

120 FLEET STREET

# Building Movement Monitoring

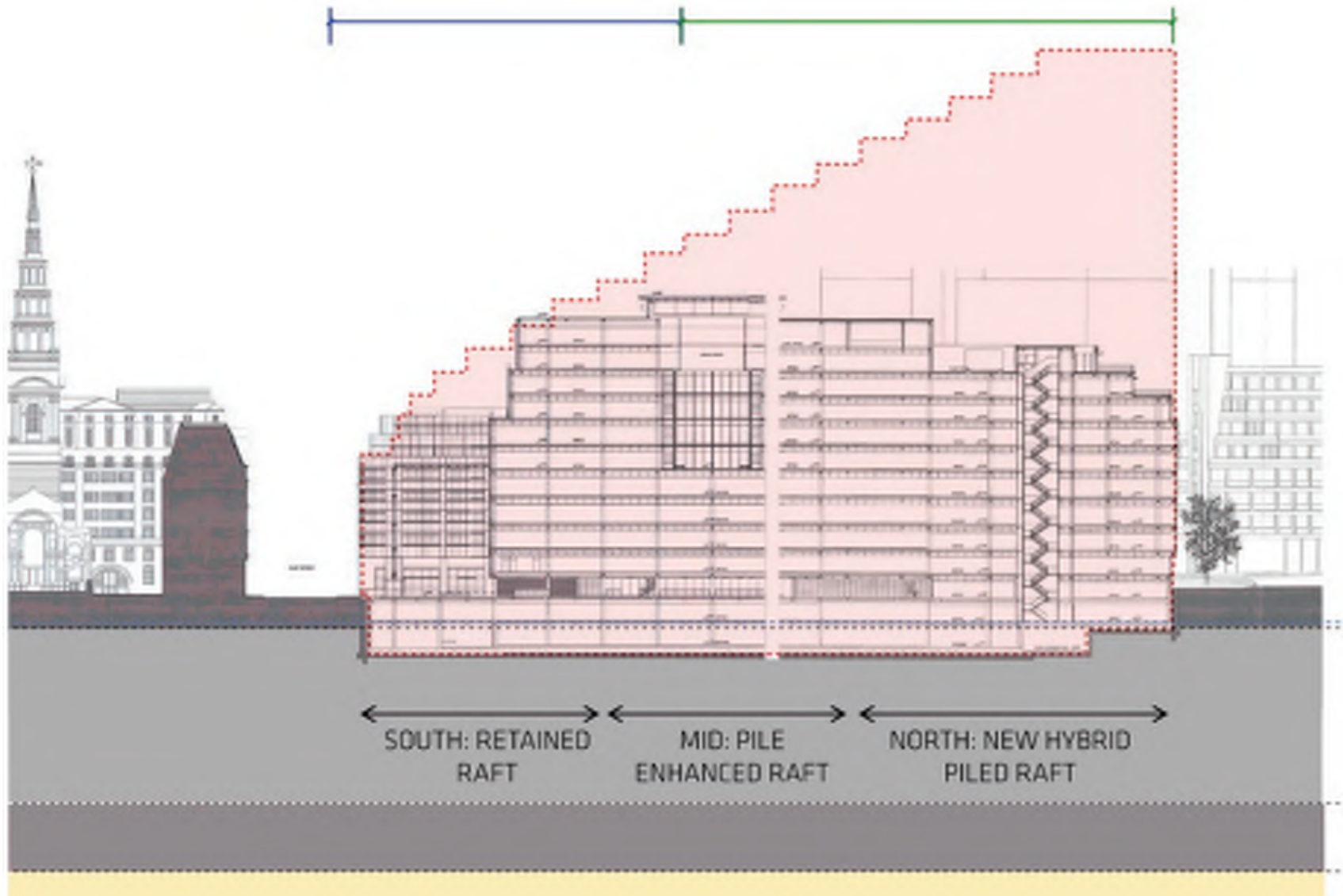
AUGUST 2022

# SOURCES OF GROUND MOVEMENTS

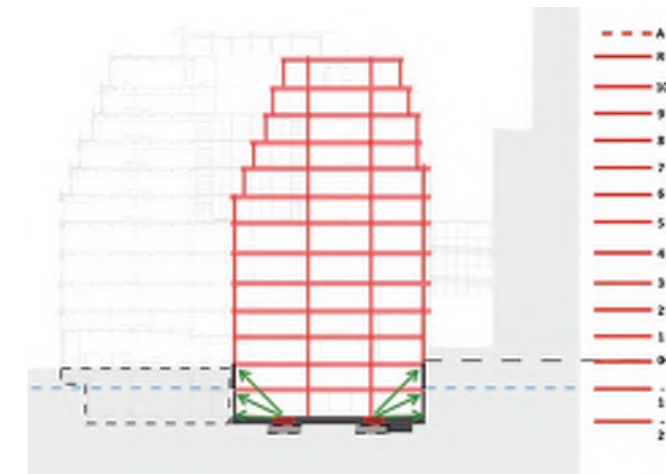
## EXISTING AND PROPOSED BUILDING MASSING

NO INCREASE TO BUILDING HEIGHT

INCREASE BUILDING HEIGHT REQUIRING STRENGTHENED FOUNDATION



