APPENDIX

APPENDIX A SELECTED PHOTOGRAPHS TAKEN ON 7/2/08



Photo A1



Photo A2



Photo A3



Photo A4



Photo A5



Photo A6



Photo A7



Photo A8



Photo A9



Photo A10



Photo A11



Photo A12



Photo A13



Photo A14



Photo A15



Photo A16



Photo A17



Photo A18



Photo A19



Photo A20



Photo A21



Photo A22



Photo A23



Photo A24



Photo A25



Photo A26



Photo A27



Photo A28



Photo A29



Photo A30



Photo A31



Photo A32



Photo A33



Photo A34



Photo A35



Photo A36



Photo A37



Photo A38



Photo A39



Photo A40

APPENDIX B

SELECTED PHOTOGRAPHS TAKEN ON 17/2/08 11.30 AM BRIDGE OPENING



Photo B41 – Mustering commences about 10 mins prior to lift (11.21 am)



Photo B42 – Yacht circles in front of bridge staying some 30 m off (11.22 am)



Photo B43 – On this occasion yacht circles within 15 m of bridge (11.25 am)



Photo B44 – Mustering craft on north side of channel (11.27 am)

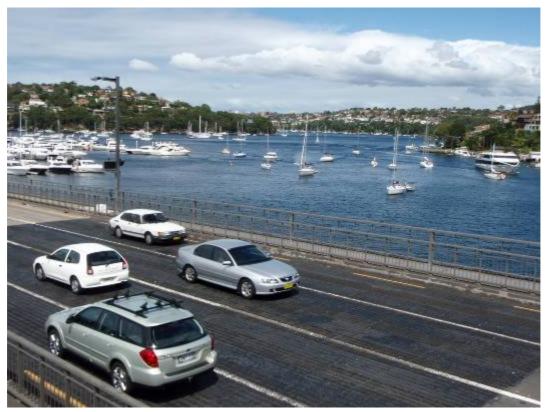


Photo B45 – Captain Cook makes her approach through the mustering fleet along north side of channel (11.27 am)



Photo B46 – Approximately 2 minutes prior to bridge lift (11.29 am)

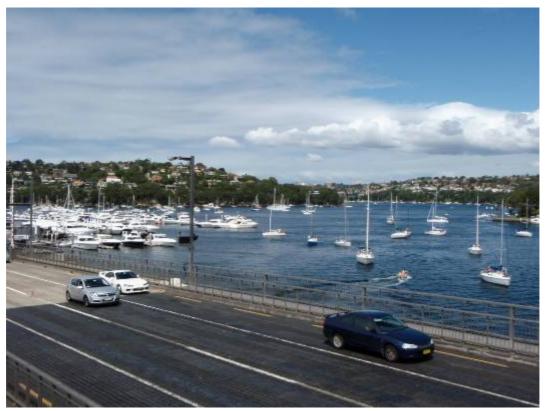


Photo B47 – Approximately 1.5 minutes prior to bridge lift (11.29 am)



Photo B48 – Approximately 1 minute prior to bridge lift (11.30 am)



Photo B49 – Gates lowered and car traffic stopped (11.30 am)



Photo B50 – Gates lowered and car traffic stopped (11.30 am)

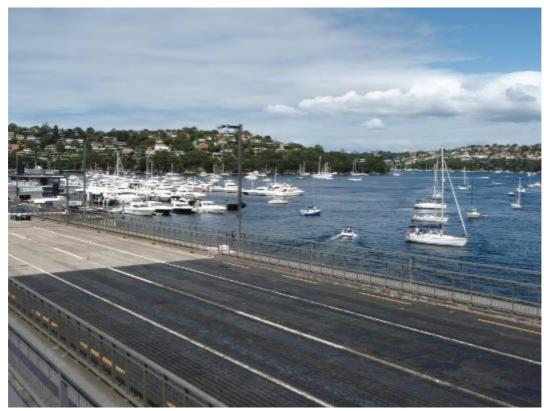


Photo B51 – Immediately prior to bridge lift (11.30 am)



Photo B52 – Bridge lift underway (11.31 am)

