INVESTIGATION OF POSSIBLE MERCURY CONTAMINATION WITHIN ROOF VOIDS AT THE UNIVERSITY OF MANCHESTER

AT

THE UNIVERSITY OF MANCHESTER
COUPLAND 1 BUILDING

FOR

C&D INDUSTRIAL SERVICES LTD
UNIT 10
WOODROW BUSINESS CENTRE
WOODROW WAY
IRLAM
M44 6NN

Report No:	**11826**	**Client Ref:**	**Mercury Monitoring**
Survey Date:	**June 2010**	**Site Contact:**	**Mr Alan Lee**
Report Date:	**August 2010**	**Server Reference:**	**Occupational Hygiene Special Projects 2010**

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EXECUTIVE SUMMARY

ALcontrol Laboratories On-Site Services were appointed by C&D Industrial Services Ltd to undertake a series of surveys on their behalf within roof voids located at the University of Manchester Coupland 1 Building.

A radiological contamination survey was performed in the loft area prior to the survey by ALcontrol consultants.

The results and information obtained during the visit indicate that:

No significant mercury vapour was detected in any location with only very low ambient concentrations (0-3 µg m^{-3}) detected in the roof voids above room 2.54 and 2.55 adjacent to the rooms being remediated for mercury contamination. No bulk samples were taken on this occasion.

The roof voids above rooms 2.62 and 2.63 were previously surveyed and results are available in ALcontrol Laboratories On-Site Services report ref: 11826.2

In addition to the mercury survey an Asbestos refurbishment/demolition survey was also undertaken (ALcontrol Ref: S10-02242)

Results reflect the conditions prevailing at the time of survey.

SURVEYED BY :

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1 INTRODUCTION

ALcontrol Laboratories On-Site Services were appointed by C&D Industrial Services Ltd to undertake a series of surveys on their behalf within roof voids located at the University of Manchester Coupland 1 Building.

A radiological contamination survey was performed in the loft area prior to the survey by ALcontrol consultants.

All results reflect the conditions prevailing at the time of the investigation

2 OBSERVATIONS

The loft area above the two rooms (2.62 and 2.63) has been surveyed previously with no specific areas of contamination found. These loft areas would be considered worst case scenarios as they are directly above the rooms undergoing de-contamination work at the time of the survey.

Initially the Mercury Vapour Indicator (MVI) was used to determine concentrations in all areas before determining if any sampling work was required.

Very low concentrations of mercury vapour were detected in the roof voids above rooms 2.54 and 2.55. There were no specific areas of contamination identified and the mercury vapour concentrations fluctuated indicating that it was as a result of air movement through the building from the area undergoing remediation in rooms 2.62 and 2.63.

Within the roof voids, plaster was visible between the joists and there was no insulation material present. This meant that a visual survey to determine the presence of any mercury was possible within all locations.

There were suspended floors in the roof void above room 3.04. It was observed that there were high levels of detritus under these floor sections but access was not possible to determine if any mercury was present. It should be noted however that no mercury vapour was detected in the main loft area and it would be highly unlikely that any mercury would be present in these areas.

There were old cable trays and cables present within the loft areas but all wiring was disconnected.

There where no cold water storage tanks or associated pipe work in any loft area.

There are modern wiring systems and fire alarm systems within the loft areas where University of Manchester staff or contractors may need access for maintenance purposes.

All old cable runs have been identified where practicable on plans shown in appendix II.

The roof voids above rooms 2.62 and 2.63 were previously surveyed and results are available in ALcontrol Laboratories On-Site Services report ref: 11826.2

There was an asbestos survey conducted at the same time as the mercury investigation and the results of this can be found in ALcontrol Report ref: S10-02242

Workplace Exposure Limits (WELs) EH40

Although the possible mercury vapour is not strictly in an area currently occupied by staff, the following should be considered.

Under the COSHH Regulations a single type of occupational exposure limit is specified for substances hazardous by inhalation, this is the Workplace Exposure Limit. An employer must ensure that a WEL is not exceeded and in addition when a substance can cause occupational asthma, cancer or genetic effects then exposure must be reduced as low as reasonably practicable. The limits are time weighted average concentrations of substances in the air using either 8-hours or 15-minutes (short term exposure limit) as the reference period.

Regulation 7 also requires that where there is exposure to a substance hazardous to health, then control of that exposure shall only be treated as adequate if the principles of good practice for the control of exposure to substances hazardous to health set out in Schedule 2A are applied.

The COSHH Regulations also place a duty on the employer to apply principles of good occupational hygiene practice for the control of substances hazardous to health (regardless of whether a substance has an exposure limit or whether exposures are below any published limit).

