Fisheries facility （1） ～ （5）

（1） Topographical Survey and bathymetric Survey (Grenville fisheries facilities)

CRC OVERSEAS CO-OPERATION INC.

PROPOSED FISH MARKET, GRENVILLE, GRENADA

TOPOGRAPHIC SURVEY FOR FISHERIES FACILITIES IN GRENVILLE

WORKING METHOD

The land topographic survey works were sub-contracted to a local company. The company used a Sokkisha SDM5 optical theodolite with Electonic Distance Measuring (EDM) attachment.

Horizontal control was based on site control stations with assumed co-ordinates.

The data submitted by the local company was based on an assumed datum, and processed at LYP's Port of Spain Head Office. The X, Y, Z co-ordinates of the survey points were plotted and AutoCAD software with Eagle Point digital terrain modelling software used to generate the contours.

WORKING SCHEDULE

Field Work :	Start - July 3, 2001 End - July 3, 2001
Data Processing:	Start – July 30, 2001 End – August 15, 2001
Final Report:	Submitted – August 28, 2001

EQUIPMENT LIST

The following equipment was used:

- Sokkisha SDM5 optical theodolite with Electronic Distance Measuring (EDM) attachment.

- Accessories (survey) – tapes, pegs, spray paint, cutlasses, hammer, etc.

STAFFING

One surveyor and two labourers (chainmen) were involved in the topographic survey.

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CRC OVERSEAS CO-OPERATION INC.

PROPOSED FISH MARKET, GRENVILLE, GRENADA

BATHYMETRIC SURVEY

WORKING METHOD

Lee Young & Partners used a Continuous Recording Raytheon DE719C Fathometer for the bathymetric survey. The fathometer was able to give a permanent echo sounder recording of the seabed profile along the path of the survey vessel. Horizontal control for the bathymetric survey was provided by Lee Young & Partners' Trimble GPS Total Station 5700. Vertical control was provided through periodic readings at the site tide gauge.

At Lee Young & Partners' Port of Spain Head Office, the fathometer tape recordings were sampled and the spot heights at selected points plotted along the vessel path, adjusted for tide. This data was then entered onto a spreadsheet along with its corresponding X and Y co-ordinates acquired from the GPS total station. The X, Y and Z co-ordinates were then plotted in AutoCAD and this data processed, using the AutoCAD and Eagle Point Software.

WORKING SCHEDULE

Field Work :	Start - July 11, 2001 End - July 11, 2001
Data Processing:	Start – July 30, 2001 End – August 15, 2001
Final Report:	Submitted – August 28, 2001

EQUIPMENT LIST

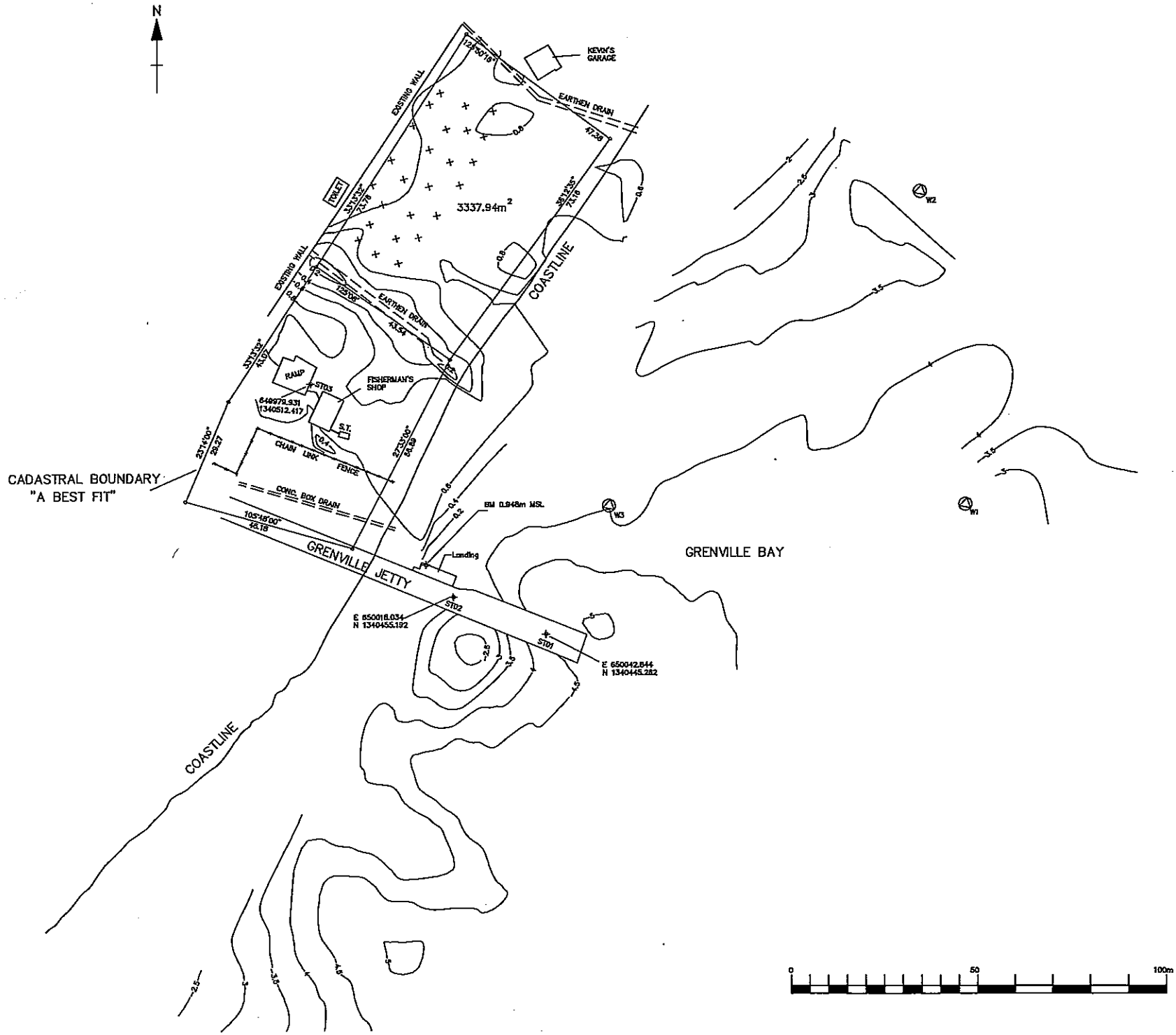
The following equipment was used:

- Raytheon DE 719C Fathometer (Echo Sounder)
- Trimble GPS Total Station 5700.
- Tapes for tide measurements.

STAFFING

- 1 Surveyor for GPS Equipment
- 1 Surveyor for Echo Sounder
- 1 Technician for tide measurements

-oo0oo-



NOTES

1. The original full-size plot of this drawing is meant for an A1-sized sheet of paper. The drawing border lines would be 569 mm x 803 mm when the sheet is plotted full size. The scale in the title block refers to the full sized plot scale only. If this drawing is plotted on a 11" x 17" sheet it is a reduction of 60% approximately.
2. Do not scale from this drawing, use figured dimensions only.
3. All dimensions are in metres unless otherwise stated.
4. Land contours are at 0.2m intervals.
5. Sea contours are at 0.5m intervals.
6. Site coordinate system is based on an assumed datum.
7. Cadastral boundary is approximate and was "best fitted" into this drawing

LEGEND

- S.T. — SEPTIC TANK
- TREE CANOPY
- INTERMEDIATE CONTOURS
- INDEX CONTOURS
- WATER SAMPLE
- CONTROL STATION

REVISION B:

1. The Cadastral boundary was changed on the northern end next to the existing wall, from 116.13 to 116.53
2. The drawing has been revised to reflect the change in BM elevation from 0.9m MSL to 0.948m MSL.

