

AMBER

INTERNATIONAL PUBLIC PARTNERSHIPS

Investor Day – Liverpool Library



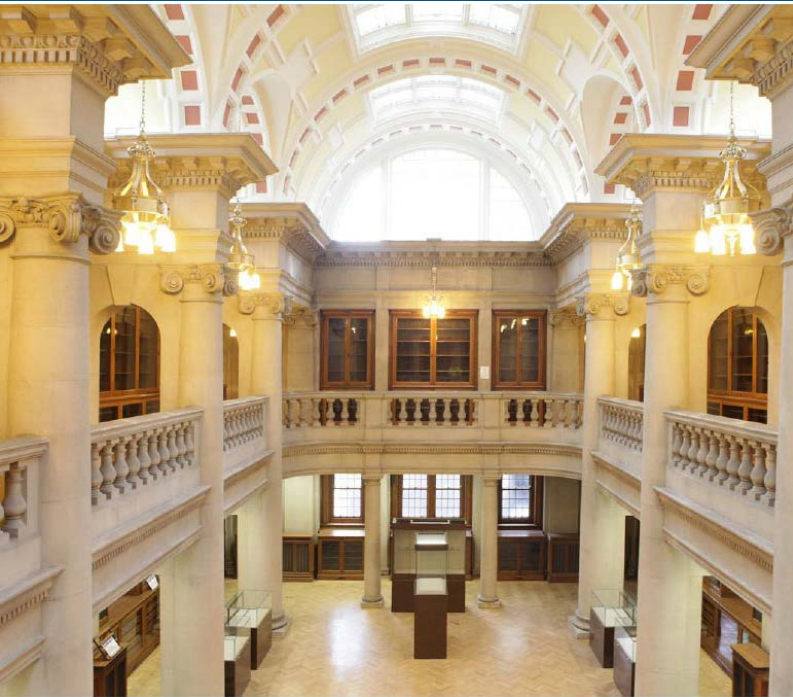
23 April 2013

Agenda

Time	Topic / Event	Speaker
11:00	Registration	
11:30	Presentations	
	Introduction / Welcome	Keith Dorrian
	Liverpool City Council	Joyce Little
	Amber – Project History – Bid Development	Mike Leto
	Austin Smith Lord Architects	Ben Aston
	Amber – Construction Completion and Asset Management	Ben Tanner
	Cofely - Facilities Management	Chris Lester
	Valuation	Jamie Hossain
	INPP Strategy and Plan	Giles Frost
	Q&As	
12:45 / 13:00	Lunch – Library Cafe	
13:45	Guided Tour	
14:45 / 15:00	Wrap up	Giles Frost
15:30	Close	

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Welcome

Keith Dorrian
International Public Partnerships

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Liverpool City Council

Joyce Little

Liverpool Central Library and Archive



Shepherd

Austin-Smith:Lord



Liverpool
City Council



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The City of Liverpool preserving our Cultural Heritage for the next generation



The Cultural Hub in the Heart of our City



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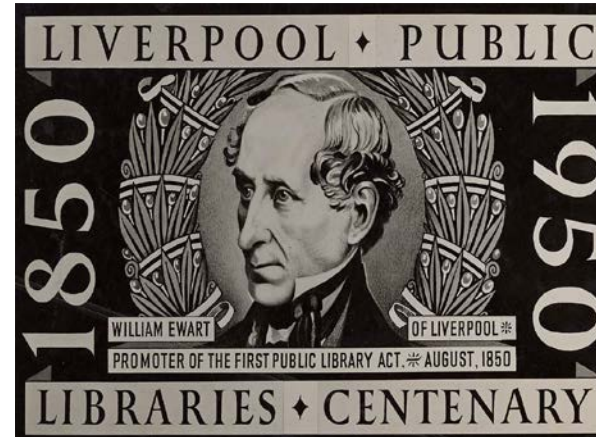
The Cultural Hub in the Heart of our City



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The Cultural Hub in the Heart of our City



Cultural Hub – Our Services

- > Book lending
- > Information
- > Local & Family History
- > Public computing
- > Archives
- > Exhibitions
- > Events
- > Meeting spaces
- > For all in the community



