

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Day Time)

Date: 15 May 2009

Time: 15:08 - 18:34

Location: Wayson Commercial Building (roof level)

Flight Ref. No.	Flight Model	Flight Direction *	Approx. Time Period	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)					Other Noise Sources #
						LAeq	LA10	LA90	LAMin	LAMax	
(A). Measured Helicopter Noise Data (with background)											
1	AW139	WE	15:26 - 15:28	Approach	95	74	77	72	70	81	-
				Hovering **							-
			15:28 - 15:34	Idling	440	73	74	71	69	77	-
	EW			Take-off **						-	
2	S76C+	WE	15:53 - 15:53	Approach **							-
				Hovering	36	75	77	73	72	83	-
			16:01 - 16:03	Idling **							-
	EW			Take-off	75	75	79	72	71	82	-
3	AW139	WE	16:21 - 16:21	Approach **							-
				Hovering	29	76	78	72	72	84	-
			16:37 - 16:38	Idling **							-
	EW			Take-off	64	74	76	71	71	78	-
4	S76C+	WE	16:47 - 16:48	Approach	35	76	78	74	73	79	-
				Hovering **							-
			16:49 - 16:51	Idling	128	72	73	71	68	78	-
	EW			Take-off **						-	
5	AW139	WE	17:22 - 17:23	Approach	54	74	76	73	72	77	
				Hovering **							
			17:24 - 17:32	Idling	495	72	73	71	68	77	
	EW			Take-off **							
6	AW139	WE	18:20 - 18:20	Approach **							
				Hovering	28	74	76	72	71	78	
			18:33 - 18:34	Idling **							
	EW			Take-off	106	72	74	70	69	76	

Lmax During the Measurement Period: 84

Remark: # Non-project related noise sources, those peak noise levels significantly mask that recorded due to operation of the new helipad.

* EW - Flight direction from East to West; WE - Flight direction from West to East.

** During the measurement, Lmax level was measured by manually start and stop the SLM during each flight event. Thus, only two flight events were measured in each flight (i.e. either "Approach" and "Idling", or "Hovering" and "Take-off").

(B). Measured Background level, dB(A)

Ref. No.	Measurement Event	Façade Noise Level, dB(A)					Major Noise Sources
		LAeq	LA10	LA90	LAMin	LAMax	
1 *	Background	72	73	70	69	80	Road traffic noise, and noise due to airplane passing-by, and TurboJet arrival/ departure at HK-Macau Ferry Terminal
2 *	Background	71	73	70	68	75	
3 *	Background	73	74	71	68	84	
4 *	Background	72	73	70	68	78	
5 *	Background	73	73	70	69	88	
6 *	Background	72	73	70	68	79	

Remark: * Background noise level recorded just before each flight.

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Evening-time)

Date: 15 May 2009

Time: 19:00 - 23:00

Location: Wayson Commercial Building (roof level)

Flight Ref. No.	Flight Model	Flight Direction *	Approx. Time Period	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)			Other Noise Sources #
						LAeq	LA10	LA90	
(A). Helicopter Noise Data Measured at Wayson Commercial Building (with background)									
1	S76C+	WE	19:00 - 19:05	Approach **					
				Hovering **					
		EW		Idling	297	72	72	71	
				Take-off	51	75	76	74	
2	AW139	WE	19:30 - 19:41	Approach	71	74	74	73	
				Hovering	35	75	76	74	
		EW		Idling	451	72	72	71	
				Take-off	76	72	72	71	
3	S76C+	WE	19:58 - 20:07	Approach	78	73	74	73	
				Hovering	31	76	76	74	
		EW		Idling	360	72	72	71	
				Take-off	63	74	74	73	
4	AW139	WE	20:26 - 20:35	Approach	78	72	72	71	
				Hovering	33	73	74	73	
		EW		Idling	352	71	71	70	
				Take-off	101	71	71	70	
5	S76C+	WE	20:54 - 21:04	Approach	82	73	74	73	
				Hovering	35	76	76	75	
		EW		Idling	397	70	71	70	
				Take-off	80	71	72	71	
6	AW139	WE	21:27 - 21:35	Approach	86	72	73	72	
				Hovering	28	75	75	74	
		EW		Idling	335	71	71	70	
				Take-off	72	71	71	70	
7	S76C+	WE	21:56 - 22:04	Approach	61	73	74	73	
				Hovering	32	75	76	75	
		EW		Idling	351	71	71	70	
				Take-off	75	71	71	70	
8	S76C+	WE	22:44 - 23:00	Approach	78	74	74	73	
				Hovering	35	75	75	74	
		EW		Idling	759	71	71	70	
				Take-off	80	71	72	71	

Remark:

Non-project related noise sources, those peak noise levels significantly mask that recorded due to operation of the new helipad.

