

HYDRAULICS DIVISION
TECHNICAL NOTE



DATE: March 1982 **REPORT NO:** 82-05

TITLE: Particle Size Data Report 82-04

AUTHOR: G. A. Duncan

REASON FOR REPORT: This report responds to a request for particle size data from Mr. Dennis Onn, Water Resources Branch, Ministry of the Environment, 135 St. Clair Avenue, West, Toronto, Ontario M4V 1P5.

CORRESPONDENCE FILE NO:
5690 (Study No. 2302)

1.0 INTRODUCTION

This report provides the results of size analysis on 24 samples submitted by Dennis Onn, MOE.

The six suspended sediment samples and the 16 sediments elutriated from the bed sediments were analysed using the Sedigraph Particle Analyser. The two bed sediments were analysed using the settling tube.

The samples were analysed by G. Duncan and K. Salisbury under study HD2302.

2.0 PROCEDURE

- (1) The Sieve, Short Pipette and Settling Tube Analysis, which provides gravel, sand, silt and clay percentages with 1/2 PHI resolution of the sand by the settling tube procedure was performed on two samples:

Briefly, the procedure consists of:

1. splitting the sample to 20 g.
2. sieving the split at -0.5 PHI (1.41 mm).
3. dispersing the sample in 50 ml of Calgon solution (50 g/l) and mixing it for 15 minutes.
4. recovering two pipette aliquots of 25 ml for sand, silt and clay percentages.
5. wet sieving the remaining suspension at 4.5 PHI (0.044 mm).
6. resolving the sand residue with settling tube analysis.
7. processing the results with SIZDIST: a FORTRAN IV computer program (Sandilands and Duncan, 1980).

- (2) The Sieve and Sedigraph Method which provides sand, silt and clay percentages was used to analyse 22 samples.

Briefly the procedure consists of:

1. Splitting the sample to 2g.
2. Removing particles large enough to block Sedigraph Suction Tube (0.088 mm).
3. Dispersing sample in a Calgon suspension.
4. Automatic analysis with the Sedigraph.
5. Processing the results with SIZDIST: a FORTRAN IV computer program (Sandilands and Duncan, 1980).

3.0 RESULTS

- (1) For the Sieve, Short Pipette and Settling Tube Method, the output consists of:

1. A histogram of the frequency distribution.
2. The percentage and cumulative percentages of the material occurring within each 1/2 PHI unit.
3. Moment measure statistics (Krumbein & Pettijohn, 1938).
4. Percentiles.
5. Percent gravel, sand, silt and clay.
6. Ratios used to plot Folk's Ternary Classification.
7. Shepard (1954) and Folk (1968) Ternary Classification.

- (2) For the Sieve and Sedigraph Method, the output consists of:

1. A histogram of the frequency distribution.
2. The percentage and cumulative percentages of the material occurring within each 1/2 PHI unit.
3. Moment measure statistics (Krumbein & Pettijohn, 1938) and graphic (Folk and Ward, 1957) statistics.
4. Percentiles.

5. Percent gravel, sand, silt and clay.
6. Ratios used to plot Folk's Ternary Classification.
7. Shepard (1954) and Folk (1974) Ternary Classifications.

REFERENCES

- Duncan, G. A. and LaHaie, G. G., 1979. "Size Analysis Procedures Used in the Sedimentology Laboratory, NWRI". NWRI, CCIW, Hydraulics Division Manual, September 1979.
- Folk, R. L., 1968. "Petrology of Sedimentary Rocks". Hemphill Publishing Co., Austin, Texas 182 p.
- Folk, R. L. and Ward, W. C., 1957. "Brazos River Bar: A Study in the Significance of Grain Size Parameters". Jour. Sed. Petrology, V. 27, pp. 3-26.
- Krumbein, W. C. and Pettijohn, F. J., 1938. "Manual of Sedimentary Petrography". Appleton-Century-Crofts, New York, 549 p.
- Sandilands, R. G. and Duncan, G. A., 1980. "SIZDIST - A Computer Program for Size Analysis". NWRI, CCIW, Hydraulics Division Technical Note, Report No. 80-08.
- Shepard, F. P., 1954. "Nomenclature Based on Sand-Silt Ratios". Jour. Sed. Petrology, V. 24, pp. 151-158.