Cultural Hub – Our Collections

> The Hornby Library

9000 volumes, thousands of engravings and autograph letters



Cultural Hub – some of the rarest books in the world

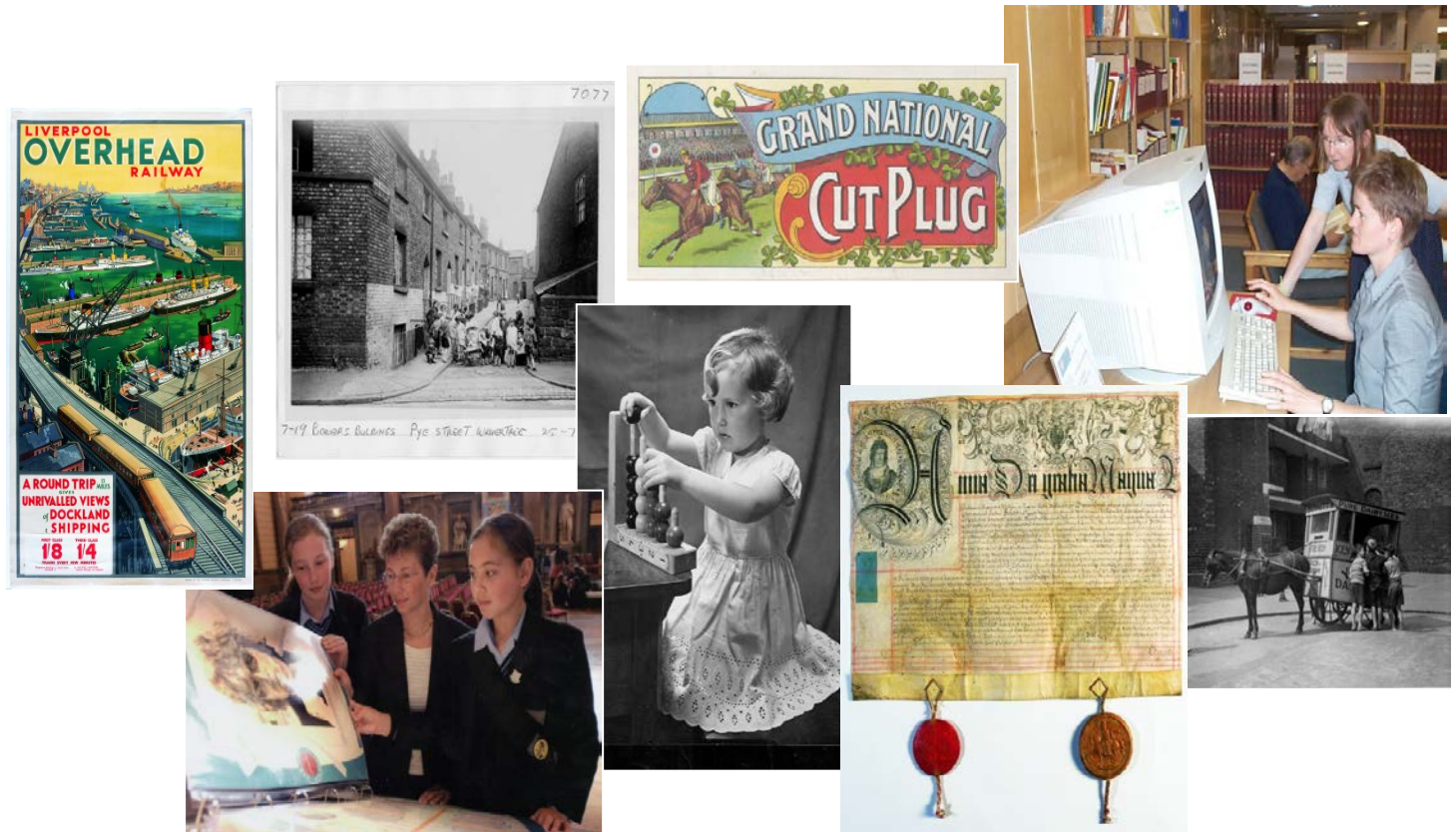
> The Oak Room

5000 rare and fine books
added to the City's collection
over the last 150 years



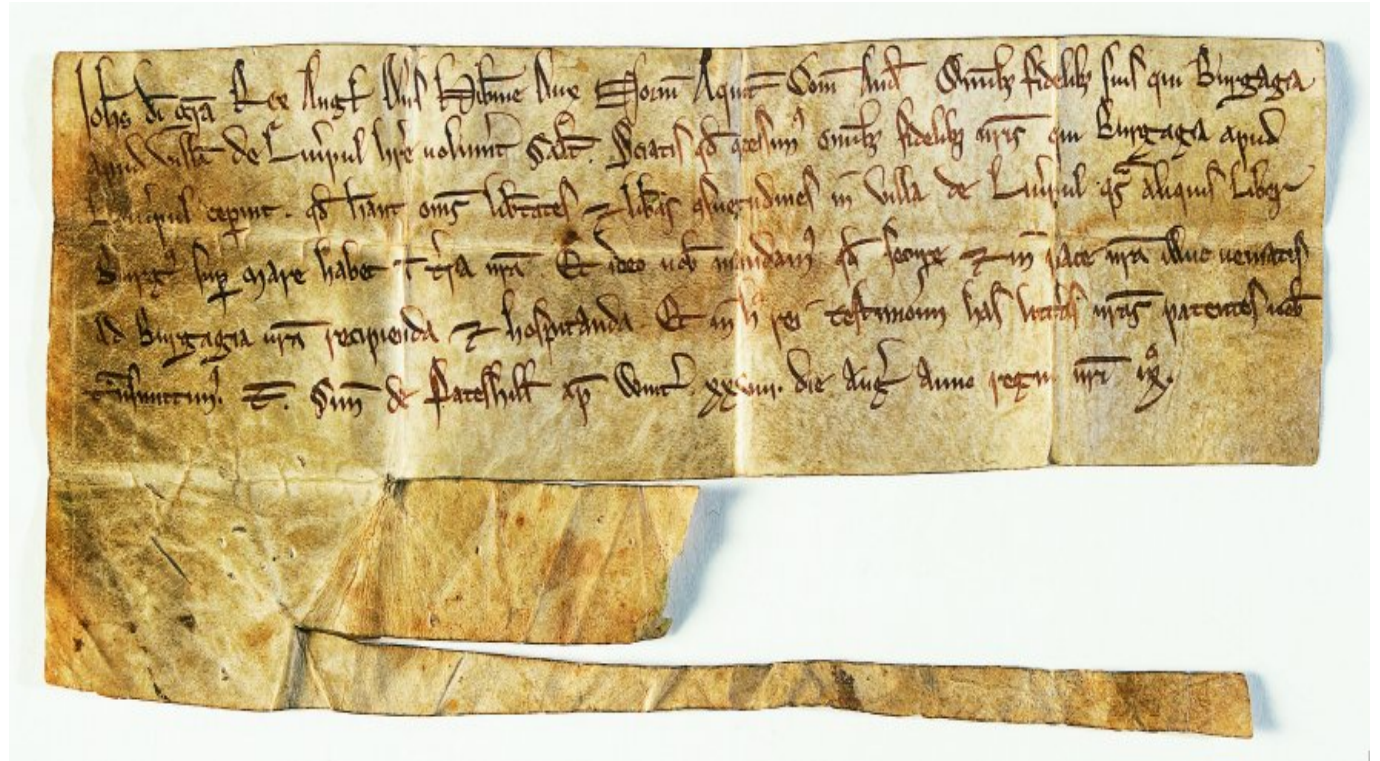
Cultural Hub – Liverpool Record Office

- > Extensive collections of local, national and international importance



