Traffic Noise Abatement by Diamond Grinding in Ohio

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Presented By:

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Objective:

- to identify traffic noise level and frequency differences due to the re-texturing of the concrete pavement surface by grinding.

Surface texture before diamond grinding

Surface texture after diamond grinding

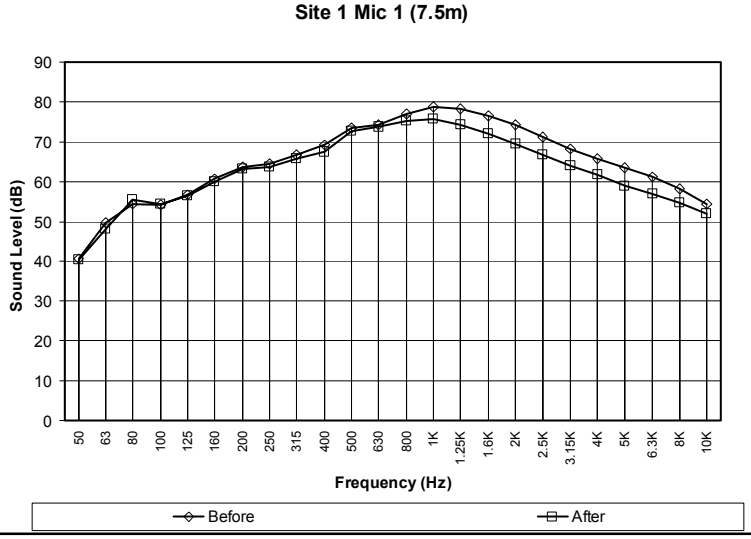
Project area map showing site locations

RTA and DAT Recorders

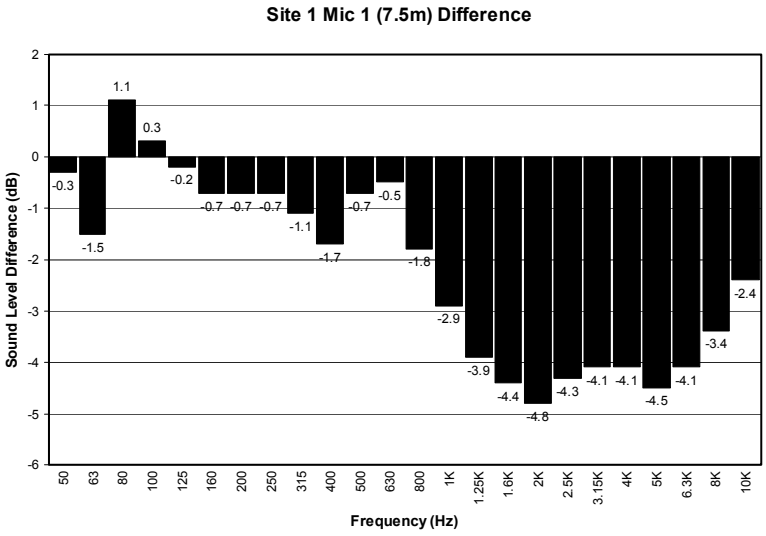
7.5 and 15 meter microphones

Environmental monitoring equipment

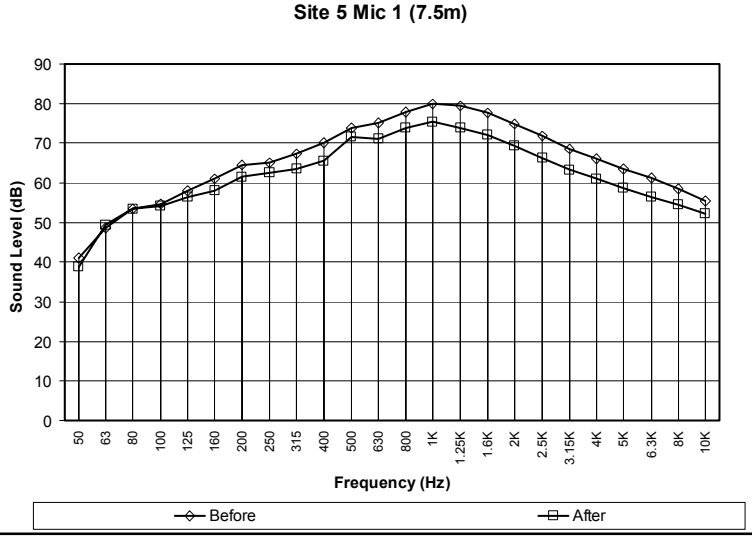
Equivalent continuous sound level measured before and after diamond grinding



