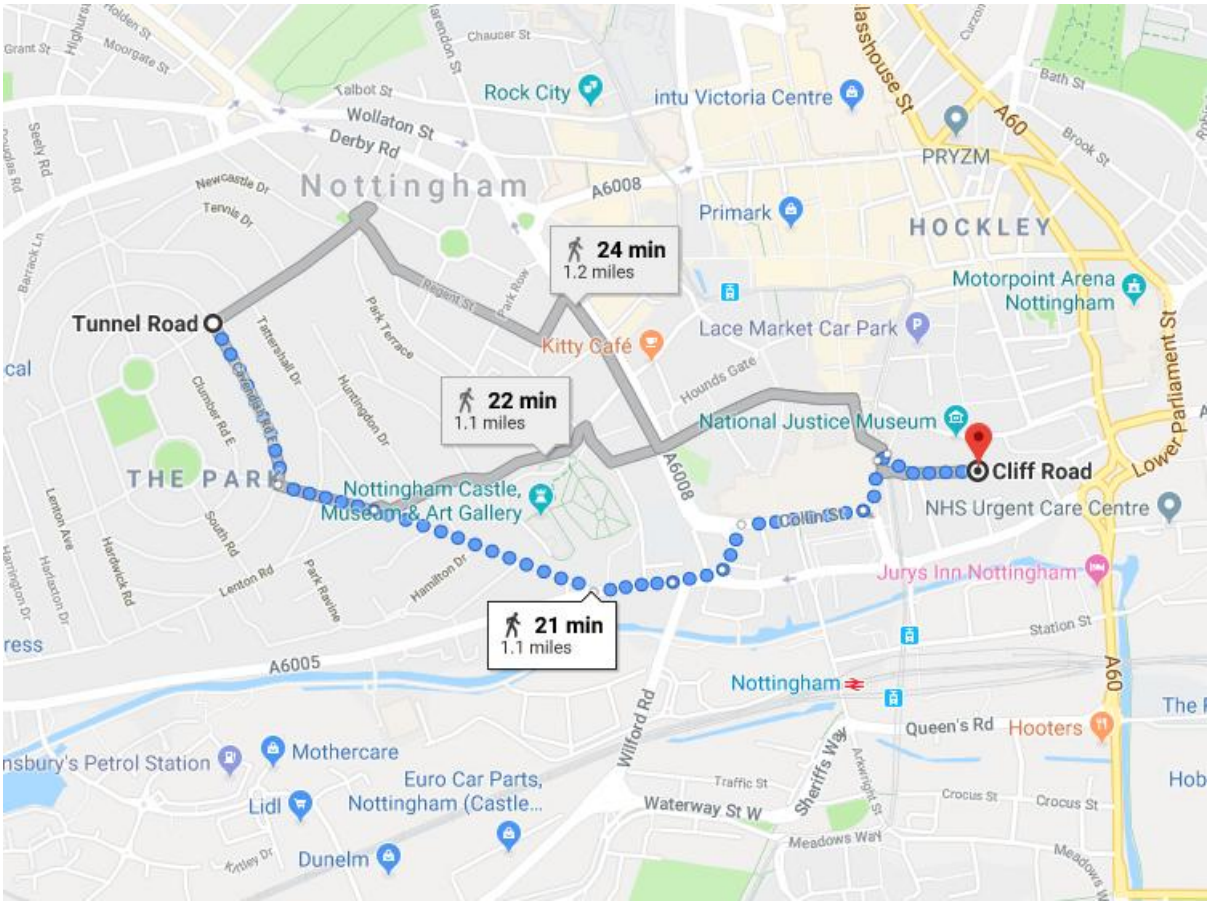
Nottingham Field Trip

BCGS - Sunday 29/7/19

Leader : Tony Waltham

Tony Waltham. (Engineering geologist and karst specialist).

