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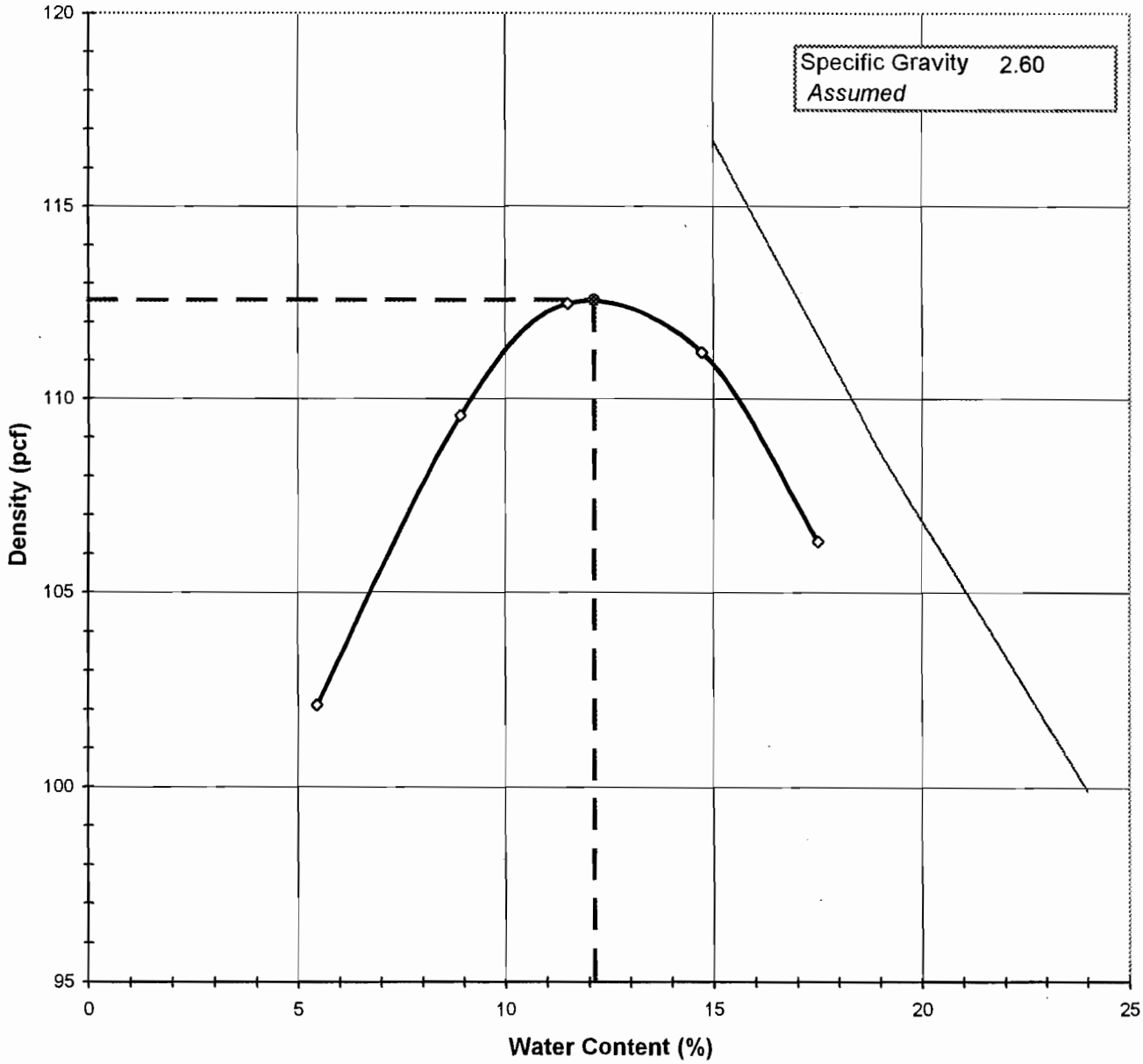
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	STOCK PILE
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R02014-03 (IP-2)	Sample No.	SF-1
Lab ID	R02014-03.01	Test Method	**STANDARD**

Visual Description GRAY CLAYEY SAND

Optimum Water Content **12.1**
Maximum Dry Density **112.6**



Tested By *DJK* *Date* *12/16/02* *Checked By* JDR *Date* 12-20-02

 DCN:CT-S12 DATE: 6-25-98 REVISION 3 *C:\2002 Projects\R02014 GNR\[R02014-03.01 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	STOCK PILE
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R02014-03 (IP-2)	Sample No.	SF-1
Lab ID	R02014-03.01		

Visual Description GRAY CLAYEY SAND

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.60
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType	**STANDARD**
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4240
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5862	6038	6130	6163	6123
Wt.of Mold (gm)	4240	4240	4240	4240	4240
Wt. of WS	1623	1798	1890	1923	1883
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	Y-13	SS-1	F-3	Y-6	Y-4
Wt. of Tare & WS (gm)	317.50	396.20	414.20	384.80	423.30
Wt. of Tare & DS (gm)	306.20	372.00	381.70	348.30	375.10
Wt. of Tare (gm)	99.00	100.50	99.20	100.50	99.90
Wt. of Water (gm)	11.30	24.20	32.50	36.50	48.20
Wt. of DS (gm)	207.20	271.50	282.50	247.80	275.20

Wet Density (gm/cc)	1.73	1.91	2.01	2.04	2.00
Wet Density (pcf)	107.7	119.3	125.4	127.6	124.9
Moisture Content (%)	**5.5**	**8.9**	**11.5**	**14.7**	**17.5**
Dry Density (pcf)	**102.1**	**109.6**	**112.5**	**111.2**	**106.3**

Zero Air Voids

Moisture Content (%)		15.0	19.0	24.0
Dry Unit Weight (pcf)		116.7	108.6	99.9

Tested By DJK *Date* 12/16/02 *Checked By* JDR *Date* 12-20-02

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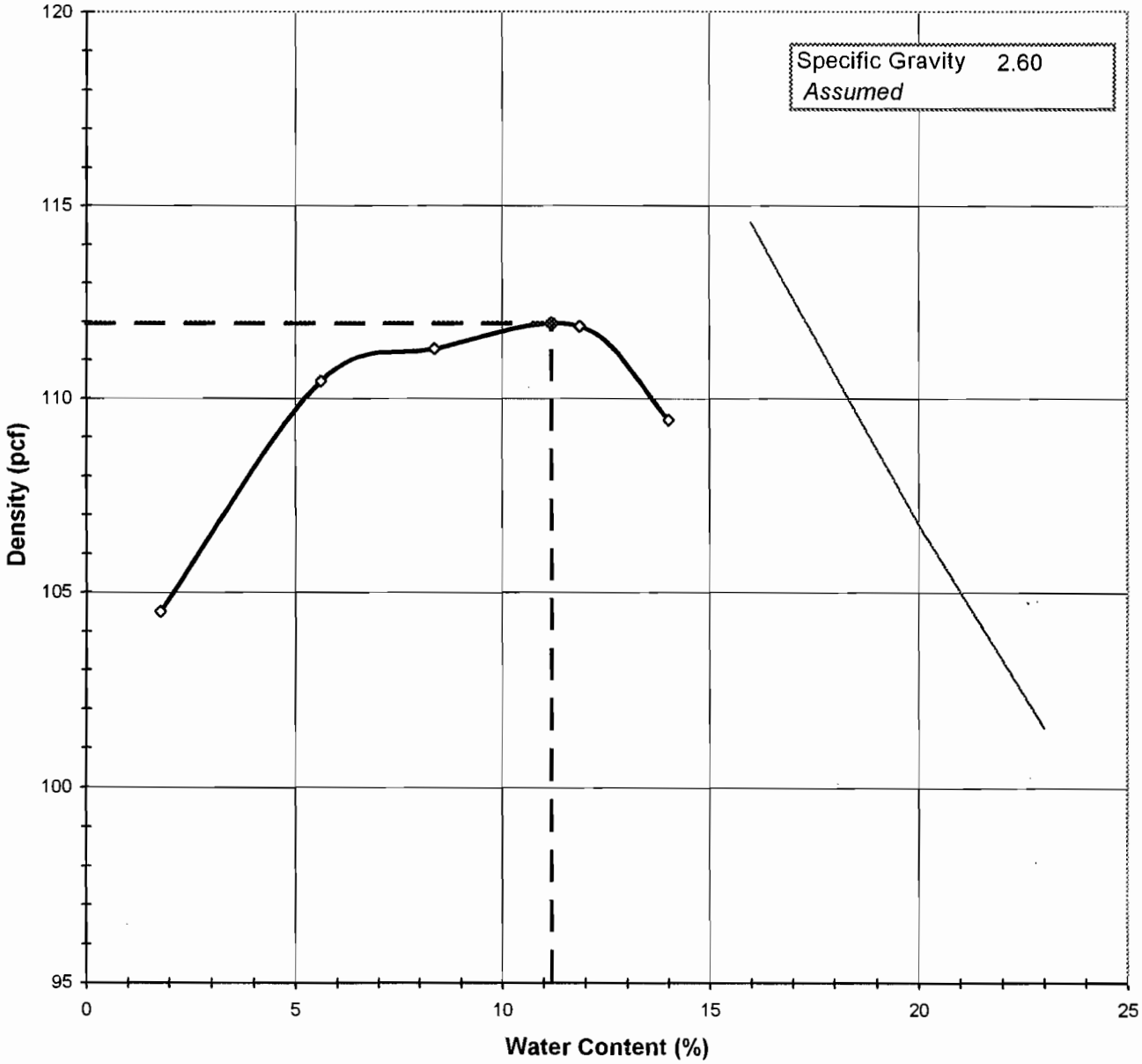
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	STOCK PILE
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R02014-03 (IP-2)	Sample No.	SF-2
Lab ID	R02014-03.02	Test Method	**STANDARD**

