OR/13/006 Glossary

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Atterberg limits	Consistency criteria for defining key water contents of a clay soil. They are: liquid limit, plastic limit and shrinkage limit.
Basin	A geological depression containing significant thicknesses of sediment, or in which sediment is able to accumulate.
Bearing capacity	The ability of a material to support an applied load. Ultimate bearing capacity is the pressure at which shear failure of the supporting soil immediately below and adjacent to a foundation. A foundation is usually designed with a working load that is some proportion of the bearing capacity.
Bed	The smallest lithostratigraphical unit.
Bedding	The arrangement of sedimentary rocks in beds or layers of varying thickness or character.
Bedrock	Unweathered rock beneath a cover of soil or superficial deposits.
Calcareous	Carbonate-rich.
Calcite	The crystalline form of calcium carbonate, $CaCO_3$.
Calcrete	a generally white to light pink or light reddish brown hardened deposit of calcium carbonate formed by pedogenic processes or other mechanisms. Can form strong lenticular to rounded boulders or very weak to powdery concretions.
Clay (particle size)	A particle that is less than 0.002 mm across.
Clay (material description)	A material that after the removal of coarse sand and larger particles can be rolled into a 3 mm diameter thread at a specific water content. In hand tests does not show dilatancy, the 3 mm thread has some strength, dry lumps are difficult or cannot be crushed between the fingers, feel smooth and takes a polish and lumps breaks up slowly in water. It contains a fair proportion of clay size particles.
Clay minerals	A group of aluminosilicate minerals with a layer lattice structure which are generally platy or fibrous crystals. These tend to have a very large surface area compared with other minerals, thus giving clays their plastic nature. They have the ability to take up and retain water and to may undergo base exchange. Commonly defined as being <0.002 mm in diameter. The same mineral may be larger than 0.002 mm in diameter for example illite is clay-size mica.
Coefficient of consolidation	A measure of the rate at which consolidation takes place.
Coefficient of volume compressibility	A measure of the amount of compression that takes place during consolidation, measured as a change in dimension per log interval of applied stress.
Cohesion	Attractive force between soil particles (clay) involving a complex association of solid and water. Specifically, the shear strength of a soil at zero normal stress.
Cohesive soil	A soil in which particles adhere after wetting and subsequent drying and significant force is required to crumble the soil.
Compaction	The reduction of voids (densification) of a soil mass by engineering action to produce a more stable, stronger material.
Compression index	The slope of the normal consolidation line with respect to the change in voids ratio over a long cycle of applied stress.
Consolidation	The process in which pore water drains from a material under an applied load with a consequent reduction in volume of the material (see subsidence).

Cross-bedding	Horizontal units that are internally composed of inclined layers and indicates fluid flow. **Trough cross bedding** relatively low angle cross-bedding.
Density	The mass of a unit volume of a material. Often used (incorrectly) as synonym for Unit weight. Usually qualified by condition of sample (e.g. saturated, bulk or dry).
Diggability	Measure of the ability for an excavation to be made in a material by a mechanical digger.
Dip	The inclination of a planar surface from horizontal. Usually applied to bedding planes.
Discontinuity	Any break in the continuum of a rock mass (e.g. faults, joints).
Dogger	Flattened calcareous or ferruginous concretion in a clay or sand deposit. Often stronger than the remainder of the deposit.
Drained	Condition applied to strength tests where pore fluid is allowed to escape under an applied load. This enables an effective stress condition to develop.
Duricrust	Hard beds formed by pedogenic processes.
Effective stress	The total stress minus pore pressure. The stress transferred across the solid matter within a rock or soil.
Elasticity	Deformation where strain is proportional to stress, and is recoverable.
Excavatability	A measure of the ability for an excavation to be made in a material by earth-moving equipment such as backhoe excavators, face shovels, scrapers, bulldozers etc. using digging, ripping and blasting as the difficulty of removing material increases.
Exposure	A visible part of an outcrop that is un-obscured by soil or other materials.
Faulting	The displacement of blocks of strata relative to each other along planar fractures. Movement may take place in several ways, depending on the direction of the compressive or extensional forces acting on the rock mass forming normal, reverse or strike slip faults.
Faults	Planes in the rock mass on which adjacent blocks of rock have moved relative to each other. The relative vertical displacement is termed ‘throw’. The faults may be discrete single planes but commonly consist of zones, perhaps up to several tens of metres wide, containing several fractures which have each accommodated some of the total movement. The portrayal of such faults as a single line on the geological map is therefore a generalization.
Ferricrete	An iron-rich hard bed formed by pedogenic processes.
Ferruginous	Iron-rich. Applied to rocks or soils having a detectable iron content.
Fill	Material used to make engineered earthworks such as embankments and capable of acquiring the necessary engineering properties during placement and compaction.
Flaser bedding	Heterolithic bedding characterized by cross-laminations draped with silt of clay typical of intermittent flow of tidal environments and rarely, fluvial conditions.
Fluvial/fluviatile	Of or pertaining to, rivers.
Formation	The basic unit of subdivision of geological strata, and comprises strata with common, distinctive, mappable geological characteristics.
Glacial	Of or relating to, the presence of ice or glaciers; formed as a result of glaciation.
Grading	A synonym (engineering) for particle-size analysis (see also Sorting).
Gravel (particle size)	Particles from 2 mm to 63 mm.
Gravel (sample description)	Material that does not stick together (cohesive) that has most particle of gravel size.
Groundwater	Water contained in saturated soil or rock below the water-table.
Group	A stratigraphical unit usually comprising one or more formations with similar or linking characteristics.

