Attachment 3

BASELINE SITE SURVEY REPORT

LIBBY ISLAND, MACHIAS BAY, MACHIASPORT
WASHINGTON COUNTY,
MAINE

Cooke Aquaculture
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PREFACE

Samples for this baseline survey and assessment were collected by Sean Small and Jason Jaimeson under contract to Cooke Aquaculture and under on-site direction of MER. All benthic infauna preparation and analysis work and in-lab sulfide measurements were performed by MER Assessment Corporation: mer@maine.com.

Additional work was performed as follows:

Copper and zinc analysis and associated fine granulometry and percent moisture measurements were performed by the University of Maine, Environmental Chemistry Lab, in Orono under direction of Clive DeVoy: Clive.Devoy@umit.maine.edu.

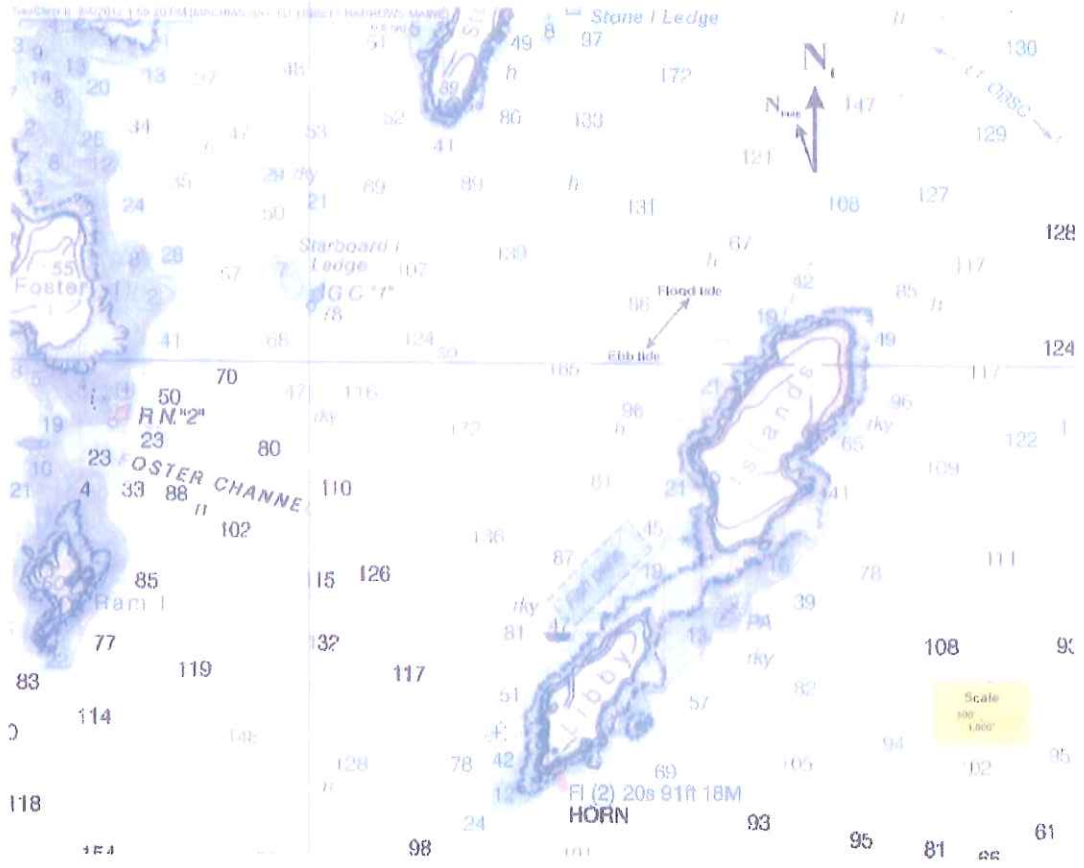
TOC analysis was performed by the University of Maine, Ira C. Darling Center chemistry lab under the direction of Kathy Hardy: kthornton@maine.edu.

Granulometry was carried out by S. W. Cole Engineering, Inc., 286 Portland Road, Gray, Maine 04039, (207) 657-2866, infogray@swcole.com.

Introduction

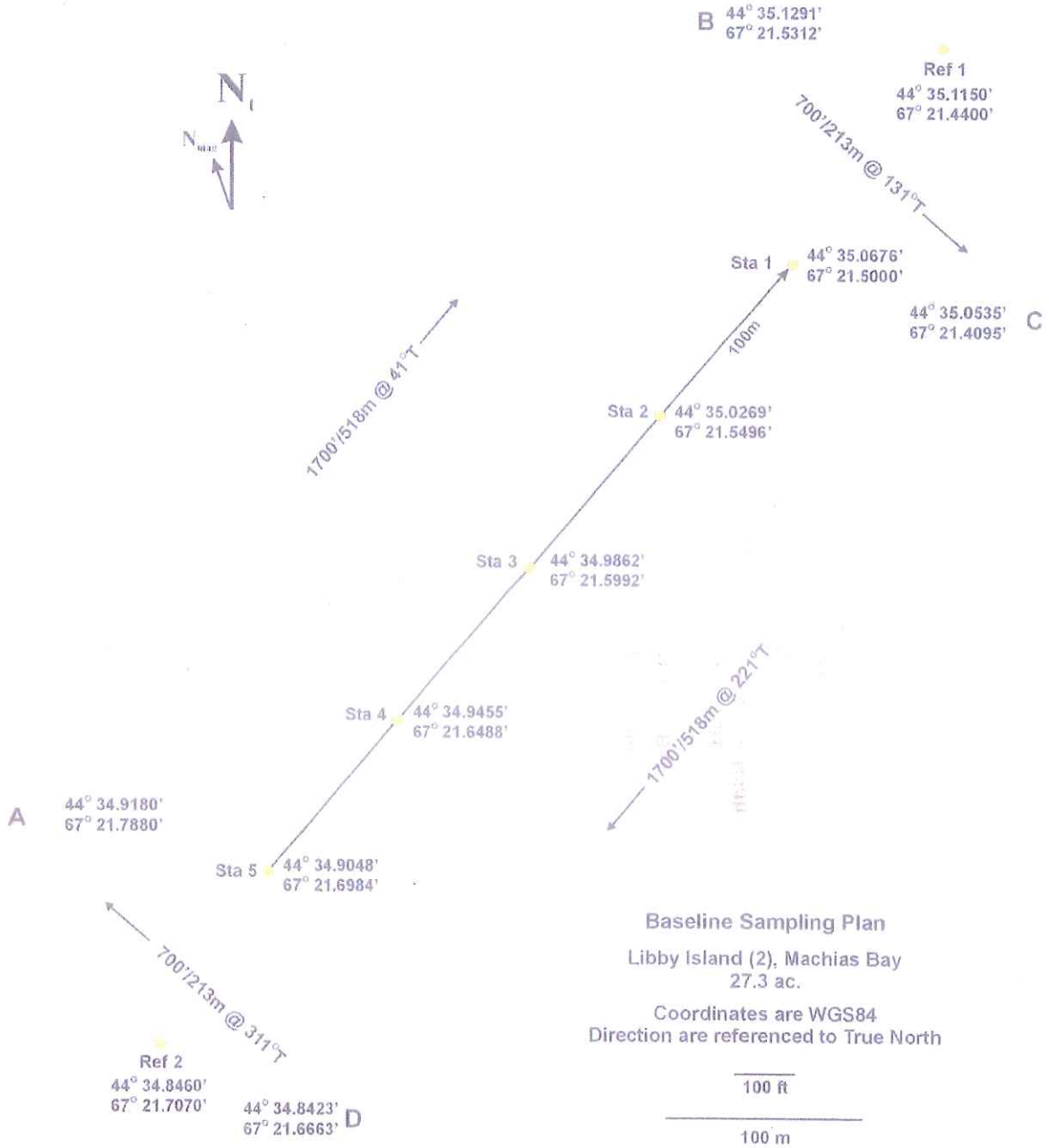
This report summarizes the results of fieldwork conducted on October 4, 2012 at the proposed Libby Island 2 in the vicinity of Libby Island, Machias Bay, Machiasport, Maine as part of the baseline survey requirements under the Maine Department of Environmental Protection (DEP) General Permit for Salmon Aquaculture. Figure 1 identifies the general location of the site in Machias Bay; Figure 2 shows the site details and sampling station locations (Stations identified as 1-5 plus References 1and 2).

Figure 1. Site location



(Source: SeaClear II based on NOAA/NOS Navigational Chart No. 13326, Machias Bay to Tibbett Narrows, Maine 13th Ed., Apr/04)

Figure 2. Site and sampling station location detail



Current study

A current study is attached to this application.

Video survey

Transect lines and deployment

Transect lines used for the survey consist of 100-meter (330 ft) ropes marked in 10m alternating black and white sections, with the exception of the first and last 10m marked as two 5m sections, the last five meters of which are marked in alternating 1m black and white increments.

The video recording was made along a 400-meter transect consisting of four 100-meter lines, as described above, clipped together and deployed along the bottom diagonally through the center of the lease site from northeast to southwest, as shown in Figure 2. The transect lines were weighted at each end with yellow window weights; the lines were deployed by allowing one end-weight to drop to the bottom at the start of the transect and the remaining lines was paid out from a boat running parallel to the predominant current direction until the lines became taut at which point the second end-weight was allowed to drop to the bottom.

