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.

-00000-

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

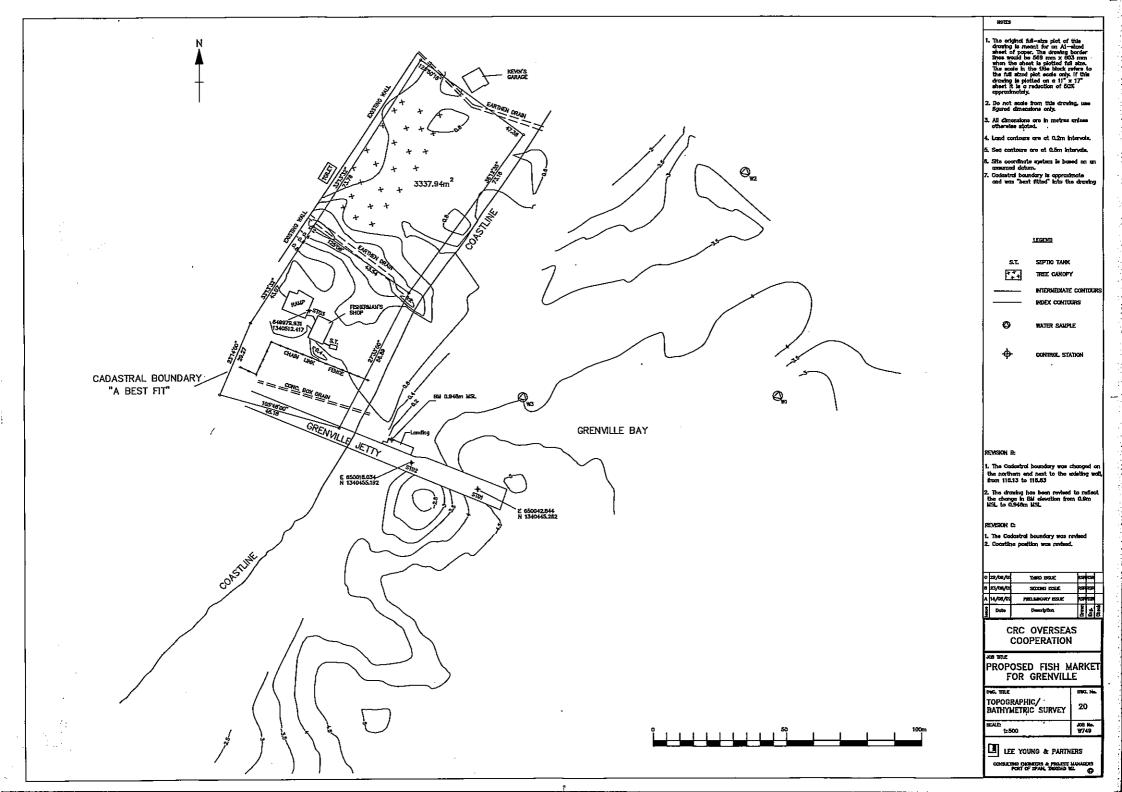
The following equipment was used:

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

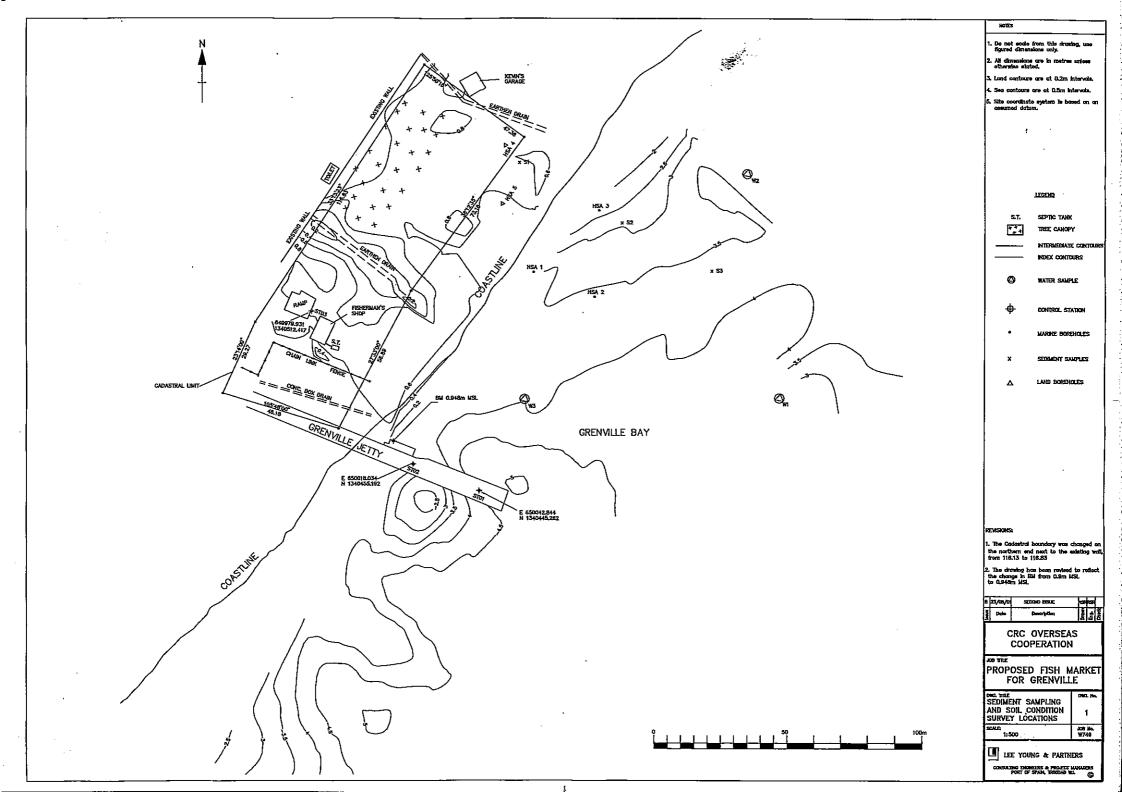
STAFFING

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

-00000-



(2) Soil condition survey(Grenville fisheries facility)