Gypsum	Mineral consisting of hydrous calcium sulphate ($CaSO_4.2H_2O$), that occurs in deposits that contain sulphides and calcium carbonate, primarily dark gray or grey clay and mudstone. Formed by the reaction of oxidised sulphide minerals (usually iron sulphide) with calcium carbonate, which may be present as disseminated particles or in shells.
Head	A deposit comprising material derived, transported and deposited by solifluction in periglacial regions. May include material derived also by hillwash, creep and other non-glacial slope processes. Composition is very variable and dependent on source material. Thickness is also very variable.
Holocene	The most recent subdivision of geologic time (RECENT) which represents time after the last ice age, approximately last 10 000 years.
Hydraulic continuity	Juxtaposition of two or more permeable deposits or rock units such that fluids may pass easily from one to another.
Illite	A 2:1 clay mineral, common in sedimentary rocks, not noted for susceptibility to shrink/swell behaviour. Clay size mica.
Index tests	Simple geotechnical laboratory tests which characterise the properties of soil (usually) in a remoulded, homogeneous form, as distinct from 'mechanical properties' which are specific to the conditions applied.
Ironpan	Hard layer formed by re-precipitation of iron compounds leached from overlying deposits.
Joint	A surface of fracture or parting in a rock, without displacement; commonly planar and part of a set.
Kaolin	A group of 2 layer, 1:1 structure clay minerals usually of low plasticity (e.g. kaolinite). Can be larger than clay size.
Landslide	A down slope displacement of bedrock or superficial deposits subject to gravity, over one or more shear failure surfaces. Landslides have many types and scales. Landslides may be considered both as 'events' and as geological deposits. Synonym of 'landslip'.
Lignite	Soft, brown-black accumulation of vegetable matter that has been altered by earth processes but still retains high water content. Somewhere between peat and coal.
Linear shrinkage	The percentage length reduction of a prism of remoulded clay subjected to oven drying at 105C.
Lithology	The characteristics of a rock such as colour, grain size and mineralogy. The material constituting a geological material.
Lithostratigraphic unit	A rock unit defined in terms of lithology/lithologies and age and not fossil content (Biostratigraphic unit).
Liquid limit	The moisture content at the point between the liquid and the plastic state of a clay. An Atterberg limit.
Lower lambeth group	Informal unit that includes the Lambeth Group units deposited below the mid-Lambeth Group Hiatus and includes the Upnor Formation and Lower Mottled Clay.
Marl	A calcareous mudstone, sensu-strictu having >30% carbonate content.
Median	The 50th percentile of a distribution; that is, the value above and below which 50% of the distribution lies.
Member	A distinctive, defined unit of strata within a formation characterised by relatively few and distinctive rock types and associations (for example, sandstones, marls, coal seams).
Micaceous	Containing mica, a sheet silica mineral.
Mid-lambeth group hiatus	The major break in deposition during the Lambeth Group between the lower Lambeth Group (Upnor Formation and Lower Mottled Clay) and upper Lambeth Group (Woolwich Formation and Upper Mottled Clay). The hard band (calcrete, silcrete and ferricrete) formed by pedogenic processes occur below the hiatus, shelly limestone occur above.