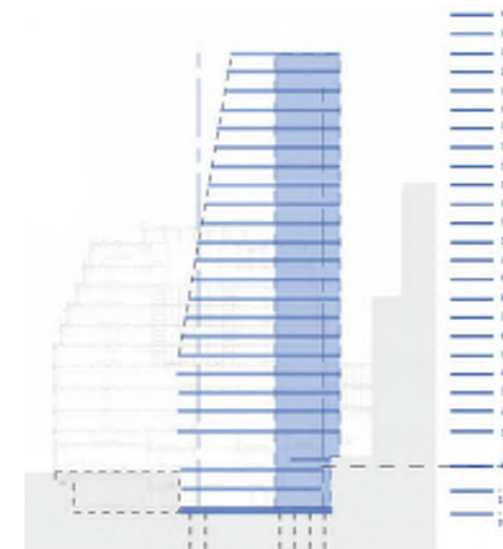
## RETAINING WALL SUPPORT



1. DEMOLITION



2. BASEMENT PROPPING

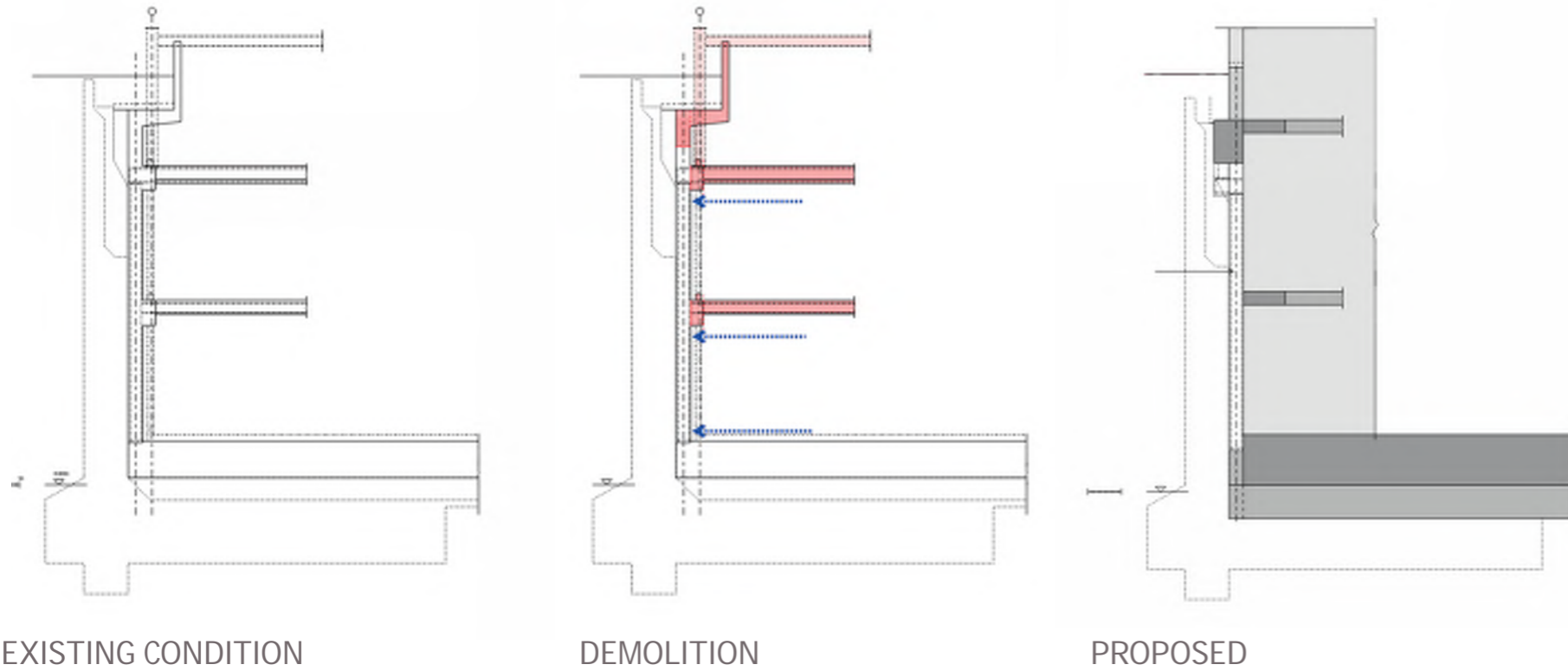


3. NEW BUILDING CONSTRUCTION



# GEOTECHNICAL ANALYSIS

## BASEMENT WALL SUPPORT CONDITIONS

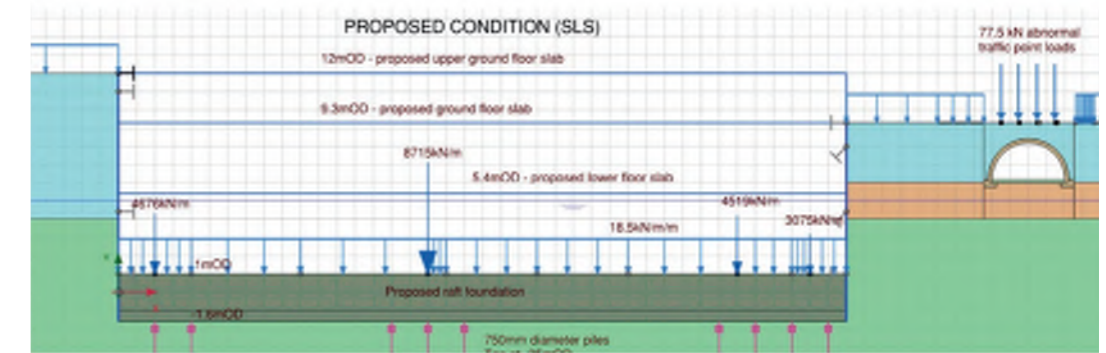