Mercury has not currently been assigned a WEL. There are two limits that can be used for guidance. The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) sets 0.025 $mg.m^{-3}$ based on an 8-hour Time Weighted Average (TWA) and there is also a draft Europe wide proposed Indicative Occupational Exposure Limit (IOELV) of 0.020 $mg.m^{-3,}$ which may also be used for comparison.[i]

Mercury - Basic toxicology

Mercury vapour can cause effects in the central and peripheral nervous systems, lungs, kidneys, skin and eyes in humans.

It is also mutagenic and affects the immune system. Acute exposure to high concentrations of mercury vapour causes severe respiratory damage, while chronic exposure to lower levels is primarily associated with central nervous system damage.

Chronic exposure to mercury is also associated with behavioural changes and alterations in peripheral nervous system. Pulmonary effects of mercury vapour inhalation include diffuse interstitial pneumonitis with profuse fibrinous exudation. Glomerular dysfunction and proteinuria have been observed mercury exposed workers.

Chronic mercury exposure can cause discoloration of the cornea and lens, eyelid tremor and, rarely, disturbances of vision and extra ocular muscles.

Delayed hypersensitivity reactions have been reported in individuals exposed to mercury vapour. Mercury vapour is reported to be mutagenic in humans, causing aneuploidy in lymphocytes of exposed workers.

Mercury contaminated material waste

Currently the Waste Acceptance Criteria (WAC) for mercury contaminated materials determined as leachate is as follows:-

<0.01 mg/kg	–	Inert waste
<0.2 mg/kg	–	Stable non-reactive hazardous waste
0.2-2 mg/kg	-	Hazardous landfill
>2 mg/kg	–	Pre treatment needed

3 MONITORING

Airborne concentrations of mercury vapour were measured using a direct reading Mercury Vapour Indicator (MVI).

No bulk samples were obtained during this survey.

4 RESULTS

Concentrations of mercury vapour monitored are reported in APPENDIX I

5 DISCUSSION

Mercury vapour concentrations

Ambient mercury vapour readings of between 0 – 3µg.m^{-3} were found in the roof voids above rooms 2.54 and 2.55 although no specific source was identified.

The mercury vapour concentrations fluctuated indicating that it was as a result of air movement through the building from the area undergoing remediation in rooms 2.62 and 2.63.

No bulk mercury samples were taken in this area.

There was an area of no access within the loft above room 3.04 but given the results for the rest of the loft and the distance of this location from the dominant source of mercury contamination within the building it is very unlikely that any mercury will be present under the suspended floor area.

6 CONCLUSIONS AND RECOMMENDATIONS

No significant concentrations of mercury vapour were detected within any of the roof voids investigated.

As a result of the findings it can be concluded that if any University of Manchester employees or contractors need access to the loft areas then control measures for personal exposure to mercury vapour will not be needed.

APPENDIX I

MERCURY VAPOUR MEASUREMENTS

Table No: 1 Levels of mercury vapour

Room	Location	MERCURY[1] EXPOSURE	
		mg.m^{-3}	% IOELV[II]
Room 2.054 Loft	Measurements varied although no specific source was identified.	0 – 0.003	0-15
Room 2.055 Loft	Throughout loft area	0 – 0.003	0-15
Room 2.053 Loft	Throughout loft area	0	0
3.03 Meeting Room Loft	Throughout loft area	0	0
Room 2.052 Loft	Throughout loft area	0	0
Room 3.04 Loft	Throughout loft area	0	0
Room 2.51 Loft	Throughout loft area	0	0

