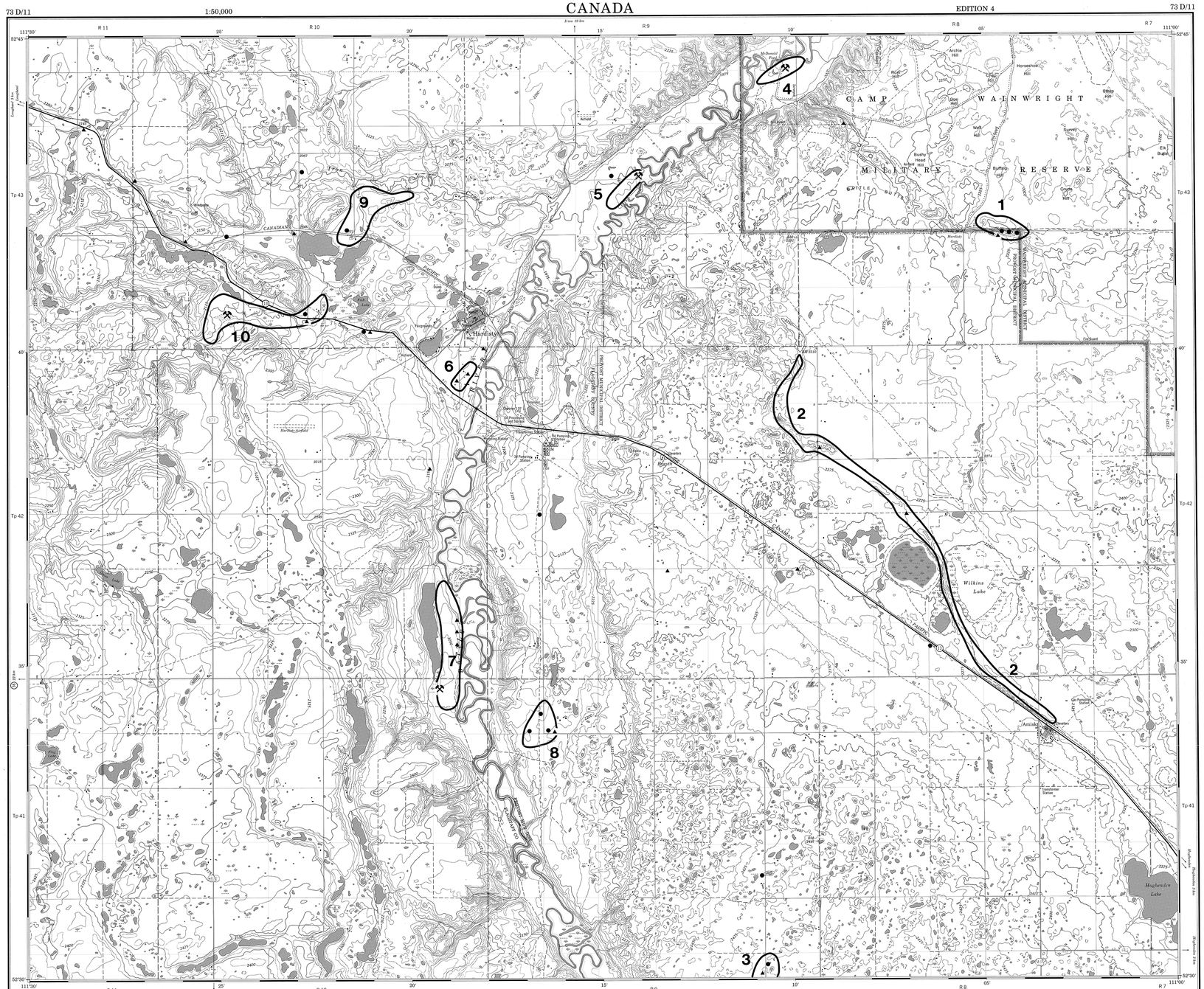
73 D/11 1:50,000 **CANADA** EDITION 4 73 D/11



Produced by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES. Updated from aerial photographs taken in 1975. Culture check 1976. Information current as of 1976.