APPENDIX 1
SIZDIST OUTPUT

S' 10-1 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMFCT.	
3.50			
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	0.00	0.00	
5.50	1.02	1.02	*
6.00	0.00	1.02	
6.50	1.02	2.04	*
7.00	3.06	5.10	***
7.50	5.10	10.20	*****
8.00	10.20	20.41	*****
8.50	12.24	32.65	*****
9.00	12.24	44.90	*****
9.50	11.22	56.12	*****
10.00	9.18	65.31	*****
10.50	7.14	72.45	*****
11.00	5.10	77.55	*****
11.50	4.08	81.63	****
12.00	3.06	84.69	***
****	15.31	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.97 1.34 .01 -.25 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	9.23	5TH	6.98	16TH	7.78	25TH	8.19
			75TH	10.75	84TH	11.89	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	20.41	(SEDIGRAPH)	79.59	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	20.41PCT.GRAV+SAND/SILT+CLAY		.00			
LABELS SHEPARD	-CLAY		FOLK(GMS)-MUD			(SCS)-CLAY		

S/10-2 230282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMFCT.	
3.50			
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	0.00	0.00	
5.50	0.00	0.00	
6.00	4.00	4.00	****
6.50	9.00	13.00	*****
7.00	13.00	26.00	*****
7.50	18.00	44.00	*****
8.00	10.00	54.00	*****
8.50	8.00	62.00	*****
9.00	5.00	67.00	*****
9.50	5.00	72.00	*****
10.00	4.00	76.00	****
10.50	4.00	80.00	****
11.00	4.00	84.00	****
11.50	2.00	86.00	**
12.00	2.00	88.00	**
****	12.00	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

7.95 1.51 .39 -.26 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	7.80	5TH	6.06	16TH	6.62	25TH	6.96
			75TH	9.88	84TH	11.00	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	54.00	(SEDIGRAPH)	46.00	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	54.00	PCT.GRAV+SAND/SILT+CLAY	.00			
LABELS SHEPARD	-CLAYEY	SILT FOLK(GMS)-MUD				(SOS)-MUD		

S/10-3 190282

SEDIGRAPH ANALYSIS

02/24/82

> PHI PCT. CUMPCT.

3.50			
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	0.00	0.00	
5.50	0.00	0.00	
6.00	1.00	1.00	*
6.50	6.00	7.00	*****
7.00	9.00	16.00	*****
7.50	17.00	33.00	*****
8.00	15.00	48.00	*****
8.50	11.00	59.00	*****
9.00	6.00	65.00	*****
9.50	4.00	69.00	****
10.00	3.00	72.00	***
10.50	3.00	75.00	***
11.00	2.00	77.00	**
11.50	1.00	78.00	*
12.00	2.00	80.00	**
****	20.00	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.00 1.31 .49 .64

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	8.09	5TH	6.33	16TH	7.00	25TH	7.26
			75TH	10.50	84TH	*****	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	48.00	(SEDIGRAPH)	52.00	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	48.00	PCT.GRAV+SAND/SILT+CLAY			.00	
LABELS SHEPARD	-SILTY CLAY	FOLK(GMS)-MLD				(SCS)-MUD		

S' 10-4 230282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMPCT.	
3.50			
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	0.00	0.00	
5.50	0.00	0.00	
6.00	0.00	0.00	
6.50	0.00	0.00	
7.00	0.00	0.00	
7.50	3.03	3.03	***
8.00	3.03	6.06	***
8.50	6.06	12.12	*****
9.00	6.06	18.18	*****
9.50	9.09	27.27	*****
10.00	6.06	33.33	*****
10.50	9.09	42.42	*****
11.00	6.06	48.48	*****
11.50	30.30	78.79	*****
12.00	21.21	100.00	*****
****	0.00	100.00	

MEAN ST.DEV. SKEWNESS KURTOSIS

10.40	1.31	-.41	-.54	KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI
10.49	1.32	-.58	.81	FOLK GRAPHIC STATISTICAL PARAMETERS FOLK AND WARD, 1957

PERCENTILES	MEDIAN 11.03	5TH 7.83	16TH 8.62	25TH 9.38
		75TH 11.44	84TH 11.62	95TH 11.85
PCT. GRAVEL	.00	SAND 0.00	SILT (PIPETTE) 0.00	CLAY (PIPETTE) 0.00
			(SEDIGRAPH) 6.06	(SEDIGRAPH) 93.94
GRAVEL+SAND	.00	SILT/(SILT+CLAY) 6.06	PCT. GRAV+SAND/SILT+CLAY	.00
LABELS SHEPARD	-CLAY	FOLK(GMS)-MUD	(SCS)-CLAY	

S/ 10-5

160282 SIEVE, SETT. TUBE, PIPETTE (2) SAMPLE WT. = 6.7000

PHI PCT. CUM PCT.

