Crookhill Brickpit SSSI

Report on DIGS workday 21 February 2020

Five DIGS members (Roger, Andy, Paul, Geoff R and Geoff P) and Lyn Cooch ((Nature Conservation Officer, Dorset Council) formed the work party. We achieved a great deal, clearing or realigning sections of access paths that were either hazardous or totally obliterated by the recent landslide on the West Face and opening up sites for geological or ecological reasons (see photos 1-9 below). The weather remained dry all day, and we did not encounter great crested newts. An updated site plan is given in Figure 1.

I have also included some attempts to understand and explain important geological and ecological features of the site. Figure 2 summarises the geological succession previously recorded by others and Figure 3 illustrates various types of landslide. For non-specialists such as myself, the range of habitats used by great crested newts is shown in Figure 4 and their seasonal behaviour is summarised in Figure 5.

Subject to permission from Natural England and Dorset Council, further geological work over the next few months might comprise careful shallow scraping at locations A, B and C. The aim would be twofold: firstly to improve access within areas which are now clear of vegetation, and secondly to reveal further parts of the succession and perhaps begin compiling a new fossil record.

Photo 1 Completion of scrub clearance work at Location A (21 February 2020).
Despite the recent wet weather, the zigzag access path was still usable. All of this exposure is in the Peterborough Member. Shales towards the top of the exposure contain abundant fossils, including compressed ammonites and bivalves. There is a badger sett just to the right of the photo.

Photo 2 Habitat enhancement close to the main site access path (21 Feb 20).
Removal of small trees and creation of log piles on the bank of a seasonal extension of the main pond in order to improve the habitat for great crested newts and other species.

Photo 3 Access path realignment around slippery slope near area shown in Photo 2 (21 Feb 20).
There is a small badger sett just to the left of the path at this location.

Photo 4 **Location B on 19 February 2020.** Stewartby Member clays overlie a prominent shale cliff in the Peterborough Member. No further scrub clearance has been carried out, but this will not impede geological investigations within the area already exposed.

Photo 5 **Access path realignment near Location C (21 Feb 20).** The original path on the right was blocked by the toe of the recent landslide. The new route on the left skirts a temporary wetland and is bounded by areas cut to promote the development of grassland.

Photo 6 **Location C (21 Feb 20).** Small-scale recent sliding has revealed a horizon with abundant Gryphaea sp. towards the top of the slope and small light-coloured septarian concretions lower in the slope. From the descriptions in Figure 2 it seems likely that this exposure is in the Athleta Zone of the Stewartby member, and the geological boundary on the site plan (Figure 1) has been amended accordingly. This needs to be verified by more detailed field study. The thick gorse scrub on the right of the photo appears to conceal a potentially unstable backscar.

Photo 7 **Tension cracks behind the top of the slope at Location C (21 Feb 20).** The very small pale rounded objects just below the top of the slope are Gryphaea fossils. Further sliding at this location is likely and therefore any shallow scraping to facilitate access will need to be carried out very carefully.

Photo 8 Fresh landslide on the West Face (21 Feb 20). The high backscar in Stewartby Member clays may shortly affect the public footpath above the pit. The toe of the slide extends as far as the green patch of grass in the foreground, where groundwater issues and drains to the wetland in Photo 5. This feature is worthy of academic study and comparison with local coastal slides in the Oxford Clay. The disturbed ground also has high ecological value. The slide removed the original access path to Location B, but this had already been superseded by a more direct route (see Figure 1).

Photo 9 Area of landslide shown in Photo 8 on 11 December 2018. During this earlier visit it seemed likely that the entire slope would gradually degrade to a stable angle rather than fail in the rather dramatic event that occurred during persistent rainfall in January-February 2020.