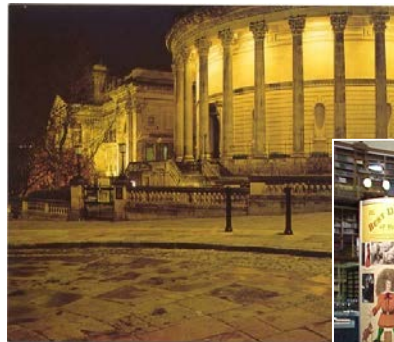
Cultural Hub – Liverpool Record Office

- > Collections start from the 12th Century and include the 1207 City Charter

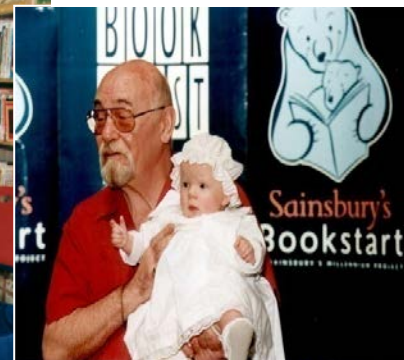


Core Principles of Redevelopment

- > Enhance the already iconic building and a new entrance on William Brown Street
- > Restore the historic fabric
- > A new archive store
- > Excellent visitor services
- > A showcase for 1m books and other items