		<u>.</u>				LEE Y	οU	NG	8								HN COF		LD	EP/	RT	MEN	TV									
JO	B N	o	n +	w	749)				BO	RING	3 No). <u> </u>		HS	A 1				s	HEE	т	1			<u> </u>	OF	-	2	!		
						ed Fish Market, Gre w Stem Auger				DA" DA"	TE S TE C	STAF	RTE	D TED	July July	v 27. v 27	200	1 21		_ L(_ G	DCA ROL	tion Ind I	I ELEV	GI	<u>en</u> DN	<i>i</i> lle,	(M:	ario	10)			<u> </u>
DEPTH (m)	SAMPLE	RAPHIC				DIL PROFILE DESCRIPTION	S.P.T. VALUE" (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. KNMm ²				WA STE N-V	TER). PE	CO INET E (B	NTE TRA SLOV	əth Nt Tion V/30	% I TE	ST*			.imit	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	C GRAVITY	WED)	C. (Whith) TRIAXIAL	IEES	ประการสาย SeconFined compression Test (สปสาวิ)	ory unit weight	SHEAR VANE (AVM?)
	TYPE NUMBER	STRATIGRAPHIC	SOIL	% FINES	% COARSE		S.P.T. VA	ROISTUR	BULK UN		0 2	0	0	0 8	0 6	0	ίο ε	.0 9	0 1	¢0 1	Ó		PLAST	ITZALI	CONSO	SPECIFI	SIÈVE (ສູ້ ເ	E E	ਤੂਸ਼ ਨੂੰ	DRY UN	SHEAR
0		-	┢╌				-													<u> </u>												
•																$\left \right $																
1														-																		
I																																
2						WATER																										
_									Γ																							
3									\uparrow		 		_							· ·	-				Γ							
									1						<u> </u>		-			-						Π						
4		-			_		Ł		┢																	Π						
	Дı						ŀ		T			<u> </u>																				
5								\square	╞		<u> </u>									.			-		F				_			
_	X						F	\vdash	┢				<u> </u>		<u> </u>	ŀ									┢							
6							┢	-	┢						<u> </u>										┢				_		F	
	∦₃				ĺ		5	┢──	╞╴																┢	-		┥	_			\square
7						GREY ODOURLESS WET, VERY SOFT	┢	$\left \right $	╋				-												┢			\neg	_		-	
	X 4	,	: M⊦	1		HOMOGENOUS ELASTIC SILT	5	┢	┢				<u> </u>												_			┥		 	-	\square
8							┝	\vdash	$\left \right $																	\vdash			_			
	X €						5	\vdash																		┢					-	$\left - \right $
9							-	•		\square				F	-	-	-	-					-			+		\neg			┝	$\left \right $
	٦	5					5		_	À		-								-]		-	┢	$\left \cdot \right $				 	┢	H
10							┝	┢	_				-	-											╞			+				$\left - \right $
		/	FICA			PER ASTM D 2487-93	4			4		00	2	200		300		00	5	i¢0		DRIL	LER_	M.	Lai	la				<u> </u>	<u> </u>	
w/		DEP				OURS AFTER DRILLING	3										√/m²)			•		WAT	ER E			ĒRE	D		-			
	8	M	ADE			GRAVEL			\$	SAND)		ŝ,	CALC	ARE					OAM					×		CHI					
	쪼	G	ROUM	1		SILT			C	LAY			<u>ن</u> ا	PEAT				33	<u> </u>	LIME	STON	IE		8	**	H,	ARC	SH	IALE	: 		
Ē	\geq	\leq	ST	AND	DAR) SPILT SPOON (DISTU	RĄE	D)					PLA LIM	NSTIC	;		LIQU					Y		KET						-	-07	
			UN		TUR	BED (SHELBY) BED (NO RECOVERY)						(△ ►	l-VA (Ang ⊧Wet	LUE gle of Sieve	(S.P. Inter	ER Co T.) nal Fr			N		₽₽	TRIA VAN C, (ا Q, (ا	XIAL ESH (N/m ² Jncor	TES EAR) tine	ST R TES	ST ompi	ress	ion \$	N TE	gth)	
			D!/	۹MC	ND	CORE							D =	Dry (Sieve							-	'HAN	MEF	! WE	IGH	IT -	140	lb D	ROP	- 30	1

 \cdot .)

							LEE Y	οŪ	NC	3 E	8. P/				- G LE T						DEP	AR	ГМЕ	NT									
JC	B	No), <u> </u>	•-	w	749					во	RING	3 No)		HS	SA 1				S	HEE	т	2		-		OF	:	2	2		
PF	0	JE	ст		Pro	pos	ed Fish Market, Gr		-																		ille	<u>(Ma</u>	arin	e)			
ΤY	PE	: E			; -		w Stem Auger		•			IEC	:OM	PLE	120	<u></u> JU	ıl <u>y 2</u>	7, 20	01_		_ G	ROL		ELEV		лч т—		— —					
DEPTH (m)	C DESCRIPTION									1				WA STI	ear Ter D, Pe (Alu	CO NE	NTE	NT TION	% I TE	sт∗					×	rest	7		TDIAYIAI		UNCONFINED COMPRESSION TEST (NUM?)	L	£
	түре	NUMBER	STRATIGRAPHIC	SOIL	% FINES	% COARSE		S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. KNIm ²		0 2		C _u ((kN/n	n²) 8					¢0 1	0	רוסתום רואנב	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	PECIFIC GRAVIT	SIEVE (W & D)	c. (tavim)	+ DEGREES	Que test (ANIm	DRY UNIT WEIGHT	SHEAR VANE (00m)
11	4	2	5	. Mł		• 				a					40 (_		ľ	σ	-	-	Ť			
_	Х	8		Ň				50	-	┢		-				Ì.	<u> </u>						<u> </u>				H	$\left \right $	—				\neg
12								┝	-	+					<u> </u>	\vdash							-			-		$\left \right $					\neg
	Х	9						60		-		-			\vdash		<u>}</u>									-		$\left \cdot \right $	-	$\left \right $			\neg
13									-	-	—				\square	/			<u> </u>				<u> </u>				$\left - \right $						
ľ	Х	10		s			BROWN ODOURLESS MOIST FIRM TO HARD	50		-	F		 	-		<u>v</u> -	\vdash					[<u> </u>	<u> </u>		-	\parallel	$\left - \right $				\vdash	\neg
-	Π		×.				HOMOGENEOUS POORLY GRADED		_		-						1		<u> </u>					<u> </u>			\square	μ					
14	М	11					SAND	52							1	k								<u> </u>		ļ							
-	\square								_														 			ļ							
15	Н	12						52								Δ		_				 .	 										
-	Μ			3	+	┝	END OF BOREHOLE																										
16											-								-														
-													_																				
17													F				-		—			 				ľ							
_										T	 		<u> </u>	1			1										Ē	Π					
18			ļ						┢	┢																<u> </u>	-		-				
_								-		┢					-								╞		·•		-				-		
19									-	┢																	┢	Η	_		-		
								\vdash		+.		-	1				-	-					<u> </u>			┢	+		_	┢──	-		
20								┝	-	+-				_									<u> </u>			+	┢	$\left - \right $			<u> </u>	$\left \right $	
									-	+		-	<u> </u>		-											┝	╞	+	-	<u> </u>		$\left \right $	
-								-							1	ļ						-	-			-	╞	-	┝	<u> </u>		\mid	
21				5104			PER ASTM D 2487-93							Ŀ,	200	L	300	E	00		i 0 0		-		M	 Lalli	Ļ						Ц
W	\TE	R	DEP	нод 1 нт			OURS AFTER DRILLIN	IG					<u>ha</u>	P	ÓCKE	T PE	Ň (k)	√/m²)			<u></u>			ER EN						-			
	G	_					GRAVEL		Ŵ		SAN	D		慾	UNCI CALC MATT	ARE					OAM					*	s	SCHI	IST				
Ĕ	8	×		ADE ROUI	N		SILT				CLA	Y	88	21	PEAT				X	3	LIME	STON	IE			**	н	ARE) SH	IALE	:		
	\geq	×	\leq	ST	ANI	DAR) SPILT SPOON (DISTU	JRBI	ED)					PL/ LIM	ASTIC IIT				םו. דוג			_	Y		KET F								
		с.)		٩U	NDIS	TUR	BED (SHELBY)								VATU				ONTE	ENT, V	N		Ð	TRIA	XIAL .	TES	T		RES	SION	N TES	σT	
				U	NDIS	TUR	BED (NO RECOVERY)								N - VA (Ang				iction)			\Diamond	NANI⊂ Cu(k	E SHE N/m²)		TES	ίT					
				Al	JGE	R							1	Ŵ.	= Wet = Dry	Sieve	е			-			♦	Q _u (L	Inconi	ined					trengt ROP -		
				D!	AMC	ND	CORE								- Ury	-1049	-									- - - - -		. 1					

