



HSE  
Occupational Health & Safety  
and Environmental Protection unit

# Construction noise assessments and mitigation proposals during asbestos remediation works in B60

Jordan MINIER  
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EDMS 2917544

# Construction noise definitions

- **Airborne noise:** Airborne noise is transmitted through the air and atmosphere (blue waves).
- **Structure borne noise:** results from an impact on, or a vibration against, a part of a building fabric resulting in sound being radiated from an adjacent vibrating surface.

Example: hand-held drill or breaker (red waves).



# CERN's "noise at work" criteria

## GSI-SH-4 Protection of workers against noise extracts:

### "ALARA"

As far as reasonably possible, Organic units, if applicable in collaboration with other Organic units concerned, shall apply technical solutions to achieve at the workstations the values indicated in the table below in accordance with the ISO 11690-1 standard.

The values below shall take account of all Immissions at the workstation, except for communication associated with the workstation itself (e.g. telephone, conversations, etc.).

Activity type	Values in dB(A)
Industrial	< 80
Office work or production work similar to office work, monitoring work, control rooms or workstations in a room with IT servers	< 55

For highly complex activities requiring particular concentration it is recommended to decrease the values above by 10 dB(A).



Noise criteria	
Noise transmission	Criteria
Structure borne noise (in receptor room)	<b>55 dBA</b>
Airborne noise (at receptor facade)	<b>80 dBA with closed windows</b>

**Note:** Following facade insulation can be considered

- 10 dBA with opened windows
- 25 dBA with closed windows

# Works programme

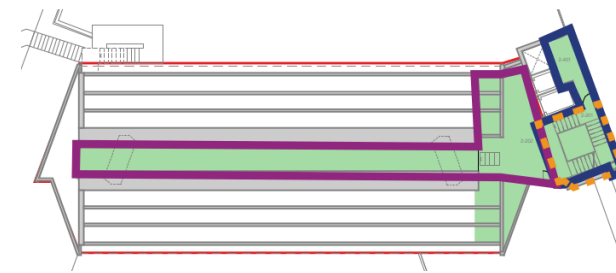
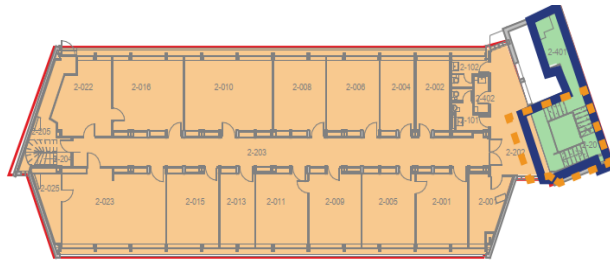
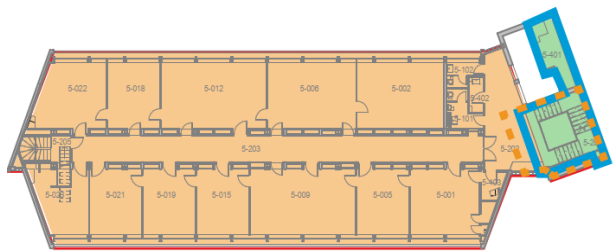
Activities	Description	Location	Duration (weeks)	Dates
1	Option A - asbestos remediation in office area (floors 2 to 6) with slab conservation. Option B - asbestos remediation in office area (floors 2 to 6) without slab conservation.	Office area	5	From 10/07 to 11/08
2	Asbestos remediation in technical room (1/2 impair floors)	North staircase	2	From 14/08 to 22/09
3	Asbestos remediation in technical floor	R+2	2	
4	Asbestos remediation in technical room (1/2 pair floors )	North staircase	1	
5	Asbestos remediation in north staircase	North staircase	1	

**Hours of work:**  
7am-12am  
1pm-5:30pm

**Note 1:** Some slight variation in the activity programme can be expected.

**Note 2:** Air Handling Unit (AHU) will be operating 24/7 at the B60 façades to control asbestos dispersion. Numbers of AHU will decrease at the end of Activity 1.