New Services for our younger visitors



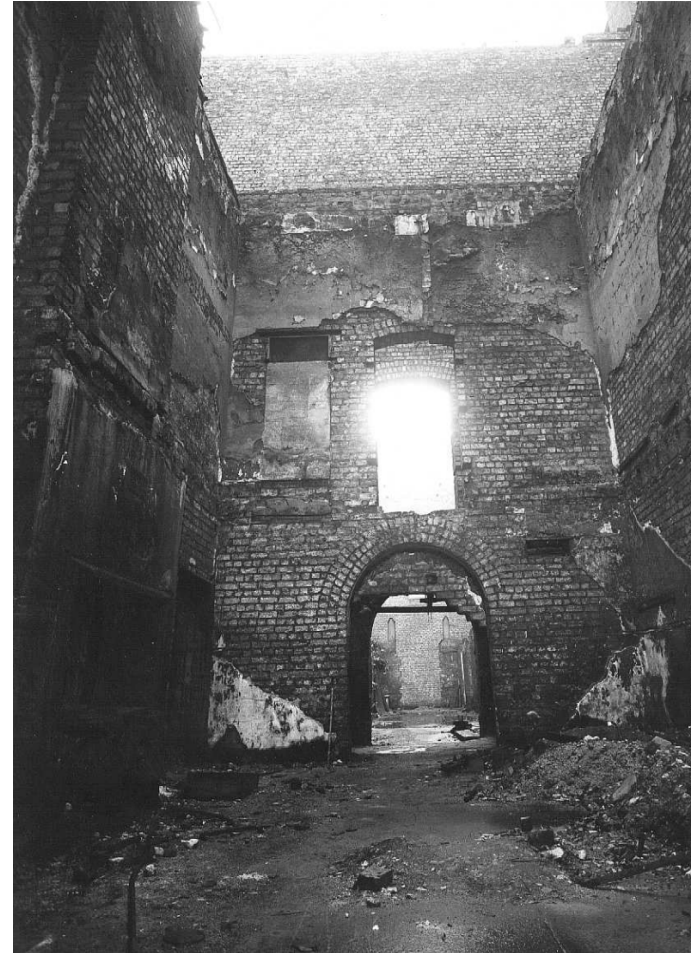


Project History – Bid Development

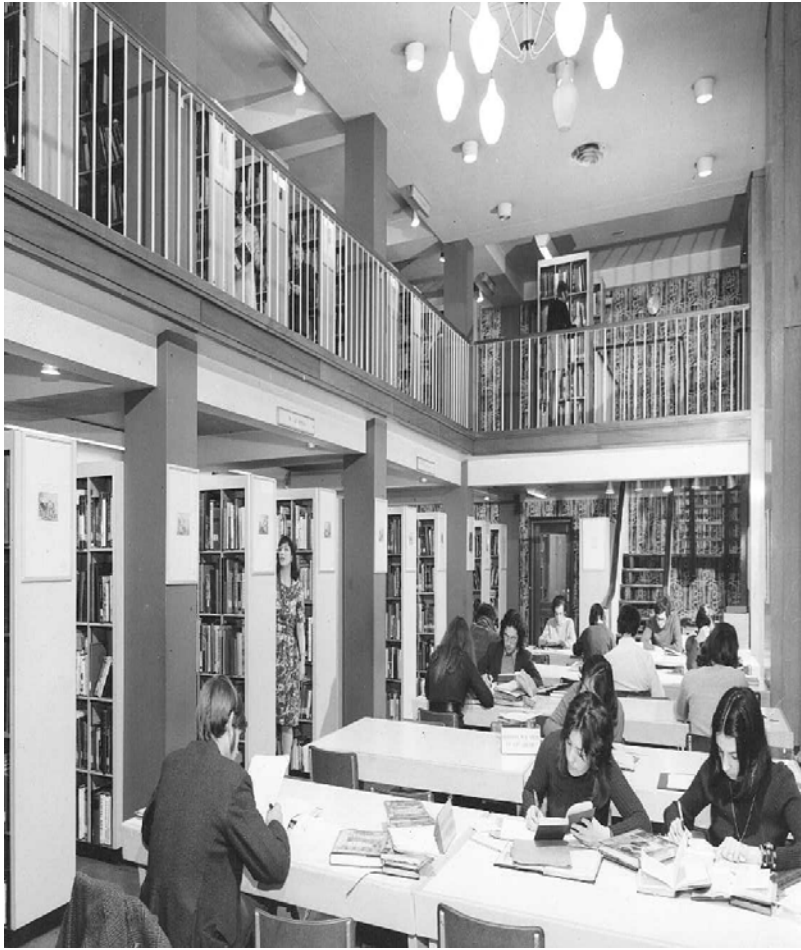
Mike Leto

Amber Infrastructure Limited

War Damage



Post War Library – as we found it!



Understanding of Project Objectives

- > Meetings with Joyce and her team commenced in 2006
- > The team was involved in an initial procurement process 2007-2008
- > Ongoing dialogue helped develop a clear understanding of client objectives;
 - Historic fabric in need of restoration
 - Inefficient M&E Services
 - Poor condition for archives
 - Non compliance with Disability Discrimination Act
 - Inadequate toilet & catering facilities
 - Confusing layout – not meeting the aspirations of a 21st century library



Authority's Project Management Framework

- > Project plan – clear aspirations
- > Affordability
- > Risk Management
- > Consultation
- > Project Board – good governance
- > Project Team – Liverpool City Council (LCC) Team & Advisors
- > Strong Business Case
- > Department for Culture, Media and Sport (DCMS), Treasury and LCC support.



Key Project Challenges

- > Listed Building / UNESCO world heritage site
- > Planning
- > Adjacent Museum & Art Gallery
- > Confined site
- > Risk associated with restoration works
- > Decant and recant risk



Selection of Team



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Sponsors, bid directors
and asset manager

Shepherd

Design & Construction

COFELY
GDF SUEZ

Facilities Management

Austin-Smith:Lord

Lead Architect

Competitive Dialogue Process

Stage	Time	Bidders
Issue OJEU	22 Nov 2008	
Prequalification	5 weeks	4
ITPD – Commence Dialogue	4 weeks	4
ITCD – Continue Dialogue	15 weeks	3
ITSFB – Submit Final Bids	10 weeks	2
Close Dialogue	30 July 2009	
Preferred Bidder	September 2009	1
Approvals, Planning, Final Business Case	36 weeks	
Contract Award / Financial Close	19 July 2010	

