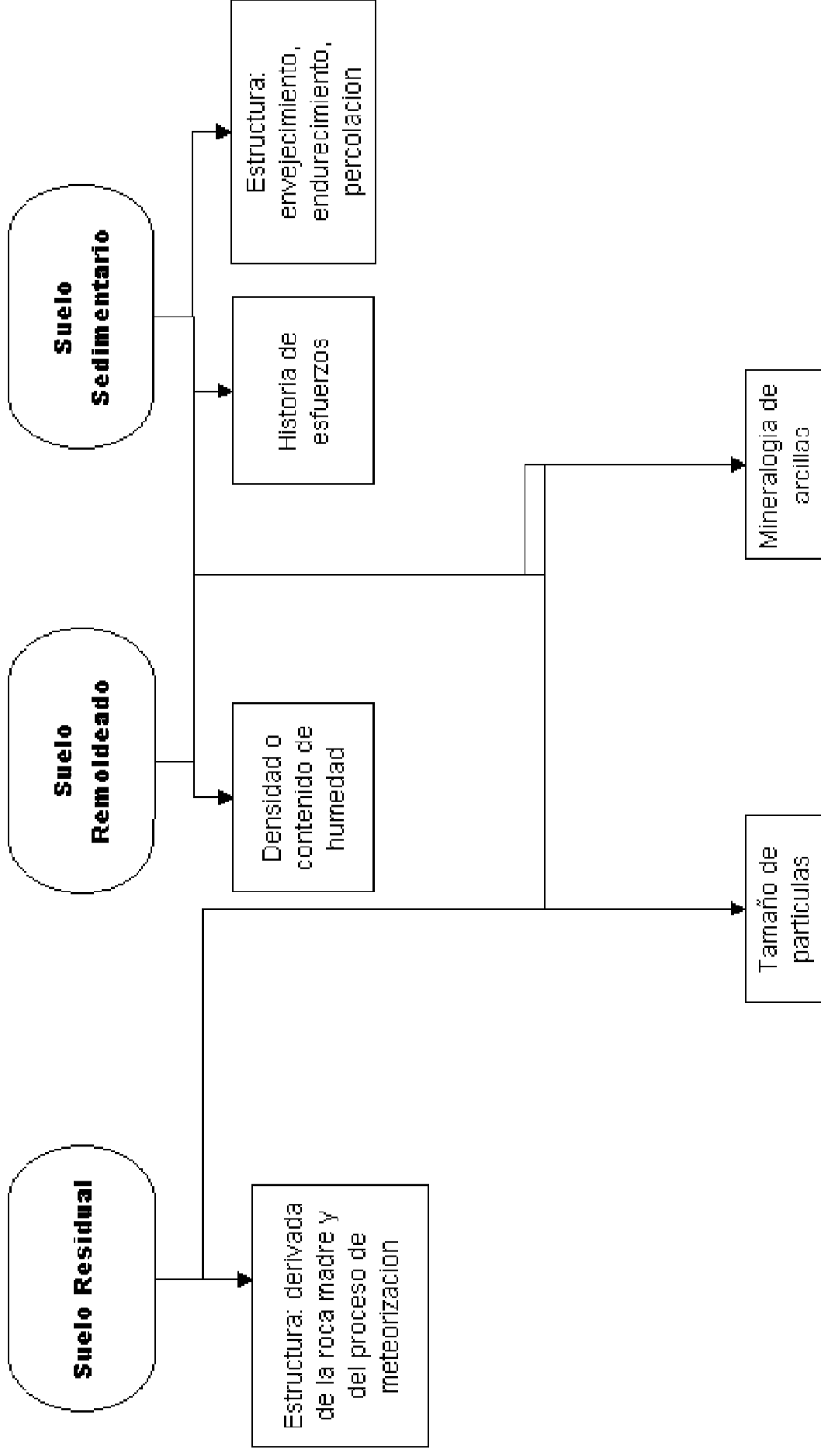


Tipos de Suelos

Factores que influyen en su comportamiento



Clasificación	Proceso de Formación	Naturaleza de los depósitos
Residual	Meteorización de la roca madre sin movimiento significativo de partículas	Arcillas/limos cuyo tipo depende principalmente del tipo de roca original y del proceso de meteorización
Aluvial	Material transportado y depositado por la acción del agua	Varía desde arcilla hasta grava gruesa y bolones. Usualmente presenta una estratificación pronunciada. Grava de ríos usualmente redondeadas.
Coluvial	Material transportado por gravedad	Avalanchas, deslizamientos, etc. Desde arcillas hasta bolones. Material usualmente heterogéneo con un amplio rango de tamaño de partículas.
Eólicos o loes	Materiales transportados por el viento	Altamente uniformes sin estratificación clara. Típicamente limos o arenas finas
Orgánico	Formado in situ por el crecimiento y descomposición de plantas	Colores oscuros, fibrosos y altamente compresibles. Mezcla con sedimentos finos produce limos y arcillas orgánicas
Volcánico	Cenizas y pumicitas depositados en erupciones volcánicas	Partículas con tamaño de limos y partículas de mayor tamaño. Partículas angulares y a menudos vesiculares. Meteorización produce arcillas altamente plásticas y a veces expansivas.
Evaporativos	Materiales precipitados o evaporados desde soluciones con alto contenido de sales	Suelos cementados o rocas sedimentarias blandas. Puede formar una costra dura bajo la superficie en regiones áridas.

Table 4 - Classification of Rock Material Decomposition Grades

Descriptive Term	Grade Symbol	General Characteristics for Granitic & Volcanic Rocks & Other Rocks of Equivalent Strength in the Fresh State	Additional Typical Characteristics for Specific Rock Types		
			Granite	Granodiorite	Coarse Ash Crystal/Lithic Tuff
Residual Soil	VI	Original rock texture completely destroyed. Can be crumbled by hand and finger pressure into constituent grains.	Reddish brown. Feldspars completely destroyed. Quartz is only remaining primary mineral, usually dull, etched or pitted and reduced in size compared with fresh condition.	Dark reddish brown. Feldspars completely destroyed. Quartz only remaining primary mineral, grains reduced in size compared with fresh condition.	Brown or reddish brown. Quartz only remaining primary mineral.
Completely Decomposed	V	Original rock texture preserved. Can be crumbled by hand and finger pressure into constituent grains. Easily indented by point of geological pick. Slakes when immersed in water. Completely discoloured compared with fresh rock.	Yellowish brown to reddish brown. Feldspars powdery to soft. Hand penetrometer shear strength index < 250 kPa. Zero rebound from N Schmidt hammer.	Yellowish brown to reddish brown. Plagioclase feldspars powdery to soft, very easily grooved by pin. Orthoclase feldspars gritty, less easily grooved. Zero rebound from N Schmidt hammer.	Brown to reddish brown. Slakes slowly in water. Mafic minerals soft, dull, dark green to brown, difficult to distinguish.
Highly Decomposed	IV	Can be broken by hand into smaller pieces. Makes a dull sound when struck by geological hammer. Not easily indented by point of geological pick. Does not slake when immersed in water. Completely discoloured compared with fresh rock.	Yellowish brown to yellowish orange/brown. Feldspars powdery. Hand penetrometer shear strength index > 250 kPa. Positive N Schmidt rebound value < 25.	Yellowish brown to yellowish orange/brown. Plagioclase feldspars powdery to gritty. N Schmidt rebound value 15-30.	Yellowish brown. Mafic minerals soft, dull, dark green. Surface can be scratched by knife.