APPENDIX C

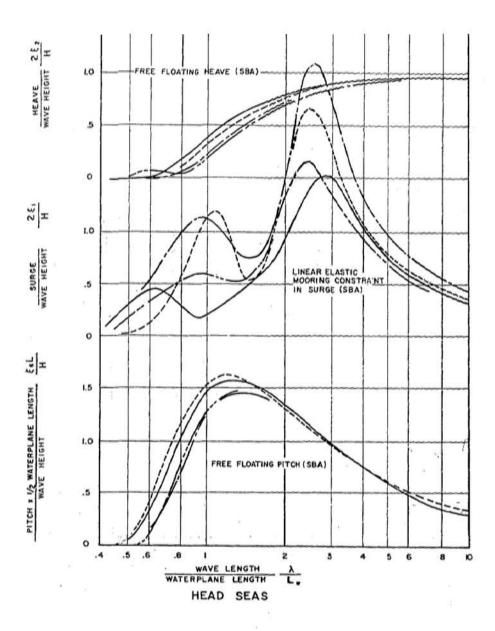
GBAC ASSESSMENT OF WAVE CLIMATE COMPLIANCE HAVING REGARD TO BOAT LENGTH

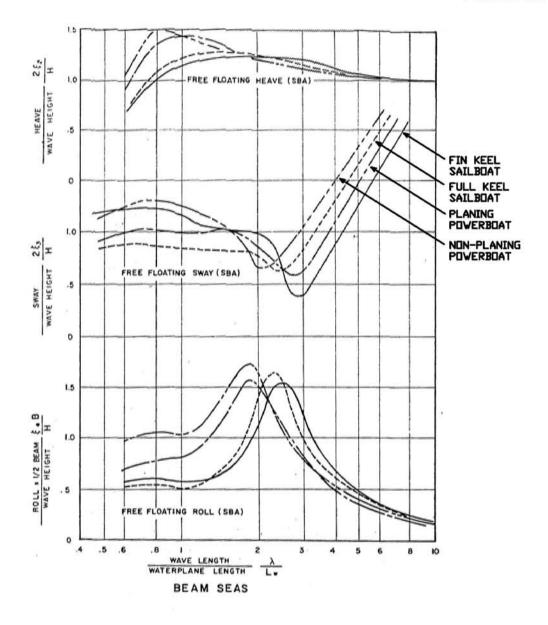
Appendix C - Effect of Boat Length on Vessel Response

A review of NHC (1980) has found that the Mercer criteria, used directly for developing marina wave climate criteria in AS 3962, were developed specifically for 20 to 40 foot boats (6 to 12 m). The design vessels to be moored at Spit Marina range up to 35 m with the average size slightly over 13 m. The question arises as to what effect this could have on seakeeping behaviour and the application of Mercer.

A main part of the NHC (1980) investigations was devoted to physical and numerical modeling of boat response to waves. A scale physical model was moored to a walkway with lines that incorporated the correct elasticity, and the response of the boat to waves of different periods was measured in heave, surge and pitch for head seas, and heave, sway and roll for beam seas. The physical model results were then used to verify a numerical analysis carried out for a range of sailboat and power boat hull types. Relevant data extracted from these assessments are shown in the attached **Figure C-1**. It is understood from NHC (1980) that the magnitude of vessel motions was the most important quantifiable parameter used to develop the Mercer criteria. It can be shown using data presented in **Figure C-1** that, in general terms, longer vessels can tolerate incident wave conditions which are larger than shorter vessels.

Example outputs from our assessment used to modify the application of the Mercer criteria at Spit Marina are attached.





