Dr. GM Reeves

For

The Stonehenge Alliance

On

Geology, Hydrogeology, Geotechnics &

Effects of Tunnelling on Groundwater

Additional Topics: August 2019

- 1. Groundwater Issues
- 2. Presentation of Data
- 3. Unpublished Information
- 4. Consequences

1. Groundwater Issues

- Whitway/Stockbridge Rock (Barrois' Sponge Bed Horizon)
- Amesbury Abbey/Blick Mead Springs
- Borehole Log interpretations.

2. Presentation of Data

- 2-D Plan
- 2-D Sections
- Complexities: Chalk Permeability is 3-dimensional and multi-modal
- Variations in 3 Dimensions- Space + Time (4^{th} Dimension!)

Fargo Plantation
The Cursus
Cumuli
Sewage Works
Long Barrow
Totterdown Clump
Dismantled Railway
Cumulus
Old King Barrows
Halfmoon Clump
MS
Memorial
The Avenue
PC
The Avenue (course of)
Countess
Countess Farm
Motel
New King Barrows
Stonehenge
Long Barrow
Stonehenge Cottages
Cumulus
A303(T)
Stoke Group
Tumuli
West Amesbury
Amesbury Park
Amesbury Abbey
Fort
Henge (site of)
Normanton Gorse
Luxenborough
Coneybury Hill
Queens Falls (Weir)
Coneybury House
Coneybury Hill Plantation
Bush Barrow
Normanton Down
FB
Cemy
Recn Gd
Moor Hatches
New Barn
Ham Hatches
Sewage Works
Aqueduct
Wilsford Down
Earthwork
Pit (dis)
Southmill Plantation
AMESBURY
Chalk Pit
Tumuli (Lake Group)
Springbottom Farm
Resr
Normanton Down House
Normanton
FBs
11
12
13
14
15
WILSFORD CUM LAKE CP
SML 2000
*1:10 000 'DESCALED'


