

Mestre Greve Associates

October 8, 2004

Mr. Mike Mais
Assistant City Attorney
Long Beach Airport
4100 Donald Douglas Drive
Long Beach, CA 90808

Subject: Long Beach Airport Noise Budget Calculations For Budget Year October 1, 2003 to September 30, 2004

Dear Mike,

Mestre Greve Associates has completed the analysis of the Airline Noise Budget for Noise Year October 1, 2003 through September 30, 2004 (NY '03-04). The following table compares the allowed budget with the actual budget used:

<u>Location</u>	<u>Allowed Budget</u>	<u>Actual Budget Used</u>
RMT 9	70.7	65.1
RMT 10	84.6	81.7

The data shows that the air carriers operated below the allowed budget at both regulated monitoring sites. Even though the air carriers operated below the budget, the margin at RMT 10 is quite low and additional flights could not be allocated and still ensure that the air carriers operate below the allowed budget in NY '04-05 as prescribed in the City's Noise Compatibility Ordinance.

The NY '03-04 was significantly impacted by fluctuations in the air carrier fleet mix during the early and latter months. During NY '02-03, the air carriers operated over budget at RMT 9, the monitor under the Runway 12/30 departure path. American Airlines operated MD80's, an aircraft that is noisy on departure and quiet on arrival, throughout NY '02-03. Early in NY '03-04, American phased out three MD80's and replaced them with the B-757, an aircraft that is much quieter on departure and noisier on arrival. This change in aircraft resulted in a dramatic

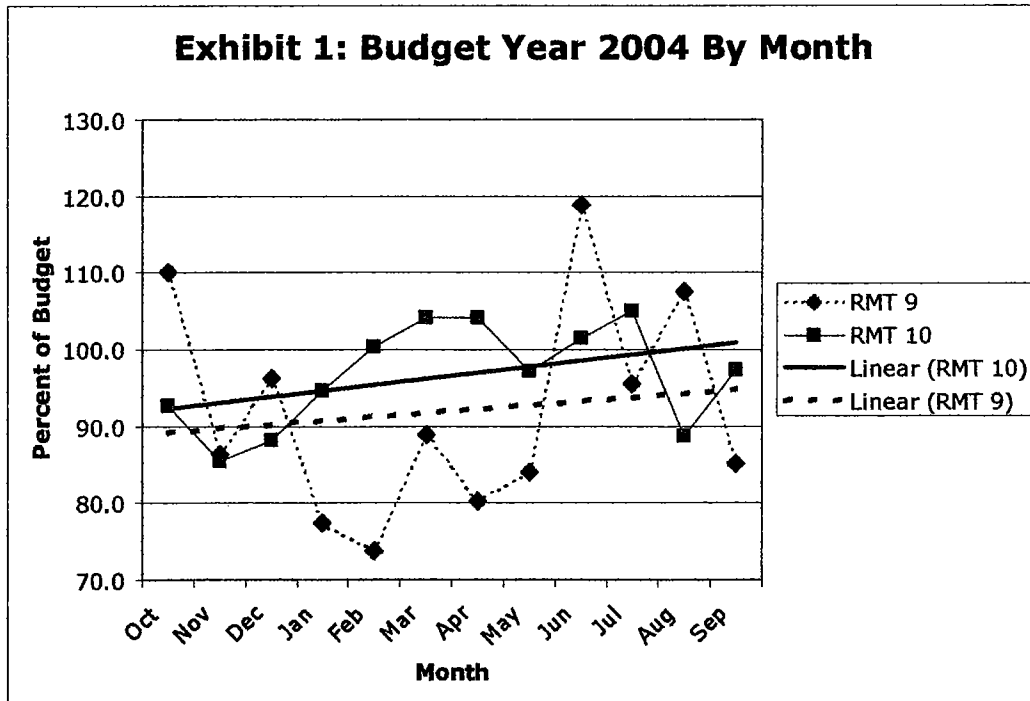
reduction in the budget utilization at RMT 9, and an increase in the budget at RMT 10. Later in the year, the MD80's were brought back, although at a slightly lower frequency than at the start of the budget year, and the subsequent effect were an increase at RMT9 and a decrease at RMT 10. Had the MD80's been utilized the entire year the noise budget would have been exceeded at RMT 9. Had the B-757's been utilized the entire year the budget would have been exceeded at RMT 10. The net effect of the changes was that the air carrier budget averaged to a value below the allocated budget.

