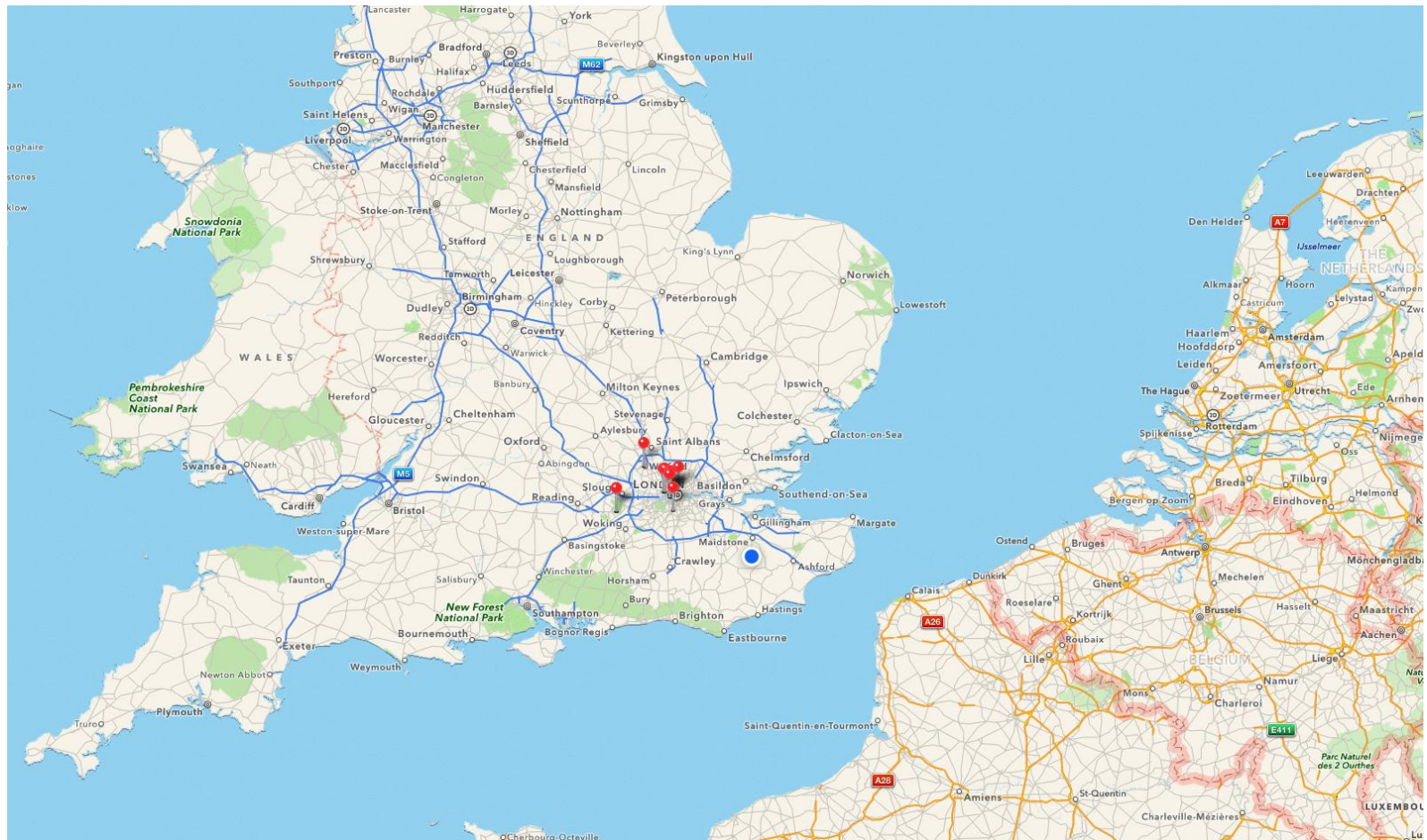


Aspects of Containment Lab Design

Anton de Paiva

Deputy Safety Director and BioRisk Manager

About Imperial



World's best lab



World's best laboratory



World's best laboratory



World's best laboratory



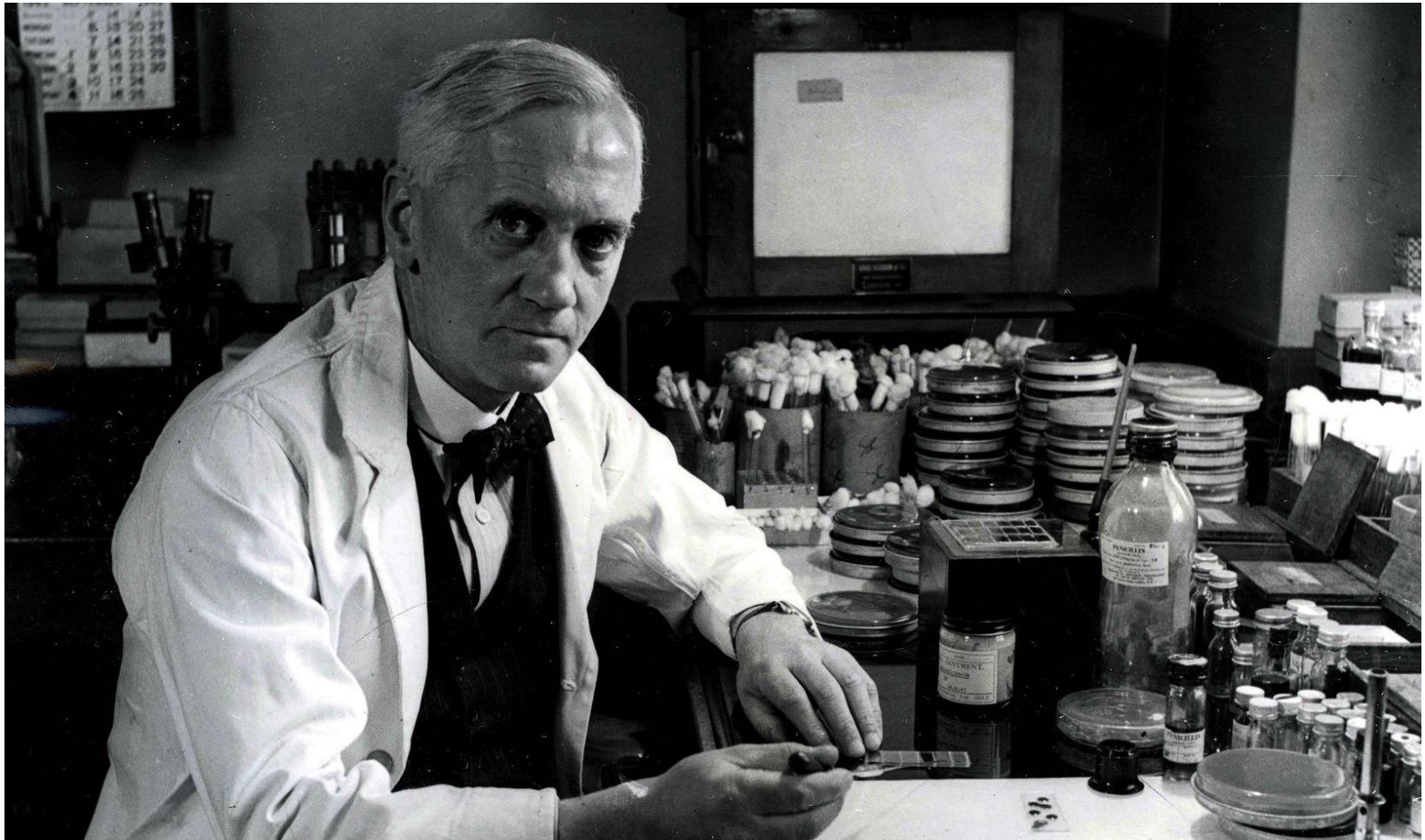
World's best laboratory



What is the ideal lab?

1. Space to do your work – it needs to be the right size
2. Need to be able to interface with the right people
3. Need to be able to think and concentrate
4. Clean and cleanable
5. Bright and light enough to be able to see
6. Comfortable – temp/humidity/smells/noise
7. Reliable
8. Secure – your IP and wallet are important
9. Need to be able to work without exposing either yourself or anyone else to something harmful
10. Ensure that you're not responsible for the next FMD outbreak

Is this the ideal lab?

