Guidelines on Preparing Ground Investigation Fieldwork and Laboratory Testing Reports in Digital Format

1. General

1.1 Ground Investigation Fieldwork (GIFW) Report shall be prepared in accordance with Geoguide 2: Guide to Site Investigation. Borehole logs shall be computerized generated from data in AGS digital format that comply with the rules listed in the Fourth Edition of the Association of Geotechnical and Geoenvironmental Specialists (AGS) publication '**Electronic Transfer of Geotechnical and Geoenvironmental Data', published in February 2017** (hereafter **AGS 4**), with the exception stated in Section 2.

1.2 Laboratory Testing (LT) Report shall be prepared with the rules listed in AGS4 with modifications as stated in Section 3.

2. Additions and Amendments to the AGS 4 for Ground Invesitgation Fieldwork Report

2.1 New User-defined Group, LEGD (Geological legend) shall be incorporated in the AGS data file, with the data specification and domains defined in Table 1.

Table 1 – Definition of user-defined group, LEGD

Group Name : LEGD – Detailed Legend Code					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
*	LOCA_ID		ID	Location identifier	BH1
	LEGD_TOP	m	2DP	Depth to top of legend interval	12.50
	LEGD_BASE	m	2DP	Depth to bottom of legend interval	16.00
	GEOL_LEG		X	Legend Code	SANDG

Notes to Table 1:

1. LEGD group enables multiple legend codes to be recorded for a single geological interval.
2. All legend intervals should be included, irrespective of whether the GEOL interval is subdivided.
3. The GEOL_LEG in the corresponding GEOL group should record the code for the predominant material if a GEOL interval is subdivided into two or more Legend intervals.

2.2 New User-defined Fields, PROJ_GUID, IPRG_PTYP and IPRG_LUGE shall be incorporated in the AGS data file as defined in Table 2 and Table 3. Field PROJ_GUID in Group PROJ has been added for recording the unique ID assigned to the project. IPRG_PTYP and IPRG_LUGE in Group IPRG are used for reporting the in-situ permeability tests.

Table 2 - Definition of User-Defined Fields in PROJ

Group Name : PROJ – Project Information					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
*	PROJ_GUID		ID	Unique ID	11789

Table 3 - Definition of User-Defined Fields in IPRG

Group Name : IPRG – In situ Permeability Tests - General					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
	IPRG_PTYP		PA	Type of packer	Double
	IPRG_LUGE		2DP	Lugeon units	0.09

2.3 Legend codes (GEOL_LEG) in LEGD GROUP and GEOL GROUP are described in **Annex A**.

2.4 Legend codes (GEOL_GEOL) are no longer required and shall be left "null". Geology codes (GEOL_GEO2) in GEOL GROUP are introduced to record the geological units commonly encountered in Hong Kong. The GEOL_GEO2 codes are described in **Annex B**.

2.5 The DICT group shall be included in each AGS file to define the above additions and amendments, and any other extensions.

3. Additions and Amendments to the AGS 4 for Laboratory Test Report

3.1 New User-defined Fields, Field PROJ_GUID in PROJ GROUP, has been added for recording the unique ID assigned to the project.

Table 4 - Definition of User-Defined Fields in PROJ

Group Name : PROJ – Project Information					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
*	PROJ_GUID		ID	Unique ID	11789

3.2 New User-defined Fields for reporting In-situ Density Test (IDEN), Index Test (LLPL), Point Loading Test (RPLT), Shear Box Test (SHBG), Traixial Effective Stress Test (TREG) and Triaxial Total Stress Test (TRIG) shall be incorporated in the AGS data file as defined in Table 5 to Table 10.

Table 5 Definition of User-Defined Fields in IDEN

Group Name : IDEN – In Situ Density Test					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
	IDEN_DDEN	Mg/m^3	2DP	In situ dry density (after any calibrations / corrections applied, i.e. reported value)	1.70

Table 6 Definition of User-Defined Fields in LLPL

Group Name : LLPL – Liquid and Plastic Limit Tests					
Statu s	**Heading**	**Unit**	**Type**	**Description**	**Example**
	LLPL_LI		2SF	Liquidity Index	0.22

Table 7 Definition of User-Defined Fields in RPLT

Group Name : RPLT – Point Load Testing					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
	RPLT_DIR		PA	Loading direction	P
	RPLT_FMOD		PA	Failure mode	M

Table 8 Definition of User-Defined Fields in SHBG

Group Name : SHBG – Shear Box Testing – General					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
	SHBG_JROU		X	Joint roughness (rock shear)	Rough undulating
	SHBG_JCON		X	Joint surface condition	Chlorite coated

Table 9 Definition of User-Defined Fields in TREG

Group Name : TREG – Triaxial Tests – Effective Stress – General					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
	TREG_FAIS	kPa	1DP	Reported s’ at failure	384.4
	TREG_FAIT	kPa	1DP	Reported t at failure	215.6
	TREG_FAIP	kPa	1DP	Reported p’ at failure	312.6
	TREG_FAIQ	kPa	1DP	Reported q at failure	431.3