NOTE:

E REPRESENTS AMPLITUDE OF MOTION

(ANGULAR FOR ROLL AND PITCH)

Notes

1. Source: NHC (1980)

	Head																
	ed against report			1			++				+ +	+		1			
eneral variable	es																
				Actual	Permissible				Actual								
50 yr				Response	Response				Response								
				m	m				m								
Hs		m		0.89	0.750				0.89								
Т		S		2.60					2.60								
λ		m	10.55					10.55									
L	AS 3962	m	12.00	worst case				25.00									
λ/L			0.88					0.42									
Head Seas																	
Ditab DAC	Planing newer		1.00				++	0.00				1			-	-	
Pitch RAO	Planing power		1.08				++	0.00			1	1	1				
	Non-planing power		1.10	0.004	0.000	wo d	++	0.00	0.000		amplitud -	A atual re-	nonce less	han narri-	nible reer	200 00 01	
	Average	\vdash	1.09	0.081	0.068	rad	++	0.00	0.000	rad	amplitude	Actual res	ponse less t	than permiss	sible respor	ise so UK	
				4.6	3.9	deg	++		0.0	deg	amplitude		+				
Surge RAO	Planing power		1.10				++	0.10			+						
Surge RAO	Non-planing power		0.58				++	0.10			1	1					
	Average		0.84	0.374	0.315	m		0.08	0.033	m	amplitude	Actual rec	nonce lecc	than permiss	eible reenor	nea en OK	
	Average		0.04	0.074	0.010			0.00	0.000		umpiituuc	7 totaar 100	porioc 1000	lian permis	JIDIC TCOPOT	100 00 010	
Heave RAO	Planing power		0.15					0.00									
	Non-planing power		0.13					0.00									
	Average		0.14	0.062	0.053	m		0.00	0.000	m	amplitude	Actual res	ponse less	than permiss	sible respor	ise so OK	
				Actual	Permissible				Actual								
1yr				Response					Response								
<u>-11-</u>				m	m				m								
Hs		m		0.58	0.375				0.89								
Hs T		m s		0.58	0.375				0.89								
Hs T		m s		0.58 2.30	0.375				0.89 2.30								
		s	8.25		0.375			8.25									
Τ	AS 3062	s m	8.25		0.375			8.25									
T λ L	AS 3962	s	12.00		0.375			25.00									
Τ	AS 3962	s m			0.375												
T λ L	AS 3962	s m	12.00		0.375			25.00									
Τ	AS 3962	s m	12.00		0.375			25.00									
T λ L	AS 3962	s m	12.00		0.375			25.00									
T λ L λ/L Head Seas		s m	12.00 0.69		0.375			25.00 0.33									
Τ	Planing power	s m	12.00 0.69		0.375			25.00 0.33 0.00									
T λ L λ/L Head Seas	Planing power Non-planing power	s m	12.00 0.69	2.30		rod		25.00 0.33 0.00 0.00	2.30	rod	amplitude	Actual rec		han parries			
T λ L λ/L Head Seas	Planing power	s m	12.00 0.69	2.30	0.009	rad		25.00 0.33 0.00	2.30	rad	amplitude	Actual res	ponse less	than permiss	sible respon	se so OK	
T λ L λ/L Head Seas	Planing power Non-planing power	s m	12.00 0.69	2.30		rad deg		25.00 0.33 0.00 0.00	2.30	rad deg	amplitude amplitude	Actual res	ponse less	than permiss	sible respon	ase so OK	
T L λ/L Head Seas Pitch RAO	Planing power Non-planing power Average	s m	0.30 0.30 0.30	2.30	0.009			0.00 0.00 0.00 0.00	2.30			Actual res	ponse less l	han permiss	sible respor	ise so OK	
T L λ/L Head Seas Pitch RAO	Planing power Non-planing power Average Planing power	s m	0.30 0.30 0.30 0.30	2.30	0.009			0.00 0.00 0.00 0.00	2.30			Actual res	ponse less I	han permiss	sible respor	ise so OK	
T L λ/L Head Seas Pitch RAO	Planing power Non-planing power Average Planing power Non-planing power	s m	0.30 0.30 0.30 0.30	2.30 0.015 0.8	0.009	deg		0.00 0.00 0.00 0.00 0.00	2.30 0.000 0.0	deg	amplitude						
T λ L λ/L Head Seas	Planing power Non-planing power Average Planing power	s m	0.30 0.30 0.30 0.30	2.30	0.009			0.00 0.00 0.00 0.00	2.30					than permissi			
T L \(\lambda \) L \(\lambda \set \) Head Seas Pitch RAO Surge RAO	Planing power Non-planing power Average Planing power Non-planing power Average	s m	0.30 0.30 0.30 0.30 0.30	2.30 0.015 0.8	0.009	deg		0.00 0.00 0.00 0.00 0.00 0.00	2.30 0.000 0.0	deg	amplitude						
T L λ/L Head Seas Pitch RAO	Planing power Non-planing power Average Planing power Non-planing power Average Planing power	s m	0.30 0.30 0.30 0.30 0.70 0.40 0.55	2.30 0.015 0.8	0.009	deg		0.00 0.00 0.00 0.00 0.00 0.00 0.00	2.30 0.000 0.0	deg	amplitude						
T L \(\lambda \) L \(\lambda \set \) Head Seas Pitch RAO Surge RAO	Planing power Non-planing power Average Planing power Non-planing power Average Planing power Non-planing power	s m	0.30 0.30 0.30 0.30 0.70 0.40 0.55	0.015 0.8	0.009 0.5	deg m		0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.000 0.000	deg	amplitude	Actual res	ponse less	than permiss	sible respor	nse so OK	
T L \(\lambda \) L \(\lambda \set \) Head Seas Pitch RAO Surge RAO	Planing power Non-planing power Average Planing power Non-planing power Average Planing power	s m	0.30 0.30 0.30 0.30 0.70 0.40 0.55	2.30 0.015 0.8	0.009	deg		0.00 0.00 0.00 0.00 0.00 0.00 0.00	2.30 0.000 0.0	deg	amplitude	Actual res	ponse less		sible respor	nse so OK	