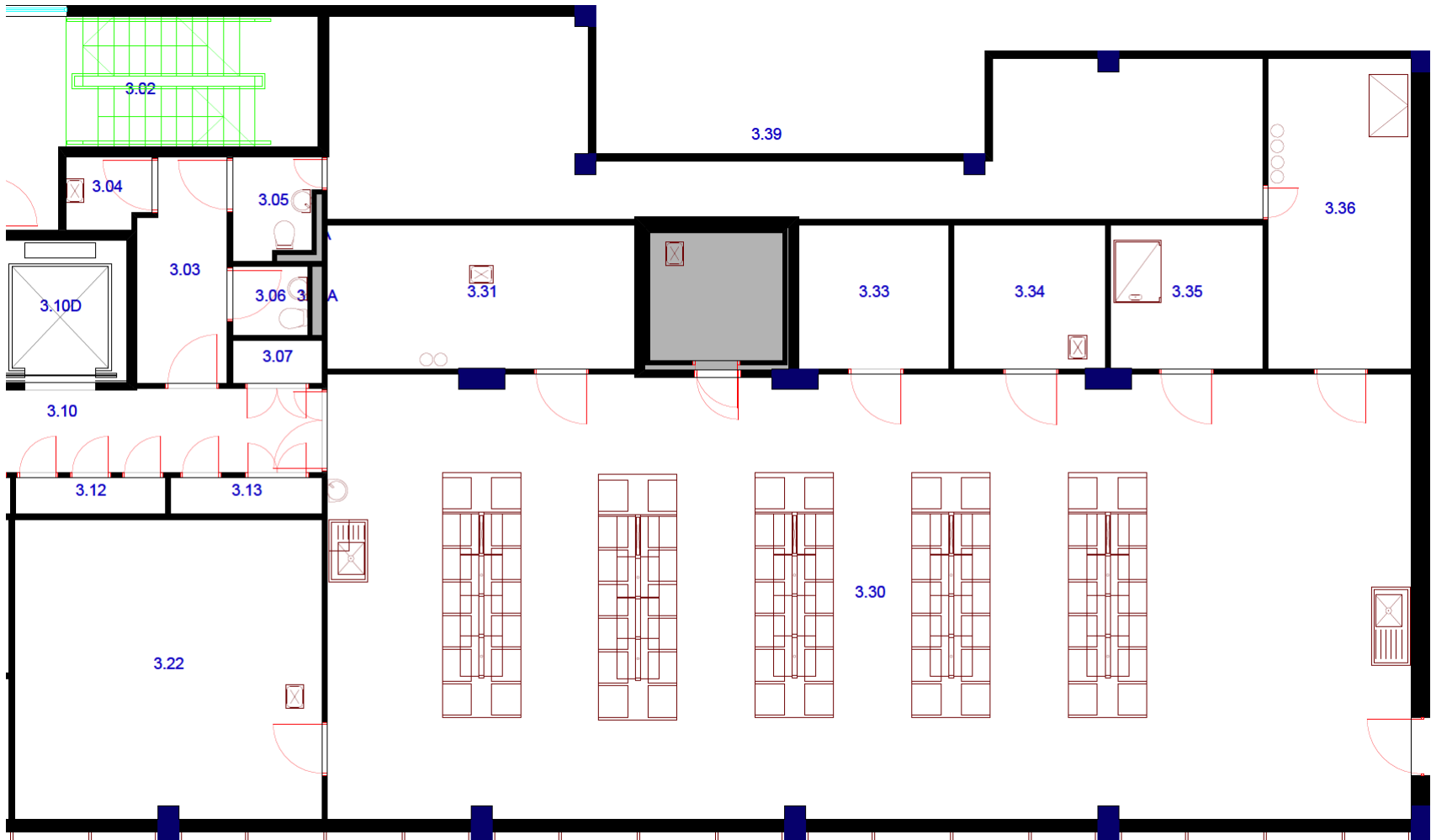


Is this any better?

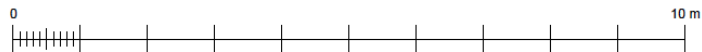
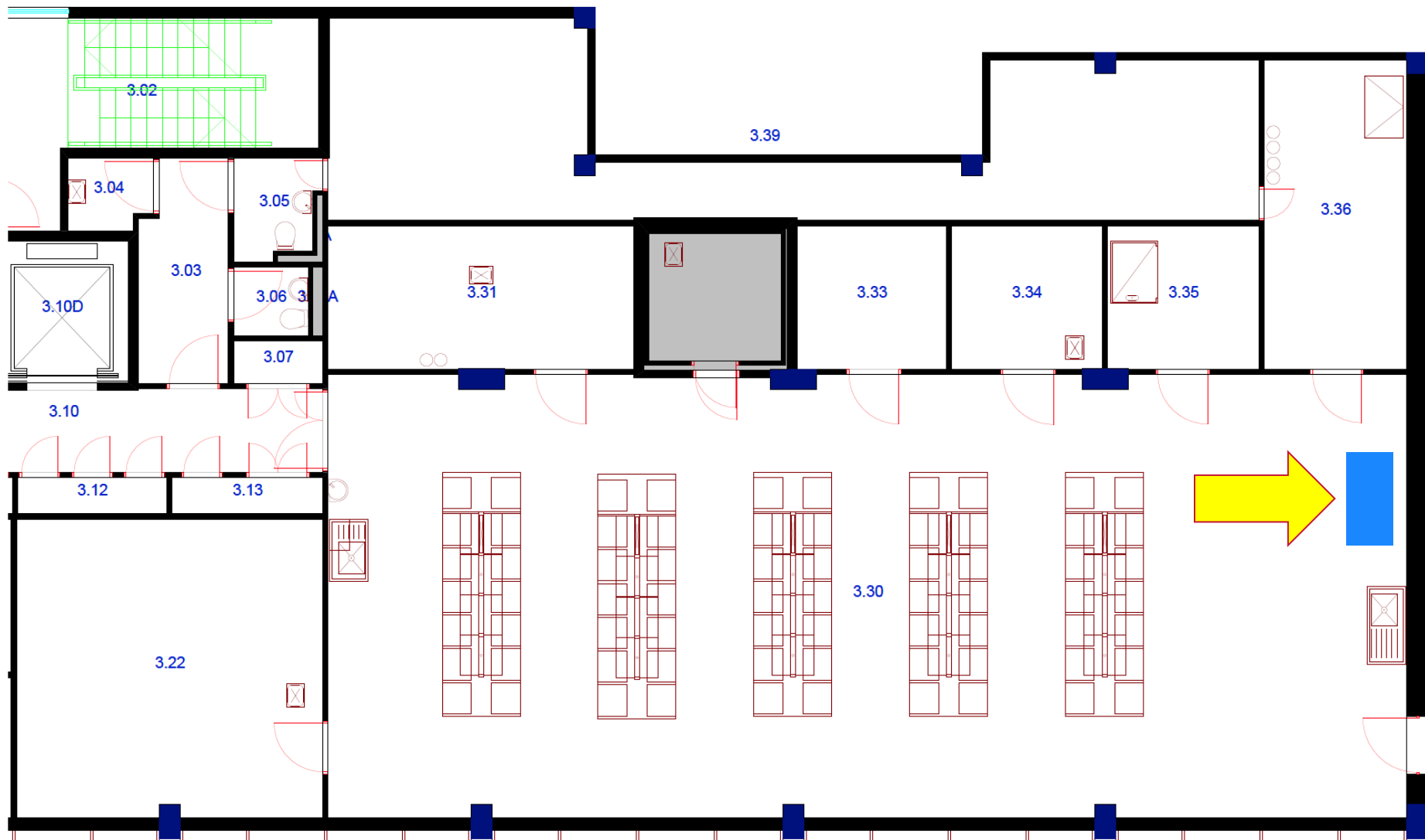


