

Aggregate Report AR89-5

Aggregate Resources in the Rural Municipality of Franklin

David Newman
Minister



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**Manitoba
Energy and Mines**

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by M. Mihychuk
Winnipeg, 1997

Energy and Mines

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MAP

Map AR89-5-1: R.M. of Franklin	in pocket
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INTRODUCTION

OBJECTIVES

An aggregate resource inventory of the R.M. of Franklin was undertaken in 1989 with the purpose of : 1) delineating sand and gravel resources; and 2) providing an estimate of aggregate resources in the study area. Resource information is available to the public, aggregate industry and resource managers.

Surficial geology mapping (1:50 000) was conducted to aid in the identification of aggregate resources, and to improve the database on the distribution and stratigraphy of Quaternary sediments in the study area.

LOCATION AND ACCESS

The R.M. of Franklin is located approximately 100 km south of Winnipeg, and includes Twps. 1 to 3, and Rges. 2E to 5E (Fig. 1) in southern Manitoba. The study area is bounded on the east by the Red River and on the south by the Canada-USA border. The municipality covers an area of approximately 854 square kilometers.

Access to the study area is via Provincial Trunk highways 59 and 75, and Provincial Roads 200, 201, 209, 217 and 218. The area has an extensive network of section roads.

PHYSIOGRAPHY

The R.M. of Franklin is within the Manitoba Lowland Section of the Interior Plains of Canada (Bostock, 1969).

Elevations above sea level range from 236 m in the west to 287 m in the southeast. The area consists of a broad flat plain in the west rising in a series of ridges to a gently undulating plain in the east.

Drift cover is relatively thick and ranges from 60 m in the east to 120 m in the east central portion of the study area (Fig. 2). Intercalated sorted and unsorted sediments form a complex stratigraphy representing several glacial and non-glacial events.

The study area is in the Langside Gauge Red River sub-basin of the Roseau River watershed (Mills *et al.*, 1974). Natural drainage patterns have been altered by a system of drains to increase arable lands.

METHODOLOGY

Field investigations were conducted during the summer of 1989. On-site observations were combined with information interpreted from aerial photographs to produce the surficial geology map (AR89-5-I, in pocket).

Deposit boundaries were delineated on 1:15 850 scale photographs and transferred to the 1:50 000 base map. Reserve values were obtained by multiplying the area of the deposit by the average depth and subtracting the sterilized or depleted portions. Reserve calculations were calculated from the map and should be considered approximate.

On-site data collected include lithology, stratigraphy, and general landuse factors. Where sand or gravel was encountered, samples of the matrix and the pebble constituents were collected.

Aggregate samples were analyzed in two stages. In the field, samples weighing between 75 and 100 kilograms were sieved utilizing 7.5 cm (3"), 3.8 cm (1.5"), and 1.9 cm (0.75") screens. The weights of the fractions were recorded and a representative sample of the <1.9 cm fraction was retained for additional processing.

Pebble counts on the 1.9 to 3.8 cm fraction were done to separate the pebbles into carbonate, gneiss, volcanic, granite, quartzite, greywacke, and sandstone lithologies. These groups were then further subdivided into good, fair and poor categories and deleterious constituents including chert and carbonate encrustation were noted.

PREVIOUS WORK

The surficial geology of the study area has been generalized at 1:1 000 000 scale by Manitoba Energy and Mines (1981). Aggregate information was collected by Manitoba Highways and reported in Block file No. 9 (1985).

Drift thickness and bedrock topography was compiled by Teller *et al.* (1976). A compilation of the bedrock geology was produced by Manitoba Energy and Mines (1990).

ACKNOWLEDGMENTS

Carole Tetreault provided able field assistance. Tom Yamashita assisted in report preparation. Manny Carvalho drafted the map and figures. The manuscript was desktopped by S. Henrie and edited by D.A. Baldwin.

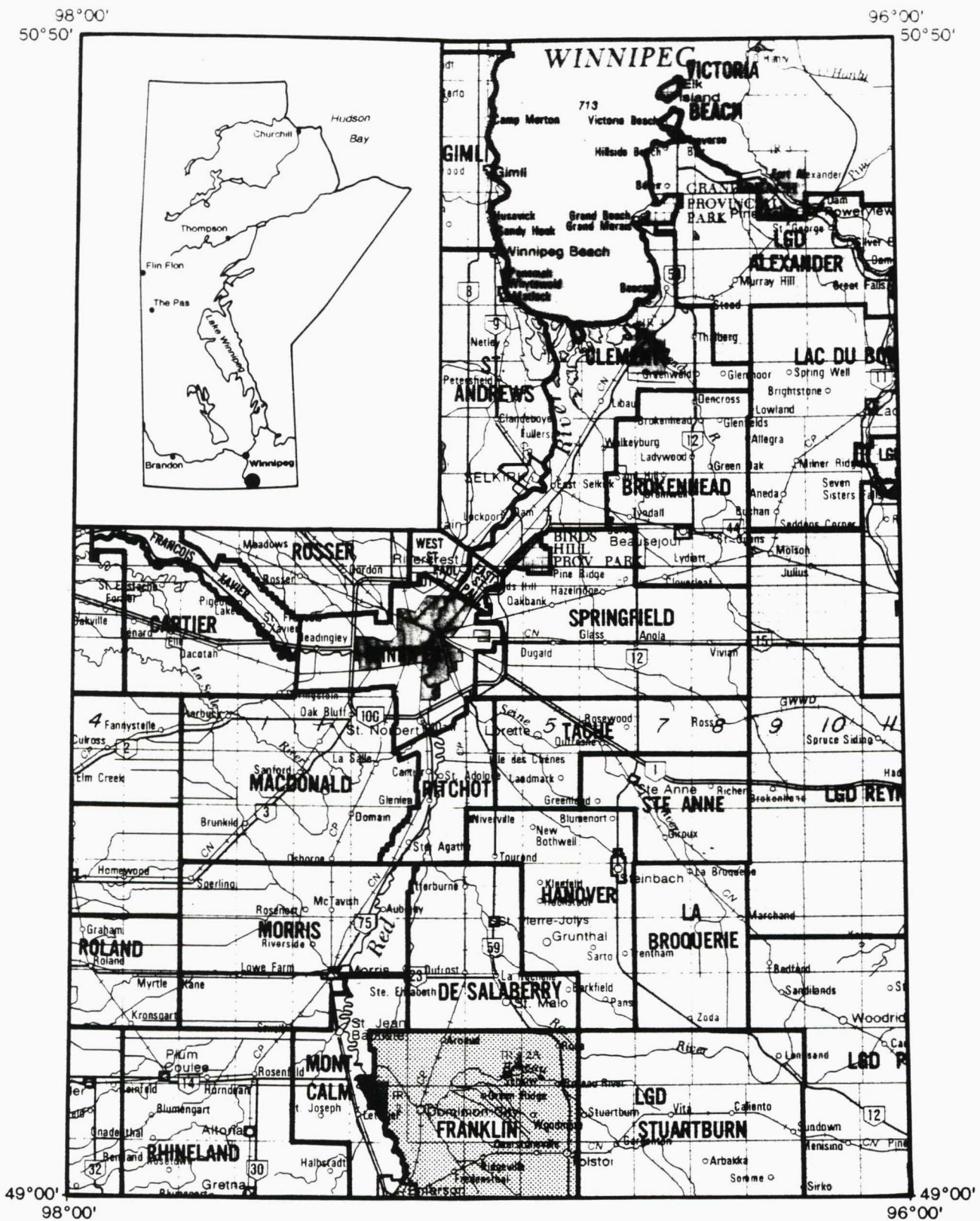


Figure 1: Location map of the R.M. of Franklin study area.

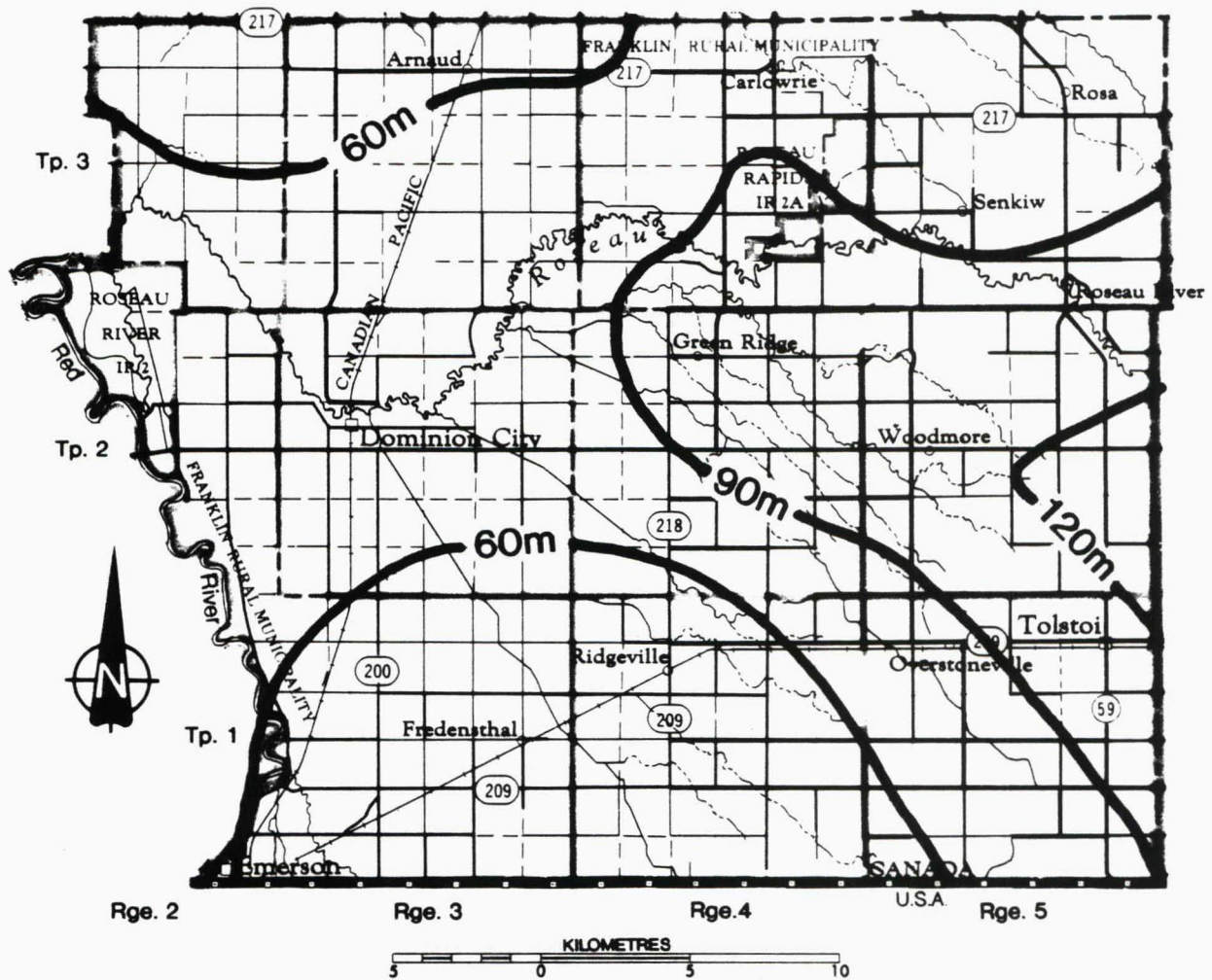


Figure 2: Drift thickness in the R.M. of Franklin.

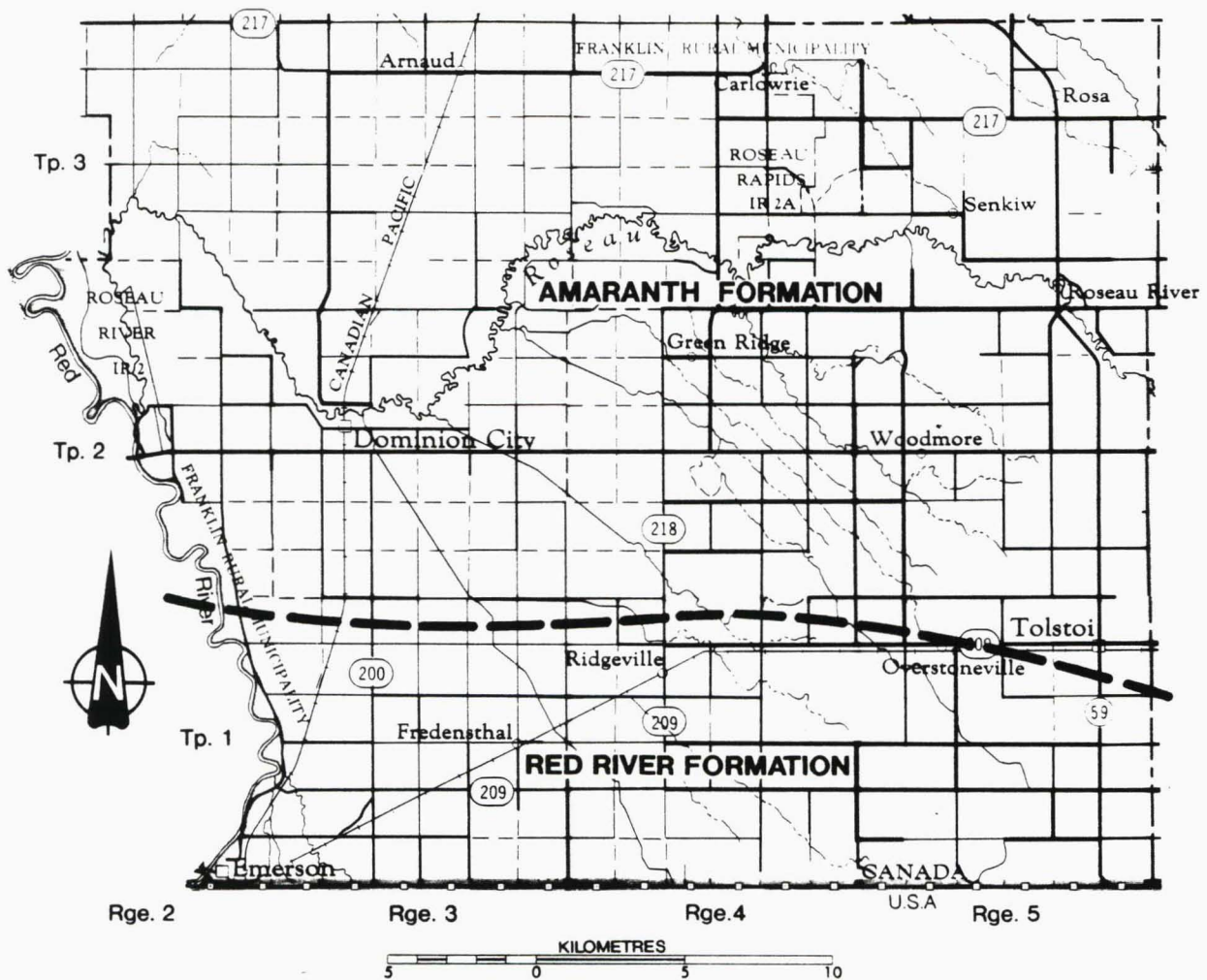


Figure 3: Bedrock geology of the R.M. of Franklin. (Manitoba Energy and Mines, 1990)

GEOLOGY

BEDROCK GEOLOGY

There are no bedrock exposures in the R.M. of Franklin. Bedrock in the study area consists of the Ordovician Red River Formation and the Jurassic Amaranth Formation (Manitoba Energy and Mines, 1990) (Fig. 3).

The most prominent bedrock feature in the area is the Amaranth Formation strata infill of the Dominion City Channel, a Mesozoic subcrop pattern which trends eastward across the area (Manitoba Energy & Mines, 1990).

Bedrock elevations are between 171 m in the Dominion City area and 197 m near Rosa. The Roseau River generally follows the path of a buried bedrock valley (Fig. 4) (Teller *et al.*, 1976).

SURFICIAL GEOLOGY

Glacial Lake Agassiz sediments compose the dominant surficial geology unit. The western half of the study area is a broad flat plain composed of fine-textured lacustrine sediments, primarily clay and silt. Nearshore sands, and shoreline beach ridges of sand, and sand and gravel are common from the central to eastern part of the study area. Till outcrops in the south central Ridgeville area and in the northeast part of the municipality (Fig. 5).

Glacial (Unit 1)

The "Ridgeville Moraine" forms a prominent escarpment that separates the Agassiz lake plain and the upper plain. Till from this moraine outcrops from Greenridge and continues south through Ridgeville. Till also outcrops in the Senkiw - Roseau River area as a broad ground moraine surface. The surface has been modified by glaciolacustrine wave action. In many areas fines have been winnowed from the till resulting in formation of thin (0.1 - 0.3 m) deposits of sand or gravel on top of cobble lag deposit overlying the till. Boulders commonly litter the surface of the moraine deposits.

Lodgement and water-lain till facies were identified in the area. Lodgement is unsorted and unstratified, moderately stony and has an overconsolidated fissile silty-clay matrix.

The water-lain facies is characterized by a very sandy matrix that supports the clast content of the till. It shows evidence of ice and water depositional environments. Deposits commonly include lenses of stratified sediments (generally sand) and lack fines.

In terms of economic potential, till is used as a source of crushable stone, binder and fill. Abundance, processing, and transportation are the significant factors for using stone from moraine deposits.

Glaciofluvial (Unit 2)

In the R.M. of Franklin, glaciofluvial deposits comprise esker and outwash sediments. The Rosa and Overstoneville eskers (Fig. 6) form linear concentrations of sand and

gravel that are commonly overlain by glaciolacustrine sediments.

The Rosa esker extends from the east map boundary west to 3 km northwest of the community of Rosa. East of Rosa it reaches heights of approximately 2 m. Northwest of Rosa the esker has been modified by glaciolacustrine processes and has no discernible surface expression.

Generally, the sediments in the Rosa esker contain more than 30% stone and are considered, in terms of aggregate, to be high quality. Bouldery cobble gravel is found at site FR165 while the material becomes finer at site FR164 where the material is coarse pebble gravel.

An outwash plain flanks the Rosa esker, fanning out in the area around the community of Rosa. There is over 1 m of gravel above the water-table; total deposit depth is not known.

The Overstoneville esker (1224) is located in township (01-5E) and is named for the hamlet of Overstoneville. This esker has no morphological expression. Deposit shape, depth and sedimentological characteristics suggest a glaciofluvial depositional environment. It is 2 - 2.5 km long and is bifurcated for approximately one half its length.

Stratigraphically, littoral nearshore sands and gravel beach deposits overlie the glaciofluvial sediments, and appear to extend below the water table.

There are several outwash deposits in the study area. The most significant is deposit 1274, 4.8 km west of Rosa that covers an area of 89.3 hectares. The outwash deposits contain an abundance of oversize material.

Outwash and esker deposits in the R.M. of Franklin have excellent aggregate potential and the material tends to be high quality.

Glaciolacustrine: basinal (Unit 3)

Extensive areas of glaciolacustrine sediments are found over the west half of the study area. Iceberg scours (Fig. 7) are evident on the clay plain east of Dominion City.

Sediments are generally uniform, consisting of a massive dark brown clay. In one location (FR075) white, calcareous, overconsolidated silt nodules were observed.

Aggregate potential in the clay plain is poor to none. There is the possibility of a buried near surface glaciofluvial deposit where basinal deposit thicknesses are less than 1 m.

Glaciolacustrine: nearshore (Unit 4)

Nearshore sands, deposited in relatively shallow glacial lake waters, are found from Ridgeville eastwards. The deposit consists of fine- to medium-grained, well sorted sand. Generally the unit is massive, but locally fine laminations were observed.

Aggregate potential is low. Nearshore sands blanket glaciofluvial deposits.

Glaciolacustrine: shoreline (Unit 5)

North-south trending beach ridges that were formed by Glacial Lake Agassiz are found from the Ridgeville Mo-

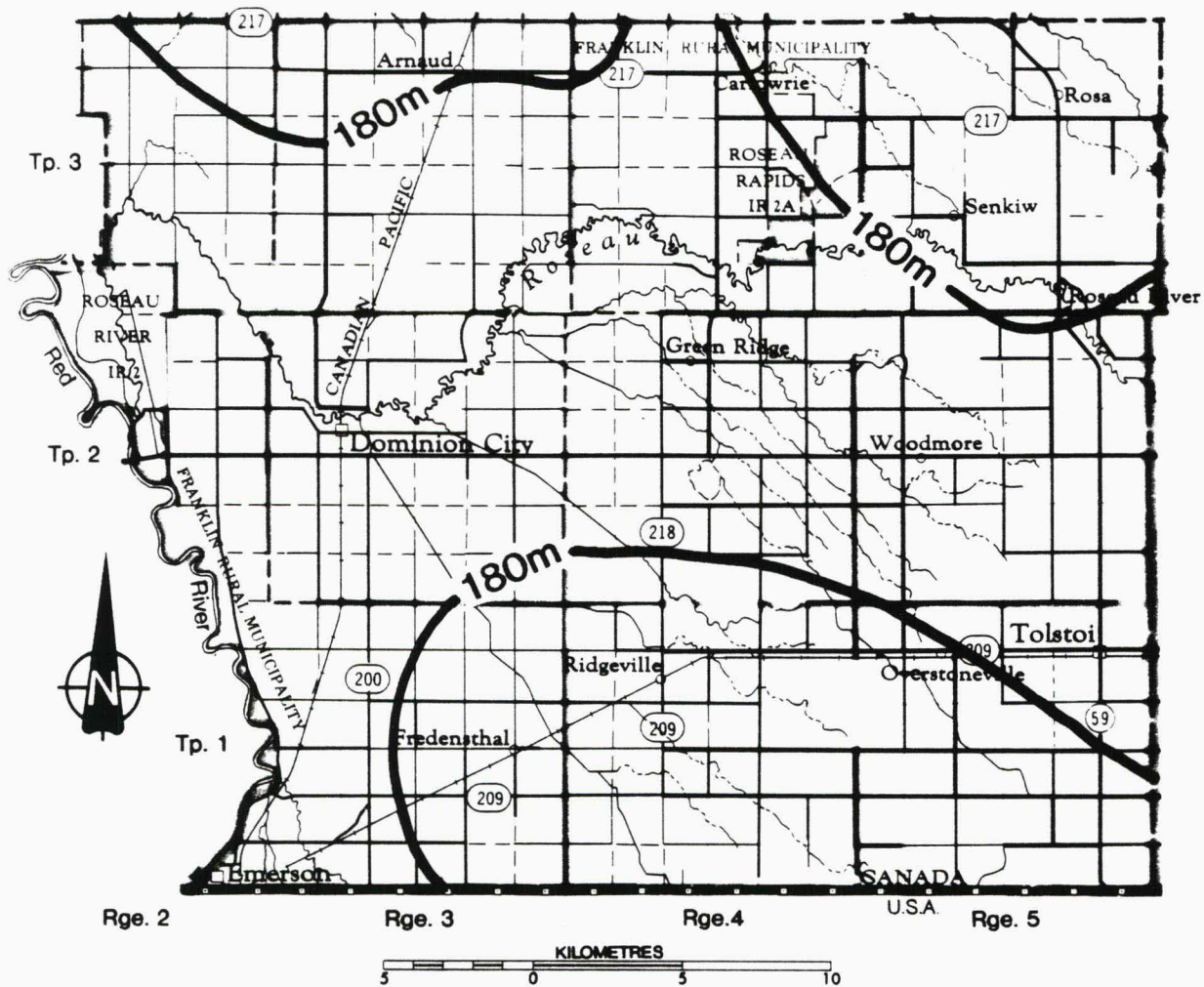
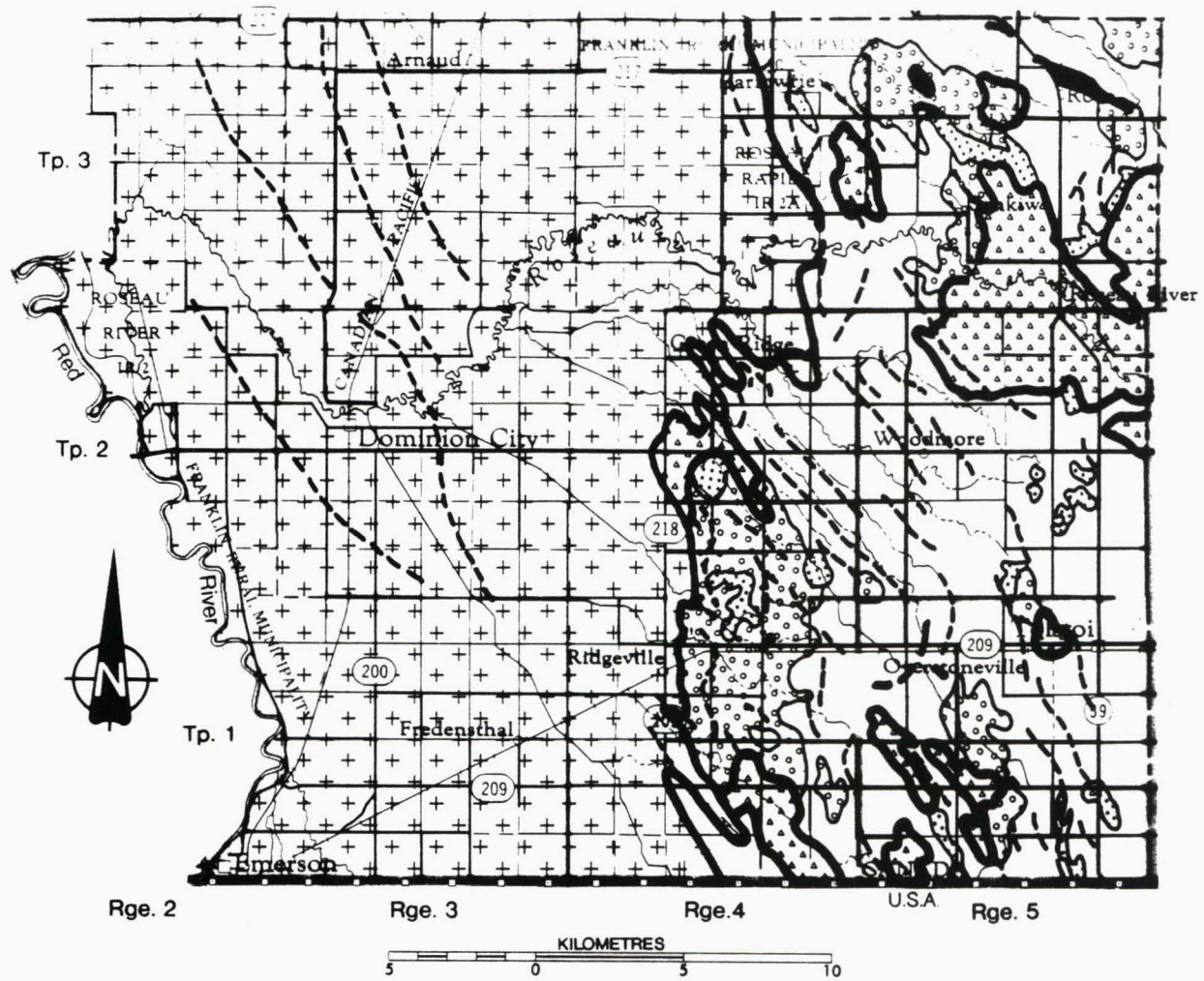


Figure 4: Buried bedrock topography in the R.M. of Franklin. (modified from Teller et al, 1976)



LEGEND

-  Organics
-  Clay and silt
-  Sand
-  Thin sand over till
-  Till
-  Glaciofluvial gravel deposits
-  Beach ridges

Figure 5: Generalized surficial geology of the R.M. of Franklin.