British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL
Geology of Britain viewer
More BGS map viewers
Surface Geology
3D Models
Borehole Scans
Earthquake Timeline
Borehole Scans
Click on a borehole to view scan.
Borehole depth
0 - 10m
10 - 30m
30m+
Unknown
Confidential or Restricted
More on boreholes
Stonehenge, Wilts
Go to Location
Switch Basemap
100%
0%
Geology Transparency
Grid Ref: 409314, 142917
Visitor Centre
A360
Longbarrow Lane
Winterbourne Stoke Barrows
Byway 12
Stonehenge Landscape
Normanton Gorse
Normanton Down Barrows
SU14SW25
SU14SW61
SU14SW78
SU14SW79
SU14SW77
SU14SW63
SU14SW58
SU14SW76
SU14SW99
SU14SW97
SU14SW98
SU14SW75
SU14SW24
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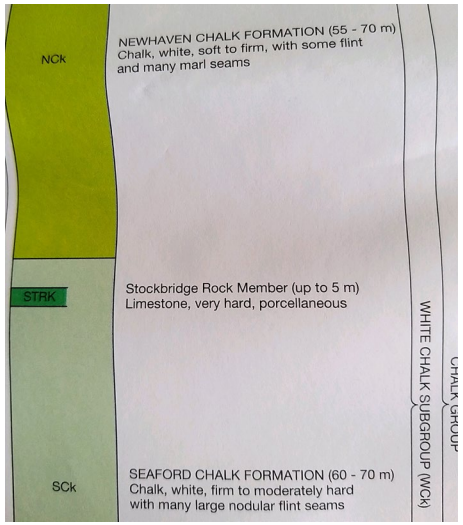
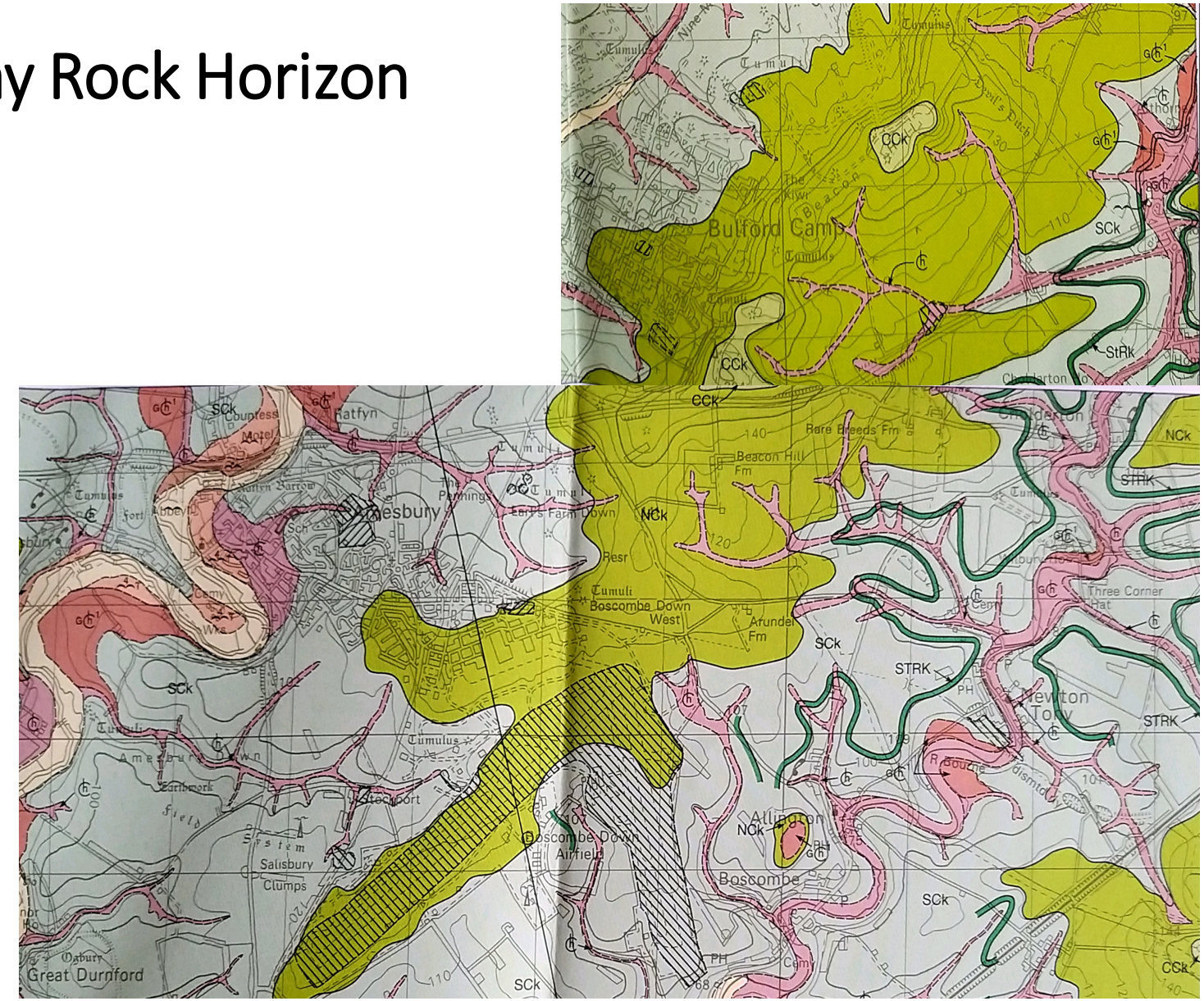
SU14SW42
SU14SW41
SU14SW43
SU14SW91
SU14SW40
SU14SW33
SU14SW32
SU14SW28
SU14SW27
SU04SE84
SU04SE85
SU04SE99
SU04SE82
SU04SE106
SU04SE33
SU04SE60
SU04SE81
SU04SE83
SU04SE117
SU14SW101
0
0.15
0.3km
POWERED BY esri