Support condition remains largely unchanged when comparing the existing and proposed condition, save for minor change in slab levels.

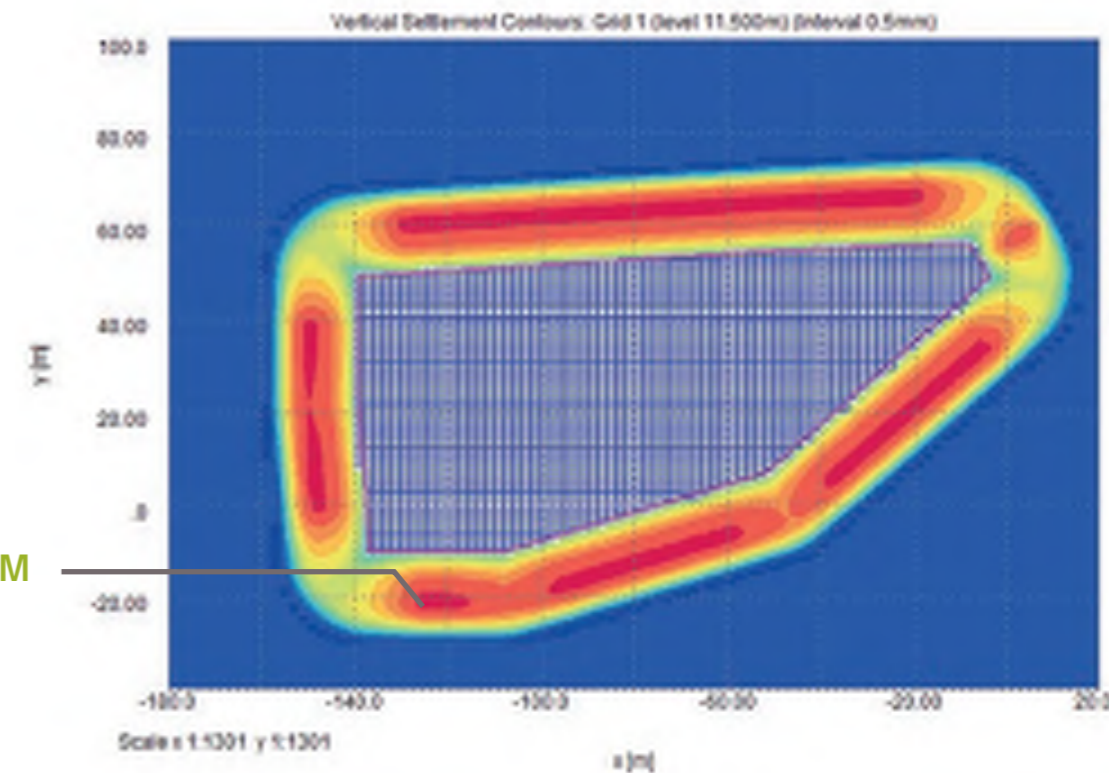
In the temporary condition sti propping is provided to replicate the existing support condition. As such wall movements are very small, much smaller than would be the case for a new retaining wall.