I Arm N C h	erths Beam															
	ed against report									+ +					1	
ariables checke General variable	eu ayamsi report															1
serierai variable	**			Actual	Permissible			Actual								
50 yr				Response												
<u> 50 yı</u>					Response			Response								
				m	m			m								
Hs		m		0.33	0.310			0.33								
T T				2.30	0.510			2.30								
l l		S		2.30				2.30								
1		_	8.25				8.25									
λ		m														
<u>L</u>	AS 3962	m	12.00	worst case			25.00									
λ/L			0.69				0.33									
Beam	AS 3962	m	4.4				6.5									
Beam Seas					,											
Roll RAO	Planing power		0.73				0.23									
	Non-planing power		1.06				0.25					1				1
	Average		0.90	0.067	0.063	rad	0.24	0.012	rad	amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	
				3.8	3.6	deg		0.7	deg	amplitude						
Sway RAO	Planing power		1.02				0.75									
	Non-planing power		1.27				1.00									
	Average		1.15	0.189	0.177	m	0.88	0.144	m	amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	
Heave RAO	Planing power		1.20				0.50									
	Non-planing power		1.27				0.70									
	Average		1.24	0.204	0.191	m	0.60	0.099		مامينانا مسمسم	A atual roa	4	4	Material and a second	00 00 OK	
				0.207	0.131	1111	0.60	0.099	m	amplitude	Actual les	ponse less t	nan permiss	sibie respon	SE SU UN	
	Ĭ			0.204	0.131	III	0.60	0.055	m	ampillude	Actual les	ponse less t	nan permiss	sible respon	Se so OK	
							0.60		m	ampillude	Actual les	ponse less t	nan permiss	sible respon	ise so OK	
				Actual	Permissible		0.60	Actual	m	ampillude	Actual les	ponse less t	nan permiss	sible respon	se so or	
1yr					Permissible		0.60		m	ampillude	Actual les	ponse less t	nan permiss	sible respon	Se SU OR	
<u>1yr</u>				Actual Response	Permissible Response		0.60	Actual Response	m	ampillude	Actualites	ponse less t	nan permiss	sible respon	se so or	
1yr				Actual	Permissible		0.60	Actual	m	ampillude	Actual les	ponse less t	nan permiss	sible respon	Se so or	
<u>1yr</u> Hs		m		Actual Response m	Permissible Response m		0.60	Actual Response m	m	ampillude	Actual les	ponse less t	nan permiss	sible respon	SE SU OK	
		m	1167	Actual Response	Permissible Response		0.60	Actual Response	m	ampillude	Actual les	ponse less t	nan permiss	sible respon	SE SU OK	
Hs			11007	Actual Response m	Permissible Response m		0.60	Actual Response m	m	ampillude	Actual res	ponse less t	nan permiss	sible respon	SE SU UK	
Hs			6.24	Actual Response m	Permissible Response m		6.24	Actual Response m	m	amplitude	Actual res	ponse less t	nan permiss	sible respon	Se SO OK	
Hs T		s m	6.24	Actual Response m 0.21 2.00	Permissible Response m		6.24	Actual Response m	m	ampillude	Actual res	ponse less t	nan permiss	sible respon	Se SU UK	
Hs T	AS 3962	S	6.24	Actual Response m	Permissible Response m		6.24 25.00	Actual Response m	m	ampillude	Actual res	ponse less t	nan permiss	sible respon	Se SO UK	
Hs T λ L λ/L		m m	6.24 12.00 0.52	Actual Response m 0.21 2.00	Permissible Response m		6.24 25.00 0.25	Actual Response m	m	ampiliude	Actual res	ponse less t	nan permiss	sible respon	SE SU UK	
Hs T λ		s m	6.24	Actual Response m 0.21 2.00	Permissible Response m	""	6.24 25.00	Actual Response m	m	ampiliude	Actual res	ponse less t	nan permiss	sible respon	SE SU UK	
Hs T λ L λ/L Beam		m m	6.24 12.00 0.52	Actual Response m 0.21 2.00	Permissible Response m		6.24 25.00 0.25	Actual Response m	m	ampiliude	Actual res	ponse less t	nan permiss	sible respon	SE SU UN	
Hs T λ L λ/L		m m	6.24 12.00 0.52	Actual Response m 0.21 2.00	Permissible Response m	"	6.24 25.00 0.25	Actual Response m	m	ampiliude	Actual res	ponse less t	nan permiss	ine respon	SE SU UN	
Hs T \[\lambda \] \[\lambda \] \[\lambda \lambda / \text{L} \] \[\lambda \lambda / \text{L} \] Beam Beam Seas	AS 3962	m m	6.24 12.00 0.52 4.4	Actual Response m 0.21 2.00	Permissible Response m		6.24 25.00 0.25 6.5	Actual Response m	m	ampiliude	nctual res	ponse less t	nan permiss	ine respon	SC 50 OK	