Visual Description BROWN CLAYEY SAND

Optimum Water Content **11.2**
Maximum Dry Density **112.0**



Tested By *DJK* *Date* *12/16/02* *Checked By* JDR *Date* 12-20-02

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	STOCK PILE
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R02014-03 (IP-2)	Sample No.	SF-2
Lab ID	R02014-03.02		

Visual Description BROWN CLAYEY SAND

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.60
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4240
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5843	5998	6058	6126	6120
Wt.of Mold (gm)	4240	4240	4240	4240	4240
Wt. of WS	1603	1758	1818	1886	1880
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	B-1	Y-1	Z-9	S-9	A-5
Wt. of Tare & WS (gm)	386.80	358.70	306.00	403.50	356.10
Wt. of Tare & DS (gm)	381.80	344.90	290.10	371.40	324.50
Wt. of Tare (gm)	100.30	98.90	100.30	101.00	99.10
Wt. of Water (gm)	5.00	13.80	15.90	32.10	31.60
Wt. of DS (gm)	281.50	246.00	189.80	270.40	225.40

Wet Density (gm/cc)	1.70	1.87	1.93	2.01	2.00
Wet Density (pcf)	106.4	116.6	120.6	125.2	124.8
Moisture Content (%)	**1.8**	**5.6**	**8.4**	**11.9**	**14.0**
Dry Density (pcf)	**104.5**	**110.4**	**111.3**	**111.9**	**109.4**

Zero Air Voids

Moisture Content (%)	16.0	20.0	23.0
Dry Unit Weight (pcf)	114.6	106.7	101.5

Tested By DJK *Date* 12/16/02 *Checked By* JDR *Date* 12-20-02

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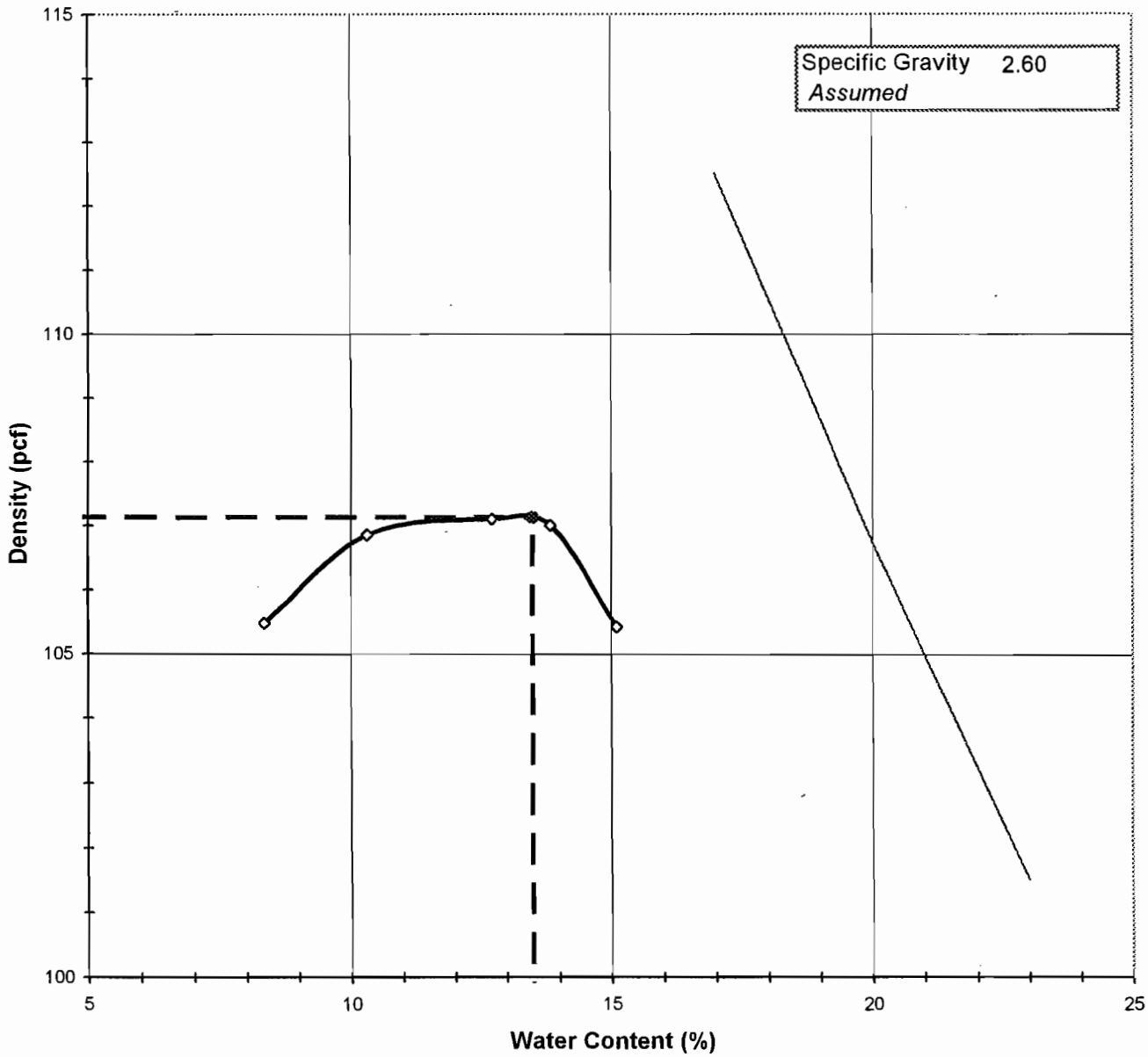
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	STOCK PILE
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R02014-03 (IP-2)	Sample No.	SF-3
Lab ID	R02014-03.03	Test Method	**STANDARD**

Visual Description TAN SAND

Optimum Water Content **13.5**
Maximum Dry Density **107.1**



Tested By *DJK* *Date* *12/16/02* *Checked By* JDR *Date* 12-20-02

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	STOCK PILE
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R02014-03 (IP-2)	Sample No.	SF-3
Lab ID	R02014-03.03		