02/24/82

-.50	0.00	0.00	
0.00	7.13	7.13	*****
.50	27.09	34.22	*****
1.00	38.50	72.73	*****
1.50	19.25	91.98	*****
2.00	4.99	96.97	*****
2.50	1.43	98.40	*
3.00	1.43	99.82	*
3.50	.18	100.00	
4.00	0.00	100.00	
8.00	0.00	100.00	

MEAN ST. DEV. SKEWNESS KURTOSIS

1.24 .58 .42 1.61 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 0.0 TO 4.0 PHI

1.22 .58 .08 1.10 FOLK GRAPHIC STATISTICAL PARAMETERS FOLK AND WARD, 1957

PERCENTILES MEDIAN 1.20 5TH .35 16TH .65 25TH .83 75TH 1.56 84TH 1.79 95TH 2.30

PCT. GRAVEL 0.00 SAND 100.00 SILT (PIPETTE) 0.00 CLAY (PIPETTE) 0.00 (SEDIGRAPH) 0.00 (SEDIGRAPH) 0.00

GRAVEL+SAND 100.00 SILT/(SILT+CLAY) 0.00 PCT. GRAV+SAND/SILT+CLAY 99999.99

LABELS SHEPARD -SAND FOLK (GMS) -SAND (SCS) -SAND

S/ 10-6

160282 SIEVE, SETT. TUBE, PIPETTE (2) SAMPLE WT.= 8.7050

PHI PCT. CUMFCT.

02/24/82

-.50			
0.00	0.00	0.00	
.50	4.99	4.99	*****
1.00	29.23	34.22	*****
1.50	41.35	75.58	*****
2.00	17.11	92.69	*****
2.50	4.99	97.68	*****
3.00	1.43	99.11	*
3.50	.71	99.82	*
4.00	.18	100.00	
8.00	0.00	100.00	
*****	0.00	100.00	

MEAN ST.DEV. SKEWNESS KURTOSIS

1.23	.54	.44	1.80
1.21	.53	.13	1.09

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 0.0 TO 4.0 PHI

FOLK GRAPHIC STATISTICAL PARAMETERS FOLK AND WARD, 1957

PERCENTILES	MEDIAN	1.19	5TH	.50	16TH	.69	25TH	.84
			75TH	1.49	84TH	1.75	95TH	2.23

PCT. GRAVEL	0.00	SAND	100.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00
				(SEDIGRAPH)	0.00	(SEDIGRAPH)	0.00

GRAVEL+SAND 100.00 SILT/(SILT+CLAY) 0.00 PCT.GRAV+SAND/SILT+CLAY 99999.99

LABELS SHEPARD -SAND FOLK(GMS)-SAND (SCS)-SAND

S/10-8 190282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMFCT.	
3.50			
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	0.00	0.00	
5.50	0.00	0.00	
6.00	0.00	0.00	
6.50	0.00	0.00	
7.00	1.00	1.00	*
7.50	6.00	7.00	*****
8.00	6.00	13.00	*****
8.50	7.00	20.00	*****
9.00	9.00	29.00	*****
9.50	9.00	38.00	*****
10.00	9.00	47.00	*****
10.50	10.00	57.00	*****
11.00	10.00	67.00	*****
11.50	8.00	75.00	*****
12.00	4.00	79.00	****
*****	21.00	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

9.51 1.33 -.08 -.99 KRUMHEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN 10.15	5TH 7.33	16TH 8.21	25TH 8.72
		75TH 11.50	84TH*****	95TH*****
PCT. GRAVEL	.00	SAND 0.00	SILT (PIPETTE) 0.00	CLAY (PIPETTE) 0.00
			(SEDIGRAPH) 13.00	(SEDIGRAPH) 87.00
GRAVEL+SAND	.00	SILT/(SILT+CLAY) 13.00PCT.GRAV+SAND/SILT+CLAY		.00
LABELS SHEPARD	-CLAY	FOLK(GMS)-MUD		(SCS)-CLAY

S/ 10-9 190282

SEDIGRAPH ANALYSIS

02/24/82

PHI PCT. CUMFCT.

