P. Raveling Open Forum BOS 6/9/15

Summary of Measured Noise Levels

for air carrier cargo overflights of El Dorado Hills and Folsom

Second draft, 6/4/2015 Measurements and document by Paul Raveling

These measurements used an EXTECH HD600 data logging meter. Corresponding flight track data were saved from captured screen images of WebTrak to record flight track details and aircraft altitude at the measurement sites.

Results are summarized by a single graph of sound level data for each observed air carrier cargo approach. The Ridgeview site is directly below the approach. Other sites sampled to date are displaced laterally from the approach course by distances ranging from 900 feet to 12,000 feet.

Site-Specific Approach Data, Feet

Noise

Date	Time	Aircraft	Site	Aircraft MSL Altitude	Aircraft AGL Altitude	Lateral offset from approach course	Slant Distance	Seconds above Ambient	dBA Lmax	dBA Leq
10/22/2014	17:01	767-300	1	3,800	2,672	0	2,672	48	58.8	41.5
10/22/2014	17:15	757-200	1	3,800	2,672	0	2,672	29	66.4	49.6
10/29/2014	16:54	767-300	1	3,700	2,572	0	2,572	66	69.8	56.0
10/29/2014	17:09	757-200	1	3,700	2,572	0	2,572	70	62.4	48.8
10/30/2014	16:23	A300-600	1	3,700	2,572	0	2,572	86	72.2	54.4
10/30/2014	17:02	767-300	1	3,700	2,572	0	2,572	55	64.0	54.6
11/5/2014	16:50	767-300	1	3,700	2,572	8,942	9,305	below ambient (Note 1)		
11/5/2014	17:08	757-200	1	3,800	2,672	0	2,672	78	62.0	50.9
11/5/2014	17:36	757-200	1	3,800	2,672	0	2,672	65	66.3	67.3
11/7/2014	16:45	767-300	5	4,900	4,076	3,372	5,290	62	63.6	53.6
11/12/2014	17:06	767-300	5	4,300	3,476	3,589	4,996	49	58.7	53.2
11/12/2014	17:18	757-200	5	4,300	3,476	3,589	4,996	36	60.8	54.9
11/12/2014	20:10	A300-600	5	4,400	3,576	3,511	5,011	88	67.7	52.3
11/14/2014	17:27	767-300	1	3,800	2,672	0	2,672	61	70.0	52.7
2/18/2015	17:22	757-200	1	3,700	2,572	0	2,572	41	lost in ambient (Note 2)	
2/18/2015	17:23	767-300	1	3,800	2,672	0	2,672	50	67.1	56.9
5/13/2015	16:50	767-300	2	3,900	3,096	3,096	3,182	65	65.9	52.0
5/13/2015	17:18	757-200	2	4,000	3,196	3,281	3,281	45	59.5	51.9
5/20/2015	17:09	767-300	4	3,400	2.980	12,527	12,877	63	62.4	52.0
5/20/2015	17:13	757-200	4	3,300	2,880	11,736	12,084	below ambient		
5/21/2015	16:56	767-300	3	2,900	2,545	4,787	5,421	72	62.4	54.6
5/21/2015	16:56	757-200	3	3,000	2,645	4,846	5,521	below ambient		
5/27/2015	17:00	757-200	1	3,700	2,572	0	2,572	120	65.5	59.0
5/27/2015	17:09	767-300	1	3,800	2,672	0	2,672	73	66.1	52.7
5/28/2015	17:27	757-200	1	3,800	2,672	0	2,672	64	66.5	51.2
Averages for Site 1:				**3,753**	**2,625**	**596**	**3,074**	**65**	**65.9**	**52.7**
Averages for all other Sites:				**3,753**	**3,195**	**4,943**	**6,266**	**60**	**62.6**	**53.1**

Note 1: This approach was nearly above US 50 over western EDH: About 400 feet north, running parallel to the freeway. This appeared to be either a vector direct to YOSHE or pilot's discretion in a visual approach.

Note 2: Aircraft's overflight Lmax at site 1 was overridden by simultaneous Lmax noise from a large diesel pickup truck. The truck recorded Lmax = 88.3 dBA. Its noise was louder than the aircraft's noise for about 20 seconds.

Comparison with other noise sources depicted on an OSHA graphic

Lmax is the momentary *maximum* sound level measured during an overflight or a fly-by.

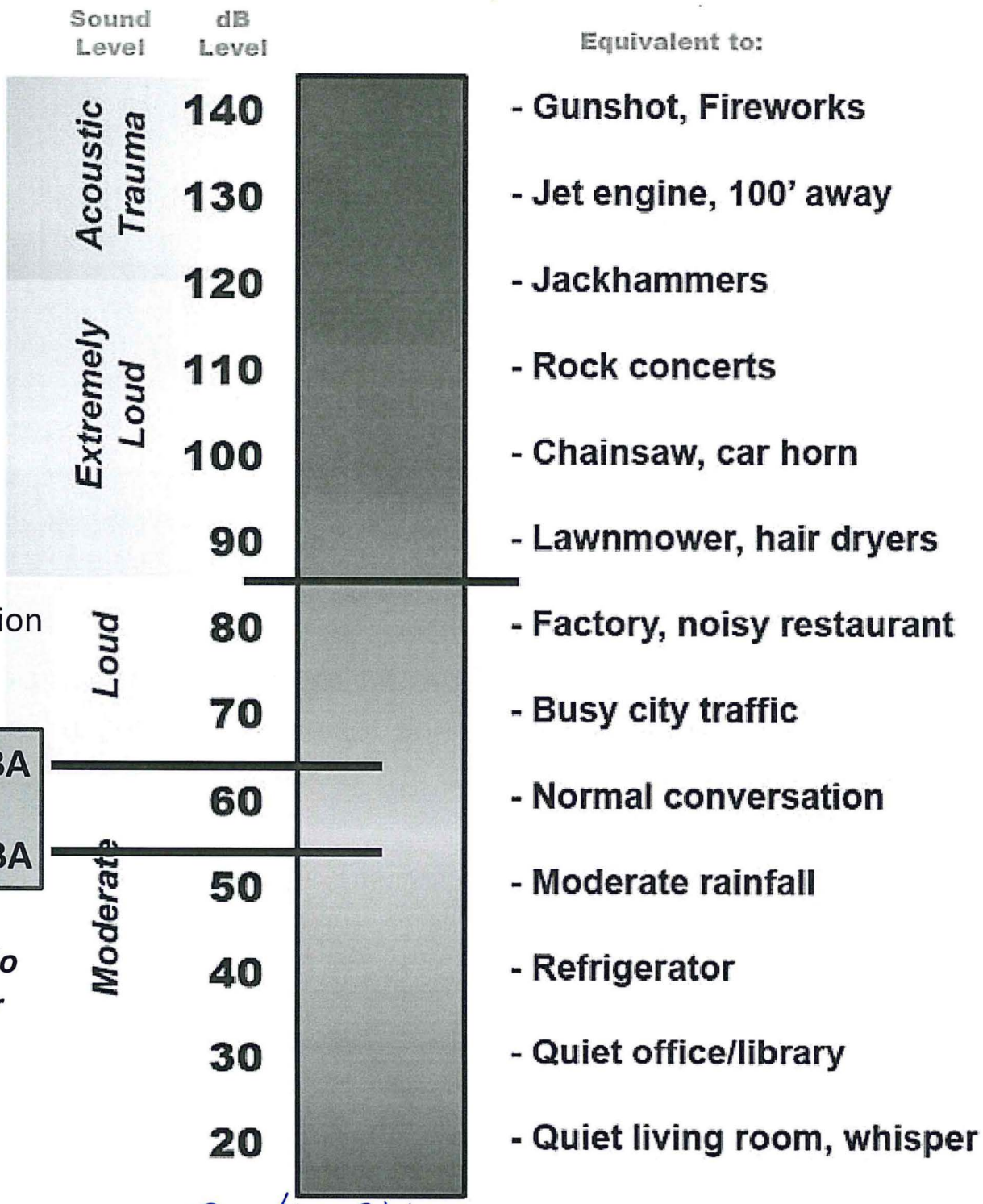
Leq is the constant sound level *equivalent* to the varying sound level over the entire audible duration of an overflight or a fly-by.

Average Lmax 64.7 dBA

Average Leq 52.9 dBA

Measured at five sites in El Dorado Hills and Folsom during air carrier cargo approaches to Mather.

25 approaches were sampled with a data logging meter for this survey.

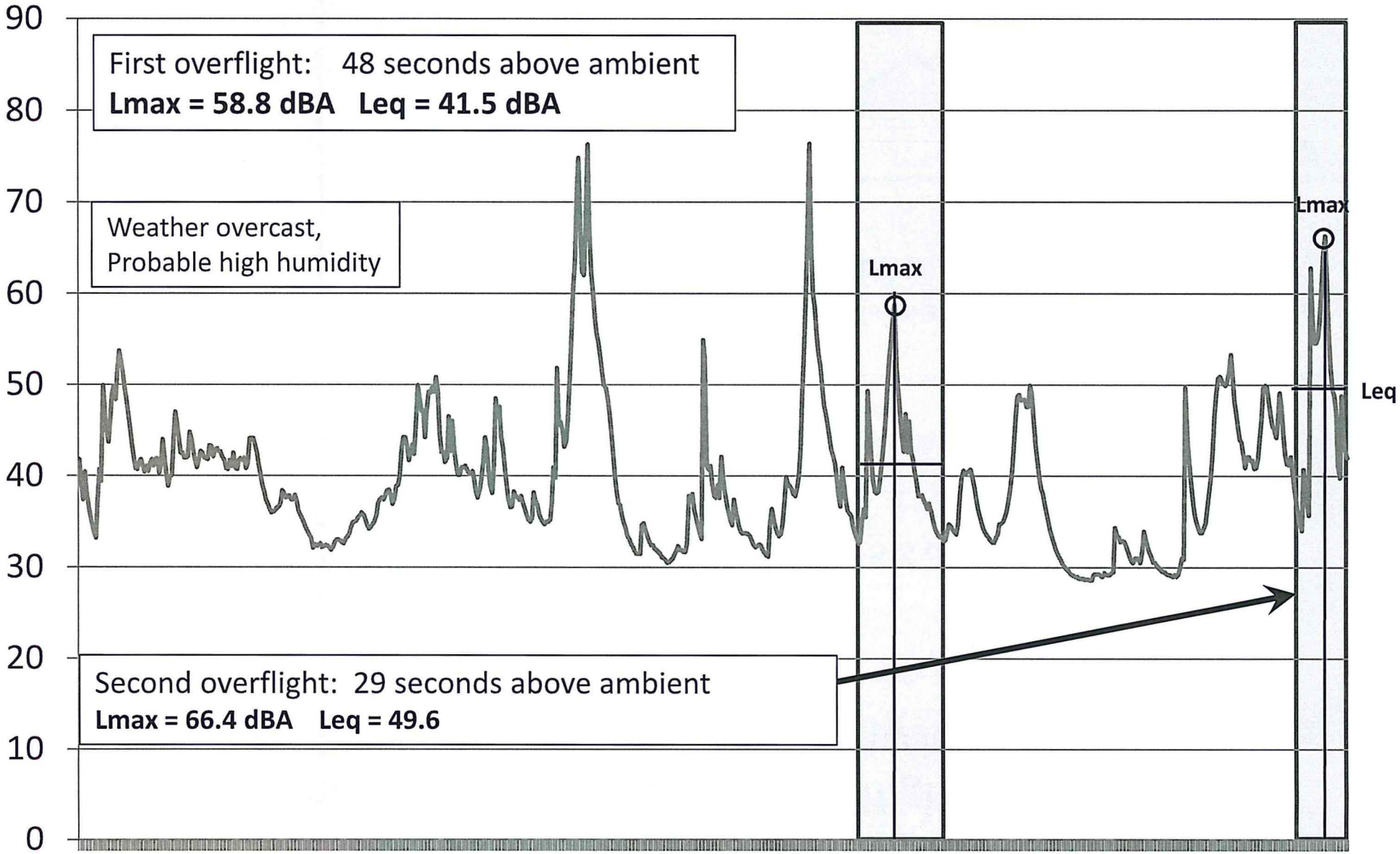


Two pages of notes are at the end of this document.

All pages between this and the notes at the end are annotated graphs of measured noise for specific approaches for UPS aircraft inbound to Mather, for landing on Runway 22L.

10-22-2014 Two Ridgeview overflights: UPS 2958, 767-300 and UPS 2940, 757-200

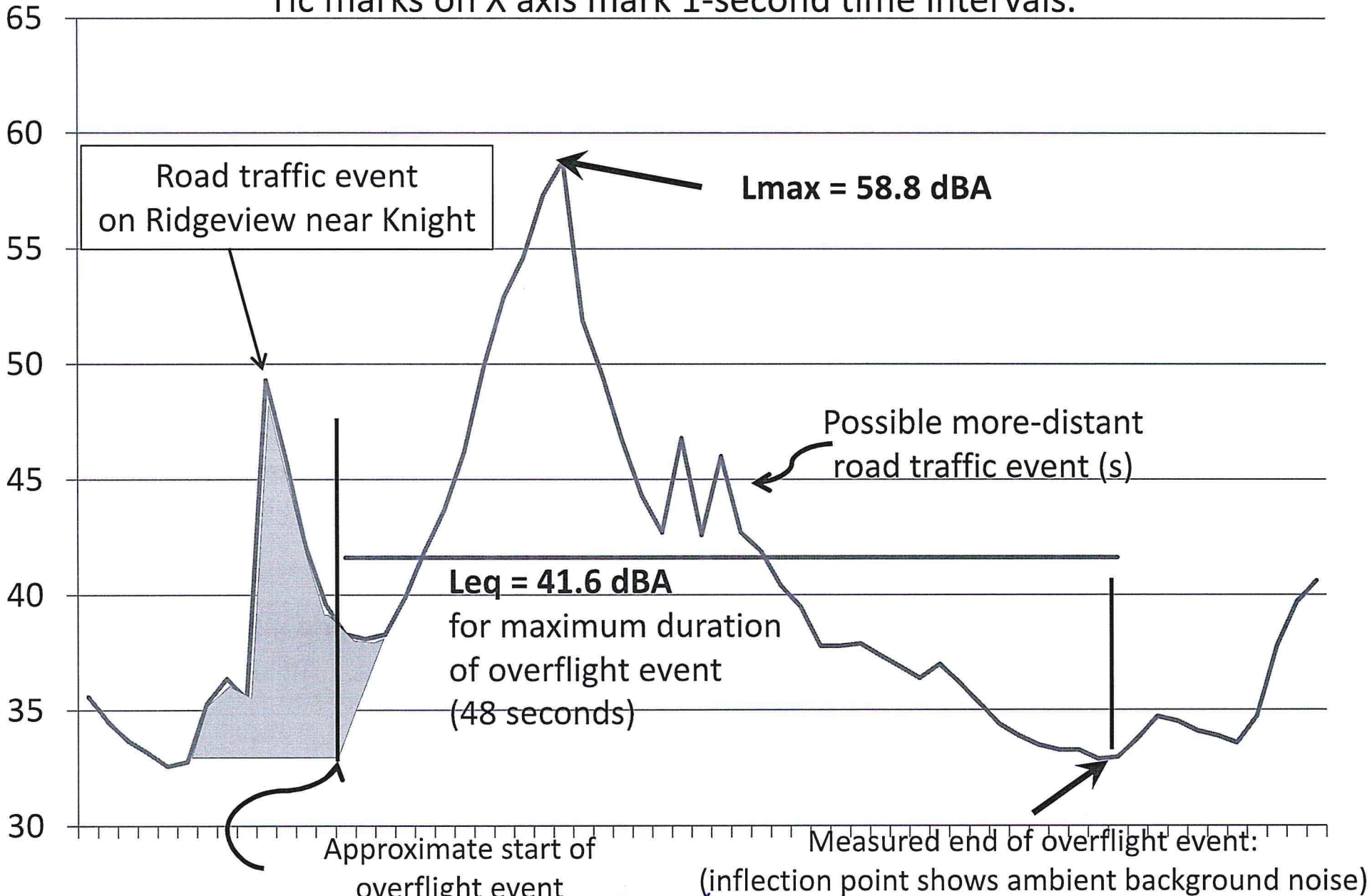
Unhighlighted peaks are road traffic noise events.