MAXIMUM PREDICTED SETTLEMENT LESS THAN 5MM

## FINITE ELEMENT ANALYSIS

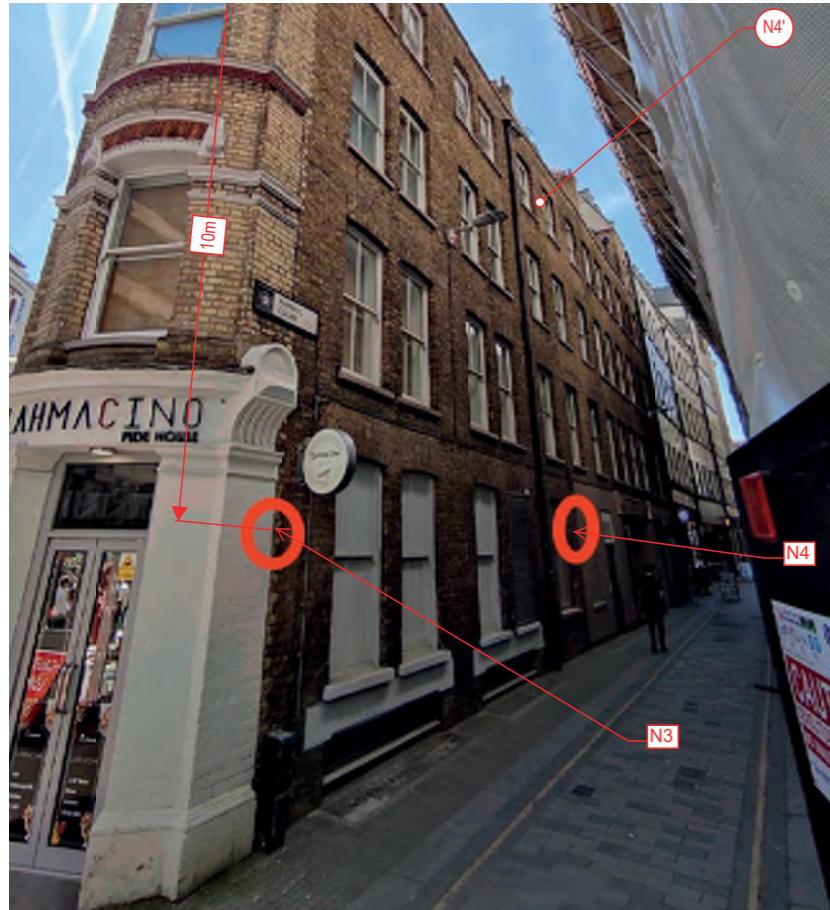


(c)