Mineral	A naturally occurring chemical compound (or element) with a crystalline structure and a composition which may be defined as a single ratio of elements or a ratio which varies within defined end members.
Moisture Condition Value (MCV)	Test to determine suitability of soil as compacted fill. The test measures the minimum compactive effort required to produce a state of near-full compaction.
Moisture content	See Water content.
Mudstone	A fine-grained, non-fissile, sedimentary rock composed of predominately clay and silt-sized particles.
Natural water content	The water content of a geological or engineering material in its natural or 'as found' state.
Oedometer	Laboratory apparatus for measuring consolidation properties of a soil.
Outcrop	The area over which a particular rock unit occurs at the surface.
Outlier	A deposit or an outcrop of rock surrounded by the outcrops of older deposits or rocks and separated from the main body by erosion.
Overburden	Material, or stress applied by material, overlying a particular stratum. Unwanted material requiring removal (quarrying).
Palaeocene	The geological epoch from approximately 65.5 to 56 Ma which include the Thanetian stage.
Particle-Size Analysis (PSA)	The measurement of the range of sizes of particles in a disaggregated soil sample. The tests follow standard procedures with sieves being used for coarser sizes and various sedimentation, laser or X-ray methods for the finer sizes usually contained within a suspension.
Particle-Size Distribution (PSD)	The result of a particle-size analysis. It is shown as a 'grading' curve, usually in terms of % by weight passing particular sizes. The terms 'clay', 'silt', 'sand' and 'gravel' are defined by their particle sizes.
Pedogenic processes	Soil forming processes — a variety of mechanisms contribute to soil formation including chemical and physical processes.
Perched ground water	Unconfined groundwater separated from an underlying main body of groundwater by an unsaturated zone or above a very low permeability layer such as clay.
Periglacial	An environment beyond the periphery of an ice sheet influenced by severe cold, where permafrost and freeze-thaw conditions are widespread. Fossil periglacial features may persist to the present day or may have been removed by subsequent glaciation or erosion.
Permeability	The property or capacity of a rock, sediment or soil for transmitting a fluid; frequently used as a synonym for 'hydraulic conductivity' (engineering). The property may be measured in the field or in the laboratory using various direct or indirect methods.
Permafrost	Permanently frozen ground, may be continuous (never thaws), discontinuous (with unfrozen patches, especially in summer) or sporadic (unfrozen areas exceed frozen areas). The surface layer subject to seasonal thaw is the 'active layer'.
pH	Measure of acidity/alkalinity on a scale of 1 to 14 (<7 is acid, >7 is alkaline).
Plasticity index	The difference between the liquid and plastic limits. It shows the range of water contents for which the clay can be said to behave plastically. It is often used as a guide to shrink/swell behaviour, compressibility, strength and other geotechnical properties.
Plastic limit	The water content at the lower limit of the plastic state of a clay. It is the minimum water content at which a soil can be rolled into a thread 3 mm in diameter without crumbling. The plastic limit is an Atterberg limit.
Pleistocene	The first epoch of the Quaternary Period prior to the Holocene from about 2 million years to about 10 000 years ago.
Poisson's ratio	The ratio of the strain parallel to an applied stress to that perpendicular to it [rock mechanics].
Pores	The voids within a soil or rock. The non-solid component of a soil or rock. May be filled with liquid or gas.

Pore pressure	The pressure of the water (or air) in the pore spaces of a soil or rock. It equals total stress minus effective stress. The pore pressure may be negative.
Puddingstone	A conglomerate formed of silcrete containing flint gravel.
Iron pyrite	The most widespread sulphide mineral, FeS_2.
Quartz	The most common silica mineral (SiO_2).
Quartzite	A sandstone composed (almost) entirely of cemented quartz (silica) grains.
Quaternary	A sub-era that covers the time from the end of the Tertiary to the present, approximately the last 2.0 Ma, and includes the Pleistocene and Holocene.
Residual shear strength	The strength along a shear surface (clay) which has previously failed or has undergone significant displacement. Generally the minimum shear strength. Tends to be constant for a given soil.
Rockhead	The upper surface of bedrock at surface (or its position) or below a cover of superficial deposits.
Running sand	Fluidisation of sand and flow into an excavation below the water table or into a perched water table, under the influence of water flow into an excavation.
Sand (particle size)	A soil with a particle-size range 0.063 to 2.0 mm.
Sand (material description)	A course grained deposit that is predominantly sand-sized.
Sandstone	Sandstones are clastic rocks of mainly sand-sized particles (0.063–2.0 mm diameter), generally with quartz being the dominant component. Sandstones exhibit some form of cementation.
Sarsen	Silica cemented, (silcrete) sandstone blocks formed by pedogenic processes. Used by man in walls and in such ancient monuments as Avesbury and Stonehenge.
Saturation	The extent to which the pores within a soil or rock are filled with water (or other liquid).
Settlement	The lowering of the ground surface due to an applied load (see consolidation).
Shear planes/surfaces	A series of closely spaced, parallel surfaces along which differential movement has taken place. Usually associated with landslides or stress-relief. May be polished (slickensides).
Shear strength	The maximum stress that a soil or rock can withstand before failing catastrophically or being subject to large unrecoverable deformations.
Shrinkage	The volume reduction of a clay (or clay-rich soil or rock) resulting from reduction of water content. Shrinkage may cause subsidence of shallow foundations.
Shrinkage limit	The water content below which little or no further volume decrease occurs during drying of a clay (or clay-rich soil or rock). The laboratory tests which measure shrinkage limit have largely fallen into disuse in the UK. An Atterberg limit.
Siderite	Carbonate mineral of iron ($FeCO_3$).
Silcrete	an indurated hard band or duricrust formed by the redeposition of silica commonly formed by pedogenic processes. May be as cobble or lenticular boulders.
Silt (particle size)	A soil with a particle-size range 0.002 to 0.06 mm (between clay and sand).
Siltstone	A sedimentary rock intermediate in grain size between sandstone and mudstone.
Slake durability	A measure of the ability of a rock to resist degradation by the combined action of wetting/drying cycles and mechanical abrasion.
Smectite	A group of 2:1 clay minerals with a very high surface area (~780 m^2/g) noted for their high plasticity and susceptibility to shrink/swell behaviour. Commonly a product of alteration (argillisation) of volcanic ash. Sometime known as montmorillonite (from France) or bentonite, (from USA).
Solid	Old term used in geology to indicate mappable bedrock (see also Superficial).
Solifluction	The slow, viscous, down slope flow of waterlogged surface material, especially over frozen ground.

