MUNICIPAL SOLID WASTE PERMIT AMENDMENT APPLICATION

FOR:

GREENBELT LANDFILL
TCEQ PERMIT NO. MSW-1586B
HARRIS COUNTY, TEXAS

VOLUME IV OF IV

Prepared for:

Waste Corporation of Texas, L. P.
1330 Post Oak Blvd, 7th Floor
Houston, Texas 77056

Prepared by:

SCS ENGINEERS
Texas Board of Professional Engineers Registration No. F-3407
12651 Briar Forest Dr., Suite 205
Houston, TX 77077
(281) 293-8494

October 2021

FOR PERMIT PURPOSES ONLY

PART III- ATTACHMENT 4

GEOLOGY REPORT

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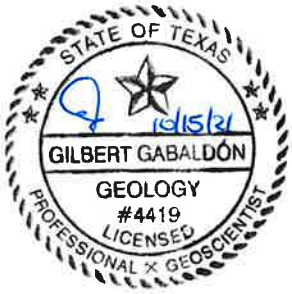
Volume 2 of 2



APPENDIX III-4H

SLUG TEST DATA

HISTORICAL

APPENDIX C

Aquifer Characterization Test Data

Appendix C

Summary of Aquifer (Slug) Test, (K = Hydraulic Conductivity)

$K_{(m)}$ = 1.19×10^{-4} cm/sec (C-15)

$K_{(m)}$ = 7.39×10^{-5} cm/sec (C-6)

$K_{(v)}$ = 1.05×10^{-4} cm/sec (C-11)

URBAN WASTE TECHNOLOGIES
AQUIFER SLUG TESTING
HARRIS COUNTY, TEXAS

WELL NO. C-15
SEPTEMBER 16, 1992
BEGIN TEST AT 2:30
END TEST AT 3:10

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
0.000	0.000	0.000	ERR
1.596	3.320	101.194	4.617
1.800	2.920	89.002	4.489
1.996	2.720	82.906	4.418
3.000	2.780	84.734	4.440
3.996	2.640	80.467	4.388
4.998	2.570	78.334	4.361
6.000	2.520	76.810	4.341
6.996	2.480	75.590	4.325
7.996	2.440	74.371	4.309
9.000	2.410	73.457	4.297
9.996	2.380	72.542	4.284
10.998	2.360	71.933	4.276
12.000	2.340	71.323	4.267
12.996	2.320	70.714	4.259
13.998	2.300	70.104	4.250
15.000	2.280	69.494	4.241
15.996	2.270	69.190	4.237
16.998	2.260	68.885	4.232
18.000	2.250	68.580	4.228
18.996	2.230	67.970	4.219
19.980	2.222	67.727	4.215
25.002	2.160	65.837	4.187
30.000	2.110	64.313	4.164
34.998	2.060	62.789	4.140
40.002	2.020	61.570	4.120
45.000	1.980	60.350	4.100
49.998	1.940	59.131	4.080
55.002	1.900	57.912	4.059
60.000	1.860	56.693	4.038
64.998	1.830	55.778	4.021
70.002	1.790	54.559	3.999
75.000	1.750	53.340	3.977
79.998	1.730	52.730	3.965
84.996	1.690	51.511	3.942
90.000	1.660	50.597	3.924
94.998	1.630	49.682	3.906
100.020	1.610	49.073	3.893
105.000	1.580	48.158	3.874
109.998	1.560	47.549	3.862
115.000	1.530	46.634	3.842

URBAN WASTE TECHNOLOGIES
WELL C-15, CONT.

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
120.000	1.500	45.720	3.823
150.000	1.370	41.758	3.732
180.000	1.250	38.100	3.640
210.000	1.140	34.747	3.548
240.000	1.040	31.699	3.456
270.000	0.960	29.261	3.376
300.000	0.880	26.822	3.289
330.000	0.810	24.689	3.206
360.000	0.750	22.860	3.129
390.000	0.690	21.031	3.046
420.000	0.640	19.507	2.971
450.000	0.600	18.288	2.906
480.000	0.560	17.069	2.837
510.000	0.510	15.545	2.744
540.000	0.480	14.630	2.683
570.000	0.440	13.411	2.596
600.000	0.410	13.411	2.596
720.000	0.310	12.497	2.525
840.000	0.230	9.449	2.246
960.000	0.180	7.010	1.947
1080.000	0.120	5.486	1.702
1200.000	0.100	3.048	1.114
1320.000	0.070	2.134	0.758
1440.000	0.040	1.219	0.198
1560.000	0.040	1.219	0.198
1680.000	0.020	0.610	-0.495
1800.000	0.010	0.305	-1.188

WELL C-15
LINEAR REGRESSION OF RECOVERY DATA 180-420 SECONDS

Regression Output:

Constant	4.13046382
Std Err of Y Est	0.00679583
R Squared	0.99922710
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	-0.00278205
Std Err of Coef.	0.000029244

HYDRAULIC CONDUCTIVITY CALCULATION

WELL C-15

6.75	BORING DIAMETER (in)
2	CASING DIAMETER (in)
19.78	TOTAL CASING DEPTH (ft)
10.43	DEPTH TO WATER (ft)
13.0	DEPTH TO SCREENED INTERVAL (ft)
2.54	rc (cm)
8.57	rw (cm)
152.40	Lw (cm)
17.70	Le/rw (cm)
2	C
2.78E-03	1/t ln(y0/yt) Slope of recovery data
2.02E+00	ln Re/rw
1.19E-04	HYDRAULIC CONDUCTIVITY (cm/sec)
2.52E+00	HYDRAULIC CONDUCTIVITY (gal/day/ft)

NOTES:

rc = Well casing radius. If recovery is in screened interval, then rc = sqrt[(1-0.3)x(rc x rc) + 0.3x(rw)x(rw)]

rw = Well borehole radius

Lw = Depth of water in well, assumed to be equal to saturated thickness of water-bearing zone.

Le = Length of screened interval, equals Lw.

C = Dinensionless parameter derived by graphing Le/rw. See Bouwer and Rice, (1989) for details.

y = Vertical difference between water level inside well and static water table outside well.

Re = Effective radial distance over which y is dissipated.

1/t ln(y0/yt) = From slope of linear regression of straight-line portion of graph seconds vs natural log of recovery in centimeters.

ln Re/rw = 1/[(1.1/ln(Lw/rw)) + C/(Le/rw)]

Hydraulic Conduct= [(rc x rc) x ln (Re/rw)]/2(Le) x [1/t x ln(y0/yt)]

URBAN WASTE TECHNOLOGIES
AQUIFER SLUG TESTING
HARRIS COUNTY, TEXAS

WELL NO. C-15
SEPTEMBER 16, 1992
BEGIN TEST AT 2:30
END TEST AT 3:10

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
0.000	0.000	0.000	ERR
1.596	3.320	101.194	4.617
1.800	2.920	89.002	4.489
1.996	2.720	82.906	4.418
3.000	2.780	84.734	4.440
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6.000	2.520	76.810	4.341
6.996	2.480	75.590	4.325
7.996	2.440	74.371	4.309
9.000	2.410	73.457	4.297
9.996	2.380	72.542	4.284
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25.002	2.160	65.837	4.187
30.000	2.110	64.313	4.164
34.998	2.060	62.789	4.140
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60.000	1.860	56.693	4.038
64.998	1.830	55.778	4.021
70.002	1.790	54.559	3.999
75.000	1.750	53.340	3.977
79.998	1.730	52.730	3.965
84.996	1.690	51.511	3.942
90.000	1.660	50.597	3.924
94.998	1.630	49.682	3.906
100.020	1.610	49.073	3.893
105.000	1.580	48.158	3.874
109.998	1.560	47.549	3.862
115.000	1.530	46.634	3.842
120.000	1.500	45.720	3.823

URBAN WASTE TECHNOLOGIES
WELL C-15 CONT.

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
150.000	1.370	41.758	3.732
180.000	1.250	38.100	3.640
210.000	1.140	34.747	3.548
240.000	1.040	31.699	3.456
270.000	0.960	29.261	3.376
300.000	0.880	26.822	3.289
330.000	0.810	24.689	3.206
360.000	0.750	22.860	3.129
390.000	0.690	21.031	3.046
420.000	0.640	19.507	2.971
450.000	0.600	18.288	2.906
480.000	0.560	17.069	2.837
510.000	0.510	15.545	2.744
540.000	0.480	14.630	2.683
570.000	0.440	13.411	2.596
600.000	0.410	13.411	2.596
720.000	0.310	12.497	2.525
840.000	0.230	9.449	2.246
960.000	0.180	7.010	1.947
1080.000	0.120	5.486	1.702
1200.000	0.100	3.048	1.114
1320.000	0.070	2.134	0.758
1440.000	0.040	1.219	0.198
1560.000	0.040	1.219	0.198
1680.000	0.020	0.610	-0.495
1800.000	0.010	0.305	-1.188

WELL C-15
LINEAR REGRESSION OF RECOVERY DATA 150-570 SECONDS

Regression Output:

Constant	4.10399670
Std Err of Y Est	0.01546628
R Squared	0.99826746
No. of Observations	15
Degrees of Freedom	13

X Coefficient(s)	-0.00266648
Std Err of Coef.	0.000030809

HYDRAULIC CONDUCTIVITY CALCULATION

WELL C-15

6.75	BORING DIAMETER (in)
2	CASING DIAMETER (in)
19.78	TOTAL CASING DEPTH (ft)
10.43	DEPTH TO WATER (ft)
13.0	DEPTH TO SCREENED INTERVAL (ft)
2.54	rc (cm)
8.57	rw (cm)
285.54	Lw (cm)
33.31	Le/rw (cm)
2.3	C
2.67E-03	1/t ln(y0/yt) Slope of recovery data
2.61E+00	ln Re/rw
7.87E-05	HYDRAULIC CONDUCTIVITY (cm/sec)
1.67E+00	HYDRAULIC CONDUCTIVITY (gal/day/ft)

NOTES:

rc = Well casing radius. If recovery is in screened interval, then rc = sqrt[(1-0.3)x(rc x rc) + 0.3x(rw)x(rw)]

rw = Well borehole radius

Lw = Depth of water in well, assumed to be equal to saturated thickness of water-bearing zone.

Le = Length of screened interval, equals Lw.

C = Dinensionless parameter derived by graphing Le/rw. See Bouwer and Rice, (1989) for details.

y = Vertical difference between water level inside well and static water table outside well.

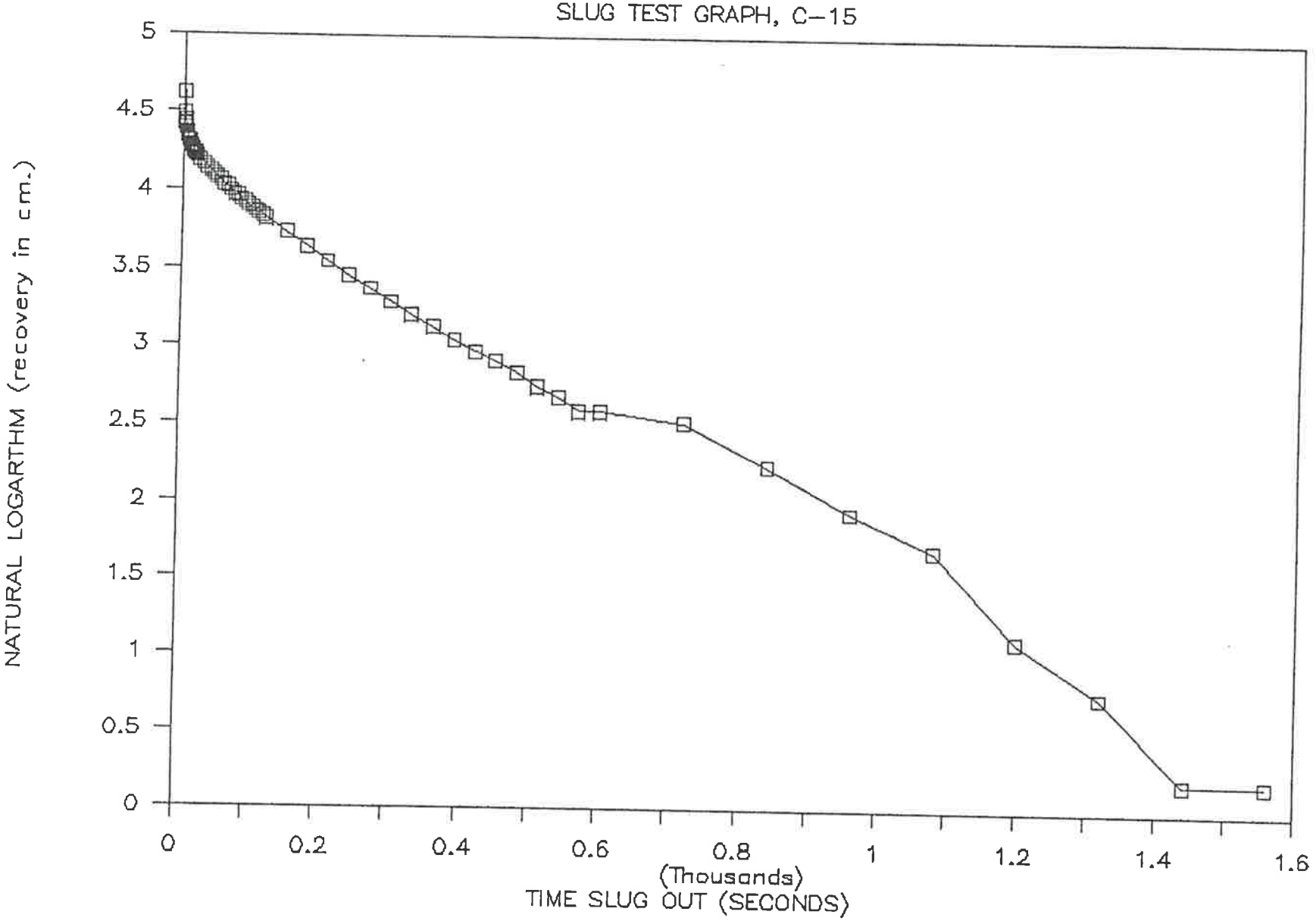
Re = Effective radial distance over which y is dissipated.

1/t ln(y0/yt) = From slope of linear regression of straight-line portion of graph seconds vs natural log of recovery in centimeters.

ln Re/rw = $1/[(1.1/\ln(Lw/rw)) + C/(Le/rw)]$

Hydraulic Conduct= $[(rc \times rc) \times \ln(Re/rw)]/2(Le) \times [1/t \times \ln(y0/yt)]$

URBAN WASTE TECHNOLOGIES



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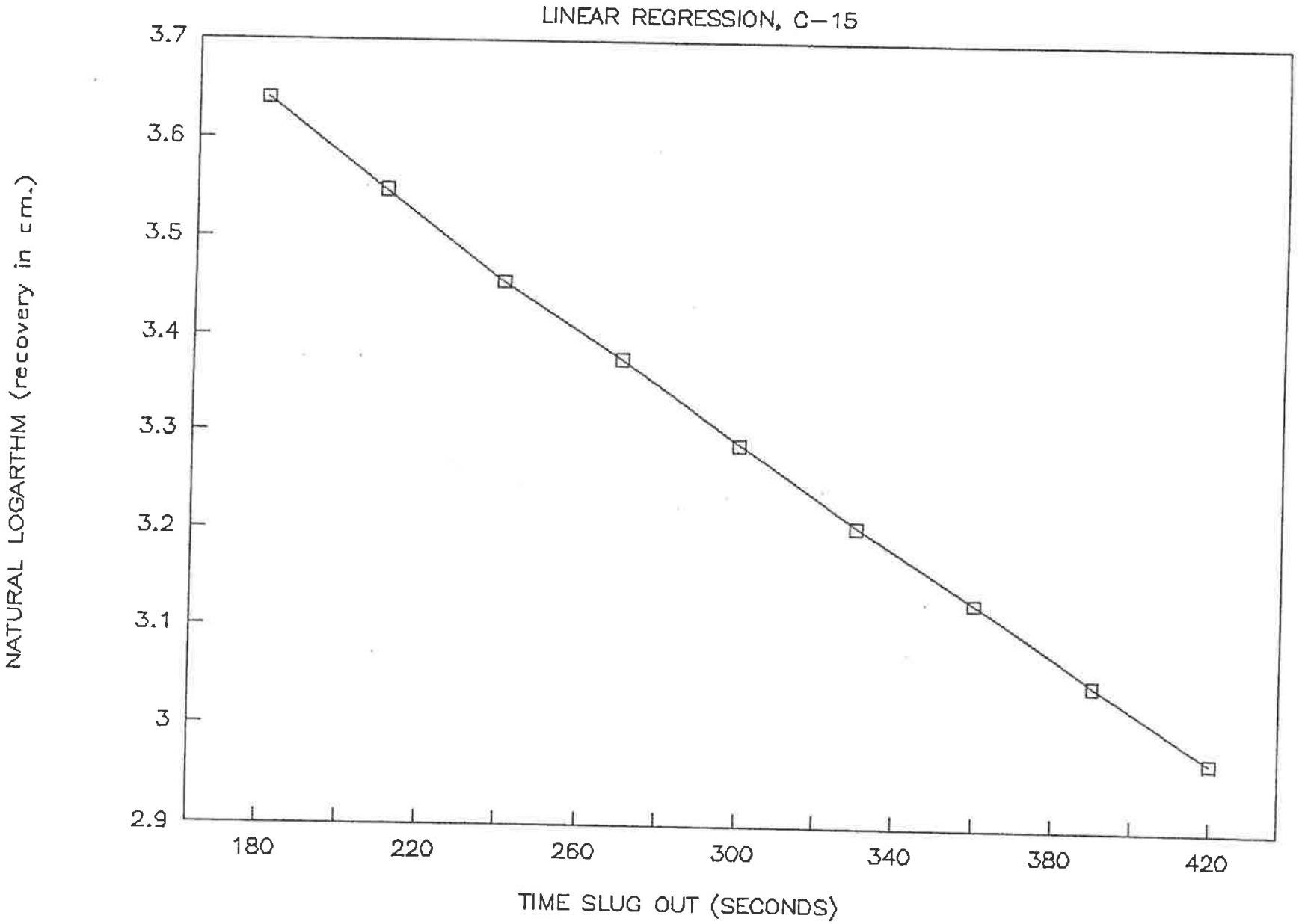
URBAN WASTE TECHNOLOGIES



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URBAN WASTE TECHNOLOGIES
AQUIFER SLUG TESTING
HARRIS COUNTY, TEXAS

WELL NO. C-6
SEPTEMBER 16, 1992
BEGIN TEST AT 10:50
END TEST AT 11:50

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
0.000	-0.420	00.0000	ERR
9.996	5.440	165.811	5.111
10.998	5.050	153.924	5.036
12.000	4.050	123.444	4.816
12.996	4.050	123.444	4.816
13.998	4.030	122.834	4.811
15.000	4.020	122.529	4.808
15.996	4.000	121.920	4.803
16.998	3.990	121.615	4.801
18.000	3.970	121.005	4.795
18.996	3.960	120.700	4.793
19.998	3.950	120.396	4.791
25.002	3.890	118.567	4.775
30.000	3.840	117.043	4.763
34.998	3.780	115.214	4.747
40.002	3.740	113.995	4.736
45.000	3.690	112.471	4.723
49.998	3.650	111.252	4.712
55.002	3.610	110.032	4.701
60.000	3.570	108.814	4.690
64.998	3.530	107.594	4.678
70.002	3.490	106.375	4.670
75.000	3.450	105.156	4.655
79.998	3.420	104.242	4.647
84.996	3.380	103.022	4.635
90.000	3.340	101.803	4.623
94.998	3.310	100.888	4.614
100.002	3.280	99.974	4.605
105.000	3.240	98.755	4.593
109.800	3.210	97.841	4.583
115.002	3.180	96.926	4.574
120.000	3.150	96.012	4.564
150.000	2.970	90.526	4.506
180.000	2.810	85.649	4.450
210.000	2.650	80.777	4.392
240.000	2.480	75.590	4.325
270.000	2.350	71.628	4.271
300.000	2.220	67.666	4.215
330.000	2.110	64.008	4.159

URBAN WASTE TECHNOLOGIES
WELL C-6, CONT.

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
360.000	2.000	60.960	4.110
390.000	1.900	57.912	4.059
420.000	1.810	55.168	4.010
450.000	1.720	52.426	3.959
480.000	1.630	49.682	3.906
510.000	1.550	47.244	3.855
540.000	1.480	45.110	3.809
570.000	1.410	42.977	3.761
600.000	1.340	40.843	3.710
720.000	1.120	34.137	3.530
840.000	0.940	28.651	3.355
960.000	0.810	24.688	3.206
1080.000	0.700	21.336	3.060
1200.000	0.620	18.897	2.939
1320.000	0.550	16.764	2.819
1440.000	0.490	14.935	2.704
1560.000	0.440	13.411	2.596
1680.000	0.410	12.497	2.525
1800.000	0.380	11.582	2.449
1920.000	0.360	10.973	2.395
2040.000	0.340	10.363	2.338
2160.000	0.320	9.750	2.278
2280.000	0.310	9.448	2.246
2400.000	0.290	8.839	2.179
2520.000	0.280	8.534	2.144
2640.000	0.270	8.229	2.108
2760.000	0.260	7.925	2.070

LINEAR REGRESSION OF RECOVERY DATA, 360 - 600 SECONDS

Regression Output:

Constant	4.70971022
Std Err of Y Est	0.00211085
R Squared	0.99979257
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-0.00166851
Std Err of Coef.	0.000009083

HYDRAULIC CONDUCTIVITY CALCULATION

WELL C-6

6.75	BORING DIAMETER (in)
2	CASING DIAMETER (in)
48.45	TOTAL CASING DEPTH (ft)
23.42	DEPTH TO WATER (ft)
42.0	DEPTH TO SCREENED INTERVAL (ft)
2.54	rc (cm)
8.57	rw (cm)
152.40	Lw (cm)
17.78	Le/rw (cm)
1.7	C
1.67E-03	1/t ln(y0/yt) Slope of recovery data
2.09E+00	ln Re/rw
7.39E-05	HYDRAULIC CONDUCTIVITY (cm/sec)
1.57E+00	HYDRAULIC CONDUCTIVITY (gal/day/ft)

NOTES:

rc = Well casing radius. If recovery is in screened interval, then rc = sqrt[(1-0.3)x(rc x rc) + 0.3x(rw)x(rw)]

rw = Well borehole radius

Lw = Depth of water in well, assumed to be equal to saturated thickness of water-bearing zone.

Le = Length of screened interval, equals Lw.

C = Dinensionless parameter derived by graphing Le/rw. See Bouwer and Rice, (1989) for details.

y = Vertical difference between water level inside well and static water table outside well.

Re = Effective radial distance over which y is dissipated.

1/t ln(y0/yt) = From slope of linear regression of straight-line portion of graph seconds vs natural log of recovery in centimeters.

ln Re/rw = 1/[(1.1/ln(Lw/rw)) + C/(Le/rw)]

Hydraulic Conduct= [(rc x rc) x ln (Re/rw)]/2(Le) x [1/t x ln(y0/yt)]

URBAN WASTE TECHNOLOGIES
AQUIFER SLUG TESTING
HARRIS COUNTY, TEXAS

WELL NO. C-6
SEPTEMBER 16, 1992
BEGIN TEST AT 10:50
END TEST AT 11:50

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
0.000	-0.420	Q0.0000	ERR
9.996	5.440	165.811	5.111
10.998	5.050	153.924	5.036
12.000	4.050	123.444	4.816
12.996	4.050	123.444	4.816
13.998	4.030	122.834	4.811
15.000	4.020	122.529	4.808
15.996	4.000	121.920	4.803
16.998	3.990	121.615	4.801
18.000	3.970	121.005	4.795
18.996	3.960	120.700	4.793
19.998	3.950	120.396	4.791
25.002	3.890	118.567	4.775
30.000	3.840	117.043	4.763
34.998	3.780	115.214	4.747
40.002	3.740	113.995	4.736
45.000	3.690	112.471	4.723
49.998	3.650	111.252	4.712
55.002	3.610	110.032	4.701
60.000	3.570	108.814	4.690
64.998	3.530	107.594	4.678
70.002	3.490	106.375	4.670
75.000	3.450	105.156	4.655
79.998	3.420	104.242	4.647
84.996	3.380	103.022	4.635
90.000	3.340	101.803	4.623
94.998	3.310	100.888	4.614
100.002	3.280	99.974	4.605
105.000	3.240	98.755	4.593
109.800	3.210	97.841	4.583
115.002	3.180	96.926	4.574
120.000	3.150	96.012	4.564
150.000	2.970	90.526	4.506
180.000	2.810	85.649	4.450
210.000	2.650	80.777	4.392
240.000	2.480	75.590	4.325
270.000	2.350	71.628	4.271
300.000	2.220	67.666	4.215
330.000	2.110	64.008	4.159
360.000	2.000	60.960	4.110

URBAN WASTE TECHNOLOGIES
WELL C-6 CONT.

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
390.000	1.900	57.912	4.059
420.000	1.810	55.168	4.010
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1560.000	0.440	13.411	2.596
1680.000	0.410	12.497	2.525
1800.000	0.380	11.582	2.449
1920.000	0.360	10.973	2.395
2040.000	0.340	10.363	2.338
2160.000	0.320	9.750	2.278
2280.000	0.310	9.448	2.246
2400.000	0.290	8.839	2.179
2520.000	0.280	8.534	2.144
2640.000	0.270	8.229	2.108
2760.000	0.260	7.925	2.070

LINEAR REGRESSION OF RECOVERY DATA, 150-600 SECONDS

Regression Output:

Constant	4.75304036
Std Err of Y Est	0.00990258
R Squared	0.99855136
No. of Observations	16
Degrees of Freedom	14

X Coefficient(s)	-0.00175855
Std Err of Coef.	0.000017901

HYDRAULIC CONDUCTIVITY CALCULATION

WELL C-6

6.75	BORING DIAMETER (in)
2	CASING DIAMETER (in)
48.45	TOTAL CASING DEPTH (ft)
23.42	DEPTH TO WATER (ft)
42.0	DEPTH TO SCREENED INTERVAL (ft)
2.54	rc (cm)
8.57	rw (cm)
762.91	Lw (cm)
89.00	Le/rw (cm)
3.5	C
1.76E-03	1/t ln(y0/yt) Slope of recovery data
3.52E+00	ln Re/rw
2.61E-05	HYDRAULIC CONDUCTIVITY (cm/sec)
5.54E-01	HYDRAULIC CONDUCTIVITY (gal/day/ft)

NOTES:

rc = Well casing radius. If recovery is in screened interval, then rc = sqrt[(1-0.3)x(rc x rc) + 0.3x(rw)x(rw)]

rw = Well borehole radius

Lw = Depth of water in well, assumed to be equal to saturated thickness of water-bearing zone.

Le = Length of screened interval, equals Lw.

C = Dinensionless parameter derived by graphing Le/rw. See Bouwer and Rice, (1989) for details.

y = Vertical difference between water level inside well and static water table outside well.

Re = Effective radial distance over which y is dissipated.

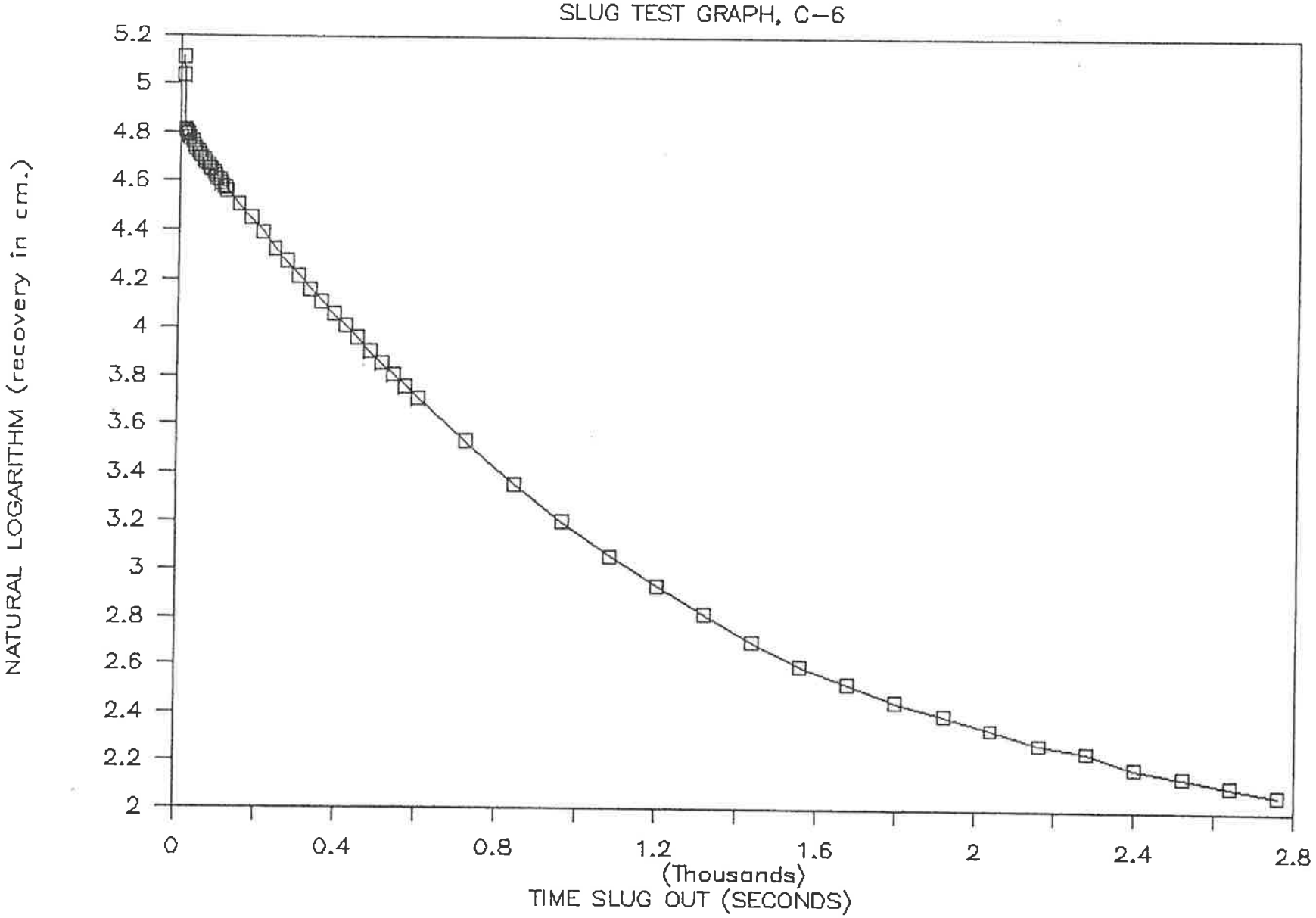
1/t ln(y0/yt) = From slope of linear regression of straight-line portion of graph seconds vs natural log of recovery in centimeters.

ln Re/rw = 1/[(1.1/ln(Lw/rw)) + C/(Le/rw)]

Hydraulic Conduct= [(rc x rc) x ln (Re/rw)]/2(Le) x [1/t x ln(y0/yt)]

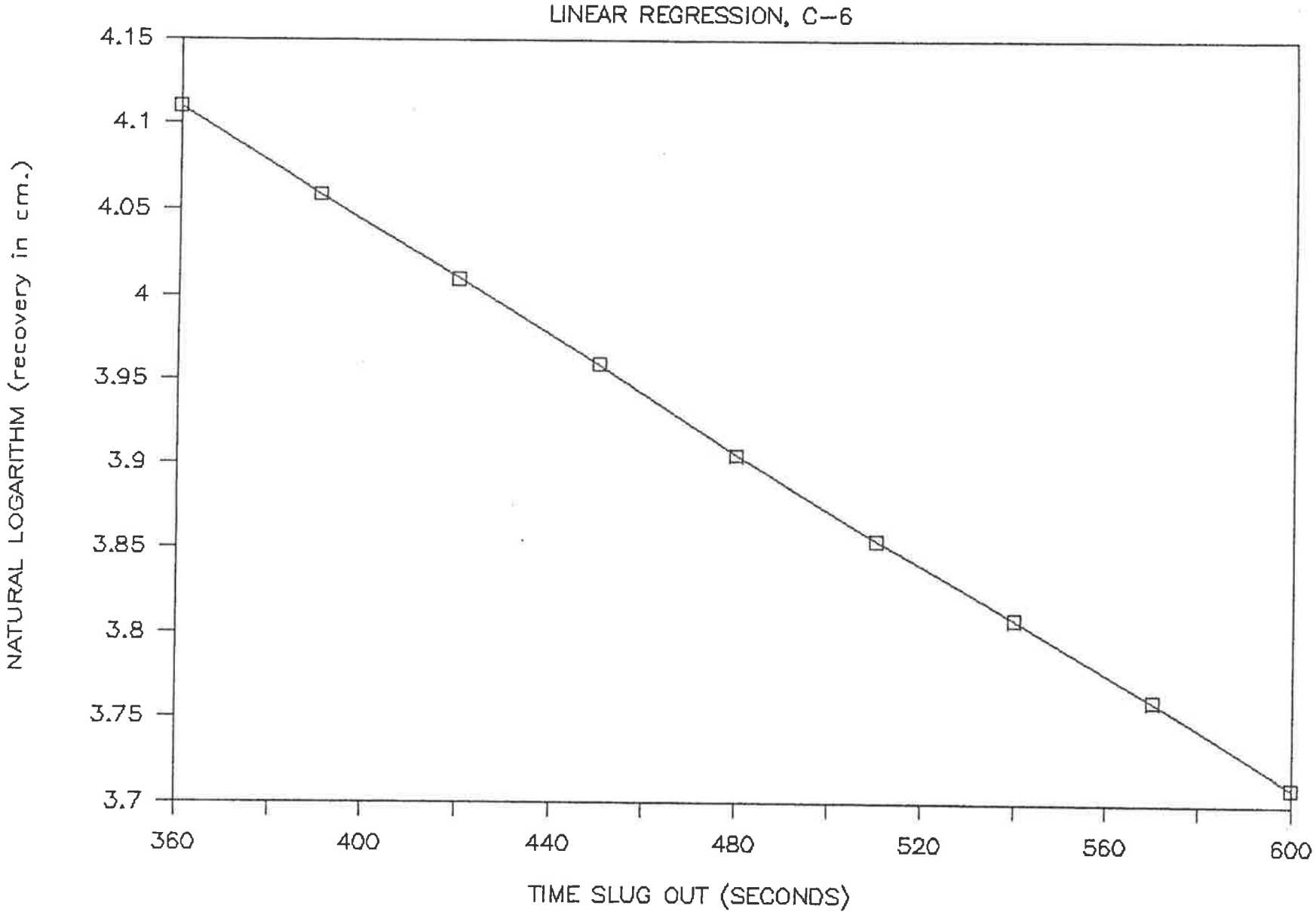
URBAN WASTE TECHNOLOGIES

SLUG TEST GRAPH, C-6



III-44-17

URBAN WASTE TECHNOLOGIES



81-HH-III

URBAN WASTE TECHNOLOGIES
AQUIFER SLUG TESTING
HARRIS COUNTY, TEXAS

WELL NO. C-11
SEPTEMBER 17, 1992
BEGIN TEST AT 1:20
END TEST AT 1:50

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
0.000	0.000	0.000	ERR
1.200	4.170	127.102	4.845
1.398	4.140	126.187	4.838
1.596	4.150	126.492	4.840
1.800	4.130	125.882	4.835
1.996	4.070	124.054	4.821
3.000	4.200	128.016	4.852
3.996	4.060	123.749	4.818
4.998	4.020	122.530	4.808
6.000	4.060	123.749	4.818
6.996	4.040	123.139	4.813
7.996	4.010	122.225	4.806
9.000	4.040	123.139	4.813
9.996	3.930	119.786	4.786
10.998	3.880	118.262	4.773
12.000	3.870	117.958	4.770
12.996	3.860	117.653	4.768
13.998	3.830	116.738	4.760
15.000	3.810	116.129	4.755
15.996	3.790	115.519	4.749
16.998	3.770	114.910	4.744
18.000	3.760	114.605	4.741
18.996	3.740	113.995	4.736
19.980	3.730	113.690	4.733
25.002	3.650	111.252	4.712
30.000	3.570	108.814	4.690
34.998	3.500	106.680	4.670
40.002	3.430	104.546	4.650
45.000	3.360	102.413	4.629
49.998	3.290	100.279	4.608
55.002	3.220	98.146	4.586
60.000	3.150	96.012	4.564
64.998	3.090	94.183	4.545
70.002	3.030	92.354	4.526
75.000	2.970	90.526	4.506
79.998	2.910	88.697	4.485
84.996	2.850	86.868	4.464
90.000	2.790	85.039	4.443
94.998	2.740	83.515	4.425
100.020	2.680	81.686	4.403

URBAN WASTE TECHNOLOGIES
WELL C-11 CONT.

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
105.000	2.630	80.162	4.384
109.998	2.570	78.334	4.361
115.000	2.520	76.810	4.341
120.000	2.470	75.286	4.321
150.000	2.190	66.751	4.201
180.000	1.940	59.131	4.080
210.000	1.730	52.730	3.965
240.000	1.550	47.244	3.855
270.000	1.390	42.367	3.746
300.000	1.250	38.100	3.640
330.000	1.130	34.442	3.539
360.000	1.030	31.394	3.447
390.000	0.940	28.651	3.355
420.000	0.870	26.518	3.278
450.000	0.810	24.689	3.206
480.000	0.750	22.860	3.129
510.000	0.710	21.641	3.075
540.000	0.670	20.422	3.017
570.000	0.640	19.507	2.971
600.000	0.620	18.898	2.939
720.000	0.550	16.764	2.819
840.000	0.520	15.850	2.763
960.000	0.500	15.240	2.724
1080.000	0.500	15.240	2.724

WELL C-11
LINEAR REGRESSION OF RECOVERY DATA, 120-360 SECONDS

Regression Output:

Constant	4.74366211
Std Err of Y Est	0.01244948
R Squared	0.99849949
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-0.00365644
Std Err of Coef.	0.000053574

HYDRAULIC CONDUCTIVITY CALCULATION

WELL C-11

6.75	BORING DIAMETER (in)
2	CASING DIAMETER (in)
99.04	TOTAL CASING DEPTH (ft)
20.06	DEPTH TO WATER, (ft)
88.0	DEPTH TO SCREENED INTERVAL (ft)
2.54	rc (cm)
8.57	rw (cm)
304.80	Lw (cm)
35.56	Le/rw (cm)
2.1	C
3.66E-03	1/t ln(y0/yt) Slope of recovery data
2.72E+00	ln Re/rw
1.05E-04	HYDRAULIC CONDUCTIVITY (cm/sec)
2.23E+00	HYDRAULIC CONDUCTIVITY (gal/day/ft)

NOTES:

rc = Well casing radius. If recovery is in screened interval, then rc = sqrt[(1-0.3)*(rc*rc) + 0.3*(rw)*(rw)]

rw = Well borehole radius

Lw = Depth of water in well, assumed to be equal to saturated thickness of water-bearing zone

Le = Length of screened interval, equals Lw.

C = Dimensionless parameter derived by graphing Le/rw. See Bouwer and Rice, (1989) for details.

y = Vertical difference between water level inside well and static water table outside well.

Re = Effective radial distance over which y is dissipated.

1/t ln(y0/yt) = From slope of linear regression of straight-line portion of graph seconds vs natural log of recovery in centimeters.

ln Re/rw = 1/[(1.1/ln(Lw/rw)) + C/(Le/rw)]

Hydraulic Conduct= [(rc x rc) x ln (Re/rw)]/2(Le) x [1/t x ln(y0/yt)]

URBAN WASTE TECHNOLOGIES
AQUIFER SLUG TESTING
HARRIS COUNTY, TEXAS

WELL NO. C-11
SEPTEMBER 17, 1992
BEGIN TEST AT 1:20
END TEST AT 1:50

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
0.000	0.000	0.000	ERR
1.200	4.170	127.102	4.845
1.398	4.140	126.187	4.838
1.596	4.150	126.492	4.840
1.800	4.130	125.882	4.835
1.996	4.070	124.054	4.821
3.000	4.200	128.016	4.852
3.996	4.060	123.749	4.818
4.998	4.020	122.530	4.808
6.000	4.060	123.749	4.818
6.996	4.040	123.139	4.813
7.996	4.010	122.225	4.806
9.000	4.040	123.139	4.813
9.996	3.930	119.786	4.786
10.998	3.880	118.262	4.773
12.000	3.870	117.958	4.770
12.996	3.860	117.653	4.768
13.998	3.830	116.738	4.760
15.000	3.810	116.129	4.755
15.996	3.790	115.519	4.749
16.998	3.770	114.910	4.744
18.000	3.760	114.605	4.741
18.996	3.740	113.995	4.736
19.980	3.730	113.690	4.733
25.002	3.650	111.252	4.712
30.000	3.570	108.814	4.690
34.998	3.500	106.680	4.670
40.002	3.430	104.546	4.650
45.000	3.360	102.413	4.629
49.998	3.290	100.279	4.608
55.002	3.220	98.146	4.586
60.000	3.150	96.012	4.564
64.998	3.090	94.183	4.545
70.002	3.030	92.354	4.526
75.000	2.970	90.526	4.506
79.998	2.910	88.697	4.485
84.996	2.850	86.868	4.464
90.000	2.790	85.039	4.443
94.998	2.740	83.515	4.425
100.020	2.680	81.686	4.403

URBAN WASTE TECHNOLOGIES
WELL C-11 CONT.

TIME SLUG OUT (SEC)	VALUE BELOW STATIC (FEET)	VALUE BELOW STATIC (CM)	LN (CM)
105.000	2.630	80.162	4.384
109.998	2.570	78.334	4.361
115.000	2.520	76.810	4.341
120.000	2.470	75.286	4.321
150.000	2.190	66.751	4.201
180.000	1.940	59.131	4.080
210.000	1.730	52.730	3.965
240.000	1.550	47.244	3.855
270.000	1.390	42.367	3.746
300.000	1.250	38.100	3.640
330.000	1.130	34.442	3.539
360.000	1.030	31.394	3.447
390.000	0.940	28.651	3.355
420.000	0.870	26.518	3.278
450.000	0.810	24.689	3.206
480.000	0.750	22.860	3.129
510.000	0.710	21.641	3.075
540.000	0.670	20.422	3.017
570.000	0.640	19.507	2.971
600.000	0.620	18.898	2.939
720.000	0.550	16.764	2.819
840.000	0.520	15.850	2.763
960.000	0.500	15.240	2.724
1080.000	0.500	15.240	2.724

WELL C-11
LINEAR REGRESSION OF RECOVERY DATA, 120-510 SECONDS

Regression Output:

Constant	4.65056903
Std Err of Y Est	0.03998133
R Squared	0.99113136
No. of Observations	13
Degrees of Freedom	12
X Coefficient(s)	-0.00323573
Std Err of Coef.	0.000088357

HYDRAULIC CONDUCTIVITY CALCULATION

WELL C-11

6.75	BORING DIAMETER (in)
2	CASING DIAMETER (in)
99.04	TOTAL CASING DEPTH (ft)
20.06	DEPTH TO WATER, (ft)
88.0	DEPTH TO SCREENED INTERVAL (ft)
2.54	rc (cm)
8.57	rw (cm)
304.80	Lw (cm)
35.56	Le/rw (cm)
2.1	C
3.79E-03	1/t ln(y0/yt) Slope of recovery data
2.72E+00	ln Re/rw
1.09E-04	HYDRAULIC CONDUCTIVITY (cm/sec)
2.32E+00	HYDRAULIC CONDUCTIVITY (gal/day/ft)

NOTES:

rc = Well casing radius. If recovery is in screened interval, then rc = sqrt[(1-0.3)*(rc*rc) + 0.3*(rw)*(rw)]

rw = Well borehole radius

Lw = Depth of water in well, assumed to be equal to saturated thickness of water-bearing zone

Le = Length of screened interval, equals Lw.

C = Dimensionless parameter derived by graphing Le/rw. See Bouwer and Rice, (1989) for details.

y = Vertical difference between water level inside well and static water table outside well.

Re = Effective radial distance over which y is dissipated.

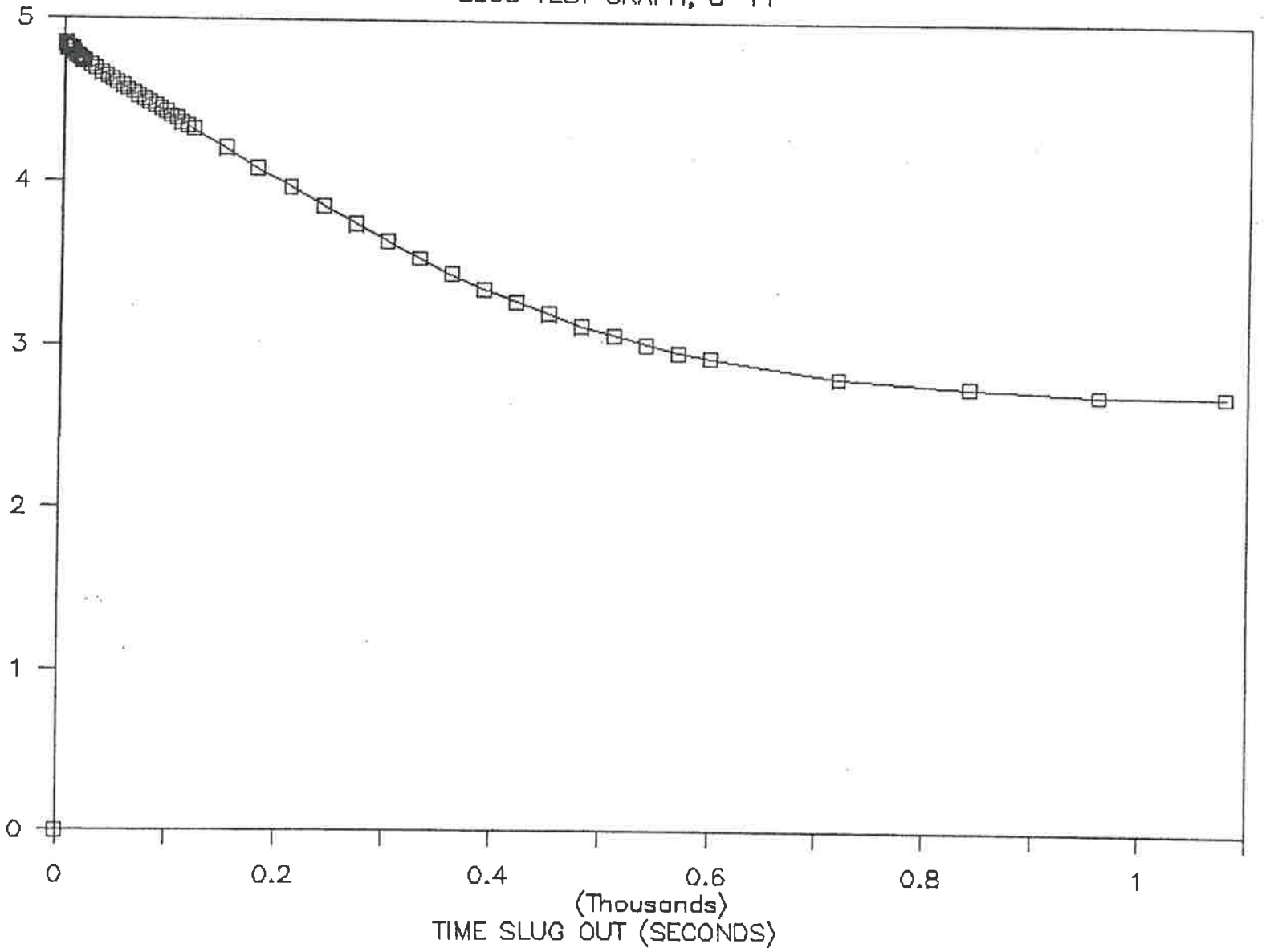
1/t ln(y0/yt) = From slope of linear regression of straight-line portion of graph seconds vs natural log of recovery in centimeters.

ln Re/rw = 1/[(1.1/ln(Lw/rw)) + C/(Le/rw)]

Hydraulic Conduct= [(rc x rc) x ln (Re/rw)]/2(Le) x [1/t x ln(y0/yt)]

URBAN WASTE TECHNOLOGIES

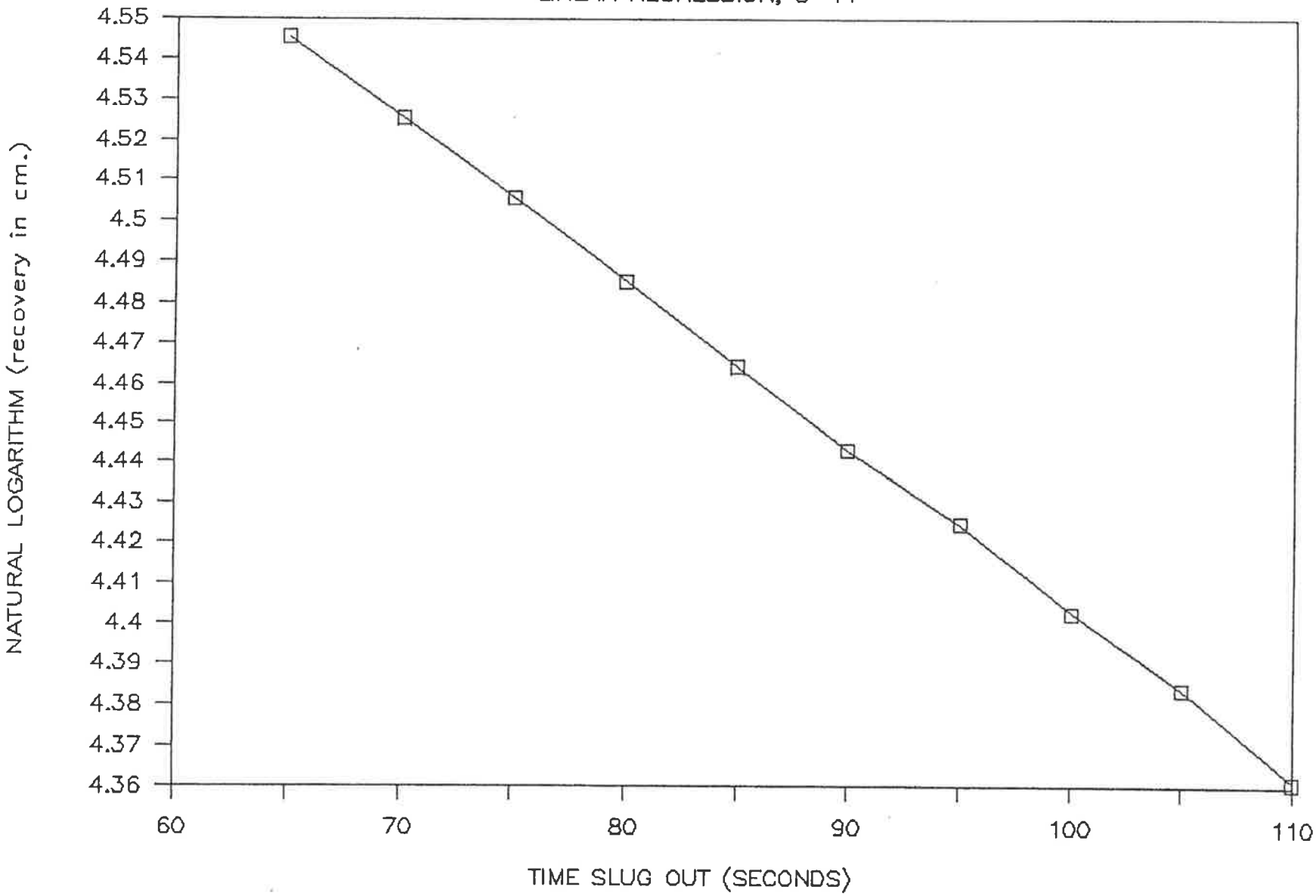
SLUG TEST GRAPH, C-11



III-44-25

URBAN WASTE TECHNOLOGIES

LINEAR REGRESSION, C-11



III-44-26

APPENDIX D

Groundwater Elevation Data

HISTORIC GROUNDWATER ELEVATIONS (Ft, MSL)