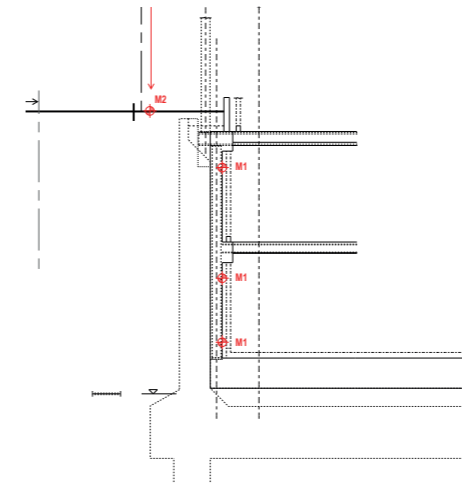
# MONITORING METHODOLOGY

## MOVEMENT TARGET MONITORED WITH ELECTRONIC SURVEY INSTRUMENTS AND RETRO-TARGETS

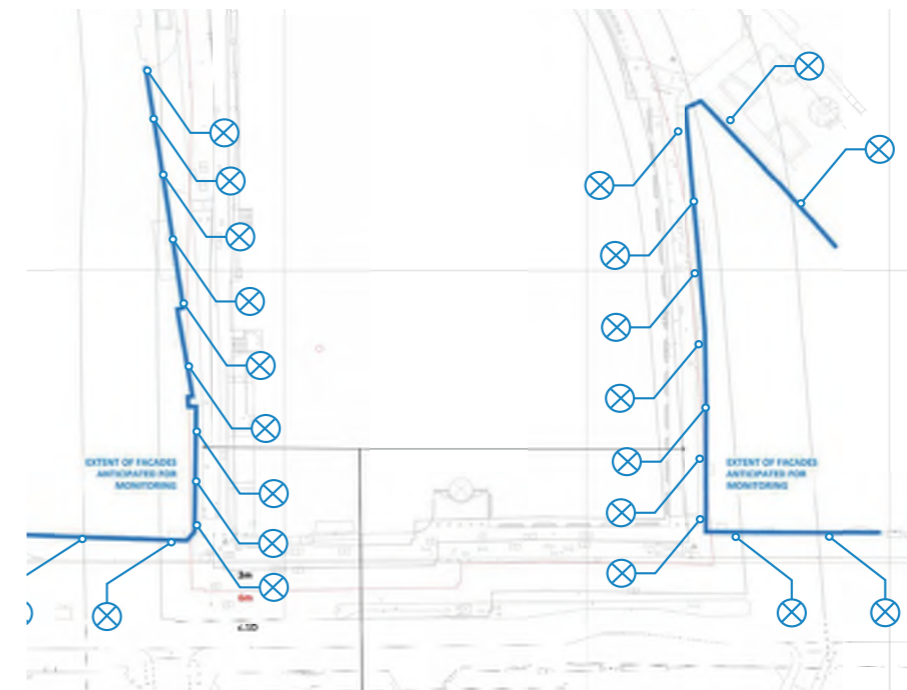


RECORDING VERTICAL, LATERAL AND LONGITUDINAL MOVEMENT TO +/-1mm ACCURACY

## LOCATIONS



AT BASEMENT WALL AND SITE BOUNDARY

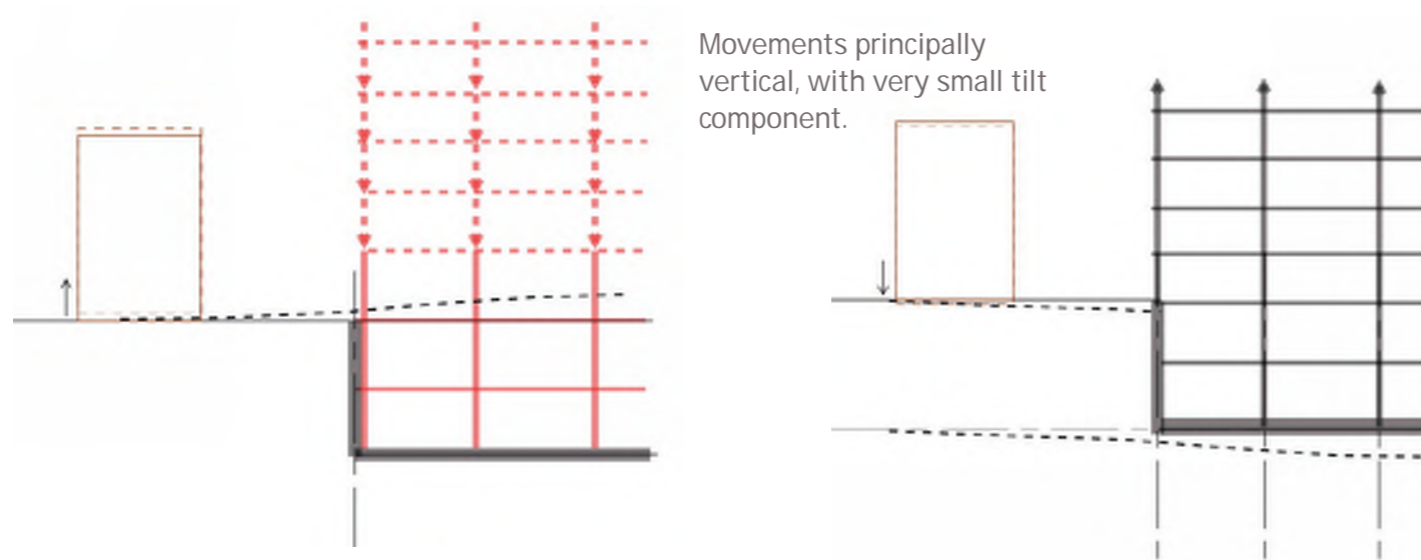


TO COVER ADJACENT BUILDINGS

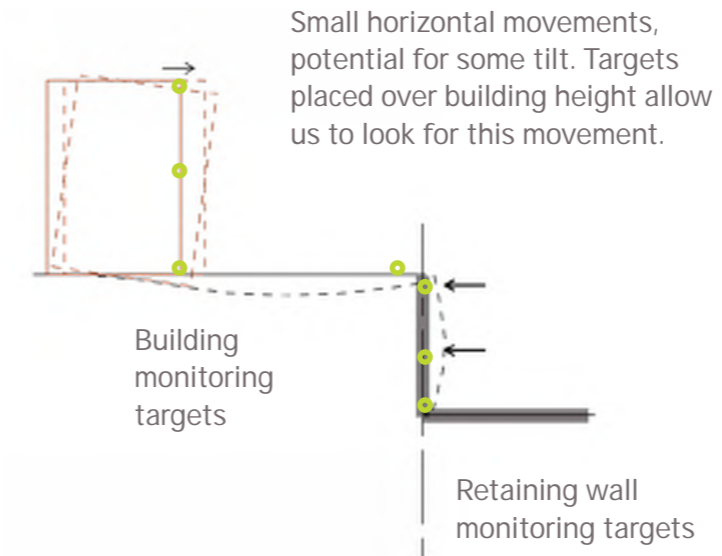
