Llandough - Adult Mental Health Unit

Exemplar Presentation

Llandough

24th February 2015

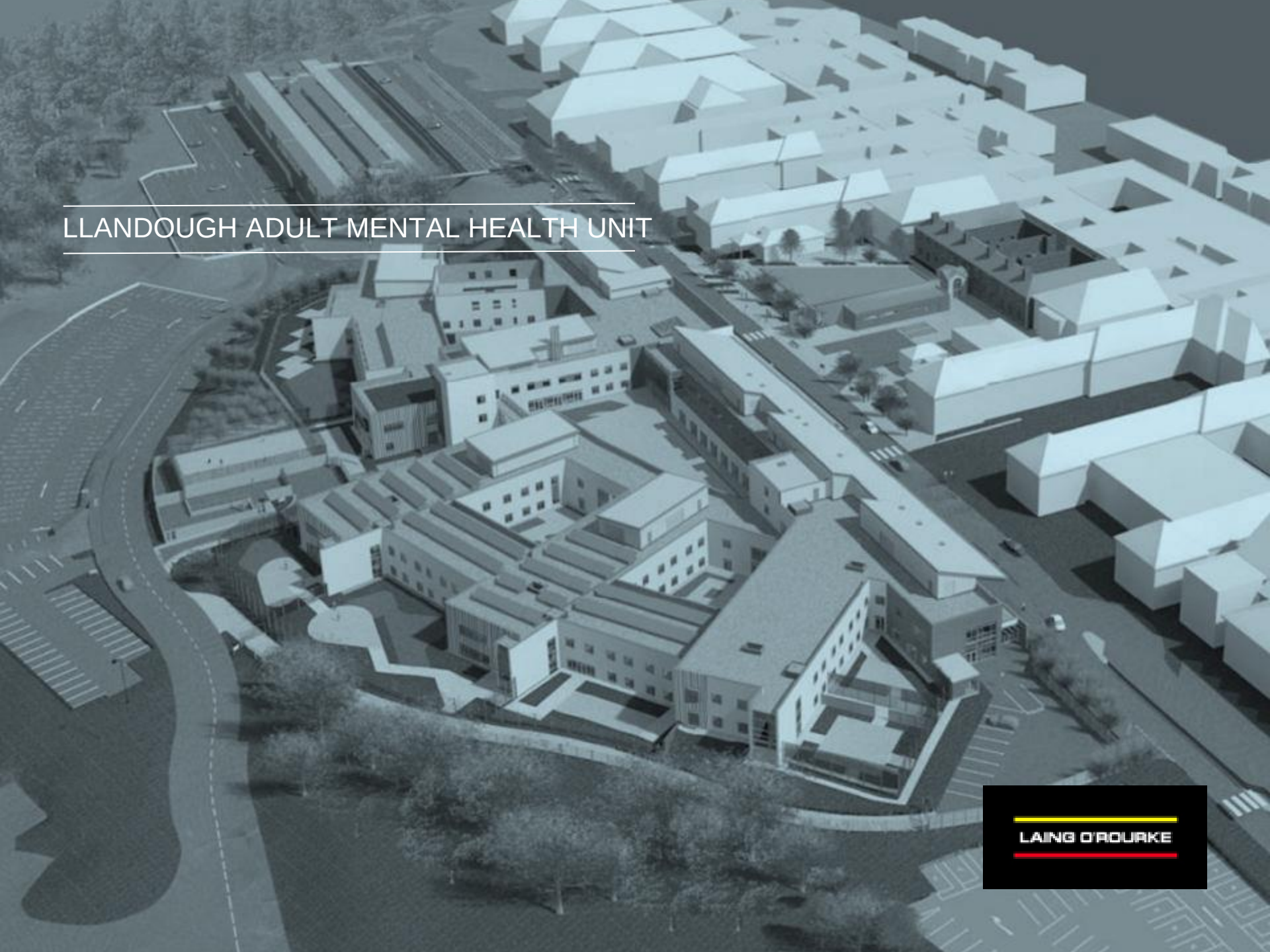
Welcome

Ed Evans

Director Exemplar Programme

Constructing Excellence in Wales

LLANDOUGH ADULT MENTAL HEALTH UNIT



STRATEGIC CONTEXT

HM Government

Industrial Strategy: government and industry

Construction 202

July 2013

Our joint ambition

By working in partnership, the construction industry and Gov
achieve by 2025:

1. A 33% reduction in both the initial cost of constructio
cost of assets[1]
2. A 50% reduction in the overall time from inception to
build and refurbished assets[2]
3. A 50% reduction in greenhouse gas emissions in the
4. A 50% reduction in the trade gap between total expo
construction products and materials[4]

These are long-term ambitions shared by industry and Gove
Construction Leadership Council will develop an action plan
ambitions between now and 2025.

1 Based on 2009/2010 benchmarks in line with the Government Construction
2 Based on the industry's performance in 2013.
3 Versus a 1990 baseline. This is set out in the Green Construction Board's Lo
Environment.
4 The UK imports £12 billion of construction products annually and exports £
building materials and components: February 2013.

Lower costs

33%

reduction in the initial cost of construction and the whole life cost of built assets

Faster delivery

50%

reduction in the overall time, from inception to completion, for newbuild and refurbished assets

Lower emissions

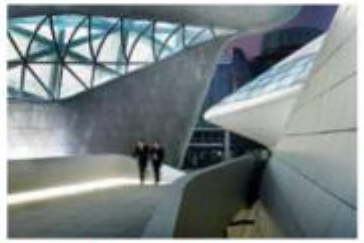
50%

reduction in greenhouse gas emissions in the built environment

Improvement in exports

50%

reduction in the trade gap between total exports and total imports for construction products and materials



The global construction market is forecast to grow by over 70% by 2025.

Global Construction 2025; Global Construction Perspectives and Oxford Economics (July 2013)

Construction Procurement Strategy Steering Group

Construction Procurement Strategy - Executive Summary and Action Plan

5. Design Quality

The design will be creative, imaginative, sustainable and capable of meeting delivery objectives, and take the whole life of projects into account. Quality in design and construction utilising the best of modern methods will ensure that the project meets the needs of all stakeholders, both functionally and architecturally

Client side commitments

- The client will produce a clear brief before design commences.

- Project briefs will specify performance criteria to encourage innovation in order to deliver cost-effective solutions, taking advantage of opportunities for standardisation, prefabrication, off-site manufacture and adopting modern logistics principles.

- Design risk assessments will be carried out throughout the life cycle of the project.

- Suppliers and contractors will ensure that the design meets the sustainability objectives of the client are met, including an approach toward a carbon neutral goal.

- Architects and designers will be encouraged to give consideration to the use of indigenous materials and products where appropriate to the project.

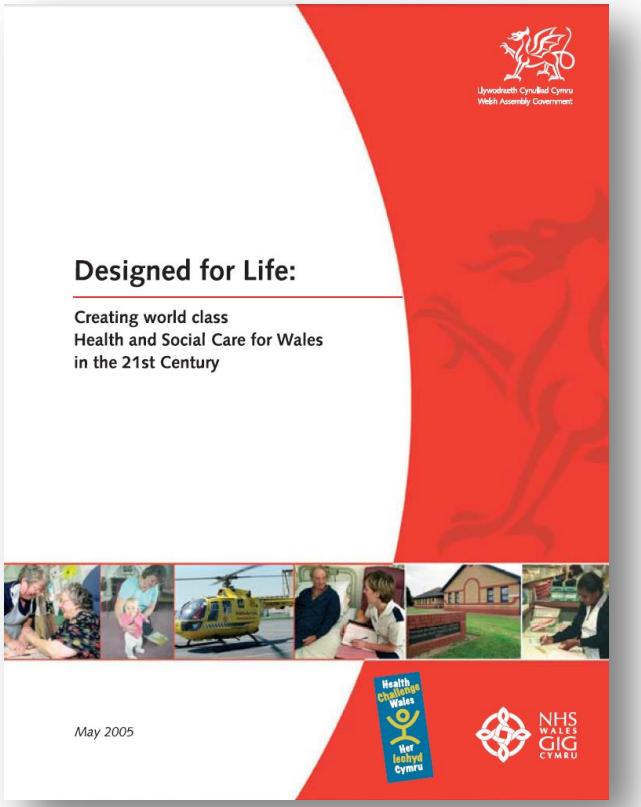
THE VISION

The contribution of SCPs

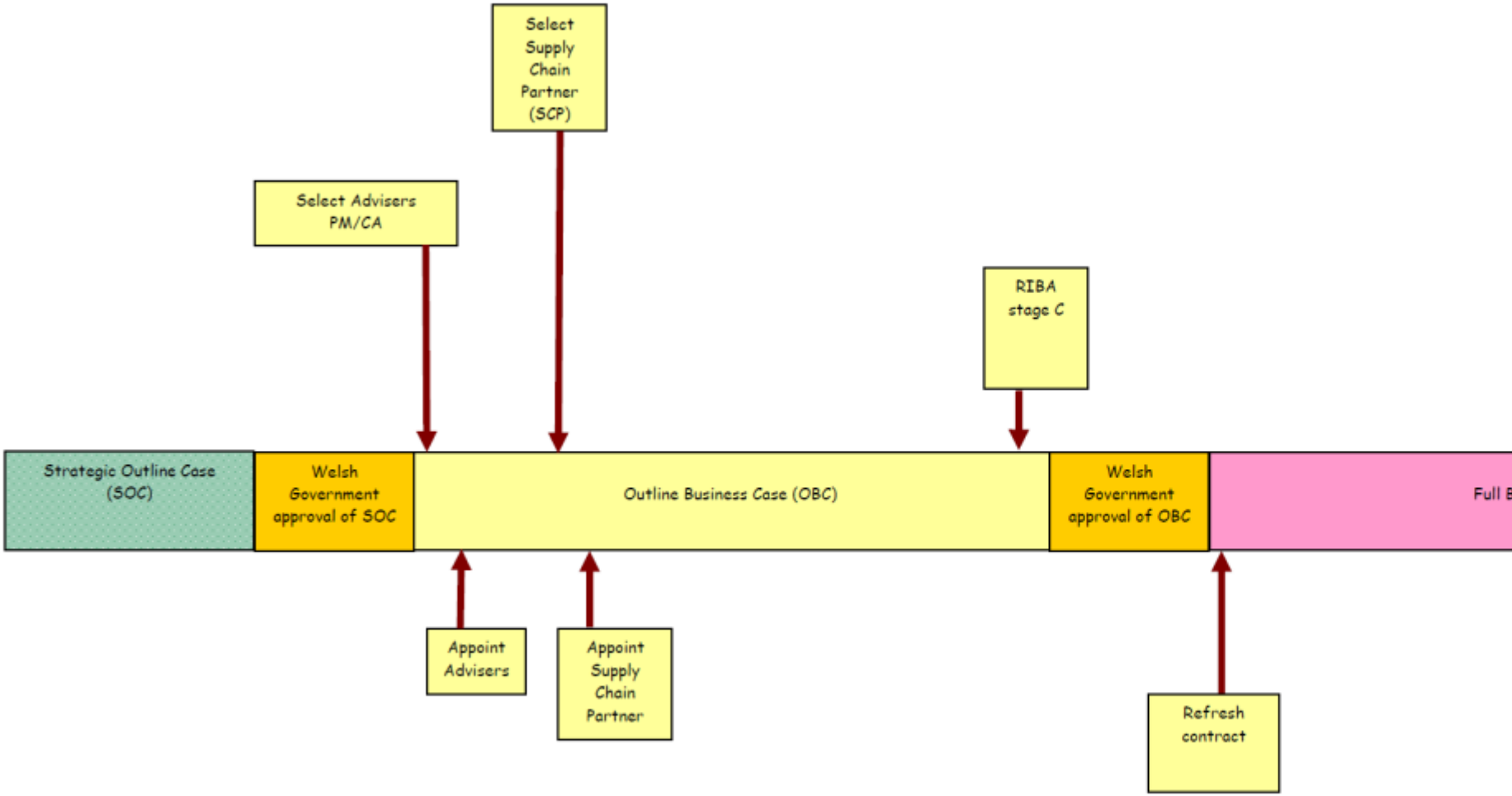
- They manage the designers and can impose standardisation upon them;
- They can review designs to improve buildability;
- They can work with manufacturers and suppliers to select appropriate standard products and systems;
- They can increase the use of local suppliers and manufacturers;
- They can deliver more prefabrication and off site manufacture to improve quality and speed up construction;
- They can utilise Building Information Modelling (BIM) to reduce on site problems, improve buildability and quality, reduce construction time and obtain better cost certainty.