							LEE Y	ou	NG	8	PA									L D	EPA	RT	MEI	NT								
JC	B	No	·	•	w	749)		-		BO	RIN	G No	o		HS	SA 2				s	HEE	т	1				OF		2		
											DA	TE S	STAF	RTE	<u>_</u> ر	Jub	/ 25,	200	1		_ L(CA	TION	l	Gı	en	/ille					
Ê	SAMPLE					S		5300mm)	(%)					WA	TER D. PE		NTE		% { TE	ST*						st			TAXIAL	OMPRESSION		
(W) H1190	PE	MBER	RATIGRAPHIC OT	01	FINES	COARSE	DESCRIPTION	T. VALUE" (BLOW:	ISTURE CONTENT	LK UNIT WT. KNMH				C _u (kN/r	n²) የ	3 ¢						auto Limit	LASTIC LIMIT	LASTICITY INDEX	NSOLIDATION TE:	ECIFIC GRAVITY	IEVE (W & D)		UNCONFINED C	I'LL WEIGHT	IEAR VANE (NVim)
0	7	N	PL	й -	*	*		2.S	W				10 :	30 '	40 9	\$0 	60	70 8	0 9		\$0 1	10	, ž	<u> </u>		ŏ	ß	<i>ω</i> τ				8
_										╞				<u> </u>				<u> </u>						-							+	
1								_		┢╍																		╉			╈	
-	WATER																															
2	X 1 X 1 X 2 X 3 X 4 X <td></td>																															
-						ŀ				+	F		╞	-						<u> </u>							Ħ	+	╎		\uparrow	
3	$\left \right $			-	_	-		-	1	+	F			 	—				-	—			-				[]	Ť			\top	
_	Å	1							T																		Π				T	
4								5	,	T					·						_						Π				Τ	\square
-	Å	2								Γ	Ħ				-		-														Τ	\square
5		_						2			E					-	-				-	-									Τ	\square
-	Å	3																														
6	М							3																								
-	Δ	4		м⊦	1		WET, VERY SOFT											-														
7	$\overline{\nabla}$	5							,																							
-	Δ	J									╟					-		\vdash														
8	Δ	6						5	5		H			-		<u> </u>																
-	Δ											\triangleright	\vdash	L																		
9	Y	7						51			Ŀ				\geq	<u>}</u>							-							_		
-	Δ												<u> </u>								.	<u> </u>									\perp	
10		8						52	2		L											$\left - \right $										
W/	ΥE	RD	DEPT					G				1	ρ٥	PC	CKE	et pe	N (ki	v/m²)			φ0 							D	-			
_		_		DE			GRAVEL	*		ş	SANE)		<u> </u>		ARE				<u>-</u>	OAM					×	s	CHIS	т			
ě	8	Ś			J		SILT			С	LAY			23	PEAT				<u> </u>	Ş	LIME	STON	IE		8	*	H	ARD	SHA	LE		
	\geq	<	3	ST.	ANE	ARI) SPILT SPOON (DISTU	RBE	D)					PLA	STIC	;		LIQU	л <u>D</u> ЛТ				¥	POC	KET	PEN	ETR	OME	TEF	2		
				UN	DIS	TUR	BED (SHELBY)						;	•		RAL	WAT		•	ENT, V	N		ė.	UNC		NE	000			SION T	EST	
				UN	DIS	TUR	BED (NO RECOVERY)						4	γŅ	1 - VA	LUE	(S.P.						δ		IE SHI kN/m²	EAR		вт				
				AU	GEF	२							1	Ŵ =	Wet Dry	Siev	e			•			À	Q, (I	Uncon	fine				n Stre DRO		
E				DI	MC	ND	CORE								1 ·									«								•

			•			LEE YO	JU	NG	8	R PA)EP/	ART	ME	NT									
JO	BNG). <u> </u>	••	W 3	749			_		BO	RIN	G No)		HS	SA 2			<u> </u>	S	HEE	т	2				OF	:	2	2		_
PR	OJE	ст_		Pro	pose	ed Fish Market, Gre		-		DA	re s	TAF	TEL)	July	25,	200	1		_ L(DCA	TION	1	Gr	env		(Ma	arin	ie)_			
ΤY	PE E	BORI	NG	Н	ollov	w Stem Auger		-		DA'	TE C	COM	PLE	TED	Ju	<u>v 25</u>	5 <u>, 20</u> 0	21		_ G	ROL	IND	ELEV		N		_			<u> </u>		
оертн (m)	SOIL PROFILE												WA STE N-V	ter). Pe	CO NE E (E	NTE TRA BLO\	GTH INT TION W/30	% I TE	ST*			IT	IMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	4 D)	TPIAYIAI	S	Qu UNCONFINED COMPRESSION	DRY UNIT WEIGHT	SHEAR VANE (Mum)
	E BER	ATIGRA	_	% FINES	% COARSE		L'VALUI	STURE (BULK UNIT WT. KWm ³													LIQUED LIMIT	PLASTIC LINUT	STICIT	VISOLID	CIFIC	N IN	C, (MMT)	+ DEGREES		INN	CAR VAN
	TYPE NUMBI	PLO	SOIL	Υ.	*		S.P.1	ğ			0:	0 :	0 4	0 8	0 (60	10 8	09	0 1	0 1	0	3	5	2	Ĩ	SPE	5	ਤ	*	ď	ŝ	<u>8</u>
11	٧,																				. 											
	Ч°						53					-			<u> </u>					-	┝											
12						OLIVE BROWN AND		1	╞				<u> </u>													Γ						
	XII		SP			GREY ODOURLESS MOIST, HARD	51	┢	┢╌	<u> </u>																┢					+	\neg
12						STRATIFIED POORLY GRADED SAND	_		╞						II -							<u> </u>				┢	_					-
13	∀ ₁,							L		<u> </u>						1	<u>† </u>															
-	Δ''						53	1					-	-		┢				├	—											
14	_							1	1									-			_					Γ						
						END OF BOREHOLE	-		╞							· · · ·										┢					-	
15												-		<u> </u>							—					\vdash					-+	_
15		1										[_				\bot						
-									ŀ	┣			-			+			· ··	+												
16										<u> </u>																						
							\vdash	<u> </u>	┢																	┢						
17							-	┢	╞			-				$\left - \right $	-									┢─		_				-
Ë								_	L	<u> </u>				 	ļ							 				L						
													_																			
18			ŀ					Γ	Γ					-	<u> </u>	_				_												
							-	-	┢					· ·												┢						
19							-	╞				-	_		-				-	┢	_					┢						
									<u> </u>									_	<u> </u>			<u> </u>	<u> </u>			╞						
-																				·												
20										<u> </u>		-	-			-																
_					$\left \right $		\mid	┢	T	þ.	ļ		1			1.					1			1	Γ	T				 		1
21			1				-	┢	╞		\vdash												-		┢	┢			<u> </u>		┝╌┼╸	-
		4.5.516				PER ASTM D 2487-93		<u> </u>		F	Γ,	00		b0	Ľ	300		bo	5	\$ 0		ייפת		<u>M. L</u>	alla	L			l			
WA	TER	DEPT				OURS AFTER DRILLING	3					<u></u>	PC	CKE	T PE	N (k	√/m²)					WAT	ERE		NTE	RE	<u> </u>	_	 			
	GEN	D				GRAVEL	\otimes			SAN	D		<u>惑</u>	CALC	ARE	VTED OUS			Ę	OAM					*	5	CHI	ST				
×	\bigotimes		DE OUN	l I		SILT				CLA	Y	\otimes	<u> </u>	VATT PEAT			İ	<u>88</u>	ŝ	LIME	STON	E			%	н	ARE) SH	IALE			
													PLA	STIC			LIQU	וסו										•				
	~					SPILT SPOON (DISTUP 3ED (SHELBY)	₹BE	D)					LIM	Т			ĻIN	ΛIT				Ţ	UNC	KET P	NED	co				I TES	т	
						SED (NO RECOVERY)										WAT (S.P.	er C(T.)	ONTE	INT, V	V		\$		XIAL 1 E SHE			т					
												(Þ۹	(Ang	le of	Inter	nal Fr	iction)			$\hat{\mathbf{x}}$	C _u (k	:N/m²)							L1	
		<u></u>	AU	GEF	ł									Wet Dry S								A		Jnconf IMER								
			DIA	MO	NDC	ORE								·																		

