Mt Coot-tha Residents Group response to the Brisbane City Council – 2013 Draft City Plan

Proposed Changes to PO-7 - Ground Borne Vibration Limits and Tables.
It is proposed that these tables be brought up to date with the 2006 Queensland Government EPA Guidelines (EPA) plus the current Australian Standard (AS) and with reference to the 1983 Blast Vibration Table from the Australian Tunnelling Society (ATS).
This document uses the term Peak Particle Velocity (PPV) which is measured in the unit millimetres per second and is the prime value for blast vibration measurement.
As all detailed data from SA is copyrighted and thus cannot be listed here, we are using the ATS table and adapting this for the new City Plan whilst adding the EPA defined measurement methods.

Overview:
Since the ATS document was published both the maximum EPA and SA vibration values have been halved from 10mm/sec to 5mm/sec ppv, whilst the older suggested values in the draft city plan and the ATS table remain at 10mm/sec ppv.
Hence it is proposed to reference the ATS table whilst applying an updated weighting to their stated values based upon the trend towards reduced building stability, increased urbanisation plus the new maximum values from EPA and AS.

Overall consideration must also be given to reducing the maximum possible allowable values based upon the increased urbanisation, the reduced strength of new structures and the general increased number and duration of vibration incidents. For example the ability of any building to sustain regular weekly vibrations at the level of 25 mm/sec ppv is highly questionable. The ability of every utility with current state computer based electronic PLC control equipment to sustain vibrations of 35 mm/sec ppv is completely impossible.

Retaining walls are also a problem as lower stability boulder and dirt design or up to 5 metres high has become popular.
Concrete slabs in themselves are very strong; however it is often the case that static loads in excess of several tons are often placed on these and may well be present at the time of the vibration which easily exceeds the slab ppv tolerance parameters.

Proposed Changes to ATS Table for use in Draft Town Plan

Vibration Sensitive Structures & Zones	**Old ATS Max PPV**	**Town Plan Max PPV**
Industrial Buildings	25 mm/sec	15 mm/sec
Other Commercial Buildings	25 mm/sec	10 mm/sec
Houses and Low Rise Residential Buildings	10 mm/sec	5 mm/sec
Historic Buildings	2 mm/sec	2 mm/sec
Utility Services	35 mm/sec	10 mm/sec
Slopes and Retaining Walls	35 mm/sec	15 mm/sec
Water Retaining Structures	13 mm/sec	10 mm/sec
Computer Installations	5 mm/sec	3 mm/sec
Human Comfort	2 mm/sec	2 mm/sec
Fresh Concrete (less than 2 days old)	5 mm/sec	3 mm/sec
New Concrete (between 2 & 8 days old)	25 mm/sec	5 mm/sec
Partly Cured Concrete (more than 8 days old)	50 mm/sec	10 mm/sec

Current Draft PO7 Definition and Tables

PO7 Development achieves the ground borne vibration criteria in the following tables in a sensitive zone or zone precinct and at a sensitive use in the Rural zone: (a) Table 9.3.10.3.F—Recommended transient maximum peak particle velocity for cosmetic damage; (b) Table 9.3.10.3.G—Transient vibration guide levels for cosmetic damage; (c) Table 9.3.10.3.H—Human vibration comfort level assessment in buildings. Note—The preparation of a vibration impact assessment report in accordance with the Noise impact assessment planning scheme policy, can assist in demonstrating achievement of this performance outcome.	**AO7** Development does not cause ground borne vibration beyond the boundary of the site.

Table 9.3.10.3.F—Recommended transient maximum peak particle velocity for cosmetic damage

Type of building	Peak particle velocity (mm/s)
Houses and low–rise residential buildings; commercial buildings not included below	10
Commercial and industrial buildings or structures of reinforced concrete or steel construction	25

Table 9.3.10.3.G—Transient vibration guide levels for cosmetic damage

Type of building	Peak particle velocity (mm/s)		
Reinforced or framed structures; industrial and heavy commercial buildings	50 at 4Hz and above		
Unreinforced or light framed structures; residential or light commercial type buildings	Below 4Hz	4Hz to 15Hz	15Hz and above
	0.6	15 at 4Hz increasing to 20 at 15Hz	20 at 15Hz increasing to 50 at 40Hz and above.

Table 9.3.10.3.H—Human vibration comfort level assessment in buildings

One-third Octave Band Frequency Level	Vibration Criteria
1Hz to 2Hz	0.48mm/s
2Hz to 8 Hz	0.18mm/s
8Hz to 80Hz	0.1mm/s

Proposal for the Revised PO7 Definition and Tables

PO7	AO7
Construction, Demolition and Mining Industry achieve the ground borne vibration limitation criteria as defined in the following table, in any sensitive zone or zone precinct and/or sensitive rural zone as defined in the following table: *Table 9.3.10.3.F Recommended transient maximum peak particle velocity for cosmetic and/or structural damage.*	Construction, Demolition and Mining Industry ground borne vibrations and locations must comply with the limits set using the measurement criteria defined in the following table: *Table 9.3.10.3.G Recommended vibration measurement methods and procedures.*

Table 9.3.10.3.F Recommended transient maximum peak particle velocity for cosmetic and/or structural damage.

Vibration Sensitive Structures & Zones	Town Plan Max PPV
Industrial Buildings	15 mm/sec
Other Commercial Buildings	10 mm/sec
Houses and Low Rise Residential Buildings	5 mm/sec
Historic Buildings	2 mm/sec
Utility Services	10 mm/sec
Slopes and Retaining Walls	15 mm/sec
Water Retaining Structures	10 mm/sec
Computer Installations	3 mm/sec
Human Comfort	2 mm/sec
Fresh Concrete (less than 2 days old)	3 mm/sec
New Concrete (between 2 & 8 days old)	5 mm/sec
Partly Cured Concrete (more than 8 days old)	10 mm/sec

Table 9.3.10.3.G Recommended vibration measurement methods and procedures.

Theme	Activity
Monitoring	Monitoring must be carried out at every instance of ground vibration where levels are anticipated to be above a level equivalent to 10% of their allowable maximum.
Logs and Records	All monitoring activity must be logged. All records must be stored for a minimum of 12 months. In the event of blasting, a government approved blast plan must be used and stored for 12 months afterwards.
Transducer Type	Vibration Transducer must be fully compatible and attached to a mass of at least 10kg and buried in solid ground with the top of the mass either at or below ground level.
Transducer Location	Vibration Transducer must be located as close as practicable to the foundations of any affected building or structure, or if not possible due to building wobble effects or terrain, then at a maximum distance of 50 metres.
Transducer Orientation	Unless located immediately adjacent to the affected building, the Vibration Transducer must be located in a direct line between the vibration source and the foundations of any affected building or structure.
Accuracy	Vibration Measurement Data Logger Instrumentation sensitivity should be capable of accurately measuring down to a level of 0.1mm/sec and at an accuracy of 5% and with a 5% flat frequency response from 4.5Hz to 250Hz.
Calibration	Vibration Measurement Data Logging Instrumentation must be calibrated within Industry best practice guidelines and to manufacturer specifications.