REVISION C:

1. The Cadastral boundary was revised
2. Coastline position was revised.

Issue	Date	Description	Drawn	Site	Check
C	29/08/01	THIRD ISSUE	RSP	RSP	
B	23/08/01	SECOND ISSUE	RSP	RSP	
A	14/08/01	PRELIMINARY ISSUE	RSP	RSP	

CRC OVERSEAS COOPERATION

JOB TITLE
PROPOSED FISH MARKET FOR GRENVILLE

DWG. TITLE
TOPOGRAPHIC/ BATHYMETRIC SURVEY

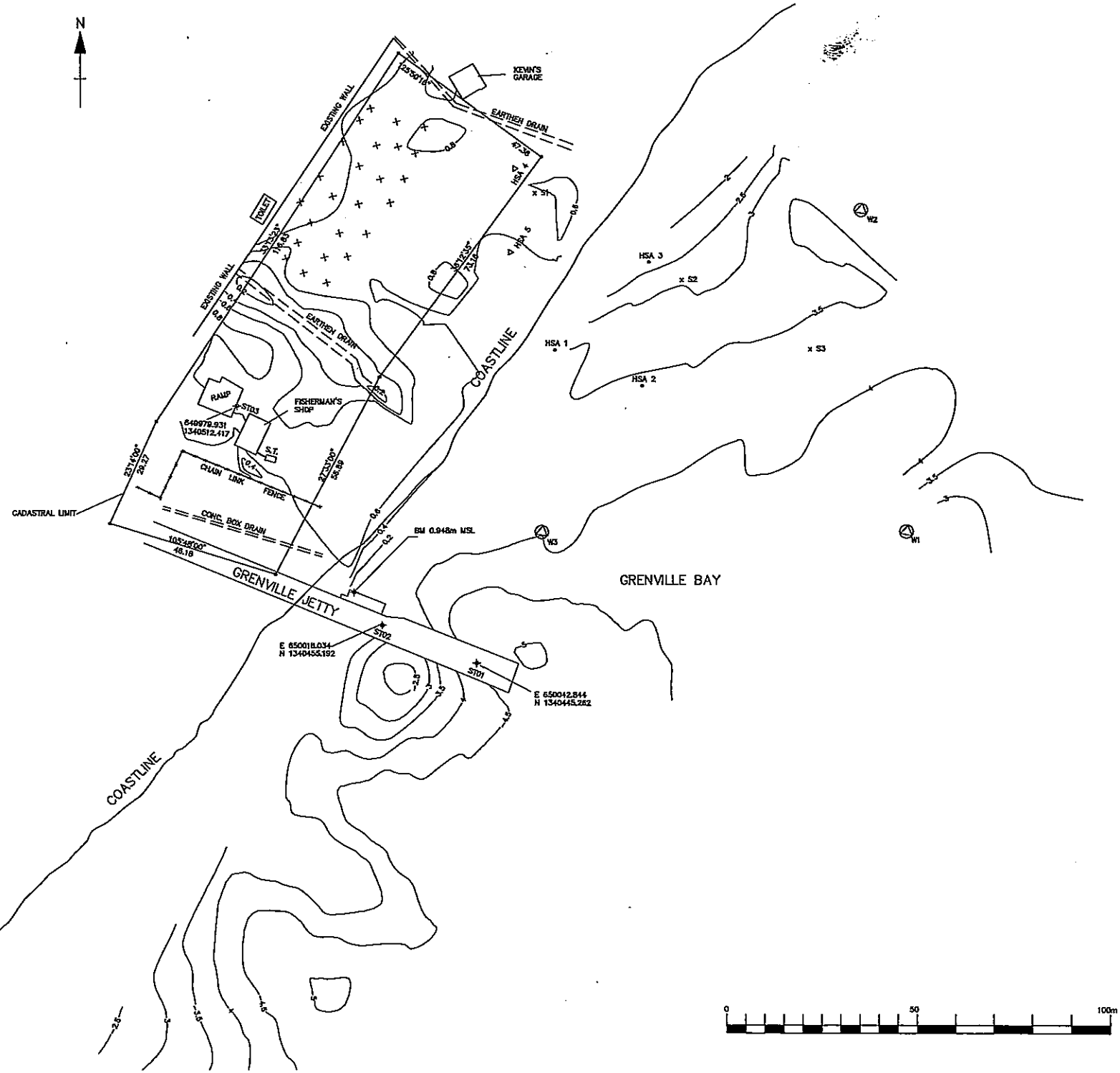
DWG. No.
20

SCALE:
1:500

JOB No.
9749

LEE YOUNG & PARTNERS
CONSULTING ENGINEERS & PROJECT MANAGERS
PORT OF SPAIN, TRINIDAD W.I.

(2) Soil condition survey(Grenville fisheries facility)



NOTES

1. Do not scale from this drawing, use figured dimensions only.
2. All dimensions are in metres unless otherwise stated.
3. Land contours are at 0.2m intervals.
4. Sea contours are at 0.5m intervals.
5. Site coordinate system is based on an assumed datum.

LEGEND

- S.T. SEPTIC TANK
- TREE CANOPY
- INTERMEDIATE CONTOURS
- INDEX CONTOURS
- WATER SAMPLE
- CONTROL STATION
- MARINE BOREHOLES
- SEDIMENT SAMPLES
- LAND BOREHOLES

REVISIONS:

1. The Cadastral boundary was changed on the northern end next to the existing wall, from 116.13 to 116.83
2. The drawing has been revised to reflect the change in BM from 0.9m MSL to 0.948m MSL.

Issue	Date	Description	Drawn	Date	Chkd
B	25/08/05	SECOND ISSUE			

CRC OVERSEAS COOPERATION

JOB TITLE
PROPOSED FISH MARKET FOR GRENVILLE

DWG. TITLE
SEDIMENT SAMPLING AND SOIL CONDITION SURVEY LOCATIONS

DWG. No. 1

SCALE: 1:500

JOB No. W748

LEE YOUNG & PARTNERS
CONSULTING ENGINEERS & PROJECT MANAGERS
PORT OF SPAIN, TRINIDAD W.I.