Activity 1
  Activity 2
  Activity 3
  Activity 4
  Activity 5

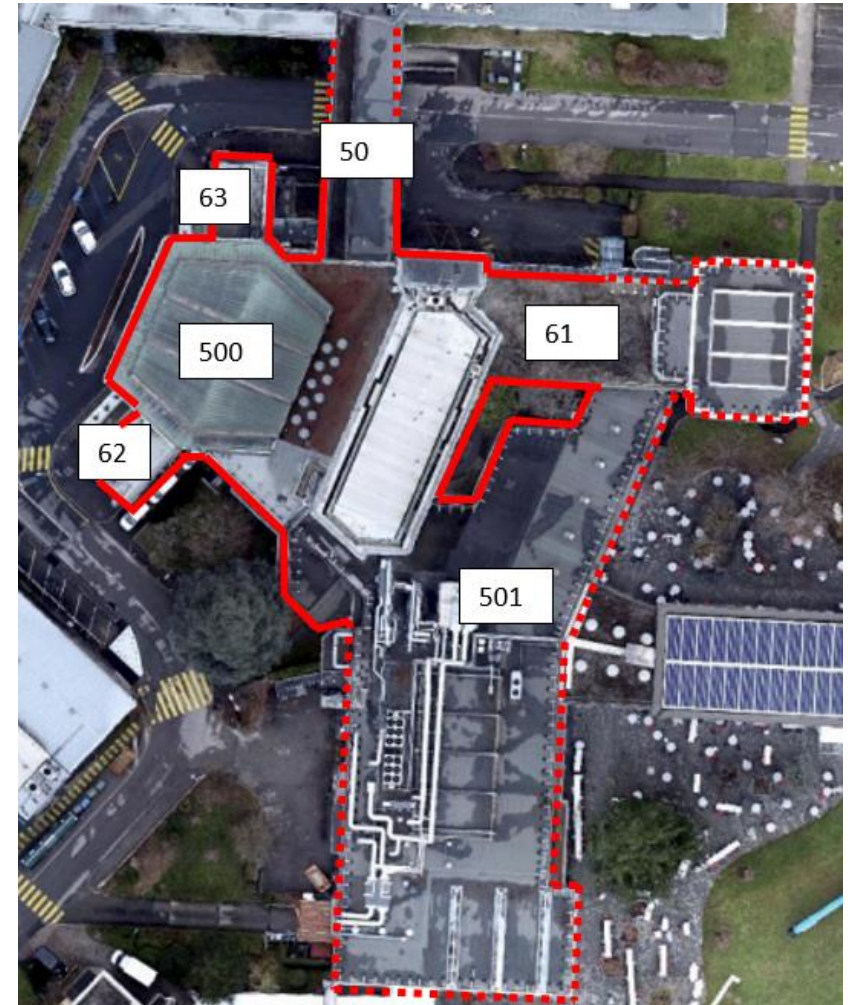


# Structure borne noise (SBN) predictions

Structure borne noise (SBN) will impact any building structurally connected to B60: **B500, B61, B62, B63 et B50**.

This disturbance could **not be forecasted** for the following reasons:

- pre-vibration survey was not possible due to asbestos presence.
- works programme includes the use of vibrating tools at all storeys at the same time to minimise works duration.



SBN impact planning

Activity	Description	Duration (weeks)	SBN impact
1	Option A - asbestos remediation in office area (floors 2 to 6) with slab conservation. Option B - asbestos remediation in office area (floors 2 to 6) without slab conservation.	5	Yes
2	Asbestos remediation in technical room (1/2 impair floors)	2	Yes
3	Asbestos remediation in technical floor	2	No
4	Asbestos remediation in technical room (1/2 pair floors )	1	Yes
5	Asbestos remediation in north staircase	1	No