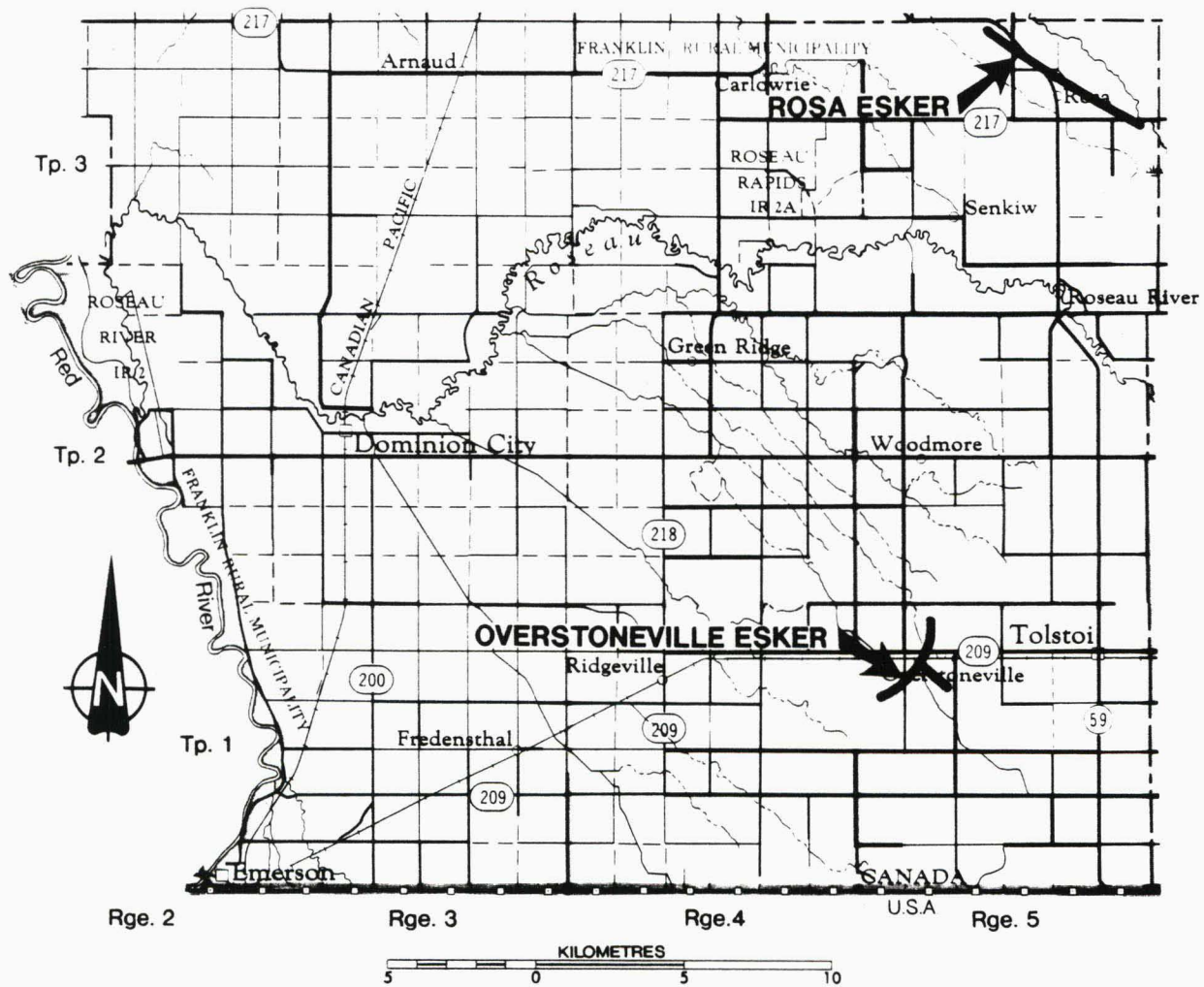


Figure 6: Location of Rosa esker and Overstoneville esker.

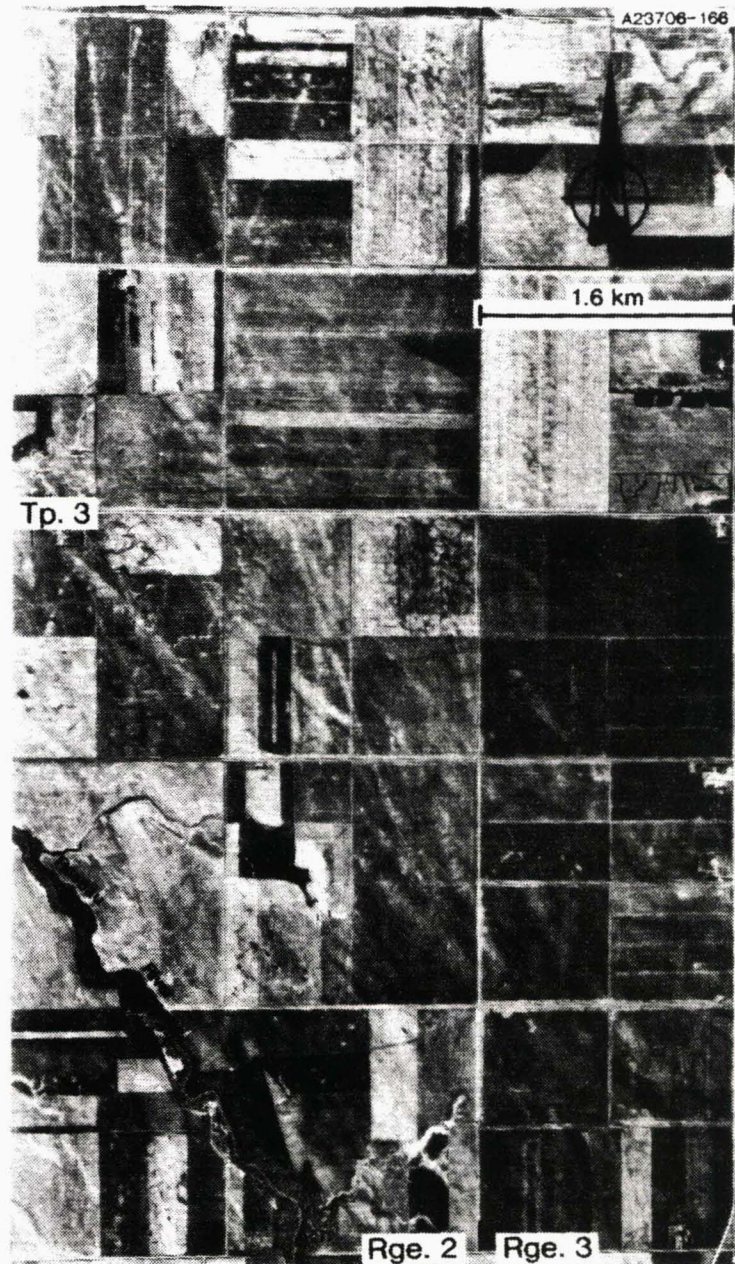


Figure 7: Iceberg scours on the glacial Lake Agassiz plain of Dominion City.

rairie eastward. Deposits consist of sand and gravel and are generally 0.5 - 1.0 m thick.

The sediments are very well sorted, very well rounded and generally have horizontal bedding. The material ranges from pebbly sand to pebble gravel.

Aggregate potential in shoreline deposits is very good. These deposits comprise the most common source of aggregate in the study area. Deposits must be tested for sand content as some deposits are too sandy for most end uses. The beach deposits generally overlay a cobble-boulder lag deposit formed by the reworking underlying till.

Alluvial (Unit 6)

Recent alluvial sediments occur along the Roseau and Jordan rivers, and some of their tributaries.

Sediments consist primarily of silt and sand with minor gravel or cobble - boulder lag deposits.

Aggregate potential in alluvial deposits in the study area is poor.

Organic (Unit 7)

Organic deposits are found in low lying, poorly drained areas primarily in the east half of the area. Many swampy areas have been drained to increase arable lands.

There is no aggregate potential in organic deposits. Low lying outwash deposits can be covered by shallow organic deposits. Testing is required to determine the presence of aggregate.

AGGREGATE RESOURCES

INTRODUCTION

Sand and gravel is typically used for road surfacing, concrete, bituminous paving mixtures and backfill. Most end uses have specifications that the material must meet. Sand and gravel must be processed to meet those specifications in most cases. Common processing methods include screening, washing, crushing and mixing. In addition to specific grain size specifications the gravel must contain durable and chemically stable rock or pebble fragments and the material must be free of organic material.

The value or quality of a sand and gravel deposit is based on the properties of the material and then its quarry status (active, inactive or revegetated) of the deposit. Properties of the sand and gravel that were tested include grain size distribution and lithologies of the clast constituents. Table 1 lists the criteria for quality assessment.

TABLE 1
AGGREGATE QUALITY ASSESSMENT CRITERIA

	High	Medium	Low
Stone %	30	15-30	0-15
Sand %	0-35	35-70	> 70
Fines %	0-7	7-17	> 17
Thickness	> 5 m	2-5 m	< 2 m
Uniformity	high	medium	low

In the R.M. of Franklin the most significant criteria for quality assessment are:

- 1) amount of stone in a deposit and the proportion of the fines to sand and gravel components;
- 2) extent and depth of the deposit; and
- 3) location.

Deposit production potential (Table 2) is a classification that indicates a deposit's likelihood of being mined or used in the foreseeable future (25 years). Production potential is based on:

- 1) aggregate quality and physical characteristics of the deposit (overburden, binder availability, watertable, crushable component);
- 2) location and geological setting (geological potential, local access, planning constraints, transportation); and
- 3) economic factors (pit status, speciality material, supply, deposit substitution).

Good production potential status indicates a deposit that is presently being mined or has high probability of being mined. Moderate status denotes a deposit is presently inactive, or a deposit that may be used in the foreseeable future. Those deposits with poor potential are interpreted to

have little probability of being mined. These deposits are often near depletion or revegetated or sterilized by cultural features.

TABLE 2
PRODUCTION POTENTIAL CRITERIA

Criteria	Good	Moderate	Poor
Aggregate Quality	high	medium	low
Crushable	abundant	moderate	minor
Overburden	< 0.5 m	0.5-1 m	> 1 m
Binder	yes	minor	none
Water table (depth)	> 3 m	1-3 m	< 1 m
Local access	0-1 km	1-5 km	> 5 km
Quarrying status	active	inactive	revegetated
Planning constraints	none	conditional	sterilized
Speciality material	yes	-	no
Aggregate substitute	none	marginal	proximal

Information was collected from 415 sites. Location of the sand and gravel pits in the study area are shown in Figure 8. General site information collected during the survey is presented in Appendix A.

Grain size distribution of the sand and gravel samples collected in the R.M. of Franklin are given in Appendix B. This information, compared to the aggregate grading specifications (Appendix C), can be used to determine whether or not the material will produce the desired product (e.g. A Base, Concrete Sand, D Traffic). Appendix D shows the size limits of granular descriptive terms (e.g. pebble gravel). Petrographic information on the clast population is detailed in Appendix E. A summary of the data is presented in Table 3.

Township 001 - 04E

Aggregate deposits are found in the east two-thirds of the township, with only two small deposits in the southern half (Fig. 9). There are 18 deposits and 16 sand and gravel pits; one pit (FR064) is active; it is located in deposit 1210.

Material quality is generally low, 86% of reserves contain less than 30% stone (greater than #4 sieve). Of the 51 100 m³ of high quality reserves (Table 4) in deposits 1228, 1229 and 1230a, 21 900 m³ has good potential for extraction.

Demand for aggregate is very high because there are no aggregate reserves to the west in the Agassiz clay plain and known supply is virtually depleted.

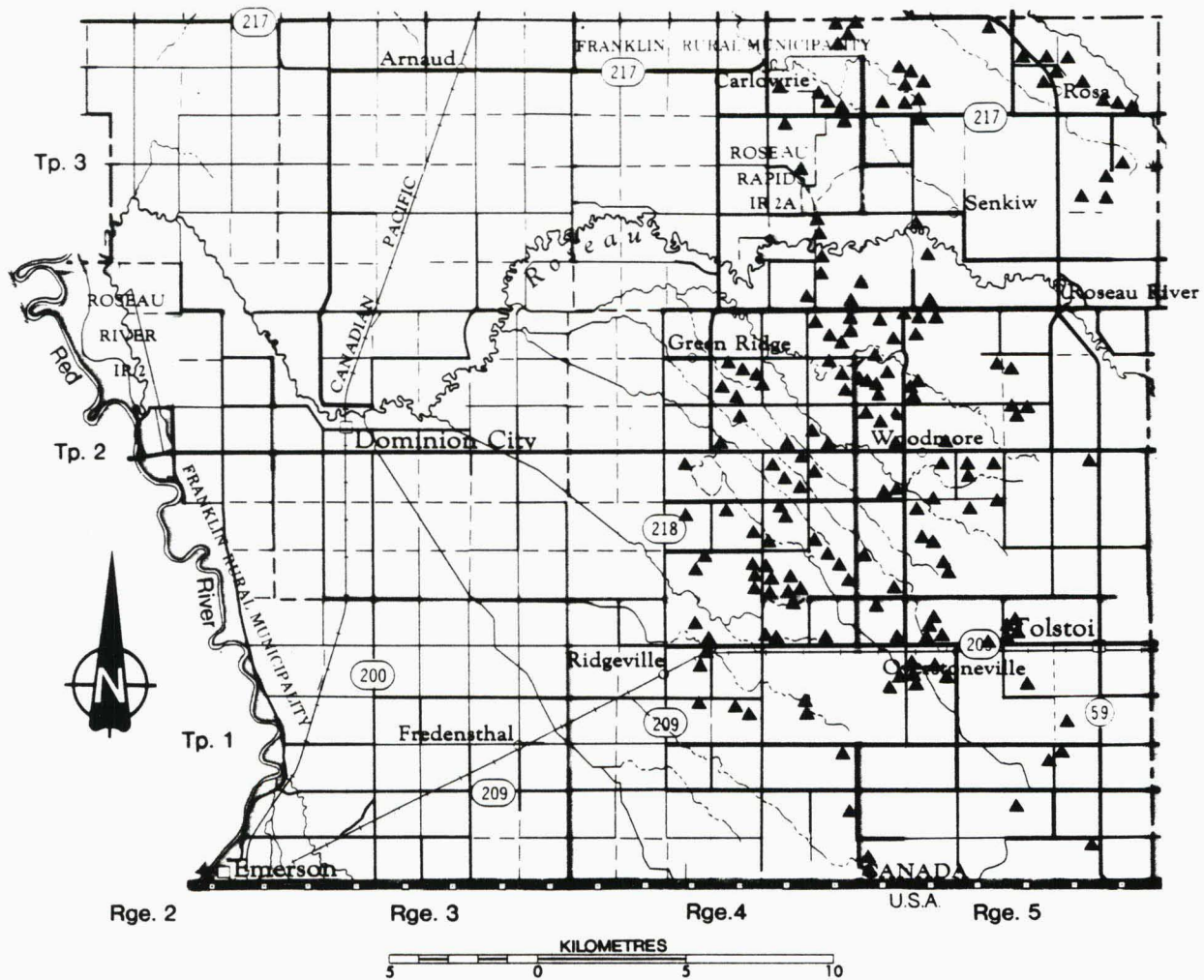


Figure 8: Pit locations in the R.M. of Franklin. (1:250 000 scale)

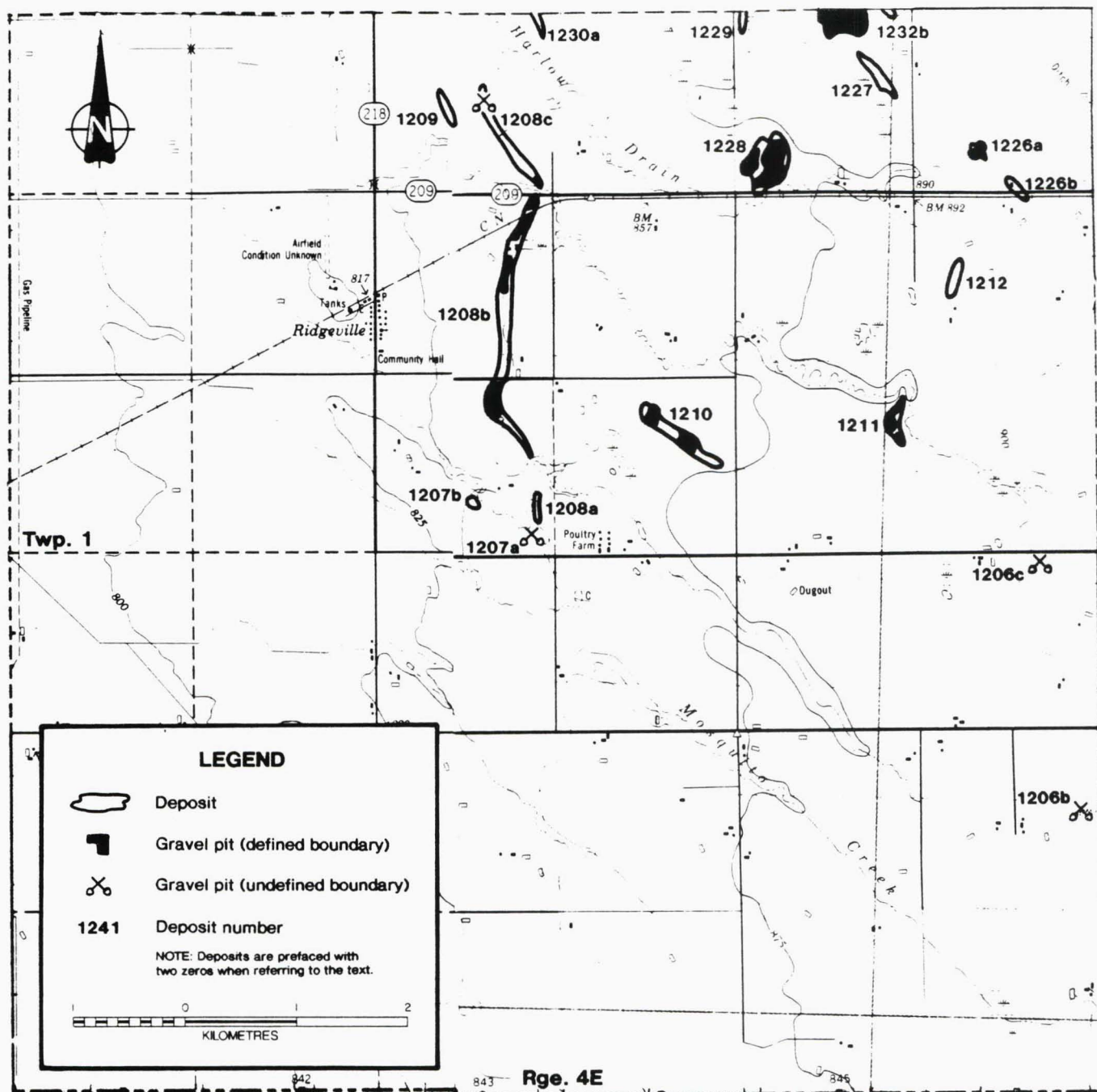


Figure 9: Aggregate deposits in township 001-04E in the R.M. of Franklin.

TABLE 3
AGGREGATE DEPOSITS IN THE R.M. OF FRANKLIN

Deposit	Legal Sub	Location			Site Number	Estimated Reserves Cubic m	% Stone (+#4) (+4.76 mm)	% Fines (-200)	Aggregate Quality+	Production Potential*
		Sect.	Twp.	Rge						
001206b	09	NE12	01	4E	FR008	7200	28	4	M	M
001206c	15	NE13	01	4E	FR032	6000	11	2	L	M
001207a	01	SE21	01	4E	FR294	3800	0	0	L	P
001207b	07	SE21	01	4E	FR213	6000	27	21	L	P
001208a	01,08	SE21	01	4E		30000	0	0	L	M
001208b	09,15	NE21	01	4E	FR258	20300	19	2	L	P
001208b	09,10,16	NE28	01	4E	FR062	0	13	5	L	P
001208b	07,02	SE28	01	4E	FR067	42500	14	3	L	P
001208b	01	SE33	01	4E		0	0	0	L	P
001208c	01,07	SE33	01	4E		45000	0	0	L	M
001208c	10	NE33	01	4E		30000	0	0	L	M
001209	06	SW33	01	4E	FR250	11000	0	0	L	G
001209	11	NW33	01	4E		8000	0	0	L	G
001210	10	SE22	01	4E	FR218	2800	30	7	M	P
001210	14	NW22	01	4E	FR219	3300	41	10	M	P
001210	09,10,15	NE22	01	4E	FR064	52800	46	7	M	M
001211	09,16	NE23	01	4E	FR289	5400	0	0	M	P
001212	12	NW25	01	4E	FR224	14400	23	4	M	M
001212	05	SW25	01	4E		5600	0	0	M	P
001226a	03,06	SW36	01	4E	FR058	700	19	5	M	P
001226b	02	SE36	01	4E	FR057	500	0	0	M	P
001226b	15	NE25	01	4E		0	0	0	M	P
001227	09,10,15	NE35	01	4E		19000	0	0	M	M
001228	All	SW35	01	4E	FR059	29200	0	0	H	M
001229	13	NW35	01	4E		7500	0	0	H	G
001230a	16	NE33	01	4E	FR251	14400	32	4	H	G
001232b	14	NW35	01	4E		0	0	0	M	P
001232b	15,16	NE35	01	4E	FR081	0	0	0	M	P
001201	16	NE02	01	5E	FR001	5000	50	5	H	P
001201	01	SE11	01	5E		300	0	0	H	P
001202a	04	NW11	01	5E	FR015	13500	0	0	L	M
001202a	03	SW14	01	5E		13500	0	0	L	M
001202b	09	NE15	01	5E	FR013	9000	8	2	L	M
001203	13	NW14	01	5E	FR012	9000	3	6	L	P
001204	05,06	SW23	01	5E	FR207	27000	14	1	L	M
001205	11	NW10	01	5E	FR017	5000	0	0	M	P
001206a	12	NW05	01	5E		0	0	0	M	P
001206a	05	SW05	01	5E		0	0	0	M	P
001213a	03	SW30	01	5E		11000	0	0	M	P
001213a	02	SE30	01	5E	FR297	4900	0	0	M	P
001214	05	SW29	01	5E	FR230f	3400	14	20	L	P
001214	01,08	SE30	01	5E	FR063	21300	0	0	L	P
001214	12	NW29	01	5E		9300	0	0	L	P
001214	09	NE30	01	5E		3100	0	0	L	P
001215a	03,04,05	SW29	01	5E	FR228c	30900	0	0	H	M

TABLE 3 (Cont'd)

Deposit	Legal Sub	Sect.	Location Twp. Rge	Site Number	Estimated Reserves Cubic m	% Stone (+4) (+4.76 mm)	% Fines (-200)	Aggregate Quality+	Production Potential*
001215b	15	NE20	01 5E	FR227d	19200	52	4	H	M
001216	01,07,08	SE29	01 5E	FR296	0	0	0	H	P
001217a	11	NW29	01 5E		400	44	5	H	P
001217a	07	SE29	01 5E		2800	0	0	H	P
001217a	09,10	NE29	01 5E	FR050	21900	46	4	H	M
001217b	t14	NW29	01 5E	FR233b	12000	31	10	H	P
001218	02,07	SE27	01 5E	FR045	4800	32	1	H	P
001218	03,06	SW27	01 5E		2400	0	0	H	P
001218	10	NE27	01 5E		13200	0	0	H	P
001218	14	NW22	01 5E		2400	0	0	H	P
001219	All	SW35	01 5E		54000	0	0	H	G
001219	02,07	SE35	01 5E		15000	62	5	H	G
001220	05,06	SW34	01 5E		900	0	0	H	P
001220	11,12	NW34	01 5E		500	0	0	H	P
001221	04,05	SW34	01 5E	FR048a	50000	57	1	H	M
001222	02	SE33	01 5E	FR049	FR242 4600	0	4	L	P
001223	All	SE32	01 5E	FR052	FR235 20100	0	0	H	G
001223	09,16	NE32	01 5E		105000	0	0	H	G
001224	03,06	SW32	01 5E	FR054	FR055 38500	17	3	M	G
001224	02,07	SE32	01 5E	FR234d	43700	0	0	H	G
001224	11	NW32	01 5E	FR053	25000	0	0	H	G
001224	10	NE32	01 5E	FR236c	37500	76	4	H	G
001225	01	SE31	01 5E	FR056	0	48	8	H	P
001234a	11,14	NW31	01 5E	FR237	FR109 59500	22	3	M	G
001234b	10	NE31	01 5E	FR238	35000	23	13	M	M
001280	05	SW	33 01 5E	FR241a	15000	53	4	H	M
001229	04	SW02	02 4E	FR084b	2400	48	2	H	P
001229	01,08	SE03	02 4E	FR085	FR088 20000	0	0	H	G
001230a	09,10	NE04	02 4E	FR144a	0	0	0	H	P
001230a	01,02,07	SE04	02 4E		48600	0	0	H	G
001230b	01,08	SE09	02 4E		13120	0	0	H	P
001230b	16	NE04	02 4E		7700	0	0	H	P
001231	12	NW02	02 4E		800	0	0	M	P
001231	05	SW02	02 4E	FR086	FR087 0	19	2	M	P
001231	09	NE03	02 4E	FR089	0	0	0	M	P
001232a	07	SE02	02 4E		10000	0	0	M	M
001232b	03	SW02	02 4E		6000	0	0	M	P
001232b	01,02	SE02	02 4E	FR082	110000	20	7	M	M
001233a	09,10	NE01	02 4E	FR139	FR248 21100	31	5	H	G
001233a	07,08	SE01	02 4E	FR247	54000	33	5	H	G
001233b	13,14	NW01	02 4E	FR138	0	0	0	H	P
001233b	04	SW12	02 4E	FR137	3000	60	4	H	P
001235a	16	NE01	02 4E	FR249	5600	55	3	H	P
001248	11,14	NW11	02 4E	FR112	FR113 16900	12	2	L	P
001248	10,15	NE11	02 4E		3300	0	0	L	P
001249a	13,14	NW02	02 4E		3600	0	0	H	P

TABLE 3 (Cont'd)

Deposit	Legal Sub	Sect.	Location		Site Number	Estimated Reserves Cubic m	%	%	Aggregate Quality+	Production Potential*	
			Twp.	Rge			Stone	Fines			
							(+#4) (+4.76 mm)	(-200)			
001249a	03,04	SW11	02	4E	FR143	1600	23	2	M	P	
001249a	01,07,08	SE10	02	4E	FR142	13400	48	5	H	P	
001249b	11,13,14	NW10	02	4E	FR114d	0	0	0	M	P	
001250	15,16	NE16	02	4E		0	0	0	M	P	
001250	11,14	NW16	02	4E		0	0	0	M	P	
001250	All	SW16	02	4E	FR291	0	0	0	M	P	
001250	07,08	SE09	02	4E	FR145	4000	0	0	M	P	
001250	04	SW22	02	4E	FR288	0	0	0	M	P	
001250	11,13,14	NW09	02	4E		0	0	0	M	P	
001250	01	SE21	02	4E	FR292	0	0	0	M	P	
001250	10	NE09	02	4E		2900	0	0	M	P	
001251	11,12	NW14	02	4E	FR141	2800	0	0	M	P	
001251	01,02,07	SE14	02	4E	FR136	FR267	11200	18	2	M	P
001251	06	SW14	02	4E			0	0	0	M	P
001252a	12	NW13	02	4E	FR268a	23100	54	4	H	M	
001252a	01,02	SE23	02	4E	FR140	1500	32	9	H	P	
001252a	03	SW23	02	4E		0	0	0	H	P	
001252a	09,16	NE14	02	4E	FR135	9000	25	2	M	P	
001252b	12	NW13	02	4E	FR287	600	0	0	M	P	
001253a	05	SW24	02	4E	FR252a	600	0	0	M	P	
001253b	04	SW24	02	4E	FR252e	4200	33	17	H	P	
001253c	03	SW24	02	4E	FR134	1200	26	3	M	P	
001254a	All	SE25	02	4E	FR133	10300	73	2	H	M	
001258c	01	SE36	02	4E	FR271b	1800	46	1	H	P	
001259b	10	NW25	02	4E	FR132	1600	45	6	H	P	
001259c	14	NW25	02	4E	FR269b	24000	39	4	H	P	
001260	10,15	NE22	02	4E	FR146a	0	20	3	M	P	
001260	11	NW22	02	4E		0	0	0	M	P	
001260	03,05,06	SW27	02	4E	FR152	2500	46	4	H	P	
001260	02,07	SE27	02	4E	FR147	FR148	4500	35	3	H	P
001261a	08	SE27	02	4E	FR151		8000	17	3	M	P
001261a	All	NE27	02	4E	FR149	85000	0	0	M	G	
001261a	12	NW26	02	4E		8000	0	0	M	P	
001261a	05	SW26	02	4E	FR150	0	16	3	M	P	
001261b	13,14	NW27	02	4E	FR293	10500	0	0	M	P	
001262a	12,13	NW36	02	4E	FR153	2800	44	1	H	P	
001263	07,08	SE36	02	4E	FR157	FR160	55500	26	4	M	G
001263	All	NE36	02	4E	FR158		FR159	135000	29	2	M
001234a	03	SW06	02	5E	FR109d	6800		0	0	M	G
001235a	11,12,13	NW06	02	5E	FR083	14700	0	0	H	M	
001235b	01,02,07	SE06	02	5E	FR079	109800	0	0	H	G	
001236a	02	SE08	02	5E	FR286	0	0	0	H	P	
001236a	03	SW08	02	5E		22900	0	0	H	M	
001236b	09,10	NE05	02	5E		0	0	0	H	P	
001236c	08	SE05	02	5E		9000	0	0	H	P	
001236c	09	NE05	02	5E		7500	0	0	H	P	