Field Notes by Ray Pratt



Meet at 10.45 at bollards at the west end of Cliff Road, Nottingham, NG1 1GZ.
Nearest car park is Lace Market Car Park, Pilcher Gate, NG1 1QE (about 100 yards to the north).
Enter caves at 11.00. The tour will take around one and a half hours.
Please do not be late. Anyone arriving after 11.00 will not be able to join the cave tour.
Numbers limited to 20. Helmets not needed. Torches needed for some parts. The caves are not suitable for wheelchairs or young children.
Afterwards we will have a walk through the town to the Tunnel and Castle Rock, with a possible walk via the Church cemetery, time permitting.

The Caves:
Entrance to the caves is from the lower level of the cliff on Cliff Road. This was formed by a down cutting river. These are all manmade. The sandstones into which they are carved are fairly soft, not too well cemented. Their primary interest is archaeological. Geologically cross bedding can be seen, but better and easier to view examples can be seen around castle rock and the Park tunnel.

Crossbedding in the walls of the cas

The water table as seen in this old well. Fairly static today as water being pumped out of the ground

The Western Caves

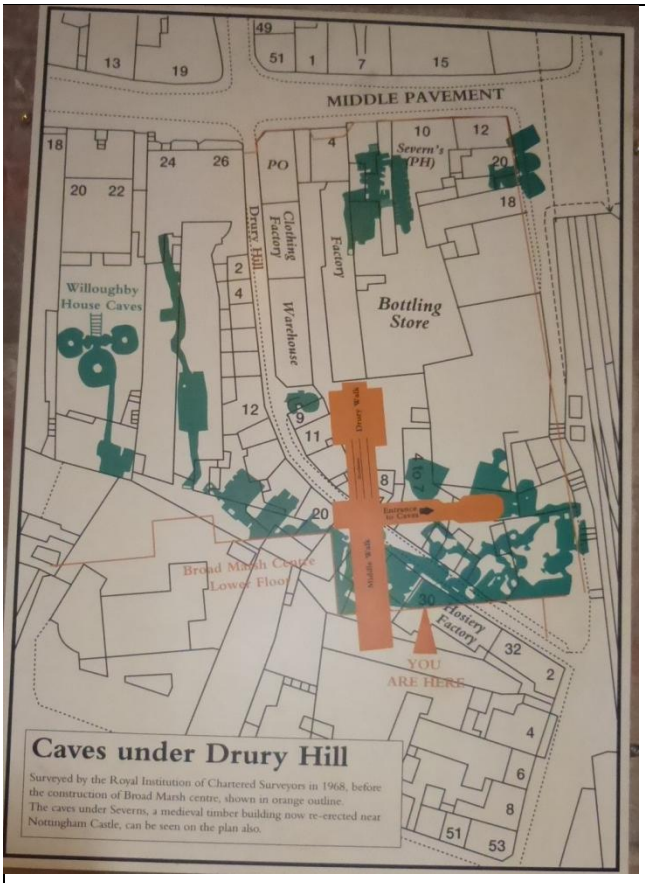
These caves are still being explored and excavated by a team of dedicated volunteers from the Nottingham Historic Archaeological Society and is currently the only live dig being undertaken in Nottingham. These caves may be as old as the pillar cave of the tannery. The most interesting feature is a cave that was modified with a brick floor for use as a stable for horses in the late 1700s.