1

.

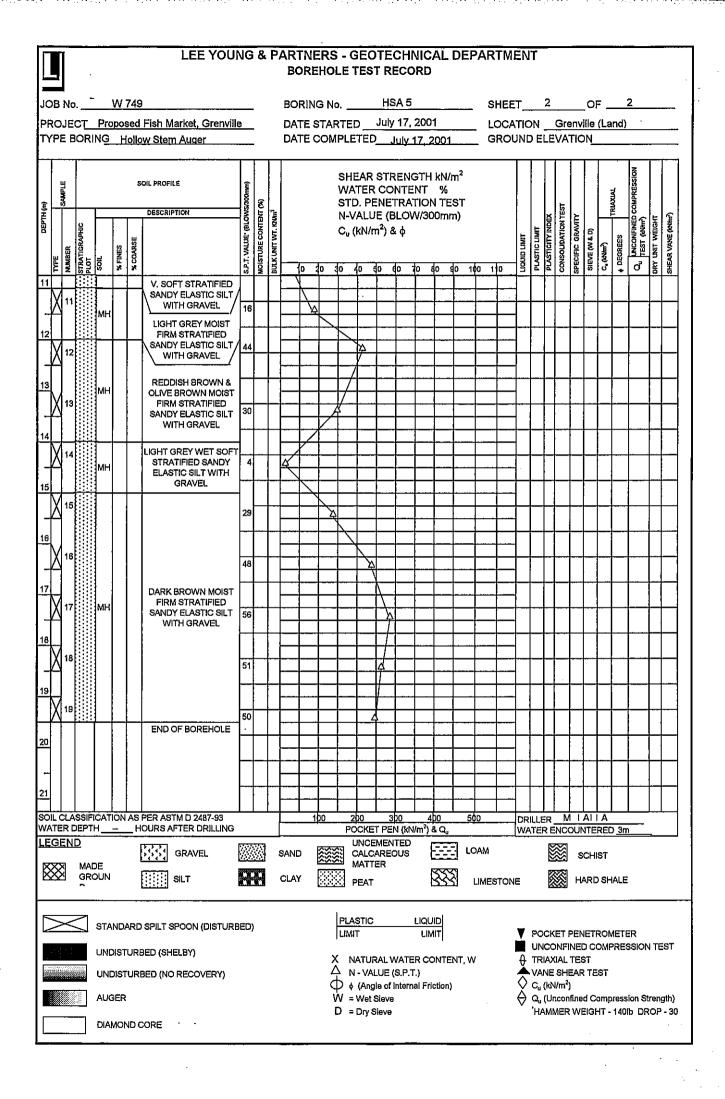
			-			LEE YO	บบ	NG	&					- GE E TE					LD	EPĀ	RT	MEN	T									
JO	B No		•	w	749	·				BO	RING	3 No	». <u> </u>		HS	<u>A 3</u>				S	HEE.	г	1				OF	: 	2	!		
						ed Fish Market, Grei w Stem Auger				DA ^T DA ^T	re s re c	TAF		D	ylitik Juli	28, v 28	200	1 01		_ L(_ G	DCA ROU	TION	I ELEV	Gr /ATIC	env DN	/ilie.	(M)	arir	ne)			
DEPTH (m)	SAMPLE					DESCRIPTION	ļ.						SHE WA	EAR TER), PE	STR COI		ith NT 10N	kN/r % I TE	n ² ST*						st			TRIAXIAL		UNCONFINED COMPRESSION TEST (MNm ²)		
	TYPE NUMBER	STRATIGRAPHIC PLOT	soit	% FINES	% COARSE	DESCRIPTION	S.P.T. VALUE* (BLOWS/300mm)	MOISTURE CONTENT (%)	BULK UNIT WT. KNUM				C _u (ALU kN/n	n²) 8	ф				1		LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W&D)	Τ	• DEGREES	Quunconfined	DRY UNIT WEIGHT	SHEAR VANE (MMm ²)
0	2 2	PLC PLC	ы М	*	*	· · · · · · ·	3	ş	3		0 2		30 -	io e	0 6		0 6	09	0 1	φo 1 [.]	0	ž	<u>a</u>	<u> </u>	В	성	Ω	ن	•	-	<u>ក</u>	贲
								-	-				<u> </u>				_									\square	╉	-			\mid	
1						i																		-			-		_			
							┝		╞															-			-		_			_
2						WATER														<u> </u>				<u> </u>			-	_				_
_				ľ					╞		·						<u> </u>	<u> </u>														
3							┢	-		<u> </u>		·				<u> </u> .																
_								┢					_							<u> </u>						┢		┥				
4							-			<u> </u>															-							
_	Дı						14				<u>}</u>	-	<u> </u>													┢						
5												<u> </u>												-								
_	X∣²						6	-						<u> </u>		<u> </u>										-						
6							F			Ħ				<u> </u>									$\left \right $		-	┢		-				
_	X₃						3			Ê			┢							+											F	
7						LIGHT GREY ODOURLESS WET				ļ <u>t</u>				-				_								-						
_	Д₄		MH			SOFT HOMOGENEOUS ELASTIC SILT WITH TRACES OF GRAVEL	5								<u> </u>										-	1						
8																																
_	X 5						5	1								_			_	-			-			-					\square	
9									╎	H.							╞─															Π
_	Х°						8	-						<u> </u>			-	1			 											
10	Π,						7																								╞	
						L PER ASTM D 2487-93 IOURS AFTER DRILLING		L	<u> </u>			po				DO N (kh		100 & Q_	1	500	I		LER ER E	M. I	L <u>all</u> JNT	a ERE	D		_		<u> </u>	
	GEN				_	GRAVEL	\otimes				•	<u> </u>	2		EMEN ARE	ITED			ΞL	,OAM		.			8		CHI	IST				
×	\bigotimes		DE OUN	I		SILT			с	LAY			X	MATI PEAT				88	<u></u>	LIME	STON	IE		8	8				HALE	:		
	\geq		ST/		ARE) SPILT SPOON (DISTUR	RBE	D)					PL/	<u>IT</u>			LIQI LIN	DIL TIN				<u> </u>								או דר	:07	
			UN AU	IDIS GEF	TUR	BED (SHELBY) BED (NO RECOVERY) CORE						4	△ r ⊅ ¢ ₩ =	NATU N - VA (Ang Wet Dry 3	LUE gle of Sieve	(S.P. Interi	T.)			N		$ \Rightarrow \diamondsuit \diamond $	TRIA VAN C, (I Q, {	CONFI AXIAL ≹E SH kN/m ² Uncor MMEF	TES EAF) าfเกต	ST R TE Id Co	ST omp	ress	slon i	Streng	gth)	•