TABLE 3 (Cont'd)

Deposit	Legal Sub	Sect.	Location		Site Number	Estimated Reserves Cubic m	%	%	Aggregate Quality+	Production Potential*	
			Twp.	Rge			Stone	Fines			
							(+#4) (+4.76 mm)	(-200)			
001237	11	NW04	02	5E		7200	0	0	M	P	
001237	07	SE04	02	5E		2400	0	0	M	P	
001237	10	NE04	02	5E	FR257a	5400	23	3	M	P	
001238a	03	SW09	02	5E	FR255b	35700	20	11	M	G	
001238a	01,02,07	SE09	02	5E	FR256a	115500	40	6	H	G	
001238b	01,07,08	SE09	02	5E	FR259a	30000	18	12	M	G	
001239a	12,13	NW10	02	5E	FR100	19800	10	1	L	P	
001239b	16	NE09	02	5E	FR099	6000	0	0	L	P	
001239c	01,08	SE16	02	5E	FR285	15000	0	0	L	M	
001240a	09,16	NE14	02	5E	FR261b	FR205	9900	28	8	M	M
001240b	02	SE23	02	5E	FR115		4000	0	0	H	P
001240b	15	NE14	02	5E			0	0	0	H	P
001241a	11,13,14	NW09	02	5E	FR104a	67500	43	3	H	G	
001241b	01,02	SE20	02	5E	FR119	6400	40	5	H	M	
001241b	06	SW16	02	5E		0	0	0	H	P	
001241b	11,12,13	NW16	02	5E	FR117	48000	0	0	H	G	
001241b	16	NE17	02	5E		0	0	0	H	P	
001242	09,10	NE16	02	5E	FR118	4200	39	5	M	G	
001243	All	NE17	02	5E		9000	0	0	M	P	
001245a	15	NE08	02	5E	FR103	100	0	0	H	P	
001245a	14	NW08	02	5E		700	0	0	H	P	
001245b	09	NE08	02	5E	FR102	14800	0	0	H	M	
001246a	13,14	NW08	02	5E		5000	0	0	H	P	
001246b	01	SE18	02	5E	FR105	500	0	0	H	P	
001247	All	NE07	02	5E		50400	0	0	H	G	
001247	03	SW18	02	5E	FR106	1200	0	0	H	P	
001247	02	SE18	02	5E		900	0	0	H	P	
001254b	13	NW19	02	5E	FR125	0	0	0	H	P	
001254c	11	NW19	02	5E	FR127	0	0	0	H	P	
001254c	10	NE19	02	5E		0	0	0	H	P	
001254d	01	SE19	02	5E	FR120	6300	56	3	H	G	
001255	03,05,06	SW20	02	5E	FR253b	25200	24	12	M	G	
001256a	13	NW22	02	5E	FR131a	0	0	0	M	P	
001256b	12,13	NW13	02	5E	FR131b	0	21	9	M	P	
001256c	15	NE22	02	5E	FR131c	2100	0	0	M	P	
001257	12,13	NW27	02	5E	FR129	147000	26	3	M	G	
001257	09,16	NE28	02	5E	FR130	8000	28	2	M	M	
001258a	05,06	SW29	02	5E	FR123	13500	41	6	H	M	
001258b	07,08	SE30	02	5E		0	36	5	H	P	
001258b	10,15	NE30	02	5E	FR124	0	0	0	H	P	
001258b	11,14	NW30	02	5E	FR128	9200	32	6	H	P	
001258d	05	SW29	02	5E		9000	0	0	H	P	
001259a	03,05,06	SW30	02	5E	FR126	11200	27	2	M	P	
001264a	14,15	NW31	02	5E	FR161	2900	22	2	M	P	
001264b	07,08	SE31	02	5E		3000	0	0	M	P	
001264c	05	SW32	02	5E		6000	0	0	M	M	

TABLE 3 (Cont'd)

Deposit	Legal Sub	Sect.	Location Twp. Rge	Site Number	Estimated Reserves Cubic m	% Stone (+4.76 mm)	% Fines (-200)	Aggregate Quality+	Production Potential*
001264c	08	SE31	02 5E		100	0	0	M	P
001264c	12	NW32	02 5E		300	0	0	M	P
001265a	13	NW32	02 5E	FR265a	6200	0	0	M	M
001265a	16	NE31	02 5E	FR264	800	29	3	M	P
001265b	13,14	NW32	02 5E	FR265b	30900	45	4	H	M
001266	09,10,15	NE32	02 5E	FR266	567000	49	3	H	G
001267	15	NE33	02 5E	FR298	0	0	0	H	P
001262a	11,16	NE02	03 4E		4500	0	0	H	P
001262a	All	SE02	03 4E	FR154	4500	21	2	M	P
001262a	15	NW01	03 4E	FR155	2200	52	2	H	P
001262a	04	SW12	03 4E	FR156	3100	6	3	L	P
001262b	04	SW13	03 4E		16000	0	0	M	M
001262b	12,13	NW12	03 4E	FR196	49000	0	0	M	M
001262b	01,08	SE14	03 4E		18000	0	0	M	M
001262c	01,08	SE23	03 4E	FR283	135000	32	2	H	G
001262c	10,15,16	NE14	03 4E		7500	0	0	H	P
001262d	04,05,06	SW26	03 4E	FR184	FR185 108000	26	3	M	G
001262d	10	NE23	03 4E		10000	0	0	M	M
001262d	07	SE23	03 4E		2500	0	0	M	P
001262d	11,13,14	NW23	03 4E	FR190a	28000	0	0	M	G
001262d	11,12,14	NW26	03 4E		27800	0	0	M	G
001263	All	SE01	03 4E		70500	0	0	H	G
001263	09	NE01	03 4E		14000	0	0	M	G
001276a	09,10,15	NE24	03 4E	FR193a	84000	0	0	M	M
001276a	02	SE25	03 4E		0	0	0	M	P
001276a	03	SW25	03 4E	FR194	0	0	0	M	P
001276b	All	SW25	03 4E	FR192	FR191 19700	0	0	M	M
001277	16	NE22	03 4E		30000	0	0	M	M
001277	All	SE27	03 4E		50400	0	0	M	M
001278a	10	NE36	03 4E		13500	0	0	M	P
001278a	07	SE36	03 4E	FR186	6700	25	2	M	P
001278b	14	NW36	03 4E	FR187	FR188 0	53	2	H	P
001278b	15	NE36	03 4E		0	0	0	H	P
001278c	15,16	NE36	03 4E	FR189	10000	30	3	H	P
001278d	10,15	NE36	03 4E		0	0	0	H	P
001266	03,04	SW05	03 5E		63000	0	0	H	G
001268	03,04	SW08	03 5E	FR273	0	38	7	H	P
001269a	01,08	SE14	03 5E	FR203	62400	51	1	H	G
001269a	16	NE11	03 5E		11700	0	0	H	G
001269b	13	NW13	03 5E	FR200	4300	0	0	H	P
001269b	09,16	NE14	03 5E	FR202	40500	23	1	M	G
001269b	04	SW24	03 5E	FR199	17500	39	1	H	G
001270	10	SE14	03 5E		6000	0	0	M	M
001270	11	NW14	03 5E		2500	0	0	M	P
001270	06	SW14	03 5E	FR204	4400	29	2	M	M
001271	13	NW24	03 5E		4500	0	0	H	P

TABLE 3 (Cont'd)

Deposit	Legal Sub	Sect.	Location Twp. Rge	Site Number	Estimated Reserves Cubic m	% Stone (+4.76 mm)	% Fines (-200)	Aggregate Quality+	Production Potential*
001271	03,04,06	SW34	03 5E	FR197	102000	0	0	H	G
001271	All	NE27	03 5E		32000	0	0	H	G
001271	All	NE26	03 5E		58900	0	0	H	G
001271	05,06	SW26	03 5E	FR164	5400	0	0	H	P
001271	All	SE34	03 5E	FR198	29000	46	5	H	G
001271	All	NW26	03 5E	FR210	187500	0	0	H	G
001271	All	SW25	03 5E	FR165	65200	62	2	H	G
001271	04	SW35	03 5E	FR209	2400	37	5	H	P
001271	08	SE27	03 5E		0	0	0	H	P
001271	01,07,08	SE26	03 5E		58600	0	0	H	G
001271	02,07	SE25	03 5E		6900	0	0	H	P
001272	15	NE33	03 5E	FR284	25000	36	3	H	G
001272	14	NW33	03 5E		30000	0	0	H	G
001273	13	NW20	03 5E		6100	0	0	H	P
001273	16	NE19	03 5E		800	0	0	H	P
001273	04	SW29	03 5E	FR168	1300	53	1	H	P
001274a	All	SE30	03 5E	FR182a	325000	29	3	M	G
001274a	04,05	SW29	03 5E	FR169	1900	50	5	H	P
001274b	05	SW29	03 5E		23000	0	0	H	G
001274b	01,02	SE31	03 5E	FR275	69100	54	14	H	G
001274b	All	NE30	03 5E	FR179	136500	49	2	H	G
001274b	08	SE30	03 5E		0	0	0	H	P
001274b	12,13	NW29	03 5E	FR180	9700	38	5	H	P
001274c	06	SW31	03 5E	FR279	8800	0	0	H	P
001275	03	SW30	03 5E	FR183	600	20	4	M	P
001279	09	NE07	03 5E		7700	0	0	M	P
001279	12,13	NW08	03 5E	FR177	5300	0	0	M	P

G = GOOD
 +H = HIGH
 L = LOW
 M = MED
 M = MED
 *P = POOR

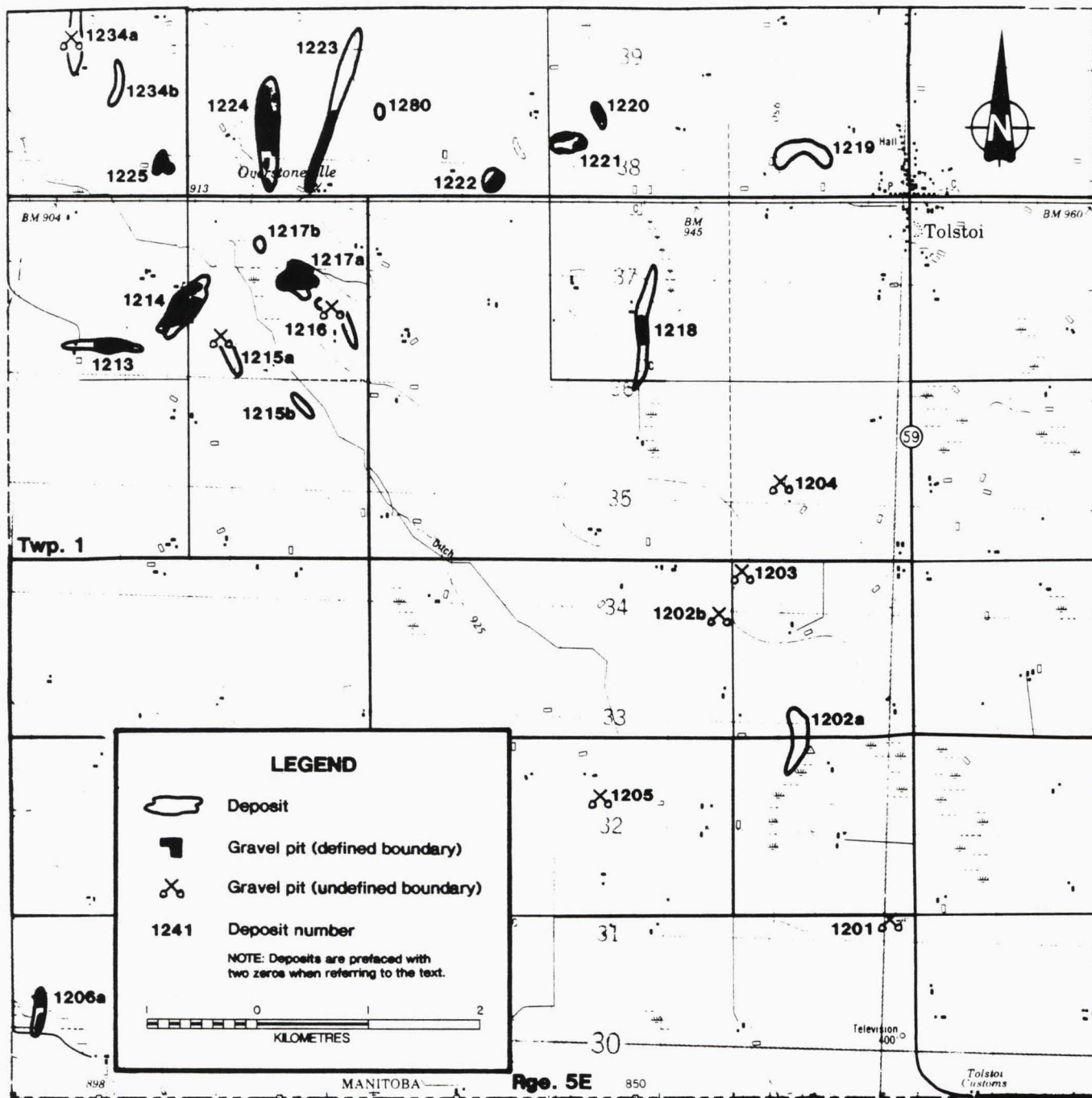


Figure 10: Aggregate deposits in township 001-05E in the R.M. of Franklin.

TABLE 4
SUMMARIZED RESERVES
TOWNSHIP 001 - 04E

PRODUCTION POTENTIAL (m³)

		GOOD	MODERATE	POOR	TOTAL
Q					
U					
A	HIGH	21 900	29 200	0	51 100
L	MEDIUM	0	93 400	18 300	111 700
I	LOW	19 000	111 000	72 600	202 600
T					
Y					
	TOTAL	40 900	233 600	90 900	365 400

Township 001 - 05E

There are 25 sand and gravel deposits and 24 pits in the township (Fig. 10). Of the deposits identified during this survey, 6 are undeveloped and 7 are depleted. The Overstoneville esker is the most significant deposit in the township. In the main part of the esker (deposit 1224) it is estimated that there are 144 700 m³ of aggregate reserves remaining, the majority of which are below the water table. Deposit 1223 in NE32-1-5E has not been mined; it is estimated to contain 105 000 m³ of sand and gravel.

Of the total 749 600 m³ of aggregate available, 398 300 m³ has good development potential, of which 75% is high quality (Table 5). Demand is expected to increase and access to aggregate areas is very good.

TABLE 5
TOWNSHIP RESERVE SUMMARY
001 - 05E

PRODUCTION POTENTIAL (m³)

		GOOD	MODERATE	POOR	TOTAL
Q					
U					
A	HIGH	300 300	137 000	44 700	482 000
L	MEDIUM	98 000	35 000	20 900	153 900
I	LOW	0	63 000	50 700	113 700
T					
Y					
	TOTAL	398 300	235 000	116 300	749 600

Township 002 - 04E

This survey identified 26 deposits and 48 pits (Fig. 11), of which 12 pits were active or temporarily inactive at the time of this survey. All significant sand and gravel deposits have been mined to some degree.

The most significant deposit 1263. Of the 751 720 m³ (Table 6) of reserves remaining in the township, 419 200 have good potential for use.

Demand is very high because the area supplies western markets and has a good transportation network. Most remaining aggregate is very sandy. Mining or extraction has been intense; most reserves have been used.

TABLE 6
TOWNSHIP RESERVES
002 - 04E

PRODUCTION POTENTIAL (m³)

		GOOD	MODERATE	POOR	TOTAL
Q					
U					
A	HIGH	143 700	33 400	91 720	268 820
L	MEDIUM	275 500	120 000	67 200	462 700
I	LOW	0	0	20 200	20 200
T					
Y					
	TOTAL	419 200	153 400	179 120	751 720

Township 002 - 05E

There are 41 deposits and 43 sand and gravel pits in the township (Fig. 12). Eight undeveloped deposits and 7 deposits each containing in excess of 40 000 m³ of reserves have been identified. Significant deposits in the township include 1235b, 1238a, 1257 and 1266. Deposit 1257 is being mined.

Demand is moderately high and is expected to increase as sources of aggregate to the west are depleted. Significant reserves remain in the township (Table 7).

TABLE 7
TOWNSHIP RESERVES
002 - 05E

PRODUCTION POTENTIAL (m³)

		GOOD	MODERATE	POOR	TOTAL
Q					
U					
A	HIGH	964 500	103 200	47 100	1 114 800
L	MEDIUM	248 900	30 100	44 400	323 400
I	LOW	0	15 000	25 800	40 800
T					
Y					
	TOTAL	1 213 400	148 300	117 300	1 479 000

Township 003 - 04E

There are 12 deposits and 20 sand and gravel pits identified in the township (Fig. 13). One undeveloped deposit (1277) is estimated to contain 80 400 m³ of reserves. Reserves considered to have good development potential amount to 383 300 m³ (Table 8). Significant reserves remain in deposits 1263 and 1262.

Exploitation of aggregate resources has been intense and demand is expected to continue. Mining activity is expected to be moderate.

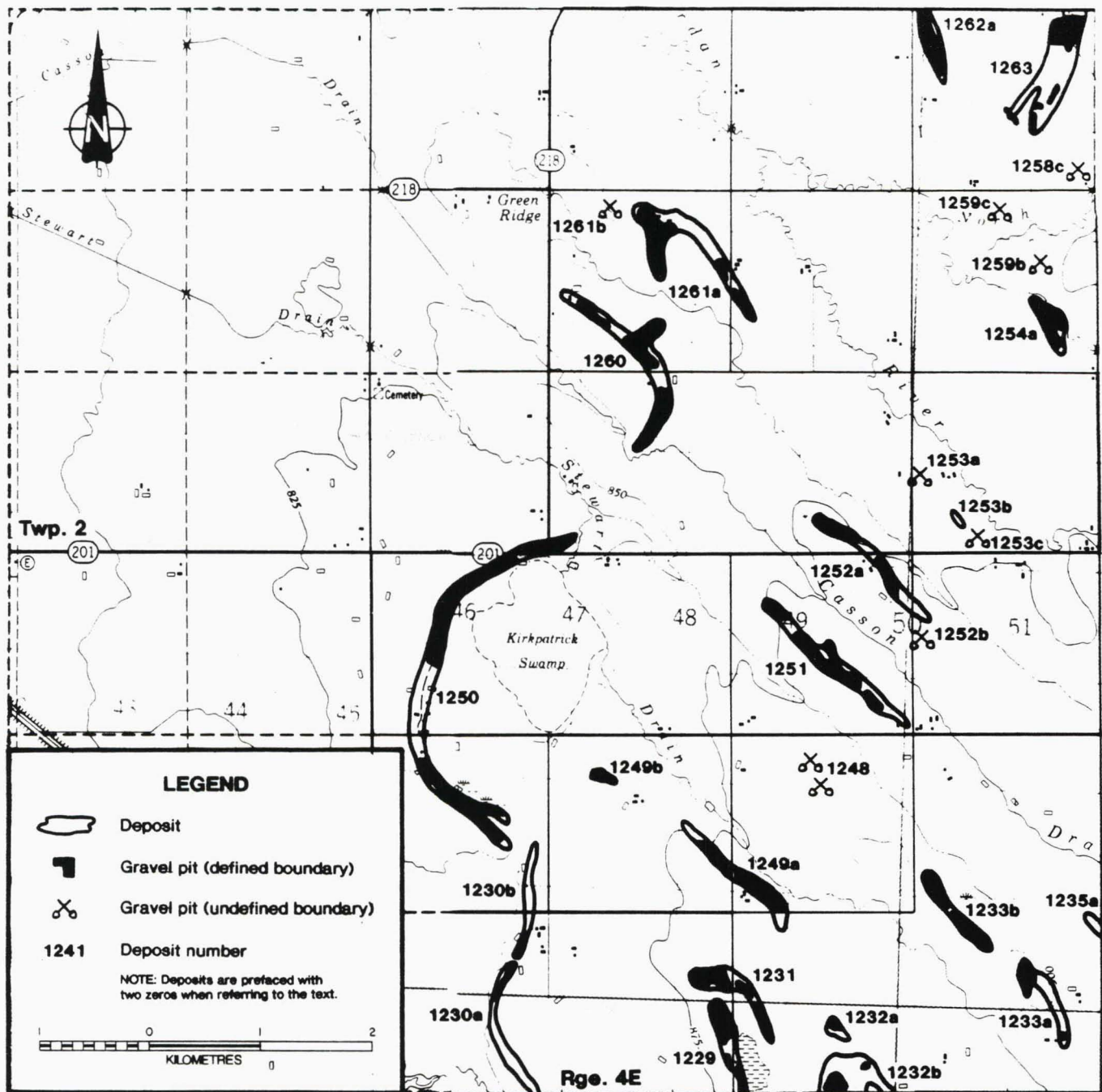


Figure 11: Aggregate deposits in township 002-4E in the R.M. of Franklin.

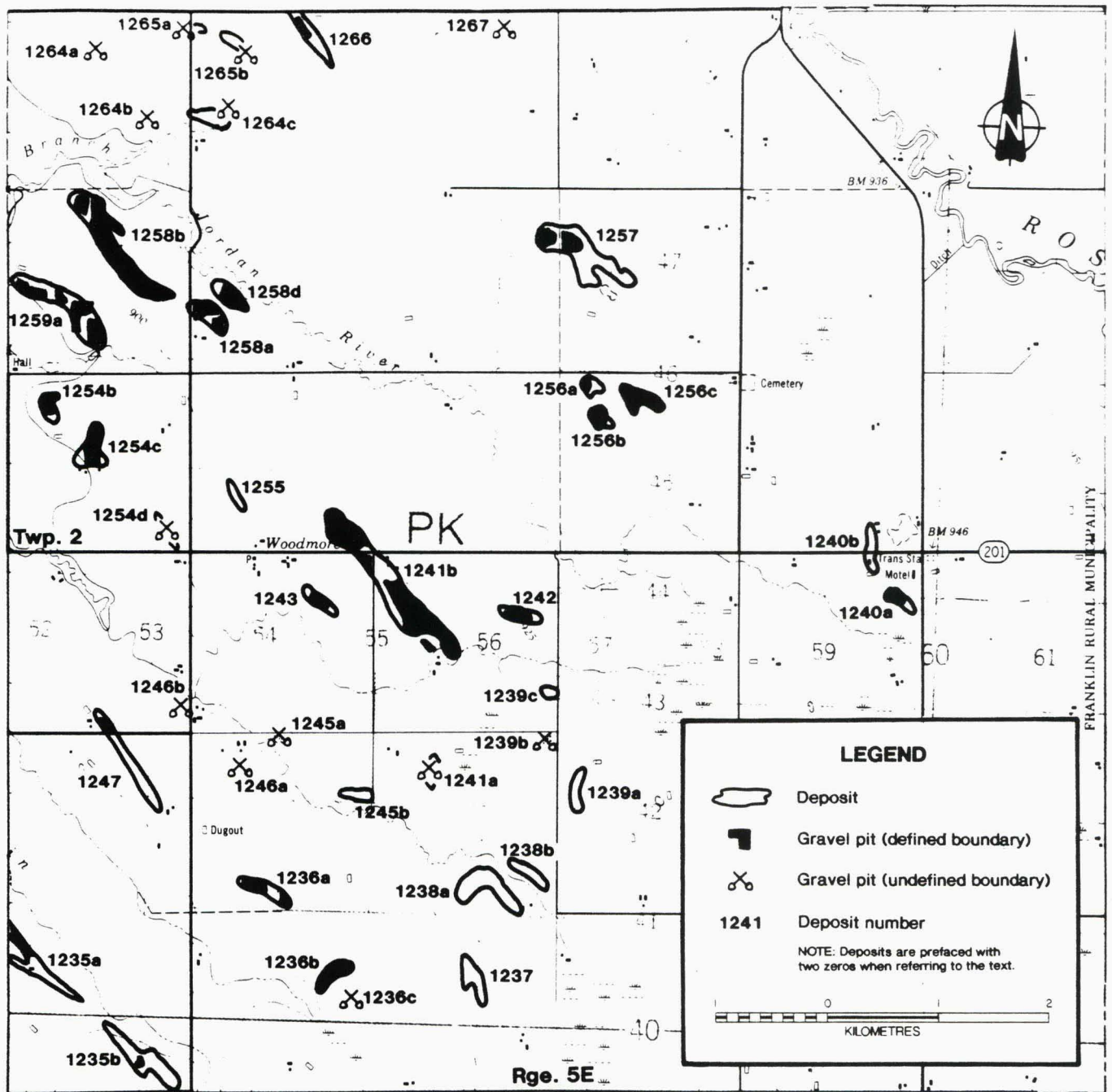


Figure 12: Aggregate deposits in township 002-5E in the R.M. of Franklin.

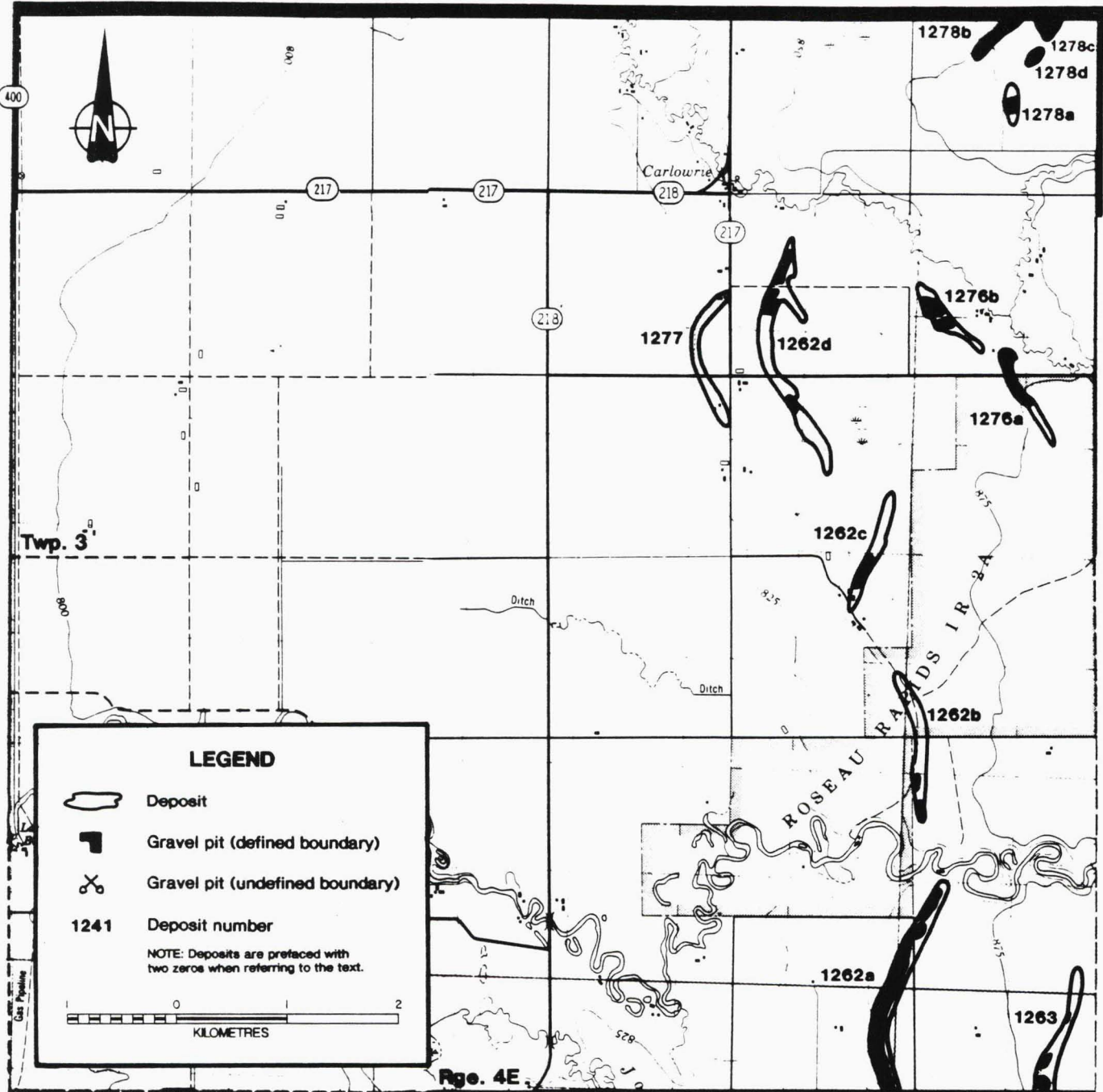


Figure 13: Aggregate deposits in township 003-4E in the R.M. of Franklin.