Video recordings

The video recording was made using an Amphibico VHHCEL57/Sony HDR-HC9 high definition digital video camera package on high definition (HDV) format tapes. Lighting was provided by an Amphibico VLDIG3AL 35W/50W switchable underwater arc lamp. Observations made of the bottom include bottom sediment composition, epifauna, and any other notable features. GPS coordinates were taken at the start and end of the transect and are included on the video observation graphics shown in Figures 3 and 4. A DVD copy of the video recordings accompanies this report.

Benthic sampling

Station Locations

Benthic sampling stations were located to allow broad characterization of site conditions as required by the Maine Department of Environmental Protection (DEP); sampling was conducted in accordance with the requirements of the DEP General Permit for Atlantic Salmon Aquaculture adopted September 22, 2008. Five (5) sampling stations and two (2) reference stations were located at the site as shown in Figure 2. Table 1 presents the sampling station location coordinates, a general description of sediment type and observations and approximate depth (in feet) at mean low water (MLW). The bottom slopes sharply from the island shoreline toward the channel to the northwest with a gradual slope from northeast to southwest parallel to the shoreline.

Table 1. Location, sediment type, and general observations at benthic sampling stations. (Refer to station coordinates in graphic on page 49)

Station	Location	Sediment type / observations	Depth (ft) MLW
1	44° 35.0676'/67°	Sandy silt, rocks, pebbles, shell hash	64
2	44° 35.0269'/67°	Sandy silt, rocks, pebbles, shell hash	67
3	44° 34.9862'/67°	Ledge bottom, unable to sample	64
4	44° 34.9455'/67°	Rocks, pebbles, shell hash, sandy silt	63
5	44° 35.9048'/67°	Sandy silt, fine shell hash	77
Ref 1	44° 35.1150'/67°	Rocks, shell hash, sandy silt, pebbles	57
Ref 2	44° 34.8460'/67°	Rocks, pebbles, shell hash, sandy silt	71

Figure 3. Graphic representation of video recording, Part 1

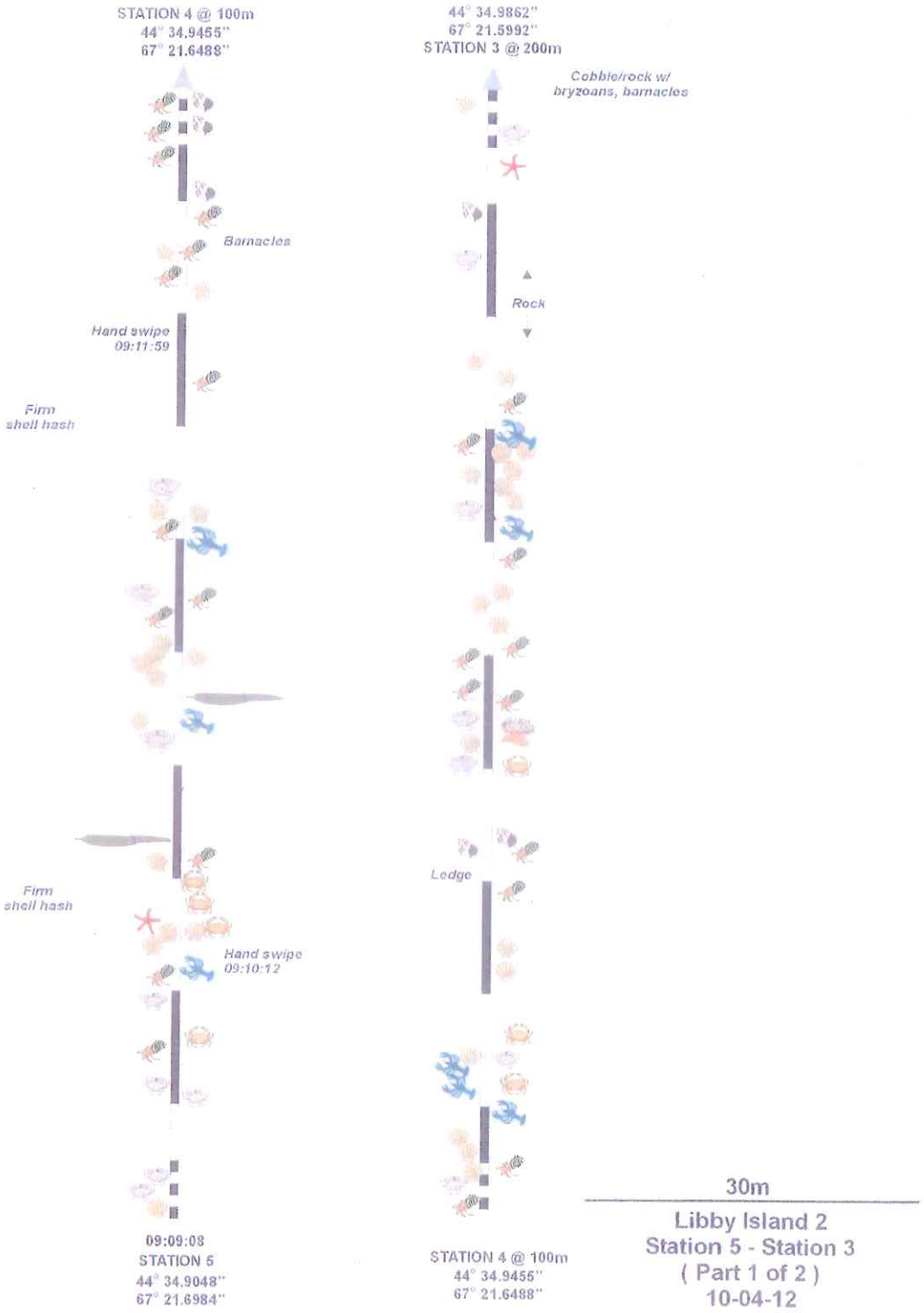
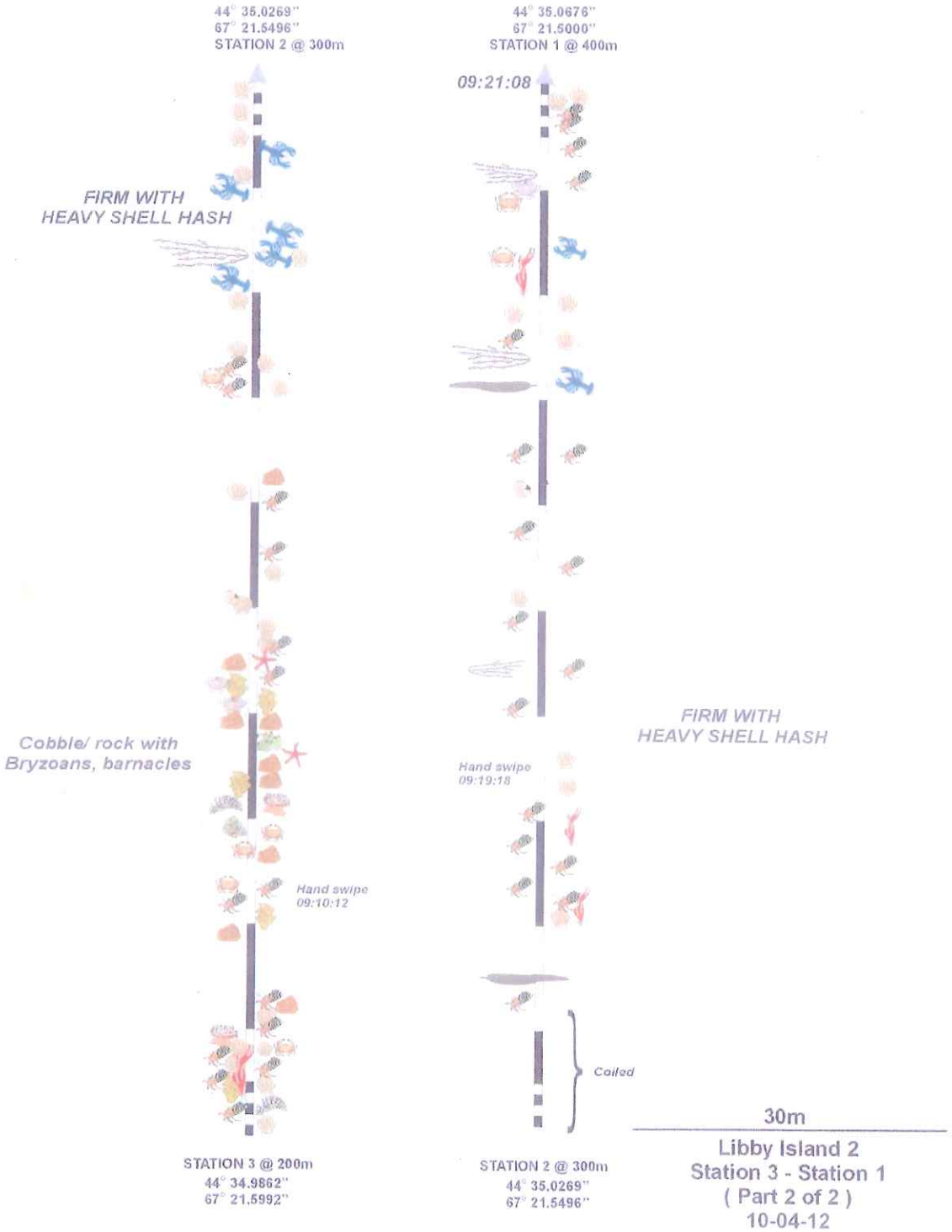


Figure 4. Graphic representation of video recording, Part 2



Sediment chemistry

Where sediment permitted, triplicate sediment cores for sediment chemistry analyses, including sulfide, total organic carbon (TOC), and metals (Cu and Zn), were taken at each station shown in Figure 2 using 4 in. diameter PVC pipe coring devices that were inserted to a depth of 10 cm or full resistance, whichever was greater. Sediment cores were removed from the corers by allowing the sediment column to slide out of the plastic corer so as not to disturb the sediment surface.