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 BORING No. HSA 1 SHEET 1 OF 2

PROJECT Proposed Fish Market, Grenville DATE STARTED July 27, 2001 LOCATION Grenville (Marine)

TYPE BORING Hollow Stem Auger DATE COMPLETED July 27, 2001 GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE DESCRIPTION	SOIL	% FINES	% COARSE	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. (kN/m³)
0										
1										
2				WATER						
3										
4										
5		1						-		
6		2						-		
7		3						5		
8		4		GREY ODOURLESS WET , VERY SOFT HOMOGENOUS ELASTIC SILT	MH			5		
9		5						5		
10		6						5		
		7						4		

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST*
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH N/A HOURS AFTER DRILLING

DRILLER M. Lalla
WATER ENCOUNTERED

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT	LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 | BORING No. HSA 1 | SHEET 2 OF 2

PROJECT Proposed Fish Market, Grenville | DATE STARTED July 27, 2001 | LOCATION Grenville (Marine)

TYPE BORING Hollow Stem Auger | DATE COMPLETED July 27, 2001 | GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE DESCRIPTION	SOIL	% FINES	% COARSE	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. KN/m³
11					MH			50		
		8								
12								60		
		9								
13				MOTTLED GREY AND BROWN ODOURLESS MOIST FIRM TO HARD HOMOGENEOUS POORLY GRADED SAND				50		
		10			SP					
14								52		
		11								
15								52		
		12								
				END OF BOREHOLE						
16										
17										
18										
19										
20										
21										

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST*
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH N/A HOURS AFTER DRILLING

DRILLER M. Lalla
WATER ENCOUNTERED

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 BORING No. HSA 2 SHEET 1 OF 2

PROJECT Proposed Fish Market, Grenville DATE STARTED July 25, 2001 LOCATION Grenville (Marine)

TYPE BORING Hollow Stem Auger DATE COMPLETED July 25, 2001 GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE DESCRIPTION	SOIL	% FINES	% COARSE	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. kN/m³
0										
1				WATER						
2										
3										
4	X	1		GREY ODOURLESS WET, VERY SOFT STRATIFIED ELASTIC SILT	MH			5		
5	X	2						2		
6	X	3						3		
7	X	4						4		
8	X	5						5		
9	X	6						51		
10	X	7								
	X	8						52		

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST*
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH N/A HOURS AFTER DRILLING

DRILLER M. Lalla
WATER ENCOUNTERED

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT
BOREHOLE TEST RECORD

JOB No. W 749 | BORING No. HSA 2 | SHEET 2 OF 2

PROJECT Proposed Fish Market, Grenville | DATE STARTED July 25, 2001 | LOCATION Grenville (Marine)

TYPE BORING Hollow Stem Auger | DATE COMPLETED July 25, 2001 | GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE: SOIL	% FINES	% COARSE	DESCRIPTION	S.P.T. VALUE (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. kN/m³
11										
		9						53		
12							OLIVE BROWN AND GREY ODOURLESS MOIST, HARD STRATIFIED POORLY GRADED SAND			
		10		SP				51		
13										
		11						53		
14							END OF BOREHOLE			
15										
16										
17										
18										
19										
20										
21										

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST*
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL: C_u (kN/m²)	TRIAXIAL: ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH N/A HOURS AFTER DRILLING

DRILLER M. Lalla
WATER ENCOUNTERED

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 BORING No. HSA 3 SHEET 1 OF 2

PROJECT Proposed Fish Market, Grenville DATE STARTED July 28, 2001 LOCATION Grenville (Marine)

TYPE BORING Hollow Stem Auger DATE COMPLETED July 28, 2001 GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE DESCRIPTION	SOIL	% FINES	% COARSE
0 – 4				WATER			
5 – 10	X	1		LIGHT GREY ODOURLESS WET SOFT HOMOGENEOUS ELASTIC SILT WITH TRACES OF GRAVEL	MH		
	X	2					
	X	3					
	X	4					
	X	5					
	X	6					
	X	7					

S.P.T. VALUE' (BLOWS/300mm) | MOISTURE CONTENT (%) | BULK UNIT WT. kN/m³

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST*
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

14 6 3 5 5 8 7

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | CONSOLIDATION TEST | SPECIFIC GRAVITY | SIEVE (M & D) | TRIAXIAL: C_u (kN/m²), ϕ DEGREES | UNCONFINED COMPRESSION TEST: Q_u (kN/m²) | DRY UNIT WEIGHT | SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH N/A HOURS AFTER DRILLING

DRILLER M. Lalla
WATER ENCOUNTERED

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
'HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 BORING No. HSA 3 SHEET 2 OF 2

PROJECT Proposed Fish Market, Grenville DATE STARTED July 28, 2001 LOCATION Grenville (Marine)

TYPE BORING Hollow Stem Auger DATE COMPLETED July 28, 2001 GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE DESCRIPTION	SOIL	% FINES	% COARSE	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. kN/m³
11										
12		8						48		
13		9						30		
14		10						56		
15		11		MOTTLED BROWN AND GREY ODOURLESS MOIST HARD HOMOGENEOUS POORLY GRADED SAND	SP			50		
16		12						50		
17		13						50		
18		14						52		
19		15		END OF BOREHOLE						
20										
21										

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST*
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)
						99				

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH N/A HOURS AFTER DRILLING

DRILLER M. Lalla
WATER ENCOUNTERED

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
⊕ ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

▼ POCKET PENETROMETER
■ UNCONFINED COMPRESSION TEST
⊖ TRIAXIAL TEST
▲ VANE SHEAR TEST
◇ C_u (kN/m²)
◈ Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 BORING No. HSA 4 SHEET 1 OF 2

PROJECT Proposed Fish Market, Grenville DATE STARTED July 16, 2001 LOCATION Grenville (Land)

TYPE BORING Hollow Stem Auger DATE COMPLETED July 16, 2001 GROUND ELEVATION

SHEAR STRENGTH kN/m² | WATER CONTENT % | STD. PENETRATION TEST N-VALUE (BLOW/300mm) | C_u (kN/m²) & ϕ

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL	% FINES	% COARSE	DESCRIPTION	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. kN/m³	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)
0																					
1																					
2	X	1						50													
3	X	2						17													
4	X	3		MH	26	74	LIGHT GREY MOIST VERY SOFT STRATIFIED ELASTIC SILT	1	51						2.65						
5	X	4						6													
6	X	5						16													
7	X	6		CL			DARK BROWN MOIST SOFT STRATIFIED LEAN CLAY	11													
8	X	7						13													
9	X	8		ML			LIGHT GREY MOIST SOFT STRATIFIED SILT WITH LOW ELASTICITY	9													
10	X	9						10													
	X	10		CH				13													

SOIL CLASSIFICATION AS PER ASTM D 2487-93

WATER DEPTH -- HOURS AFTER DRILLING

POCKET PEN (kN/m²) & Q_u

DRILLER M. LALLA

WATER ENCOUNTERED 3m

LEGEND

MADE GROUND | GRAVEL | SILT | SAND | CLAY | UNCEMENTED CALCAREOUS MATTER | PEAT | LOAM | LIMESTONE | SCHIST | HARD SHALE

STANDARD SPILT SPOON (DISTURBED)

UNDISTURBED (SHELBY)

UNDISTURBED (NO RECOVERY)

AUGER

DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W

△ N - VALUE (S.P.T.)