Piezometer or Well No.	Screen Zone Stratum	September 1990	October 1990	December 1990	January 1991	February 1991	March 1991	April 1991	May 1991	June 1991	July 1991	August 1991
C-6	III	NR	15.27	15.59	18.18	18.55	19.48	17.52	18.85	18.72	18.38	18.82
SMW-2	II	18.24	NR	17.84	18.71	18.87	18.46	19.25	19.46	19.34	18.83	19.51
SMW-5	II	0.63	NR	-1.79	1.58	1.88	1.58	0.84	0.86	0.07	-0.60	0.39
SMW-9	II	10.86	NR	10.18	10.84	11.28	10.90	12.37	12.69	11.82	11.39	10.98
DMW-6	III	2.18	NR	2.26	4.21	4.27	4.19	5.99	4.41	2.65	2.08	3.39
C-7	III	NR	0.81	3.82	5.95	5.74	5.09	5.23	5.47	4.94	4.61	4.49
C-8	III	NR	-0.25	3.26	7.31	5.80	5.56	5.52	4.31	4.50	4.25	4.76
C-9	III	NR	NR	NR	10.23	10.10	9.48	9.78	10.39	11.0	11.03	10.58
C-1	IV	NR	19.42	Overflow	21.97	Overflow	Overflow	19.77	22.57	22.50	21.88	22.26
C-2	III	NR	16.37	Overflow	20.2	21.13	20.51	19.85	21.13	20.99	20.80	21.01
C-3	IV	NR	19.07	19.23	21.45	16.91	18.28	14.61	20.5	19.21	18.88	20.05
C-4	III	NR	14.86	15.37	17.44	17.96	17.45	16.94	17.91	17.64	17.38	16.80
C-5	IV	NR	18.5	Overflow	NR	20.85	21.31	16.69	19.92	19.92	19.69	19.69
DMW-1	IV	20.56	NR	18.74	20.02	20.62	20.14	20.63	21.91	21.81	21.19	21.94
DMW-3(R)	IV						14.80	13.49	20.06	20.26	19.89	20.84
DMW-4	IV	19.43	NR	19.10	21.29	21.97	21.51	18.80	21.93	20.79	20.44	21.17
DMW-8	IV	20.45	NR	19.22	21.70	22.46	22.19	21.50	23.70	23.51	23.01	23.34

NR - Not recorded
DNR- Damaged, no recording

III-44-28

Historic Groundwater Elevations (Ft, MSL)
(continued)

Piezometer or Well No.	Screen Zone Stratum	March 1992	April 1992	May 1992	June 1992	July 1992	August 1992	September 1992	October 1992	November 1992	January 1993
C-6	III	Under Water	20.48	17.53	16.37	18.19	16.50	16.28	15.54	16.41	17.89
SMW-2	II	18.04	18.04	17.80	18.12	17.99	17.70	17.57	17.48	17.49	16.88
SMW-5	II	4.41	4.41	2.01	1.83	1.65	2.73	1.36	1.02	2.29	2.03
SMW-9	II	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
DMW-6	III	6.21	6.21	5.03	4.96	5.03	4.64	4.69	3.92	5.08	5.48
C-7	III	6.32	8.20	7.28	7.56	7.77	7.56	7.37	6.96	7.75	8.11
C-8	III	NR	NR	5.72	5.60	6.69	6.99	5.82	5.27	7.10	6.46
C-9	III	12.38	12.38	5.18	12.48	12.69	11.87	12.10	11.34	12.35	13.06
C-1	IV	NR	NR	16.73	17.79	19.02	18.61	18.40	16.91	18.58	19.09
C-2	III	17.91	17.91	17.22	16.05	18.92	18.58	18.24	16.92	18.23	19.01
C-3	IV	16.96	16.96	16.61	17.85	18.79	18.42	18.02	16.79	19.10	18.80
C-4	III	16.44	16.44	15.80	16.47	16.80	16.09	15.99	15.16	15.96	16.78
C-5	IV	17.15	17.15	16.00	14.84	16.00	16.00	14.84	14.84	12.34	19.03
DMW-1	IV	19.95	19.95	19.46	20.46	21.44	21.26	20.86	19.30	20.34	21.00
DMW-3(R)	IV	17.57	17.57	17.51	18.81						
DMW-4	IV	20.38	20.38	19.74	20.78	21.16	20.56	20.07	19.15	20.08	21.18
DMW-8	IV	19.73	19.73	18.95	19.93	20.69	20.31	19.88	18.63	19.92	20.70
C-10	IV							20.33	18.45	19.40	20.59
C-11	IV							18.80	18.72	19.81	21.12

III-44-29

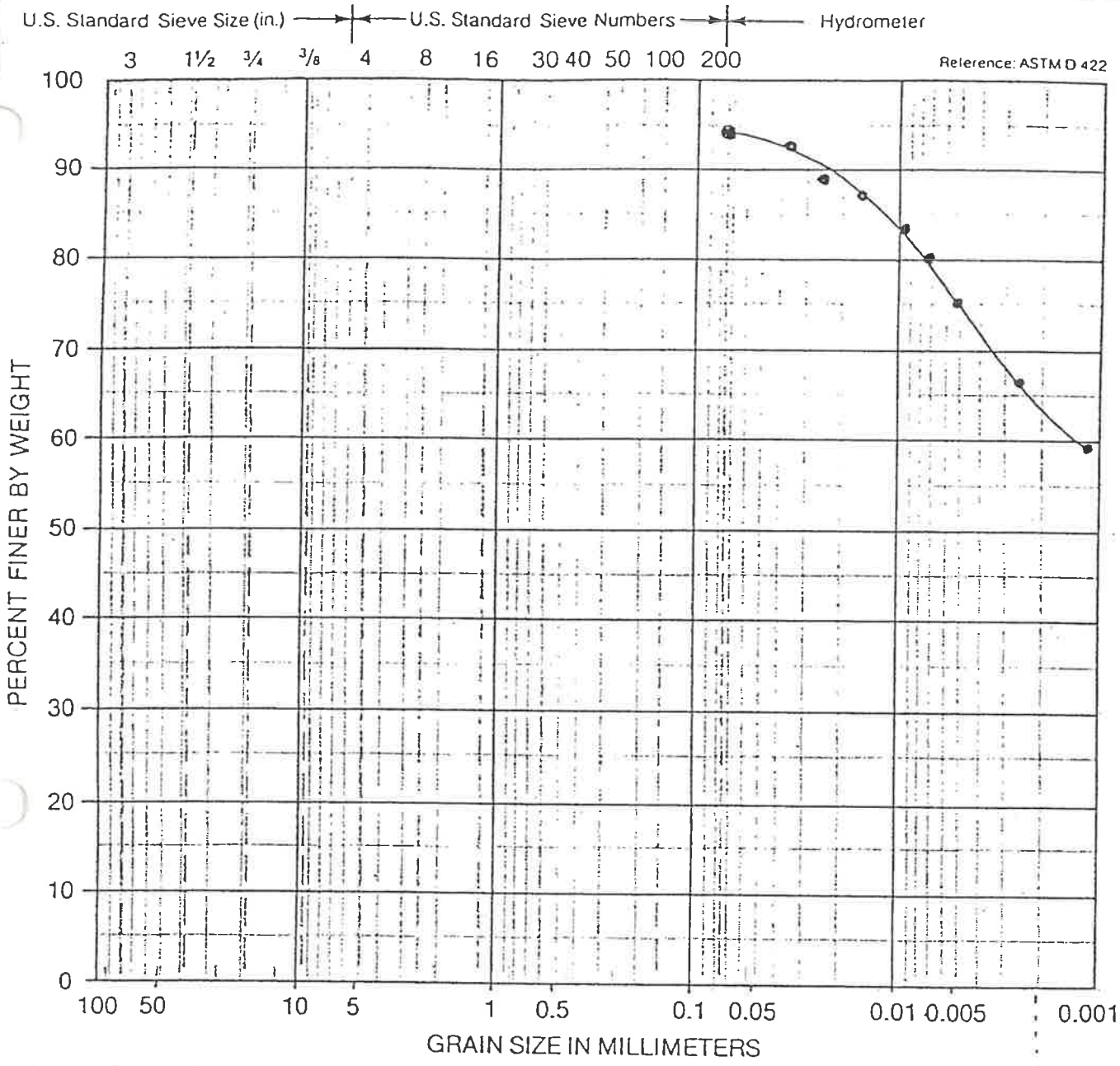
Historic Groundwater Elevations (Ft, MSL)
(continued)

Piezometer or Well No.	Screen Zone Stratum	March 1992	April 1992	May 1992	June 1992	July 1992	August 1992	September 1992	October 1992	November 1992	January 1993
C-12	III							13.49	12.82	14.14	15.26
C-13	II							28.03	26.53	26.79	32.03
C-14	II							31.55	29.47	29.79	34.80
C-15	II							28.45	27.26	29.32	32.48
C-16	II							30.47	28.64	33.18	34.73
C-17	II							25.25	23.37	25.83	30.05
C-18	II							21.68	21.52	21.47	21.42
C-19	III							15.81	14.93	15.83	16.56
C-20	II							23.14	22.99	22.55	22.89
C-21	II							25.64	25.37	25.00	25.67
C-22	II							25.70	25.42	24.99	25.66
C-23	IV									19.82	20.60
DMW-3R2	IV					22.73	20.93	20.18	18.92	20.00	21.08
SMW-10	III			19.03	19.76	19.37	18.89	18.48	17.83	18.57	19.94
T-1	III				5.38	7.21	9.62	5.70	4.70	4.64	2.46
T-2	III				-2.06	-0.29	-0.61	-0.84	-1.85	-0.55	-1.05

III-44-30

APPENDIX E

Geotechnical Laboratory Data



Symbol	Sample Source	Classification
●	C-1 10'	Red. brown-gray clay CH

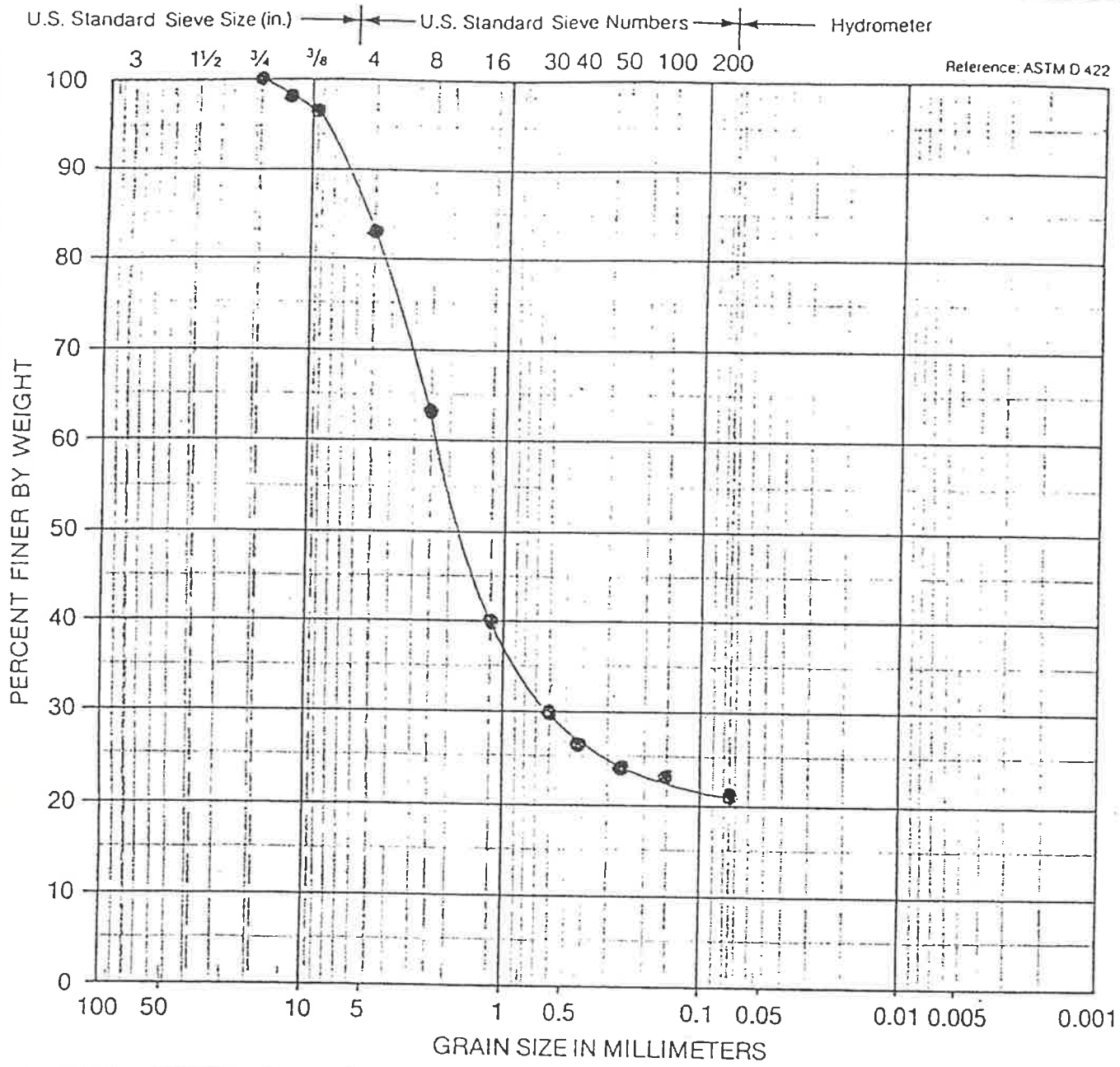
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4 H-32

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-1 (74'-76') 75'	Reddish brown-gray silty sand with gravel. (SM)

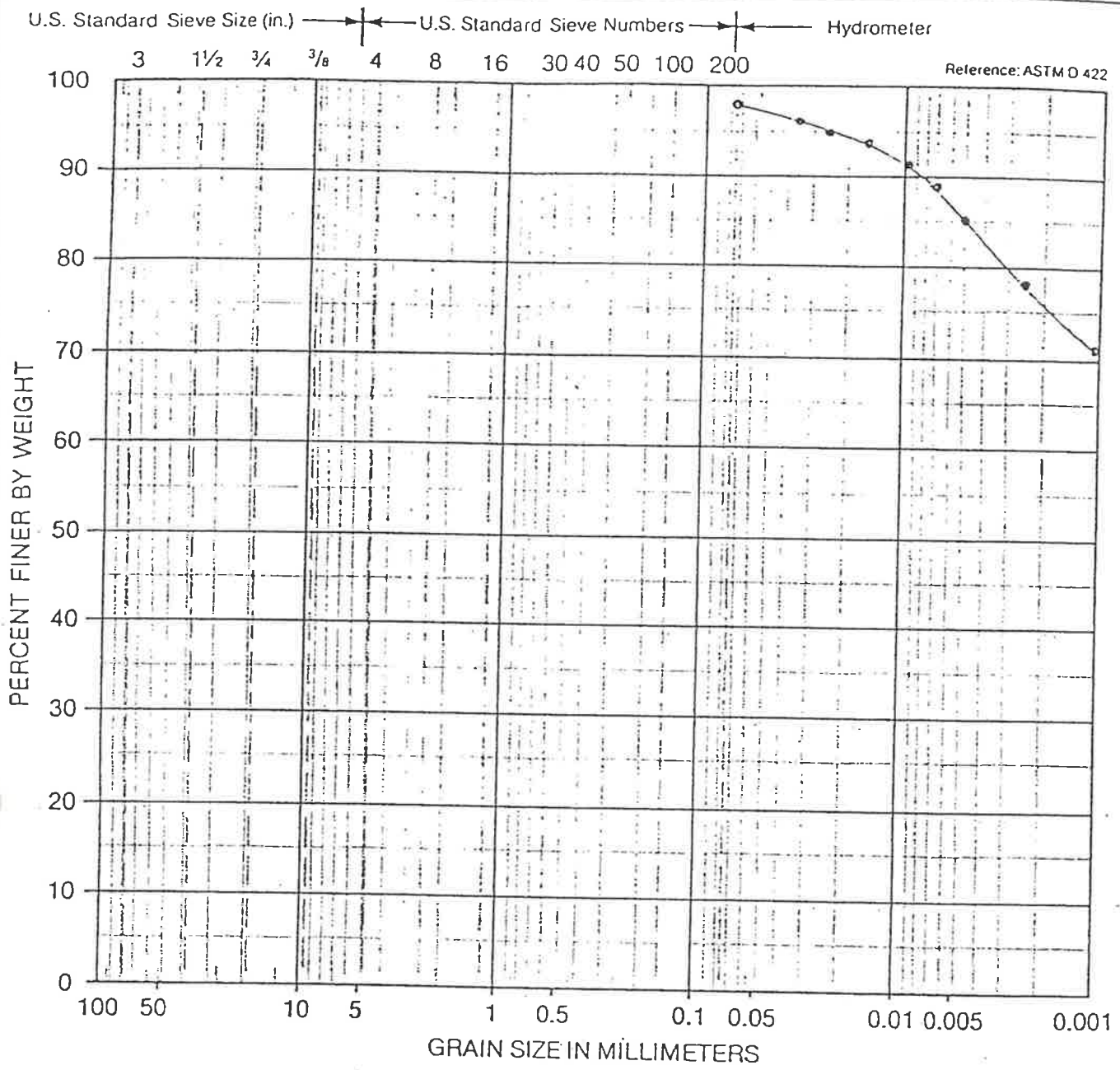
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-33

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-2 5' (3-8')	LIGHT Tan and gray Clay

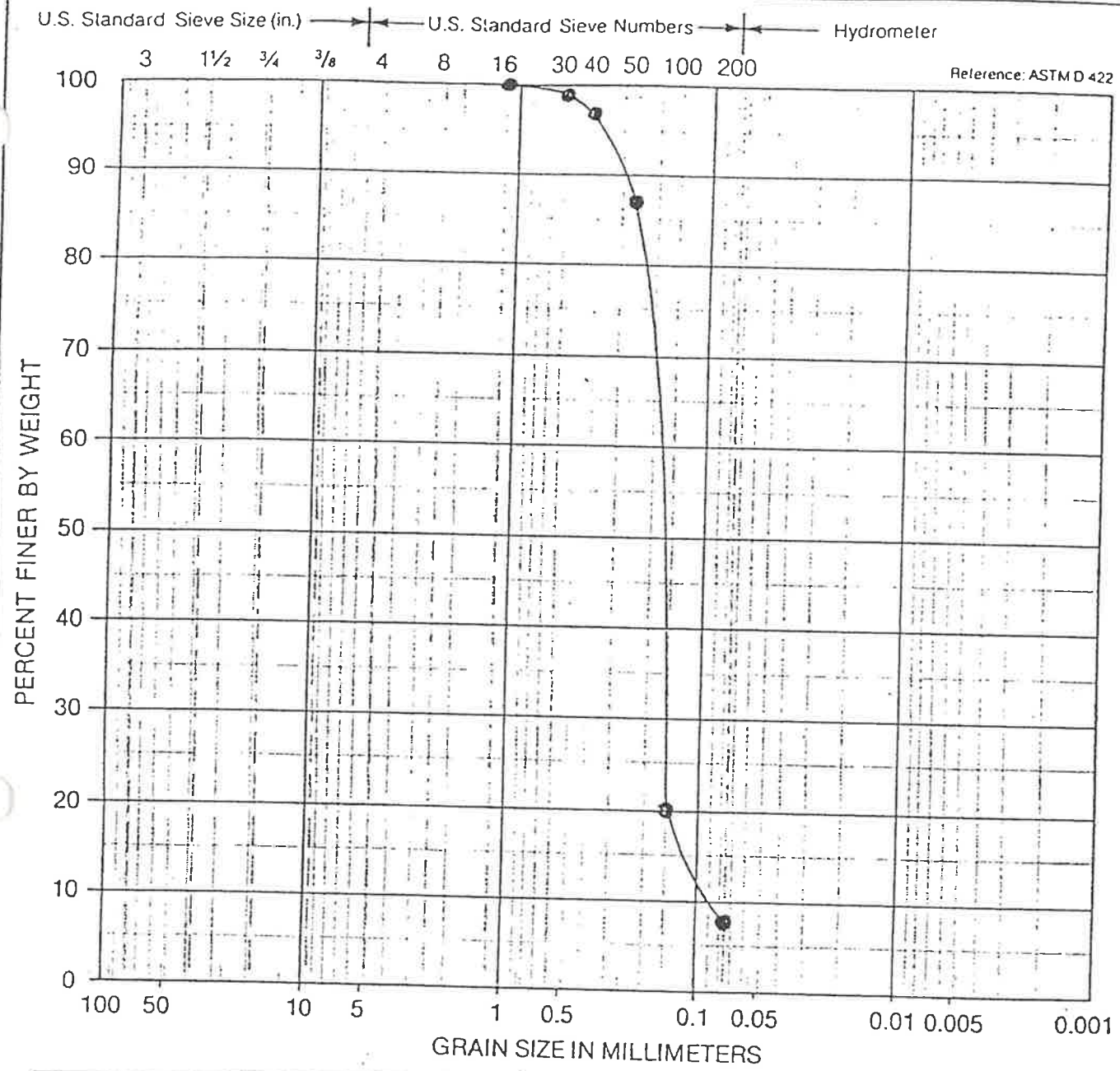
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-34

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SEN	18915,06.12	JSH	10-29-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-2 (40'-41.5') Actual → 41'	Gray Poorly graded sand (SP)

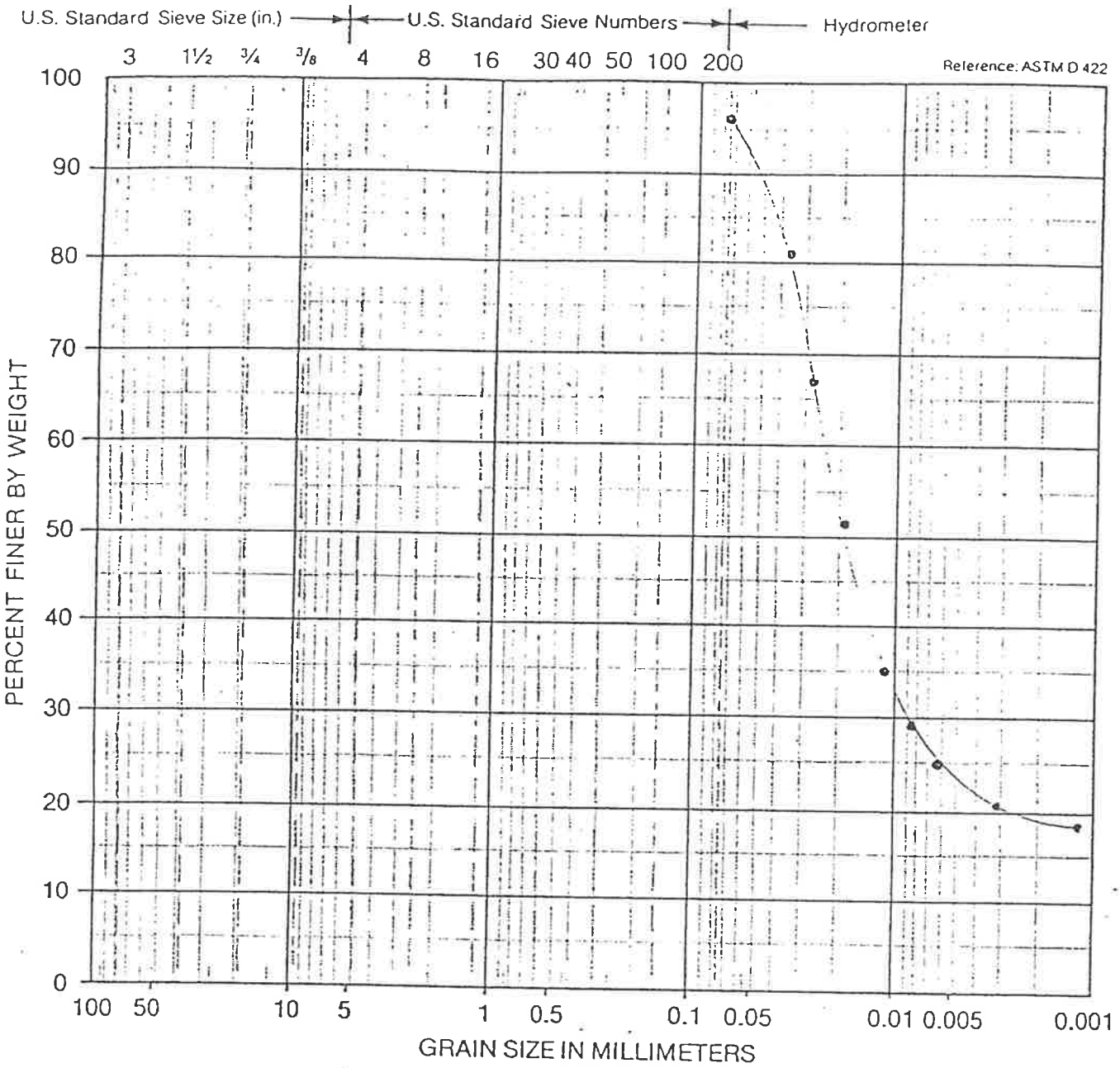
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-35

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-3 40'	Reddish brown clayey silt. ML

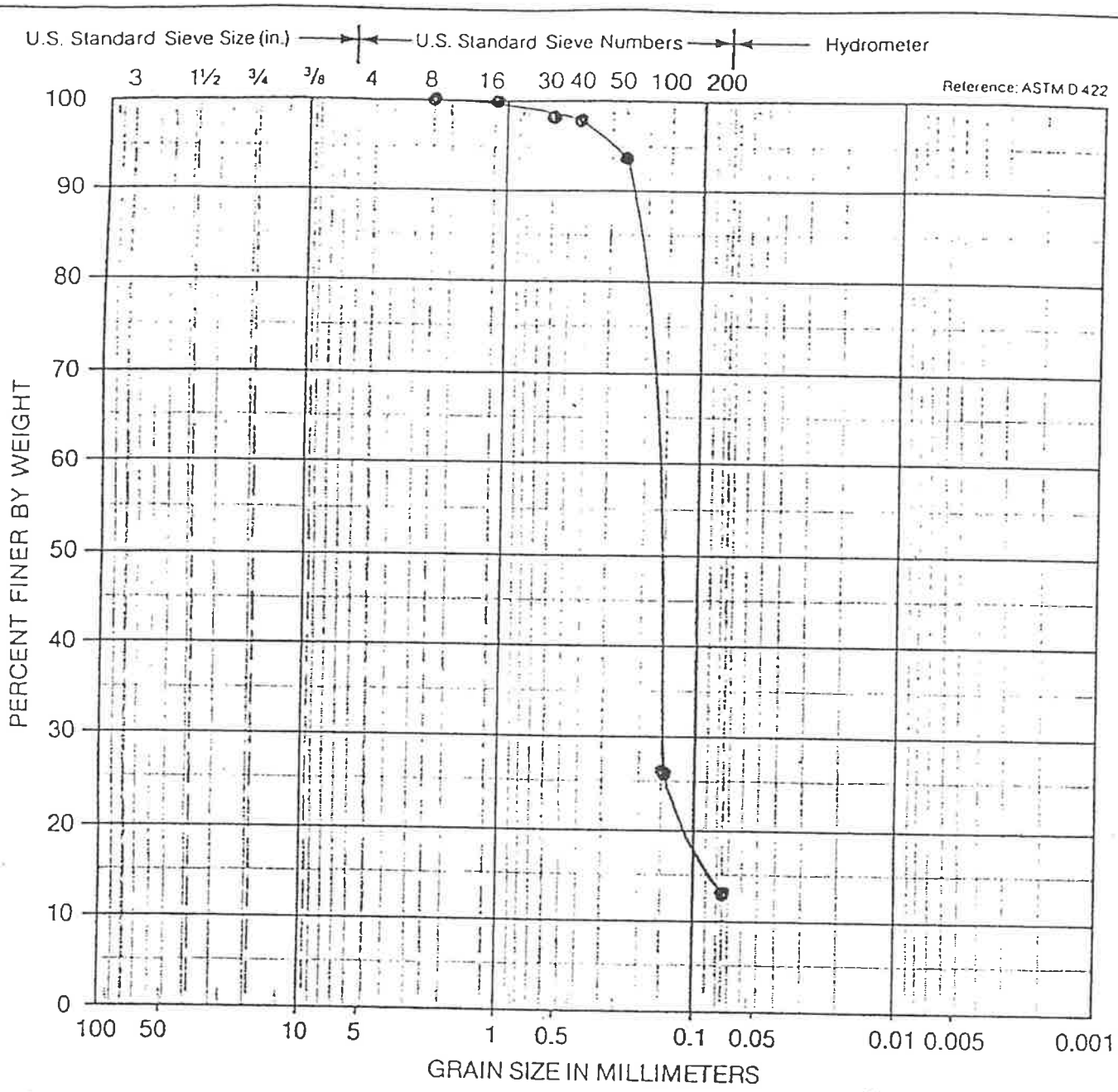
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-36

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,066.12	JSH	10-29-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-3 (75'-85') Actual 74'-79'	TAN SILTY SAND (SM)

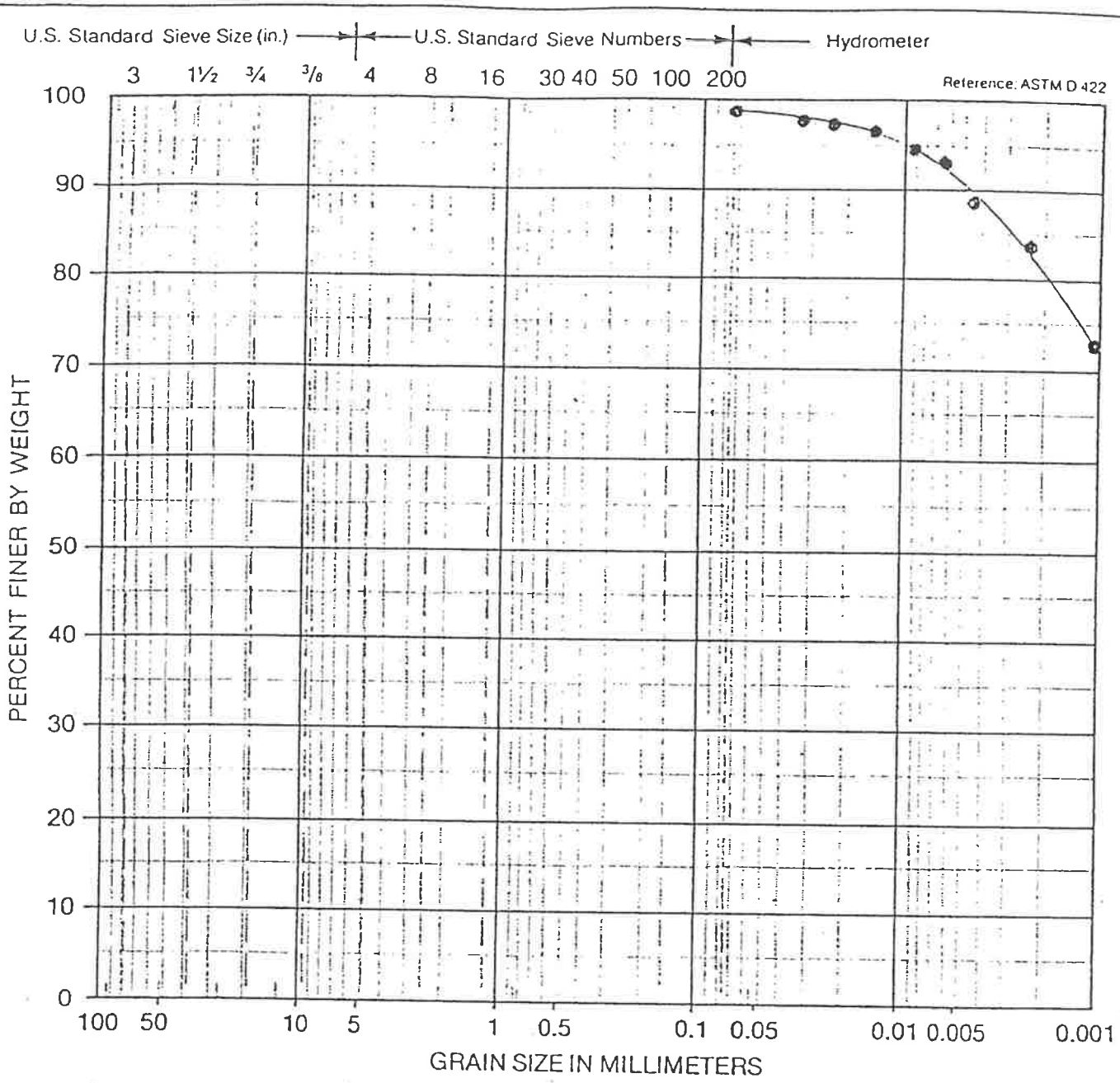
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-37

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-4 5' (2.5'-7.5')	LIGHT BROWN CLAY

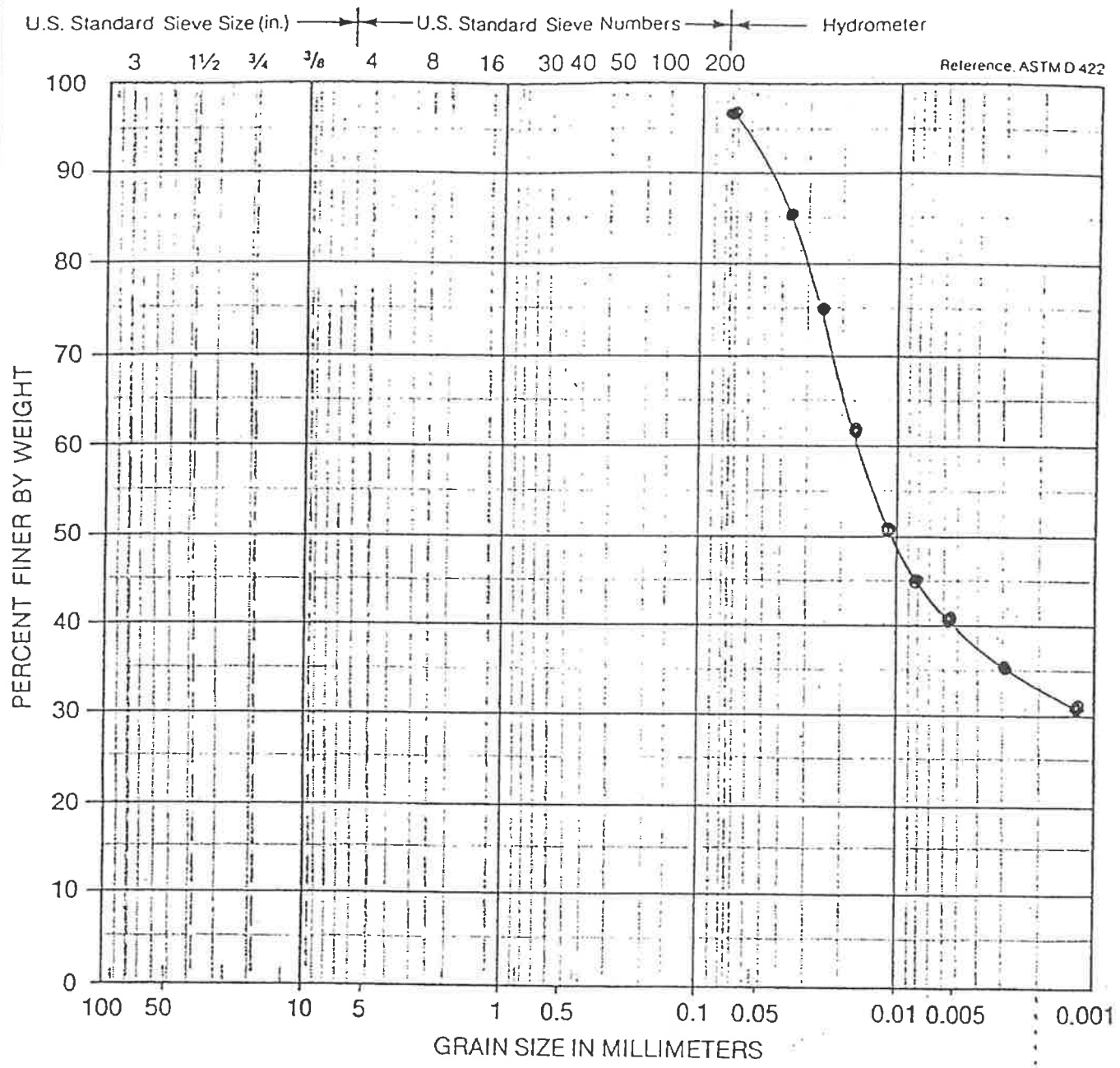
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-38

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915.006.12	JSH	10-29-90		



Symbol	Sample Source	Classification
•	C-5 5' (4'-9')	Red. brown-gray clayey silt ML

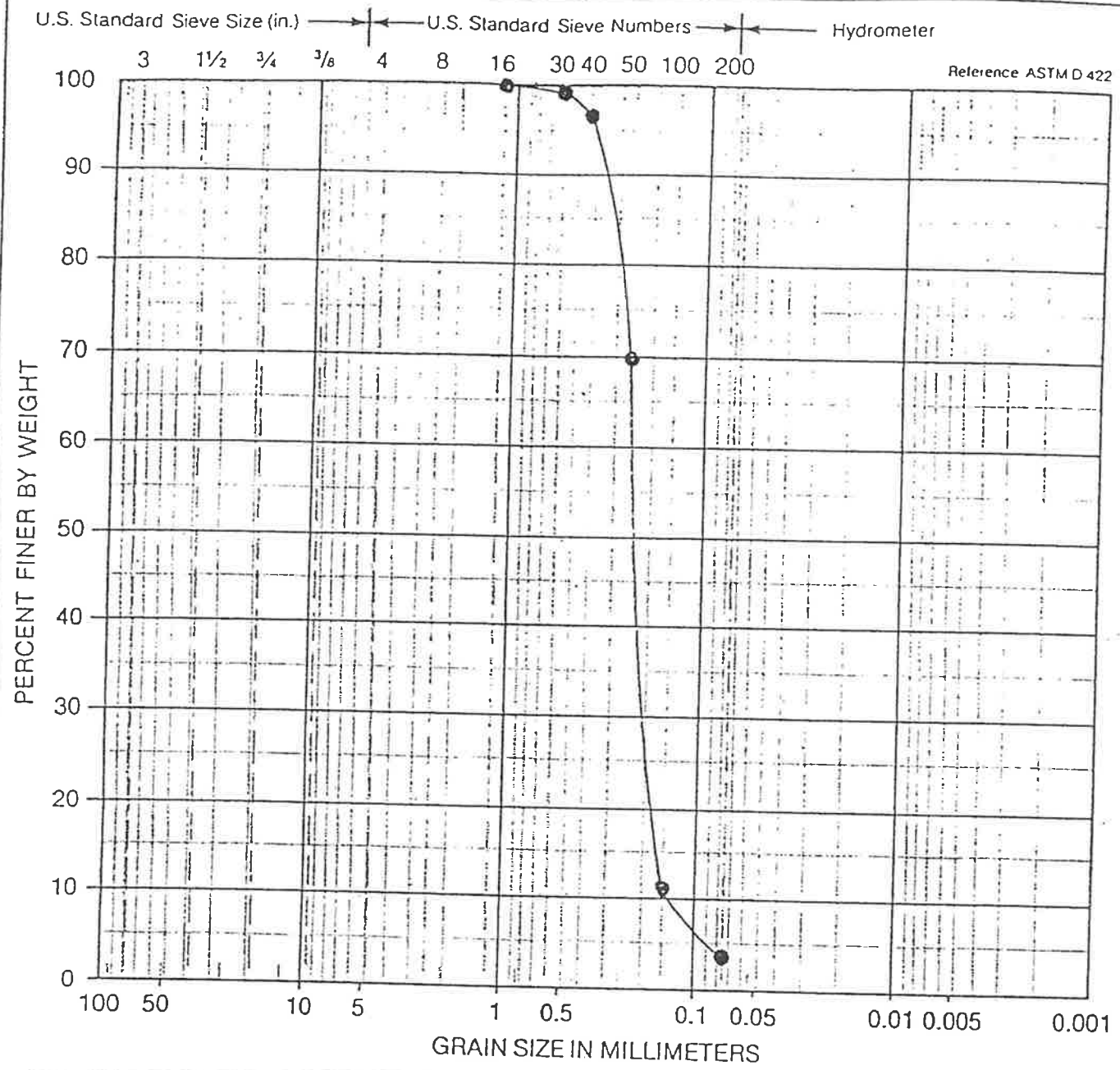
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-39

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-5 (50'-70') – upper portion of zone –	TAN-GRAY Poorly graded sand (SP)

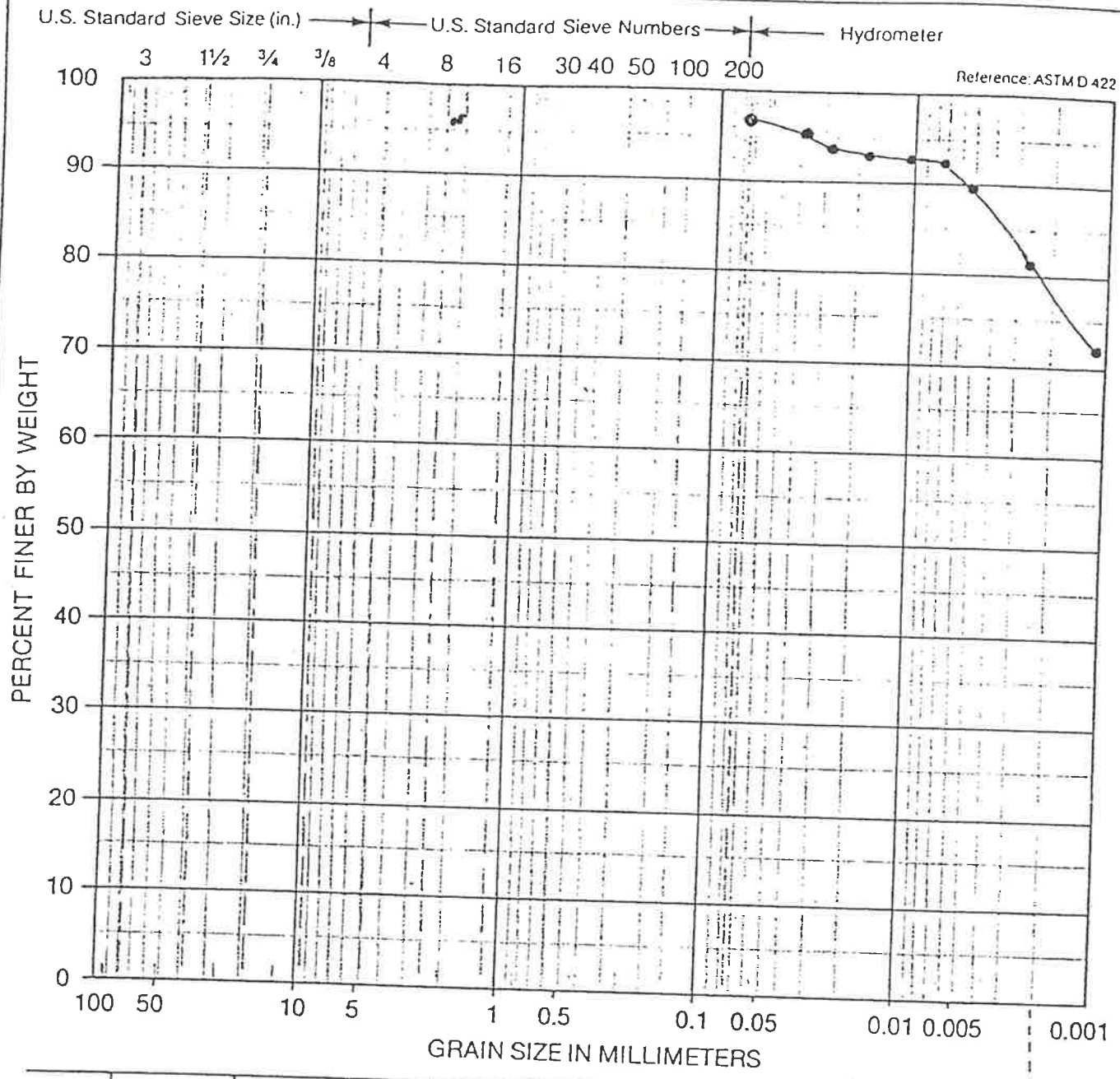
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-40

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



Symbol	Sample Source	Classification
•	C-6 25' (24'-26')	Red. brown - gray clay

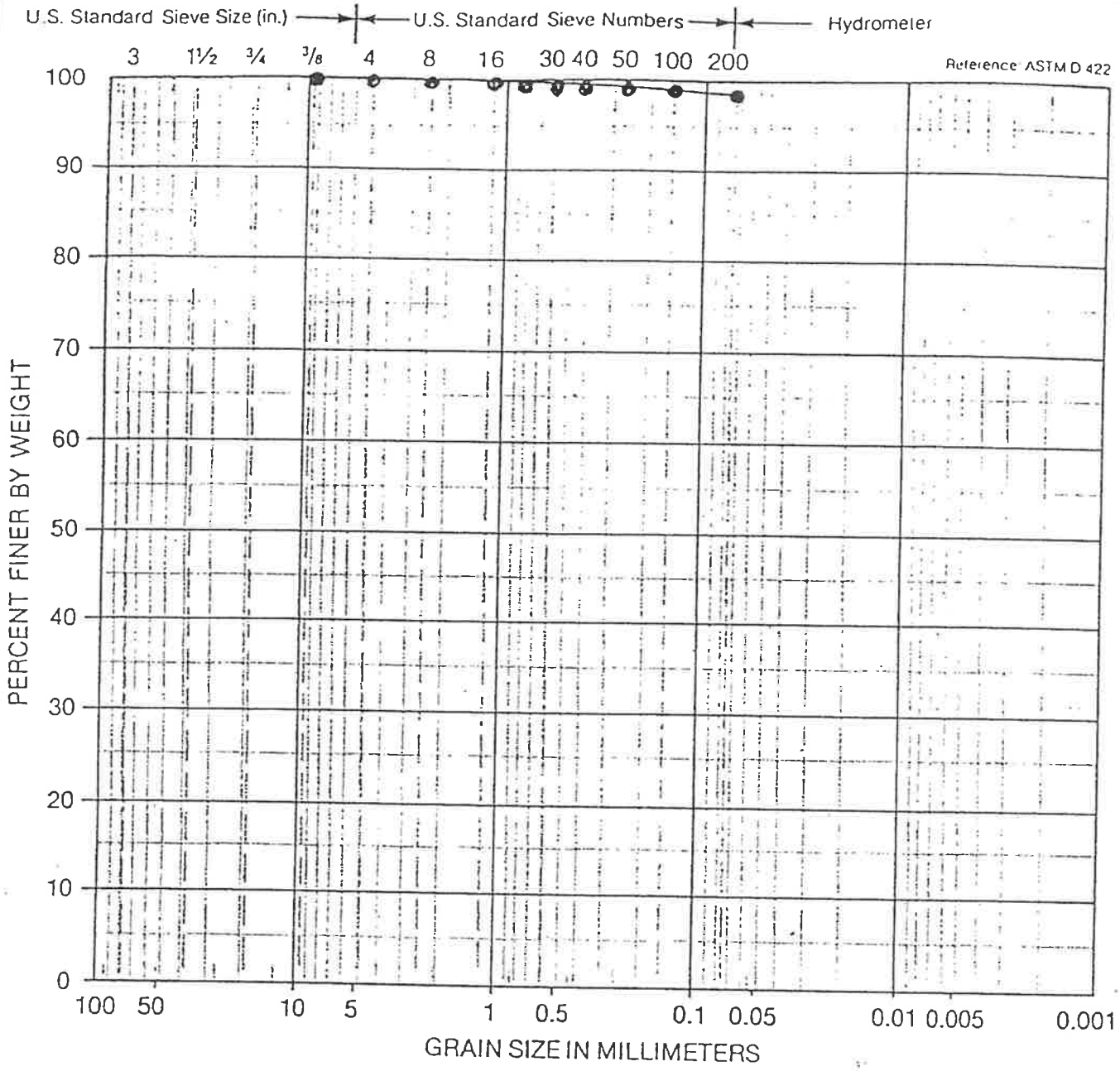
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-HH-41

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-6 39′ (39′-44′)	Brown and gray Clay (CL)

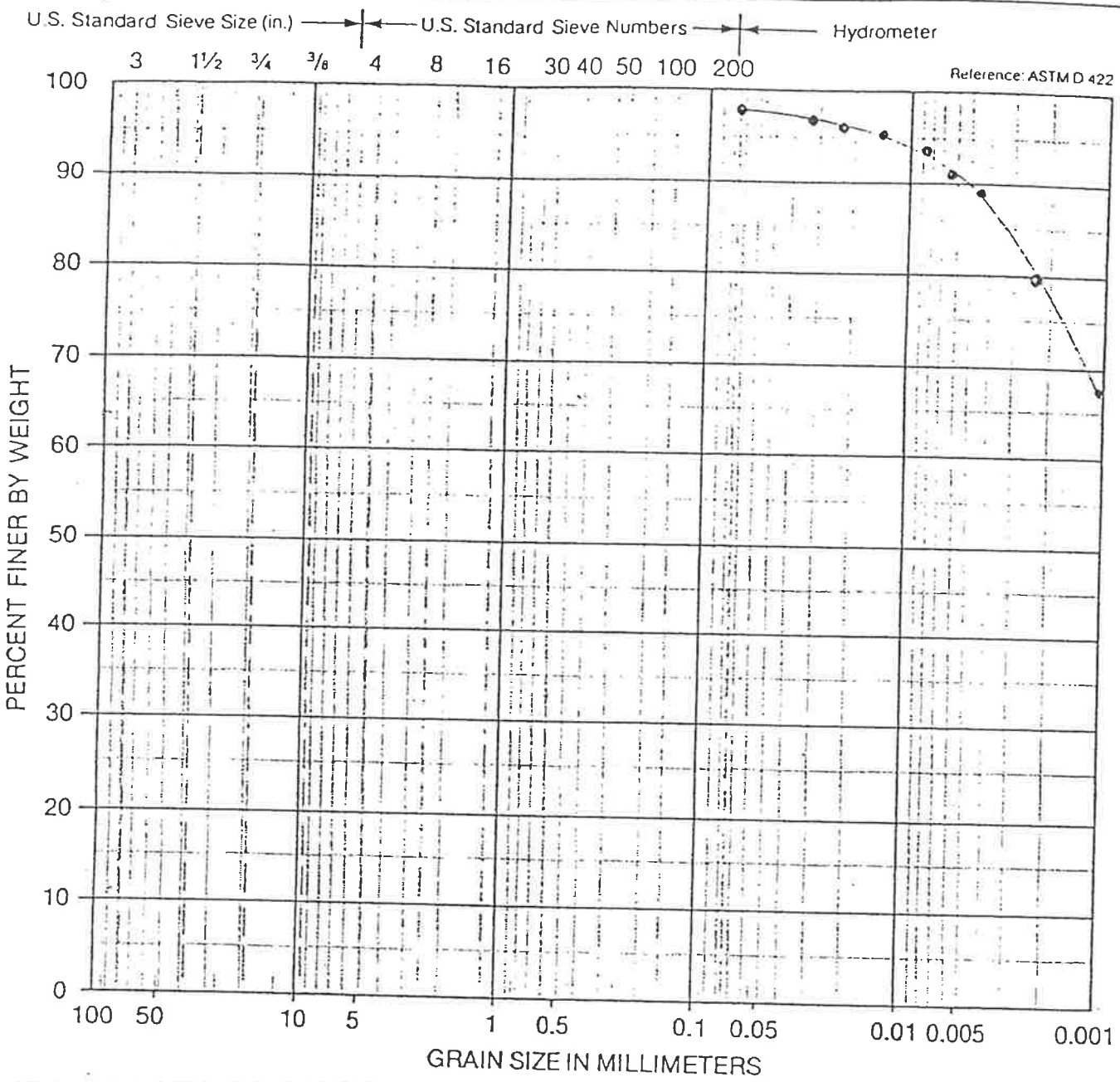
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-42

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-15-90		



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-8 15' (14'-14')	Red. brown and gray clay. CH