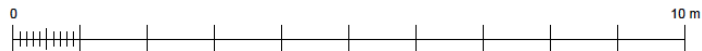
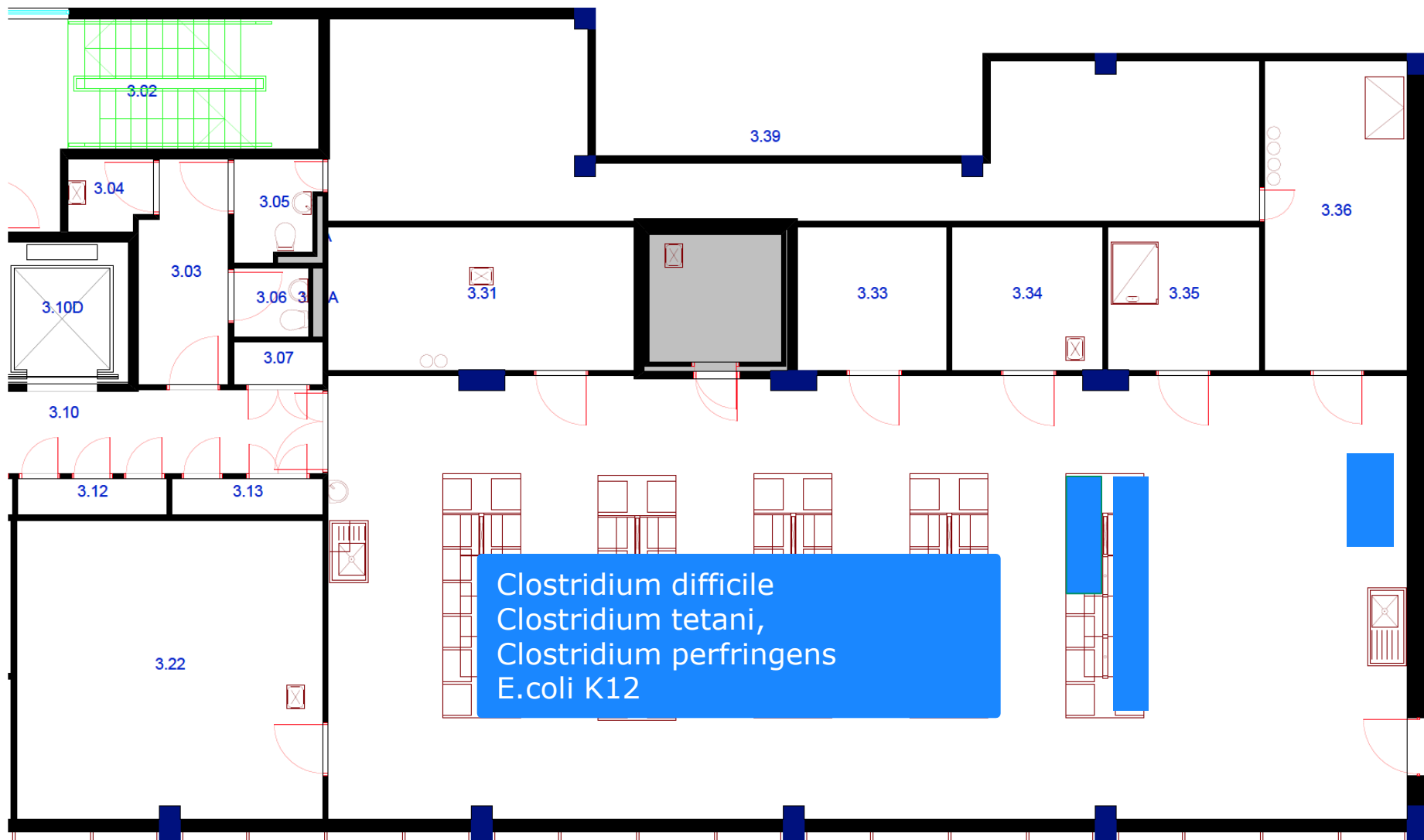