# Airborne noise predictions

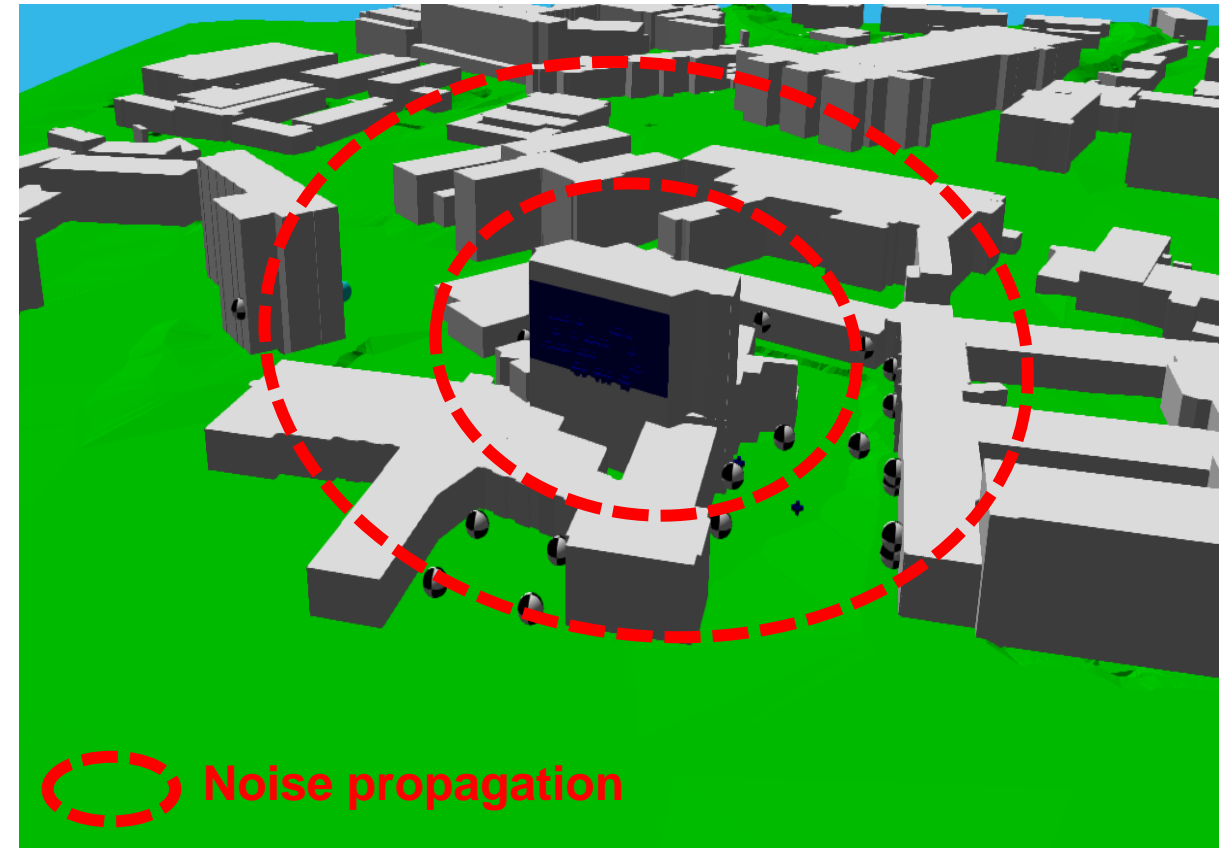
The “Directive sur le bruit de chantier” from OFEV requires that a construction noise assessment is carried out.

To do so, 3D noise model has been used to predict noise levels associated with the construction activities.

The software sums the noise levels calculated from each noise source at each receptor location.

Plant noise levels are taken from:

- Datasheets provided by manufacturer
- On-site measurement.
- BS 5228 Code of practice for noise and vibration control construction and open sites database.