TABLE 8
TOWNSHIP RESERVES
003 - 04E

PRODUCTION POTENTIAL (m³)

		GOOD	MODERATE	POOR	TOTAL
Q					
U					
A	HIGH	205 500	0	24 200	229 700
L	MEDIUM	177 800	277 100	27 200	482 100
I	LOW	0	0	3 100	3 100
T					
Y					
	TOTAL	383 300	277 100	54 500	714 900

Township 003 - 05E

The most significant deposits in the township are located in the north. Thirteen deposits and 25 pits are identified (Fig. 14). The Rosa esker (deposit 1271) is estimated to contain 552 400 m³ of reserves. The esker is actively mined at sites FR210, FR201 and FR284. Aggregate quality in the esker is generally high and there is good potential for additional material, both below the water table and in the

area around deposit 1272. In addition, deposit 1274 contains significant reserves, however, the abundance of over-size material and the deposit's shallow depth limits its production potential.

Of the townships remaining reserves, 94% is high quality, of which 971 400 m³ (Table 9) has good development potential. Mining pressure is expected to continue to be high and extraction at present rates is expected to continue.

TABLE 9
TOWNSHIP RESERVES
003 - 05E

PRODUCTION POTENTIAL (m³)

		GOOD	MODERATE	POOR	TOTAL
Q					
U					
A	HIGH	971 400	0	52 100	1 023 500
L	MEDIUM	365 500	10 400	16 100	392 000
I	LOW	0	0	0	0
T					
Y					
	TOTAL	1 336 900	10 400	68 200	1 415 500

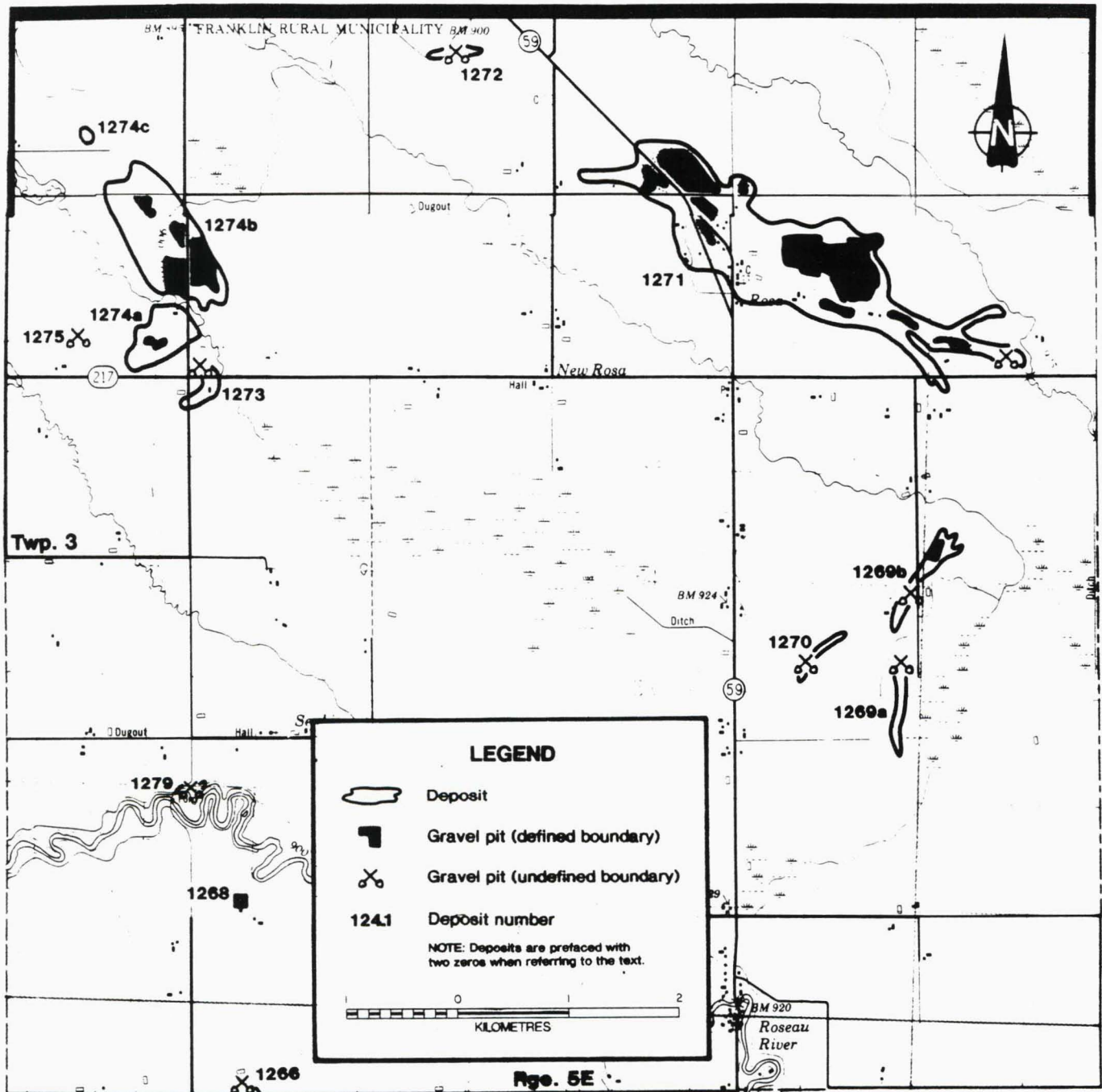


Figure 14: Aggregate deposits in township 003-5E in the R.M. of Franklin.

SUPPLY

Supply is determined by taking the calculated area and the known or estimated depth of the deposit to obtain amount of aggregate in the deposit; amounts are given in cubic metres.

Resource values are calculated by quarter section and are given in Appendix F. From the total area calculated, a depletion factor is applied, which includes the area unavailable due to presence of permanent cultural features and those areas previously extracted. The result is an estimate of the amount of aggregate available.

There is an estimated 5.5 million cubic metres of sand and gravel in the R.M. of Franklin. Table 10 shows reserves by quality for each of the townships in the municipality. Reserves with good potential for extraction or development are listed in Table 11.

**TABLE 10
AGGREGATE QUALITY IN THE R.M. OF FRANKLIN**

Township	High	Medium	Low	Total
001-04E	51 100	111 700	202 600	365 400
001-05E	482 000	153 900	113 700	749 600
002-04E	268 820	462 700	20 200	751 720
002-05E	1 114 800	323 400	40 800	1 479 000
003-04E	229 700	482 100	3 100	714 900
003-05E	1 023 500	392 000	0	1 415 500
	3 169 920	1 925 800	380 400	5 476 120

**TABLE 11
RESERVES WITH GOOD PRODUCTION POTENTIAL
BY TOWNSHIP IN THE R.M. OF FRANKLIN**

Township	Good Potential
001-04E	40 900
001-05E	398 300
002-04E	419 200
002-05E	1 213 400
003-04E	383 300
003-05E	1 336 900
	3 792 000

Townships 002-05E and 003-05E contain approximately equal amounts of reserves, accounting for 54% of the total reserves in the municipality. Half of the municipalities reserves are high quality and are located essentially in township 003-05E.

In the R.M. of Franklin it is estimated that there are 3.8 million cubic metres of aggregate with good potential for being extracted or mined in the foreseeable future.

Most of the aggregate in the municipality lacks crushable stone and this is commonly the limiting factor.

Demand for aggregate material is expected to be extremely strong to support regional needs such as:

- 1) expansion of Provincial Highway 75;
- 2) maintaining provincial roads in the area; and
- 3) providing aggregate for areas to the west.

The limited amount of good quality, accessible, gravel for aggregate purposes in the R.M. of Franklin combined with continued strong demand puts intense pressure on this resource. Known aggregate resources should be protected to ensure future needs are met.

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**APPENDIX A
SITE AND LANDFORM INFORMATION**

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR001 A	NE02	01	5E	A	Z	A	1.0	1.0	0.0	0.5	G	Y	S	FINE SAND OVER PEBBLE GRAVEL
FR002 A	SE11	01	5E	I	A	A	0.0	1.0	0.2	0.0	C	N	N	MED FINE WELL SORTED SAND WITH OCC PEBBLE
FR003 A	SW11	01	5E	K	A	A	0.0	0.5	0.0	0.0	C	N	N	WELL SORTED SAND WITH OCC PEBBLE
FR004 A	SE10	01	5E	D	A	A	0.0	0.7	0.1	0.0	C	N	N	FINE SAND
FR005 A	SW10	01	5E	I	A	A	0.0	0.6	0.1	0.0	C	N	N	GRANULAR SD WITH MINOR PEBBLES(INCH)
FR006 A	SE09	01	5E	D	P	P	0.0	0.5	0.1	0.5	D	N	A	SILTY SANDY TILL
FR007 A	SW07	01	5E	L	P	P	0.0	0.8	0.1	0.4	D	Y	S	WELL SORTED SD/ TILL
FR008 A	NE12	01	4E	A	X	A	0.6	0.6	0.1	0.3	G	N	M	PEBBLE GRAVEL WITH OCC COBBLE OR BOULDER
FR009 A	SW01	01	4E	D	P	A	0.0	0.5	0.1	0.4	D	N	M	TILL
FR010 A	SE23	01	5E	D	P	A	0.0	0.6	0.5	0.0	C	N	M	OXID MED SAND
FR011 A	SW23	01	5E	D	A	A	0.0	0.4	0.0	0.0	C	N	M	MED COARSE SAND WITH OCC SM PEBBLE
FR012 A	NE14	01	5E	A	Z	A	1.5	1.0	0.1	0.0	C	Y	S	PEBBLY COARSE SAND
FR013 A	NE15	01	5E	A	Y	A	1.5	1.5	0.1	0.5	C	Y	M	FINE PEBBLY SAND
FR014 A	NE11	01	5E	I	Y	A	0.0	0.6	0.0	0.0	D	Y	M	MED FINE SAND / TILL
FR015 A	NW11	01	5E	D	A	A	0.5	0.5	0.1	0.0	C	N	N	MED FINE SAND WITH OCC SM PEBBLES
FR015 B	SW14	01	5E	D	A	A	0.5	0.5	0.1	0.0	G	N	N	SAND / PEBBLE GRAVEL
FR016 A	SW14	01	5E	D	A	A	0.0	0.5	0.1	0.0	C	N	N	20 CM COARSE PEB GRAVEL OVER MED SAND
FR017 A	NW10	01	5E	A	Z	A	1.0	1.0	0.0	0.0	G	N	S	SANDY PEBBLE GRAVEL
FR018 A	NE09	01	5E	D	A	A	0.0	1.3	0.0	0.5	D	N	M	'TILL' LACUSTRINE DIAMICTON
FR019 A	SW16	01	5E	D	A	A	0.0	0.5	0.0	0.0	D	Y	M	FINE PEBBLY SAND / SANDY 'TILL'
FR020 A	NE08	01	5E	D	A	A	0.0	0.6	0.1	0.0	D	N	M	1" PEBBLE GRAVEL / SANDY 'TILL'
FR020 B	NE08	01	5E	D	A	A	0.0	0.6	0.1	0.0	G	Y	N	50 CM FINE SAND / 10CM 1" PEB GRAVEL/WATER
FR021 A	SW17	01	5E	L	P	A	0.0	0.6	0.1	0.3	D	Y	S	40CM FINE PEBBLE GRAVEL/ TILL
FR022 A	NW08	01	5E	C	F	F	0.0	0.2	0.0	0.0	Z	N	M	PROMINANT RIDGE HAS COBBLES AT SURFACE
FR023 A	SW18	01	5E	D	A	A	0.0	0.8	0.1	0.0	C	N	N	MED FINE WELL SORTED SAND
FR024 A	SE14	01	4E	C	P	P	0.0	0.5	0.1	0.0	D	N	N	MED FINE SAND / LODGEMENT 'TILL'
FR025 A	NE10	01	4E	C	P	A	0.0	1.0	0.2	0.4	D	N	M	SILTY SANDY LODGEMENT 'TILL'
FR026 A	SE16	01	4E	D	A	A	0.0	0.3	0.0	0.0	E	N	N	LACUSTRINE CLAY
FR027 A	NW09	01	4E	D	A	A	0.0	0.5	0.0	0.0	E	N	N	POORLY SORTED PEBBLE GRAVEL/ CLAY
FR028 A	SE17	01	4E	D	A	A	0.0	0.4	0.2	0.0	E	N	N	CLAY
FR029 A	SW22	01	5E	L	P	A	0.0	1.0	0.2	0.0	C	Y	N	PEBBLE GRAVEL / FINE SAND
FR030 A	NW16	01	5E	D	A		0.0	0.6	0.2	0.0	D	N	M	MED FINE SD / COBBLE LAG / LODGEMENT TILL
FR031 A	NE18	01	5E	C	P	P	0.0	1.5	0.2	0.3	D	N	M	LACUSTRINE AND LODGEMENT TILL FACIES
FR032 A	NE13	01	4E	A	Y	A	1.5	1.5	0.2	0.0	C	Y	N	PEBBLY SAND
FR033 A	SW23	01	4E	C	A	A	0.0	1.0	0.2	0.0	D	N	S	WELL SORTED MED FINE SD / LACUST TILL
FR034 A	NE04	01	5E	I	A	P	0.0	0.6	0.2	0.0	C	N	N	FINE PEBBLE GRAVEL GRADING TO MED SAND
FR035 A	SE22	01	4E	D	A	A	0.0	0.6	0.2	0.0	D	N	M	FINE SAND / TILL
FR035 B	SE22	01	4E	D	A	A	0.0	0.6	0.2	0.0	D	N	S	10 CM FINE SAND / TILL

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR036 A	SE21	01	4E	D	A	A	0.0	0.8	0.4	0.0	C	N	N	80 CM FINE SAND / CLAY
FR037 A	SW21	01	4E	D	A	A	0.0	0.4	0.2	0.0	E	N	N	CLAY
FR038 A	SE20	01	4E	D	A	A	0.0	0.4	0.2	0.0	E	N	N	CLAY (STONES LITTER SURFACE)
FR039 A	NW20	01	4E	D	A	A	0.0	0.4	0.2	0.0	E	N	N	CLAY
FR040 A	SE29	01	4E	K	A	A	0.0	0.2	0.0	0.1	E	N	A	COBBLES LITTER SURFACE ON CLAY
FR040 B	SE29	01	4E	K	A	A	0.0	0.5	0.5	0.0	C	N	A	MED SAND (BOULDER PILES)
FR041 A	SE35	01	5E	D	P	P	0.0	0.5	0.5	0.0	C	N	N	SAND WITH SM PEBBLES / MED FINE SAND
FR042 A	NW26	01	5E	L	P	A	0.0	1.0	0.2	0.0	C	Y	N	PEBBLE GRAVEL / FINE SAND
FR043 A	NW26	01	5E	L	P	P	0.0	0.8	0.0	0.0	D	N	M	LACUSTRINE 'TILL'
FR044 A	SW34	01	5E	D	A	A	0.0	0.7	0.0	0.0	C	N	N	SAND/ 5CM PEBBLE GRAV / MED SAND
FR045 A	SE27	01	5E	A	Z	A	1.2	1.5	0.2	0.1	G	Y	N	PEBBLE GRAVEL
FR046 A	SE27	01	5E	D	A	A	0.0	0.7	0.0	0.0	C	N	N	SAND/ SD WITH OCC PEBBLE
FR047 A	SE26	01	5E	D	A	A	0.0	0.5	0.0	0.0	C	N	N	MED FINE SAND
FR048 A	SW34	01	5E	A	Y	P	2.0	2.0	0.2	0.5	D	Y	A	COBBLY PEBBLE GRAVEL
FR048 B	SW34	01	5E	B	A	P	0.0	1.0	0.3	0.0	D	N	N	SAND / TILL
FR048 C	SW34	01	5E	B	A	P	0.0	2.3	0.3	0.0	C	Y	N	SAND / WATER AT A PEBB-COBBLE LAYER
FR049 A	SE32	01	5E	A	Y	P	1.2	1.7	0.1	0.7	C	Y	A	COBBLES IN SANDY PEBBLE GRAVEL
FR049 B	SE32	01	5E	B	A	P	0.0	1.2	0.3	0.0	D	N	N	SAND / TILL
FR050 A	NE29	01	5E	A	Y	P	1.5	1.5	0.1	0.4	G	Y	A	BOULDERY PEBBLE GRAVEL
FR051 A	NW28	01	5E	D	A	A	0.0	1.2	0.0	0.0	D	N	M	TILL
FR052 A	SE32	01	5E	A	Z	P	1.5	0.0	0.2	0.7	D	Y	M	PEBBLE GRAVEL
FR053 A	NW32	01	5E	A	Z	A	5.0	1.0	0.1	0.2	G	Y	N	SANDY PEBBLE GRAVEL
FR054 A	SW32	01	5E	A	Z	A	0.7	0.8	0.1	0.0	C	Y	N	FINE TO MED SAND WITH PEBBLES
FR055 A	SW32	01	5E	A	Z	A	0.6	0.7	0.1	0.0	C	Y	N	FINE SAND
FR056 A	SE31	01	5E	A	Z	A	1.0	1.0	0.2	1.0	C	Y	A	BOULDERY COBBLE GRAVEL ON FINE SAND
FR056 B	SE31	01	5E	B	P	P	0.5	2.4	0.2	0.4	C	N	A	COBBLY GRAVEL
FR057 A	SE36	01	4E	C	H	A	0.5	0.5	0.0	0.0	F	N	N	PEBBLE GRAVEL
FR058 A	SW36	01	4E	A	Z	A	0.6	0.8	0.1	0.0	C	Y	N	VERY FINE PEA GRAVEL
FR059 A	SW35	01	4E	A	Y	P	1.0	0.0	0.2	0.0	D	Y	M	THIN GRAVEL/TILL
FR060 A	SE34	01	4E	D	A	A	0.0	0.7	0.0	0.0	C	Y	N	MED FINE SAND
FR061 A	SW34	01	4E	D	A	A	0.0	0.5	0.0	0.0	D	Y	S	FINE SAND/TILL
FR062 A	NE28	01	4E	A	Z	A	1.0	1.0	0.1	0.0	D	Y	N	FINE PEBBLY SAND
FR063 A	SE30	01	5E	A	Z	P	1.5	0.0	0.1	0.5	F	Y	A	BOULDERY PEBBLE GRAVEL
FR064 A	NE22	01	4E	A	X	A	1.0	1.2	0.2	0.2	D	Y	S	FINE PEBBLE GRAVEL
FR064 B	NE22	01	4E	A	X	A	1.0	0.8	0.1	0.0	D	Y	N	FINE PEBBLE GRAVEL
FR064 C	NE22	01	4E	A	X	A	1.0	1.0	0.1	0.0	D	Y	N	FINE PEBBLE GRAVEL
FR065 A	NW23	01	4E	K	A	A	0.0	0.0	0.0	0.0	C	N	N	PROM BEACH RIDGE (THIN FINE PEB GR/ SAND)
FR066 A	SW27	01	4E	D	A	A	0.0	0.8	0.0	0.0	E	N	N	25 CM PEB GRAVEL/ YELLOW CLAY
FR067 A	SE28	01	4E	C	H	A	1.0	1.0	0.1	0.0	C	N	M	VERY SANDY FINE PEBBLE GRAVEL

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION	
FR067	B	SE28	01	4E	A	P	A	1.0	1.0	0.1	0.2	G	N	S	SANDY FINE PEBBLE GRAVEL
FR068	A	SE28	01	4E	D	A	A	0.0	0.9	0.0	0.0	C	N	M	SAND WITH OCC SM. PEBBLE/ TILL (BOULDER PILE)
FR069	A	SE29	01	4E	D	A	A	0.0	0.7	0.0	0.0	E	N	N	CLAY
FR070	A	NE32	01	4E	D	A	A	0.0	0.3	0.0	0.0	E	N	M	STONES LITTER CLAY FIELD
FR071	A	SE02	02	5E	L		P	0.0	0.0	0.0	0.0	F	Y	M	SANDY PEBBLE GRAVEL
FR072	A	SW02	02	5E	D	A	A	0.0	0.6	0.2	0.0	E	N	N	SANDY PEBBLE GRAV/ MED SAND WITH OCC PEB
FR073	A	NE34	01	5E	D	A	A	0.0	0.6	0.2	0.2	D	N	S	FINE SAND/ COBBLE LAG / TILL
FR074	A	SW03	02	5E	K	A	A	0.0	0.0	0.0	0.0	D	Y	M	STONEY FIELD
FR075	A	NE33	01	5E	D	A	A	0.0	0.5	0.0	0.0	E	N	N	PEBBLY SAND / CLAY
FR076	A	NW33	01	5E	L	P	P	0.0	0.5	0.0	0.0	F	Y	M	GRAVELLY (VERY HIGH WATER TABLE)
FR077	A	SE05	02	5E	L	P	P	0.0	0.5	0.0	1.0	C	Y	M	FINE SAND WITH OCC PEBBLES/ BOULDER LAG
FR078	A	SE06	02	5E	K	P	P	0.0	0.0	0.0	0.4	D	N	M	STONEY FIELD/CLAY
FR079	A	SE06	02	5E	A	Z	P	2.0	2.0	0.4	0.0	C	Y	N	SAND WITH PEBBLES
FR080	A	SW06	02	5E	D	P	P	0.0	0.4	0.0	0.4	D	N	M	15CM MED FINE SAND / LAC 'TILL'
FR081	A	NE35	01	4E	A	Z	A	1.5	1.0	0.2	0.0	F	N	A	COBBLY PEBBLE GRAVEL
FR082	A	SE02	02	4E	A	Y	A	1.0	1.0	0.2	0.0	C	N	A	COBBLES IN PEBBLY SAND
FR082	B	SE02	02	4E	B	P	P	1.4	2.9	0.3	0.1	C	N	S	PEBBLY SAND
FR083	A	NW06	02	5E	A	A	A	0.7	0.0	0.0	0.0	F	Y	M	PEBBLE GRAVEL
FR084	A	SW02	02	4E	A	X	P	1.0	1.0	0.1	0.0	G	Y	N	FINE PEBBLE GRAVEL
FR084	B	SW02	02	4E	A	X	P	1.2	1.0	1.0	0.0	G	Y	N	PEBBLY SAND
FR084	C	SW02	02	4E	A	X	P	0.8	0.8	0.1	0.0	G	Y	N	VERY SANDY PEBBLE GRAVEL
FR085	A	SE03	02	4E	A	Z	P	1.0	0.5	0.1	0.0	G	Y	N	PEBBLE GRAVEL
FR086	A	SW02	02	4E	A	Z	P	0.5	0.3	0.1	0.0	G	Y	N	FINE PEBBLE GRAVEL
FR087	A	SW02	02	4E	A	Z	P	0.8	0.8	0.1	0.0	C	N	S	PEA GRAVEL
FR088	A	SE03	02	4E	A	Z	P	1.5	0.6	0.1	0.0	C	Y	A	COBBLES IN SANDY PEBBLE GRAVEL
FR089	A	NE03	02	4E	A	Z	W	1.0	1.0	0.1	0.0	G	Y	M	SANDY FINE PEBBLE GRAVEL
FR090	A	NE03	02	4E	D	A	A	0.0	0.3	0.1	0.0	G	N	N	PEBBLE GRAVEL
FR091	A	NW03	02	4E	K	A	A	0.0	0.0	0.0	0.0	D	N	A	RIDGE LITTERED WITH STONES
FR092	A	SW03	02	4E	B	A	F	0.0	1.0	0.1	0.0	C	N	N	25CM VERY FINE PEBBLE GR/ SILTY SAND
FR093	A	NW34	01	4E	D	P	P	0.0	0.5	0.0	0.0	E	N	N	BEACH LAG OF COBBLES OR PEBBLE GRAV / CLAY
FR094	A	NE34	01	4E	D	P	P	0.0	0.5	0.0	0.0	D	N	N	PEBBLY SAND / LAC 'TILL'
FR095	A	NE02	02	5E	D	P	P	0.0	0.5	0.0	0.0	D	N	N	PEBBLY SAND / LAC 'TILL'
FR096	A	NW02	02	5E	D	A	A	0.0	0.5	0.0	0.0	C	N	N	PEBBLY COARSE SAND / PEB-COBBLE LAG/ SAND
FR097	A	NE03	02	5E	D	A	A	0.0	0.5	0.0	0.0	C	N	N	MED SAND WITH OCC PEBBLES
FR098	A	SE09	02	5E	A	Y	P	2.5	2.5	0.1	0.3	G	Y	M	COARSE PEBBLE GRAVEL
FR099	A	NE09	02	5E	A	Y	A	2.5	2.5	0.1	0.0	C	Y	N	PEBBLE GRAVEL (COB-BOULDERS DUMPED IN PIT)
FR100	A	NW10	02	5E	B	A	A	0.6	2.0	0.1	0.0	C	N	N	3/4" SANDY PEBBLE GRAVEL
FR100	B	NW10	02	5E	B	A	A	0.8	2.0	0.1	0.0	C	N	N	PEBBLY SAND
FR101	A	SW16	02	5E	K	A	A	0.0	0.3	0.0	0.0	C	N	N	SANDY PEBBLE GRAVEL IN DITCH