ϕ (Angle of Internal Friction)

W = Wet Sieve

D = Dry Sieve

POCKET PENETROMETER

UNCONFINED COMPRESSION TEST

TRIAXIAL TEST

VANE SHEAR TEST

◇ C_u (kN/m²)

◇ Q_u (Unconfined Compression Strength)

*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT
BOREHOLE TEST RECORD

JOB No. W 749 | BORING No. HSA 4 | SHEET 2 OF 2

PROJECT Proposed Fish Market, Grenville | DATE STARTED July 16, 2001 | LOCATION Grenville (Land)

TYPE BORING Hollow Stem Auger | DATE COMPLETED July 16, 2001 | GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE: SOIL	% FINES	% COARSE	DESCRIPTION	S.P.T. VALUE- (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. KN/m³
11										
	X	11		CH			REDDISH BROWN AND LIGHT GREY MOIST FIRM STRATIFIED FAT CLAY	15		
12										
	X	12		CH			OLIVE BROWN MOIST FIRM STRATIFIED FAT CLAY	21		
13										
	X	13						25		
14										
	X	14		MH			OLIVE BROWN MOIST FIRM STRATIFIED ELASTIC SILT	38		
15										
	X	15						50		
16										
	X	16						63		
17										
	X	17		MH			OLIVE BROWN MOIST SOFT STRATIFIED ELASTIC SILT	39		
18							END OF BOREHOLE			
19										
20										
21										

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL: C_u (kN/m²)	TRIAXIAL: ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH -- HOURS AFTER DRILLING

DRILLER M I A I I A
WATER ENCOUNTERED 3m

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

▼ POCKET PENETROMETER
■ UNCONFINED COMPRESSION TEST
θ TRIAXIAL TEST
VANE SHEAR TEST
◇ C_u (kN/m²)
◇ Q_u (Unconfined Compression Strength)

*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 BORING No. HSA 5 SHEET 1 OF 2

PROJECT Proposed Fish Market, Grenville DATE STARTED July 17, 2001 LOCATION Grenville (Land)

TYPE BORING Hollow Stem Auger DATE COMPLETED July 17, 2001 GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL PROFILE DESCRIPTION	SOIL	% FINES	% COARSE	S.P.T. VALUE (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. kN/m³
0										
1										
2	X	1						36		
3	X	2						42		
4				LIGHT GREY BROWN WET VERY SOFT STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	MH			10		
5	X	3						6		
6	X	4						4		
7	X	5								
8	X	6						8		
9	X	7		DARK BROWN MOIST FIRM STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	MH			5		
10	X	8						6		
	X	9		LIGHT GREY MOIST SOFT STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	MH			3		
	X	10		LIGHT GREY MOIST	MH			8		

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH — HOURS AFTER DRILLING

DRILLER M I AI I A
WATER ENCOUNTERED 3

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
LOAM
LIMESTONE
SCHIST
HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT	LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

LEE YOUNG & PARTNERS - GEOTECHNICAL DEPARTMENT

BOREHOLE TEST RECORD

JOB No. W 749 | BORING No. HSA 5 | SHEET 2 OF 2

PROJECT Proposed Fish Market, Grenville | DATE STARTED July 17, 2001 | LOCATION Grenville (Land)

TYPE BORING Hollow Stem Auger | DATE COMPLETED July 17, 2001 | GROUND ELEVATION

DEPTH (m)	SAMPLE TYPE	SAMPLE NUMBER	STRATIGRAPHIC PLOT	SOIL	% FINES	% COARSE	DESCRIPTION	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. kN/m³
11										
12		11		MH			V. SOFT STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	16		
13		12		MH			LIGHT GREY MOIST FIRM STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	44		
14		13		MH			REDDISH BROWN & OLIVE BROWN MOIST FIRM STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	30		
15		14		MH			LIGHT GREY WET SOFT STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	4		
16		15		MH			DARK BROWN MOIST FIRM STRATIFIED SANDY ELASTIC SILT WITH GRAVEL	29		
17		16		MH				48		
18		17		MH				56		
19		18		MH				51		
20		19		MH				50		
21							END OF BOREHOLE			

SHEAR STRENGTH kN/m²
WATER CONTENT %
STD. PENETRATION TEST
N-VALUE (BLOW/300mm)
C_u (kN/m²) & ϕ

10 20 30 40 50 60 70 80 90 100 110

100 200 300 400 500
POCKET PEN (kN/m²) & Q_u

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	TRIAXIAL C_u (kN/m²)	TRIAXIAL ϕ DEGREES	UNCONFINED COMPRESSION TEST Q_u (kN/m²)	DRY UNIT WEIGHT	SHEAR VANE (kN/m²)

SOIL CLASSIFICATION AS PER ASTM D 2487-93
WATER DEPTH — HOURS AFTER DRILLING

DRILLER M I AI I A
WATER ENCOUNTERED 3m

LEGEND

MADE GROUN
GRAVEL
SILT
SAND
CLAY
UNCEMENTED CALCAREOUS MATTER
PEAT
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HARD SHALE

STANDARD SPILT SPOON (DISTURBED)
UNDISTURBED (SHELBY)
UNDISTURBED (NO RECOVERY)
AUGER
DIAMOND CORE

PLASTIC LIMIT | LIQUID LIMIT

X NATURAL WATER CONTENT, W
△ N - VALUE (S.P.T.)
ϕ (Angle of Internal Friction)
W = Wet Sieve
D = Dry Sieve

POCKET PENETROMETER
UNCONFINED COMPRESSION TEST
TRIAXIAL TEST
VANE SHEAR TEST
C_u (kN/m²)
Q_u (Unconfined Compression Strength)
*HAMMER WEIGHT - 140lb DROP - 30

(3) Tide Analysis

(Grenville fisheries facility)

Tide Analysis

(1) Result of Survey

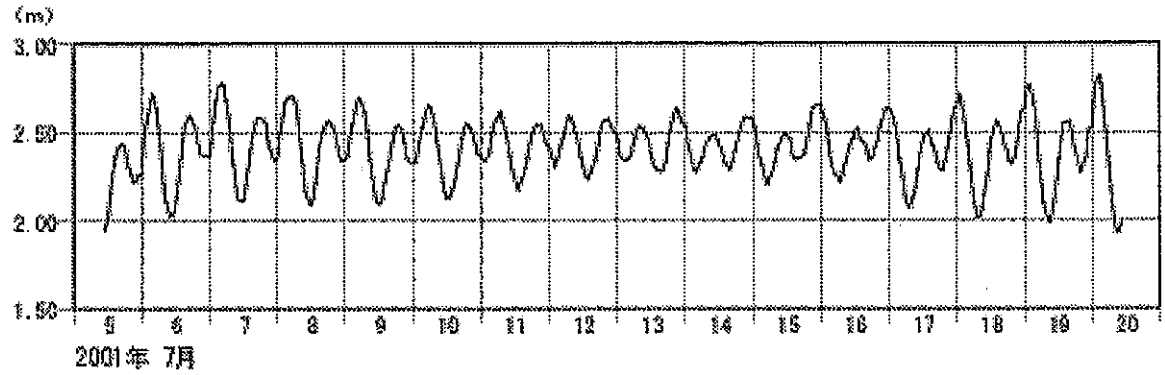


Figure 1 Tide data in Grenville

(5^{th} July 2001 – 20^{th} July)

(2) Summary of Tide

Summary of Tide, Chart Datum Level (C.D.L) and Mean Sea Level (M.S.L) are as follow.