						LEE YO	JU	NG) 8	P/						TEC			LD	EPA	ART	ME	NT									
		0						-															2									
						ed Fish Market, Gre w Stem Auger				DA DA	TE S TE C	COM	RTEC PLE		July July	<u>28.</u> ly 28	200	1 D1		_ L(_ G	ROL	TION IND I	I ELEV	<u> </u>	ren\ DN	/ille	(Ma	<u>arin</u>	e)			
DEPTH (m)	Number Number 11 17PE Number Number Soil Soil Soil Soil Soil Soil MoisTure C MoisTure C Soil Soil Soil Soil															ARY UNIT WEIGHT	SHEAR VANE (ANT)															
11																																
12																																
4																																
13																	_															
14	(1	1				MOTTLED BROWN AND GREY	50	,							//									 								
<u>15</u>	7	2	SP		-	ODOURLESS MOIST HARD HOMOGENEOU POORLY GRADED SAND	s 50	 																		-						
 16								 	-											 												
_/ 17	(1)								-																							
	(1	4					52	2		-					<u>Å</u> 							-										
18	1	5												-													\square	99				
19		0404	<u>.</u>			END OF BOREHOLE	-		+	<u> </u>															-							
-																						-			L							
20																										_	$\left \right $					
21							╞									-		 				 					$\left \right $					
WA	ER	DEP				PER ASTM D 2487-93 OURS AFTER DRILLING	3				1	<u>þö</u>	PC		T PE	30 N (kn		00 & Q ₀	5	φo		DRIL WAT	LER ER EI	M. L NCOU	alla	REI	<u></u>	_	-			
		MA	ADE ROUN	ł	ļ	GRAVEL				SAN CLA					ARE ER	ITED OUS		 XX	- ಸಿ ಸ್	DAM	STON	IE			***	•	ichi Ard		IALE			
	\geq					SPILT SPOON (DISTUR	RBEI	D)					PLA LIM	<u>STIC</u> T			LIQL LIN					Y		KET F						TES	т	
			UN AU	IDIST GER	UR	BED (SHELBY) BED (NO RECOVERY) CORE							л № Д ф ₩ =	i - VA (Ang Wet	LUE	(S.P. Interr	Г.)		NT, V	v			TRIA ► VAN C _u (k Q _u (l	XIAL .	TES EAR finec	T TES I Col	ST mpre	essio	on St	rengti	h)	

							LEEN	OU	NG	8							ECI			D	EPAF	T	ΝĒ	NT	4								
JC	8	No	•		W	749	9		-		BO	RIN	3 No	o		HS	SA 4				S⊦	IEE	Τ_		1			_0	F _	2	2		
PF TN	(O.	JEC B	ORI	Pro INC	pos i (ied. Holio	Eish Market, Grenv ow Stem Auger	/ille	-		DA DA	TE S TE C	TAF OM	RTEI	D	يانيان ان	/ 16, uly 10	200 6, 20	1 001_		_ LC _ GF	ROL	TIC	DN DEI	G	iren ATI	ville ON	(Lai -	nd).				
DEPTH (m)	SAUPLE			<u> </u>		s	OIL PROFILE DESCRIPTION	OWS/300mm)	ENT (%)	Lin Lin				WA STE N-V	TER D. PE ALU	CO ENE E (E	RENG NTE TRA	NT TION	% \ TE	ST					X	N TEST	È			IRIAMAL	Que UNCONFINED COMPRESSION	нT	(true)
	TYPE NUMBER STRATIGRAP PLOT SOIL % COARSE % COARSE % COARSE % COARSE % COARSE														kN/n			to s	in (0 1	¢0 1∳	0	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	C. (tallm?)	+ DEGREES	Qu UNCONFIN	dry unit weight	SHEAR VANE (MMm)
0		z	νē						12	ä	<u> </u>	10 : 			Ē	Ĕ			Ē			• .	-			ľ	<i>v</i> 1	Ť				-	<i>"</i>
									┢									<u> </u>	<u> </u>					$\left \right $				┢				\square	
1								+	-								$\left - \right $											┢					
	M	1						<u>)</u>	+				-												╞		╀						
- 2	M							-	╀				$\overline{\mathcal{V}}$	<u> </u>	F		Ē						\vdash		 		╞			<u> </u>		H	
ŕ	М	2								╞		<u> </u>	\square	[<u> </u>	<u> </u>	<u> </u>								_	<u> </u>	╞				\square	
Ŀ	H						LIGHT GREY MOIS	т 17		Ļ		Ź		<u> </u>	<u> </u>		<u> </u>						 				<u> </u>	╞	_			\square	Ц
3	М	э		М		6 74	STRATIFIED ELAST	ю	51		\$	\vdash										_					2.6	5					
-	Щ	2									+					╞	-		<u> </u> .	<u> </u>												i	
4	H										H																	Τ					
	Д	4						e	3	T	-4												-					T	\square				
5								┢	┢		1				<u> </u>									-				+					$\left \right $
	М	5						16	<u> </u>	+		Î		-														╈					$\left \right $
6	\square				+	┢			-	+		\mathbb{H}									$\left - \right $					\vdash		┢		<u> </u>		\vdash	$\left - \right $
Γ	Μ	6		с			DARK BROWN MOI SOFT STRATIFIED		-	-		I												_		-		+			<u> </u>	\vdash	
Ļ	É			2		_	LEAN CLAY		_					-														+			<u> </u>		
ľ	М	7												_	.								.										
~	А							1:	3		-	<u>}</u>							<u> </u>														
8	Н						LIGHT GREY MOIS																										
-	Й	8		M	-		SOFT STRATIFIED S		1	T	4	4			-		-		-	—						Γ		Τ	Γ				\Box
9	Ц							F	┢	ϯ	P			-		1	-							T		┢		ϯ	Γ				П
_	И	9						10	7	╉	╧	¥				<u> </u>	<u> </u>	<u> </u>					-	┢		╞		╀	-		⊢	┢	$\left \right $
10	\mathbb{H}			c	_ _	+			╀	╉					<u> </u>					<u> </u>				┢─	-	+	-	╉		<u> </u>	-	┢	H
		10 2LA	III. SSIF	ÌI ≂ICA			PER ASTM D 2487-9		3	1.		<u>人</u> 1	b0		200] 300	4	- 	5	фо		DR		l ERM	 _ L/					L	L	Ц
W,		RD	DEP				OURS AFTER DRILL										N (kh	I/m²)	& Q _u						REN		UNTE) <u>3</u>	m		—	
				DE			GRAVEL	\mathbb{N}	<u>~</u>		SANE)		<u> </u>	CALC	ARE				E u	OAM				Š	**	SC	:HIS	Т				
Ľ	8	<		200			SILT			. (PEAT				<u>8</u> 3	<u></u>	LIMES		E		×	×	HAI	۶D S	SHAI	LE			
	2	<	\leq	S	ANI	DAR	D SPILT SPOON (DIST	URBE	:D)					PL/	ASTIC IT			<u>LIQL</u> LIN					Ţ	PC	OCKE	ET P	ENET	ROI	NET	ER			
		×		U	NDIS	STUF	RBED (SHELBY)							XN		RAL	WATE	ER CO		INT, V	v		ф.				IED C EST	OMI	PRE	ssic	ON TE	ST	
				U	NDIS	STUF	RBED (NO RECOVER'	0					4	Α r	I-VA	LUE	(S.P.	T.)					ð	►VA	NE		AR TE	EST					
				A	JGE	R								Ŵ =	Wet	Sieve		iai t-fi	ICEON	,	•		ð	Q	(Un	confi					Streng		
<u>ا</u>			7	D	AMC	DND	CORE							D =	Dry	Sieve	•							Ή/	AMN	IER '	WEIG	HT -	- 140)IB C	OROP	- 30	1
╏┕																																	