Visual Description TAN SAND

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.60
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4240
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5962	6016	6059	6076	6069
Wt.of Mold (gm)	4240	4240	4240	4240	4240
Wt. of WS	1722	1776	1819	1836	1829
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	B-5	SS-6	Z-14	SS-6	Z-14
Wt. of Tare & WS (gm)	414.90	345.80	313.40	334.00	281.90
Wt. of Tare & DS (gm)	390.50	322.90	289.37	305.65	258.10
Wt. of Tare (gm)	98.10	100.90	100.60	100.80	100.60
Wt. of Water (gm)	24.40	22.90	24.03	28.35	23.80
Wt. of DS (gm)	292.40	222.00	188.77	204.85	157.50

Wet Density (gm/cc)	1.83	1.89	1.93	1.95	1.94
Wet Density (pcf)	114.3	117.9	120.7	121.8	121.4
Moisture Content (%)	**8.3**	**10.3**	**12.7**	**13.8**	**15.1**
Dry Density (pcf)	**105.5**	**106.9**	**107.1**	**107.0**	**105.4**

Zero Air Voids

Moisture Content (%)	17.0	20.0	23.0
Dry Unit Weight (pcf)	112.5	106.7	101.5

Tested By DJK *Date* 12/16/02 *Checked By* JDR *Date* 12-20-02

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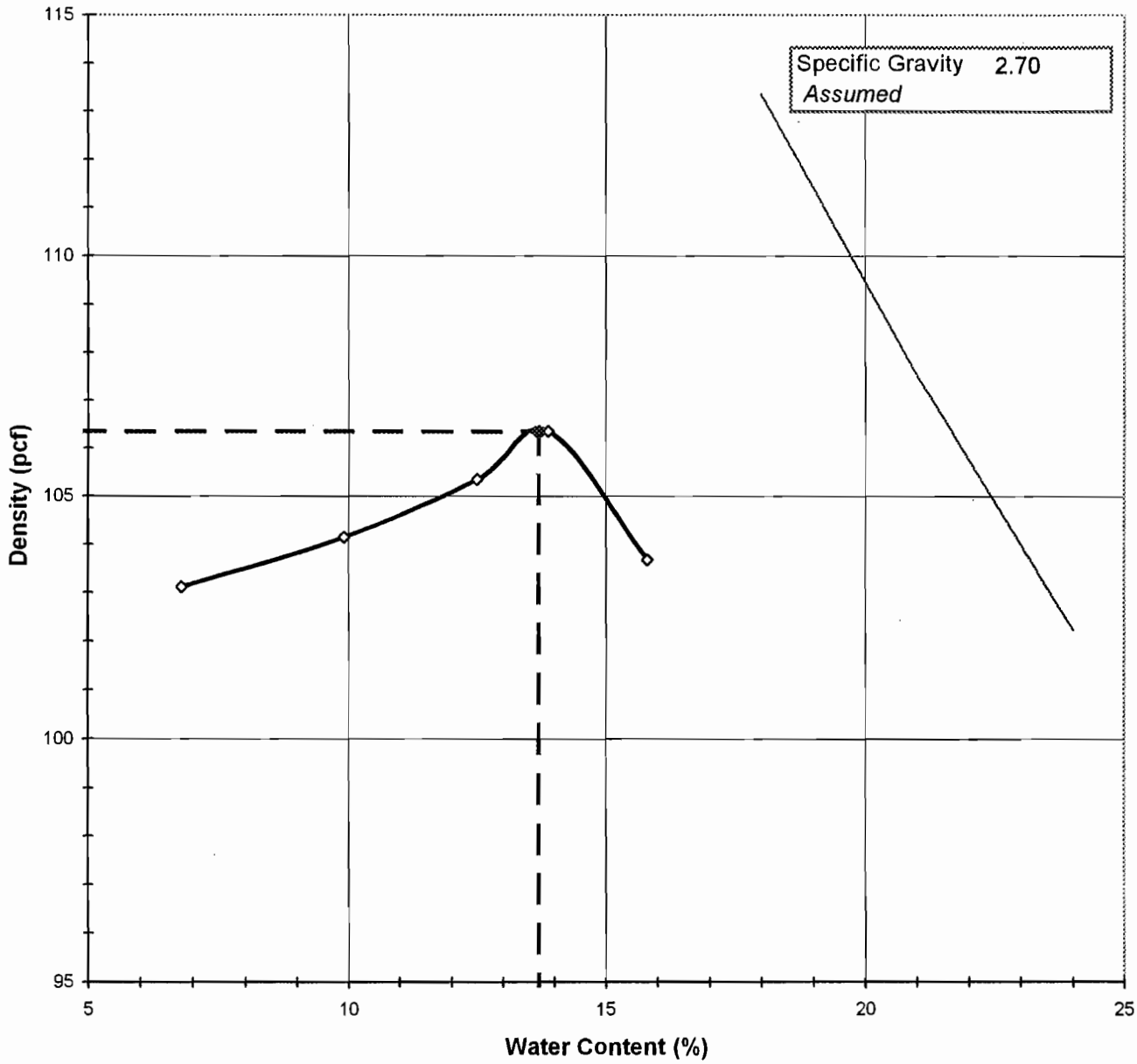
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON	Boring No.	SF-4
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-4
Lab ID	R03011-01.01	Test Method	**STANDARD**

Visual Description LIGHT GRAY SAND WITH SILT

Optimum Water Content	**13.7**	107.00
Maximum Dry Density	**106.3**	



Tested By JDR *Date* 02/01/03 *Checked By* DAJ *Date* 2-4-03

 DCN:CT-S12 DATE: 6-25-98 REVISION 3 *C:\2003 Projects\R03011 G.N.R\[R03011-01.01 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON	Boring No.	SF-4
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-4
Lab ID	R03011-01.01		

Visual Description LIGHT GRAY SAND WITH SILT

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	0
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	A

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4239
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	5899	5964	6025	6064	6049
Wt.of Mold (gm)	4239	4239	4239	4239	4239
Wt. of WS	1659	1725	1786	1825	1809
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	SS-8	Y-6	S-9	A-1	Y-3
Wt. of Tare & WS (gm)	421.10	501.70	422.10	524.10	554.20
Wt. of Tare & DS (gm)	400.60	465.50	386.40	472.30	492.30
Wt. of Tare (gm)	98.70	100.40	100.95	99.23	100.95
Wt. of Water (gm)	20.50	36.20	35.70	51.80	61.90
Wt. of DS (gm)	301.90	365.10	285.45	373.07	391.35

Wet Density (gm/cc)	1.76	1.83	1.90	1.94	1.92
Wet Density (pcf)	110.1	114.5	118.5	121.1	120.1
Moisture Content (%)	**6.8**	**9.9**	**12.5**	**13.9**	**15.8**
Dry Density (pcf)	**103.1**	**104.1**	**105.4**	**106.4**	**103.7**