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR102 A	NE08	02	5E	C	F	F	0.5	0.5	0.2	0.0	G	N	N	COARSE SAND PEBBLE GRAVEL
FR103 A	NE08	02	5E	A	Z	P	1.5	0.0	0.0	0.0	F	Y	S	SANDY PEBBLE GRAVEL
FR104 A	NW09	02	5E	A	Y	P	3.0	3.0	0.1	0.5	C	Y	M	COBBLES IN VERY SANDY GARVEL
FR104 B	NW09	02	5E	B	A	P	0.0	1.5	0.2	0.0	D	N	N	PEBBLY SAND/ TILL
FR104 C	NW09	02	5E	B	A	P	2.3	3.2	0.2	0.0	E	N	N	SANDY FINE PEBBLE GRAVEL/CLAY
FR104 D	NW09	02	5E	B	A	P	0.0	2.5	0.5	0.0	C	Y	N	SAND/ PEBBLE GRAVEL
FR105 A	SE18	02	5E	A	P	P	0.5	0.5	0.1	0.0	G	N	N	PEBBLE GRAVEL/ PIT REHABILITATED
FR106 A	SE18	02	5E	A	Z	F	0.5	0.0	0.0	0.4	C	N	S	PEBBLE GRAVEL
FR107 A	NW07	02	5E	A	Z	A	0.0	0.5	0.0	0.0	F	N	S	PEBBLE GRAVEL
FR108 A	SW07	02	5E	D	A	A	0.0	0.4	0.0	0.0	D	N	N	SILTY FINE SD WITH PEB'S AND SM COBBLES
FR109 A	NW31	01	5E	D	A	P	0.0	0.4	0.0	0.0	D	N	N	COB LAG / TILL
FR110 A	NW05	02	5E	D	A	A	0.4	0.4	0.0	0.0	G	N	N	COARSE COBBLY PEBBLE GRAV (NEEDS TESTING)
FR110 B	NE06	02	5E	I	A	A	0.0	0.7	0.1	1.5	C	N	N	PEBBLY SAND
FR111 A	NE12	02	4E	D	A	A	0.0	0.4	0.1	0.0	C	N	N	MED TO FINE SAND WITH PEBBLES
FR112 A	NW11	02	4E	A	Z	A	1.3	1.3	0.1	0.3	C	Y	S	VERY FINE SANDY PEBBLE GARVEL
FR113 A	NW11	02	4E	A	Z	P	1.0	1.0	0.0	0.0	C	Y	S	PEBBLE GRAVEL
FR114 A	NW10	02	4E	D	P	P	0.0	0.6	0.3	0.0	C	N	S	FINE SAND
FR114 B	NW10	02	4E	D	P	P	0.0	0.5	0.3	0.0	C	N	S	SILTYFINE SAND
FR114 C	NW10	02	4E	D	P	P	0.0	0.5	0.2	0.0	C	N	S	SILTYFINE SAND
FR114 D	NW10	02	4E	A	Z	P	1.0	0.0	0.3	0.0	G	N	N	SANDY PEBBLE GRAVEL
FR115 A	SE23	02	5E	C	A	A	1.0	2.0	0.1	0.3	C	N	M	COBBLE GRAVEL / FINE SAND
FR116 A	SW23	02	5E	C	A	A	0.7	0.7	0.1	0.0	G	Y	N	FINE PEBBLE GRAVEL (HIGH WATER TABLE)
FR117 A	NW16	02	5E	A	Z	A	2.0	1.5	0.0	0.0	G	Y	S	COBBLY PEBBLE GRAVEL
FR118 A	NE16	02	5E	A	Y	A	1.0	0.0	0.0	0.0	G	Y	M	PEBBLE GRAVEL
FR119 A	SE20	02	5E	A	Z	A	1.6	1.5	0.1	0.2	C	Y	S	SANDY PEBBLE GRAVEL
FR120 A	SE19	02	5E	A	X	A	1.0	0.0	0.1	0.2	C	Y	S	SANDY PEBBLE GRAVEL
FR120 B	SE19	02	5E	A	X	A	0.5	0.5	0.1	0.2	C	Y	S	PEBBLE GRAVEL
FR121 A	NW20	02	5E	C	A	A	0.0	0.3	0.1	0.0	G	N	S	BOULDERS LITTER FIELD - PEBBLE GRAV IN DITCH
FR122 A	NE19	02	5E	C	A	P	0.0	0.8	0.1	0.0	C	N	N	PEBBLY SAND
FR123 A	SW29	02	5E	A	Z	P	1.5	1.5	0.1	0.5	G	Y	A	COBS AND BOULDERS IN SDY PEBBLE GRAVEL
FR124 A	NE30	02	5E	A	Z	F	1.0	0.3	0.2	0.0	D	Y	M	FINE PEBBLE GRAVEL
FR125 A	NW19	02	5E	A	Z	A	0.5	0.5	0.2	0.0	E	Y	N	FINE PEBBLE GRAVEL
FR126 A	SW30	02	5E	A	Y	A	0.5	0.5	0.1	0.4	C	Y	M	COBBLY PEBBLE GRAVEL
FR126 B	SW30	02	5E	A	Y	A	1.0	1.0	0.1	0.5	C	Y	M	FINE PEBBLE GRAVEL OVER COB/BOULDER LAG
FR126 C	SW30	02	5E	A	Y	A	1.0	1.0	0.1	0.6	C	N	M	FINE PEBBLE GRAVEL WITH COB/BOULDERS
FR127 A	NW19	02	5E	A	Z	A	1.5	1.0	0.1	0.5	C	N	S	FINE PEBBLE GRAVEL WITH COB/BOULDERS
FR128 A	NW30	02	5E	A	Y	P	2.0	2.0	0.1	0.8	C	Y	A	BOULDERY PEBBLE GRAVEL
FR129 A	NW27	02	5E	A	X	F	2.0	1.5	0.1	0.8	C	Y	M	SANDY FINE PEBBLE GRAVEL
FR130 A	NE28	02	5E	A	X	A	1.0	1.1	0.0	1.0	C	N	A	SANDY FINE PEBBLE GRAVEL WITH BOULDERS

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR131 A	NW22	02	5E	A	Z	P	0.6	0.7	0.1	0.5	C	N	M	SANDY PEBBLE GRAVEL WITH BOULDERS
FR131 B	NW22	02	5E	A	Z	P	0.7	0.8	0.2	0.5	C	Y	S	SANDY VERY FINE PEBBLE GRAVEL
FR131 C	NW22	02	5E	A	Z	P	0.6	0.8	0.2	0.6	C	Y	M	SANDY FINE PEBBLE GRAVEL
FR132 A	NW25	02	4E	A	Y	A	0.8	1.0	0.2	0.0	E	Y	N	FINE PEBBLE GRAVEL
FR133 A	SE25	02	4E	A	Y	P	1.5	1.0	0.2	0.0	C	Y	N	FINE PEBBLE GRAVEL
FR134 A	SW24	02	4E	A	Z	A	0.8	1.0	0.1	0.3	C	Y	S	SANDY FINE PEBBLE GRAVEL
FR135 A	NE14	02	4E	A	Z	A	1.0	0.6	0.1	0.8	G	N	M	FINE PEBBLE GRAVEL
FR136 A	SE14	02	4E	A	Z	A	1.0	0.4	0.1	1.0	C	N	A	COB/BOULDER IN SDY FINE PEBBLE GRAVEL
FR137 A	SW12	02	4E	A	Z	P	1.5	0.8	0.1	0.7	C	Y	A	BOULDERY COARSE PEBBLE COBBLE GRAVEL
FR138 A	NW01	02	4E	A	Z	F	0.5	0.5	0.1	1.0	C	N	A	COBBLY PEBBLE GRAVEL WITH LARGE BOULDERS
FR139 A	NE01	02	4E	A	Y	A	1.0	1.0	0.2	0.8	C	Y	A	BOULDERY COARSE PEBBLE GRAVEL
FR140 A	SE23	02	4E	A	Z	P	0.3	2.5	0.2	0.8	D	N	A	COBBLY PEBBLE GRAVEL
FR141 A	NW14	02	4E	A	Z	A	0.3	1.5	0.2	0.8	D	Y	A	FINE SAND/ BOULDERS/ TILL
FR142 A	SE10	02	4E	A	Z	P	0.8	0.8	0.1	0.8	D	N	A	BOULDERY FINE PEBBLE GRAVEL
FR143 A	SW11	02	4E	A	Z	P	0.5	0.7	0.2	0.6	G	N	A	BOULDERY PEBBLE GRAVEL
FR144 A	NE04	02	4E	A	X	P	0.6	0.8	0.1	0.0	G	N	N	SANDY FINE PEBBLE GRAVEL
FR144 B	NE04	02	4E	A	Z	P	0.0	0.0	0.0	0.0	G			
FR145 A	SE09	02	4E	A	Y	A	0.8	1.0	0.2	0.0	C	N	N	SANDY FINE PEBBLE GRAVEL
FR146 A	NE22	02	4E	A	Z	A	1.0	1.0	0.1	0.0	C	Y	N	SANDY FINE PEBBLE GRAVEL
FR146 B	NE22	02	4E	A	X	A	1.2	1.5	0.3	0.0	C	Y	N	SANDY PEBBLE GRAVEL
FR147 A	SE27	02	4E	A	Z	A	0.5	0.5	0.2	0.0	C	N	N	VERY SANDY PEBBLE GRAVEL
FR148 A	SE27	02	4E	A	Z	A	1.0	1.2	0.2	0.4	D	Y	S	PEBBLE GRAVEL
FR149 A	NE27	02	4E	A	Z	A	1.0	1.0	0.1	0.3	C	Y	S	SANDY PEBBLE GRAVEL
FR150 A	SW26	02	4E	A	Z	P	0.5	0.8	0.1	0.0	C	Y	N	FINE PEBBLE GRAVEL
FR151 A	SE27	02	4E	A	Y	P	1.0	1.0	0.1	0.0	C	Y	N	FINE PEBBLY SAND
FR152 A	SW27	02	4E	A	Z	A	0.6	0.6	0.1	0.3	E	N	M	PEBBLE GRAVEL WITH BOULDERS
FR153 A	NW36	02	4E	A	Z	A	0.9	1.0	0.1	0.5	D	Y	S	SANDY FINE PEBBLE GRAVEL
FR154 A	SE02	03	4E	A	Y	P	1.0	1.1	0.1	0.3	D	N	S	SANDY PEBBLE GRAVEL
FR154 B	SE02	03	4E	A	Y	P	0.6	0.7	0.1	0.0	D	N	N	VERY SANDY FINE PEBBLE GRAVEL
FR154 C	SE02	03	4E	A	Y	P	1.0	1.0	0.1	0.6	D	N	S	VERY SANDY PEBBLE GRAVEL
FR155 A	NW01	03	4E	A	Y	P	0.5	1.0	0.1	0.0	C	N	N	COARSE PEBBLE GRAVEL
FR155 B	NW01	03	4E	A	Y	P	1.0	1.3	0.1	0.0	C	N	N	VERY FINE PEBBLE GRAVEL
FR156 A	SW12	03	4E	A	Y	P	0.5	0.6	0.1	0.0	C	N	N	PEBBLY SAND
FR157 A	SE36	02	4E	A	Y	P	1.1	1.2	0.1	0.0	C	Y	N	FINE PEBBLY SAND
FR157 B	SE36	02	4E	A	Y	P	1.0	1.0	0.1	0.6	F	N	A	COBBLY PEBBLE GRAVEL WITH BOULDERS
FR157 C	SE36	02	4E	A	Y	P	1.0	1.0	0.1	0.5	F	Y	A	BOULDERY PEBBLE GRAVEL
FR158 A	NE36	02	4E	A	Y	P	1.5	1.5	0.1	0.4	C	N	M	VERY SANDY PEBBLE GRAVEL/ PEBBLY SAND
FR159 A	NE36	02	4E	A	Y	P	0.5	0.7	0.1	0.0	C	N	N	PEBBLY SAND
FR159 B	NE36	02	4E	A	Y	P	0.5	0.5	0.1	0.0	F	N	N	SANDY PEBBLE GRAVEL

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR160 A	SE36	02	4E	A	Y	P	0.6	1.6	0.1	0.4	C	Y	A	PEBBLE GRAVEL WITH BOULDERS
FR160 B	SE36	02	4E	I	Y	P	1.0	1.3	0.1	0.0	C	N	N	PEBBLY SAND
FR161 A	NW31	02	5E	A	Z	P	0.6	1.0	0.2	0.0	D	Y	M	SANDY FINE PEBBLE GRAVEL
FR162 A	NW35	02	5E	L	P	P	0.0	2.0	0.1	0.0	D	Y	M	SANDY TILL
FR163 A	NE01	03	5E	A	G	P	0.3	0.3	0.1	0.0	C	Y	N	PEBBLY SAND
FR164 A	SW26	03	5E	A	Z	P	1.2	1.5	0.2	1.0	C	Y	A	BOULDERY COBBLY GRAVEL
FR165 A	SW25	03	5E	A	Z	P	1.5	1.5	0.1	0.2	D	Y	S	COARSE PEBBLE GRAVEL
FR166 A	NW21	03	5E	J	Z	P	0.3	0.5	0.2	0.0	D	N	A	SANDY PEBBLE GRAVEL/TILL
FR166 B	NW21	03	5E	J	Z	P	1.0	2.0	0.2	0.7	D	Y	A	BOULDERY TILL
FR167 A	SE29	03	5E	D	F	P	0.0	0.6	0.1	0.0	C	N	N	SAND WITH PEBBLES AND MINOR COBS
FR168 A	SW29	03	5E	C	H	P	0.2	0.4	0.1	0.0	D	N	N	SANDY PEBBLE GRAVEL/ BOULDERY TILL
FR168 B	SW29	03	5E	A	Z	P	0.5	0.6	0.1	0.3	D	Y	A	PEBBLE GRAVEL/ BOULDERY TILL
FR169 A	SW29	03	5E	A	Z	P	0.8	0.9	0.1	0.2	D	Y	S	COARSE PEBBLE GRAVEL
FR170 A	SW09	03	5E	D	F	C	0.0	0.6	0.1	0.0	D	N	N	MED FINE SAND/COBBLE LAG/TILL
FR171 A	NW04	03	5E	D	P	P	0.4	1.7	0.1	0.0	D	Y	N	40CM SANDY PEBBLE GRAVEL/ LACUSTRINE 'TILL'
FR172 A	NW04	03	5E	D	P	P	0.0	0.4	0.1	0.0	D	N	N	40CM SAND WITH OCC STONE/ TILL
FR173 A	SW09	03	5E	L	P	P	0.3	1.5	0.1	0.4	D	N	M	FINE PEBBLE GRAVEL/ SILTY TILL
FR174 A	SW16	03	5E	D	P	P	0.0	0.4	0.1	0.0	D	N	N	THIN SAND/ COBBLE LAG/ SILTY 'TILL'
FR175 A	SE17	03	5E	D	B	B	0.0	0.9	0.1	0.0	D	N	N	80 CM FINE SAND/ 'TILL'
FR176 A	SW17	03	5E	D	P	P	0.0	0.4	0.1	0.3	D	N	M	40CM COB-BOULDER LAG DEPOSIT/ TILL
FR177 A	NW08	03	5E	A	Z	A	1.2	1.5	0.2	0.0	E	Y	N	SANDY PEBBLE GRAVEL
FR178 A	NW32	03	5E	B	W	W	0.5	2.2	0.0	0.0	C	N	N	SAND/PEBBLE GRAVEL
FR179 A	NE30	03	5E	A	Z	P	0.6	0.7	0.1	0.6	D	Y	A	BOULDERY PEBBLE GRAVEL
FR180 A	NW29	03	5E	A	Z	P	1.0	1.0	0.1	0.5	D	Y	A	BOULDERY PEBBLE GRAVEL
FR181 A	NW29	03	5E	A	Z	P	0.6	0.7	0.1	0.8	D	Y	A	BOULDERY COARSE PEBBLE GRAVEL
FR182 A	SE30	03	5E	B	F	P	2.5	2.5	0.2	0.0	C	N	N	PEBBLY SAND
FR182 C	SE30	03	5E	A	Z	F	1.5	2.0	0.2	0.3	D	N	M	COBBLY PEBBLE GRAVEL
FR183 A	SW30	03	5E	A	Z	P	0.7	0.7	0.1	0.6	C	N	A	BOULDERY PEBBLY SAND
FR184 A	SW26	03	4E	A	Y	P	1.5	1.0	0.1	0.0	C	Y	N	SANDY PEBBLE WITH OCC COBBLE
FR185 A	SW26	03	4E	A	Y	P	1.5	1.5	0.2	0.0	C	Y	N	VERY SANDY PEBBLE GRAVEL
FR185 B	SW26	03	4E	A	Y	P	1.5	1.5	0.2	0.0	C	Y	N	PEBBLY SAND
FR186 A	SE36	03	4E	A	Y	P	1.5	2.0	0.1	0.5	Z	N	M	PEBBLY SAND WITH OCC BOULDER
FR187 A	NW36	03	4E	A	Y	P	2.5	2.5	0.1	0.6	Z	N	M	VERY SANDY PEB GRAVEL WITH OCC BOULDER
FR188 A	NW36	03	4E	A	Y	P	1.5	1.5	0.1	0.6	F	N	A	BOULDERY PEB GRAVEL
FR189 A	NE36	03	4E	A	Z	P	1.0	1.0	0.1	0.5	D	N	A	BOULDERY PEB GRAVEL
FR190 A	NW23	03	4E	A	Y	P	0.5	1.5	0.2	0.5	C	Y	M	SANDY PEBBLE GRAVEL/ TILL
FR190 B	NW23	03	4E	A	Z	P	1.0	1.0	0.1	0.2	D	Y	S	PEBBLE GRAVEL WITH COBBLES
FR191 A	SW25	03	4E	A	Y	P	1.0	1.0	0.1	0.7	C	Y	A	SANDY FINE PEBBLE GRAVEL
FR192 A	SW25	03	4E	A	Y	P	0.7	1.0	0.1	0.5	C	N	A	SANDY PEB GRAV/ BOULDER PAVEMENT/FINE SD

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR193 A	NE24	03	4E	A	Y	P	3.0	3.0	0.1	0.3	C	Y	S	PEBBLY SAND
FR193 B	NE24	03	4E	A	Y	P	0.6	2.0	0.1	0.5	C	N	M	PEBBLY SAND
FR194 A	SW25	03	4E	A	Y	A	0.7	1.0	0.1	0.4	C	N	M	PEBBLY SAND
FR195 A	NW18	03	5E	D	P	H	0.0	0.5	0.1	0.0	D	N	M	LODGEMENT TILL
FR196 A	NW12	03	4E	A	Y	A	1.0	1.0	0.1	0.0	C	N	N	VERY SANDY PEBBLE GRAVEL
FR197 A	SW34	03	5E	A	Z	A	2.0	2.0	0.1	0.1	F	Y	S	COARSE PEBBLE GRAVEL
FR198 A	SE34	03	5E	A	Z	A	1.0	0.0	0.0	0.0	G	Y	N	
FR198 B	SE34	03	5E	A	Z	A	1.5	1.5	0.2	0.3	F	Y	S	PEBBLE GRAVEL WITH OCC BOULDER
FR198 C	SE34	03	5E	A	Z	P	0.4	0.4	0.1	0.1	F	Y	S	COARSE PEBBLE GRAVEL
FR199 A	SW24	03	5E	A	Y	A	1.0	1.0	0.1	0.0	C	N	N	SANDY FINE PEBBLE GRAVEL
FR200 A	NW13	03	5E	A	Z	P	0.6	0.0	0.1	0.0	C	N	N	VERY SANDY PEBBLE GRAVEL
FR201 A	SE34	03	5E	A	Y	P	0.7	0.7	0.1	0.3	F	Y	M	COB COARSE PEB GRAVEL WITH OCC BOULDER
FR201 B	SE34	03	5E	A	Y	P	2.5	2.5	0.1	0.4	F	Y	M	SANDY COASRE PEBBLE GRAVEL WITH BOULDERS
FR202 A	NE14	03	5E	A	Y	A	1.1	1.2	0.1	0.0	C	N	N	PEBBLY SAND
FR203 A	SE14	03	5E	A	Z	F	1.0	1.4	0.2	0.0	C	N	N	SANDY PEBBLE GRAVEL
FR204 A	SW14	03	5E	A	Y	A	1.0	1.2	0.2	0.0	F	Y	N	FINE PEBBLE GRAVEL
FR204 B	SW14	03	5E	I	F	A	1.0	1.2	0.2	0.0	C	Y	N	SANDY PEBBLE GRAVEL
FR205 A	NE14	02	5E	A	Z	P	0.8	0.6	0.1	0.1	F	Y	N	PEBBLE GRAVEL
FR206 A	NW25	01	5E	D	E	B	0.0	0.0	0.2	0.0	C	N	N	
FR207 A	SW23	01	5E	A	Y	P	1.5	1.5	0.2	0.0	C	N	N	SANDY PEBBLE GRAVEL
FR207 B	SW23	01	5E	B	P	P	1.5	2.5	0.1	0.0	C	N	N	FINE PEBBLY SAND
FR207 C	SW23	01	5E	B	P	P	1.5	2.6	0.1	0.0	C	N	N	FINE PEBBLY SAND
FR208 A	SW29	01	5E	A	Y	P	1.5	1.5	0.1	0.6	F	Y	A	BOULDERY PEBBLE GRAVEL
FR209 A	SW35	03	5E	A	Z	F	1.0	1.0	0.1	0.6	F	Y	M	COB/BOULDERY COARSE PEBBLE GRAVEL
FR210 A	NW26	03	5E	A	X	F	1.5	1.5	0.1	0.7	F	Y	M	COARSE PEBBLE GRAVEL WITH BOULDERS
FR211 A	NE20	01	4E	B	A	A	0.0	1.6	0.0	0.0	E	N	N	MED SAND / CLAY
FR212 A	NE20	01	4E	B	A	A	0.0	1.2	0.0	0.0	E	N	N	70 CM MED SAND / CLAY
FR213 A	SE21	01	4E	B	P	P	0.6	3.0	0.2	0.0	C	N	N	COARSE PEBBLE IN FINE SAND
FR213 B	SE21	01	4E	B	P	P	0.5	1.8	0.2	0.1	C	N	S	COBBLY PEBBLY FINE SAND
FR214 A	SE22	01	4E	B	A	A	0.0	1.8	0.2	0.0	B	N	N	SAND WITH CLAY SEAMS GRAD INTO LAMIN SILT
FR215 A	SE22	01	4E	B	A	F	0.0	2.0	0.1	0.0	B	N	N	25 CM SNDY FINE PEB GRAVEL/ LAMIN SILT &CLAY
FR216 A	SW26	01	4E	B	A	A	0.0	1.8	0.0	0.0	D	N	S	SAND/TILL
FR216 B	SW26	01	4E	B	A	A	0.0	2.3	0.3	0.0	C	N	M	50CM SANDY FINE PEB GRAV WITH BOULD/ SAND
FR217 A	NW22	01	4E	B	A	F	0.0	1.5	0.3	0.0	D	N	M	60CM SILTY GRAV COB-BOULDER LAG/ LODGE TILL
FR218 A	SE22	01	4E	B	A	A	1.4	3.0	0.1	0.0	E	Y	N	VERY SANDY PEBBLE GRAVEL
FR219 A	NW22	01	4E	B	A	P	0.0	0.6	0.3	0.4	D	N	M	BOULDER LAG/ MED FINE SAND/ TILL
FR219 B	NW22	01	4E	B	Z	P	0.3	0.5	0.1	0.2	D	N	M	COBBLY PEBBLE GRAVEL
FR219 C	NW22	01	4E	B	A	P	0.4	1.6	0.2	0.2	D	N	M	BOULDER LAG/ TILL
FR220 A	NW25	01	4E	B	A	P	0.0	2.0	0.2	0.0	D	N	M	VERY FINE PEBBLY SAND/ TILL

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR221 A	NW25	01	4E	B	A	P	0.0	2.3	0.2	0.0	C	N	S	PEB SAND WITH MINOR COB-BOULD/ SILTY SAND
FR222 A	NW25	01	4E	B	A	A	0.3	2.8	0.2	0.0	C	Y	N	VERY SANDY PEBBLE GRAVEL/ FINE SAND
FR223 A	NW25	01	4E	B	A	A	0.0	2.2	0.2	0.0	C	N	N	SAND WITH OCC PEBBLE
FR224 A	NW25	01	4E	B	P	P	0.8	2.2	0.1	0.0	D	N	N	VERY FINE PEBBLE GRAVEL
FR225 A	NW25	01	4E	B	A	P	0.8	2.0	0.2	0.0	G	Y	N	PEBBLY SAND/GRAVEL (WATER AT GRAVEL LEVEL)
FR226 A	NE20	01	5E	B	A	P	0.0	1.0	0.3	0.0	D	N	M	PEBBLY SAND/LODGEMENT TILL
FR227 A	NE20	01	5E	B	A	A	0.0	1.7	0.2	0.0	D	N	M	SAND/LODGEMENT TILL
FR227 B	NE20	01	5E	B	A	A	0.0	1.0	0.2	0.0	D	N	M	SAND WITH STONES/LODGEMENT TILL
FR227 C	NE20	01	5E	B	A	A	0.0	1.2	0.2	0.0	D	N	M	PEBBLE GRAVEL/LODGEMENT TILL
FR227 D	NE20	01	5E	B	F	F	1.2	2.1	0.1	0.0	E	N	N	SANDY PEBBLE GRAVEL
FR227 E	NE20	01	5E	B	P	P	1.5	1.7	0.2	0.0	E	N	A	COBBLY PEBBLE GRAVEL
FR227 F	NE20	01	5E	B	P	P	0.0	1.0	0.5	0.1	E	N	N	
FR228 A	SW29	01	5E	B	A	A	0.0	2.8	0.2	0.0	D	N	S	PEBBLY SAND/LODGEMENT TILL
FR228 B	SW29	01	5E	B	A	A	0.0	2.8	0.2	0.0	C	Y	S	PEBBLY SAND
FR228 C	SW29	01	5E	A	Y	P	0.7	3.0	0.1	0.6	D	Y	M	VERY SANDY FINE PEBBLE GRAVEL
FR229 A	SW29	01	5E	B	A	A	0.0	2.5	0.2	0.0	D	N	S	SAND/ TILL
FR230 A	SW29	01	5E	B	P	P	0.0	2.7	0.1	0.0	C	N	S	FINE SAND WITH OCC FINE PEBBLE
FR230 B	SW29	01	5E	A	Y	P	0.5	2.7	0.1	0.4	C	N	M	SANDY FINE PEBBLE GRAVEL
FR230 C	SW29	01	5E	I	P	F	0.5	0.7	0.1	0.4	G	N	M	FINE PEBBLE GRAVEL/ BOULDER LAG
FR230 D	SW29	01	5E	B	P	P	0.5	0.6	0.2	0.3	G	N	M	BOULDERY PEBBLE GRAVEL
FR230 E	SW29	01	5E	I	P	P	0.3	0.5	0.1	0.4	G	N	M	SANDY FINE PEBBLE GRAVEL/ BOULDER LAG
FR230 F	SW29	01	5E	I	P	P	0.4	0.6	0.1	0.4	G	N	M	SANDY FINE PEBBLE GRAVEL/ BOULDER LAG
FR231 A	NE29	01	5E	B	P	P	0.0	1.8	0.2	0.0	D	N	S	SAND/PEBBLE GRAVEL
FR231 B	NE29	01	5E	B	P	P	0.0	2.7	0.3	0.0	C	Y	N	SAND
FR231 C	NE29	01	5E	B	P	P	0.0	2.7	0.1	0.0	C	Y	M	MED SAND / THIN PEB GRAVEL LAYER
FR231 D	NE29	01	5E	B	P	P	0.0	1.1	0.2	0.0	C	N	N	MED SAND/ THIN FINE PEB GRAVEL/SAND
FR232 A	NW29	01	5E	B	P	P	0.4	2.2	0.1	0.0	C	N	N	PEBBLE GRAVEL WITH OCC COBBLE
FR233 A	NW29	01	5E	B	P	P	0.0	2.0	0.2	0.0	D	N	N	MED SAND / TILL
FR233 B	NW29	01	5E	R	P	P	1.2	3.3	0.2	0.2	G	Y	A	COBBLE GRAVEL
FR233 C	NW29	01	5E	B	A	P	0.0	2.1	0.5	0.3	C	N	S	SAND
FR234 A	SE32	01	5E	B	P	P	1.5	2.5	0.2	0.0	C	Y	N	PEBBLY SAND
FR234 B	SE32	01	5E	B	P	P	2.5	2.5	0.3	0.0	G	Y	N	SANDY PEBBLE GRAVEL
FR234 C	SE32	01	5E	B	P	P	0.0	2.3	0.5	0.0	D	Y	M	FINE TO MED SAND
FR234 D	SE32	01	5E	A	Z	A	5.0	1.3	0.1	0.2	G	Y	S	COARSE PEBBLE GRAVEL
FR235 A	SE32	01	5E	B	P	P	2.0	2.3	0.2	0.0	D	Y	N	SANDY FINE PEBBLE GRAVEL
FR236 A	NE32	01	5E	B	P	P	0.0	2.7	0.4	0.0	C	N	N	70 CM SAND/ 10 CM PEB GR/ 2M FINE SAND
FR236 B	NE32	01	5E	B	P	P	1.3	1.7	0.4	0.0	G	Y	N	40 CM SAND/ 130CM SANDY PEBBLE GRAVEL
FR236 C	NE32	01	5E	A	Z	P	5.0	0.0	0.2	0.1	D	Y	N	COARSE PEBBLE GRAVEL
FR237 A	NW31	01	5E	B	A	P	0.8	2.7	0.2	0.0	C	N	N	SANDY FINE PEBBLE GRAVEL