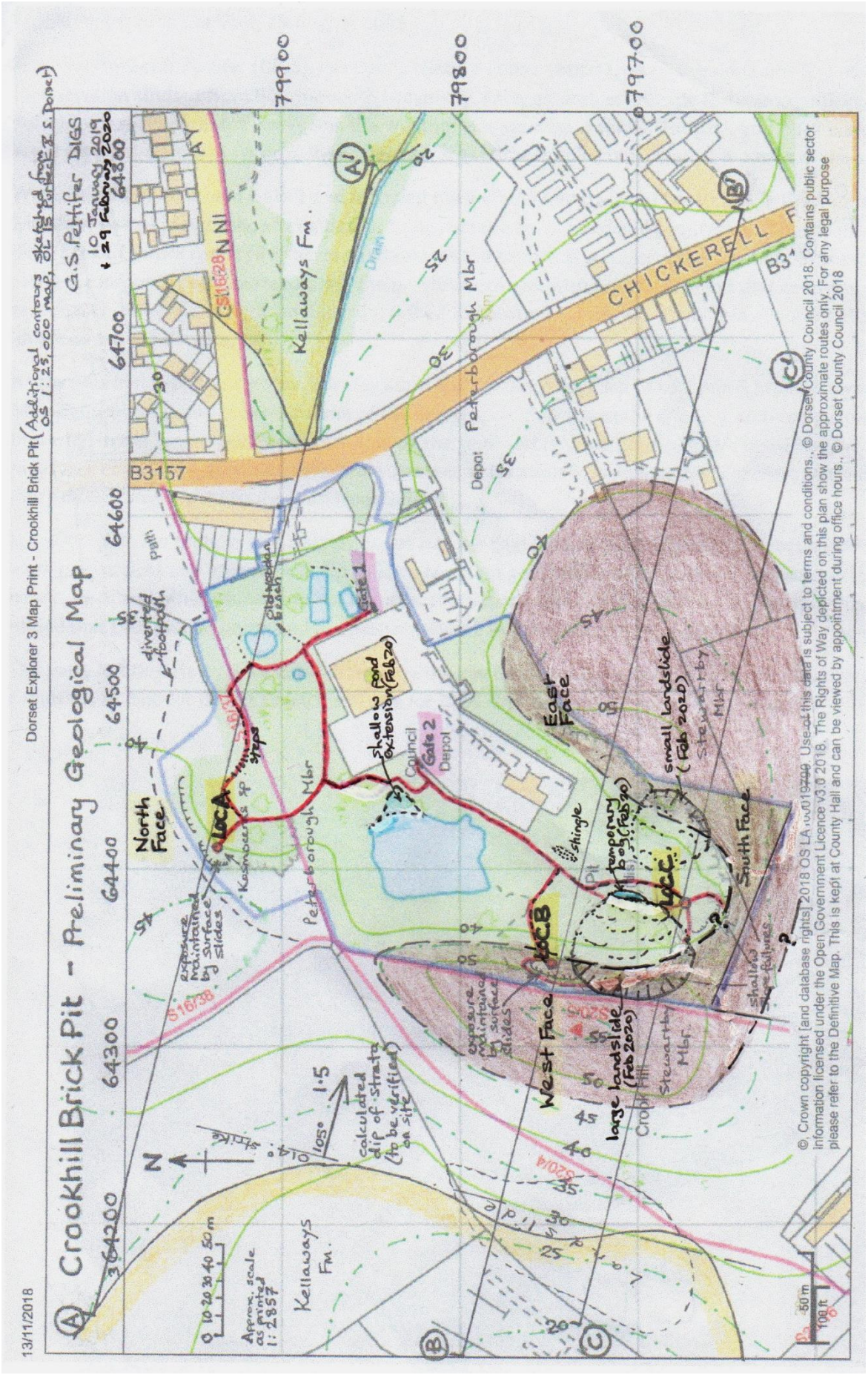


Figure 1 Site plan.

Updated following visit on 21 February 2020. The approximate positions of paths are shown in red.

Chickerell

At Chickerell (Fig. 31) are the sites of two former brickpits. The one to the east at Putton Lane [SY 652 800] closed in the early 1950s and formerly exposed the Kellaways Formation and the basal Medea Subzone of the Jason Zone of the Oxford Clay. The northern end of the pit is now covered by housing, whilst the southern part is a water garden. The other brickpit, Crookhill [SY 644 798], closed in 1969; it is scheduled as an SSSI. The section embraces most of the Peterborough Member and the basal part of the Stewartby Member. The shales and clays are now much degraded, particularly in the lower part; but the top of the Jason Zone was only visible before water collected at the base of the pit. The succession modified after Smith (1969) is:

Stewartby Member

Athleta Zone

21 Weathered brown clays with large septarian concretions and with well-preserved ammonites (mainly body-chambers) including *Peltoceras*. Abundant *Gryphaea lituola* ... ... 5·00m