Copies may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, or your nearest map dealer

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Roads:	Routes:	dual highway 2 chaussées séparées	more than 2 lanes plus de 2 voies
hard surface, all weather	pavée, toute saison	2 lanes 2 voies	less than 2 lanes moins de 2 voies
hard surface, all weather	pavée, toute saison	2 lanes 2 voies	more than 2 lanes plus de 2 voies
loose or stabilized surface, all weather	gravier aggloméré, toute saison	2 lanes or more 2 voies ou plus	less than 2 lanes moins de 2 voies
loose surface, dry weather and unclassified streets	de gravier, temps sec et rues hors classe		
cart track	de terre		
trail, cut line or portage	sentier, percée ou portage		

FOR COMPLETE REFERENCE SEE REVERSE SIDE — POUR UNE LISTE COMPLÈTE DES SIGNES VOIR AU VERSO

HARDISTY

ALBERTA

WEST OF FOURTH MERIDIAN - OUEST DU QUATRIÈME MÉRIDIEN

Scale 1:50,000 Échelle

Miles 1 0 1 2 3 Milles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges

CONTOUR INTERVAL 25 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

ÉQUIDISTANCE DES COURBES 25 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer
Système de référence géodésique nord-américain 1927
Projection transverse de Mercator

Établie par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. Mise à jour à partir de photographies aériennes de 1975. Vérification des ouvrages en 1976. Renseignements à jour en 1976.

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GENERAL COMMENTS

DEPOSIT CHARACTERISTICS

Deposit Number	Material Description	Reserves (1000 m³) Gravel	Reserves (1000 m³) Sand	Additional Comments	Texture (%) Gravel	Texture (%) Sand	Texture (%) Fines	(%) Wear	Overburden Thickness (m)	Deposit Thickness (m)	Deposit Area (ha)	Deposit Genesis	Additional Comments
1	Clean gravelly sand	610	1325	Concrete quality. Markets at Wainwright and Wainwright Military Reserve. Poor access.	30	65	5	-	0.3	4.5-8.0	67.9	Esker	Excellent 'pea', or fine gravel.
2	Clean sandy gravel	2280	1330	The variable thickness and discontinuous presence of the deposit may make extraction of the sand and gravel difficult. Estimates of reserves and area should be recognized as very general approximations, because of this variability and a lack of quantitative data. Good access.	60	35	5	-	0.3	0.5-5.0	384.2	Esker	Good quality. Granite and quartzite clasts are abundant.
3	Dirty gravelly sand	35	280	May be used for roads.	10	80	10	-	0.6	1.0	35.3	Outwash	Principally medium to coarse sand and fine gravel. Thin.
4	Clean sandy gravel	470	110	Used by military	78	18	4	-	1.6	1.8	33.4	Outwash Terrace	Coarse gravel, mainly. Moderate overburden thickness. Clean.
5	Dirty sandy gravel	970	200	Presently being crushed for ballast and concrete. Since pit is being actively worked the reserve estimate may need adjusting.	70	15	15	-	0.3-1.0	2.0-8.0	37.6	Outwash	The sand has a high % of deleterious material in it and is very carbonaceous, therefore it is not used. Gravel is principally quartzites and sandstones, some crystallines.
6	Dirty sandy gravel	300	150	Not concrete quality unless crushed and screened. Up to 15% deleterious material (soft sandstones and ironstones). Easy access. Convenient for Hardisty market.	60	30	10	-	0.8	1.0-3.0	25.2	Outwash	Dirty.
7	Clean sandy gravel	5425	1940	Up to 15% deleterious material (soft sandstones and ironstones) therefore must be crushed and screened if used for concrete.	70	25	5	-	0.3	4.0	193.9	Outwash	Extensive. Overall moderate quality.
8	Clean gravelly sand	300	2550	Good fill material.	10	85	5	-	0.3	2.0-5.0	85.6	Outwash	Principally medium to coarse sand, some fine gravel. Clean well sorted
9	Dirty gravelly sand	215	1080	Not concrete quality. Thinness of deposit, variable overburden thickness and a high water table complicate extraction.	15	75	10	-	0.8-3.0	0.0-1.6	146.1	Outwash	Principally coarse sand and fine gravel. Variable thickness. Crystallines dominate.
10	Very dirty sand and gravel	640	720	High % of deleterious material (soft sandstones and ironstones).	25-60	25-60	15	-	0.0-1.2	1.0-1.5	161.5	Outwash	Dirty. Variable thickness and texture. Ranges from sandy gravel to gravelly sand. Overall a thin deposit of poor to moderate quality.