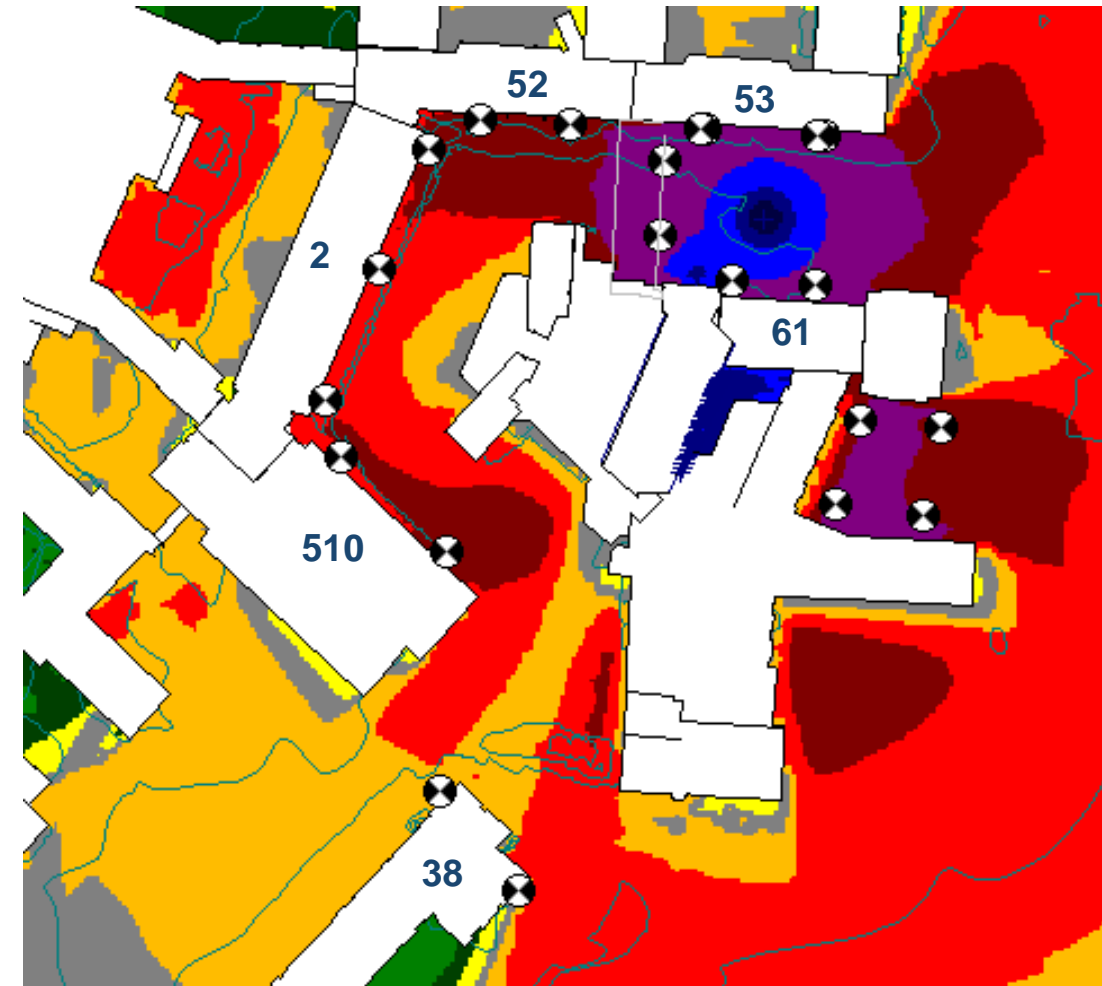
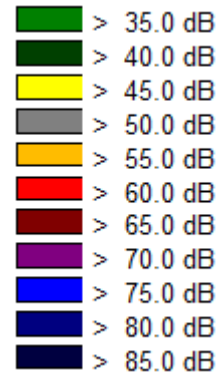
# Activity 1 – Asbestos remediation in office area

→ From 10/07 to 11/08 (5 weeks)

Building	Max noise levels (with closed windows) 8 hours average – dBA
B53	46.5
B50	50
B52	43
B2	40
B510	40.5
B38	31.5
B61	49.5
Cantine (Terrasse)	68 (Terrasse)