Sulfide measurement *(Method of Wildish et al., 1999)*

A 5 ml portion of a mixed sediment slurry from the top 2 cm from each core was removed with a modified 5 ml plastic syringe with the needle attachment end removed to form an open cylinder; the open end was immersed into the mixed sediment slurry and the sample extracted by pulling back on the plunger, thus obtaining a sample containing no bubbles. Immediately after obtaining the sample, the open end of the syringe was covered with plastic wrap insuring no air was trapped beneath the wrap. Aluminum foil was then placed over the end of the syringe to secure the plastic wrap in place. The syringe was then placed in a cooler with ice to maintain a temperature of <5°C during transport to the laboratory for sulfide (S_2) analysis within 72 hrs. of sample collection.

Once at the lab, all syringes were allowed to warm to room temperature (≈20°C) before analysis using an Accumet® AP63 pH/mV/Ion meter equipped with a Thermo Orion model 9616BN Combination Silver/Sulfide electrode filled with Thermo Orion Ionplus B Optimum Results™ Reference Electrode Filling Solution (900062). The meter was standardized at 1.00 (100μM), 10.0 (1,000μM), and 100 (10,000μM) using standards prepared according to Wildish *et al.*, (1999). All samples were analyzed within a maximum of 3 hrs. Following analysis of all samples, measurements of the three standards were retaken and recorded on the calibration sheets. Actual S_2 μM values were calculated by multiplying the meter readings by 100. Results of the redox and sulfide measurements are presented in Table 2 on the following page.

Total organic carbon (TOC)

Approximately 10-15 ml of sediment was taken as a subsample of the mixed sediment from each core and placed in a labeled 7"x 3" 100 ml *Nasco* Whirl-Pak®; TOC samples were refrigerated until returned to the lab, then frozen until delivered to the analyzing facility. TOC analysis was performed by the University of Maine, Ira C. Darling Center chemistry lab.

Copper (Cu), zinc (Zn), granulometry >63μm, and percent moisture analyses

Approximately 50-75 ml of sediment was taken from the top 2cm surface sediment from each core and placed in a labeled 7"x 3" 100 ml *Nasco* Whirl-Pak®; samples were refrigerated until delivered to the analyzing facility. Copper and zinc analysis, and associated fine granulometry and percent moisture measurements, were performed by the University of Maine, Environmental Chemistry Lab, Orono. Results of the TOC and metals analyses are presented in Table 3.

Table 2. Sediment sulfide measurement results summary

	Warning	Impact limit	Site Means
S_2 µM	2500-6000	>6000	

S_2 in-lab pre-test stand.: 1.01; 10.1; 100
S_2 in-lab post-test stand. check: 1.01; 10.2; 105

Site: Libby Is 2 Baseline
Date: 10/4/2012
Time 0800-1330
Tide:

Location	S_2 meter	S_2 µM	depth	T°	Metals	TOC	Smell	Color	Comment
Sta 1-1	0.013	1	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash, pebbles
Sta 1-2	0.000	0	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash, pebbles
Sta 1-3	0.000	0	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash, pebbles
Mean	0.00	0							
S.D.		1							
Var.		0							
Sta 2-1	0.117	11.7	2 cm	10.0	√	√	N	Brown	Sandy silt, shell hash
Sta 2-2	0.004	0.4	2 cm	10.0	√	√	N	Brown	Sandy silt, shell hash, rock
Sta 2-3	0.008	0.8	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash, pebbles
Mean	0.04	4							
S.D.		6							
Var.		27							
Sta 3-1	UTS	-----	2 cm	10.0	UTS	UTS	N	Brown	Rocks, shell hash, sandy silt, UTS
Sta 3-2	UTS	-----	2 cm	10.0	UTS	UTS	N	Brown	Rocks, UTS
Sta 3-3	UTS	-----	2 cm	10.0	UTS	UTS	N	Brown	Rocks, UTS
Mean	N/A	N/A							
S.D.		N/A							
Var.		N/A							
Sta 4-1	0.005	1	2 cm	10.0	√	√	N	Gray	Rocks, shell hash, sandy silt
Sta 4-2	0.003	0	2 cm	10.0	√	√	N	Brown	Sand silt, shell hash, rocks
Sta 4-3	0.000	0	UTS	10.0	√	√	UTS	Brown	Shell hash, rocks, sandy silt
Mean	0.003	0							
S.D.		0							
Var.		0							

Table 2. Sediment Chemistry Summary: Sulfide measurement (Continued)

	Warning	Impact limit	Site Means
S_2 µM	2500-6000	>6000	

S_2 in-lab pre-test stand.: 1.01; 10.1; 100
S_2 in-lab post-test stand. check: 1.01; 10.2; 105

Site: Libby Is 2 Baseline
Date: 10/4/2012
Time 0800-1330
Tide:

Location	S_2 meter	S_2 □M	depth	T°	Metals	TOC	Smell	Color	Comment
Sta 5-1	0.000	0	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash
Sta 5-2	0.045	5	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash
Sta 5-3	0.002	0	2 cm	10.0	√	√	N	Brown	Sandy silt, fine shell hash
Mean	0.016	2							
S.D.		3							
Var.		4							
Ref 1-1	0.220	22	UTS	10.0	√	√	N	Brown	Sandy silt, fine shell hash, pebbles
Ref 1-2	0.01	1	2 cm	10.0	√	√	N	Brown	Rocks, shell hash, sandy silt
Ref 1-3	UTS	-----	2 cm	10.0	UTS	UTS	UTS	Brown	Rocks, shell hash, sandy silt
Mean	0.12	12							
S.D.		15							
Var.		0							
Ref 2-1	UTS	-----	2 cm	10.0	√	√	N	Brown	Shell hash, rocks, sandy silt
Ref 2-2	UTS	-----	2 cm	10.0	√	√	N	Brown	Shell hash, rocks, sandy silt
Ref 2-3	UTS	-----	2 cm	10.0	√	√	N	Brown	Rocks, shell hash, sandy silt
Mean	N/A	N/A							
S.D.		N/A							
Var.		N/A							

Table 3. Sediment chemistry metals and Total Organic Carbon (TOC) results summary

Metals analysis (copper and zinc)
Clive DeVoy, Environmental Chemistry Lab., U. Maine
TOC analysis by Kathy Hardy, Darling Center, U. Maine

	Cu (mg/Kg)	Zn (mg/Kg)
ER-L	34	150
ER-M	270	410

Station	Cu mg/Kg	Zn mg/Kg	% solid	TOC %	TON %	>1mm (g)	<1mm (g)
Station 1/1	<2.5	71.9	80.3	0.226	0.042	19.25	39.86
Station 1/2	<2.5	70.9	80.3	0.142	0.032	13.48	29.16
Station 1/3	<2.5	57.3	81.2	0.074	0.027	12.88	31.84
Mean	<2.5	66.7	80.6	0.147	0.034	15.203	33.620
S.D.	-----	8.2	0.5	0.076	0.008	3.517	5.568
Var.	-----	44.5	0.2	0.004	0.000	8.248	20.666
Station 2/1	<2.5	61.2	77.0	0.194	0.047	14.55	31.55
Station 2/2	3.14	59.0	72.4	0.152	0.039	11.17	31.20
Station 2/3	<2.5	62.7	77.0	0.165	0.038	15.94	41.50
Mean	<3.1	61.0	75.5	0.170	0.041	13.887	34.750
S.D.	-----	1.9	2.7	0.022	0.005	2.453	5.848
Var.	0.0	2.3	4.8	0.000	0.000	4.012	22.802
Station 3/1	UTS	-----	-----	-----	-----	-----	-----
Station 3/2	UTS	-----	-----	-----	-----	-----	-----
Station 3/3	UTS	-----	-----	-----	-----	-----	-----
Mean	-----	-----	-----	-----	-----	-----	-----
S.D.	-----	-----	-----	-----	-----	-----	-----
Var.	-----	-----	-----	-----	-----	-----	-----
Station 4/1	<2.5	66.2	80.8	0.056	0.027	22.78	34.19
Station 4/2	<2.5	58.4	76.7	0.078	0.039	15.36	42.52
Station 4/3	<2.5	58.6	82.2	0.075	0.031	12.09	20.35
Mean	<2.5	61.1	79.9	0.070	0.032	16.743	32.353
S.D.	-----	4.4	2.9	0.012	0.006	5.478	11.199
Var.	-----	13.0	5.6	0.000	0.000	20.003	83.605
Station 5/1	<2.5	63.5	80.3	0.091	0.039	11.80	39.16
Station 5/2	<2.5	61.6	80.3	0.162	0.052	11.15	29.37
Station 5/3	3.38	60.4	78.8	0.204	0.032	11.92	24.38
Mean	<3.38	61.8	79.8	0.152	0.041	11.62	30.97
S.D.	-----	1.6	0.8	0.057	0.010	0.41	7.52
Var.	0.0	1.7	0.5	0.002	0.000	0.11	37.69

Table 3. Sediment chemistry metals results and Total Organic Carbon (TOC) summary (cont.)