Zero Air Voids

Moisture Content (%)	18.0	21.0	24.0
Dry Unit Weight (pcf)	113.4	107.5	102.2

Tested By JDR *Date* 02/01/03 *Checked By* DAJ *Date* 2-4-03

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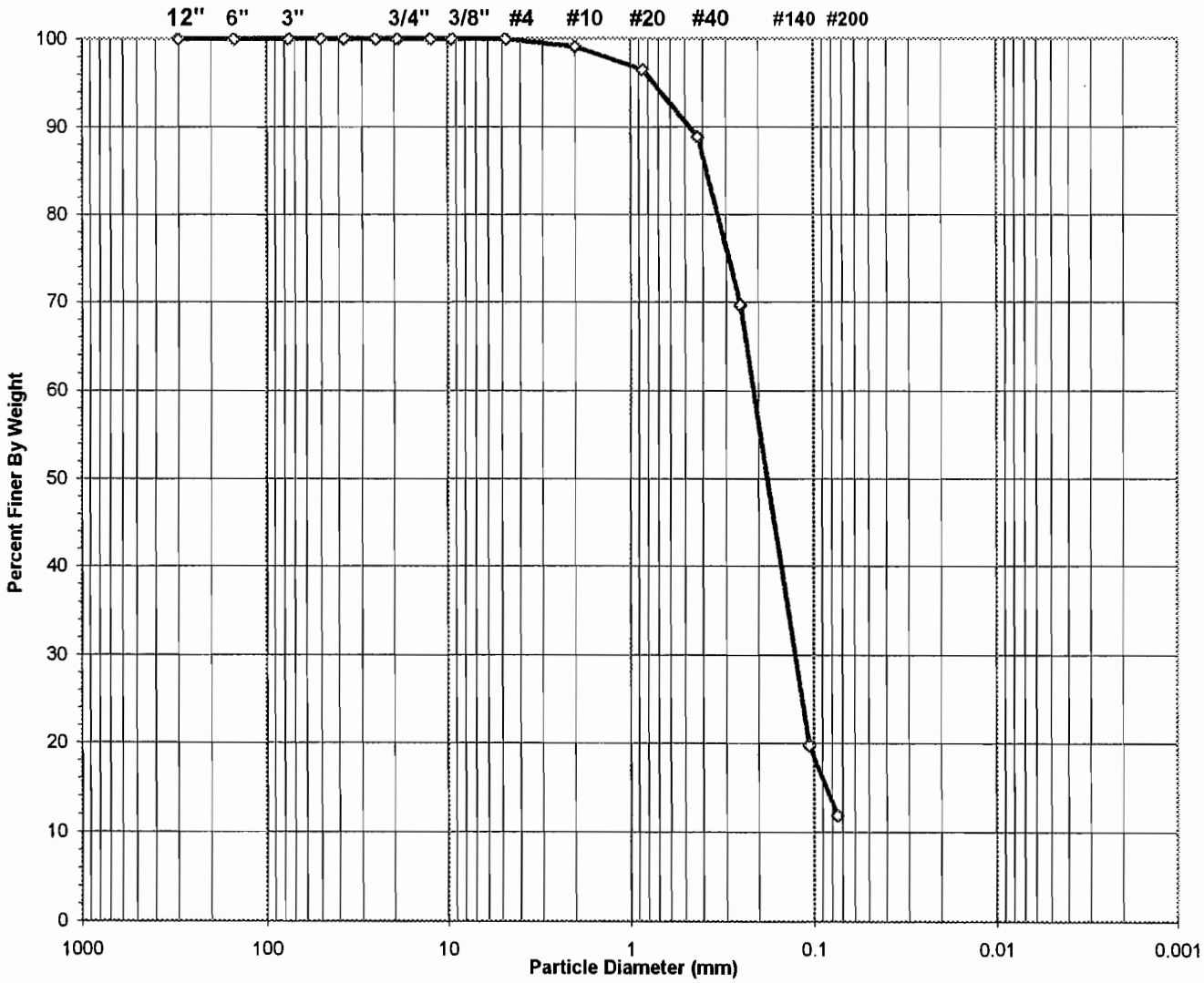
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOCIATES	Boring No.	SF-4
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-4
Lab ID	R03011-01.01	Soil Color	**LIGHT GRAY**

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol	***sp-sm, ASSUMED***	**D60 =**	**0.2**	**CC =**	**1.0**
USCS Classification	***POORLY GRADED SAND WITH SILT***	**D30 =**	**0.1**	**CU =**	**2.8**
		D10 =	**0.1**		

Tested By DJK Date 02/04/03 Checked By DAJ Date 2-4-03

 DCN: CT-S3C DATE 6-25-98 REVISION: 2 *C:\2003 Projects\R03011 G.N.R\[R03011-01.01 Sieve.XLS]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOCIATES	Boring No.	SF-4
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-4
Lab ID	R03011-01.01	Soil Color	**LIGHT GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	K-1	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	444.20	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	437.50	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	156.00	Weight of Tare (gm)	NA
Weight of Water (gm)	6.70	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	281.50	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**2.4**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	281.50
Dry Weight - 3/4" Sample (gm)	248.2	Weight of minus #200 material (gm)	33.28
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	248.22
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0	0	100	**100**
6"	150	0.00	0	0	100	**100**
3"	75	0.00	0	0	100	**100**
2"	50	0.00	0	0	100	**100**
1 1/2"	37.5	0.00	0	0	100	**100**
1"	25.0	0.00	0	0	100	**100**
3/4"	19.0	0.00	0	0	100	**100**
1/2"	12.50	0.00	0	0	100	**100**
3/8"	9.50	0.00	0	0	100	**100**
#4	4.75	0.00	0	0	100	**100**
#10	2.00	2.44	1	1	99	**99**
#20	0.850	7.26	3	3	97	**97**
#40	0.425	21.61	8	11	89	**89**
#60	0.250	53.98	19	30	70	**70**
#140	0.106	140.71	50	80	20	**20**
#200	0.075	22.22	8	88	12	**12**
Pan	-	33.28	12	100	-	-

Tested By DJK Date 02/04/03 Checked By DAJ Date 2-4-03

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\2003 Projects\R03011 G.N.R\[R03011-01.01 Sieve.XLS]Sheet1

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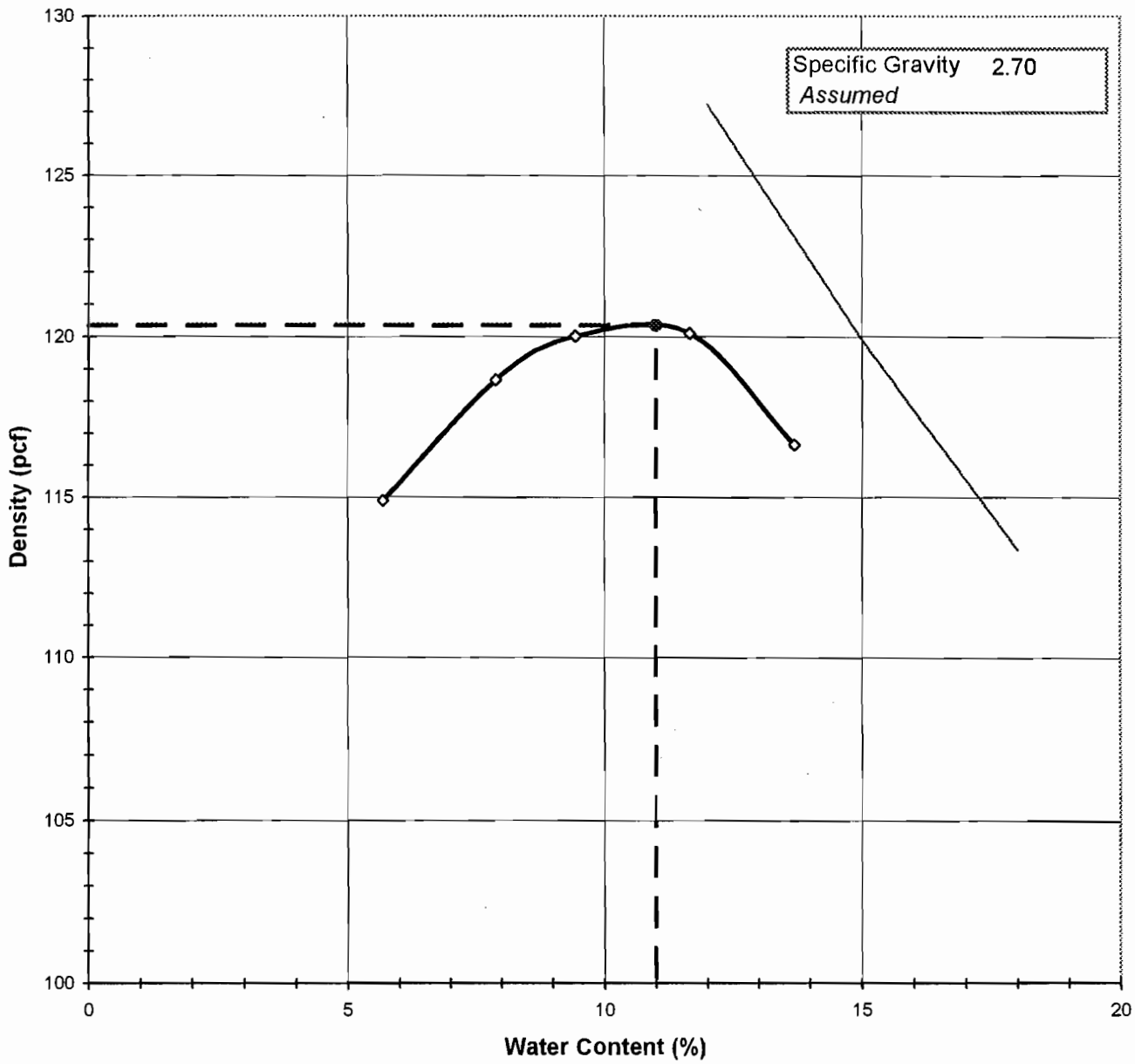
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON	Boring No.	SF-5
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-5
Lab ID	R03011-01.02	Test Method	**STANDARD**