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-43

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12	JSH	10-29-90		

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-5 @ 45.0

Natural Moisture Content (%): 21.6

Liquid Limit : 22

Plasticity Limit : 23

Plasticity Index : NP

Liquidity Index : NP

Fines Classification: GREY SAND WITH SILT (ML)

Data Entry By: MAP

File #: 349

ATTERBERG LIMITS DETERMINATION

HARDING LAWSON ASSOCIATES

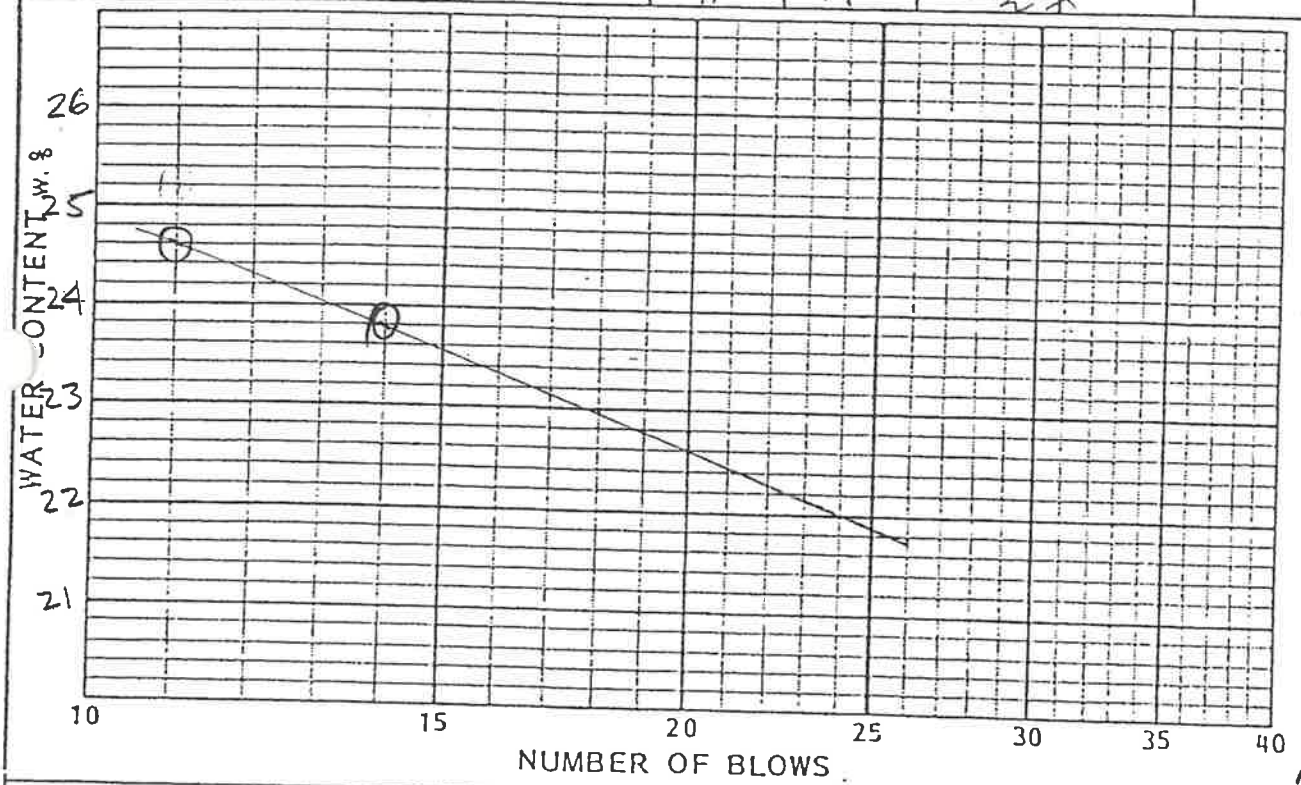
PROJECT: URBAN WASTE | DATE: 10-8-90

BORING C-5 | DEPTH 45 | JOB NO. 18615 006 12

45 (44'-49')

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			073	065	043			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		36.84	49.52				
	TARE PLUS DRY SOIL		31.07	41.62				
	WATER	W_w	5.77	7.90				
	TARE		760	838	742			
	DRY SOIL	W_s	23.47	33.24				
WATER CONTENT, %		w	24.6	23.8	Cannot Run			
NUMBER OF BLOWS			11	14				



LL	21.9
PL	23.5
PI	N/P

Non-plastic

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			064	106				M-S
WEIGHT IN GRAMS	TARE PLUS WET SOIL		25.27	27.50				199.1
	TARE PLUS DRY SOIL		22.06	23.75				173.2
	WATER	Ww	3.21	3.75				25.9
	TARE		8.11	8.09				53.5
	DRY SOIL	Ws	13.95	15.66				119.7
WATER CONTENT, %		w	23.0	23.9				21.6
PLASTIC LIMIT,				23.5				

REMARKS:

Grey SAND w/ ~~trace~~ some silt SM

III-4H-45

Tested by: MAP

Computed by: SW

Checked by: SW

ATTERBERG LIMITS DETERMINATION

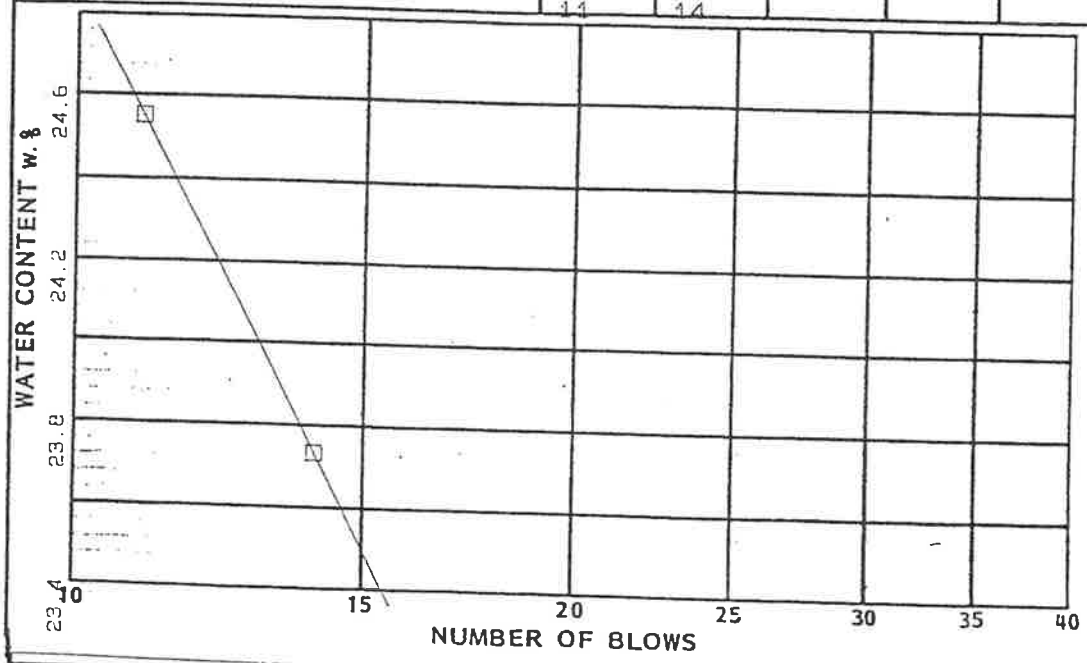
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING: C-5 | DEPTH: 45.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		073	065				
WEIGHT IN GRAMS: TARE PLUS WET SOIL		36.84	49.52				
TARE PLUS DRY SOIL		31.07	41.62				
WATER	W_w	5.77	7.90				
TARE		7.60	8.38				
DRY SOIL	W_s	23.47	33.24				
WATER CONTENT, %	w	24.58	23.77				
NUMBER OF BLOWS		14	14				



LL	22
PL	23
PI	-1

SOIL SYMBOL FROM PLASTICITY CHART (ML)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		064	106				M-5
WEIGHT IN GRAMS: TARE PLUS WET SOIL		25.27	27.50				199.1
TARE PLUS DRY SOIL		22.06	23.75				173.2
WATER	Ww	3.21	3.75				25.9
TARE		8.11	8.09				53.5
DRY SOIL	Ws	13.95	15.66				119.7
WATER CONTENT, %	w						21.6
PLASTIC LIMIT,		23	24				

REMARKS:

GREY SAND WITH SILT

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | APPROVED

III-4H-46

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-1 @ 54.0

Natural Moisture Content (%): 28.3

Liquid Limit : 33

Plasticity Limit : 21

Plasticity Index : 12

Liquidity Index : 61

Fines Classification: GRAY SANDY CLAY (CL)

Data Entry By: MAP

File #: 351

ATTERBERG LIMITS DETERMINATION

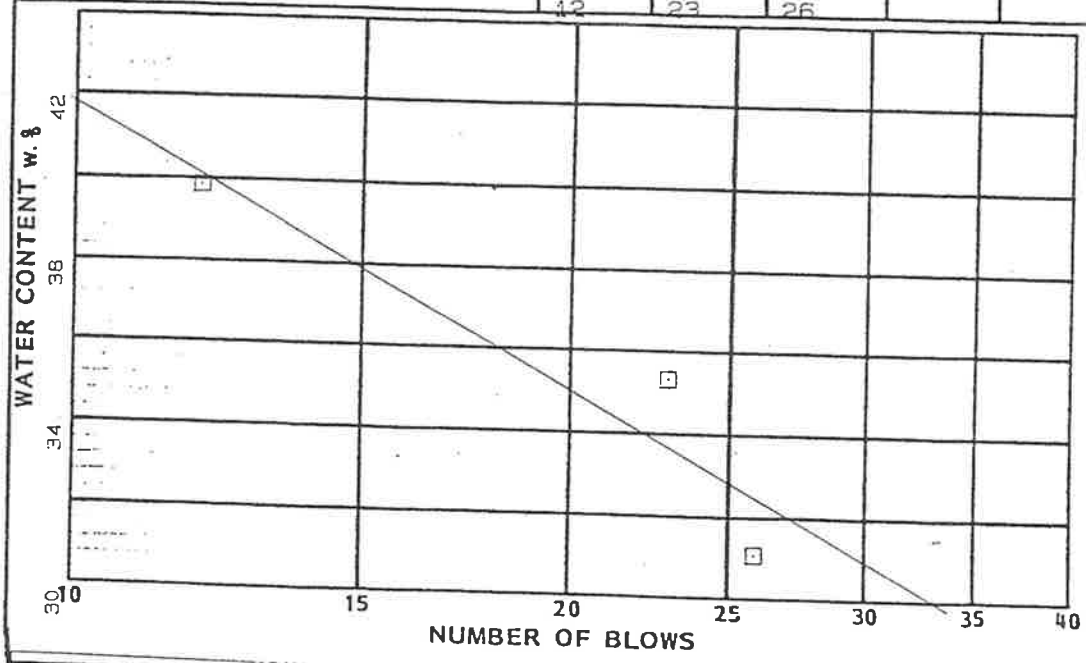
HARDING LAWSON ASSOCIATES

PROJECT URBAN WASTE | DATE 11-17-93

BORING C-1 | DEPTH 54.0 | JOB NO. 18915.006.12

LIQUID LIMIT

		1	2	3	4	5	6
RUN NO.							
TARE NO.		039	078	074			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		26.75	26.43	27.44			
TARE PLUS DRY SOIL		21.45	21.64	22.83			
WATER	W_w	5.30	4.79	4.61			
TARE		8.26	8.17	8.11			
DRY SOIL	W_s	13.19	13.47	14.72			
WATER CONTENT, %	w	40.18	35.56	31.32			
NUMBER OF BLOWS		12	23	26			



LL	33
PL	21
PI	12

SOIL SYMBOL FROM PLASTICITY CHART (CL)

PLASTIC LIMIT

		1	2	3	4	5	NATURAL WATER CONTENT
RUN NO.							
TARE NO.		070	065				L-1
WEIGHT IN GRAMS: TARE PLUS WET SOIL		20.39	20.11				190.1
TARE PLUS DRY SOIL		18.28	18.08				157.3
WATER	Ww	2.11	2.03				32.8
TARE		7.94	8.38				41.4
DRY SOIL	Ws	10.34	9.70				115.9
WATER CONTENT, %	w						28.3
PLASTIC LIMIT,		20	21				

REMARKS:

GRAY SANDY CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-44-48

ATTERBERG LIMITS DETERMINATION

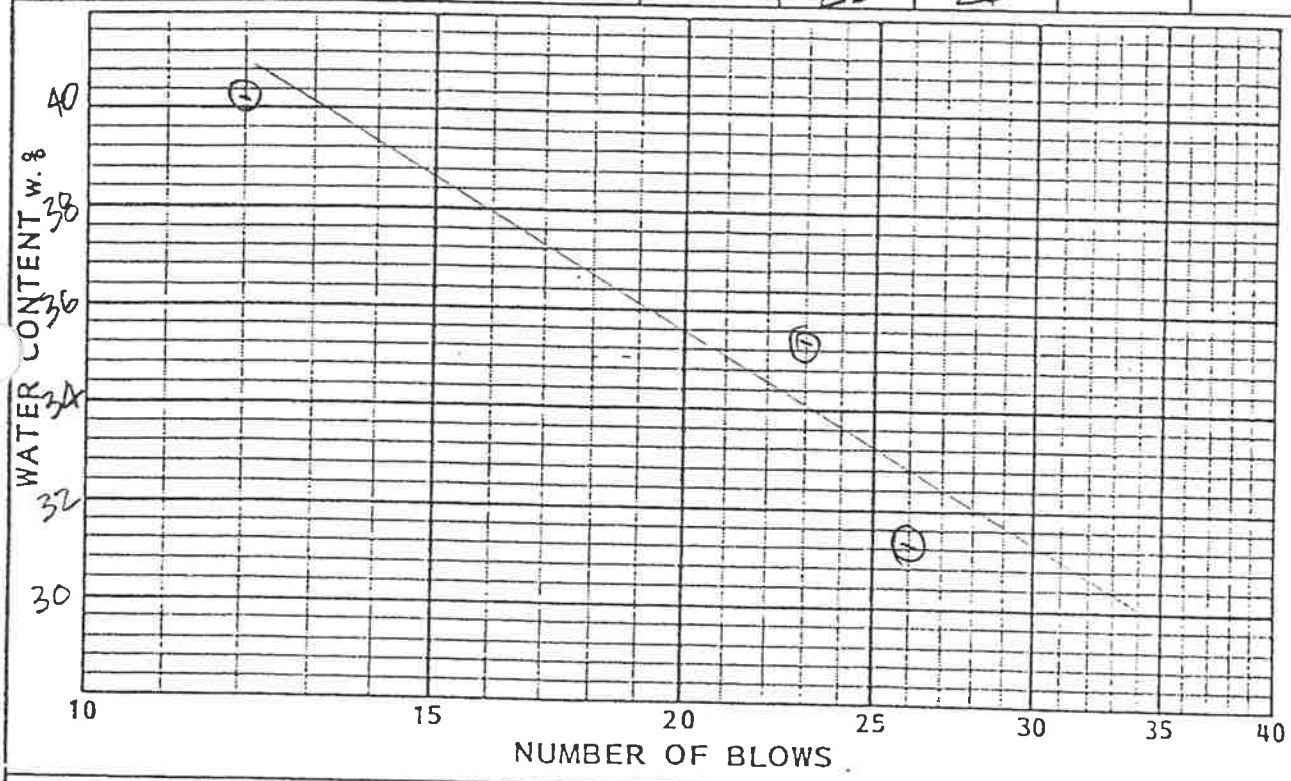
HARDING LAWSON ASSOCIATES

PROJECT: Urban Waste Technology | DATE: 9-27-90

BORING C-1 | DEPTH 49'-54' (54') | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			039	078	074			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		26.75	26.43	27.44			
	TARE PLUS DRY SOIL		21.45	21.64	22.83			
	WATER	W_w	5.30	4.79	4.61			
	TARE		8.26	8.18	8.11			
	DRY SOIL	W_s	13.19	13.53	14.72			
WATER CONTENT, %		w	40.2	35.4	31.3			
NUMBER OF BLOWS			12	23	26			



LL	33.3
PL	20.7
PI	12.6

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			070	065				L-1
WEIGHT IN GRAMS	TARE PLUS WET SOIL		20.39	20.11				190.1
	TARE PLUS DRY SOIL		18.28	18.08				157.3
	WATER	Ww	2.11	2.03				32.8
	TARE		7.94	8.38				41.4
	DRY SOIL	Ws	10.34	9.70				115.9
WATER CONTENT, %		w	20.4	20.9				28.3
PLASTIC LIMIT,				20.7				

REMARKS:
LT. GRAY SANDY CLAY (CL)

III-4H-49

Tested by: SBW / MAP
Computed by: SW
Checked by: SW

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-1 @ 10.0

Natural Moisture Content (%): 22.5

Liquid Limit : 63

Plasticity Limit : 26

Plasticity Index : 37

Liquidity Index : -9

Fines Classification: REDDISH BROWN CLAY (CH)

Data Entry By: MAP

File #: 350

ATTERBERG LIMITS DETERMINATION

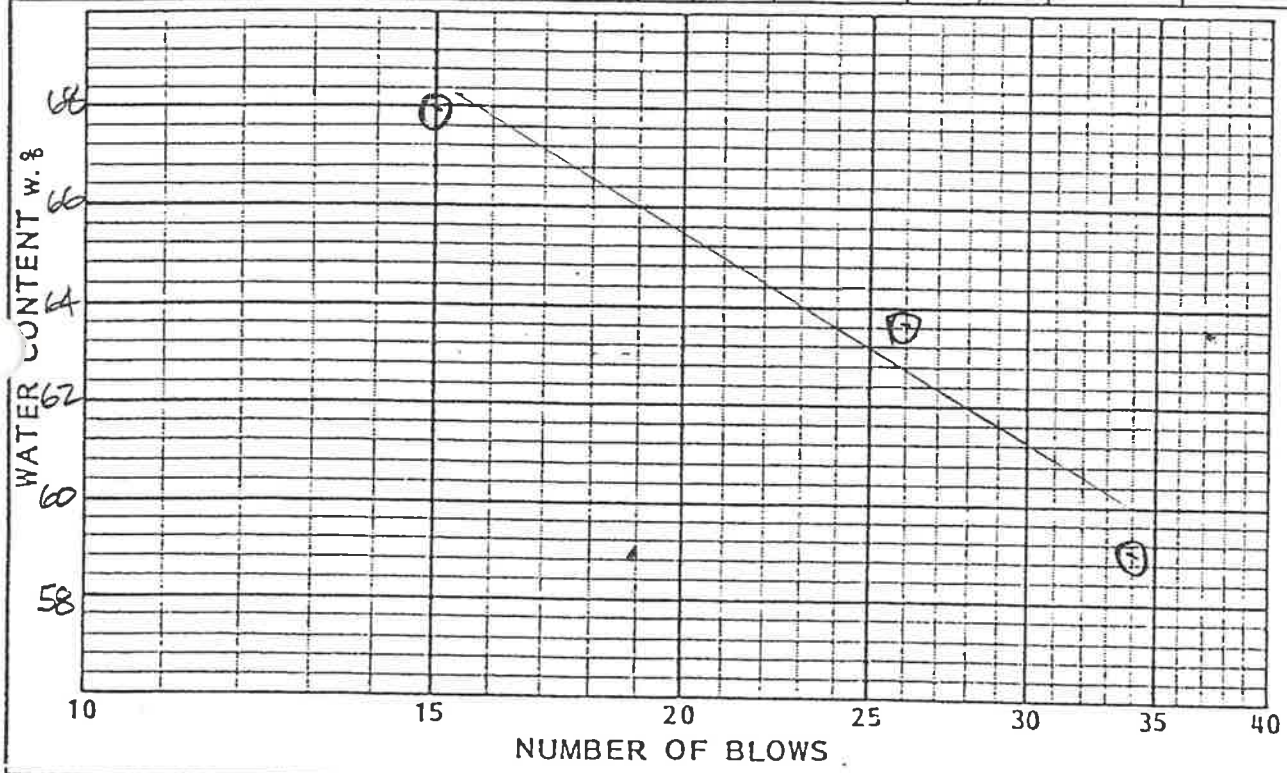
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 10-02-90

BORING C-1 | DEPTH 9.5 - 14.5 (10') | JOB NO. 18615.005.12

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			095	075	043			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		29.90	26.72	28.08			
	TARE PLUS DRY SOIL		20.81	19.31	20.41			
	WATER	W_w	9.09	7.41	7.67			
	TARE		7.43	7.67	7.43			
	DRY SOIL	W_s	13.38	11.64	12.98			
WATER CONTENT, %		w	67.9	63.7	59.1			
NUMBER OF BLOWS			15	26	34			



LL	63.2
PL	26.3
PI	36.9

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			079	051				C-1
WEIGHT IN GRAMS	TARE PLUS WET SOIL		19.27	21.28				187.0
	TARE PLUS DRY SOIL		16.86	18.46				162.3
	WATER	Ww	2.39	2.82				24.7
	TARE		7.92	7.53				52.6
	DRY SOIL	Ws	8.96	10.93				109.7
WATER CONTENT, %		w	26.7	25.8				22.5
PLASTIC LIMIT,				26.3				

REMARKS: Lt Reddish Brown CLAY (CH) w/ trace Silt

(CH) III-4H-51

Tested by:
Computed by: SW
Checked by: SW

ATTERBERG LIMITS DETERMINATION

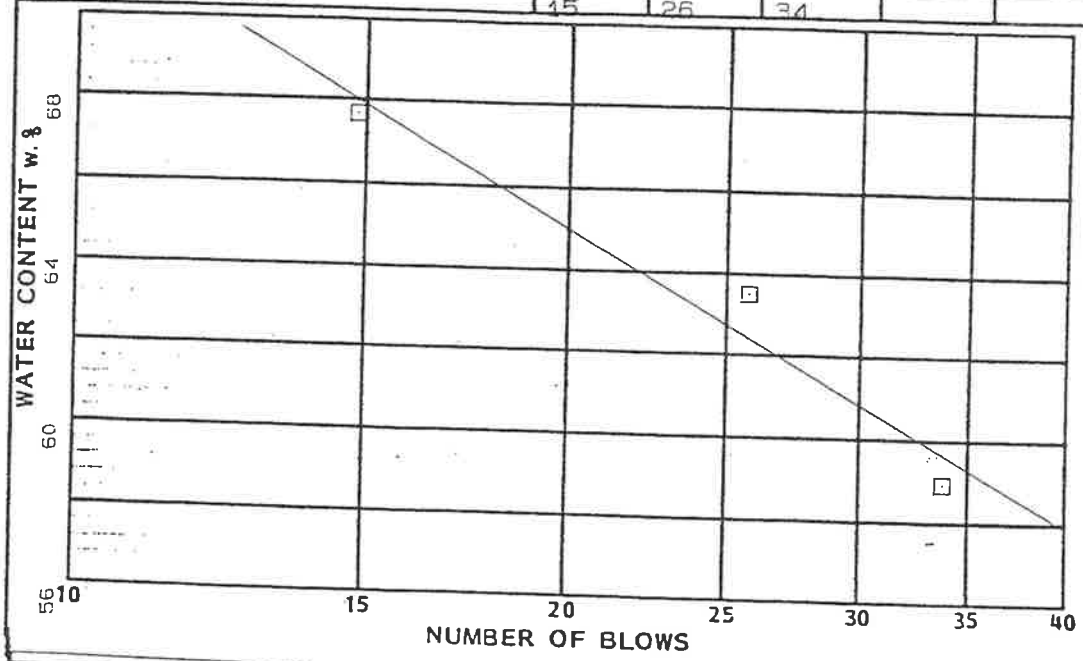
HARDING LAWSON ASSOCIATES

PROJECT URBAN WASTE | DATE 11-17-93

BORING C-1 | DEPTH 10.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		095	075	043			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		29.90	26.72	28.08			
TARE PLUS DRY SOIL		20.81	19.31	20.41			
WATER	W_w	9.09	7.41	7.67			
TARE		7.43	7.67	7.43			
DRY SOIL	W_s	13.38	11.64	12.98			
WATER CONTENT, %	w	67.94	63.66	59.09			
NUMBER OF BLOWS		15	26	34			



LL	63
PL	26
PI	37

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		079	051				Z-1
WEIGHT IN GRAMS: TARE PLUS WET SOIL		19.27	21.28				187.0
TARE PLUS DRY SOIL		16.88	18.46				162.3
WATER	Ww	2.39	2.82				24.7
TARE		7.92	7.53				52.0
DRY SOIL	Ws	8.96	10.93				109.7
WATER CONTENT, %	w						22.5
PLASTIC LIMIT,		27	26				

REMARKS:

REDDISH BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-4H-52

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-2 @ 5.0

Natural Moisture Content (%): 33.0

Liquid Limit : 88

Plasticity Limit : 28

Plasticity Index : 60

Liquidity Index : 8

Fines Classification: TAN/GRAY CLAY (CH)

Data Entry By: MAP

File #: 352

ATTERBERG LIMITS DETERMINATION

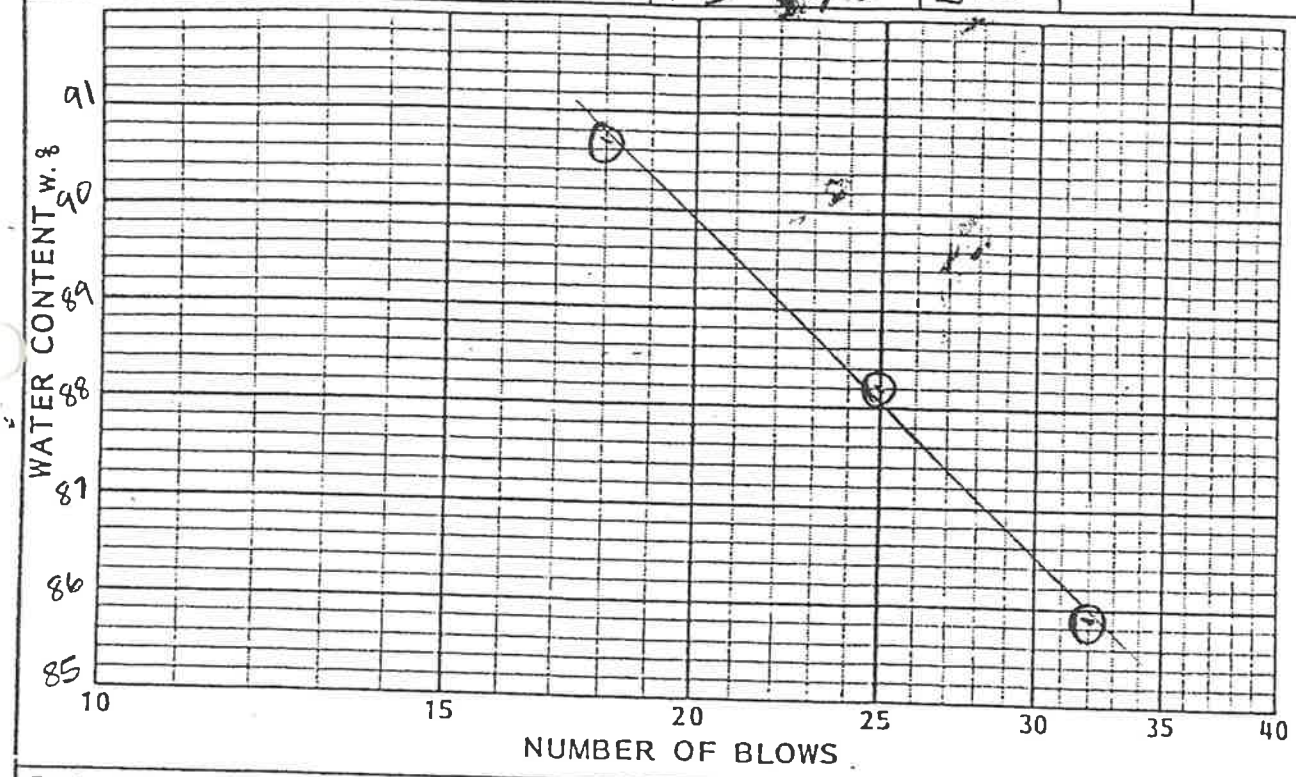
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 10-8-90

BORING C-2 | DEPTH 5' (3'-8') | JOB NO. 186150061 2

LIQUID LIMIT

		1	2	3	4	5	6
RUN NO.							
TARE NO.		042	051	062			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		19.34	19.47	19.62			
TARE PLUS DRY SOIL		14 10	1378	1403			
WATER	W_w	5.24	5.69	5.59			
TARE		8.16	7.51	7.52			
DRY SOIL	W_s	5.94	6.27	6.51			
WATER CONTENT, %	w	88.2	90.7	85.9			
NUMBER OF BLOWS		25	18	32			



LL	88.1
PL	28.0
PI	60.1

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

		1	2	3	4	5	NATURAL WATER CONTENT
RUN NO.							
TARE NO.		103	101				X-3
WEIGHT IN GRAMS: TARE PLUS WET SOIL		17.30	17.21				152.5
TARE PLUS DRY SOIL		1508	1511				125.0
WATER	Ww	2.22	2.10				27.5
TARE		7.20	7.53				41.6
DRY SOIL	Ws	7.88	7.58				83.4
WATER CONTENT, %	w	28.2	27.7				33.0
PLASTIC LIMIT,			28.0				

REMARKS:

Lt. Tan to Grey CLAY (CH)

CH

III-4H-54

Tested by: ~~MAP~~ MRW

Computed by: SW

Checked by: SW

ATTERBERG LIMITS DETERMINATION

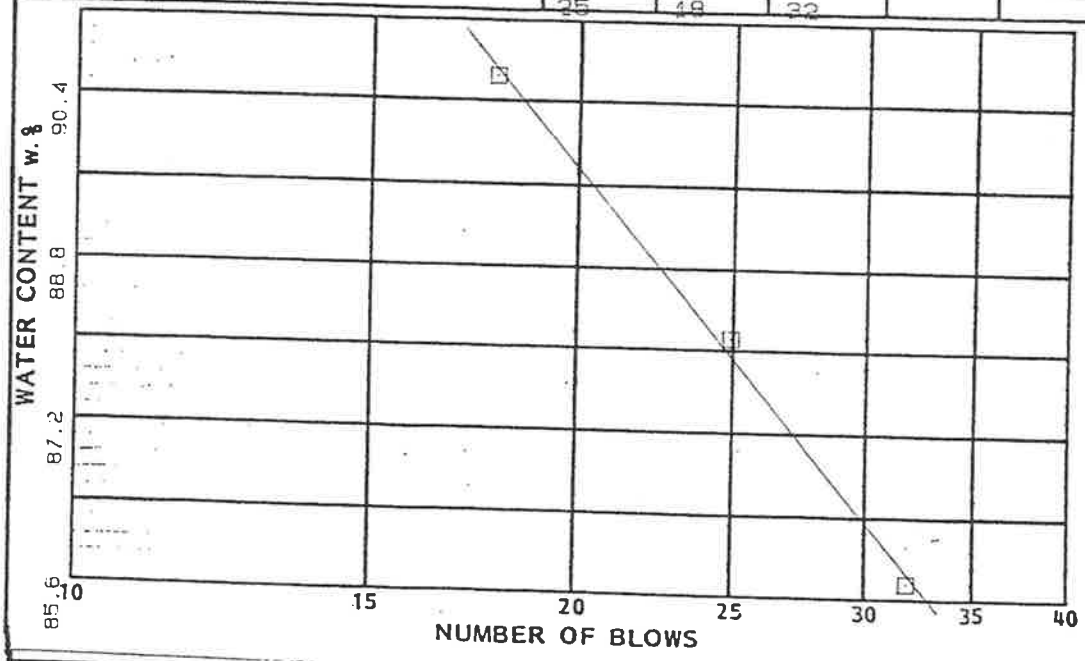
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING B-2 | DEPTH 5.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		042	051	062			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		19.34	19.47	19.62			
TARE PLUS DRY SOIL		14.10	13.78	14.03			
WATER	W_w	5.24	5.69	5.59			
TARE		8.16	7.51	7.52			
DRY SOIL	W_s	5.94	6.27	6.51			
WATER CONTENT, %	w	88.22	90.75	85.87			
NUMBER OF BLOWS		25	18	32			



LL	88
PL	28
PI	60

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		103	101				X-3
WEIGHT IN GRAMS: TARE PLUS WET SOIL		17.30	17.21				152.5
TARE PLUS DRY SOIL		15.08	15.11				125.0
WATER	Ww	2.22	2.10				27.5
TARE		7.20	7.53				41.6
DRY SOIL	Ws	7.88	7.58				83.4
WATER CONTENT, %	w						33.0
PLASTIC LIMIT,		28	28				

REMARKS:

TAN/GRAY CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-44-55

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-2 @ 30.0

Natural Moisture Content (%): 20.5

Liquid Limit : 48

Plasticity Limit : 19

Plasticity Index : 29

Liquidity Index : 5

Fines Classification: GRAY SILTY CLAY
(CL)

Data Entry By: MAP

File #: 353

III-4H-56

ATTERBERG LIMITS DETERMINATION

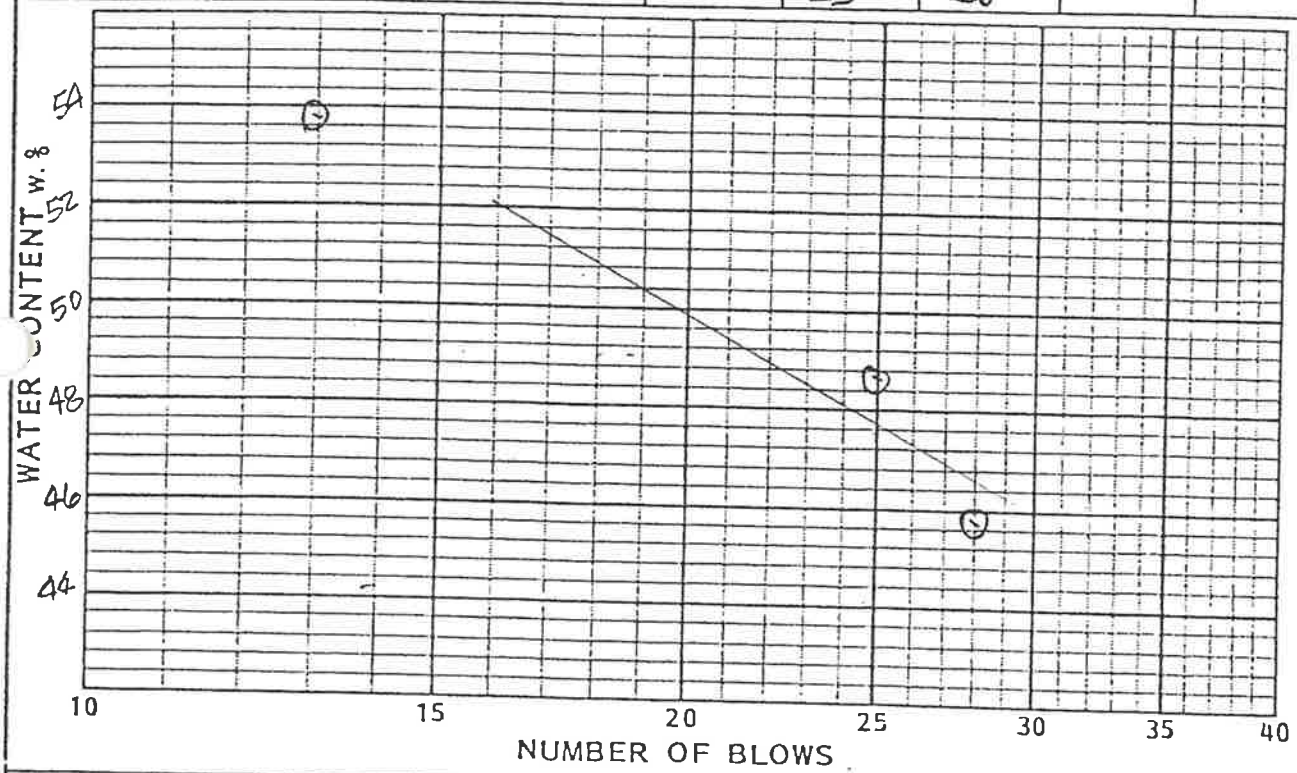
HARDING LAWSON ASSOCIATES

PROJECT: Urban Waste Technology | DATE: 9-27-90

BORING C-2 | DEPTH 28-33 (30') | JOB NO. 18915.006.12

LIQUID LIMIT

			1	2	3	4	5	6
RUN NO.								
TARE NO.			076	060	Back 815			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		24.46	26.04	21.82			
	TARE PLUS DRY SOIL		18.70	20.00	17.51			
	WATER	W_w	5.76	6.04	4.31			
	TARE		7.99	7.61	8.09			
	DRY SOIL	W_s	10.71	12.39	9.42			
WATER CONTENT, %		w	53.8	48.7	45.8			
NUMBER OF BLOWS			13	25	28			



LL	47.7
PL	19.5
PI	28.2

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

			1	2	3	4	5	NATURAL WATER CONTENT
RUN NO.								
TARE NO.			039	065				M-21
WEIGHT IN GRAMS	TARE PLUS WET SOIL		19.54	20.92				169.1
	TARE PLUS DRY SOIL		17.71	18.87				147.4
	WATER	Ww	1.83	2.05				21.7
	TARE		8.23	8.39				41.3
	DRY SOIL	Ws	9.48	10.48				106.1
WATER CONTENT, %		w	19.3	19.6				20.5
PLASTIC LIMIT,				19.5				

REMARKS: GRAY SILTY CLAY (CL)

III-4H-57

Tested by: SBW/MAP

Computed by: SW

Checked by: SW

ATTERBERG LIMITS DETERMINATION

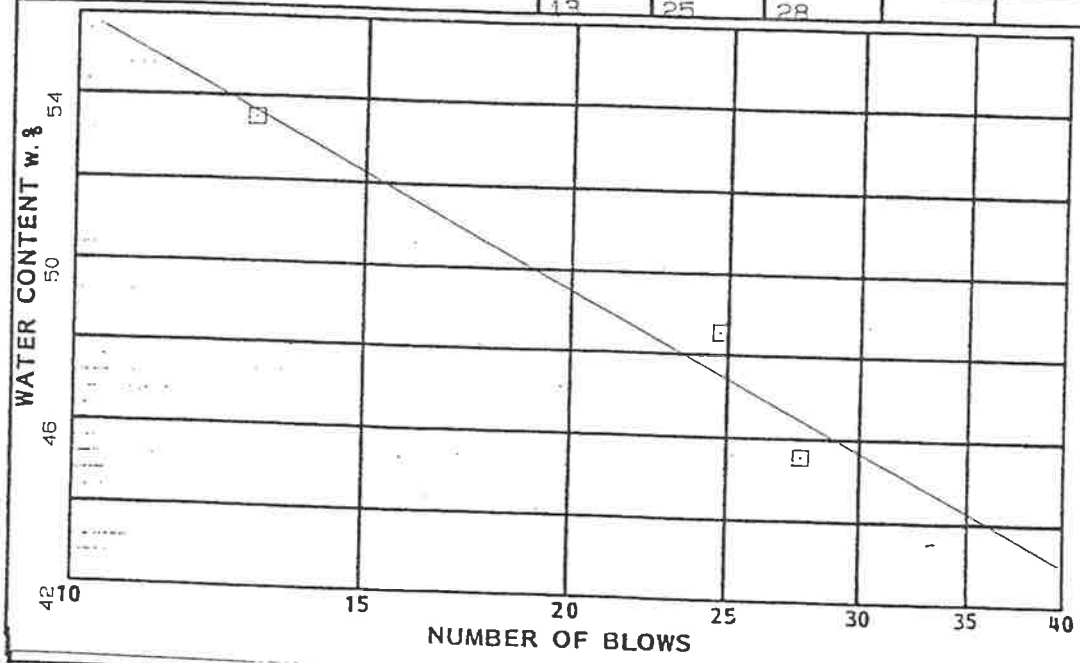
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING: C-2 | DEPTH: 30.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		076	060	815			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		24.46	26.04	21.82			
TARE PLUS DRY SOIL		18.70	20.00	17.51			
WATER	W_w	5.76	6.04	4.31			
TARE		7.99	7.61	8.09			
DRY SOIL	W_s	10.71	12.39	9.42			
WATER CONTENT, %	w	53.78	48.75	45.75			
NUMBER OF BLOWS		13	25	28			



LL	48
PL	19
PI	29

SOIL SYMBOL FROM PLASTICITY CHART (CL)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		039	065				M-21
WEIGHT IN GRAMS: TARE PLUS WET SOIL		19.54	20.92				169.1
TARE PLUS DRY SOIL		17.71	18.87				147.4
WATER	Ww	1.83	2.05				21.7
TARE		8.23	8.39				41.3
DRY SOIL	Ws	9.48	10.48				106.1
WATER CONTENT, %	w						20.5
PLASTIC LIMIT,		19	20				

REMARKS:

GRAY SILTY CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | APPROVED

III-4H-58

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-3 @ 40.0

Natural Moisture Content (%): 26.0

Liquid Limit : 30

Plasticity Limit : 19

Plasticity Index : 11

Liquidity Index : 64

Fines Classification: REDDISH BROWN SILTY CLAY (CL)

Data Entry By: MAP

File #: 354

ATTERBERG LIMITS DETERMINATION

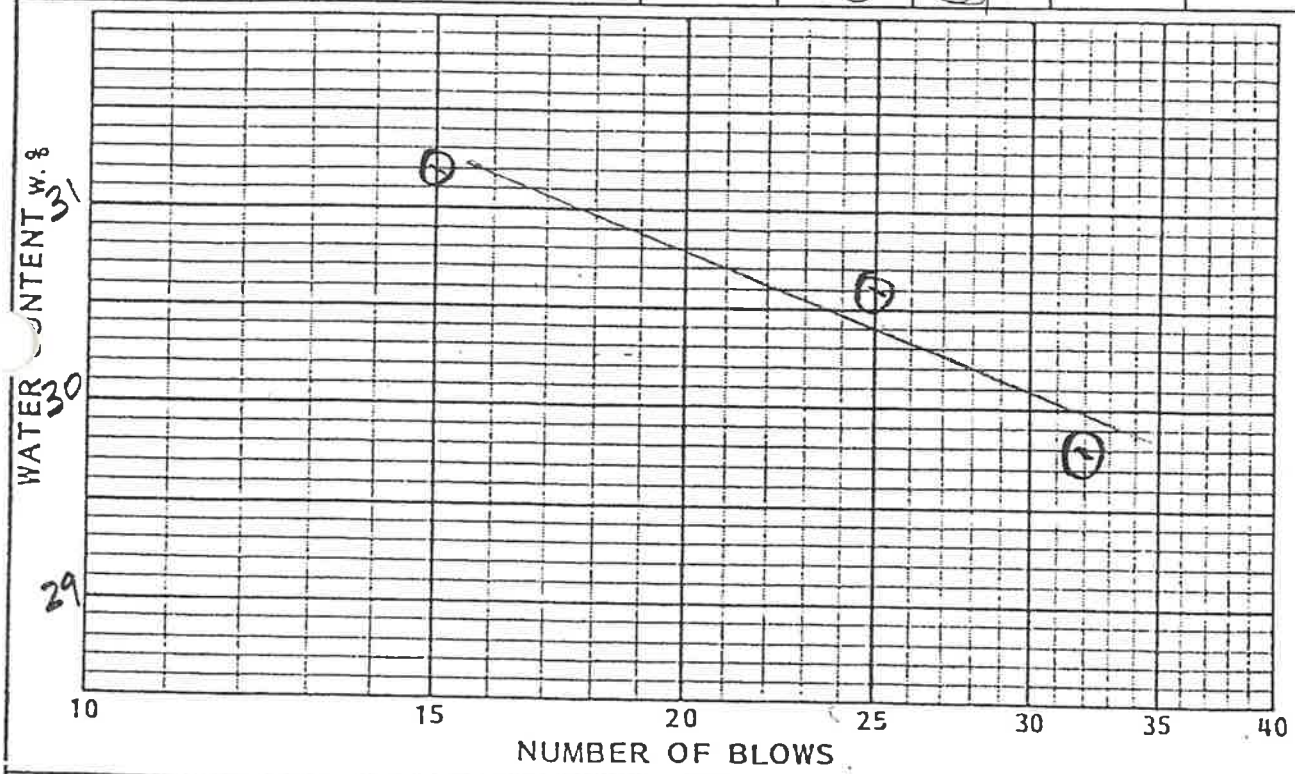
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE 915 DATE: 10-8-90

BORING C-3 DEPTH 40' (39-44) JOB NO. 186150061.2

LIQUID LIMIT

			1	2	3	4	5	6
RUN NO.								
TARE NO.			033	030	013			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		28.58	34.98	37.15			
	TARE PLUS DRY SOIL		24.58	29.48	31.27			
	WATER	W_w	4.00	5.50	5.88			
	TARE		11.77	11.49	11.52			
	DRY SOIL	W_s	12.81	17.99	19.75			
WATER CONTENT, %		w	31.2	30.6	29.8			
NUMBER OF BLOWS			15	25	~~35~~ 32			



LL	30.4
PL	18.7
PI	11.7

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

			1	2	3	4	5	NATURAL WATER CONTENT
RUN NO.								
TARE NO.			034	028				8M6
WEIGHT IN GRAMS	TARE PLUS WET SOIL		25.66	23.98				149.3
	TARE PLUS DRY SOIL		23.43	22.02				127.1
	WATER	Ww	2.23	1.96				22.2
	TARE		11.61	11.45				41.7
	DRY SOIL	Ws	11.82	10.57				85.4
WATER CONTENT, %		w	18.9	18.5				26.0
PLASTIC LIMIT,				18.7				

REMARKS:

Reddish Brown Silty Clay [redacted]

CL

III-4H-60

Tested by: MAP
Computed by: SW
Checked by: SW

ATTERBERG LIMITS DETERMINATION

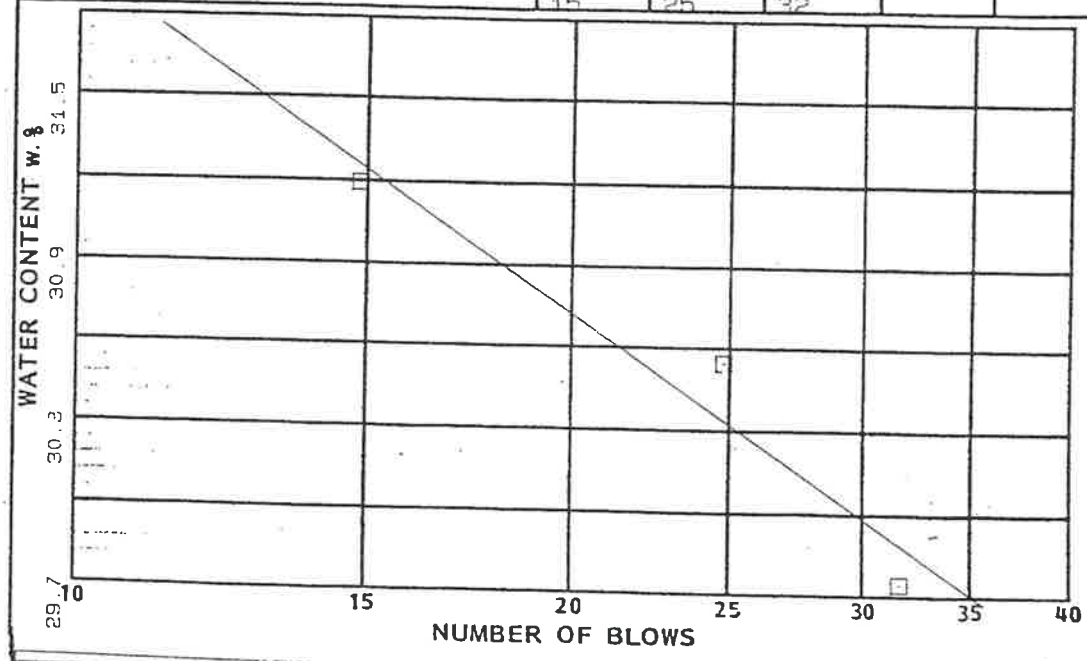
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING: C-3 | DEPTH: 40.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		033	030	013			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		28.58	34.98	37.15			
TARE PLUS DRY SOIL		24.58	29.48	31.27			
WATER	W_w	4.00	5.50	5.88			
TARE		11.77	11.49	11.52			
DRY SOIL	W_s	12.81	17.99	19.75			
WATER CONTENT, %	w	31.23	30.57	29.77			
NUMBER OF BLOWS		15	25	32			



LL	30
PL	19
PI	11

SOIL SYMBOL FROM PLASTICITY CHART (CL)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		034	028				BME
WEIGHT IN GRAMS: TARE PLUS WET SOIL		25.66	23.98				149.3
TARE PLUS DRY SOIL		23.43	22.02				127.1
WATER	Ww	2.23	1.96				22.2
TARE		11.61	11.45				41.7
DRY SOIL	Ws	11.82	10.57				85.4
WATER CONTENT, %	w						26.0
PLASTIC LIMIT,		19	19				

REMARKS:

REDDISH BROWN SILTY CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-4H-61

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-3 @ 69.0

Natural Moisture Content (%): 23.8

Liquid Limit : 42

Plasticity Limit : 18

Plasticity Index : 24

Liquidity Index : 24

Fines Classification: TAN/GRAY SANDY CLAY (CL)

Data Entry By: MAP

File #: 355

III-44-62

ATTERBERG LIMITS DETERMINATION

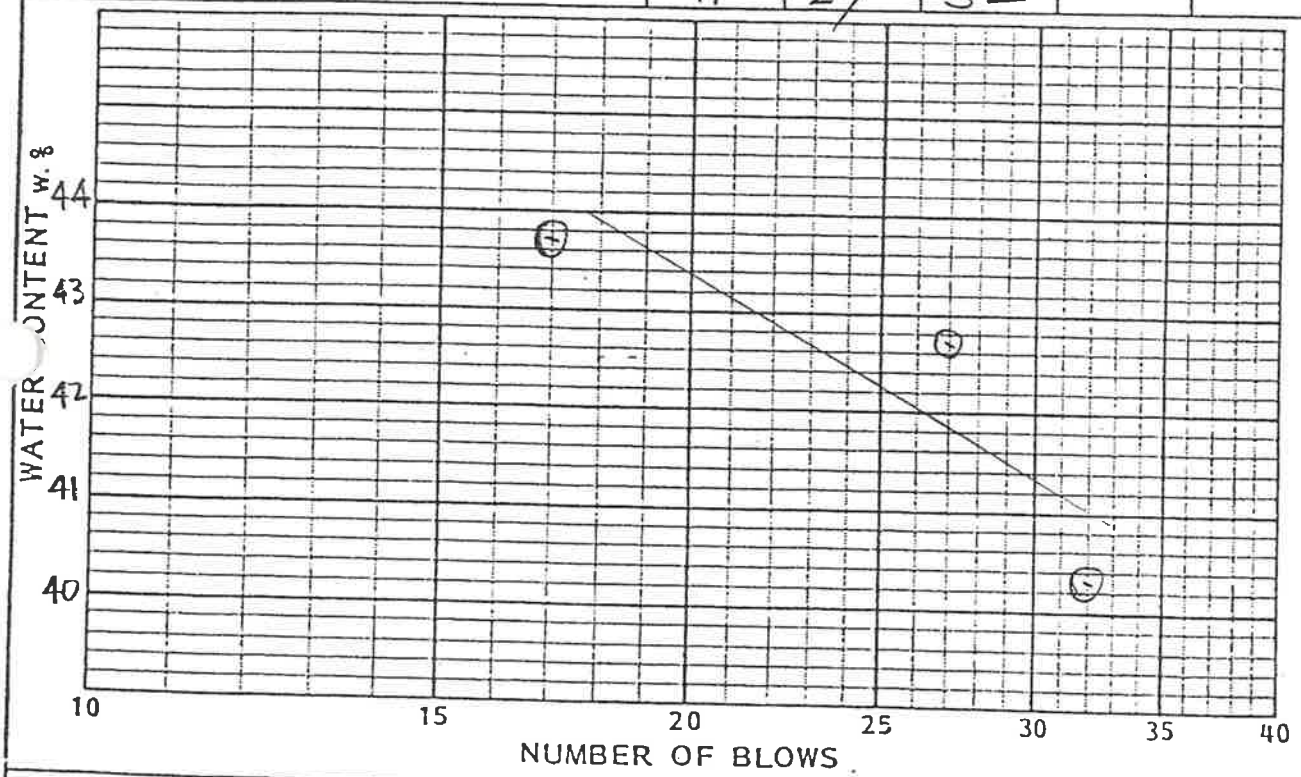
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 9-27-90

