STANDARD PRACTICE FOR IDENTIFICATION AND DESCRIPTION OF AGGREGATE PROSPECTS (Visual – Manual Procedure)

1.0 SCOPE

1.1 This practice covers the procedures for the description of gravels and sands prospected for departmental use.

1.2 This procedure does not attempt to describe the techniques used for determining the grading, plasticity, shape, surface texture or amount of deleterious materials, since it is assumed that the examination will be performed by persons qualified by experience and training.

1.3 When precise classification of materials for engineering purposes is required, the procedures prescribed in the Department's specifications shall be used.

2.0 APPLICABLE DOCUMENTS

2.1 ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

2.2 Forms (attached):

- Summary of Sieve Analyses – Gravel Prospect
- Grain Size Analysis
- Aggregate Identification

Copies of all forms are available from Alberta Transportation’s Highway Engineering Section.

3.0 APPARATUS

3.1 A supply of water

3.2 400 μm sieve

4.0 PROCEDURE

4.1 Dry sample.

4.2 Inspect each individual sample for its grading, plasticity, gravel shape, surface texture and deleterious materials characteristics as follows:

4.2.1 Grading

Each sample is viewed thoroughly to determine grading. The proportion of sand (-5000 μm) to gravel (+5000 μm) and type of sand is estimated to determine the grading characteristics. The descriptions on the Aggregate Identification sheet are self-explanatory and are checked off accordingly. It is possible to check off several characteristics for a given sample (e.g., a sample may appear to be well graded but is short of fine sand). Both characteristics would be checked off. Where excessive pea gravel is indicated the percentage fracture during crushing may be a concern.

4.2.2 Plasticity

A 400 μm sieve is used to obtain a 60 gram sample of the -5000 μm material from each sample. Lumps of clay are broken down to ensure they are included proportionately in the fines.

Mould the sample into a ball by adding water until it has a soft, but not sticky, consistency. Shape the specimen into an elongated pat and roll by hand on a smooth surface or between the palms into a thread about 3 mm in diameter (if the sample is too wet to roll easily, it should be spread into a thin layer and allowed to lose some water by evaporation). Fold the sample threads and reroll repeatedly until the thread crumbles at diameter of about 3 mm. The thread will crumble at a diameter of 3 mm when the soil is near the plastic limit. Also, note the strength of the thread. After the thread crumbles, the pieces should be lumped together and kneaded until the lump crumbles. Describe the plasticity of the material in accordance with criteria given in Table 1.

TABLE 1 CRITERIA FOR DESCRIBING PLASTICITY

DESCRIPTION	CRITERIA
Non-plastic	A 3-mm thread cannot be rolled at any moisture content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

Samples exhibiting medium to high plasticity may require Atterberg limits (TLT-412) determination and samples with low to medium plasticity may require dry strength (TLT-401) determination after laboratory crushing. A reduction of more than 50% in PI between pit run and crushed samples is not uncommon.

4.2.3 Gravel Shape and Surface Texture

These categories are self-explanatory. The degree of encrustment is rated as Trace, Low, Medium or High. High indicates 50% of material is covered in encrustments.

4.2.4 Deleterious Materials

If a substantial amount of deleterious material is noted (> 10% is high) a Los Angeles Abrasion (ASTM D131) and/or Detrimental Matter Content Test (TLT-107) may be recommended. An extra warning should be placed in the cover report.

5.0 REPORT

5.1 Results are recorded along with the information provided by the Prospector such as % oversize on the Aggregate Identification sheet (attached).

5.2 Results are to be submitted in digital format.

6.0 GENERAL NOTES

6.1 This procedure is used initially to provide an overall general description of a source and aide in the selection of physical testing requirements used for assessing the aggregate quality and in checking the reasonableness of results obtained from laboratory crushing.

6.2 Charts for estimating percent composition of rocks and sediments are attached (pages 8 – 9) and are from the Journal of Sedimentary Petrology.

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SUMMARY OF SIEVE ANALYSES - GRAVEL PROSPECT

PIT NAME: _____ JOB: _____ DATE: _____

LOCATION: _____ DESIGNATION: _____ DATE RECEIVED: _____

	FIELD INFORMATION									SIEVE ANALYSIS																	
LAB SAMPLE NO.	BAG NO.	TEST HOLE NO.	SAMPLED DEPTH (m)	TOP SIZE (mm)	LL	PL	PI	DRY S	AGG CLASSIF.	FIELD MC %	150000	100000	80000	50000	40000	25000	20000	16000	12500	10000	5000	2500	1250	630	315	160	80
SIEVE AVG.																											