								LEE YO	UN	IG	&							TEC F RE			LD	EPA	RT	MEN	NT	-	-							
JC	ЭВ	No	•		Ì	<u>N 7</u>	49					BC	RIN	GN	o		Н	ISA 4				s	HEE	т		2			0	:		2		:
								Fish Market, Grenvill																					(La	and))		<u> </u>	
Ľ					<u> </u>	Н	00	w Stem Auger				שט 		.01			<u>ر ر</u>	<u>1417</u> 1	6 <u>. 20</u>	.01		_ 6						4 		,,		_		
TH (m)	(%) LATING														WA ST N-V	ATEF D. PI /ALU	R C(ENE JE ((BLO)	ENT TIOI	% N TE	ST					EX.	NTEST	TTV TTV			- TRIAXIAL	UNCONFINED COMPRESSION TEST (AVMP)	Ħ	(turi)
Control Contro											BULK UNIT WT. KNMm ³		10 :	ło	C _u		m²)	& ¢ 60	10	do :	40 1	¢0 1	10	LICUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D)	c. (wwh)	DEGREES	Q, UNCONFIN	DRY UNIT WEIGHT	SHEAR VANE (KUM)
11													1 A																					
12																								-	_									
13 CH FIRM STRATIFIED FAT CLAY 25 A A 14 14 38 A A A A																_				 														
14	X	14							38							<u>\</u>																		
<u>15</u> -	CLAY 25 A <td></td> <td></td>																																	
-	X	16							63	1																								
17	X	17		N	۱H			OLIVE BROWN MOIST SOFT STRATIFIED ELASTIC SILT END OF BOREHOLE	39	1		-				Z								-			-				_			
18										-																								
19																				 														
20										. 										 														
21	\square	1 4	201		AT4		49	250 ASTM D 2407 02								200		300		100		500		-		M								
W.		RC)EP					PER ASTM D 2487-93 DURS AFTER DRILLING					1	<u>þo</u>		OCK		<u>spu</u> EN (ki ENTED	√/m²)	έQ,				WA1	IER E				ED_	3m		<u> </u>		
	8		MA	NDE ROL				GRAVEL									CAR	EOUS		 XX		.OAM LIME	STON	٩E			**	-			HALE	:		
	>	<]					SPILT SPOON (DISTURI BED (SHELBY)	BED)					LIN					VIT .				V	UN	CKET	INE	DC				ON TE	IST	
				L	INC (UG	ER	URE	BED (NO RECOVERY)							Δ Φ W	N - VA	ALUE gle (Sie ^r		T.)			N		₽	► VAI Cui Qui	IAXIAL NE SH (KN/m (Unco (MME)	HEAH ²) onfine	R TE ed C	omp					

							LEE YO	วบ	NG	8	PA							HN		L D	EPA	RT	ME	ΝT								
JC	в	No	•		w	<u>749</u>)														S											
							Fish Market, Grenville ww.Stem Auger														_ L(_ G						/ille_	(Lar	ıd)			
DEPTH (m)						S	DIL PROFILE DESCRIPTION	(mm00E/SM	NT (%)	-tuş				WA STE	TER). PE	CO INE	NTE TRA	GTH INT TION W/30	% TE	ST					×	TEST			TRIAXIAL	Quuconfined compression		£
	TYPE	NUMBER	STRATIGRAPHIC PLOT	SolL	% FINES	% COARSE		S.P.T. VALUE" (BLOWS/200mm)	MOISTURE CONTENT (%)	BULK UNIT WT. KN		0 :		C _u (kN/n	n²) 8	¢φ				¢0 1	0	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	CONSOLIDATION TEST	SPECIFIC GRAVITY	SIEVE (W & D) C. ONITED	DECREES	Qui TEST (MMm ²	DRY UNIT WEIGHT	SHEAR VANE (AUAnd)
0																																
1	V	1						36						4																		
-	μ							_																							\downarrow	
2	2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4																															
3																																
-																																
4	X	4						6		-	H										<u> </u>								_	<u> </u>	_	
5								_	_	-	Ĥ						╞									_					╞	Ц
	M	5						4		-	4												<u> </u>	<u> </u>			$\left \right $	╀	-		╀	
6				L				╞╌	<u> </u>			<u> </u>						<u> </u>			<u> </u>						$\left \right $	-			╀	
-	Д	6						8																					+		┢	
7	Ņ	-		м	-		DARK BROWN MOIST FIRM STRATIFIED SANDY ELASTIC SILT				H	-																-			\square	
-	Δ	1					WITH GRAVEL	5			A																					
8	X	8		-		<u> </u>	·						<u> </u>											ļ								
 9	Ϊ						LIGHT GREY MOIST SOFT STRATIFIED	6	. 	L	Î	-												_				_			╞	
Ū	M	9		M	1		SANDY ELASTIC SILT WITH GRAVEL	3			Į	\vdash		-				-							-	_	$\left - \right $					<u> </u>
10								-	-	╞	Ţ												 				$\left \right $	-		+	┢	
					TION		LIGHT GREY MOIST PER ASTM D 2487-93 IOURS AFTER DRILLING	8 3	<u> </u>	<u> </u>			<u>po</u>		po DCKE		iþo N (kr	 4 ⊮m²) 4	00 & Q.,	5	ф0	<u> </u>		LER_ ER EI				33			<u> </u>	
	G						GRAVEL				L	1					ITED] u	OAM		1			<u></u>		2 <u> </u>	 T	 ,		1
8	8	N N		DE	٧		SILT			Ċ	LAY			<u>s</u> '	VATT PEAT				X	3	LIME	STON	E		8	*		RD :		.E		
	\geq	~	\triangleleft	ST	ANE	ARE) SPILT SPOON (DISTUR	RBE	D)					PLA LIM	STIC			LIQU Liiv					Y		KET						COT	
				U١	1DIS	TUR	BED (SHELBY) BED (NO RECOVERY)						2	∆ ∧ ⊅∮	l - VA (Ang	LUE : gle of	(S.P.) Intern	ER CO T.) val Fri			N			TR1A ►VAN C _u (i	XIAL E SHI (N/m ²	tes Ear)	it Tes	īΤ		ON TI		
					Jgef Amc		CORE								Wet Dry (DROF		