What about this?









E.coli, EPEC , EHEC, ETEC, EAEC, UPEC
Citrobacter Rodentium,
Salmonella enterica serovar Typhi,
Legionella pneumophila,
Anthamoebea castellani,
Dictyostelium discoideum,
Saccharomyces cerevisiae,
Listeria monocytogens,
Vibrio cholera,
Yersinia enterocolitica,
Campylobacter jejuni,
Campilobacter coli,
Shigella sonnie,
Shigella boydii,
Shigella flexneri,
Helicobacter pylori

3.02

3.39

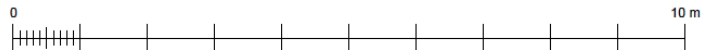
3.36

3.33

3.34

3.35

3.30







Regulation 7 Prevention or control of exposure to substances hazardous to health

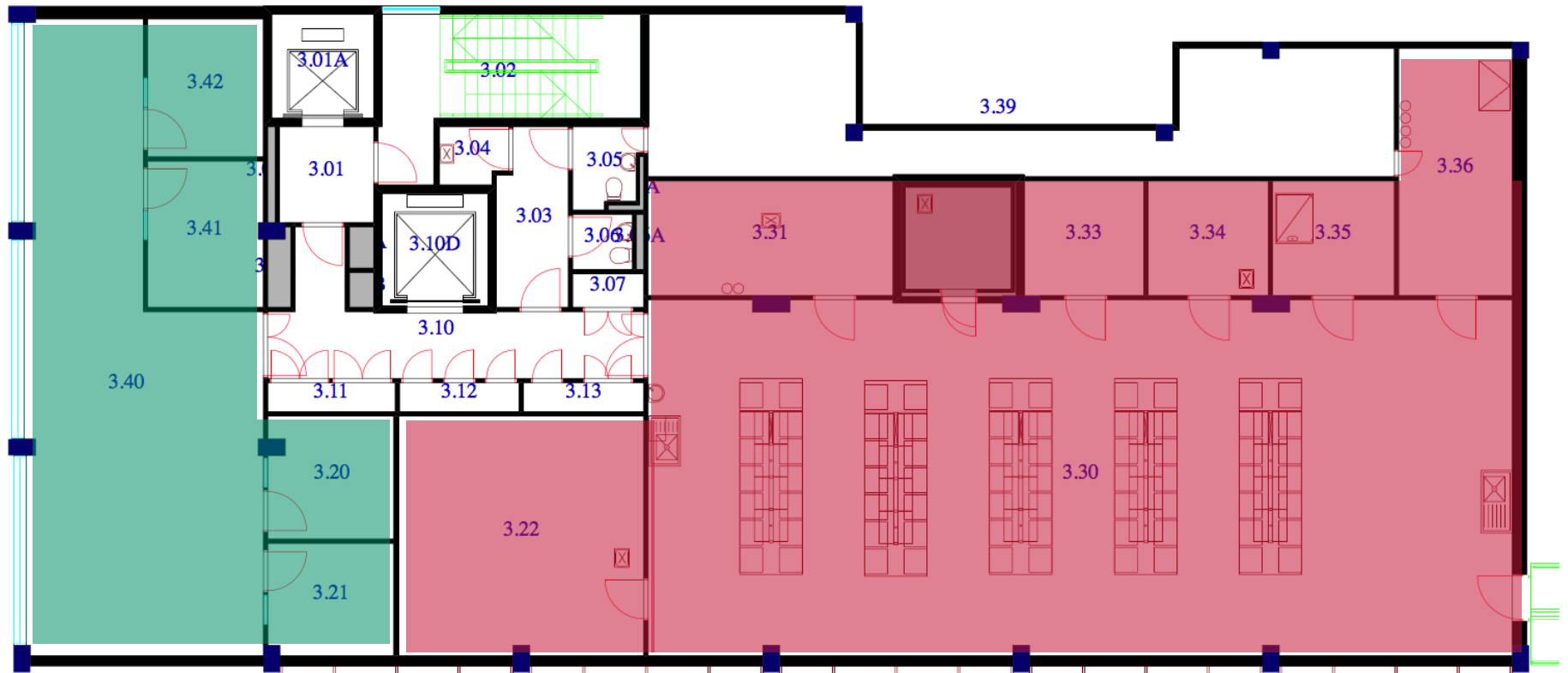
(1) Every employer shall ensure that the exposure of his employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled.

