

# The Evolution of Research Facilities

James Edwards

15 August 2011

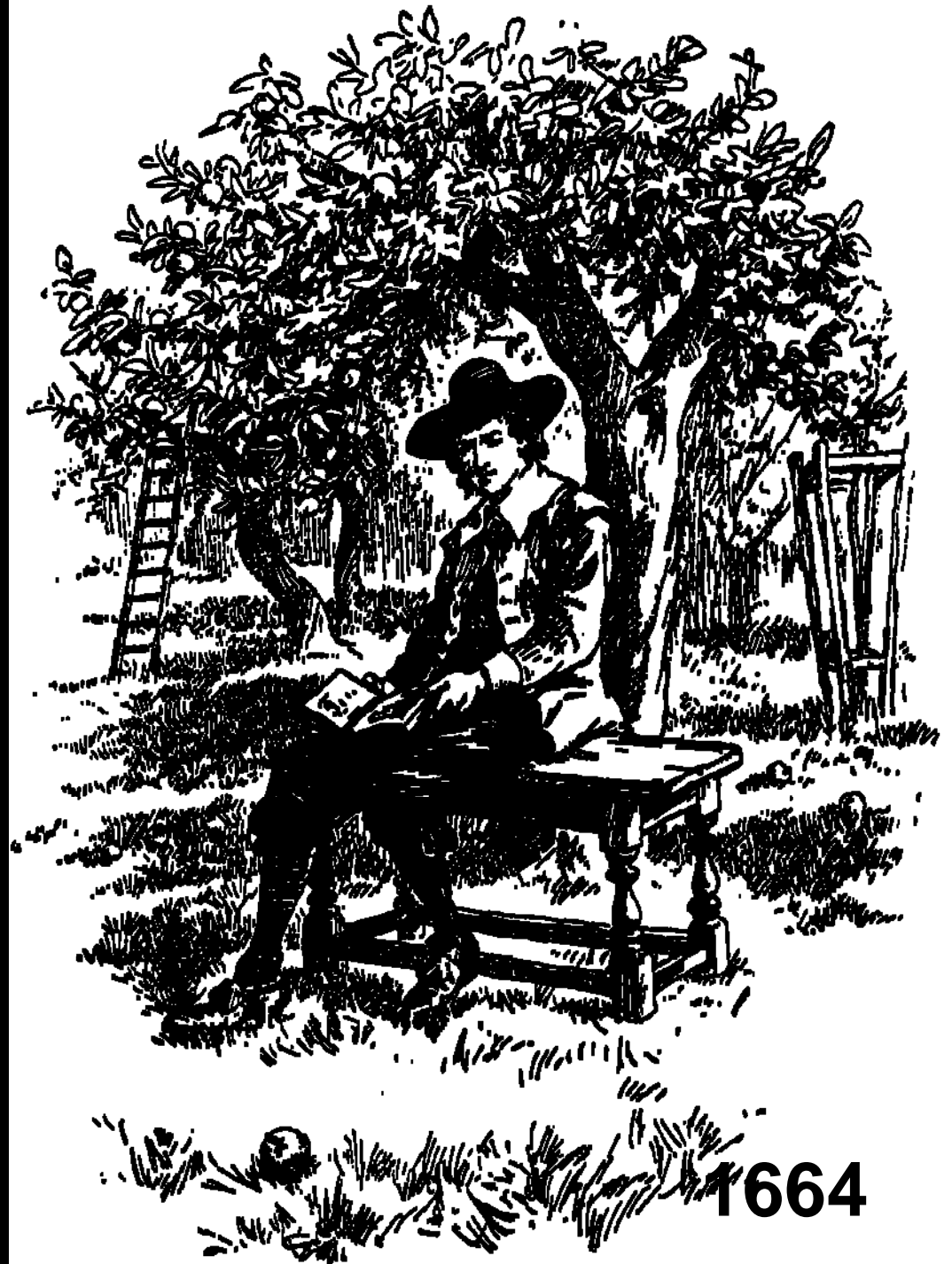
# **Great Life-Changing Scientific Discoveries**



**Nicholas Copernicus**

**1543**

**Isaac Newton**





**Michael Faraday's Lab**

**1821**



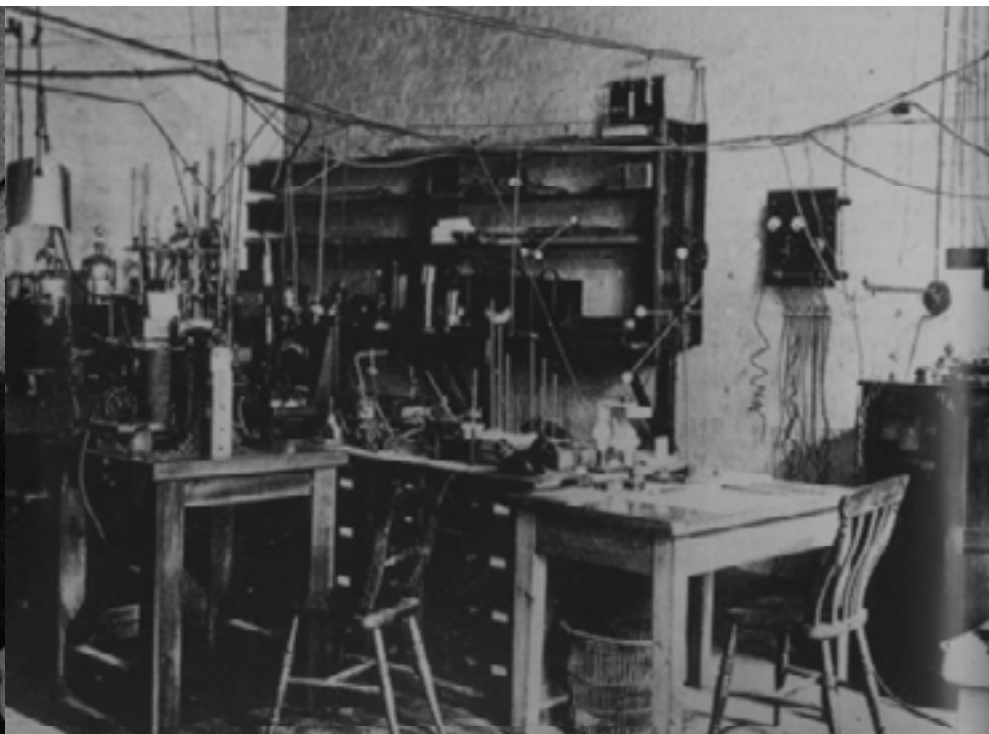
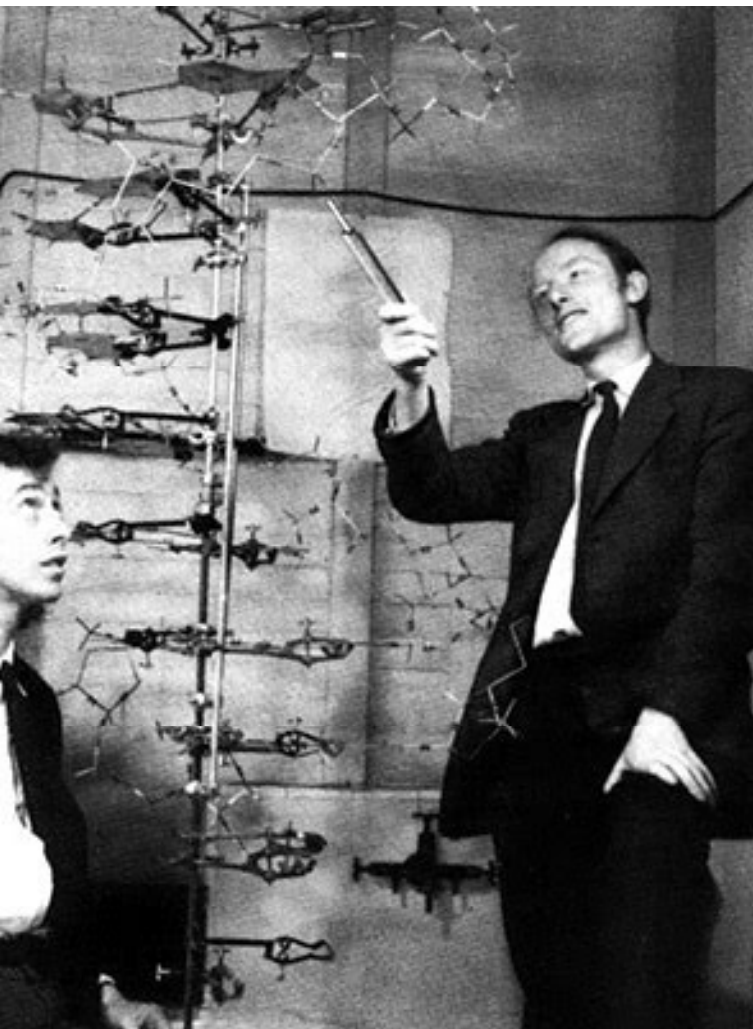
**Albert Einstein**