3.50 ASSUMED UPPER LIMIT

4.00	1.00	1.00	*
4.50	0.00	1.00	
5.00	0.00	1.00	
5.50	0.00	1.00	
6.00	2.00	3.00	**
6.50	2.00	5.00	**
7.00	6.00	11.00	*****
7.50	9.00	20.00	*****
8.00	10.00	30.00	*****
8.50	9.00	39.00	*****
9.00	11.00	50.00	*****
9.50	11.00	61.00	*****
10.00	8.00	69.00	*****
10.50	9.00	78.00	*****
11.00	5.00	83.00	*****
11.50	4.00	87.00	****
12.00	3.00	90.00	***
****	10.00	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.75 1.55 -.12 .02 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN 9.00	5TH 6.50	16TH 7.28	25TH 7.75
		75TH 10.33	84TH 11.13	95TH*****
PCT. GRAVEL	.00	SAND 1.00	SILT (PIPETTE) 0.00	CLAY (PIPETTE) 0.00
			(SEDIGRAPH) 29.00	(SEDIGRAPH) 70.00
GRAVEL+SAND	1.00	SILT/(SILT+CLAY)	29.29PCT.GRAV+SAND/SILT+CLAY	.01
LABELS SHEPARD	-SILTY CLAY	FOLK(GMS)-MUD		(SCS)-CLAY

S/ 10-10 190282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT. CUMPCT.	
3.50		
4.00	0.00	0.00
4.50	0.00	0.00
5.00	0.00	0.00
5.50	0.00	0.00
6.00	1.00	*
6.50	2.00	**
7.00	4.00	****
7.50	8.00	*****
8.00	15.00	*****
8.50	24.00	*****
9.00	34.00	*****
9.50	46.00	*****
10.00	55.00	*****
10.50	64.00	*****
11.00	71.00	*****
11.50	77.00	*****
12.00	82.00	****
****	86.00	*****
****	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.97 1.45 .04 -.74

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN 9.22	5TH 6.75	16TH 7.56	25TH 8.05
		75TH 10.83	84TH 11.75	95TH*****
PCT. GRAVEL	.00	SAND 0.00	SILT (PIPETTE) 0.00	CLAY (PIPETTE) 0.00
			(SEDIGRAPH) 24.00	(SEDIGRAPH) 76.00
GRAVEL+SAND	.00	SILT/(SILT+CLAY) 24.00	PCT.GRAV+SAND/SILT+CLAY	.00
LABELS SHEPARD	-CLAY	FOLK(GMS)-MUD		(SCS)-CLAY

S/10-11 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI PCT. CUM PCT.

3.50	ASSUMED UPPER LIMIT		
4.00	1.01	1.01	*
4.50	0.00	1.01	
5.00	0.00	1.01	
5.50	0.00	1.01	
6.00	1.01	2.02	*
6.50	0.00	2.02	
7.00	3.03	5.05	***
7.50	5.05	10.10	*****
8.00	11.11	21.21	*****
8.50	11.11	32.32	*****
9.00	10.10	42.42	*****
9.50	7.07	49.49	*****
10.00	6.06	55.56	*****
10.50	5.05	60.61	*****
11.00	3.03	63.64	***
11.50	3.03	66.67	***
12.00	3.03	69.70	***
****	30.30	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.77 1.46 -.09 .90 Krumbein + Pettijohn (1938) Moment Measures
 for size range 4.0 to 12.0 phi

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	9.54	5TH	6.99	16TH	7.77	25TH	8.17
			75TH	*****	84TH	*****	95TH	*****
PCT. GRAVEL	.00	SAND	1.01	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	20.20	(SEDIGRAPH)	78.79	
GRAVEL+SAND	1.01	SILT/(SILT+CLAY)	20.41	PCT.GRAV+SAND/SILT+CLAY			.01	
LABELS SHEPARD	-CLAY	FOLK(GMS)	-MUD	(SCS)	-CLAY			

S 10-12 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT. CUMFCT.	
3.50		
4.00	0.00	0.00
4.50	0.00	0.00
5.00	1.00	1.00
5.50	1.00	2.00
6.00	1.00	3.00
6.50	3.00	6.00
7.00	5.00	11.00
7.50	10.00	21.00
8.00	9.00	30.00
8.50	11.00	41.00
9.00	13.00	54.00
9.50	11.00	65.00
10.00	9.00	74.00
10.50	6.00	80.00
11.00	6.00	86.00
11.50	3.00	89.00
12.00	4.00	93.00
****	7.00	100.00

MEAN ST.DEV. SKEWNESS KURTOSIS

8.72 1.52 -.02 -.33

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	8.85	5TH	6.33	16TH	7.25	25TH	7.72
			75TH	10.08	84TH	10.83	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	30.00	(SEDIGRAPH)	70.00	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	30.00	PCT.GRAV+SAND/SILT+CLAY			.00	
LABELS SHEPARD	-SILTY CLAY	FOLK(GMS)-MUD		(SCS)-CLAY				

S 10-13 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI PCT. CUMFCT.