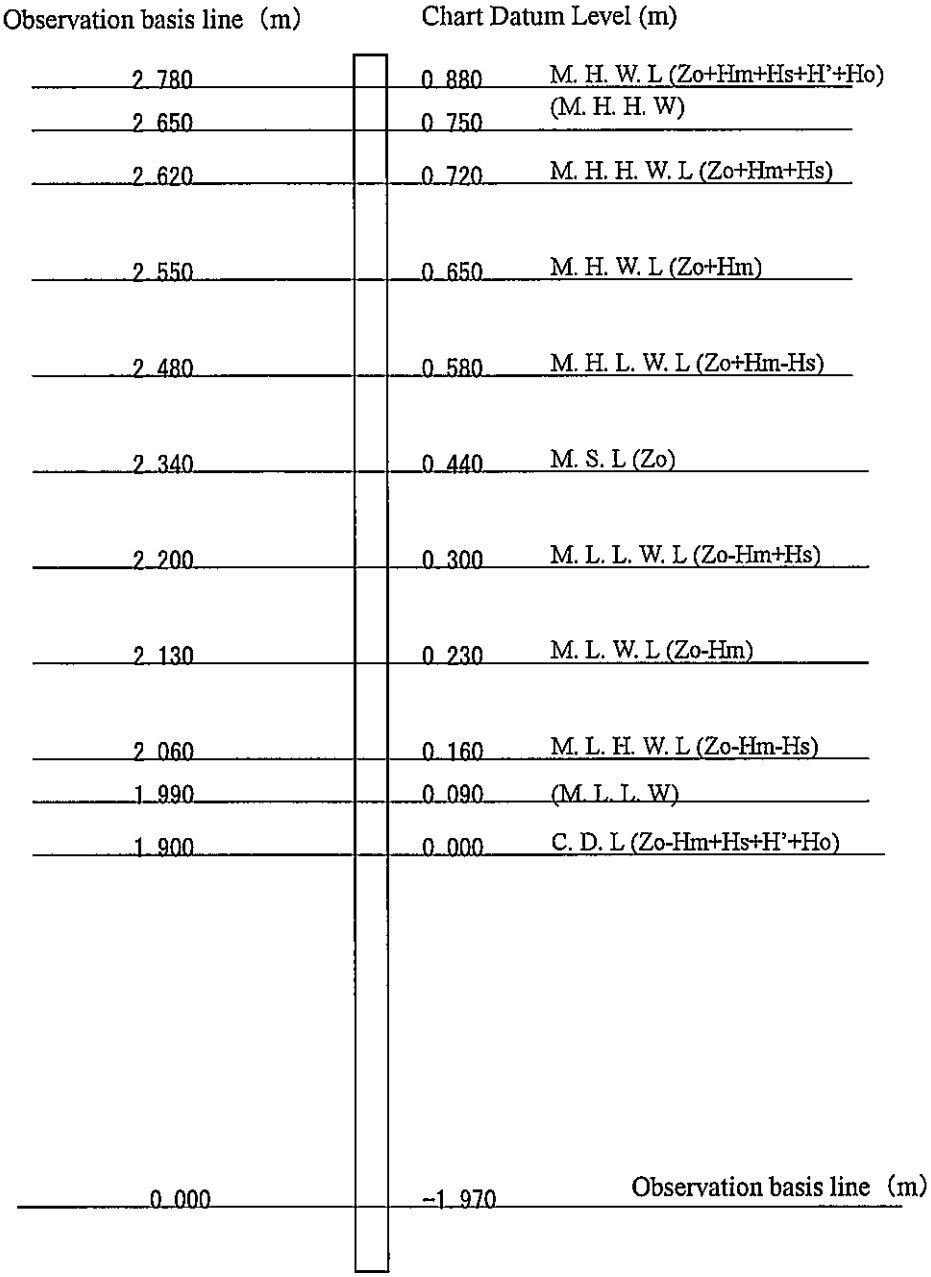


Figure 2 Summary of tide in Grenville

(4) Wave Analysis

(Grenville fisheries facility)

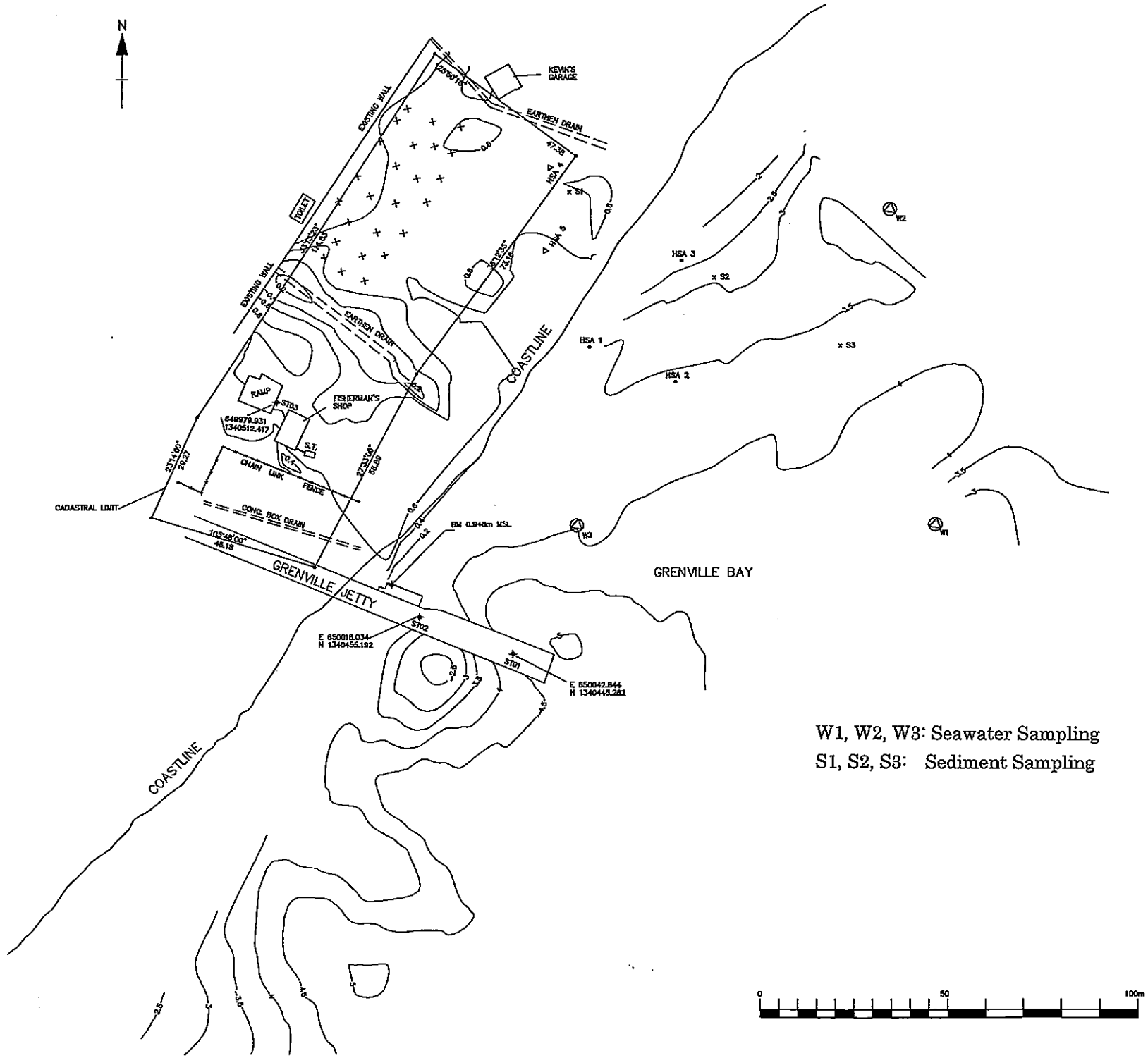
Wave Analysis

Table 1 Wave direction and wave height around planed jetty tip

Characters of offshore Wave			Wave direction and wave height around planned jetty tip	
Offshore Wave Direction	Wave Height (m)	Period (s)	Wave Direction(degree)	Wave Height(m)
NE	4.9	15.3	128-131	0.33-0.38
ENE	4.1	13.5	127-131	0.33-0.37
E	4.2	8.0	127-131	0.30-0.34
ESE	4.2	8.0	128-134	0.31-0.35

Note: Characters of offshore wave are fixed from NE, ENE, E, and ESE. Typical wave directi on and wave height are calculated by distribution of average wave direction and wave height in wave transforming calculation.