20 Blue-grey clays with small septarian concretions. Similar fauna to bed 21, but sparser and also includes rare *Reineckei* ... ... 3·00m

Peterborough Member

19-6 Bituminous and laminated shales with some clay interbeds. Crushed white shells of ammonites and bivalves ... ... 3·30m

5 Acutistriatum Bed. Tough calcareous shales with abundant ammonites. This bed can be traced into the Midlands and eastern England. Abundant *Kosmoceras* including *K. acutistriatum* and perisphinctids (*Binatisphinctes*) ... ... 1·50m

Coronatum Zone, Grossouvrei Subzone

4 Comptoni Bed. Tough brown shales with abundant *Binatisphinctes comptoni*, *B. fluctuosus*. *Kosmoceras grossouvrei*, *K.* spp., *Hecticoceras* ... ... 1·20m

3 Alternating hard bituminous shales and soft clays with grey concretions. Abundant *Erymnoceras coronatum*, *K. grossouvrei*, *K.* spp. finely pyritized and crushed ... ... 6·15m

Coronatum Zone, Obductum Subzone

2 Green bituminous shales with clay bands. *E. coronatum*, *K. obductum*, *K. gulielmii*, *Cylindroteuthis pusoziana*, nuculid bivalves, cerithiid gastropods and *Gryphaea* ... ... 3·80m

Jason Zone, Jason Subzone

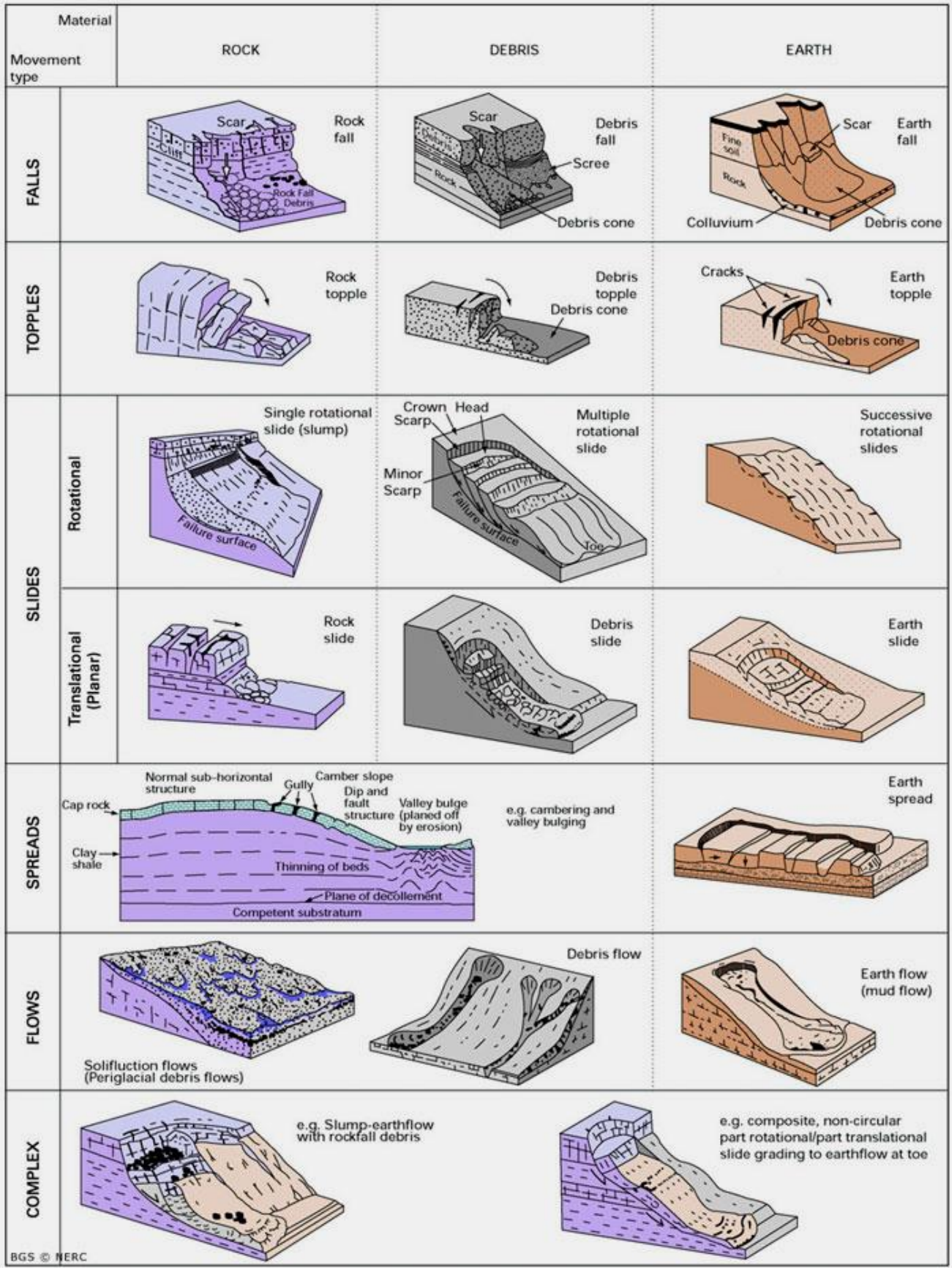
1 Blue and grey bituminous shales. *K. jason*, *K. gulielmii*, *K. baylei*, nuculids and oysters. [Formerly exposed in base of pit in 1966–69 when the water levels were low]