Visual Description DARK GRAY SAND WITH SILT

Optimum Water Content **11.0**
Maximum Dry Density **120.4**



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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON	Boring No.	SF-5
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-5
Lab ID	R03011-01.02		

Visual Description DARK GRAY SAND WITH SILT

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	0
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	A

TestType	**STANDARD**
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4239
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6069	6169	6219	6260	6238
Wt.of Mold (gm)	4239	4239	4239	4239	4239
Wt. of WS	1830	1929	1979	2021	1999
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	Z-9	F-3	SS-5	Y-3	S-9
Wt. of Tare & WS (gm)	497.80	543.30	478.00	489.00	649.30
Wt. of Tare & DS (gm)	476.40	510.80	445.40	448.50	583.20
Wt. of Tare (gm)	100.30	99.30	100.10	101.10	100.94
Wt. of Water (gm)	21.40	32.50	32.60	40.50	66.10
Wt. of DS (gm)	376.10	411.50	345.30	347.40	482.26

Wet Density (gm/cc)	1.95	2.05	2.10	2.15	2.13
Wet Density (pcf)	121.4	128.0	131.4	134.1	132.6
Moisture Content (%)	**5.7**	**7.9**	**9.4**	**11.7**	**13.7**
Dry Density (pcf)	**114.9**	**118.7**	**120.0**	**120.1**	**116.7**

Zero Air Voids

Moisture Content (%)		12.0	15.0	18.0
Dry Unit Weight (pcf)		127.3	119.9	113.4

Tested By *JDR* *Date* *02/01/03* *Checked By* DAJ *Date* 2-5-03

DCN:CT-S12 DATE: 6-25-98 REVISION 3

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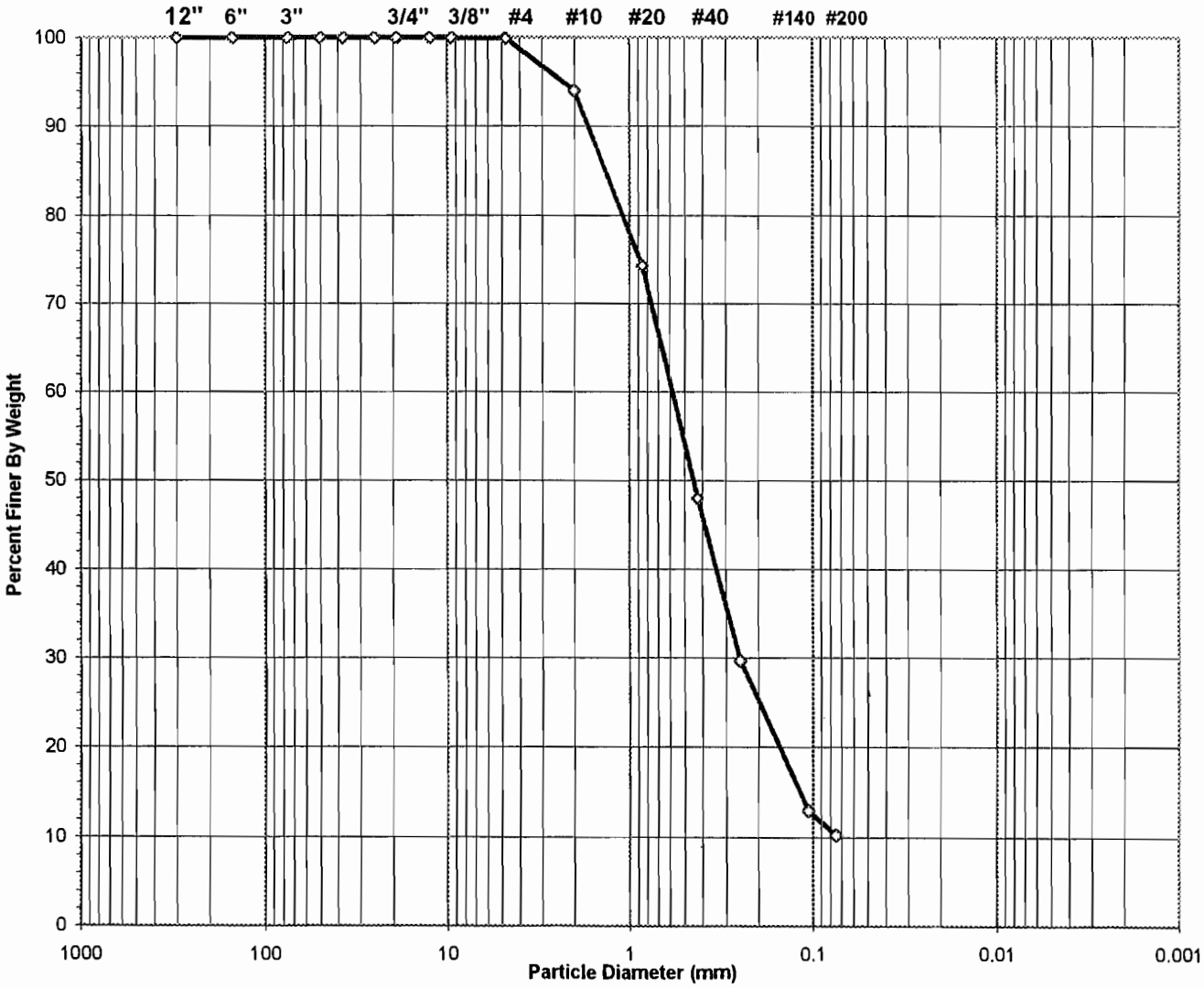
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOCIATES	Boring No.	SF-5
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-5
Lab ID	R03011-01.02	Soil Color	**DARK GRAY**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	gravel	sand	silt and clay



USCS Symbol ***sp-sm, ASSUMED***

USCS Classification ***POORLY GRADED SAND WITH SILT***

Tested By DJK Date 02/04/03 Checked By DAJ Date 2-4-03

 DCN: CT-S3C DATE 6-25-98 REVISION: 2 *C:\2003 Projects\R03011 G.N.R\[R03011-01.02 Sieve.XLS]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOCIATES	Boring No.	SF-5
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-5
Lab ID	R03011-01.02	Soil Color	**DARK GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	H-5	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	600.70	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	587.60	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	153.40	Weight of Tare (gm)	NA
Weight of Water (gm)	13.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	434.20	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**3.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	434.20
Dry Weight - 3/4" Sample (gm)	389.9	Weight of minus #200 material (gm)	44.33
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	389.87
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0	0	100	**100**
6"	150	0.00	0	0	100	**100**
3"	75	0.00	0	0	100	**100**
2"	50	0.00	0	0	100	**100**
1 1/2"	37.5	0.00	0	0	100	**100**
1"	25.0	0.00	0	0	100	**100**
3/4"	19.0	0.00	0	0	100	**100**
1/2"	12.50	0.00	0	0	100	**100**
3/8"	9.50	0.00	0	0	100	**100**
#4	4.75	0.31	0	0	100	**100**
#10	2.00	25.66	6	6	94	**94**
#20	0.850	85.59	20	26	74	**74**
#40	0.425	114.18	26	52	48	**48**
#60	0.250	79.84	18	70	30	**30**
#140	0.106	72.33	17	87	13	**13**
#200	0.075	11.96	3	90	10	**10**
Pan	-	44.33	10	100	-	-

Tested By DJK Date 02/04/03 Checked By DAJ Date 2-4-03

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\2003 Projects\R03011 G.N.R\[R03011-01.02 Sieve.XLS]Sheet1