Station	Cu mg/Kg	Zn mg/Kg	% solid	TOC %	TON %	> 1mm (g)	< 1mm (g)
Station REF 1/1	<2.5	58.3	76.6	0.177	0.033	21.71	21.45
Station REF 1/2	<2.5	54.3	80.0	0.227	0.042	21.87	18.23
Station REF 1/3	UTS	-----	-----	-----	-----	-----	-----
Mean	-----	56.3	78.3	0.202	0.038	21.79	19.84
S.D.	-----	2.9	2.4	0.035	0.006	0.11	2.28
Var.	-----	4.1	2.8	0.001	0.000	0.01	2.60
Station REF 2/1	<2.5	31.5	84.6	0.175	0.022	27.33	12.88
Station REF 2/2	<2.5	66.3	84.1	0.098	0.020	14.64	16.73
Station REF 2/3	<2.5	44.0	83.7	0.153	0.031	39.35	14.36
Mean	<2.5	47.3	84.1	0.142	0.024	27.11	14.66
S.D.	-----	17.6	0.4	0.040	0.006	12.36	1.94
Var.	-----	206.3	0.1	0.001	0.000	101.79	2.51

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Granulometry

Three sediment cores for granulometric analysis were taken at each station shown in Figure 2 using 4 in. diameter PVC pipe coring devices as described above for infauna. The contents of the cores were transferred into labeled, doubled Zip-loc bags. Granulometric analyses were performed by S.W. Cole Engineering, Inc., Gray, Maine using standard wash method sediment granulometry methods. Results of the granulometry analyses are presented in Table 4.

Table 4. Sediment granulometry testing results

Site: **Libby Island, Machias Bay, Machiasport, Maine**
Date: **10/4/2012**

	Station 1/1		Station 1/2		Station 1/3		Station 2/1		Station 2/2		Station 2/3	
	Passing	Retained	Passing	Retained	Passing	Retained	Passing	Retained	Passing	Retained	Passing	Retained
2"	100		100		UTS		100		100		100	
1-1/2"	100	0	100	0	100	0	100	0	100	0	100	0
1"	100	0	86	14	100	0	100	0	100	0	100	0
3/4"	100	0	80	6	100	0	90	10	100	0	86	14
1/2"	94	6	74	6	100	0	85	5	98	2	78	8
1/4"	80	14	63	11	100	0	79	6	88	10	71	7
#4	76	4	61	2	100	0	78	1	85	3	69	2
#10	63	13	53	8	100	0	75	3	79	6	63	6
#20	57	6	49	4	100	0	72	3	75	4	59	4
#40	44	13	39	10	100	0	58	14	58	17	44	15
#60	10	34	13	26	100	0	31	27	23	35	17	27
#100	4	6	7	6	100	0	24	7	14	9	11	6
#230	3	1	5	2	100	0	20	4	11	3	8	3
<#230		3		5		100		20		11		8

Table 4. Sediment granulometry testing results (Cont.)

	Station 3/1		Station 3/2		Station 3/3		Station 4/1		Station 4/2		Station 4/3	
	Passing	Retained	Passing	Retained	Passing	Retained	Passing	Retained	Passing	Retained	Passing	Retained
2"	100		UTS		UTS		100		100		100	
1-1/2"	100	0	100	0	100	0	100	0	100	0	100	0
1"	47	53	100	0	100	0	100	0	100	0	100	0
3/4"	28	19	100	0	100	0	100	0	100	0	99	1
1/2"	25	3	100	0	100	0	93	7	92	8	93	6
1/4"	19	6	100	0	100	0	90	3	88	4	79	14
#4	17	2	100	0	100	0	89	1	86	2	75	4
#10	13	4	100	0	100	0	83	6	77	9	61	14
#20	11	2	100	0	100	0	74	9	65	12	46	15
#40	6	5	100	0	100	0	34	40	31	34	21	25
#60	1	5	100	0	100	0	6	28	7	24	5	16
#100	1	0	100	0	100	0	2	4	3	4	2	3
#230	1	0	100	0	100	0	1	1	2	1	1	1
<#230		1		0		0		1		2		1

	Station 5/1		Station 5/2		Station 5/3	
	Passing	Retained	Passing	Retained	Passing	Retained
2"	100		100		100	
1-1/2"	100	0	100	0	100	0
1"	100	0	100	0	100	0
3/4"	100	0	100	0	100	0
1/2"	99	1	94	6	98	2
1/4"	94	5	89	5	92	6
#4	93	1	85	4	89	3
#10	85	8	71	14	74	15
#20	74	11	58	13	60	14
#40	49	25	36	22	39	21
#60	20	29	12	24	14	25
#100	10	10	4	8	4	10
#230	7	3	2	2	2	2
<#230		7		2		2

Table 4. Sediment granulometry testing results (Cont.)

	Reference 1-1		Reference 1-2		Reference 1-3		Reference 2-1		Reference 2-2		Reference 2-3	
	Passing	Retained	Passing	Passing	Retained	Passing	Passing	Retained	Passing	Retained	Passing	Retained
2"	100		100		100		100		100		100	
1-1/2"	100	0	100	0	100	0	100	0	100	0	100	0
1"	100	0	100	0	100	0	100	0	100	0	100	0
3/4"	76	24	100	0	86	14	99	1	100	0	100	0
1/2"	65	11	88	12	81	5	81	18	93	7	73	27
1/4"	58	7	81	7	72	9	58	23	78	15	55	18
#4	56	2	78	3	68	4	53	5	74	4	49	6
#10	48	8	67	11	59	9	41	12	61	13	36	13
#20	43	5	61	6	52	7	34	7	53	8	29	7
#40	27	16	40	21	35	17	19	15	27	26	15	14
#60	8	19	10	30	10	25	5	14	5	22	4	11
#100	3	5	5	5	5	5	3	2	3	2	3	1
#230	2	1	3	2	4	1	2	1	2	1	2	1
<#230		2		3		4		2		2		2

Infauna sampling

Sample collection

Three sediment cores for benthic infauna community analysis were taken at each station. Cores were taken by diver using 4 in. diameter PVC pipe coring devices where the corers were inserted to a depth of 10 cm or full resistance.

Benthic infauna analyses

The contents of the cores for benthic infauna analysis were washed through a U.S. Standard No. 18 sieve (1 mm mesh), all material retained on the screen was transferred into sample bottles, and the bottles filled with 10% buffered formalin. Several drops of a 1% Rose Bengal staining solution were added to each sample to assist in the sorting of organisms. After approximately 5 days of fixing in the 10% Formalin, the formalin solution was decanted from the sample jars through a 500μ mesh sieve and the formalin volume replaced with 70% ethanol to insure preservation of the organisms' integrity, particularly the bivalves and other calcareous forms. Samples were sorted using standard methods and the organisms identified at least to Family-level or lowest practical level, in many cases to species-level. Benthic infauna was subsequently analyzed for total organisms/core, abundance (number of organisms/0.1 m2), abundance less *Capitella capitata*/Capitellidae, taxa richness (number of species/ families), percent *C. capitata* (an indicator species of organic loading), and relative diversity, "*J*" (Shannon, 1948); these indices results are summarized below in Table 5; details are presented in Appendix I.

Table 5. Benthic infauna indices summaries

Station 1

SPECIES level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	202	133	163	498		166.0
Abundance (organisms/0.1 m²)	2494	1642	2012			2049
Abundance minus Caps	2494	1642	2012			2049
Species richness (No. species)	28	16	19	40		21.0
Distance in meters	0	0	0			0
Rel. Diversity	0.591	0.467	0.550			0.536
% CAPITELLA	0.0	0.0	0.0			0.0

FAMILY level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	202	133	163	498		166.0
Abundance (organisms/0.1 m²)	2494	1642	2012			2049
Abundance minus Caps	2494	1642	2012			2049
Family richness (No. families)	27	15	17	38		19.7
Distance in meters	0	0	0			0
Rel. Diversity	0.598	0.379	0.513			0.497
% CAPITELLIDAE	0.0	0.0	0.0			0.0

Station 2

SPECIES level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	53	45	64	162		54.0
Abundance (organisms/0.1 m²)	655	556	790			667
Abundance minus Caps	655	556	790			667
Species richness (No. species)	16	14	22	31		17.3
Distance in meters	0	0	0			0
Rel. Diversity	0.6	0.675	0.817			0.694
% CAPITELLA	0.0	0.0	0.0			0.0

FAMILY level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	53	45	64	162		54.0
Abundance (organisms/0.1 m²)	655	556	790			667
Abundance minus Caps	655	556	790			667
Family richness (No. families)	15	14	21	29		16.7
Distance in meters	0	0	0			0
Rel. Diversity	0.600	0.661	0.809			0.676
% CAPITELLIDAE	0.0	0.0	0.0			0.0