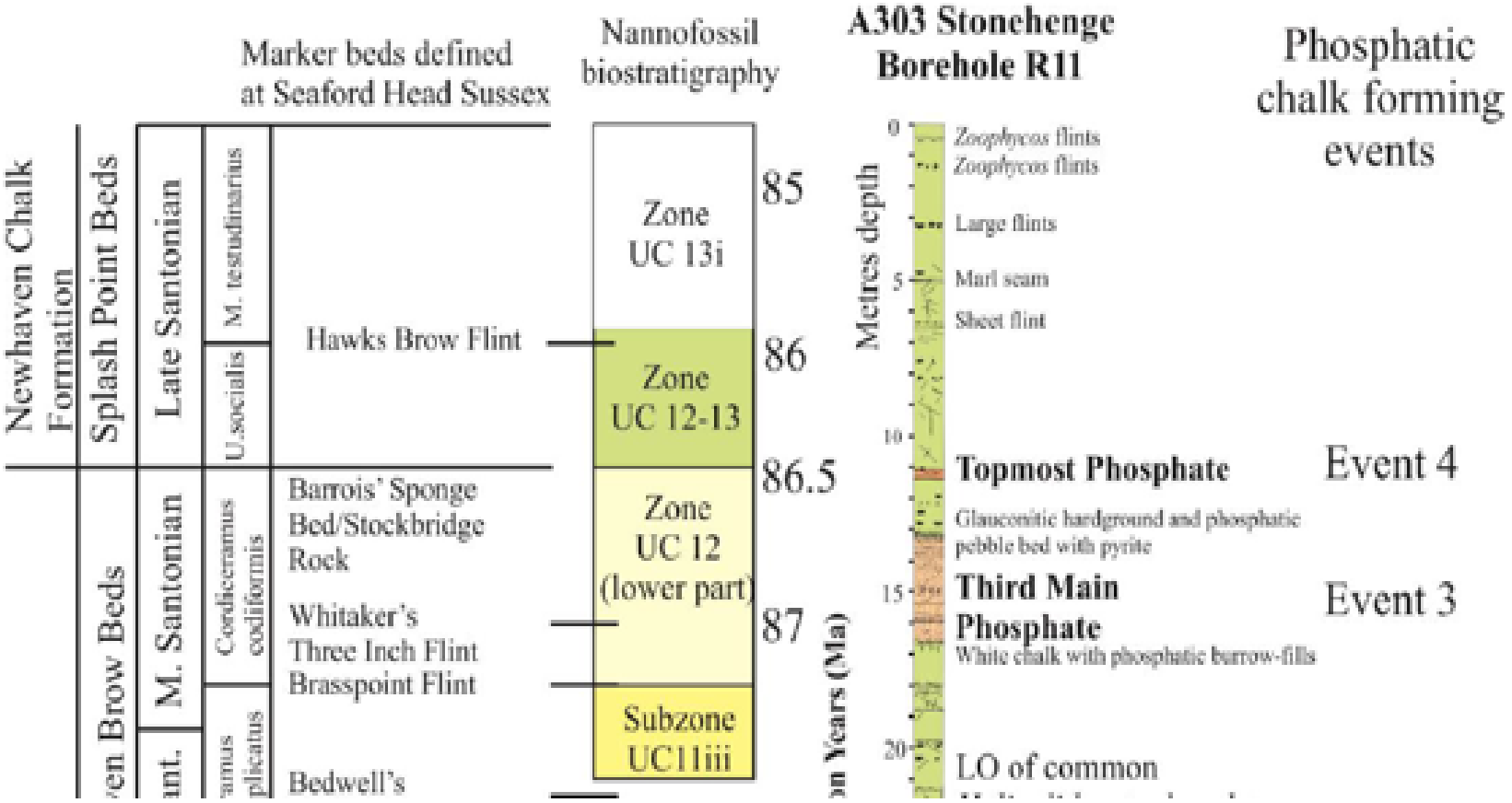
The Whitway Rock Horizon





Barrois' Sponge Bed/Whitway Rock Stratigraphic Level:

- A zone of elevated permeability (sub-horizontal fissures) controlling lateral groundwater flow- SE wards- :underlain by Seaford Chalk/"Porcellanous Limestone" of significantly lower horizontal permeability.