3.50 ASSUMED UPPER LIMIT

4.00	2.02	2.02	**
4.50	2.02	4.04	**
5.00	8.08	12.12	*****
5.50	8.08	20.20	*****
6.00	14.14	34.34	*****
6.50	14.14	48.48	*****
7.00	6.06	54.55	*****
7.50	17.17	71.72	*****
8.00	6.06	77.78	*****
8.50	3.03	80.81	***
9.00	3.03	83.84	***
9.50	2.02	85.86	**
10.00	1.01	86.87	*
10.50	2.53	89.39	***
11.00	.51	89.90	*
11.50	1.01	90.91	*
12.00	1.01	91.92	*
****	8.08	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

6.68 1.60 .43 .85 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	6.63	5TH	4.56	16TH	5.24	25TH	5.67
			75TH	7.77	84TH	9.04	95TH	*****
PCT. GRAVEL	.00	SAND	2.02	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	75.76	(SEDIGRAPH)	22.22	
GRAVEL+SAND	2.02	SILT/(SILT+CLAY)	77.32	PCT.GRAV+SAND/SILT+CLAY			.02	
LABELS SHEPARD	-SILT	FOLK(GMS)-MUD		(SCS)-SILT				

S'10-14 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI PCT. CUMFCT.

3.50 ASSUMED UPPER LIMIT

4.00	1.00	1.00	*
4.50	0.00	1.00	
5.00	0.00	1.00	
5.50	0.00	1.00	
6.00	2.00	3.00	**
6.50	5.00	8.00	*****
7.00	9.00	17.00	*****
7.50	12.00	29.00	*****
8.00	14.00	43.00	*****
8.50	12.00	55.00	*****
9.00	11.00	66.00	*****
9.50	8.00	74.00	*****
10.00	5.00	79.00	*****
10.50	4.00	83.00	****
11.00	2.00	85.00	**
11.50	7.00	92.00	*****
12.00	7.00	99.00	*****
*****	1.00	100.00	*

MEAN ST.DEV. SKEWNESS KURTOSIS

8.53 1.68 .14 -.30

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

8.66 1.79 .27 1.00

FOLK GRAPHIC STATISTICAL PARAMETERS FOLK AND WARD, 1957

PERCENTILES MEDIAN 8.29 5TH 6.20 16TH 6.94 25TH 7.33

75TH 9.60 84TH 10.75 95TH 11.71

PCT. GRAVEL .00 SAND 1.00 SILT (PIPETTE) 0.00 CLAY (PIPETTE) 0.00

(SEDIGRAPH) 42.00 (SEDIGRAPH) 57.00

GRAVEL+SAND 1.00 SILT/(SILT+CLAY) 42.42 PCT. GRAV+SAND/SILT+CLAY .01

LABELS SHEPARD -SILTY CLAY FOLK(GMS)-MUD

(SCS)-MUD

S/10-15 190282

SEDIGRAPH ANALYSIS

PHI PCT. CUMFCT.

02/24/82

3.50			
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	0.00	0.00	
5.50	0.00	0.00	
6.00	3.00	3.00	***
6.50	2.00	5.00	**
7.00	6.00	11.00	*****
7.50	11.00	22.00	*****
8.00	12.00	34.00	*****
8.50	11.00	45.00	*****
9.00	12.00	57.00	*****
9.50	9.00	66.00	*****
10.00	7.00	73.00	*****
10.50	5.00	78.00	*****
11.00	4.00	82.00	****
11.50	4.00	86.00	****
12.00	2.00	88.00	**
****	12.00	88.00	*****
****	100.00		

MEAN ST.DEV. SKEWNESS KURTOSIS

8.56 1.43 .13 -.50 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	8.71	5TH	6.50	16TH	7.23	25TH	7.63
			75TH	10.20	84TH	11.25	95TH	*****

PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00
				(SEDIGRAPH)	34.00	(SEDIGRAPH)	66.00

GRAVEL+SAND .00 SILT/(SILT+CLAY) 34.00PCT.GRAV+SAND/SILT+CLAY .00

LABELS SHEPARD -SILTY CLAY FOLK(GMS)-MUD (SCS)-MUD

S/10-16 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMFCT.	
3.50			
4.00	0.00	0.00	
4.50	1.00	1.00	*
5.00	0.00	1.00	
5.50	0.00	1.00	
6.00	0.00	1.00	
6.50	.50	1.50	
7.00	1.50	3.00	*
7.50	2.00	5.00	**
8.00	1.00	6.00	*
8.50	6.00	12.00	*****
9.00	6.00	18.00	*****
9.50	8.00	26.00	*****
10.00	8.00	34.00	*****
10.50	10.00	44.00	*****
11.00	11.00	55.00	*****
11.50	10.00	65.00	*****
12.00	10.00	75.00	*****
*****	25.00	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