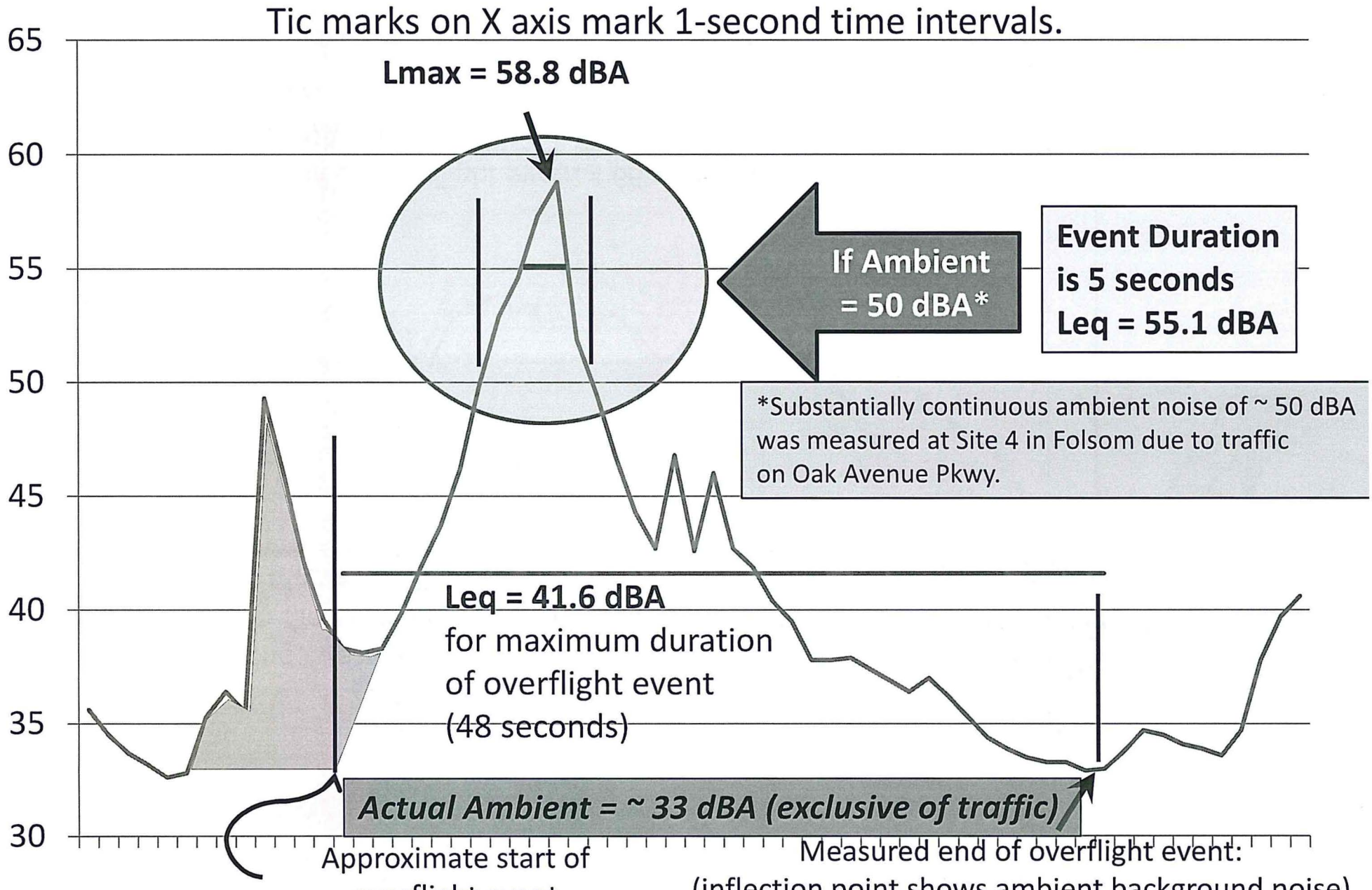
Higher resolution detail for first flight in preceding graph:

10-22-2014 First 757-200 Ridgeview overflight, expanded view

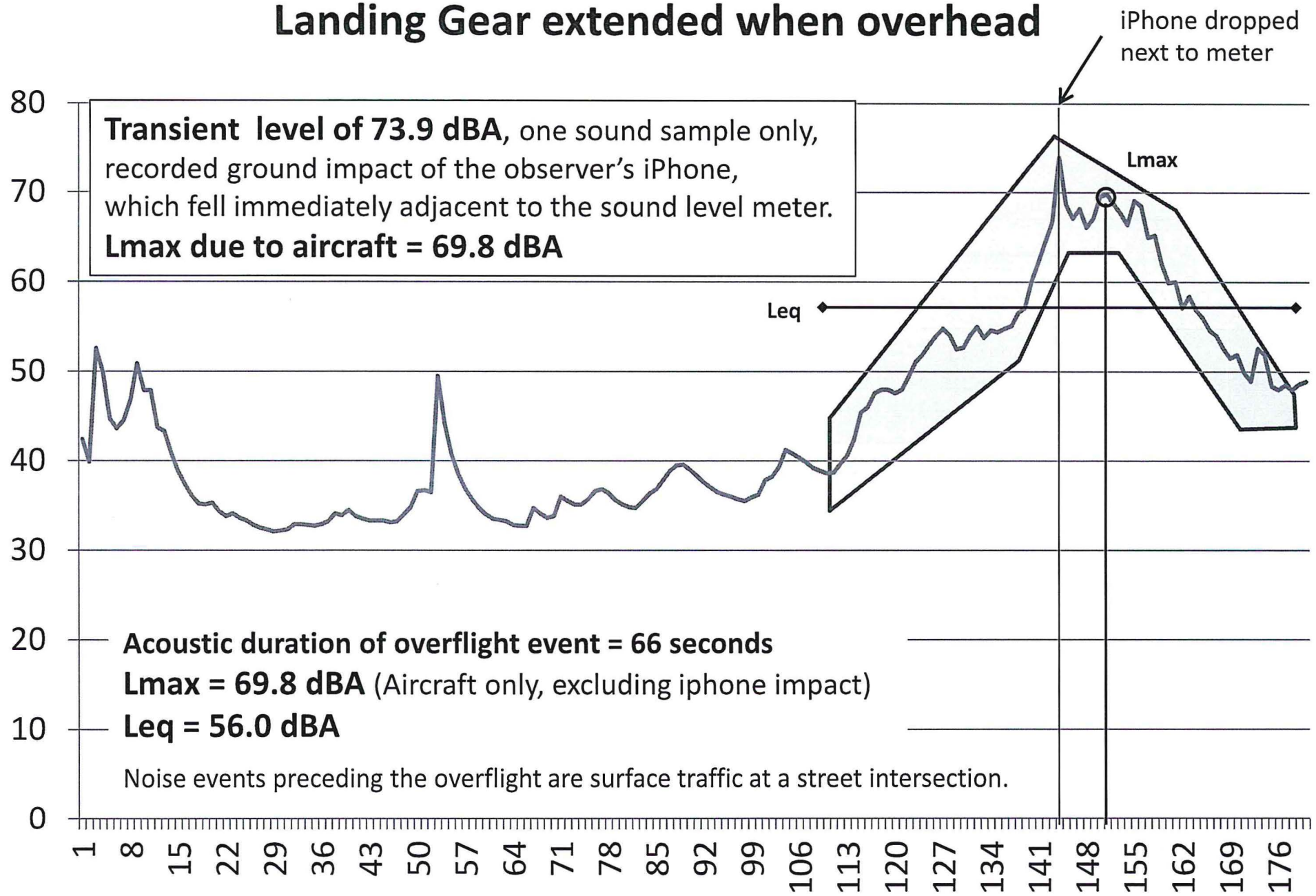
Tic marks on X axis mark 1-second time intervals.



10-22-2014 First 757-200 Ridgeview overflight, expanded view, edited to illustrate Leq dependence on ambient background noise.



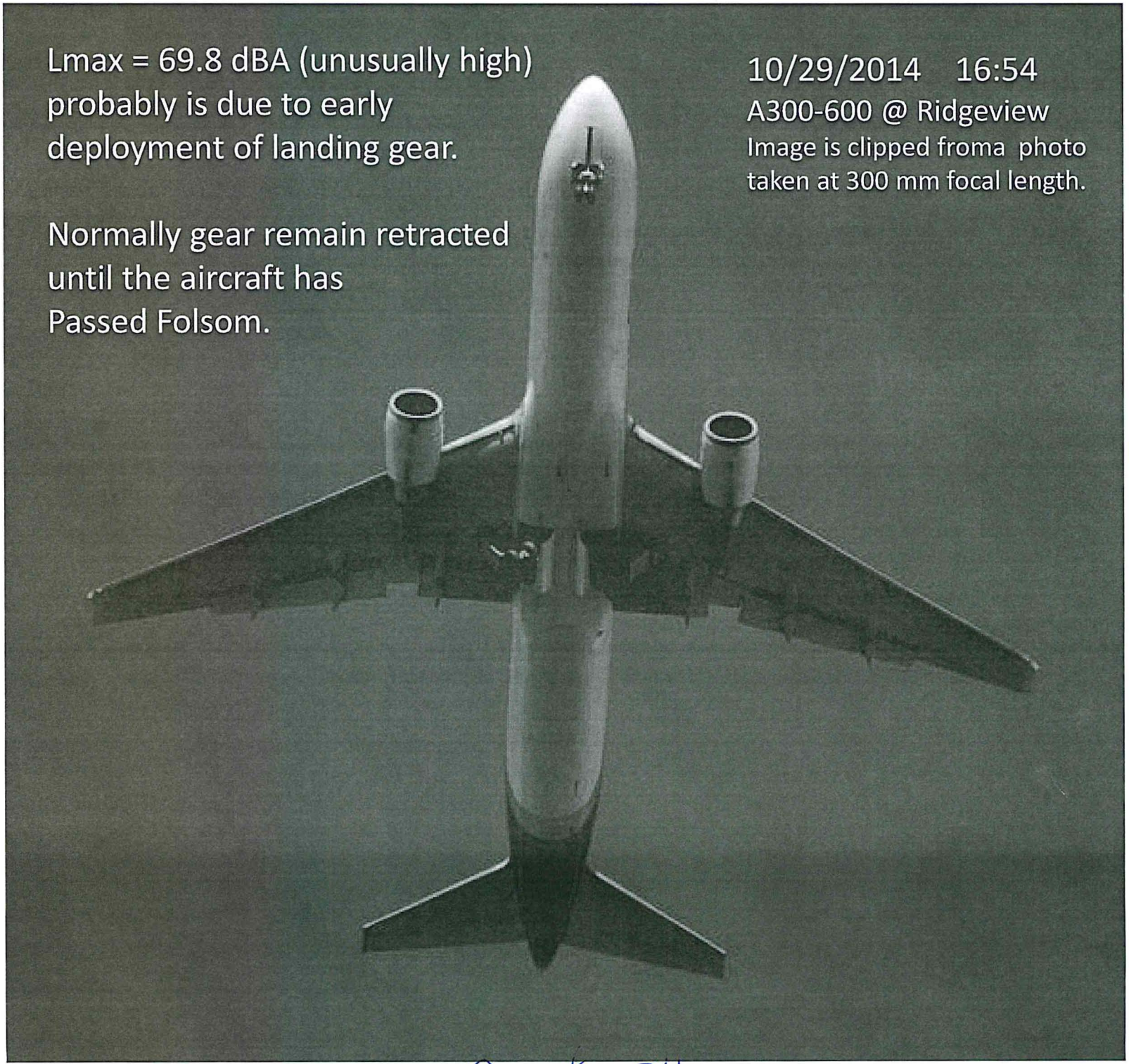
UPS-2958 10/29/2014 16:51:43-16:54:42
Landing Gear extended when overhead



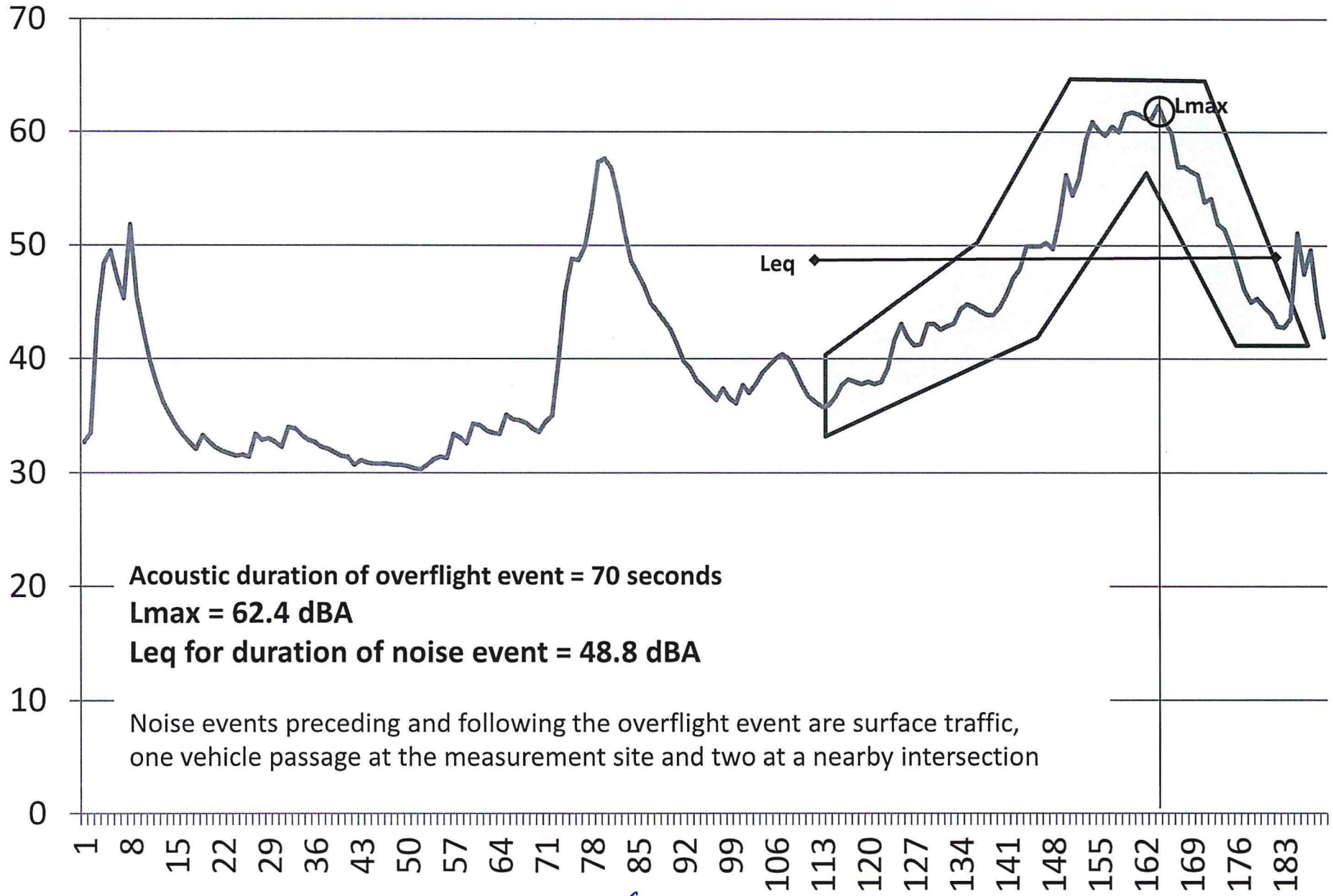
Transient level of 73.9 dBA, one sound sample only, recorded ground impact of the observer's iPhone, which fell immediately adjacent to the sound level meter.
Lmax due to aircraft = 69.8 dBA

Acoustic duration of overflight event = 66 seconds
Lmax = 69.8 dBA (Aircraft only, excluding iphone impact)
Leq = 56.0 dBA

Noise events preceding the overflight are surface traffic at a street intersection.