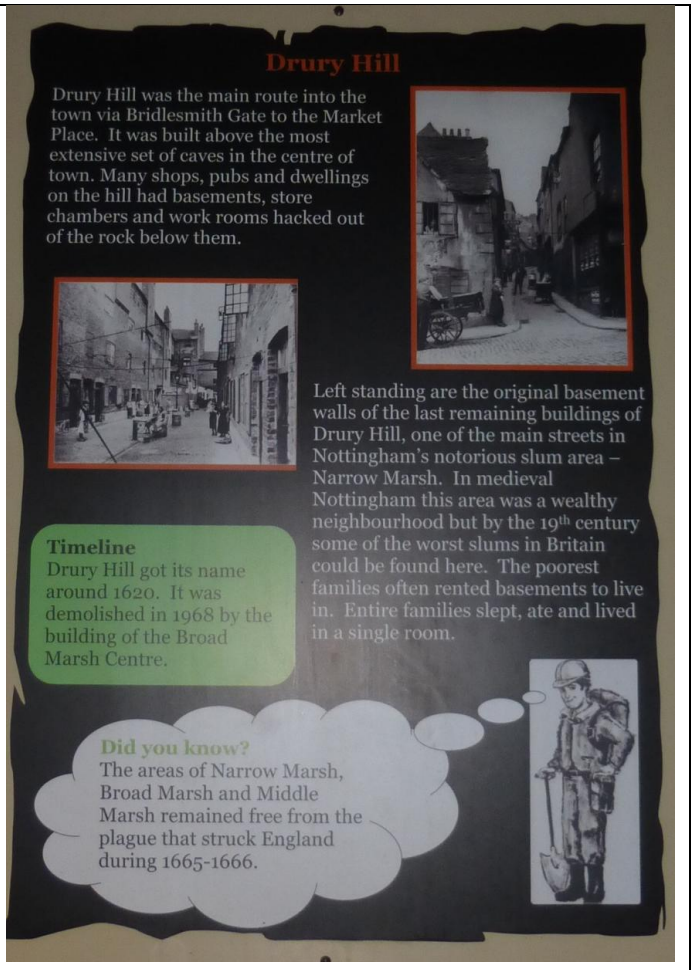
The stables in the Western cave

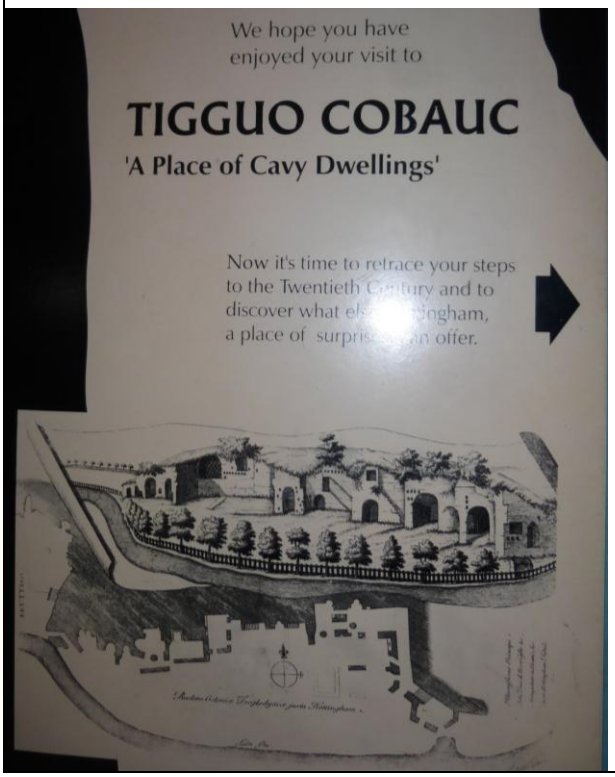
Timeline
These caves may pre-date 1270

Did you know?
Early discoveries in these caves have included numerous animal bones

A cave pillar with seating carved out of the sandstone


MIDDLE PAVEMENT
Willoughby House Caves
Drury Hill
Clothing Factory
Warehouse
Factory
Bottling Store
Severn's (PH)
PO
Broad Marsh Centre Lower Floor
Hosiery Factory
YOU ARE HERE
Caves under Drury Hill
Surveyed by the Royal Institution of Chartered Surveyors in 1968, before the construction of Broad Marsh centre, shown in orange outline.
The caves under Severns, a medieval timber building now re-erected near Nottingham Castle, can be seen on the plan also.


Drury Hill
Drury Hill was the main route into the town via Bridlesmith Gate to the Market Place. It was built above the most extensive set of caves in the centre of town. Many shops, pubs and dwellings on the hill had basements, store chambers and work rooms hacked out of the rock below them.
Left standing are the original basement walls of the last remaining buildings of Drury Hill, one of the main streets in Nottingham's notorious slum area – Narrow Marsh. In medieval Nottingham this area was a wealthy neighbourhood but by the 19th century some of the worst slums in Britain could be found here. The poorest families often rented basements to live in. Entire families slept, ate and lived in a single room.
Timeline
Drury Hill got its name around 1620. It was demolished in 1968 by the building of the Broad Marsh Centre.
Did you know?
The areas of Narrow Marsh, Broad Marsh and Middle Marsh remained free from the plague that struck England during 1665-1666.