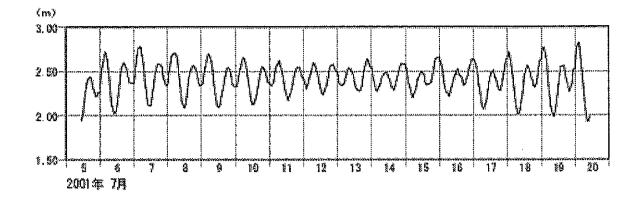
l

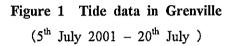
(3) Tide Analysis

(Grenville fisheries facility)

Tide Analysis

(1) Result of Survey





(2) Summary of Tide

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

Observation basis line (m)	um Level (m)		
2.780	0.880	<u>M. H. W. L (Zo+Hm+Hs+H'+H</u> o) (M. H. H. W)	
2_650	0 750		
2_620	0_720	M. H. H. W. L (Zo+Hm+Hs)	
2_550	0_650	M. H. W. L (Zo+Hm)	
2_480	0_580	<u>M. H. L. W. L (Zo+Hm-Hs)</u>	
2_340	0_440	M. S. L (Zo)	
2_200	0_300	M. L. L. W. L (Zo-Hm+Hs)	
2.130	0.230	M. L. W. L (Zo-Hm)	
2 060	0.160	M. L. H. W. L (Zo-Hm-Hs)	
1_990	0_090	(M. L. L. W)	
1_900	0.000	C. D. L (Zo-Hm+Hs+H'+Ho)	
0_000	-1_970	Observation basis line (m)	

Figure 2 Summary of tide in Grenville

(4) Wave Analysis

(Grenville fisheries facility)

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	

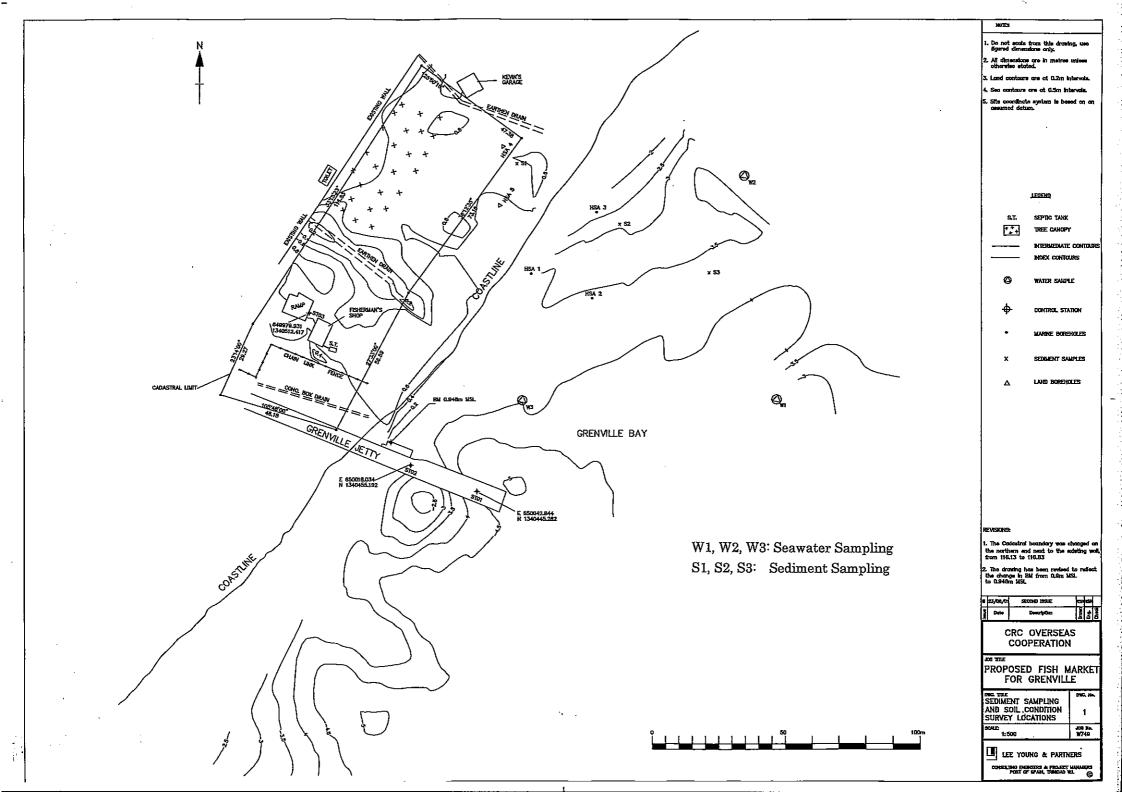
Table 1 Wave direction and wave height around planed jetty tip

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)

1



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)
W 1	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< td=""><td>5236</td></dl<>	5236
W1	July 4, 9:07 a.m.	7.94	28.0	<dl< td=""><td>7656</td></dl<>	7656
W2	July 4, 9:10 a.m.	7.96	28.0	<dl< td=""><td>6610</td></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.

-00000-

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

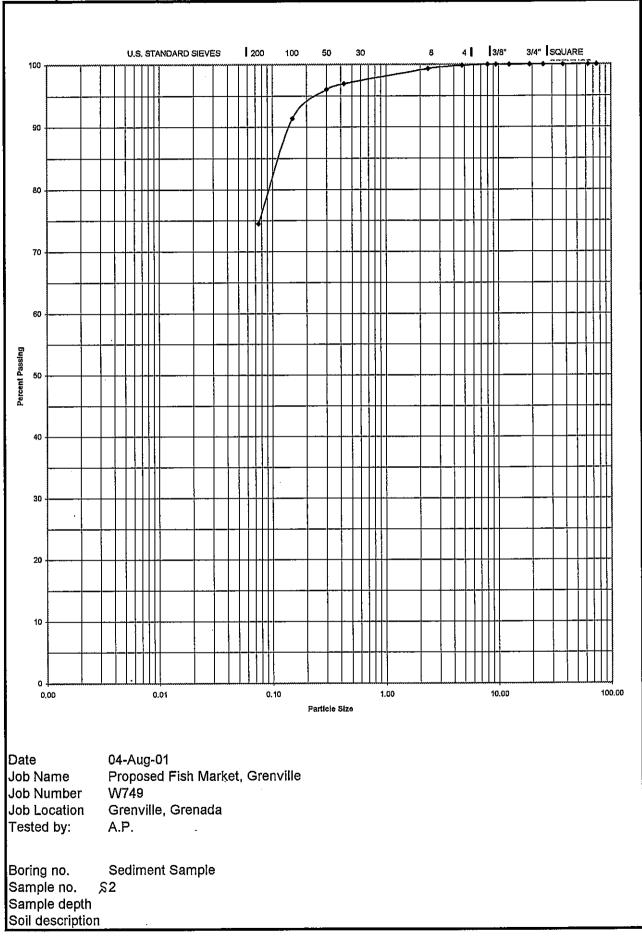
Table 1. Results of analyses performed on samples

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< td=""><td>5236</td></dl<>	5236
4/07/01	W1	033-005-4	<dl< td=""><td>7656</td></dl<>	7656
4/07/01	W2	033-005-5	<dl< td=""><td>6610</td></dl<>	6610
4/07/01	W3	033-006-6	2.00	3165

