

MODERN METHODS OF CONSTRUCTION

**ACUITY
LAW.**

castleoak 

 **Principality**
Commercial



Building the future

- What do we mean by MMC?
- New materials, digital working, precision manufacturing
- Cleaner, faster, cheaper?





New methods, old problems

- Covid-19 – ‘the great accelerator’
- The appeal of MMC
- An intimidating prospect?
- A long track record



Meet your largest customer

- The UK Government wants to 'Build Back Better'
- Key departments have issued a presumption in favour of off-site construction methods
- What can the government do?



Back to the drawing board?

- Huge opportunities, but a long way to go
- Industry needs new components, skills, contracts and standards
- Nothing less than a cultural change will deliver

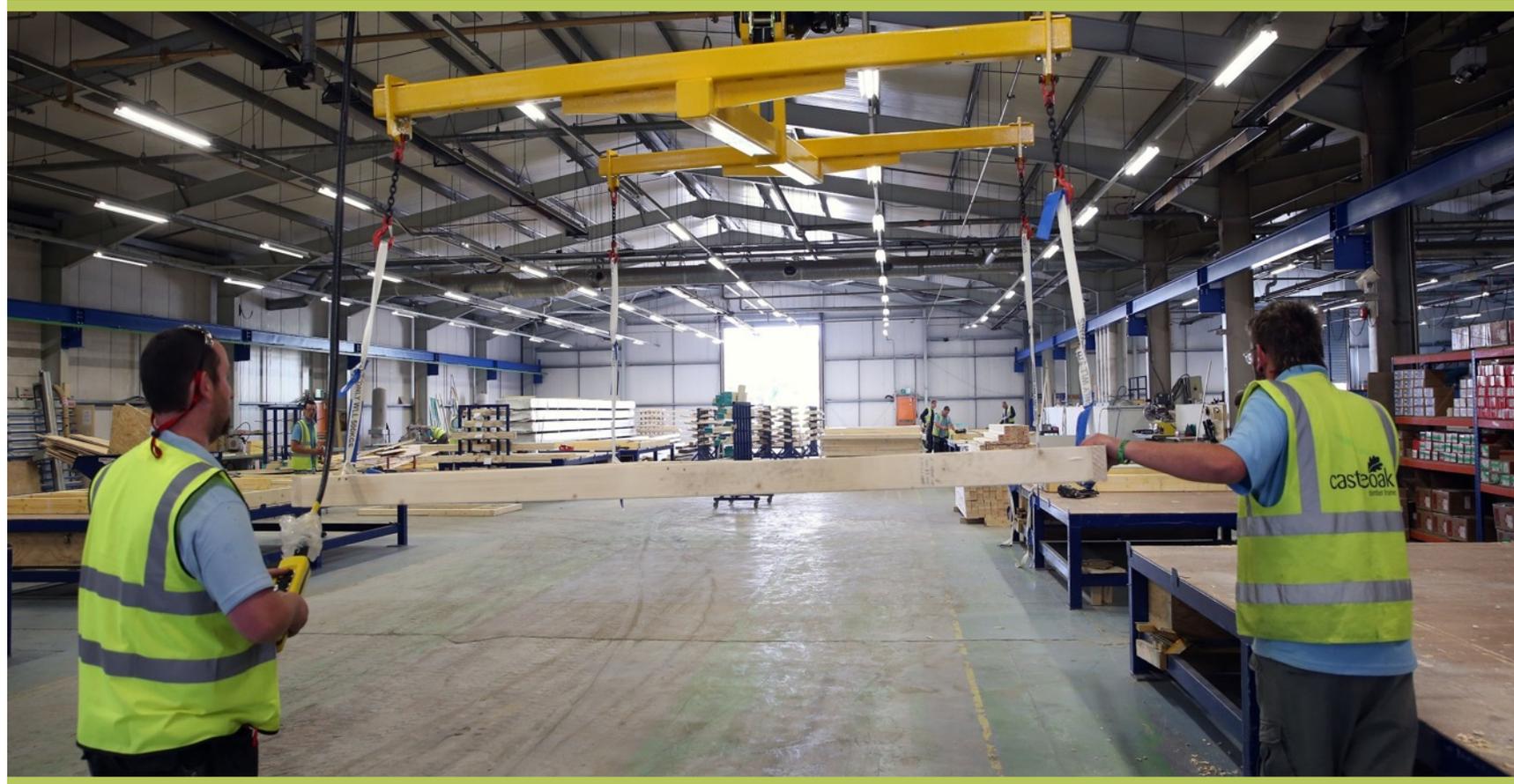


Introduction to CastleOak precision off-site manufacturing solutions



Precision off-site solutions designed and manufactured in Wales

ISO 9001 quality assured manufacturing since 2008



Development of skills

- NVQ programme
- STA programme
- Mapping to the shared apprenticeship Scheme
 - Health & Safety
 - Manual Handling
 - Use of Plant and Machinery
 - Quality Control
 - Sustainability



YPRENTIS

SHARED APPRENTICESHIP SCHEME

CYNLLUN PRENTISIAETH AR Y CYD

One size does NOT fit all

Tailored Solutions

- Difficult site access
- Health & Safety implications
- Innovation to meet your requirements
- Fire risk assessments

Providing Programme Certainty