From: Cope J.C.W. (2nd ed.2016). Geology of the Dorset Coast. Geologists' Association Guide No.22.

Figure 2 Previously recorded geological succession at Crookhill Brickpit.

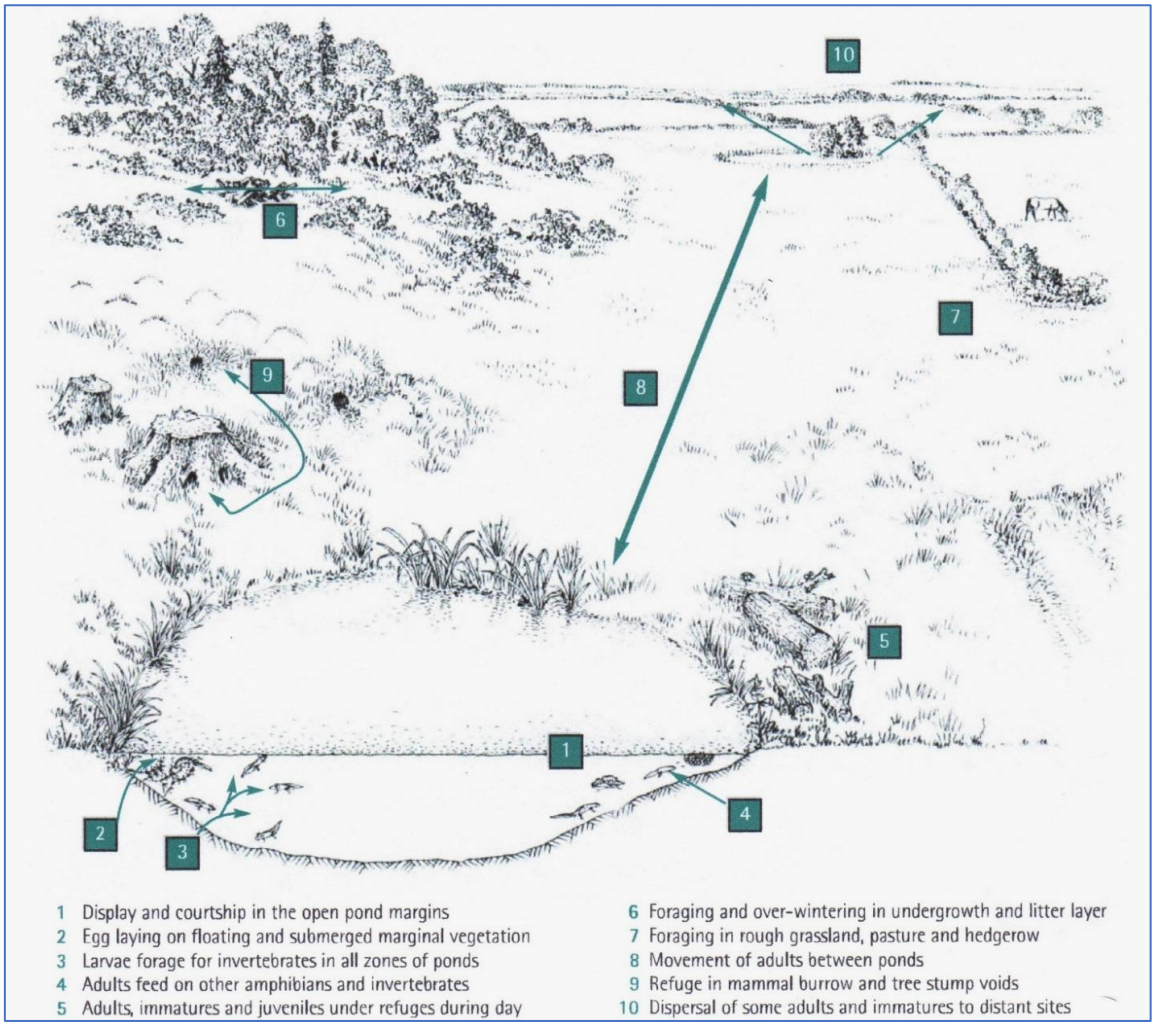
Current exposures at the pit range from the Coronatum Zone up to the Athleta Zone. Of particular interest, constituent materials of the Stewartby Member are described as clays, whilst those of the Peterborough Member are predominantly shales. This is an important distinction with respect to the engineering properties of the materials and their potential failure mechanisms.

