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| **From:** | Christoph Schreiner |
| **To:** | Warriors, PLN (CPC) |
| **Cc:** | Tom Lippe; Samuel Barondes |
| **Subject:** | Vibration sensitive equipment at Mission Bay |
| **Date:** | Monday, July 27, 2015 2:44:03 PM |
| **Attachments:** | Vibrationexamples.pptx<br>ATT00001.htm |

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Dear Ms Bohee:

The following statement is provided in addition and as complementary information to the comments provided to you by Tom Lippe (Law Offices of Thomas N. Lippe APC, 201 Mission St., 12th Floor, San Francisco, CA 94105) on behalf of the Mission Bay Alliance regarding the Warriors Arena Project.

Surveying the vibration-sensitive equipments that are mostly used at the UCSF Mission Bay (MB) by members of the Neuroscience research community, there appear to be two groups of equipment that fall under different criteria when considering vibration design/tolerance features for buildings (according to the ASHRAE Handbook).

The main category (VC-B) relevant for MB includes: Microsurgery, eye surgery, neurosurgery; bench microscopes greater than 400x magnification; optical equipment on isolation tables such as two-photon microscopes. Tolerance vibration velocities (in microns/sec) are indicated as the yellow line in the two attached figures from a study in another building (not at MB but relevant as general reference for vibration-sensitive equipment used here). Acceptable values for vibration velocities above 8Hz vibration frequencies are 25 microns/sec (max) and up to 50 microns/sec for lower frequencies, especially those in the range of walking-induced vibrations (~2Hz). Actual values of measurements should fall below those lines (as in the example measurement in the second slide; again not made at MB) for equipment to work error free.

The next category (VC-C) deals with ultrahigh vibration requirements (< 6 microns/sec Max.) for electron microscopes (TEMs, SEMs). However, I did not hear from any of the Neuroscience faculty whether those currently are in use.

The EIR considers vibration-sensitive equipment not to be 'sensitive receptors' but we would disagree with that since those pieces of equipment are indispensable for performing our research, largely supported by the National Institute of Healths. The EIR indicates that, during construction, research buildings may experience vibration velocities that exceed 0.008 in/s (or 203.2 microns/s), 5 to10-fold the values considered acceptable for operating the equipment (although the affected vibration frequency range is not indicated). Additionally, the EIR does not indicate by how much those velocities may be exceeded. Without a more thorough assessment of the potential vibration levels and spectra to be expected during construction and usage of the facility the impact on vibration-sensitive equipment is not possible. Even from the few points mentioned in the EIR it appears that vibration levels would be significantly above the VC-B criteria and, thus, may constitute intolerable interference with ongoing research or medical practice.

Sincerely,

Christoph Schreiner, PhD, MD