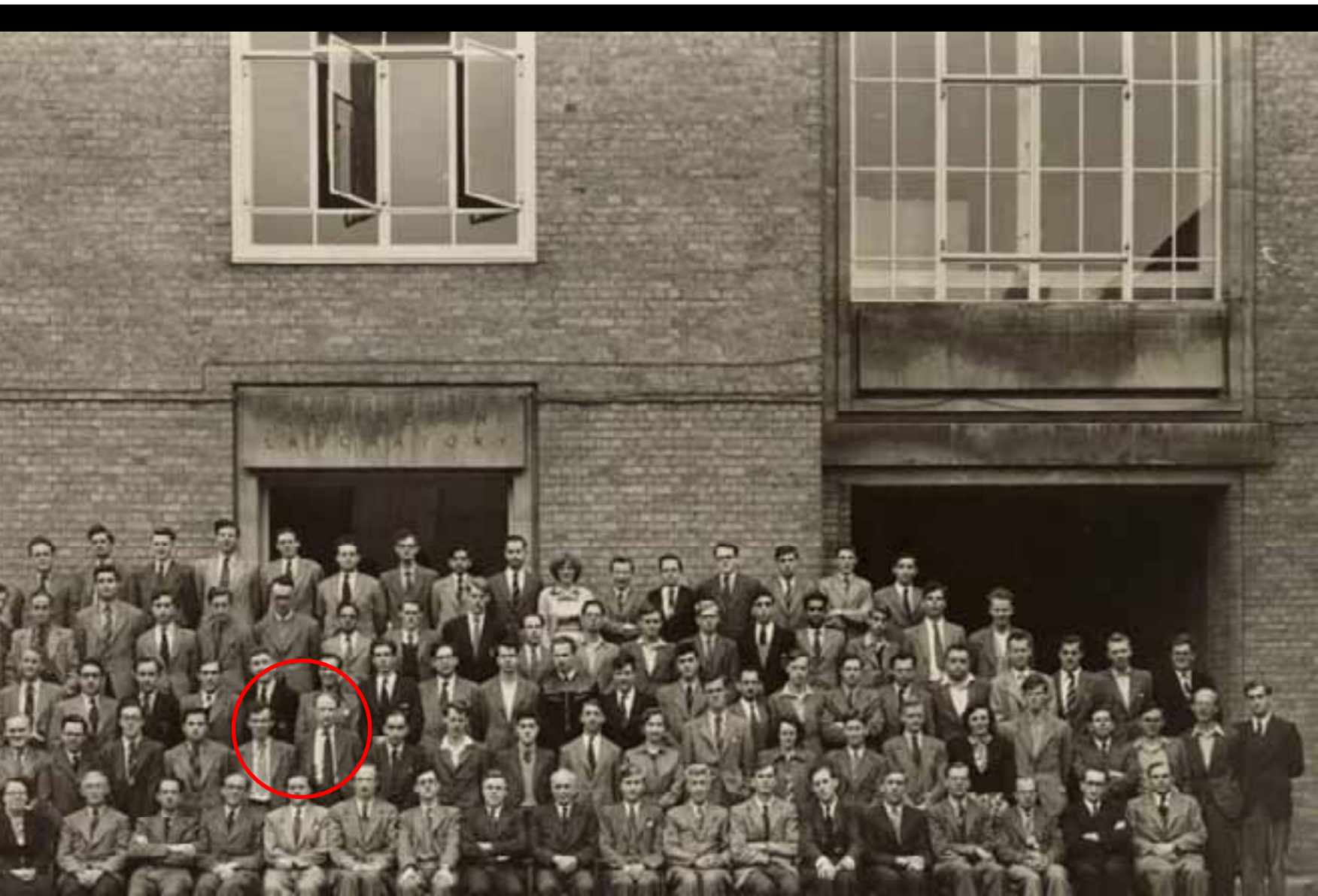


**Alexander  
Fleming**





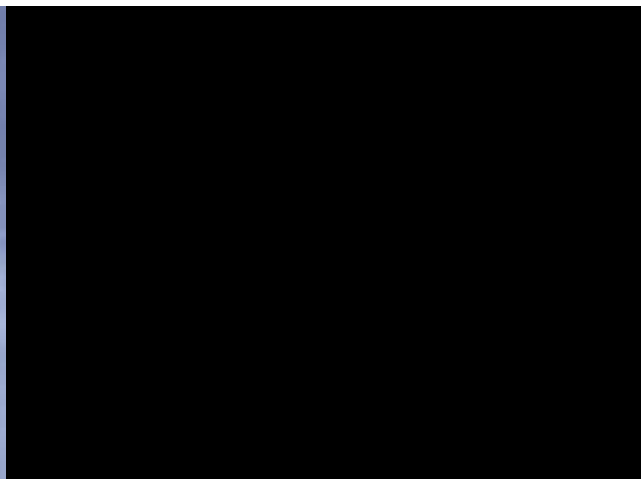
**James Watson and Francis Crick**

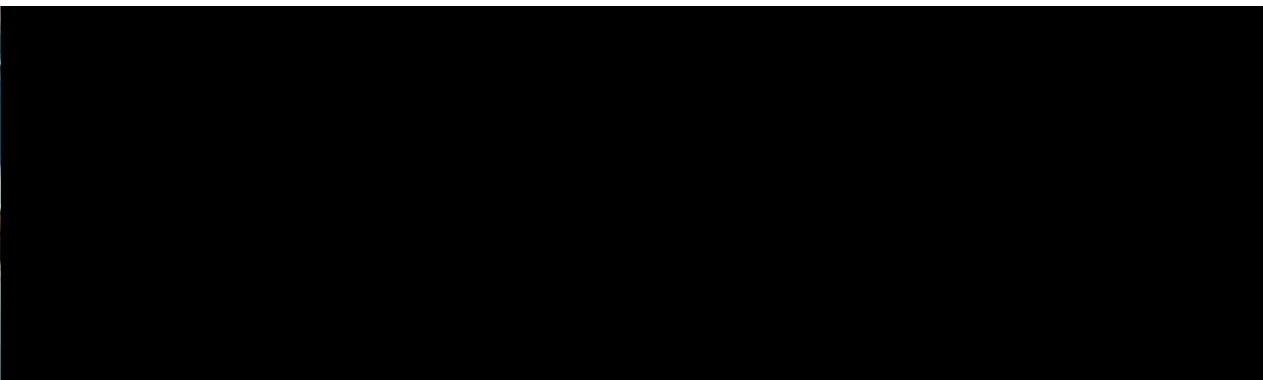






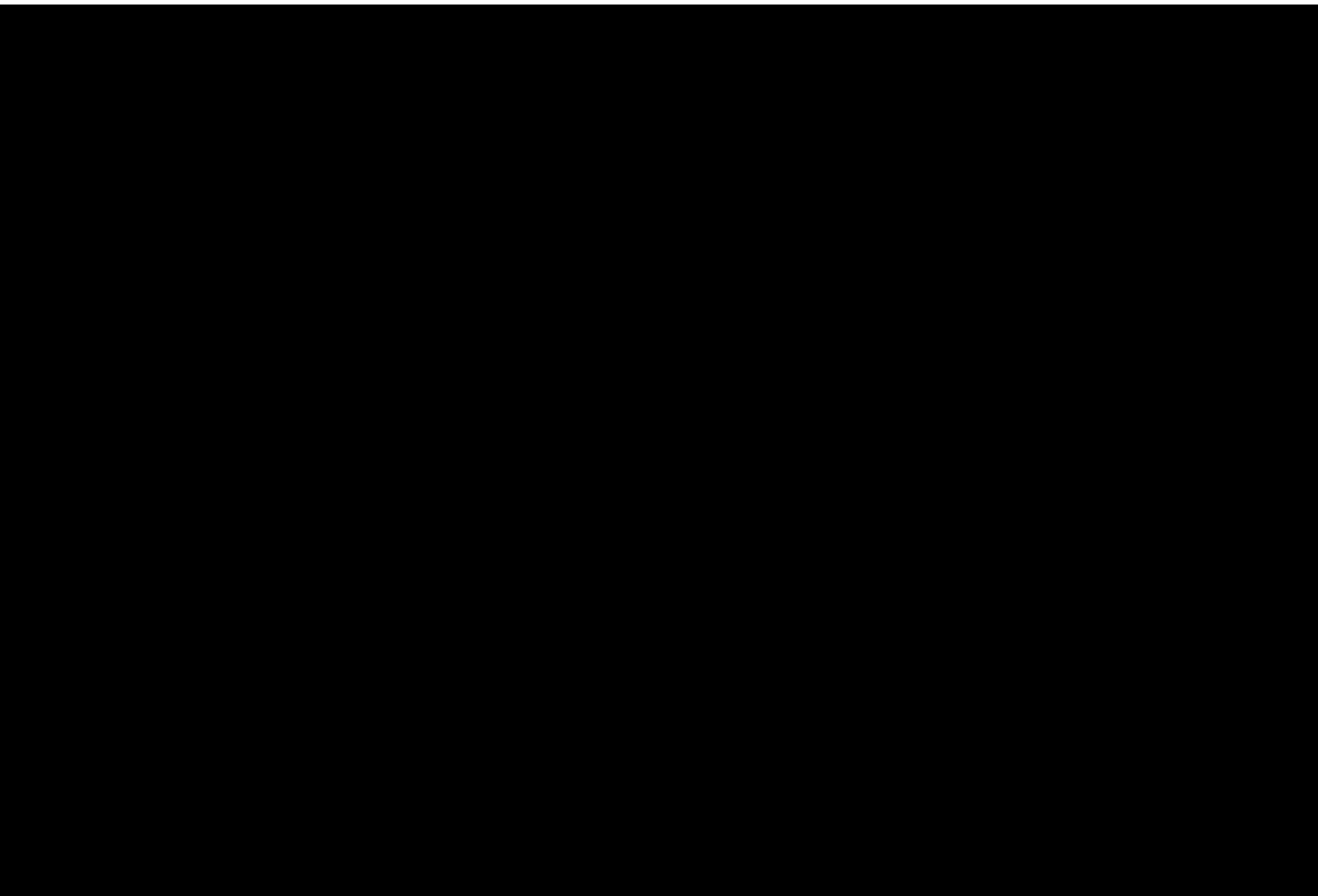






***New  
education  
and research  
buildings  
score top  
marks at 2008  
Queensland  
Architecture***





The Parliament of the Commonwealth of Australia

# Building Australia's Research Capacity

**House of Representatives**

**Standing Committee on Industry, Science and Innovation**

December 2008

The value of research and innovation in today's 'knowledge economy' cannot be overestimated.

Australia's research climate has been allowed to lag behind world standards such that we now face severe challenges in bolstering our capacity for research and innovation.

Three key issues were identified

. The path to research begins not at university but at school, as early as the primary or secondary years.

. There needs to be greater collaboration between universities and research institutes, schools and industry.

. Under-funding of research across the spectrum is reducing Australia's international competitiveness in the areas of research

“In Australia, we still do not hold research  
and researchers in high esteem,  
despite the significant contribution  
they make to the nation”







Wednesday, April 13, 2011 @theWest \$1.30

# The West Australian

LATEST TRENDS IN BEAUTIFUL **BOOTS** Style LIFTOUT

PLAN TO WIDEN STIRLING HIGHWAY News PAGE 5

...ed like never before with our own **West Rewards** SEE PAGE 12



## Scientists revolt







**Companion of the Order  
of Australia**

**Fiona Stanley**

1996

‘for service to maternal and  
child health research,  
particularly in perinatal and  
infant problems, and for her  
contributions to improving  
aboriginal and community





**Nobel Laureates**

**Professor Barry Marshall  
and Dr Robin Warren**

2005

‘for the discovery of the  
bacterium *Helicobacter  
pylori* and its role in gastritis  
and peptic ulcer disease’







**Nobel Laureate**

**Professor Peter Doherty**

1996

‘for discoveries concerning  
the specificity of the cell  
mediated immune defence’



# Current design trends



## Engaging with a wider audience

- Visual connection between internal spaces and the broader public context
- Interaction spaces and permeable edges to the building
- Facilities for teachers, school students and community groups
- Cafe and social spaces

## Designing for a diverse scientific community

## Fostering interaction and collaboration

- Creating a fertile and stimulating environment to support interdisciplinary teams
- Rational planning within a loose fit framework that fosters change and interaction
- Sharing infrastructure

## Flexibility and adaptability

- Open plan









You are seeing streams of data recently created here at the Broad.



### CHEMICAL SCREENING

Current Project: **Identifying novel inhibitors of the mTOR pathway**




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Background: mTOR is a central regulator of cell growth and metabolism. It is a serine/threonine kinase that is activated by growth factors and nutrients. Inhibitors of mTOR are used in the treatment of cancer and other diseases.

Project Description: We are screening a library of small molecules to identify novel inhibitors of mTOR. We are using a combination of biochemical assays and high-throughput screening to identify potential inhibitors.

Results: We have identified several potential inhibitors of mTOR. We are currently validating these compounds and determining their mechanism of action.

### GENOME SEQUENCING

Current Project: **Genome-wide association study (GWAS) of type 2 diabetes**



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Background: Type 2 diabetes is a complex disease with a strong genetic component. GWAS is a powerful tool for identifying genetic variants associated with complex diseases.

Project Description: We are conducting a GWAS of type 2 diabetes in a large population of individuals. We are using high-throughput genotyping to identify genetic variants associated with the disease.

Results: We have identified several genetic variants associated with type 2 diabetes. We are currently validating these variants and determining their effect sizes.

### MICROARRAY ANALYSIS

Current Project: **Gene expression analysis of human chromosomes**




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Background: Microarray analysis is a powerful tool for measuring gene expression levels across the genome. It is used to identify differentially expressed genes and to study gene regulation.

Project Description: We are using microarray analysis to study gene expression levels across the human genome. We are focusing on the expression of genes on individual chromosomes.

Results: We have identified several genes that are differentially expressed across chromosomes. We are currently validating these genes and determining their function.

HUMAN CHROMOSOMES

STREAMING REAL DATA



# GENOME SEQUENCING

SHOWING 1 OF 117 MACHINES RUNNING AT 10x SPEED

TOTAL DNA LETTERS SEQUENCED:

**156409055**

A 29% T 29% C 20% G 20%

DNA LETTER DETERMINATION



902

16 SIMULTANEOUS READS



## CURRENT PROJECT

### SEQUENCING GENOME OF THE african elephant

By comparing the elephant's genome to the genomes of other mammals, scientists will be able to identify some of the oldest pieces of DNA that are common among placental mammals.

What you are seeing is the sequence of genetic letters that make up the elephant genome. Shown here are 16 simultaneous reads from a single DNA sequencing machine. Each read provides 700,000 letters per hour. 117 sequencers running 24 hours a day generate billions of bases per week. The elephant genome is estimated to be 2.2 billion letters long and scientists will sequence and re-sequence it as a series of reads to ensure accuracy.