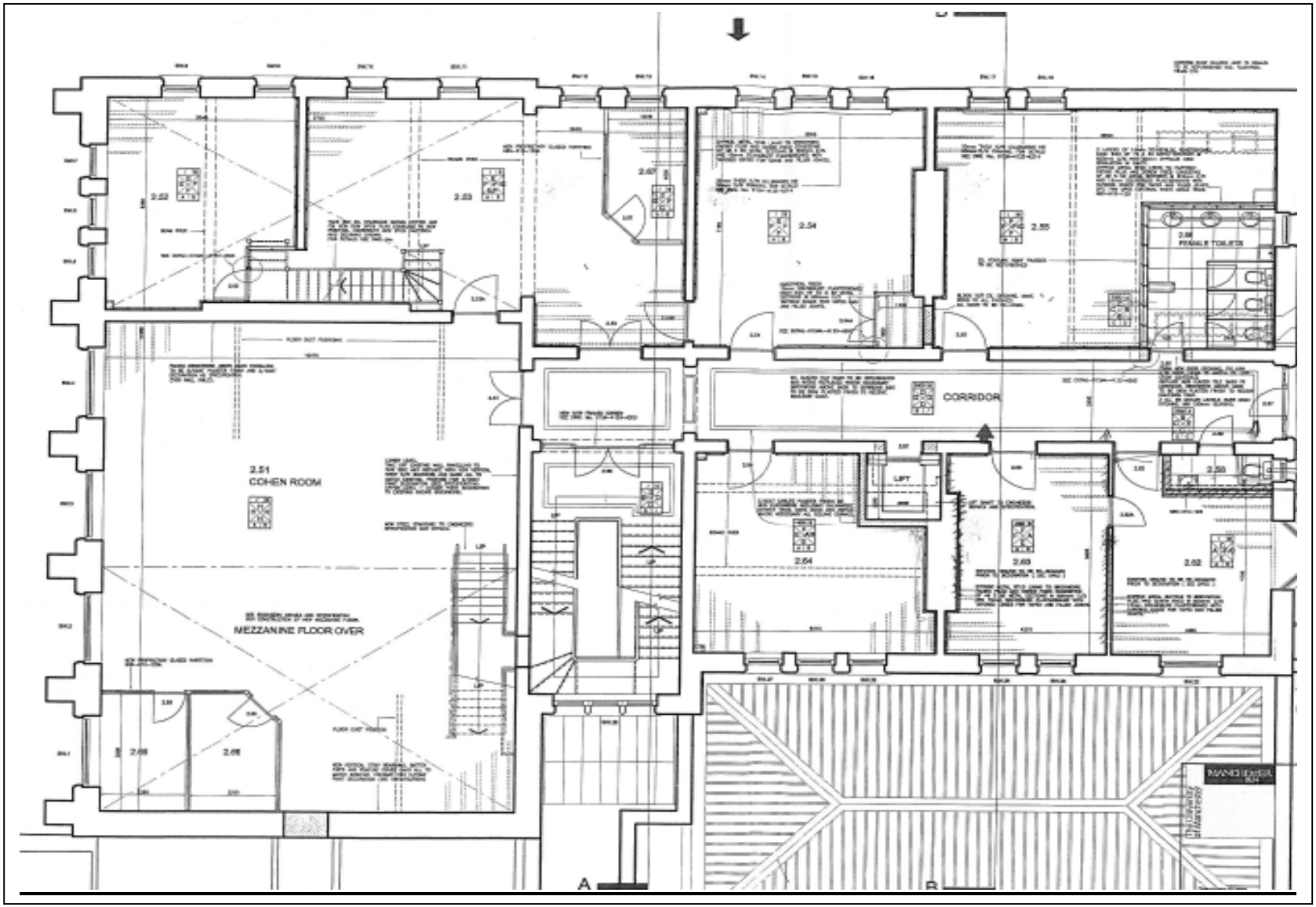
IOELV for mercury vapour = 0.020 mg.m^{-3} 8-hour TWA
TLV for mercury vapour = 0.025 mg.m^{-3} 8-hour TWA