(2) In complying with his duty of prevention under paragraph (1), substitution shall by preference be undertaken, whereby the employer shall avoid, so far as is reasonably practicable, the use of a substance hazardous to health at the workplace by replacing it with a substance or process which, under the conditions of its use, either eliminates or reduces the risk to the health of his employees.



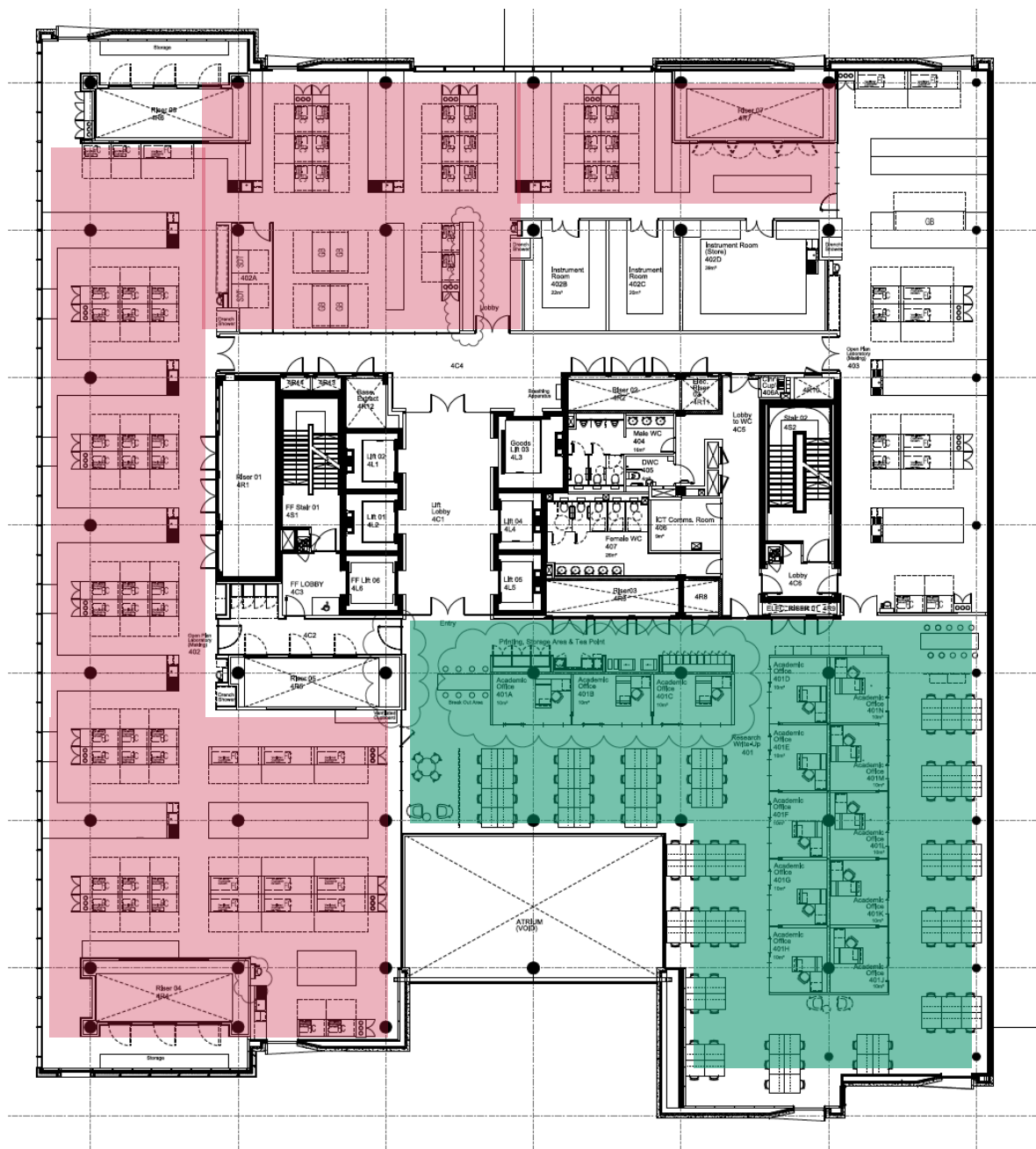
So what's the solution?