We hope you have enjoyed your visit to
TIGGUO COBAUC
'A Place of Cavy Dwellings'
Now it's time to retrace your steps to the Twentieth Century and to discover what el[s]e Singham, a place of surpris[e] can offer.

Park Tunnel

33 Derby Road, Nottingham XR3 R+Q6

Access to the tunnel was gained by walking down flights of stairs leading from the corner od Upper College Street and College Street. The cross bedding is magnificent.

The above shows an excellent example of foreset beds

A **foreset bed** is one of the main parts of a river delta. It is the inclined part of a delta that is found at the end of the stream channel as the delta sediment is deposited along the arcuate delta front. As the sediments are deposited on a sloping surface the resulting bedding is not horizontal, but dips in the direction of current flow toward deeper water. A cross-section of a delta shows the cross bedding in the direction of stream flow into the still water.

The foreset bed is formed when a stream carrying sediment meets still water. When the stream meets the still water, the velocity of the water is decreased enough so that the larger sediment particles can no longer be carried and are therefore deposited. The deposited sediment builds up over time, and a delta is formed. (Ref Wikipedia)

View of the tunnel from the south end

The lowermost unit has the appearance of a Gilbert Delta type deposit. However, to the left of the photo there are cross bedding and channels underneath indicating it was simply part of the fluvial deposits.

Gilbert deltas[Wikipedia]

A Gilbert delta (named after Grove Karl Gilbert) is a type of delta formed from coarse sediments, as opposed to gently-sloping muddy deltas such as that of the Mississippi. For example, a mountain river depositing sediment into a freshwater lake would form this kind of delta.[17] [18] While some authors describe both lacustrine and marine locations of Gilbert deltas,[17] others note that their formation is more characteristic of the freshwater lakes, where it is easier for the river water to mix with the lakewater faster (as opposed to the case of a river falling into the sea or a salt lake, where less dense fresh water brought by the river stays on top longer).[19]