James H Clark Centre  
Stanford University



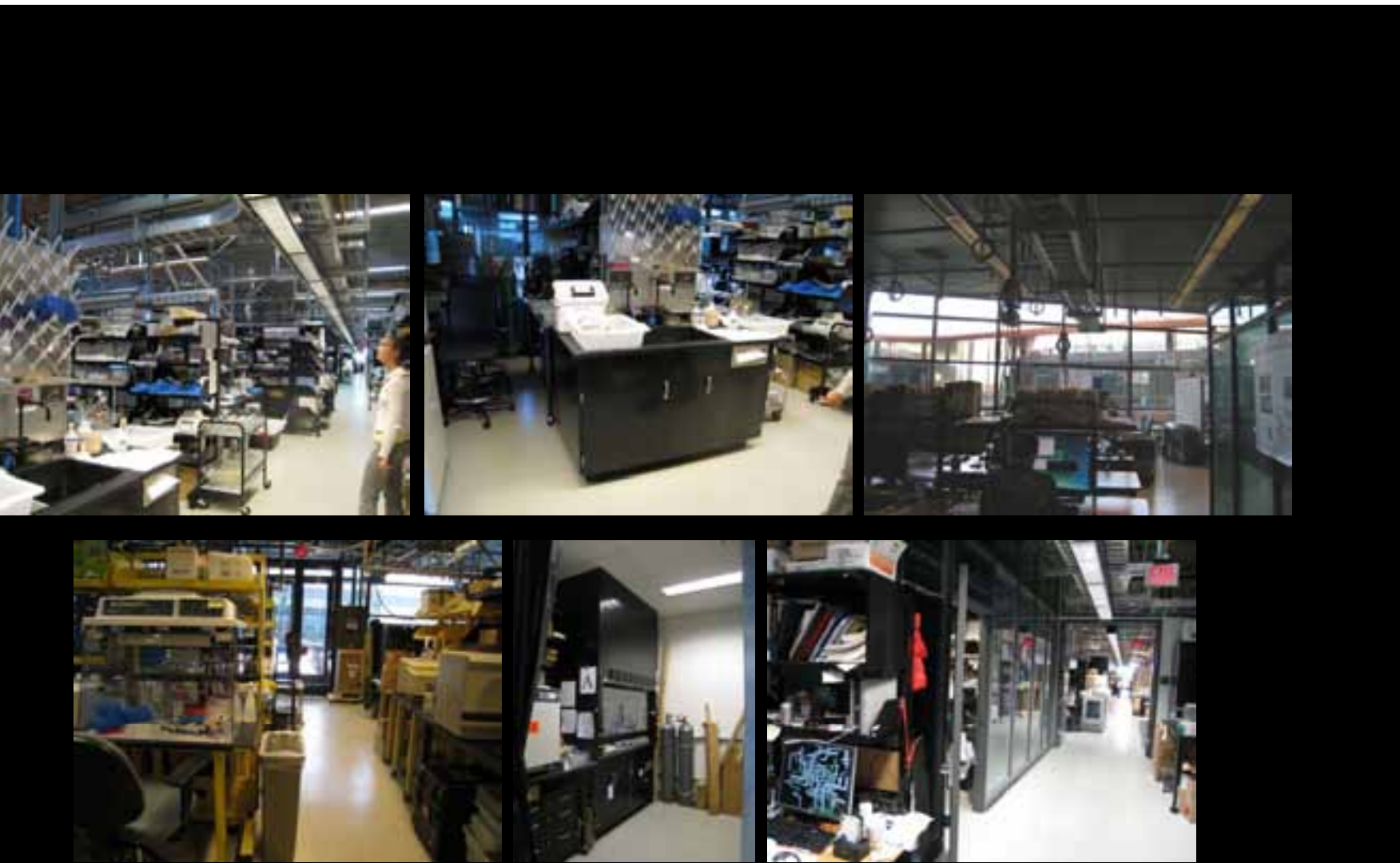








benches and desks are on wheels and can be moved to allow ad hoc  
am formation that can respond easily to fast-evolving research needs