Resist this



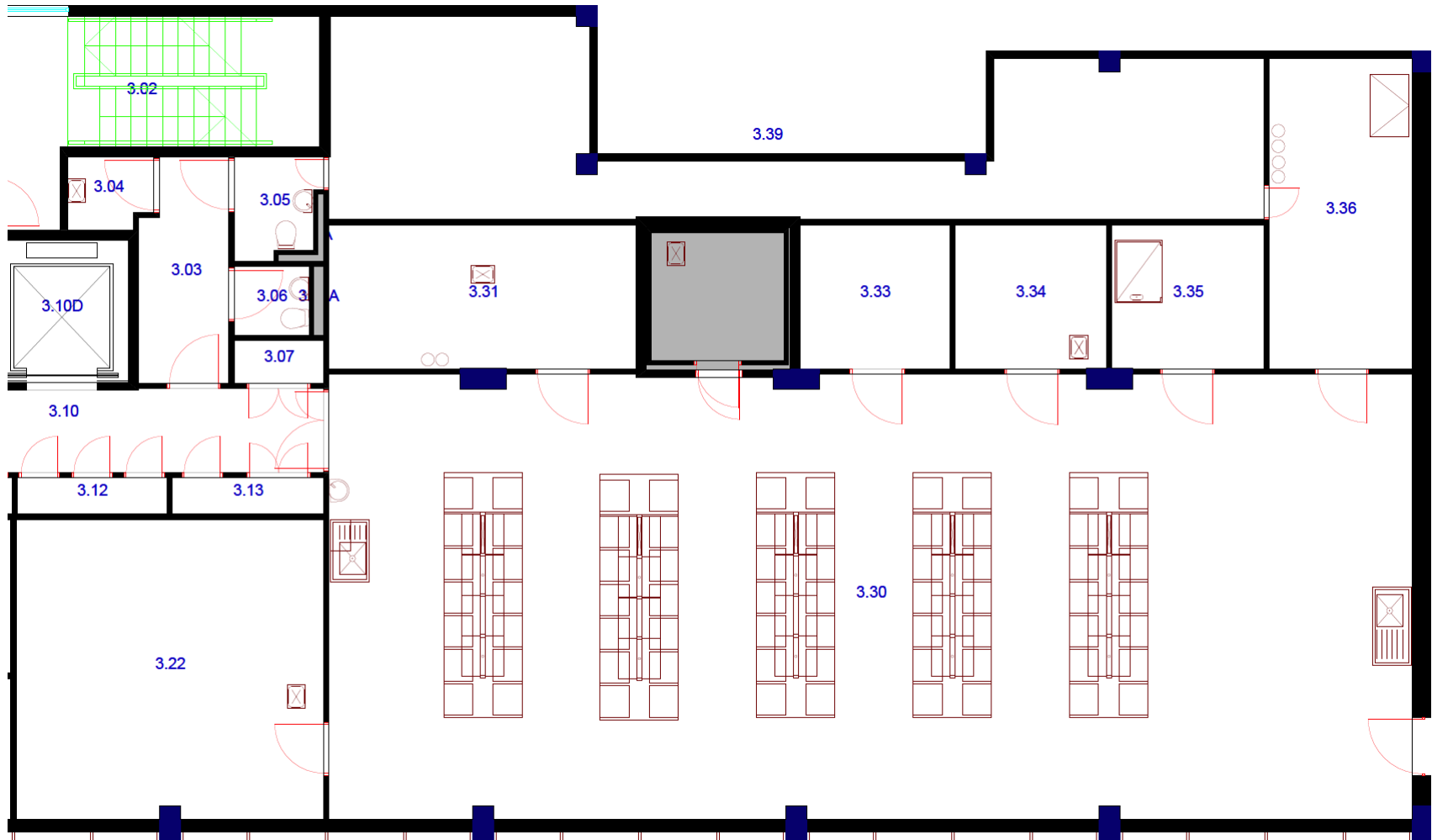






What can we do?

Risk assessment



ORIGINAL ARTICLE

Microbial aerosol generation during laboratory accidents and subsequent risk assessment

A. Bennett & S. Parks

Centre for Emergency Preparedness and Response, Health Protection Agency, Porton Down, Salisbury, UK

Journal of Applied Microbiology **100** (2006) 658–663

	Accident	Casella (CFU m ⁻³)	Andersen (CFU m ⁻³)	Cyclone (CFU m ⁻³)
1	Dropping a flask	173	643	1.03×10^3
2	Dropping a Thompson bottle	2.48×10^3	3.48×10^3 *	1.37×10^4
3	15 ml spill	387	493†	2.07×10^3
4	Dropping three bottles	588	1.06×10^3 *	3.98×10^3
5	Peristaltic pump	634	886	5.18×10^3
6	Syringe filter	3.70×10^3	3.43×10^3 †	1.77×10^4
7	Fungal plate	$>3.3 \times 10^3$	1.34×10^5 *	$>1.56 \times 10^5$
8	Centrifuge spill	$>3.3 \times 10^3$	1.71×10^4 †	2.30×10^4
9a	Centrifuge bucket	150	64	142
9b	Centrifuge bucket	3.00×10^3	1.10×10^3 *	1.50×10^3
10	Bacterial plate	26.7	3.6	8.2
11	Orbital shaker	1.15×10^3	818*	871

*Over 50% of particles less than 2.2 μm .