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GRAIN SIZE ANALYSIS

Project: _____ Project No: _____

_____ Pit Name: _____

Client: _____ Pit Location: _____

_____ Sample Source: _____

_____ Sample No: _____

_____ Date Tested: _____

Attention: _____ Tested By: _____

Sample Description _____

_____

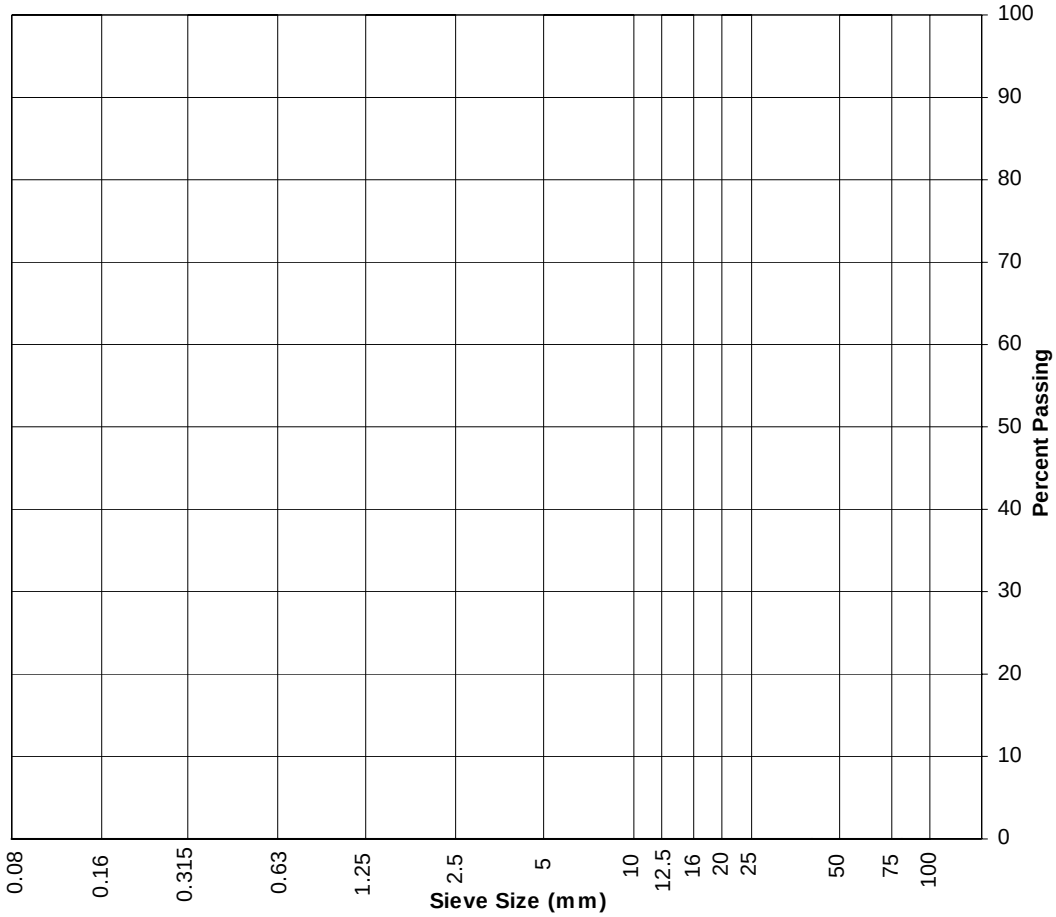
Remarks: Average Moisture Content = _____

_____

_____

Gradation Analysis

Sieve Size (mm)	Percent Passing
150	
100	
80	
50	
40	
25	
20	
16	
12.5	
10	
5	
2.50	
1.250	
0.63	
0.315	
0.16	
0.08	



Reviewed By: _____

Alberta TRANSPORTATION

AGGREGATE IDENTIFICATION

PIT NAME: _____ PROJECT _____ JOB _____ DATE _____

LOCATION: ¼ SEC. TP RGE W M FROM _____ TO _____ SAMPLED Rec'd _____

AGGREGATE SUITABILITY

1ST COURSE GBC CSBC OTHER

ACP ASBC BLEND SAND DES_____ CLASS_____

ADDITION TO AGGREGATE AT:

