

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION

PARTICLE SIZE DEFINITIONS*

Fraction	Components	Subdivision	Size (mm)
Oversize	BOULDERS		>200
	COBBLES		63-200
Coarse grained	GRAVEL	Coarse	19-63
		Medium	6.7-19
		Fine	2.36-6.7
	SAND	Coarse	0.6-2.36
		Medium	0.21-0.6
		Fine	0.075-0.21
Fine grained	SILT		0.002-0.075
	CLAY		<0.002

GRAPHIC LOG

	PEAT		TOPSOIL
	CLAY		FILL
	SILT		BASALT
	SAND		GREYWACKE
	GRAVEL		METAMORPHIC
	COBBLES		LIMESTONE
	BOULDERS		CORAL

MOISTURE CONDITION*

Term	Description
Dry (D)	- Non-cohesive and free-running
Moist (M)	- Soil feels cool, darkened in colour. - Soil tends to stick together.
Wet (W)	- Soil feels cool, darkened in colour. - Soil tends to stick together, free water forms when handling.

For Fine Grained Soils*

'Moist, dry of plastic limit'	- Hard and friable or powdery, or ('w < PL').
'Moist, near plastic limit'	- Soils can be moulded at a moisture content approximately equal to the plastic limit, or ('w ≈ PL').
'Moist, wet of plastic limit'	- Soils usually weakened and free water forms on hands when handling, or ('w > PL').
'Wet, near liquid limit'	- Or ('w ≈ LL').
'Wet, wet of liquid limit'	- Or ('w > LL').

USCS SOIL CLASSIFICATION CODES

GW - well graded gravel	ML - silt, low plasticity
GP - poorly graded gravel	CL - clay, low plasticity
GM - silt gravel	CI - clay, medium plasticity
GC - clayey gravel	OL - organic silt / organic clay, low plasticity
SW - well graded sand	MH - silt, high plasticity
SP - poorly graded sand	CH - clay, high plasticity
SM - silty sand	OH - organic silt / organic clay, high plasticity
SC - clayey sand	Pt - peat

G= Gravel, S= Sand, M= Silt, C= Clay

WATER

	- Level (date observed)
	- Inflow
	- Partial Loss
	- Complete Loss

CONSISTENCY*

Term	Field guide to consistency	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	Exudes between the fingers when squeezed in hand	≤12
Soft (S)	Can be moulded by light finger pressure	12 - 25
Firm (F)	Can be moulded by strong finger pressure	25 - 50
Stiff (St)	Cannot be moulded by fingers	50 - 100
Very Stiff (VSt)	Can be indented by thumbnail	100 - 200
Hard (H)	Can be indented with difficulty by thumbnail	>200
Friable (Fr)	Can be easily crumbled or broken into small pieces by hand	-

RELATIVE DENSITY*

Term	Density Index %
Very Loose (VL)	≤15
Loose (L)	15 - 35
Medium Dense (MD)	35 - 65
Dense (D)	65 - 85
Very Dense (VD)	>85

PLASTICITY (fine grained soil)*

Term	Range of liquid limit for silt	Range of liquid limit for clay
Non-Plastic (NP)	Not applicable	Not applicable
Low Plasticity (LP)	≤50	≤35
Medium Plasticity (IP)	Not applicable	35 and ≤50
High Plasticity (HP)	>50	>50

GRADING (coarse grained soil)*

Term	Description
Well Graded (WG)	Having good representation of all particle sizes from the largest to the smallest.
Poorly Graded (PG)	With one or more intermediate sizes poorly represented.
Gap Graded (GG)	With one or more intermediate sizes absent.
Uniform (UG)	Essentially of one size.

Notes

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Core Penetration Test (CPT)

LIQUEFACTION POTENTIAL INDEX (LPI)

	Very High Risk
	High Risk
	Low Risk

SOIL BEHAVIOUR TYPE (SBT) - ROBERTSON ET AL. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

CEMENTATION*

Term	Description
Weakly cemented	The soil may be easily disaggregated by hand in air or water.
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water.
Duricrust	Consistent cementation throughout a soil mass.

SOIL DEFECT TYPES*

Term	Description
Parting	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (e.g. bedding). May be open or closed.
Fissure	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. May include desiccation cracks.
Sheared seam	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting fissures which divide the mass into lenticular or wedge shaped blocks.
Sheared surface	A near planar, curved or undulating smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.
Softened zone	A zone in clayey soil, usually adjacent to a defect in which the soil has higher moisture content than elsewhere.
Tube	Tubular cavity. May occur singly or as one of a large number of separate or interconnected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter. Origins include root holes, animal burrows, tunnel erosion.
Tube cast	An infilled tube. The infill may be uncemented or weakly cemented soil or have rock properties.
Infilled seam	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open defects.