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Austin Smith Lord Architects

Ben Aston

Competitive Dialogue Process

- > Read thoroughly - read between the lines
- > Client contact time is important to develop a 'real' dialogue
- > Healthy paranoia – not too risky, not too safe
- > What are the Bid priorities and the Library's priorities
- > Adequate planning to meet deadlines

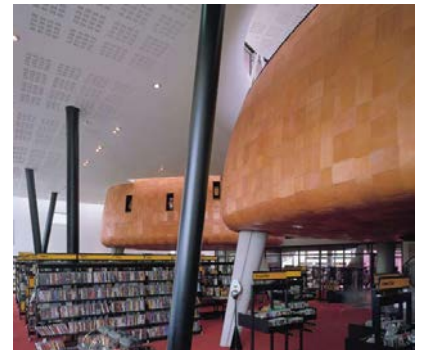
Competitive Bid Process for a Designer

The Right Team

Amber Infrastructure	‘Active’ Investors
Shepherd Construction	Bid leaders
Cofely	Facilities Management
Buro Happold	M&E Services Engineers
SES	‘Active’ M&E Subcontractor
Rory O’Connor	Civil & Structural Engineers
Buro Happold / FEDRA	Access and Fire Consultants
SRL	Acoustic Engineers
Tweeds/WYG	CDM Co-ordinators
William Anelay	Conservation Contractor
Austin-Smith:Lord	Architects, Conservation Architect, Landscape Architect & Interior Designers

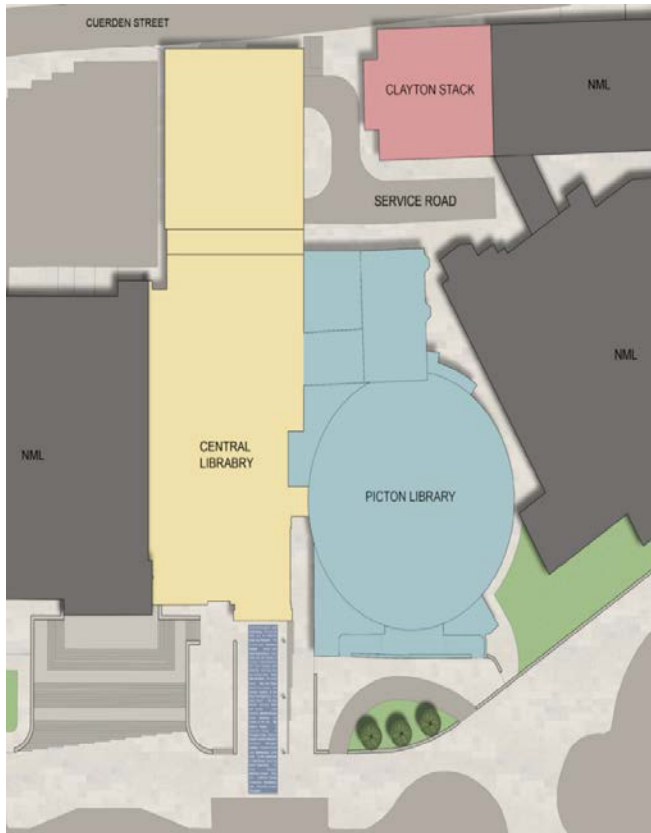
Key Issues and Challenges

- > Understanding the 'New Service Concept'
- > How should the library work: attitude, workflows, staffing, appearance
- > What is a 'World Class Library'? – 'wow' factor, civic space
- > Considering the reference scheme



Key Issues and Challenges

> Existing/site constraints



> Historic 'Listed' Rooms

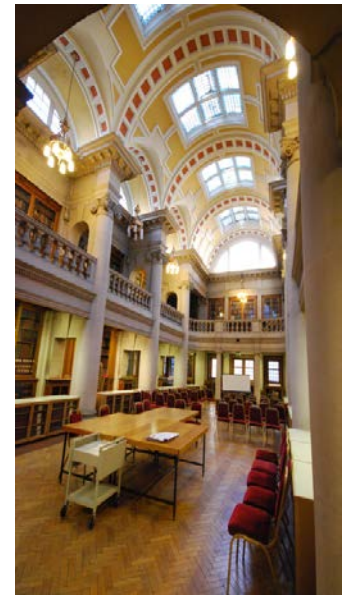
Pickton Library



Oak Room



Hornby Library

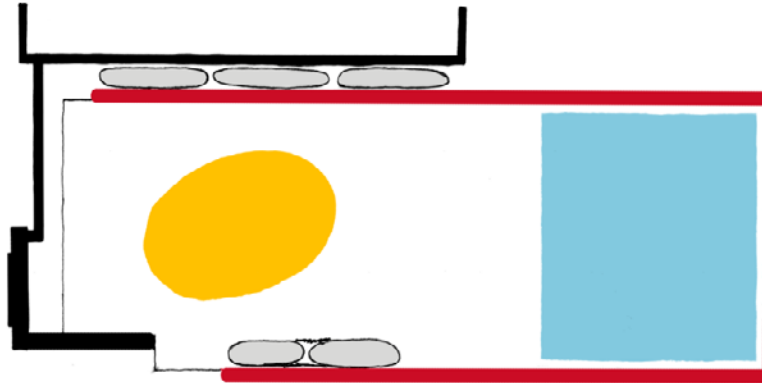


Developing a Design

- > Show the thought process
- > Use design to generate discussion
 - Engages the Client, encourages input and ownership of the design