- Minimising on-site waste
- Water tight sooner
- Safer working practices
- Less reliance upon 'wet trades'

Offering Commercial Benefits

- Less skips required
- Improved site security
- Faster procurement cycles



Precision MMC off-site manufacturing solutions

Timber Frame Solutions

- Open Panel Timber Frame
- Floor cassettes and Roof trusses
- Semi-closed Insulated Panels
- Cladding systems
- Prefabricated components – windows fitted
- Modular components – Dormer windows.

Services

- In-house Design expertise
- Frame erection and installation
- Logistics planning & management
- Quality controlled environment



Quality assured; we measure what matters





Case Study 1

Juniper House care home

The UK's first Passivhaus care home by Castleoak, 2012

Juniper House

Off-site manufactured timber frame construction.

- **Design and build cost uplift: 6%**
- **Energy Performance Certificate rating: A**
- **Annual energy savings: 50%**
- **CO² savings: 50%**
- **Payback period: 6 years**



Fabric first approach delivered building performance

- Innovative project - the first of its type in the UK
- Sustainably-sourced timber frame
- Very high standards of insulation and air tightness for superstructure achieved high thermal energy efficiency
- Triple glazing in windows and doors
- Very efficient air source heat pumps and PH-compliant heat recovery units
- LED lighting, low energy light fittings, low flow water fittings, circuit controls
- A-rated appliances