Table 1 shows the monthly budget status and how much the budget utilization varied over the year. Table 1 also shows the adjustments that were made to the budget to account for Runway 25 use during the main runway repair project. That is discussed in more detail later in this letter.

Table 1 Summary of Monthly and Cumulative Budget Status

Month	UNADJUSTED		RWY 25 ADJUSTMENT		ADJUSTED		Monthly Budget Status		Year To Date Cumulative Budget		Cumulative Budget Status	
	RMT 9 Eq Ops	RMT 10 Eq Ops	RMT 9 Eq Ops	RMT 10 Eq Ops	RMT 9 Eq Ops	RMT 10 Eq Ops	RMT 9	RMT 10	RMT 9	RMT 10	RMT 9	RMT 10
October	77.8	78.3	0.0	0.0	77.8	78.3	Over	ok	77.8	78.3	Over	ok
November	61.1	72.3	0.0	0.0	61.1	72.3	ok	ok	69.6	75.4	ok	ok
December	68.1	74.5	0.0	0.0	68.1	74.5	ok	ok	69.0	75.1	ok	ok
January	54.7	80.1	0.0	0.0	54.7	80.1	ok	ok	65.4	76.3	ok	ok
February	52.2	84.9	0.0	0.0	52.2	84.9	ok	Over	63.3	78.5	ok	ok
March	62.8	88.0	0.0	0.0	62.8	88.0	ok	Over	63.0	79.6	ok	ok
April	56.8	88.1	0.0	0.0	56.8	88.1	ok	Over	62.1	80.8	ok	ok
May	59.3	82.2	0.0	0.0	59.3	82.2	ok	ok	61.7	81.0	ok	ok
June	84.0	85.8	0.0	0.0	84.0	85.8	Over	Over	64.2	81.5	ok	ok
July	62.1	78.7	5.5	10.1	67.6	88.8	ok	Over	64.5	82.3	ok	ok
August	73.6	71.0	2.5	4.0	76.1	75.0	Over	ok	65.6	81.6	ok	ok
September	58.0	78.6	2.1	3.7	60.1	82.3	ok	ok	65.1	81.7	ok	ok
Budget:									70.7	84.6		
Below Budget:									5.6	2.9		

Exhibit 1 plots the monthly budget utilization and shows the linear trend line for these data. This is discussed in more detail later in this letter.



Noise Budget Methodology

The noise budget status was computed from individual flight data collected from the Long Beach Airport’s permanent airport noise monitoring system (ANOMS). Individual data was provided for each of the commercial airline flights arriving and departing from Long Beach Airport during the budget year. The following paragraphs describe how the computations were done:

An example of 5 flights recorded at RMT 9 are as follows:

<u>Max Date Time</u>	<u>Aircraft Type</u>	<u>Airline</u>	<u>A/D/O</u>	<u>Runway</u>	<u>RMT</u>	<u>SEL</u>
10/1/02 7:06	MD80	AAL	D	30	9	99.7
10/1/02 7:09	A320	JBU	D	30	9	89.8
10/1/02 7:11	A320	AWE	D	30	9	88.2
10/1/02 7:17	A320	JBU	D	30	9	94.7
10/1/02 8:02	A320	JBU	D	30	9	90

The first column lists the date and time of the flight. The time used for noise budget calculations is the time that the noise event was recorded at the monitoring site, not the scheduled flight time. Subsequent data includes the aircraft type, airline, departure/arrival/overflight, runway utilized, noise monitor measurement site, and the Sound Exposure Level (SEL), in decibels, as measured at the RMT (remote monitoring terminal).

It is interesting to note that 4 of the 5 aircraft in the above example are Airbus A-320’s and there is a substantial range in the measured noise level. There are many factors that contribute to this range, but the most significant is aircraft weight. Aircraft weight is a function of the number of passengers and the distance to the destination. A flight of 2000 miles carries substantially more fuel than a flight of 250 miles.

Noise Budget Calculations and Analysis

The conversion of the measured SEL at RMT 9 and RMT 10, is done according to the budget definitions and as prescribed in the City’s Noise Compatibility Ordinance (LBMC 16.43).