Station 3: Unable to Sample

Station 4

SPECIES level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	62	19	606	687		229.0
Abundance (organisms/0.1 m²)	765	235	7481			2827
Abundance minus Caps	765	235	7481			2827
Species richness (No. species)	18	10	24	35		17.3
Distance in meters	0	0	0			0
Rel. Diversity	0.736	0.924	0.265			0.642
% CAPITELLA	0.0	0.0	0.0			0.0

FAMILY level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	62	19	606	687		229.0
Abundance (organisms/0.1 m²)	765	235	7481			2827
Abundance minus Caps	765	235	7481			2827
Family richness (No. families)	17	10	22	33		16.3
Distance in meters	0	0	0			0
Rel. Diversity	0.700	0.912	0.255			0.622
% CAPITELLIDAE	0.0	0.0	0.0			0.0

Station 5

SPECIES level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	168	36	191	395		131.7
Abundance (organisms/0.1 m²)	2074	444	2358			1625
Abundance minus Caps	2074	444	2358			1625
Species richness (No. species)	11	12	18	25		13.7
Distance in meters	0	0	0			0
Rel. Diversity	0.640	0.737	0.322			0.567
% CAPITELLA	0.0	0.0	0.0			0.0

FAMILY level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	168	36	191	395		131.7
Abundance (organisms/0.1 m²)	2074	444	2358			1625
Abundance minus Caps	2074	444	2358			1625
Family richness (No. families)	11	12	17	25		13.3
Distance in meters	0	0	0			0
Rel. Diversity	0.592	0.691	0.247			0.510
% CAPITELLIDAE	0.0	0.0	0.0			0.0

Reference station 1

SPECIES level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	345	375	137	857		285.7
Abundance (organisms/0.1 m²)	4259	4629	1691			3527
Abundance minus Caps	4234	4629	1691			3518
Species richness (No. species)	30	34	22	55		28.7
Distance in meters	100	100	100			100
Rel. Diversity	0.496	0.611	0.501			0.536
% CAPITELLA	0.6	0.0	0.0			0.2

FAMILY level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	345	375	137	857		285.7
Abundance (organisms/0.1 m²)	4259	4629	1691			3527
Abundance minus Caps	4234	4629	1691			3518
Family richness (No. families)	29	31	22	48		27.3
Distance in meters	100	100	100			100
Rel. Diversity	0.462	0.598	0.442			0.500
% CAPITELLIDAE	0.6	0.0	0.0			0.2

Reference station 2

SPECIES level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	885	552	227	1664		554.7
Abundance (organisms/0.1 m²)	10925	6814	2802			6847
Abundance minus Caps	10925	6814	2802			6847
Species richness (No. species)	29	27	19	46		25.0
Distance in meters	100	100	100			100
Rel. Diversity	0.235	0.293	0.385			0.304
% CAPITELLA	0.0	0.0	0.0			0.0

FAMILY level analysis	Rep 1	Rep 2	Rep 3	Total	Mean	Var.
Total organisms	885	552	227	1664		554.7
Abundance (organisms/0.1 m²)	10925	6814	2802			6847
Abundance minus Caps	10925	6814	2802			6847
Family richness (No. families)	27	24	18	41		23.0
Distance in meters	100	100	100			100
Rel. Diversity	0.199	0.222	0.3			0.254
% CAPITELLIDAE	0.0	0.0	0.0			0.0

Water quality sampling (To Be Completed)

Sampling was conducted on October 3, 2013 using MER Assessment Corporation's Yellow Spring Instruments (YSI) Model 6600 Sonde connected to an YSI MDS 650 handheld real-time display unit. The sonde is equipped with a pressure sensor to measure depth, a temperature-conductivity sensor, a dissolved oxygen sensor, and a turbidity sensor.

The YSI 6600 allows individual data files to be created for each profile. Data collection frequency for the YSI 6600 is set at one record every 0.5 sec, *i.e.*2 records/second. A file is created using the site identification code and station location; replicate profiles are appended to the initial data set under the same file name. During sampling the sonde is allowed to rest at the surface until the temperature and dissolved oxygen readings on the YSI MDS 650 display have stabilized. Following stabilization, the data logger is activated and the profiler lowered through the water column at a rate of approximately 0.25-0.30 m/sec (approx. 1 ft./sec). Once the sonde reaches bottom, the data logging is stopped; the collected data therefore represent descending measurements only. Data summaries are shown in Table 8, below; details of profiles are presented in Appendix II.

Table 8. Temperature, salinity, and dissolved oxygen profile results

Cast 1					
	Depth (m)	Temp.	Salinity	DO mg/l	DO % sat.
Mean	11.4	12.3	32.8	8.3	95.5
Max	21.8	12.3	32.8	8.6	98.2
Min	0.6	12.3	32.8	8.1	93.3

Cast 2					
	Depth (m)	Temp.	Salinity	DO mg/l	DO % sat.
Mean	9.7	12.3	32.8	8.4	96.5
Max	19.7	12.3	32.8	8.7	99.7
Min	0.1	12.2	32.8	8.2	94.4

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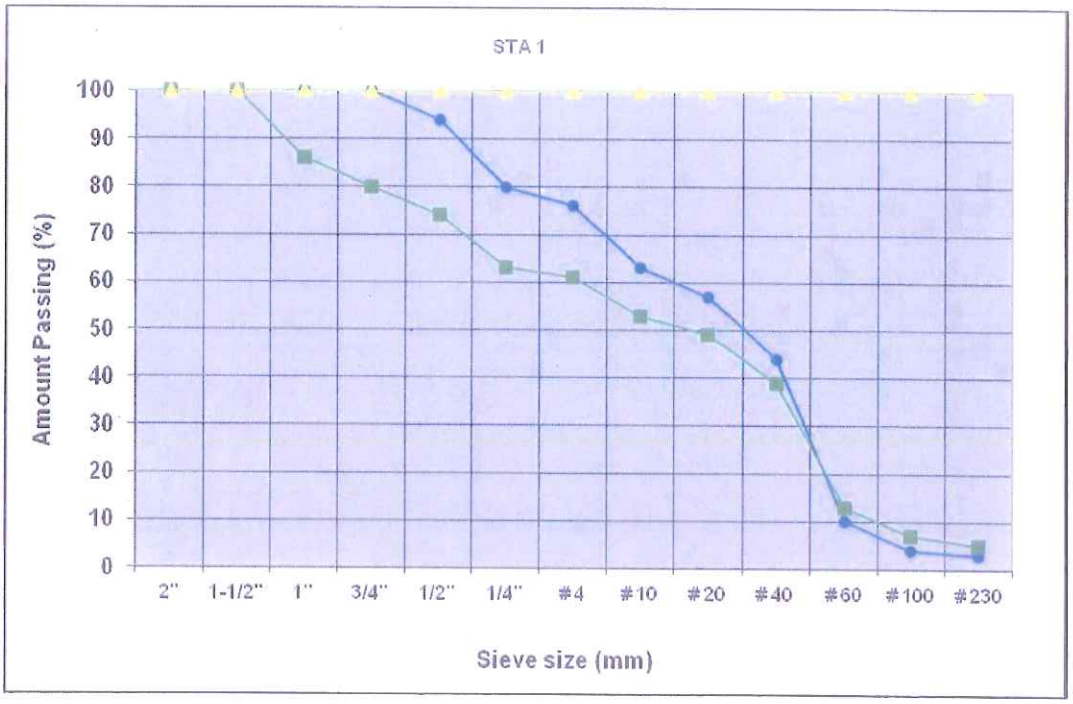
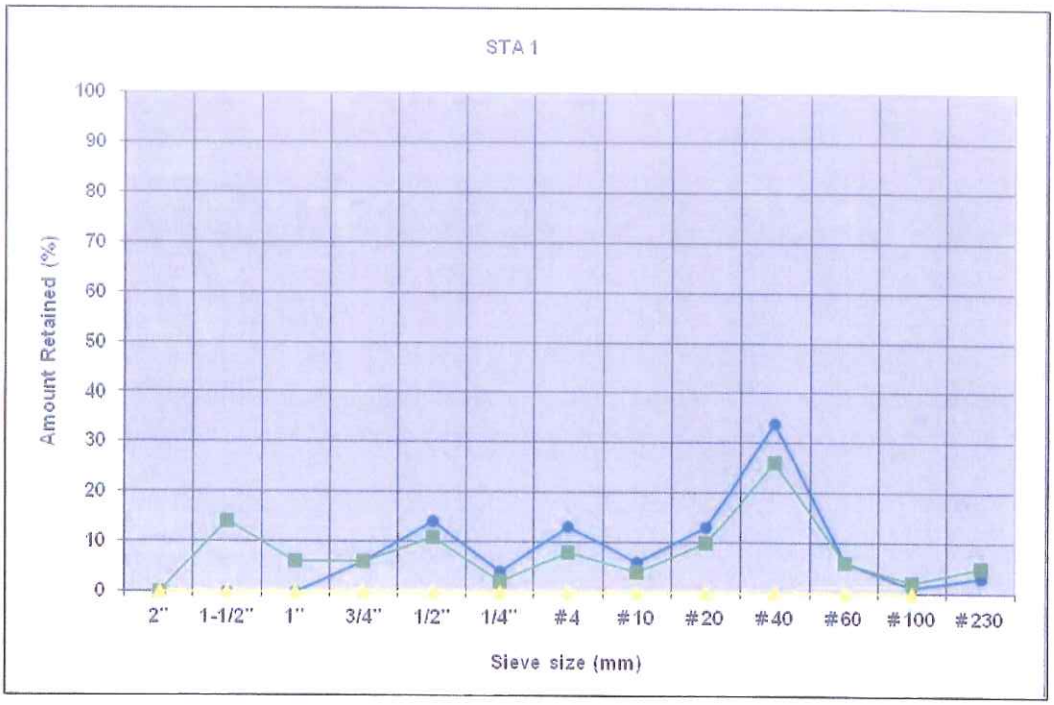
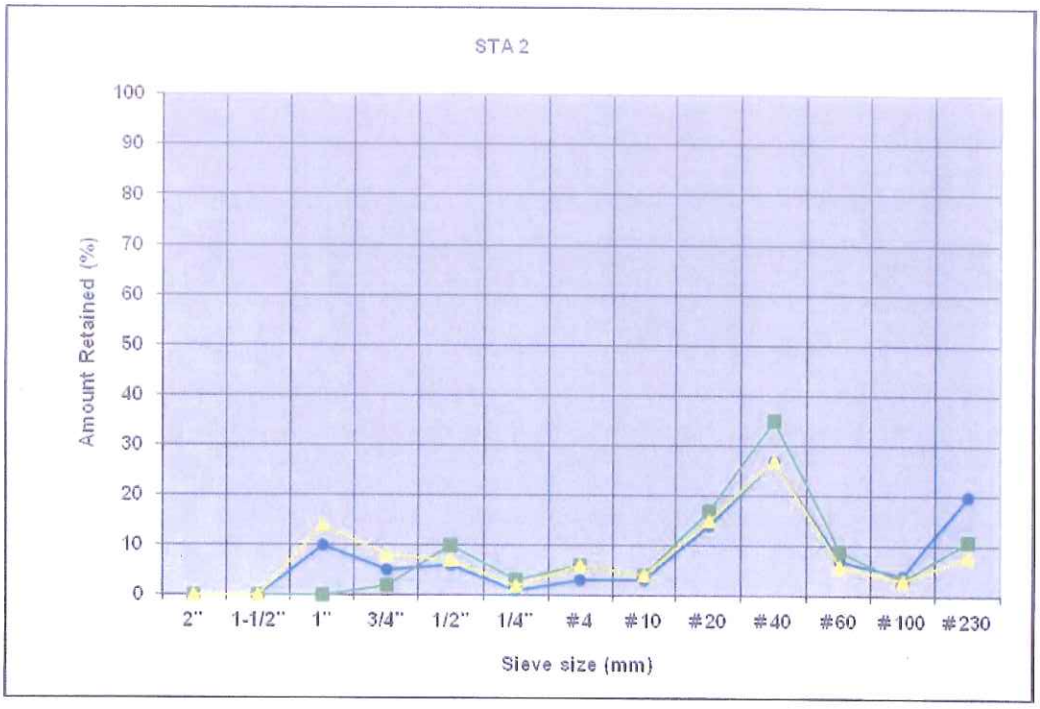
Appendix I
Granulometry data details