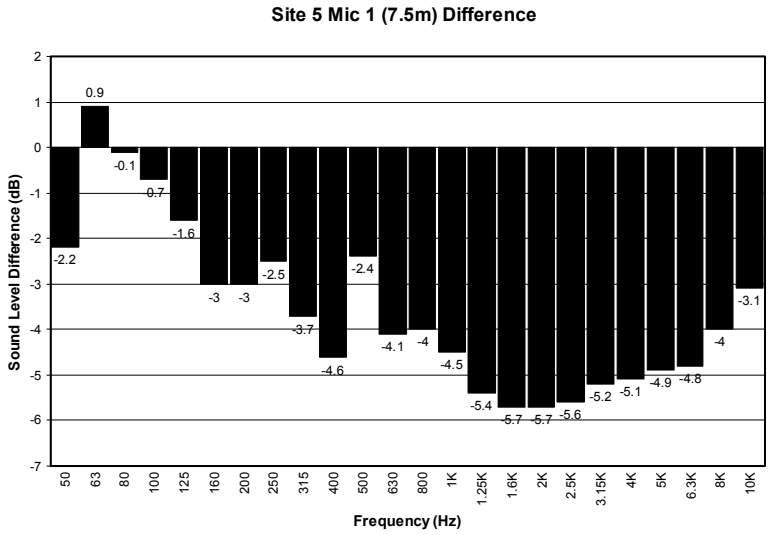
The difference in equivalent continuous sound level



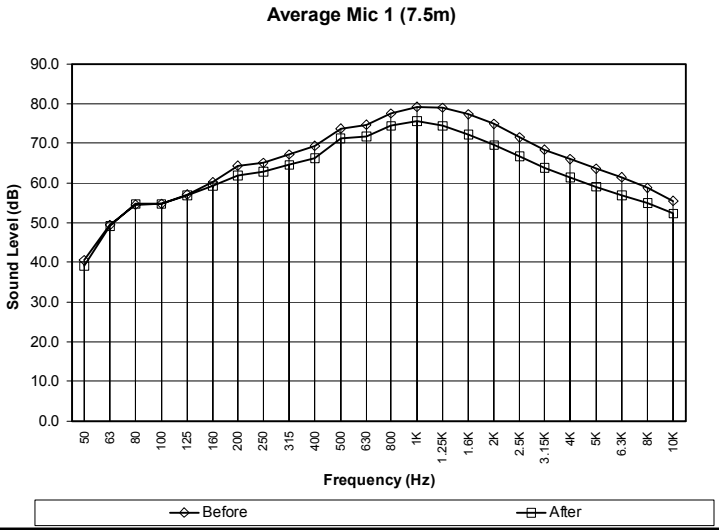
Equivalent continuous sound level measured before and after diamond grinding



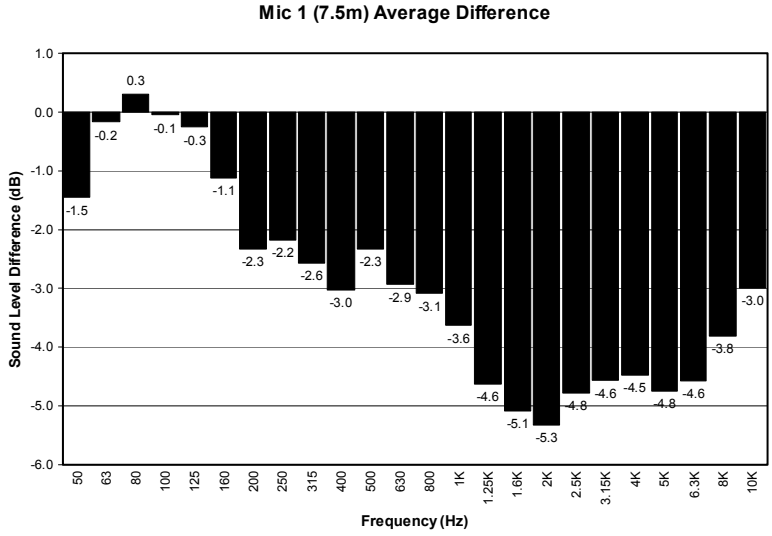
The difference in equivalent continuous sound level