NAME: _____

LOCATION: _____

SAMPLED BY: _____

REPORT TO: _____

POST OFFICE: _____

DISTRICT: _____

LAB SAMPLE NO.	FIELD INFORMATION									LABORATORY VISUAL EVALUATION																					
	BAG NO.	TEST PIT NO.	SAMPLED DEPTH (m)	TOP SIZE (mm)	% BETWEEN 80-150 mm	% BETWEEN 150-300 mm	% OVER 300 mm	MOIST. CONT.	REMARKS	WELL GRADED	EXCESSIVE PEA GRAVEL	EXCESSIVE COARSE SAND	EXCESSIVE FINE SAND	SHORT OF COARSE SAND	SHORT OF FINE SAND	PLASTICITY ASTM D2488	ANGULAR	SUB-ANGULAR	SUB-ROUND	ROUGH	SMOOTH	ENCRUSTED	SOFT SHALE	IRON NODULES	SOFT SANDSTONE	CLAY/SILT LUMPS	CLAY COATING ON ROCK	COAL

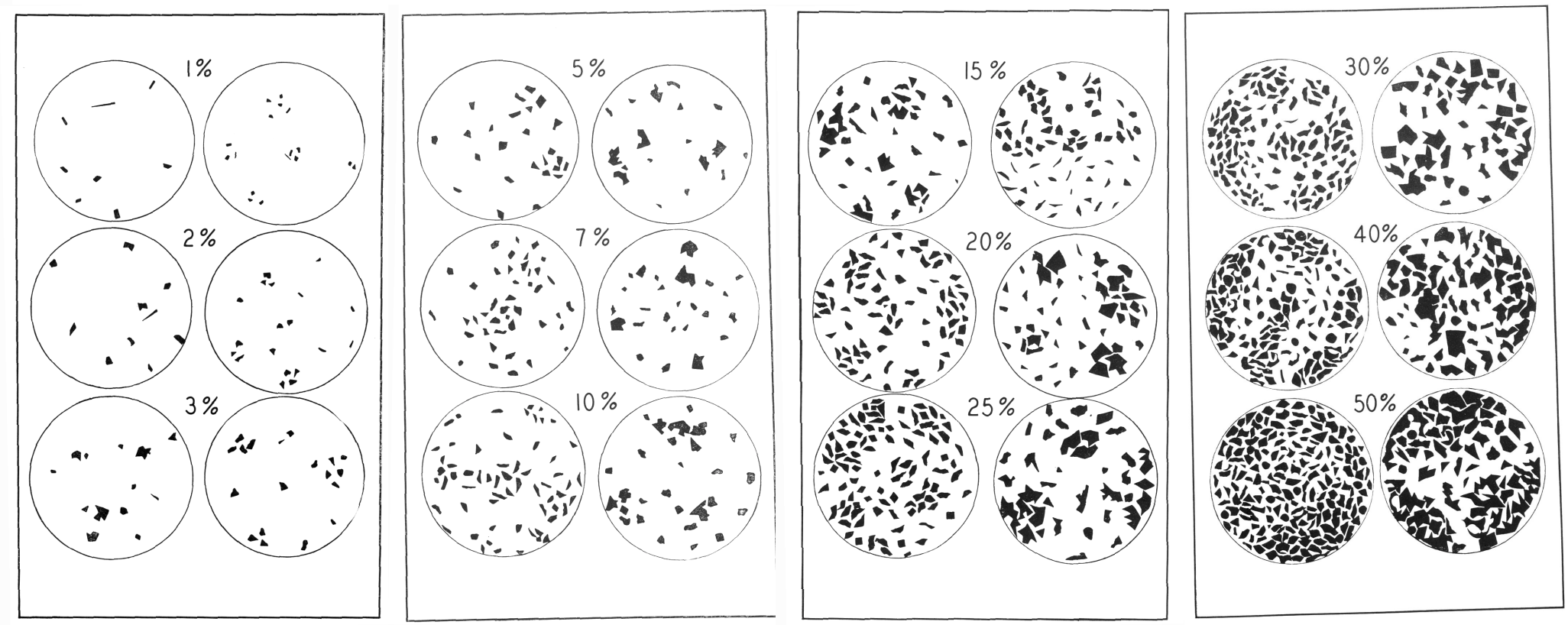
LEGEND

H - HIGH
M - MEDIUM
L - LOW
T - TRACE
N/P - NON PLASTIC

REMARKS _____

Charts for estimating percent composition of rocks and sediments

From figures 1 – 4 of “Summary of ‘Concerning Some Additional Aids in Studying Sedimentary Formations’ By M. S. Shvetsov”, Journal of Sedimentary Petrology, Vol. 25, No. 3, pp. 229-234, September, 1955.



From figure 1 of “A Comparison Chart for Visual Percentage Estimation”, Journal of Sedimentary Petrology, Vol. 21, No. 1, pp. 32-33, March, 1951. Note that each square contains the given percentage of black area and each quarter square also contains that same percentage.