Collaboration through clarity and consistency

- ✓ Standardised forms of NEC3 – agreed by all parties
- ✓ Agreed standardised processes
- ✓ All two stage design and build
- ✓ Early SCP involvement
- ✓ Agreed budget and programme
- ✓ Framework management team
- ✓ Best practise forums



THE PROCESS


Select Supply Chain Partner (SCP)
Select Advisers PM/CA
RIBA stage C
Strategic Outline Case (SOC)
Welsh Government approval of SOC
Outline Business Case (OBC)
Welsh Government approval of OBC
Full B
Appoint Advisers
Appoint Supply Chain Partner
Refresh contract

EXPERIENCE TO DATE

KEIR HARDIE HEALTH PARK, MERTHYR £25M

CEDAR COURT, ABERGELE £16M

PRINCE CHARLES HOSPITAL, MERTHYR £23M

YSBYTY GWYNEDD, BANGOR £26M

EXPERIENCE TO DATE

BRONGLAIS HOSPITAL, ABERYSTWYTH £28M

YSBYTY GLAN CLWYD, RHYL £100M

CARDIFF ROYAL INFIRMARY £25M

SPECIAL CRITICAL CARE, CWMBRAN £180M

CONSTRUCTING EXCELLENCE WALES, EXEMPLAR CASE STUDY

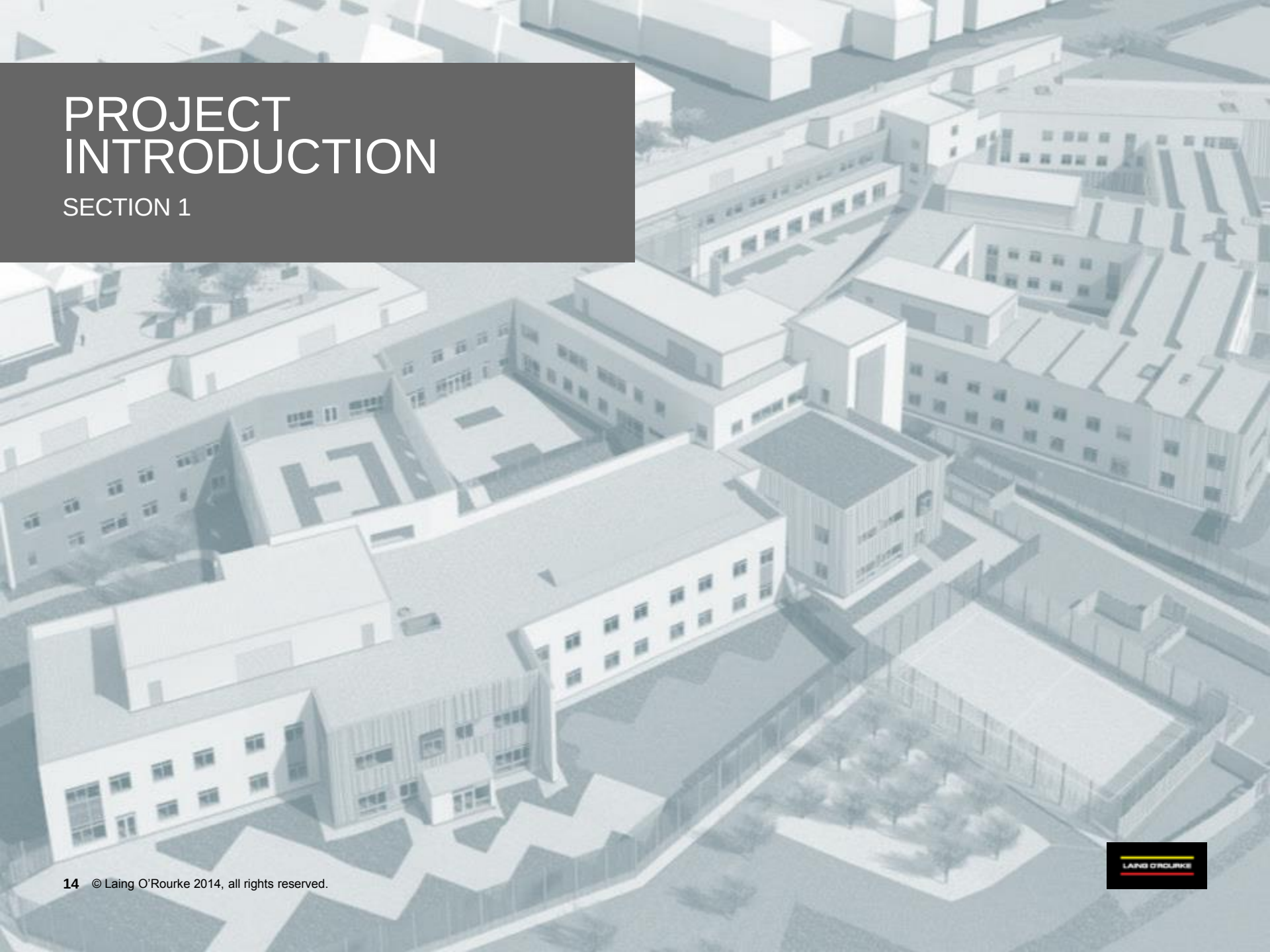
LLANDOUGH ADULT MENTAL HEALTH UNIT

LAING O'ROURKE

CONTENTS

PROJECT INTRODUCTION

SECTION 1



Llandough Adult Mental Health Unit £89m

PROJECT OVERVIEW

Project Team

- Client
- Project Manager / Supervisor
- Principal Supply Chain Partner
- Architects
- Civil & Structural
- Building Services

ENABLING WORKS

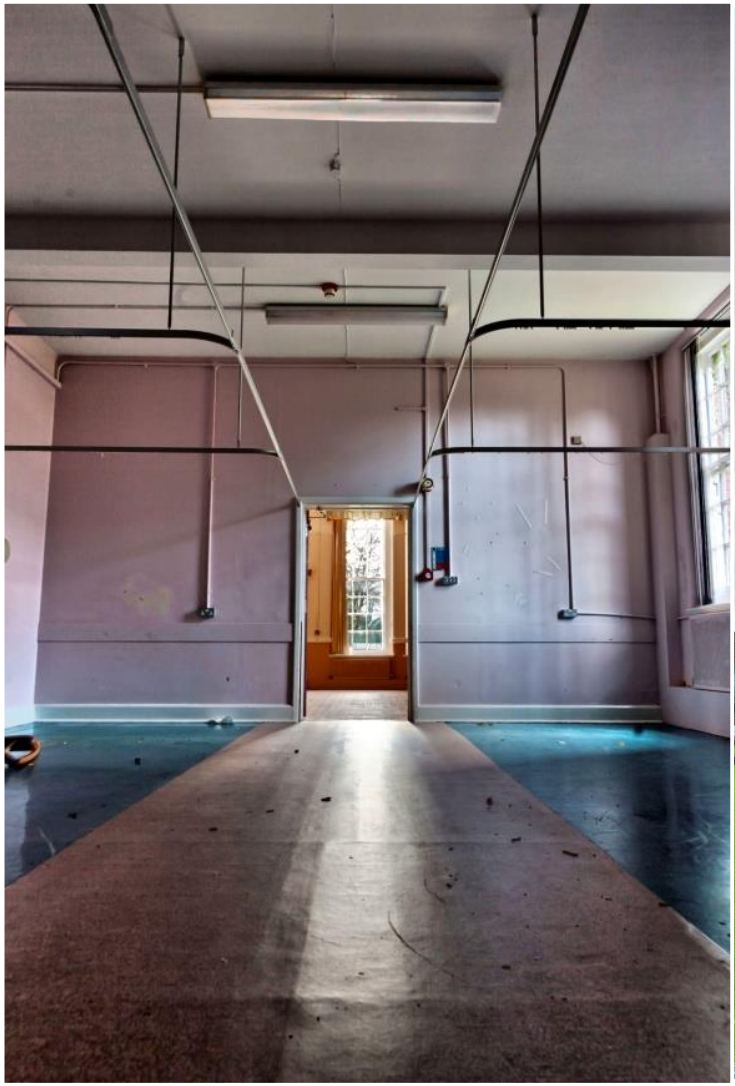
Scope of works: Ecology works, 586 space MSCP, 470 space grade parking, drainage infrastructure works, road diversion, incoming mains services

Scope of Works

- 135 bed Mental Health Unit
- GIFA 19,500m^2
- Secure gardens
- Service yard
- Fire access road
- Multi use games area
- 600m^2 concourse to existing hospital
- Public plaza enhancements to main hospital access
- Refurbishment and extension to existing hospital entrance area including gallery, radio studios, porters, post, security and general public space

	Commencement	Duration
Outline Business Case		
Full Business Case	05.09.2011	84 weeks
Enabling Works	05.11.2012	53 weeks
Main Works	18.11.2013	113 Weeks
Client Commissioning	16.01.2016	16 weeks
Facility Open	May 2016	