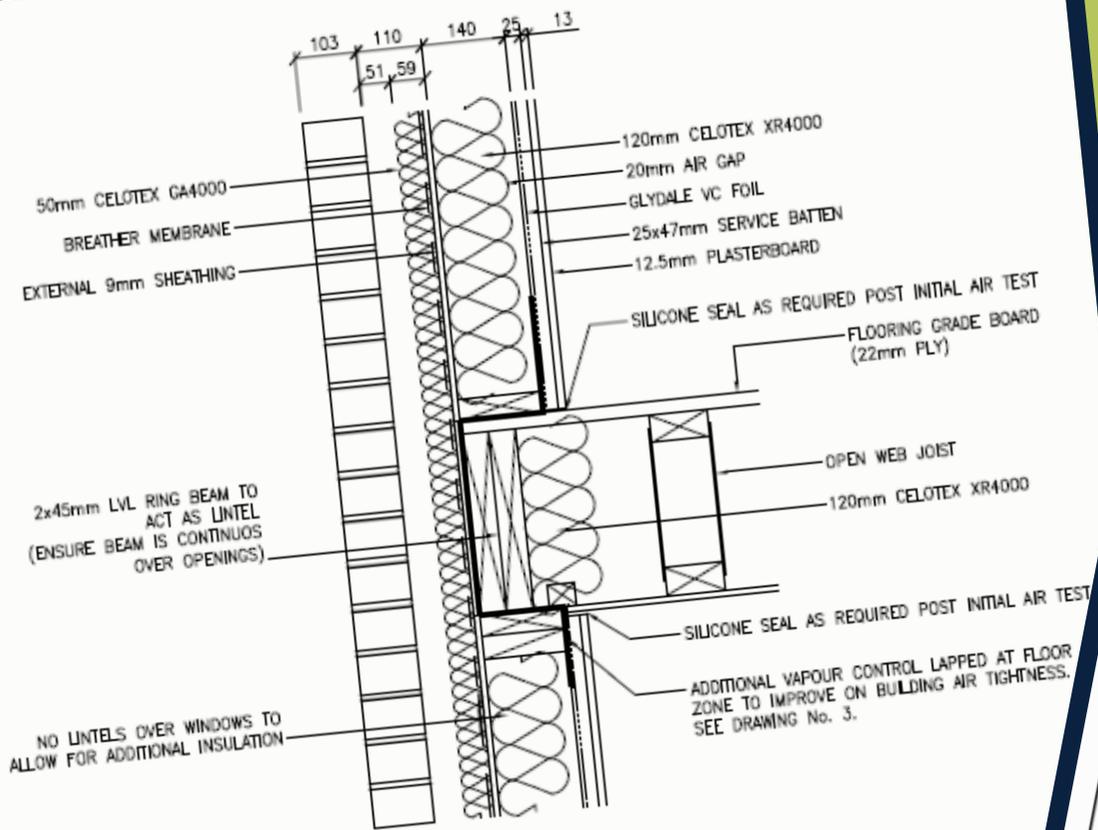
Proven Passivhaus delivery

- Technical detailing in-house
- Specialist manufacture to PassivHaus standards
- Bespoke construction training tools developed to ensure effective erect and installation on site
- Proven design and manufacture delivery



For Best Development and Construction Project





U-VALUES	
WALL	0.12 W/m ² K
Ψ-VALUE OF JUNCTION	0.01 W/m ² K
BRE APPROVED	16/12/2010

JUNCTION NAME: No.1 External Wall -Intermediate Floor Joist Para Rev C

Thermal Performance of Fabric

Element	U-value
Element 1	0.12
Element 2	0

ψ values for linear thermal bridges

ψ int = W/m²K

ψ ext = 0.011 W/m²K

Isotherms

Heat Flux



Integrated Passivhaus compliant mechanical and electrical design

- Super efficient air source heat pumps and heat recovery units.
- Gas fired wet heating system to occupied rooms.
- Air source heat pumps provide heating and cooling to communal areas.
- Mechanical ventilation heat recovery units provide fresh air throughout the care home.

Fabric first design

Designed to a very high standard of insulation and air tightness - achieving high level thermal energy efficiency.

U values achieved:

- 0.11 for the roof
- 0.12 for the walls
- 0.12 for the floor slab
- 0.6 for air tightness
- 0.8 for triple glazed windows and doors



Case Study 2

**Programme benefits of Off-site
Construction at Abbeyfield Winnersh
care home**

Abbeyfield, Winnersh

Specialist care home

Winner

Pinders Healthcare design awards 2017 Best new care home

Finalist

Innovation award, RICS Awards 2017

Finalist & Highly commended

Structural Timber Frame Awards 2016 Best Healthcare project and Innovation Award



OSM delivered programme benefits

- Optimised off-site construction strategy
- 8 weeks quicker than traditional build
- Off-site manufactured large panels, battens with external render boards
- Factory fitted external cladding saved 50% on-site work
- Factory fitted windows with patented clip system cut on-site installation time by 93%
- Timber waste reduction measures with off-cuts recycled as noggins & used in electrical fix - all manufactured off-site
- Mechanical & electrical services designed up front within the timber frame structural design
- Dry, off-site construction removed the need for drying times – reducing programme time



OSM delivered Health & Safety benefits

- Custom manufactured fall arrest net installation on site
- Controlled timber frame erection, significantly reduced risk of serious injury from a fall
- Roof panels manufactured and assembled off site reducing working at height
- Factory fitted windows reduced manual handling



OSM delivered strong sustainability credentials

- Higher thermal insulation will deliver long-term building operating efficiency
- Consideration given to the environment during construction with materials sustainably sourced
 - All timber from sustainable sources or PEFC certified sources
 - Manufacturing and construction processes governed by BS8555 and ISO14001 Environmental Management System
- Reduced transport cut trades on site, and 25% less CO² generated
- Increased embodied carbon
 - Timber frame absorbs carbon throughout its natural life and continues to store it when cut
 - Compared to traditional build, the fabric of the property saved an estimated 150 tonnes of carbon whilst acting as a carbon store



“Castleoak has shown great innovation in off-site construction and determination in delivering our projects.”