# ANTICIPATED MOVEMENTS, DATA COLLECTION AND TRIGGER LEVELS

## ANTICIPATED MOVEMENTS

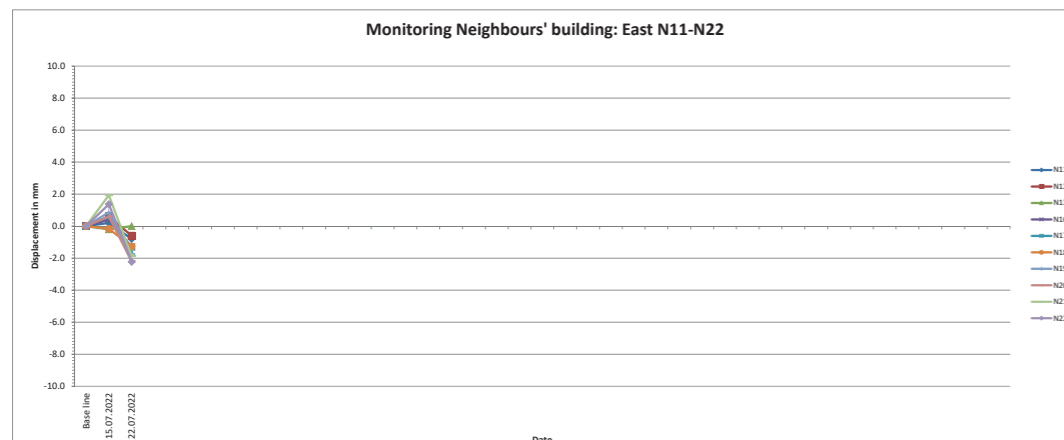
### DEMOLITION AND NEW BUILDING LOAD MOVEMENT - EXAGGERATED



### RETAINING WALL MOVEMENTS - EXAGGERATED



## DATA COLLECTION AND TRIGGER LEVELS



**NB:** Tolerance on equipment +/-1mm. Variation in temperature also has the potential to cause measureable movement.

Results provided weekly for review against trigger levels.