Lmax = 69.8 dBA (unusually high)
probably is due to early
deployment of landing gear.
Normally gear remain retracted
until the aircraft has
Passed Folsom.
10/29/2014 16:54
A300-600 @ Ridgeview
Image is clipped froma photo
taken at 300 mm focal length.

UPS-2940 10/29/2014 17:06:19 - 17:09:27



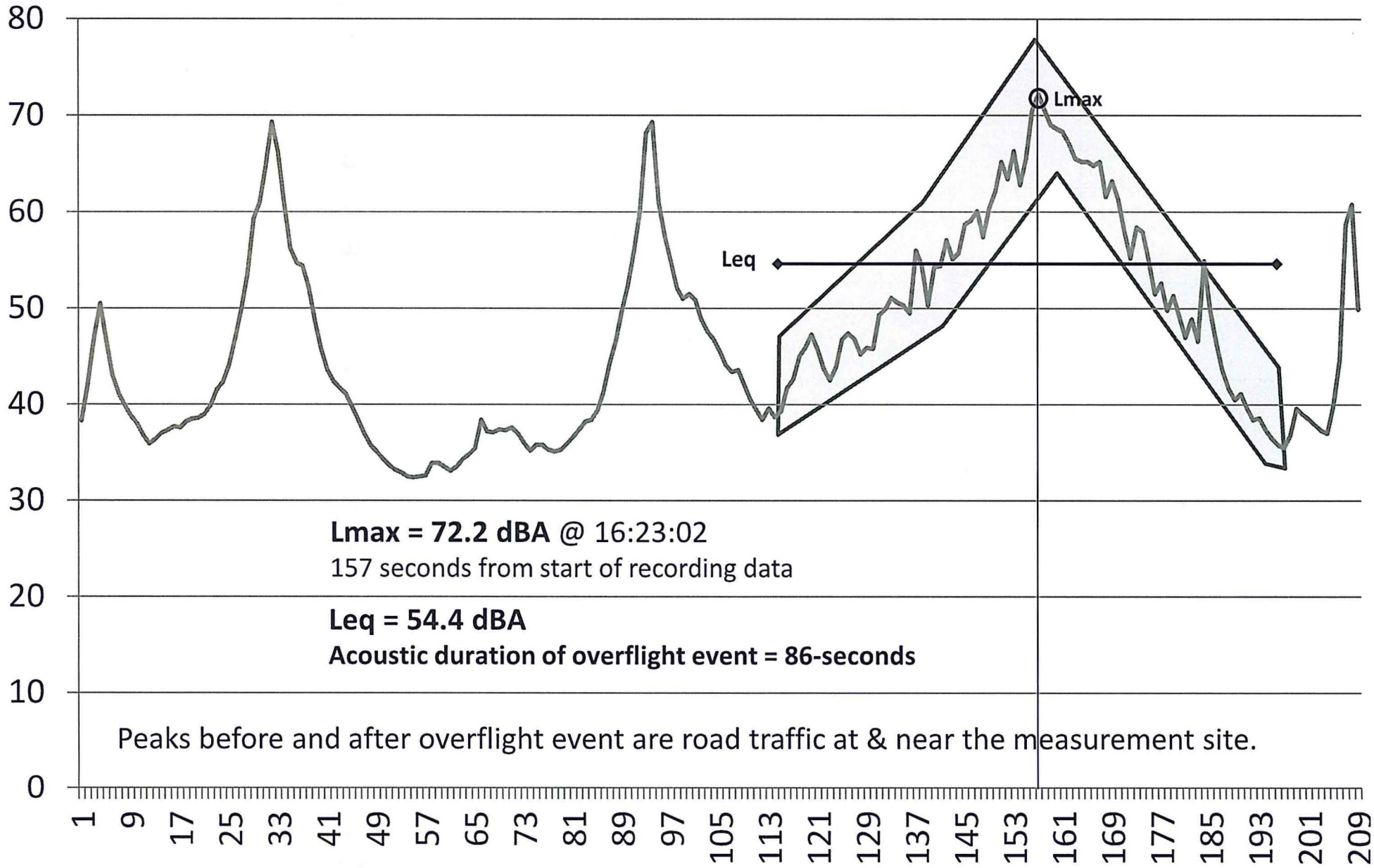
Acoustic duration of overflight event = 70 seconds

Lmax = 62.4 dBA

Leq for duration of noise event = 48.8 dBA

Noise events preceding and following the overflight event are surface traffic, one vehicle passage at the measurement site and two at a nearby intersection

UPS-2506, A300-600 10/30/2014 16:20:25 - 16:23:54

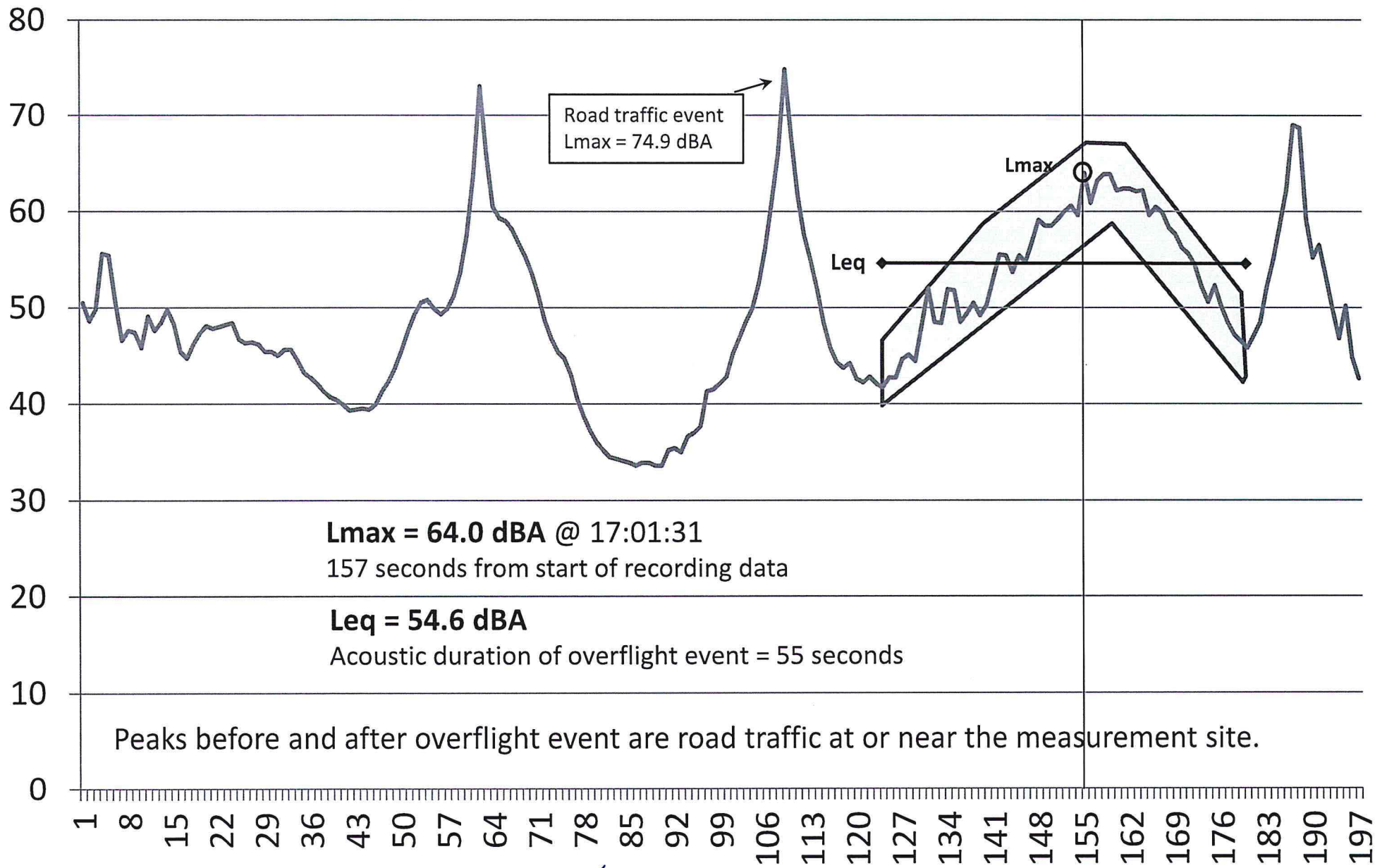


Lmax = 72.2 dBA @ 16:23:02
157 seconds from start of recording data

Leq = 54.4 dBA
Acoustic duration of overflight event = 86-seconds

Peaks before and after overflight event are road traffic at & near the measurement site.

UPS-2958, 767-300 10/30/2014 16:58:25 - 17:02:11



Lmax = 64.0 dBA @ 17:01:31
157 seconds from start of recording data

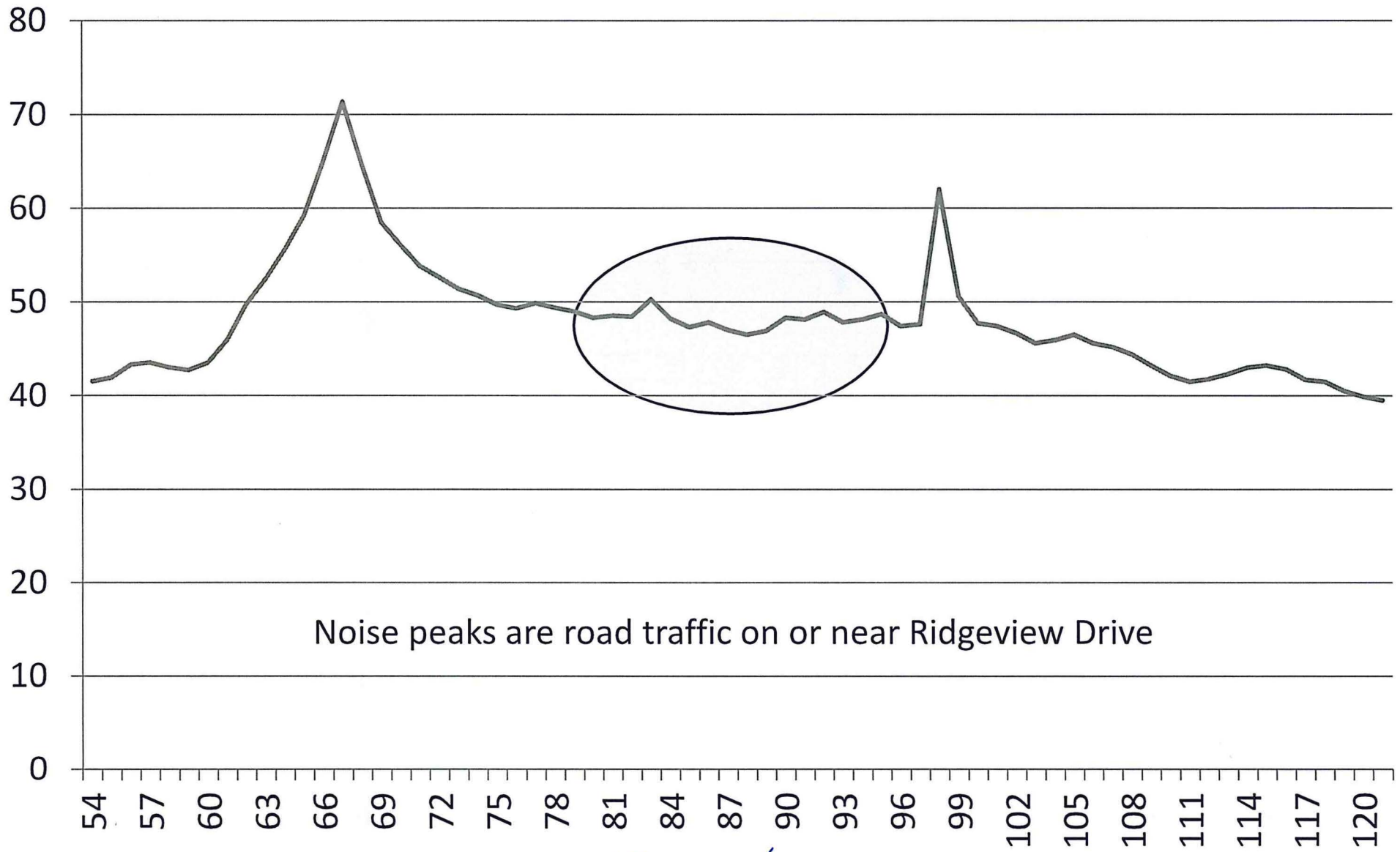
Leq = 54.6 dBA
Acoustic duration of overflight event = 55 seconds

Peaks before and after overflight event are road traffic at or near the measurement site.