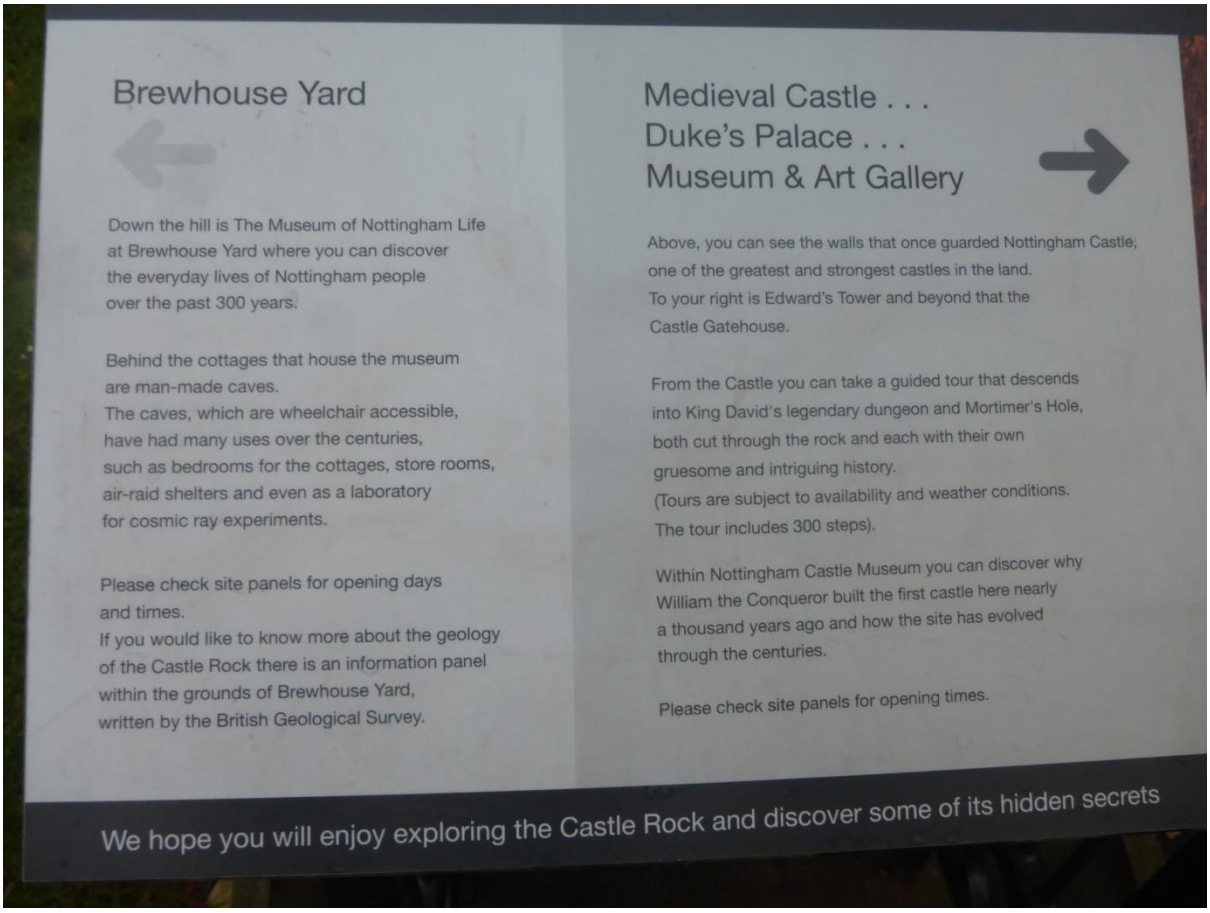
Agglomeration of cross cutting channels

The exposures in this cutting show that the fluvial conditions were frequently changing. High energy events led to pebble bed deposits. Channels erode earlier deposits before they lay down new sediment as the flow current wanes.

Castle Rock, Perervil Drive, NG7 1DE

Brewhouse Yard, Castle Boulevard

Castle Road



Stratigraphy

Nottingham Castle built on Chester Fm., 247-250mm yrs, Triassic Sandstone, pebbly. Underlying this is the Lenton Sst Fm. 247-272 mm yrs, Triassic & Permian

Chester Formation

Computer Code:	CHES	Preferred Map Code:	notEntered
Status Code:	Full		
Age range:	Olenekian Age (TO) — Olenekian Age (TO)		
Lithological Description:	The formation shows a progressive change in lithology northwards, from a coarse-grained, typically well-cemented proximal facies to a fine-grained, less well-cemented distal facies. The Devon outcrops are closest to the presumed source, in northern France, and comprise brown, horizontally-bedded conglomerate with subordinate lenticular beds of trough cross-bedded pebbly sand and sand (Smith, 1990; Smith and Edwards, 1991). The gravel is composed of well-rounded pebbles, cobbles and boulders in a coarse to fine granulestone and silty sandstone matrix. The clasts are mainly (84 to 90 per cent) metaquartzite, together with porphyry, vein quartz, tourmalinite, and conglomerate. From just south of Hillhead, east Devon [ST 067 136], locally		