BORING C-3 | DEPTH (56-74) ACTUAL 64'-69' | JOB NO. 189150061.2

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			101	075	089			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		21.23	25.64	24.83			
	TARE PLUS DRY SOIL		17.06	20.26	19.87			
	WATER	W_w	4.17	5.38	4.96			
	TARE		7.52	7.66	7.55			
	DRY SOIL	W_s	9.54	12.6	12.32			
WATER CONTENT, %		w	43.7	42.7	40.3			
NUMBER OF BLOWS			17	27	32			



LL	42.3
PL	17.8
PI	24.5

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			074	070				8-ME
WEIGHT IN GRAMS	TARE PLUS WET SOIL		18.86	17.93				214.6
	TARE PLUS DRY SOIL		17.21	16.43				181.4
	WATER	Ww	1.65	1.50				33.2
	TARE		8.11	7.93				41.7
	DRY SOIL	Ws	9.10	8.50				139.7
WATER CONTENT, %		w	18.1	17.6				23.8
PLASTIC LIMIT,				17.8				

REMARKS: Tan Gray Sandy CLAY

CL

III-4H-63

Tested by: MAP
Computed by: SW
Checked by: SW

ATTERBERG LIMITS DETERMINATION

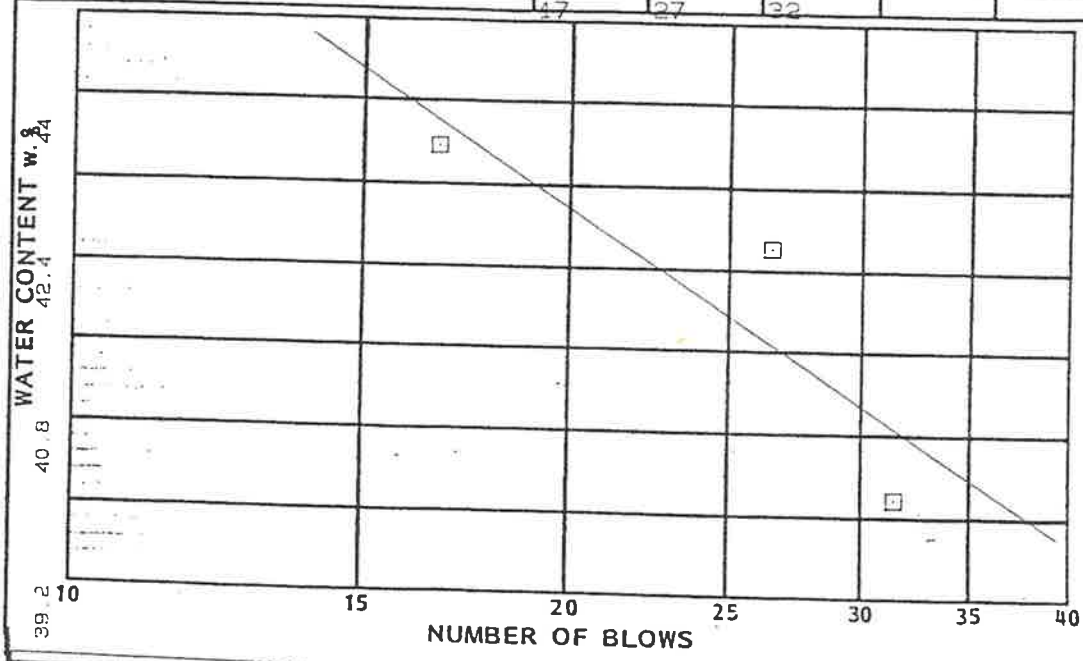
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 1-17-93

BORING: C-3 | DEPTH: 69.0 | JOB NO.: 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		401	075	089			
WEIGHT IN GRAMS	TARE PLUS WET SOIL	21.23	25.64	24.83			
	TARE PLUS DRY SOIL	17.06	20.26	19.27			
	WATER W_w	4.17	5.38	4.96			
	TARE	7.52	7.66	7.55			
	DRY SOIL W_s	9.54	12.60	12.32			
WATER CONTENT, % w		43.71	42.70	40.26			
NUMBER OF BLOWS		17	27	32			



LL	42
PL	18
PI	24

SOIL SYMBOL FROM PLASTICITY CHART (CL)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		074	070				8ME
WEIGHT IN GRAMS	TARE PLUS WET SOIL	18.86	17.93				214.0
	TARE PLUS DRY SOIL	17.21	16.43				181.4
	WATER Ww	1.65	1.50				33.2
	TARE	8.11	7.93				41.7
	DRY SOIL Ws	9.10	8.50				139.7
WATER CONTENT, % w							23.9
PLASTIC LIMIT,		18	18				

REMARKS:

TAN/GRAY SANDY CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-4H-64

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-4 @ 5.0

Natural Moisture Content (%): 34.4

Liquid Limit : 79

Plasticity Limit : 34

Plasticity Index : 45

Liquidity Index : 1

Fines Classification: BROWN CLAY (CH)

Data Entry By: MAP

File #: 356

ATTERBERG LIMITS DETERMINATION

HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE

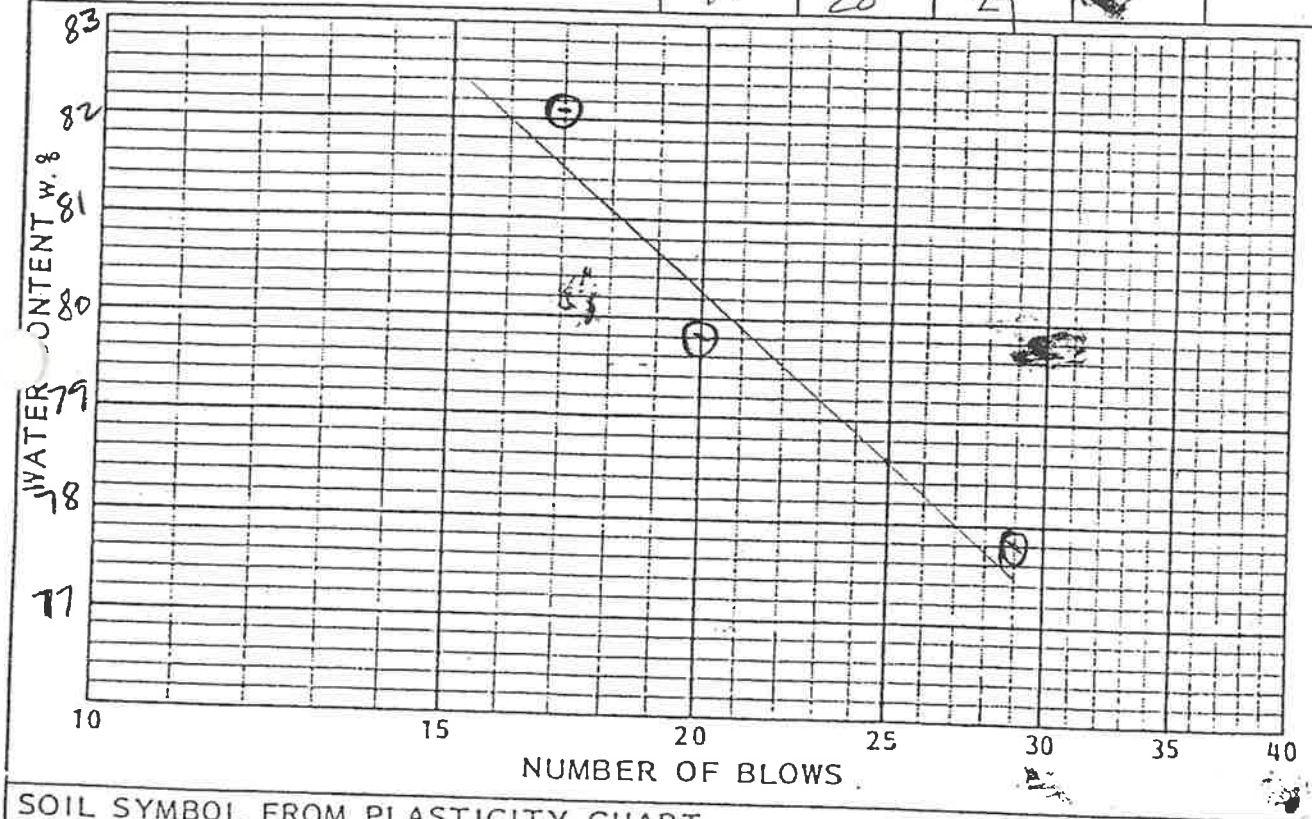
DATE: 10-8-90

BORING C-4 | DEPTH 5 | JOB NO. 18615 00612

5' (2.5-7.5)

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		074	045	085			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		24.11	29.03	25.12			
TARE PLUS DRY SOIL		16.90	19.62	17.43			
WATER	W_w	7.21	9.41	7.69			
TARE		8.12	7.83	7.54			
DRY SOIL	W_s	8.78	11.79	9.89			
WATER CONTENT, %	w	82.1	79.8	77.8			
NUMBER OF BLOWS		17	20	29			



LL	78.6
PL	33.6
PI	45.0

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		101	076				RA5
WEIGHT IN GRAMS: TARE PLUS WET SOIL		17.49	17.80				146.9
TARE PLUS DRY SOIL		14.99	15.33				119.9
WATER	Ww	2.50	2.47				27.0
TARE		7.52	8.01				41.4
DRY SOIL	Ws	7.47	7.32				78.5
WATER CONTENT, %	w	33.5	33.7				34.4
PLASTIC LIMIT,			33.6				

REMARKS:

Lt Brown Clay

CH

III-4H-66

Tested by: [illegible]

Computed by: SW

Checked by: SW

ATTERBERG LIMITS DETERMINATION

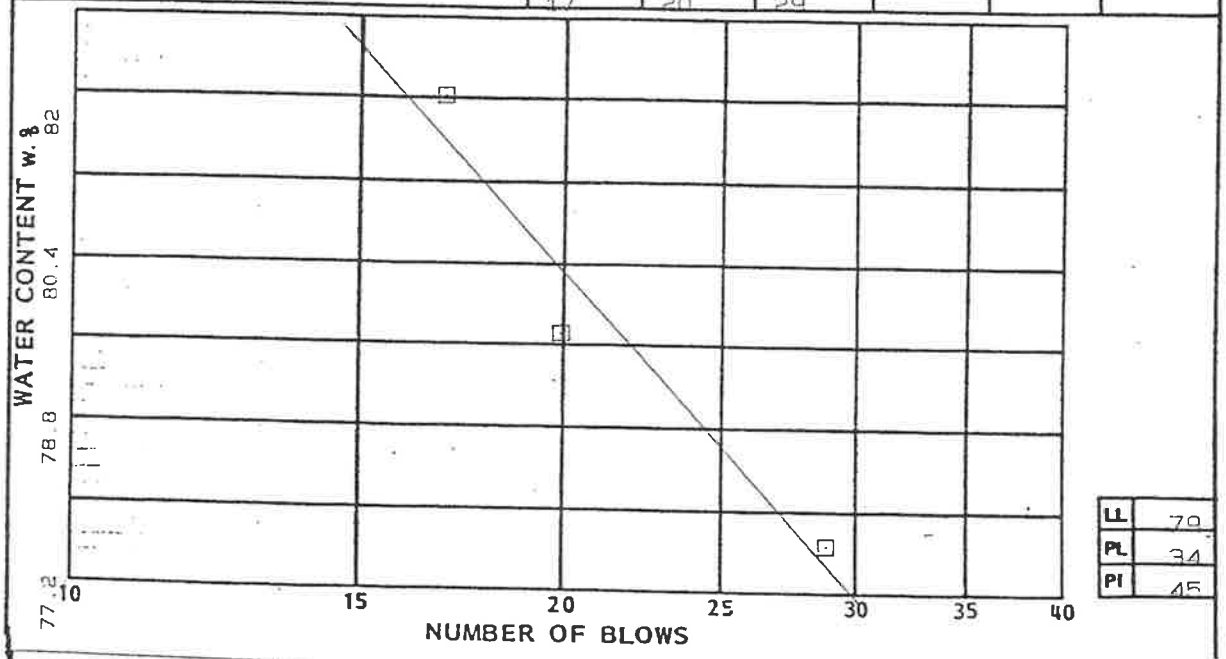
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING: B-4 | DEPTH: 5.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		074	045	085			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		24.11	29.03	25.12			
WEIGHT IN GRAMS: TARE PLUS DRY SOIL		16.90	19.62	17.43			
WEIGHT IN GRAMS: WATER	W_w	7.21	9.41	7.69			
WEIGHT IN GRAMS: TARE		8.12	7.83	7.54			
WEIGHT IN GRAMS: DRY SOIL	W_s	8.78	11.79	9.89			
WATER CONTENT, %	w	82.12	79.81	77.76			
NUMBER OF BLOWS		17	20	29			



LL	79
PL	34
PI	45

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		101	076				RA5
WEIGHT IN GRAMS: TARE PLUS WET SOIL		17.49	17.80				146.9
WEIGHT IN GRAMS: TARE PLUS DRY SOIL		14.99	15.33				119.9
WEIGHT IN GRAMS: WATER	Ww	2.50	2.47				27.0
WEIGHT IN GRAMS: TARE		7.52	8.01				41.4
WEIGHT IN GRAMS: DRY SOIL	Ws	7.47	7.32				78.5
WATER CONTENT, %	w						34.4
PLASTIC LIMIT,		33	34				

REMARKS:

BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

III-4H-67

DRAWN | SUBMITTED | APPROVED | DATE

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-4 @ 30.0

Natural Moisture Content (%): 32.5

Liquid Limit : 54

Plasticity Limit : 18

Plasticity Index : 36

Liquidity Index : 40

Fines Classification: BROWN CLAY (CH)

Data Entry By: MAP

File #: 357

III-4H-68

ATTERBERG LIMITS DETERMINATION

HARDING LAWSON ASSOCIATES

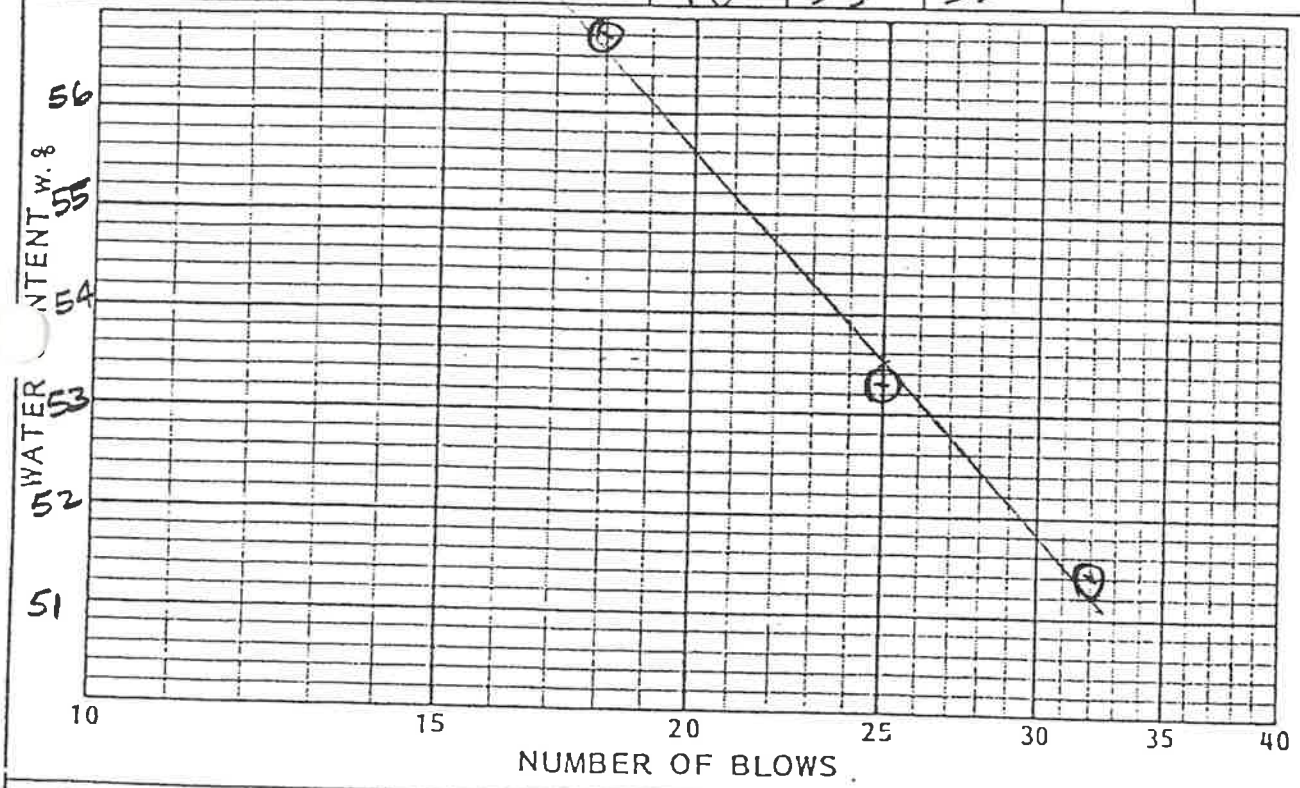
PROJECT: URBAN WASTE 18915 DATE: 10-9-90

BORING C4 DEPTH 30-33 JOB NO. 186150612

30-33 (28-33)

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			02	031	020			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		24.84	23.49	29.24			
	TARE PLUS DRY SOIL		19.80	19.73	23.26			
	WATER	W_w	5.04	4.26	5.98			
	TARE		10.93	11.74	11.62			
	DRY SOIL	W_s	8.87	7.99	11.64			
WATER CONTENT, %		w	56.8	53.3	51.4			
NUMBER OF BLOWS			18	25	32			



LL	53.5
PL	18.6
PI	34.9

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			029	01				M5
WEIGHT IN GRAMS	TARE PLUS WET SOIL		22.46	23.32				228.4
	TARE PLUS DRY SOIL		20.72	21.48				185.5
	WATER	Ww	1.74	1.84				42.9
	TARE		11.41	11.55				53.5
	DRY SOIL	Ws	9.31	9.93				132.0
WATER CONTENT, %		w	18.7	18.5				32.5
PLASTIC LIMIT,				18.6				

REMARKS:

Brown Clay (CH)

CH

III-4H-69

Tested by: MAP

Computed by: SW

Checked by: SLJ

ATTERBERG LIMITS DETERMINATION

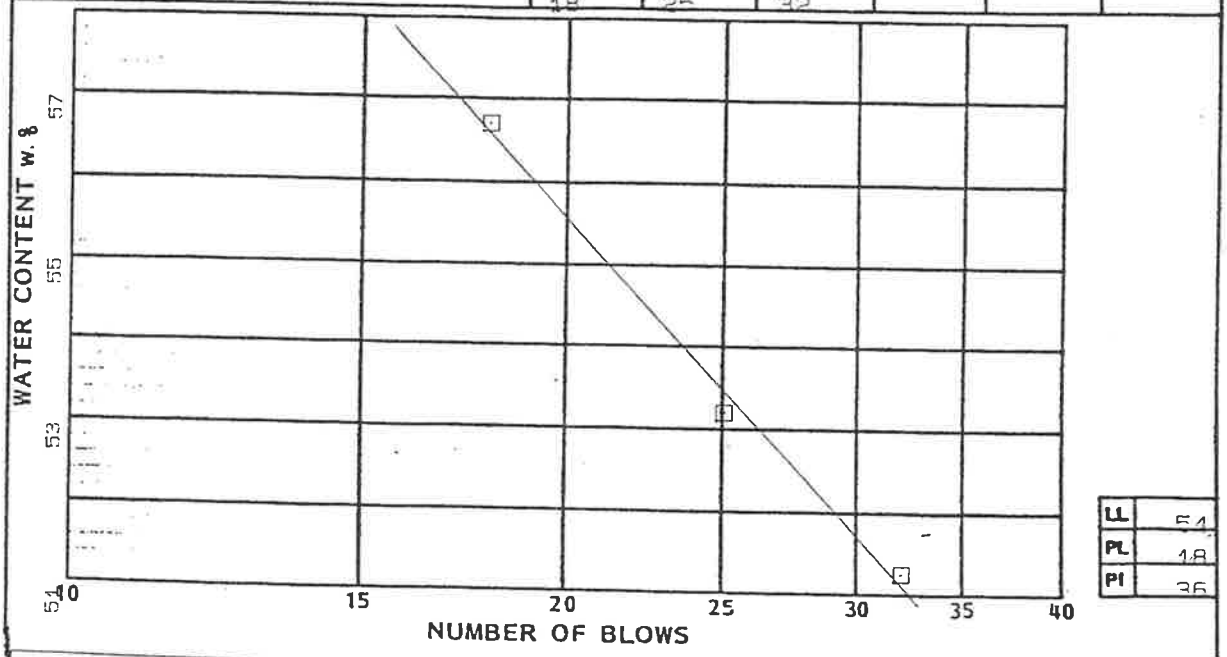
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING C-4 | DEPTH 30.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		02	031	020			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		24.84	23.99	29.24			
TARE PLUS DRY SOIL		19.80	19.73	23.26			
WATER	W_w	5.04	4.26	5.98			
TARE		10.93	11.74	11.62			
DRY SOIL	W_s	8.87	7.99	11.64			
WATER CONTENT, %	w	56.82	53.32	51.37			
NUMBER OF BLOWS		18	25	32			



LL	54
PL	18
PI	36

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		029	01				M-5
WEIGHT IN GRAMS: TARE PLUS WET SOIL		22.46	23.32				228.4
TARE PLUS DRY SOIL		20.72	21.48				185.5
WATER	Ww	1.74	1.84				42.9
TARE		11.41	11.41				53.5
DRY SOIL	Ws	9.31	10.07				132.0
WATER CONTENT, %	w						32.5
PLASTIC LIMIT,		19	18				

REMARKS:

BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

DRAWN | APPROVED

III-44-70

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-5 @ 5.0

Natural Moisture Content (%): 39.9

Liquid Limit : 39

Plasticity Limit : 20

Plasticity Index : 19

Liquidity Index : 105

Fines Classification: RED.BROWN/GRAY SANDY CLAY (CL)

Data Entry By: MAP

File #: 358

ATTERBERG LIMITS DETERMINATION

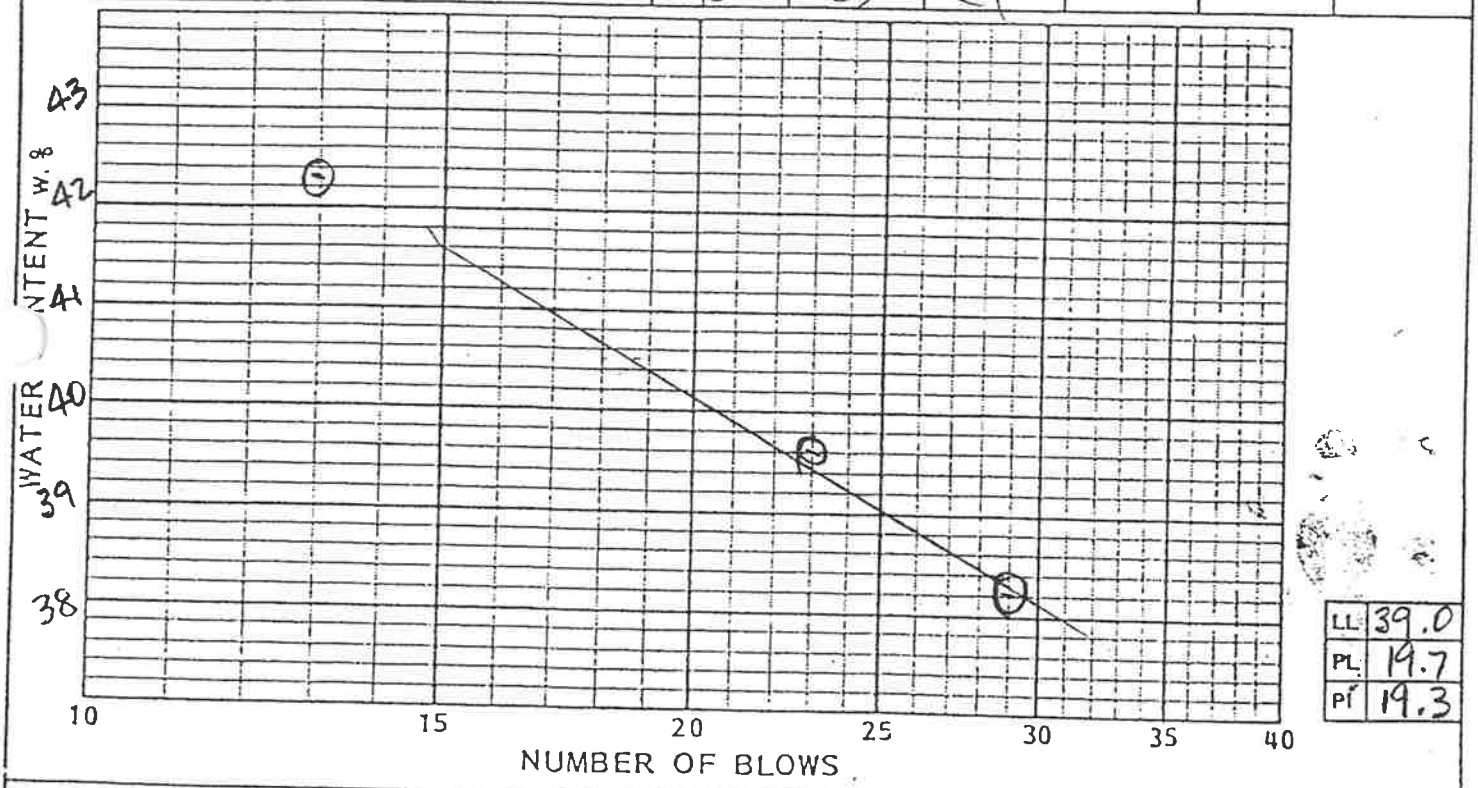
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 10-8-90

BORING E-5 (4'-9') | DEPTH 5 | JOB NO. 18615061R

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			105	038	123			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		27.76	34.43	32.82			
	TARE PLUS DRY SOIL		21.86	27.03	25.85			
	WATER	W_w	5.90	7.40	6.97			
	TARE		7.91	8.32	7.62			
	DRY SOIL	W_s	13.95	18.71	18.23			
WATER CONTENT, %		w	42.3	39.6	38.2			
NUMBER OF BLOWS			13	23	29			



LL	39.0
PL	19.7
PI	19.3

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			042	053				A-3
WEIGHT IN GRAMS	TARE PLUS WET SOIL		20.34	20.14				212.7
	TARE PLUS DRY SOIL		18.35	18.13				163.9
	WATER	Ww	1.99	2.01				48.8
	TARE		8.17	8.05				41.6
	DRY SOIL	Ws	10.18	10.08				122.3
WATER CONTENT, %		w	19.5	19.9				39.9
PLASTIC LIMIT,				19.7				

REMARKS:
Red Brn + Grey Sandy Clay
"Clayey silt" from hydrometer analysis.

CL

III-4H-72

Tested by: MA
Computed by: SW
Checked by: SW

ATTERBERG LIMITS DETERMINATION

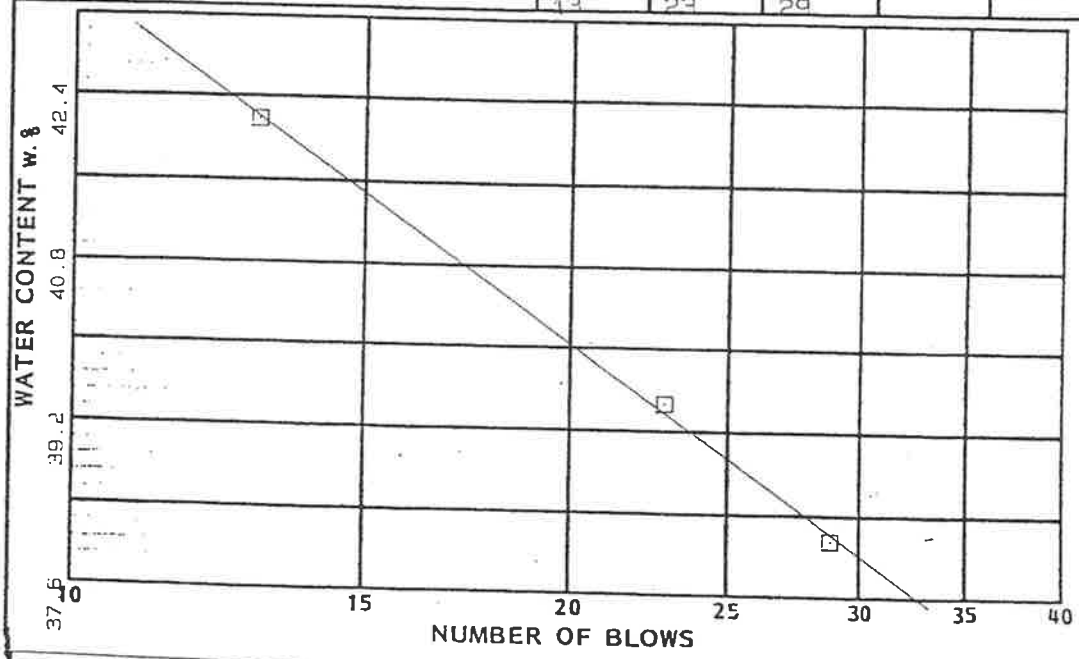
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING C-5 | DEPTH 5.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		105	038	123			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		27.76	34.43	32.82			
TARE PLUS DRY SOIL		21.86	27.03	25.85			
WATER	W_w	5.90	7.40	6.97			
TARE		7.91	8.32	7.62			
DRY SOIL	W_s	13.95	18.71	18.23			
WATER CONTENT, %	w	42.29	39.55	38.23			
NUMBER OF BLOWS		13	23	29			



LL	30
PL	20
PI	10

SOIL SYMBOL FROM PLASTICITY CHART (CL)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		042	053				A-3
WEIGHT IN GRAMS: TARE PLUS WET SOIL		20.34	20.14				212.7
TARE PLUS DRY SOIL		18.35	18.13				163.9
WATER	Ww	1.99	2.01				48.8
TARE		8.17	8.05				41.6
DRY SOIL	Ws	10.18	10.08				122.3
WATER CONTENT, %	w						39.9
PLASTIC LIMIT,		20	20				

REMARKS:

RED.BROWN/GRAY SANDY CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-4H-73

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-6 @ 25.0

Natural Moisture Content (%): 32.4

Liquid Limit : 86

Plasticity Limit : 29

Plasticity Index : 57

Liquidity Index : 6

Fines Classification: REDDISH BROWN CLAY (CH)

Data Entry By: MAP

File #: 359

ATTERBERG LIMITS DETERMINATION

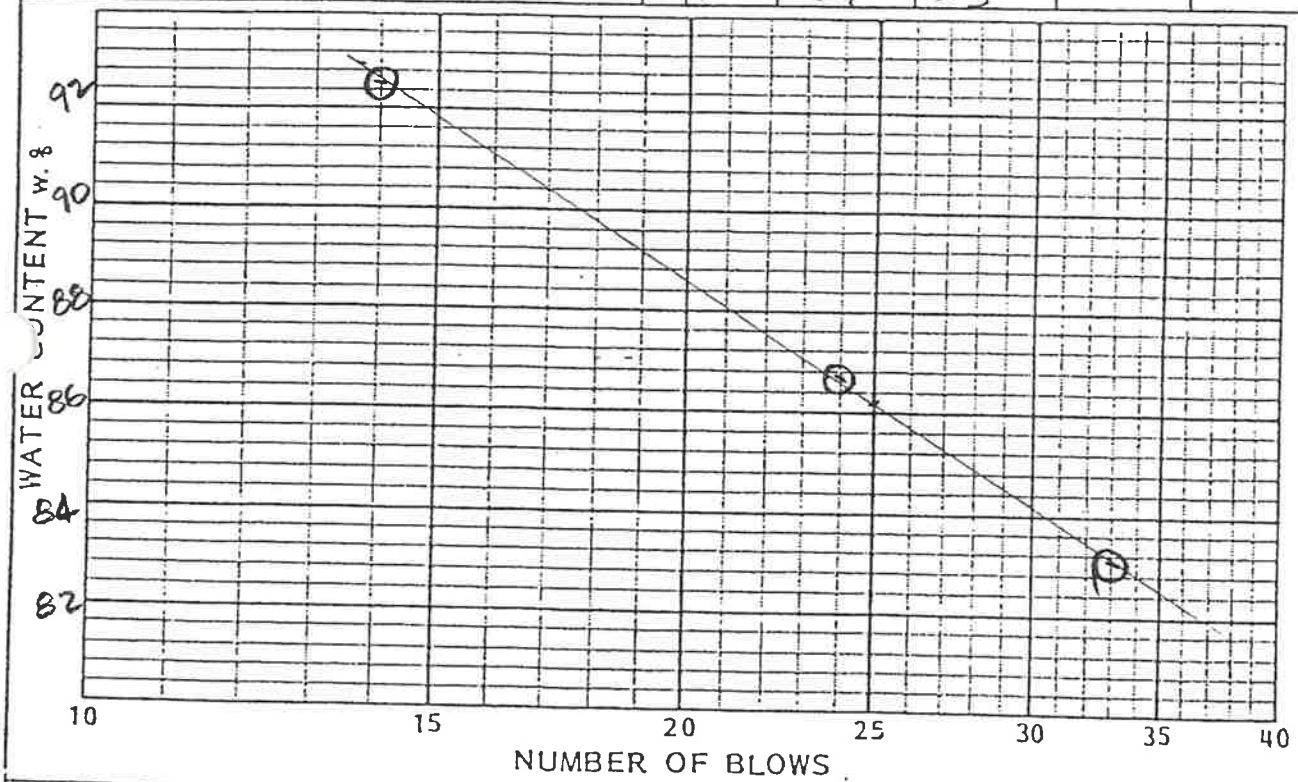
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 10-8-90

BORING C-6 | DEPTH 25' (24'-26') | JOB NO. 186150.06 10

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		054	066	068			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		20.56	19.77	15.72			
TARE PLUS DRY SOIL		14.53	14.42	12.17			
WATER	W_w	6.03	5.35	3.55			
TARE		8.02	8.25	7.90			
DRY SOIL	W_s	6.51	6.17	4.27			
WATER CONTENT, %	w	92.6	86.7	83.1			
NUMBER OF BLOWS		15	24	33			



LL	86.2
PL	28.9
PI	57.3

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		103	107				1
WEIGHT IN GRAMS: TARE PLUS WET SOIL		18.26	18.31				123.7
TARE PLUS DRY SOIL		15.78	15.90				103.6
WATER	Ww	2.48	2.41				20.10
TARE		7.19	7.56				41.6
DRY SOIL	Ws	8.59	8.35				62.0
WATER CONTENT, %	w	28.9	28.9				32.4
PLASTIC LIMIT,			28.9				

REMARKS: Reddish Brown Clay

III-4H-75

CH

Tested by: MH

Computed by: SW

Checked by: SW

ATTERBERG LIMITS DETERMINATION

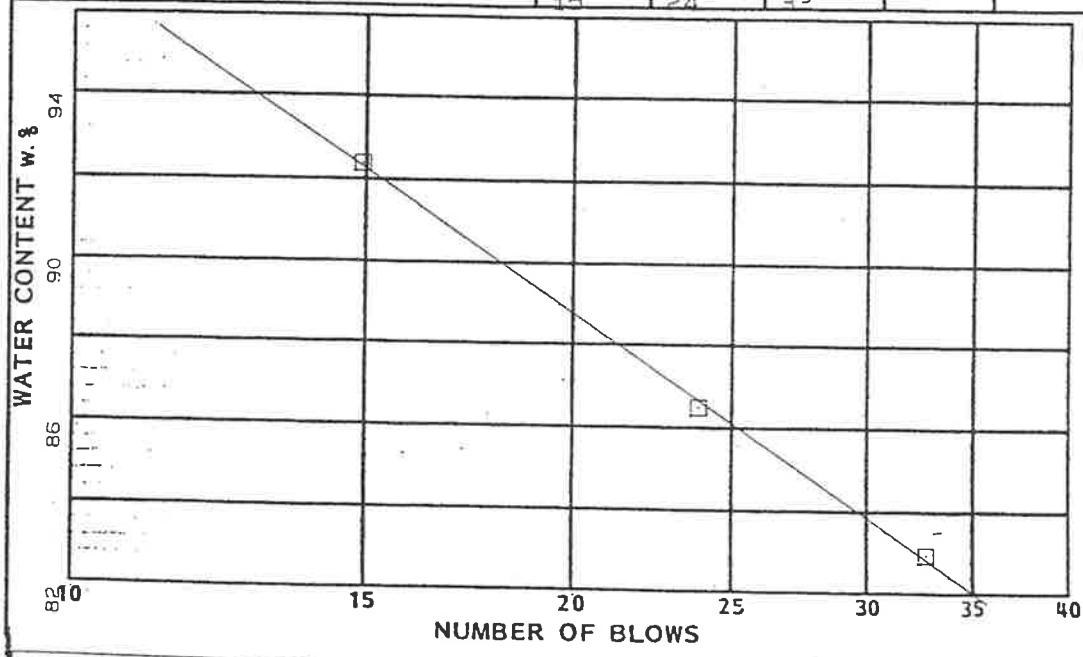
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING C-6 | DEPTH 25.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			054	066	068			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		20.56	19.77	15.72			
	TARE PLUS DRY SOIL		14.53	14.42	12.17			
	WATER	W_w	6.03	5.35	3.55			
	TARE		8.02	8.25	7.90			
	DRY SOIL	W_s	6.51	6.17	4.27			
WATER CONTENT, %		w	92.63	86.71	83.14			
NUMBER OF BLOWS			15	24	32			



LL	88
PL	29
PI	57

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			103	107				1
WEIGHT IN GRAMS	TARE PLUS WET SOIL		18.26	18.31				123.7
	TARE PLUS DRY SOIL		15.78	15.90				103.6
	WATER	Ww	2.48	2.41				20.1
	TARE		7.19	7.56				41.0
	DRY SOIL	Ws	8.59	8.34				62.0
WATER CONTENT, %		w						32.4
PLASTIC LIMIT,			29	29				

REMARKS:

REDDISH BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | APPROVED | DATE

III-4H-76

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-7 @ 9.0

Natural Moisture Content (%): 34.7

Liquid Limit : 66

Plasticity Limit : 30

Plasticity Index : 36

Liquidity Index : 13

Fines Classification: REDDISH BROWN CLAY
(CH)

Data Entry By: MAP

File #: 360

ATTERBERG LIMITS DETERMINATION

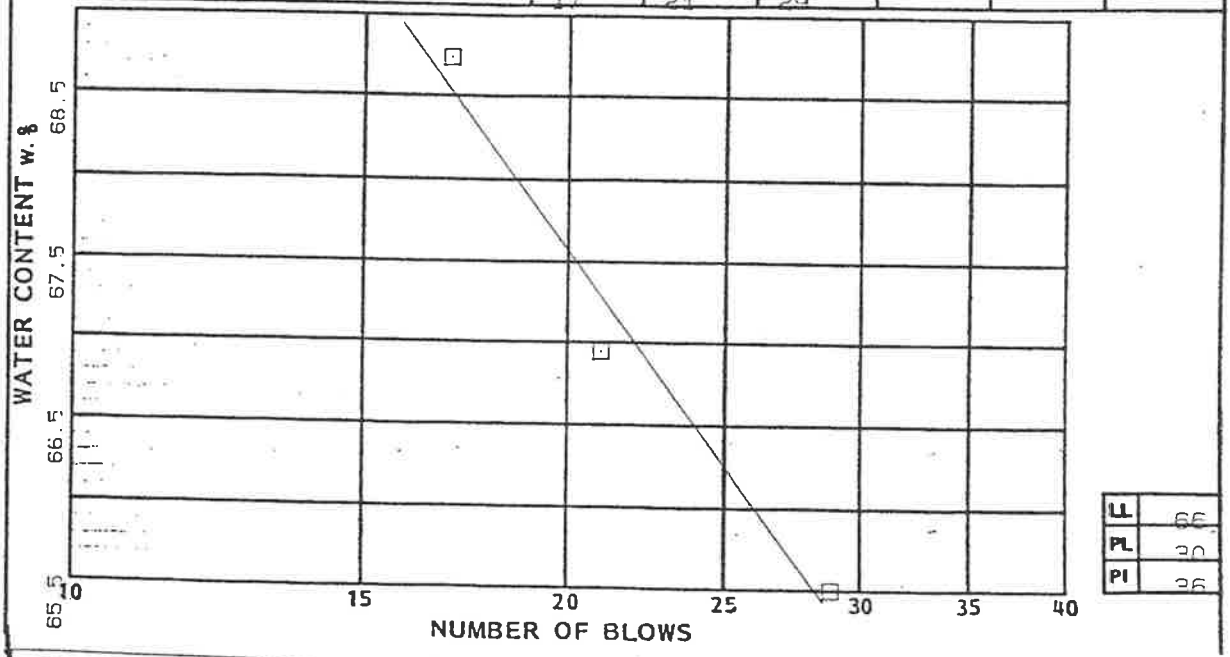
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE | DATE: 11-17-93

BORING C-7 | DEPTH 9.0 | JOB NO. 18915.006.12

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		061	028	029			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		32.04	32.47	31.46			
TARE PLUS DRY SOIL		23.75	24.04	23.52			
WATER	W_w	8.29	8.43	7.94			
TARE		11.70	11.46	11.41			
DRY SOIL	W_s	12.05	12.58	12.11			
WATER CONTENT, %	w	68.80	67.01	65.57			
NUMBER OF BLOWS		17	21	29			



LL	66
PL	30
PI	36

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		01	034				M21
WEIGHT IN GRAMS: TARE PLUS WET SOIL		27.21	27.37				189.9
TARE PLUS DRY SOIL		23.50	23.77				151.6
WATER	Ww	3.71	3.60				38.3
TARE		11.55	11.62				41.3
DRY SOIL	Ws	11.95	12.15				110.3
WATER CONTENT, %	w						34.7
PLASTIC LIMIT,		31	30				

REMARKS:

REDDISH BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN | CHECKED | APPROVED | DATE

III-4H-78

ATTERBERG LIMITS DETERMINATION

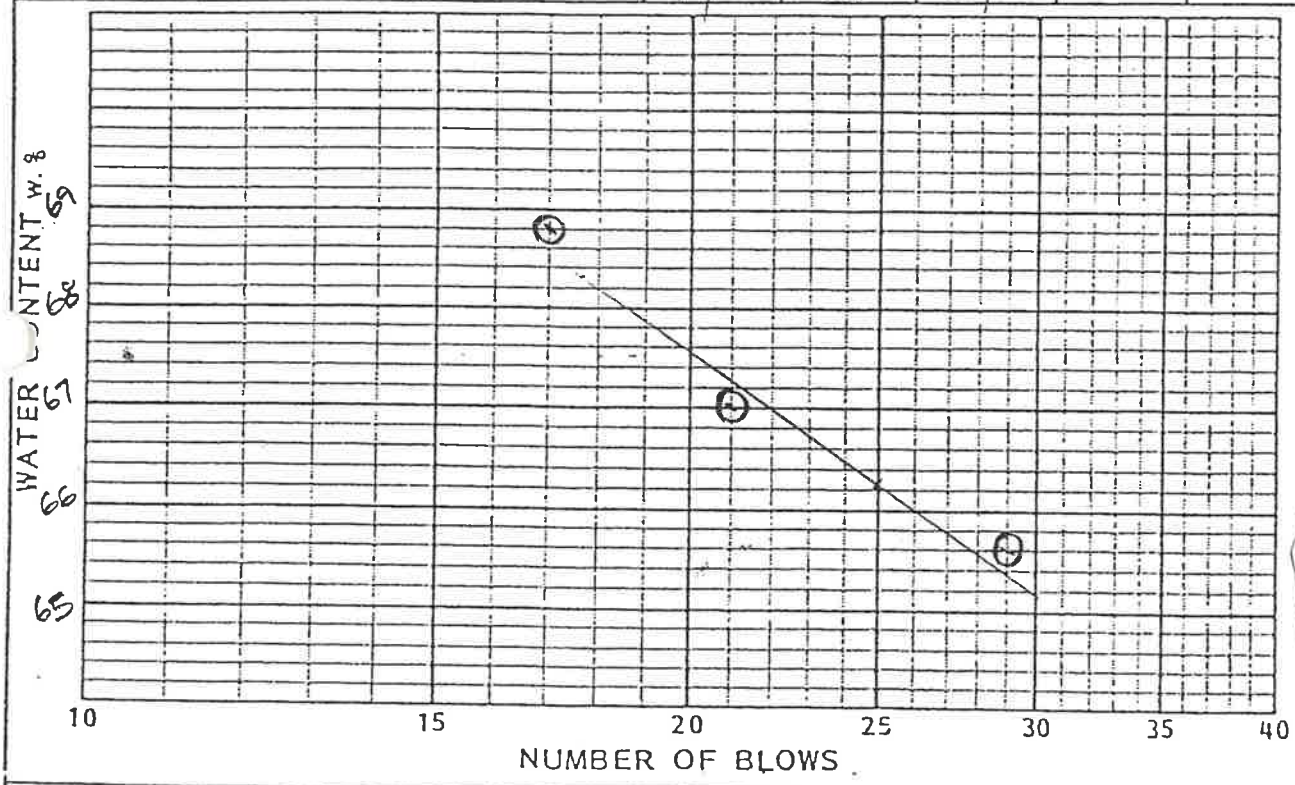
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE 915 | DATE: 10-9-90

BORING C-7 | DEPTH 9' (4-9) | JOB NO. 186150161 2

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			061	028	029			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		32.04	32.47	31.46			
	TARE PLUS DRY SOIL		23.75	24.04	23.52			
	WATER	W_w	8.29	8.43	7.94			
	TARE		11.70	11.46	11.41			
	DRY SOIL	W_s	12.05	12.58	12.11			
WATER CONTENT, %		w	68.8	67.0	65.6			
NUMBER OF BLOWS			17	21	29			



LL	66.3
PL	30.3
PI	36.0

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			01	034				M21
WEIGHT IN GRAMS	TARE PLUS WET SOIL		27.21	27.37				189.9
	TARE PLUS DRY SOIL		23.50	23.77				151.6
	WATER	Ww	3.71	3.60				38.3
	TARE		11.55	11.62				41.3
	DRY SOIL	Ws	11.95	12.15				110.3
WATER CONTENT, %		w	31.0	29.6				34.7
PLASTIC LIMIT,				30.3				

REMARKS: Lt. Reddish Brown CLAY

CH

III-4H-79

Tested by: MAP
Computed by: SW
Checked by: SW

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-7 @ 5.0

Natural Moisture Content (%): 27.8

Liquid Limit : 50

Plasticity Limit : 19

Plasticity Index : 31

Liquidity Index : 29

Fines Classification: REDDISH BROWN CLAY (CH)

Data Entry By: MAP

File #: 361

III-4H-80

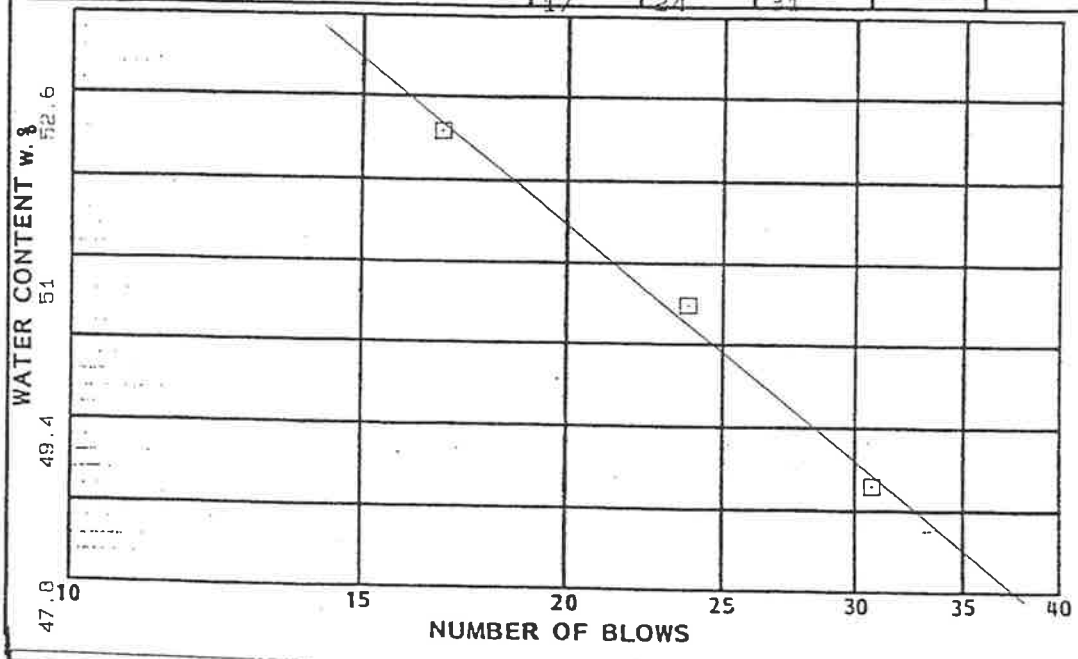
ATTERBERG LIMITS DETERMINATION

HARDING LAWSON ASSOCIATES

PROJECT URBAN WASTE			DATE 11-17-93
BORING B-7	DEPTH 5.0	JOB NO. 18915.006.12	

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		097	094	070			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		26.32	21.85	25.92			
WEIGHT IN GRAMS: TARE PLUS DRY SOIL		19.85	17.02	20.01			
WEIGHT IN GRAMS: WATER	W_w	6.47	4.83	5.91			
WEIGHT IN GRAMS: TARE		7.50	7.49	7.93			
WEIGHT IN GRAMS: DRY SOIL	W_s	12.35	9.53	12.08			
WATER CONTENT, %	w	52.39	50.68	48.92			
NUMBER OF BLOWS		17	24	31			



LL	50
PL	19
PI	31

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		062	039				JP2
WEIGHT IN GRAMS: TARE PLUS WET SOIL		17.71	18.36				152.5
WEIGHT IN GRAMS: TARE PLUS DRY SOIL		16.07	16.71				128.3
WEIGHT IN GRAMS: WATER	Ww	1.64	1.65				24.2
WEIGHT IN GRAMS: TARE		7.54	8.24				41.4
WEIGHT IN GRAMS: DRY SOIL	Ws	8.53	8.47				86.9
WATER CONTENT, %	w						27.8
PLASTIC LIMIT,		19	19				

REMARKS:

REDDISH BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists & Geophysicists