(5) Seawater Analysis, Sediment Sampling & Analysis (Grenville fisheries facility)



NOTES

1. Do not scale from this drawing, use figured dimensions only.
2. All dimensions are in metres unless otherwise stated.
3. Land contours are at 0.2m intervals.
4. Sea contours are at 0.5m intervals.
5. Site coordinate system is based on an assumed datum.

LEGEND

- S.T. — SEPTIC TANK
- TREE CANOPY
- INTERMEDIATE CONTOURS
- INDEX CONTOURS
- WATER SAMPLE
- CONTROL STATION
- MARINE BOREHOLES
- SEDIMENT SAMPLES
- LAND BOREHOLES

REVISIONS:

1. The Cadastral boundary was changed on the northern end next to the existing wall, from 116.13 to 116.83
2. The drawing has been revised to reflect the change in BM from 0.9m MSL. to 0.948m MSL.

Issue	Date	Description	Drawn	Chkd.	Appd.
B	23/08/07	SECOND ISSUE			

CRC OVERSEAS COOPERATION

JOB TITLE
PROPOSED FISH MARKET FOR GRENVILLE

DWG. TITLE
SEDIMENT SAMPLING AND SOIL CONDITION SURVEY LOCATIONS

DWG. No. 1

SCALE: 1:500

JOB No. W748

LEE YOUNG & PARTNERS
CONSULTING ENGINEERS & PROJECT MANAGERS
PORT OF SPAIN, TRINIDAD W.I.

LEE YOUNG & PARTNERS

CRC OVERSEAS CO-OPERATION INC.

PROPOSED FISH MARKET, GRENVILLE, GRENADA

SEA WATER ANALYSIS

EQUIPMENT LIST

The YSI 63 pH and Temperature Meter (Data logs 60 data sets and automatically compensates pH measurements for temperature) was used to measure pH and temperature.

RESULTS

Location	Time	pH	Temperature	BOD_5 (mg O_2/L)	COD (mg O_2/L)
W1	July 3, 2:45 p.m.	7.96	30.3	4.08	5998
W2	July 3, 2:50 p.m.	8.04	30.4	2.74	7798
W3	July 3, 2:55 p.m.	8.04	30.1	<DL	5236
W1	July 4, 9:07 a.m.	7.94	28.0	<DL	7656
W2	July 4, 9:10 a.m.	7.96	28.0	<DL	6610
W3	July 4, 9:05 a.m.	7.88	28.2	2.00	3165

The above table presents the results from the tests performed.

The bathymetric survey report includes a map which identifies the location of the samples corresponding to their identification number.

The analytical data sheet and quality control data sheets as well as photographs illustrating the general area where sampling wads done are attached.

-oo0oo-

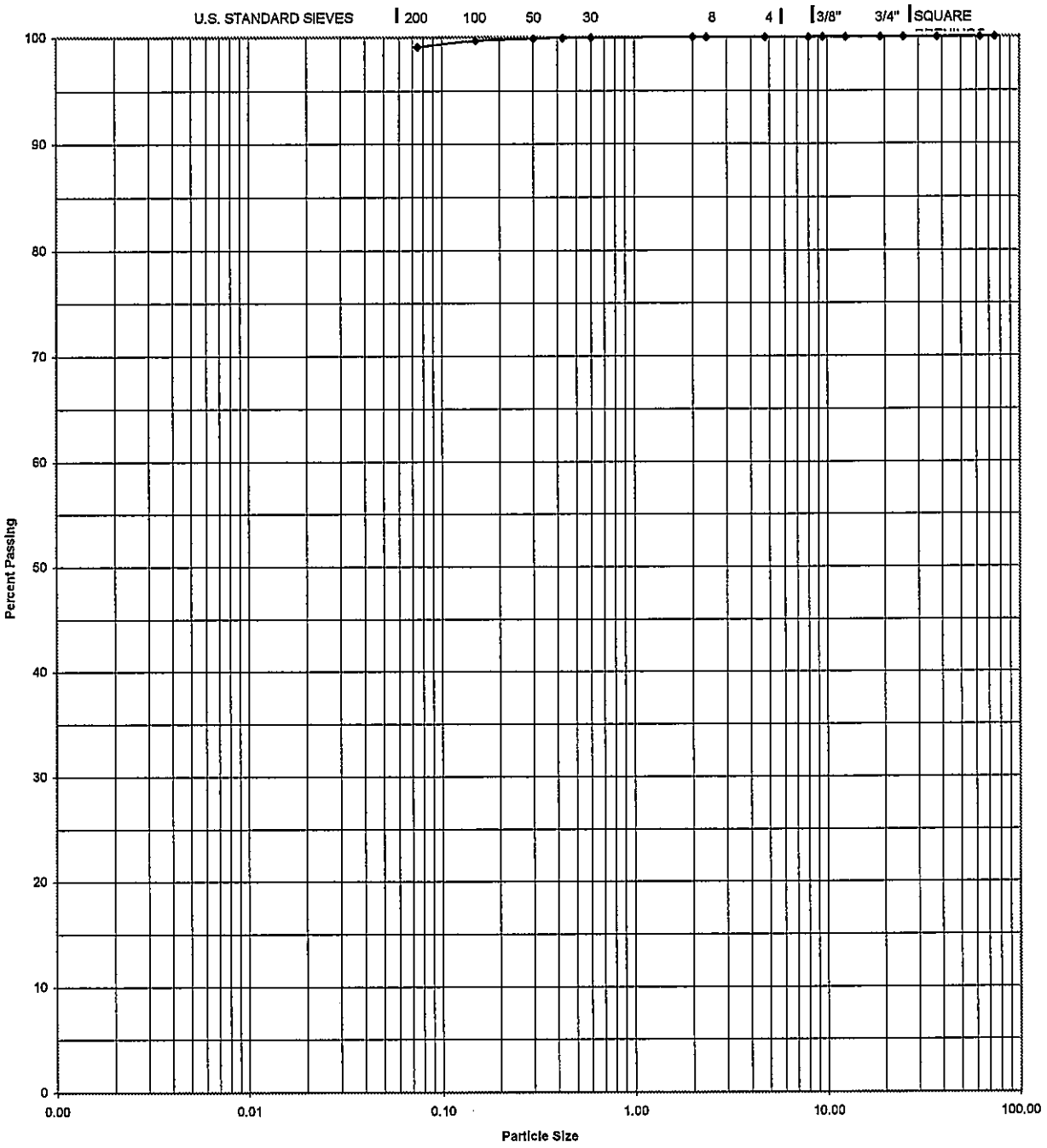
LEE YOUNG & PARTNERS

Client Name: Lee Young and Partners.
Sample Receive Date: 4/07/01
Sample Matrix: Water
Project number: 033-005