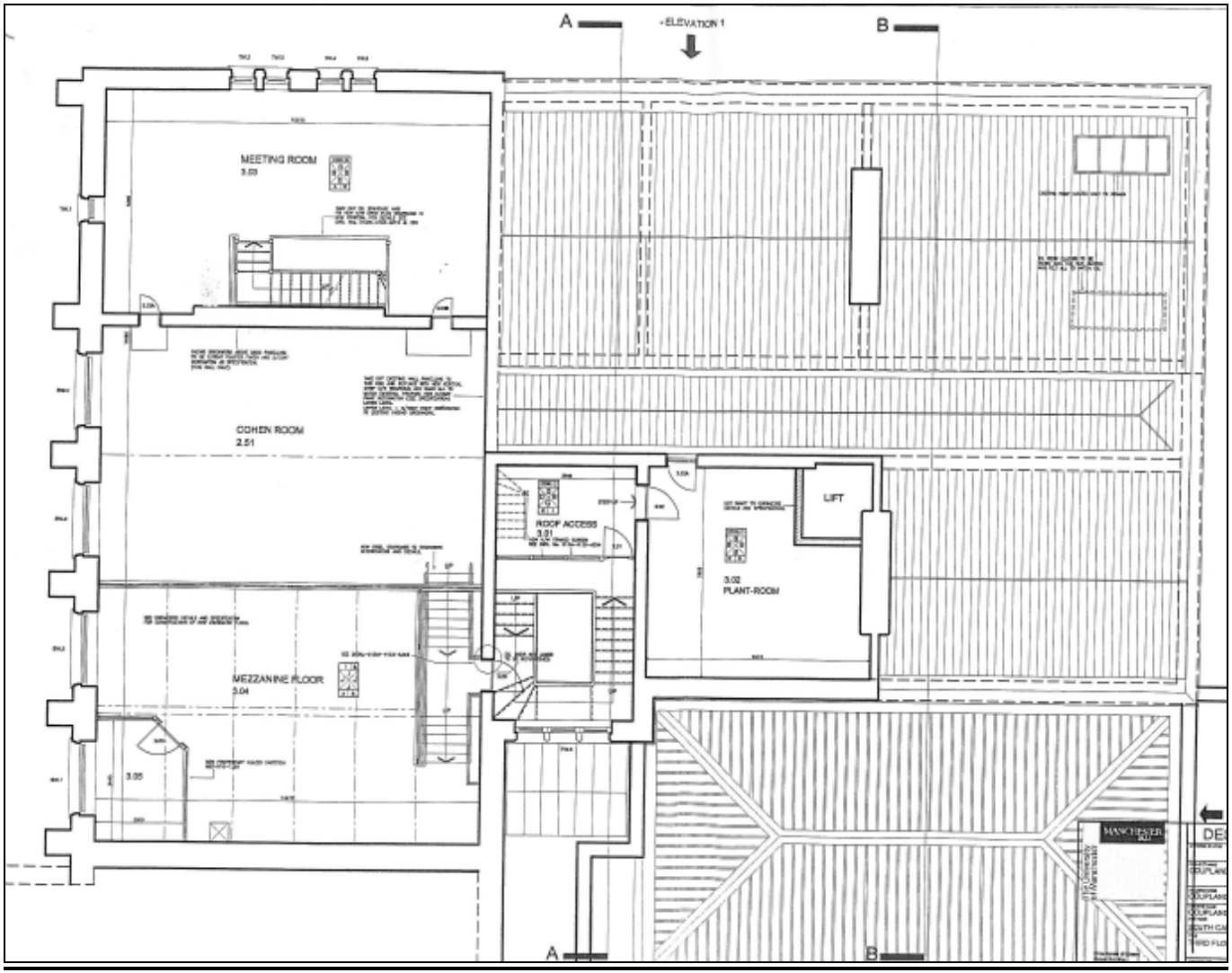
% IOELV expressed for guidance illustrative purposes only. Not representative of past or present personal exposure.