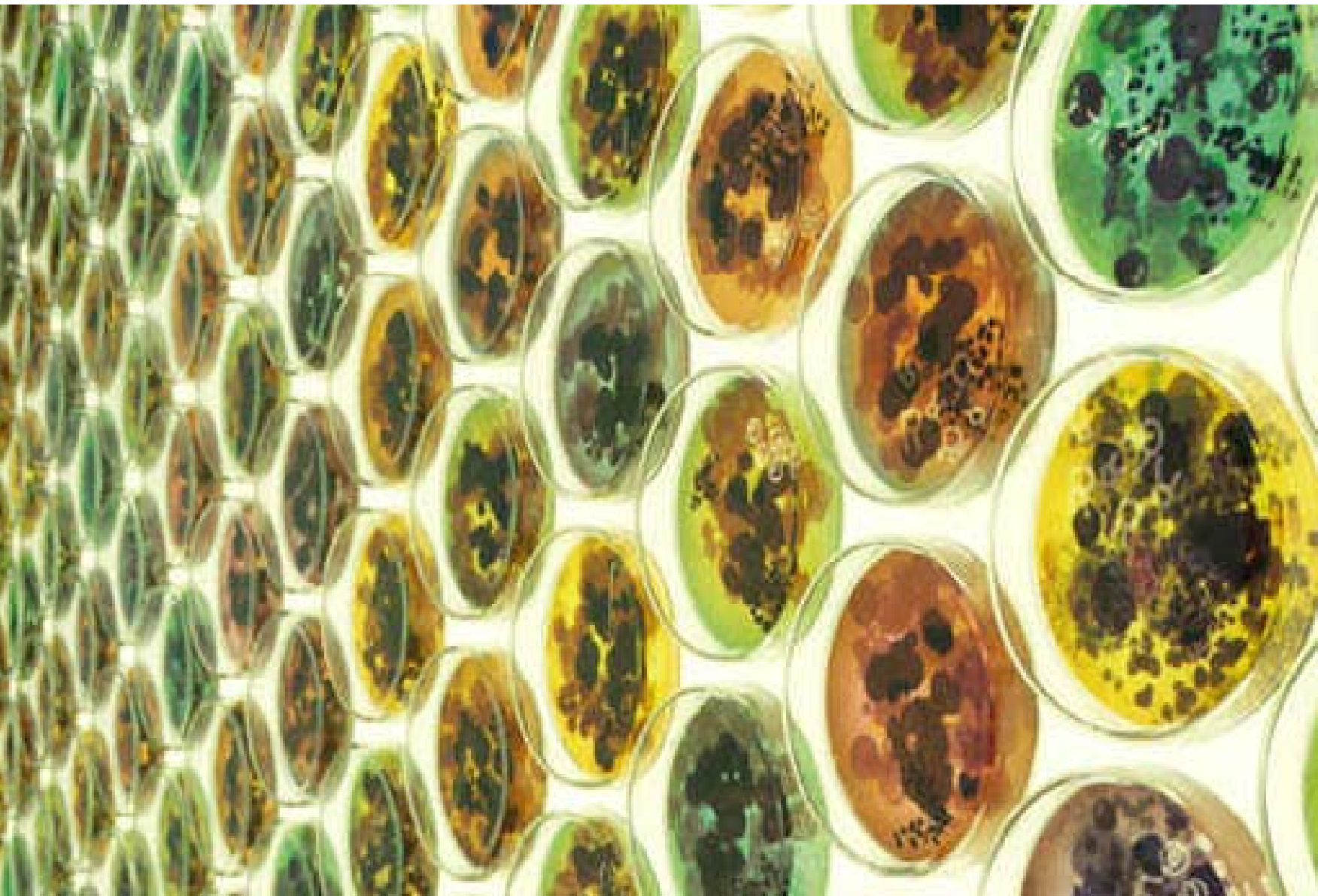


Workstations plug into an overhead unistrut system of exposed services

Wellcome Trust

London















girl







# Centre of the Cell

London





















**Session times:**

**10:30am**

**1:30pm**

**4:30pm**

**Public and family  
sessions run  
during half-term:**

**Oct 26 - 30**





















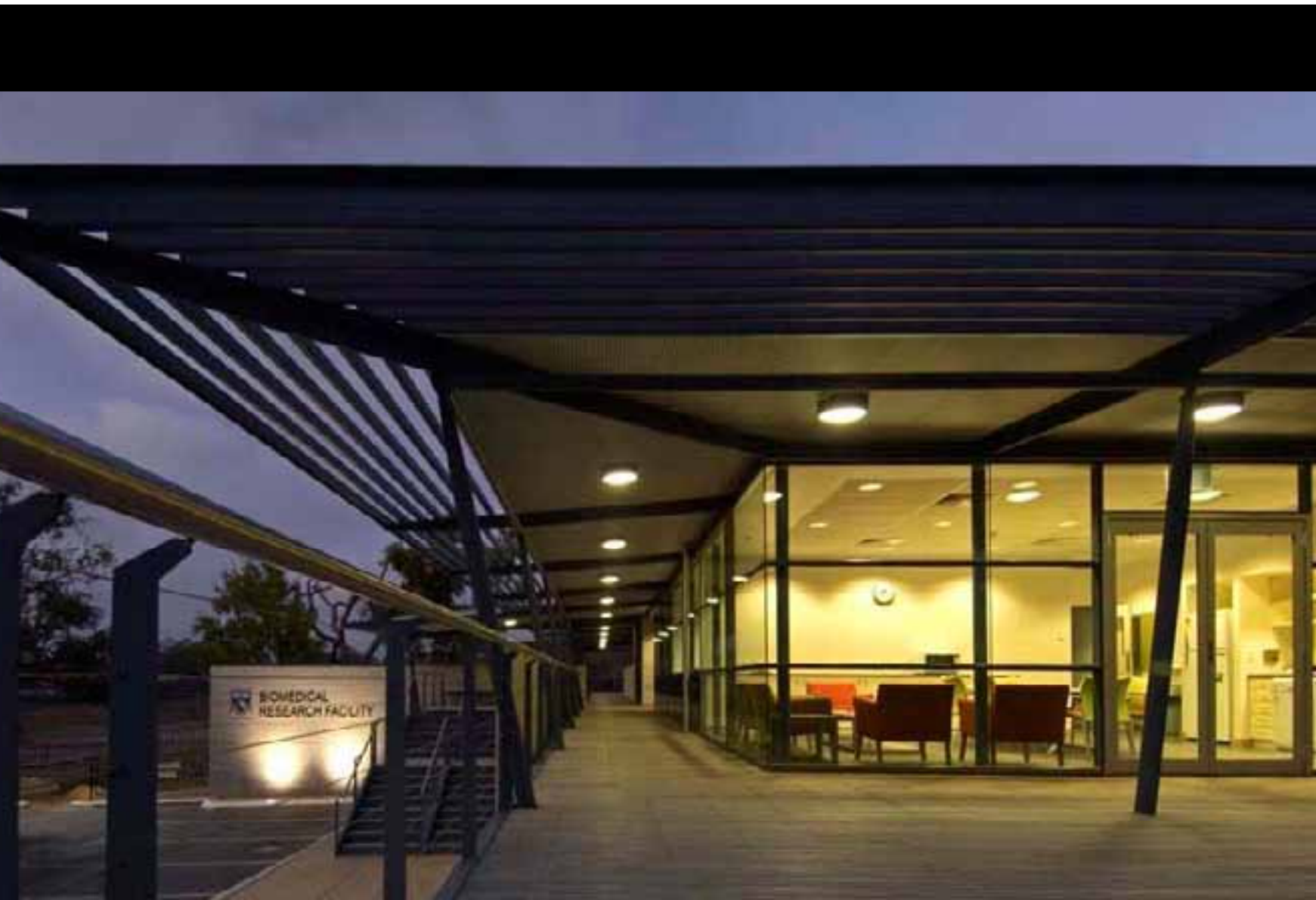






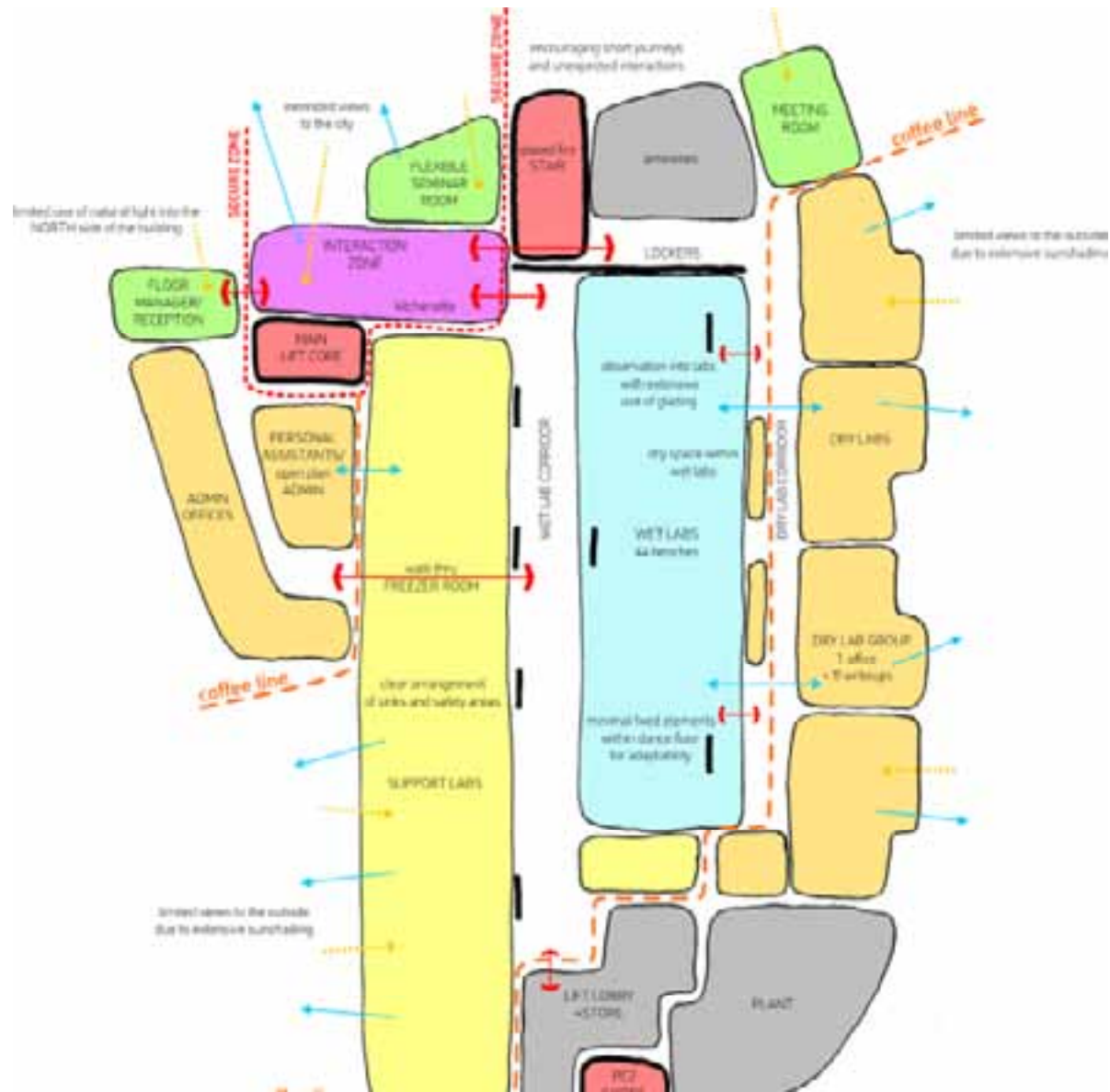




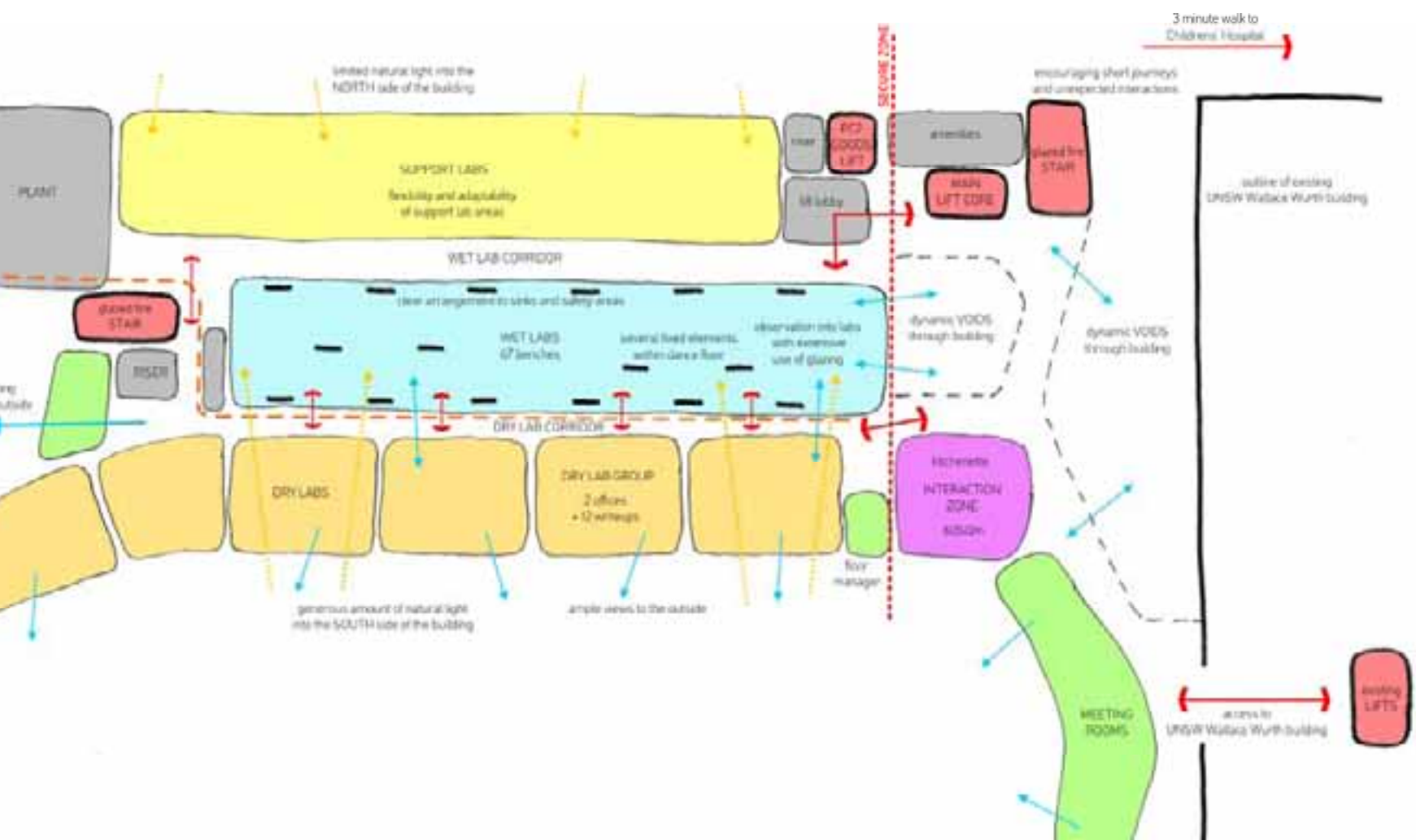


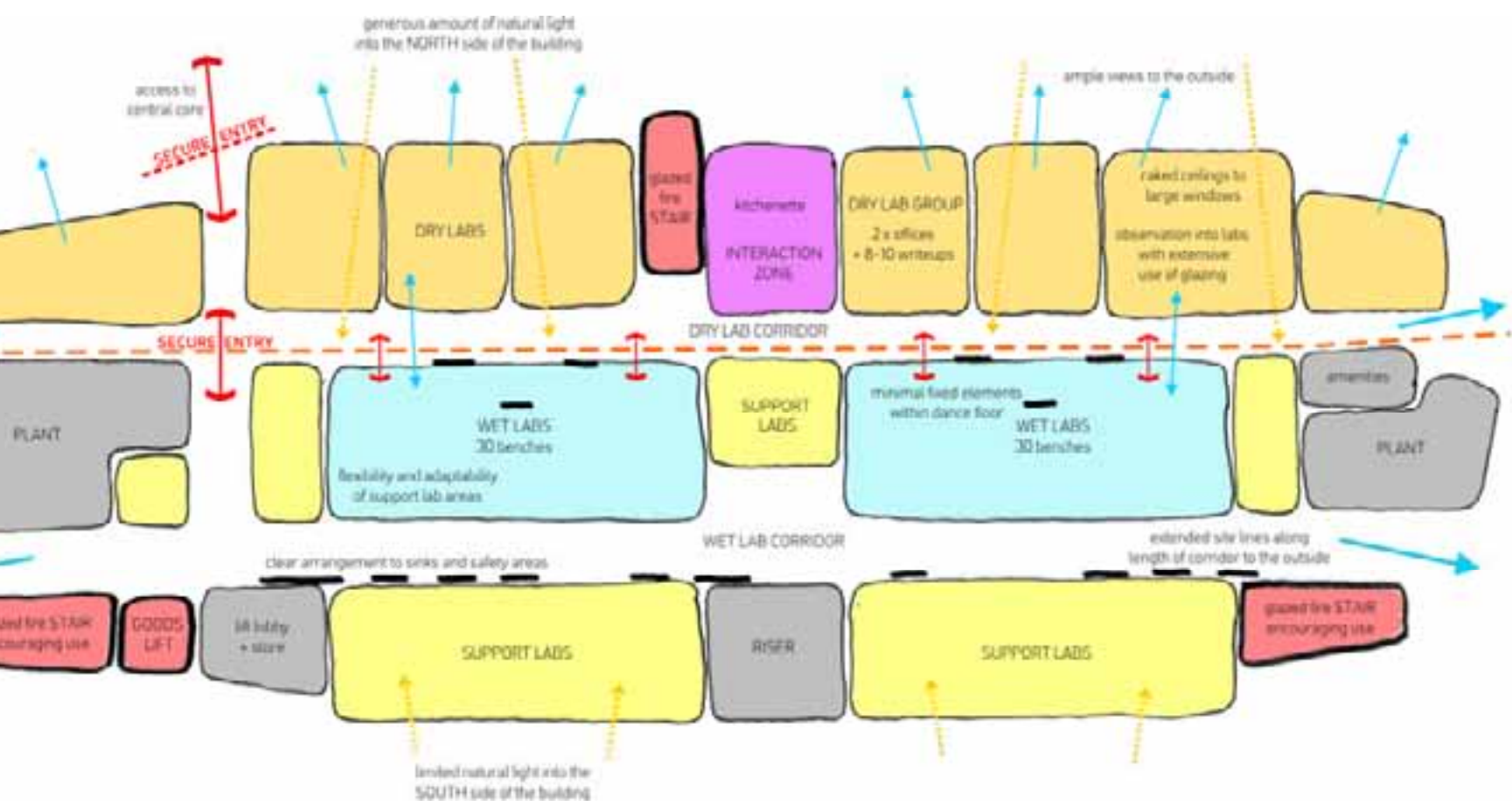


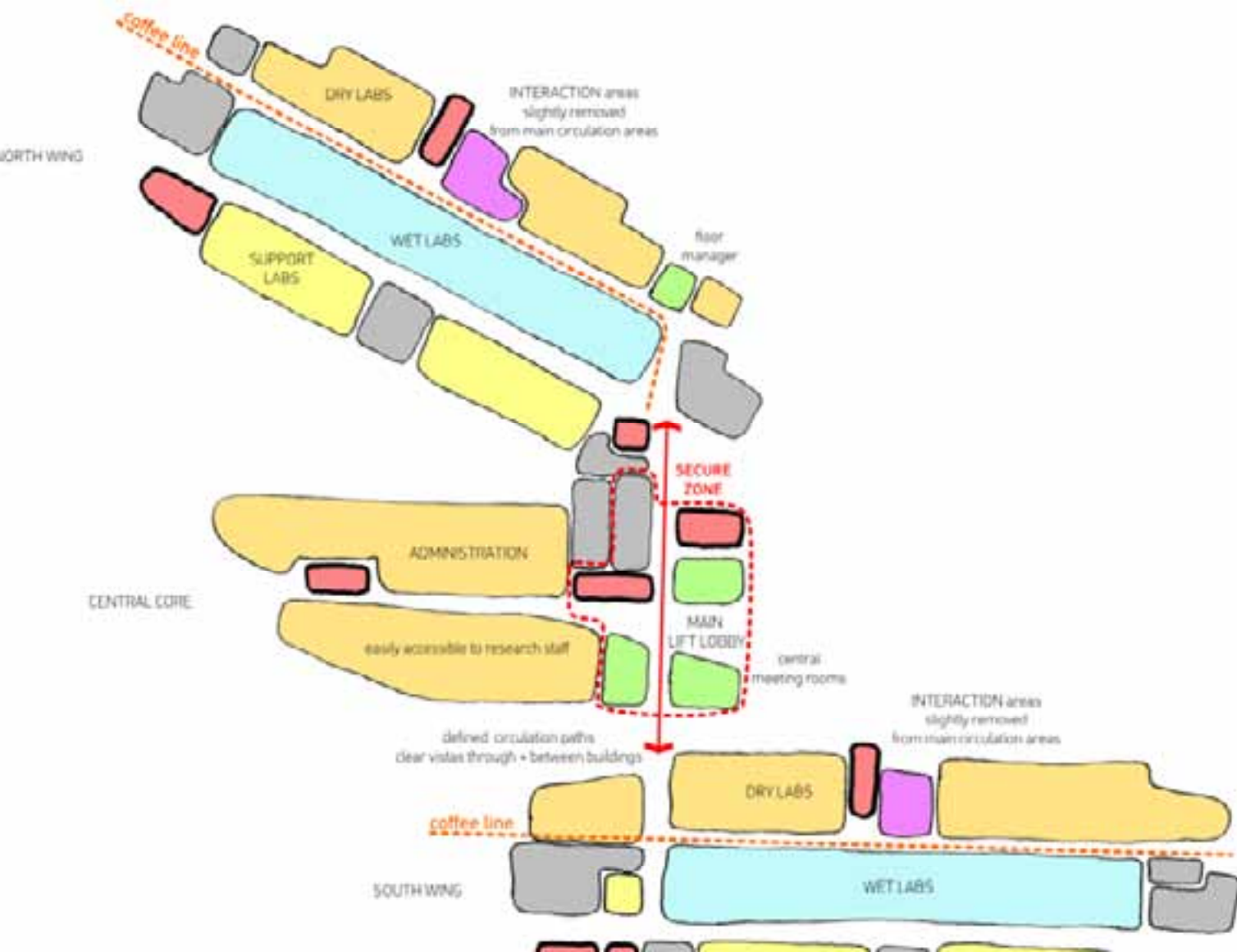


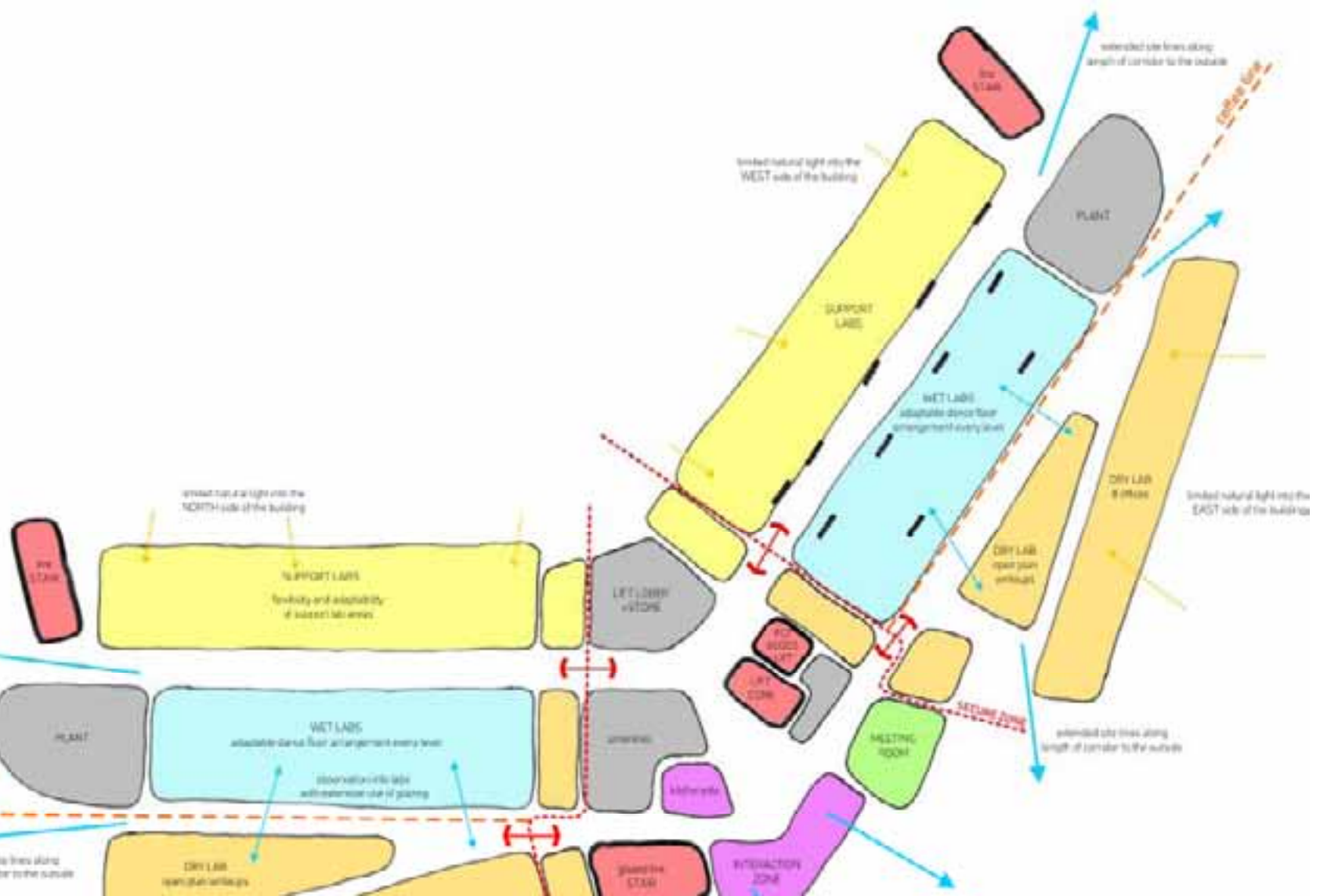


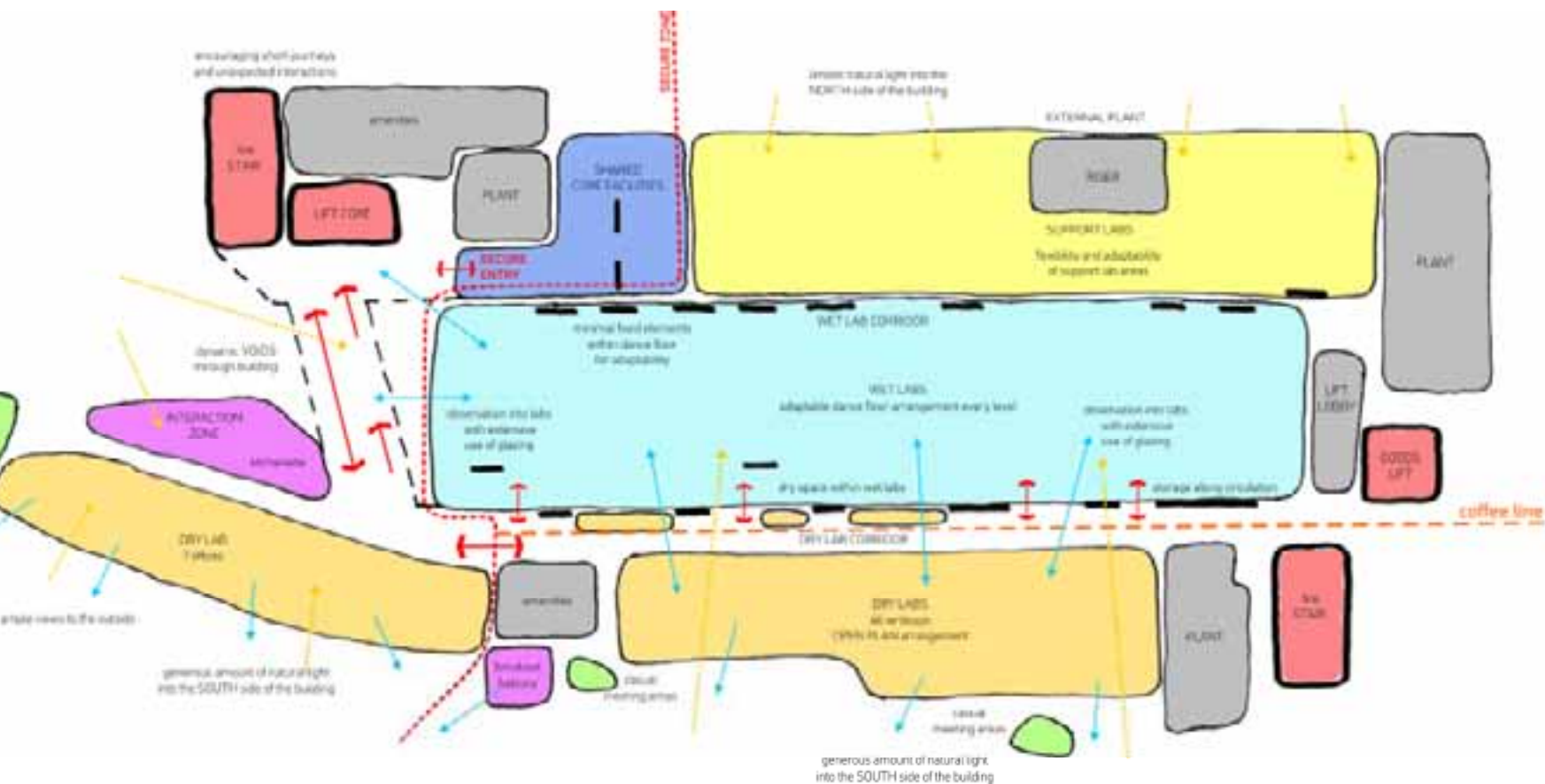