Sorting	A descriptive term to express the range and distribution of particle sizes in a sediment or sedimentary rock, which has implications regarding the environment of deposition. Well-sorted = poorly graded indicates a small range of particle sizes, poorly sorted = well-graded) indicates a larger range of particle size.
Standard Penetration Test (SPT)	A long-established in-situ test for soil where the number of blows (N) with a standard weight falling through a standard distance to drive a standard cone or sample tube a set distance is counted. Used as an indication of lithology and bearing capacity of a soil.
Stiffness	The ability of a material to resist deformation.
Strain	A measure of deformation resulting from application of stress.
Stratigraphy	The study of the sequence of deposition of rock units through time and space.
Stress	The force per unit area to which it is applied. Frequently used as synonym for pressure.
Subcrop	The area over which a particular rock unit or deposit occurs immediately beneath another deposit, e.g. the Solid unit lying below Superficial Deposits (i.e. at rockhead).
Subsidence	The settling of the ground or a building in response to physical changes in the subsurface such as underground mining, clay shrinkage or drained response to overburden (consolidation).
Suction	The force exerted when fluid within pores in a soil or rock is subjected to reduced atmospheric (or other environmental) pressure.
Superficial deposits	Quaternary age deposits overlying bedrock; formerly called ‘drift’.
Swelling	The volume increase of a clay (or clay-rich soil or rock) resulting from an increase in water content. Swelling behaviour may cause heave of shallow foundations.
Swelling index	The rebound (unloading) equivalent of the Compression index.
Glacial till	An unsorted mixture which may contain any combination of clay, sand, silt, gravel, cobbles and boulders deposited by glacial action without subsequent reworking by meltwater.
Thanetian	The latest stage of the Palaeocene approximately 58.7 to 55.8 Ma which included the deposition of the Ormesby Clay and Thanet formations and the Lambeth Group.
Trafficability	The capacity of a soil to support vehicle movement. This is influenced by soil shear strength, water content, and surface friction, ground pressure and vehicle wheel or track configuration.
Triaxial test	A laboratory test designed to measure the stress required to deform a sample until it fails, or until a constant rate of deformation is obtained.
Unconformity	A break in the sedimentary record indicating cessation of deposition.
Unconsolidated	A triaxial soils strength test carried out without a consolidation stage (see Consolidation).
Undrained	Condition applied to strength tests where pore fluid is prevented from escaping under an applied load. This does not enable an effective stress condition to develop.
Uniaxial compressive strength	The strength of a rock sample (usually a cylinder) subjected to an axial stress causing failure (usually in an undrained condition) in the laboratory.
Unit weight	The weight of a unit volume of a material. Often used (incorrectly) as synonym for Density. Usually qualified by condition of sample (e.g. saturated, dry).
Upper lambeth group	The Lambeth Group units deposited above the mid-Lambeth Group Hiatus.
Water content	In a geotechnical context: the mass of water in a soil/rock as a % of the dry mass (usually dried at 105C). Synonymous with the moisture content.
Water table	The level in the rocks at which the pore water pressure is at atmospheric.
Weathering	The physical and chemical processes leading to the alteration of geological materials near surface (e.g. due to water, wind, temperature).

Young's modulus	A measure of linear stiffness. The slope of the stress-strain graph for elastic deformation [soil and rock mechanics].

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