Notes

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CLASSIFICATION SYMBOLS AND ROCK DESCRIPTION

MOISTURE CONDITION*			ALTERATION*		
Term	Description		XA - Extremely Altered		
Dry (D)	Looks and feels dry.		HA - Highly Altered		
Moist (M)	Feels cool, darkened in colour, but no water is visible on the surface.		MA - Moderately Altered		
Wet (M)	Feels cool, darkened in colour, water film or droplets visible on the surface.		DA - Distinctly Altered		
			SA - Slightly Altered		

STRENGTH*			WEATHERING**		
Term	Uniaxial Compressive Strength MPa	Point load strength index Is(50) MPa	RS - Residual Soil*		
Extremely Low Strength (EL) **	-	-	EW - Extremely Weathered (XW *)		
Very Low Strength (VL)	0.6 - 2	0.03 - 0.1	HW - Highly Weathered		
Low Strength (L)	2 - 6	0.1 - 0.3	MW - Moderately Weathered		
Medium Strength (M)	6 - 20	0.3 - 1	DW - Distinctly Weathered *		
High Strength (H)	20 - 60	1 - 3	SW - Slightly Weathered		
Very High Strength (VH)	60 - 200	3 - 10	F - Fresh (FR *)		
Extremely High Strength (EH)	more than 200	more than 10			

TEXTURE*		FABRIC*	
Term	Description	Term	Description
Bedding	Layering produced by changes in sedimentation, which may be defined by grain size, colour, or other features.	Indistinct fabric	There is little effect on strength properties.
Lamination	Similar to bedding but developed in layer thicknesses of less than 20 mm.	Distinct fabric	The rock may break more easily parallel to the fabric.
Foliation	The parallel arrangement of minerals due to metamorphic processes.		
Cleavage	A type of foliation developed in fine grained metamorphic rocks such as slates.		
Flow Banding	A layering produced during flow of a partially solidified igneous rock that causes crystals to become oriented. Sometimes called a trachytic fabric.		

BLOCK SHAPE*	
Term	Description
Polyhedral blocks	Irregular discontinuities without arrangement into distinct sets, and of small persistence.
Tabular blocks	One dominant set of parallel discontinuities (1), for example bedding planes, with other noncontinuous joints; thickness of blocks much less than length or width.
Prismatic blocks	Two dominant sets of discontinuities (1 and 2), approximately orthogonal and parallel, with a third irregular set; thickness of blocks much less than length or width.
Equidimensional blocks	Three dominant sets of discontinuities (1, 2 and 3), approximately orthogonal, with occasional irregular joints, giving equidimensional blocks.
Rhomboidal blocks	Three (or more) dominant, mutually oblique, sets of joints (1, 2 and 3) giving oblique-shaped, equidimensional blocks.
Columnar blocks	Several, usually more than three sets of continuous, parallel joints (1, 2, 3, 4, 5) usually crossed by irregular joints; lengths much greater than other dimensions.

DISCONTINUITY SYMBOLS					
BD - Bedding	CS - Crushed Seam	DK - Dyke	FC - Fracture	JT - Joint	SZ - Shear Zone
CL - Cleavage	DZ - Decomposed Zone	FL - Fault	FZ - Fracture Zone	SH - Schistosity	SI - Sill
CO - Contact	DB - Drilling Break	VN - Vein	HB - Handling Break	SM - Seam	VO - Void
CZ - Crush Zone	DL - Drilling Lift	FL - Foliation	IS - Infilled Seam	SS - Shear Seam	

CLASSIFICATION SYMBOLS AND ROCK DESCRIPTION CON'T.

DEFECT TYPES*

Term	Description
Parting	A surface or crack across which the rock has little or no tensile strength.
Joint	A surface or crack with no apparent shear displacement and across which the rock has little or no tensile strength, but which is not parallel or subparallel to layering or to planar anisotropy in the rock material.
Sheared Surface (fault)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided and which shows evidence of shear displacement.
Sheared Zone (fault)	Zone of rock material with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects.
Sheared Seam (fault)	Seam of soil material with roughly parallel almost planar boundaries, composed of soil materials with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects.
Crushed Seam (fault)	Seam of soil material with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock material which may be more weathered than the host rock.
Infilled Seam	Seam of soil material usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1 mm thick may be described as a veneer or coating on a joint surface.
Extremely Weathered Seam	Seam of soil material, often with gradational boundaries. Formed by weathering of the rock material in place.

DEFECT ROUGHNESS AND SHAPE*

<i>Small Scale (10-100 mm)</i>	Surface roughness and shape with some limitation on the latter due to the small scale.
<i>Medium scale (100-1000 mm)</i>	The defect has a gradual change in orientation.
<i>Large Scale (>1000 mm)</i>	The defect has a wavy surface.