APPENDIX II

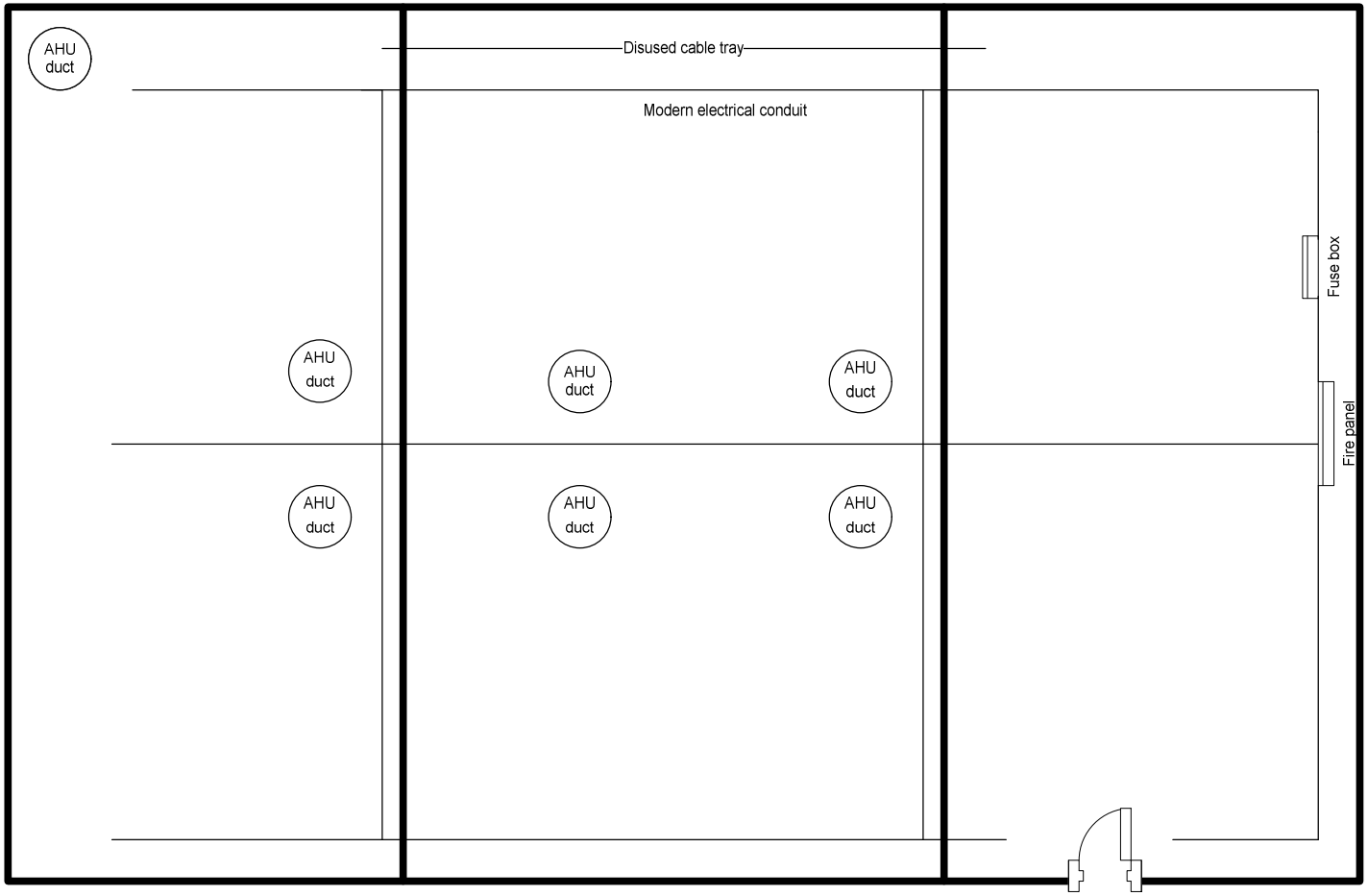
SITE PLANS

Site plan showing room locations

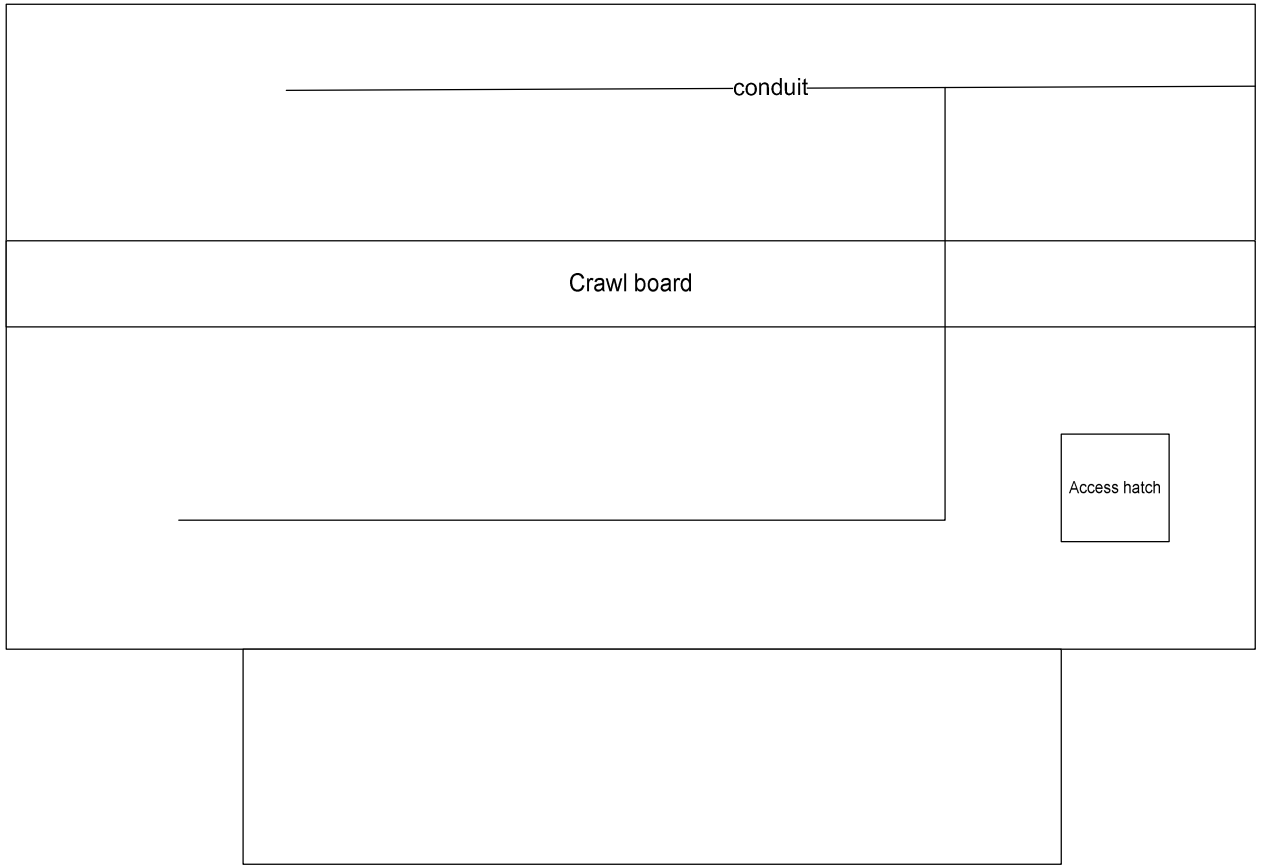



A
ELEVATION 1
B
MEETING ROOM
3.03
COHEN ROOM
2.51
ROOF ACCESS
3.01
LIFT
3.02
PLANT-ROOM
MEZZANINE FLOOR
3.04
3.05
A
B

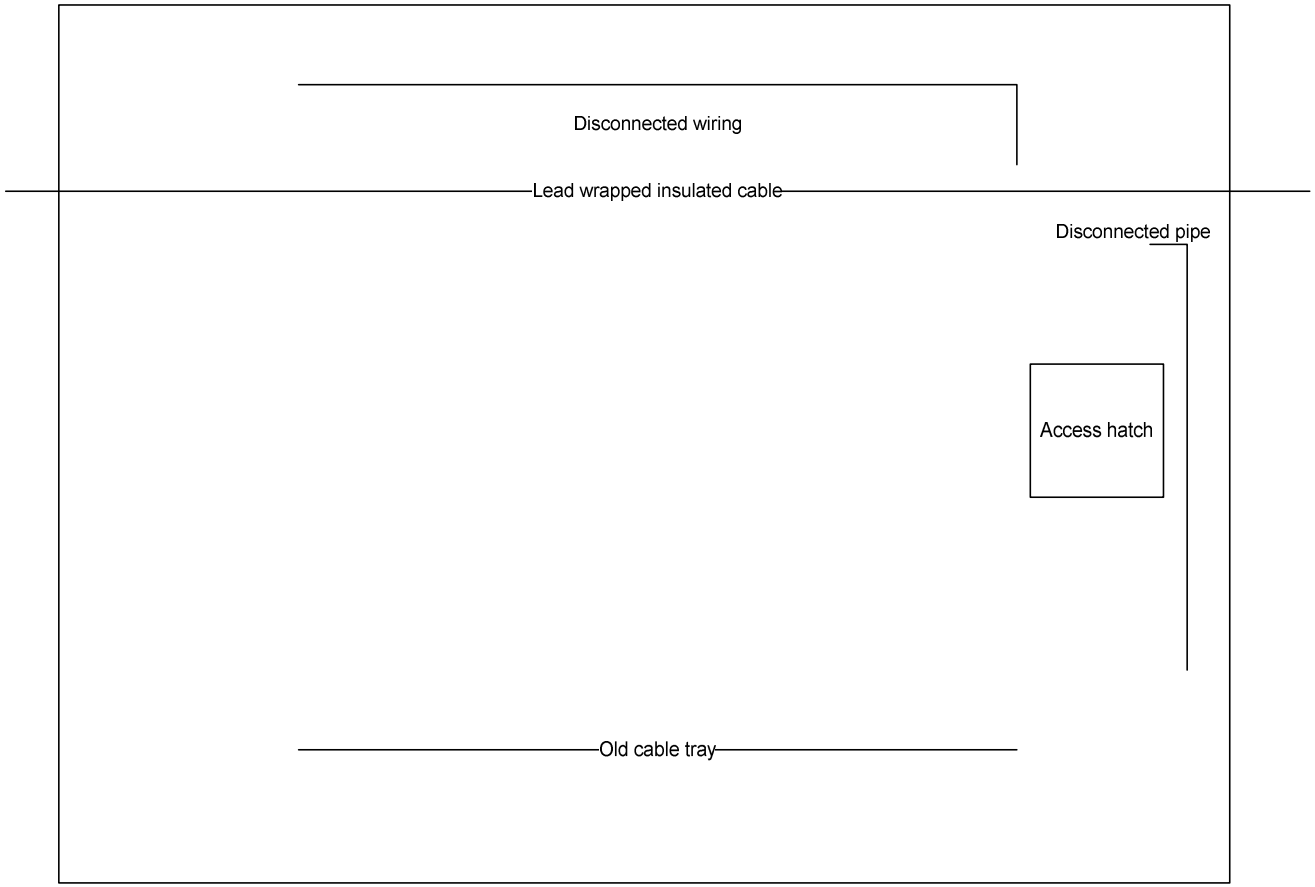
Loft above rooms 3.04 and 2.051