PLATE

DRAWN

APPROVED

III-4H-81

ATTERBERG LIMITS DETERMINATION

HARDING LAWSON ASSOCIATES

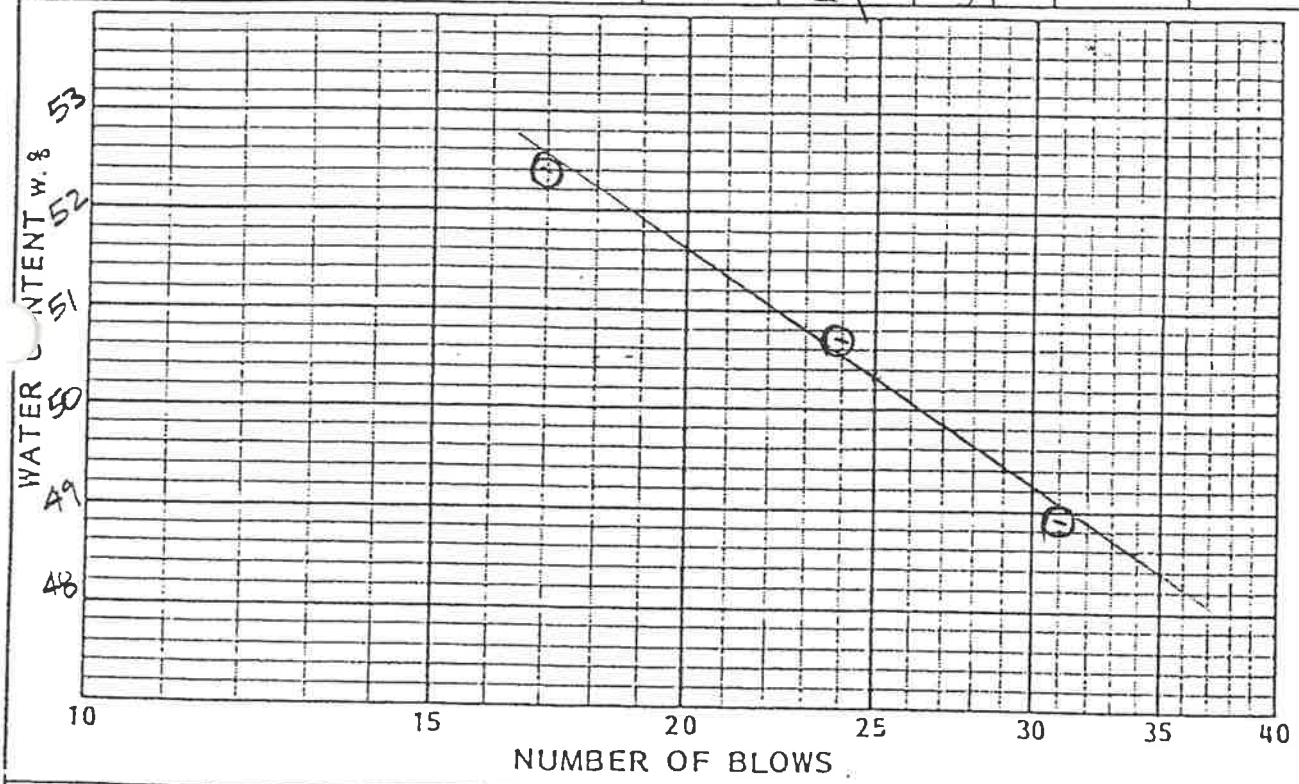
PROJECT: URBAN WASTE 915 | DATE: 10-8-90

BORING ~~B~~ C-7 | DEPTH 5' | JOB NO. ~~18618~~ 00612

5' (4-8)

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		097	094	070			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		26.32	21.85	25.92			
TARE PLUS DRY SOIL		19.85	17.02	20.01			
WATER	W_w	6.47	4.83	5.91			
TARE		7.50	7.49	7.93			
DRY SOIL	W_s	12.35	9.53	12.08			
WATER CONTENT, %	w	52.4	50.7	48.9			
NUMBER OF BLOWS		17	24	31			



LL	50.3
PL	19.4
PI	30.9

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		062	039				JP2
WEIGHT IN GRAMS: TARE PLUS WET SOIL		17.71	18.36				152.5
TARE PLUS DRY SOIL		16.07	16.71				128.3
WATER	Ww	1.64	1.65				24.2
TARE		7.54	8.24				41.4
DRY SOIL	Ws	8.53	8.47				86.9
WATER CONTENT, %	w	19.2	19.5				27.8
PLASTIC LIMIT			19.4				

REMARKS: Red Brn silty Tan ~~[illegible]~~ CLAY (~~[illegible]~~) CH III-4H-82

Tested by: MAT MKW
Computed by: SW
Checked by: SW

Atterburg Limits Test Results
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-8 @ 15.0

Natural Moisture Content (%): 28.3

Liquid Limit : 74

Plasticity Limit : 31

Plasticity Index : 43

Liquidity Index : -6

Fines Classification: GRAY/RED.BROWN CLAY (CH)

Data Entry By: MAP

File #: 362

III-4H-83

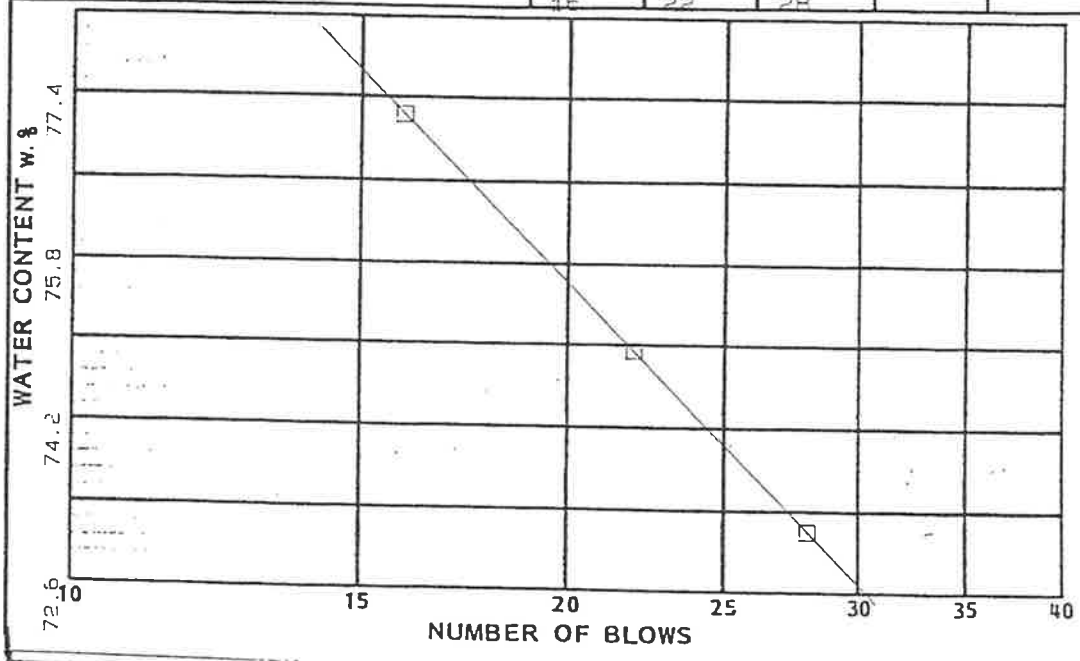
ATTERBERG LIMITS DETERMINATION

HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE			DATE: 11-17-93
BORING: B-8	DEPTH: 15.0	JOB NO. 18915.006.12	

LIQUID LIMIT

RUN NO.		1	2	3	4	5	6
TARE NO.		072	053	107			
WEIGHT IN GRAMS: TARE PLUS WET SOIL		24.60	29.79	24.58			
TARE PLUS DRY SOIL		17.40	20.47	17.30			
WATER	W_w	7.20	9.32	7.19			
TARE		8.00	8.05	7.58			
DRY SOIL	W_s	9.31	12.42	9.81			
WATER CONTENT, %	w	77.34	75.04	73.29			
NUMBER OF BLOWS		16	22	28			



LL	74
PL	31
PI	43

SOIL SYMBOL FROM PLASTICITY CHART (CH)

PLASTIC LIMIT

RUN NO.		1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.		039	076				032
WEIGHT IN GRAMS: TARE PLUS WET SOIL		18.88	20.55				35.0
TARE PLUS DRY SOIL		16.34	17.58				29.9
WATER	Ww	2.54	2.97				5.2
TARE		8.24	8.02				11.0
DRY SOIL	Ws	8.10	9.56				18.3
WATER CONTENT, %	w						28.3
PLASTIC LIMIT,		31	31				

REMARKS:

GRAY/RED BROWN CLAY

Tested by:
Computed by: MAP
Checked by:

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

PLATE

DRAWN | SUBMITTED | APPROVED | DATE

III-4H-84

ATTERBERG LIMITS DETERMINATION

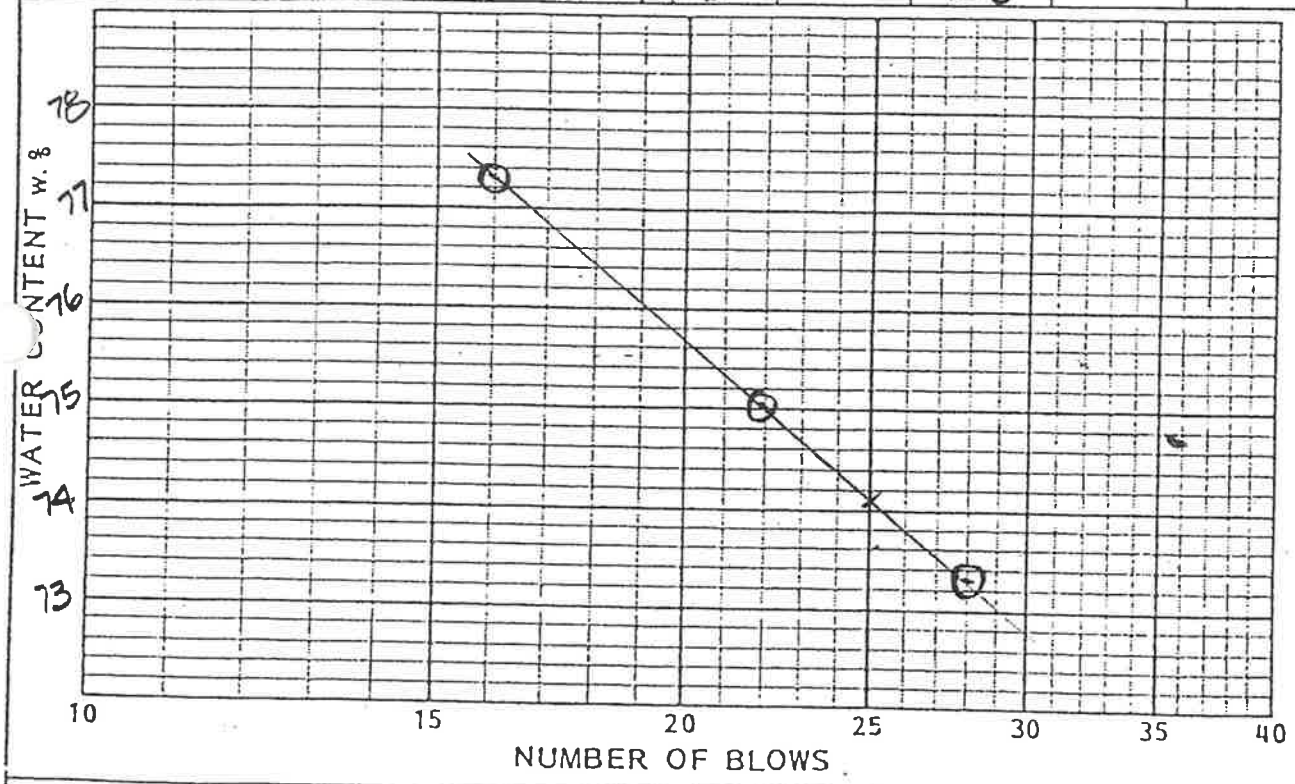
HARDING LAWSON ASSOCIATES

PROJECT: URBAN WASTE 915 DATE: 10-9-90

BORING C-8 (14-19) DEPTH 15 JOB NO. 18675 00612

LIQUID LIMIT

RUN NO.			1	2	3	4	5	6
TARE NO.			072	053	107			
WEIGHT IN GRAMS	TARE PLUS WET SOIL		24.60	29.79	24.58			
	TARE PLUS DRY SOIL		1740	2047	1739			
	WATER	W_w	7.20	9.32	7.19			
	TARE		809	805	758			
	DRY SOIL	W_s	9.31	12.42	9.81			
WATER CONTENT, %		w	77.3	75.0	73.3			
NUMBER OF BLOWS			16	22	28			



LL	74.1
PL	31.3
PI	42.8

SOIL SYMBOL FROM PLASTICITY CHART

PLASTIC LIMIT

RUN NO.			1	2	3	4	5	NATURAL WATER CONTENT
TARE NO.			039	076				032
WEIGHT IN GRAMS	TARE PLUS WET SOIL		1888	2055				35.05
	TARE PLUS DRY SOIL		1634	1758				29.88
	WATER	Ww	2.54	2.97				5.17
	TARE		824	802				11.62
	DRY SOIL	Ws	8.10	9.56				18.26
WATER CONTENT, %		w	31.4	31.1				28.3
PLASTIC LIMIT,				31.3				

REMARKS: Lt Grey and Reddish Brown Clay (CH) w/some sandy seams

III-4H-85

CH

Tested by: MAT

Computed by: SW

Checked by: SW

Minus #200 Test
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Data File : TEST0363

Boring Desc.	Depth (ft)	Soil Class	% Passing #200 Sieve
C-7	5.0	CL	94.1
C-7	9.0	CH	99.2

% PASSING NO. 200 SIEVE

915 HARDING LAWSON ASSOCIATES

JOB ()WT NO 18815.06.12 BY MAP DATE 10,8,90

BORING	C-7		C-7				
DEPTH	5'		9'				
	(4-8) Red Brn Sdy Clay		(4-9) Lt Reddish Brown Clay				
CUP NO.	SU1		B5				
DRY WT. BEFORE WASH + TARE	267.8		400.2				
DRY WT. AFTER WASH + TARE	126.5		124.9				
DRY WT. PASSING NO. 200	141.3		275.3				
CUP WT.	117.7		122.7				
DRY WT. BEFORE WASH	150.1		277.5				
% PASSING NO. 200	94.1		99.2				

BORING							
DEPTH							
SOIL							
CUP NO.							
DRY WT. BEFORE WASH + TARE							
DRY WT. AFTER WASH + TARE							
DRY WT. PASSING NO. 200							
CUP WT.							
DRY WT. BEFORE WASH							
% PASSING NO. 200							

NG							
CUP NO.							
DRY WT. BEFORE WASH + TARE							
DRY WT. AFTER WASH + TARE							
DRY WT. PASSING NO. 200							
CUP WT.							
Y WT. BEFORE WASH							
PASSING NO. 200							

Tested by: MAP Computed by: SW Checked by: SW

III-4H-87

Minus #200 Test
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE TECH. ID : 18915.006.12 Test Date : 06-10-1991

Data Entry By : SBW Data File : TEST0090

Boring Desc.	Depth (ft)	Soil Class	% Passing #200 Sieve
B-3	2.0	CH	89.7
B-5	0.0	CL	60.6
B-1	2.0	CL	55.9

III-44-88

% PASSING NO. 200 SIEVE

HARDING LAWSON ASSOCIATES

JOB UWT NO 18915006 BY MAP DATE 6/6/91

BORING	3	5	1				
DEPTH	2	0	2				
SOIL	Red Brn clay w/tr gravel	Grey SANDY Clay (cl)	Lt Brn sandy clay (cl)				
CUP NO.	B-18	T-3	B-5				
DRY WT. BEFORE WASH + TARE	395.6	432.3	421.8				
DRY WT. AFTER WASH + TARE	149.1	287.4	254.7				
DRY WT. PASSING NO. 200	246.5	144.9	167.1				
CUP WT.	120.7	192.7	123.0				
DRY WT. BEFORE WASH	274.9	239.6	298.8				
% PASSING NO. 200	89.7	60.5	55.9				

BORING							
DEPTH							
SOIL							
CUP NO.							
DRY WT. BEFORE WASH + TARE							
DRY WT. AFTER WASH + TARE							
DRY WT. PASSING NO. 200							
CUP WT.							
DRY WT. BEFORE WASH							
% PASSING NO. 200							

BORING							
DEPTH							
SOIL							
CUP NO.							
DRY WT. BEFORE WASH + TARE							
DRY WT. AFTER WASH + TARE							
DRY WT. PASSING NO. 200							
CUP WT.							
DRY WT. BEFORE WASH							
% PASSING NO. 200							

III-4H-89

Tested by: RDG Computed by: SW Checked by: SW

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-1 @ 10.0

Total Sample Weight (g): 52.4

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 52.4

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0
Sand : 5.8
Silt : 19.8
Clay : 74.4

Particle Diameter (mm):

@ 60% Passing : 1.56E-3
@ 30% Passing : -----
@ 10% Passing : -----

Coefficient of Curvature : ----

Coefficient of Uniformity : ----

Soil Classification : BROWN LEAN CLAY

Symbol : CL*

Frost Classification : F4*

Data Entry By: MAP

File #: 364

III-4H-90

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-1 @ 10.0 Data File : TEST0364

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
No. 40	0.425	0.0	100.0
No. 50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	3.0	94.2

III-4H-91

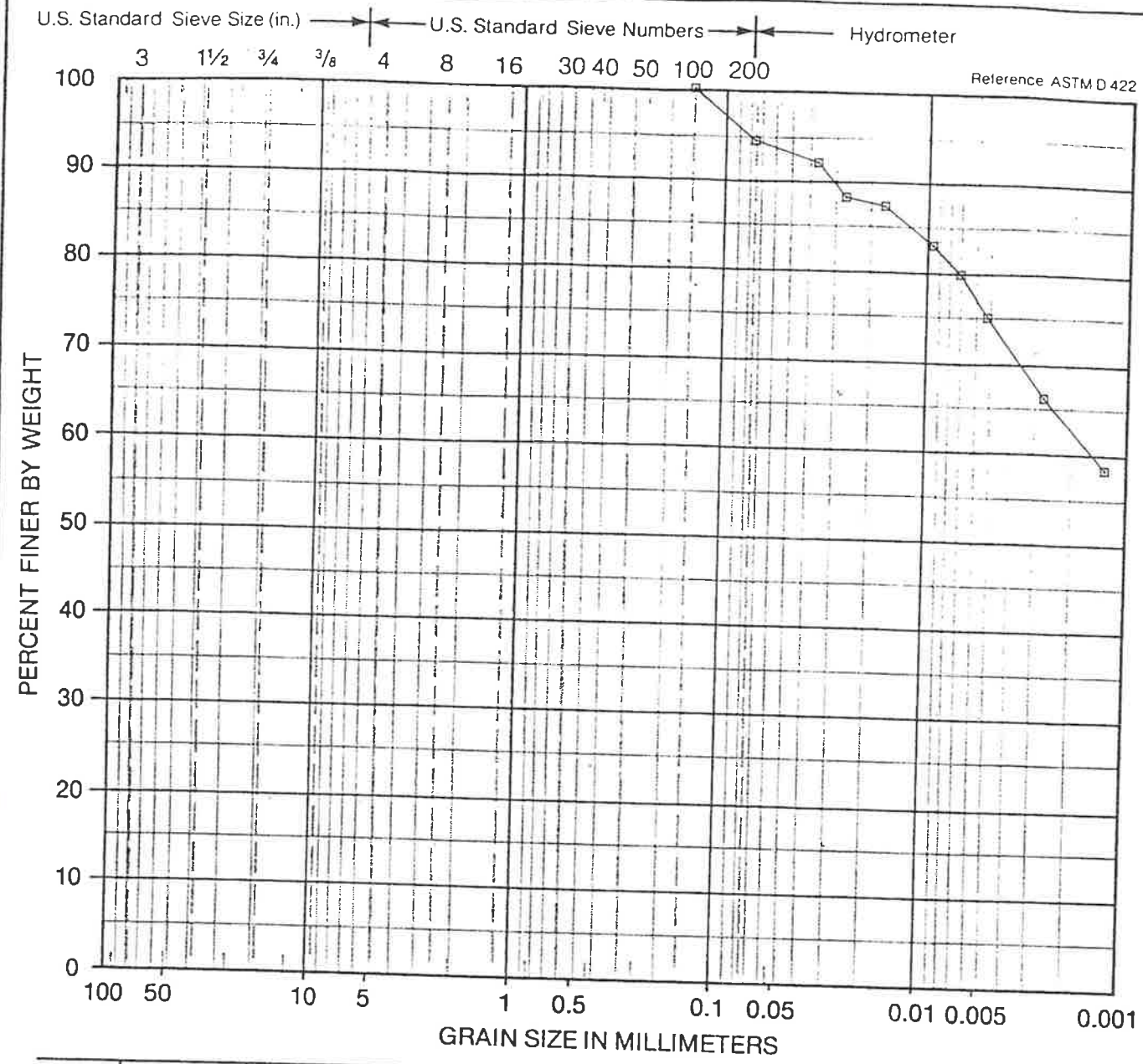
Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-1 @ 10.0 Data File : TEST0364

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	52.5	21.0	91.8	0.03679
2	50.5	21.0	88.1	0.02656
5	50.0	21.0	87.1	0.01689
16	47.7	21.0	82.8	0.00966
31	46.0	21.0	79.6	0.00705
60	43.5	21.0	74.9	0.00519
250	39.0	20.0	66.0	0.00267
1440	35.0	19.0	58.1	0.00132

III-4H-92



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
▫	C-1 @ 10.0 FT	BROWN LEAN CLAY (CL)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

III-4H-93

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: UWT | Job No. 18915,006.12

Bor. No. C-1 | Bulk Sample No. | Depth or Elevation 10' | Date 10-8-90

TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
			1-1/2"	38.1					
Wt. of Soil & Can (Dry)			1"	25.4					
			3/4"	19.1					
H_2O Loss			1/2"	12.7					
Wt. of Can			3/8"	9.52					
Wt. of Soil Dry			No. 4	4.76					
			Pan						
% Moisture			Total						

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia., MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074		3.04				94.2
270	0.053						
Pan							
Total							

Specific Gravity, G LL____ PI____ Classification

HYDROMETER #6

K_G = | Wt. of Hydrometer Sample 52.44 grams | Deflocculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading Actual	Reading Corr.	$\sqrt{L/T}$	Corrected Grain Size Diameter, MM.	% of Total Passing
9:41 1	0.078	21.0	.01328	52.5	48.5	2.775	.0369	92.5
:42 2	0.055	21.0	|	50.5	46.5	2.000	.0266	88.7
:45 5	0.035	21.0	|	50.0	46.0	1.273	.0169	87.7
:56 16	0.020	21.0	|	47.7	43.7	.729	.0097	83.3
10:11 31	0.014	21.0	|	46.0	42.0	.533	.0071	80.1
:40 60	0.010	21.0	↓	43.5	39.5	.391	.0052	75.3
1:50 250	0.005	20.0	.01344	39.0	35.0	.199	.0027	66.7
1440	0.002	19	.01361	35.0	31.0	.086	.0012	59.2

Tested by: MAP / SW | Computed by: SW | Checked by: SW

52.44

Hydrometer
= (1.20) 421
+T = 97.9

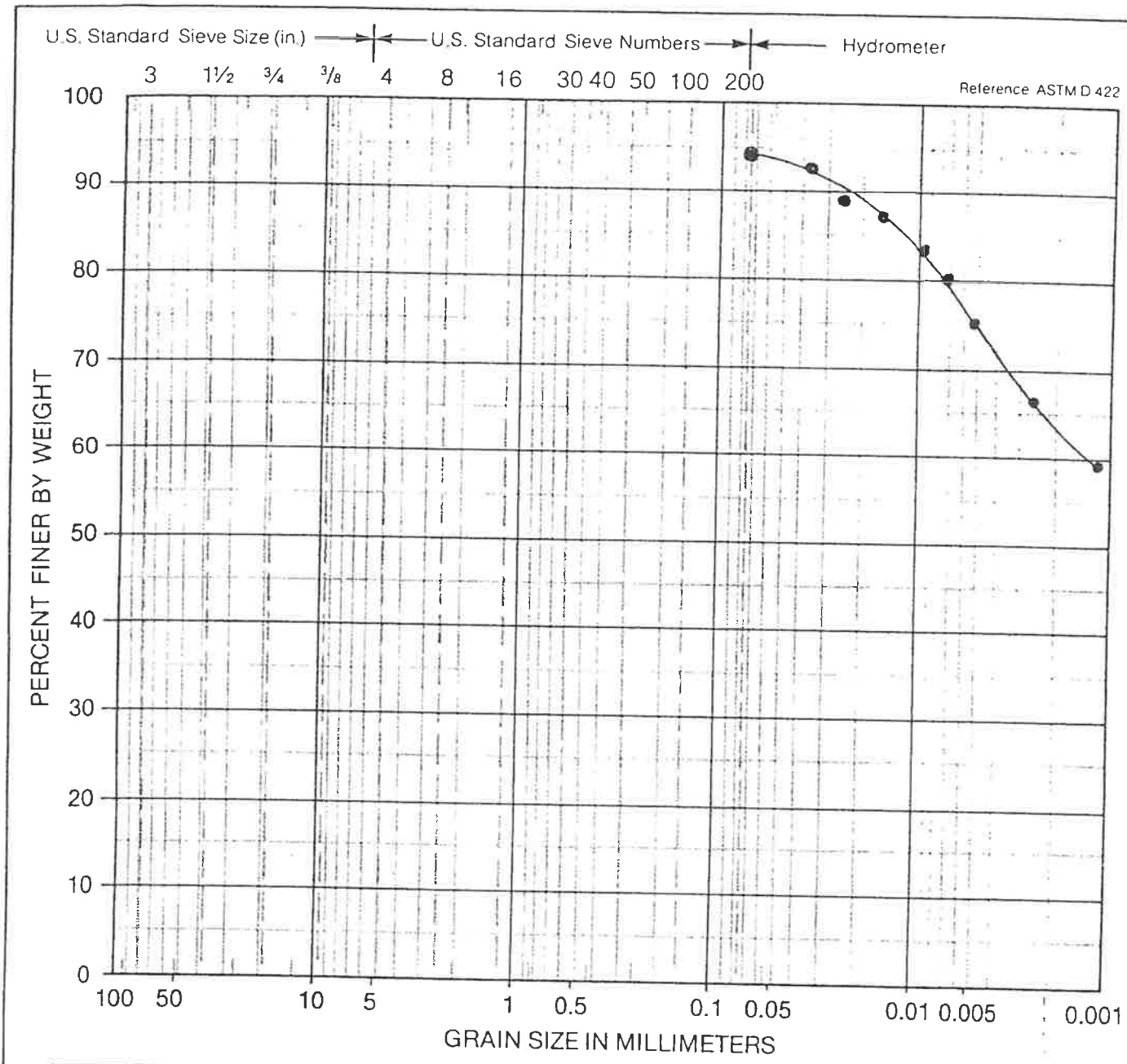
HMC
(030) 11.49
Wm+T = 20.35 (64)
Wd+T = 19.82

-200
Tare (T-2) 197.5
wd+T = 411.4 94.2

III-MH-94

206.3
218.9

* Reddish Brown CLAY (CH) w/ trace



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY silt : clay

Symbol	Sample Source	Classification
•	C-1 10'	Red, brown-gray clay CH

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

III-4H-95

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-1 @ 15.0

Total Sample Weight (g): 58.3

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 58.3

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0
Sand : 1.8
Silt : 9.1
Clay : 89.1

Particle Diameter (mm):

@ 60% Passing : -----
@ 30% Passing : -----
@ 10% Passing : -----

Coefficient of Curvature : ----

Coefficient of Uniformity : ----

Soil Classification : R.BROW LEAN CLAY

Symbol : CL*

Frost Classification : F4*

Data Entry By: MAP

File #: 365

III-4H-96

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-1 @ 15.0 Data File : TEST0365

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
No. 40	0.425	0.0	100.0
No. 50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	1.0	98.2

III-4H-97

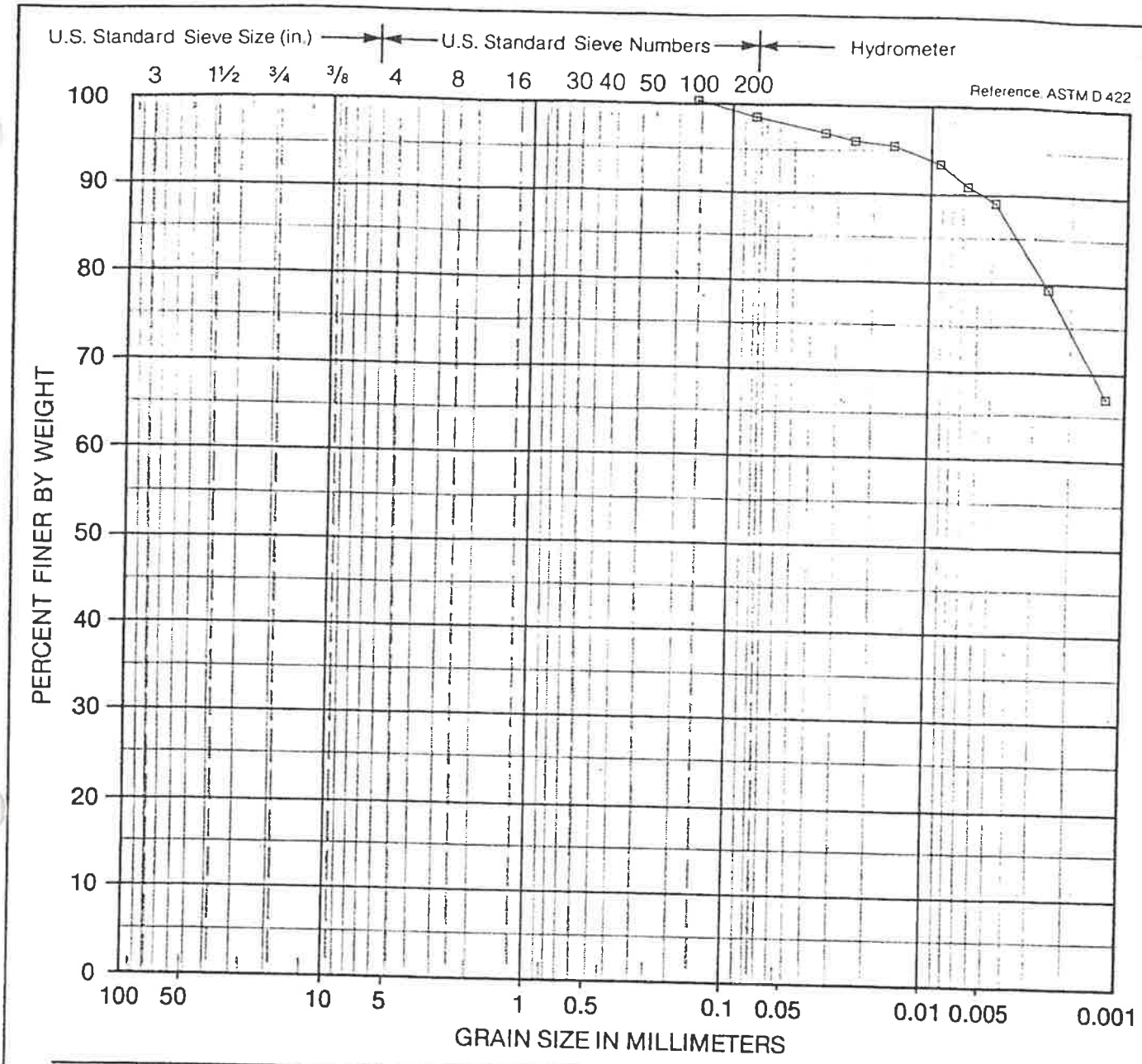
Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-1 @ 15.0 Data File : TEST0365

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	60.5	21.5	96.4	0.03330
2	60.0	21.5	95.6	0.02370
5	59.7	21.5	95.1	0.01504
15	58.5	21.5	93.0	0.00882
30	57.0	21.5	90.5	0.00635
60	56.0	21.0	88.6	0.00457
250	50.5	20.0	78.9	0.00240
1440	43.5	19.0	66.7	0.00123

III-4H-98



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
◘	C-1 @ 15.0 FT	R.BROW LEAN CLAY (CL)

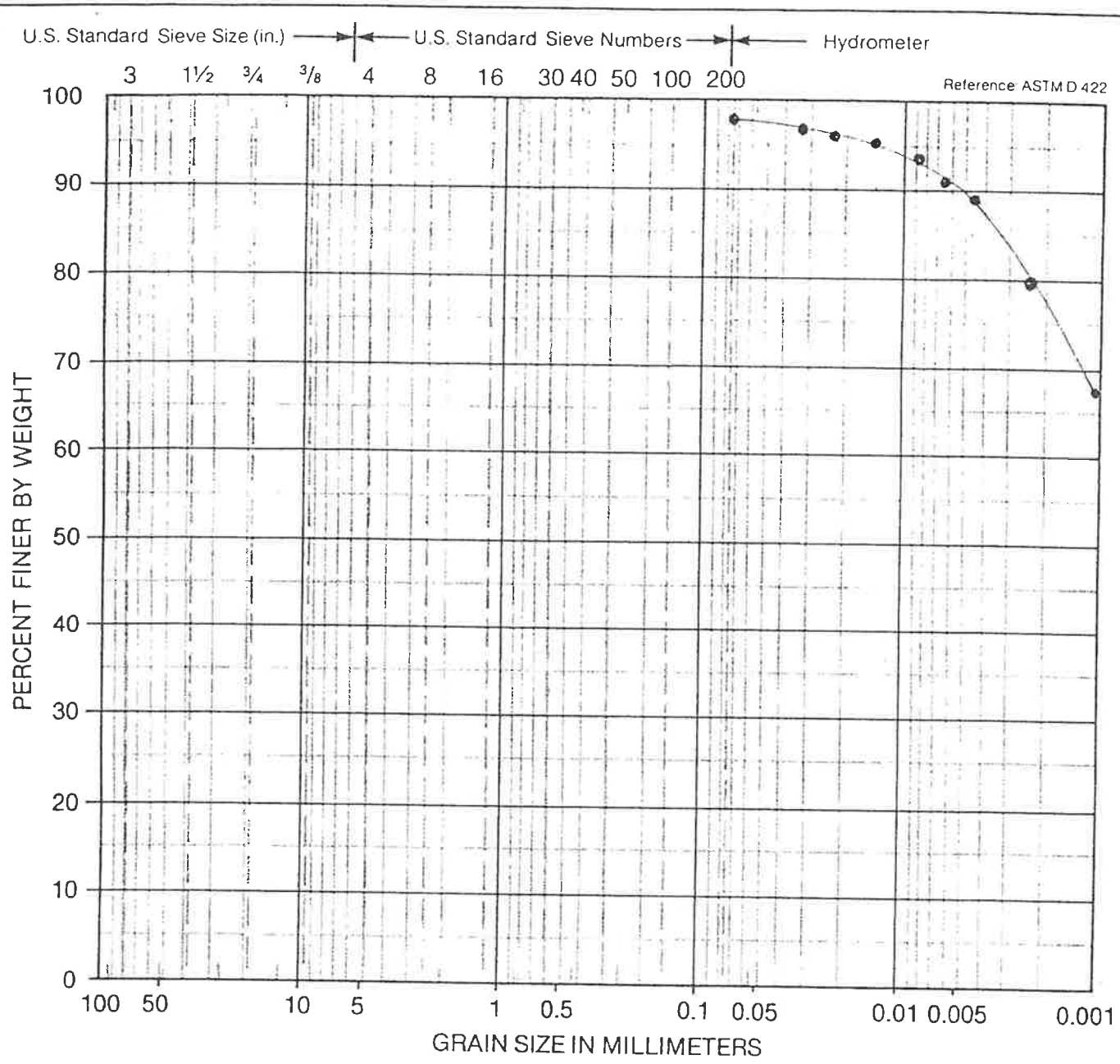
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

III-4H-99



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-8 15' (14'-14')	Red. brown and gray clay. CH

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-29-90		

III-4H-100

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: URBAN WASTE | Job No. \ 8615000612

Bor. No. C-8 | Bulk Sample No. | Depth or Elevation 15 | Date 10-9-90

15' (14-19)

TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
Wt. of Soil & Can (Dry)			1-1/2"	38.1					
			1"	25.4					
H_2O Loss			3/4"	19.1					
Wt. of Can			1/2"	12.7					
Wt. of Soil Dry			3/8"	9.52					
% Moisture			No. 4	4.76					
			Pan						
			Total						

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia., MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074						
270	0.053						98.2
Pan							
Total							

Sieve -200

Specific Gravity, G LL____ PI____ Classification

HYDROMETER (#1)

K_G = | Wt. of Hydrometer Sample 58.25 grams | Deflocculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading A Actual	Reading A Corr.	$\sqrt{L/T}$	Corrected Grain Size Diameter, MM.	% of Total Passing
8:57 1	0.078	21.5	.01328	60.5	56.5	2.529	.0336	97.0
:58 2	0.055	21.5	"	60.2	56.0	1.8028	.0239	96.1
9:02 5	0.035	21.5	"	59.7	55.7	1.1424	.0152	95.6
:12 15	0.020	21.5	"	58.5	54.5	.6683	.0089	93.6
:27 30	0.014	21.5	"	57.0	53.0	.4830	.0064	91.0
:57 60	0.010	21.0	"	56.0	52.0	.3440	.0046	89.3
1:06 250	0.005	20.0	.01344	50.5	46.5	.1789	.0024	79.8
8:56 1440	0.002	19	.01361	43.5	39.5	.0797	.0011	67.8

Tested by: | Computed by: | Checked by:

Hydrom

L-1 41.3

Wm+T= 101.0

Hmc III-4A-101

(034) 11.61

Wm+T= 16.59

Wd+T= 16.19

-200

ml

287.1

124.4

127.3

162.7 / 2.9 = 98.2

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-6 @ 25.0

Total Sample Weight (g): 42.9

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 42.9

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel	0.0
Sand	3.0
Silt	8.2
Clay	88.8

Particle Diameter (mm):

@ 60% Passing	-----
@ 30% Passing	-----
@ 10% Passing	-----

Coefficient of Curvature : ----

Coefficient of Uniformity : ----

Soil Classification : BROWN LEAN CLAY

Symbol : CL*

Frost Classification : F4*

Data Entry By: MAP

File #: 366

III-4H-102

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-6 @ 25.0 Data File : TEST0366

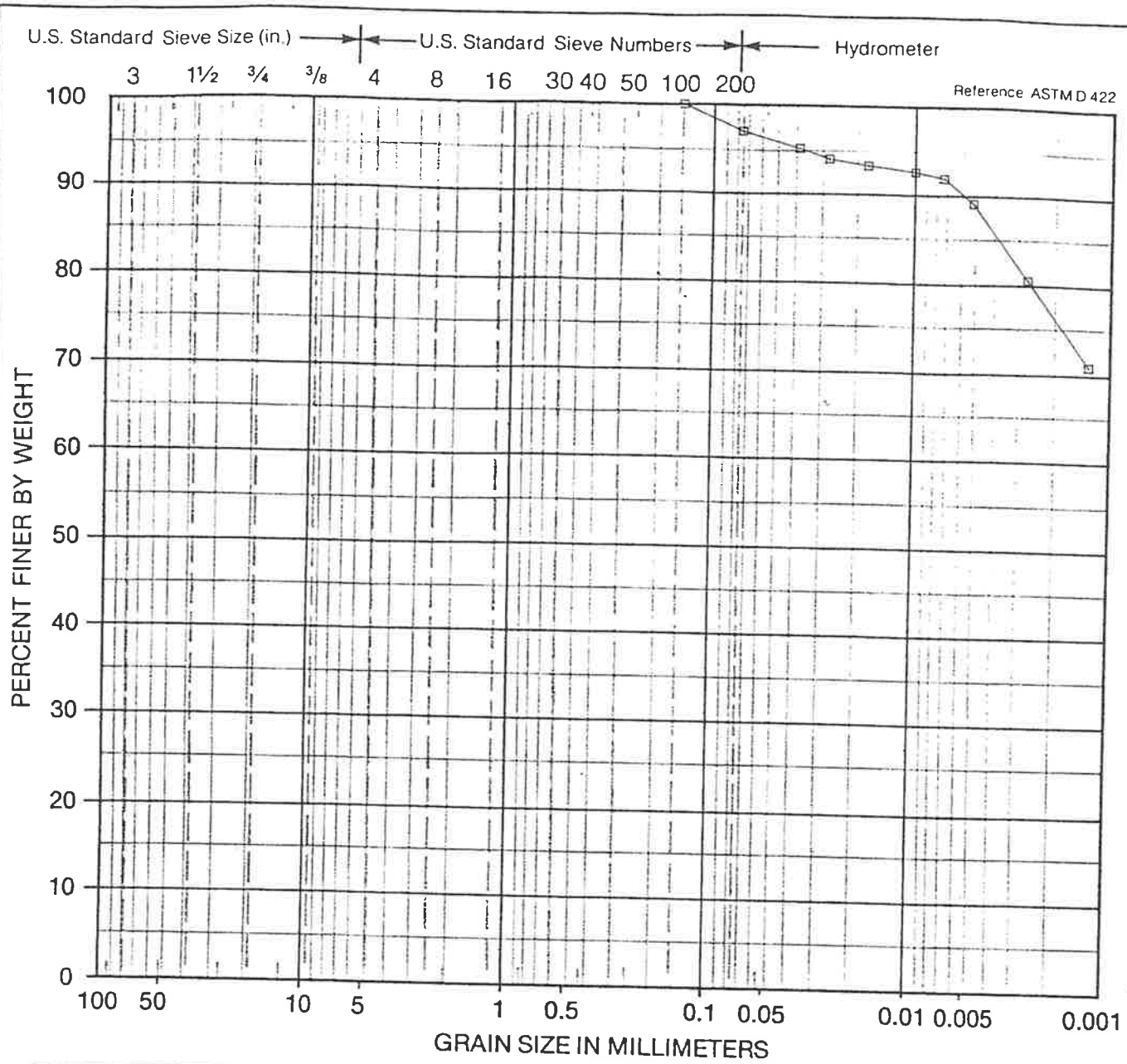
Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
No. 40	0.425	0.0	100.0
No. 50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	1.3	97.0

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-6 @ 25.0 Data File : TEST0366

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	45.0	21.5	95.1	0.03939
2	44.5	21.5	94.0	0.02798
5	44.2	21.5	93.3	0.01774
15	44.0	21.0	92.6	0.01032
30	43.7	21.0	91.9	0.00732
62	42.5	21.0	89.1	0.00515
250	39.0	20.0	80.6	0.00267
1440	35.0	19.0	70.9	0.00132



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
▣	C-6 @ 25.0 FT	BROWN LEAN CLAY (CL)

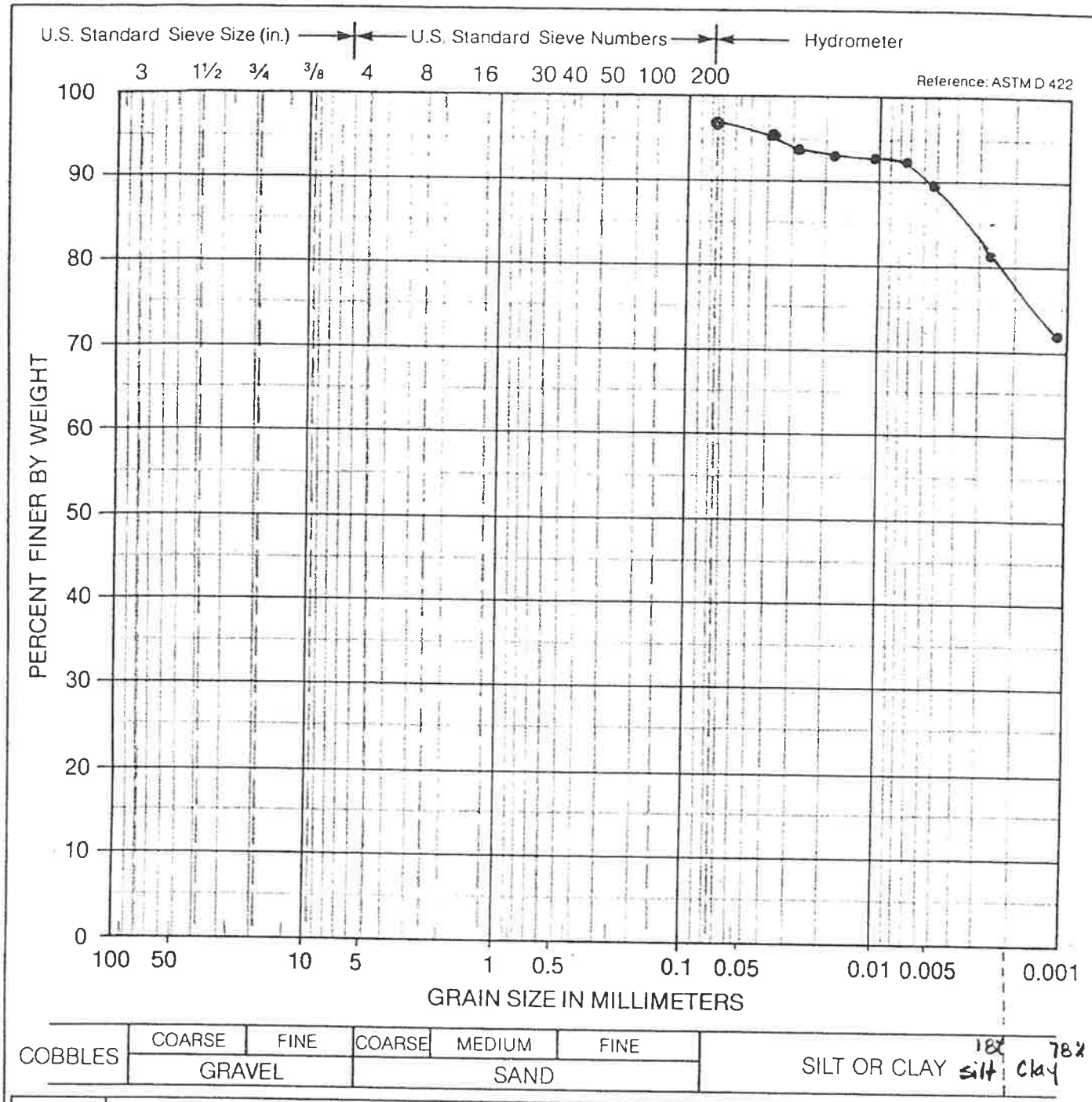
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

III-4H-105



Symbol	Sample Source	Classification
•	C-6 25' (24'-26')	Red. brown - gray clay CH?

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-106

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: URBAN WASTE | Job No. 18615 MB 12

Bor. No. C-6 | Bulk Sample No. | Depth or Elevation 25 | Date 10-8-90

25' (24'-26')

TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
			1-1/2"	38.1					
Wt. of Soil & Can (Dry)			1"	25.4					
			3/4"	19.1					
H2O Loss			1/2"	12.7					
Wt. of Can			3/8"	9.52					
Wt. of Soil Dry			No. 4	4.76					
			Pan						
% Moisture			Total						

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia., MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074						
270	0.053						97.0
Pan							
Total							

Specific Gravity, G LL____ PI____ Classification

HYDROMETER #4

K_G = | Wt. of Hydrometer Sample 42.93 grams | Defloculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading -4 Actual	Reading -4 Corr.	$\sqrt{\frac{L}{T}}$	Corrected Grain Size Diameter, MM.	% of Total Passing
9:24 1	0.078	21.5	.01328	45.0	41.0	2.983	.0396	95.5
:25 2	0.055	21.5		44.5	40.5	2.1213	.0282	94.3
:28 5	0.035	21.5		44.2	40.2	1.345	.0179	93.6
:38 15	0.020	21.0		44.0	40.0	.779	.0103	93.2
:53 30	0.014	21.0		43.5	39.7	.552	.0073	92.5
10:25 62	0.010	21.0		42.5	38.5	.387	.0051	89.7
1:33 250	0.005	20	.01344	39	35.0	.199	.0027	81.5
9:24 1440	0.002	19	.01361	35	31	.086	.0012	72.2

Tested by: SW | Computed by: SW | Checked by: SW

HYDROM

RH1 41.7

Wm+T: 88.24

HMC

033 11.81

Wm+T: 15.16 (8.4)

Wd+T: 14.90

III-4H-107

-200

AE-1 = 96.6

Wd+T = 225.7 97.0

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-4 @ 5.0

Total Sample Weight (g): 54.5

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 54.5

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0
Sand : 1.1
Silt : 10.0
Clay : 88.9

Particle Diameter (mm):

@ 60% Passing : -----
@ 30% Passing : -----
@ 10% Passing : -----

Coefficient of Curvature : ----

Coefficient of Uniformity : ----

Soil Classification : BROWN LEAN CLAY

Symbol : CL*

Frost Classification : F4*

Data Entry By: MAP

File #: 368

III-4H-108

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-4 @ 5.0 Data File : TEST0368

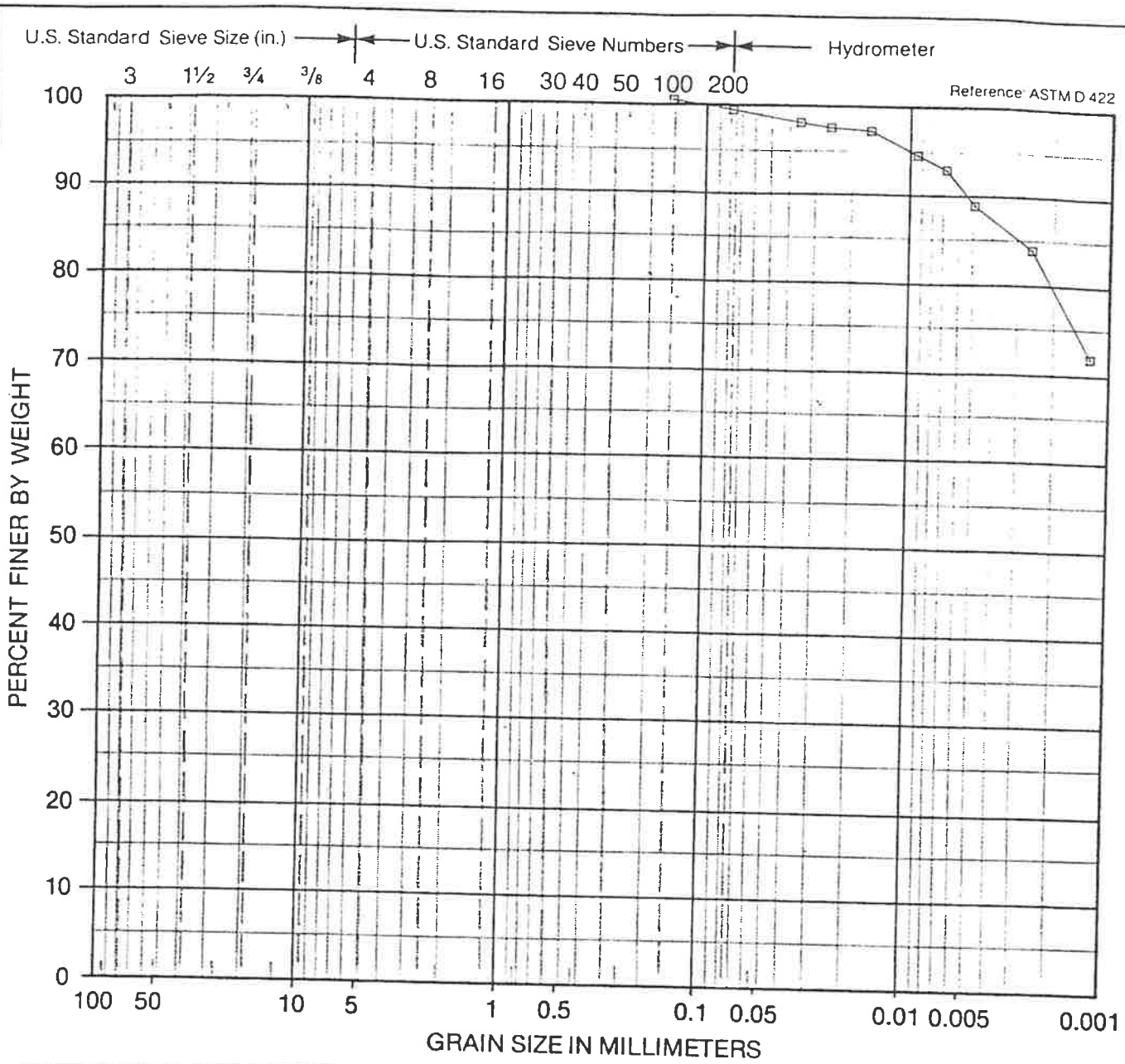
Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
No. 40	0.425	0.0	100.0
No. 50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	0.6	98.9

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-4 @ 5.0 Data File : TEST0368

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	57.5	21.5	97.5	0.03456
2	57.2	21.5	97.0	0.02453
5	57.0	21.5	96.6	0.01555
15	55.5	21.5	93.9	0.00913
30	54.7	21.0	92.3	0.00656
60	52.5	21.0	88.3	0.00475
250	50.0	20.0	83.4	0.00242
1440	43.5	19.0	71.2	0.00123



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
⊠	C-4 @ 5.0 FT	BROWN LEAN CLAY (CL)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-111

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: URBAN WASTE | Job No. 186150612

Bor. No. C-4 | Bulk Sample No. | Depth or Elevation 5' | Date 10-8-90

5' (2.5-7.5) TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
			1-1/2"	38.1					
Wt. of Soil & Can (Dry)			1"	25.4					
			3/4"	19.1					
H_2O Loss			1/2"	12.7					
			3/8"	9.52					
Wt. of Can			No. 4	4.76					
			Pan						
Wt. of Soil Dry			Total						
% Moisture									

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia., MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074						
270	0.053						98.9
Pan							
Total							

Specific Gravity, G _____ LL _____ PI _____ Classification

HYDROMETER #3

K_G = | Wt. of Hydrometer Sample 54.55 grams | Deflocculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading – 4 Actual	Reading – 4 Corr.	$\sqrt{L/T}$	Corrected Grain Size Diameter, MM.	% of Total Passing
9:15 1	0.078	21.5	.01312	57.5	53.5	2.627	.0345	98.1
:16 2	0.055	21.5		57.2	53.2	1.8641	.0245	97.5
:19 5	0.035	21.5		57.0	53.0	1.1832	.0155	97.2
:29 15	0.020	21.5	↓	55.5	51.5	.6928	.0091	94.4
:44 30	0.014	21.0	.01328	54.7	50.7	.4941	.0066	92.9
10:14 60	0.010	21.0	"	52.5	48.5	.3582	.0048	88.9
1:24 250	0.005	20.0	.01344	50.0	46.0	.1800	.0024	84.3
9:14 1440	0.002	19	.0136	43.5	39.5	.0797	.0011	72.4

Tested by: MA | Computed by: SW | Checked by: SW

HYDR HMC -200

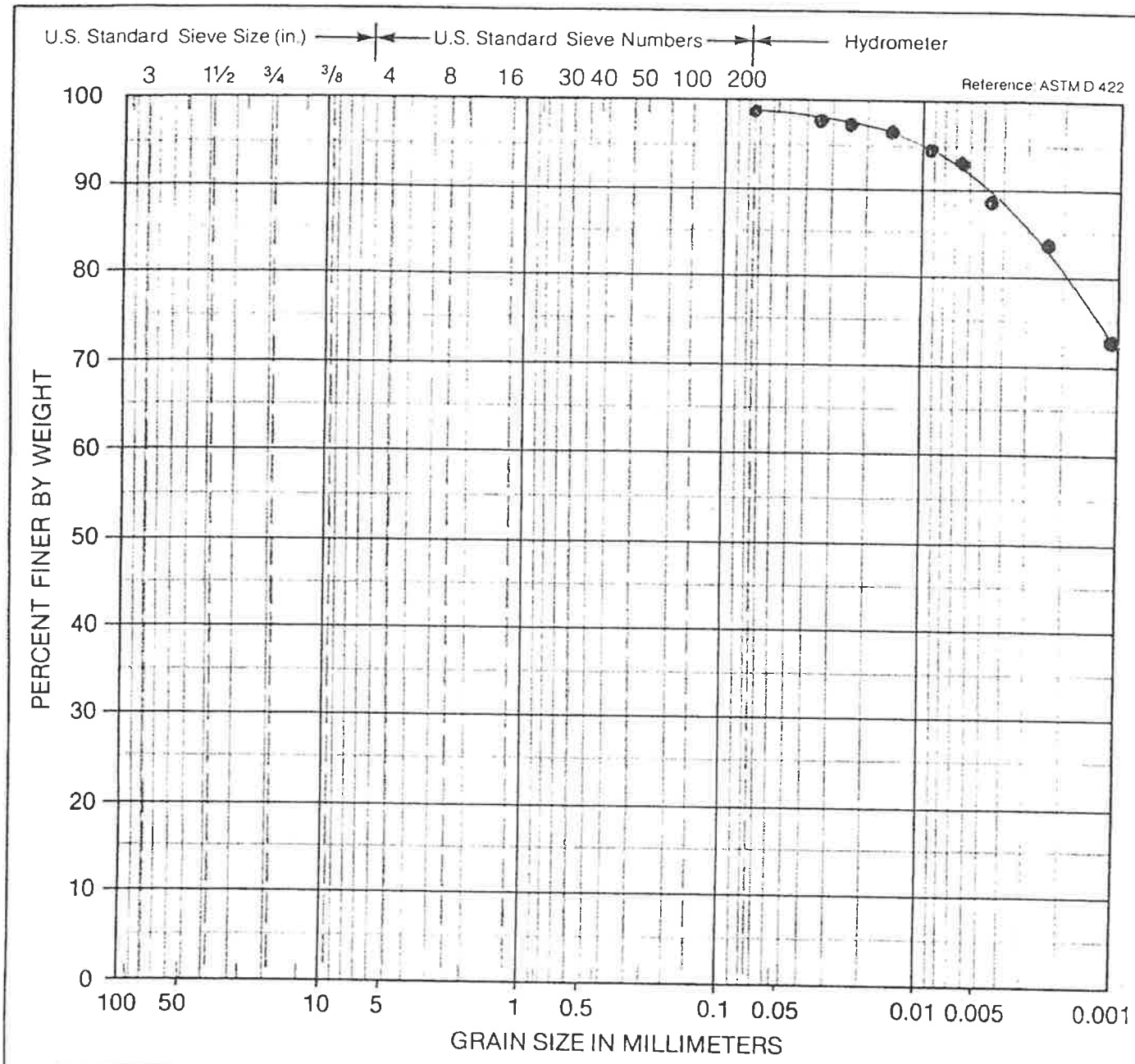
CAN# A (F28) 11.48 CAN# XJ-4

TARE 52.1 Wm+T= 19.11 TARE 168.0 Wd+T = 324.2 156.2

M+T 110.9 Wd+T= 18.56 7.8% Wd+T: 169.7 154.5 (=98.9)

Lt Brown CLAY

III-4H-112



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-4 5' (2.5'-7.5')	LIGHT BROWN CLAY CH?