SURFACE ROUGHNESS*

VR	Very Rough	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.
RF	Rough	Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
S	Smooth	Smooth to touch. Few or no surface irregularities.
POL	Polished	Shiny smooth surface.
SL	Slickensided	Grooved or striated surface, usually polished.

JOINT ROUGHNESS COEFFICIENT (JCR)*

JRC 1-10	- Values based on the figure by Barton, N and Choubey, V. The Shear Strength of Rock Joints in Theory and Practice. Rock Mechanics. Vol. 10 (1977), pp. 1-54.
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SURFACE SHAPE*

PR	Planar	The defect does not vary in orientation.
CU	Curved	The defect has a gradual change in orientation.
UN	Undulating	The defect has a wavy surface.
ST	Stepped	The defect has one or more well defined steps.
IR	Irregular	The defect has many sharp changes of orientation.
DIS	Discontinuous	**

DEFECT COATINGS AND COMPOSITION OF SEAMS*

Clean	- No visible coating.
Stained	- No visible coating but surfaces are discoloured.
Veneer	- A visible coating of soil or mineral, too thin to measure; may be patchy.
Coating	- A visible coating up to 1 mm thick. Thicker soil material shall be described using defect terms (e.g. infilled seam). Thicker rock strength material shall be described as a vein.

DURICRUST MASS GRADES*

Grade	Term
DI	Massive or Hardspan
DII	Vuggy or Patchy
DIII	Nodular or Fragmental

ROCK MASS WEATHERING GRADES*

Grade	Description
IA	Fresh; no visible sign of rock material weathering
IB	Fresh except for staining on major defect surfaces
II	Some to all of the rock mass is discoloured by slight weathering
III	Less than 35% of the mass is weathered to a soil
IV	More than 35% of the mass is weathered to a soil with rock present as a discontinuous framework or corestones
V	Virtually all of the rock mass is weathered to a soil but the original mass structure still largely intact

Notes

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DRILLING / EXCAVATION METHOD

AD/T - Auger Drilling with TC-bit
AD/V - Auger Drilling with V-bit
AS - Auger Screwing
AT - Air Track
B - Dozer Blade
BH - Backhoe Bucket
CT - Cable Tool
DB - Washbore Drag Bit
DT - Diatube

E - Excavator
EH - Excavator with Hammer
HA - Hand Auger
HMLC - HMLC Core Barrel
HQ3 - HQ3 Core Barrel
MZ - Mazier
N - Natural Exposure
NMLC - NMLC Core Barrel
NQ3 - NQ3 Core Barrel

PQ3 - PQ3 Core Barrel
Pushed SPT - Pushed SPT
PT - Push Tube
R - Ripper
RR - Rock Roller
SPT - Driven SPT
WB - Washbore
X - Existing Excavation

BACKFILL TYPES

 Bituminous Material (BITUBKFL)

 Sand (SANDBKFL)

 Cuttings (CUTTBKFL)

 Concrete (CONCBKFL)

 Bentonite (BENTBKFL)

 Gravel (GRAVBKFL)

 Grout (GROUBKFL)

SAMPLES & TESTS **

 B - Bulk Disturbed Sample

 BLK - Block Sample

 C - Core Sample (general)

 CBR - CBR Mould Sample

 D - Small Disturbed Sample

 ES - Soil Sample for Environmental Testing

 EW - Water Sample for Environmental Testing

 G - Gas Sample

 LB - Large Bulk Disturbed Sample (earthworks testing)

 M - Mazier Type Sample

 P - Piston Sample

 U - Undisturbed Sample - Open Drive

 W - Water Sample

 SPT - Standard Penetration Test - No Liner

TEST TYPE **

 BH - Borehole

 CPT - Core Penetration Test

 DCP - Dynamic Cone Penetrometer

 EXP - Logged Exposure

 ICBR - In Situ CBR Test

 INST - Instrument

 IRDX - In Situ Redox Test

 IVAN - In Situ Vane Test

 OP - Observation Pit/ Trench

 PM - Pressuremeter Test Hole

 S - Shaft

 SRAL - Seismic Refraction Line

 TP - Trial Pit/ Trench

 IDEN - In Situ Density Test

 TRAV - Linear Logging, Traverse, or Scanline Survey

TOTAL CORE RECOVERY*

Total core recovery (TCR) is defined as:

$$TCR = \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100\%$$

PIEZOMETER TYPE

EPIE - Electronic Piezometer
HPIE - Hydraulic Piezometer
PPIE - Pneumatic Piezometer
SPIE - Standpipe Piezometer

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