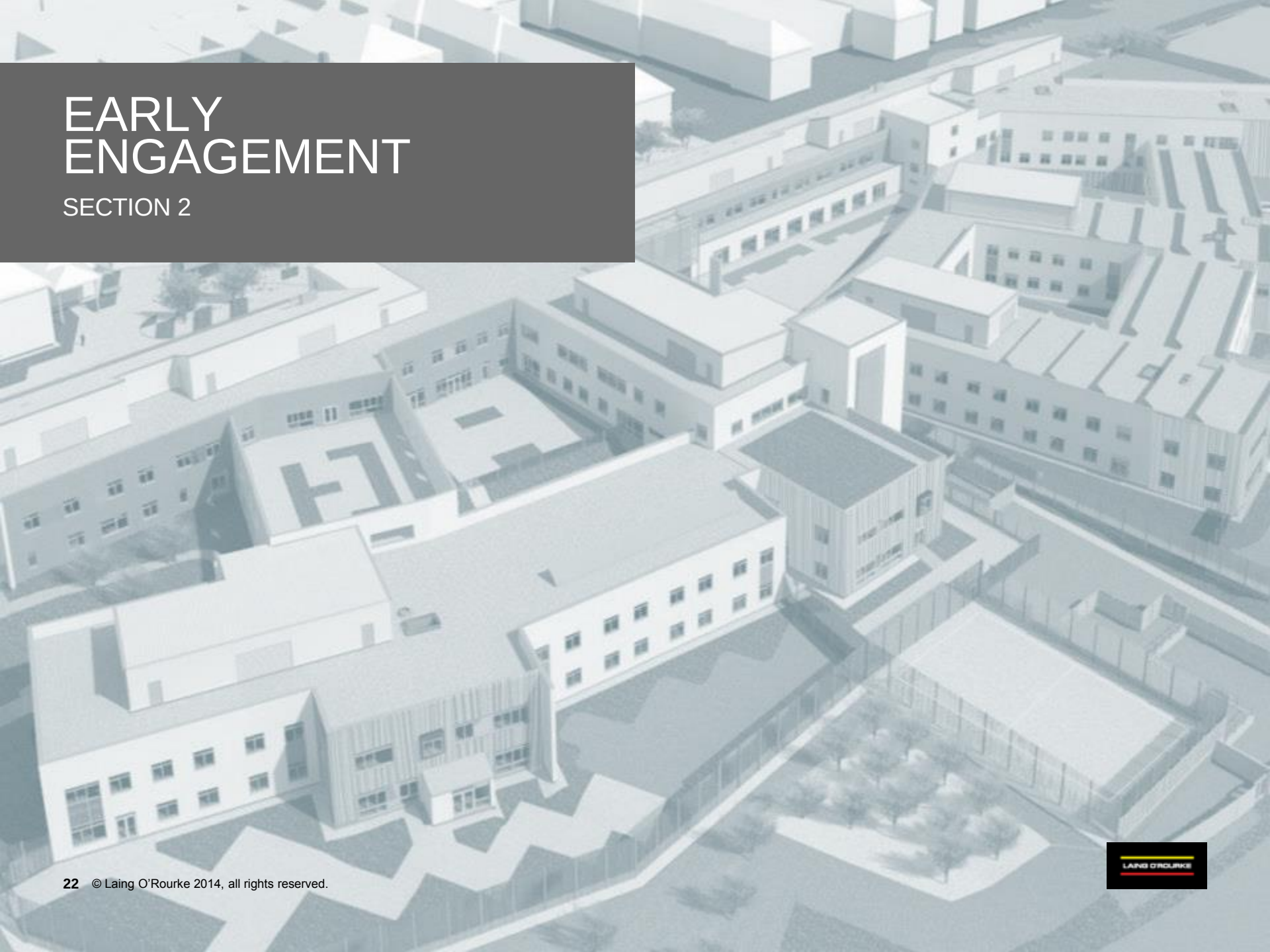
EXISTING FACILITY



PROPOSED AMHU

EARLY ENGAGEMENT

SECTION 2



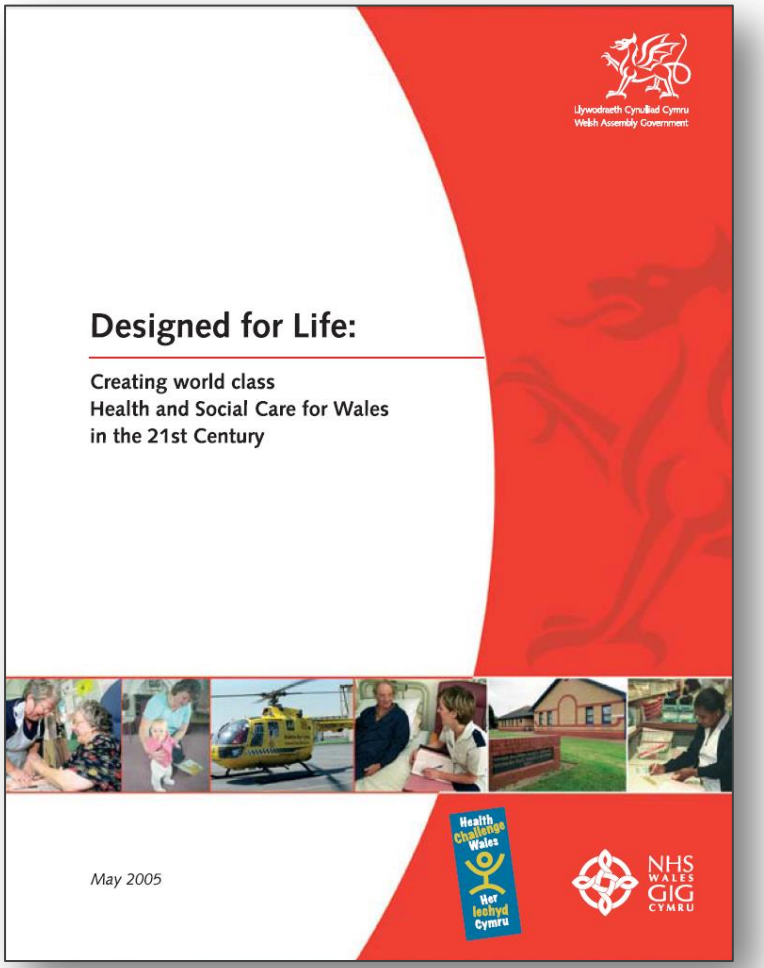
Designed for Life 1 – NEC3 Option C (Target price)

OBC – Stage D design, Quantified Cost Plan

FBC – Stage E/F design, Bill of Quantities, Market Testing

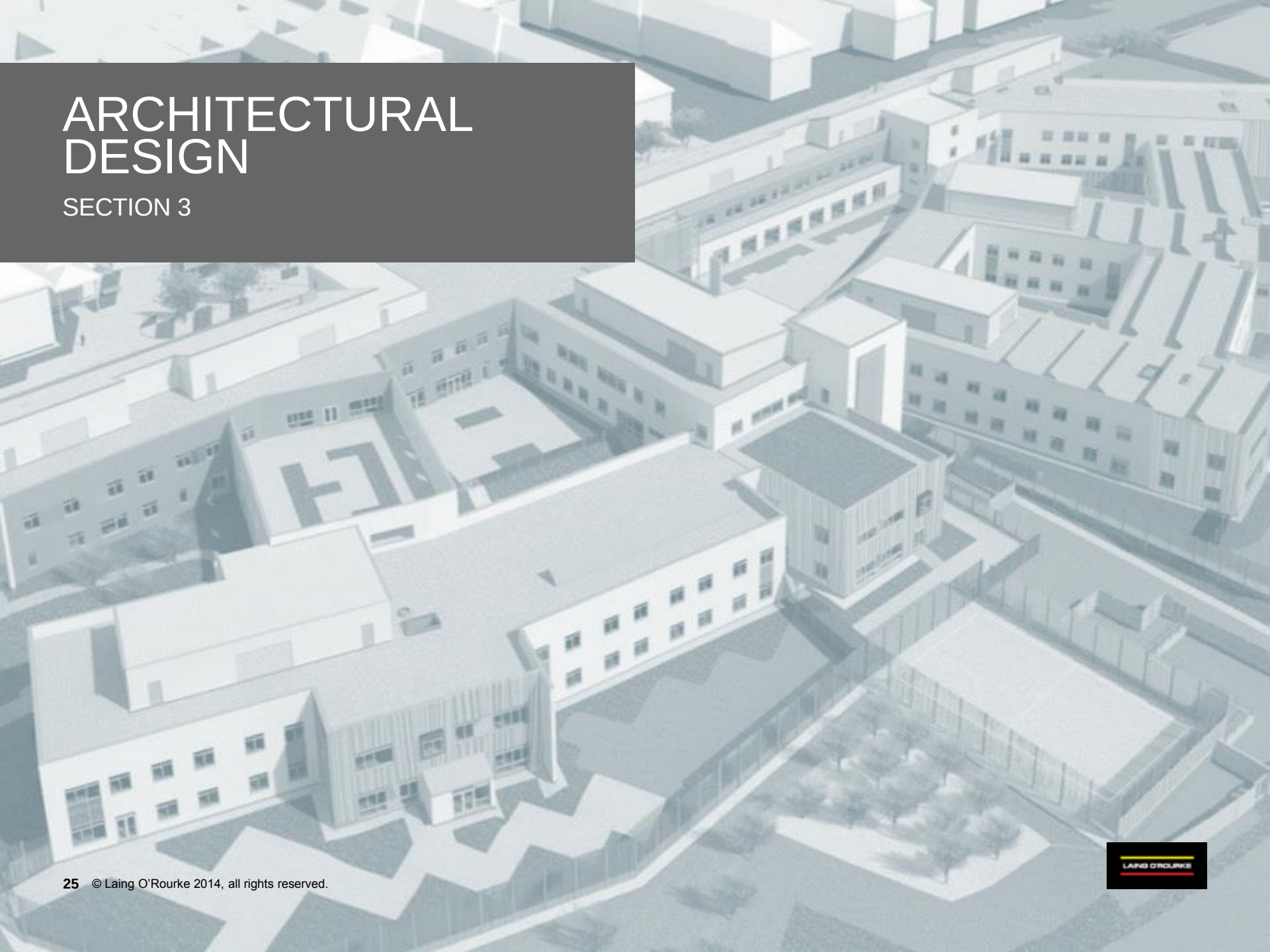
Managing the design

- Design to a cost – continuous cost checks
- Ensure Best Value
- Life Cycle considerations
- Buildability
- Supply Chain involvement
- Design for manufacture and assembly



ARCHITECTURAL DESIGN

SECTION 3



Hafan y Coed, Adult Mental Health Unit - University Hospital Llandough.

DESIGN CONCEPT

Whitchurch AMHU

- 121 Bed Mental health unit on site of Whitchurch Hospital
- Site earmarked for expansion of Velindre Cancer Hospital and Maggie's Centre
- Project was reassigned to Llandough 2010

Llandough Site Options 2010

Plan Development

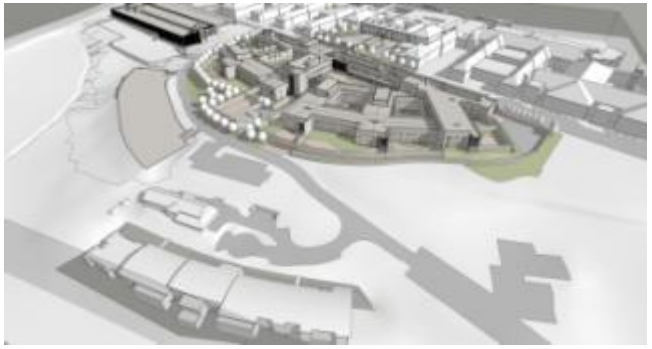
OBC for Llandough approved September 2011

Core principles:

- Cardiff &Vale UHB wanted the building close to the main hospital not hidden away.
- Maximising views out.
- Flexible ward design.
- Garden courtyards for the use of patients.
- Strong axial link between AMHU and Main Hospital.
- The creation of a new ‘concourse’ building.
- The relocation of the existing surface car park to a new MSCP
- BREEAM Excellent

SCALE, MASSING & TOPOGRAPHY

- 2 Storeys to facilitate ward access to gardens.
- Height of Building doesn't dominate existing hospital and fits within perimeter landscape.
- Building utilises the slope of the site.



BUILDING LAYOUT

Key Departments:

A. Reception

B. Hub (Pharmacy, Therapies , ADL & Patient Social Spaces)

C. ECT
D. Mental Health Act suite
E. MSQ

F. Emergency Admissions

G. Assessment Ward
H. PICU Ward
I. 3 X Adult Acute Wards
J. 2 X Low Secure Wards
K. Neuropsychiatry Ward
L. Addiction Ward
M. Support Recovery Ward

N. Crisis Resolution

O. Admin

P. Concourse / Plaza & Gallery

Gross internal Area: 19,700 m2
135 Bedrooms

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Key Features:

Same design in each ward (except for Neuropsychiatry)

A. Bespoke Fitted Furniture

B. Salto Locking system

C. En Suites (Pre fabricated GRP).

D. Mental health window

E. Obswatch system

MATERIALS CONCEPT

A) North Block - Brickwork & Infil Panels

B) North Block - Cladding panels to reflect existing stonework

C)Chamaeleon cladding Feature wall to concourse and main entrance

D)Ward Blocks - Cladding panels white roughcast render

E)Ward Block Ends - Textured Cladding Panel

Design principles:

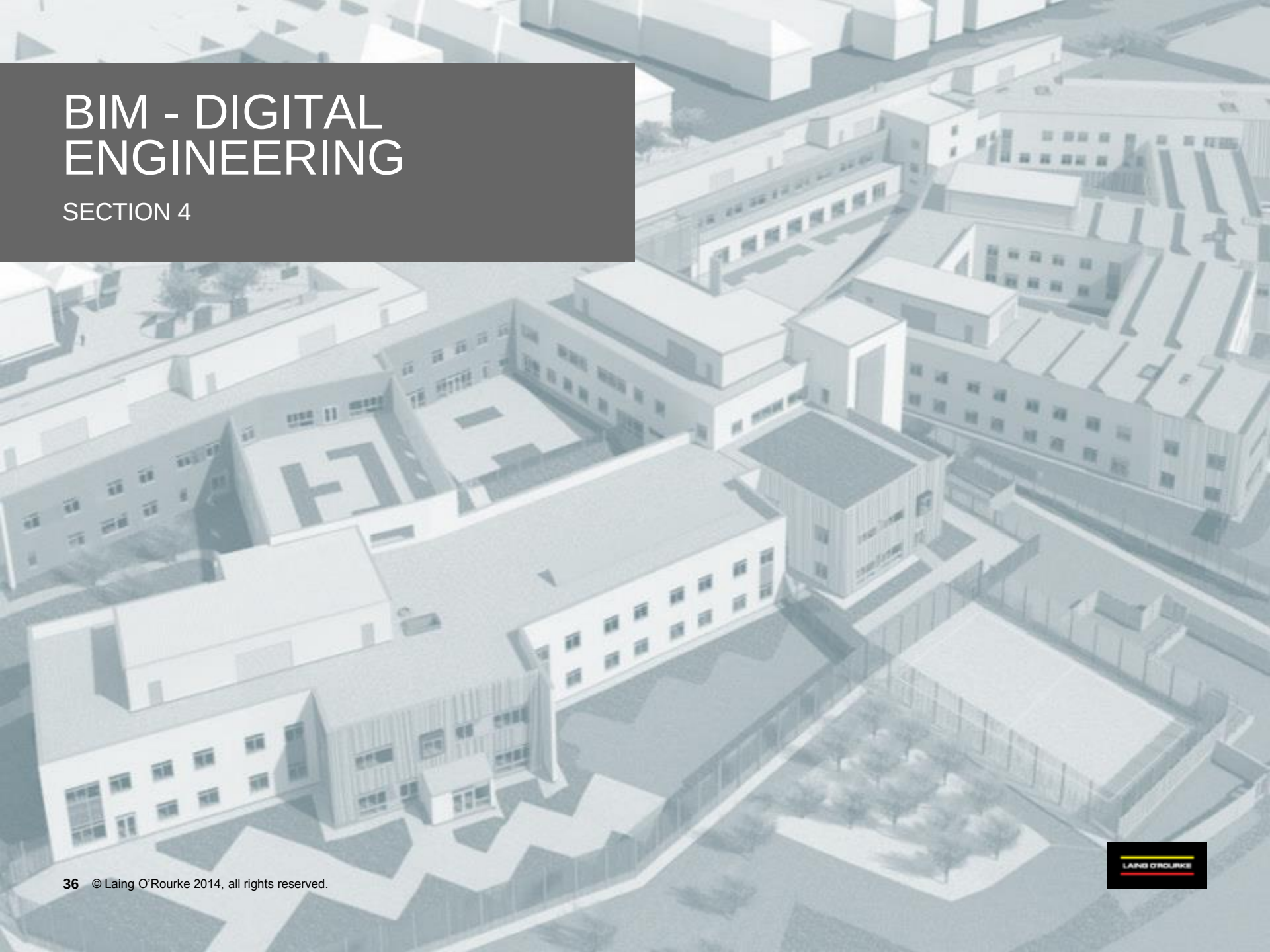
- Variety of public and private garden spaces.
- Planting to emphasise seasonal change and offer therapeutic benefits.
- Ward and Dayroom access.
- MUGA
- Integration of the retained mature woodland.
- Creation of a hard landscaped Plaza adjacent to the concourse and main entrance with traffic calming surface.

