



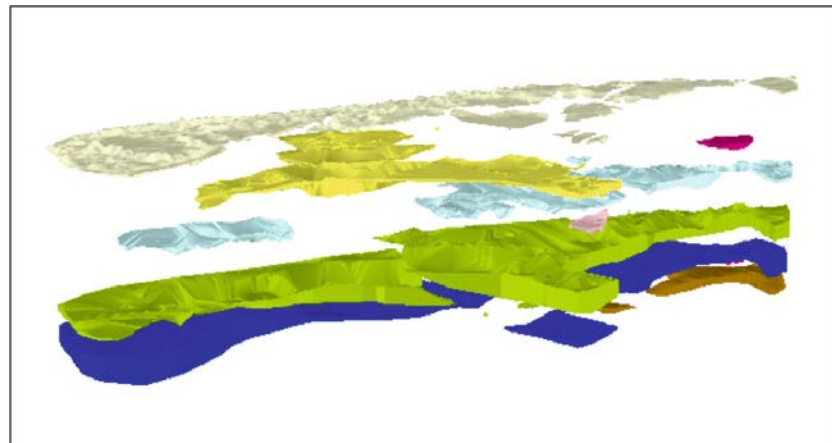
**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Model metadata report for the GSI3D model of the superficial geology of the ground seaward of the Drigg Low Level Waste Repository Site, West Cumbria

Geology and Landscape Programme

Internal Report IR/12/075



BRITISH GEOLOGICAL SURVEY

GEOLOGY AND LANDSCAPE PROGRAMME

INTERNAL REPORT IR/12/075

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Front cover

The superficial geological model viewed from the east.

Bibliographical reference

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E Callaghan and C A Auton

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Summary

This report describes the GSI3D model of the superficial geology of the ground seaward of the Drigg Low Level Waste Repository site, West Cumbria. This geological model is based on the GSI3D geophysical model described in IR/12/071:

Callaghan, E, Kearsey, T, Finlayson, A and Auton, C.A. 2012. Model metadata report for the GSI3D model of shallow geophysical surveys of the ground seaward of the Drigg Low Level Waste Repository Site, West Cumbria. *British Geological Survey Internal Report*, IR/12/071. 16pp.

The geophysical model was built to show resistivity characteristics of Quaternary sequences overlying sandstone bedrock and was commissioned by the National Nuclear Laboratory (NNL) for Low Level Waste Repository Ltd (LLWR) and is Commercial in Confidence.

The superficial geological model is not Commercial in Confidence.

1 Modelled volume, purpose and scale

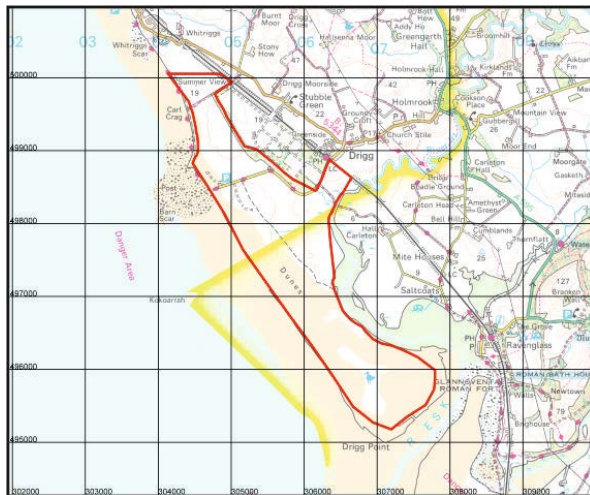


Figure 1: Location map showing area of study

The modelled area outlined in red is known as the Drigg Spit in West Cumbria.

The geological GSI3D model has had attributes of superficial geology as well as bedrock added to the original generalized vertical section (GVS) of the geophysical model, see Figure 2.

The model has been constructed for use at 1:10,000 scale but can be used for more detailed studies.

2 Modelled surfaces

name	id	code	old_drigg	2007_present	BGS_lithostrat	full_lithostrat_name	geological description
DTM	0	DTM	NULL	NULL	NULL	NULL	NULL
SITE	2	SITE	NULL	NULL	NULL	NULL	LLWR Site
A	5	A	HFF	A	DPS	Drigg_Point_Sand_Formation	Post_glacial_sands
B1	25	B1	LFF	B2	PMS	Peckmill_Sand_Member	Recent_estuarine_drainage_sequence
B2	30	B2	LFF	B2	PMS	Peckmill_Sand_Member	Recent_estuarine_drainage_sequence
B3	35	B3	LFF	B2	PMS	Peckmill_Sand_Member	Recent_estuarine_drainage_sequence
C	40	C	LFF	B2	PPG	Peel_Place_Sand_and_Gravel_Member	Incised_sand_and_gravel
D1	45	D1	PCF	B2	FWT	Fishgarth_Wood_Till_Member	Upper_Till_sequence
D2	50	D2	PCF	B2	DBT	Drigg_Beach_Till_Member	Upper_Till_sequence
D3	52	D2	PCF	B2	DBT	Drigg_Beach_Till_Member	Upper_Till_sequence
E1	55	E1	FOF	B2	KWS_RVT	Kirkland_Wood_Sand_and_Gravel_Member_Ravenglass_Till_Member	Fluvial_outwash_sequence
E2	60	E2	MDF	B3	BSS	Barn_Scar_Sand_and_Silt_Member	Fluvial_outwash_sequence
E3	62	E3	NULL	NULL	BSS	Barn_Scar_Sand_and_Silt_Member	Fluvial_outwash_sequence
F	65	F	MDF	C	HRT_MST	Holmrook_Till_Member_Maudsyke_Till_member	Lower_Till_sequence
PQU	70	PQU	NULL	NULL	SBS	St_Bees_Sandstone_Formation	Pre_quaternary_rock
C_top	-100	C_top	NULL	NULL	PPG_lens	Peel_Place_Sand_and_Gravel_Member_lens	C_lens
C_base	100	C_base	NULL	NULL	PPG_lens	Peel_Place_Sand_and_Gravel_Member_lens	C_lens
E2_top	-150	E2_top	NULL	NULL	BSS_lens	Barn_Scar_Sand_and_Silt_Member_lens	E2_lens
E2_base	150	E2_base	NULL	NULL	BSS_lens	Barn_Scar_Sand_and_Silt_Member_lens	E2_lens