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-113

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-29-90		

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-2 @ 5.0

Total Sample Weight (g): 50.5

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 50.5

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0
Sand : 2.0
Silt : 13.4
Clay : 84.6

Particle Diameter (mm):

@ 60% Passing : -----
@ 30% Passing : -----
@ 10% Passing : -----

Coefficient of Curvature : ----

Coefficient of Uniformity : ----

Soil Classification : GRAY LEAN CLAY

Symbol : CL*

Frost Classification : F4*

Data Entry By: MAP

File #: 370

III-4H-114

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-2 @ 5.0 Data File : TEST0370

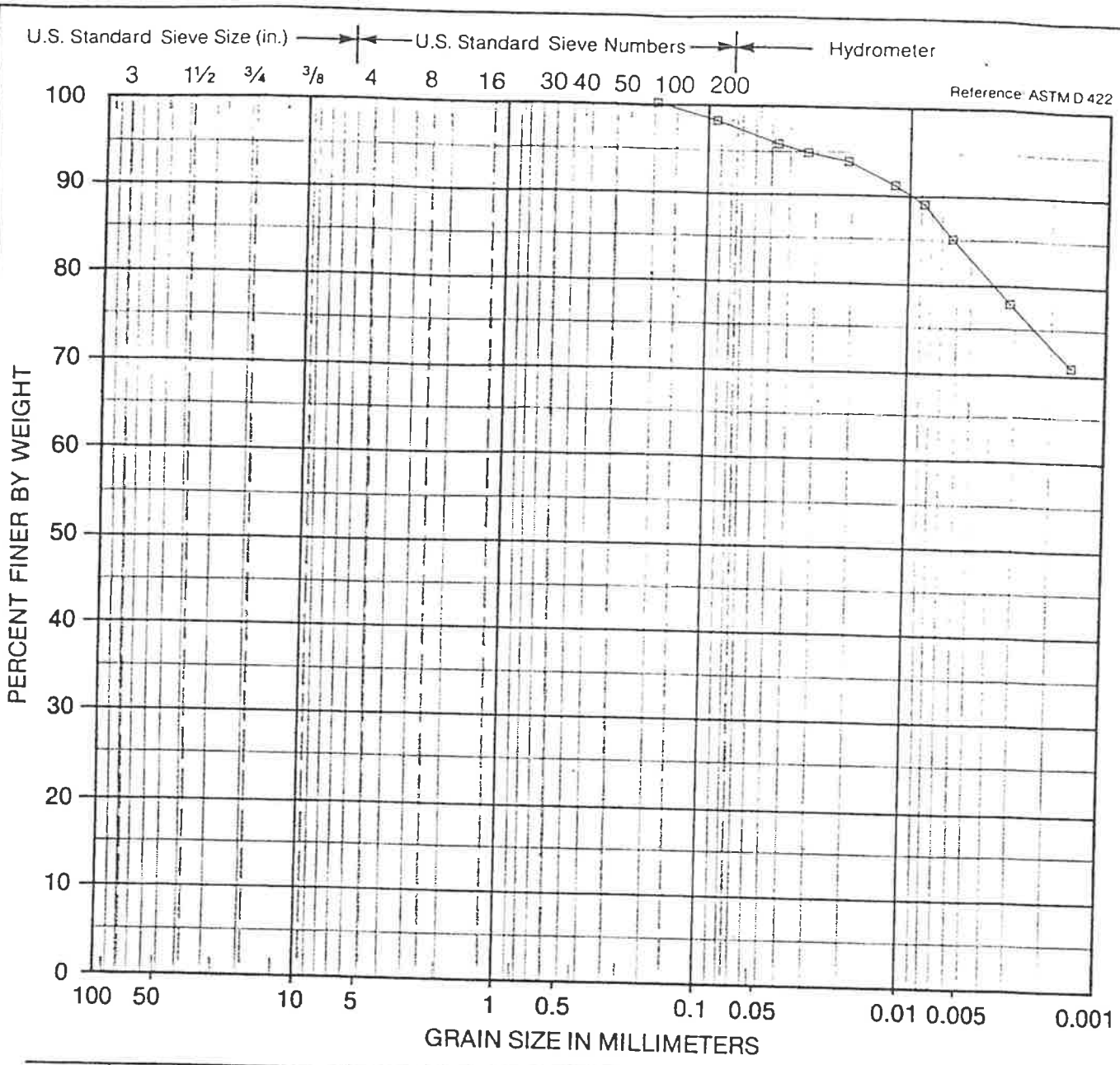
Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
No. 40	0.425	0.0	100.0
No. 50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	1.0	98.0

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-2 @ 5.0 Data File : TEST0370

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	52.5	21.0	95.4	0.03679
2	52.0	21.0	94.4	0.02615
5	51.5	21.0	93.4	0.01663
15	50.1	21.0	90.7	0.00974
30	49.0	21.0	88.5	0.00696
60	47.0	21.0	84.6	0.00502
250	43.5	20.0	77.3	0.00257
1440	40.0	19.0	70.1	0.00126



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
▫	C-2 @ 5.0 FT	GRAY LEAN CLAY (CL)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-117

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: URBAN WASTE | Job No. 861500612

Bor. No. C-2 | Bulk Sample No. | Depth or Elevation 5' | Date 10-8-90

5'(3'-8')

TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
			1-1/2"	38.1					
Wt. of Soil & Can (Dry)			1"	25.4					
			3/4"	19.1					
H_2O Loss			1/2"	12.7					
Wt. of Can			3/8"	9.52					
			No. 4	4.76					
Wt. of Soil Dry			Pan						
% Moisture			Total						

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia. .MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074						98.0
270	0.053						
Pan							
Total							

-200

Specific Gravity, G LL____ PI____ Classification

HYDROMETER #7

K_G = | Wt. of Hydrometer Sample 50.5 grams | Deflocculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading Actual	Reading Corr.	$\sqrt{L/T}$	Corrected Grain Size Diameter, MM.	% of Total Passing
9:50 1	0.078	21.0	.01328	52.5	48.5	2.7749	.0369	96.0
:51 2	0.055	21.0		52.0	48.0	1.9748	.0262	95.0
:54 5	0.035	21.0		51.5	47.5	1.2530	.0166	94.1
10:04 15	0.020	21.0		50.1	46.1	.7348	.0098	91.3
:19 30	0.014	21.0		49.0	45.0	.5260	.0070	89.1
:49 60	0.010	21.0	↓	47.0	43.0	.3766	.0050	85.1
1:59 250	0.005	20.0	.01344	43.5	39.5	.1913	.0026	76.2
1440	0.002	19.0	.01364	40.0	36.0	.0620	.0011	71.3

Tested by: | Computed by: | Checked by:

HYDROM

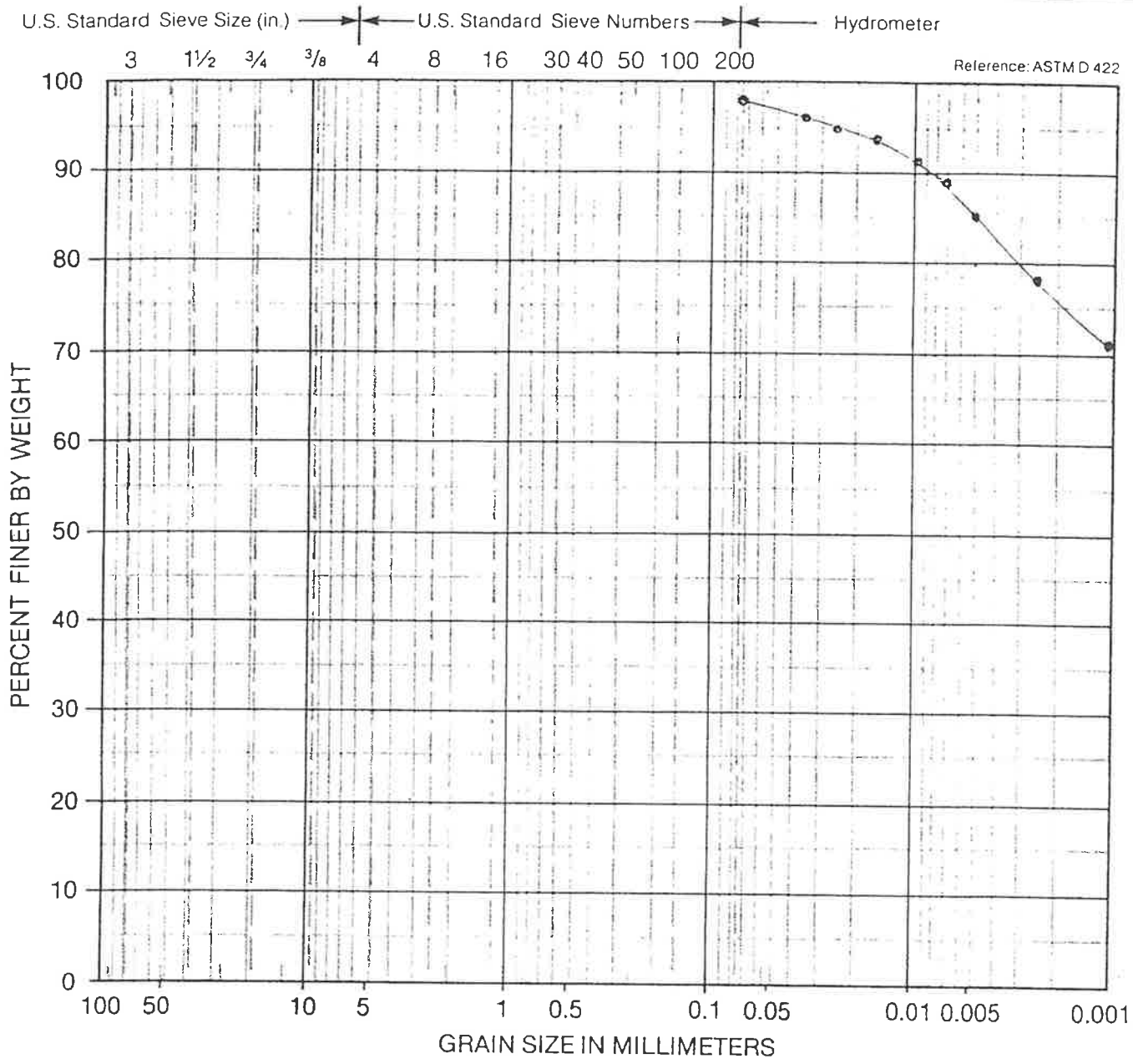
-3 38.7 here
WM+T= 88.9

HMC

013 11.52
WM+T= 18.24
WdT= 17.71

III-4H-118

-200 After wash
8.3 39.62
46.24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-2 5' (3-8')	LIGHT Tan and gray Clay CH

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-HH-119

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915.006.12		10-29-90		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-2 @ 41.0

Total Sample Weight (g): 190.0

Percent Passing No. 4 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0

Sand : 91.7

Fines : 8.3

Particle Diameter (mm):

@ 60% Passing : 0.2274

@ 30% Passing : 0.1670

@ 10% Passing : 0.0834

Coefficient of Uniformity: 2.73E 0

Coefficient of Curvature: 1.47E 0

Soil Classification: GRAY SAND W/CLAY (SP-SC*)

Frost Classification: F2**

Data Entry By: MAP

File #: 374

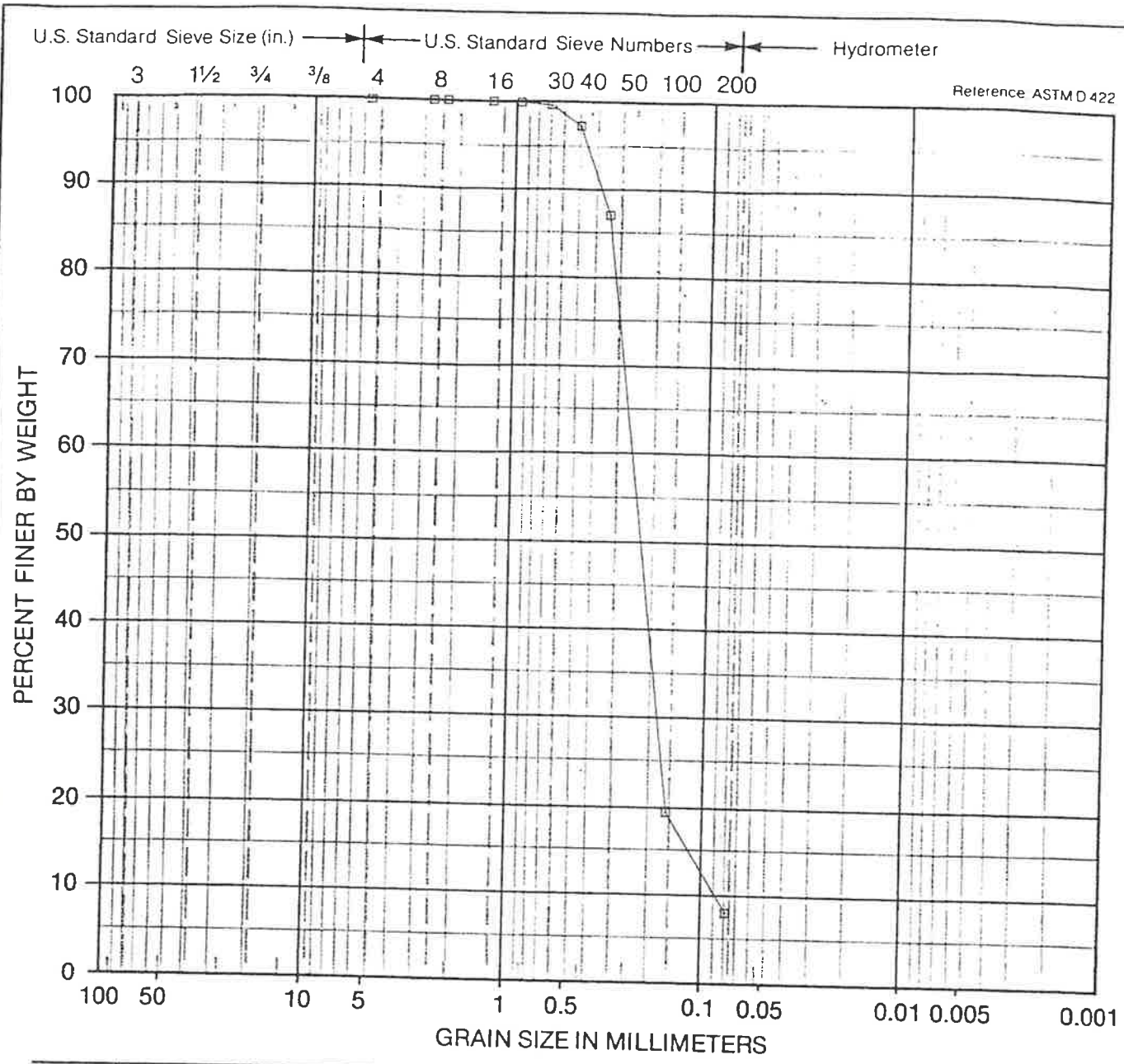
III-HH-120

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-2 @ 41.0 Data File : TEST0374

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.1	99.9
No. 10	2.000	0.1	99.9
No. 16	1.180	0.3	99.8
No. 20	0.850	0.5	99.7
No. 30	0.600	1.1	99.4
No. 40	0.425	5.7	97.0
No. 50	0.300	24.9	86.9
No. 100	0.150	152.8	19.6
No. 200	0.075	174.3	8.3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
▣	C-2 @ 41.0 FT	GRAY SAND W/CLAY (SP-SC)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-122

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

SIEVE ANALYSIS

HARDING LAWSON ASSOCIATES

JOB URBAN WASTE JOB NO. 18615 006 17

Sample Source C-2 41' (40.0-41.5) Tested by: MAP Date 10/8/92

Classification Lt Grey SAND(SP)

Before Washing
Dry Wt. Total Sample + Tare 286.0
Wt. Tare No. ICU-2, 96.0
Dry Wt. Total Sample ~~278.5~~ 190.0

☐ After Washing on #200
Dry Wt. Washed Sample + Tare 272.4
Wt. Tare No. _____, _____
Dry Wt. Washed Sample _____

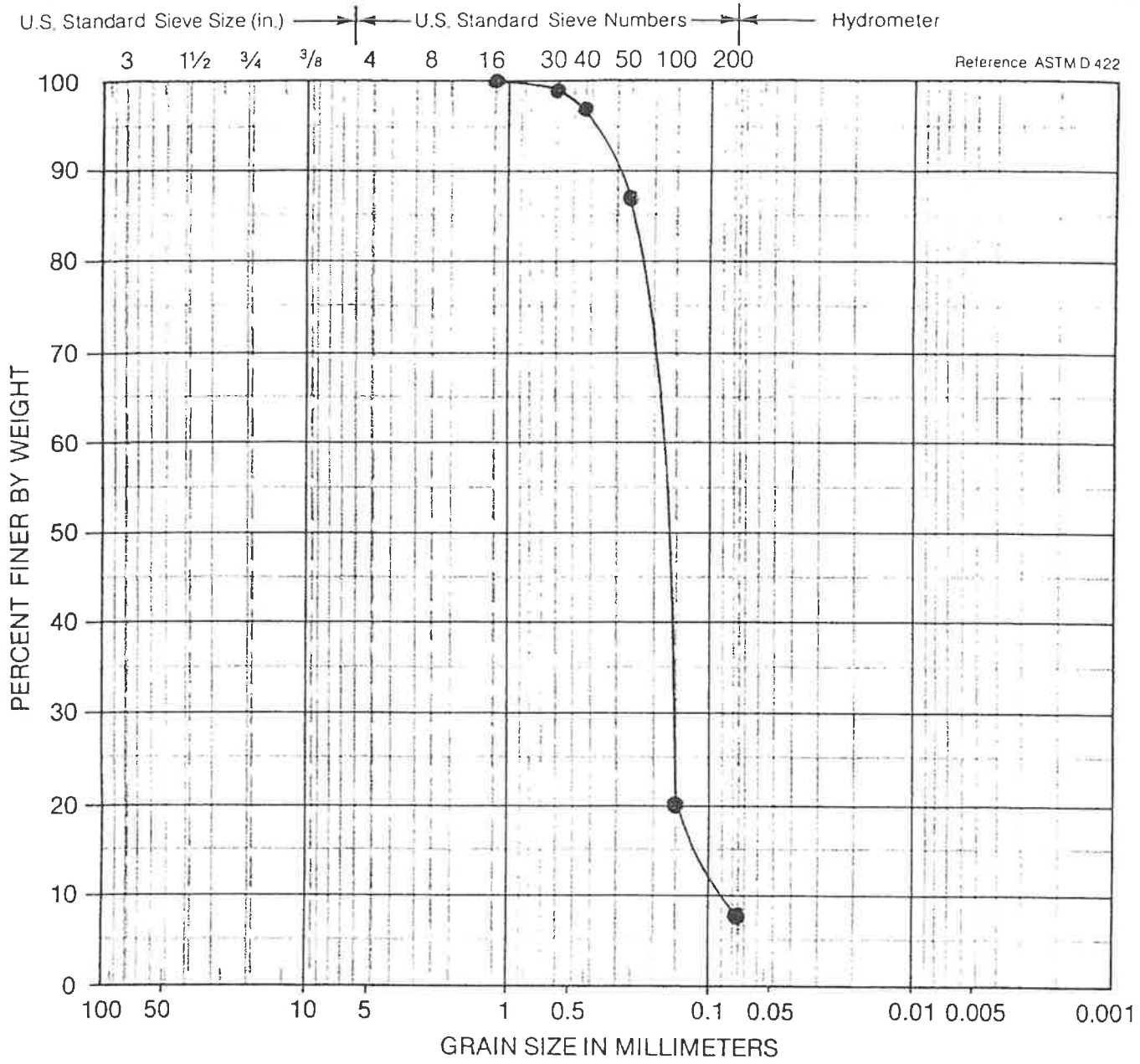
SIEVE SIZE	WEIGHT-RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	PERCENT FINER CUMULATIVE		CLASS 2 1½" MAX.	AGGREGATE BASE 3/4" MAX.
6"						
3"						
2"					100	
1½"					87-100	
1"						100
3/4"				GRAVEL %	45-90	87-100
1/2"						
3/8"						
4	0	0	100		20-50	30-60
8	0.1	0.1	99.9			
10	0.1	0.1	99.9			
16	0.3	0.2	99.8			
20	0.5	0.3	99.7			
30	1.1	0.6	99.4	SAND %	6-29	5-35
40	5.7	3.0	97.0			
50	24.9	13.1	86.9			
100	152.8	80.4	19.6			
200	174.3	91.7	8.3		0-12	0-12
PAN						
TOTAL	176.6					

FINES %

Remarks:

Tested by: MAP
Computed by: SW
Checked by: SW

III-4H-123



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-2 (40'-41.5') Actual → 41'	Gray poorly graded sand (SP)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-124

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-6 @ 39.0

Total Sample Weight (g): 244.1

Percent Passing No. 4 Sieve : 99.6

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.4

Sand : 1.3

Fines : 98.3

Particle Diameter (mm):

@ 60% Passing : ---

@ 30% Passing : ---

@ 10% Passing : ---

Coefficient of Uniformity: ----

Coefficient of Curvature: ----

Soil Classification: BROWN LEAN CLAY (CL*)

Frost Classification: F4***

Data Entry By: MAP

File #: 371

III-4H-125

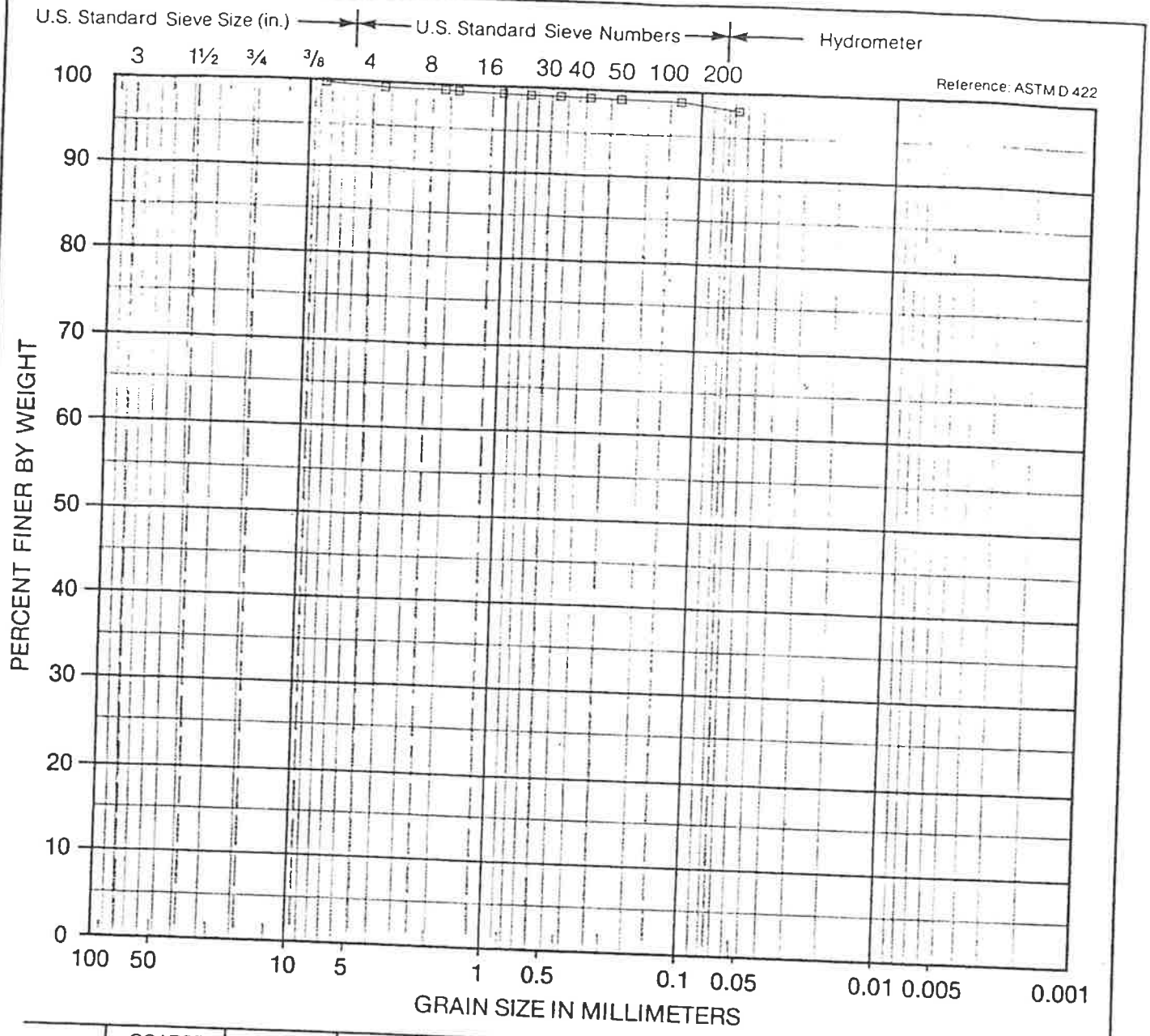
Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-6 @ 39.0 Data File : TEST0371

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	1.0	99.6
No. 8	2.360	1.1	99.5
No. 10	2.000	1.3	99.5
No. 16	1.180	1.5	99.4
No. 20	0.850	1.6	99.3
No. 30	0.600	1.6	99.3
No. 40	0.425	1.7	99.3
No. 50	0.300	1.8	99.3
No. 100	0.150	2.0	99.2
No. 200	0.075	4.1	98.3

III-4H-126



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
◘	C-6 @ 39.0 FT	BROWN LEAN CLAY (CL)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-127

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

SIEVE ANALYSIS

HARDING LAWSON ASSOCIATES

JOB URBAN WASTE JOB NO. 18615.004.12

Sample Source C-6 39' (39-44) Tested by: MAP Date 10/9/90

Classification Lt Brown +6mg SANDY CLAY (CL)

Before Washing
Dry Wt. Total Sample + Tare 436.6
Wt. Tare No. T-3, 192.5
Dry Wt. Total Sample 244.1

☐ After Washing on #200
Dry Wt. Washed Sample + Tare 197.3
Wt. Tare No. T-3, 192.5
Dry Wt. Washed Sample

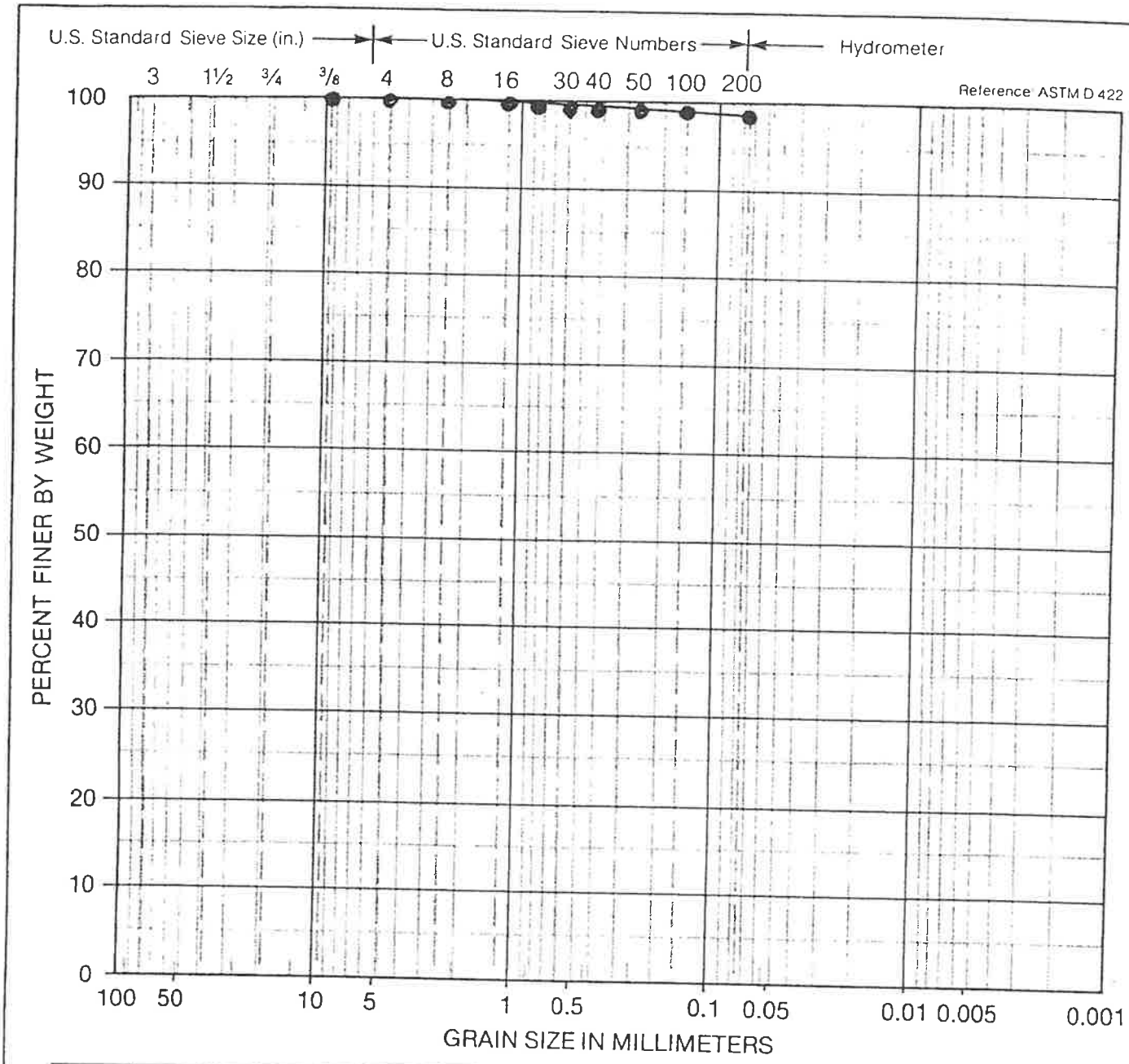
SIEVE SIZE	WEIGHT-RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	PERCENT FINER CUMULATIVE		CLASS 2 1½" MAX.	AGGREGATE BASE 3/8" MAX.
6"						
3"						
2"					100	
1½"					87-100	
1"						100
3/4"				GRAVEL %	45-90	87-100
1/2"						
3/8"	0	0	100			
4	1.0	0.4	99.6		20-50	30-60
8	1.1	0.5	99.5			
10	1.3	0.5	99.5			
16	1.5	0.6	99.4			
20	1.6	0.7	99.3			
30	1.6	0.7	99.3	SAND %	6-29	5-35
40	1.7	0.7	99.3			
50	1.8	0.7	99.3			
100	2.0	0.8	99.2			
200	4.1	1.7	98.3		0-12	0-12
PAN				FINES %		
TOTAL	5.0					

Remarks:

Lt Brown SANDY CLAY (CL)

Tested by: MAP
Computed by: SW
Checked by: SW

III-4H-128



Symbol	Sample Source	Classification
•	C-6 39′ (39′-44′)	Brown and gray Clay (CL)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-129

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-1 @ 75.0

Total Sample Weight (g): 536.4

Percent Passing No. 4 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 17.5

Sand : 61.5

Fines : 21.0

Particle Diameter (mm):

@ 60% Passing : 2.2036

@ 30% Passing : 0.5833

@ 10% Passing : 0.0024

Coefficient of Uniformity: 9.11E 2

Coefficient of Curvature: 6.38E 1

Soil Classification: BROWN SILTY SAND W/GRAVEL (SM*)

Frost Classification: F4**

Data Entry By: MAP

File #: 375

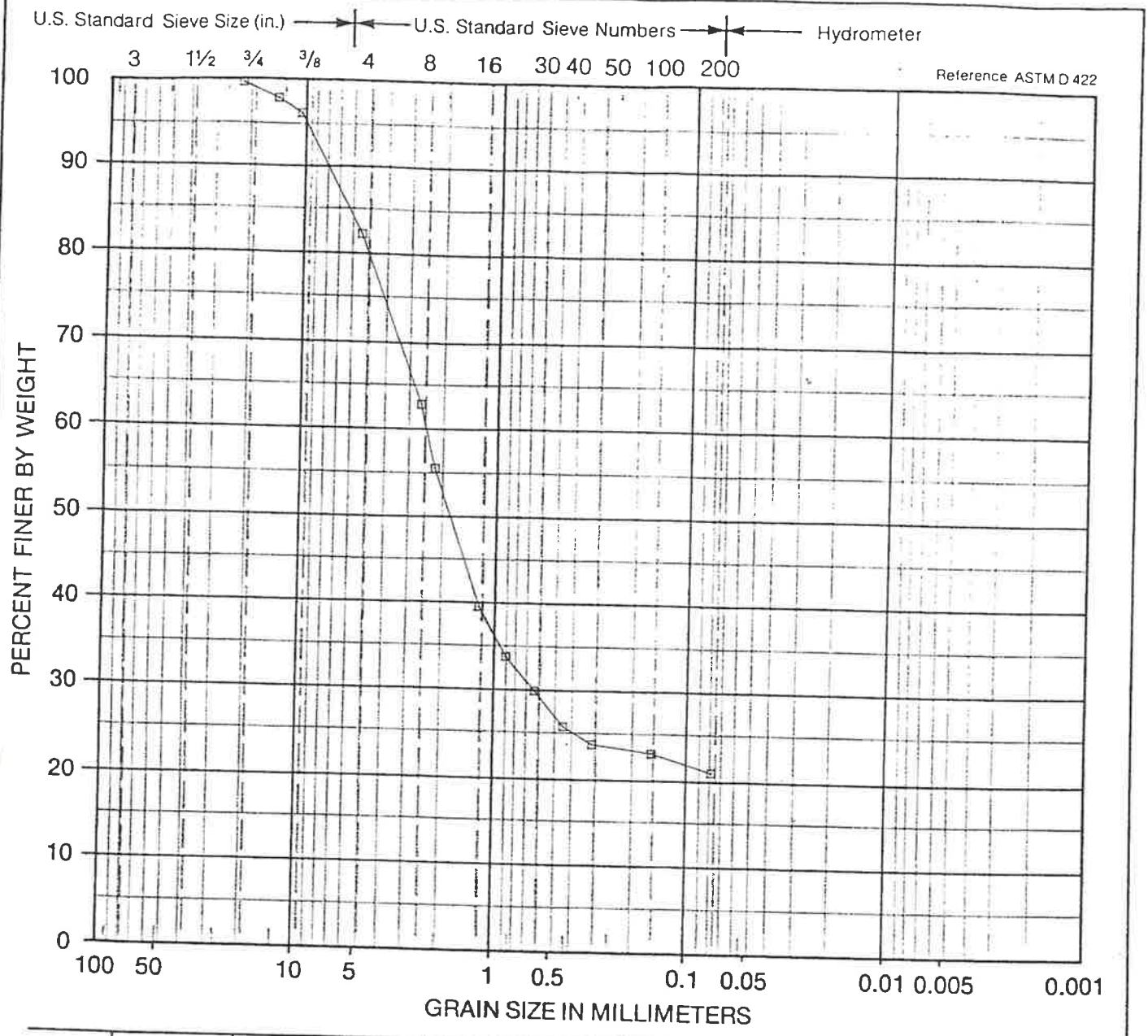
III-4H-130

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-1 @ 75.0 Data File : TEST0375

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	9.9	98.2
3/8 in	9.500	19.4	96.4
No. 4	4.750	93.9	82.5
No. 8	2.360	198.4	63.0
No. 10	2.000	237.4	55.7
No. 16	1.180	322.0	40.0
No. 20	0.850	352.6	34.3
No. 30	0.600	373.7	30.3
No. 40	0.425	395.5	26.3
No. 50	0.300	406.3	24.3
No. 100	0.150	411.9	23.2
No. 200	0.075	423.8	21.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
⊕	C-1 @ 75.0 FT	BROWN SILTY SAND W/GRAVEL (SM)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-132

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

SIEVE ANALYSIS

HARDING LAWSON ASSOCIATES

JOB URBAN WASTE JOB NO. 186150012

Sample Source C-1 75' (74-76) Tested by: MAP Date 10/8/90

Classification Lt Reddish Brown SAND + GRAVEL

Before Washing
Dry Wt. Total Sample + Tare 698.0
Wt. Tare No. M50, 161.6
Dry Wt. Total Sample ~~536.0~~ 536.4

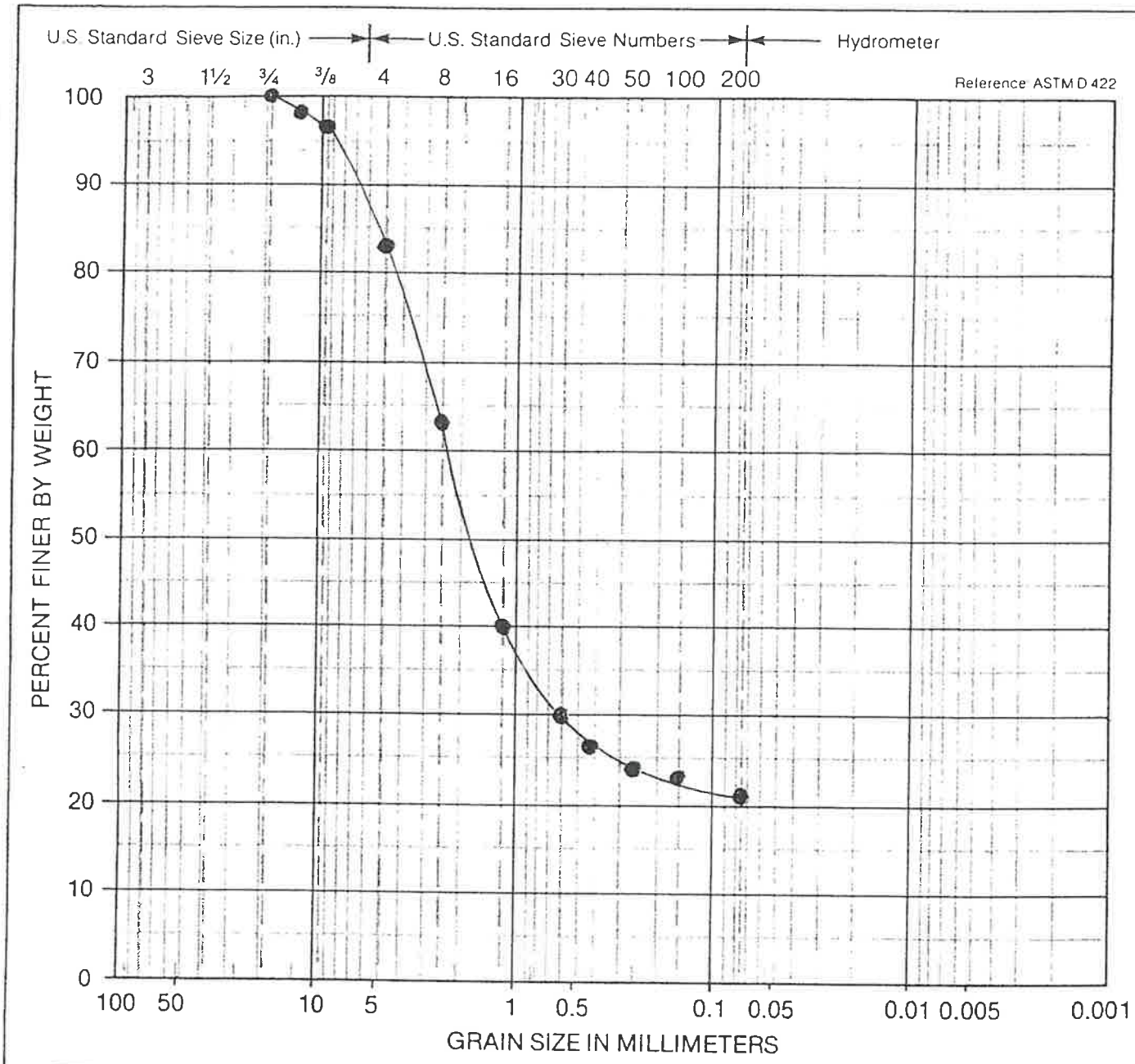
☐ After Washing on #200
Dry Wt. Washed Sample + Tare
Wt. Tare No. ,
Dry Wt. Washed Sample 425.7

SIEVE SIZE	WEIGHT-RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	PERCENT FINER CUMULATIVE		CLASS 2 1½" MAX.	AGGREGATE BASE 3/4" MAX.
6"						
3"						
2"					100	
1½"					87-100	
1"						100
3/4"	0	0	100	GRAVEL	45-90	87-100
1/2"	9.9	1.8	98.2			
3/8"	19.4	3.6	96.6			
4	93.9	17.5	82.5		20-50	30-60
8	198.4	37.0	63.0			
10	237.4	44.3	55.7			
16	322.0	60.0	40.0			
20	352.6	65.7	34.3			
30	373.7	69.7	30.3	SAND	6-29	5-35
40	395.5	73.7	26.3	61.9%		
50	406.3	75.7	24.3			
100	411.9	76.8	23.2			
200	423.8	79.0	21.0		0-12	0-12
PAN				FINES		
TOTAL	425.7					

Remarks:

Tested by: MAP
Computed by: SW
Checked by: SW

III-4H-133



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
●	C-1 (74'-76') 75'	Reddish brown-gray silty sand with gravel. (SM)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-134

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-5 @ 55.0

Total Sample Weight (g): 330.8

Percent Passing No. 4 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: --- Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0
Sand : 28.9
Fines : 71.1

Particle Diameter (mm):

@ 60% Passing : ---
@ 30% Passing : ---
@ 10% Passing : ---

Coefficient of Uniformity: ----

Coefficient of Curvature: ----

Soil Classification: GRAY LEAN CLAY W/SAND (CL*)

Frost Classification: F4***

Data Entry By: MAP

File #: 372

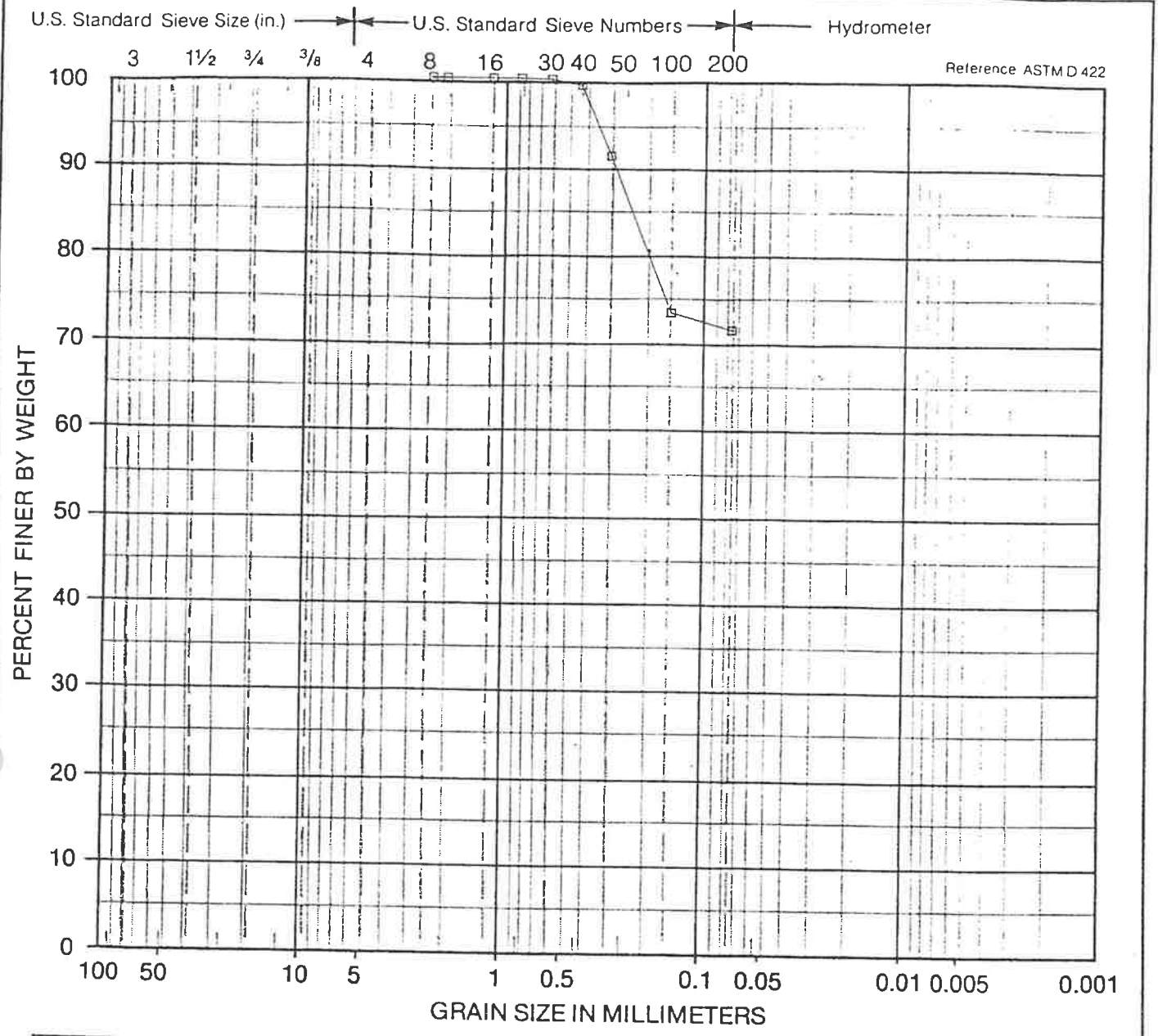
III-HH-135

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-5 @ 55.0 Data File : TEST0372

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.1	100.0
No. 16	1.180	0.2	99.9
No. 20	0.850	0.3	99.9
No. 30	0.600	0.7	99.8
No. 40	0.425	3.0	99.1
No. 50	0.300	29.9	91.0
No. 100	0.150	88.9	73.1
No. 200	0.075	95.7	71.1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
⊡	C-5 @ 55.0 FT	GRAY LEAN CLAY W/SAND (CL)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-137

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

SIEVE ANALYSIS

HARDING LAWSON ASSOCIATES

JOB ~~BAILEY~~ UWT JOB NO. ~~19539-23-12~~ 1861500612

Sample Source WASH SAND C-5 Tested by: MAr Date 10/11/90

Classification TC FINE SAND

Before Washing
Dry Wt. Total Sample + Tare 426.8
Wt. Tare No. 1CU2, 96.0
Dry Wt. Total Sample ~~330.8~~ ~~[illegible]~~ / 330.8