Design principles:

- 3 Retail units and Cafe.
- Concourse building to be a linking element on the axis through the existing hospital.
- Preserved portico linking to the original 1930s hospital.
- Relocation of Cochrane mural

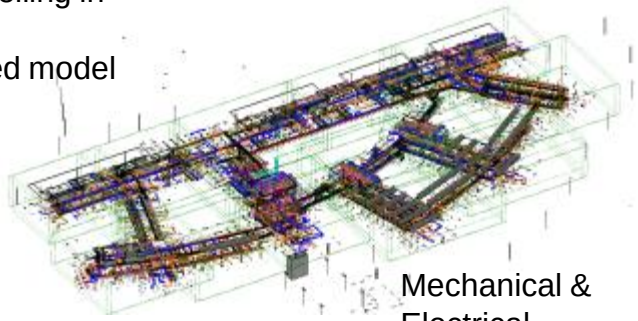
BIM - DIGITAL ENGINEERING

SECTION 4

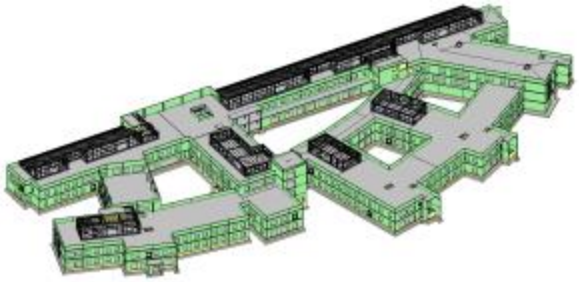


The AMHU utilises Level 2 BIM
Consultants & MEP subcontractor modelling in Revit.
All disciplines contribute to one combined model

Architectural



Mechanical & Electrical

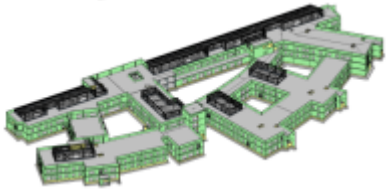


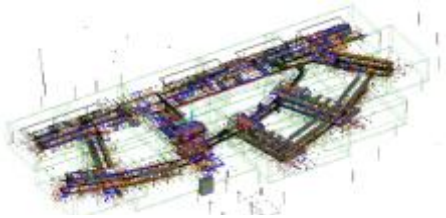
Structural

Equipment

Combined model

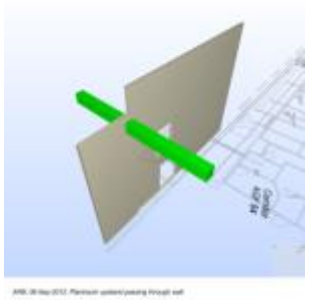
CLASH DETECTION





Consultant / Sub-Contractor Models

Models Integrated in Revit / Solibri / Navisworks

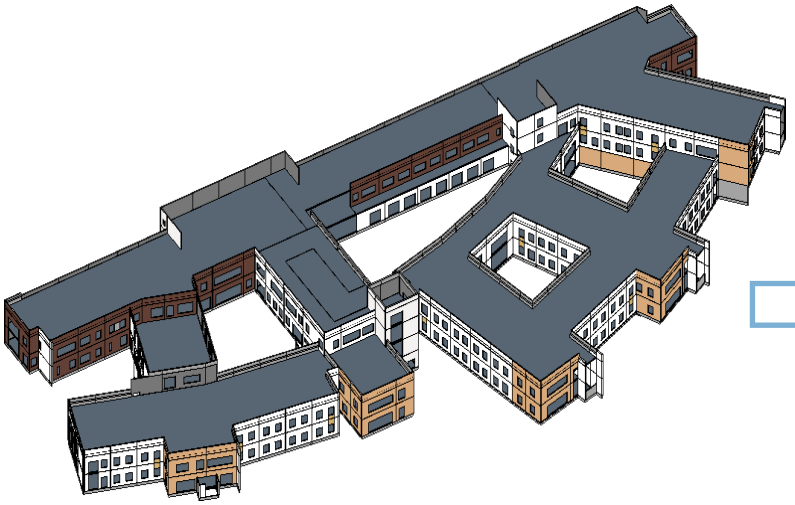


Clash Detection / QA Discussion

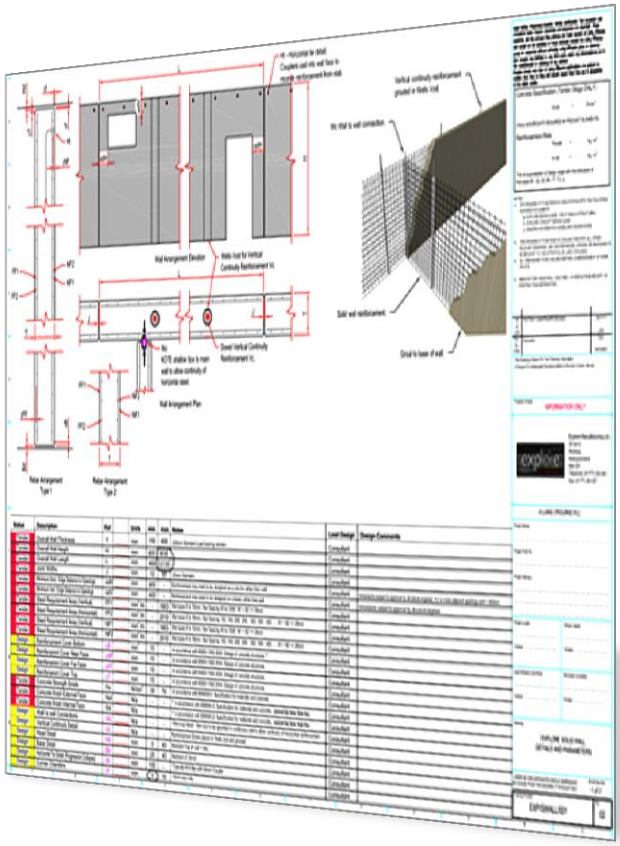
Clashes resolved within relevant consultant model.

OFF SITE MANUFACTURE - PANELISATION

- Building façade panelised within Revit model including structural parameters



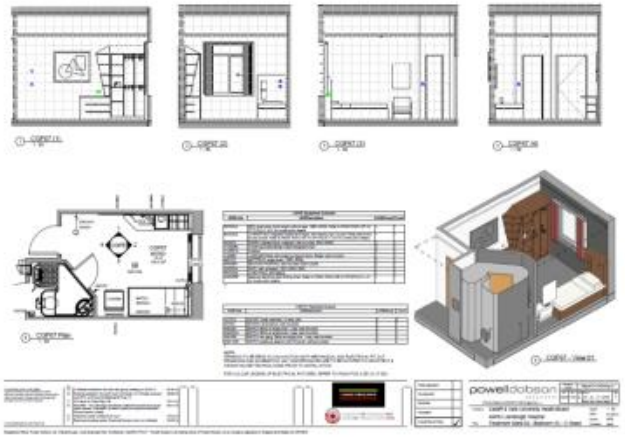
- Explore concrete panel automated manufacture



BIM – FEEDBACK

Benefits:

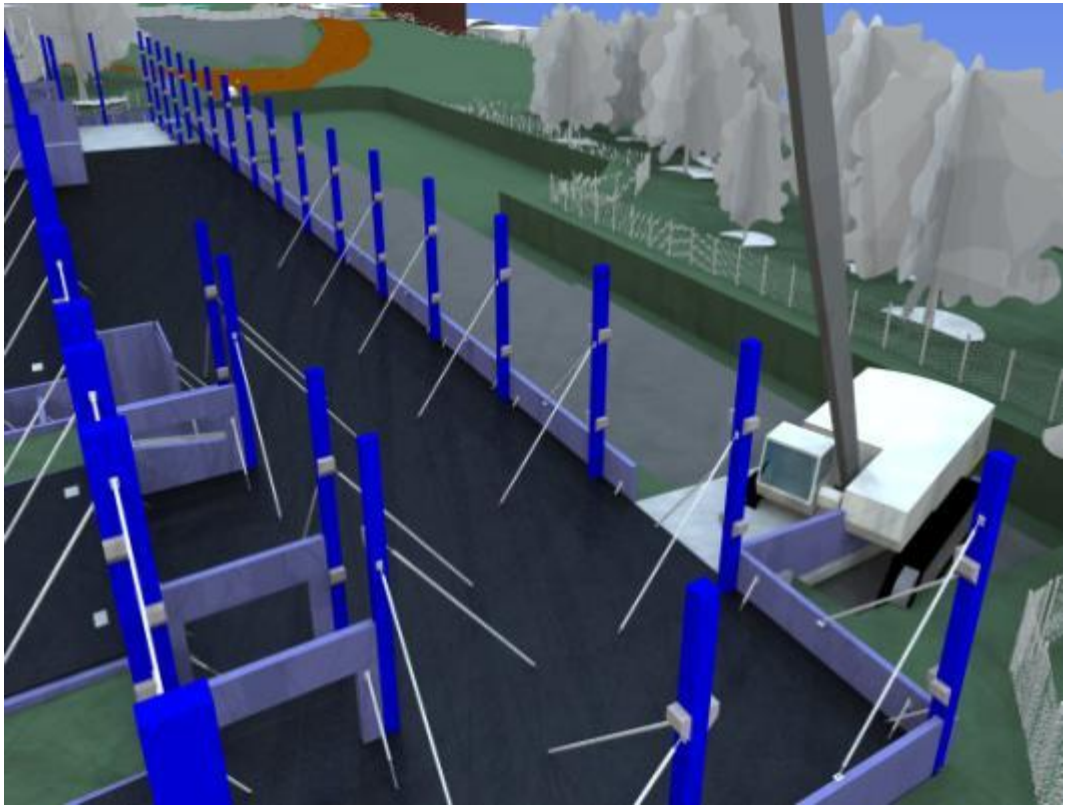
- ✓ Live model – Early client understanding of design through use of model.
- ✓ Visualisation- Rendering perspective images of scheme.
- ✓ Co –ordination of architectural information. Plans, sections and elevations are automatically aligned with door, window schedules etc.
- ✓ Ability to schedule information (used to calculate material volumes for BREEAM and generate equipment schedules for procurement)
- ✓ Clash Detection - reduces problems on site and risks to us
- ✓ Facilitates problem solving between the consultants, contractor and sub contractor when everyone can visualise issues.