UPS 2958 11/5/2014 16:50

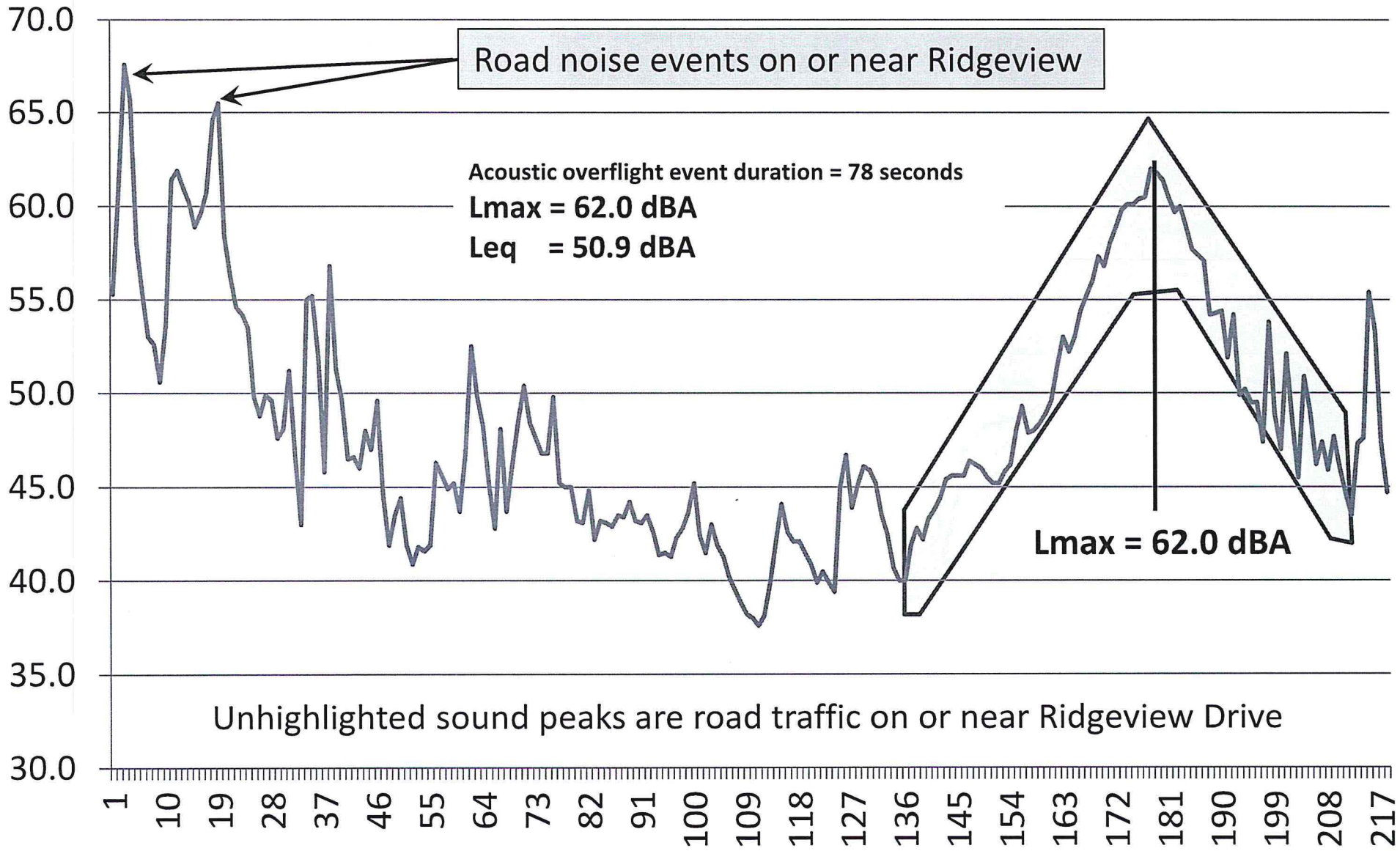
Aircraft sound lost in ambient, ~46 – 50 dBA

Approach was nearly over US 50, ~ 1.55 – 1.6 miles away



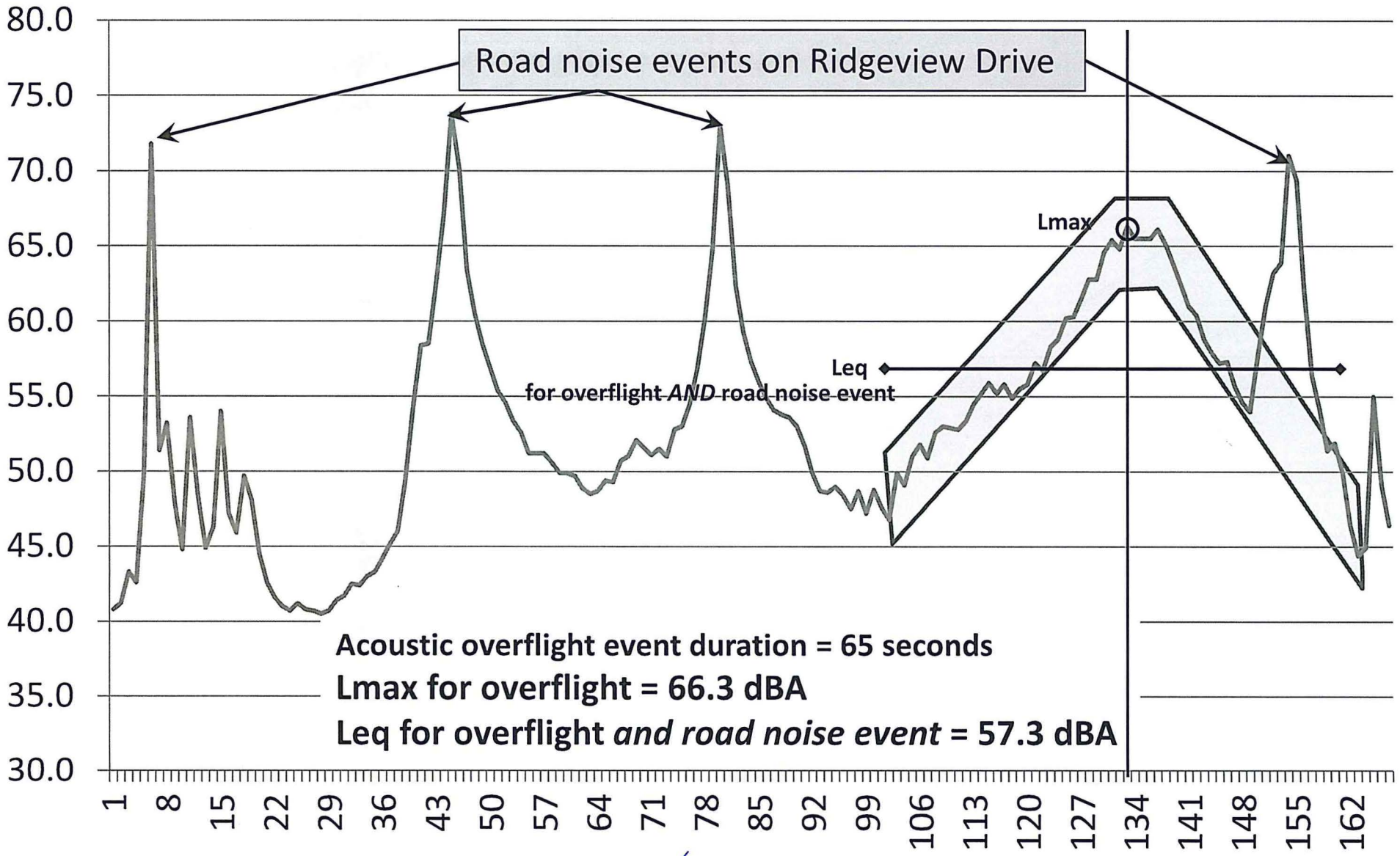
UPS 2940 11/5/2014 17:08

At Ridgeview crossing, near Knight & Knollridge intersections



UPS 2962, 757-200, 11/5/2014 17:36

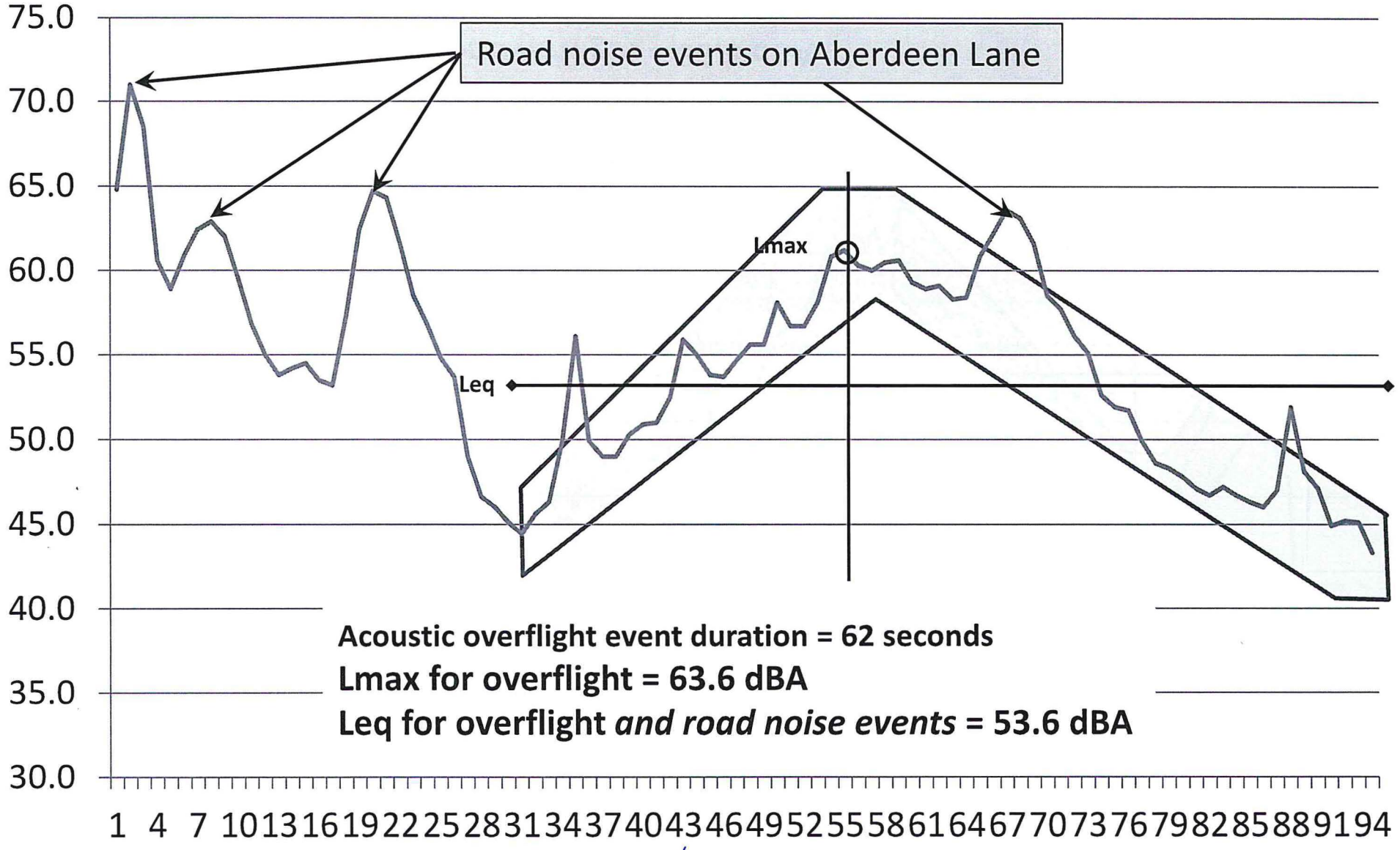
At Ridgeview Drive, near Knight & Knollridge intersections



UPS 2958 11/7/2014 16:45

2637 Aberdeen Lane

767-300, turned onto ILS at LDOOR instead of CAMRR



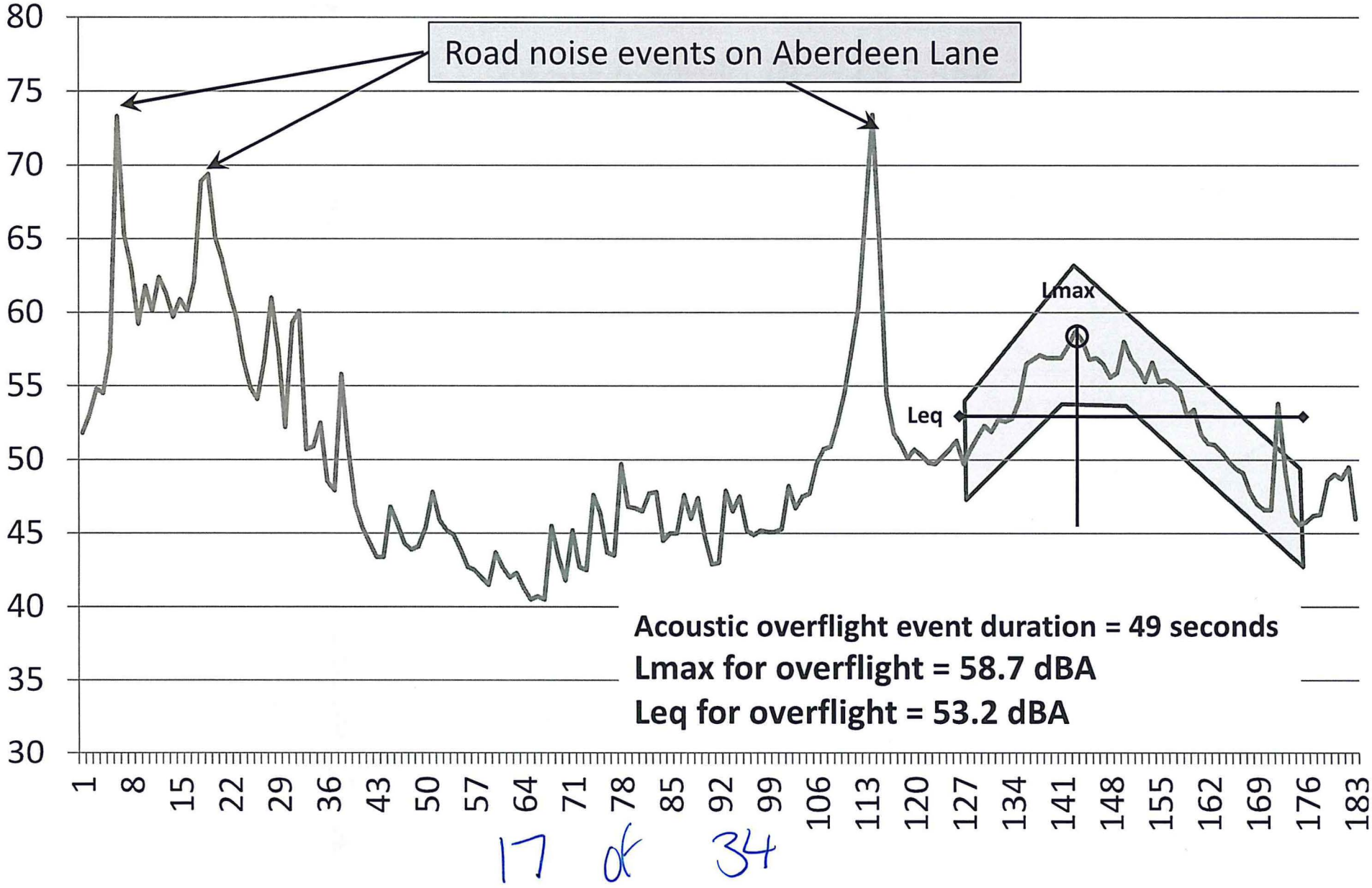
Acoustic overflight event duration = 62 seconds