Hs T λ L λ/L Beam	AS 3962 Planing power	m m	6.24 12.00 0.52 4.4	Actual Response m 0.21 2.00	Permissible Response m		6.24 25.00 0.25 6.5	Actual Response m	m	ampiliude	Actual res	ponse less t	nan permiss	ine respon	SC 50 ON	
Hs T	AS 3962 Planing power Non-planing power	m m	6.24 12.00 0.52 4.4	Actual Response m 0.21 2.00 worst case	Permissible Response m 0.190		6.24 25.00 0.25 6.5	Actual Response m 0.21 2.00								
Hs T	AS 3962 Planing power	m m	6.24 12.00 0.52 4.4	Actual Response m 0.21 2.00 worst case	Permissible Response m 0.190	rad	6.24 25.00 0.25 6.5	Actual Response m 0.21 2.00	rad	amplitude		ponse less t				
Hs T \[\lambda \] \[\lambda \] \[\lambda \lambda / \text{L} \] \[\lambda \lambda / \text{L} \] Beam Beam Seas	AS 3962 Planing power Non-planing power	m m	6.24 12.00 0.52 4.4	Actual Response m 0.21 2.00 worst case	Permissible Response m 0.190		6.24 25.00 0.25 6.5	Actual Response m 0.21 2.00								
Hs T	AS 3962 Planing power Non-planing power Average	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case	Permissible Response m 0.190	rad	6.24 25.00 0.25 6.5 0.23 0.25 0.24	Actual Response m 0.21 2.00	rad	amplitude						
Hs T \[\lambda \] \[\lambda \] \[\lambda \lambda / \text{L} \] \[\lambda \lambda / \text{L} \] Beam Beam Seas	AS 3962 Planing power Non-planing power Average Planing power	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case	Permissible Response m 0.190	rad	6.24 25.00 0.25 6.5 0.23 0.25 0.24	Actual Response m 0.21 2.00	rad	amplitude						
Hs T	AS 3962 Planing power Non-planing power Average Planing power Non-planing power	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case 0.036 2.1	Permissible Response m 0.190 0.032 1.9	rad deg	6.24 25.00 0.25 6.5 0.23 0.25 0.24	Actual Response m 0.21 2.00 0.008 0.4	rad deg	amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	
Hs T	AS 3962 Planing power Non-planing power Average Planing power	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case	Permissible Response m 0.190	rad	6.24 25.00 0.25 6.5 0.23 0.25 0.24	Actual Response m 0.21 2.00	rad	amplitude	Actual res		han permiss	sible respon	se so OK	
Hs T L	AS 3962 Planing power Non-planing power Average Planing power Non-planing power Average	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case 0.036 2.1	Permissible Response m 0.190 0.032 1.9	rad deg	6.24 25.00 0.25 6.5 0.23 0.25 0.24 0.75 1.00	Actual Response m 0.21 2.00 0.008 0.4	rad deg	amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	
Hs T	AS 3962 Planing power Non-planing power Average Planing power Non-planing power Average Planing power	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case 0.036 2.1	Permissible Response m 0.190 0.032 1.9	rad deg	6.24 25.00 0.25 6.5 0.23 0.25 0.24 0.75 1.00 0.88	Actual Response m 0.21 2.00 0.008 0.4	rad deg	amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	
Hs T L	AS 3962 Planing power Non-planing power Average Planing power Non-planing power Average Planing power Non-planing power Non-planing power	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case 0.036 2.1 0.110	Permissible Response m 0.190 0.190 0.032 1.9	rad deg m	6.24 25.00 0.25 6.5 0.23 0.25 0.24 0.75 1.00 0.88	Actual Response m 0.21 2.00 0.008 0.4 0.092	rad deg m	amplitude amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	
Hs T L	AS 3962 Planing power Non-planing power Average Planing power Non-planing power Average Planing power	m m	6.24 12.00 0.52 4.4 0.65 0.85 0.75	Actual Response m 0.21 2.00 worst case 0.036 2.1	Permissible Response m 0.190 0.032 1.9	rad deg	6.24 25.00 0.25 6.5 0.23 0.25 0.24 0.75 1.00 0.88	Actual Response m 0.21 2.00 0.008 0.4	rad deg	amplitude	Actual res	ponse less t	han permiss	sible respon	se so OK	