* EW - Flight direction from East to West; WE - Flight direction from West to East.

** Noise measurement was commenced at 19:00. Thus, noise data before 19:00 is not available.

(B). Background level Measured at Wayson Commercial Building, dB(A)

Ref. No.	Measurement Event	Façade Noise Level, dB(A)			Major Noise Sources
		LAeq	LA10	LA90	
1 *	Background #	71	71	70	Road traffic noise, and noise due to airplane passing-by, and TurboJet arrival/ departure at HK-Macau Ferry Terminal
2 *	Background	71	71	70	
3 *	Background	70	71	70	
4 *	Background	70	71	70	
5 *	Background	70	70	69	
6 *	Background	69	69	68	
7 *	Background	70	70	69	
8 *	Background	69	69	68	

Remark: * Background noise level recorded just before each flight.

Based on background noise level recorded before the second flight.

(C). Calculated Helicopter Noise Level at Wayson Commercial Building (without background)

Flight Ref. No.	Flight Model	Flight Direction ##	Approx. Time Period	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A) #		
						LAeq	LA10	LA90
1	S76C+	WE	19:00 - 19:05	Approach **				
				Hovering **				
				Idling	297	63	64	63
		EW		Take-off	51	73	74	72
2	AW139	WE	19:30 - 19:41	Approach	71	70	70	70
				Hovering	35	73	74	72
				Idling	451	65	65	64
		EW		Take-off	76	66	66	65
3	S76C+	WE	19:58 - 20:07	Approach	78	71	71	69
				Hovering	31	74	75	73
				Idling	360	66	66	64
		EW		Take-off	63	72	72	71
4	AW139	WE	20:26 - 20:35	Approach	78	67	67	67
				Hovering	33	71	71	69
				Idling	352	60	60	59
		EW		Take-off	101	63	62	63
5	S76C+	WE	20:54 - 21:04	Approach	82	71	71	70
				Hovering	35	74	75	73
				Idling	397	62	61	61
		EW		Take-off	80	66	66	66
6	AW139	WE	21:27 - 21:35	Approach	86	70	70	69
				Hovering	28	73	74	72
				Idling	335	65	66	65
		EW		Take-off	72	65	66	65
7	S76C+	WE	21:56 - 22:04	Approach	61	71	71	70
				Hovering	32	74	75	73
				Idling	351	64	65	64
		EW		Take-off	75	66	66	65
8	S76C+	WE	22:44 - 23:00	Approach	78	72	72	71
				Hovering	35	73	74	72
				Idling	759	65	65	65
		EW		Take-off	80	68	68	67
Average Noise Level (4 hrs)						62	62	61

Remark: ** Noise measurement was commenced at 19:00. Thus, noise data before 19:00 is not available.

In the case the recorded noise level is equal to or smaller than the background noise level recorded during the same measurement time period, an adjustment of "background noise level -10 dB(A)" is applied to represent noise level due to operation of the new helipad.

EW - Flight direction from East to West; WE - Flight direction from West to East.

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Day Time)

Date: 21 May 2009

Time: 12:18 - 13:21

Location: Wing On Centre (roof level)

Flight Ref. No.	Flight Model	Flight Direction *	Approx. Time Period	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)					Other Noise Sources #
						LAeq	LA10	LA90	LAMin	LAMax	
(A). Measured Helicopter Noise Data (with background)											
1	S76C+	WE	12:18:39	Approach **							-
				Hovering **	33	71	73	68	67	75	-
		EW	12:26:06	Take-off	71	71	75	66	66	79	-
2	AW139	WE	12:50:59	Approach	68	73	76	67	65	78	-
				Hovering **							
		EW	12:53:57	Idling **	331	67	69	66	64	72	-
				Take-off **							

Lmax During the Measurement Period: 79

Remark: # Non-project related noise sources, those peak noise levels significantly mask that recorded due to operation of the new helipad.

* EW - Flight direction from East to West; WE - Flight direction from West to East.

** During the measurement, Lmax level was measured by manually start and stop the SLM during each flight event. Thus, only two flight events were measured in each flight (i.e. either "Approach" and "Idling", or "Hovering" and "Take-off").

Noise measurement was undertaken between 1218 hours and 1321 hours. The subsequent two flights were cancelled due to small number of passengers that breakeven cannot be achieved. Thus, no measurement was conducted after 1321 hours.

(B). Measured Background level, dB(A)

Ref. No.	Measurement Event	Façade Noise Level, dB(A)					Major Noise Sources
		LAeq	LA10	LA90	LAMin	LAMax	
1 *	Background	67	68	65	63	70	Road traffic noise, and noise due to airplane passing-by, and TurboJet arrival/ departure at HK-Macau Ferry Terminal
2 *	Background	67	68	65	63	75	

Remark: * Background noise level recorded just after each flight event.