9.93 1.47 -.54 1.64 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN 10.77	5TH 7.50	16TH 8.83	25TH 9.4+
		75TH 12.00	84TH*****	95TH*****
PCT. GRAVEL	.00	SAND 0.00	SILT (PIPETTE) 0.00	CLAY (PIPETTE) 0.00
			(SEDIGRAPH) 6.00	(SEDIGRAPH) 94.00
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	6.00PCT.GRAV+SAND/SILT+CLAY	.00
LABELS SHEPARD	-CLAY	FOLK(GMS)-MUD		(SCS)-CLAY

S/ 10-18 220282

SEDIGRAPH ANALYSIS

02/24/82

PHI PCT. CUMFCT.

3.50 ASSUMED UPPER LIMIT

4.00	9.09	9.09	*****
4.50	0.00	9.09	
5.00	0.00	9.09	
5.50	0.00	9.09	
6.00	1.82	10.91	**
6.50	2.73	13.64	***
7.00	7.27	20.91	*****
7.50	10.00	30.91	*****
8.00	10.91	41.82	*****
8.50	10.91	52.73	*****
9.00	8.18	60.91	*****
9.50	7.27	68.18	*****
10.00	5.45	73.64	*****
10.50	4.55	78.18	*****
11.00	3.64	81.82	****
11.50	2.73	84.55	***
12.00	3.64	88.18	****
*****	11.82	100.00	*****

NO STATISTICS ARE COMPUTED BECAUSE THE UPPER SIZE LIMIT IS ASSUMED AND THIS AFFECTS MORE THAN 5 PERCENT OF THE SAMPLE

PERCENTILES	MEDIAN 8.38	5TH*****	16TH 6.65	25TH 7.20
		75TH 10.15	84TH 11.40	95TH*****
PCT. GRAVEL	.00	SAND 9.09	SILT (PIPETTE) 0.00	CLAY (PIPETTE) 0.00
			(SEDIGRAPH) 32.73	(SEDIGRAPH) 58.18
GRAVEL+SAND	9.09	SILT/(SILT+CLAY)	36.00PCT.GRAV+SAND/SILT+CLAY	.10
LABELS SHEPARD	-SILTY CLAY	FOLK(GMS)-MUD		(SGS)-MUD

S' 10-19 180282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMFCT.	
3.50			
4.00	0.00	0.00	
4.50	2.02	2.02	**
5.00	3.03	5.05	***
5.50	2.02	7.07	**
6.00	4.04	11.11	****
6.50	3.03	14.14	***
7.00	4.04	18.18	****
7.50	7.07	25.25	*****
8.00	6.06	31.31	*****
8.50	7.07	38.38	*****
9.00	8.08	46.46	*****
9.50	7.07	53.54	*****
10.00	6.06	59.60	*****
10.50	7.07	66.67	*****
11.00	5.05	71.72	*****
11.50	7.07	78.79	*****
12.00	5.05	83.84	*****
****	16.16	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.59 2.02 -.15 -.77

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	9.25	5TH	4.99	16TH	6.73	25TH	7.48
			75TH	11.23	84TH	*****	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	31.31	(SEDIGRAPH)	68.69	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	31.31	PCT.GRAV+SAND/SILT+CLAY			.00	
LABELS SHEPARD	-SILTY CLAY	FOLK(GMS)-MUD		(SCS)-CLAY				

S/ 10-20 230282

SEDIGRAPH ANALYSIS

02/24/82

PHI PCT. CUM.PCT.

3.50	ASSUMED UPPER LIMIT		
4.00	4.08	4.08	****
4.50	4.08	8.16	****
5.00	4.08	12.24	****
5.50	4.08	16.33	****
6.00	2.04	18.37	**
6.50	3.06	21.43	***
7.00	6.12	27.55	*****
7.50	9.18	36.73	*****
8.00	9.18	45.92	*****
8.50	8.16	54.08	*****
9.00	9.18	63.27	*****
9.50	7.14	70.41	*****
10.00	6.12	76.53	*****
10.50	0.00	76.53	
11.00	4.08	80.61	****
11.50	4.08	84.69	****
12.00	3.06	87.76	***
****	12.24	87.76	*****
****	100.00		