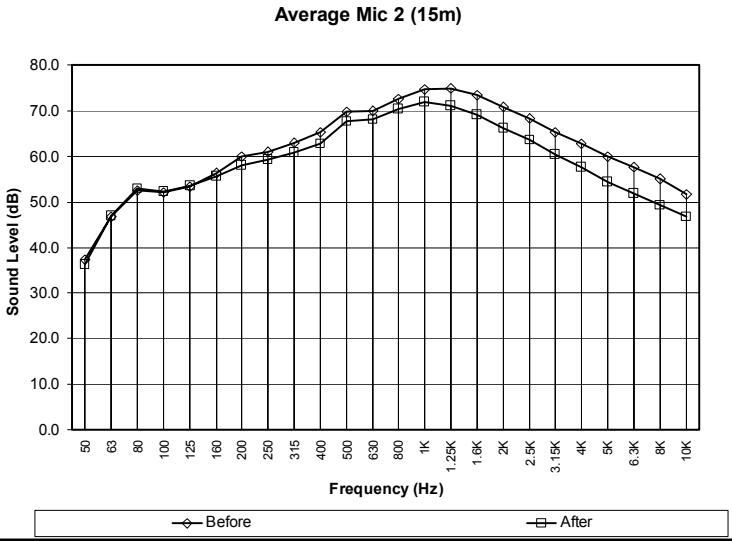
Average equivalent continuous sound level measured before and after diamond grinding



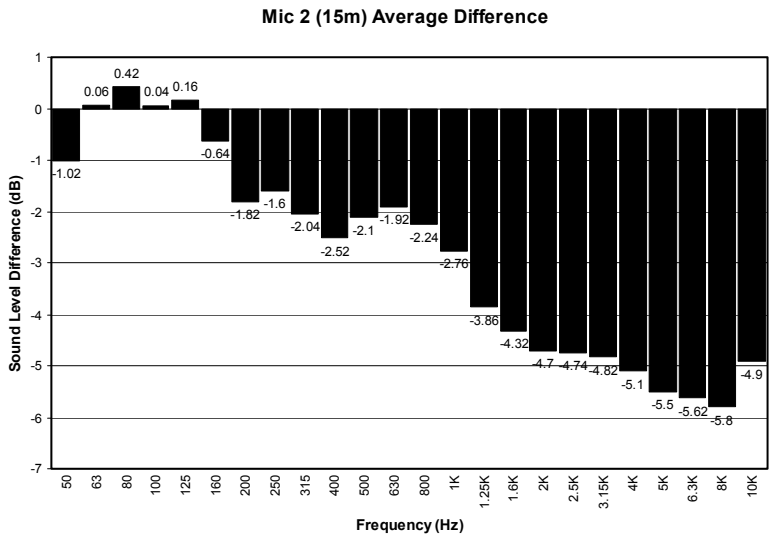
Average equivalent continuous sound level difference



Average equivalent continuous sound level measured before and after diamond grinding



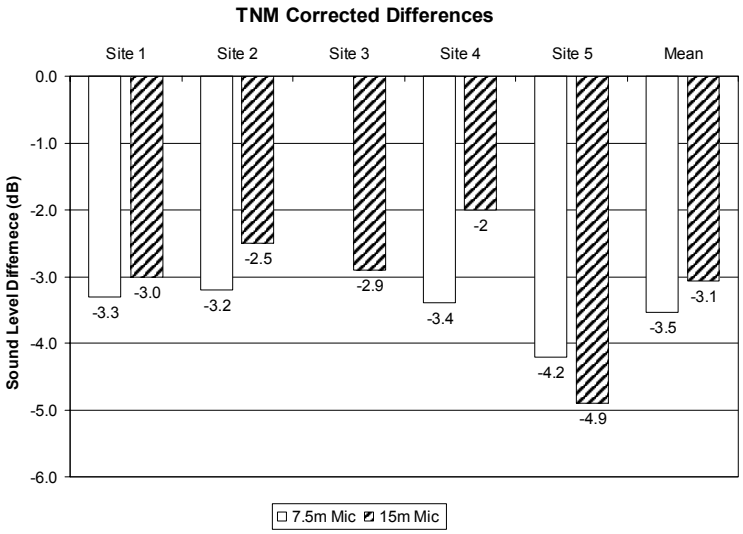
Average equivalent continuous sound level difference