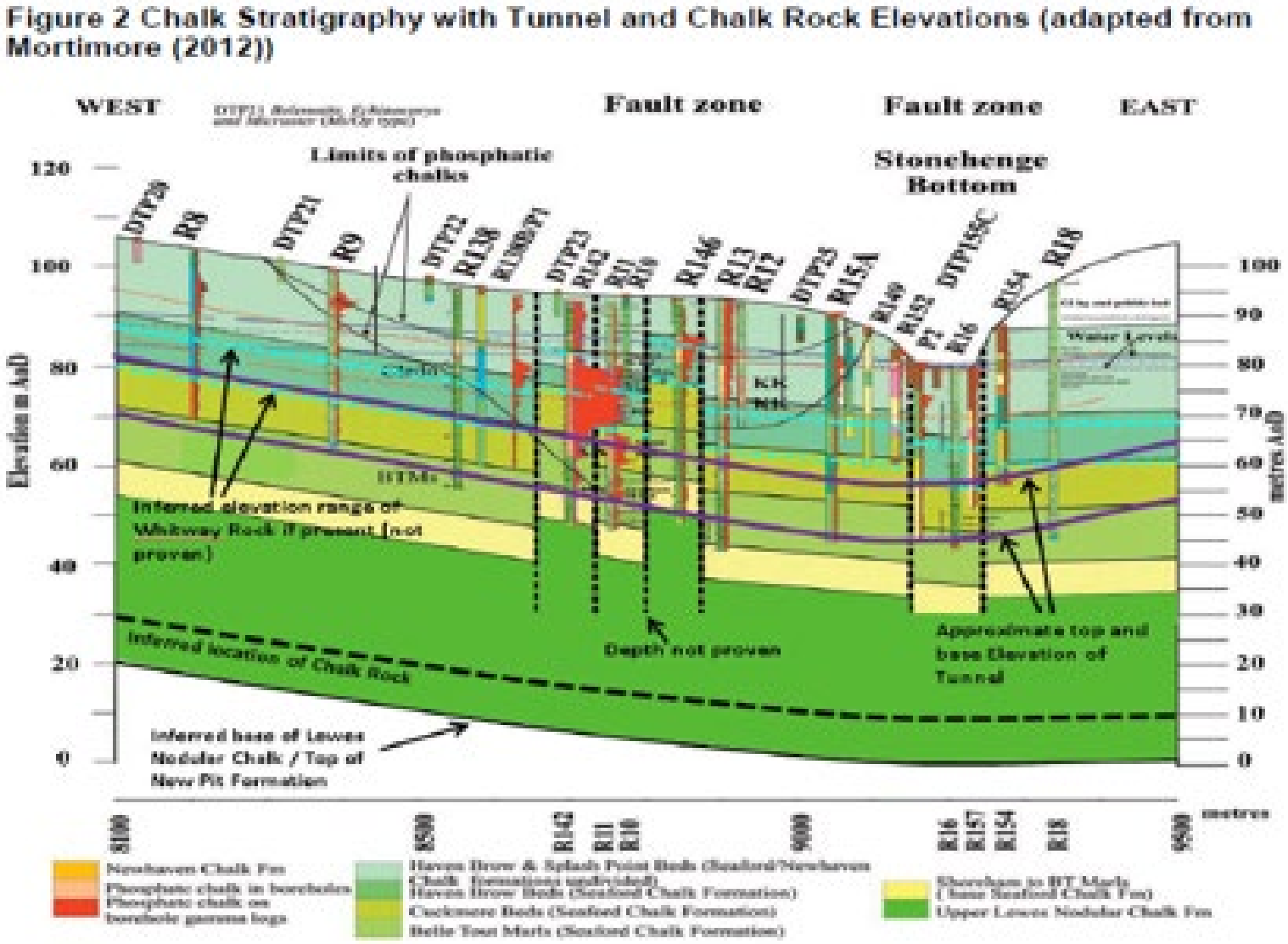


(From Mortimore et al, 2017, in part)

Details of Evidence for Whitway Rock Horizon

- From Blick Mead to Eastern Portal to Western Portal.
- **A zone of elevated permeability (sub-horizontal fissures) controlling lateral groundwater flow- SE wards- :underlain by Seaford Chalk/"Porcellanous Limestone" of significantly lower horizontal permeability.**
- **A dominant High Permeability sub-horizontal zone, above, with restricted flow below.**
- Varies from 60m AOD to 71.30m AOD at Blick Mead
- Sometimes as Stockbridge Rock Member…"a hard porcellanous limestone up to 5m thick, ……approx. 5m below Seaford/Newhaven Chalk Boundary.
- Equivalent stratigraphically with Barrois' Sponge Bed.
- Typified by high degree of fracturing (sub-horizontal to near vertical.
- Seen as weak zones in numerous core boxes
- Coincident often with orange staining, core loss and sponge fragments with rinded flints.
- Often shows on OPT, POR, Den
- For full list of evidence, see separate listing.