The first step in analyzing the data is to convert the noise measurements made at RMT 9 and RMT 10 to the noise level at the nearest residences to Runway 12/30. For RMT 9 the noise level is increased by 1.1 dB and at RMT 10 the noise level is increased by 0.9 dB to account for the fact that the nearest homes are closer to the runway than the actual monitoring stations.

The next step is to convert the noise level at the nearest home to an equivalent number of daytime flights of the ‘standard’ aircraft that is built into the budget. This equivalent number of daytime flights is termed “budget units.” The ‘standard’ aircraft noise level is the SEL that 100 daytime flights would have to have to produce a CNEL of 65 dB at the nearest residence.

The equation for CNEL as a function of SEL and number of daytime flights is as follows:

$$CNEL = SEL + 10 \log_{10} N_{eq} - 49.4$$

The above equation can be solved for a value of 65 CNEL and 100 daytime flights and the result is that the 'standard' aircraft SEL is 94.4 dB. The task of converting the actual SEL to an equivalent number of budget units is done using the following equation:

$$N = \frac{10^{SEL/10}}{10^{94.4/10}}$$

The N computed in the above equation is the number of equivalent noise budget units that are contributed to the budget for a daytime flight. If the flight occurred between the hours of 7 pm and 10 pm, the result is multiplied by a factor of 3. If the flight occurred between the hours of 10 pm and 7 am the result is multiplied by a factor 10. Note that for purposes of this computation, the evening penalty begins at 7:00:00 pm and ends at 9:59:59 pm and the night penalty begins at 10:00:00 pm and ends at 6:59:59 pm. There are no exceptions to the evening and night penalties. For example an aircraft may begin its takeoff roll prior to 10 pm but produce a noise event at RMT 9 or 10 after 10 pm. In that case the after 10 pm penalty is applied.

Adjustments for Runway 7L/25R Operations

Throughout NY'03-04, and specifically for seven Saturdays during July, August and September, the main runway was shut down for repair. During those times aircraft traffic were diverted to Runway 7L/25R. The budget calculation methodology used for the main runway would not have included operations on Runway 7L/25. In order to allocate the operation of these flights to the annual budget a budget adjustment was made. This budget adjustment is shown in Table 1. The budget adjustment was computed by adding all of the Runway 7L/25R operations to the budget calculation. First, if the flight occurred during the day hours it was considered as one flight. Second, flights that occurred during the evening hours were considered as 3 flights, and flights that occurred during the night hours were considered as 10 flights. Lastly, the average noise level of flights for that aircraft type, for that month, had they used the main runway, were factored into the calculation. The resulting number of equivalent noise budget units computed for each aircraft operation was added up to determine the airline contribution. The raw data used to make these calculations are not reprinted here, but are available on CD-ROM for your review.

The resulting numbers of equivalent budget units are then compared to the budget allocations of 70.7 budget units at RMT 9, and 84.6 at RMT 10. The budget allocations were based on the 1989/90 baseline actual noise level and industrial aircraft forecast as prescribed in the federal court approved and federal code-grandfathered Long Beach Airport Noise Compatibility Ordinance LBMC 16.43).

Projection For Budget Year 2005

The Long Beach Ordinance provides for allocating additional flights for the next budget year if it is clear that such additional flights will not cause the air carrier budget to be exceeded. Based upon our findings, additional flights cannot be allocated with the assurance that NY '04-05 budget will not be exceeded. If the MD80 had remained in the fleet at last year's levels the budget at RMT 9 would have been exceeded. If the replacement aircraft for the MD80 had remained at LGB for the entire year, the RMT 10 budget would have been exceeded. Only by changing the MD80 out for a while and then bringing it back, the air carrier budget averaged to a value below the allocated budget. Further, as the budget year progressed, the trendline for the budget utilization was increasing, particularly at RMT 10. That trendline, shown in Exhibit 1, shows that the budget is trending upward toward an exceedence of the allowed budget at RMT 10. For this reason, additional flights cannot be allocated with assurance that the air carrier budget will be met for the NY '04-05.

If you have any questions please do not hesitate to call.

Yours very truly,
Mestre Greve Associates



Vincent Mestre, P.E.