Prepared by G Blumberg 29/01/200912:45 PM

N-Arm N-S b	erths Head														
ariables check	ed against report														
Seneral variable	es														
				Actual	Permissible			Actual							
<u>1yr</u>				Response	Response			Response							
				m	m			m							
Hs		m		0.50	0.375			0.50							
Т		S		2.50				2.50							
λ		m	9.75				9.75								
L	AS 3962	m	12.00	worst case	I		25.00	worst case							
λ/L			0.81				0.39								
· · · · · · · · · · · · · · · · · · ·															
Head Seas															
Pitch RAO	Planing power		0.73				0.00								
	Non-planing power		0.79				0.00								
	Average		0.76	0.032	0.024	rad	0.00	0.000	rad	amplitude	Actual res	ponse less	than permissible respor	nse so OK	
				1.8	1.4	deg		0.0	deg						
Surge RAO	Planing power		1.05				0.10								
ourge read	Non-planing power		0.55				0.00								
	Average		0.80	0.200	0.150	m	0.05	0.013	m	amplitude	Actual res	ponse less	than permissible respor	nse so OK	
				5.255	3.133		3.30							122 00 011	
Heave RAO	Planing power		0.08				0.00								
	Non-planing power		0.06				0.00								
	Average		0.07	0.018	0.013	m	0.00	0.000	m	amplitude	Actual res	ponse less	than permissible respor	nse so OK	
			<u></u>												