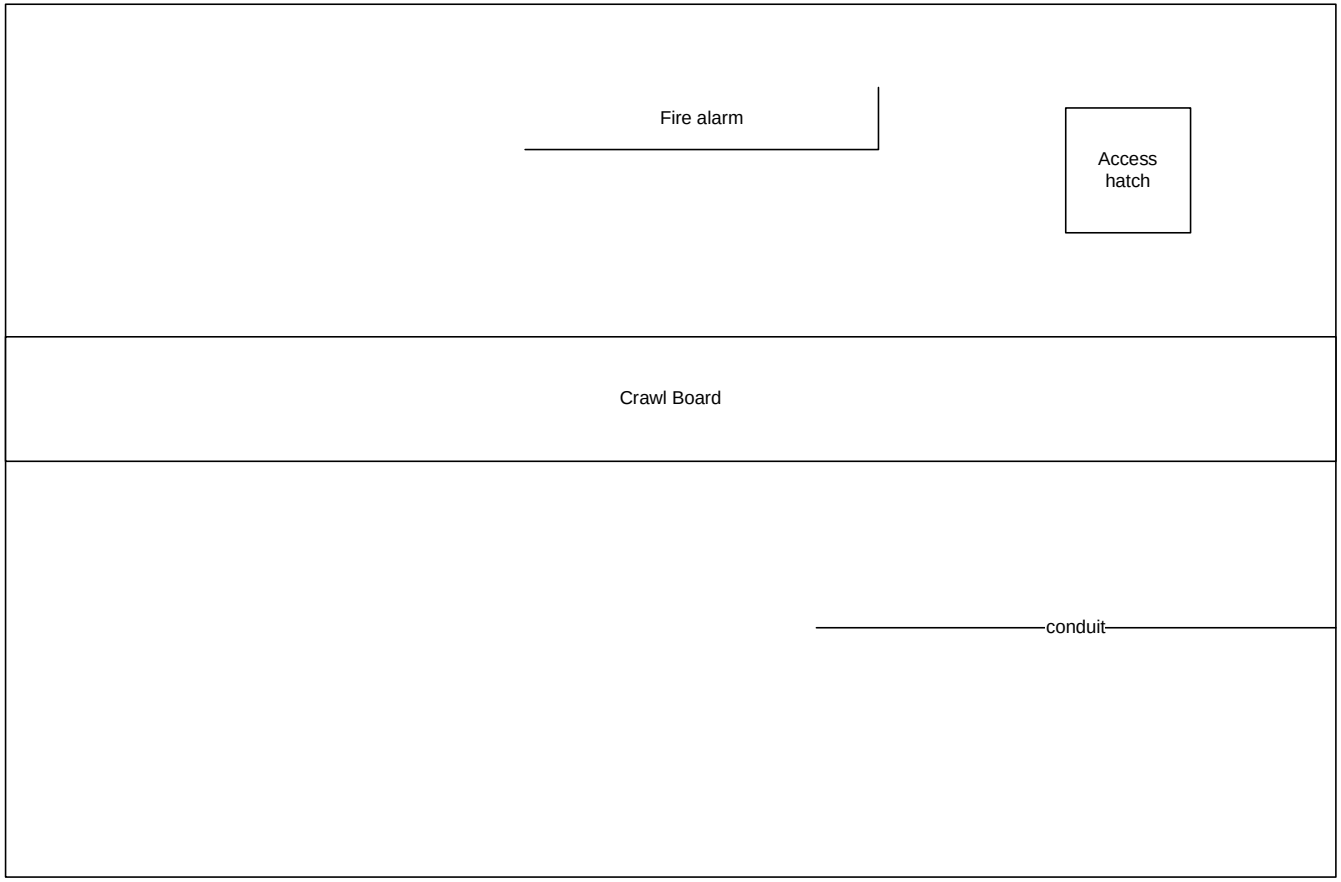
Loft above 2.053



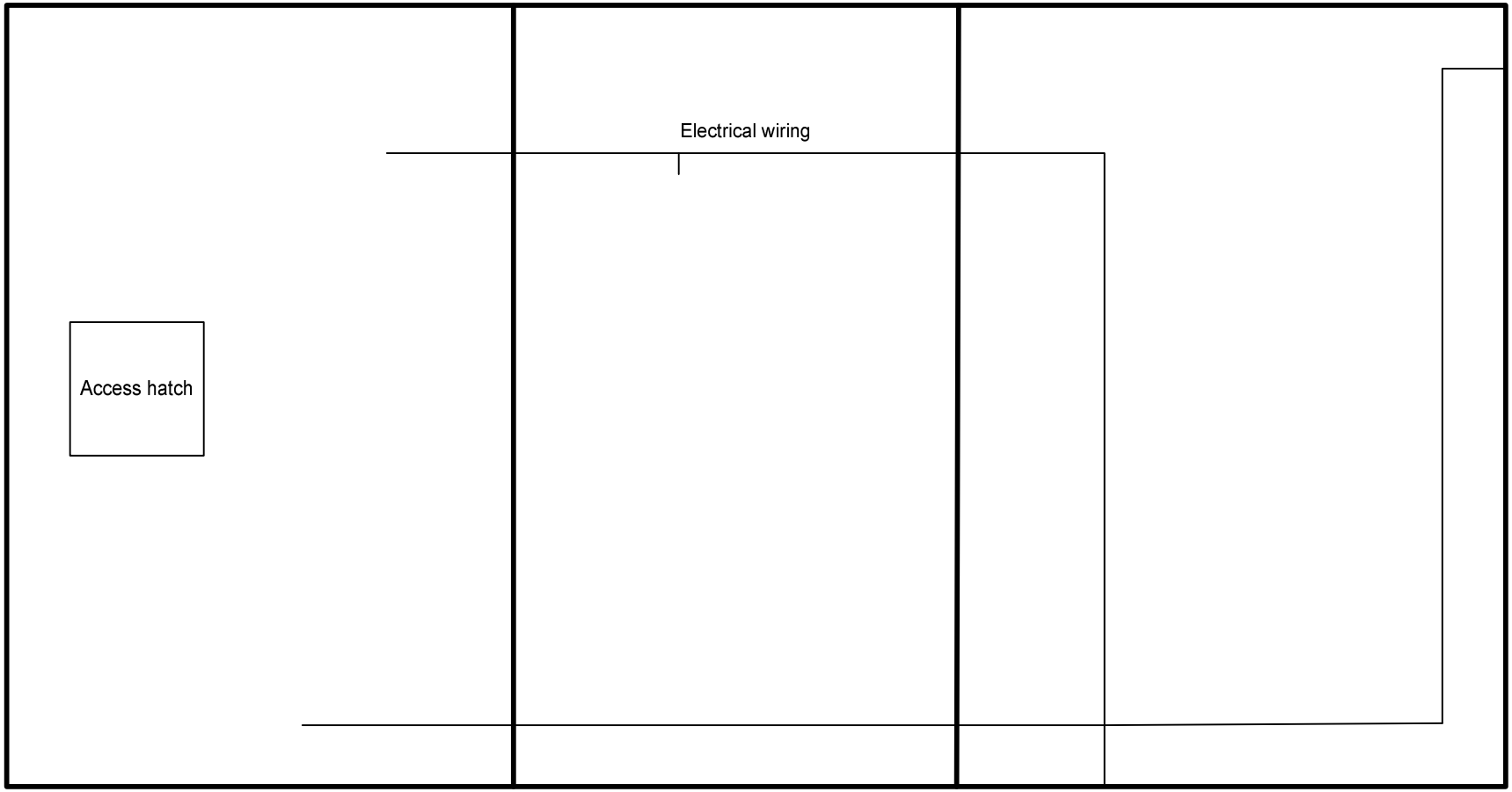
Loft above 2.052



Loft above 3.03



Loft above 2.054 and 2.055



APPENDIX III

PHOTOGRAPHS

Photograph showing modern fire panel in roof void above 3.04 where University of Manchester employees or contractors may need access

Photograph showing AHU ducting serving room 2.51

Photograph showing debris under suspended floor in roof void above Room 3.04

Photograph showing exposed plaster and wiring conduits in roof void above Room 3.03

Photograph showing exposed plaster and old wiring within roof void above room 2.53

Photograph showing redundant cables within the roof void above room 2.55

Photograph showing redundant cables RSJ within the roof void above room 2.54.

APPENDIX IV

LIST OF AMMENDMENTS

[i] At the request of the University of Manchester comparisons are made against the proposed IOELV rather than the TLV.

[ii] Results changed to make reference against the IOELV.