Lmax for overflight = 63.6 dBA

Leq for overflight *and road noise events* = 53.6 dBA

UPS 2958 11/12/2014 17:06

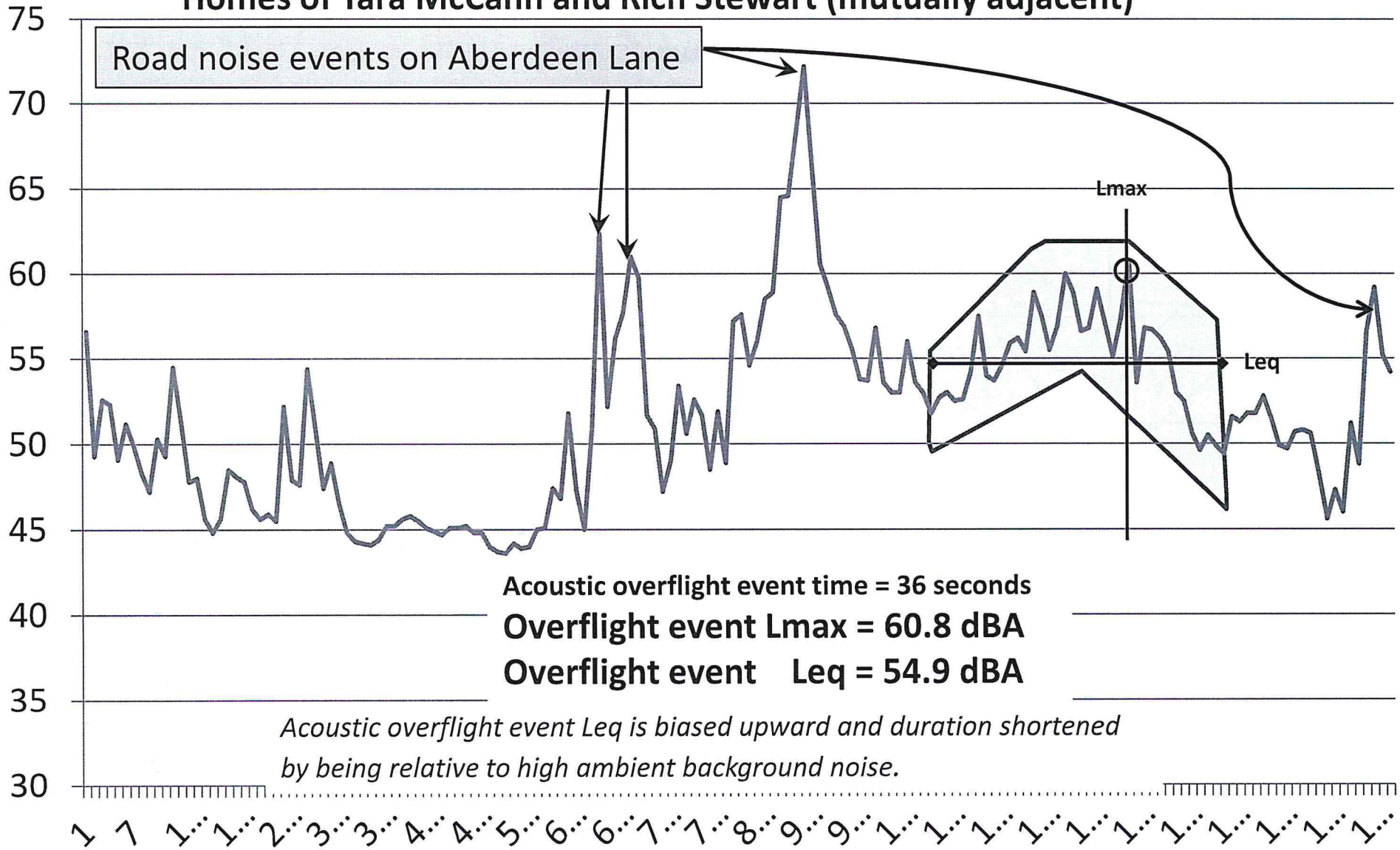
767-300 at 2637 Aberdeen Lane



UPS 2940 11/12/2014 17:18

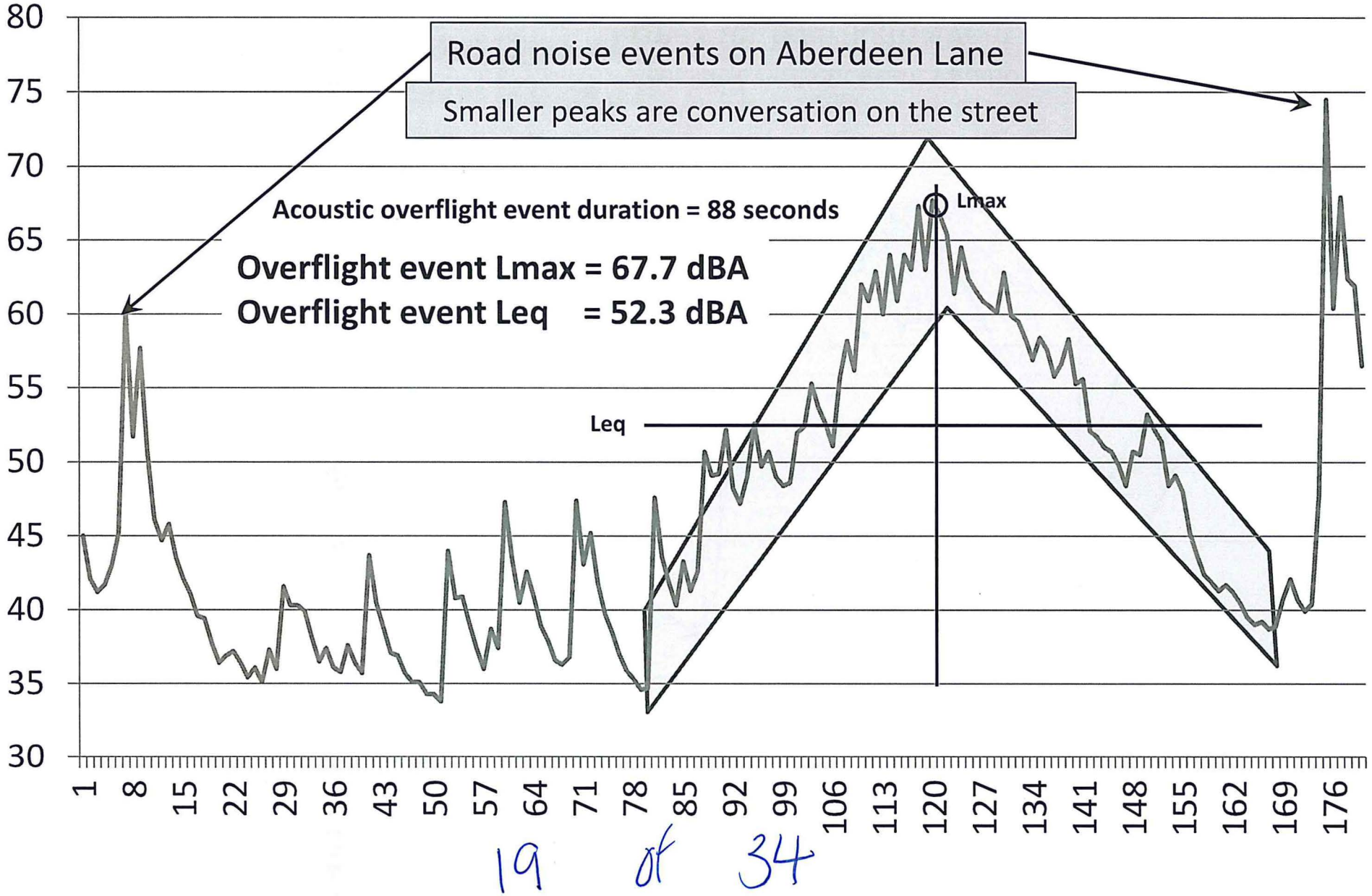
757-200 at 2637 Aberdeen Lane

Homes of Tara McCann and Rich Stewart (mutually adjacent)