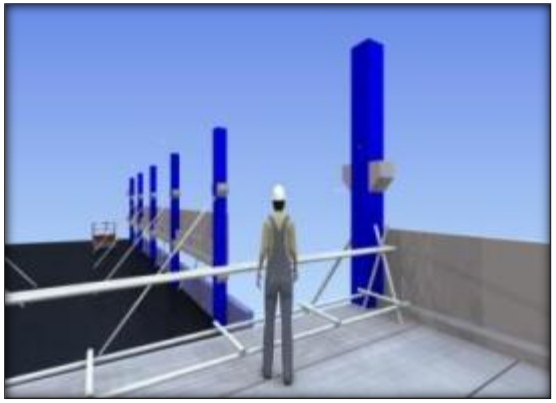


Challenges:

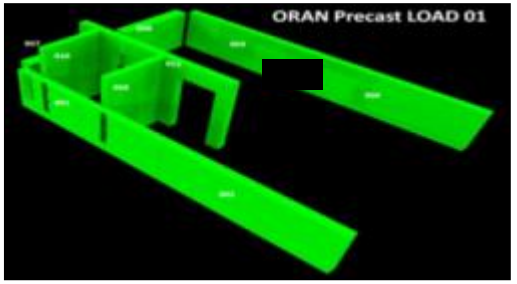
- ✓ Steep learning curve
- ✓ Managing Size and number of models:
  - 20 Architectural models
  - 6 Structural models
  - 7 MEP models
  - 28 MEP Sub contractor models
  - 12 Sprinkler models
- ✓ Managing changes
- ✓ 2D construction Information

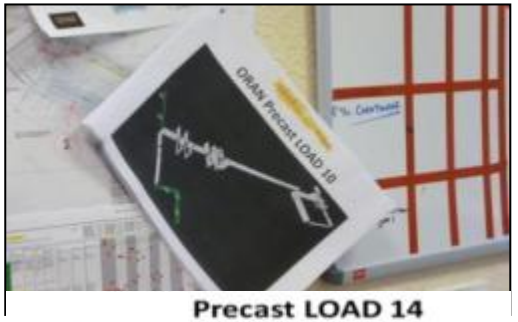
Model used in conjunction with drawings to explain frame construction methodology and temporary works scheme



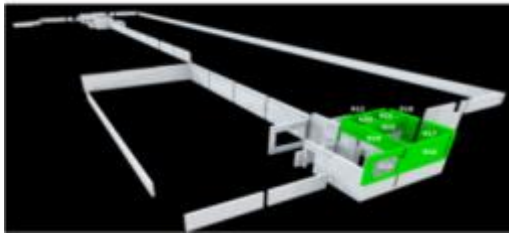


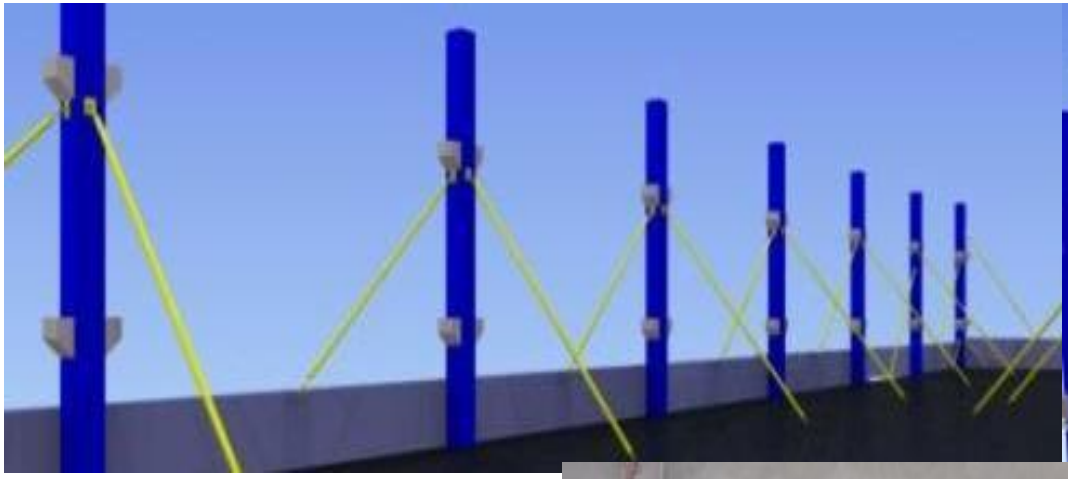
Breakdown of precast deliveries being used as an aid to project weekly and daily coordination meetings