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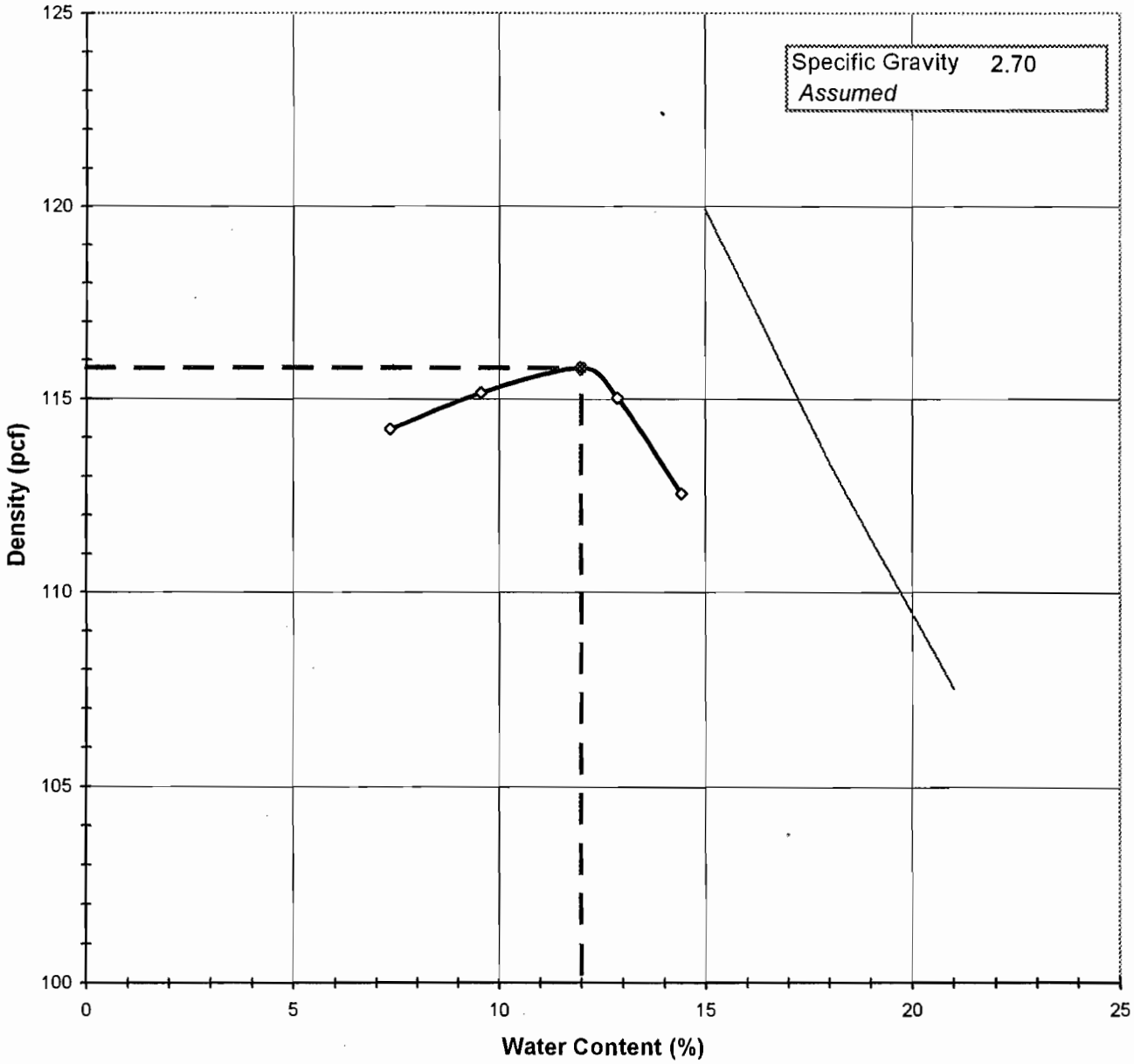
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON	Boring No.	SF-6
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-6
Lab ID	R03011-01.03	Test Method	**STANDARD**

Visual Description GRAY SILTY SAND

Optimum Water Content **12.0**
Maximum Dry Density **115.8**



Tested By *JDR* *Date* *02/01/03* *Checked By* DAJ *Date* 2-5-03

 DCN:CT-S12 DATE: 6-25-98 REVISION 3 *C:\2003 Projects\R03011 G.N.R\[R03011-01.03 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON	Boring No.	SF-6
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-6
Lab ID	R03011-01.03		

Visual Description GRAY SILTY SAND

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	0
Percent Retained on #4	2
Oversize Material	Not included
Procedure Used	A

TestType	**STANDARD**
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4239
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6087	6140	6194	6196	6180
Wt.of Mold (gm)	4239	4239	4239	4239	4239
Wt. of WS	1847	1901	1954	1956	1941
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	Z-14	B-2	SS-8	B-2	B-5
Wt. of Tare & WS (gm)	513.30	556.50	469.20	624.70	562.10
Wt. of Tare & DS (gm)	485.10	516.70	429.50	564.60	503.60
Wt. of Tare (gm)	100.70	100.70	98.61	97.90	98.10
Wt. of Water (gm)	28.20	39.80	39.70	60.10	58.50
Wt. of DS (gm)	384.40	416.00	330.89	466.70	405.50

Wet Density (gm/cc)	1.96	2.02	2.08	2.08	2.06
Wet Density (pcf)	122.6	126.2	129.7	129.8	128.8
Moisture Content (%)	**7.3**	**9.6**	**12.0**	**12.9**	**14.4**
Dry Density (pcf)	**114.2**	**115.2**	**115.8**	**115.0**	**112.6**

Zero Air Voids

Moisture Content (%)	15.0	18.0	21.0
Dry Unit Weight (pcf)	119.9	113.4	107.5

Tested By JDR *Date* 02/01/03 *Checked By* DAJ *Date* 2-5-03

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SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOCIATES	Boring No.	SF-6
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-6
Lab ID	R03011-01.03	Soil Color	**GRAY**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**

USCS Symbol ***sm, ASSUMED***

USCS Classification ***SILTY SAND***

Tested By DJK Date 02/04/03 Checked By DAJ Date 2-4-03

 DCN: CT-S3C DATE 6-25-98 REVISION: 2 *C:\2003 Projects\R03011 G.N.R\[R03011-01.03 Sieve.XLS]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOCIATES	Boring No.	SF-6
Client Reference	I.P. RIEGLEWOOD	Depth (ft)	NA
Project No.	R03011-01 (IP-2)	Sample No.	SF-6
Lab ID	R03011-01.03	Soil Color	**GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	G-3	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	598.80	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	593.20	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	155.60	Weight of Tare (gm)	NA
Weight of Water (gm)	5.60	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	437.60	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**1.3**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	437.60
Dry Weight - 3/4" Sample (gm)	357.1	Weight of minus #200 material (gm)	80.47
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	357.13
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0	0	100	**100**
6"	150	0.00	0	0	100	**100**
3"	75	0.00	0	0	100	**100**
2"	50	0.00	0	0	100	**100**
1 1/2"	37.5	0.00	0	0	100	**100**
1"	25.0	0.00	0	0	100	**100**
3/4"	19.0	0.00	0	0	100	**100**
1/2"	12.50	0.00	0	0	100	**100**
3/8"	9.50	1.77	0	0	100	**100**
#4	4.75	7.01	2	2	98	**98**
#10	2.00	9.25	2	4	96	**96**
#20	0.850	41.08	9	14	86	**86**
#40	0.425	71.22	16	30	70	**70**
#60	0.250	64.71	15	45	55	**55**
#140	0.106	134.47	31	75	25	**25**
#200	0.075	27.62	6	82	18	**18**
Pan	-	80.47	18	100	-	-

Tested By DJK Date 02/04/03 Checked By DAJ Date 2-4-03

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\2003 Projects\R03011 G.N.R\[R03011-01.03 Sieve.XLS]Sheet1