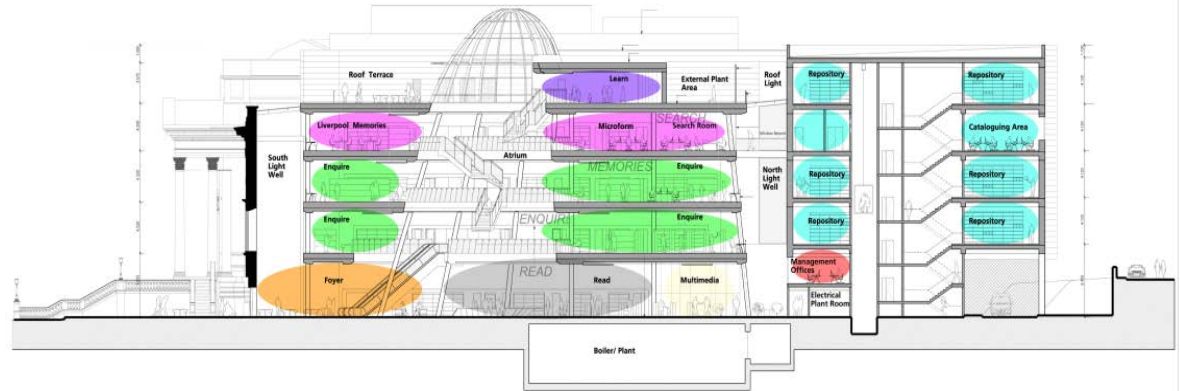
Developing a Design

- > Keep it simple
- > The best ideas can be illustrated simply
- > A simple design concept
- > Reaching a 'Big Idea' (and cover the minutiae)



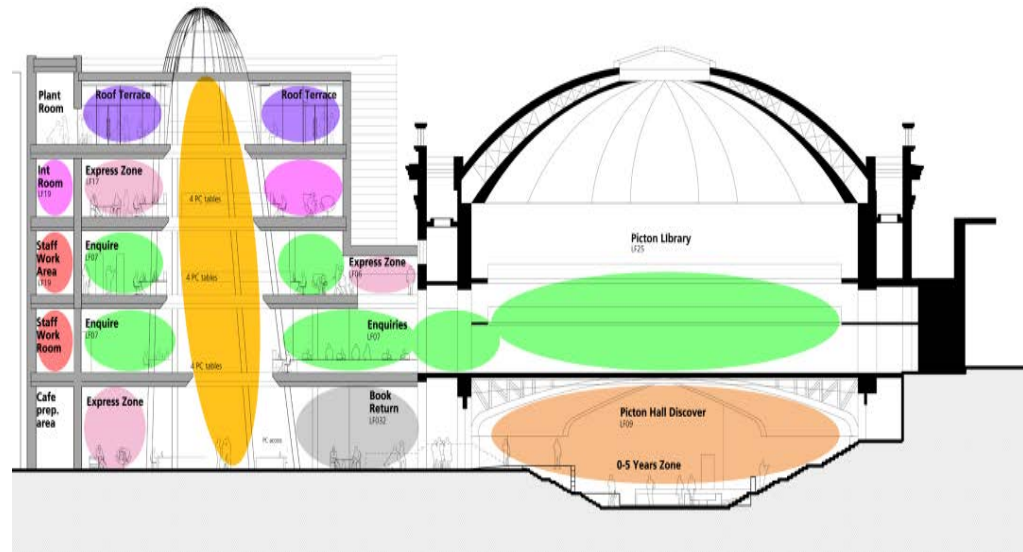
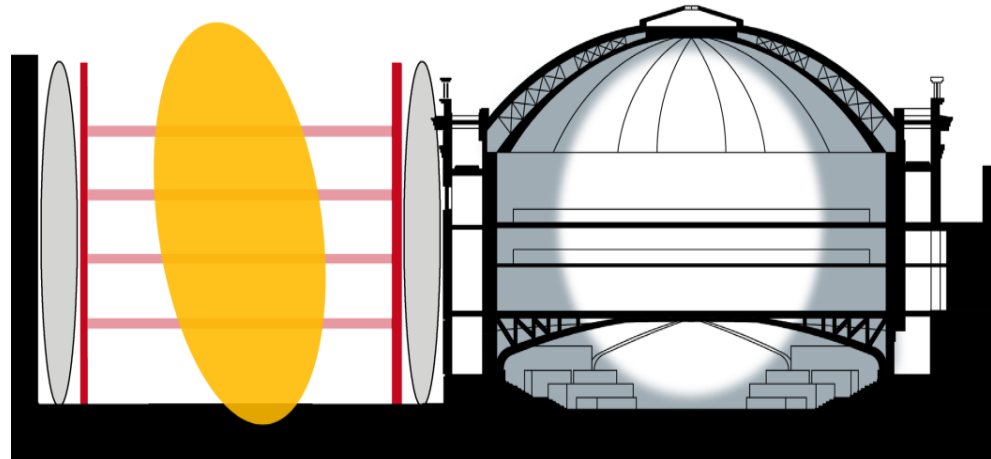
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Developing a Design