Predicted movements at trigger levels would still only result in Damage Classification 0 (negligible, the lowest level).

GREEN	- CARRY ON THE WORKS
AMBER	TEMPORARY REDIRECT WORK AWAY FROM AREA AFFECTED AND TAKE FURTHER VALIDATION MEASURES AS NECESSARY. REVIEW CAUSES AND SUBMIT PROPOSALS.
RED	STOP WORK POTENTIALLY CAUSING MOVEMENTS, CONFIRM CAUSE AND REVISE WORKING PROCEDURES TO LIMIT FURTHER MOVEMENTS. AGREE REVISE ACTION AND TRIGGER LEVELS.

### Traffic light trigger levels

For retaining wall targets:

Red trigger: 10mm

Amber trigger: 60% of these values

### For targets on buildings

Red trigger: height/750 (min. 10mm)

Amber trigger: 60% of these values

# VIBRATION LEVELS

## VIBRATION TRANSMISSION

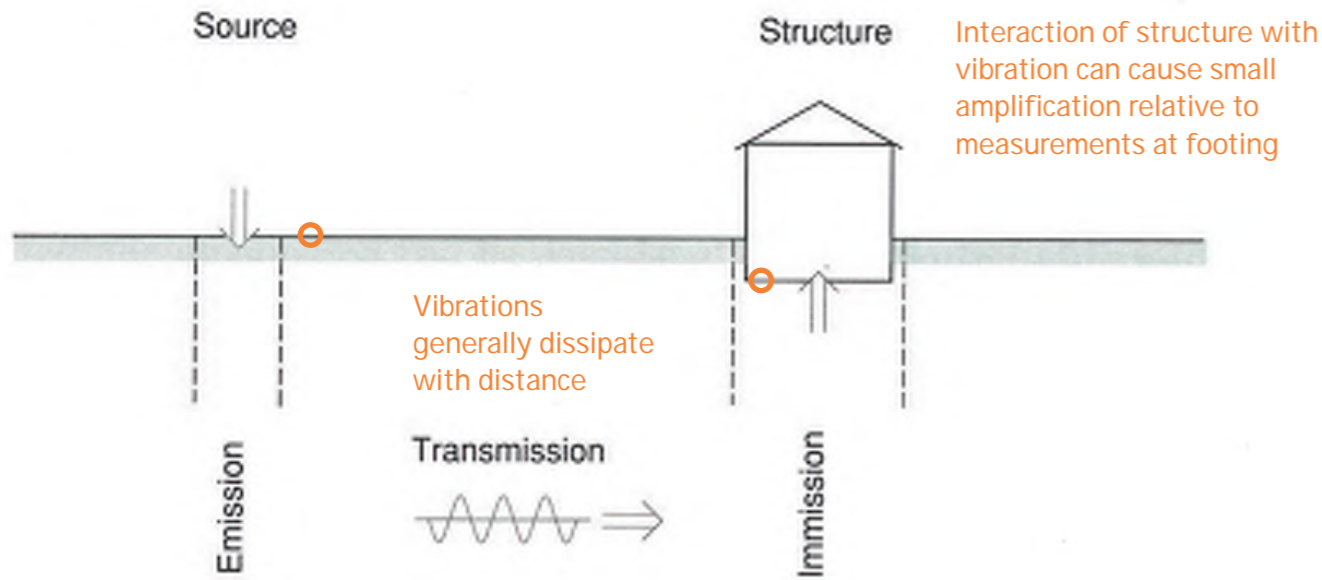


Figure 2.17: System for the propagation of vibrations

Recommended limits of human perception as per BS6472 for residential daytime 0.8mm/s horizontal. Intermittant vibration limits much higher.