Richard Virr,
Development Director, Abbeyfield Society

Social housing in Wales

- Pobl Pill, Newport
- 16 Unit Development
- Pre-fitted Insulation - 0.022W/mK Lambda Value
- Pre-fitted Windows – uPVC Anthracite Grey
- TF200 Thermo Breather Paper
- Prefitted Crash Decks to stair openings

U Value achieved:

- Wall - 0.19W/m²K
- Window - 1.4W/m²K



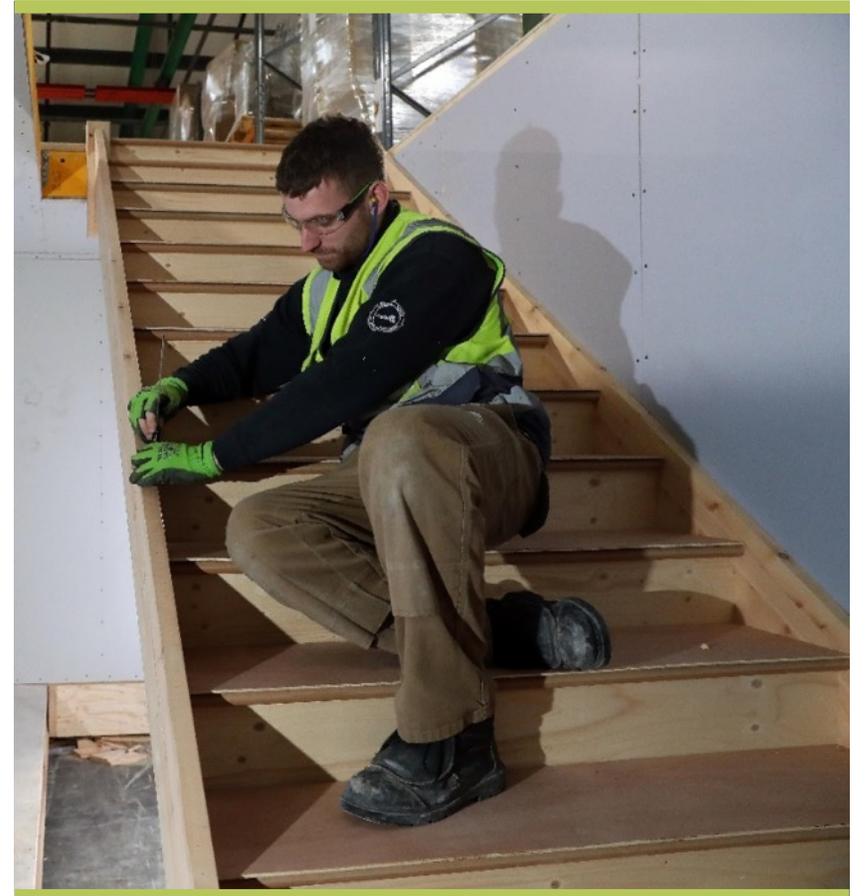
Bungalow construction and assembly



Dormer design and volume factory manufacturing



Innovating with modular staircase components



Modern Methods of Construction from a funder's perspective

Chad Griffiths
Senior Relationship Manager, Housing
Principality Commercial

Content

- The growing need for housing
- Record house prices in Wales
- Is MMC the answer? Benefits & Challenges
- What has Principality done to date?
- Funder Perspective - Mortgage Lending
- Funder Perspective – Development Finance
- Change is on the way