**Note 1:** SBN not included in noise levels results.

**Note 2:** ALARA criteria :  $55 \text{ dBA} + 25 \text{ dBA} = \underline{80} \text{ dBA}$  at facade.

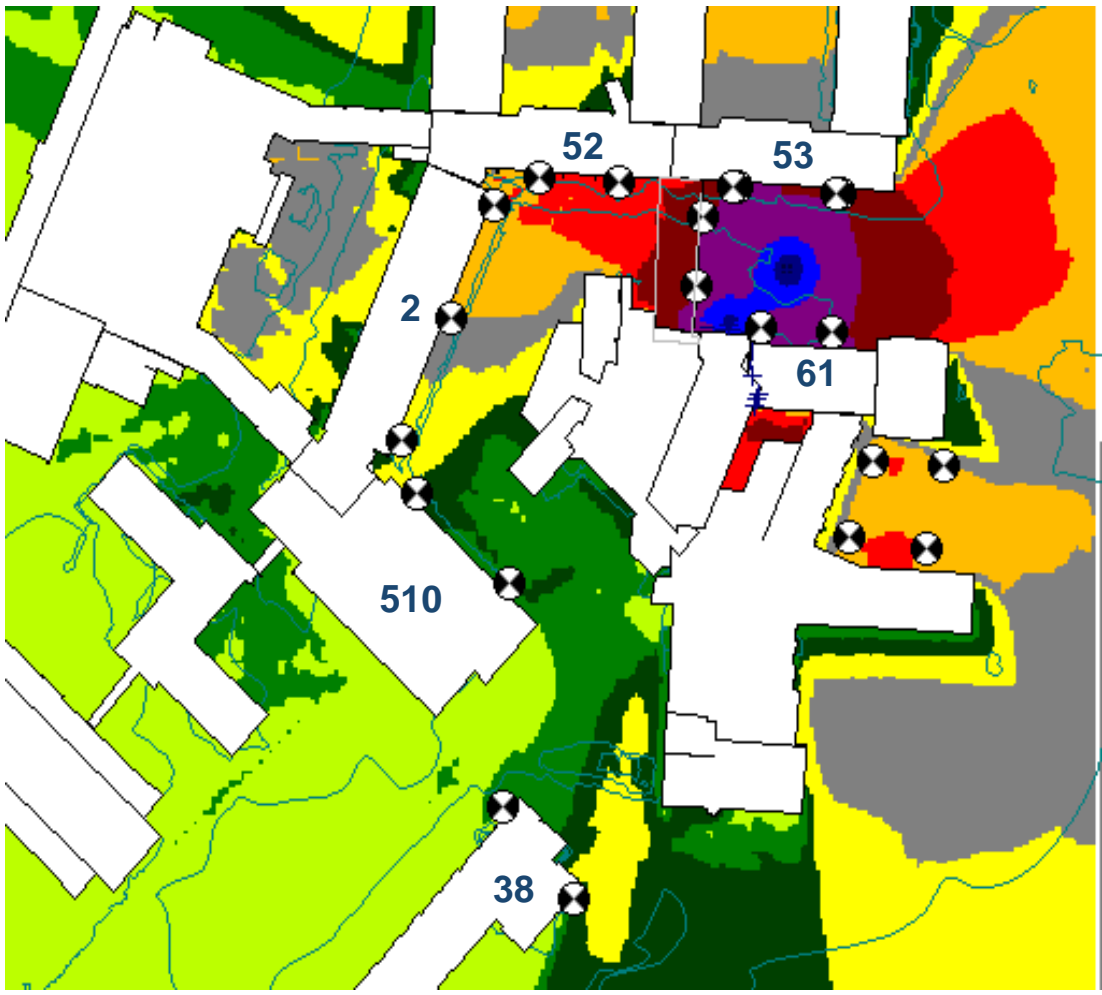
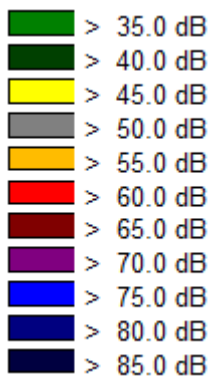


# Activity 2-5 – Asbestos remediation in north staircase and R+2

→ From 14/08 to 22/09 (6 weeks)

Bâtiment	Max noise levels (with closed windows) 8 hours average – dBA
B53	44
B50	46.5
B52	40
B2	32
B510	20
B38	11
B61	48.5
Cantine (Terrasse)	56 (Terrasse)

**Note 1:** SBN not included in noise levels results.  
**Note 2:** ALARA criteria : 55 dBA + 25 dBA = 80 dBA at facade.





# Observations and results

1. For buildings connected to B60, structure borne noise might exceed ALARA criteria for a 8 week duration.
2. For other buildings, airborne noise will never exceed ALARA criteria with closed windows.
3. Delivery area is the main noise source. Unfortunately due to asbestos restrictions, this area needs to remain near the construction area.

# Control measures during asbestos remediation works

1. Asbestos remediation works to be undertaken during holiday period to limit noise impact.
2. Contractors to be made aware of the environmental constraints of the site and follow the necessary procedures to minimise noise. Task Briefings will be carried out to ensure all operatives are fully aware of the need to keep noise to a minimum:
  - No radios or music systems are permitted on site, this extends to include any in-cabin music systems present on any vehicles attending site.
  - Drop heights for materials will be minimised wherever possible.
  - Site traffic will be instructed to switch engines off and not to leave engines idling.
3. A continuous liaison between project team and neighbours will be in place through **batiment60@cern.ch**. If a direct complaint is received, the site supervisor will check if remedial action can be taken on site.
4. Attended noise measurements may also be taken as the work progresses.

# Recommendations

1. B60 asbestos remediation works will generate noise.
2. The construction noise assessment has permitted to state the followings:
  - For buildings connected to B60, structure borne noise might exceed ALARA noise level (55 dBA) during a 8 weeks period  
→ Prioritise teleworking during this period.
  - For other buildings, airborne noise will not exceed ALARA limits with closed windows  
→ Keep windows closed during this period and prefer night ventilation.
3. Project team and HSE noise specialist remain available throughout the construction duration and regular update will be given.  
→ Contact **batiment60@cern.ch** in case of disturbance.

## Reminder:

B60 construction works noise impact are closely assessed and monitored.

For next construction stages, methodologies will be reviewed to minimise impacts which are likely to be less significant.