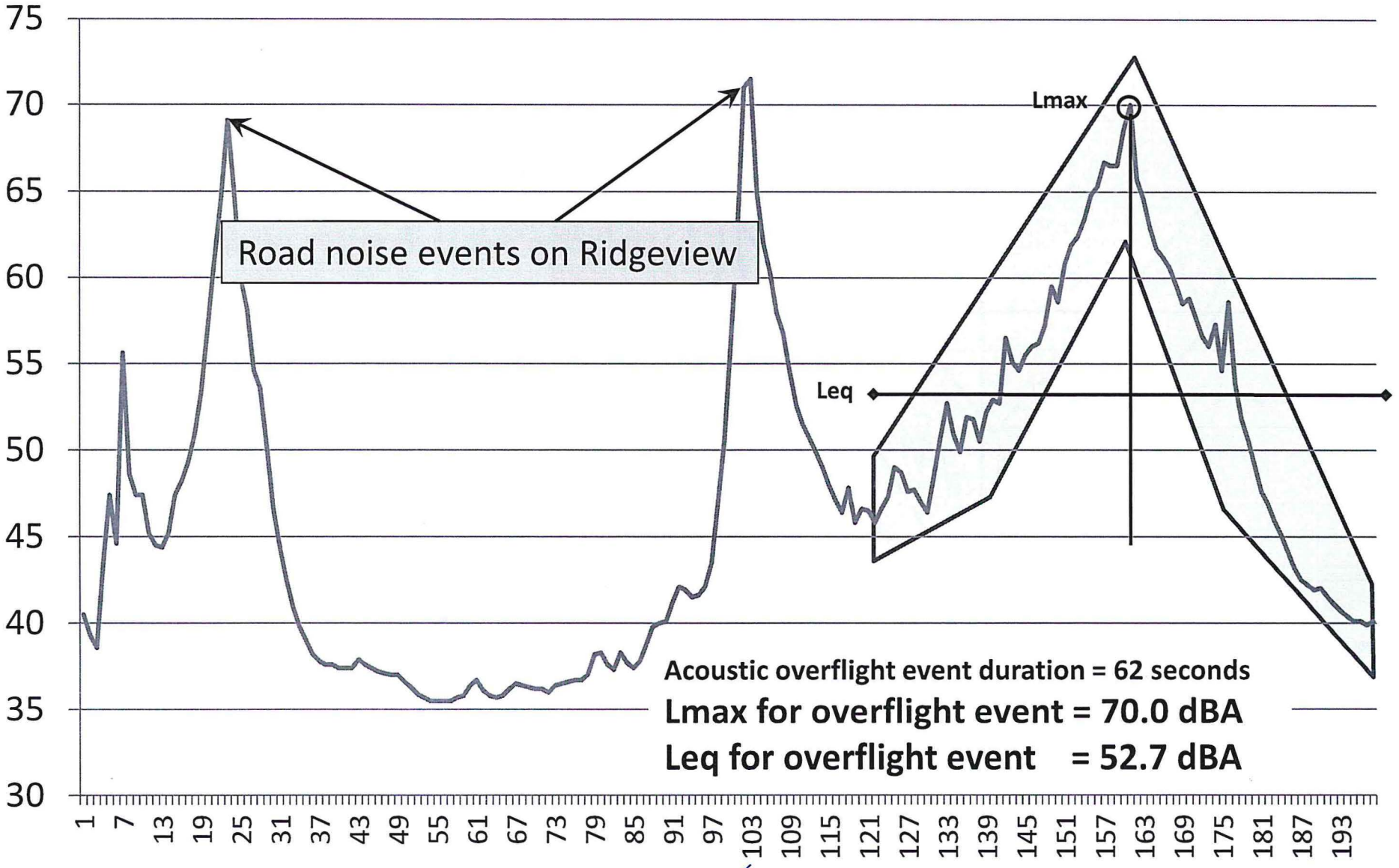
UPS 953 11/12/2014 20:10

A300-600 at 2637 Aberdeen Lane



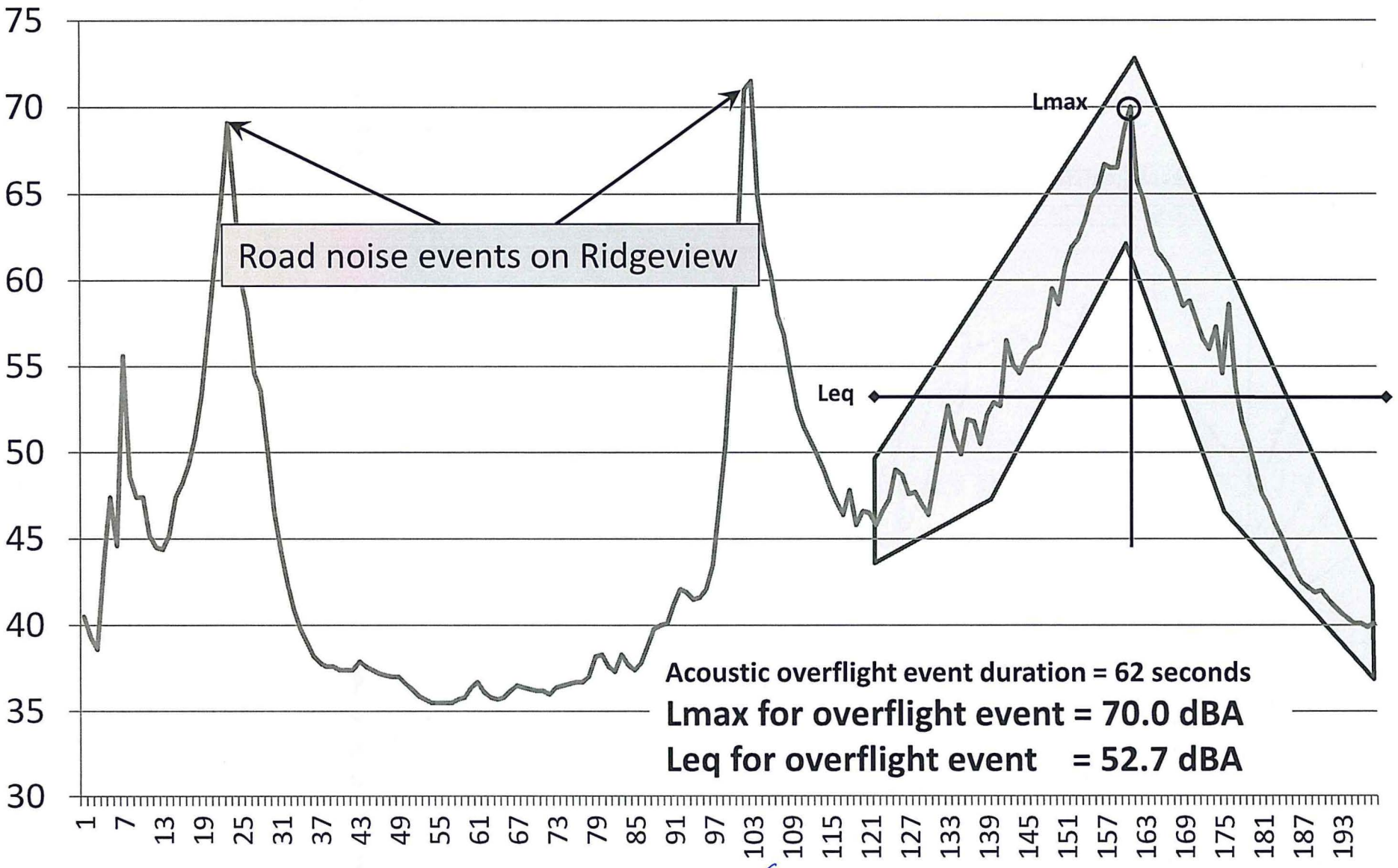
UPS 2958 11/14/2014 17:27

767-300 at Ridgeview



UPS 2958 11/14/2014 17:27

767-300 at Ridgeview

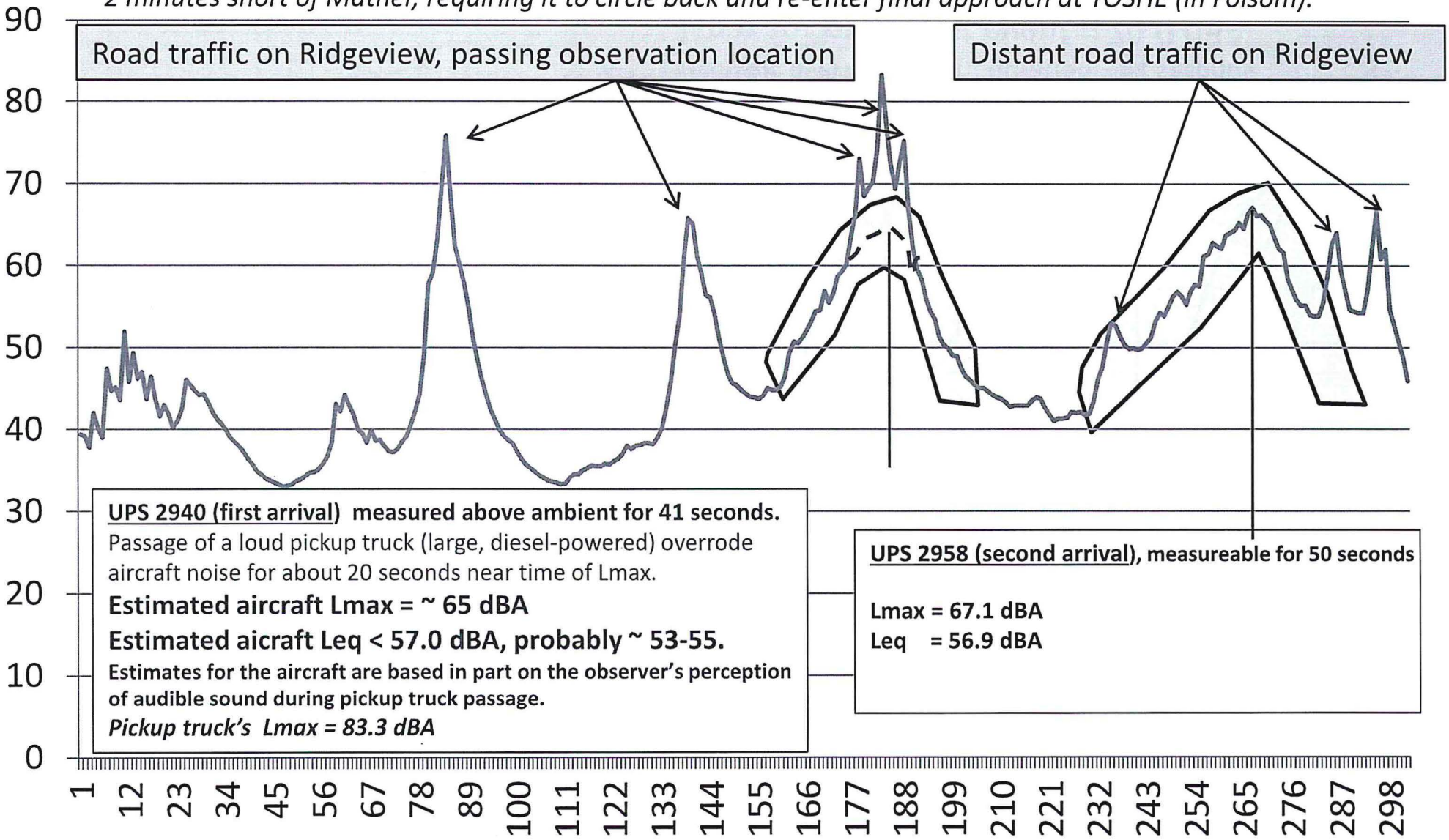


Sound Level Measurements

UPS 2940 2/18/2015 757-200 17:22:00 over Ridgeview

UPS 2958 2/18/2015 767-300 17:23:24 over Ridgeview

The in-trail aircraft had insufficient separation behind the lead aircraft on final approach under FAA Separation requirements for wake turbulence avoidance. ATC gave the in-trail aircraft a wave-off about 2 minutes short of Mather, requiring it to circle back and re-enter final approach at YOSHE (in Folsom).



UPS 2940 (first arrival) measured above ambient for 41 seconds.
Passage of a loud pickup truck (large, diesel-powered) overrode aircraft noise for about 20 seconds near time of Lmax.

Estimated aircraft Lmax = ~ 65 dBA

Estimated aicraft Leq < 57.0 dBA, probably ~ 53-55.

Estimates for the aircraft are based in part on the observer's perception of audible sound during pickup truck passage.

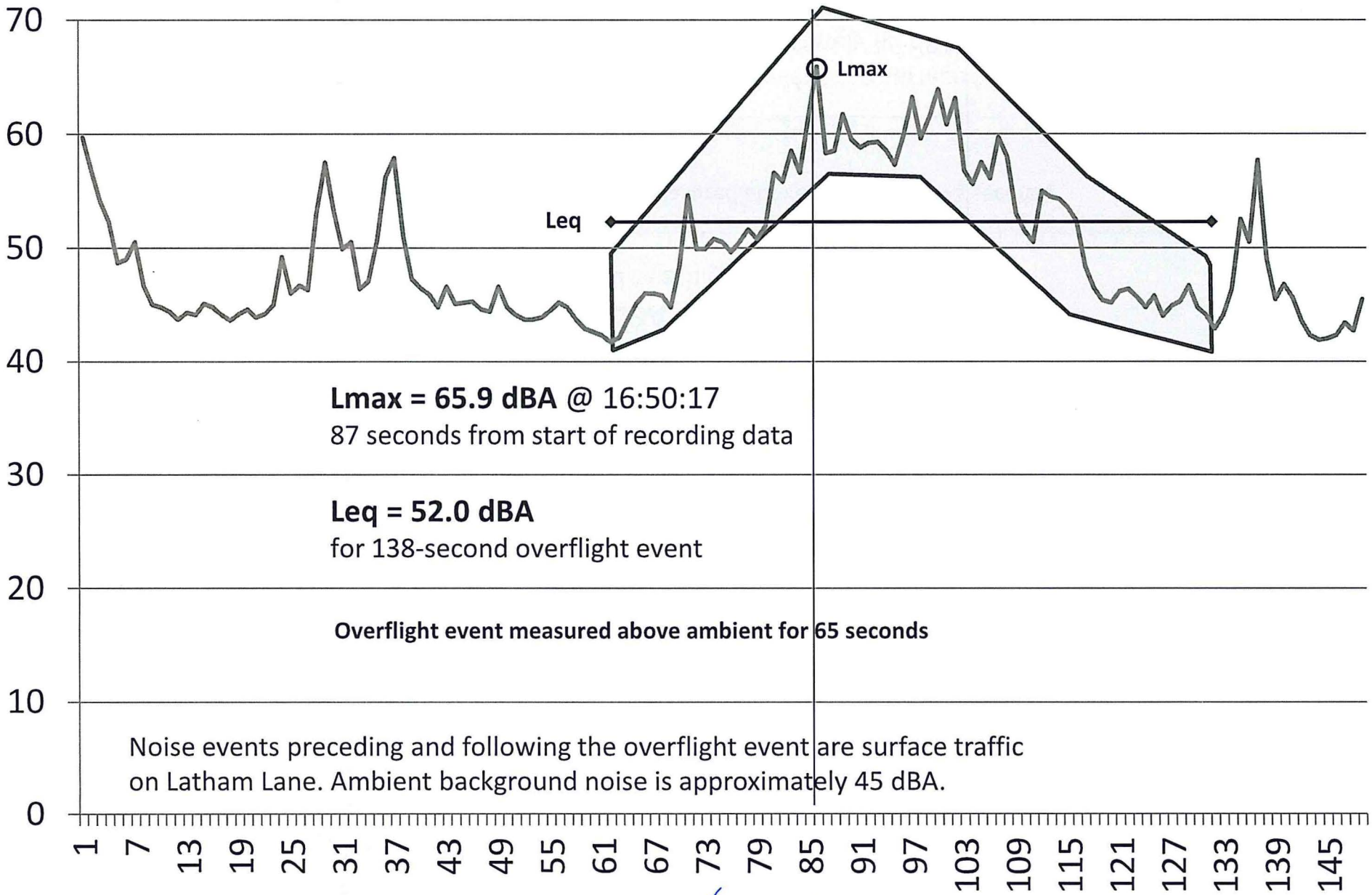
Pickup truck's Lmax = 83.3 dBA

UPS 2958 (second arrival), measureable for 50 seconds

Lmax = 67.1 dBA
Leq = 56.9 dBA

UPS-2958, 767-300 5/13/2015 16:49:02 - 16:51:20

Measurement Site: Within 100 feet of home of Larry Brilliant, in EDH



Lmax = 65.9 dBA @ 16:50:17
87 seconds from start of recording data

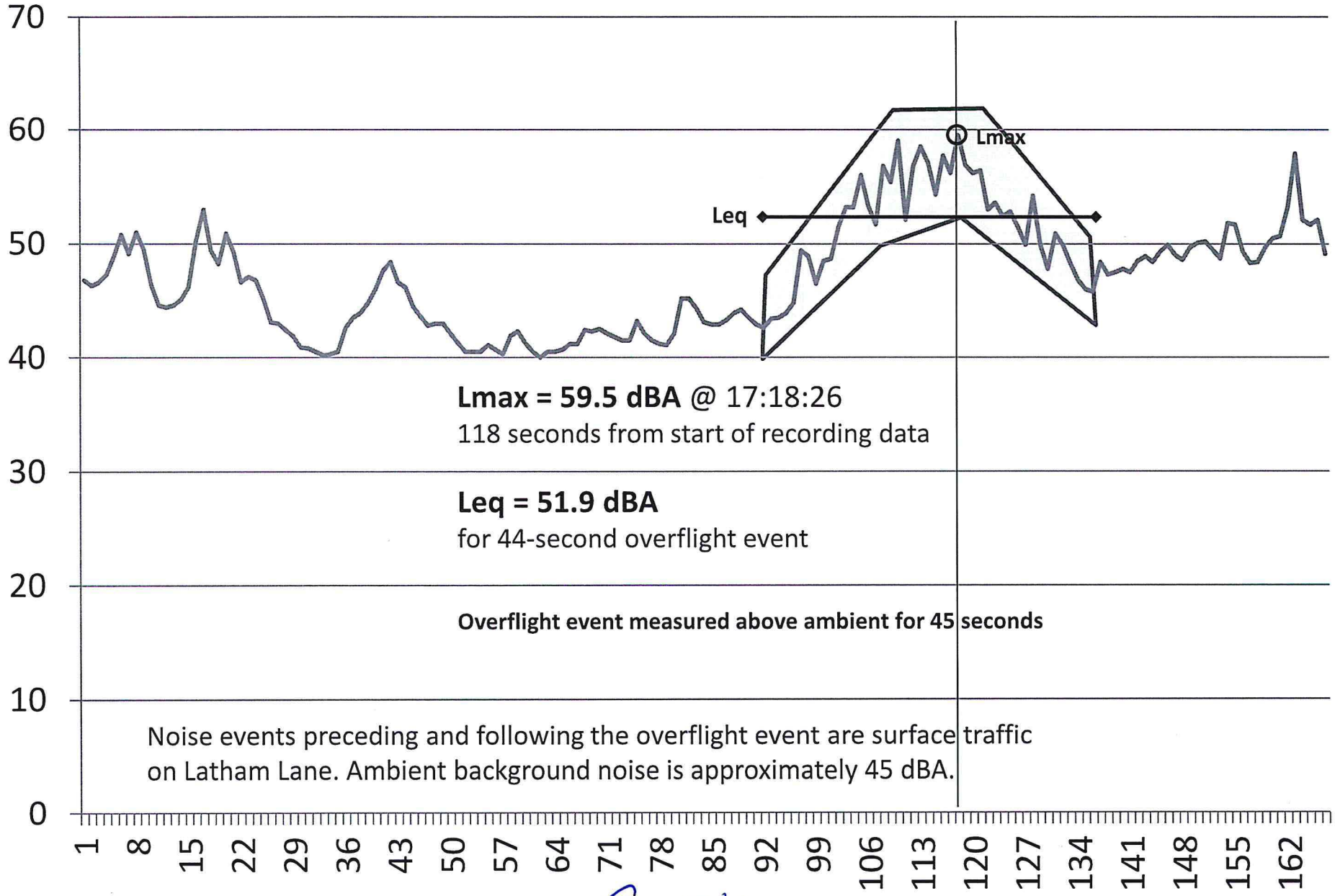
Leq = 52.0 dBA
for 138-second overflight event

Overflight event measured above ambient for 65 seconds

Noise events preceding and following the overflight event are surface traffic on Latham Lane. Ambient background noise is approximately 45 dBA.