Table 10 Definition of User-Defined Fields in TRIG

Group Name : TRIG – Triaxial Tests – Total Stress – General					
Status	**Heading**	**Unit**	**Type**	**Description**	**Example**
	TRIG_FAIS	kPa	1DP	Reported s’ at failure	384.4
	TRIG_FAIT	kPa	1DP	Reported t at failure	215.6
	TRIG_FAIP	kPa	1DP	Reported p’ at failure	312.6
	TRIG_FAIQ	kPa	1DP	Reported q at failure	431.3

Annex A - Legend Code for Field GEOL_LEG (Groups GEOL and LEGD)

AGGLOM	Agglomerate, tuff breccia
ASPHALT	Asphalt
BASALT	Basalt
BIOCLAST	Shell
BLANK	Materials not recovered
BLDR	Boulder
BLDRCBBL	Boulders and Cobbles
BRECCIA	Breccia (sedimentary)
CBBL	Cobbles
CLAY	Clay
CLAYSTON	Claystone
CONCRETE	Concrete
CONGLOM	Conglomerate
DOLOMITE	Dolomite, dolomitic limestone
FAULT	Fault rock (breccia, gouge, mylonite)
FILL	Fill or made ground
FINE	SILT/CLAY (Geoguide 3)
FISSIN	Fissure infill
GABBRO	Gabbro, lamprophyre
GNEISS	Gneiss
GRANITE	Granite
GRAV	Gravel
LST	Limestone
LSTSLT	Interbedded limestone and siltstone
MARBLE	Marble (pure or impure)
METACON	Contact metamorphic rock
METAREG	Regional metamorphic rock
MUDSTONE	Mudstone
ORGANICS	Organic material, peat
PEGMTITE	Pegmatite
PHYLLITE	Phyllite
QUARTZIT	Quartzite, quartz (vein)
RHYOLITE	Rhyolite (feldsparphyric, quartzphyric)
SAND	Sand
SANDSTON	Sandstone
SCHIST	Schist
SHALE	Shale
SILT	Silt
SILTSTON	Siltstone
SURFACE	Artificial surface (masonry, shotcrete, chunam, etc)
SYENITE	Granodiorite, syenite, monzonite
TRACHYTE	Trachyte, dacite, latite, andesite
TUFF	Coarse ash tuff, lapilli tuff
TUFFINE	Fine ash tuff
VOID	Void
WASHING	Wash Boring (no sample recover attempted)

Note:

A 1. The code BLDRCBBL is reserved for very coarse soils where the sample size is too small to determine the actual proportion of boulders and cobbles (it is not likely to be required for excavations).

A 2. Common Ground soil descriptions are based on Geoguide 3. Textual soil descriptions can become very complex (e.g. Geoguide 3, Tables 11, 15 & 16). Legend codes for soils shall be constructed according to the following rules:

(a) Made ground of any type shall be represented by the code FILL.

(b) Codes for natural soils shall start with the 4-character code for the basic soil type, taken from the list above (i.e., CLAY, SILT, FINE, SAND, GRAV, CBBL, BLDR).

(c) Secondary and tertiary size fractions from the soil name are indicated using the following codes, appended to the basic soil code, in the order stated below:

(i) C - clayey
(ii) Z - silty
(iii) F - silty/clayey
(iv) S - sandy
(v) G - gravelly, with … gravel
(vi) K - cobbly, with … cobbles
(vii) V - bouldery, with … boulders

(d) Selected additional information is indicated by appending relevant codes from the list (and in the order) below:

(i) O - with organic material
(ii) B - with shell

(e) The following examples of soil descriptions, from Geoguide 3 Tables 15 and 16, illustrate the derivation of codes:

Slightly silty/clayey, sandy GRAVEL	GRAVFS
Slightly clayey, gravelly SAND	SANDCG
Very gravelly SAND or SAND with much gravel	SANDG
Sandy SILT	SILTS
Slight gravelly, slightly sandy SILT/CLAY or Slightly sandy SILT/CLAY with occasional gravel	FINESG
Sandy GRAVEL with occasional boulders	GRAVSV
Cobbly BOULDERS with some finer material (slightly gravelly sand)	BLDRSK
BOULDERS with much finer material (silty/clayey, very sandy gravel)	BLDRSG

Annex B - Legend Code for Field GEOL_GEO2 (Group GEOL)