TNM Simulation Results

	Sound Level (dB)	
	7.5m	15m
Site 1		
Before	78.2	74.1
After	78.8	74.7
Difference	0.6	0.6
Site 2		
Before	78.3	74.6
After	77.7	73.8
Difference	-0.6	-0.8
Site 3		
Before	78.1	74.1
After	78.2	74.1
Difference	0.1	0.0
Site 4		
Before	78.3	74.5
After	77.6	73.7
Difference	-0.7	-0.8
Site 5		
Before	78.5	74.1
After	78.1	74.5
Difference	-0.4	0.4

TNM corrected differences in before and after broadband traffic noise levels



Conclusions

- The average reduction in broadband noise at 7.5 m was 3.5 dB (3.2 dB to 4.2 dB range), and the average reduction at 15m was 3.1 dB (2 dB to 4.9 dB).

Conclusions continued…

- Spectrum analysis showed the greatest reduction in noise occurred at frequencies above 1 kHz and that the retexturing had little to no effect on frequencies less than 200 Hz

Questions???

Average environmental conditions

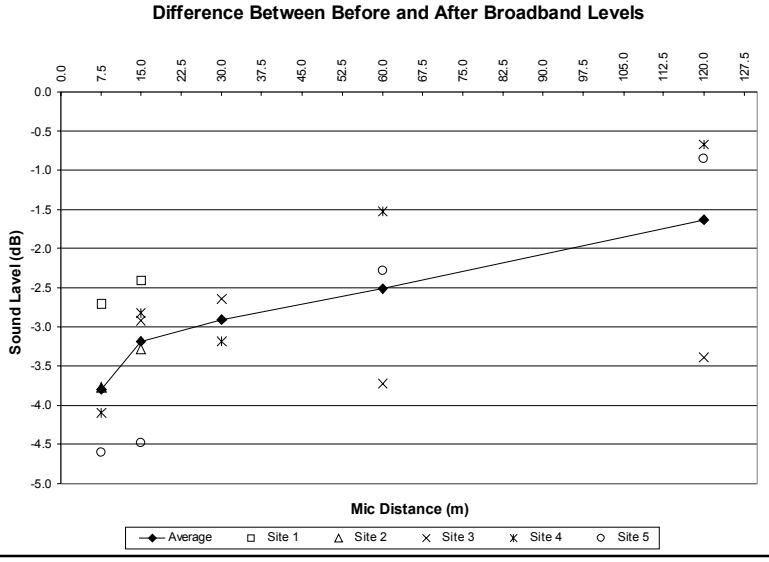
	Average Ambient Temp (°C)	Average Pavement Temp (°C)	Average Relative Humidity (%)	Average Wind Speed (km/h)	Average Wind Direction
Site 1					
Before	27	28	61	7	ENE
After	8	4	70	2	SSE
Site 2					
Before	27	28	82	8	WNW
After	8	7	71	2	S
Site 3					
Before	22	24	63	2	S
After	9	2	56	4	S
Site 4					
Before	24	30	55	8	WSW
After	3	4	76	2	W
Site 5					
Before	21	24	62	3	NNE
After	7	3	76	5	ESE