	derived Devonian and Carboniferous clasts begin to appear. Near Milverton, Somerset, the formation is a massive calcareous conglomerate with limestone clasts. Northwards into the Worcester Basin, West Midlands, Staffordshire (Steel and Thompson, 1983), Cheshire and Leicestershire, the formation comprises conglomerates and reddish brown, cross-bedded, pebbly sandstones with subordinate beds of red-brown mudstone. The conglomerates have a reddish brown sandy matrix and consist mainly of pebbles of brown or purple quartzite, with quartz conglomerate and vein quartz. In these areas the formation generally fines upwards, from dominantly conglomerates at the base, to interbedded conglomerates and sandstones, with sandstone and pebbly sandstone predominant in the upper part, and rare mudstones. In Nottinghamshire, the formation comprises pinkish red or buff-grey, medium- to coarse-grained, pebbly, cross-bedded, friable sandstone. In north Staffordshire, it consists of red-brown, yellow, or yellow-mottled, very fine- to coarse-grained sandstones that are commonly cross-bedded, locally micaceous, silty or argillaceous, pebbly or conglomeratic, and generally friable. Northwards from Nottingham the pebbles gradually die out; the farthest north they have been seen consistently is around Doncaster. West of the Pennines they occur in the Wirral-Liverpool area but disappear farther north in Lancashire, where the formation cannot be distinguished. On the Cumbrian coast, the formation is represented by a distal facies comprising red-brown, very fine- to medium-grained, commonly micaceous sandstones, which are generally cross-bedded, with some parallel lamination; mudstone clasts are locally common and subordinate thin beds of greenish grey sandstone occur. The formation has subordinate lenticular beds of reddish brown mudstone or siltstone throughout; these are more common in Cumbria.
Definition of Lower Boundary:	The lower boundary varies across the country. The formation rests conformably, unconformably or disconformably on Permian rocks, and unconformably on rocks of mainly Carboniferous or older Palaeozoic and Precambrian age.
Definition of Upper Boundary:	The upper boundary is, in parts of the country, overlain unconformably by sandstones or pebbly sandstones of the Helsby Sandstone Formation, or generally laminated mudstones, siltstones and sandstones of the MMG. Elsewhere it is conformable and generally transitional to the Wilmslow Sandstone Formation. In places the boundary is taken arbitrarily at the gradational upward change from the highest pebble bed to the overlying silty sandstones of the Wilmslow Sandstone Formation. In Cumbria it is placed at the sharp upward change from generally fine-grained, well-cemented sandstones, with features typical of fluvial deposition, to coarser, more friable sandstones with common well-rounded aeolian grains. A feature of the Chester Formation on borehole geophysical logs is the sonic velocity which is always higher than in the bulk of the overlying formations, and often higher than in the underlying formation. The gamma-ray response is more variable. The top of the formation is not always clearly defined on the gamma-ray logs when compared to the known downhole appearance of pebbles.
Thickness:	The formation shows a wide range of thicknesses across the country. It is thinnest (less than 50 m), in Dorset, and up to 220 m in most other regions. In north Staffordshire it is up to 300 m thick; the thickest proven sequences (340-627 m) are in Cumbria.
Geographical Limits:	The formation extends from the south Devon coast northwards, up to the Cumbrian coast on the west side of England, and to the Doncaster area on the east side. From Doncaster northwards, to Teesside, and in parts of Lancashire,

	the Sherwood Sandstone Group is undivided.
Parent Unit:	Sherwood Sandstone Group (SSG)
Previous Name(s):	Kidderminster Formation [Obsolete name and code, use CHES] (KDM) Budleigh Salterton Conglomerate And Sandstone (-5126) Budleigh Salterton Pebble Bed (-3877) Budleigh Salterton Pebble Beds Formation [Obsolete Name And Code Use: CHES] (BSP) Bunter Conglomerate Beds (-5128) Bunter Pebble Beds [Obsolete Name And Code: Use CHES] (BNP) Bunter Sandstone (-1199) Cannock Chase Formation [Obsolete Name And Code Use: CHES] (CCF) Chester Pebble Beds Formation [Obsolete Name And Code Use: CHES] (CPB) Conglomerate Beds (-5130) Hawksmoor Formation [Obsolete Name And Code Use: CHES] (HAW) Kidderminster Conglomerate Formation (-990) Nottingham Castle Formation (-3590) Nottingham Castle Sandstone Formation [Obsolete Name And Code Use: CHES] (NTC) Pebble Bed Group (-5131) Pebble Beds (-1399) Polesworth Formation [Obsolete Name And Code Use: CHES] (PLWF) St Bees Sandstone (-1162) St Bees Sandstone Member (SBS)
Alternative Name(s):	Smith Bank Formation Rottington Sandstone Member Bunter Sandstone Formation