- > Reaching a 'Big Idea' (and cover the minutiae)
- > New Atrium – a space which works for the library and is an 'experience'



Developing a Design

- > Reaching a 'Big Idea' (and cover the minutiae)
- > New Atrium – a space which works for the library and is an 'experience'



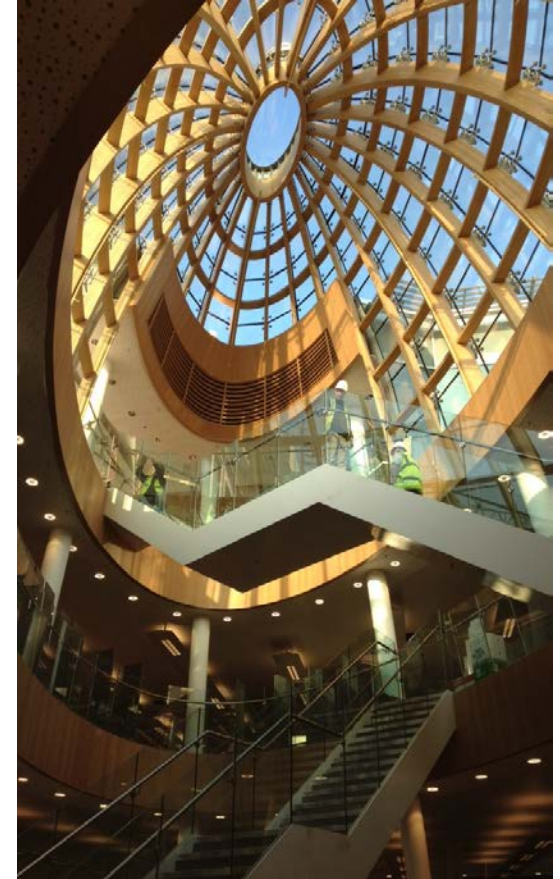
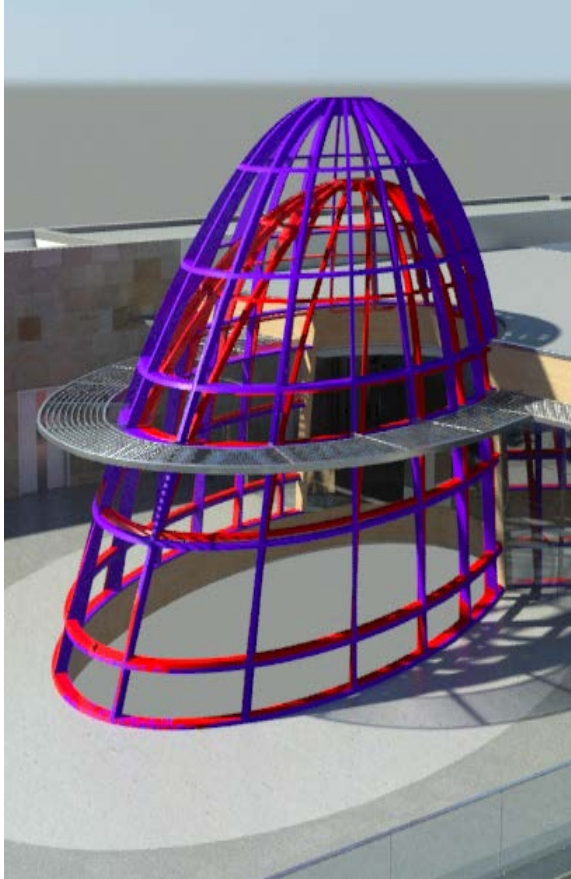
Developing a Design

- > Social space, circulation to top floor, roof terrace attraction
- > Learning /education opens out onto new roof terrace