Measurement system calibration

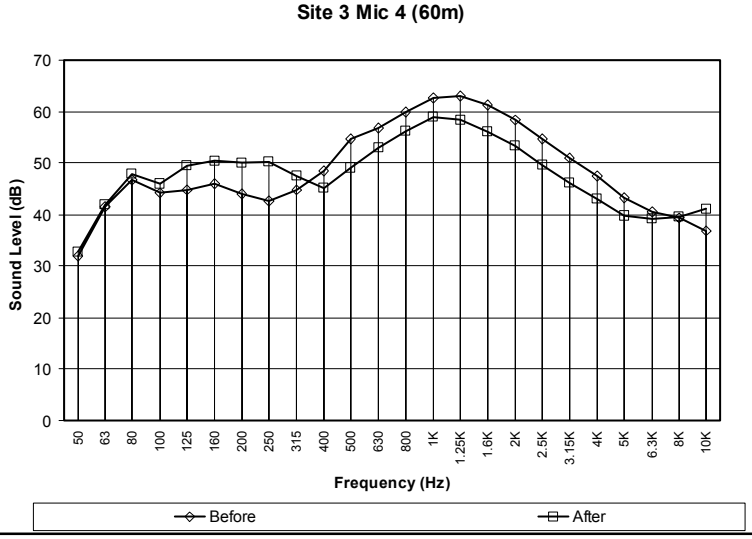
Measurement system calibration

Distant Receivers

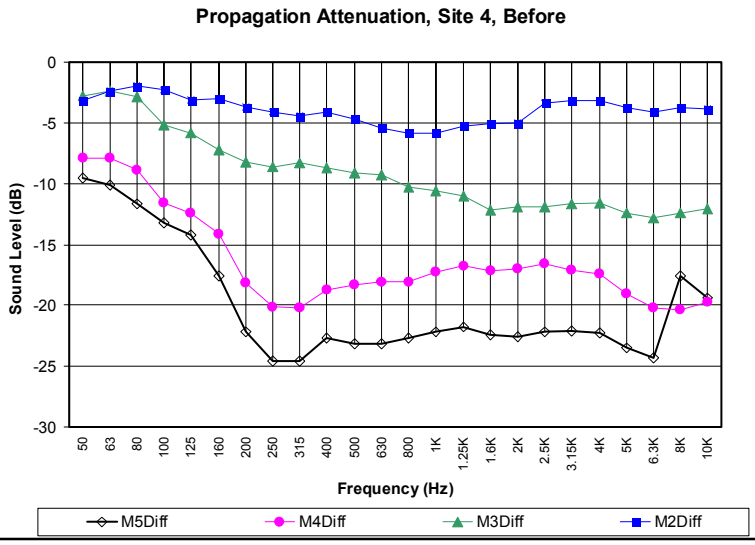
The differences in broadband levels between before and after diamond grinding



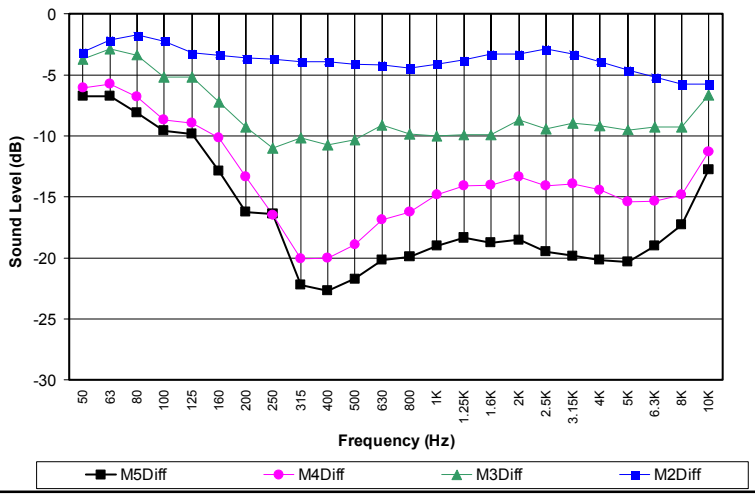
Equivalent continuous sound level measured before and after diamond grinding



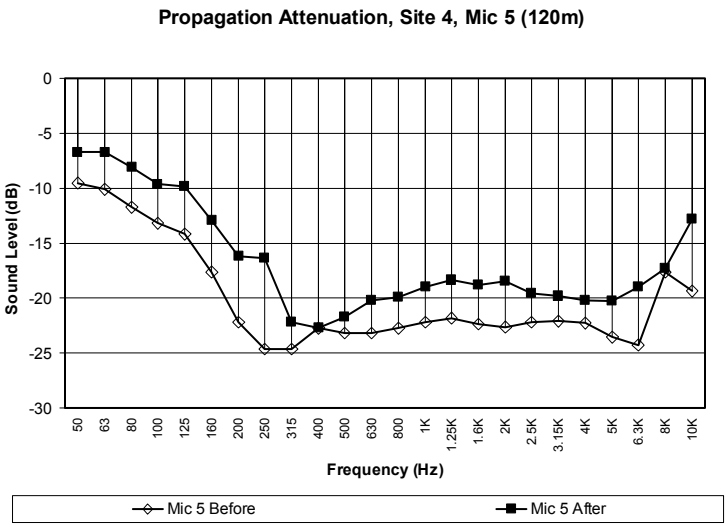
The difference in noise levels, before diamond grinding, between the 7.5 m microphone position and each of the more distant microphone



The difference in noise levels, after diamond grinding, between the 7.5 m microphone position and each of the more distant microphone positions



The difference in noise levels between the 7.5 m and 120m microphone position before and after diamond grinding



Equivalent continuous sound level compensated for calculated propagation attenuation differences