

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	
<i>(A). Measured Helicopter Noise Data (with background)</i>											
1	AW139	WE	15:26 - 15:28	Approach	95	74	77	72	70	81	
			15:28 - 15:34	Idling	440	73	74	71	69	77	
2	S76C+	WE	15:53 - 15:53	Hovering	36	75	77	73	72	83	
			16:01 - 16:03	Take-off	75	75	79	72	71	82	
3	AW139	WE	16:21 - 16:21	Hovering	29	76	78	72	72	84	
			16:37 - 16:38	Take-off	64	74	76	71	71	78	
4	S76C+	WE	16:47 - 16:48	Approach	35	76	78	74	73	79	
			16:49 - 16:51	Idling	128	72	73	71	68	78	
5	AW139	WE	17:22 - 17:23	Approach	54	74	76	73	72	77	
			17:24 - 17:32	Idling	495	72	73	71	68	77	
6	AW139	WE	18:20 - 18:20	Hovering	28	74	76	72	71	78	
			18:33 - 18:34	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)

Flight Ref. No.	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)					Major Noise Sources
			LAeq	LA10	LA90	LAMin	LAMax	
1	Background	301	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	204	71	73	70	68	75	
3	Background	532	73	74	71	68	84	
4	Background	415	72	73	70	68	78	
5	Background	255	73	73	70	69	88	
6	Background	303	72	73	70	68	79	

Remark: Background noise level recorded before or/and after helipad operation events.

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). Measured Helicopter Noise Data (with background)									
1	S76C+	WE	19:00 - 19:05	Approach **					
				Hovering **					
				Idling	297	72	72	71	
		EW		Take-off	51	75	76	74	
2	AW139	WE	19:30 - 19:41	Approach	71	74	74	73	
				Hovering	35	75	76	74	
				Idling	451	72	72	71	
		EW		Take-off	76	72	72	71	
3	S76C+	WE	19:58 - 20:07	Approach	78	73	74	73	
				Hovering	31	76	76	74	
				Idling	360	72	72	71	
		EW		Take-off	63	74	74	73	
4	AW139	WE	20:26 - 20:35	Approach	78	72	72	71	
				Hovering	33	73	74	73	
				Idling	352	71	71	70	
		EW		Take-off	101	71	71	70	
5	S76C+	WE	20:54 - 21:04	Approach	82	73	74	73	
				Hovering	35	76	76	75	
				Idling	397	70	71	70	
		EW		Take-off	80	71	72	71	
6	AW139	WE	21:27 - 21:35	Approach	86	72	73	72	
				Hovering	28	75	75	74	
				Idling	335	71	71	70	
		EW		Take-off	72	71	71	70	
7	S76C+	WE	21:56 - 22:04	Approach	61	73	74	73	
				Hovering	32	75	76	75	
				Idling	351	71	71	70	
		EW		Take-off	75	71	71	70	
8	S76C+	WE	22:44 - 23:00	Approach	78	74	74	73	
				Hovering	35	75	75	74	
				Idling	839	71	71	70	

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). Measured Background level, dB(A)

Flight Ref. No.	Flight Event	Duration of Flight Event, s	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	1499	71	71	70	
3	Background	1021	70	71	70	
4	Background	1135	70	71	70	
5	Background	1125	70	70	69	
6	Background	1384	69	69	68	
7	Background	1213	70	70	69	
8	Background	2361	69	69	68	

Remark: Background noise level recorded before or/and after helipad operation events.

* Based on background noise level recorded during the second 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	19:00 - 19:05	Approach **				
				Hovering **				
				Idling	297	63	64	63
				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
				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
				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
				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
				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
				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
				Take-off	75	66	66	65
8	S76C+	WE	22:44 - 23:00	Approach	78	72	72	71
				Hovering	35	73	74	72
				Idling	839	65	65	65
				Average Noise Level (4 hrs)			62	62

Remark: * Based on the measured Lmin (with background) and Lmax (with background) noise levels.

** 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	
<i>(A). Measured Helicopter Noise Data (with background)</i>											
1	S76C+	WE	12:18:39	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	-
			12:53:57	Idling	331	67	69	66	64	72	-

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)

Flight Ref. No.	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)					Major Noise Sources
			LAeq	LA10	LA90	LAMin	LAMax	
1	Background	868	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	600	67	68	65	63	75	

Remark: Background noise level recorded before or/and after helipad operation events.

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	TurboJET at HKM-FT
				Hovering	19	72	73	72	
				Idling	360	69	69	68	
		EW		Take-off	48	74	74	73	
2	S76C+	WE	20:36 - 20:48	Approach	69	68	68	67	
				Hovering	29	72	73	72	
				Idling	495	66	66	66	
		EW		Take-off	77	72	72	71	
3	S76C+	WE	20:58 - 21:06	Approach	61	66	66	65	
				Hovering	27	72	72	71	
				Idling	323	66	66	65	
		EW		Take-off	64	72	72	71	
4	S76C+	WE	21:27 - 21:37	Approach	57	70	71	69	
				Hovering	41	75	76	74	
				Idling	354	69	69	68	
		EW		Take-off	86	74	75	73	
5	S76C+	WE	21:48 - 21:57	Approach	45	66	66	65	
				Hovering	108	72	72	71	
				Idling	364	67	67	66	
		EW		Take-off	56	71	72	70	
6	S76C+	WE	22:18 - 22:29	Approach	58	68	68	67	
				Hovering	23	73	73	72	
				Idling	536	66	66	65	
		EW		Take-off	64	73	74	72	
7	S76C+	WE	22:48 - 22:57	Approach	49	70	70	69	
				Hovering	23	74	75	74	
				Idling	398	66	66	66	
		EW		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)

Flight Ref. No.	Flight Event	Duration of Flight Event, s	Façade Noise Level, dB(A)			Major Noise Sources
			LAeq	LA10	LA90	
1	Background	2197	67	68	67	Road traffic noise, and noise due to airplane passing-by, and TurboJet arrival/ departure at HK-Macau Ferry Terminal
2	Background	3223	66	67	66	
3	Background	606	65	65	64	
4	Background	1291	66	66	65	
5	Background	714	65	65	64	
6	Background	1221	65	65	64	
7	Background	1149	66	66	65	
8	Background	147	64	64	64	

Remark: Background noise level recorded before or/and after helipad operation events.

(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
		EW		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
		EW		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
		EW		Take-off	64	71	71	70
4	S76C+	WE	21:27 - 21:37	Approach	57	67	68	66
				Hovering	41	75	75	73
				Idling	354	66	66	65
		EW		Take-off	86	73	74	73
5	S76C+	WE	21:48 - 21:57	Approach	45	59	60	59
				Hovering	108	71	71	70
				Idling	364	62	62	61
		EW		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
		EW		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
		EW		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.

* Based on the measured Lmin (with background) and Lmax (with background) noise levels.

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.