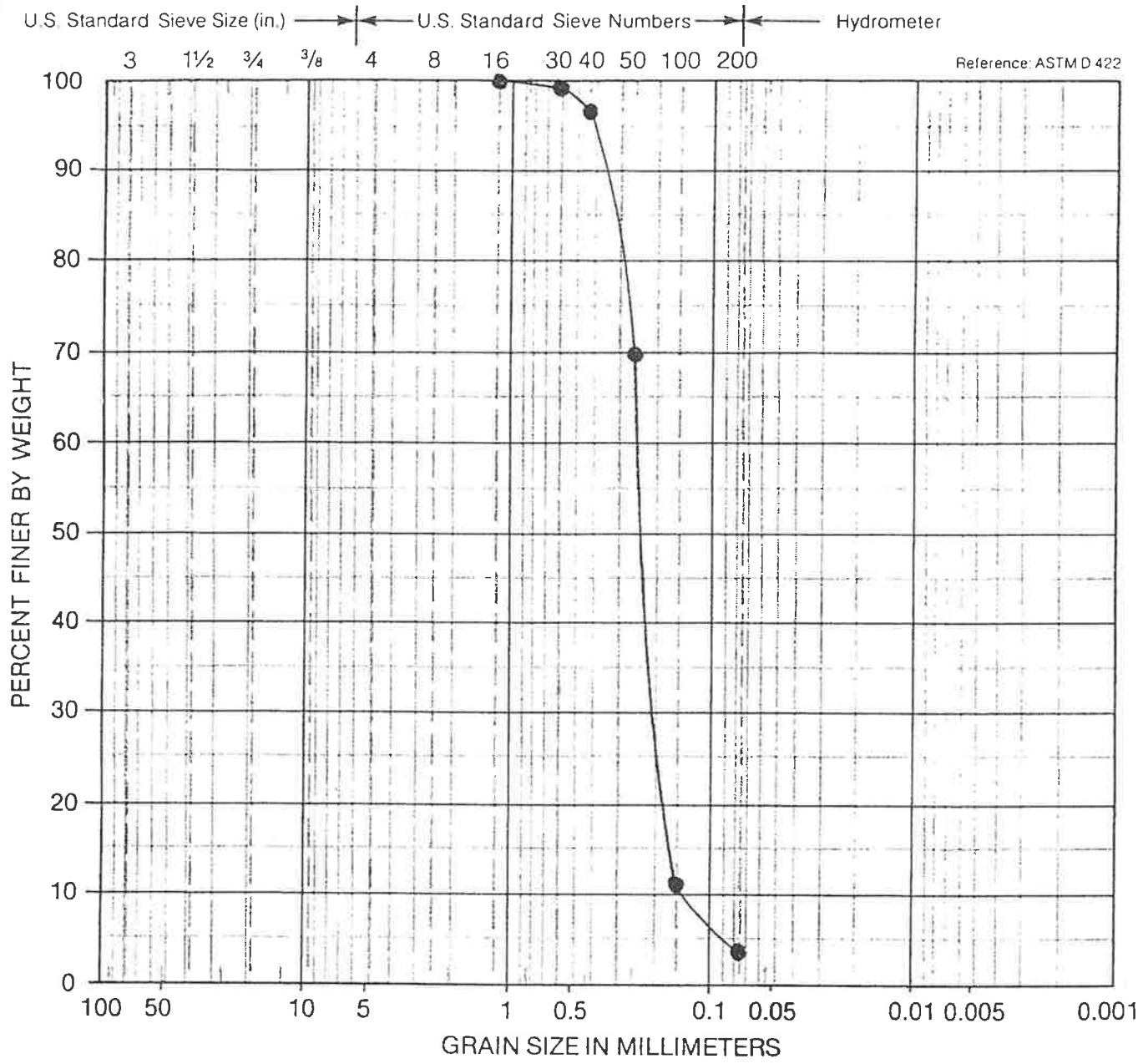
After Washing on #200
Dry Wt. Washed Sample + Tare [redacted]
Wt. Tare No. 1CU2, ~~101.0~~ 96.0
Dry Wt. Washed Sample [redacted]

SIEVE SIZE	WEIGHT-RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	PERCENT FINER CUMULATIVE		CLASS 2 AGGREGATE BASE 1½" MAX.	CLASS 2 AGGREGATE BASE 3/4" MAX.
6"						
3"						
2"					100	
1½"					87-100	
1"						100
3/4"				GRAVEL	45-90	87-100
1/2"						
3/8"	~~0~~					
4	~~1.0~~ 0	0	100		20-50	30-60
8	~~1.1~~ 0.1	0	100			
10	~~1.3~~ 0.3	0.1	99.9			
16	~~1.5~~ 0.6	0.2	99.8			
20	~~1.6~~ 1.1	0.3	99.7			
30	~~1.6~~ 2.2	0.7	99.3	SAND	6-29	5-35
40	~~1.7~~ 9.8	3.0	97.0			
50	~~1.8~~ 99.0	29.9	70.1			
100	~~2.0~~ 294.1	88.9	11.1			
200	~~4.1~~ 316.6	95.7	4.3		0-12	0-12
PAN						
TOTAL	~~5.0~~ 318.5			FINES		

Remarks:

Tested by: MAr
Computed by: SW
Checked by: SW

III-4H-138



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-5 (50'-70') – upper portion of zone –	TAN-GRAY Poorly graded sand (SP)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-139

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-3 @ 76.0

Total Sample Weight (g): 369.9

Percent Passing No. 4 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0
Sand : 86.9
Fines : 13.1

Particle Diameter (mm):

@ 60% Passing : 0.2127
@ 30% Passing : 0.1564
@ 10% Passing : 0.0635

Coefficient of Uniformity: 3.35E 0

Coefficient of Curvature: 1.81E 0

Soil Classification: TAN SILTY SAND (SM*)

Frost Classification: F2**

Data Entry By: MAP

File #: 373

III-4H-140

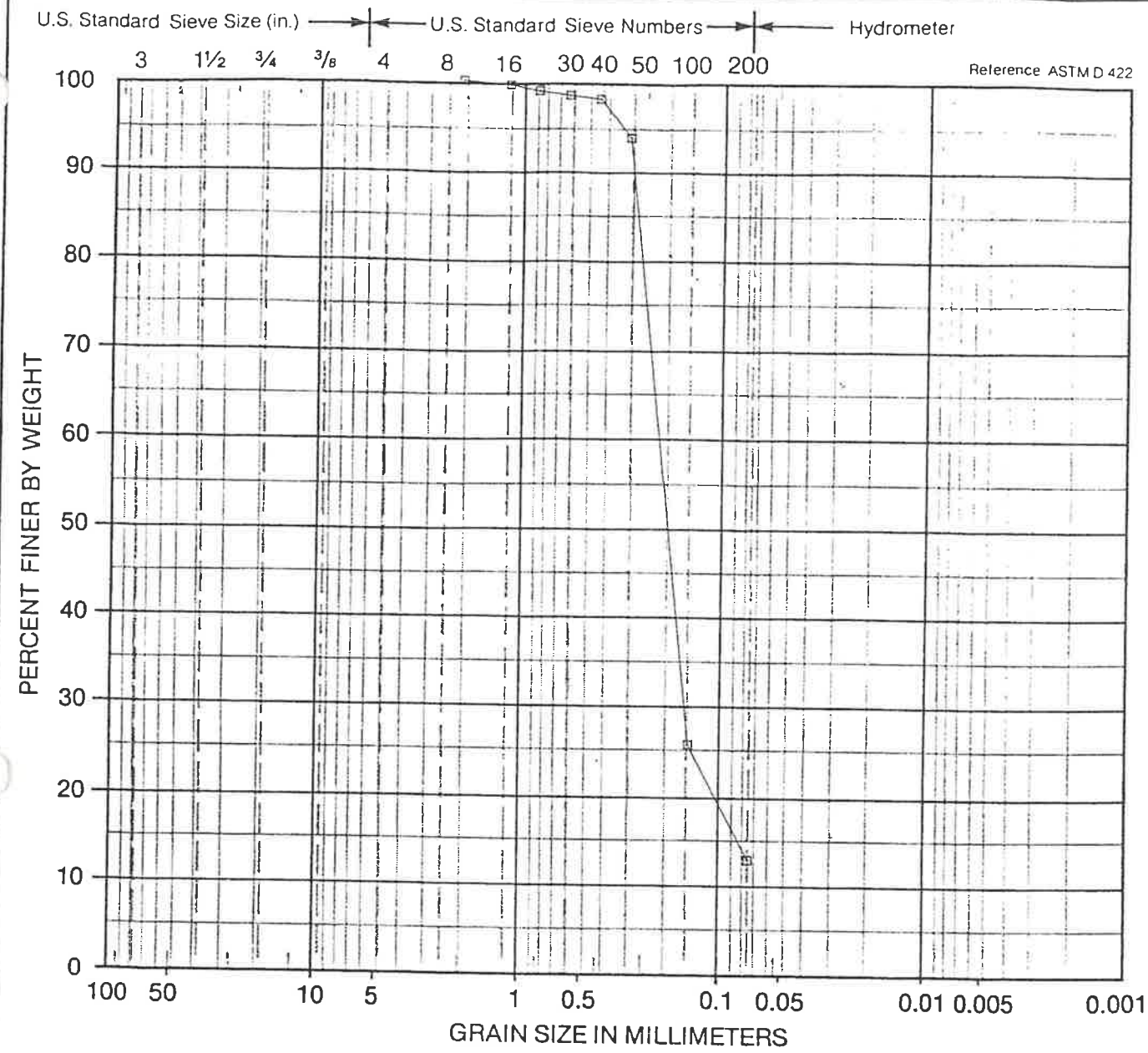
Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-3 @ 76.0 Data File : TEST0373

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	1.9	99.5
No. 20	0.850	4.3	98.8
No. 30	0.600	6.2	98.3
No. 40	0.425	7.8	97.9
No. 50	0.300	23.9	93.5
No. 100	0.150	274.1	25.9
No. 200	0.075	321.5	13.1

III-HH-141



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
⊡	C-3 @ 76.0 FT	TAN SILTY SAND (SM)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-142

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

SIEVE ANALYSIS

HARDING LAWSON ASSOCIATES

JOB URBAN WASTE JOB NO.

Sample Source C-3 75'-85' (74-79) Tested by: MAP Date 10/18/82

Classification Tan SAND (SP)

Before Washing
Dry Wt. Total Sample + Tare 516.6
Wt. Tare No. A5, 146.7
Dry Wt. Total Sample 369.9

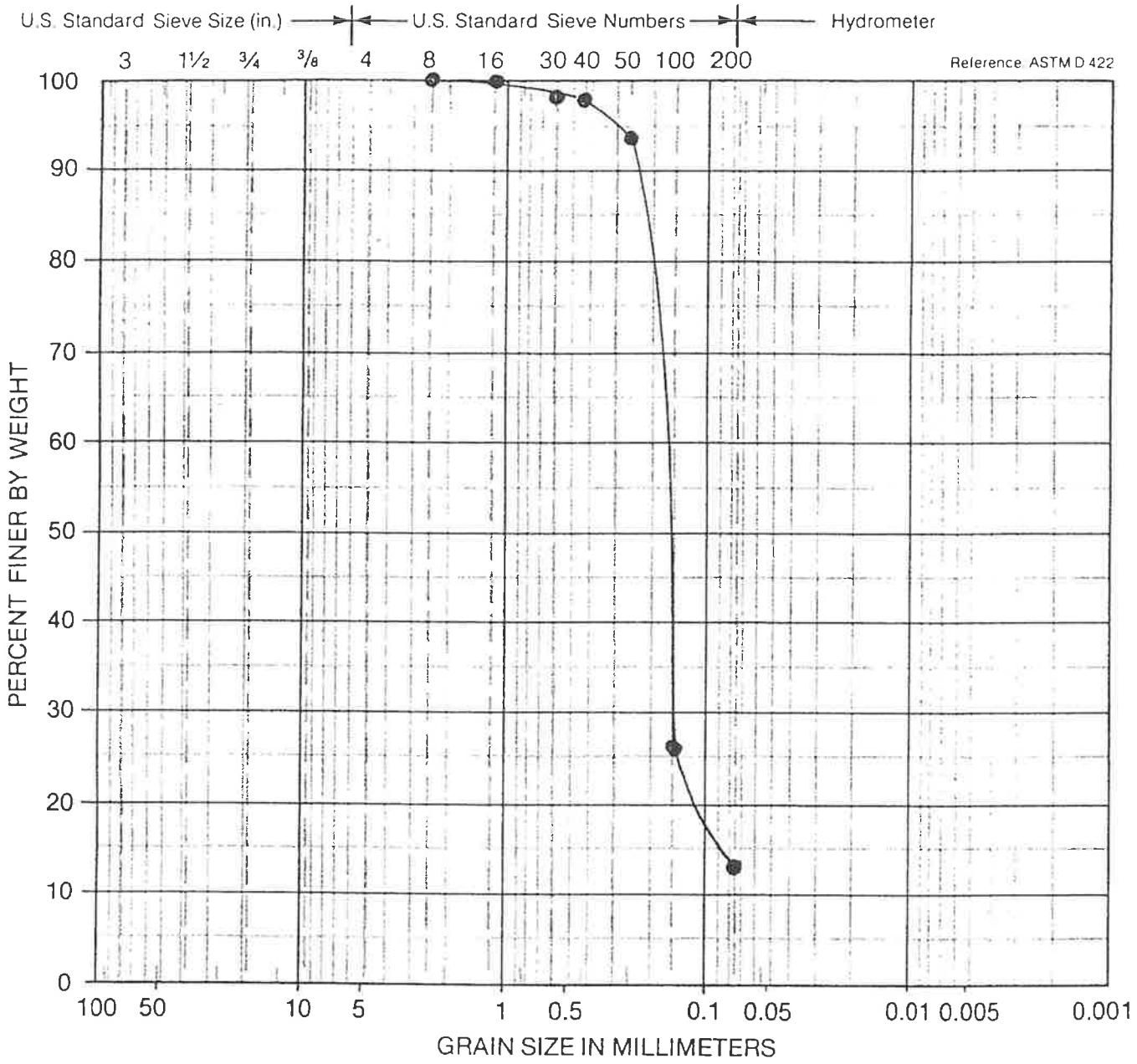
☐ After Washing on #200
Dry Wt. Washed Sample + Tare 473.4
Wt. Tare No. , 146.7
Dry Wt. Washed Sample

SIEVE SIZE	WEIGHT-RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	PERCENT FINER CUMULATIVE		CLASS 2 1½" MAX.	AGGRECATE BASE 3/8" MAX.
6"						
3"						
2"					100	
1½"					87-100	
1"						100
3/4"				GRAVEL	45-90	87-100
1/2"						
3/8"						
4					20-50	30-60
8						
10	0	0	100			
16	1.9	0.5	99.5			
20	4.3	1.2	98.8			
30	6.2	1.7	98.3	SAND	6-29	5-35
40	7.8	2.1	97.9			
50	23.9	6.5	93.5			
100	274.1	74.1	25.9			
200	321.5	86.9	13.1		0-12	0-12
PAN				FINES		
TOTAL	326.5					

Remarks:

Tested by: MAP
Computed by: SW
Checked by: SW

III-4H-143



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
●	C-3 (75'-85') Actual 74'-79'	TAN SILTY SAND (SM)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-144

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-3 @ 40.0

Total Sample Weight (g): 58.2

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 58.2

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel	0.0
Sand	4.3
Silt	72.4
Clay	23.3

Particle Diameter (mm):

@ 60% Passing	2.40E-2
@ 30% Passing	9.05E-3
@ 10% Passing	9.40E-5

Coefficient of Curvature : 3.62E 1

Coefficient of Uniformity : 2.56E 2

Soil Classification : BROWN SILT

Symbol : ML*

Frost Classification : F4

Data Entry By: MAP

File #: 369

III-4H-145

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-3 @ 40.0 Data File : TEST0369

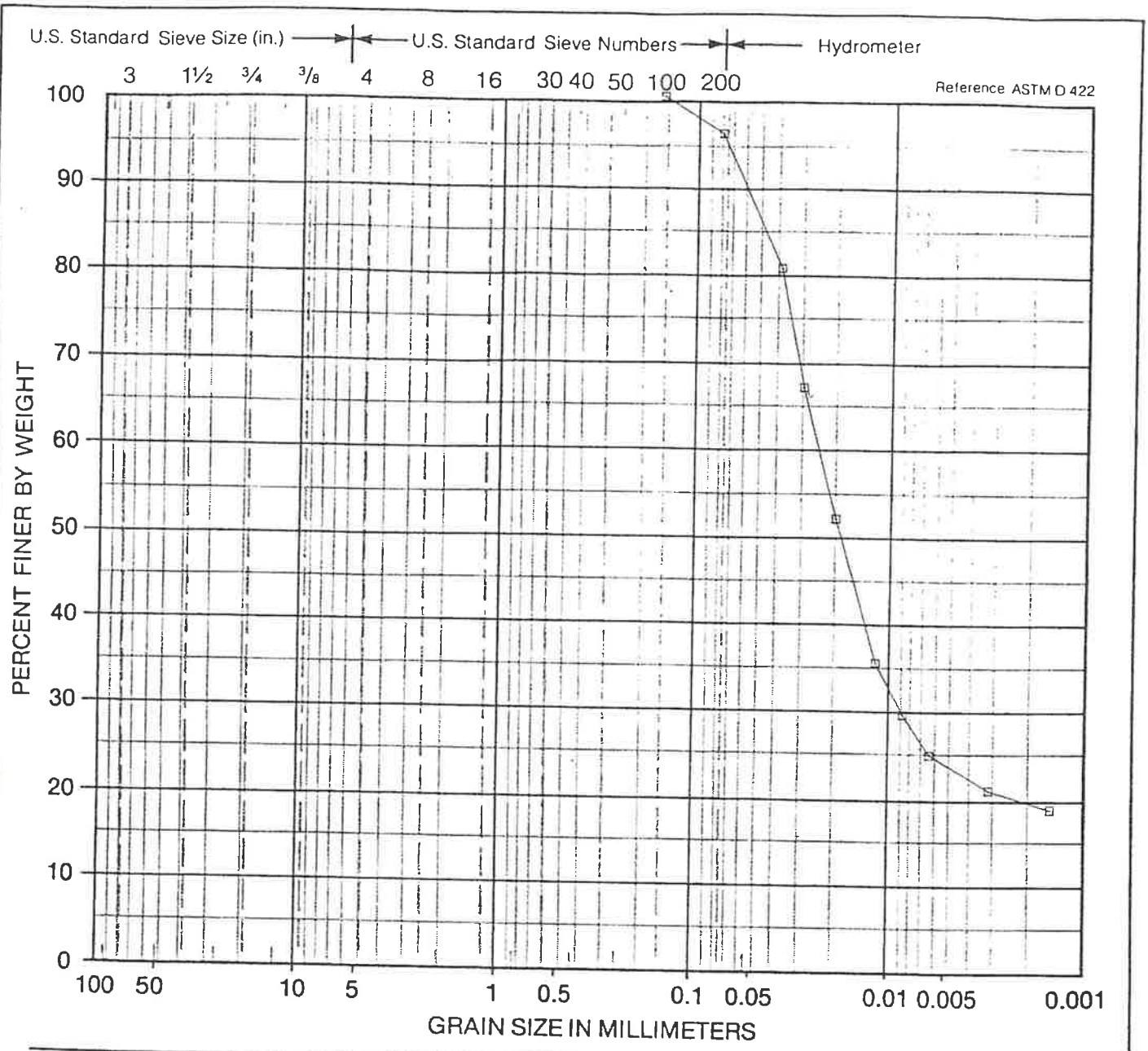
Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
40	0.425	0.0	100.0
50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	2.5	95.7

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-3 @ 40.0 Data File : TEST0369

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	51.0	21.0	80.3	0.03737
2	43.0	21.0	66.7	0.02853
5	34.2	21.0	51.7	0.01940
15	24.5	21.0	35.2	0.01201
30	21.0	21.0	29.2	0.00869
60	18.5	20.0	24.7	0.00631
250	16.1	20.0	20.6	0.00314
1440	15.0	19.0	18.4	0.00151



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
▫	C-3 @ 40.0 FT	BROWN SILT (ML)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-148

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: UWT			Job No. 18915,006.12
Bor. No. C-3	Bulk Sample No.	Depth or Elevation 40'	Date 10-9-90

TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
			1-1/2"	38.1					
Wt. of Soil & Can (Dry)			1"	25.4					
			3/4"	19.1					
H2O Loss			1/2"	12.7					
Wt. of Can			3/8"	9.52					
Wt. of Soil Dry			No. 4	4.76					
			Pan						
% Moisture			Total						

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia., MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074						
270	0.053						95.7
Pan							
Total							

Specific Gravity, G LL____ PI____ Classification

HYDROMETER #9

K_G = | Wt. of Hydrometer Sample 58.16 grams | Defloculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading Actual	Reading Corr.	$\sqrt{\frac{L}{T}}$	Corrected Grain Size Diameter, MM.	% of Total Passing
10:09 1	0.078	21.0	.01328	51.0	47.0	2.8107	.0373	80.8
:10 2	0.055	21.0		43.0	39.0	2.1448	.0285	67.1
:13 5	0.035	21.0		34.2	30.2	1.4612	.0194	51.9
:23 15	0.020	21.0		24.5	20.5	.9655	.0120	35.2
:38 30	0.014	21.0		21.0	17.0	.6557	.0087	29.2
11:08 60	0.010	20.0	.01344	18.5	14.5	.4699	.0063	24.9
2:18 250	0.005	20.0	"	16.1	12.1	.2341	.0031	20.8
1440	0.002	19	.01361	15.0	11	.0979	.0013	18.9

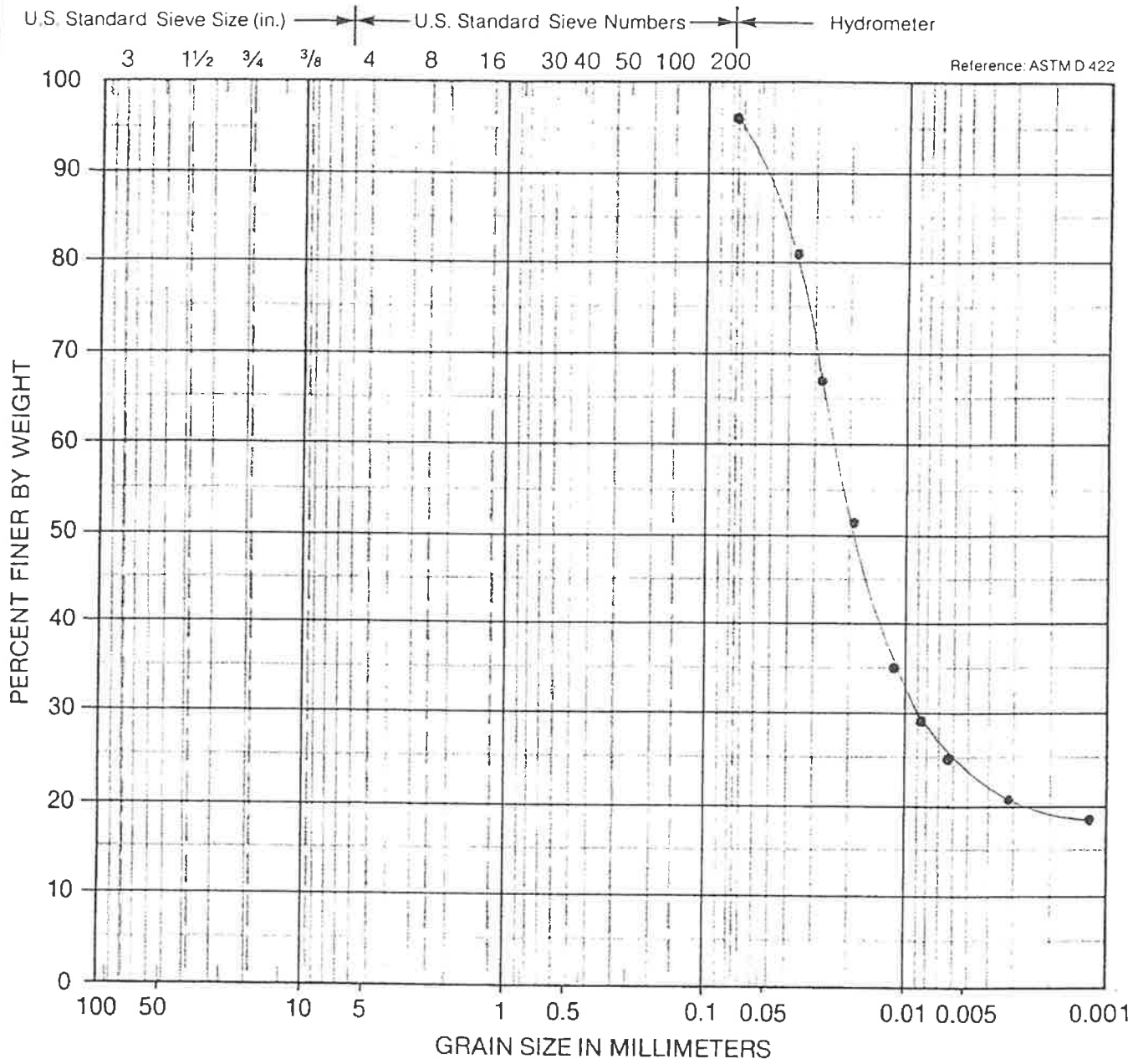
.07
.8

Tested by: MAY | Computed by: SW | Checked by: SW

HYDR
0
41.3
+T= 100.7

HMC
.061 11.70
Wm+T= 19.83
Wd+T= 19.66 2.14

-200
III-4H-149
Cup# H-6 103.3
Wd+T = 260.1 ... = 95.7%



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
•	C-3 40'	Reddish brown clayey silt. ML

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-150

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,066.12		10-29-90		

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: URBAN WASTE
Project Number: 18915.006.12

Test Date: 11-17-1993
Location: C-5 @ 5.0

Total Sample Weight (g): 56.3

Percent Passing No. 4 Sieve: 100.0

Weight of Split Sample Used (g): 56.3

Specific Gravity (g/cc): 2.70

Hygroscopic Moisture (%): 0.0

Hydrometer Correction Value (div): 4.0

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel	0.0
Sand	3.0
Silt	57.5
Clay	39.5

Particle Diameter (mm):

@ 60% Passing	1.72E-2
@ 30% Passing	2.20E-3
@ 10% Passing	6.78E-4

Coefficient of Curvature : 4.13E-1

Coefficient of Uniformity : 2.54E 1

Soil Classification : BROWN SILT

Symbol : ML*

Frost Classification : F4

Data Entry By: MAP

File #: 367

III-4H-157

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-5 @ 5.0 Data File : TEST0367

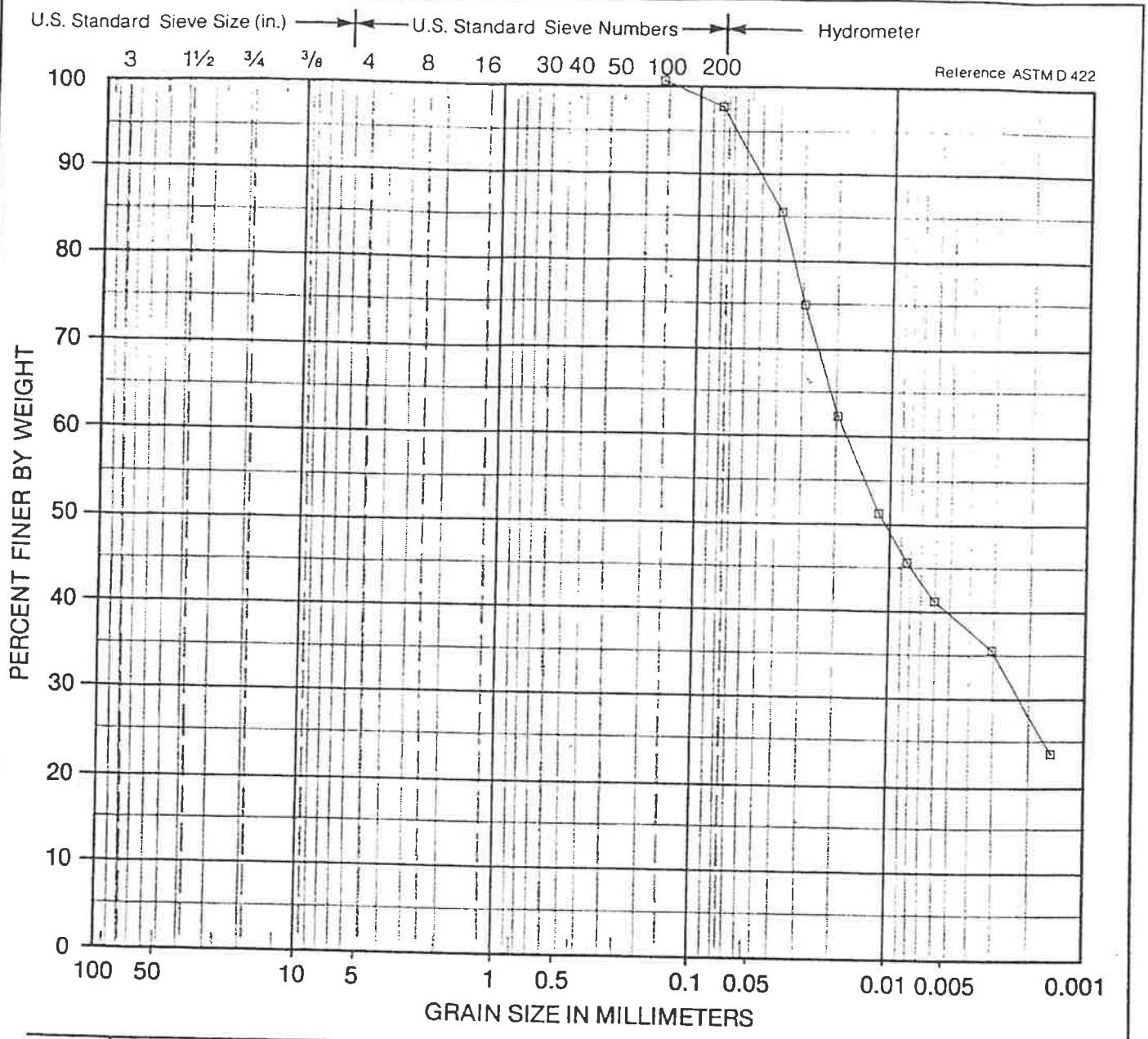
Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
1.500 in	37.500	0.0	100.0
1.000 in	25.000	0.0	100.0
3/4 in	19.000	0.0	100.0
1/2 in	12.500	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 20	0.850	0.0	100.0
No. 30	0.600	0.0	100.0
40	0.425	0.0	100.0
50	0.300	0.0	100.0
No. 100	0.150	0.0	100.0
No. 200	0.075	1.7	97.0

Particle Size Analysis
Hydrometer Method
HLA Laboratory Analysis Routines Ver 3.0

Project : URBAN WASTE ID : 18915.006.12 Test Date : 11-17-1993

Data Entry By : MAP Location : C-5 @ 5.0 Data File : TEST0367

Elapsed Time (min)	Hydrometer Reading	Temperature (deg C)	% of Total Passing in Solution	Particle Diameter (mm) in Suspension
1	52.2	21.0	85.0	0.03691
2	46.2	21.0	74.4	0.02771
5	39.0	21.0	61.8	0.01867
15	32.7	21.0	50.7	0.01133
31	29.5	21.0	45.1	0.00807
62	27.0	21.0	40.7	0.00581
254	24.0	20.0	35.1	0.00296
1440	17.5	19.0	23.3	0.00149



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
▫	C-5 @ 5.0 FT	BROWN SILT (ML)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis

PLATE

III-4H-154

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	18915.006.12		11-17-1993		

WORKSHEET – PARTICLE SIZE ANALYSIS

HARDING LAWSON ASSOCIATES

Job: URBAN WASTE			Job No. 18615 006 12
Bor. No. C-5' (4'-9')	Bulk Sample No.	Depth or Elevation 5	Date 10 8 90

TOTAL SAMPLE

Moisture Content			Sieve Size	Dia., MM.	Air Dry Wt. Ret.	Dry Wt. Ret.	% Ret.	Cum. % of Total Ret.	Cum. % of Total Passing
			4"	101.6					
Can No.			3"	76.2					
Wt. of Soil & Can (Wet)			2"	50.8					
			1-1/2"	38.1					
Wt. of Soil & Can (Dry)			1"	25.4					
			3/4"	19.1					
H_2O Loss			1/2"	12.7					
Wt. of Can			3/8"	9.52					
Wt. of Soil Dry			No. 4	4.76					
			Pan						
% Moisture			Total						

REPRESENTATIVE MINUS NO. 4 SAMPLE

Weight of Representative Sample: _____ grams

Sieve Size	Dia., MM.		Weight Retained	% Retained	% of Total Retained	Cum. % of Total Ret.	Cum. % of Total Passing
8	2.380						
16	1.190						
30	0.590						
40	0.420						
50	0.297						
100	0.149						
200	0.074						
270	0.053						97.0
Pan							
Total							

Specific Gravity, G LL____ PI____ Classification

HYDROMETER #5

K_G = | Wt. of Hydrometer Sample 56.34 grams | Defloculation Agent

Time, Minutes	Maximum Diameter, MM.	Temp. °C	K	Reading - 4 Actual	Reading - 4 Corr.	$\sqrt{\frac{L}{T}}$	Corrected Grain Size Diameter, MM.	% of Total Passing
4 9:33 1	0.078	21.0	.01328	52.2	48.2	2.775	.0369	85.6
2 :34 2	0.055	21.0		46.2	42.2	2.086	.0277	74.9
:37 5	0.035	21.0		39.0	35.0	1.407	.0187	62.1
:47 15	0.020	21.0		32.7	28.7	.856	.0114	50.9
10:03 31	0.014	21.0		29.5	25.5	.608	.0081	45.3
:34 62	0.010	21		27.0	23.0	.4381	.0058	40.8
1:46 254	0.005	20.0	.01344	24.0	20.0	.221	.0030	35.5
2 9:32 1440	0.002	19	.01361	21.5	17.5	.0943	.0013	31.1

Tested by: MAT | Computed by: SW | Checked by: SW

Hydron

HMC III-4H-155 -200

04 11.30

WO-5 52.5

Wm+T= 112.0

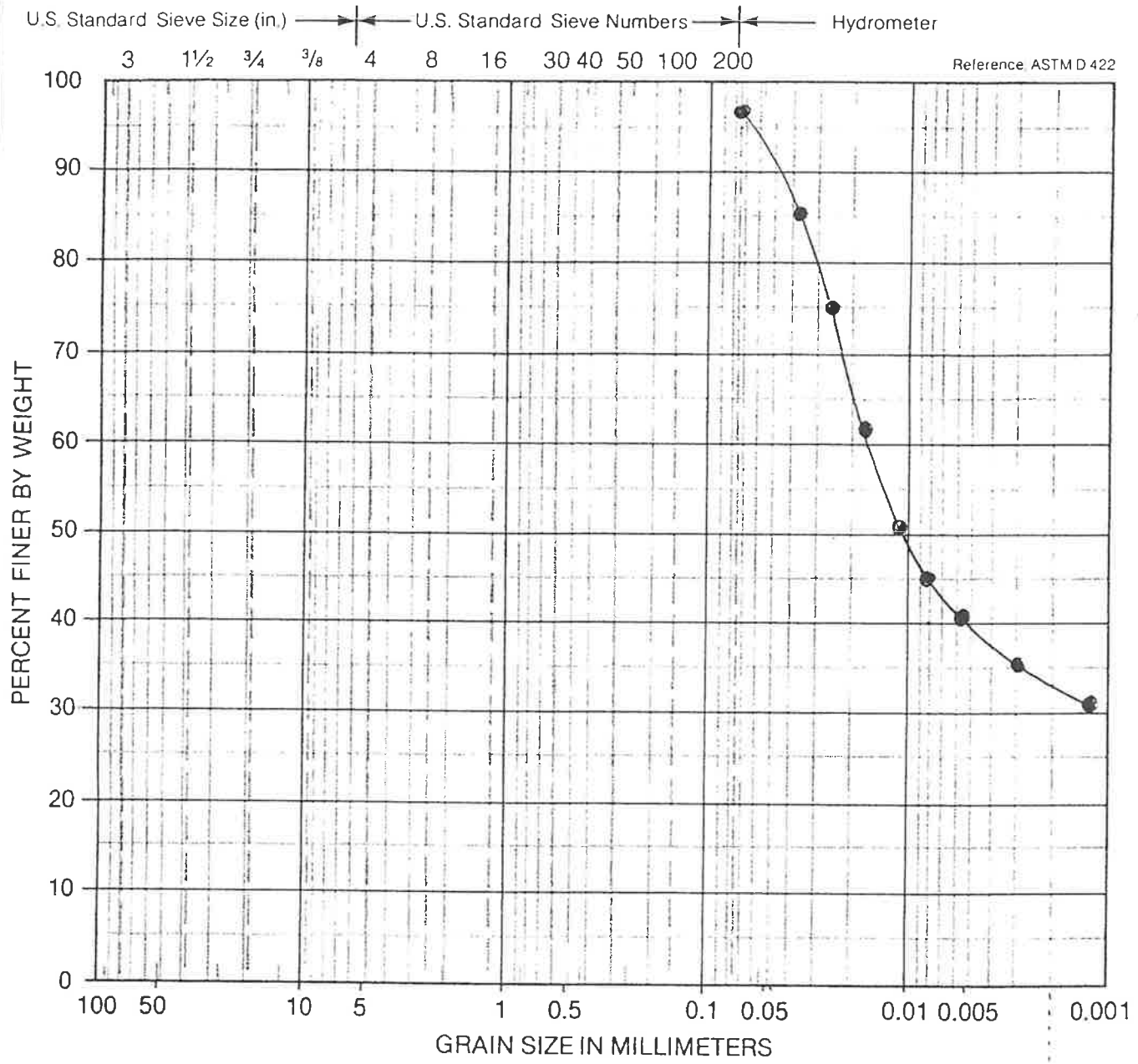
Wm+T= 19.57

Wd+T= 19.13

AB3 168.8

Wd+T = 481.5

Wd+T= 178.3



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY (64% silt; 33% clay)

Symbol	Sample Source	Classification
●	C-5 5' (4'-9')	Red. brown-gray clayey silt ML

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis

PLATE

III-4H-156

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SBW	18915,006.12		10-15-90		

HARDING LAWSON ASSOCIATES

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY — JOB NUMBER:18915.006.12
SAMPLE LOCATION:C-2 5' — DATE:10-29-90
SAMPLE DESCRIPTION AND REMARKS:BROWN-GRAY CLAY (VERT.)
*-VOLUMES CORRECTED TO 100%SATURATION
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 2
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 43

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	151	190.8	195.5		
DRY WT.+PAN		153.3	155	0	
WT.OF WATER	37.5		40.5	0	40.5
PAN WEIGHT	0	41.3	41.5	0	
DRY SAMPLE	113.5		113.5	0	113.5
% MOISTURE	33	33.5	35.7		

GENERAL DATA

	INITIAL	FINAL	I		
STRAIN READING	.908	.906	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	82.5	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	42	42	I	CELL NUMBER	1
VOLUME OF VOIDS	38.4	40.5	I	INITIAL HT(CM)	2.54
VOID RATIO	.914	.964	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	88.1	85.8	I	FINAL HT.(CM)	2.55
SATURATION	99	100	I	FINAL AREA(CM.SQ)	32.4

CHANGE IN VOLUME FROM BURETTE READINGS:-5.2

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
68.5	67.2	69.8	1.3	11 : 47	0
65.4	61	69.8	4.4	16 : 25	2
53.6	38.1	69.1	15.5	11 : 47	4
51	33	69	18	17 : 8	4
27.6	-12.7	67.9	40.3	15 : 39	6

PERMEABILITY RESULTS — ARITHMETIC MEAN: 4.110940445E-08

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)
189480	.09	1.343337472E-08
345600	.35	3.633458854E-08
364860	.41	4.092417488E-08
531660	.96	7.374551038E-08

III-4H-157

WORK SHEET – PERMEABILITY — HARDING LAWSON ASSOCIATES

Job: Urban Waste Technology		Job No. 18915,006.12	Date 9-25-90
Hole No. C-2	Depth 3-8. (5)	Sample Diameter 2.492	Unit No. 1

Description of Sample and Remarks: @ psi (psf)

BROWN AND GRAY CLAY WITH FEW CALC. NODS. (Slickensided) (Vertical direction)

Backpressure Saturated

Specific Gravity, G. 2.70

+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

		Before Test		After Test						
		MC	sample	Wedge		Solids		Total		
	Tare No.	L-1	/	X-3		/				
Weights in lbs. · grams	Tare + Wet Soil	190.8	/	195		/				
	Tare + Dry Soil	153.3	/	155.0		/				
	Water W_w		/			/				
	Tare	41.3	/	41.5		/				
	Wet Soil		151.0			/				
	Dry Soil W_s				+	/	=		= W_s	
	Water Content % w									

DIMENSIONS

	Areas in sq. cm.							Height	in.	cm.
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area			
Before Test								h_o =	.994	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure,	psi	0				
Back Pressure	psi	0				
Date		/ /		/ /		/ /
Hour						
Strain Dial Reading	in.	.908	.906			
Interior Burette,	cc.					
Exterior Burette,	cc.					
Volume of Specimen, V = A x H	cc.					
Volume of Solids, $V_s = W_s \div G$	cc.					
Volume of Voids, $V_v = V - V_s$	cc.					
Void Ratio, $e = V_v \div V_s$						
Dry Density, $\gamma_d = 62.4\ W_s \div V$, lbs/ft^3						
Saturation, $S = V_w \div V_v \times 100$,	%					

Tested by: SBW

Computed by:

Checked by:

III-4H-158

PERMEABILITY

HARDING LAWSON ASSOCIATES

JOB Urban Waste NO. 18915.006.12 BY SBW DATE 9/25/90

BOR	DEPTH		SATURATION DATA			UNIT NO.		CONSOLIDATION DATA	
TIME DATE 9/25/90	$\sigma_{CHAMBER}$ PRESS. (psi)	σ_{BACK} PRESS. (psi)	EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	PORE PRESSURE (psi)	Δ	B	ELAPSED TIME MIN.	INTERIOR VOL. BURETTE (cc)
10:16	3 HG		FLUSH SYSTEM						
			SATURATION						
10:24	10	8	119.9	67.7					
11:25	20	18	117.1	65.9	17.0				
14:21	30	18	—	—	25.5	8.5	.85		
14:24	30	28	114.1	65.0	27.1				
16:45	40	28	—	—	36.3	9.2	.92		
16:49	40	38	111.8	64.6	37.4				
8:56	50	38	←	—	46.9	9.5	.95	0	Δ 0
8:57	40	38	110.2	64.1				.1	
								.25	
								.5	
			CONSOLIDATION					1	
8:58	43	37/39		64.2/4.4	= 68.6			2	
9:07	"	"	109.1	62.5/6.2	= 68.7			4	
10:11				56.1/12.4	= 68.5			8	
8:00	"	"	108.9	52.9/15.6	= 68.5			16	
								30	
								60	
								120	
								240	
								480	
								1440	

Δ Δ NET

Date:
Time:
σ_{CH} =
σ_{BP} =
σ =
(CONSOL.)

Tested by: SBW Computed by: Checked by:

III-4H-159

PERMEABILITY TEST DATA

HARDING LAWSON ASSOCIATES

JOB _____ UNIT NO. _____ BORING _____ CONSOL. PRESS. _____ psi

NO. _____ DATE _____ DEPTH _____ PRESS. HEAD _____ psi

$k = \frac{aL}{At} \log_e h_o/h_f$ cm./sec.

Type of Test FALLING HEAD

Chamber Press. _____ psi

Back Press. _____ psi

where:

a = _____ cm^2, L = _____ in. = _____ cm.

A = _____ cm^2, t = _____ hrs. _____ min.

= _____ x10 sec.

h_o = _____ cc = _____ cm.

h_f = _____ cc = _____ cm.

	Burettes							
	Ext. cc	Bott. Int. cc	Δ Int. cc	Sum Int. cc	Top Int. cc	Time	Date	24 h.
							[illegible]	
X	109.0	68.5	—	—	1.3	11:47	9-27	0
	108.3	67.0	—	—	2.8	14:00	9-28	1
X	108.2	65.4	—	—	4.4	16:25	9-29	2
(5) X	108.1	53.6	—	—	15.5	11:49	10-1	4
X	108.0	51.0	—	—	18.0	17:08	10-1	4
X	107.9	27.6	—	—	40.3	15:28	10-3	6

Tested by:

Computed by:

Checked by:

091-44-III

HARDING LAWSON ASSOCIATES

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY — JOB NUMBER:18915.006.1C
SAMPLE LOCATION:C-3 40' — DATE:10-09-90
SAMPLE DESCRIPTION AND REMARKS:BROWN CLAY (VERT.)
*-VOLUMES CORRECTED TO 100%SATURATION
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 2
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 43

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	152.2	196.5	209.3		
DRY WT.+PAN		159.5	169.2	0	
WT.OF WATER	36.4		40.1	0	40.1
PAN WEIGHT	0	41.9	53.4	0	
DRY SAMPLE	115.8		115.8	0	115.8
% MOISTURE	31.4	31.5	34.6		

GENERAL DATA

	INITIAL	FINAL			
STRAIN READING	.862	.856	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	83	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	42.9	42.9	I	CELL NUMBER	2
VOLUME OF VOIDS	37.5	40.1	I	INITIAL HT(CM)	2.54
VOID RATIO	.874	.935	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	89.9	87.1	I	FINAL HT.(CM)	2.56
SATURATION	97	100	I	FINAL AREA(CM.SQ)	32.4

CHANGE IN VOLUME FROM BURETTE READINGS:-19.1

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
69.1	67.6	70.6	1.5	11 : 48	0
64.8	59.2	70.4	5.6	16 : 25	2
55.3	39.9	70.7	15.4	11 : 48	4
53.3	36	70.6	17.3	17 : 8	4
33.6	-3	70.2	36.6	15 : 28	6

PERMEABILITY RESULTS — ARITHMETIC MEAN: 3.85485344E-08

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)
189420	.1	1.83311476E-08
345600	.35	3.45522371E-08
364800	.39	3.76746616E-08
531600	.88	6.36360912E-08

III-4H-161

HARDING LAWSON ASSOCIATES

Job: Urban Waste Technology		Job No. 18915,006,12	Date 9-25-90
Hole No. C-3	Depth 39-44 (40')	Sample Diameter 2,492	Unit No. 2
Description of Sample and Remarks: BROWN CLAY (VERTICAL DIRECTION) Backpressure Saturated	@ psi (psf)	Specific Gravity, G. 2.70	
		+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

		Before Test		After Test						
		MC	Sample	Wedge		Solids		Total		
	Tare No.	QT-TT		M-5						
Weights in lbs. or grams	Tare + Wet Soil	196.5		209.3						
	Tare + Dry Soil	159.5		169.2						
	Water W_w									
	Tare	41.9								
	Wet Soil		152.2	53.4						
	Dry Soil W_s				+		=		= W_s	
	Water Content % w									

DIMENSIONS

	Areas in sq. cm.							Height	in.	cm.
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area			
Before Test								h_o =	1.000	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure,	psi	0				
Back Pressure	psi	0				
Date		/ /		/ /		/ /
Hour						
Strain Dial Reading	in.	.862	.856			
Interior Burette,	cc.					
Exterior Burette,	cc.					
Volume of Specimen, V = A x H	cc.					
Volume of Solids, $V_s = W_s \div G$	cc.					
Volume of Voids, $V_v = V - V_s$	cc.					
Void Ratio, $e = V_v \div V_s$						
Dry Density, $\gamma_d = 62.4\ W_s \div V$, lbs/ft^3						
Saturation, $S = V_w \div V_v \times 100$,	%					

Tested by: SBW

Computed by:

Checked by:

III-4H-162

PERMEABILITY — CONSOLIDATION PHASE — HARDING LAWSON ASSOCIATES

JOB Urban Waste NO. 18915.006.12 BY SBW DATE 9/25/90

BOR	DEPTH	SATURATION DATA					UNIT NO.		CONSOLIDATION DATA	
TIME DATE 9/25/90	σ CHAMBER PRESS. (psi)	σ BACK PRESS. (psi)	EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	PORE PRESSURE (psi)	Δ	B	ELAPSED TIME MIN.	INTERIOR VOL. BURETTE (cc)
25 11:28		3HG	FLUSH SYSTEM						
			SATURATION						
11:33	10	8	125.4	68.3					
13:52	20	18	120.2	65.6	17.0				
14:24	30	18	—	—	23.0	6.0	.60		
14:26	30	28	116.9	64.6	27.1				
16:51	40	28	—	—	34.6	7.5	.75	0	
16:54	40	38	110.0	63.7	37.5			.1	
26 8:59	50	38	—	—	47.0	9.5	.95	.25	
9:00	40	38	99.6	62.9				.5	
								1	
			CONSOLIDATION					2	
26 9:02	43	37 | 39	98.9	62.9/3.4	= 66.3			4	
10:11				61.8/4.7	= 66.5			8	
11:00	"	"	98.2	61.2/5.4	= 66.6			16	
								30	
								60	
								120	
								240	
								480	
								1440	

Δ Δ NET (CONSOL.)

Date:
Time:
σ CH =
σ BP =
σ =

Tested by: Computed by: Checked by:

III-4H-163

PERMEABLITY TEST DATA

HARDING LAWSON ASSOCIATES

JOB _____ UNIT NO. _____ BORING _____ CONSOL. PRESS. _____ psi

NO. _____ DATE _____ DEPTH _____ PRESS. HEAD _____ psi

$k = \frac{aL}{At} \log_e h_o/h_f$ cm./sec.

Type of Test FALLING HEAD

where:

a = _____ cm^2, L = _____ in. = _____ cm.

A = _____ cm^2, t = _____ hrs. _____ min.

= _____ x10 sec.

h_o = _____ cc = _____ cm.

h_f = _____ cc = _____ cm.

Chamber Press. _____ psi

Back Press. _____ psi

	Burettes							
	Ext. cc	Bott. Int. cc	Δ Int. cc	Sum Int. cc	Top Int. cc	Time	Date	24 h
1	96.5	69.1	—	—	1.5	11:48	9.27	0
	95.9	66.9	—	—	3.7	14:00	9-28	1
2	95.8	64.8	—	—	5.6	16:25	9-29	2
3	95.1	55.3	—	—	15.4	11:48	10-1	4
4	95.0	53.3	—	—	17.3	17:08	10-1	4
5	94.2	33.6	—	—	36.6	15:28	10-3	6

Tested by:

Computed by:

Checked by:

691-HH-III

HARDING LAWSON ASSOCIATES

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY JOB NUMBER:18915.006.12
SAMPLE LOCATION:C-3 40' DATE:10-30-90
SAMPLE DESCRIPTION AND REMARKS:BROWN CLAY (HORIZ.)
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 2
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 43

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	153.2	161.3	198.5		
DRY WT.+PAN		132.5	158.3	0	
WT.OF WATER	36.6		40.2	0	40.2
PAN WEIGHT	0	41.3	41.7	0	
DRY SAMPLE	116.6		116.6	0	116.6
% MOISTURE	31.4	31.6	34.5		

GENERAL DATA

	INITIAL	FINAL	I		
STRAIN READING	2.48	2.48	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	82.5	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	43.2	43.2	I	CELL NUMBER	5
VOLUME OF VOIDS	37.2	39.3	I	INITIAL HT(CM)	2.54
VOID RATIO	.861	.91	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	90.5	88.2	I	FINAL HT.(CM)	2.54
SATURATION	98	102	I	FINAL AREA(CM.SQ)	32.5

CHANGE IN VOLUME FROM BURETTE READINGS: 2.09999999

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
43.7	16.7	70.7	27	10 : 49	0
39.4	9.00000001 1		70.8	31.4	17 : 6
37.2	3.60000001 1		70.8	33.6	8 : 46
33.9	-3	70.8	36.9	11 : 23	3
31.2	-8.4	70.8	39.6	13 : 1	4

PERMEABILITY RESULTS

ARITHMETIC MEAN: 4.04691388E-08

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)
109020	.11	4.14075923E-08
165420	.17	4.15827927E-08
261240	.25	4.0327493E-08
353520	.32	3.85586774E-08

III-4H-165

WORK SHEET - PERMEABILITY — HARDING LAWSON ASSOCIATES

Job: Urban Waste Technology		Job No. 18915,006.12	Date 9-25-90
Hole No. C3	Depth 39-44 (40)	Sample Diameter 2.493	Unit No. 5

Description of Sample and Remarks: @ psi (psf)

BROWN CLAY
(HORIZONTAL DIRECTION)
Backpressure Saturated

Specific Gravity, G. 2.70.