UPS-2940, 757-200 5/13/2015 17:18:02 - 17:18:44

Measurement Site: Within 100 feet of home of Larry Brilliant, in EDH



Lmax = 59.5 dBA @ 17:18:26
118 seconds from start of recording data

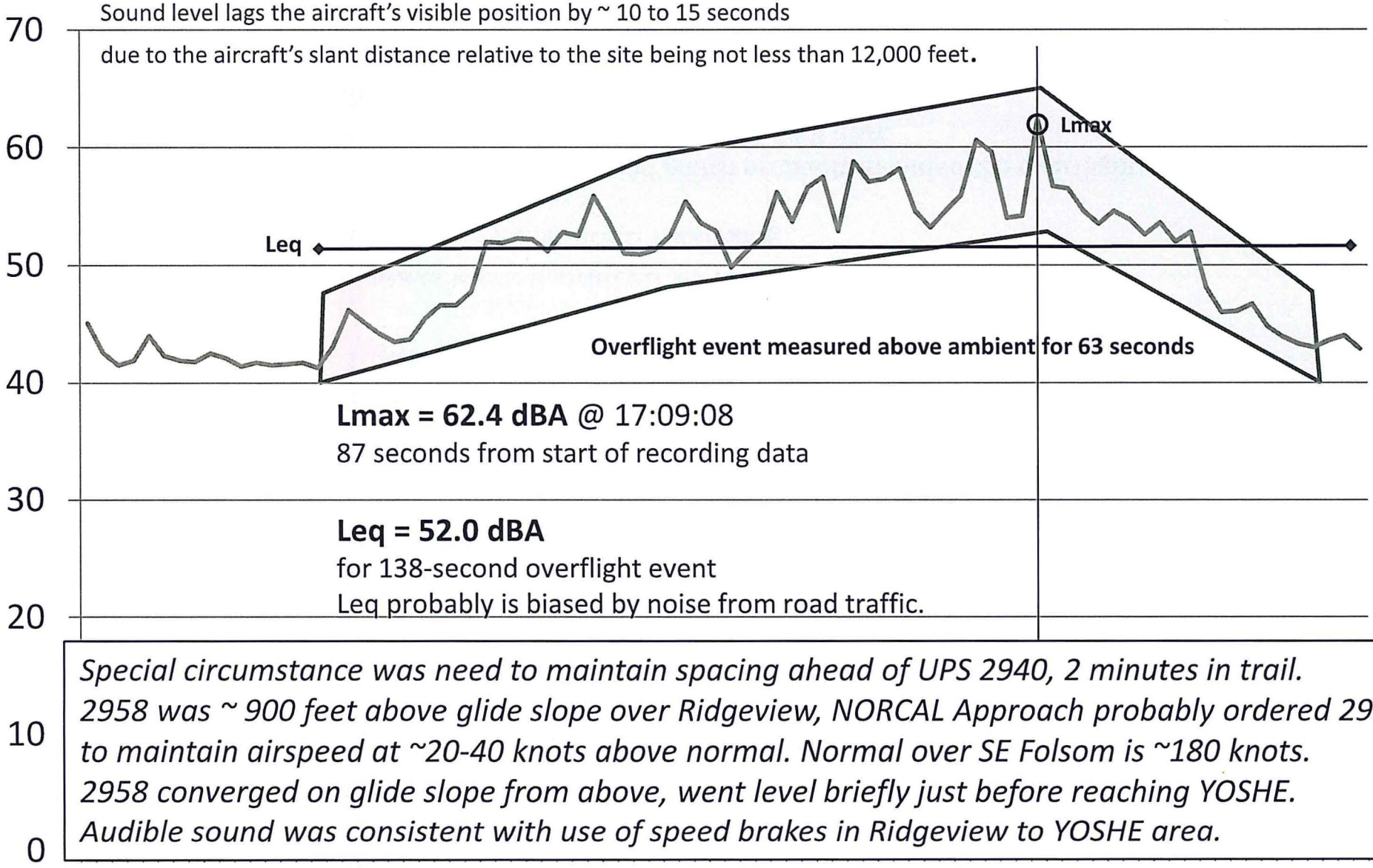
Leq = 51.9 dBA
for 44-second overflight event

Overflight event measured above ambient for 45 seconds

Noise events preceding and following the overflight event are surface traffic on Latham Lane. Ambient background noise is approximately 45 dBA.

UPS-2958, 767-300 5/20/2015 17:08:07 - 17:09:22

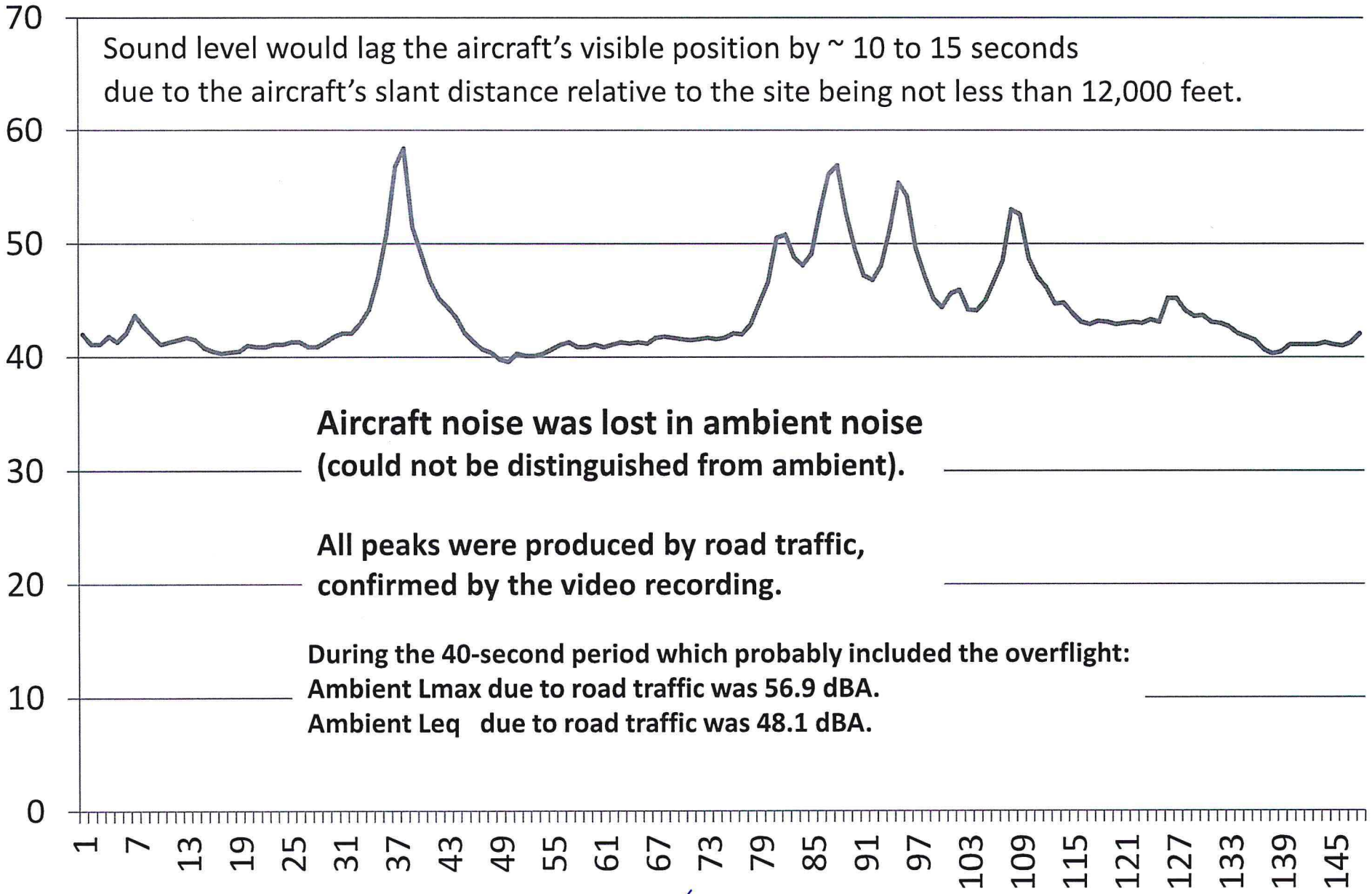
Measurement Site: Within 200 feet of home of Bill Bryant, in Folsom



Special circumstance was need to maintain spacing ahead of UPS 2940, 2 minutes in trail. 2958 was ~ 900 feet above glide slope over Ridgeview, NORCAL Approach probably ordered 2958 to maintain airspeed at ~20-40 knots above normal. Normal over SE Folsom is ~180 knots. 2958 converged on glide slope from above, went level briefly just before reaching YOSHE. Audible sound was consistent with use of speed brakes in Ridgeview to YOSHE area.

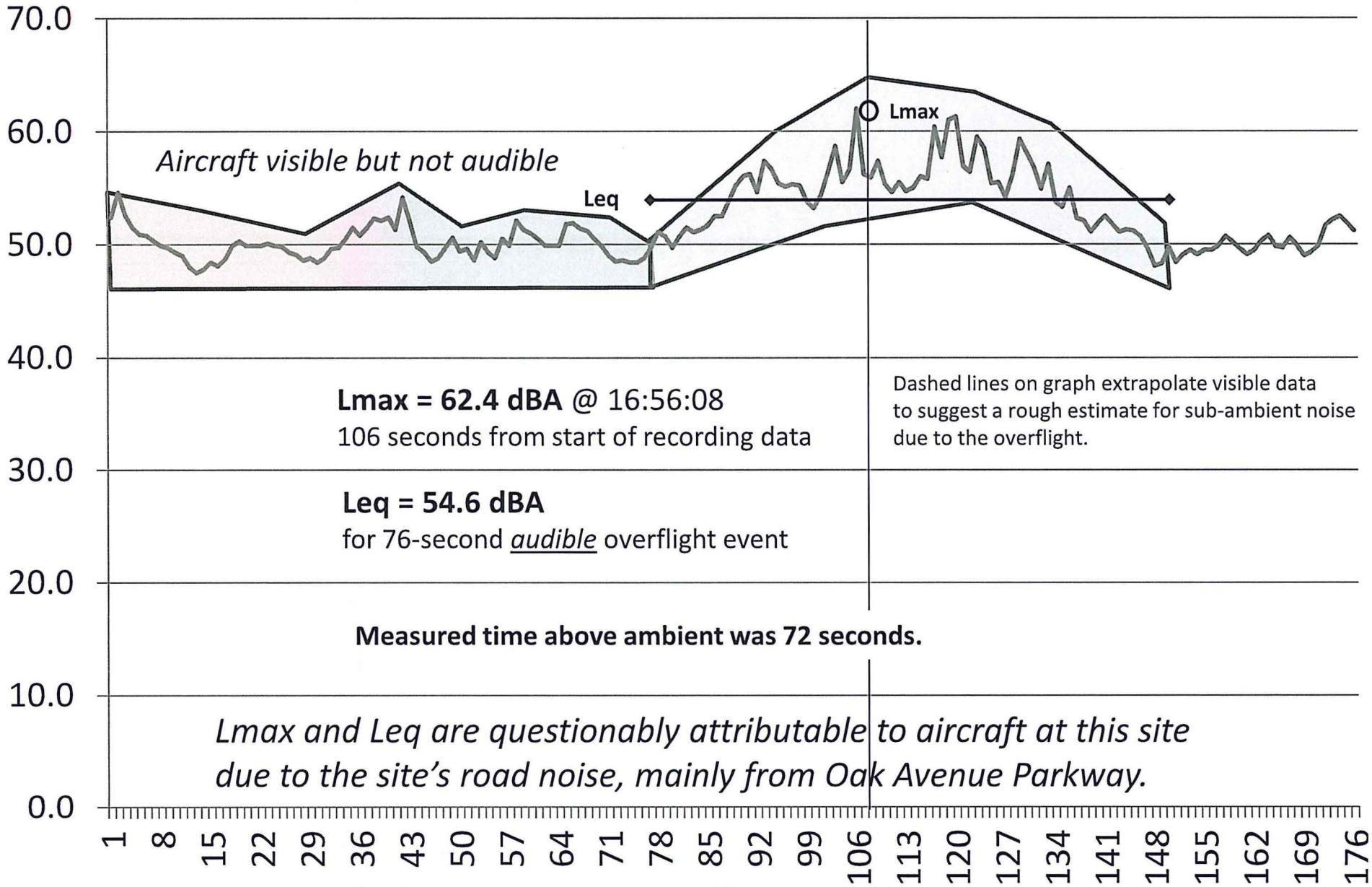
UPS-2940, 757-200 5/20/2015 17:10:49 - 17:12:34

Measurement Site: Within 200 feet of home of Bill Bryant, in Folsom



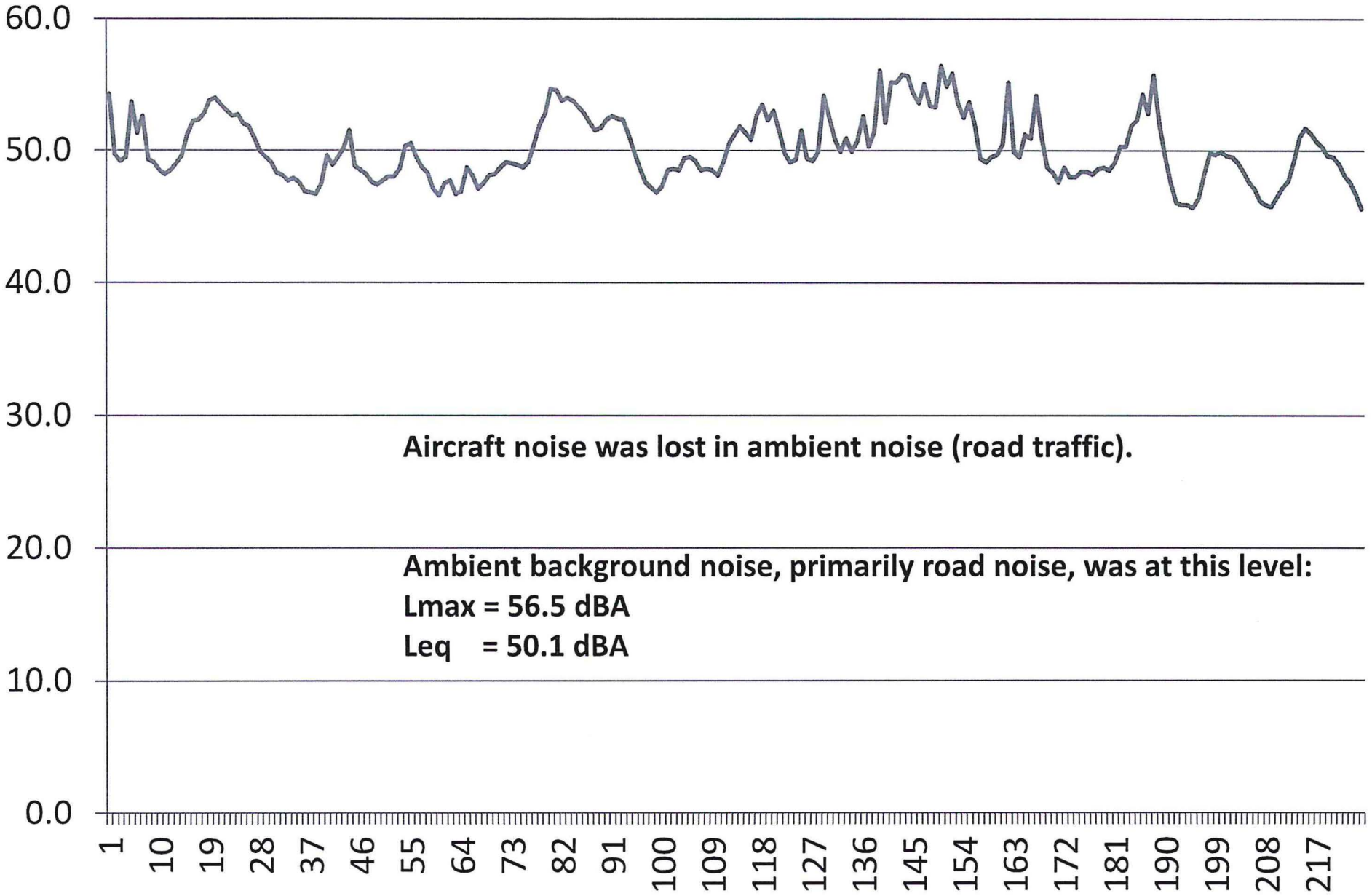
UPS-2958, 767-300 5/21/2015 16:55:22 - 16:58:18