MEAN ST.DEV. SKEWNESS KURTOSIS

7.78 2.10 -.07 -.62 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	8.25	5TH	4.11	16TH	5.46	25TH	6.79
			75TH	9.98	84TH	11.42	95TH	*****
PCT. GRAVEL	.00	SAND	4.08	SILT (PIPETTE)	0.00	CLAY (PIPETTE)		0.00
				(SEDIGRAPH)	41.84	(SEDIGRAPH)		54.08
GRAVEL+SAND	4.08	SILT/(SILT+CLAY)	43.62PCT.GRAV+SAND/SILT+CLAY					.04
LABELS SHEPARD -SILTY CLAY FOLK(GMS)-MUD				(SCS)-MUD				

S* 57-1. 230282

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT.	CUMPCT.	
3.50	0.00		
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	1.02	1.02	*
5.50	5.10	6.12	*****
6.00	6.12	12.24	*****
6.50	9.18	21.43	*****
7.00	10.20	31.63	*****
7.50	13.27	44.90	*****
8.00	12.24	57.14	*****
8.50	10.20	67.35	*****
9.00	8.16	75.51	*****
9.50	6.12	81.63	*****
10.00	3.57	85.20	****
10.50	2.55	87.76	***
11.00	2.04	89.80	**
11.50	2.04	91.84	**
12.00	1.02	92.86	*
*****	7.14	92.86	*****
*****		100.00	

MEAN ST.DEV. SKEWNESS KURTOSIS

7.69 1.52 .22 -.17

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	7.71	5TH	5.39	16TH	6.20	25TH	6.68
			75TH	8.97	84TH	9.83	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	57.14	(SEDIGRAPH)	42.86	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	57.14	PCT.GRAV+SAND/SILT+CLAY			.00	
LABELS SHEPARD	-CLAYEY	SILT	FOLK (GMS)	-MUD		(SQS)	-MUD	

PHI	PCT. CUMFCT.	
3.50	ASSUMED UPPER LIMIT	*
4.00	1.01	*
4.50	1.01	*****
5.00	7.07	*****
5.50	11.11	*****
6.00	20.20	*****
6.50	32.32	*****
7.00	46.46	*****
7.50	56.57	*****
8.00	68.69	*****
8.50	74.75	*****
9.00	79.80	****
9.50	83.84	***
10.00	86.87	**
10.50	88.89	**
11.00	90.91	*
11.50	91.92	*
12.00	92.93	*
*****	93.94	*****
*****	100.00	

MEAN ST.DEV. SKEWNESS KURTOSIS

6.82 1.61 .41 .45

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	6.68	5TH	4.71	16TH	5.31	25TH	5.70
			75TH	8.03	84TH	9.03	95TH	*****

PCT. GRAVEL	.00	SAND	1.01	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00
				(SEDIGRAPH)	73.74	(SEDIGRAPH)	25.25

GRAVEL+SAND 1.01 SILT/(SILT+CLAY) 74.49PCT.GRAV+SAND/SILT+CLAY .01

LABELS SHEPARD -CLAYEY SILT FOLK (GMS)-MID (SCS)-SILT

S* 69-1 230282

SEDIGRAPH ANALYSIS

02/25/82

PHI PCT. CUMPCT.

3.50	ASSUMED UPPER LIMIT		
4.00	2.00	2.00	**
4.50	0.00	2.00	
5.00	0.00	2.00	
5.50	2.00	4.00	**
6.00	3.00	7.00	***
6.50	4.00	11.00	****
7.00	4.00	15.00	****
7.50	6.00	21.00	*****
8.00	7.00	28.00	*****
8.50	7.00	35.00	*****
9.00	8.00	43.00	*****
9.50	10.00	53.00	*****
10.00	8.00	61.00	*****
10.50	10.00	71.00	*****
11.00	8.00	79.00	*****
11.50	7.00	86.00	*****
12.00	4.00	90.00	*****
*****	10.00	100.00	*****

MEAN ST.DEV. SKEWNESS KURTOSIS

8.86 1.85 -.28 -.20 KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	9.35	5TH	5.67	16TH	7.08	25TH	7.79	
			75TH	10.75	84TH	11.36	95TH	*****	
PCT. GRAVEL	.00	SAND	2.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00		
				(SEDIGRAPH)	26.00	(SEDIGRAPH)	72.00		
GRAVEL+SAND	2.00	SILT/(SILT+CLAY)	26.53PCT.GRAV+SAND/SILT+CLAY		.02				
LABELS SHEPARD -SILTY CLAY				FOLK(GMS)-MUD			(SCS)-CLAY		