Code	Rock Name	Code	Rock Name
A	ANDESITE	PB	PYROCLASTIC BRECCIA
AG	AGGLOMERATE	PH	PHYLLITE
AP	APLITE	Q	QUARTZ VEIN
B	BASALT	QL	QUARTZ LATITE
BR	BRECCIA	QZ	QUARTZITE
CG	CONGLOMERATE	RD	RHYODACITE
CH	CHERT	RF	FELDSPARPHYRIC RHYOLITE
COM	CONTACT METAMORPHIC ROCK	RH	RHYOLITE
CT	CLAYSTONE	RQ	QUARTZPHYRIC RHYOLITE
D	DACITE	SC	SCHIST
DI	DIORITE	SH	SHALE
DL	DOLOMITE, DOLOMITIC LIMESTONE	SK	SKARN
DO	DOLERITE	SL	SLATE
E	EUTAXITE	SQ	QUARTZ SYENITE
FB	FAULT BRECCIA	ST	SANDSTONE
FG	FAULT GOUGE	SY	SYENITE
G	GRANITE	T	TUFF
GB	GABBRO	TA	TUFF AGGLOMERATE
GD	GRANODIORITE	TB	TUFF BRECCIA
GN	GNEISS	TC	COARSE ASH TUFF
HF	HORNFEL	TD	TRACHYDACITE
IM	IMPURE MARBLE	TF	FINE ASH TUFF
L	LAMPROPHYRE	TG	TUFFACEOUS CONGLOMERATE
LA	LATITE	TL	LAPILLI TUFF
LT	LIMESTONE	TQ	QUARTZ TRACHYTE
MB	MARBLE	TR	TUFFACCEOUS BRECCIA
MQ	QUARTZ MONZONITE	TS	TUFFACEOUS SANDSTONE
MT	MUDSTONE	TY	TRACHYTE
MY	MYLONITE	TZ	TUFFACEOUS SILTSTONE
MZ	MONZONITE	ZT	SILTSTONE
P	PEGMATITE		

Note:

B 1. A code shall be provided for rocks, soils derived from insitu rock weathering, superficial deposits and man-made materials.

B 2. For rocks and soils derived from insitu rock weathering, the code shall be constructed according to their decomposition grade, rock name and additional geological information (e.g. metamorphism), based on the following rules:

(a) The code shall start with 2-character code for decomposition grade taken from the list below:

(i) FR - fresh rock
(ii) SD - slightly decomposed
(iii) MD - moderately decomposed
(iv) HD - highly decomposed
(v) CD - completely decomposed
(vi) RS - residual soil

No mixed grade is allowed.

(b) Rock name (in CAPITALS) shall be indicated using the codes in this Annex, appended to the decomposition grade code. For residual soil, as all evidence of the original rock texture has lost, no rock name code shall be assigned.

(c) For the rocks and soils derived from insitu rock weathering with a prefix “meta-” added to the rock name, a code “M” shall be added after the rock name code.

(d) The following examples of descriptions of rocks/soil derived from insitu rock weathering illustrate the derivation of codes:

Very strong, light greyish pink, slightly decomposed, fine-grained GRANITE	SDG
Extremely weak, light yellowish brown spotted with grey, dark brown and white, completely decomposed, medium-grained GRANITE. (Loose, slightly silty/clayey, gravelly SAND)	CDG
Moderately strong, dark greenish grey, moderately decomposed META-SILTSTONE	MDZTM

B 3. For superficial deposits, the code shall be constructed according to their general classification (the geological origin of the soil and in CAPITALS) and the basic soil type (in CAPITALS), based on the following rules:

(a) The codes shall start with 3-character code for the general classification, taken from the list below:

(i) ALL - ALLUVIUM
(ii) BED - BEACH DEPOSIT
(iii) CFD - CAVITY FILLING DEPOSIT
(iv) COL - COLLUVIUM
(v) ESD - ESTUARINE DEPOSIT
(vi) ITD - INTERTIDAL DEPOSIT
(vii) MAD - MARINE DEPOSIT
(viii) POD - POND DEPOSIT

(b) The basic soil type shall be indicated using the following codes, appended to the general classification code:

(i)	C	-	CLAY
(ii)	Z	-	SILT
(iii)	F	-	SILT/CLAY
(iv)	S	-	SAND
(v)	G	-	GRAVEL
(vi)	K	-	COBBLE
(vii)	V	-	BOULDERS

(c) The following examples of descriptions of superficial deposits illustrate the derivation of codes:

Loose, moist, light brown, slightly gravelly fine to coarse SAND. (MARINE DEPOSIT)	MADS
Dense, dry, yellowish brown, bouldery COBBLES with much finer material (slightly gravelly, sandy, silt/clay). (COLLUVIUM)	COLK
Soft, dark grey, silty CLAY with occasional shell fragment. (ESTUARINE DEPOSIT)	ESDC

B 4. The codes for man-made materials shall be taken from the list below:

(i)	FILL	-	FILL
(ii)	CONCRETE	-	CONCRETE, SHOTCRETE, CHUNAM
(iii)	ASPHALT	-	ASPHALT
(iv)	WALL	-	MANSONRY WALL, BRICK WALL, CONCRETE WALL

B 5. The code for TOP SOIL is TS. The code for the section with no recovery is NR.

B 6. No code shall be assigned if there is any doubts about the rock name or the general classification of soil, which is indicated by including a “?” in the description. No code shall be assigned for the wash boring section.