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION	
FR237 B	NW31	01	5E	A	Y	P	1.5	1.0	0.1	0.0	C	N	N	PEBBLY SAND	
FR237 C	NW31	01	5E	B	P	P	1.3	2.7	0.2	0.0	C	N	N	SANDY PEBBLE GRAVEL	
FR237 D	NW31	01	5E	B	P	P	1.4	3.0	0.2	0.0	C	N	N	PEBBLY SAND	
FR238 A	NE31	01	5E	B	A	A	1.4	3.2	0.1	0.0	C	N	N	COBBLY PEBBLY SAND	
FR239 A	SE31	01	5E	B	A	A	0.0	1.6	0.3	0.3	C	N	S	COBBLY PEB GRAVEL/ FINE SAND	
FR240 A	SE31	01	5E	B	A	A	0.0	2.3	0.3	0.3	C	N	S	COBBLY PEB GRAVEL/ FINE SAND	
FR240 B	SE31	01	5E	B	A	A	0.0	1.6	0.2	0.3	D	N	S	COBBLY PEB GRAVEL/ WASHED TILL	
FR241 A	SW33	01	5E	B	P	P	1.0	1.5	0.2	0.2	D	N	A	COBBLY GRAVEL	
FR241 B	SW33	01	5E	B	A	P	0.0	1.3	0.4	0.5	D	N	A	BOULDER LAG/ LODGEMENT TILL	
FR242 A	SE33	01	5E	B	A	A	0.0	1.0	0.2	0.2	D	N	N	SAND/COBBLY GRAVEL/ TILL	
FR242 B	SE33	01	5E	B	A	A	0.0	1.1	0.3	0.4	D	N	M	BOULDERY SAND/ SANDY TILL	
FR243 A	SE02	01	5E	B	A	A	0.0	3.5	0.2	0.0	C	N	N	SAND	
FR243 B	SE02	01	5E	B	A	A	0.0	2.0	0.2	0.0	C	N	N	SAND	
FR244 A	NE03	01	5E	B	A	A	0.0	2.2	0.2	0.0	E	N	N	SAND/AT 80 CM BOULDER-PEB GRAVEL UNIT/ CLAY	
FR245 A	SE04	01	5E	B	A	A	0.0	2.3	0.6	0.0	E	N	N	SAND/PEBBLY AT 60-75CM/SD/BOULDER LAG/CLAY	
FR246 A	SE12	01	4E	B	A	A	0.0	1.2	0.3	0.0	E	N	N	SAND/CLAY	
FR247 A	SE01	02	4E	A	A	P	1.8	2.6	0.2	0.0	C	N	N	PEBBLE GRAVEL	
FR247 B	SE01	02	4E	A	Z	P	1.8	2.6	0.2	0.0	C	N	N	PEBBLE GRAVEL	
FR247 C	SE01	02	4E	B	P	P	0.8	1.9	0.2	0.0	B	N	N	VERY FINE SANDY PEBBLE GRAVEL	
FR248 A	NE01	02	4E	B	P	P	0.7	2.0	0.2	0.0	E	N	S	SANDY PEBBLE GRAVEL	
FR249 A	NE01	02	4E	B	A	A	0.7	2.5	0.3	0.3	C	N	S	PEBBLE GRAVEL	
FR250 B	SW33	01	4E	B	P	P	1.0	0.8	0.0	0.0	F				
FR251 A	NE33	01	4E	B	A	A	0.0	1.5	0.7	0.0	D	N	N	SAND/COB LAG/TILL	
FR251 B	NE33	01	4E	B	A	A	1.0	2.4	0.3	0.0	C	N	N	SANDY VERY FINE PEBBLE GRAVEL	
FR252 A	SW24	02	4E	A	Z	P	0.6	1.7	0.3	0.0	D	N	N	PEBBLY SAND	
FR252 B	SW24	02	4E	B	A	P	0.0	1.0	0.1	0.2	D	N	N	COBBLY PEBBLE GRAVEL/ LODGEMENT TILL	
FR252 C	SW24	02	4E	B	A	P	0.0	1.3	0.3	0.0	D	N	N	SAND/ COBBLY PEBBLE GRAV/ FINE SAND/ TILL	
FR252 D	SW24	02	4E	B	A	P	0.0	0.9	0.9	0.2	0.0	D	N	N	COBBLY PEBBLE GRAV/ TILL
FR252 E	SW24	02	4E	B	A	A	0.7	1.4	0.2	0.2	D	N	A	COBBLY PEBBLE GRAVEL	
FR252 F	SW24	02	4E	B	A	P	0.0	1.3	0.2	0.0	D	N	N	50CM PEBBLY SAND/ TILL	
FR253 A	SW20	02	5E	B	A	A	1.2	1.5	0.3	1.0	C	N	A	BOULDERY PEBBLE GRAVEL	
FR253 B	SW20	02	5E	B	A	A	1.5	2.2	0.2	0.0	C	N	M	COARSE PEBBLES IN FINE SAND	
FR253 C	SW20	02	5E	B	A	A	0.0	1.2	0.1	0.0	D	N	N	SAND/ TILL	
FR254 A	SW16	02	4E	B	A	A	0.0	2.0	0.2	0.0	C	N	N	SAND/LAMINATED FINE SD AND CLAY	
FR254 B	SW16	02	4E	B	A	A	0.0	3.2	0.5	0.0	C	N	N	1M SAND/ 30CM PEB GRAVEL/ SAND	
FR254 C	SW16	02	4E	B	A	A	0.0	0.7	0.2	0.0	E	N	N	30 CM COARSE PEB GRAVEL/ CLAY	
FR255 A	SW09	02	5E	B	A	P	0.0	2.5	0.3	0.0	C	N	M	SAND WITH BOULDERS/ SAND	
FR255 B	SW09	02	5E	B	P	P	2.1	2.4	0.1	0.4	D	N	S	SANDY COARSE PEB GRAV WITH OCC BOULDERS	
FR255 C	SW09	02	5E	B	A	P	1.0	2.9	0.2	0.3	C	N	S	COBBLY PEBBLE GRAVEL/ SAND WITH OCC SM PEB	

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR255 D	SW09	02	5E	B	A	P	0.5	2.5	0.1	0.0	C	Y	S	PEBBLE GRAVEL/SAND
FR256 A	SE09	02	5E	B	A	A	1.5	2.0	0.1	0.4	D	N	M	PEB GRAVEL WITH BOULDERS
FR256 B	SE09	02	5E	B	W	A	1.2	1.4	0.2	0.3	D	N	A	BOULDERY COBBLE GRAVEL
FR256 C	SE09	02	5E	B	W	A	2.0	2.2	0.3	0.2	D	N	S	PEBBLE GRAVEL WITH OCC SM BOULDERS
FR256 D	SE09	02	5E	B	P	A	0.4	1.5	0.2	0.0	C	N	N	FINE SAND / PEBBLE GRAVEL
FR256 E	SE09	02	5E	B	A	A	0.0	2.3	0.2	0.0	C	N	N	20CM FINE SD/ 10CM PEB GR/ MED SAND
FR257 A	NE04	02	5E	B	F	F	1.2	1.7	0.1	0.0	E	N	N	SANDY VERY FINE PEBBLE GRAVEL
FR257 B	NE04	02	5E	B	P	P	1.3	2.7	0.1	0.0	C	N	N	VERY SANDY FINE PEBBLE GRAVEL
FR258 A	NE21	01	4E	A	Z	P	0.7	1.0	0.1	0.0	C	N	N	VERY SANDY FINE PEBBLE GRAVEL
FR259 A	SE09	02	5E	B	A	A	0.6	1.2	0.2	0.0	E	N	N	SANDY PEBBLE GRAVEL
FR259 B	SE09	02	5E	B	A	A	0.0	1.2	0.2	0.0	E	N	N	SND/ CLAY
FR259 C	SE09	02	5E	B	A	A	0.0	1.7	0.2	0.0	E	N	N	80CM SAND/ 40CM CLEAN 2" PEBB GRAV/ CLAY
FR260 A	NE10	02	5E	B	A	A	0.0	2.0	0.2	0.0	C	Y	N	SAND
FR260 B	NW11	02	5E	B	A	A	0.0	1.0	0.1	0.0	D	N	N	SAND/ LODGEMENT TILL
FR261 A	NE14	02	5E	A	Z	A	0.6	2.4	0.2	0.0	C	Y	N	SANDY PEBBLE GRAVEL
FR261 B	NE14	02	5E	B	A	A	0.8	2.2	0.1	0.0	C	Y	N	FINE PEBBLE GRAVEL
FR262 A	NE21	02	5E	B	A	A	0.0	2.2	0.7	0.0	D	N	N	SAND /TILL
FR263 A	NE31	02	5E	A	Z	W	0.5	1.0	0.1	0.0	C	N	N	SANDY FINE PEBBLE GRAVEL
FR264 A	NE31	02	5E	A	Z	F	0.3	2.2	0.2	0.0	C	N	N	VERY SANDY PEBBLE GRAVEL
FR265 A	NW32	02	5E	B	A	A	1.0	3.0	0.2	0.1	C	N	S	SANDY PEBBLE GRAVEL
FR265 B	NW32	02	5E	B	A	A	2.1	2.8	0.2	0.1	C	N	S	SANDY PEBBLE GRAVEL
FR266 A	NE32	02	5E	A	Z	P	3.5	3.5	0.1	0.2	G	Y	M	COBBLE GRAVEL
FR267 A	SE14	02	4E	B	W	W	1.5	2.5	0.1	0.2	D	N	N	COBBLY PEBBLE GRAVEL
FR267 B	SE14	02	4E	B	A	P	0.0	1.5	0.2	0.0	D	N	N	SILTY PEBB GRAVEL/ TILL
FR268 A	NW13	02	4E	B	H	A	1.7	2.4	0.1	0.2	D	N	S	COBBLE GRAVEL
FR268 B	NW13	02	4E	B	A	A	0.0	1.3	0.2	0.0	D	N	N	30 CM COB PEBBLE GRAVEL/ TILL
FR269 A	NW25	02	4E	B	A	P	0.0	2.4	0.4	0.0	C	N	N	SAND
FR269 B	NW25	02	4E	A	Y	P	2.5	2.7	0.1	0.3	C	N	M	COBBLY PEBBLE GRAVEL WITH BOULDERS
FR269 C	NW25	02	4E	B	P	P	0.5	2.2	0.4	0.2	C	N	M	BOULDERY PEBBLE GRAVEL
FR269 D	NW25	02	4E	B	W	W	0.5	2.0	0.2	0.2	N	N	S	PEBBLE GRAVEL WITH COBBLES
FR270 A	SE36	02	4E	B	A	A	0.0	1.5	0.2	0.0	C	N	N	20CM SAND/ 20CM BOULDERY PEB GRAVEL/ SAND
FR271 A	SE36	02	4E	B	A	A	0.0	2.0	0.2	0.0	C	N	N	20CM SAND/ 20CM BOULDERY PEB GRAVEL/ SAND
FR271 B	SE36	02	4E	A	Y	P	0.4	2.0	0.2	0.0	C	N	A	BOULDERY PEBBLE GRAVEL
FR272 A	SE36	02	4E	B	P	P	0.0	1.1	0.4	0.3	D	N	S	MED SAND/ 20CM BOULDER-COB GRAV/ TILL
FR273 A	SW08	03	5E	B	W	W	0.5	0.5	0.1	0.0	C	Y	N	PEBBLY SAND
FR273 B	SW08	03	5E	B	A	A	0.6	1.5	0.0	0.1	C	N	N	PEBBLE GRAVEL
FR274 A	SE31	03	5E	B	P	P	0.0	1.0	0.3	0.0	D	N	N	SILTY SAND WITH OCC COB/ TILL
FR275 A	SE31	03	5E	B	P	P	0.6	1.0	0.1	0.2	D	N	M	COBBLY PEBBLE GRAVEL
FR276 A	NE30	03	5E	A	Z	P	0.7	2.0	0.1	0.5	D	N	A	BOULDERY PEBBLE GRAVEL

APPENDIX A (Cont'd)

SITE NUMBER	SECT	TWP	RGE	PIT TYPE	PIT USE	SURFACE USE	SAND/ GRAVEL M	HOLE DEPTH M	OVER- BURDEN M	AVG. OVER- SIZE M	MAT- ERIAL AT BASE	WATER TABLE	AM'T OF OVER- SIZE	SEDIMENT DESCRIPTION
FR277 A	SE31	03	5E	B	A	A	0.0	2.2	0.4	0.1	C	N	N	SAND/10 COBBLY GRAV/ SAND
FR278 A	SW31	03	5E	I	A	A	0.8	0.8	0.0	0.0	G	N	N	COARSE PEBBLE GRAVEL
FR279 A	SW31	03	5E	B	A	A	0.0	2.3	0.5	0.3	C	N	N	SAND/COB PEBBLE GRAVEL/ SAND
FR279 B	SW31	03	5E	B	A	A	0.5	2.7	0.1	0.0	C	N	N	PEBBLE GRAVEL/ MED SAND
FR280 B	SW31	03	5E	B	A	A	0.0	2.8	0.2	0.4	C	N	N	BOULDERS AND SD/ 20CM PEB GR/ SAND
FR281 A	NW31	03	5E	B	A	P	0.0	1.7	0.3	0.4	C	N	N	COBBLY PEB GRAV/ SAND
FR282 A	SE25	03	4E	B	A	P	0.0	1.5	0.3	0.0	D	N	N	SAND/ COB-BOULDER LAG/ TILL
FR283 A	SE23	03	4E	B	A	A	2.5	2.5	0.1	0.0	C	N	N	PEBBLY SAND
FR283 B	SE23	03	4E	A	Z	A	2.5	0.0	0.1	0.0	C	N	N	SANDY PEBBLE GRAVEL
FR284 A	NE33	03	5E	A	X	A	2.5	1.5	0.3	0.4	G	Y	M	COBBLE GRAVEL
FR284 B	NE33	03	5E	A	X	A	2.5	1.5	0.1	0.0	G	Y	N	SANDY COARSE PEBBLE GRAVEL
FR284 C	NE33	03	5E	A	X	A	1.5	1.5	0.2	0.0	G	Y	N	SANDY PEBBLE GRAVEL
FR285 A	SE16	02	5E	I	F	F	1.0	0.6	0.1	0.0	G	N	N	FINE PEBBLE GRAVEL
FR286 A	SE08	02	5E	A	Z	A	1.3	1.0	0.1	0.0	G	Y	N	SANDY PEBBLE GRAVEL
FR287 A	NW13	02	4E	A	Z	A	0.6	0.6	0.1	0.0	G	Y	N	FINE PEBBLE GRAVEL
FR288 A	SW22	02	4E	A	Z	F	1.0	1.0	0.1	0.0	C	Y	N	SANDY FINE PEBBLE GRAVEL
FR289 A	NE23	01	4E	A	Z	F	0.6	1.0	0.2	0.0	C	N	N	PEBBLY SAND
FR290 A	NE28	01	4E	A	Z	A	1.0	1.0	0.2	0.0	C	N	N	FINE PEBBLY SAND
FR291 A	SW16	02	4E	A	Z	A	1.0	1.0	0.2	0.0	C	Y	N	PEBBLY SAND
FR292 A	SE21	02	4E	A	Z	A	1.0	1.0	0.2	0.0	C	Y	N	SAND WITH PEBBLES
FR293 A	NW27	02	4E	A	Z	A	1.0	1.0	0.2	0.0	C	N	N	PEBBLY SAND
FR294 A	SE21	01	4E	A	Z	A	0.8	1.0	0.2	0.0	C	N	N	FINE PEBBLY SAND
FR295 A	SW02	01	5E	B	A	A	0.0	1.7	0.2	0.0	C	N	N	SAND
FR296 A	SE29	01	5E	A	Y	P	1.0	0.0	0.2	0.0	G	Y		GRAVEL (ACCESS NOT PERMITTED BY OWNER)
FR297 A	SE30	01	5E	A	Z	A	1.0	0.0	0.0	0.0				
FR298 A	NE33	02	5E	A	Z	A	1.0	1.0	0.2	0.0	G	N	N	VERY SANDY PEBBLE GRAVEL

Pit Type

A	Sand and gravel pit
B	Backhoe test pit
C	Road cut or ditch section
D	Hand dug hole
I	Bulldozer test pit
J	Borrow pit
K	Natural exposure
L	Dug out

Pit Use

A	Agriculture
B	Building site
C	Cemetery
F	Forest, natural
G	Garbage dump
H	Highway, roadway, railway
P	Pasture
X	Active pit

Pit Use

Y	Temporarily inactive
Z	Not in use (commonly revegetated)

Material at Base

B	Silt
C	Sand
D	Till
E	Clay
F	Gravel
G	Sand and gravel
Z	Same as pit wall

Amount of Oversize

N	None
S	Sparse
M	Moderate
A	Abundant

**APPENDIX B
SIEVE ANALYSIS**

SITE #			PERCENT PASSING										OVERSIZED (PLUS 6")
			3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	
FR001	A	(NE-02-001-05E)	100	100	88	66	50	34	25	23	20	10	5
FR008	A	(NE-12-001-04E)	100	100	93	80	72	63	52	38	29	12	4
FR012	A	(NW-14-001-05E)	100	100	100	99	97	93	81	42	14	8	6
FR013	A	(NE-15-001-05E)	100	100	100	98	92	89	87	81	43	8	2
FR032	A	(NE-13-001-04E)	100	100	100	94	89	84	73	51	26	3	2
FR034	A	(NE-04-001-05E)	100	100	100	93	90	87	82	73	58	22	8
FR045	A	(SW-27-001-05E)	100	96	87	77	68	58	48	39	20	3	1
FR048	A	(SW-34-001-05E)	91	86	75	55	40	27	16	7	3	2	1
FR048	B	(SW-34-001-05E)	100	99	92	85	75	63	48	25	8	2	1
FR049	A	(SE-33-001-05E)	100	100	100	100	100	99	90	30	10	6	4
FR050	A	(NE-29-001-05E)	100	98	90	78	64	49	31	16	9	6	4
FR053	A	(SW-32-001-05E)	100	100	92	76	67	58	50	35	13	4	2
FR054	A	(SW-32-001-05E)	100	100	100	99	98	95	91	84	75	48	4
FR055	A	(SW-32-001-05E)	100	100	100	100	100	99	97	95	90	73	7
FR056	B	(SW-31-001-05E)	89	77	70	64	52	36	25	20	15	11	8
FR058	A	(SW-36-001-04E)	100	100	100	98	81	53	28	17	14	9	5
FR062	A	(NE-28-001-04E)	100	100	100	95	87	79	71	58	30	7	5
FR064	A	(NE-22-001-04E)	100	100	99	80	61	41	20	9	7	6	5
FR064	B	(NE-22-001-04E)	100	100	95	68	49	32	20	11	8	8	7
FR064	C	(NE-22-001-04E)	100	100	97	68	48	32	20	13	10	10	8
FR067	A	(SE-28-001-04E)	100	100	100	97	91	81	68	53	22	4	3
FR067	B	(SE-28-001-04E)	100	100	100	89	82	74	61	41	11	3	3
FR082	B	(SE-02-002-04E)	100	100	100	94	80	66	52	40	31	14	7
FR084	A	(SW-02-002-04E)	100	99	84	46	28	24	22	20	14	4	3
FR084	B	(SW-02-002-04E)	100	97	92	87	84	80	73	56	12	2	1
FR084	C	(SW-02-002-04E)	100	100	100	84	66	55	48	40	25	4	3
FR084	C	(---)	100	100	100	84	66	55	48	40	25	3	2
FR084	C	(SW-02-002-04E)	100	100	95	75	59	50	43	36	21	3	2
FR087	A	(SW-02-002-04E)	100	100	100	94	81	62	38	16	7	4	2
FR099	A	(---)	99	89	79	***	***	***	***	***	***	***	***
FR100	A	(---)	100	100	100	95	94	92	90	87	60	6	1
FR100	B	(---)	100	100	100	92	86	81	77	72	55	5	1
FR104	A	(NW-09-002-05E)	87	76	65	54	43	36	28	22	17	11	3
FR104	B	(NW-09-002-05E)	100	100	93	81	71	61	54	49	46	22	3
FR112	A	(NW-11-002-04E)	100	100	100	97	88	71	47	18	5	3	2
FR118	A	(NE-16-002-05E)	100	99	93	76	61	49	39	24	16	13	5
FR119	A	(SE-20-002-05E)	100	91	82	72	60	47	35	24	17	10	5
FR120	A	(SE-19-002-05E)	100	90	80	74	69	64	59	50	38	15	2
FR120	B	(SE-19-002-05E)	100	86	74	63	56	48	40	29	17	7	4
FR123	A	(SW-29-002-05E)	95	87	79	67	59	51	41	29	19	11	6
FR124	A	(SE-30-002-05E)	100	98	87	78	64	54	45	34	20	15	5
FR126	A	(SW-30-002-05E)	100	100	100	82	73	65	57	39	12	5	2
FR128	A	(NW-30-002-05E)	100	98	90	76	65	57	45	30	17	9	3
FR128	C	(NW-30-002-05E)	100	100	100	92	81	70	59	50	45	17	5
FR128	D	(NW-30-002-05E)	100	100	100	73	58	47	39	35	26	14	10
FR129	A	(NW-27-002-05E)	100	96	90	85	74	61	47	34	20	9	3
FR130	A	(NE-28-002-05E)	100	93	88	80	72	58	30	12	6	3	2
FR131	A	(NW-22-002-05E)	93	92	85	82	79	77	73	66	33	19	9
FR132	A	(NE-25-002-04E)	96	91	82	65	55	46	38	31	20	10	6
FR133	A	(SE-25-002-04E)	100	80	60	39	27	20	15	9	5	3	2

APPENDIX B (cont'd)

SITE #	PERCENT PASSING												OVERSIZED (PLUS 6")
	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200		
FR134 A	(SW-24-002-04E)	98	95	92	84	74	62	49	38	18	6	3	
FR135 A	(NE-14-002-04E)	100	100	100	94	75	57	41	26	8	4	2	
FR136 A	(SE-14-002-04E)	100	100	100	90	82	70	54	36	9	3	2	
FR137 A	(SW-12-002-04E)	100	98	82	52	40	32	25	17	11	8	4	
FR138 A	(NW-01-002-04E)	100	100	96	96	96	96	96	96	96	96	96	
FR139 A	(NE-01-002-04E)	100	90	76	64	56	50	44	34	27	15	6	
FR139 B	(NE-01-002-04E)	100	100	100	100	99	99	99	99	98	41	6	
FR140 A	(SE-23-002-04E)	100	100	87	78	68	58	52	45	36	24	9	
FR142 A	(SE-10-002-04E)	97	89	76	64	52	41	28	15	10	7	5	
FR143 A	(SW-11-002-04E)	100	94	88	83	77	71	59	32	7	3	2	
FR146 A	(NE-22-002-04E)	100	100	100	92	83	72	60	51	43	10	3	
FR146 B	(NE-22-002-04E)	100	100	100	88	76	65	52	41	31	5	2	
FR147 A	(SE-27-002-04E)	100	100	100	97	88	74	57	37	10	4	3	
FR148 A	(SE-27-002-04E)	100	91	76	56	42	33	26	20	13	5	2	
FR150 A	(SW-26-002-04E)	100	100	100	94	84	71	55	36	3	5	3	
FR151 A	(NE-27-002-04E)	100	100	100	90	83	69	48	31	17	5	3	
FR152 A	(SW-27-002-04E)	100	93	77	63	54	46	39	31	18	8	4	
FR153 A	(NW-36-002-04E)	100	96	80	57	53	50	43	25	6	1	1	
FR153 B	(NW-36-003-04E)	100	96	80	67	58	47	40	34	16	2	1	
FR154 A	(NE-02-003-04E)	100	100	95	87	77	65	52	38	12	3	2	
FR154 B	(NE-02-003-04E)	100	100	100	96	90	82	74	63	36	5	2	
FR154 C	(NE-02-003-04E)	100	100	100	79	69	59	44	25	10	2	1	
FR155 B	(NW-01-003-04E)	100	99	95	73	48	32	21	14	7	2	2	
FR156 A	(SW-12-003-04E)	100	100	100	99	94	85	72	48	18	4	3	
FR157 A	(SE-01-003-04E)	100	100	100	88	74	64	53	42	21	3	2	
FR157 B	(SE-01-003-04E)	100	99	85	56	43	35	27	21	16	3	1	
FR157 C	(SE-01-003-04E)	95	86	76	67	58	49	41	33	25	17	12	
FR158 A	(NE-36-002-04E)	100	100	96	81	74	69	64	57	3	2	1	
FR159 A	(NE-36-002-04E)	100	100	100	86	76	70	62	54	43	7	1	
FR159 B	(NE-36-002-04E)	100	100	100	79	60	46	34	27	18	4	2	
FR159 B	(NE-36-002-04E)	100	100	92	76	67	56	46	37	24	4	2	
FR160 B	(---)	100	100	100	96	91	87	82	78	72	15	2	
FR160 C	(SE-36-002-04E)	100	100	100	93	89	84	80	76	71	16	4	
FR161 A	(NW-31-002-05E)	100	100	100	94	78	63	51	40	21	2	2	
FR165 A	(SW-25-003-05E)	100	94	73	49	38	33	28	22	9	2	2	
FR168 A	(---)	100	100	100	58	47	38	30	21	10	2	1	
FR168 B	(SW-29-003-05E)	100	100	100	62	47	37	28	20	10	2	1	
FR169 A	(---)	100	100	100	74	56	42	31	20	11	4	2	
FR169 A	(SW-29-003-05E)	97	90	76	56	44	35	28	21	15	9	7	
FR176 A	(---)	100	100	100	72	52	37	27	18	10	6	3	
FR176 B	(---)	100	100	100	73	52	39	29	20	11	5	3	
FR179 A	(---)	100	100	100	80	60	43	28	17	9	3	2	
FR179 A	(NE-30-003-05E)	100	98	92	75	61	45	31	19	11	4	3	
FR180 A	(---)	100	100	100	82	62	46	32	20	11	6	4	
FR180 A	(NW-29-003-05E)	96	90	80	63	50	38	27	17	10	6	5	
FR181 A	(---)	100	100	100	88	72	59	45	29	15	7	4	
FR181 A	(NW-29-003-05E)	96	92	84	72	62	51	40	28	18	11	10	
FR182 A	(--003-)	100	100	100	90	85	81	77	71	17	6	4	
FR182 B	(---)	100	93	85	79	73	67	60	49	19	8	4	
FR183 A	(SW-30-003-05E)	100	94	87	80	74	68	64	58	33	11	4	
FR183 A	(---)	100	100	100	93	87	81	76	69	41	11	3	

APPENDIX B (cont'd)

SITE #			PERCENT PASSING										OVERSIZED (PLUS 6")
			3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	
FR184	A	(NW-26-003-04E)	100	95	89	78	69	59	49	32	16	8	5
FR184	A	(---)	100	100	100	92	79	68	56	35	14	6	4
FR185	A	(SW-26-003-04E)	100	98	88	69	61	55	47	22	6	2	2
FR185	B	(SW-26-003-04E)	100	100	100	90	87	85	80	47	10	2	2
FR185	C	(---)	100	100	100	89	78	71	61	29	8	3	2
FR186	A	(SE-36-003-04E)	100	100	100	86	75	68	63	21	3	2	2
FR187	A	(NW-36-003-04E)	100	99	86	58	48	39	24	7	3	2	2
FR188	A	(NW-36-003-04E)	100	100	89	63	45	27	11	4	2	1	
FR189	A	(---)	100	100	100	87	74	59	20	7	5	4	3
FR189	A	(NE-36-003-04E)	100	100	100	79	65	50	17	5	4	3	3
FR199	A	(SW-24-003-05E)	100	100	92	73	6	152	47	42	23	3	1
FR201	A	(SE-34-003-05E)	91	86	74	61	47	37	27	18	11	7	5
FR201	B	(SE-34-003-05E)	99	96	91	79	60	48	33	18	10	6	4
FR202	A	(NE-14-003-05E)	100	100	100	84	77	69	61	49	26	5	1
FR203	A	(SE-14-003-05E)	100	97	79	61	49	40	32	18	11	3	1
FR204	A	(SW-14-003-05E)	100	97	90	78	71	66	61	51	16	3	2
FR205	A	(--002-05E)	100	100	100	85	70	53	34	26	22	18	13
FR207	A	(SW-23-001-05E)	100	97	85	77	70	64	57	48	22	4	2
FR207	B	(SW-23-001-05E)	100	100	100	95	91	85	77	69	32	3	1
FR207	C	(SW-23-001-05E)	100	100	100	100	97	95	94	92	87	7	1
FR208	A	(SW-29-001-05E)	100	99	94	74	58	44	32	17	5	2	1
FR209	A	(SW-35-003-05E)	98	89	81	72	63	52	36	20	13	8	5
FR213	A	(SE-21-001-04E)	99	86	82	74	70	67	64	59	53	46	30
FR213	B	(SE-21-001-04E)	100	87	83	79	75	69	64	58	54	42	13
FR218	A	(SE-22-001-04E)	100	100	100	87	70	52	35	21	13	10	7
FR219	B	(NW-22-001-04E)	100	99	94	75	59	45	33	23	17	13	10
FR224	A	(NW-25-001-04E)	100	99	97	89	77	66	57	49	29	8	4
FR227	D	(NE-20-001-05E)	100	99	87	70	54	42	31	24	18	15	6
FR227	E	(NE-20-001-05E)	91	86	75	55	42	31	21	12	5	3	2
FR230	A	(--001-05E)	100	100	100	95	86	74	61	53	49	36	20
FR232	A	(NW-29-001-05E)	100	96	80	65	56	47	37	25	14	10	5
FR233	B	(NW-29-001-05E)	100	100	100	80	69	61	53	44	30	18	10
FR234	A	(SE-32-001-05E)	99	94	83	73	69	64	55	38	11	4	1
FR234	B	(SE-32-001-05E)	100	96	86	62	50	41	33	23	12	8	2
FR234	C	(SE-32-001-05E)	100	100	97	78	64	63	52	34	17	12	10
FR235	A	(SE-32-001-05E)	100	100	99	93	86	80	74	66	34	3	1
FR235	B	(SE-32-001-05E)	93	92	89	86	80	73	66	57	41	8	2
FR236	B	(NE-32-001-05E)	100	100	100	98	97	94	87	66	23	12	5
FR236	C	(NE-32-001-05E)	100	93	83	70	55	43	31	17	6	3	2
FR237	A	(NE-32-001-05E)	100	100	100	94	86	79	74	70	63	20	4
FR237	C	(NW-31-001-05E)	100	100	95	80	71	62	52	42	23	3	1
FR237	D	(NW-31-001-05E)	100	100	95	88	78	66	51	31	16	6	3
FR238	A	(NW-31-001-05E)	100	98	91	80	76	71	66	61	51	36	25
FR238	B	(NE-31-001-05E)	100	100	100	87	77	71	66	60	42	8	1
FR241	A	(SW-33-001-05E)	85	74	67	58	47	37	29	22	16	7	4
FR247	A	(SE-01-002-04E)	100	98	90	67	53	43	34	19	7	5	2
FR247	B	(SE-01-002-04E)	100	100	97	87	78	69	58	42	28	22	8
FR247	C	(SE-01-002-04E)	100	100	100	84	70	58	47	27	16	15	6
FR248	A	(SE-01-002-04E)	100	100	95	76	60	47	33	19	13	9	4
FR249	A	(NE-01-002-04E)	100	100	91	60	45	37	30	21	14	7	3
FR251	B	(SE-04-002-04E)	100	100	100	84	68	51	36	24	17	5	4