Figure 2: GVS showing BGS lithostratigraphical coding (see column 6) and full lithostratigraphical name (see column 7)

3 Modelled faults

Not applicable

4 Model datasets

The model datasets are those described in Callaghan et al. (2012) which have been reattributed

according to the standard BGS Quaternary Lithostratigraphic Scheme of McMillan et al. (2011). The latter follows the Quaternary stratigraphy of the Sellafeld area established by Merritt and Auton (2000).

The reattribution is as shown in Figure 2 which amends Table 1 of Callaghan et al. (2012) by assigning BGS lexicon codes to the geophysical units described in the original model.

General caveats regarding BGS datasets and interpretations follow those in Callaghan et al. (2012)

Data for the geophysical model can be found at this link:

W:\Teams\CEC\LLWRCoastalErosion\RestrictedProjectInformation\Drigg_3d_model

Data for the lithostratigraphical model described here can be found at this link:

W:\Teams\CEC\LLWRCoastalErosion\RestrictedProjectInformation\Drigg_3d_model\MODEL_FILES\Lithostrat_Model

5 Dataset integration and Model development log

See Callaghan et al. (2012)

6 Model workflow

See Callaghan et al. (2012)

7 Model assumptions, geological rules and model uncertainty etc.

See Callaghan et al. (2012)

8 Model image

Figure 3 shows a screen grab of the GSI3D model reattributed with the formal Quaternary lithostratigraphy. The table of contents (left hand side of image) shows BGS lexicon codes. Most of the envelopes show individual lithostratigraphical units (e.g. DPS = Drigg Point Sand Formation; PMS = Peckmill Sand Member). The pairing of codes is denoted by the code abbreviation with an underscore between them (e.g. KWS_RVT) this indicates that the envelope comprises of two separate BGS lithostratigraphical units, see Figure 2. The full Quaternary lithostratigraphy of the sequence within the modelled area is described in detail in Merritt and Auton (2000).

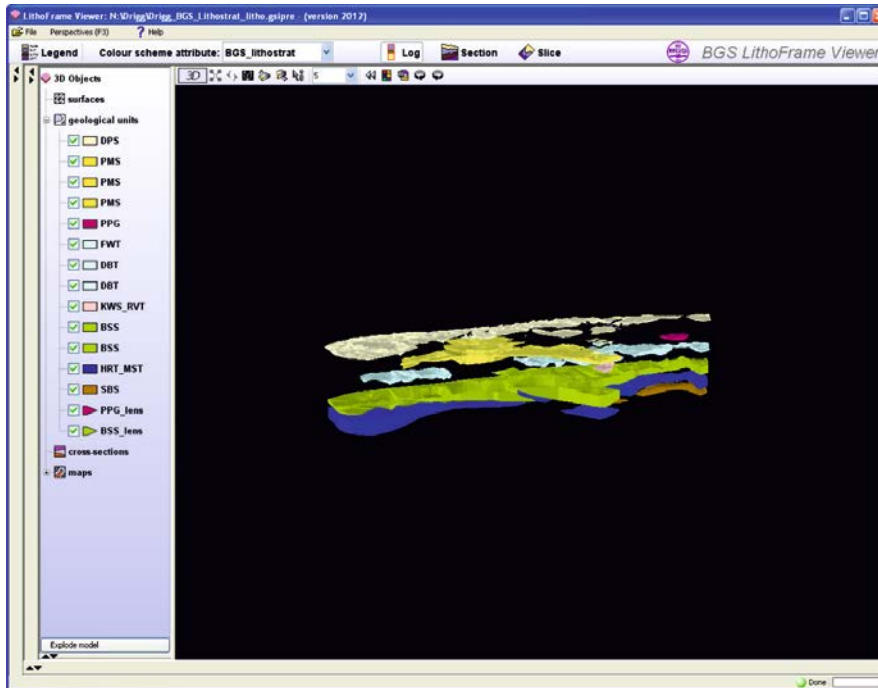


Figure 3: Snapshot from the 3D model showing coded lithostratigraphy (vertical exaggeration x3)

References

British Geological Survey holds most of the references listed below, and copies may be obtained via the library service subject to copyright legislation (contact libuser@bgs.ac.uk for details). The library catalogue is available at: <http://geolib.bgs.ac.uk>.

Callaghan, E, Kearsey, T, Finlayson, A and Auton, C.A. 2012. Model metadata report for the GSI3D model of shallow geophysical surveys of the ground seaward of the Drigg Low Level Waste Repository Site, West Cumbria. *British Geological Survey Internal Report*, IR/12/071. 16pp.

McMillan, A.A, Hamblin, R.J.O, Merritt, J.W. 2011. A lithostratigraphical framework for onshore Quaternary and Neogene (Tertiary) superficial deposits of Great Britain and the Isle of Man. *British Geological Survey Research Report*, RR/10/03. 343pp

Merritt, J. W. and Auton, C. A. 2000. An outline of the lithostratigraphy and depositional history of Quaternary deposits in the Sellafield district, West Cumbria, *Proceedings of the Yorkshire Geological Society*, Vol. 53, Part 2, pp 129-154