STA 1
Amount Passing (%)
100
90
80
70
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)


STA 1
Amount Retained (%)
100
90
80
70
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)


STA 2
Amount Passing (%)
100
90
80
70
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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Amount Retained (%)
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90
80
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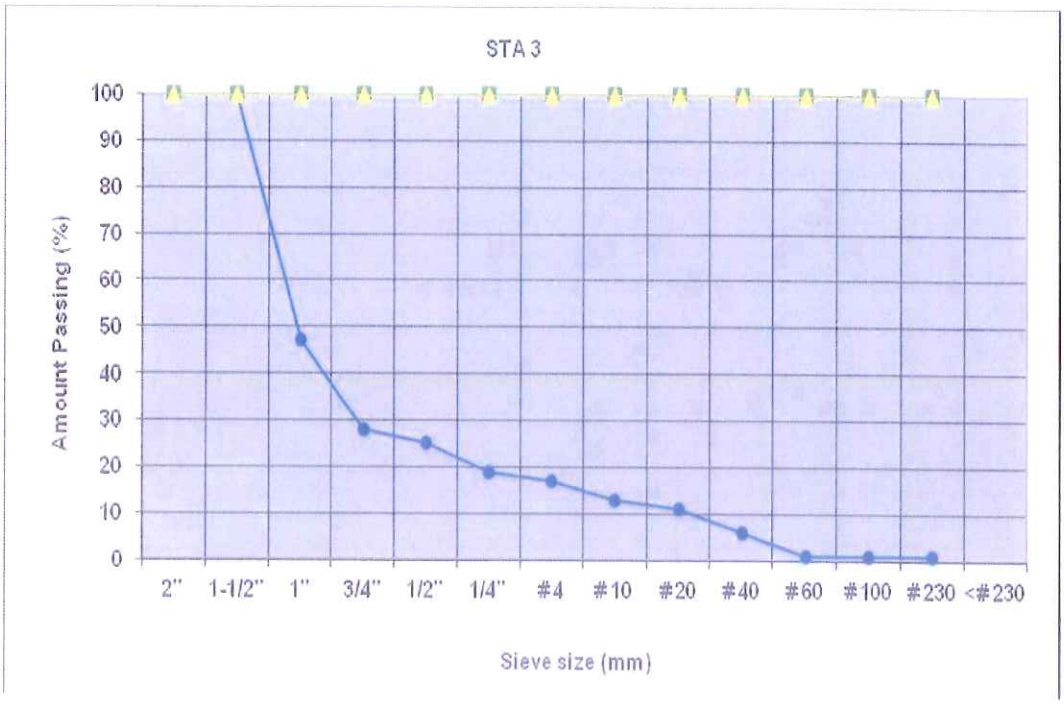
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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Amount Passing (%)
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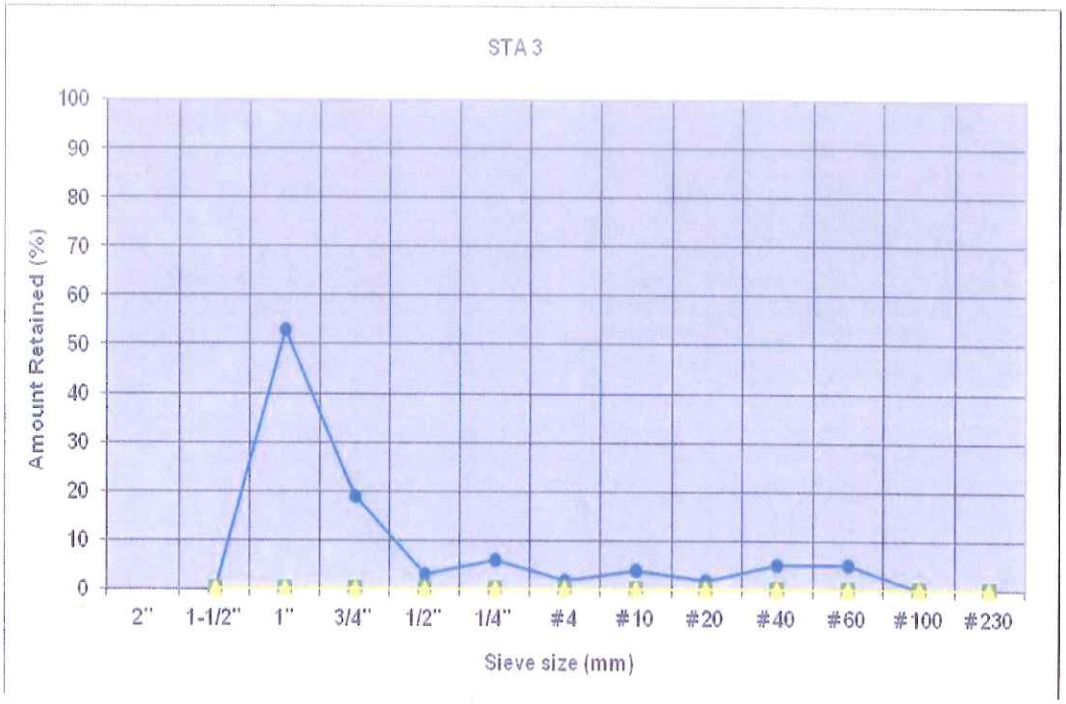
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
<#230
Sieve size (mm)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60
50