S* 98-2 230262

SEDIGRAPH ANALYSIS

02/24/82

PHI	PCT. CUMFCT.	
3.50	ASSUMED UPPER LIMIT	*****
5.10		
4.00	5.10	
4.50	11.22	*****
	14.29	*****
5.00	30.61	
5.50	8.16	*****
	33.73	
6.00	8.16	*****
	46.94	
6.50	6.12	*****
	53.06	
7.00	4.08	****
	57.14	
7.50	7.14	*****
	64.29	
8.00	4.08	****
	68.37	
8.50	4.08	****
	72.45	
9.00	4.08	****
	76.53	
9.50	3.06	***
	79.59	
	3.06	***
10.00		
	82.65	
10.50	1.02	*
	83.67	
	3.06	***
11.00		
	86.73	
	3.06	***
11.50		
	89.80	
	2.04	**
12.00		
	91.84	
*****	8.16	*****
	100.00	

NO STATISTICS ARE COMPUTED BECAUSE THE UPPER SIZE LIMIT IS ASSUMED AND THIS AFFECTS MORE THAN 5 PERCENT OF THE SAMPLE

PERCENTILES	MEDIAN	6.25	5TH*****	16TH	4.49	25TH	4.80
			75TH	8.81	84TH	10.55	95TH*****
PCT. GRAVEL	.00	SAND	5.10	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00
				(SEDIGRAPH)	63.27	(SEDIGRAPH)	31.63
GRAVEL+SAND	5.10	SILT/(SILT+CLAY)	66.67	PCT. GRAV+SAND/SILT+CLAY			.05
LABELS SHEPARD	-CLAYEY SILT	FOLK(GMS)-MUD				(SCS)-SILT	

FHI	FCT.	CUMFCT.	
3.50		ASSUMED UPPER LIMIT	
	16.16		*****
4.00	13.13	16.16	*****
4.50	15.15	29.29	*****
5.00	11.11	44.44	*****
5.50	8.08	55.56	*****
6.00	8.08	63.64	*****
6.50	5.05	71.72	*****
7.00	6.06	76.77	*****
7.50	4.04	82.83	****
8.00	3.03	86.87	***
8.50	2.02	89.90	**
9.00	1.01	91.92	*
9.50	1.01	92.93	*
10.00	1.01	93.94	*
10.50	.51	94.95	*
11.00	.51	95.45	*
11.50	0.00	95.96	
12.00	4.04	95.96	****
*****		100.00	

NO STATISTICS ARE COMPUTED BECAUSE THE UPPER SIZE LIMIT IS ASSUMED AND THIS AFFECTS MORE THAN 5 PERCENT OF THE SAMPLE

PERCENTILES	MEDIAN	5.25	5TH*****	16TH*****	25TH	4.34	
			75TH	6.33	84TH	7.65	
					95TH	10.55	
PCT. GRAVEL	.00	SAND	16.16	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00
				(SEDIGRAPH)	70.71	(SEDIGRAPH)	13.13
GRAVEL+SAND	16.16	SILT/(SILT+CLAY)	54.34	PCT.GRAV+SAND/SILT+CLAY		.19	
LABELS SHEPARD -SANDY SILT		FOLK(GMS)-SANDY MUD			(SCS)-SANDY SILT		

02/24/82

PHI	FCT.	CUMPCT.	
3.50	0.00	0.00	
4.00	2.02	2.02	**
4.50	5.05	7.07	*****
5.00	7.07	14.14	*****
5.50	8.08	22.22	*****
6.00	10.10	32.32	*****
6.50	8.08	40.40	*****
7.00	10.10	50.51	*****
7.50	7.07	57.58	*****
8.00	7.07	64.65	*****
8.50	6.06	70.71	*****
9.00	5.05	75.76	*****
9.50	4.04	79.80	*****
10.00	4.04	83.84	*****
10.50	3.03	86.87	*****
11.00	2.02	88.89	*****
11.50	2.02	90.91	*****
12.00	9.09	100.00	*****

MEAN ST. DEV. SKEWNESS KURTOSIS

7.48 1.87 .20 -.65

KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	7.48	5TH	4.80	16TH	5.62	25TH	6.14
			75TH	9.43	84TH	10.53	95TH	*****
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00	
				(SEDIGRAPH)	57.58	(SEDIGRAPH)	42.42	
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	57.58	PCT. GRAV+SAND/SILT+CLAY			.00	
LABELS SHEPARD	-CLAYEY SILT	FOLK (GMS)-MLD				(SCS)-MUD		