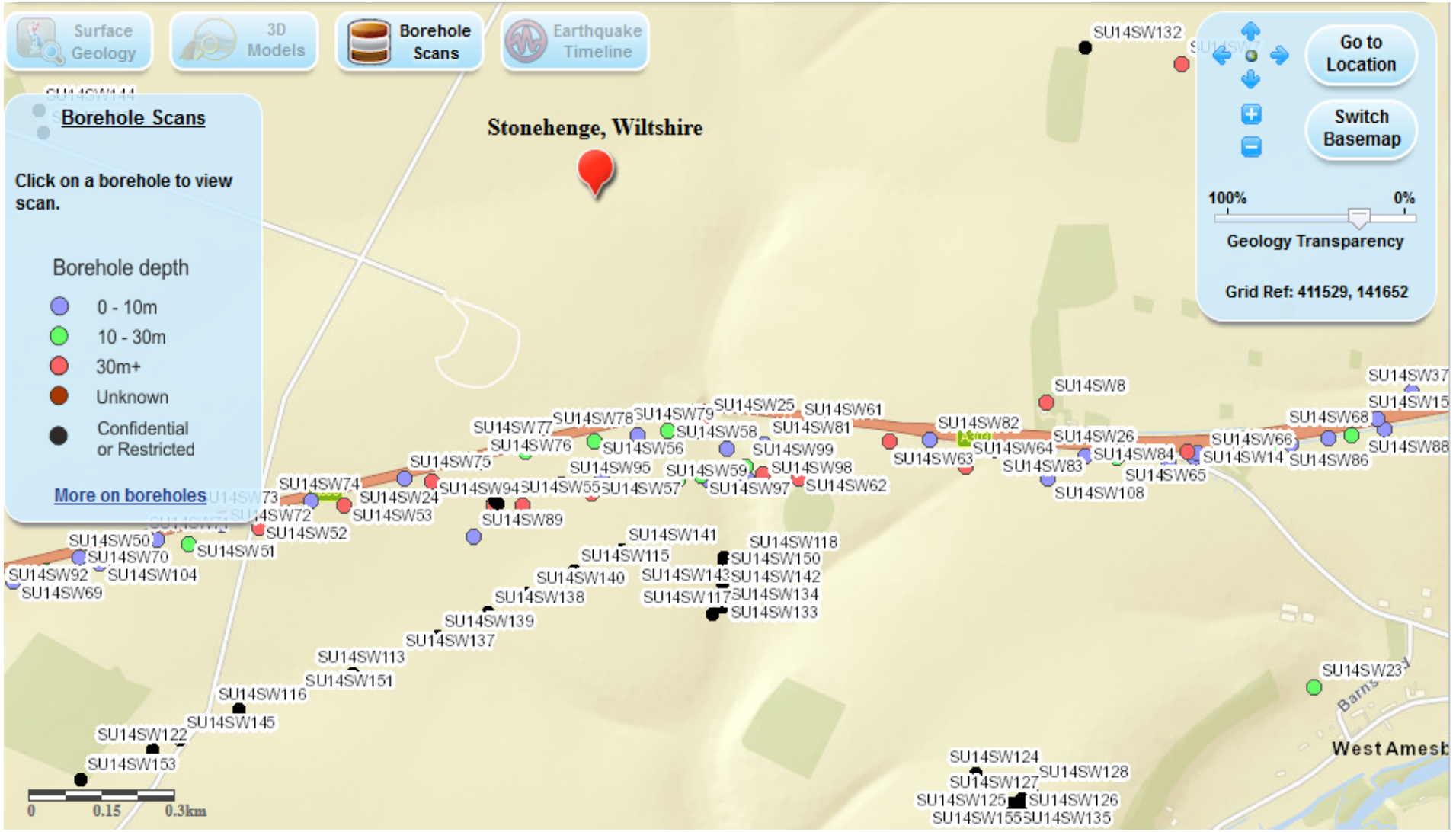
Figure 2: from AWMReport No. TR010025 Document 8.23 – Implications of 2018 Ground Investigations to the Groundwater Risk Assessment (republished with tracked changes, dated 31.05.19)- Travis et al.



3. Unpublished SI Information

- **A303 Amesbury to Berwick Down:** Factual Report on Ground Investigation
  -Project No: 731823 (Last available Download from BGS- Ref:
- Amesbury Abbey/Blick Mead Springs investigation
- Supporting SI data for Groundwater modelling and Reports.
- Borehole Log interpretations.

BGS GeoIndex Database:



Whiteway Rock Horizon- Boreholes: East to West- A Zone of Elevated Permeability

Borehole No.	GL (mAOD)	Total Depth	GWL (mAOD) (As Drilled)	WR Level (mAOD)	Evidence
P3	109.48	31.3	12	N/A	Not deep enough for WR
R20	103.9	35	N/A	c.74-68m…71.30m	"Possible Sponge Bed at 32.56-32.69m+CorePix-9+10
R19A	106.33	45	N/A	c.80.0-73.00m	26.00-Por:33.0-FDN+CorePix
R18	96.5	51	N/A	70-66m	CoreBoxes 6-9+POR:26m+FDN:29m
R16	79.5	36	N/A	c.53mAOD	26.0m-30.50m
P2	80.88	35.7	N/A		10-18m -core heavily orange stainned
R152	83.48	23	N/A		Zero RQD for whole hole.
R13	93.1	50	N/A	60.6mAOD	32.50 CoreBox 12
R11	92.9	45.7	19.5	86.5	OPT+Core+RM
R10	94.4	25.43	N/A	c.74.40m	20.50 DEPTH-Core Pix
R142	92.94	45	19.5	c.80mAOD	

The Whitway Rock Horizon- A Zone of Higher Permeability-

:underdraining the Newhaven Chalk & Upper Seaford Chalk

Borehole R20