†Over 90% less than 2.2 μm .

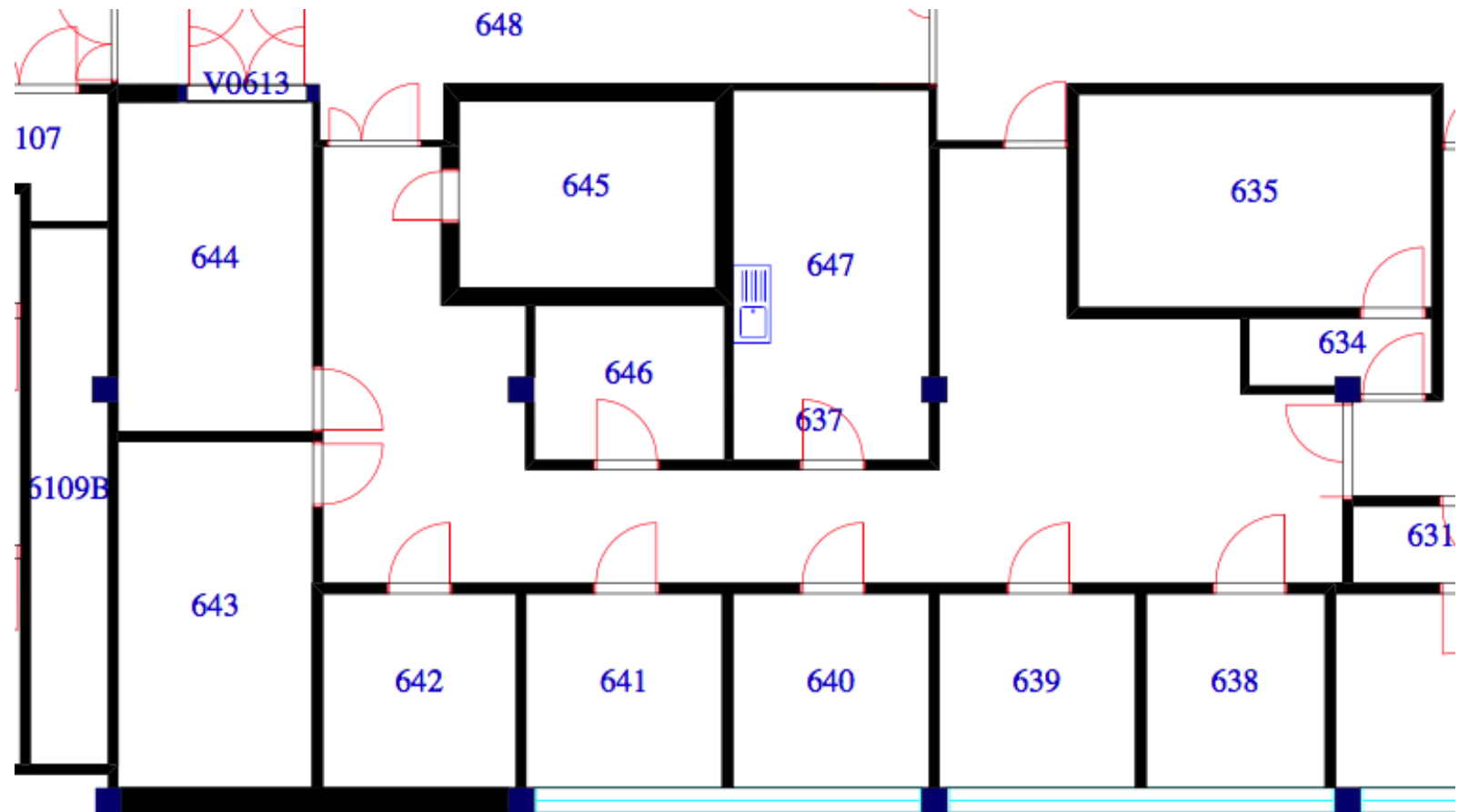
‡50% less than 1.5 μm .

Coincidence?

Of the 7 exposure incidences at Imperial College since 2010, 6 have taken place in this building.

(No. of those in this space $< 5\%$ of total bio workers)

However....



Don't forget the ancillary aspects...



Campaign for small labs