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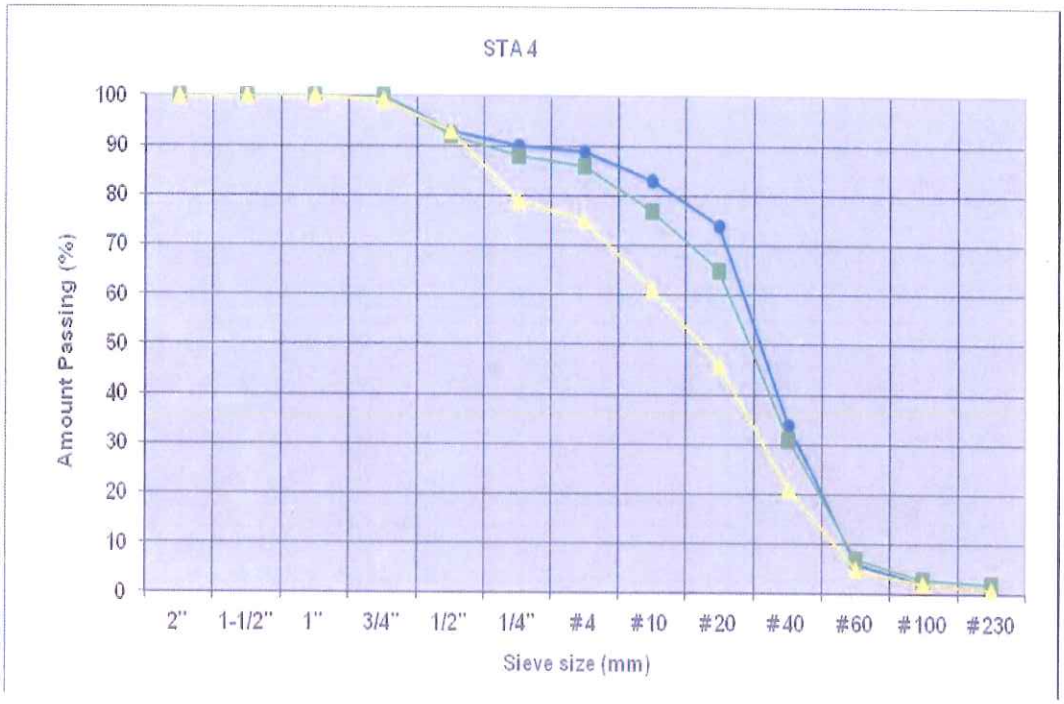
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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Amount Passing (%)
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50
40
30
20
10
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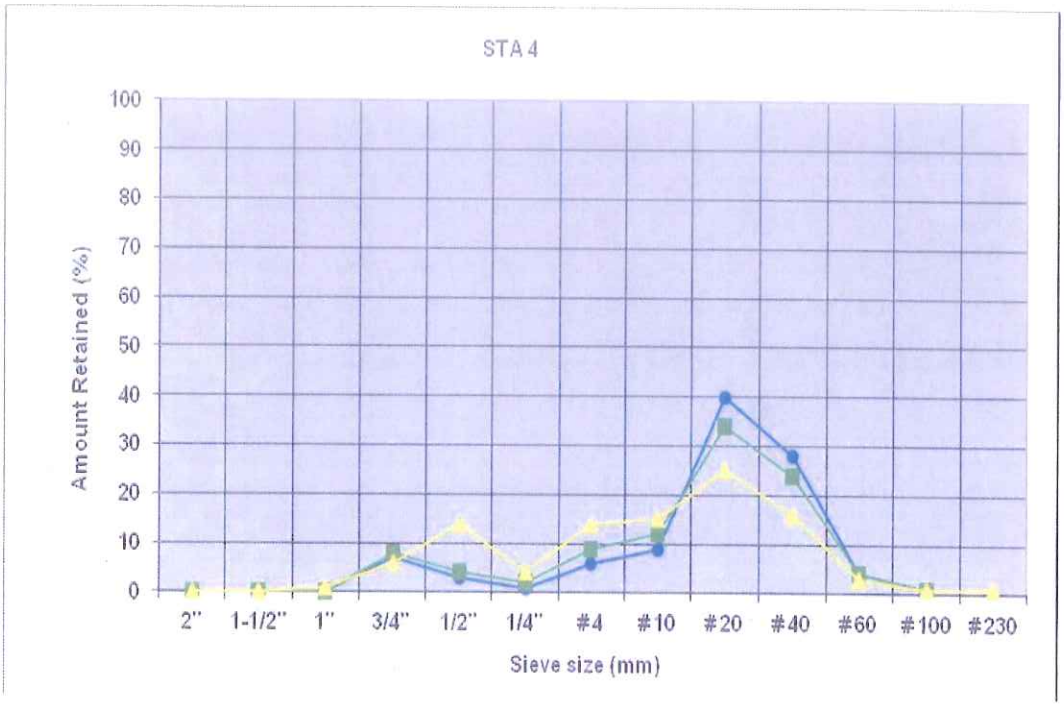
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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Amount Retained (%)
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2"
1-1/2"
1"
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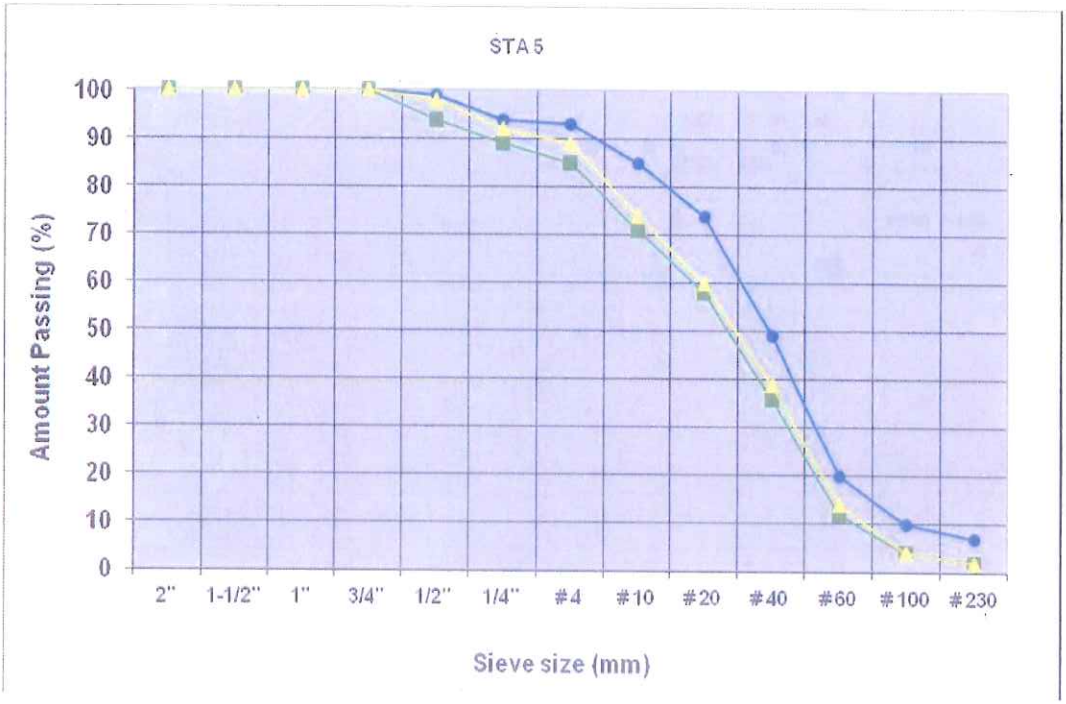
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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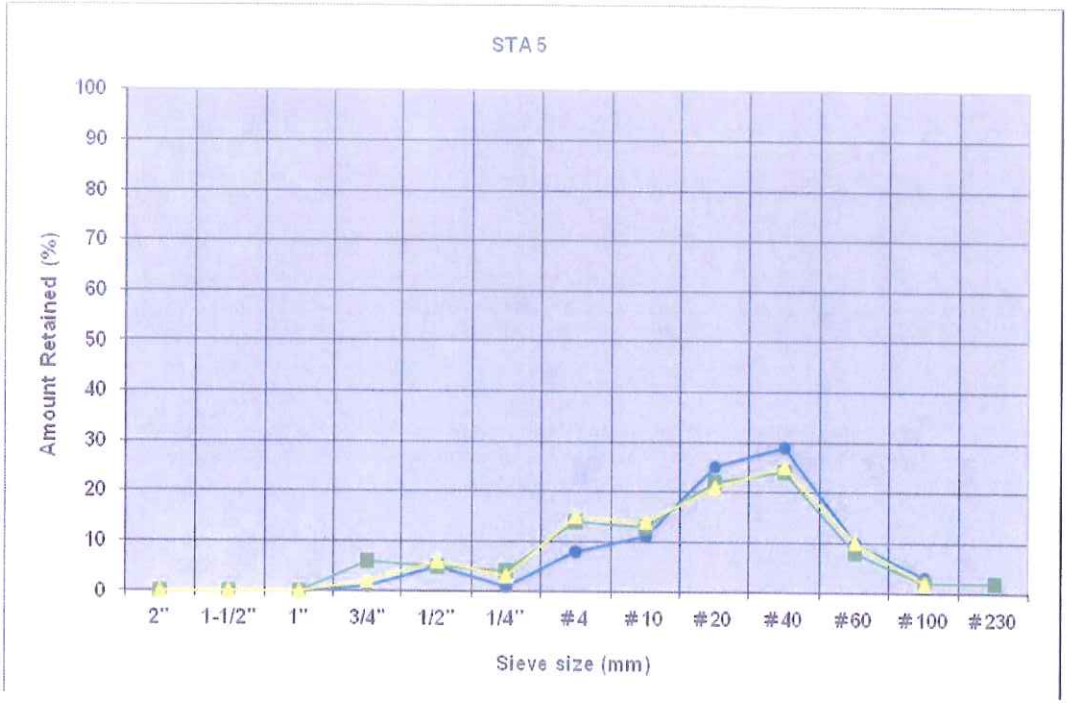
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)