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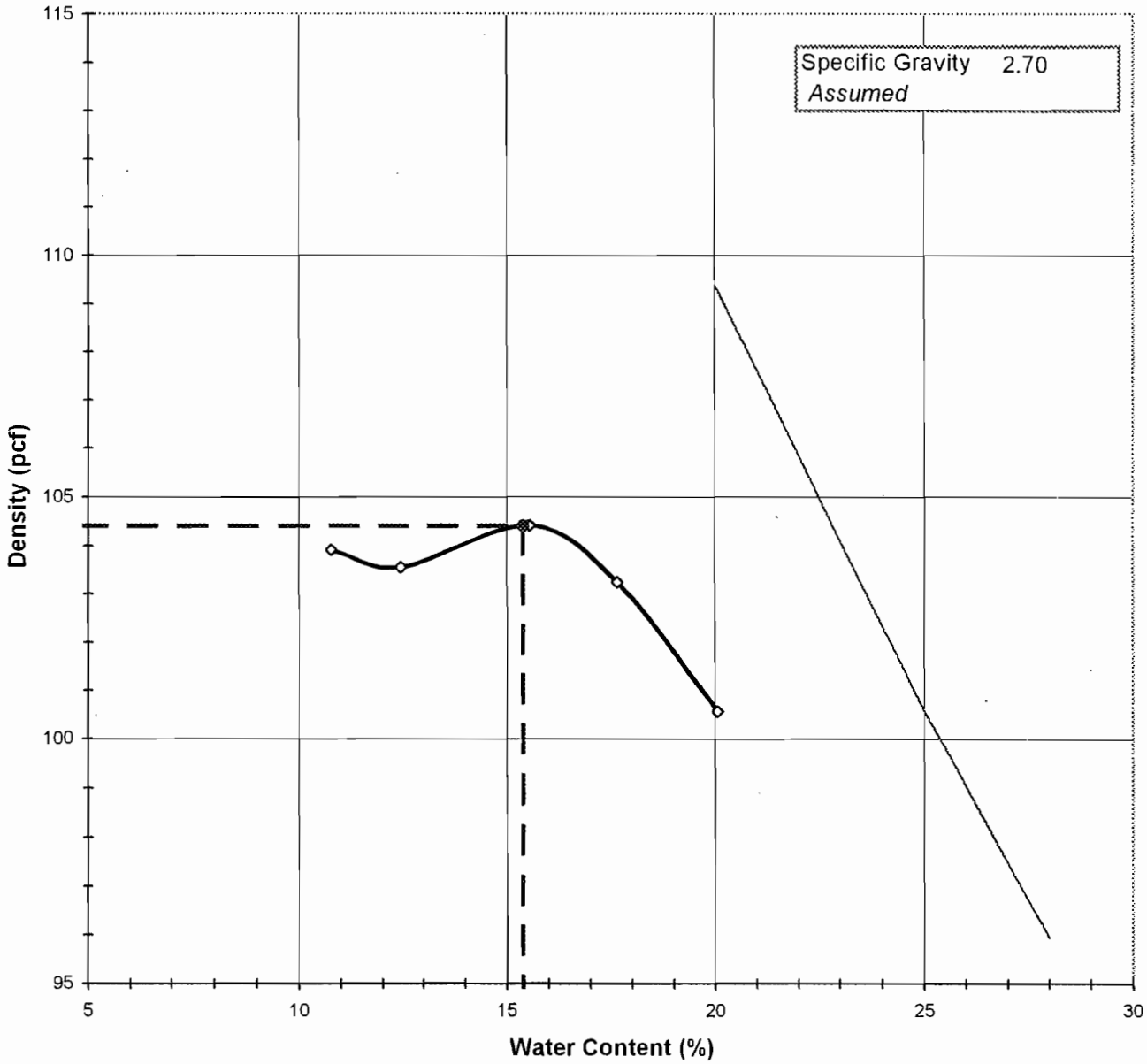
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	SF-7
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-02 (IP-2)	Sample No.	SF-7
Lab ID	R03011-02.01	Test Method	**STANDARD**

Visual Description LIGHT BROWN POORLY GRADED SAND WITH SILT

Optimum Water Content **15.4**
Maximum Dry Density **104.4**



Tested By DAJ *Date* 03/14/03 *Checked By* DAJ *Date* 3-24-03

 DCN:CT-S12 DATE: 6-25-98 REVISION 3 C:\2003 Projects\R03011 G.N.R\[R03011-02.01 Proctor.XLS]Sheet1

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	G.N. RICHARDSON & ASSOC.	Boring No.	SF-7
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-02 (IP-2)	Sample No.	SF-7
Lab ID	R03011-02.01		

Visual Description LIGHT BROWN POORLY GRADED SAND WITH SILT

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	0
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	A

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	R174
Mold ID	R172
Mold diameter	4"
Weight of the Mold	4239
Volume of the Mold(cc)	940

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5973	5993	6057	6069	6058
Wt.of Mold (gm)	4239	4239	4239	4239	4239
Wt. of WS	1735	1755	1818	1830	1820
Mold Volume (cc)	940	940	940	940	940

Moisture Content / Density

Tare Number	ZZ-1	Z-1	Y-2	Y-3	SS-8
Wt. of Tare & WS (gm)	410.10	340.60	414.70	392.40	376.90
Wt. of Tare & DS (gm)	379.96	314.00	372.40	348.70	330.40
Wt. of Tare (gm)	100.04	100.40	100.30	101.10	98.70
Wt. of Water (gm)	30.14	26.60	42.30	43.70	46.50
Wt. of DS (gm)	279.92	213.60	272.10	247.60	231.70

Wet Density (gm/cc)	1.84	1.87	1.93	1.95	1.94
Wet Density (pcf)	115.1	116.4	120.6	121.5	120.8
Moisture Content (%)	**10.8**	**12.5**	**15.5**	**17.6**	**20.1**
Dry Density (pcf)	**103.9**	**103.6**	**104.4**	**103.2**	**100.6**