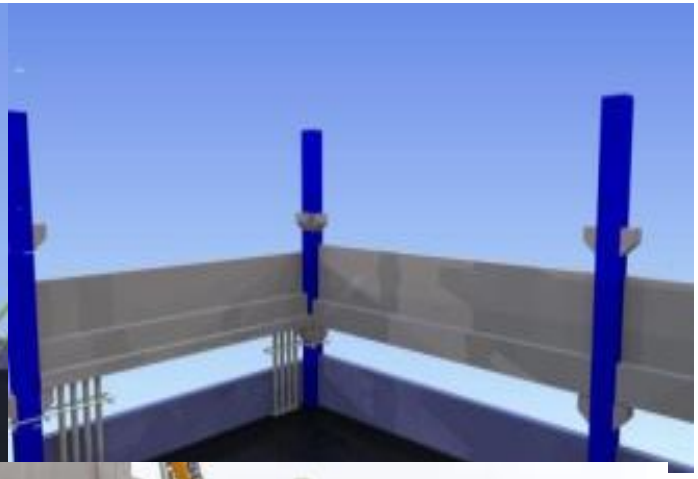


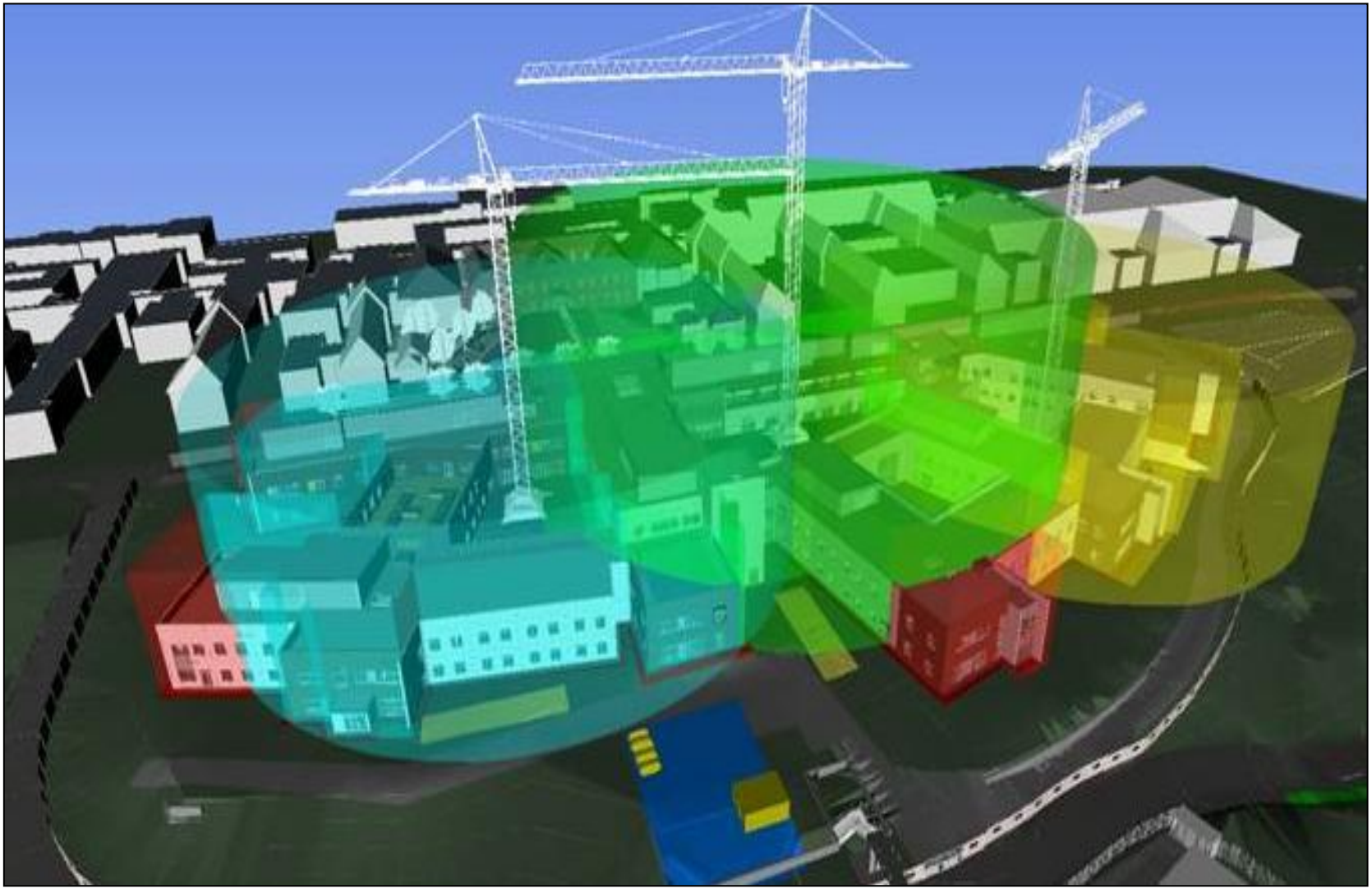


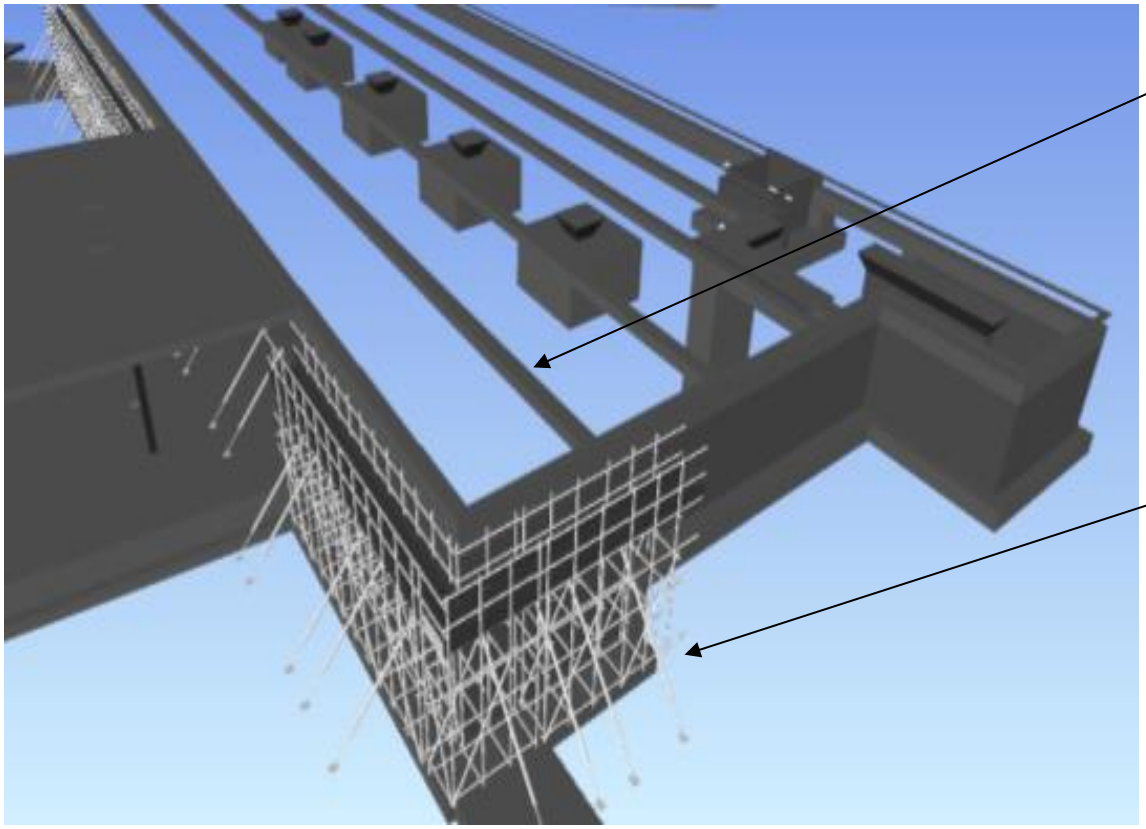
Precast LOAD 14









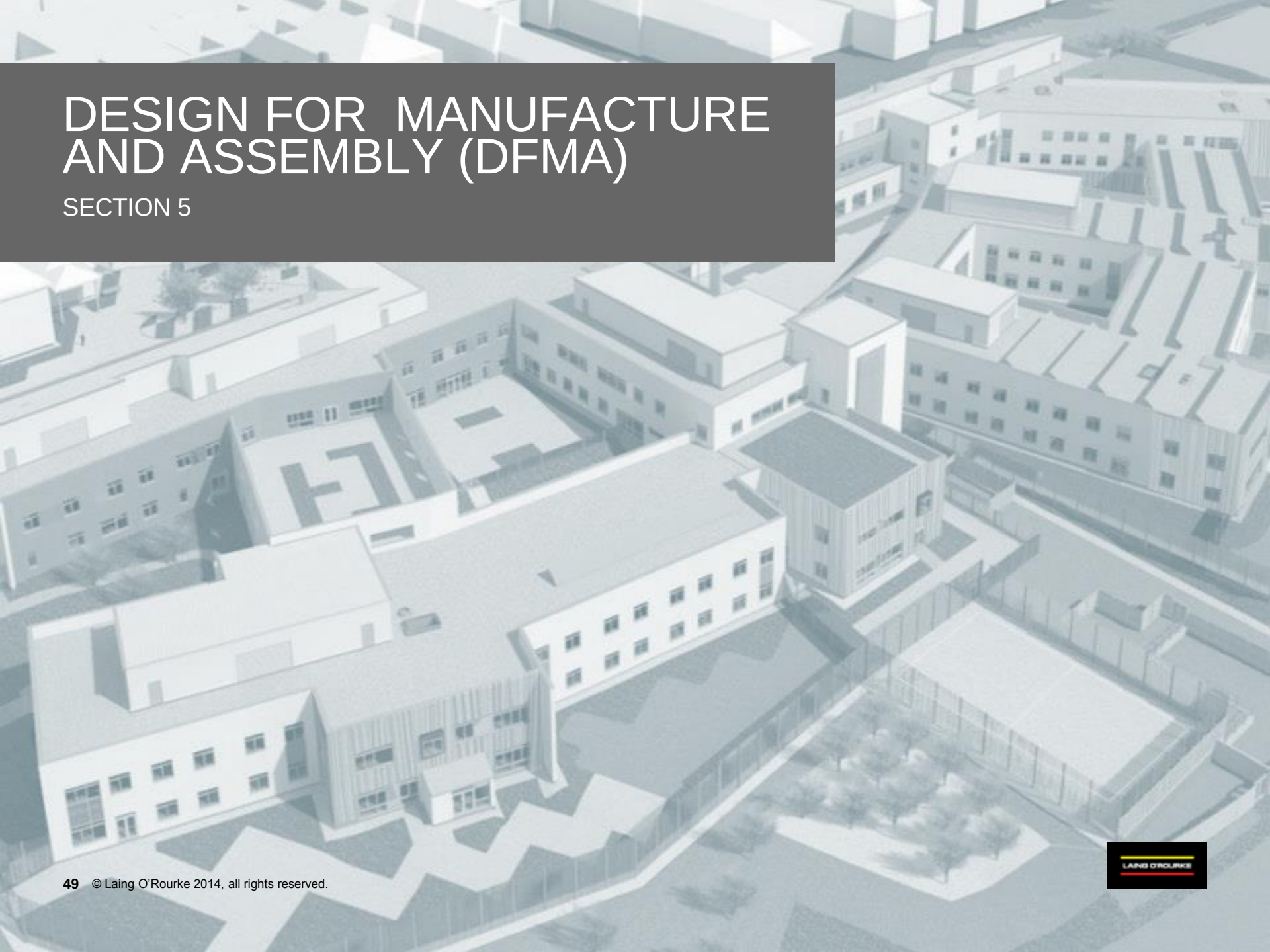


Strip foundations installed to ground works MS

Scaffold to be installed to provide safe working platform for construction of edge beam

DESIGN FOR MANUFACTURE AND ASSEMBLY (DFMA)

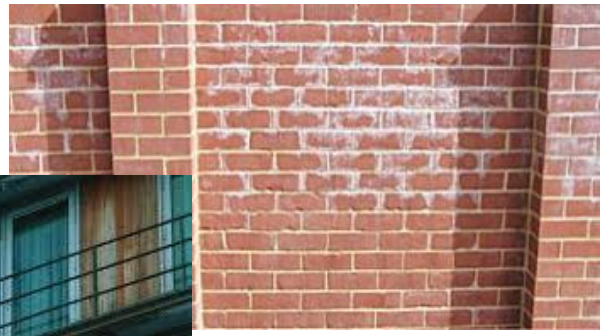
SECTION 5

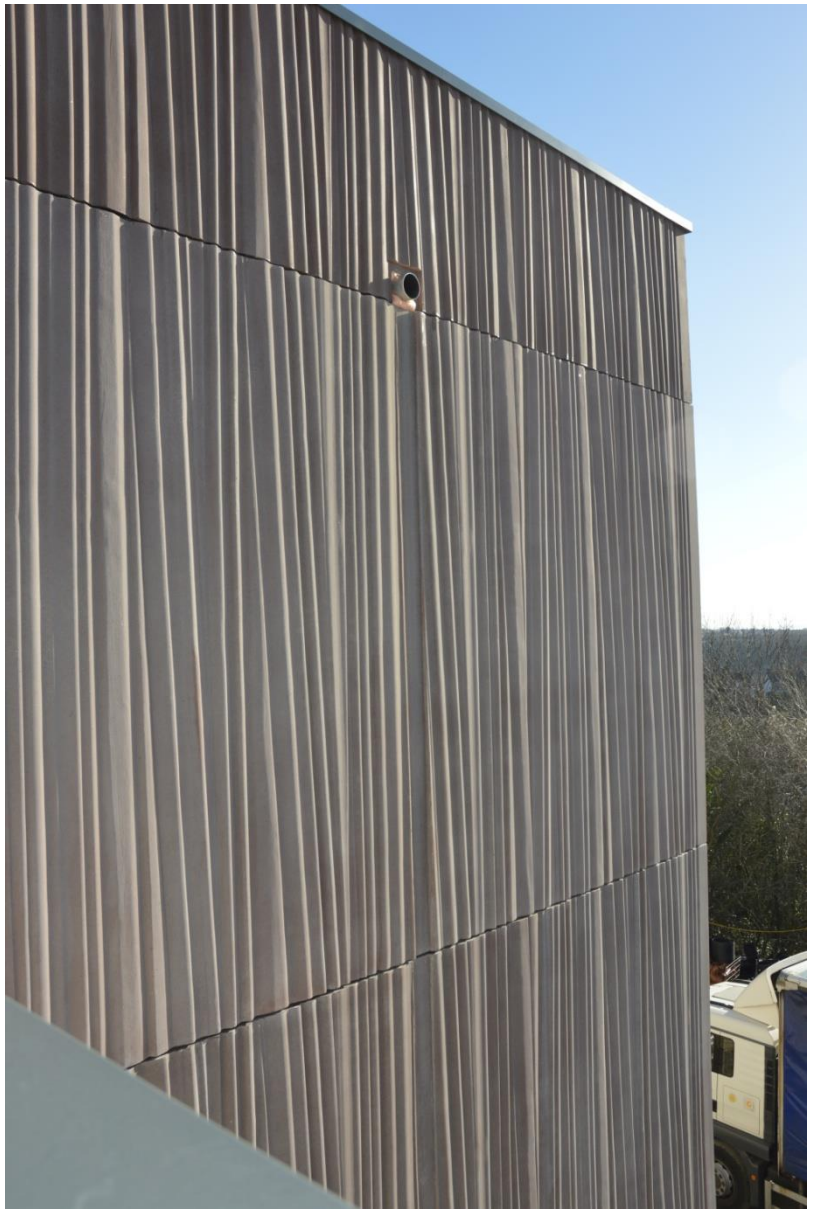


- A collaborative approach that provides an engineering led end-to-end, unique solution for our Clients from standardised components
- It should challenge and change conventional approaches by ensuring smarter, safer, more efficient ways of providing more predictable affordable outcomes
- This approach will deliver a more sustainable built environment that we can all be proud of

ADVANTAGES - QUALITY

- Quality of finish – consistent finish provided in factory conditions
- Longevity and Robustness – significantly improved impact resistance both internally and externally, suited to Mental Health environment
- Factory fitted windows – quality and consistency of installation in factory conditions.
- Omission of perimeter columns – more flexible space
- Fire Performance – inherent fire resistance with concrete product





ADVANTAGES – HEALTH & SAFETY

- Reduced labour force and interfaces on site
- Reduced handling of glass on site
- Reduced working at height
- Cleaner site – reduced risk of slips, trips and falls.

ADVANTAGES – SUSTAINABILITY

- Significantly reduced wastage on site
- Less deliveries to site
- Reduced energy consumption during construction
- Reduced energy costs through increased building mass, air tightness and thermal properties
- Reduced maintenance costs due to robustness of material and reduced absorption

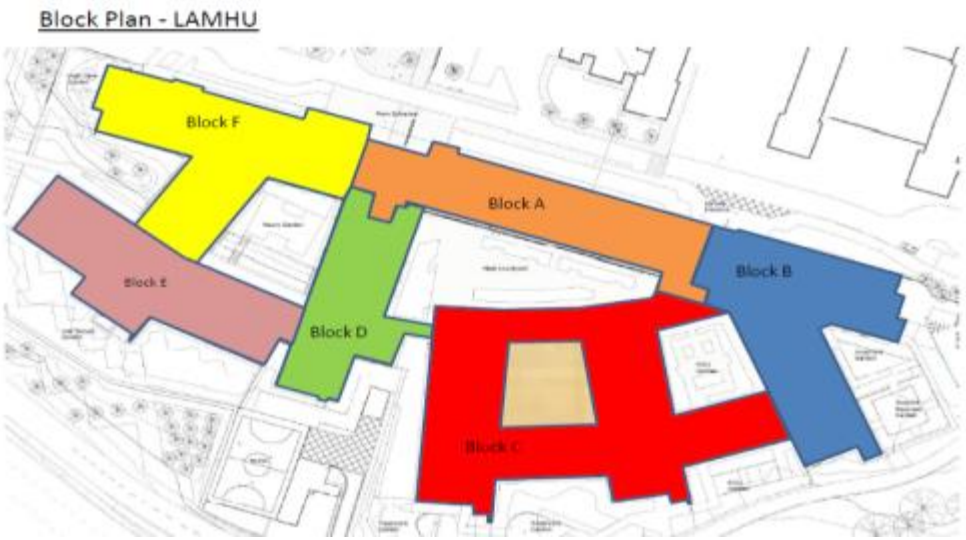
.

ADVANTAGES – DELIVERY

- Shorter programme - **10 week saving** to the project programme through the use of DfMA facades. This has been realised
- Reduced disruption to hospital – peak labour 150 less
- Reduced overall project risk
- Reduced commissioning risk

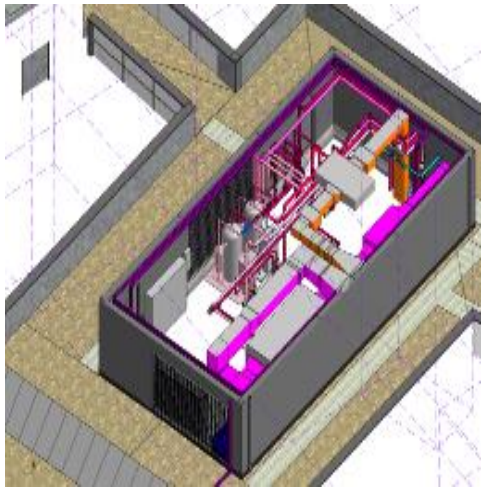
METHODOLOGY

- Traditional programme - 130 weeks
- Contract programme - 113 weeks
- Methodology
  - Sequence (changed due to brick facades) E, D, C1, C2, F, B, A (West to East)
  - Early drainage and retaining walls
  - 3nr TC's – 561's.
    Lifting 15t @ 40m
  - Crawlers not used due to topography
  - Pods to be installed with TC's with frame
  - Workflow Finishes system
  - Finishes 820m^2/wk



- 58% of project pre-assembled
- Retaining walls to building and external works
- Precast concrete frame including lattice planks, load bearing façade, precast columns, twin wall
- Precast frame – 19,700m^2
- 35 weeks
- Average 25 men
- Including brick effect facade