STA 5
Amount Retained (%)
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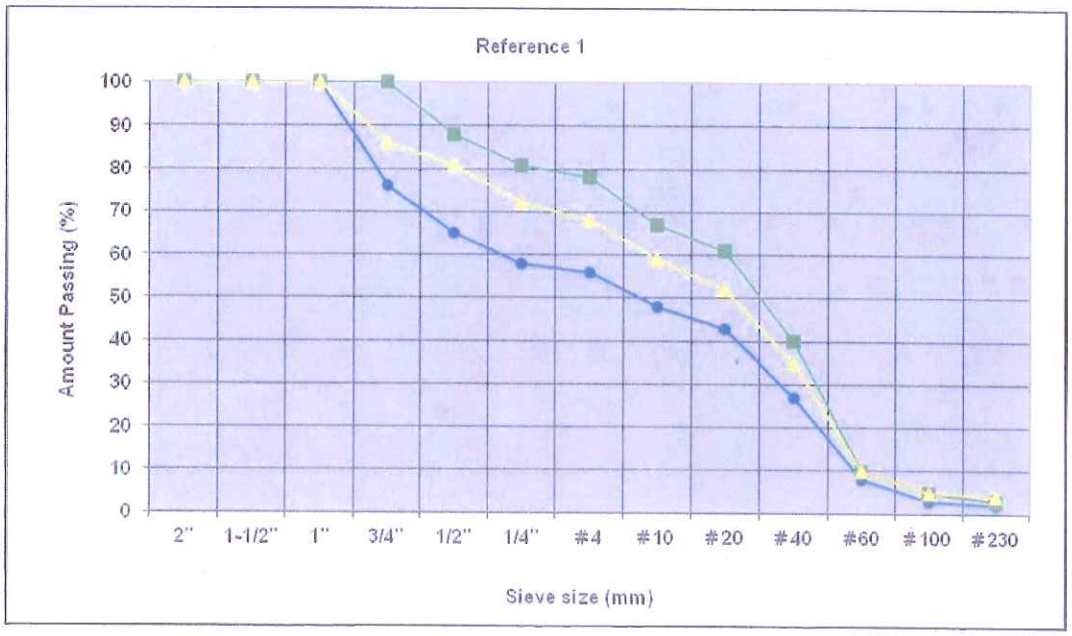
90
80
70
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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Amount Passing (%)
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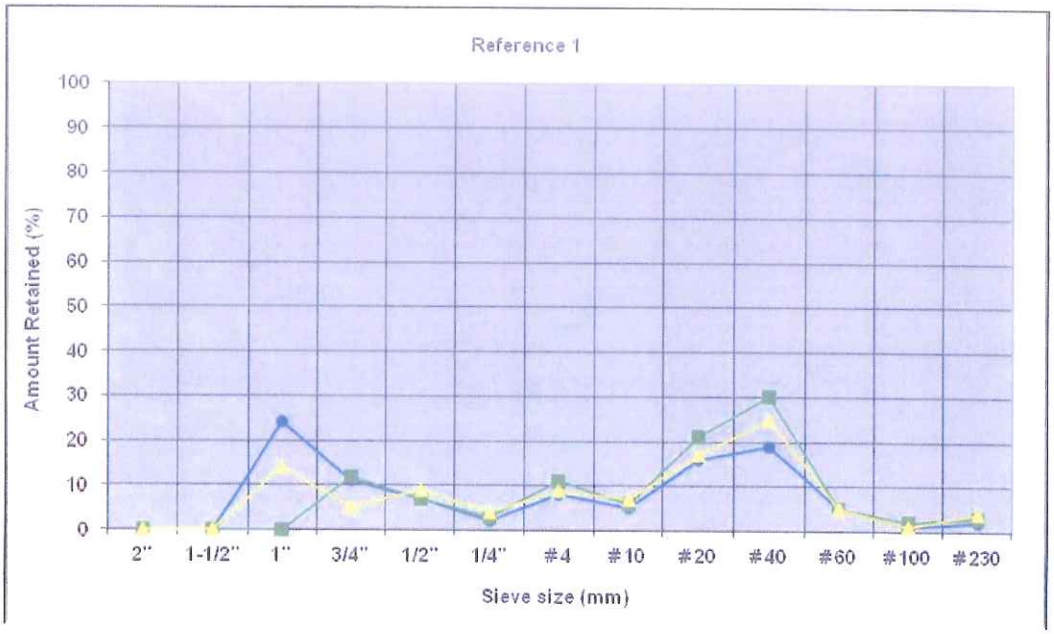
90
80
70
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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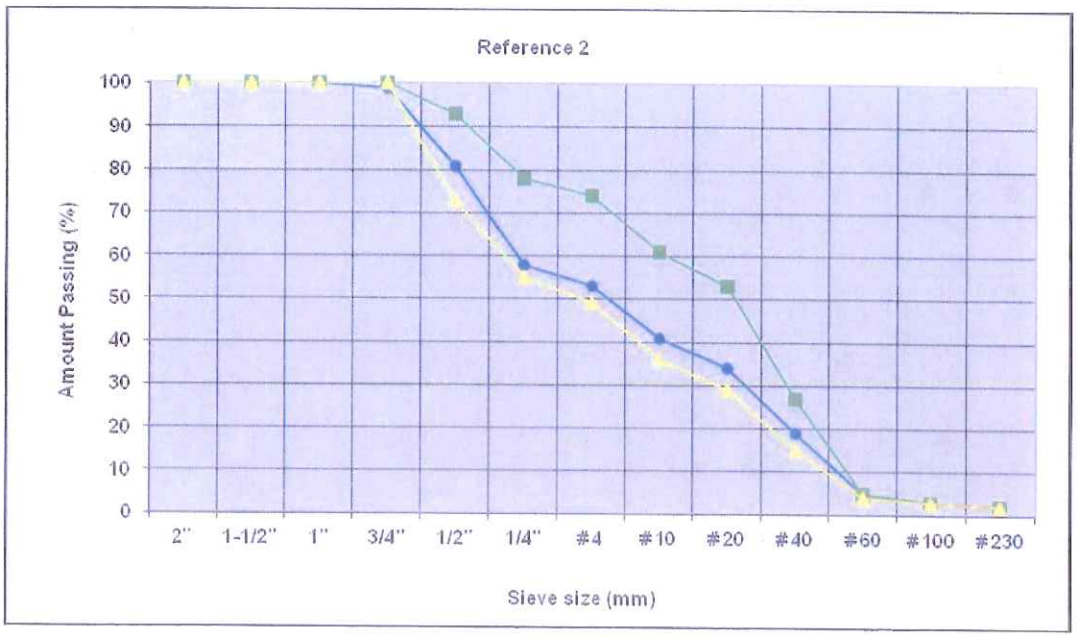
Amount Retained (%)
100
90
80
70
60
50
40
30
20
10
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)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Amount Passing (%)
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40
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20
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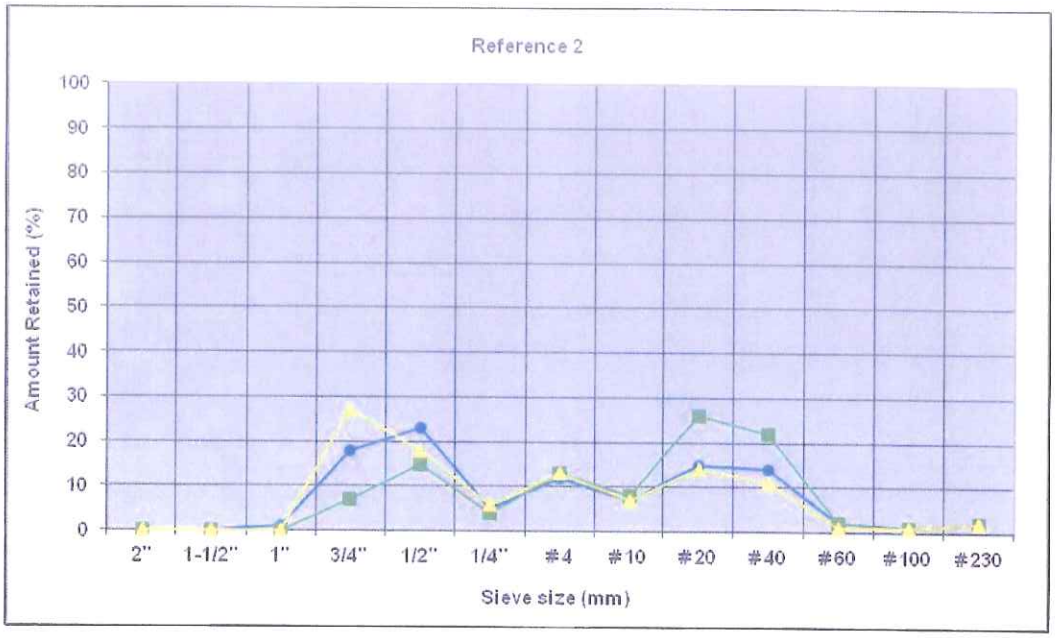
0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)


Reference 2
Amount Retained (%)
100
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80
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60
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40
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20
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0
2"
1-1/2"
1"
3/4"
1/2"
1/4"
#4
#10
#20
#40
#60
#100
#230
Sieve size (mm)