Nottingham Castle Sandstone Formation [Obsolete Name And Code Use: CHES]

Computer Code:	NTC	Preferred Map Code:	Ntc
Status Code:	Pending Upgrade		
Age range:	Early Triassic Epoch (TE) — Early Triassic Epoch (TE)		
Lithological Description:	Sandstone, pinkish red or buff-grey, medium- to coarse-grained, pebbly, cross-bedded, friable; subordinate lenticular beds of reddish brown mudstone.		
Definition of Lower Boundary:	Marked but gradual upward increase in grain size and pebble content; overlies Lenton Sandstone Formation.		
Definition of Upper Boundary:	Sharp, non-sequence; marked by mudstone of thin conglomerate at base of Mercia Mudstone Group.		

Thickness:	70-170m (thickens to NE) in Nottinghamshire.
Geographical Limits:	Crops out in Nottinghamshire and south Yorkshire; pebbles die out north of Doncaster and hence formation not recognisable. Probably correlates with Kidderminster Formation etc. of central England.
Parent Unit:	*none recorded or not applicable*
Previous Name(s):	Bunter Pebble Beds [Obsolete Name And Code: Use CHES] (BNP) Nottingham Castle Formation (-3590)
Alternative Name(s):	*none recorded or not applicable*
Stratotypes:	
Type Section	Castle Rock, Nottingham; 40m high river cliff with up to 35m of exposure.
Reference Section	Park Tunnel off Derby Road, Nottingham. 8m high tunnel with exposures of cross-bedding in 3-dimensional view.
Reference(s):	
Ambrose, K, Hough, E, Smith, N J P and Warrington, G. 2014. Lithostratigraphy of the Sherwood Sandstone Group of England, Wales and south-west Scotland. British Geological Survey Research Report, RR/14/01.	
Elliott, R E 1961. The stratigraphy of the Keuper Series in southern Notinghamshire. Proceedings of the Yorkshire Geological Society, Vol.33, 197-231.	
Charsley, T J, Rathbone, P A and Lowe, D J, 1990. Nottingham: A geological background for planning and development. British Geological Survey Technical Report WA/90/1.	
Warrington, G, Audley-Charles, M G, Elliott, R E, Evans, W B, Ivimey-Cook, H C, Kent, P E, Robinson, P L, Shotton, F W and Taylor, F M. 1980. A correlation of the Triassic rocks in the British Isles. Special Report of the Geological Society of London, No.13.	
1:50K maps on which the lithostratigraphical unit is found, and map code used:	
E126 E087 E088 E101 E113 E142	

Lenton Sandstone Formation

Computer Code:	LNS	Preferred Map Code:	LnS
Status Code:	Full		
Age range:	Guadalupian Epoch (PUG) — Early Triassic Epoch (TE)		
Lithological Description:	Sandstone, very fine- to medium-grained. Argillaceous, red-brown with buff mottles, cross-stratified; subordinate beds of red-brown mudstone and		

	conglomerate.
Definition of Lower Boundary:	Gradational, upward passage by interdigitation, from mudstone of Edlington Formation. Overlaps successively onto Cadeby Formation and Basal Breccia to south of Nottingham.
Definition of Upper Boundary:	Marked but gradual upward increase in grain size and pebble content into overlying Nottingham Castle Sandstone Formation.
Thickness:	12-c.70m
Geographical Limits:	Crops out from Nottingham to south Yorkshire, identifiable in subsurface to east. Lower part is a sandy facies of upper Permian, Edlington Formation.
Parent Unit:	Not Applicable (-)
Previous Name(s):	Lenton Sandstone Formation [Obsolete Code: Use LNS] (LNSF) Lower Mottled Sandstone (-4496)
Alternative Name(s):	*none recorded or not applicable*
Stratotypes:	
Reference Section	Former moulding sand quarries, Bobbers Mill, Nottingham. Includes boundary with, and lowermost 2m of, Nottingham Castle Sandstone Formation.
Type Section	Former quarry face along north side of Queen's Medical Centre, Nottingham.