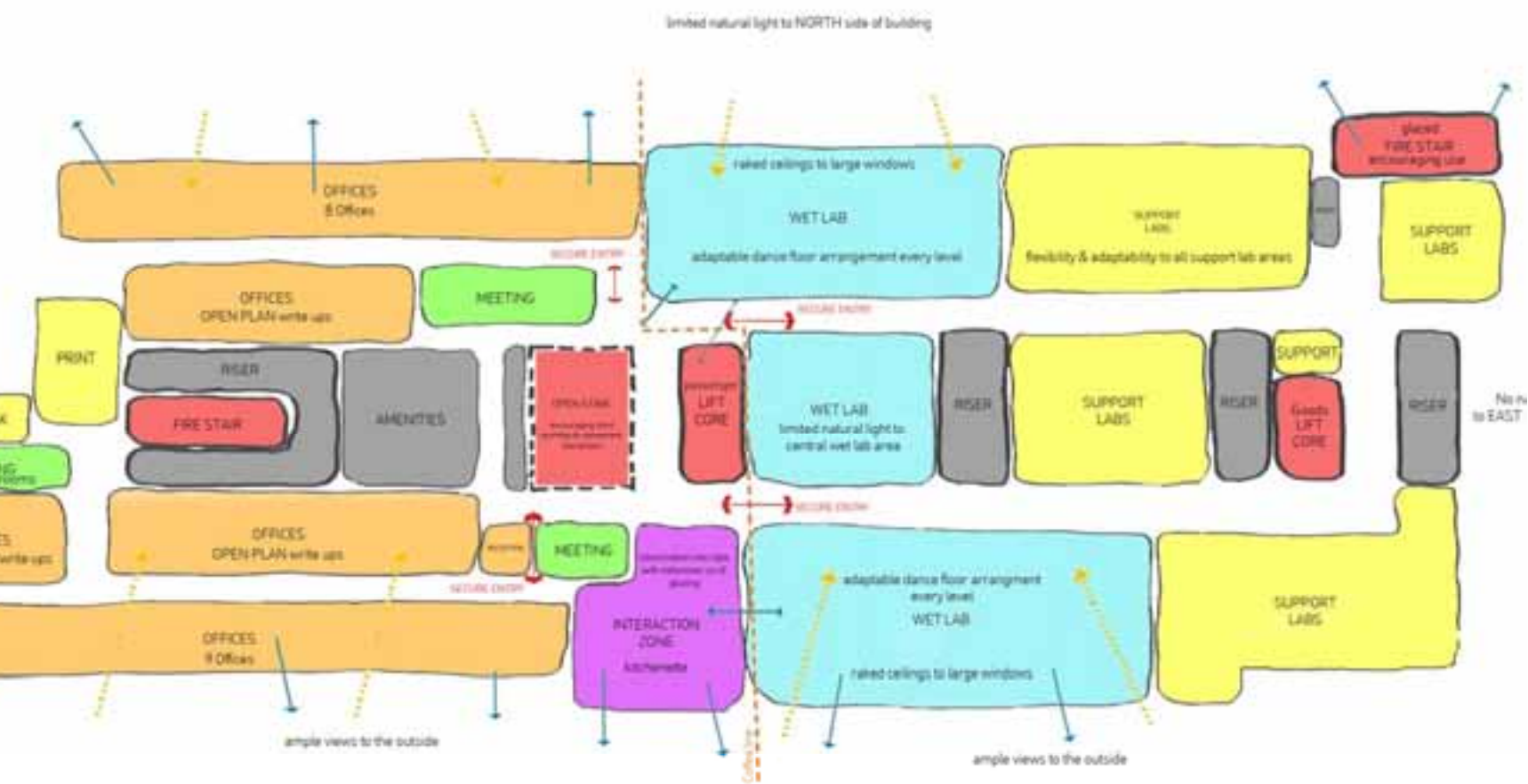












# Western Australian Institute for Medical Research Medical Centre, Perth









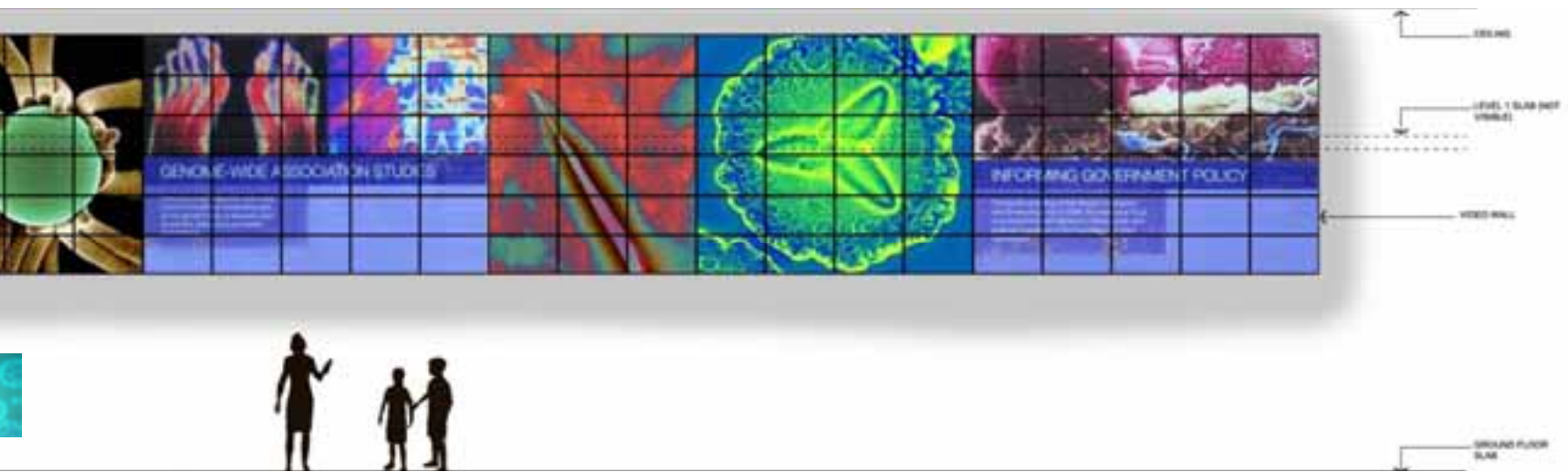
PATH WEST PROPOSED FLOOR

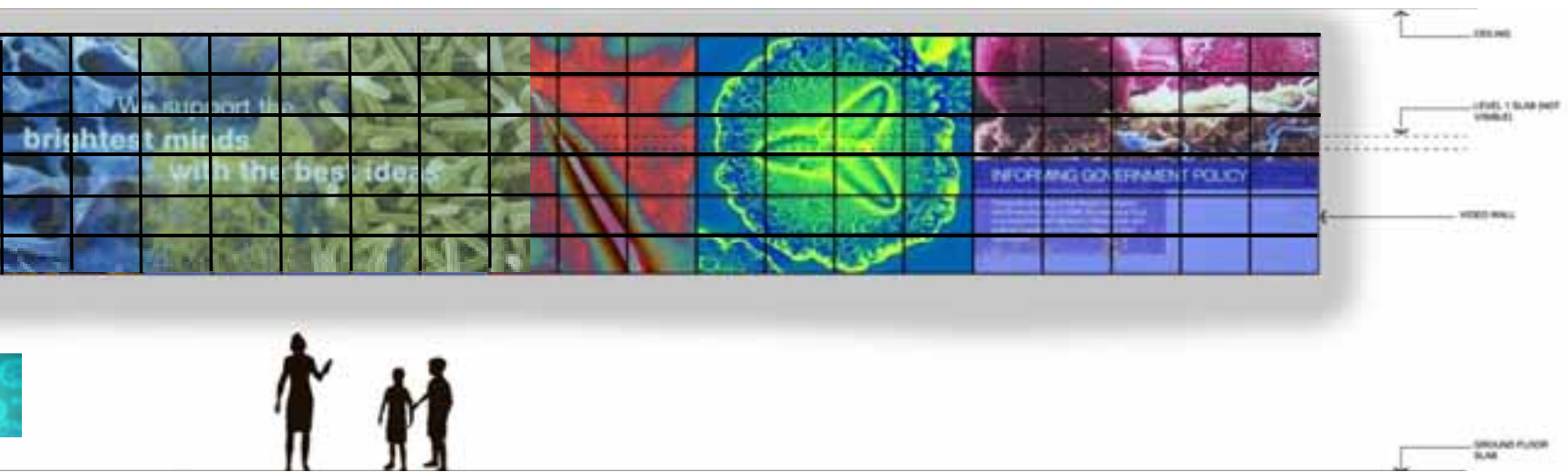


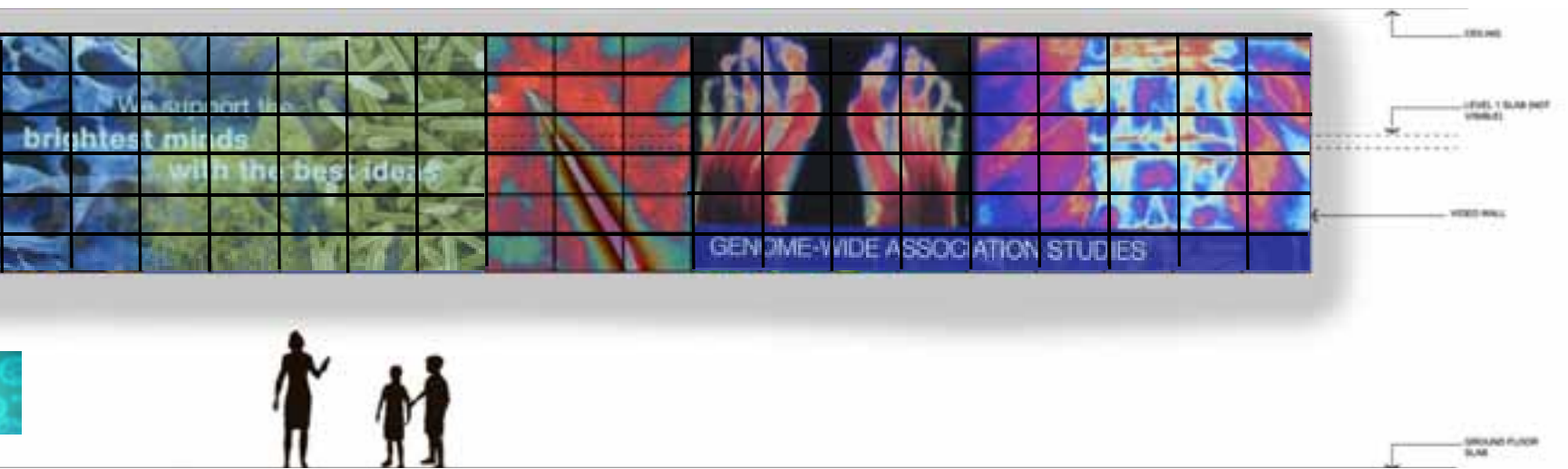




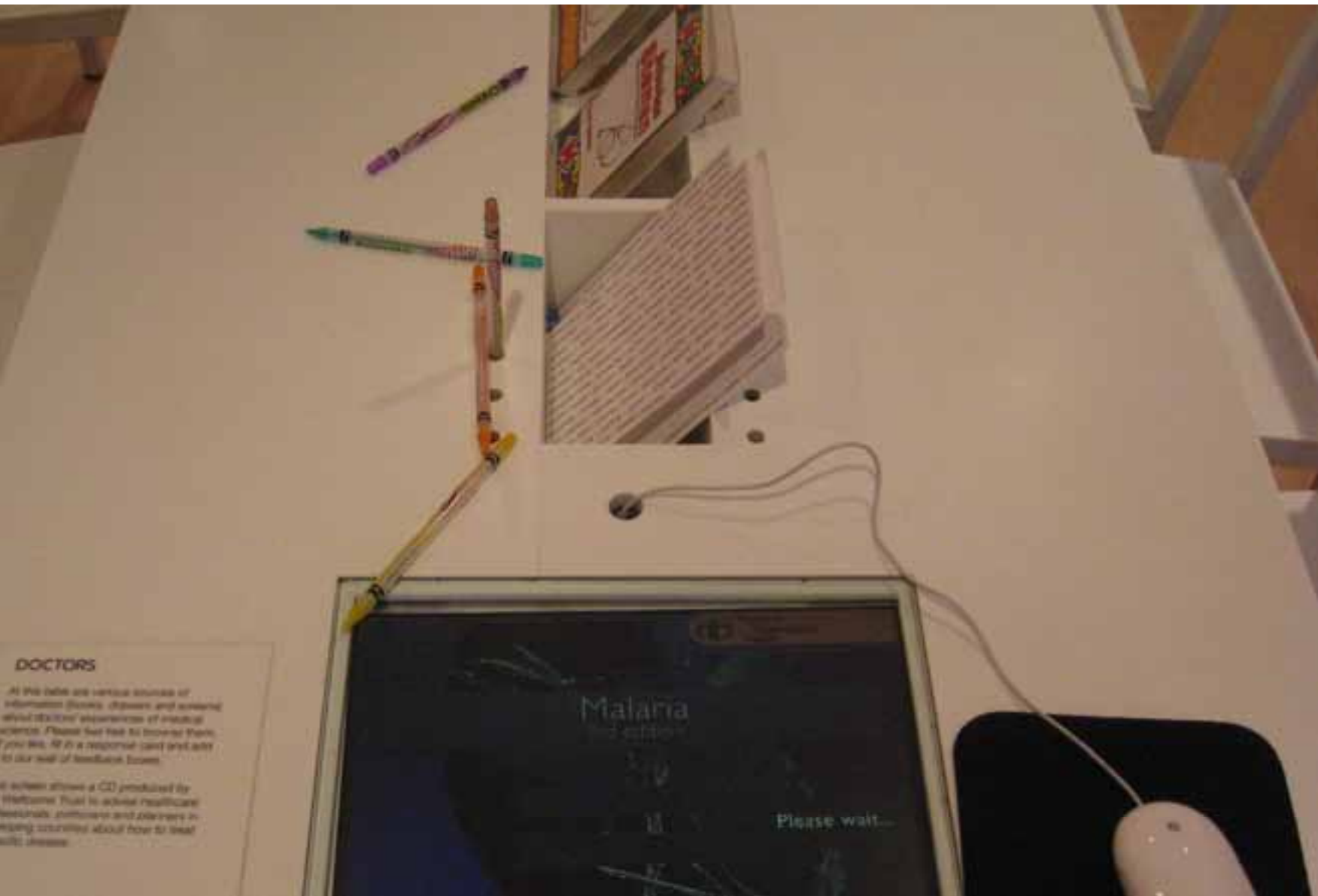












**DOCTORS**

At this table are various sources of information (books, papers, and screens) about doctors' experiences of medical science. Please feel free to browse them. You will find a response card and add it to our wall of feedback forms.

The screen shows a CD produced by Wellcome Trust to advise healthcare providers, professors and clinicians in high countries about how to treat with disease.

Malaria  
2nd edition

Please wait...

## SCIENTISTS

Available are various sources of information (books, drawers and screens) of scientists' experiences of medical work. Please feel free to browse them. If you like, fill in a response card and add it to our wall of feedback boxes.

This screen presents acknowledgement of the scientists, commonly used in scientific publications to thank those involved in research. It shows the breadth of types of people working in biomedical science.





Standard diet plate and bowl  
Used to help visualize food portion sizes.

Portion comparison kit  
This kit compares healthy and unhealthy food portion sizes.



