line painted to identify when 10% of the capacity has been filled by rainwater etc.

Filling of bulk storage tanks

1. A member of site staff must supervise all tank filling operations.
2. Storage tank levels must be checked to gauge spare capacity before starting filling operations.
3. Check delivery hoses and hose connections for leaks.
4. Report spillages and leaks and clean them up promptly, disposing of waste correctly according to the requirements of prevailing regulation(s).

Storage and handling of drums

1. All drums and containers used for the storage of fuels and oils, including waste oil, shall be appropriately labelled and kept in designated areas identified on a site plan. This will include temporary storage areas.
2. All drums or containers will be kept in bunded storage or on bund trays. This will include temporary storage.
3. Where drum taps are fitted these should be secure. The tap should be positioned over a bund tray to collect drips and spillage.

4. No drum shall be stored in the open without a drum cap fitted.
5. Drums shall be secured when moving them about the site.
6. Report spillages and leaks and clean them up promptly.
7. Spill kits shall be provided.
8. Drum storage areas shall be checked weekly for evidence of poor practice.

Refuelling operations

1. The person refuelling the vehicle must be present throughout the entire refuelling operation.
2. Check vehicle fuel tank level before starting refuelling operations to gauge how much fuel is required.
3. Check delivery hose from the pump / tank to the nozzle for leaks.
4. All delivery nozzles shall be fitted with an automatic cut-out to prevent over-filling.
5. Ensure delivery nozzle is held upright when moving between storage tank and vehicle.
6. Operatives should be prepared to react to any gas oil splashing out whilst re-fuelling.
7. Fuel delivery nozzles shall be locked or similarly disabled when not in use.
8. Report spillages and leaks and clean them up promptly.

Procedure for emptying bunded areas

1. Authority of site management is required before emptying a bund.
2. Details of bund emptying shall be recorded and maintained on site.
3. If the contents of the bund include floating oil then the water underneath this oil should be carefully pumped out. The remaining oil coated water should be collected and disposed of through a licensed contractor.
4. The reason for bund contamination shall be investigated.

Fuel and oil spills

1. Any spillage that cannot be cleaned up promptly with a rag or use of a shovel-full of absorbent material must be reported to the site Manager or his designated deputy who will co-ordinate the response and investigate the cause.
2. Spills to ground shall be absorbed and prevented from spreading by using absorbent materials such as sand, fines, absorbent mats, paper or cloth.
3. Halt the movement of fuel or oil towards a watercourse by creating a barrier in front of it by sand bagging, deployment of absorbent boom or use of 3mm or finer dust.
4. If oil enters a watercourse, prevent it spreading by deploying an absorbent boom.
5. If spilt oil or fuel leaves the site the Quarry Manager must inform the Environment Agency (EA).
6. Contaminated materials from clean-up should be put in an appropriately labelled container and disposed of through a licensed contractor in line with regulatory requirements as stipulated by the EA.