Deposit Number — Granular deposits shown on this map may have commercial possibilities. That assumption followed from two criteria used in the mapping process: study of the area considered only granular deposits greater than one metre thick, and covering an area more than one hectare; and it only considered deposits where the mineral-aggregate thickness was greater than the overburden thickness. Although the scale of mapping did not permit investigation of all small deposits, many small deposits containing existing pits are indicated.

Material Description — Sand and gravel has a variety of applications, such as concrete for construction, asphalt concrete, subbase and base course aggregate for roads, gravel and sand for road surfaces, and pit run for fill. Gradation, rock hardness, and binding characteristics, are some of the specific qualities that are considered in aggregate towards determining its end use. This map indicates these, and other, geological qualities of the sand and gravel within each deposit, but does not indicate their potential uses. The terms used in the table are defined in the figure below.

Reserves — The method of calculating in cubic metres the aggregate reserves of deposits took four basic steps. First, the area, in hectares, of each deposit was determined using aerial photographs. Second, geological interpretation, sometimes supported by subsurface information, was assumed in determining the geometry of each deposit, to estimate an overall, average deposit thickness in metres. Third, geological study and limited sample analyses determined the texture (gradation) of sediments in the deposit, and an overall average percentage of gravel and sand. Finally, the volume was calculated as follows: reserve gravel (m³) = area (ha) × thickness (m) × 10,000 × % gravel; the same formula was used for sand.

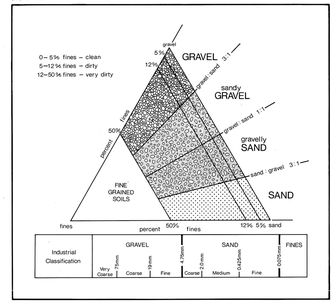
Texture — The texture of the sediment refers to the percentage of particles of various sizes. For mineral aggregate, the most important fractions are the gravel and sand. The actual dimensions of the clasts and particles in these fractions are given in the figure. The values given for a particular deposit were determined from a field estimate, or from laboratory analysis, of one or more samples from that deposit. Where more than one sample is taken the tabulated number is the mean value.

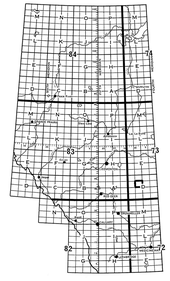
Wear — The resistance of gravel-size clasts to wear or abrasion can be measured in a laboratory test (ASTM-C131, Los Angeles Abrasion Testing). The amount of material that breaks down into smaller sizes is measured and related to the original sample weight in terms of percent wear. The higher the percentage wear the more susceptible the gravel is to breakdown under stress. Gravel with a percentage wear of less than 40 is considered very resistant.

Overburden Thickness — The thickness of non-economic material, or overburden, covering a deposit, sometimes is a limiting factor in the exploitation of an aggregate deposit. The tabulated values given are approximate overburden thicknesses as determined from geological investigations and subsurface testing.

Deposit Area — Deposits in this study were delineated by interpretation of aerial photographs and the contacts should be considered approximate. Information is precise only where test holes, or geological sections, are indicated.

Deposit Genesis — The genesis, or formation, of deposits is vital to the understanding of the gradational nature, extent and geometry of the deposit. This understanding forms the basis for extrapolation from a limited number of known points (test holes, pits, sections) and permits an overall assessment of the deposit.





Alberta RESEARCH COUNCIL Natural Resources Division

Alberta Geological Survey

This is a sand and gravel resource map prepared by the Alberta Geological Survey as part of a series at a scale of 1:50,000. The series represents an ongoing aggregate inventory of Alberta which provides data for general land-use planning, land management or aggregate exploration. Please note that the delineation of deposits and calculation of reserves are approximations only.

REFERENCES

Geology by B.N. Peterson and N.K. Jones, 1980. Compilation by N.K. Jones, 1980. Additional information from L.A. Baycock, 1957.

AGGREGATE RESOURCES

HARDISTY 73D/11