APPENDIX B (cont'd)

SITE #			PERCENT PASSING										OVERSIZED (PLUS 6")
			3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	
FR252	A	(SW-24-002-04E)	100	100	100	91	82	74	67	61	54	43	28
FR252	E	(SW-24-002-04E)	91	82	73	62	52	43	33	26	17	12	7
FR253	A	(SW-20-002-04E)	100	96	90	87	76	64	51	40	35	27	17
FR253	B	(SW-20-002-04E)	100	89	82	79	77	75	73	67	41	14	8
FR255	B	(SW-09-002-05E)	100	95	87	77	67	57	47	36	28	22	5
FR255	C	(SW-09-002-05E)	100	100	100	96	94	92	90	86	76	36	17
FR256	A	(SE-09-002-05E)	98	91	86	72	61	52	42	36	27	17	6
FR256	B	(SE-09-002-05E)	92	74	62	55	49	43	36	29	21	15	9
FR256	C	(SE-09-002-05E)	100	96	91	84	71	61	51	38	23	15	3
FR257	A	(NE-04-002-05E)	100	100	100	94	80	65	51	34	21	17	5
FR257	B	(NE-04-002-05E)	100	100	100	90	74	61	51	43	16	5	2
FR258	A	(NE-21-001-04E)	100	100	100	87	81	73	63	51	20	4	2
FR259	A	(SE-09-002-05E)	100	100	98	93	82	71	60	46	33	20	12
FR261	A	(--002-05E)	100	100	99	89	72	55	38	30	26	14	4
FR261	B	(--002-05E)	100	100	92	84	75	63	49	35	24	9	3
FR264	A	(SE-31-002-05E)	100	100	97	85	71	61	52	45	40	8	3
FR265	C	(NW-32-002-05E)	100	81	44	38	32	27	22	19	17	7	2
FR266	A	(NE-33-002-05E)	94	87	77	62	51	41	33	24	13	6	3
FR267	A	(SE-14-002-04E)	95	81	70	54	40	31	22	13	8	7	4
FR268	A	(NW-13-002-04E)	91	80	66	57	46	36	25	16	9	6	4
FR269	B	(NW-25-002-04E)	91	87	79	71	61	49	38	30	17	7	4
FR271	B	(SE-36-002-04E)	100	99	88	***	***	***	***	***	***	***	***
FR273	B	(SW-08-003-05E)	99	97	85	71	62	50	33	17	12	10	7
FR275	A	(--003-05E)	95	82	67	51	45	40	36	2	25	18	14
FR276	A	(---)	89	77	67	52	41	32	25	18	13	9	6
FR283	A	(--003-04E)	100	100	96	80	68	61	54	44	35	7	2
FR284	A	(NE-33-003-05E)	90	57	38	31	26	21	15	10	5	3	2
FR284	B	(NE-33-003-05E)	100	97	89	79	68	55	42	30	11	4	2
FR284	C	(NE-33-003-05E)	98	89	72	55	38	25	17	14	11	8	5
FR286	A	(---)	100	94	81	***	***	***	***	***	***	***	***

APPENDIX C
AGREGATE GRADING SPECIFICATIONS

Screen (mm)		Wentworth size class*	
Field Processing	Sample is 100% Passing 3" (76.1mm)	Boulders	-8 phi (256mm)
	1 1/2" (38.1mm)	Cobbles	
	3/4" (19.1mm)	Coarse	-6 phi (64mm)
	3/8" (9.5mm)	Medium	
Laboratory Processing	#4 (4.8mm)	Fine	
	#8 (2.4mm)	Granules	-2 phi (4mm)
	#16 (1.2mm)	Coarse	-1 phi (2mm)
	#30 (0.6mm)	Medium	
	#50 (0.3mm)	Fine	
	#100 (0.15mm)		
	#200 (0.07mm)		
	< 200		
		Fines	
		Silt & Clay < 0.063mm	+4 phi (0.063mm)

* modified from Folk, 1974

1988

PROVINCE OF MANITOBA
AGGREGATE GRADING SPECIFICATIONS

*NOTE: N.S. = Not Specified
F.M. = Fineness Modulus

PASSING SIEVE SIZE		BITUMINOUS PLANT MIX			BASE COURSE					GRANULAR FILL	CLEANEST GRAVEL	TRAFFIC TYPE						CONCRETE			SEAL COAT COVER				PASSING SIEVE SIZE		
					"A"	"A"	"B"	"C"	"C"									Fines	"A" COURSE								
Metric	Imp.	"A"	"B"	"C"	Gravel	Lime- stone	All	Gravel	Lime- stone			"A"	"A" Lime- stone	"B"	"C"	"C" Lime- stone	"C" Quarried rock		65% Lime- stone	Gravel		"A"	"B"	Cover "C"	Blotter "C"	Metric	Imp.
50 mm	2"								100	3" 100																50 mm	2"
37.5mm	1½"							100	N.S. 100		100															37.5mm	1½"
25 mm	1"			100										100	100	100				100						25 mm	1"
19 mm	¾"				100	100	100					100	100			85-100	100		100	90-100						19 mm	¾"
16 mm	5/8"		100		80-100																		100			16 mm	5/8"
12.5mm	1/2"	100										75-90		70-90	60-95			100			100	80-100	100	100		12.5mm	1/2"
9.5 mm	3/8"	70-95	70-90															96-100	20-55	20-55						9.5 mm	3/8"
4.75mm	#4	55-70	55-70	60-90	40-70	35-70	30-75	25-80	25-80		N.S. 25-80	45-70	35-60	40-70	30-70	35-60	30-60	90-100	0-10	0-10	0-60	0-65				4.75mm	#4
2.00mm	#10	35-55	35-55	35-80	25-55		25-65																			2.00mm	#10
1.18mm	#16																	50-80								1.18mm	#16
600um	#30																	25-60								600um	#30
425um	#40	17-29	17-29	20-50	15-30	10-30	15-35	15-40				10-35		10-35	5-35						0-15	0-15	0-25	0-50		425um	#40
300um	#50																	10-30								300um	#50
180um	#80	N.S. < 10	N.S. < 10																							180um	#80
75 um	#200	3-8	3-8	5-12	8-15	6-17	4-18	8-20 4-20	5-20	0-15	N.S. 4-20	8-15	6-17	0-15	0-15	0-17	0-10	0-3	0-2	0-2	0-4	0-5	0-5	0-10		75um	#200
MINIMUM CRUSH		50%	50%		35%		25%					35%	100%	35%	25%	100%	100%				30%	20%				MINIMUM CRUSH	
MAXIMUM SHALE		T 3% B 7%	T 3% B 7%		12%		12%	12%			N.S. 15%	12%		12%	15%						3%	4%				MAXIMUM SHALE	
MAXIMUM L.A.		35%	35%		35%	35%	35%	35%	35%			45%	45%	45%	45%	45%			28%	28%	35%	35%				MAXIMUM L.A.	
MAXIMUM DELETERIOUS																		2%	1.5%	1.5%						MAXIMUM DELETERIOUS	
MAXIMUM IRONSTONE																		F.M. 2.3-3.5				5%	5%			MAXIMUM IRONSTONE	
MAXIMUM ABSORPTION																			2.25%	2.25%						MAXIMUM ABSORPTION	
SPEC NUMBER		920	920	920	900	900	900	900	900	520		910	910	910	910	910	910	930	930	930	940	940	940	940		SPEC NUMBER	

APPENDIX D
GRAIN SIZE CLASSIFICATION

**APPENDIX E
PETROGRAPHIC RESULTS**

SITE NUMBER	GOOD CARB	GOOD SDST	GOOD GNEISS	GOOD QTZ	GOOD WACKE	GOOD VOL	GOOD GRAN	FAIR CARB	FAIR SDST	FAIR GNEISS	FAIR WACKE	FAIR VOL	FAIR GRAN	FAIR CHERT
FR001 A	24.8	0.0	3.4	0.0	0.0	1.4	9.7	52.4	0.0	0.0	0.0	0.0	0.7	0.0
FR008 A	46.4	0.0	6.5	0.0	0.0	0.0	9.8	29.4	0.0	0.0	0.0	0.0	1.3	0.0
FR032 A	63.8	0.0	6.5	0.0	0.0	0.0	7.8	13.8	1.4	0.0	0.0	0.0	1.4	0.0
FR043 A	53.3	2.6	4.0	0.0	0.0	2.6	13.2	21.1	0.0	2.0	0.0	0.0	2.6	0.0
FR045 A	72.0	0.0	19.0	1.2	0.0	1.8	1.8	1.8	0.0	1.2	0.0	0.0	0.0	0.6
FR048 A	60.2	0.0	20.3	0.0	0.0	2.5	8.5	3.4	0.0	1.7	0.0	0.0	0.8	0.0
FR053 A	47.2	0.0	6.2	0.0	0.0	0.0	29.2	14.0	0.0	0.0	0.0	0.0	1.7	0.0
FR053 B	43.6	0.0	4.2	0.0	0.0	0.3	3.8	2.9	0.0	0.6	0.0	0.0	0.0	0.0
FR056 A	81.0	0.0	13.4	0.0	0.0	2.8	0.0	0.0	0.	1.4	0.0	0.0	0.0	0.0
FR056 B	84.4	0.0	7.3	0.0	0.0	1.0	0.0	1.0	0.0	5.2	0.0	0.0	0.0	0.0
FR062 A	35.2	0.0	2.5	0.0	0.0	1.6	11.5	36.9	0.0	0.0	0.0	0.0	0.0	0.0
FR063 A	44.1	0.0	3.5	0.0	0.0	1.4	11.9	27.3	0.0	0.0	0.0	0.0	0.0	1.4
FR071 A	42.6	0.0	10.1	0.0	0.0	1.2	6.5	32.0	0.0	3.6	0.0	0.0	0.6	0.0
FR084 A	28.8	0.0	1.8	0.0	0.0	1.2	11.7	37.4	0.0	2.5	0.0	0.0	6.1	0.6
FR104 A	41.3	0.0	4.0	0.0	0.7	5.3	15.3	24.7	0.0	0.0	0.0	0.0	1.3	0.0
FR117 A	37.2	0.0	2.7	0.0	0.0	4.1	14.2	35.8	1.4	0.0	0.0	0.0	0.0	1.0
FR118 A	54.4	0.0	20.8	2.0	0.7	3.4	8.1	6.7	0.0	0.0	0.0	0.0	0.7	0.0
FR119 A	65.0	0.0	16.9	0.0	1.3	4.4	3.8	5.0	0.0	3.1	0.0	0.0	0.0	1.0
FR120 A	62.5	0.0	15.6	0.0	0.0	0.0	9.2	7.0	0.0	0.0	0.0	0.0	0.0	0.0
FR123 A	62.5	0.0	15.6	0.0	0.0	5.0	4.3	6.9	0.0	3.8	0.0	0.0	0.6	0.0
FR124 A	66.7	0.0	10.2	0.0	0.0	0.7	8.2	6.1	0.0	3.4	0.0	0.0	0.0	0.0
FR125 A	67.5	0.0	8.6	0.0	0.0	0.0	8.6	11.9	0.0	1.3	0.0	0.0	0.0	1.0
FR126 A	50.4	0.0	3.5	0.0	0.0	0.7	14.2	22.7	0.0	1.4	0.0	0.0	4.3	0.0
FR127 A	45.3	0.0	1.8	0.0	0.0	1.8	14.9	25.0	0.0	2.4	0.0	0.0	4.2	0.0
FR128 A	31.0	0.0	2.1	0.0	0.0	0.0	16.6	37.2	0.0	0.0	0.0	0.0	0.7	0.7
FR129 A	70.3	0.0	10.1	0.0	0.0	0.7	8.1	6.1	1.4	0.0	1.4	0.0	0.0	0.7
FR130 A	67.8	0.0	16.1	0.7	0.0	0.0	9.4	3.4	0.0	0.0	0.0	0.0	0.0	0.7
FR131 A	78.6	0.0	10.3	0.8	0.0	0.0	5.6	3.2	0.0	0.0	0.0	0.0	0.0	0.8
FR132 A	71.5	0.0	12.4	0.0	0.0	0.0	9.5	2.9	0.0	0.0	0.0	0.0	0.0	0.0
FR133 A	70.9	0.0	10.0	0.0	0.0	1.4	2.0	2.7	0.0	6.1	0.0	0.0	0.0	0.7
FR134 A	67.9	0.0	14.6	0.7	0.0	0.7	8.8	5.8	0.0	0.0	0.0	0.0	0.7	0.7
FR135 A	68.5	0.0	13.6	0.0	0.0	1.9	2.5	4.9	0.0	3.1	0.0	0.0	0.6	0.0
FR136 A	54.9	0.0	3.7	0.0	0.0	1.2	14.2	22.2	0.0	0.0	0.0	0.0	0.0	0.0
FR137 A	69.4	0.0	9.8	0.0	0.6	1.2	4.6	5.2	0.0	6.4	0.0	0.0	1.2	0.0
FR138 A	70.4	0.0	10.1	0.0	0.0	3.1	5.0	1.9	0.0	9.4	0.0	0.0	0.0	0.0
FR139 A	63.8	0.0	21.3	0.0	0.0	0.0	7.5	5.6	0.0	0.0	0.0	0.6	0.0	0.0
FR140 A	76.5	0.0	14.1	0.0	0.0	8.1	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
FR142 A	74.1	0.0	16.8	0.0	0.0	0.0	7.0	1.4	0.0	0.7	0.0	0.0	0.0	0.0
FR144 A	78.4	0.0	11.8	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.7
FR145 A	80.1	0.0	11.0	0.7	0.0	0.0	6.2	0.7	0.0	0.0	0.0	0.0	0.0	1.4
FR146 A	73.6	0.0	8.0	0.8	0.0	3.2	8.8	3.2	0.0	1.6	0.0	0.0	0.0	0.0
FR148 A	71.2	0.6	18.8	0.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FR149 A	64.4	0.0	15.9	0.8	0.0	8.3	6.1	0.0	0.0	2.3	0.0	0.0	0.0	1.5
FR152 A	81.6	0.0	11.2	1.1	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6

APPENDIX E CONT'D
PETROGRAPHIC RESULTS

POOR CARB	POOR SDST	POOR GNEISS	POOR VOL	POOR GRAN	POOR SCHIST	POOR SILTST	DEL CHERT	DEL CEMENT	DEL CLAY	DEL SCHIST	PERCENT SAMPLE ENCRUST	TOTAL OF CLASTS
5.5	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	2.8	145
6.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	70.6	153
4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	53.0	138
0.7	0.0	0.7	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	2.0	152
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	7.1	168
0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	118
0.6	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	178
0.6	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	31.8	176
0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.7	142
0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	38.5	96
9.8	0.0	0.8	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	93.4	122
6.3	0.0	1.4	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	80.4	143
3.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	169
8.0	0.0	0.0	0.0	0.6	1.2	0.0	0.0	0.0	0.0	0.0	68.7	163
4.7	0.0	0.0	0.0	2.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	150
3.4	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9	148
0.7	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	16.1	149
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160
0.0	1.4	0.0	1.4	0.0	0.7	0.0	0.0	0.0	0.0	0.0	95.7	141
0.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	160
1.4	0.0	1.4	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	4.8	147
1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.5	151
1.4	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.8	141
4.2	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.4	168
8.3	0.0	0.7	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	70.3	145
2.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.5	148
1.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	149
0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.2	126
2.9	0.0	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	8.8	137
1.4	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	2.7	36.5	148
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	137
0.6	0.0	3.1	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	33.3	162
3.1	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0	35.8	162
0.6	0.0	0.6	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.0	49.1	173
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.8	159
0.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.1	160
0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	60.4	149
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.3	143
2.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.5	153
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.5	146
0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.2	125
0.6	0.0	0.6	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.0	28.2	170
0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	37.9	132

APPENDIX E CONT'D
PETROGRAPHIC RESULTS

SITE NUMBER	GOOD CARB	GOOD SDST	GOOD GNEISS	GOOD QTZ	GOOD WACKE	GOOD VOL	GOOD GRAN	FAIR CARB	FAIR SDST	FAIR GNEISS	FAIR WACKE	FAIR VOL	FAIR GRAN	FAIR CHERT
FR153 A	76.1	0.0	7.3	0.0	0.0	0.5	8.3	3.9	0.0	2.4	0.0	0.0	0.0	1.0
FR154 A	76.0	0.0	9.1	0.8	0.0	0.0	3.3	2.5	0.0	2.5	0.0	0.0	0.0	1.7
FR155 A	50.0	0.0	28.9	0.0	0.7	1.4	9.9	6.3	0.0	2.8	0.0	0.0	0.0	0.0
FR156 A	66.7	0.0	20.6	0.0	0.0	0.0	12.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0
FR157 B	74.3	0.0	14.3	0.0	0.0	1.0	6.7	0.0	0.0	2.9	0.0	0.0	0.0	0.0
FR157 C	77.0	0.0	13.0	1.2	0.0	0.0	6.2	1.9	0.0	0.0	0.0	0.0	0.0	0.6
FR158 A	77.6	0.0	14.1	0.0	0.0	0.0	6.5	1.8	0.0	0.0	0.0	0.0	0.0	0.0
FR159 A	77.6	0.0	8.7	1.2	0.0	0.6	6.8	2.5	0.0	1.9	0.0	0.0	0.0	0.6
FR160 A	58.3	0.0	13.6	0.0	0.0	7.6	6.1	5.3	0.0	5.3	0.0	0.0	0.0	0.0
FR161 A	69.3	0.0	17.3	0.8	0.0	0.0	9.4	3.1	0.0	0.0	0.0	0.0	0.0	0.0
FR164 A	66.2	0.0	24.6	6.3	0.0	0.0	0.0	0.0	0.7	0.0	0.7	0.0	0.0	0.7
FR165 A	68.6	0.0	16.0	0.5	0.0	2.1	9.3	2.1	0.0	0.0	0.0	0.0	0.0	1.5
FR168 B	75.2	0.0	14.5	0.0	0.0	2.8	4.8	0.0	0.0	0.7	0.0	0.0	0.0	0.0
FR169 A	73.8	0.0	12.2	0.0	0.0	2.9	3.5	2.9	0.0	0.0	3.5	0.0	0.0	1.2
FR176 A	80.3	0.7	8.8	0.7	0.0	0.0	4.4	2.9	0.0	1.5	0.0	0.0	0.0	0.0
FR179 A	78.7	0.0	15.7	0.0	0.0	0.0	4.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0
FR180 A	76.5	0.0	5.2	0.0	0.0	0.0	9.6	4.3	0.0	0.0	0.9	0.0	0.0	0.0
FR181 A	69.5	0.0	8.5	0.0	0.0	0.8	1.7	8.5	0.0	8.5	0.0	0.0	0.0	0.0
FR183 A	76.6	0.0	5.1	0.0	0.0	2.2	2.2	5.8	0.0	5.8	0.0	0.0	0.0	0.0
FR184 A	71.2	0.0	12.9	0.0	0.0	0.0	3.0	4.5	0.0	6.1	0.0	0.0	0.0	0.0
FR185 A	74.5	0.0	6.0	0.0	0.0	2.0	4.7	2.0	0.0	5.4	0.0	0.0	0.7	1.0
FR186 A	70.4	0.0	6.6	0.7	0.0	0.0	13.8	3.3	0.0	0.7	0.0	0.0	0.7	4.0
FR187 A	48.2	0.0	18.0	0.0	0.0	3.9	8.6	2.3	0.0	3.1	0.0	0.0	0.8	1.0
FR188 A	71.5	0.0	10.6	0.0	0.0	0.7	9.3	4.0	0.0	2.6	0.0	1.0	0.7	0.0
FR189 A	63.4	0.0	16.4	0.0	0.0	0.7	10.4	3.0	0.0	2.2	0.0	1.0	0.0	0.0
FR199 A	76.4	0.0	21.4	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
FR201 A	73.8	0.0	13.1	0.0	0.0	3.8	6.9	0.0	0.0	1.5	0.0	0.0	0.8	0.0
FR201 B	70.7	0.0	12.9	0.0	0.0	1.4	8.2	1.4	0.7	3.4	0.0	0.0	0.0	0.7
FR203 A	77.7	0.0	10.8	0.0	0.0	3.1	2.3	0.8	0.0	1.5	0.0	0.0	0.0	0.0
FR205 A	71.9	0.0	11.7	0.8	0.0	1.6	5.5	4.7	0.0	2.3	0.0	0.0	0.0	0.8
FR219 B	82.9	0.0	9.3	0.0	0.0	2.3	1.5	0.0	0.0	3.1	0.0	0.0	0.0	0.0
FR227 D	67.8	0.5	15.4	0.5	0.0	3.4	6.3	1.0	0.0	3.4	0.0	0.0	0.0	0.0
FR230 A	66.1	0.0	20.5	0.8	0.0	0.0	1.6	2.4	0.0	2.4	0.0	0.0	0.0	0.0
FR234 A	76.3	0.6	15.8	0.6	0.0	1.7	0.6	2.3	0.0	2.3	0.0	0.0	0.0	0.0
FR234 B	74.6	0.0	16.2	0.5	0.0	1.1	1.1	1.1	0.0	2.7	0.0	0.0	1.0	0.0
FR237 C	80.3	0.0	13.2	0.7	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
FR238 A	74.1	0.7	14.8	0.0	0.0	1.5	0.7	1.5	0.0	3.0	0.0	0.0	0.0	0.0
FR255 B	69.3	0.8	20.5	1.6	0.0	3.1	1.6	0.0	0.0	1.6	0.0	0.0	0.0	0.0
FR256 B	71.7	0.0	14.2	0.0	0.0	3.8	1.9	2.8	0.0	3.8	0.0	0.0	0.0	0.0
FR264 A	87.2	0.0	6.4	0.0	0.0	1.1	1.6	1.6	0.0	1.1	0.0	0.0	0.0	0.5
FR276 A	72.0	0.0	17.4	0.0	0.0	1.5	2.3	0.0	0.0	4.5	0.0	0.0	0.0	0.0

**APPENDIX E CONT'D
PETROGRAPHIC RESULTS**

POOR CARB	POOR SDST	POOR GNEISS	POOR VOL	POOR GRAN	POOR SCHIST	POOR SILTST	DEL CHERT	DEL CEMENT	DEL CLAY	DEL SCHIST	PERCENT SAMPLE ENCRUST	TOTAL OF CLASTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	179
0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	205
0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.2	121
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	142
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.5	141
0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	10.5	210
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	161
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.2	170
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.1	161
0.0	0.0	3.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	78.0	132
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.3	127
1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.3	142
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.9	194
0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.7	0.0	0.0	0.0	31.0	145
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	172
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	47.4	137
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.0	127
0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.2	115
0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	61.0	118
0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	16.8	137
0.8	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	132
0.0	0.0	3.4	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	70.5	149
0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	99.3	152
0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.8	128
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	151
0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	87.3	134
0.0	0.0	1.4	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	9.3	140
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	130
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	128
0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	147
0.0	0.0	2.3	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	53.1	130
0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.7	0.0	0.0	4.2	142
0.0	0.0	0.8	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	12.4	129
0.5	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.5	21.6	208
0.0	0.0	3.9	0.8	0.0	0.0	0.0	0.0	1.6	0.0	0.0	NA	127
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	177
0.0	0.0	1.1	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	NA	185
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.8	152
0.0	0.0	2.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	51.9	135
0.0	0.0	3.7	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	28.3	127
0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	55.7	106
0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	187
0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	0.8	0.0	0.0	62.9	132

APPENDIX F
AGGREGATE RESERVES IN THE R.M. OF FRANKLIN

Deposit Number	Legal Subdiv	Sec.	Location Twp Rge	Station	Average Depth m.	Area	Quantity cu. m.	Depleted Sterile %	Remaining Reserves cu m.
Twp. Rge. 01									
001206b	09	NE12	01 4E	FR008	0.60	1.50	9000	20.0	7200
001206c	15	NE13	01 4E	FR032	1.50	0.80	12000	50.0	6000
001207a	01	SE21	01 4E	FR294	0.80	0.80	9600	60.0	3800
001207b	07	SE21	01 4E	FR213	0.60	1.00	6000	0.0	6000
001208a	01,08	SE21	01 4E		1.00	3.00	30000	0.0	30000
001208b	09,15	NE21	01 4E	FR258	0.70	5.80	40600	50.0	20300
001208b	09,10,16	NE28	01 4E	FR062	1.00	8.50	85000	100.0	0
001208b	07,02	SE28	01 4E	FR067	1.00	8.50	85000	50.0	42500
001208b	01	SE33	01 4E		1.00	0.20	2000	100.0	0
001208c	01,07	SE33	01 4E		1.00	5.00	50000	10.0	45000
001208c	10	NE33	01 4E		1.00	3.00	30000	0.0	30000
001209	06	SW33	01 4E	FR250	1.00	1.10	11000	0.0	11000
001209	11	NW33	01 4E		1.00	0.80	8000	0.0	8000
001210	10	SE22	01 4E	FR218	1.40	0.20	2800	0.0	2800
001210	14	NW22	01 4E	FR219	0.60	1.10	3300	0.0	3300
001210	09,10,15	NE22	01 4E	FR064	1.00	8.80	88000	40.0	52800
001211	09,16	NE23	01 4E	FR289	0.60	4.50	27000	80.0	5400
001212	12	NW25	01 4E	FR224	0.80	1.80	14400	0.0	14400
001212	05	SW25	01 4E		0.80	0.70	5600	0.0	5600
001226a	03,06	SW36	01 4E	FR058	0.60	0.50	3000	75.0	700
001226b	02	SE36	01 4E	FR057	0.50	1.10	5500	90.0	500
001226b	15	NE25	01 4E		0.50	0.70	3500	100.0	0
001227	09,10,15	NE35	01 4E		0.50	3.80	19000	0.0	19000
001228	All	SW35	01 4E	FR059	1.00	14.60	146000	80.0	29200
001229	13	NW35	01 4E		1.00	1.00	10000	25.0	7500
001230a	16	NE33	01 4E	FR251	1.00	1.60	16000	10.0	14400
001232b	14	NW35	01 4E		1.20	0.90	11200	100.0	0
001232b	15.16	NE35	01 4E	FR081	1.50	8.40	126000	100.0	0
001201	16	NE02	01 5E	FR001	1.00	1.00	10000	50.0	5000
001201	01	SE11	01 5E		1.00	0.30	3000	90.0	300
001202a	04	NW11	01 5E	FR015	0.50	3.00	15000	10.0	13500
001202a	03	SW14	01 5E		0.50	3.00	15000	10.0	13500
001202b	09	NE15	01 5E	FR013	1.50	1.20	18000	50.0	9000
001203	13	NW14	01 5E	FR012	1.50	1.50	22500	60.0	9000
001204	05,06	SW23	01 5E	FR207	1.50	2.00	30000	10.0	27000
001205	11	NW10	01 5E	FR017	1.00	1.00	10000	50.0	5000
001206a	12	NW05	01 5E		1.00	1.00	10000	100.0	0
001206a	05	SW05	01 5E		1.00	1.00	10000	100.0	0
001213a	03	SW30	01 5E		1.00	2.20	22000	50.0	11000
001213a	02	SE30	01 5E	FR297	1.00	3.30	33000	85.0	4900
001214	05	SW29	01 5E	FR230	1.00	2.25	22500	85.0	3400
001214	01,08	SE30	01 5E	FR063	1.50	7.10	106500	80.0	21300
001214	12	NW29	01 5E		1.50	3.10	46500	80.0	9300
001214	09	NE30	01 5E		1.50	0.35	4500	30.0	3100