Structural risk of damage limits much higher. Note that a much lower than recommended limit has been adopted for residential monitoring related to human perception:

**Amber:** 0.8mm/s

**Red:** 1.0.mm/s

## HUMAN RESPONSE AND BUILDING RESPONSE

**5** Four- to six-storey houses, and buildings of associated urban uses, made with blockwork or brickwork, load-bearing walls of heavier construction, including "stately homes" and small palace-style buildings

Non-tied reinforced concrete piles  
Spread wall footing  
Timber piles and rafts

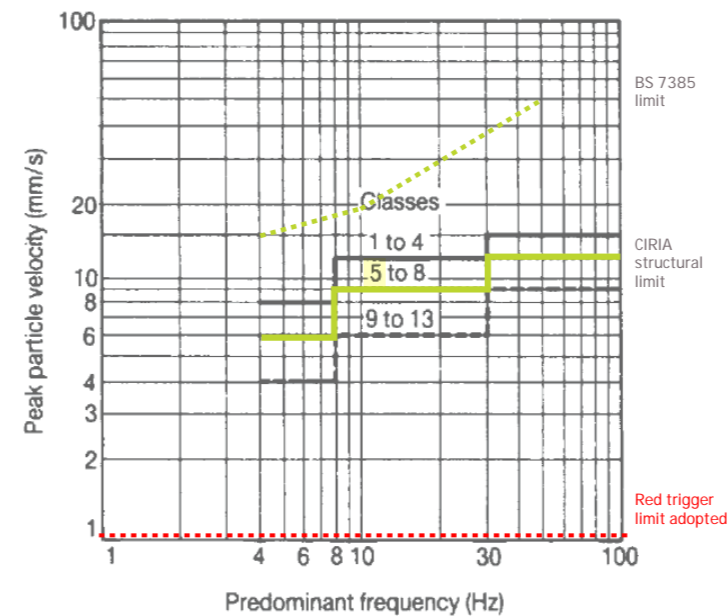
**B**

Compact, horizontally bedded soils

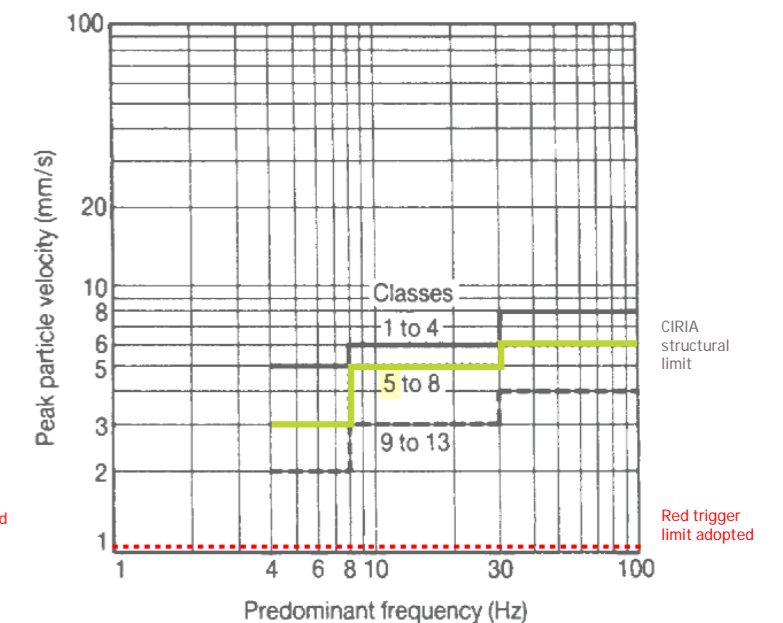
**b**

Table 12 Classification of buildings according to their resistance to vibration and the tolerance that can be accepted for vibrational effects (Draft ISO/DIS 4866, 1986)

Class of Building	Category of structure (see Table 11)							
	1	2	3	4	5	6	7	8
	Categories of foundations (capital letters) and types of soil (lower case letter)							
1	Aa							
2	Ab	Aa	Aa	Aa				
3		Ab	Ab	Ab	Aa			
4		Ba	Ba	Ba	Ab			
		Ac	Bb	Ac	Ac			
		Bd			Ba			
5		Bc	Ac		Bc	Ba		
6		Af		Ad	Bd	Bb	Ba	
			Af	Ae	Bc	Ca		
7						Bc	Bb	
						Cb	Ca	
8						Be	Be	
						Cc	Cb	



Building response limits for intermittent vibration (CIRIA TN 142)



Building response limits for continuous vibration (CIRIA TN 142)