BELAIR RESEARCH LIMITED

BROADWAY . BOURN . CAMBRIDGESHIRE . CB23 2TA
Tel: (01954) 718366 Fax: (01954) 718355
Email: brl@acoustical.co.uk

B2431/RAC/ne

Mrs C Fountain
Senior Associate
Peacock and Smith
Suite 9C
Joseph's Well
Hanover Walk
Leeds
LS3 1AB

30th March 2012

Re: Wm Morrison Supermarkets PLC – Grafton Street, Manchester

The attached *Calculation Sheet 1* provides an analysis of noise breaking through from the store to the dwellings above.

Lines 1 & 2 show sound level measurements taken within the store which are combined at *Line 3* to provide a worst case scenario with both occurring simultaneously. This gives a corresponding level of 75dB(A) in the store.

Line 4 shows the measured level difference between the store and rooms above, using the minimum measured performance for a lounge and bedroom.

Line 5 combines these to give the resultant level in the dwellings above. This shows that normal activity within the store may produce a level of up to 23dB(A) in the dwellings above which is significantly lower than levels identified as suitable by authoritative guidance such as BS8233:1999 and The World Health Organisation which both recommend steady levels of 30dB(A) for bedrooms as providing good acoustic conditions.

Line 6 shows the sound being produced when a box was dropped in the warehouse area producing a maximum level of 75dB(A) at a distance representative of the ceiling giving a corresponding level of 24dB(A) in the flat above.

Line 8 shows the sound level measured when the bell in the stock area was rung to alert staff to the need to attend the tills. This produced a maximum level of 90dB(A), equating to 32dB(A) in the dwellings above.

In addition to recommending a steady level of 30dB(A) as being suitable in bedrooms the guidance also identifies that occasional maximum levels of up to 45dB(A) are suitable. This shows that the sound levels being produced within the store will be suitably attenuated so as not to disturb the residents of the dwellings above, by the existing building structure, as previously tested.

/cont'd...

I trust that this provides sufficient information for your present requirements but will be pleased to provide any further information or clarification as required.

Kind regards.

Yours sincerely,
for Belair Research Limited

Richard A. Collman, BSc. (Jt. Hons), CEng, MIOA, Tech IOSH
Director

Enc: Calculation Sheet 1

Calculation Sheet 1 - Analysis of noise breaking through from store activity to the flat above

Line	Details	(A)	63	125	250	500	1k	2k	4k	8k	Notes
1	Sound level close to loud speaker	73	71	73	68	65	70	68	61	55	From measurements at store
2	Merchandising activity	71	80	68	63	59	59	62	67	65	Average level in stock area
3	Cumulative level if both occurring	75	81	74	69	66	70	69	68	66	Logarithmic sum Lines 1 & 2
4	Measured D_{nT} Lower of Lounge & Bedroom performance		-37	-42	-45	-56	-62	-57	-58	-58	Level difference between store and flat (Grey = estimated values)
5	**Resultant sound level in flat above store**	**23**	**44**	**32**	**24**	**10**	**8**	**12**	**10**	**8**	**Lines 3 + 4**
6	Occasional maximum levels	75	83	75	71	72	72	67	63	55	Box being dropped nearby
7	**Resultant occasional level in flat above store**	**24**	**46**	**33**	**26**	**16**	**10**	**10**	**5**	**-3**	**Lines 6 + 4**
8	Bell in stock area	90	74	66	63	66	67	80	86	85	
9	**Resultant occasional level in flat above store**	**32**	**37**	**24**	**18**	**10**	**5**	**23**	**29**	**27**	**Lines 8 + 4**