Zero Air Voids

Moisture Content (%)	20.0	25.0	28.0
Dry Unit Weight (pcf)	109.4	100.6	95.9

Tested By DAJ *Date* 03/14/03 *Checked By* DAJ *Date* 3-24-03

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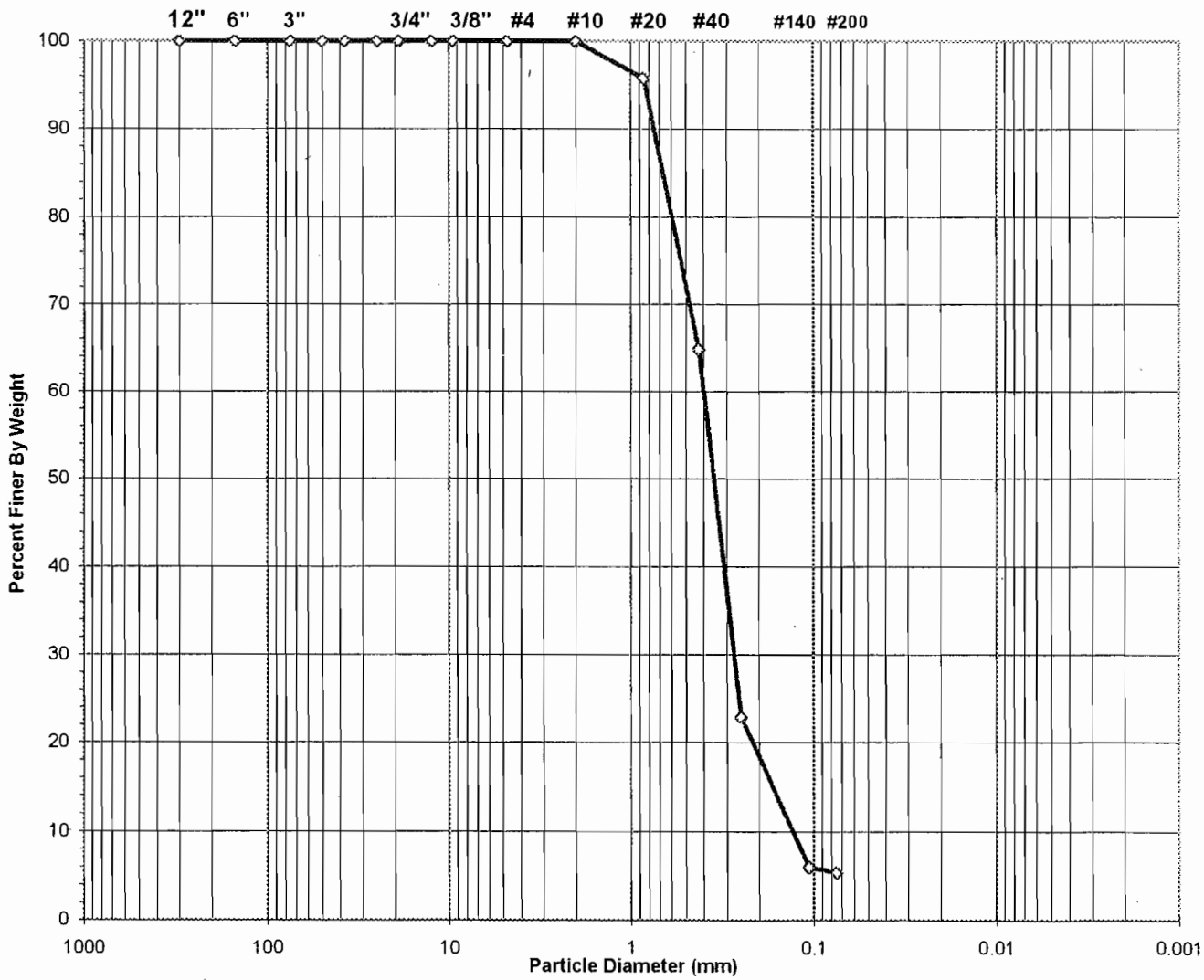
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOC.	Boring No.	SF-7
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-02 (IP-2)	Sample No.	SF-7
Lab ID	R03011-02.01	Soil Color	**LIGHT BROWN**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol	***sp-sm, ASSUMED***	**D60 =**	**0.4**	**CC =**	**1.4**
USCS Classification	***POORLY GRADED SAND WITH SILT***	**D30 =**	**0.3**	**CU =**	**3.1**
		D10 =	**0.1**		

Tested By DJK Date 03/17/03 Checked By DAJ Date 3-17-03

 DCN: CT-S3C DATE 6-25-98 REVISION: 2 *C:\2003 Projects\R03011 G.N.R\[R03011-02.01 Sieve.XLS]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	G.N. RICHARDSON & ASSOC.	Boring No.	SF-7
Client Reference	I.P. RIEGELWOOD	Depth (ft)	NA
Project No.	R03011-02 (IP-2)	Sample No.	SF-7
Lab ID	R03011-02.01	Soil Color	**LIGHT BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	K-4	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	852.40	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	826.30	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	155.10	Weight of Tare (gm)	NA
Weight of Water (gm)	26.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	671.20	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**3.9**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	671.20
Dry Weight - 3/4" Sample (gm)	635.1	Weight of minus #200 material (gm)	36.14
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	635.06
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0	0	100	**100**
6"	150	0.00	0	0	100	**100**
3"	75	0.00	0	0	100	**100**
2"	50	0.00	0	0	100	**100**
1 1/2"	37.5	0.00	0	0	100	**100**
1"	25.0	0.00	0	0	100	**100**
3/4"	19.0	0.00	0	0	100	**100**
1/2"	12.50	0.00	0	0	100	**100**
3/8"	9.50	0.00	0	0	100	**100**
#4	4.75	0.00	0	0	100	**100**
#10	2.00	0.03	0	0	100	**100**
#20	0.850	28.09	4	4	96	**96**
#40	0.425	207.95	31	35	65	**65**
#60	0.250	281.53	42	77	23	**23**
#140	0.106	113.62	17	94	6	**6**
#200	0.075	3.84	1	95	5	**5**
Pan	-	36.14	5	100	-	**-**

Tested By DJK Date 03/17/03 Checked By DAJ Date 3-17-03

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\2003 Projects\R03011 G.N.R\[R03011-02.01 Sieve.XLS]Sheet1

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RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-74 (SOP-S35)

Client	G.N. RICHARDSON & ASSOC.	Sample No.	SF-7
Client Reference	I.P. RIEGELWOOD	Visual Description	LIGHT BROWN SAND
Project No.	R03011-02 (IP-2)		
Lab ID	R03011-02.01		

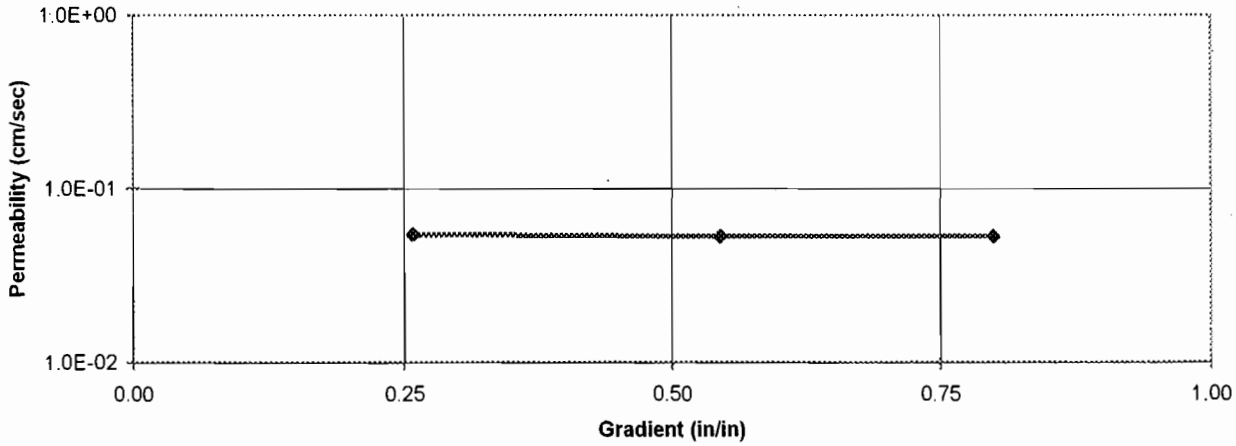
Unit Weight

Wt. of Wet Material (gm)	1917.1
Average Length (in)	7.0
Permeameter Diameter (in)	3.975
Sample Volume (cc)	1423.5
Unit Dry Weight (gm/cc)	1.31
Unit Dry Weight (pcf)	81.5
Piezometer Spacing (in)	*5.125*
Temperature (° C)	*21.5*
Temp. Correction Factor	*0.9646*

Water Content

Tare Number	ZZ-1
Wt. of Tare & Wet Mat.(gm)	293.12
Wt. of Tare & Dry Mat.(gm)	287.30
Wt. of Tare (gm)	100.14
Wt. Water (gm)	5.82
Wt. of Dry Material (gm)	187.16
Water Content (%) *(Measured)*	***3.1***
Load (psf)	***NA***

Test No.	Reading No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collected Volume (ml)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	H_1= 2.4		H_2= 1.075					
	1	1.33	0.26	30	35	34.8	5.4E-02	
	2	1.33	0.26	45	53	52.6	5.4E-02	**5.43E-02**
	3	1.33	0.26	60	70	70.2	5.5E-02	
2	H_1= 4.15		H_2= 1.35					
	1	2.80	0.55	30	72	72.3	5.3E-02	
	2	2.80	0.55	45	109	108.7	5.3E-02	**5.31E-02**
	3	2.80	0.55	60	144	143.9	5.3E-02	
3	H_1= 5.7		H_2= 1.6					
	1	4.10	0.80	15	53	52.5	5.3E-02	
3	2	4.10	0.80	30	106	106.3	5.3E-02	**5.30E-02**
3	3	4.10	0.80	45	158	157.7	5.3E-02	



Tested By DJK Date 03/25/03 Checked By DAJ Date 3-25-03

 DCN: CT-S35A DATE: 11/13/96 REVISION: ORIGINAL *C:\2003 Projects\R03011 G.N.R\[R03011-02.01 Sand Perm.xls]Sheet1*

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