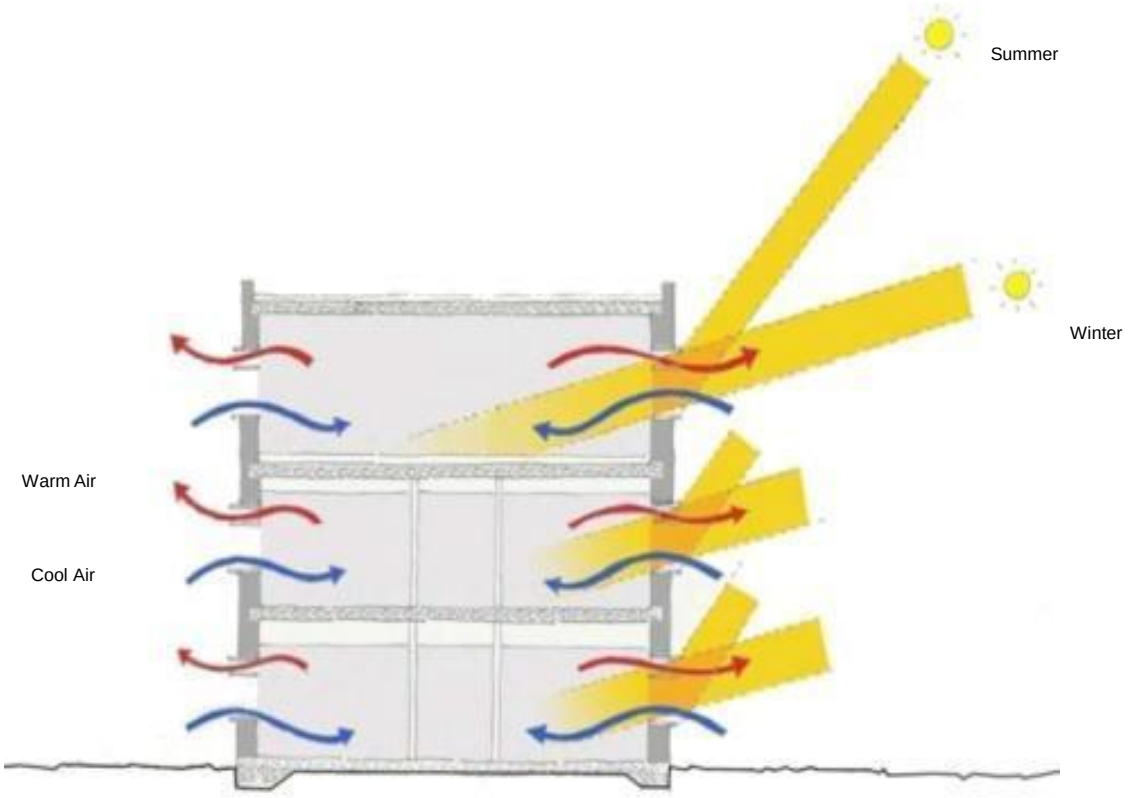
- Modular plant rooms
- Service modules
- Bathroom pods
- Plant skids
- Modular wiring
- Containment in concrete walls
- Modular riser



SUSTAINABILITY

SECTION 6

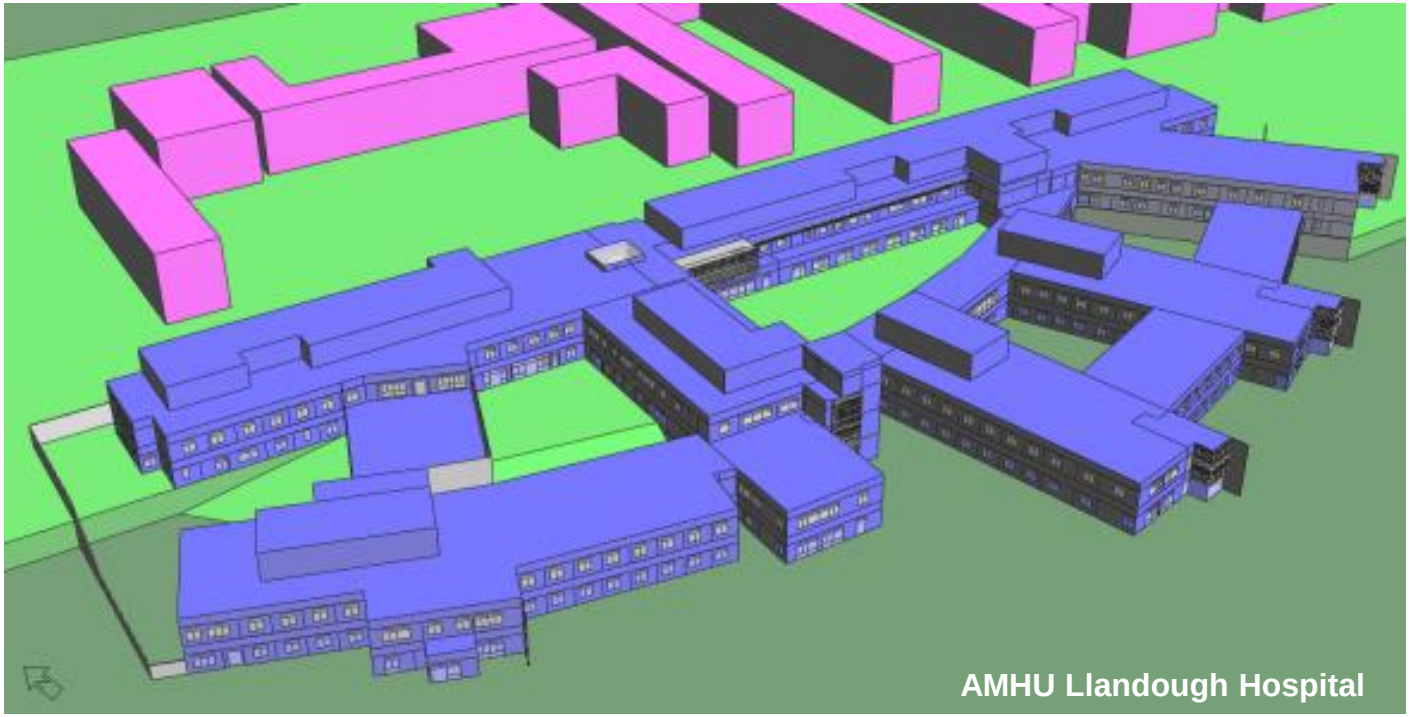
- Minimise energy use
- Natural ventilation
- Reduce carbon footprint
- Flexible solutions
- Reduced ‘U’ values
- Good air tightness
- BREEAM Excellent



Naturally ventilated

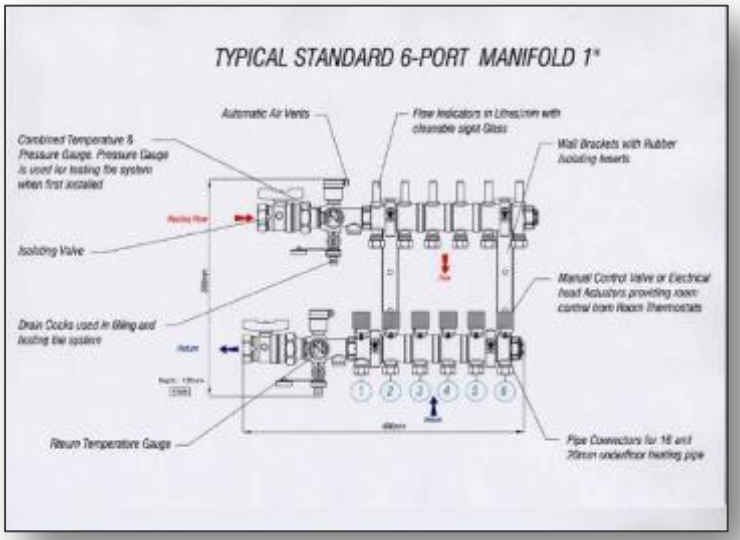
Environmental requirements modelled and assessed for:

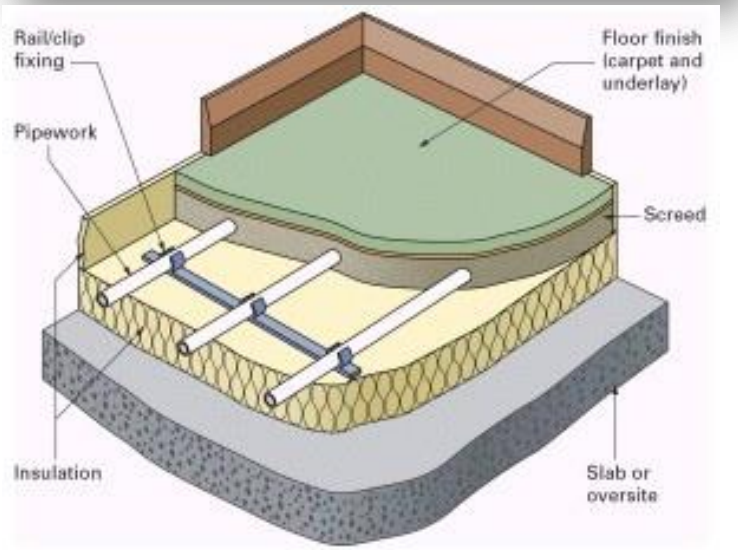
- Part L compliance
- Overheating
- Day lighting



Heating - Under floor

- Safe temperatures and Anti-ligature
- Local temperature control
- Work effectively with natural ventilation
- Aids cleaning and infection control
- Works well with 24 hour occupation



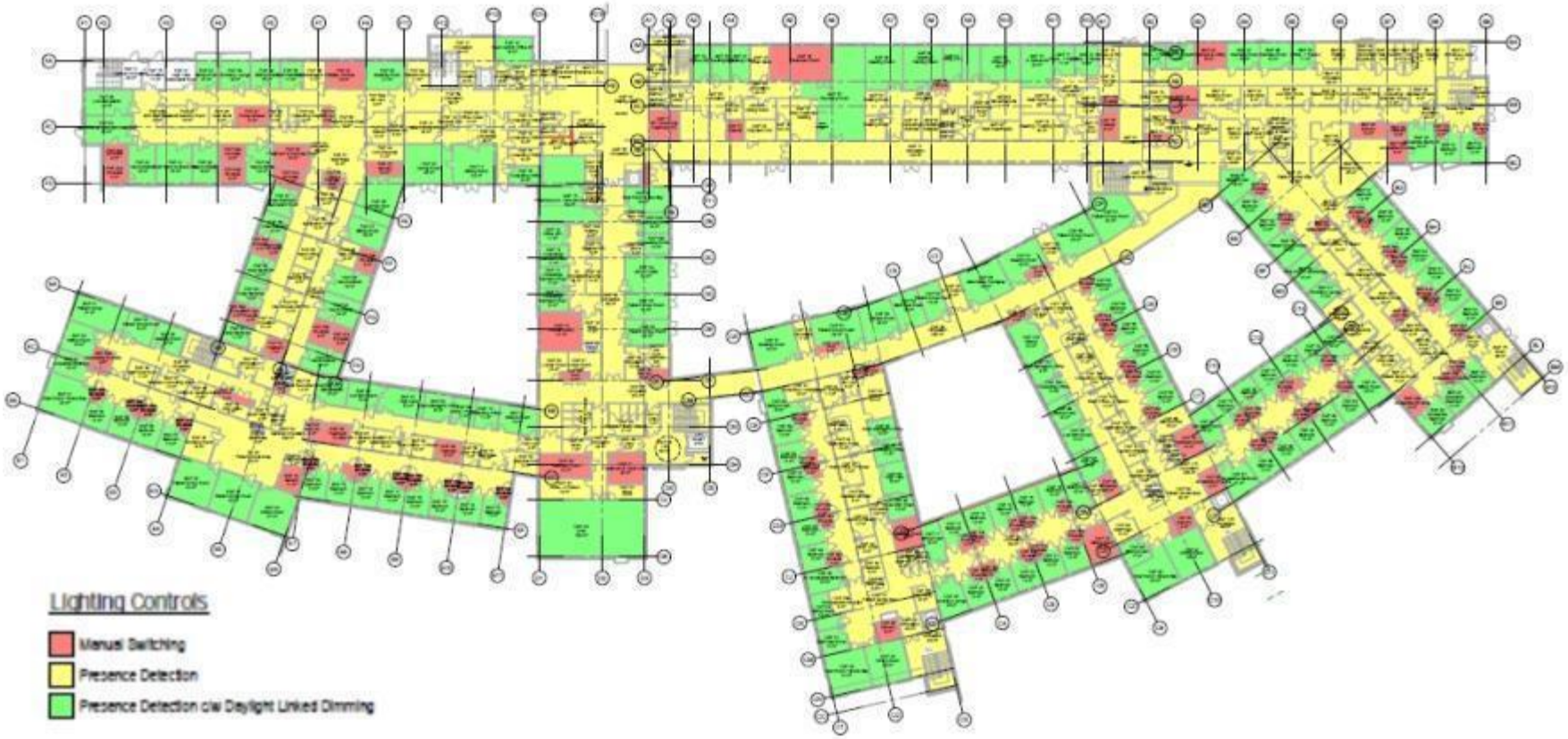


Lighting

- Utilising a mixture of LED and high frequency fluorescent luminaires
- Daylight linked dimming in areas of natural daylight
- Occupancy detection utilised throughout