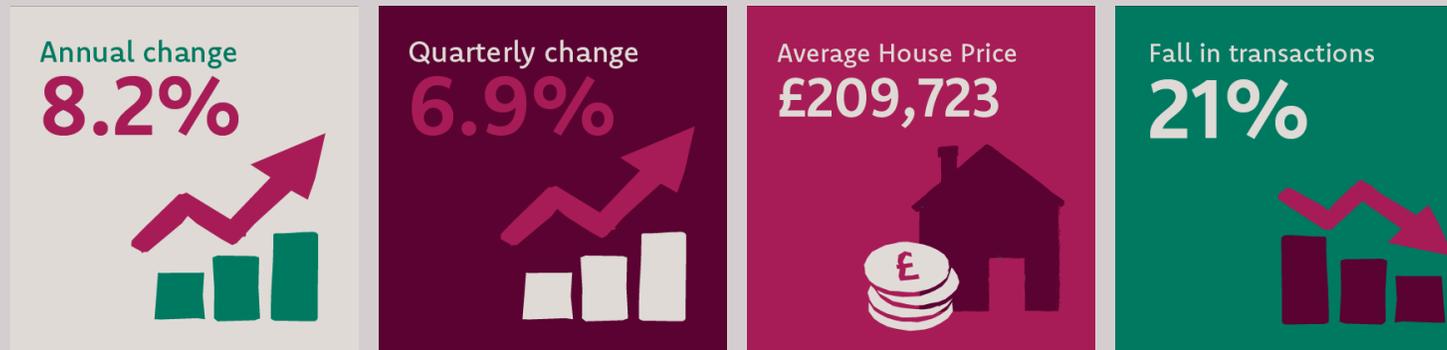
The growing need for housing

- According to the Welsh Government, during 2018-19, the number of new dwellings completed decreased by 13%, compared to the previous year, to 5,777.
- It's estimated that between 2019-2024, between 6,200 and 8,300 additional housing units will be required annually, with a central estimate of 7,400.
- We therefore need to deliver c. 30% more units annually compared to the 2018-19 figures.

Record house prices in Wales despite successive lockdowns

Wales House Price Index – Q4 2020

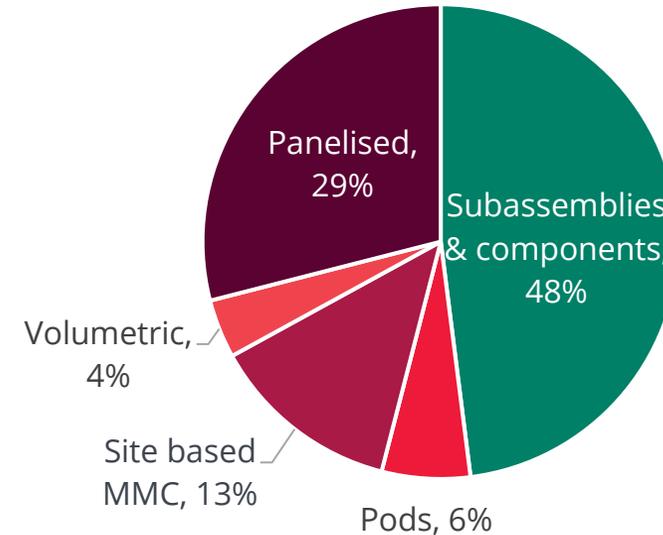
Average house prices in Wales in 2020 topped £200,000 for the first time, with record high house prices seen across most parts of Wales and all property types. The average house price now stands at £209,723, however, overall transactions were down 21% in 2020 compared to 2019. Annual house price inflation was 8.2% last year, the strongest in 15 years, with double-digit percentage increases in prices in a third of local authorities.



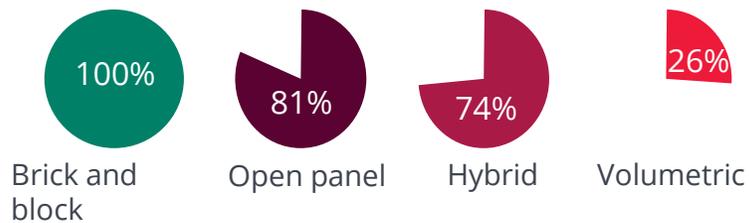
Is MMC the answer?

- Faster delivery including less weather disruption
- Quality assurance – precision engineering / reduced snagging
- Sustainability - reduced waste; energy efficiency; reduced carbon footprint; reduced construction / traffic noise
- Health and Safety
- Elimination of fuel poverty
- Healthier Homes
- Potential response to ageing workforce

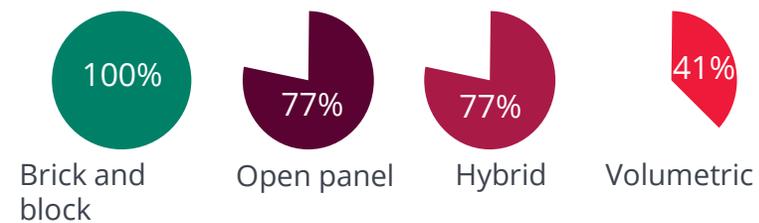
Different Forms of MMC



MMC requires less on-site labour



MMC can halve on-site construction duration



Is MMC the answer?