APPENDIX F Cont'd

Deposit Number	Legal Subdiv	Sec.	Location		Station	Average	Area	Quantity cu. m.	Depleted Sterile %	Remaining	
			Twp	Rge		Depth m.				Reserves cu m.	
001215a	03,04,05	SW29	01	5E	FR228c	0.70	4.90	34300	10.0	30900	
001215b	15	NE20	01	5E	FR227d	1.20	1.60	19200	0.0	19200	
001216	01,07,08	SE29	01	5E	FR296	1.00	3.10	93000	100.0	0	
001217a	11	NW29	01	5E		0.40	0.50	2000	80.0	400	
001217a	07	SE29	01	5E		0.40	0.70	2800	0.0	2800	
001217a	09,10	NE29	01	5E	FR050	1.50	7.30	109500	80.0	21900	
001217b	14	NW29	01	5E	FR233b	1.20	1.00	12000	0.0	12000	
001218	02,07	SE27	01	5E	FR045	1.20	8.00	96000	95.0	4800	
001218	03,06	SW27	01	5E		1.20	1.70	20400	90.0	2400	
001218	10	NE27	01	5E		1.20	1.10	13200	0.0	13200	
001218	14	NW22	01	5E		1.20	0.40	4800	50.0	2400	
001219	All	SW35	01	5E		1.00	5.40	54000	0.0	54000	
001219	02,07	SE35	01	5E		1.00	1.50	15000	0.0	15000	
001220	05,06	SW34	01	5E		1.00	1.80	18000	95.0	900	
001220	11,12	NW34	01	5E		1.00	0.10	1000	50.0	500	
001221	04,05	SW34	01	5E	FR048a	2.00	5.00	100000	50.0	50000	
001222	02	SE33	01	5E	FR049	FR242	0.90	2.70	22900	80.0	4600
001223	All	SE32	01	5E	FR052		1.80	7.90	134300	85.0	20100
001223	09,16	NE32	01	5E		1.80	6.00	105000	0.0	105000	
001224	03,06	SW32	01	5E	FR054	FR055	2.90	9.00	256500	85.0	38500
001224	02,07	SE32	01	5E	FR234d		5.00	3.50	175000	75.0	43700
001224	11	NW32	01	5E	FR053		5.00	2.50	125000	80.0	25000
001224	10	NE32	01	5E	FR236c		5.00	1.50	75000	50.0	37500
001225	01	SE31	01	5E	FR056		0.60	2.80	16800	100.0	0
001234a	11,14	NW31	01	5E	FR237	FR109	1.20	6.20	74400	20.0	59500
001234b	10	NE31	01	5E	FR238		1.40	2.50	35000	0.0	35000
001280	05	SW33	01	5E	FR241a		1.00	1.50	15000	0.0	15000
Subtotal						87.900	213.20	2868100	3355.0	111500	
Twp Rge 02											
001229	04	SW02	02	4E	FR084b		1.20	1.70	20400	90.0	2400
001229	01,08	SE03	02	4E	FR085	FR088	1.50	8.00	100000	80.0	20000
001230a	09,10	NE04	02	4E	FR144a		0.60	3.10	18600	100.0	0
001230a	01,02,07	SE04	02	4E			0.80	6.40	51200	5.0	48600
001230b	01,08	SE09	02	4E			0.80	4.10	32800	60.0	13120
001230b	16	NE04	02	4E			0.80	3.20	25600	70.0	7700
001231	12	NW02	02	4E			0.70	2.20	15400	95.0	800
001231	05	SW02	02	4E	FR086	FR087	0.6	52.00	13000	100.0	0
001231	09	NE03	02	4E	FR089		1.00	7.00	70000	100.0	0
001232a	07	SE02	02	4E			1.00	2.00	20000	50.0	10000
001232b	03	SW02	02	4E			1.20	0.60	7500	20.0	6000
001232b	01,02	SE02	02	4E	FR082		1.20	16.00	200000	45.0	110000
001233a	09,10	NE01	02	4E	FR139	FR248	0.80	3.70	31400	33.0	21100
001233a	07,08	SE01	02	4E	FR247		1.80	4.00	72000	25.0	54000
001233b	13,14	NW01	02	4E	FR138		0.50	4.10	20500	100.0	0
001233b	04	SW12	02	4E	FR137		1.50	4.00	60000	95.0	3000

APPENDIX F Cont'd

Deposit Number	Legal Subdiv	Sec.	Location Twp	Rge	Station		Average Depth m.	Area	Quantity cu. m.	Depleted Sterile %	Remaining Reserves cu m.
001235a	16	NE01	02	4E	FR249		0.70	1.00	7000	20.0	5600
001248	11,14	NW11	02	4E	FR112	FR113	1.10	4.20	48300	65.0	16900
001248	10,15	NE11	02	4E			1.10	1.00	11000	70.0	3300
001249a	13,14	NW02	02	4E			0.50	1.80	9000	60.0	3600
001249a	03,04	SW11	02	4E	FR143		0.50	6.50	32500	95.0	1600
001249a	01,07,08	SE10	02	4E	FR142		0.80	5.60	44800	70.0	13400
001249b	11,13,14	NW10	02	4E	FR114d		1.00	2.30	23000	100.0	0
001250	15,16	NE16	02	4E			1.00	6.00	60000	100.0	0
001250	11,14	NW16	02	4E			1.00	5.20	52000	100.0	0
001250	All	SW16	02	4E	FR291		1.00	8.00	80000	100.0	0
001250	07,08	SE09	02	4E	FR145		0.80	2.50	20000	80.0	4000
001250	04	SW22	02	4E	FR288		1.00	2.30	23000	100.0	0
001250	11,13,14	NW09	02	4E			0.80	8.00	64000	100.0	0
001250	01	SE21	02	4E	FR292		1.00	3.00	30000	100.0	0
001250	10	NE09	02	4E			0.80	7.30	58400	95.0	2900
001251	11,12	NW14	02	4E	FR141		0.30	4.70	14100	80.0	2800
001251	01,02,07	SE14	02	4E	FR136	FR267	1.20	9.00	112500	90.0	11200
001251	06	SW14	02	4E			1.20	2.00	24000	100.0	0
001252a	12	NW13	02	4E	FR268a		1.70	1.70	28900	20.0	23100
001252a	01,02	SE23	02	4E	FR140		0.30	5.00	15000	90.0	1500
001252a	03	SW23	02	4E			0.60	0.30	1800	100.0	0
001252a	09,16	NE14	02	4E	FR135		1.00	4.50	45000	80.0	9000
001252b	12	NW13	02	4E	FR287		0.60	1.10	6600	90.0	600
001253a	05	SW24	02	4E	FR252a		0.60	0.50	3000	80.0	600
001253b	04	SW24	02	4E	FR252e		0.60	0.70	4200	0.0	4200
001253c	03	SW24	02	4E	FR134		0.80	1.00	8000	85.0	1200
001254a	All	SE25	02	4E	FR133		1.50	6.90	103500	90.0	10300
001258c	01	SE36	02	4E	FR271b		0.40	0.90	3600	50.0	1800
001259b	10	NW25	02	4E	FR132		0.80	1.00	8000	80.0	1600
001259c	14	NW25	02	4E	FR269b		2.50	1.20	30000	20.0	24000
001260	10,15	NE22	02	4E	FR146a		1.00	7.50	75000	100.0	0
001260	11	NW22	02	4E			1.00	0.40	4000	100.0	0
001260	03,05,06	SW27	02	4E	FR152		0.60	8.50	51000	95.0	2500
001260	02,07	SE27	02	4E	FR147	FR148	0.70	6.00	45000	90.0	4500
001261a	08	SE27	02	4E	FR151		1.00	1.00	10000	20.0	8000
001261a	All	NE27	02	4E	FR149		1.00	17.00	170000	50.0	85000
001261a	12	NW26	02	4E			1.00	1.00	10000	20.0	8000
001261a	05	SW26	02	4E	FR150		0.50	3.20	16000	100.0	0
001261b	13,14	NW27	02	4E	FR293		1.00	3.00	30000	65.0	10500
001262a	12,13	NW36	02	4E	FR153		0.90	6.20	55800	95.0	2800
001263	07,08	SE36	02	4E	FR157	FR160	1.00	7.40	74000	25.0	55500
001263	All	NE36	02	4E	FR158	FR159	1.00	22.50	225000	40.0	135000
001234a	03	SW06	02	5E	FR109d		1.30	0.75	9700	30.0	6800
001235a	11,12,13	NW06	02	5E	FR083		0.70	7.00	49000	70.0	14700
001235b	01,02,07	SE06	02	5E	FR079		2.00	6.10	122000	10.0	109800
001236a	02	SE08	02	5E	FR286		1.30	0.80	10400	100.0	0

APPENDIX F Cont'd

Deposit Number	Legal Subdiv	Sec.	Location Twp Rge	Station	Average Depth m.	Area	Quantity cu. m.	Depleted Sterile %	Remaining Reserves cu m.
001236a	03	SW08	02 5E		1.30	4.40	57200	60.0	22900
001236b	09,10	NE05	02 5E		1.20	4.30	51600	100.0	0
001236c	08	SE05	02 5E		1.20	0.75	9000	0.0	9000
001236c	09	NE05	02 5E		1.20	1.25	15000	50.0	7500
001237	11	NW04	02 5E		1.20	0.60	7200	0.0	7200
001237	07	SE04	02 5E		1.20	0.20	2400	0.0	2400
001237	10	NE04	02 5E	FR257a	1.20	4.20	5400	0.0	5400
001238a	03	SW09	02 5E	FR255b	2.10	1.70	35700	0.0	35700
001238a	01,02,07	SE09	02 5E	FR256a	1.50	7.70	115500	0.0	115500
001238b	01,07,08	SE09	02 5E	FR259a	0.60	5.00	30000	0.0	30000
001239a	12,13	NW10	02 5E	FR100	0.60	3.30	19800	0.0	19800
001239b	16	NE09	02 5E	FR099	2.50	1.20	30000	80.0	6000
001239c	01,08	SE16	02 5E	FR285	1.00	1.50	15000	0.0	15000
001240a	09,16	NE14	02 5E	FR261b	0.80	3.10	24800	60.0	9900
001240b	02	SE23	02 5E	FR115	1.00	2.00	20000	80.0	4000
001240b	15	NE14	02 5E		1.00	1.30	13000	100.0	0
001241a	11,13,14	NW09	02 5E	FR104a	3.00	9.00	270000	75.0	67500
001241b	01,02	SE20	02 5E	FR119	1.60	8.00	128000	95.0	6400
001241b	06	SW16	02 5E		2.00	1.40	28000	100.0	0
001241b	11,12,13	NW16	02 5E	FR117	2.00	16.00	320000	85.0	48000
001241b	16	NE17	02 5E		1.80	1.60	28800	100.0	0
001242	09,10	NE16	02 5E	FR118	1.00	2.80	28000	85.0	4200
001243	All	NE17	02 5E		1.20	3.00	36000	75.0	9000
001245a	15	NE08	02 5E	FR103	1.50	0.10	1500	90.0	100
001245a	14	NW08	02 5E		1.50	0.50	7500	90.0	700
001245b	09	NE08	02 5E	FR102	0.50	3.30	16500	10.0	14800
001246a	13,14	NW08	02 5E		0.50	2.00	10000	50.0	5000
001246b	01	SE18	02 5E	FR105	0.50	1.00	5000	90.0	500
001247	All	NE07	02 5E		0.70	8.00	56000	10.0	50400
001247	03	SW18	02 5E	FR106	0.50	0.25	1250	0.0	1200
001247	02	SE18	02 5E		0.70	1.30	9100	90.0	900
001254b	13	NW19	02 5E	FR125	0.50	2.00	10000	100.0	0
001254c	11	NW19	02 5E	FR127	1.50	3.30	49500	100.0	0
001254c	10	NE19	02 5E		1.50	0.50	7500	100.0	0
001254d	01	SE19	02 5E	FR120	1.00	0.90	9000	30.0	6300
001255	03,05,06	SW20	02 5E	FR253b	1.20	2.10	25200	0.0	25200
001256a	13	NW22	02 5E	FR131a	0.60	1.40	8400	100.0	0
001256b	12,13	NW13	02 5E	FR131b	0.60	1.80	10800	100.0	0
001256c	15	NE22	02 5E	FR131c	0.60	3.50	21000	90.0	2100
001257	12,13	NW27	02 5E	FR129	2.00	10.50	210000	30.0	147000
001257	09,16	NE28	02 5E	FR130	1.00	4.00	40000	80.0	8000
001258a	05,06	SW29	02 5E	FR123	1.50	4.50	67500	80.0	13500
001258b	07,08	SE30	02 5E		1.00	3.30	33000	100.0	0
001258b	10,15	NE30	02 5E	FR124	1.50	11.00	165000	100.0	0
001258b	11,14	NW30	02 5E	FR128	2.00	4.60	92000	90.0	9200
001258d	05	SW29	02 5E		1.50	3.00	45000	80.0	9000

APPENDIX F Cont'd

Deposit Number	Legal Subdiv	Sec.	Location		Station	Average Depth m.	Area	Quantity cu. m.	Depleted Sterile %	Remaining Reserves cu m.	
001259a	03,05,06	SW30	02	5E	FR126	0.50	9.00	45000	75.0	11200	
001264a	14,15	NW31	02	5E	FR161	0.60	1.60	9600	70.0	2900	
001264b	07,08	SE31	02	5E		0.60	1.00	6000	50.0	3000	
001264c	05	SW32	02	5E		0.60	5.00	30000	80.0	6000	
001264c	08	SE31	02	5E		0.60	0.20	1200	90.0	100	
001264c	12	NW32	02	5E		0.60	0.50	3000	90.0	300	
001265a	13	NW32	02	5E	FR265a	0.70	1.10	7700	20.0	6200	
001265a	16	NE31	02	5E	FR264	0.70	1.10	7700	90.0	800	
001265b	13,14	NW32	02	5E	FR265b	2.10	2.10	44100	30.0	30900	
001266	09,10,15	NE32	02	5E	FR266	3.50	5.40	945000	40.0	567000	
001267	15	NE33	02	5E	FR298	1.00	1.20	12000	100.0	0	
Subtotal						127.35	461.00	5988950	7878.0	2230720	
Twp Rge 03											
001262a	11,16	NE02	03	4E		0.70	6.50	45500	90.0	4500	
001262a	All	SE02	03	4E	FR154	1.00	9.00	90000	95.0	4500	
001262a	15	NW01	03	4E	FR155	0.50	2.20	11000	80.0	2200	
001262a	04	SW12	03	4E	FR156	0.50	3.10	15500	80.0	3100	
001262b	04	SW13	03	4E		1.00	2.00	20000	20.0	16000	
001262b	12,13	NW12	03	4E	FR196	1.00	7.00	70000	30.0	49000	
001262b	01,08	SE14	03	4E		1.00	2.00	20000	10.0	18000	
001262c	01,08	SE23	03	4E	FR283	1.50	10.00	150000	10.0	135000	
001262c	10,15,16	NE14	03	4E		1.50	5.00	75000	90.0	7500	
001262d	04,05,06	SW26	03	4E	FR184	FR185	1.50	9.00	135000	20.0	108000
001262d	10	NE23	03	4E		0.50	2.00	10000	0.0	10000	
001262d	07	SE23	03	4E		1.00	0.25	2500	0.0	2500	
001262d	11,13,14	NW23	03	4E	FR190a	0.50	8.00	40000	30.0	28000	
001262d	11,12,14	NW26	03	4E		1.50	5.30	79500	65.0	27800	
001263	All	SE01	03	4E		1.00	9.40	94000	25.0	70500	
001263	09	NE01	03	4E		0.70	2.00	14000	0.0	14000	
001276a	09,10,15	NE24	03	4E	FR193a	3.00	7.00	210000	60.0	84000	
001276a	02	SE25	03	4E		3.00	2.10	63000	100.0	0	
001276a	03	SW25	03	4E	FR194	0.80	0.10	850	100.0	0	
001276b	All	SW25	03	4E	FR192	FR191	0.70	9.40	65800	70.0	19700
001277	16	NE22	03	4E		1.00	5.00	50000	40.0	30000	
001277	All	SE27	03	4E		1.00	8.40	84000	40.0	50400	
001278a	10	NE36	03	4E		1.50	1.50	22500	40.0	13500	
001278a	07	SE36	03	4E	FR186	1.50	1.50	22500	70.0	6700	
001278b	14	NW36	03	4E	FR187	FR188	2.50	3.60	90000	100.0	0
001278b	15	NE36	03	4E		2.50	1.00	25000	100.0	0	
001278c	15,16	NE36	03	4E	FR189	1.00	2.00	20000	50.0	10000	
001278d	10,15	NE36	03	4E		1.00	1.30	13000	100.0	0	
001266	03,04	SW05	03	5E		3.50	3.00	105000	40.0	63000	
001268	03,04	SW08	03	5E	FR273	0.50	1.00	5000	100.0	0	
001269a	01,08	SE14	03	5E	FR203	1.00	7.80	78000	20.0	62400	
001269a	16	NE11	03	5E		1.00	1.30	13000	10.0	11700	

APPENDIX F Cont'd

Deposit Number	Legal Subdiv	Sec.	Location		Station	Average Depth m.	Area	Quantity cu. m.	Depleted Sterile %	Remaining Reserves cu m.	
001269b	13	NW13	03	5E	FR200	0.60	1.20	7200	40.0	4300	
001269b	09,16	NE14	03	5E	FR202	1.10	4.60	50600	20.0	40500	
001269b	04	SW24	03	5E	FR199	1.00	3.50	35000	50.0	17500	
001270	10	SE14	03	5E		1.00	0.60	6000	0.0	6000	
001270	11	NW14	03	5E		1.00	0.25	2500	0.0	2500	
001270	06	SW14	03	5E	FR204	1.00	1.10	11000	60.0	4400	
001271	13	NW24	03	5E		1.00	0.90	9000	50.0	4500	
001271	03,04,06	SW34	03	5E	FR197	2.00	8.50	170000	40.0	102000	
001271	All	NE27	03	5E		1.00	32.00	320000	90.0	32000	
001271	All	NE26	03	5E		1.50	26.20	393000	85.0	58900	
001271	05,06	SW26	03	5E	FR164	1.20	9.00	108000	95.0	5400	
001271	All	SE34	03	5E	FR198	FR201	1.00	29.00	290000	90.0	29000
001271	All	NW26	03	5E	FR210		1.50	50.00	750000	75.0	187500
001271	All	SW25	03	5E	FR165		1.50	17.40	261000	75.0	65200
001271	04	SW35	03	5E	FR209		1.00	2.40	24000	90.0	2400
001271	08	SE27	03	5E		1.20	0.10	1200	100.0	0	
001271	01,07,08	SE26	03	5E		1.20	24.40	292800	80.0	58600	
001271	02,07	SE25	03	5E		1.50	2.30	34500	80.0	6900	
001272	15	NE33	03	5E	FR284	2.50	1.00	25000	0.0	25000	
001272	14	NW33	03	5E		2.50	2.40	60000	50.0	30000	
001273	13	NW20	03	5E		0.40	3.80	15200	60.0	6100	
001273	16	NE19	03	5E		0.40	0.40	1600	50.0	800	
001273	04	SW29	03	5E	FR168	0.40	1.60	6400	80.0	1300	
001274a	All	SE30	03	5E	FR182a	2.50	20.00	500000	35.0	325000	
001274a	04,05	SW29	03	5E	FR169	0.80	1.20	9600	80.0	1900	
001274b	05	SW29	03	5E		0.80	3.20	25600	10.0	23000	
001274b	01,02	SE31	03	5E	FR275	FR277	0.60	12.80	76800	10.0	69100
001274b	All	NE30	03	5E	FR179		FR276	0.60	42.00	273000	50.0
001274b	08	SE30	03	5E		0.60		2.00	12000	100.0	0
001274b	12,13	NW29	03	5E	FR180	FR181	0.80	8.10	64800	85.0	9700
001274c	06	SW31	03	5E	FR279		0.80	1.10	8800	0.0	8800
001275	03	SW30	03	5E	FR183	0.70	0.40	2800	80.0	60000	
001279	09	NE07	03	5E		1.20	0.80	9600	20.0	7700	
001279	12,13	NW08	03	5E	FR177	1.20	1.10	13200	60.0	5300	

APPENDIX G

AGGREGATE

Any inert, construction material (sand, gravel, slag, crushed stone or other mineral material).

AGGREGATE RESERVES

Aggregate in a deposit which is proven and is economically significant.

ALLUVIUM

Alluvium is a general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during postglacial time by a stream.

BEACH DEPOSITS

These are relatively narrow, linear features formed at the shores of glacial lakes that existed during deglaciation. Well developed beaches are usually less than 20 feet (6 m) thick. The aggregate is well sorted and stratified and sand-sized material commonly predominates.

BEDROCK

In-place pre-Quaternary material exposed at the surface or underlying the surficial material.

BINDER

Material that produces or promotes consolidation in loosely aggregated sediments. Usually mud or clay, sometimes till is used for binder.

CARBONATE ROCKS

A broad term referring to those sedimentary rocks consisting chiefly of carbonate minerals, mainly limestone and dolostone.

CLAST

An individual constituent, grain, or fragment of a sediment or rock, produced by the mechanical weathering of a large rock mass. Synonyms include particle and fragment.

CROWN LAND

Land reserved and administered by the Crown. Sand and gravel usually administered by the Crown.

CROWN SAND AND GRAVEL

Sand and gravel reserved and administered by the Crown.

DELETERIOUS LITHOLOGY

A general term used to designate those rock types which are chemically or physically unsuited for use as construction or road-building aggregates. Such lithologies as chert, shale, siltstone, and sandstone may deteriorate rapidly.

DEPOSIT

An accumulation of sediments left in a new location by a natural transportative agent such as water, wind, ice, or gravity.

An aggregate deposit is a deposit of sand and gravel considered to be of economic significance.

DIRT

See fines.

DOLOMITE (DOLOSTONE)

A carbonate sedimentary rock consisting chiefly of the mineral dolomite and containing relatively little calcite (dolomite is also known as dolostone).

DRIFT

A general term for all unconsolidated rock debris transported from one place and deposited in another; distinguished from underlying bedrock. In North America, glacial activity has been the dominant mode of transport and deposition of drift. Synonyms include overburden and surficial deposit.

DURABLE ROCK

A rock fragment which is hard and inert and can be used as aggregate without breaking, crumbling or reacting with the cementing material.

EOLIAN

Pertaining to wind action.

EPOCH

A geological-time unit longer than an age and a subdivision of a period.

ESKERS

Eskers are narrow, sinuous ridges of sand and gravel. They vary greatly in size. Many eskers consist of a central core of poorly sorted and stratified gravel. The core material is often draped by better sorted and stratified sand and gravel.

FINES

A general term used to describe the size fraction of an aggregate which passes (is finer than) the No. 200 mesh screen (0.074 mm). Also described informally as "dirt", these particles are in the silt- and clay-size range.

FLUVIAL

Pertaining to rivers or streams.

GLACIOFLUVIAL DEPOSITS

Material deposited by streams flowing from, on, or within melting glacier ice, generally composed of sorted, stratified sand and gravel; includes outwash, kame, esker, etc.

GLACIOLACUSTRINE DELTAS

These features were formed where streams or rivers of glacial meltwater flowed into lakes and deposited their suspended sediment. Such deposits tend to consist mainly of sand and abundant silt. However, in near-ice or ice-contact positions, coarse material may be present.

GLACIOLACUSTRINE DEPOSITS

Material deposited in lakes affected by glacier ice or by meltwater flowing directly from glaciers; composed of well-sorted clay, silt, or sand.

GRANULAR BASE COURSE

Components of a road placed on subgrade and designed to provide strength, stability, and drainage, as well as support for surfacing materials. Several types have been defined: Granular Base Course A consists of crushed and processed aggregate and has relatively stringent quality standards in comparison to Granular Base Course B and C which are usually pit-run or other unprocessed aggregate.

GROUND MORaine

A deposit of till with a flat or undulating surface.

HOLOCENE

An epoch of the Quaternary period covering the time period from the retreat of the continental glaciers to the present, about 10 000 years.

HUMMOCKY

An irregular or knob and kettle surface.

HUMMOCKY MORaine

A landscape composed primarily of till with a hummocky surface.

ICE-CONTACT DEPOSIT

Material deposited in contact with glacier ice by meltwater; includes kames, eskers, kame terraces, etc.

ICE-CONTACT TERRACES

These are glaciofluvial features deposited between the glacial margin and a confining topographic high, such as the side of a valley. The structure may be similar to outwash deposits.

KAMES

Kames are mounds of poorly sorted sand and gravel deposited by meltwater in depressions or fissures on the ice surface or at its margin. The deposits consist mainly of irregularly bedded and cross-bedded, poorly sorted sand and gravel. Deposits include single mounds, linear ridges (crevasse fillings) or complex groups of landforms.

LACUSTRINE DEPOSIT

Material deposited in a lake.

LITHOLOGY

The description of rocks on the basis of such characteristics as color, structure, mineralogic composition, and grain size. Generally, the description of the physical character of a rock.

MELTwater CHANNEL

A drainage way produced by water flowing away from a melting glacier margin.

MORaine

A distinct accumulation of glacial drift. Could represent an ice marginal position.

OUTWASH

Outwash deposits consist of sand and gravel laid down by meltwaters beyond the margin of the ice lobes. They occur as sheets

or as terraced valley fills (valley trains) and may be very large in extent and thickness. Well developed outwash deposits have good horizontal bedding and are uniform in grain-size distribution. Outwash deposited near the glacier's margin is much more variable in texture and structure.

PIT RUN

Unprocessed aggregate removed from pit. Generally consists of fine pebble gravel with minor amounts of material coarser than 38 mm (1 1/2"). It is used for road maintenance, upgrading and resurfacing.

PLEISTOCENE

An epoch of the recent geological past including the time from approximately 1.8 million years ago to 10 000 years ago. Much of the Pleistocene was characterized by extensive glacial activity.

QUATERNARY

The second period of the Cenozoic era, thought to cover the last 2-3 million years. It consists of two epochs: The Pleistocene and the Holocene.

RESOURCE

An aggregate deposit or environment which may or may not be proven and is presently not economically significant.

SHALE

A fine-grained, sedimentary rock formed by the consolidation of clay, silt, or mud and characterized by well developed bedding planes, along which the rock breaks readily into thin layers. The term shale is also commonly used for fissile claystone, siltstone, and mudstone.

SPILLWAY

Large drainage valley formed by meltwater flowing from a glacial lake. Spillways often have gravel terraces.

STONE

That component of aggregate coarser than 4.76 mm or the #4 sieve, includes pebbles, cobbles and boulders.

SURFICIAL GEOLOGY

A form of geological mapping dealing with all materials occurring at surface in an area: un lithified or lithified (sediments or bedrock).

TERRACE

A relatively flat, stair-stepped, depositional or erosional surface bounded by an ascending slope on one side and a descending slope on the other.

TILL

Unsorted and unstratified rock debris, deposited directly by glaciers, and ranging in size from clay to large boulders.

WISCONSINAN

Pertaining to the last glacial stage of the Pleistocene Epoch in North America. It began approximately 100 000 years ago and ended approximately 10 000 years ago. The glacial deposits and landforms of southern Manitoba are predominantly the result of glacial activity during the Wisconsinan Stage.