Office

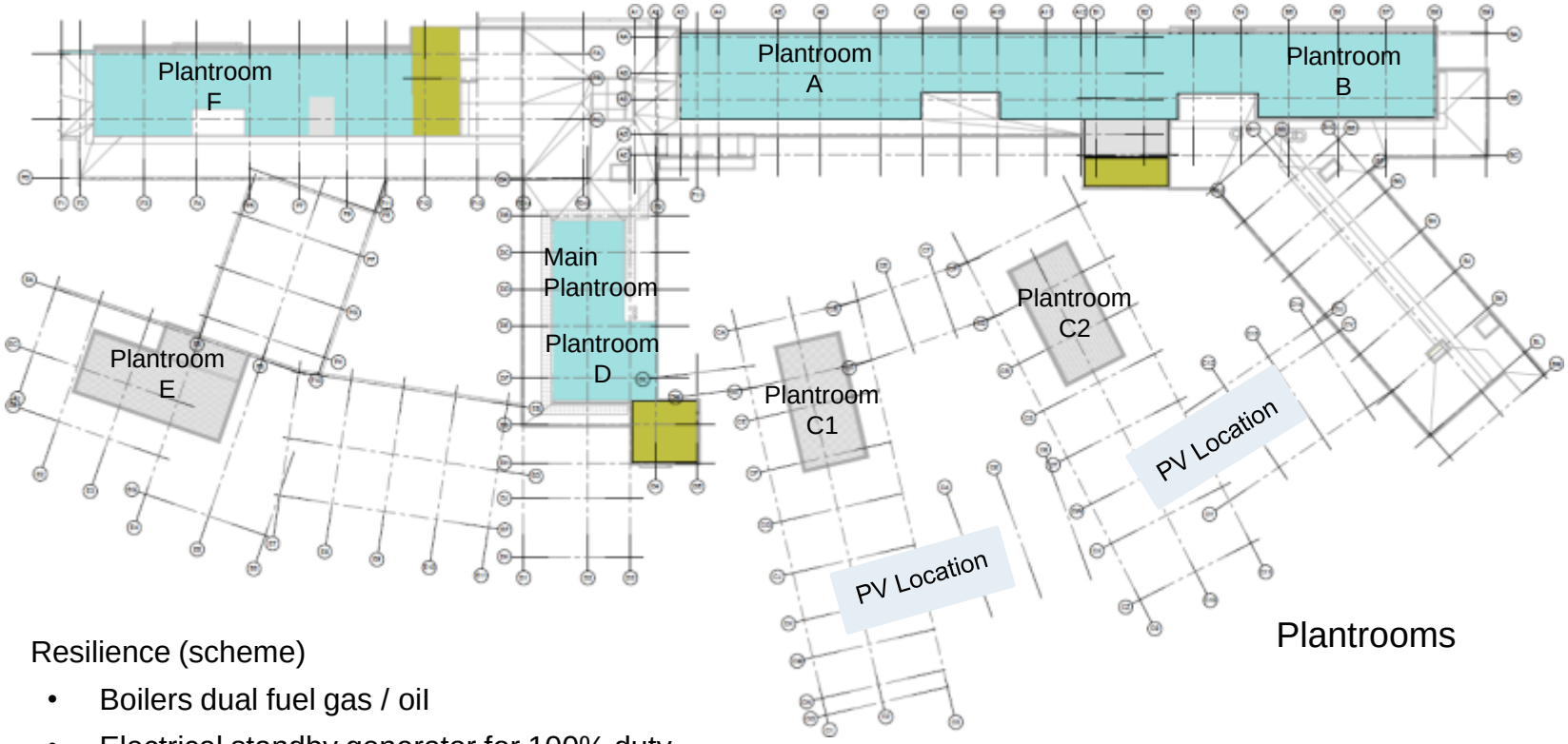
Recovery room



Ground floor

Natural ventilated areas

Ground floor



Plantrooms

- Resilience (scheme)
  - Boilers dual fuel gas / oil
  - Electrical standby generator for 100% duty
- Resilience (ward blocks)
  - Independent plant room for each block for heating, hot water and AHU
  - Mains distribution boards and hub rooms located in each block
  - Interleaving of lighting circuits within corridors and treatment rooms
- Mains services distribution through corridors
- Isolation of power provided for patient bedrooms

EFFICIENT

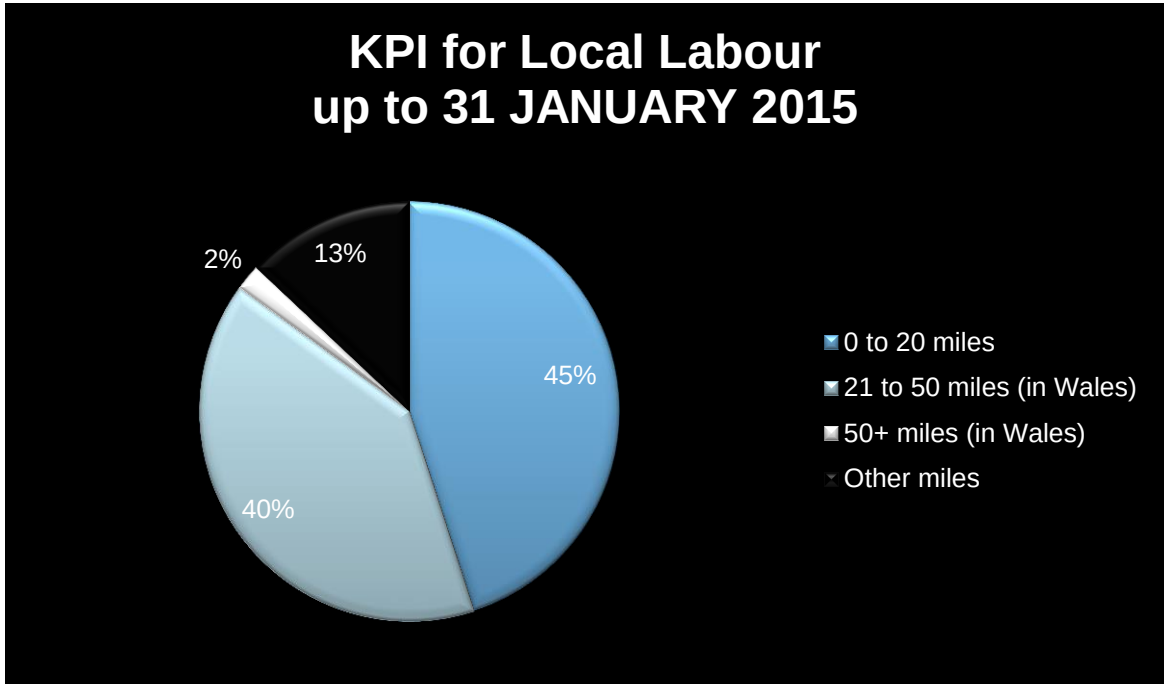
- BMS network with environmental control
- Heat recovery in ventilation systems
- Low flush volume WC’s
- Sensor operated taps
- Energy metering / monitoring of all distribution equipment to each block
- High efficiency lighting (as above)
- Photo voltaics (low carbon technology)

Health and safety

- AFR 0.00
- 22nr minor accidents in 15 months
- 480,000 hours worked to date

Local labour

- 45% of workers live within 20 miles of site
- 85% within 50 miles in Wales



Training

- Currently employing 11nr local apprentices
- 2nr year out students
- 2nr Cadets on day release
- 4nr staff on day release
- 2nr staff on Laing O'Rourke Graduate Management Programme

Education

- Team have presented in Sully Primary School and Llandough Primary School
- Stanwell School Engineering day – year 8 girls

Community Support

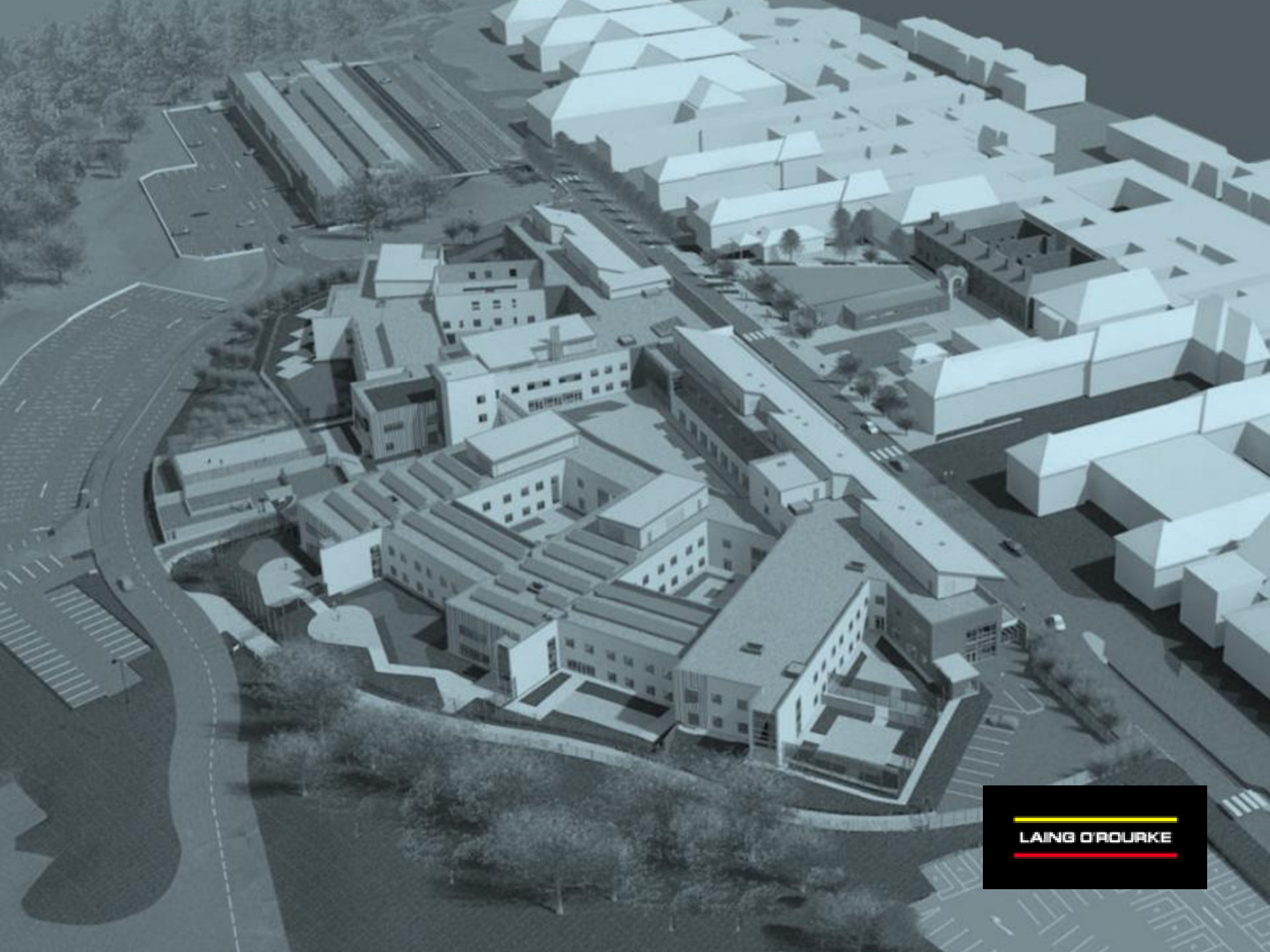
- New fencing for Llandough Primary School
- Alcohol Treatment Centre, Cardiff
- Painting sheds for Llandough Primary School

MEASURING SUCCESS

SECTION 7

ACHIEVEMENTS TO DATE

- ✓ Full Implementation of Level 2 BIM
- ✓ AFR – ZERO
- ✓ Enabling works delivered to time and budget
- ✓ On programme – 113weeks
- ✓ 30% Reduction in labour on site
- ✓ Superstructure 35weeks
- ✓ Commissioning commenced
- ✓ Lights on in 1st Block 11months prior to completion
- ✓ On budget
- ✓ Design Stage BREEAM Excellent


LAING O'ROURKE