level NINE  
PLANT

level EIGHT  
WAIMR EXECUTIVE/ADMIN + PLANT

level SEVEN  
TYPICAL RESEARCH FLOOR

level SIX  
SHELL

level FIVE  
TYPICAL RESEARCH FLOOR

level FOUR  
TYPICAL RESEARCH FLOOR

level THREE  
SHELL

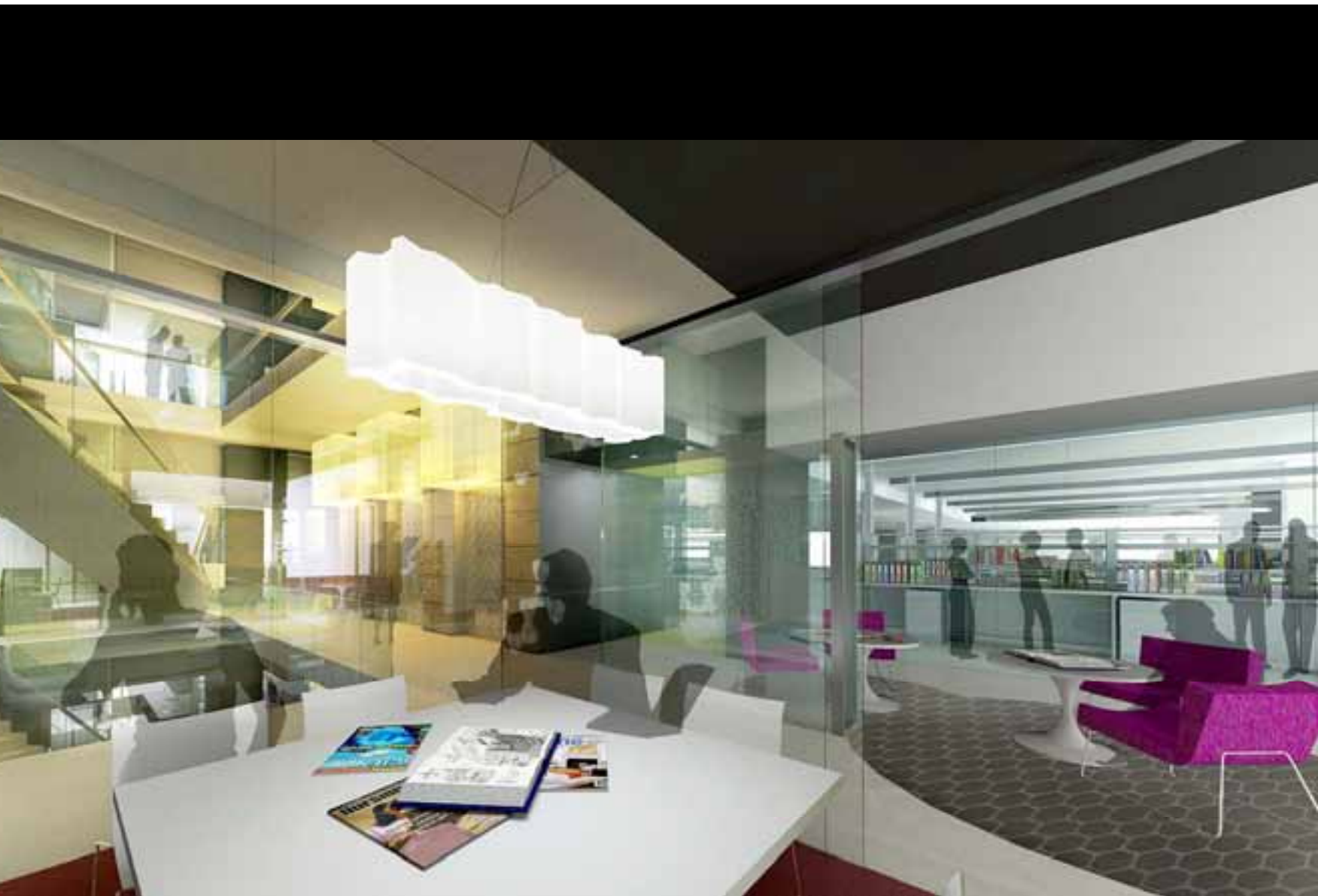
level TWO  
CLINICAL RESEARCH

level ONE  
CORE FACILITIES















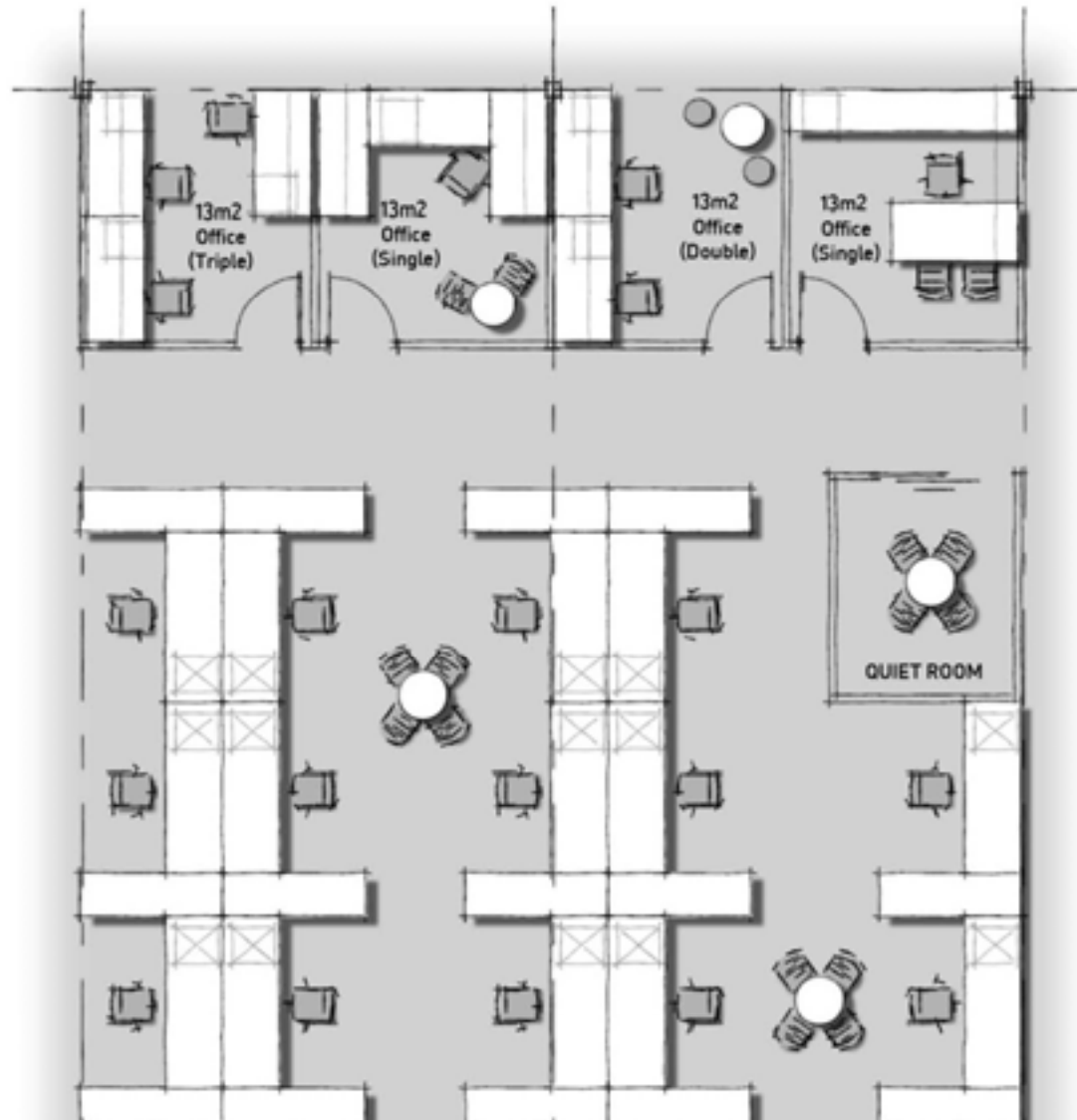
1



Neo System, Primary Desk Space with Storage Return



Freeplay System, Primary Desk Space with Storage Return



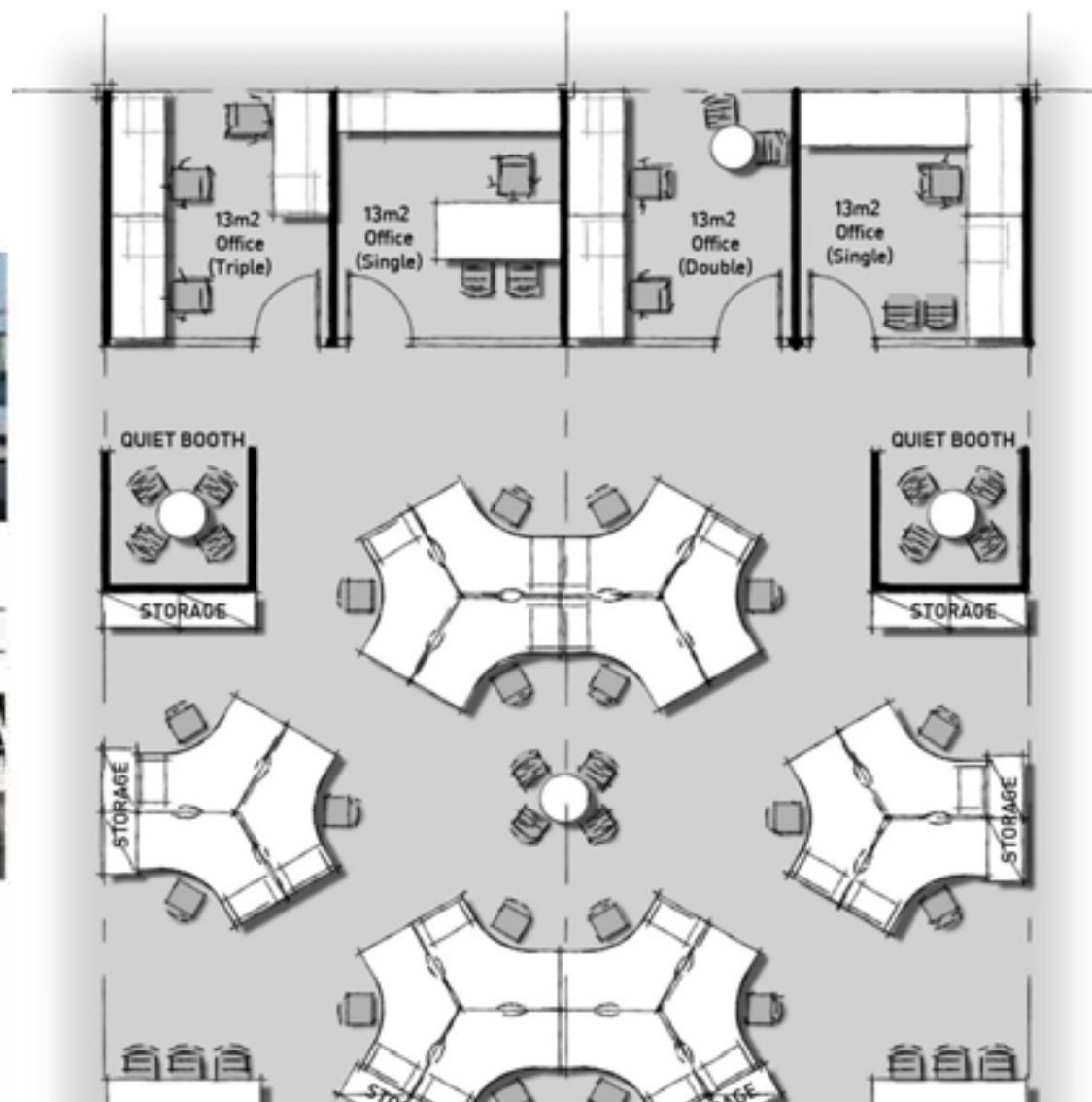
2