Various types of slope failure are illustrated in Figure 3. The clays would be classed as 'earth' and the shales as very weak 'rock' (although possibly as an overconsolidated clay by a geotechnical engineer). The recent slide on the West Face might be described as a 'composite earth fall and translational slide grading to mud flow at toe', providing an opportunity for further study and robust discussion. Translation may be related to rain infiltration and groundwater movement during the preceding very wet winter. Pore water pressure would have increased, and consequently shear strength decreased, in Stewartby clays along the gently ESE-dipping boundary with the underlying Peterborough shales. Slope height and angle, particle size distribution and clay mineralogy are also important factors that might be considered.



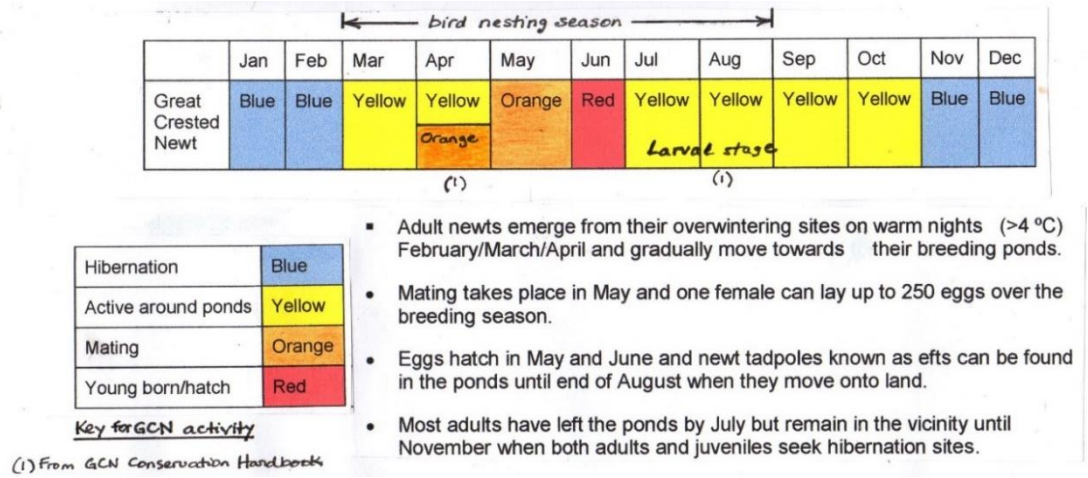
From: British Geological Survey website (www.bgs.ac.uk/landslides)

Figure 3 Various types of slope failure identified by the British Geological Survey



From: Langton T., Beckett C. & Foster J. (2001). Great Crested Newt Conservation Handbook. Froglife, Halesworth, Suffolk.

Figure 4 **Habitat use by great crested newts at a two-pond site.** Future ecological management at Crookhill Brickpit might seek to increase or enhance the range of habitats at the site.



From: Guidance on managing woodlands with great crested newts in England. Forest Research, Forestry Commission (2016).

Figure 5 **Seasonal behaviour of great crested newts.** This diagram is a useful reminder of how the newts might disperse around the site at various times of the year.

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3 March 2020