There are challenges to overcome;

- Industry alignment
- Perception and education
- Longevity – data / assurances
- Inflexibility of design
- Scale
- Valuation uncertainty – data
- Set up costs
- Skills gap – digital design and manufacture, technical, planning, collaboration (communication, team building, problem solving) and logistics

What has Principality done to date?



Funder Perspective – Mortgage Lending

What are mortgage lenders looking for?

Security

- MMC home lifespan – will they last?
- What is the quality like? BOPAS Accreditation? NHBC warranty?

Marketability

- Is there a good market for onward sale?
- Do we have the valuation data for similar properties?

At present MMC homes only make up a small amount of the overall housing stock so lenders are not overly limiting their market if they exclude lending on MMC homes entirely. But change is coming . .

Funder Perspective– Development Finance

Development funding has its own challenges when funding a MMC development.

- How much is built off site? Are we talking about volumetric or timber frames and structural insulated panels manufactured off-site and assembled on-site?
- Security challenge – property lenders are secured by way of a charge over the site as well as additional security, but what happens if the majority of the property is built off-site? Funders don't have a relationship with the manufacturer.
- Solutions exist, such as vesting certificates, but what level of protection do they offer?
- Development lending is already considered a 'risky' proposition by the PRA – should lenders be expected to take on more risk?

Change is on the way

- From the end of 2021, lenders will be required to report to the PRA on the risks to their business from climate change.
- From 2025, the Future Homes Standard will apply in England, with equivalent legislation in Wales, meaning new homes will need to emit 80% less carbon than current building regulations.
- It's clear that in order to meet the challenge of net -zero, more homes are going to have to be constructed using MMC.
- Principality Commercial's Green Development Fund. We expect the majority of properties built using the fund to utilise MMC in some way.
- As lenders look to improve the overall energy efficiency of their mortgage book, energy efficient MMC properties could become more attractive to lend against.
- Buy in from all stakeholders – lenders, valuers, other industry professionals and government – will be key.

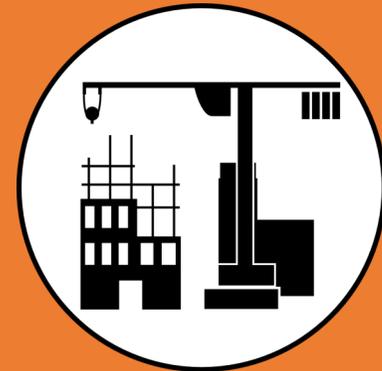


Any questions?

MMC

Global, local and future impact

Harriet Kennerley
Acuity Law



China - Wuhan

The global impact of MMC



Japan



Sweden

- The use of MMC varies significantly from country to country, but the global leaders historically have been Sweden and Japan.
- China, Wuhan – hospital built in just ten days to assist with the COVID 19 virus outbreak.
- Japan – global leaders, each year up to 180,000 new modular homes are manufactured in Japan (15-20% of all new housing)
- Sweden – a country that utilises MMC to build quickly due to the changeable climate.

Local impact of MMC – The Grange Hospital

- A major new hospital in Cwmbran, Wales opened 17 November 2020
- The hospital has been highlighted as a model which would help the UK to achieve Boris Johnson's aspirations to build 40 hospitals by 2030.
- Directly funded by the Welsh government, it is a happy story of a £350m hospital opening four months early, a first for a hospital of this size. It has also come in under budget.



The Future Generations Act – MMC



- Welsh Government led the world in legislating for sustainable development when they introduced the **Well-being of Future Generations (Wales) Act 2015 (Future Generations Act)**.
- Meeting obligations set out under the Future Generations Act – how MMC will help to reach these goals.
- Areas of reform which MMC assists:
 - the ongoing housing need;
 - climate change – MMC will assist Wales to meet net zero targets by 2050.
 - developing a safer, more resource efficient and technically skilled construction sector;
 - equipping local authorities/housing associations with support to create environments and communities that current/future generations will aspire to be part of; and
- Paving the way for the future.

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Any Questions?

LONDON | CARDIFF | SWANSEA | UAE

acuitylaw.com | +44 (0)333 016 3553

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