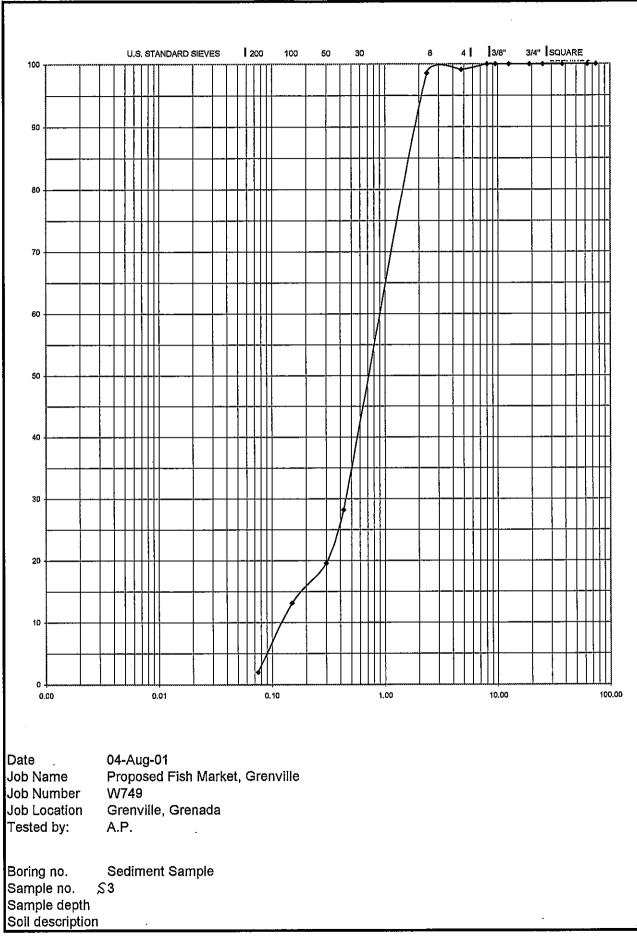
3/4" SQUARE U.S. STANDARD SIEVES 200 100 50 30 4 3/8" 8 100 90 80 70 60 Percent Passing 50 40 30 20 10 0 100,00 10.00 0.00 1.00 0.01 0.10 Particle Size Date 03-Aug-01 Job Name Proposed Fish Market, Grenville Job Number W749 Job Location Grenville, Grenada Tested by: A.P. . Sediment Sample Boring no. Sample no. <u>،</u>1 Sample depth

.

Soil description



. ..



SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT	FISHERIES	JOB No.	• • • • • • • • • • • • • • • • • • •		
LOCATION OF PR	OJECT GRENVILLE		<u> </u>		
TEST HOLE No. 51		SAMPLE	DEPTH		
DESCRIPTION OF	SAMPLE				
			·····		
<u></u>					
REMARKS	······	<u></u>			
3	·				
FLASK No.		<u> </u>	<u> </u>		
THERMOMETER		101.14	222.32		
COHESIONLESS	WT.FLASK + DRY SOIL	196.17	197.32		
SOILS ONLY	WT.FLASK WT. DRY SOIL, W _S	25	25	· ·	
UET 100 05	AIR REMOVAL	BOILIN			
		681.71			
	NATER + SOIL, Wows	30	20		
	WATER, Wbw	666-85			
WI, FLASAT	EVAP. DISH NO.				
COHESIVE					
SOILS ONLY	· · · · · · · · · · · · · · · · · · ·				
	WT. DRY SOIL, Ws				
SPECIFIC G	RAVITY, G ₅	2.45	2.61		
	ECIFIC GRAVITY		2,53		
FORMULA:	''s ' ''p		OF SOILS		
WHEF	W _s = WT.OF W _{bw} = WT.OF `(FROM W _{bws} = WT.OF	DRY SOIL FLASK + WA CALIBRATIO F FLASK + V		°c.	
COMPUTED	DATE DATE DATE DATE		IL MECHANICS I LEE YOUNG & PAR CONSULTING ENGIN PORT OF SP/ TRINIDAD	TNERS	

SPECIFIC GRAVITY TESTS ASTM D854M

PROJECT 7	SHERTES J	OB No		
LOCATION OF PROV	JECT GREAVILLE			
TEST HOLE No,	<u>\$2</u> \$	AMPLE	DEP18	
DESCRIPTION OF	SAMPLE GREATSH	Gen1 - 7	INES	
······				
·				
REMARKS	······································			
		······································		
		9	10	
FLASK No.	NIA	-1		
THERMOMETER		199.11	213.80	
	WT.FLASK + DRY SOIL	174.11	188.80	
SOILS ONLY	WT. DRY SOIL , Ws	25	25	
		BOELENO	BOSHENG	
METHOD OF A		684.60	66896	
WT.FLASK + W	ATER + SOIL, Wows	30	20	
		668.30		
WT. FLASK + V	EVAP, DISH No.			
COHESIVE	WT.DRY SOIL + TARE			
	WT. TARE			
30/20 0/121	WT. DRY SOIL , Ws			
SPECIFIC GF	RAVITY, G _s	2.86	0.92	
	CIFIC GRAVITY	1.89		
FORMULA: WHERE	E G _S = SPECIFIC W _s = WT. OF	GRAVITY OF		
	(FROM W _{bus} = WT. OF	FLASK + WATE	CURVE FOR F R + SOIL AT T WATER AT T	°c.
COMPUTED	DATE DATE DATE		MECHANICS I E YOUNG & PAR DISULTING ENGIN PORT OF SPA TRINIDAD	TNERS

.

SPECIFIC GRAVITY TESTS ASTM D854M

1

PROJECT PESH	REES	JOB No				
I OCATION OF PRO	JECT BREASHELLE					
TEST HOLE No. S 3		SAMPLE	DEPTH			
	SAMPLE					
	······					
REMARKS						
•	•					
3						
FLASK No.	······································	5	15			
THERMOMETER			1000 10			
	WT.FLASK + DRY SOIL	223-46	198-69			
SOILS ONLY	WT.FLASK + DRY SOIL	198.46	173.69			
	WT. DRY SOIL , WS	25	25			
METHOD OF A	IR REMOVAL	BOILING	BOILTMO			
the second se	ATER + SOIL Wows	708.93	684.52			
TEMP, OF SUS	PENSION, T°C.	30	20			
	WATER, W _{bw}	693.45	671-25			
	EVAP. DISH No.					
COHESIVE	WT.DRY SOIL + TARE					
SOILS ONLY	WT. TARE					
	WT. DRY SOIL, Ws					
SPECIFIC GI		2.61	2.88			
	ECIFIC GRAVITY	7.	.745			
		W _s Gt				
FORMULA	$G_s = \frac{W_s + W_s}{W_s + W_s}$	/bw -Wbws.				
	-					
WHER		IC GRAVITY OF	SOILS			
	W _s = WT.O					
	w _{bw} = WT. О	F FLASK + WATE	FLASK + WATER AT T°C.			
	(FRO	CALIBRATION	CALIBRATION CURVE FOR FLASK)			
W _{hure} = WT. O		FLASK + WATER + SOIL AT TC.				
	G = SPECI	PIC GRAVITY OF	WATER AT T	С.		
	-1					
	<u>-</u>					
		5011	MECHANICS	ABORATORY		
TE STED	TE STED DATE		EE YOUNG & PAR	ARTNERS		
COMPUTED DATE CHECKED DATE		CONSULTING ENGINEERS PORT OF SPAIN TRINIDAD				
CHECKED			TRINIDAD			
		L	1 FUNIDAD	······		

÷