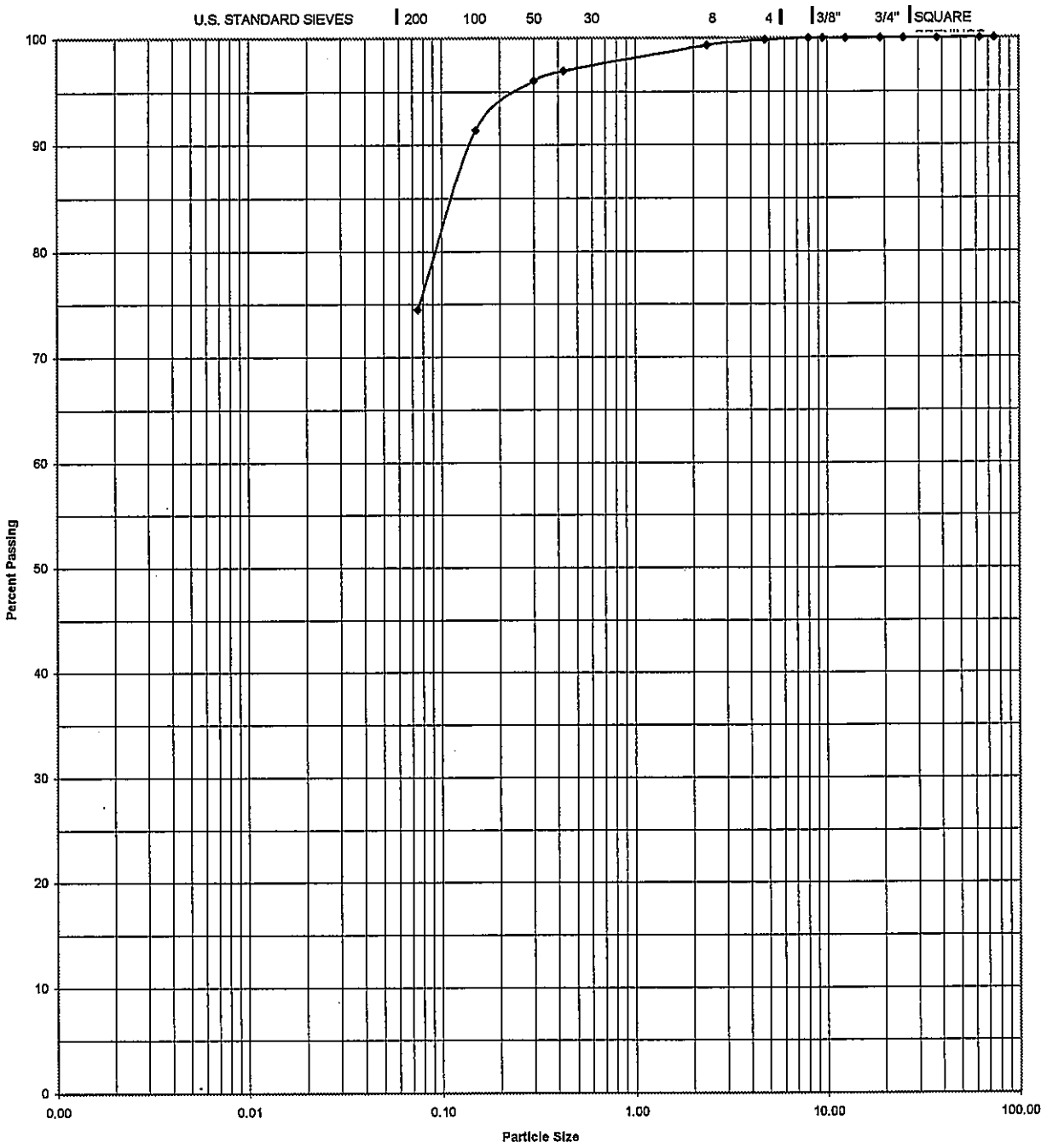
ANALYTICAL DATA SHEET

Table 1. Results of analyses performed on samples

Sample Date	Sample Description	Sample Reference number	Biochemical Oxygen Demand (mg O_2/L)	Chemical Oxygen Demand (mg O_2/L)
3/07/01	W1	033-005-1	4.08	5998
3/07/01	W2	033-005-2	2.74	7798
3/07/01	W3	033-005-3	<DL	5236
4/07/01	W1	033-005-4	<DL	7656
4/07/01	W2	033-005-5	<DL	6610
4/07/01	W3	033-006-6	2.00	3165