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Evening-time)

Date: 19 May 2009
Time: 19:00 - 23:00
Location: Wing On Centre (roof level)

Flight Ref. No.	Flight Model	Flight Direction *	Approx. Time Period	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)			Other Noise Sources #	
						LAeq	LA10	LA90		
(A). Measured Helicopter Noise Data (with background)										
1	S76C+	WE	19:35 - 19:43	Approach	54	70	70	69		
				Hovering	19	72	73	72		
		EW		Idling	360	69	69	68		TurboJET at HKM-FT
				Take-off	48	74	74	73		
2	S76C+	WE	20:36 - 20:48	Approach	69	68	68	67		
				Hovering	29	72	73	72		
		EW		Idling	495	66	66	66		
				Take-off	77	72	72	71		
3	S76C+	WE	20:58 - 21:06	Approach	61	66	66	65		
				Hovering	27	72	72	71		
		EW		Idling	323	66	66	65		
				Take-off	64	72	72	71		
4	S76C+	WE	21:27 - 21:36	Approach	65	70	71	69		
				Hovering	33	76	76	75		
		EW		Idling	354	69	69	68		
				Take-off	86	74	75	73		
5	S76C+	WE	21:48 - 21:57	Approach	75	68	68	67		
				Hovering	29	72	72	72		
		EW		Idling	413	68	68	67		
				Take-off	56	71	72	70		
6	S76C+	WE	22:18 - 22:29	Approach	58	68	68	67		
				Hovering	23	73	73	72		
		EW		Idling	536	66	66	65		
				Take-off	64	73	74	72		
7	S76C+	WE	22:48 - 22:57	Approach	49	70	70	69		
				Hovering	23	74	75	74		
		EW		Idling	398	66	66	66		
				Take-off	55	72	72	71		

Remark: # Non-project related noise sources, those peak noise levels significantly mask that recorded due to operation of the new helipad.
 * EW - Flight direction from East to West; WE - Flight direction from West to East.

(B). Measured Background level, dB(A)

Ref. No.	Measurement Event	Façade Noise Level, dB(A)			Major Noise Sources
		LAeq	LA10	LA90	
1 *	Background	67	68	67	Road traffic noise, and noise due to airplane passing-by, and TurboJet arrival/ departure at HK-Macau Ferry Terminal
2 *	Background	66	67	66	
3 *	Background	65	65	64	
4 *	Background	66	66	65	
5 *	Background	65	65	64	
6 *	Background	65	65	64	
7 *	Background	66	66	65	

Remark: * Background noise level recorded just after each flight event.

(A) - (B). Calculated Helicopter Noise Level (without background)

Flight Ref. No.	Flight Model	Flight Direction ##	Approx. Time Period	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A) #		
						LAeq	LA10	LA90
1	S76C+	WE	19:35 - 19:43	Approach	54	67	67	66
				Hovering	19	71	71	70
				Idling	360	62	62	61
				Take-off	48	72	73	71
2	S76C+	WE	20:36 - 20:48	Approach	69	61	62	60
				Hovering	29	71	71	70
				Idling	495	56	57	56
				Take-off	77	70	71	69
3	S76C+	WE	20:58 - 21:06	Approach	61	60	60	59
				Hovering	27	71	71	70
				Idling	323	59	59	59
				Take-off	64	71	71	70
4	S76C+	WE	21:27 - 21:36	Approach	65	67	68	66
				Hovering	33	75	76	74
				Idling	354	66	66	65
				Take-off	86	73	74	73
5	S76C+	WE	21:48 - 21:57	Approach	75	64	65	63
				Hovering	29	71	72	71
				Idling	413	65	65	64
				Take-off	56	70	71	69
6	S76C+	WE	22:18 - 22:29	Approach	58	65	65	64
				Hovering	23	72	72	71
				Idling	536	58	58	58
				Take-off	64	73	73	71
7	S76C+	WE	22:48 - 22:57	Approach	49	67	68	66
				Hovering	23	74	74	73
				Idling	398	56	53	57
				Take-off	55	70	71	69
Average Noise Level (4 hrs)						60	61	59

Remark: ** Noise measurement was commenced at 19:00. Thus, noise data before 19:00 is not available.

In the case the recorded noise level is equal to or smaller than the background noise level recorded during the same measurement time period, an adjustment of "background noise level -10 dB(A)" is applied to represent noise level due to operation of the new helipad.

EW - Flight direction from East to West; WE - Flight direction from West to East.