Moderately Decomposed	III	Cannot usually be broken by hand, easily broken by geological hammer. Makes a dull or slight ringing sound when struck by geological hammer. Completely stained throughout.	Yellowish brown. Feldspars gritty. Biotite not shiny. N Schmidt rebound value 25-45.	Yellowish brown. Plagioclase feldspars partly decomposed to gritty small pieces. N Schmidt rebound value 25-50.	Yellowish grey. Mafic minerals generally not shiny, soft, black or stained dark brown.
Slightly Decomposed	II	Not broken easily by geological hammer. Makes a ringing sound when struck by geological hammer. Fresh rock colours generally retained but stained near joint surfaces.	Feldspars hard to slightly gritty. Orthoclase feldspars often pink. Biotite slightly stained and dull around edges. N Schmidt rebound value > 45.	Plagioclase feldspars slightly gritty. Biotite and hornblende slightly stained and dull. N Schmidt rebound value 45-70.	Light grey or greenish grey. Mafic minerals shiny, hard, black, may be slightly stained and dull around edges.
Fresh	I	Not broken easily by geological hammer. Makes a ringing sound when struck by geological hammer. No visible signs of decomposition (i.e. no discolouration).	Overall rock colour grey/white. Feldspars hard and shiny. Biotite shiny, not stained. Quartz colourless or grey, glassy.	Overall rock colour grey. Feldspars hard and shiny. Biotite and hornblende shiny, not stained. Quartz colourless or grey, glassy. N Schmidt rebound value > 60.	Overall rock colour black. Glassy appearance.
General Notes		(1) Not all these general characteristics are applicable to rocks whose strength in the fresh state is moderately strong or less (see Table 2). Alternative classifications may be more appropriate for such materials (see Section 2.3.4). (2) Use of geological hammer applicable mainly to materials confined in a field exposure.	(3) Based on Moye (1955), Hencher & Martin (1987) and unpublished work by the GCO. (4) Assessments of minerals applicable to medium and coarse-grained granite, may be difficult or impossible to assess in fine-grained granites.	(5) Based on Irwin & Powell (1983a,b). (6) Based on unpublished work by the GCO. (7) JYT = Yim Tin Tsai Formation JSM = Shing Mun Formation (See HKGS maps and memoirs) (8) Mafic minerals referred to are biotite and hornblende.	(9) Based on unpublished work by the GCO.
Notes on Index Tests		(10) Slake test: samples already close to saturation moisture content are less likely to slake. (11) Feldspar alteration test: Hard: cannot be cut by knife or grooved by pin; Gritty: can be cut by knife or grooved by pin, can be crushed to silt fragments in fingers; Soft: easily grooved by pin, can be moulded very easily to clay in fingers. (12) N Schmidt hammer test: rebound values are for hammer held perpendicular to rock face: take initial 'sealing' blows to ensure good contact and record average value from a minimum of five consecutive impacts, ignoring unusually low readings. (13) Hand penetrometer test: press instrument head slowly and smoothly into sample, take an average of ten values and divide by two to give shear strength index, test may be impractical on very small samples. (14) Test results in general may be affected by sample moisture content and degree of microfracturing.			