Measurement Site: Within 100 feet of home of Chuck Coalson, in Folsom



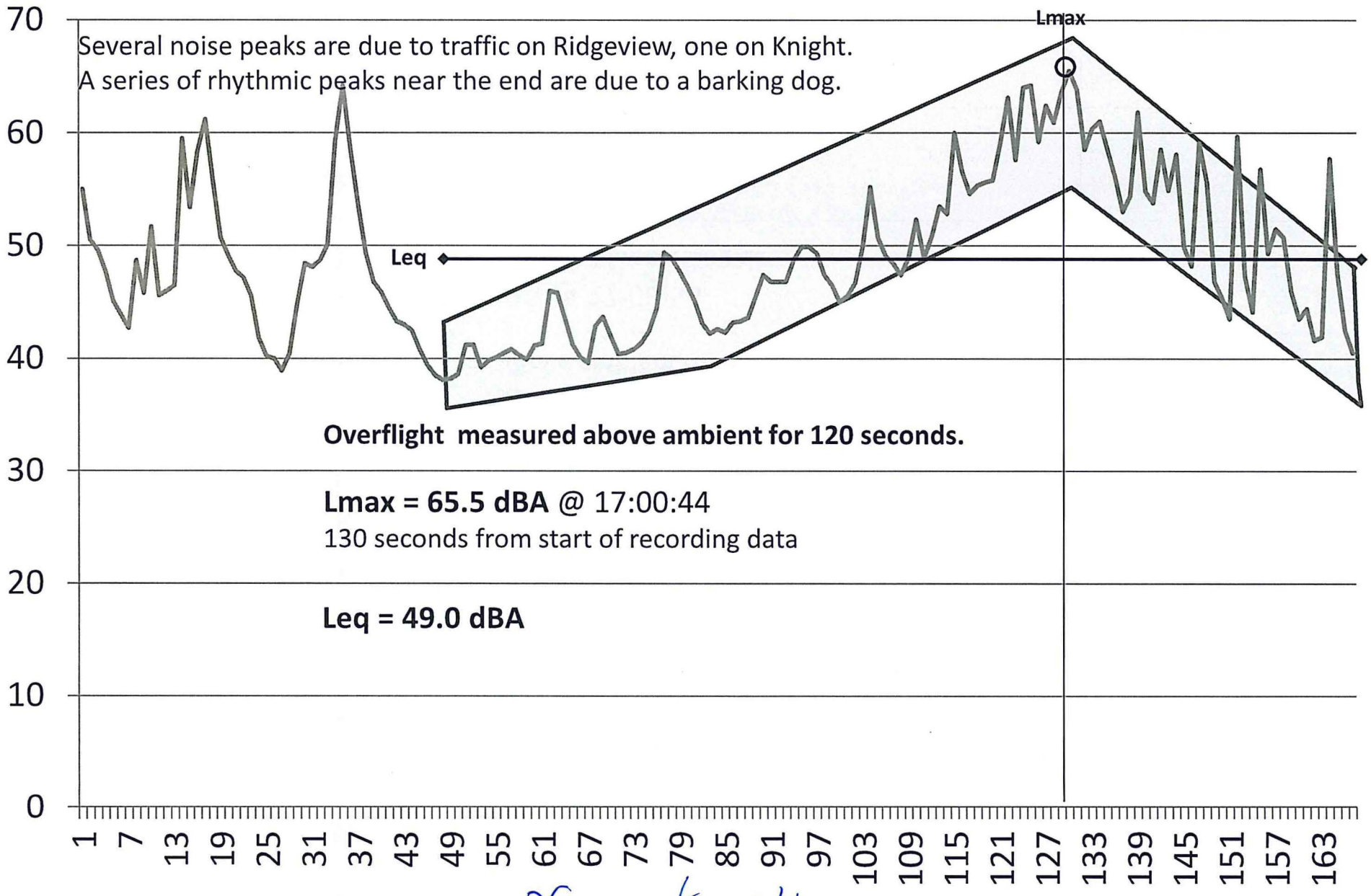
UPS-2940, 757-200 5/21/2015 17:53:46 - 17:57:26

Measurement Site: Within 100 feet of home of Chuck Coalson, in Folsom



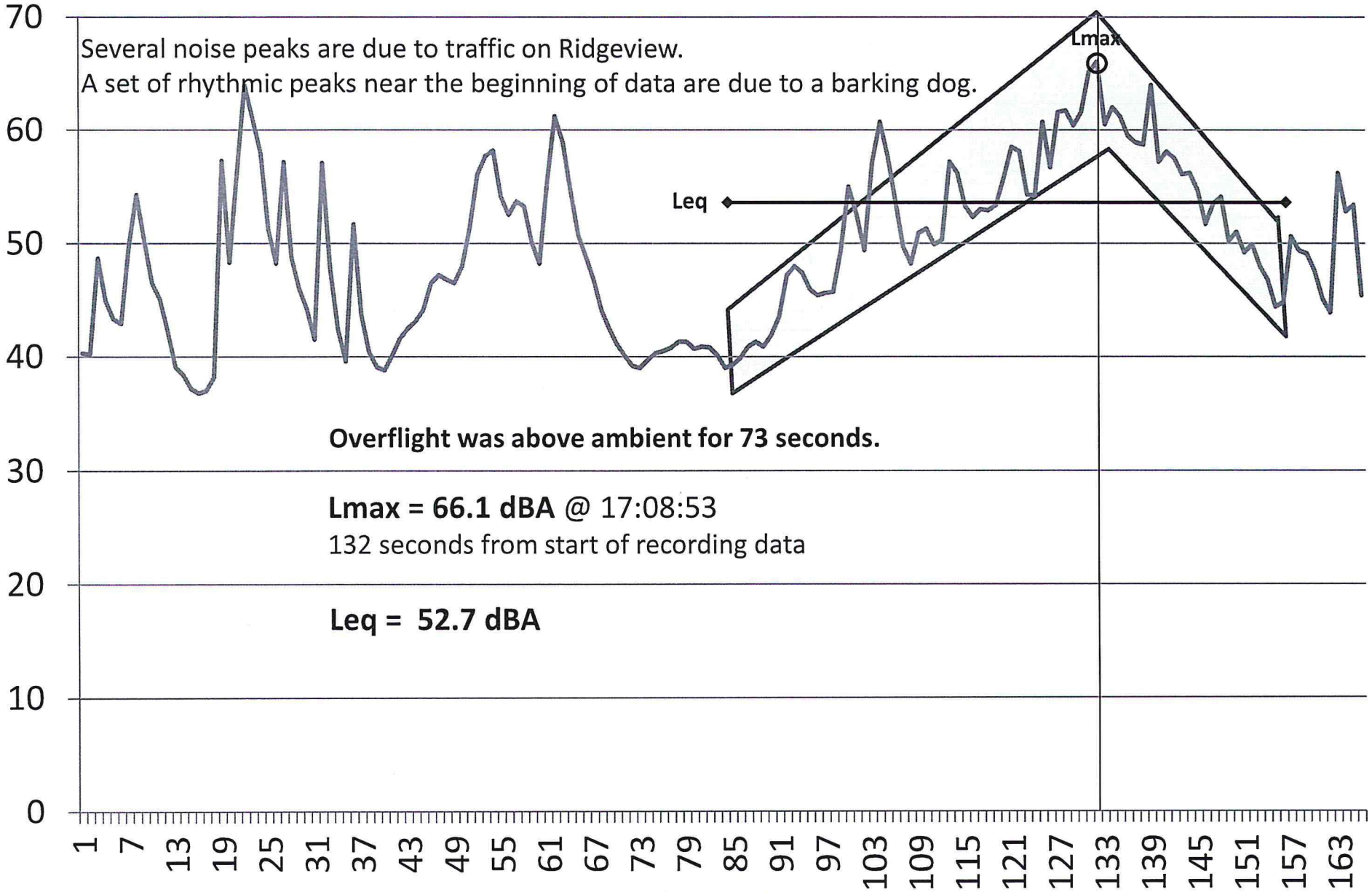
UPS-2940, 757-200 5/27/2015 16:58:34 - 17:01:17

Measurement Site: Ridgeview & Knight, EDH max noise exposure location



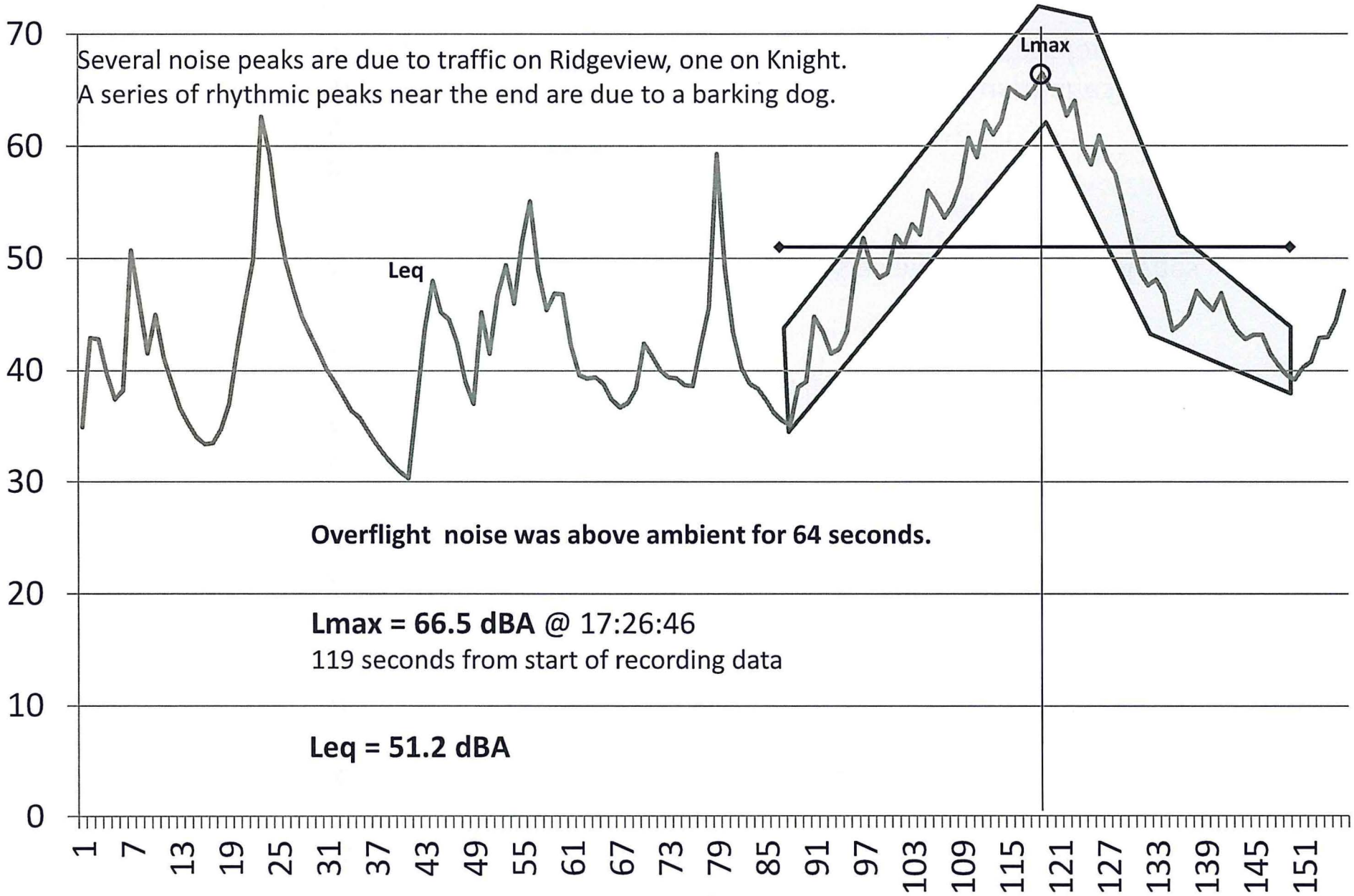
UPS-2958, 767-300 5/27/2015 17:06:443 - 17:09:27

Measurement Site: Ridgeview & Knight, EDH max noise exposure location



UPS-2940, 757-200 5/28/2015 17:26:46 - 17:29:22

Measurement Site: Ridgeview & Knight, EDH max noise exposure location



15 of the 25 data samples were taken on Ridgeview Drive in El Dorado Hills, at the point of maximum noise exposure, directly below the approach. This is at the intersection of Ridgeview and Knight, also very close to Knollridge.

Site choice included samples at or within 200 feet of the homes of the three CRMA co-chairs. Sampling in Folsom was limited for two functional reasons:

-- The Folsom sites have have lower overflight noise exposure than the Ridgeview site.
-- Ambient background noise is higher in Folsom due to road noise.

Those two factors combine to produce a high measurement failure rate: Inability to distinguish jet noise masked by ambient noise. In attempting to measure noise for four approaches in Folsom, two resulted in "lost in ambient" results -- one at each of the two sites used.

If desired, additional materials can be made available on sierrafoot.org. These types of files are available:

- Data sets exported by the meter as Excel files
- WebTrak screen images showing approach paths, including the aircraft position and data block at the point closest to the measurement site.
- Individual PowerPoint graphic summary pages. These are the content for the remainder of this document.
- In some cases, an iPad video of the approach.

Each data set in the meter is summarized in a single graph per page in the remainder of this document. Two columns of the Excel spreadsheets exported by the meter are imported to PowerPoint to produce the graph.

In most cases each graph shows noise from a single overflight. Data recording normally was started about one to two minutes before the aircraft reached the measurement site.

In two cases a graph shows two overflights, when two arrivals happened to be spaced *very* closely, typically two to three minutes in-trail. UPS 2958 from Louisville and UPS 2940 from Columbia usually arrive around the same time, sometimes they would arrive almost exactly simultaneously except for Air Traffic Control management to maintain required separation.

For each approach two noise levels are reported in the detail pages:

---- Lmax, the maximum instantaneous sound level in any data sample during the event.
---- Leq, the equivalent (average) sound level for the duration of the entire event.

Wherever the site of an observation is not noted explicitly, the site is Ridgeview & Knight in El Dorado Hills: The point of maximum noise exposure on the Mather 22L Approach.

End of Document