Commercial Office, 140 William St Perth



Schiavello, Centric Workstations



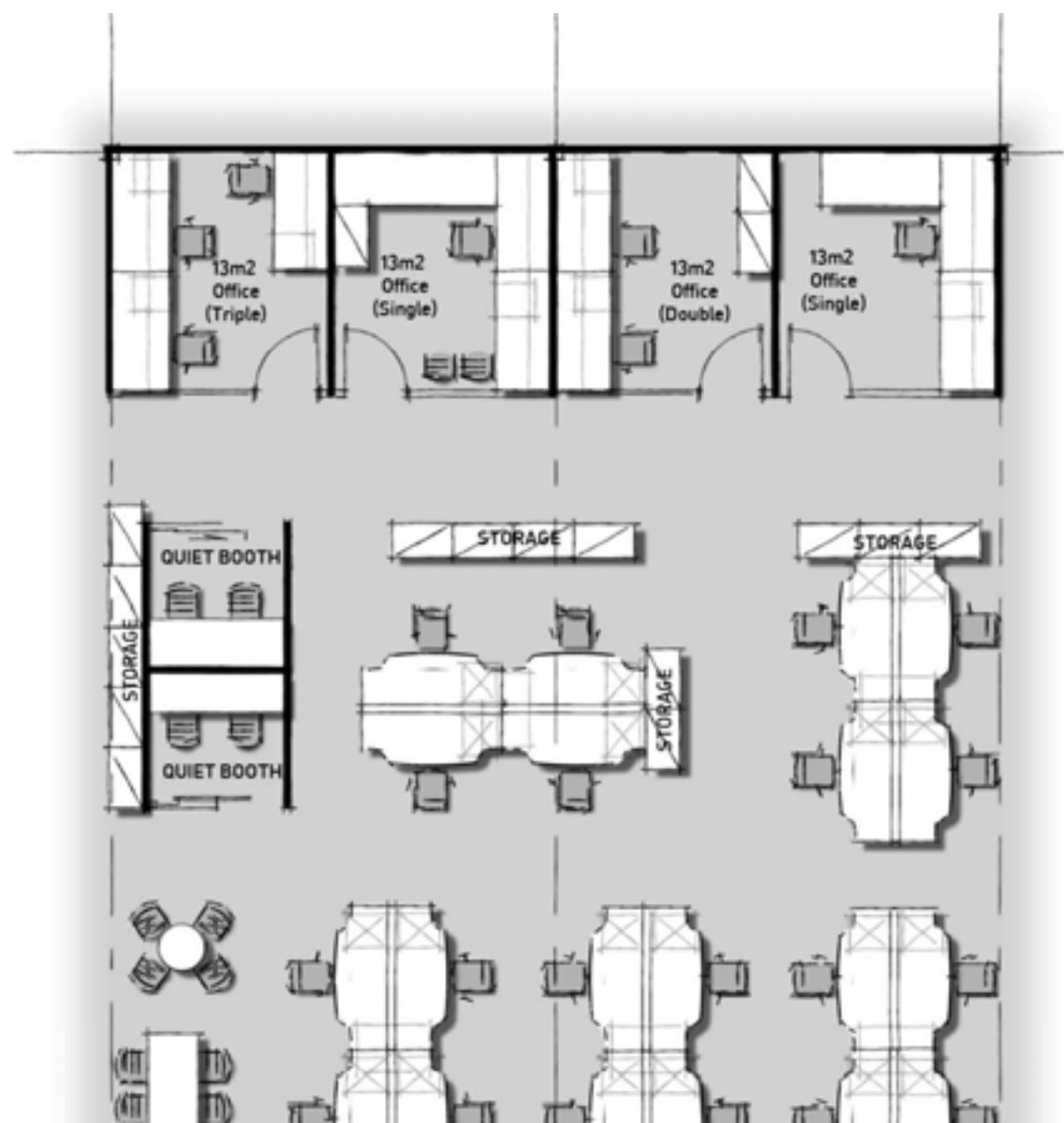
3



Hum Workstation, with Central 'Meet Me' Zone



Hum Workstations, Plan View of Central 'Meet Me' Zones



4



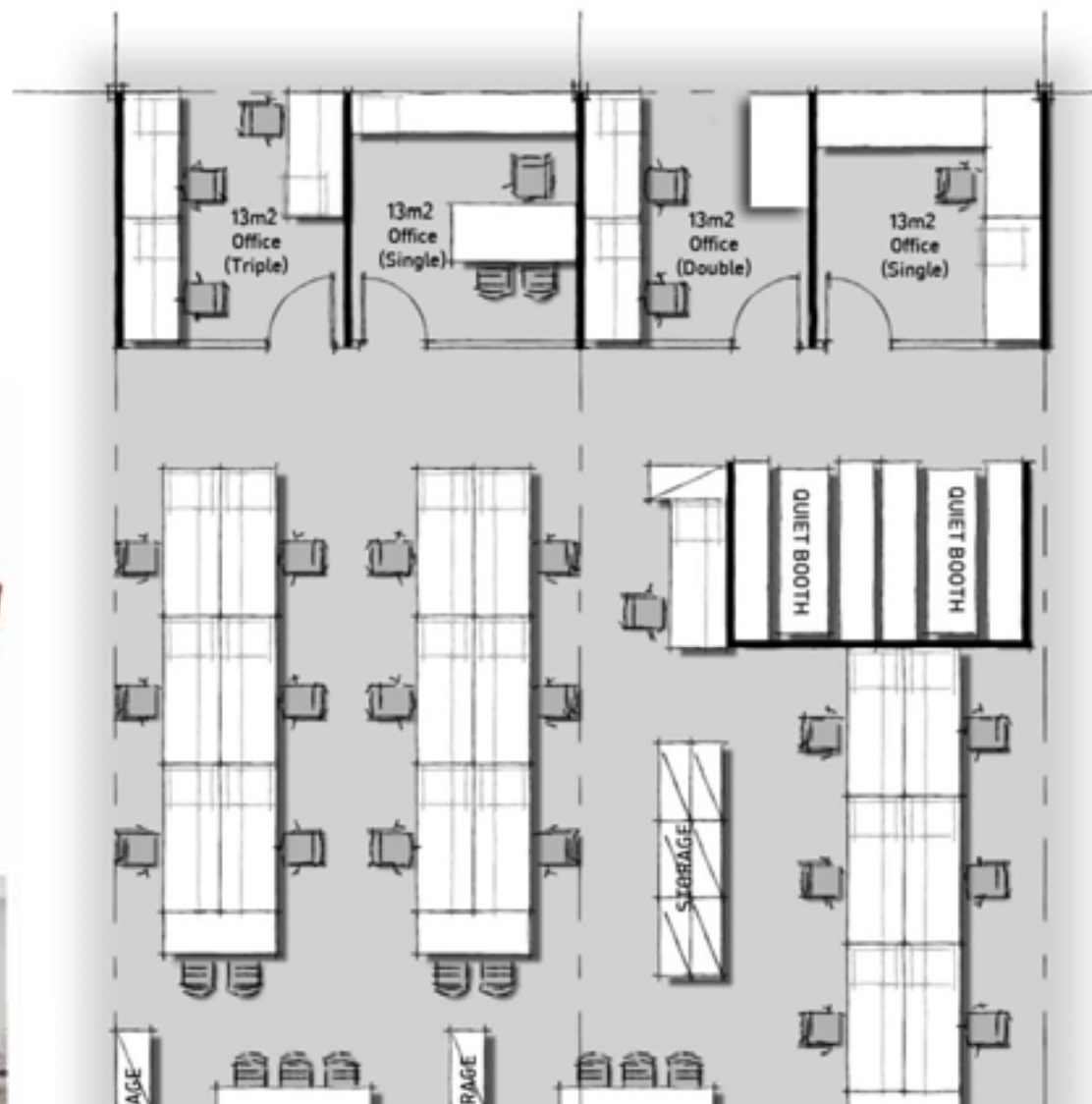
Semi Private Workstation, with storage either side



5



Workstations, with End Visitor Space

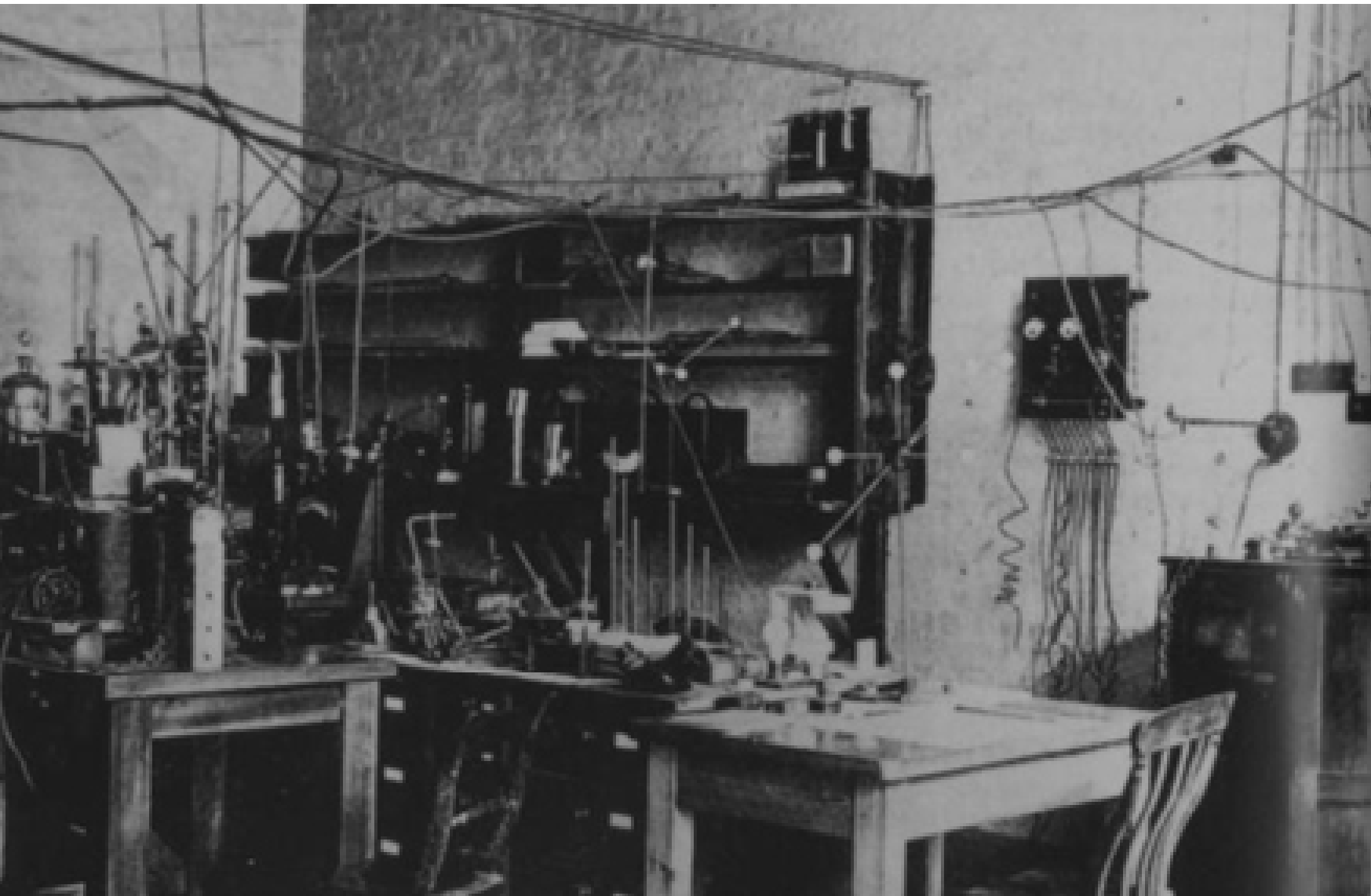






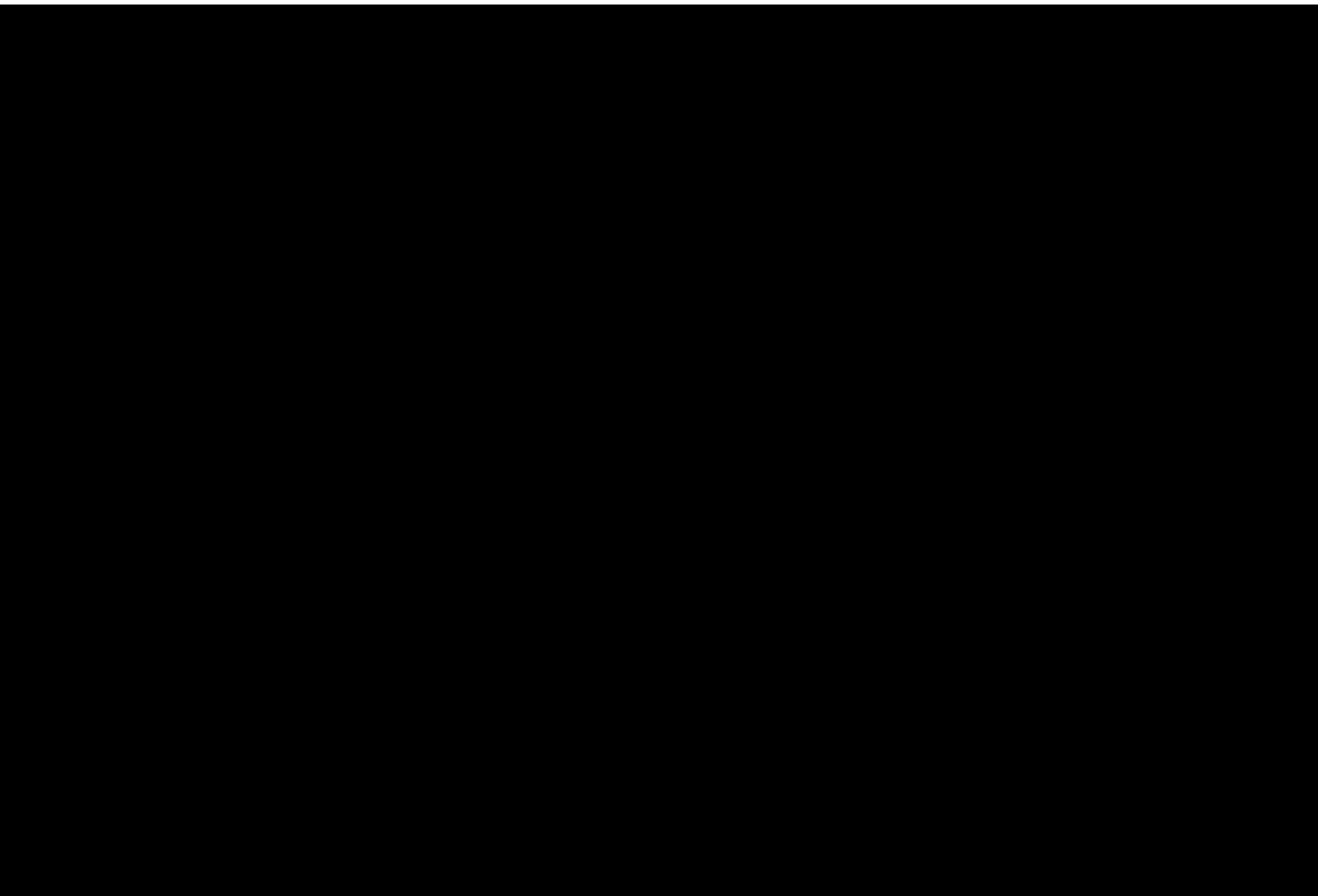












# Thank You

**HAMES  
SHARLEY**

James Edwards

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