Descriptive Term	Grade Symbol	General Characteristics for Granitic & Volcanic Rocks & Other Rocks of Equivalent Strength in the Fresh State
Residual Soil	VI	Original rock texture completely destroyed Can be crumbled by hand and finger pressure into constituent grains
Completely Decomposed	V	Original rock texture preserved Can be crumbled by hand and finger pressure into constituent grains Easily indented by point of geological pick Slakes when immersed in water Completely discoloured compared with fresh rock
Highly Decomposed	IV	Can be broken by hand into smaller pieces Makes a dull sound when struck by geological hammer Not easily indented by point of geological pick Does not slake when immersed in water Completely discoloured compared with fresh rock
Moderately Decomposed	III	Cannot usually be broken by hand; easily broken by geological hammer Makes a dull or slight ringing sound when struck by geological hammer Completely stained throughout
Slightly Decomposed	II	Not broken easily by geological hammer Makes a ringing sound when struck by geological hammer Fresh rock colours generally retained but stained near joint surfaces
Fresh	I	Not broken easily by geological hammer Makes a ringing sound when struck by geological hammer No visible signs of decomposition (i.e. no discolouration)

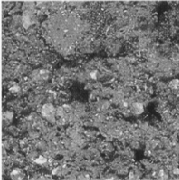
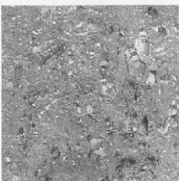
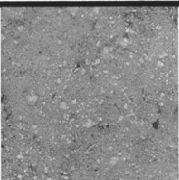
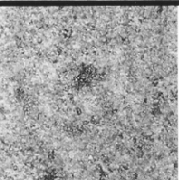
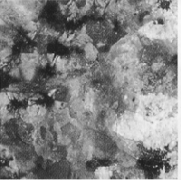
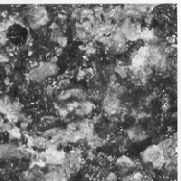
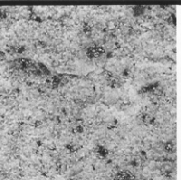
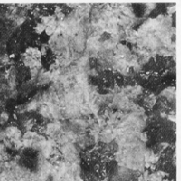
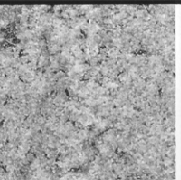
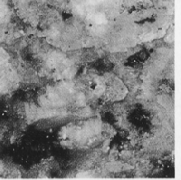
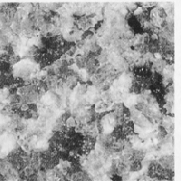
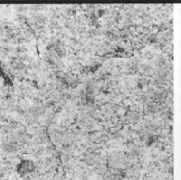
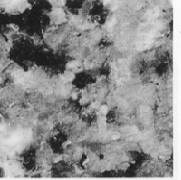
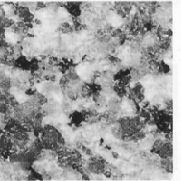
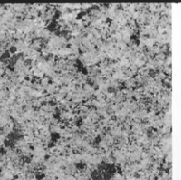
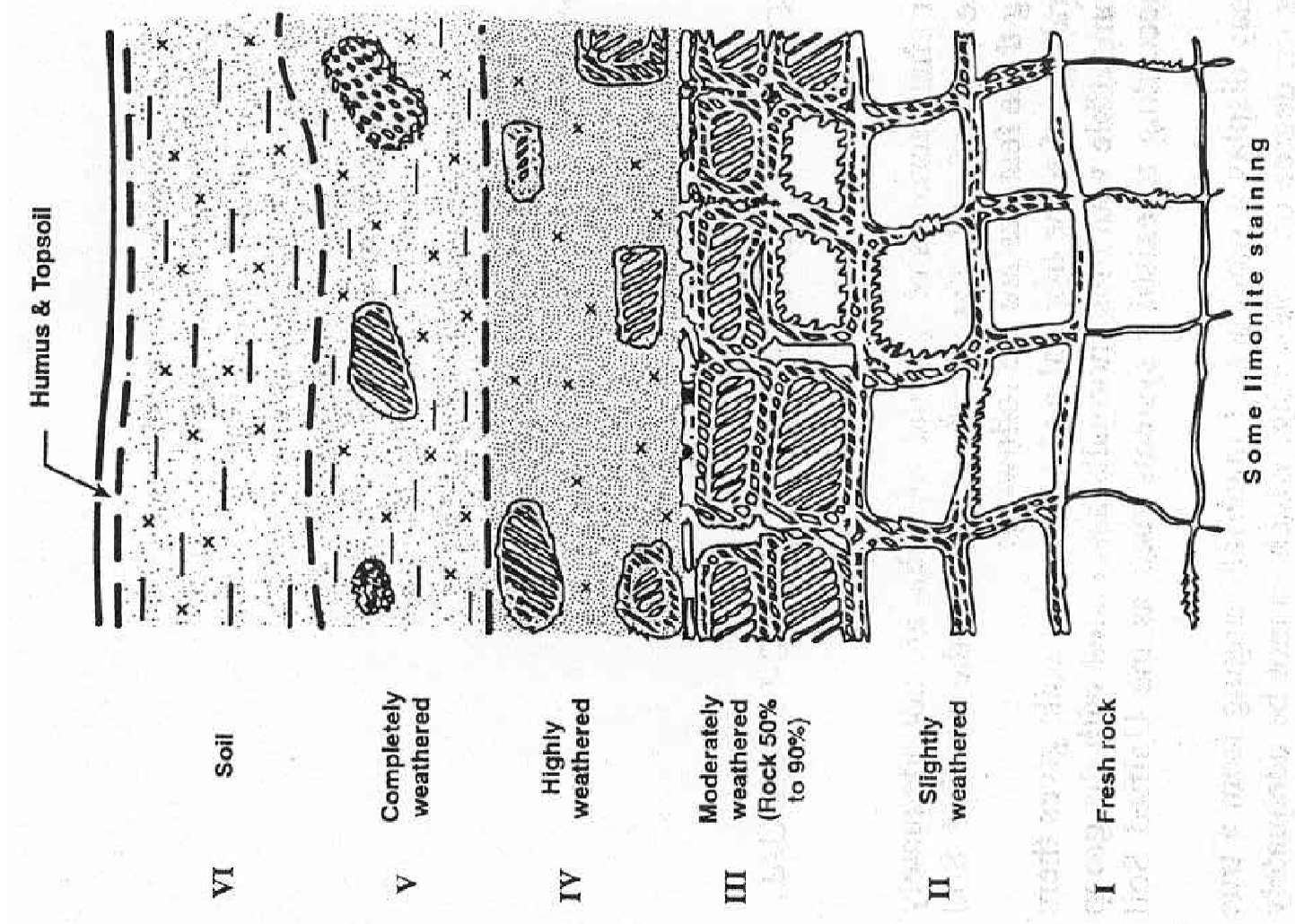
Descriptive Term & Grade Symbol		Coarse-grained Granite	Medium-grained Granite	Fine-grained Granite
Residual Soil	VI			
Completely Decomposed	V			
Highly Decomposed	IV			
Moderately Decomposed	III			
Slightly Decomposed	II			
Fresh	I			
				
		Natural scale		

Plate 3 - Decomposition Grades of Rock Material (Sheet 1 of 2)

Zonas de meteorización

Basado en granito
(Little, 1969)



No siempre válido para
otros suelos