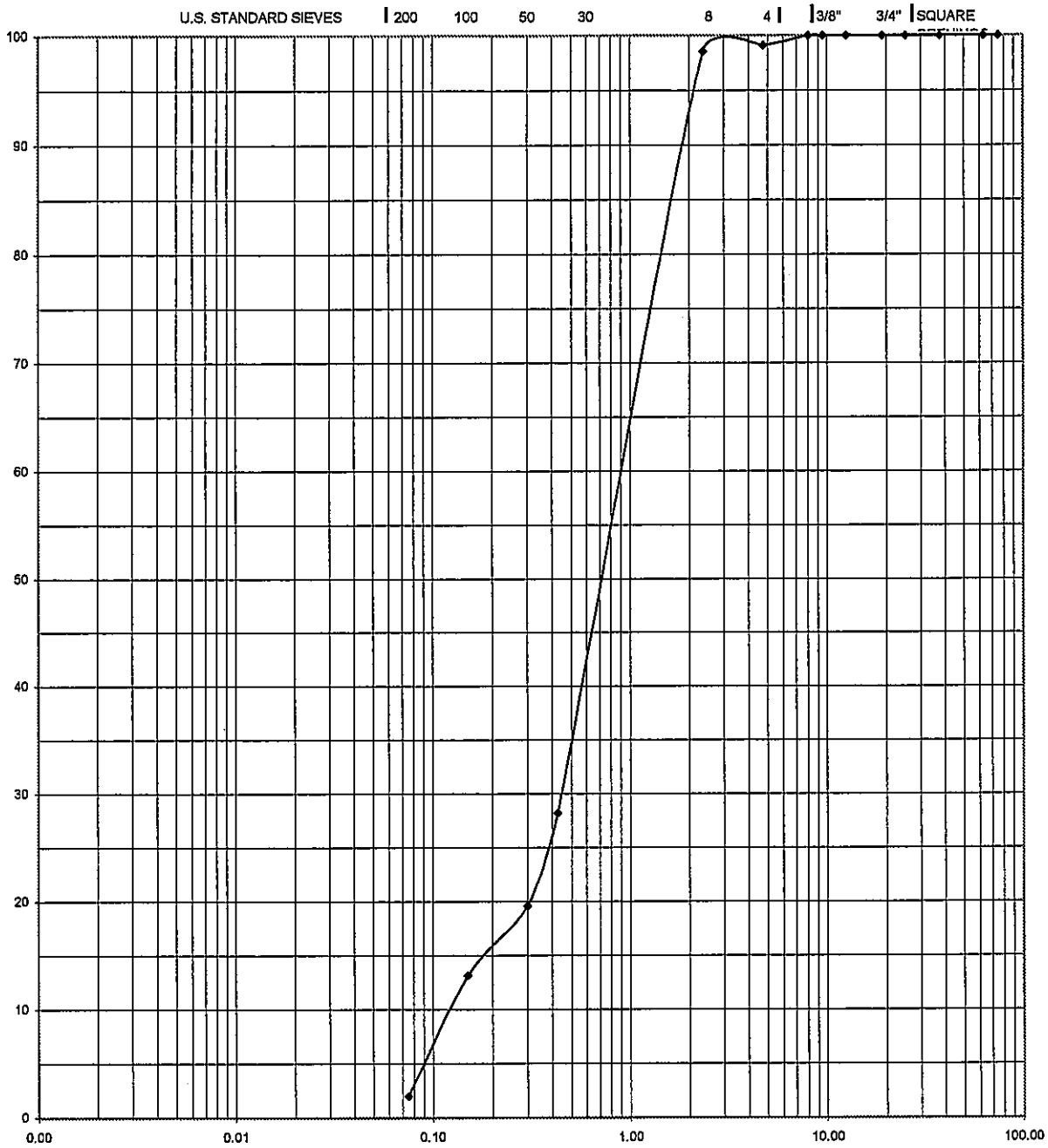


Date	03-Aug-01
Job Name	Proposed Fish Market, Grenville
Job Number	W749
Job Location	Grenville, Grenada
Tested by:	A.P.
Boring no.	Sediment Sample
Sample no.	S1
Sample depth	
Soil description	



Date	04-Aug-01
Job Name	Proposed Fish Market, Grenville
Job Number	W749
Job Location	Grenville, Grenada
Tested by:	A.P.

Boring no.	Sediment Sample
Sample no.	S2
Sample depth	
Soil description	



Date	04-Aug-01
Job Name	Proposed Fish Market, Grenville
Job Number	W749
Job Location	Grenville, Grenada
Tested by:	A.P.
Boring no.	Sediment Sample
Sample no.	S3
Sample depth	
Soil description	

SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT FISHERIES JOB No.

LOCATION OF PROJECT GRENVILLE

TEST HOLE No. S1 SAMPLE DEPTH

DESCRIPTION OF SAMPLE

REMARKS

FLASK No.		4	8	
THERMOMETER No.				
COHESIONLESS SOILS ONLY	WT. FLASK + DRY SOIL	196.17	222.32	
	WT. FLASK	171.17	197.32	
	WT. DRY SOIL, W_s	25	25	
METHOD OF AIR REMOVAL		BOILING	BOILING	
WT. FLASK + WATER + SOIL, W_{bws}		681.71	710.47	
TEMP. OF SUSPENSION, T°C.		30	20	
WT. FLASK + WATER, W_{bw}		666.85	695.05	
COHESIVE SOILS ONLY	EVAP. DISH No.			
	WT. DRY SOIL + TARE			
	WT. TARE			
	WT. DRY SOIL, W_s			
SPECIFIC GRAVITY, G_s		2.45	2.61	
AVERAGE SPECIFIC GRAVITY		2.53		

FORMULA: $$G_s = \frac{W_s\, G_t}{W_s + W_{bw} - W_{bws}}$$

WHERE
- G_s = SPECIFIC GRAVITY OF SOILS
- W_s = WT. OF DRY SOIL
- W_{bw} = WT. OF FLASK + WATER AT T°C. (FROM CALIBRATION CURVE FOR FLASK)
- W_{bws} = WT. OF FLASK + WATER + SOIL AT T°C.
- G_t = SPECIPIC GRAVITY OF WATER AT T°C.

TESTED _____ DATE _____
COMPUTED _____ DATE _____
CHECKED _____ DATE _____

SOIL MECHANICS LABORATORY
LEE YOUNG & PARTNERS
CONSULTING ENGINEERS
PORT OF SPAIN
TRINIDAD

SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT FISHERIES JOB No.

LOCATION OF PROJECT GRENVILLE

TEST HOLE No. S2 SAMPLE DEPTH

DESCRIPTION OF SAMPLE GREYISH GRAY — FINES

REMARKS

FLASK No.		9	10	
THERMOMETER No.				
COHESIONLESS SOILS ONLY	WT. FLASK + DRY SOIL	199.11	213.80	
	WT. FLASK	174.11	188.80	
	WT. DRY SOIL, W_s	25	25	
METHOD OF AIR REMOVAL		BOILING	BOILING	
WT. FLASK + WATER + SOIL, W_{bws}		684.60	668 96	
TEMP. OF SUSPENSION, T°C.		30	20	
WT. FLASK + WATER, W_{bw}		668.30	670.25	
COHESIVE SOILS ONLY	EVAP. DISH No.			
	WT. DRY SOIL + TARE			
	WT. TARE			
	WT. DRY SOIL, W_s			
SPECIFIC GRAVITY, G_s		2.86	0.92	
AVERAGE SPECIFIC GRAVITY		1.89		

FORMULA: $$G_s = \frac{W_s\, G_t}{W_s + W_{bw} - W_{bws}}$$

WHERE
G_s = SPECIFIC GRAVITY OF SOILS
W_s = WT. OF DRY SOIL
W_{bw} = WT. OF FLASK + WATER AT T°C. (FROM CALIBRATION CURVE FOR FLASK)
W_{bws} = WT. OF FLASK + WATER + SOIL AT T°C.
G_t = SPECIPIC GRAVITY OF WATER AT T°C.

TESTED _____ DATE _____
COMPUTED _____ DATE _____
CHECKED _____ DATE _____

SOIL MECHANICS LABORATORY
LEE YOUNG & PARTNERS
CONSULTING ENGINEERS
PORT OF SPAIN
TRINIDAD

SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT FISHERIES JOB No.

LOCATION OF PROJECT BRIGHTVILLE

TEST HOLE No. S3 SAMPLE DEPTH

DESCRIPTION OF SAMPLE

REMARKS

FLASK No.		5	15	
THERMOMETER No.				
COHESIONLESS SOILS ONLY	WT. FLASK + DRY SOIL	223.46	198.69	
	WT. FLASK	198.46	173.69	
	WT. DRY SOIL, W_s	25	25	
METHOD OF AIR REMOVAL		BOILING	BOILING	
WT. FLASK + WATER + SOIL, W_{bws}		708.93	684.52	
TEMP. OF SUSPENSION, T°C.		30	20	
WT. FLASK + WATER, W_{bw}		693.45	671.25	
COHESIVE SOILS ONLY	EVAP. DISH No.			
	WT. DRY SOIL + TARE			
	WT. TARE			
	WT. DRY SOIL, W_s			
SPECIFIC GRAVITY, G_s		2.61	2.88	
AVERAGE SPECIFIC GRAVITY		2.745		

FORMULA: $$G_s = \frac{W_s\, G_t}{W_s + W_{bw} - W_{bws}}$$

WHERE
G_s = SPECIFIC GRAVITY OF SOILS
W_s = WT. OF DRY SOIL
W_{bw} = WT. OF FLASK + WATER AT T°C. (FROM CALIBRATION CURVE FOR FLASK)
W_{bws} = WT. OF FLASK + WATER + SOIL AT T°C.
G_t = SPECIPIC GRAVITY OF WATER AT T°C.

TESTED DATE
COMPUTED DATE
CHECKED DATE

SOIL MECHANICS LABORATORY
LEE YOUNG & PARTNERS
CONSULTING ENGINEERS
PORT OF SPAIN
TRINIDAD