+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

			Before Test		After Test						
			MC	Sample	Wedge		Solids		Total		
	Tare No.		0	/	8-ME		/				
Weights in grams	Tare + Wet Soil		161.3	/	198.5		/				
	Tare + Dry Soil		132.5	/	158.3		/				
	Water	W_w		/			/				
	Tare		41.3	/	41.7		/				
lbs.	Wet Soil			153.2			/				
	Dry Soil	W_s				+		=		= W_s	
	Water Content %	w									

DIMENSIONS

	Areas in sq. cm.									
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area	Height	in.	cm.
Before Test								h_o =	1.000	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure,	psi	0				
Back Pressure	psi	0				
Date		/ /		/ /		/ /
Hour						
Strain Dial Reading	in.	2.480	2.480			
Interior Burette,	cc.					
Exterior Burette,	cc.					
Volume of Specimen, V = A x H	cc.					
Volume of Solids, $V_s = W_s \div G$	cc.					
Volume of Voids, $V_v = V - V_s$	cc.					
Void Ratio, $e = V_v \div V_s$						
Dry Density, $\gamma_d = 62.4\ W_s \div V$, lbs/ft^3						
Saturation, $S = V_w \div V_v \times 100$,	%					

Tested by: SBW

Computed by:

Checked by:

III-4H-166

...ATION & CONSOLIDATION PHASE – PERMEABILITY

HARDING LAWSON ASSOCIATES

JOB _____ NO. _____ BY _____ DATE ___/___/___

BOR _____ DEPTH _____ SATURATION DATA _____ UNIT NO. _____

	TIME DATE 9/25/90	σ CHAMBER PRESS. (psi)	σ BACK PRESS. (psi)	EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	PORE PRESSURE (psi)	Δ	B	CONSOLIDATION DATA: ELAPSED TIME MIN.	CONSOLIDATION DATA: INTERIOR VOL. BURETTE (cc)
25	14:15	3 AG		FLUSH	SYSTEM					
				SATURATION						
	14:19	10	8	58.9	67.9					
	14:27	20	18	56.1	66.0					
	14:53	30	28	54.1	64.5	26.7				
	16:54	40	28	—	—	34.6	7.9	.79		Δ
	16:56	40	38	53.2	63.4	37.5			0	0
26	9:03	50	38			47.0	9.5	.95	.1	
	9:04	40	38	51.6	62.5				.25	
									.5	
				CONSOLIDATION					1	
26	9:06	43	37/39	61.1	62.5/3.0	= 65.5			2	
	10:12				59.2/6.6	= 65.8			4	
	11:00	"	"	60.4	57.3/8.6	= 65.9			8	
									16	
									30	
									60	
									120	
									240	
									480	
									1440	

Δ Δ NET

Date:
Time:
σ CH =
σ BP =
σ =
CONSOL.1

Tested by: Computed by: Checked by:

III-4H-167

PERMEABLITY TEST DATA

HARDING LAWSON ASSOCIATES

10.5 170/hr- 4.4/377 M 3.5/ 4.9 cc/.83

JOB _____ UNIT NO. _____ BORING _____ CONSOL. PRESS. _____ psi

NO. _____ DATE _____ DEPTH _____ PRESS. HEAD _____ psi

$k = \frac{aL}{At} \log_e h_o/h_f$ cm./sec.

Type of Test FALLING HEAD

Chamber Press. psi

Back Press. psi

where:

a = _____ cm^2, L = _____ In. = _____ cm.

A = _____ cm^2, t = _____ hrs. _____ min.

= _____ x10 sec.

h_o = _____ cc = _____ cm.

h_f = _____ cc = _____ cm.

	Burettes							
	Ext. cc	Bott. Int. cc	Δ Int. cc	Sum Int. cc	Top Int. cc	Time	Date	24 h.
	60.4	69.4	—	—	1.8	11:49	9-27	0
	59.9	65.4	—	—	5.8	14:00	"	0
	59.8	61.6	—	—	9.5	16:25	"	0
	59.5	39.7	—	—	31.5	11:49	9-28	1
STOP	59.5	35.4	—	—	35.9	17:08	"	1
START	58.9	69.5	—	—	0.9	5:28	10-1	0
	58.7	64.6	—	—	6.1	10:13	10-1	0
	58.6	45.6	—	—	25.4	8:16	10-2	1
1	58.6	43.7	—	—	27.0	10:49	10-3	0
2	58.5	39.4	—	—	31.4	17:06	10-4	1
(5) 3	58.4	37.2	—	—	33.6	8:46	10-5	1
4	58.2	33.9	—	—	36.9	11:23	10-6	3
5	58.1	31.2	—	—	39.6	13:01	10-7	4

Tested by:

Computed by:

Checked by:

84-44-III

HARDING LAWSON ASSOCIATES

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY — JOB NUMBER:19915.006.12
SAMPLE LOCATION(VERT.) C-3 64'-69' — DATE:10-29-90
SAMPLE DESCRIPTION AND REMARKS:BROWN-GRAY SILTY CLAY
*-VOLUMES CORRECTED TO 100%SATURATION
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 2
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 33

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	163.4	186.9	216.6		
DRY WT.+PAN		158.9	185.7	0	
WT.OF WATER	30.7		30.9	0	30.9
PAN WEIGHT	0	41.9	53	0	
DRY SAMPLE	132.7		132.7	0	132.7
% MOISTURE	23.1	24	23.3		

GENERAL DATA

	INITIAL	FINAL			
STRAIN READING	.502	.508	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	80	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	49.1	49.1	I	CELL NUMBER	6
VOLUME OF VOIDS	31.3	30.9	I	INITIAL HT(CM)	2.54
VOID RATIO	.637	.629	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	103	103.5	I	FINAL HT.(CM)	2.52
SATURATION	98	100	I	FINAL AREA(CM.SQ)	31.7

CHANGE IN VOLUME FROM BURETTE READINGS:-6.99999999

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
65.4	61.1	69.7	4.3	16 : 26	0
61.1	52.5	69.7	8.6	11 : 49	1
59.9	50.2	69.6	9.7	17 : 10	2
47.4	25.4	69.4	22	15 : 28	4

PERMEABILITY RESULTS — ARITHMETIC MEAN: 2.938208455E-08

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)
156120	.14	2.355556375E-08
175440	.17	2.670047682E-08
428520	.57	3.789021285E-08

III-4H-169

HARDING LAWSON ASSOCIATES

Job: Urban Waste Technology	Job No. 18915,006.12	Date 9-26-90
Hole No. C-3 Depth 64-69 (56'-74')	Sample Diameter 2.499	Unit No. 6

Description of Sample and Remarks:
BROWN AND GRAY SILTY CLAY (VERTICAL DIRECTION)
Backpressure Saturated
(@ psi (psf) Some portions of sample is sandy clay so I'm calling it a borderline fat clay / SW

Specific Gravity, G. 2.70.

+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

		Before Test		After Test						
		MC	Sample	Wedge		Solids		Total		
	Tare No.	QT-TT	/	A-4						
Weights in grams	Tare + Wet Soil	186.9	/	216.6						
	Tare + Dry Soil	158.8	/	185.7						
	Water W_w		/							
	Tare	41.9	/							
	Wet Soil		163.4	53.0						
	Dry Soil W_s				+		=		= W_s	
	Water Content % w									

DIMENSIONS

	Areas in sq. cm.							Height	in.	cm.
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area			
Before Test								h_o =	1.000	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure,	psi	0					
Back Pressure	psi	0					
Date		/ /		/ /		/ /	
Hour							
Strain Dial Reading	in.	.502	.508				
Interior Burette,	cc.						
Exterior Burette,	cc.						
Volume of Specimen, V = A x H	cc.						
Volume of Solids, $V_s = W_s \div G$	cc.						
Volume of Voids, $V_v = V - V_s$	cc.						
Void Ratio, $e = V_v \div V_s$							
Dry Density, $\gamma_d = 62.4\ W_s \div V$, lbs/ft^3							
Saturation, $S = V_w \div V_v \times 100$,	%						

Tested by: SBW
Computed by:
Checked by:

III-4H-170

HARDING LAWSON ASSOCIATES

PERMEABILITY

JOB Urban Waste Tech NO. 18915.006.12 BY SBW DATE 9/26/90

BOR / TIME DATE	DEPTH σ CHAMBER PRESS. (psi)	σ BACK PRESS. (psi)	SATURATION DATA EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	UNIT NO. PORE PRESSURE (psi)	Δ	B	CONSOLIDATION DATA ELAPSED TIME MIN.	INTERIOR VOL. BURETTE (cc)
9-26-90									
10:16	3 HG		FLUSH SYSTEM						
			SATURATION						
10:19	10	8	56.1	68.4					
10:59	20	18	52.2	67.5					
11:50	30	28	49.4	67.1	26.6				
27 11:43	40	28	—	—	36.2	9.6	.96	0	Δ 0
11:44	30	28						.1	
								.25	
								.5	
			CONSOLIDATION						
11:49	33	27 29	45.2	66.6/2.7	= 69.3			1	
14:01	"	"	44.4	66.1/3.6	= 69.7			2	
16:25	"	"	44.2	65.5/4.3	= 69.8			4	
								8	
								16	
								30	
								60	
								120	
								240	
								480	
								1440	
								Date:	
								Time:	
								σ CH =	
								σ BP =	
								σ =	
			Δ	Δ	NET			(CONSOL.)	

Tested by: Computed by: Checked by:

PERMEABLITY TEST DATA

HARDING LAWSON ASSOCIATES

JOB _____ UNIT NO. _____ BORING _____ CONSOL. PRESS. _____ psi

NO. _____ DATE _____ DEPTH _____ PRESS. HEAD _____ psi

$k = \frac{aL}{At} \log_e \frac{h_o}{h_f}$ cm./sec.

Type of Test FALLING HEAD

Chamber Press. psi

Back Press. psi

where:

a = _____ cm^2, L = _____ In. = _____ cm.

A = _____ cm^2, t = _____ hrs. _____ min.

= _____ x10 sec.

h_o = _____ cc = _____ cm.

h_f = _____ cc = _____ cm.

Burettes							
Ext. cc	Bott. Int. cc	Δ Int. cc	Sum Int. cc	Top Int. cc	Time	Date	24 hr
44.1	65.4			4.3	16:26	9-27	0
43.2	61.1			8.6	11:48	9-29	1
43.1	59.9			9.7	17:10	9-29	2
42.3	47.4			22.0	15:28	10-1	4

Tested by:

Computed by:

Checked by:

24-44-III

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY JOB NUMBER:19915.004.11
SAMPLE LOCATION:C-5 5' DATE:10-24-91
SAMPLE DESCRIPTION AND REMARKS:RED.BRN.-GRAY CLAY (USCS)
*-VOLUMES CORRECTED TO 100%SATURATION
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 3
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 47

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	227.3	140.4	166.5		
DRY WT.+PAN		136.1	121.9	0	
WT.OF WATER	35.9		44.6	0	44.6
PAN WEIGHT	69.6	53.5	0	0	
DRY SAMPLE	121.9		121.9	0	121.9
% MOISTURE	29.4	29.4	36.6		

GENERAL DATA

	INITIAL	FINAL			
STRAIN READING	2.5	2.5	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	99.7	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	45.1	45.1	I	CELL NUMBER	5
VOLUME OF VOIDS	35.3	44.6	I	INITIAL HT(CM)	2.54
VOID RATIO	.783	.989	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	94.6	84.8	I	FINAL HT.(CM)	2.54
SATURATION	101	100	I	FINAL AREA(CM.SQ)	35.3

CHANGE IN VOLUME FROM BURETTE READINGS: 6.9

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
69.1	66.7	71.5	2.4	11 : 6	0
66.7	61.8	71.6	4.9	11 : 21	2
64.4	57.3	71.5	7.1	15 : 2	4
57.8	44.3	71.3	13.5	10 : 10	10
54.9	38.4	71.4	16.5	17 : 49	14
54.1	36.9	71.3	17.2	13 : 43	15

PERMEABILITY RESULTS ARITHMETIC MEAN: 9.53630861E-09

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)	
173700	.06	1.05812623E-08	
383360	.11	9.79567588E-09	
947040	.25	9.21199934E-09	
1233780		.32	9.05255885E-09
1305420		.33	9.04004873E-09

III-4H-173

WORK SHEET – PERMEABILITY

HARDING LAWSON ASSOCIATES

Job: U.W.T.		Job No. 18915,006.12	Date 10-12-90
Hole No. A-5	Depth 5'	Sample Diameter 2.50	Unit No. 5

Description of Sample and Remarks: Red. brn-. gray clay (vertical direction)

@ psi (psf)

Specific Gravity, G. 2.70.

Backpressure Saturated

+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

			Before Test		After Test							
			MC	sample	Wedge		Solids		Total		
	Tare No.		M-5	Rmg	JP-11						
Weights in grams	Tare + Wet Soil		160.4	227.3	208.1						
	Tare + Dry Soil		136.1								
	Water	W_w	24.3								
	Tare		53.5	69.6	41.6						
	Wet Soil		82.6	157.7	166.5						
	Dry Soil	W_s		121.9	121.9	+		=		= W_s	
	Water Content %	w	29.4								

DIMENSIONS

	Areas in sq. cm.							Height	in.	cm.
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area			
Before Test								h_o =	1.00	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

k=

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure, psi	0					
Back Pressure psi	0					
Date	/ /		/ /		/ /	
Hour						
Strain Dial Reading in.						
Interior Burette, cc.						
Exterior Burette, cc.						
Volume of Specimen, V = A x H cc.						
Volume of Solids, $V_s = W_s \div G$ cc.						
ume of Voids, $V_v = V - V_s$ cc.						
id Ratio, $e = V_v \div V_s$						
Dry Density, γ_d =62.4 $W_s \div V$, lbs/ft^3						
Saturation, $S = V_w \div V_v \times 100$, %						

Tested by: SBW

Computed by:

Checked by:

III-4H-174

PERMEABILITY

JOB _____ NO. _____ BY _____ DATE __/__/__

BOR	DEPTH	SATURATION DATA				UNIT NO.		CONSOLIDATION DATA	
TIME / DATE / /	σ CHAMBER PRESS. (psi)	σ BACK PRESS. (psi)	EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	PORE PRESSURE (psi)	Δ	B	ELAPSED TIME MIN.	INTERIOR VOL. BURETTE (cc)
1-12 10:21	2 HG	FLUSH SYSTEM							
		SATURATION							
10:25	10	8	58.6	67.3					
11:26	20	18	56.9	64.7					
11:52	30	28	55.3	63.4	27.6				
11:58	40	28	——	——	34.9	7.3	.73		
11:59	40	38	53.4	63.0	37.8				Δ
1-15 8:52	50	38	——	——	47.3	9.5	.95	0	0
8:53	40	38	56.1	56.7				.1	
								.25	
								.5	
								1	
			CONSOLIDATE					2	
8:54	43	37/39	55.7	69.1/1.9	= 71.0			4	
9:01	"	"	55.5	69.1/2.1	= 71.2			8	
10:21	"	"	55.1	69.1/2.4	= 71.5			16	
11:05	"	"	55.1	69.1/2.4	= 71.5			30	
								60	
								120	
								240	
								480	
								1440	

Date:
Time:
σ_{CH} =
σ_{BP} =
σ =
CONSOL.

Δ Δ NET

Tested by: Computed by: Checked by:

III-4H-175

PERMEABILITY TEST DATA

HARDING LAWSON ASSOCIATES

JOB _____ UNIT NO. _____ BORING _____ CONSOL. PRESS. _____ psi

NO. _____ DATE _____ DEPTH _____ PRESS. HEAD _____ psi

$k = \frac{aL}{At} \log_e h_o/h_f$ cm./sec.

Type of Test: FALLING HEAD

Chamber Press. _____ psi

Back Press. _____ psi

where:

a = _____ cm^2, L = _____ In. = _____ cm.

A = _____ cm^2, t = _____ hrs. _____ min.

= _____ x10 sec.

h_o = _____ cc = _____ cm.

h_f = _____ cc = _____ cm.

(6)

	Burettes							24 h
	Ext. cc	Bott. Int. cc	Δ Int. cc	Sum Int. cc	Top Int. cc	Time	Date	
1	55.1	69.1	—	—	2.4	11:06	10-15	0
	54.8	68.8	—	—	3.0	18:03	10-15	0
2	54.4	66.7	—	—	4.9	11:21	10-17	2
	54.3	65.4	—	—	6.2	16:35	10-18	3
3	54.1	64.4	—	—	7.1	16:02	10-19	4
	53.7	61.4	—	—	10.2	16:58	10-22	7
4	53.6	57.8	—	—	13.5	10:10	10-26	10
5	53.3	54.9	—	—	16.5	17:49	10-29	14
6	53.2	54.1	—	—	17.2	13:43	10-30	15

Tested by:

Computed by:

Checked by:

III-HH-176

HARDING LAWSON ASSOCIATES

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY — JOB NUMBER:19915.006.12
SAMPLE LOCATION:C-5 5' — DATE:10-30-90
SAMPLE DESCRIPTION AND REMARKS:RED.BRN.-GRAY CLAY (HORIZ.)
*-VOLUMES CORRECTED TO 100%SATURATION
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 2
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 43

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	223.5	133.9	161.1		
DRY WT.+PAN		112.5	118.2	0	
WT.OF WATER	35.7		42.9000001		0
	42.9				
PAN WEIGHT	69.6	41.6	0	0	
DRY SAMPLE	118.2		118.2	0	118.2
% MOISTURE	30.2	30.2	36.3		

GENERAL DATA

	INITIAL	FINAL	I		
STRAIN READING	.5	.486	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	86.7	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	43.8	43.8	I	CELL NUMBER	6
VOLUME OF VOIDS	36.6	42.9	I	INITIAL HT(CM)	2.54
VOID RATIO	.836	.979	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	91.7	85.1	I	FINAL HT.(CM)	2.52
SATURATION	98	100	I	FINAL AREA(CM.SQ)	33.6

CHANGE IN VOLUME FROM BURETTE READINGS:-.900000012

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
67.3	63.3	71.3	4	10 : 22	0
58.7	46.3	71.1	12.4	11 : 21	2
52.1	33.9	70.3	18.2	16 : 2	4
35	-.599999994		70.6	35.6	10 : 11
	10				
28.1	-14.3	70.5	42.4	17 : 49	14
26.6	-17.1	70.3	43.7	12 : 16	15

PERMEABILITY RESULTS — ARITHMETIC MEAN: 3.33287573E-08

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)
176340	.2	4.0175351E-08
366000	.33	3.44268698E-08
949740	.74	3.14203631E-08
1236420	.9	3.04439728E-08
1302940	.93	3.01777298E-08

III-4H-177

WORK SHEET – PERMEABILITY

HARDING LAWSON ASSOCIATES

Job: UWT	Job No. 18915.006.12	Date 10-12-90
Hole No. C-5 / Depth 5'	Sample Diameter 2.50	Unit No. 6

Description of Sample and Remarks: Red. brn – gray clay (Horiz. direction) @ psi (psf)

Backpressure Saturated

Specific Gravity, G. 2.70

+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

			Before Test		After Test							
			MC	Sample	Wedge		Solids		Total		
	Tare No.		A-3	Ring	J-P11						
Weights in grams / lbs.	Tare + Wet Soil		133.9	223.5	202.7						
	Tare + Dry Soil		112.5								
	Water	W_w	21.4								
	Tare		41.6	69.6	41.6						
	Wet Soil		70.9	153.9	161.1						
	Dry Soil	W_s		118.2	118.2	+		=		= W_s	
	Water Content %	w	30.2								

DIMENSIONS

	Areas in sq. cm.									
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area	Height	in.	cm.
Before Test								h_o =		
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

k=

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure,	psi	0					
Back Pressure	psi	0					
Date		/ /		/ /		/ /	
Hour							
Strain Dial Reading	in.	.500	.456				
Interior Burette,	cc.						
Exterior Burette,	cc.						
Volume of Specimen, V = A x H	cc.						
Volume of Solids, $V_s = W_s \div G$	cc.						
Volume of Voids, $V_v = V - V_s$	cc.						
Void Ratio, $e = V_v \div V_s$							
Dry Density, $\gamma_d = 62.4\ W_s \div V$, lbs/ft³							
Saturation, $S = V_w \div V_v \times 100$, %							

Tested by: SBW

Computed by:

Checked by:

III-4H-178

PERMEABILITY

JOB _____ NO. _____ BY _____ DATE __/__/__

BOR	DEPTH	SATURATION DATA					UNIT NO.		CONSOLIDATION DATA	
TIME / DATE / /	σ CHAMBER PRESS. (psi)	σ BACK PRESS. (psi)	EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	PORE PRESSURE (psi)	Δ	B	ELAPSED TIME MIN.	INTERIOR VOL. BURETTE (cc)
12 11:49	2 HG		FLUSH SYSTEM						
			SATURATION						
11:55	10	8	58.9	63.8					
12:02	20	18	56.7	61.3					
13:12	30	28	56.5	57.0					
17:37	40	38	54.8	54.9	37.9				
5 8:54	50	38	—	—	47.4	9.5	.95		Δ
								0	0
								.1	
								.25	
			CONSOLIDATION					.5	
								1	
8:56	43	37/39	52.5	68.4/2.6	= 71.0			2	
9:0	"	"	52.1	68.3/2.9	= 71.2			4	
10:22	"	"	51.6	67.3/4.0	= 71.3			8	
								16	
								30	
								60	
								120	
								240	
								480	
								1440	

Δ Δ NET

Date:
Time:
σ_{CH} =
σ_{BP} =
σ =
(CONSOL.)

Tested by: Computed by: Checked by:

III-4H-179

PERMEABILITY TEST DATA

HARDING LAWSON ASSOCIATES

JOB _____ UNIT NO. _____ BORING _____ CONSOL. PRESS. _____ psi

NO. _____ DATE _____ DEPTH _____ PRESS. HEAD _____ psi

$k = \frac{aL}{At} \log_e h_o/h_f$ cm./sec.

Type of Test: FALLING HEAD

Chamber Press. _____ psi

Back Press. _____ psi

where:

a = _____ cm^2, L = _____ in. = _____ cm.

A = _____ cm^2, t = _____ hrs. _____ min.

= _____ x10 sec.

h_o = _____ cc = _____ cm.

h_f = _____ cc = _____ cm.

(6)

	Burettes							
	Ext. cc	Bott. Int. cc	Δ Int. cc	Sum Int. cc	Top Int. cc	Time	Date	24 h
1	51.6	67.3			4.0	10:22	10-15	0
	51.2	64.8			6.5	18:03	10-15	0
2	50.6	58.7			12.4	11:21	10-17	2
	50.4	54.9			16.0	16:35	10-18	3
3	50.4	52.1			18.9	16:02	10-19	4
	49.9	43.6			27.1	16:59	10-22	7
4	49.7	35.0			35.6	10:11	10-26	10
5	49.4	28.1			42.4	17:49	10-29	14
6	49.3	26.6			43.7	12:16	10-30	15

Tested by:

Computed by:

Checked by:

III-44-180

PERMEABILITY TEST DATA

PROJECT:URBAN WASTE TECHNOLOGY JOB NUMBER:18915.005.12
SAMPLE LOCATION:C-6 25' DATE:10-30-90
SAMPLE DESCRIPTION AND REMARKS:RED.BRN.-GRAY CLAY (VERT.)
*-VOLUMES CORRECTED TO 100%SATURATION
AVE CONSOL.PRESSURE(PSI): 5 DIFF.PRESSURE(PSI) 2
PERMEANT FLUID: TAP WATER EXTERNAL PRESSURE: 40

MOISTURE CONTENTS:

	SAMPLE	TRIMMINGS	WEDGE	SOLIDS	TOTAL
WET WT.+PAN	222.5	212.5	156.5		
DRY WT.+PAN		175	117.2	0	
WT.OF WATER	35.8		39.3	0	39.3
PAN WEIGHT	69.5	52.6	0	0	
DRY SAMPLE	117.2		117.2	0	117.2
% MOISTURE	30.5	30.6	33.5		

GENERAL DATA

	INITIAL	FINAL	I		
STRAIN READING	.91	.902	I	INITIAL DIAMETER(IN)	2.5
VOLUME OF SPECIMEN	80.4	82.7	I	SPECIFIC GRAVITY	2.7
VOLUME OF SOLIDS	43.4	43.4	I	CELL NUMBER	1
VOLUME OF VOIDS	37	39.3	I	INITIAL HT(CM)	2.54
VOID RATIO	.853	.906	I	INIT.AREA(CM.SQ)	31.65
DRY DENSITY	91	88.4	I	FINAL HT.(CM)	2.58
SATURATION	97	100	I	FINAL AREA(CM.SQ)	32.0

CHANGE IN VOLUME FROM BURETTE READINGS:-5.00000001

PERMEABILITY DATA

BOTTOM BURETTE	DIFF.OF BURETTES	SUM OF BURETTES	TOP BURETTE	TIME HR:MIN	NO. DAYS
64.3	63	65.6	1.3	10 : 15	0
45.4	25.2	65.6	20.2	11 : 23	2
30.2	-5.2	65.6	35.4	16 : 10	4
20.6	-24.4	65.6	45	14 : 21	8
16.9	-31.8	65.6	48.7	14 : 25	9

PERMEABILITY RESULTS ARITHMETIC MEAN: 7.859873995E-08

ELAPSED TIME(SEC)	PORE VOLUMES	PERMEABILITY (CM/SEC)
176880	.48	9.655550335E-08
366900	.87	9.07940146E-08
705960	1.11	6.38983862E-08
792600	1.21	6.31570555E-08

III-4H-181

WORK SHEET – PERMEABILITY

HARDING LAWSON ASSOCIATES

Job: U.W.T.		Job No. 18915.006.12	Date 10-10-90
Hole No. C-6	Depth 25' (24'-29')	Sample Diameter 2.50	Unit No. 1

Description of Sample and Remarks: @ psi (psf)

RED BRN. - GRAY CLAY (VERTICAL DIRECTION)

(CH)

Backpressure Saturated

Specific Gravity, G. 2.70

+ No. 4	- No. 4

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

			Before Test		After Test							
			MC	sample	Wedge		Solids		Total		
	Tare No.		Z-1	Ring	JP. 11						
Weights in lbs. · grams	Tare + Wet Soil		212.5	222.5	198.1						
	Tare + Dry Soil		175.0								
	Water	W_w	37.5								
	Tare		52.6	69.5	41.6						
	Wet Soil		122.4	153.0	156.5						
	Dry Soil	W_s		117.2	117.2	+		=		= W_s	
	Water Content %	w	30.6								

DIMENSIONS

	Areas in sq. cm.							Height	in.	cm.
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area			
Before Test								h_o =	1.00	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

k=

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure,	psi	0				
Back Pressure	psi	0				
Date		/ /		/ /		/ /
Hour						
Strain Dial Reading	in.	.910	.902			
Interior Burette,	cc.					
Exterior Burette,	cc.					
Volume of Specimen, V = A x H	cc.					
Volume of Solids, $V_s = W_s : G$	cc.					
ume of Voids, $V_v = V - V_s$	cc.					
id Ratio, $e = V_v : V_s$						
Dry Density, $\gamma_d = 62.4\ W_s : V$, lbs/ft³						
Saturation, $S = V_w : V_v \times 100$, %						

Tested by: SW

Computed by:

Checked by:

III-HH-182

PERMEABILITY

JOB _____ NO. _____ BY _____ DATE / /

BOR TIME / /	DEPTH	SATURATION DATA			UNIT NO.			CONSOLIDATION DATA	
	σ CHAMBER PRESS. (psi)	σ BACK PRESS. (psi)	EXTERNAL BURETTE (cc)	SATURATION BURETTE (cc)	PORE PRESSURE (psi)	Δ	B	ELAPSED TIME MIN.	INTERIOR VOL. BURETTE (cc)
14:49	2 HG	FLUSH SYSTEM							
		SATURATION							
14:56	10	8	111.9	67.6					
15:34	20	18	109.2	65.2					
15:47	30	28	107.2	64.3	28.0				
8:21	40	28	—	—	37.0	9.0	.90		
8:26	40	38	103.9	62.2	38.2				
11:34	50	38	—	—	47.7	9.5	.95		
11:46	40	38	103.0	62.0					
								0	
								.1	
								.25	
			CONSOLIDATION					.5	
12:01	43	37/39	102.9	62.0/3.1	= 65.1			1	
13:10	"	"	102.3	53.8/11.2	= 65.0			2	
								4	
								8	
								16	
8:5	43	37/39	102.0	60.6/3.4	= 64.0			30	
9:00	"	"	101.9	57.8/5.9	= 63.7			60	
10:21	"	"	101.4	40.7/22.5	= 63.2			120	
11:02	"	"	101.3	33.9/29.3	= 63.2			240	
13:14	"	"	101.2	16.2/46.1	= 62.3			480	
15:01				5.6/56.3	= 61.9			1440	
		reset							
15:03	"	"	101.1	68.2/0.7	= 68.9				
16:13	"	"	101.1	57.5/11.3	= 68.8				

III-HH-183

Date:
Time:
σ CH
σ BP
σ
(CONSOL.)

Δ Δ NET

2.8 2.5 18.7/h ✓ Tested by: Computed by: Checked by:
17.1 16.6 12.8/h ✓ 17.7 - 8.0/h. 10.7 = 9.2

WORK SHEET - PERMEABILITY — HARDING LAWSON ASSOCIATES

Job: U.W.T		Job No. 18915,006.12	Date 10-10-90
Hole No. C-8	Depth 14-19 (15')	Sample Diameter 2.50	Unit No. 2

Description of Sample and Remarks: @ psi (psf)

BROWN - GRAY CLAY (vertical direction)

Backpressure Saturated

Specific Gravity, G. 2.70

+ No. #	- No. #

WEIGHTS AND WATER CONTENTS

Formula: Water Content, $w = \frac{W_w}{W_s} \times 100$

			Before Test		After Test							
			MC	Sample	Wedge		Solids		Total		
	Tare No.		A-4	Ring	JP-11						
Weights in lbs. grams	Tare + Wet Soil		215.2	225.1	198.6						
	Tare + Dry Soil		169.9								
	Water	W_w	45.3								
	Tare		53.1	69.5	41.6						
	Wet Soil		116.8								
	Dry Soil	W_s		155.6	157.0	+		=		= W_s	
	Water Content %	w	38.8	112.1	112.1						

DIMENSIONS

	Areas in sq. cm.							Height	in.	cm.
	Top	Middle	Bottom	Avg.	Membrane Thick.	Membrane Corr.	A, Net Area			
Before Test								h_o =	1.00	
After Evacuation								h_{c_1} =		
After Saturation								h_{c_2} =		
After Consolidation										

k=

Dimensions After Consolidation

V_o =

A_{c_1} =

A_{c_2} =

GENERAL DATA

Chamber Pressure, psi	0				
Back Pressure psi	0				
Date	/ /		/ /		/ /
Hour					
Strain Dial Reading in.	.870	.873			
Interior Burette, cc.					
Exterior Burette, cc.					
Volume of Specimen, V = A x H cc.					
Volume of Solids, $V_s = W_s \div G$ cc.					
Volume of Voids, $V_v = V - V_s$ cc.					
Void Ratio, $e = V_v \div V_s$					
Dry Density, $\gamma_d = 62.4\ W_s \div V$, lbs/ft^3					
Saturation, $S = V_w \div V_v \times 100$, %					

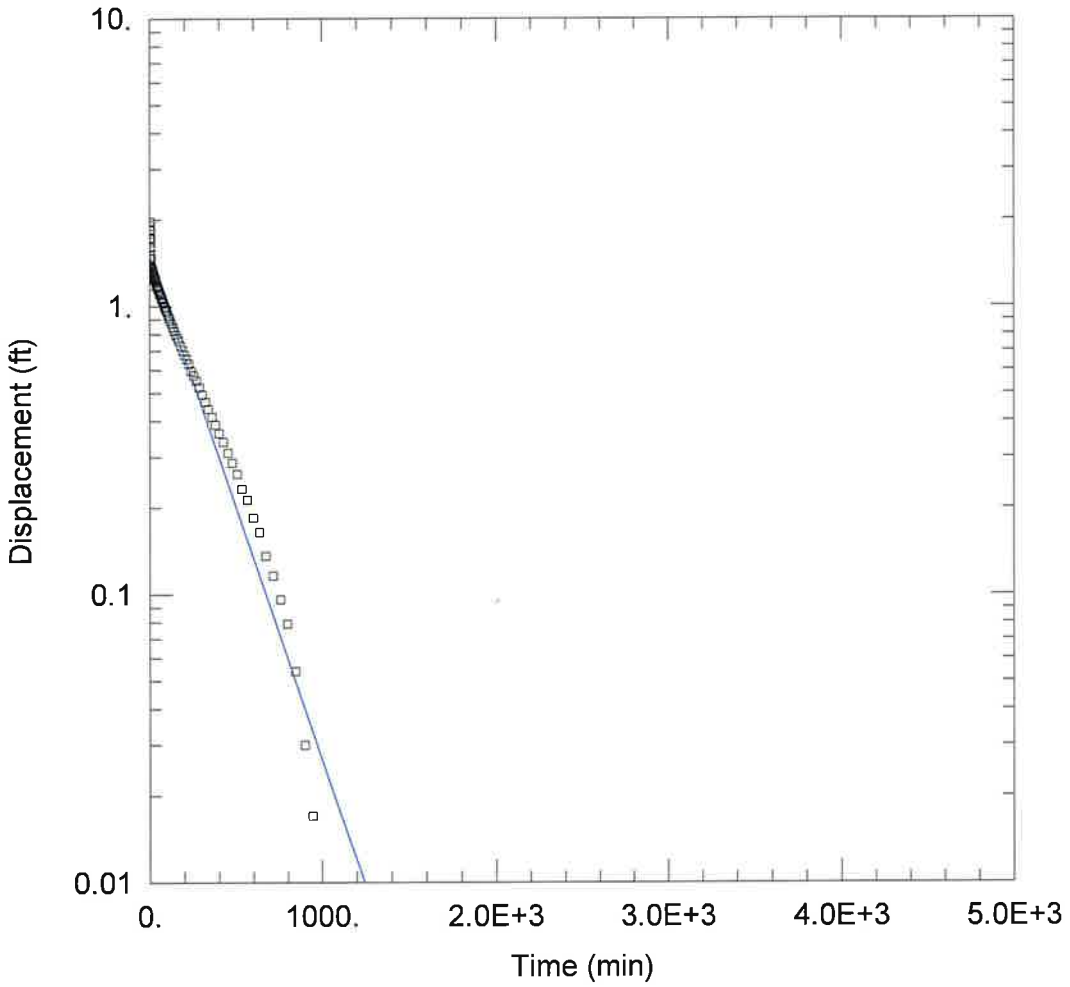
Tested by:

Computed by:

Checked by:

III-4H-184

SCS 2020 SLUG TEST DATA



GB SCS PZ--2 SLUG IN

Data Set: M:\...\SCS-PZ-2 Slug in Solution.aqt
Date: 07/31/20 Time: 13:51:51

PROJECT INFORMATION

Company: SCS Engineers
Client: WCA
Project: 16213104.14
Location: Houston, TX
Test Well: GB SCS-PZ-2
Test Date: May 2020

AQUIFER DATA

Saturated Thickness: 10.52 ft Anisotropy Ratio (Kz/Kr): 1.

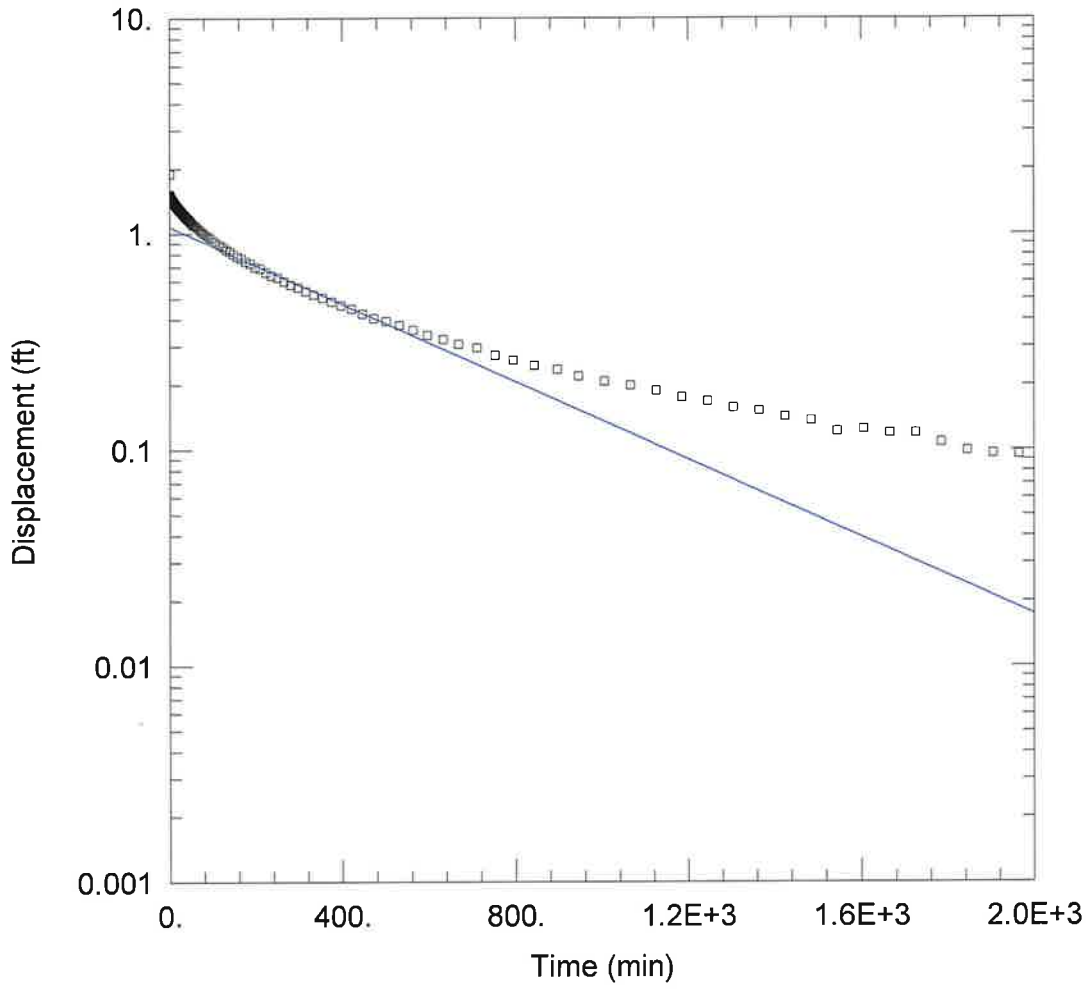
WELL DATA (SCS-PZ-2)

Initial Displacement: 1.903 ft
Total Well Penetration Depth: 38.5 ft
Casing Radius: 0.089 ft
Static Water Column Height: 10.52 ft
Screen Length: 10. ft
Well Radius: 0.089 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 3.419E-6 cm/sec III-4H-186 y0 = 1.489 ft



GB SCS PZ--2 SLUG OUT

Data Set: M:\...\SCS-PZ-2 Slug Out Solution.aqt
Date: 07/31/20 Time: 13:51:08

PROJECT INFORMATION

Company: SCS Engineers
Client: WCA
Project: 16213104.14
Location: Houston, TX
Test Well: GB SCS-PZ-2
Test Date: May 2020

AQUIFER DATA

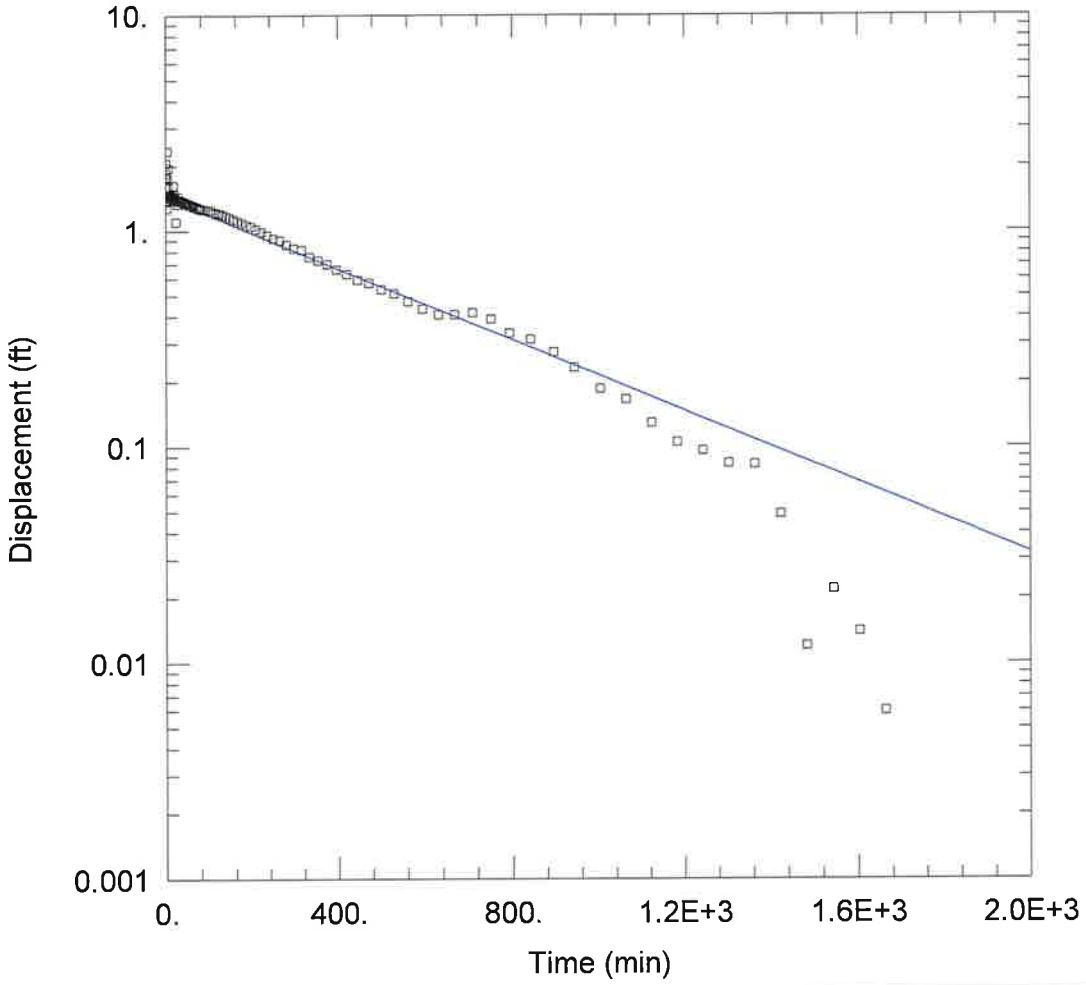
Saturated Thickness: 10.52 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (SCS-PZ-2)

Initial Displacement: 1.903 ft
Total Well Penetration Depth: 38.5 ft
Casing Radius: 0.089 ft
Static Water Column Height: 10.52 ft
Screen Length: 10. ft
Well Radius: 0.089 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.758E-6 cm/sec III-4H-187 y0 = 1.074 ft



GB SCS PZ--6 SLUG IN

Data Set: M:\...\SCS-PZ-6 Slug in Solution.aqt
Date: 07/31/20 Time: 13:49:16

PROJECT INFORMATION

Company: SCS Engineers
Client: WCA
Project: 16213104.14
Location: Houston, TX
Test Well: GB SCS-PZ-6
Test Date: May 2020

AQUIFER DATA

Saturated Thickness: 15.74 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (SCS-PZ-6)

Initial Displacement: 2.064 ft
Total Well Penetration Depth: 42. ft
Casing Radius: 0.089 ft
Static Water Column Height: 15.74 ft
Screen Length: 10. ft
Well Radius: 0.089 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 1.627E-6 cm/sec III-4H-188 y0 = 1.415 ft

APPENDIX III-4I

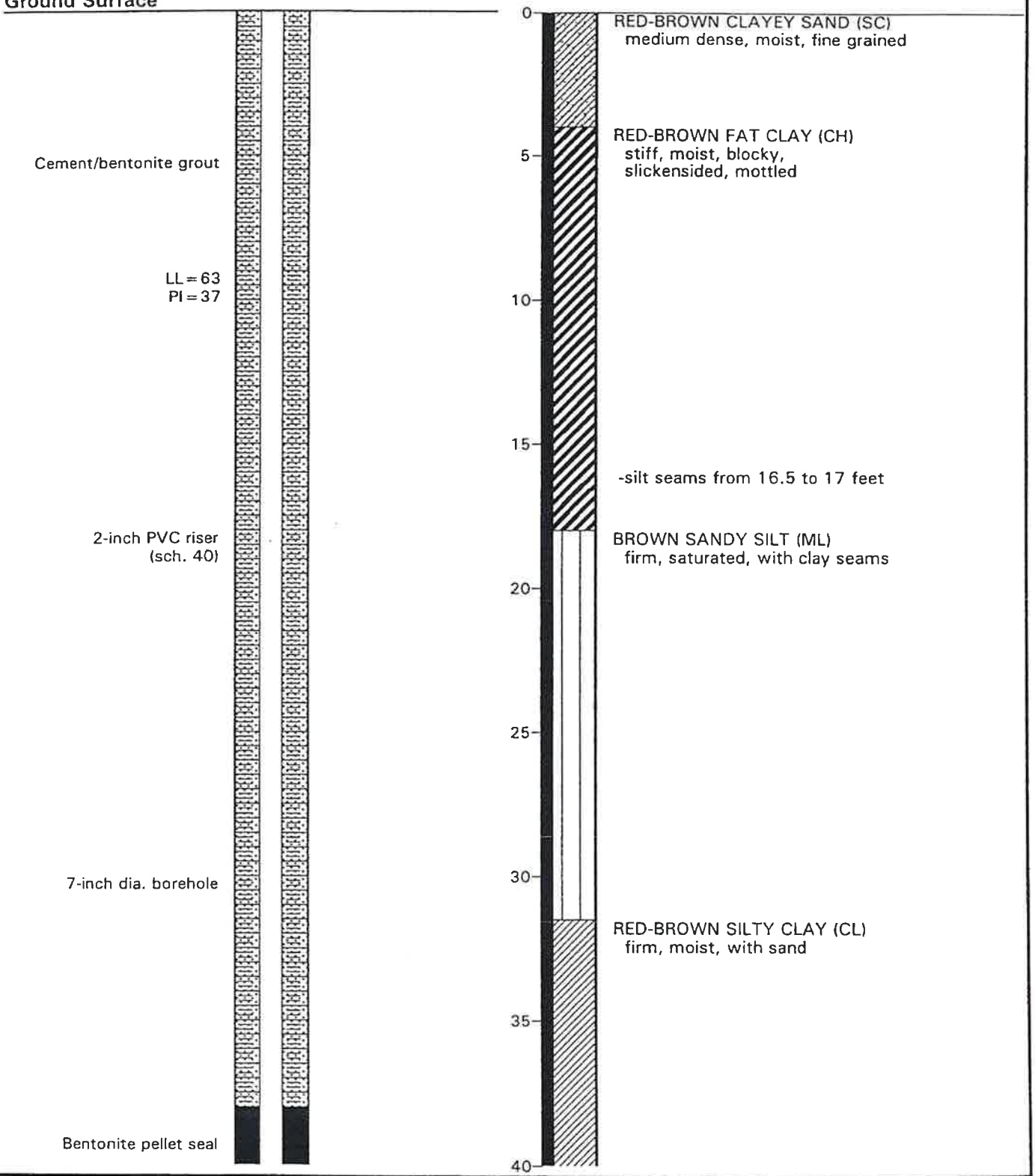
PIEZOMETER AND MONITORING WELL COMPLETION DATA

Top of PVC Casing
Elevation 19.73

Ground Surface

Equipment CME 75

Elevation 17.20 Date 9/6/90



Harding Lawson Associates
Engineering and
Environmental Services

PIEZOMETER INSTALLATION DETAIL C-1

Urban Waste Technologies
100 Genoa-Red Bluff Road
Houston, Texas

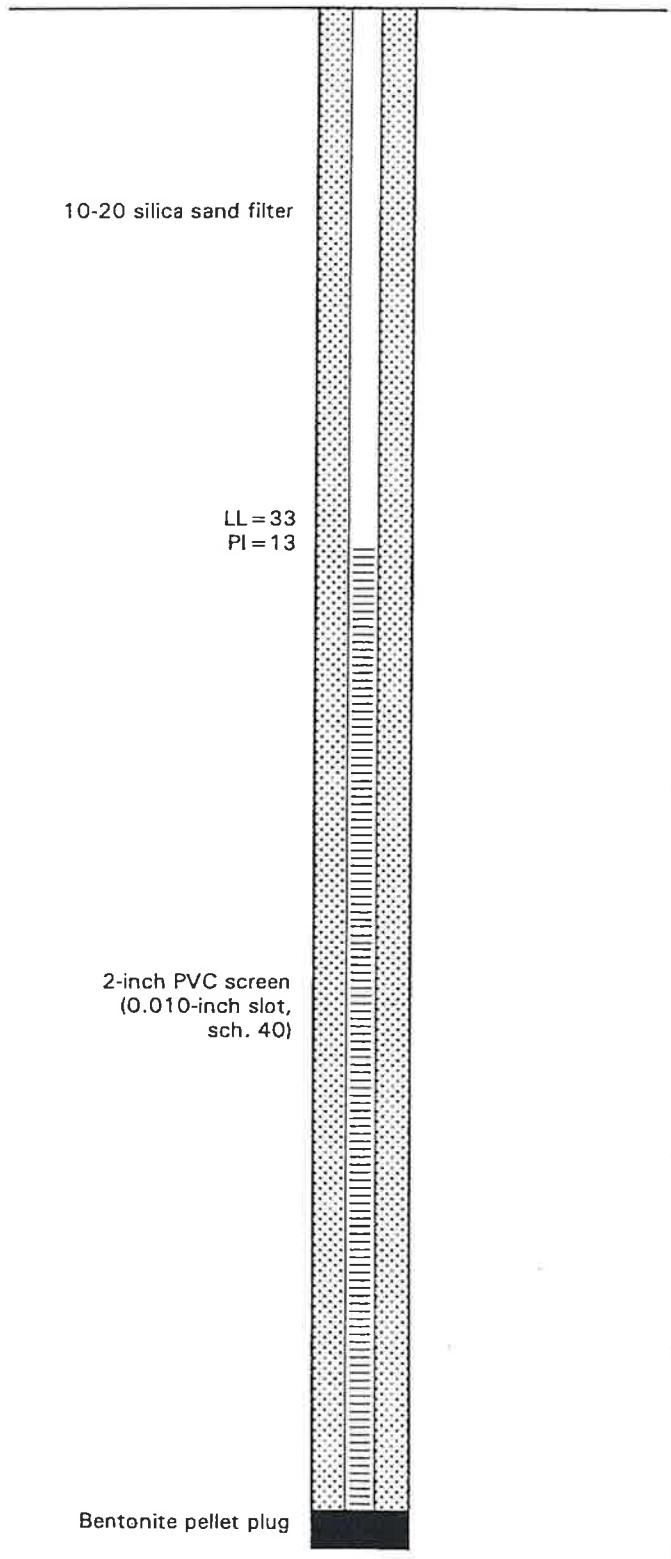
PLATE
B-1

DRAWN	JOB NUMBER	APPROVED	DATE
DAB	11495 1.5	JSK	10/14/93

III-HE-1

Equipment CME 75

Date 9/6/90



Harding Lawson Associates
Engineering and
Environmental Services

PIEZOMETER INSTALLATION DETAIL C-1

Urban Waste Technologies
100 Genoa-Red Bluff Road
Houston, Texas

PLATE
B-1

DRAWN	JOB NUMBER	APPROVED	DATE
DAB	11495 1.5	JSH	10/14/93

III-4E-2