Developing a Design

> Modelling the dome



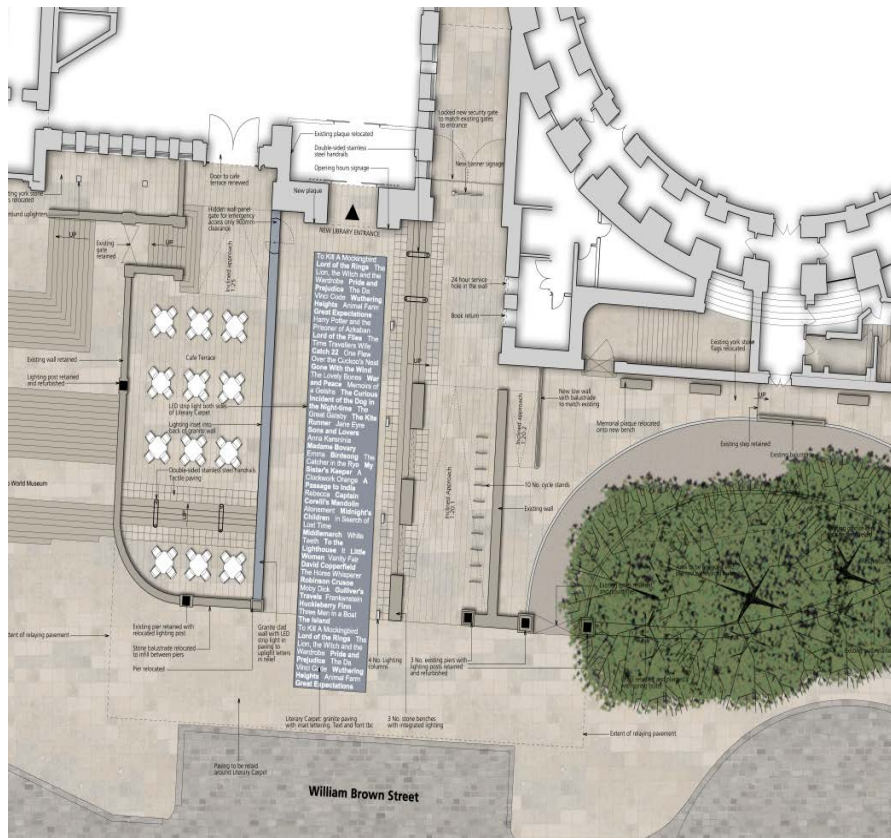
Developing a Design

- > Generate a consensus, moving from concept to detail
- > Consultation to 'Clear the way forward'
- > Demonstrate that future approvals can be achieved
- > Reduce the future risk - show the scheme can be delivered



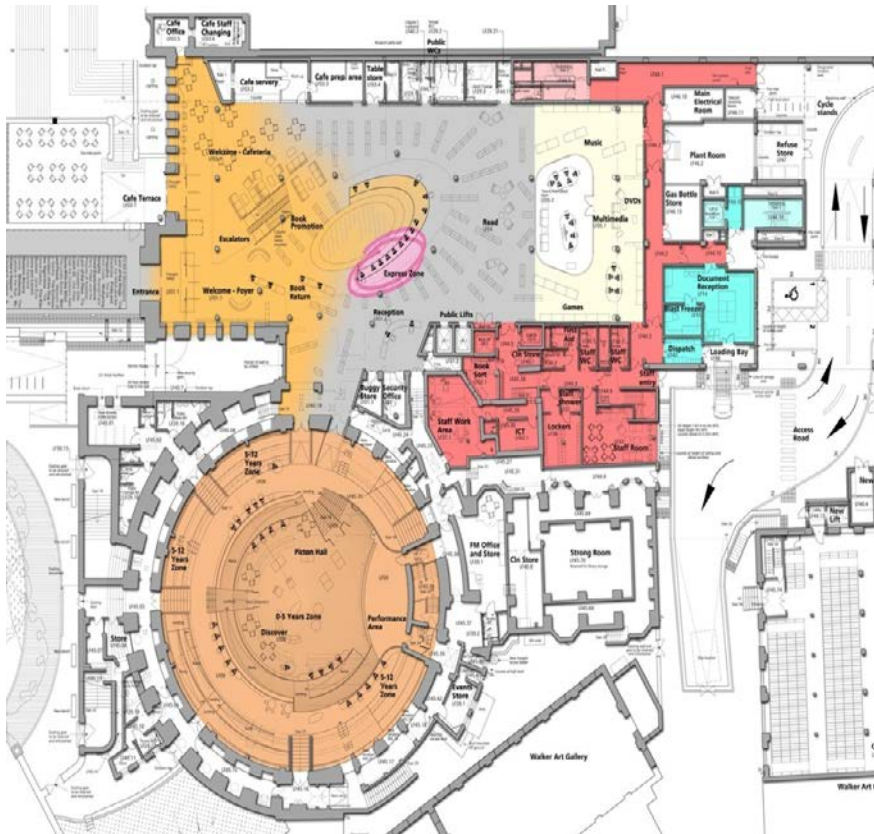
Design – Key challenges

- > New entrance and forecourt



Design – Key challenges

> Connections between new and Historic Rooms



Design – Key challenges

> Connections between new and Historic Rooms



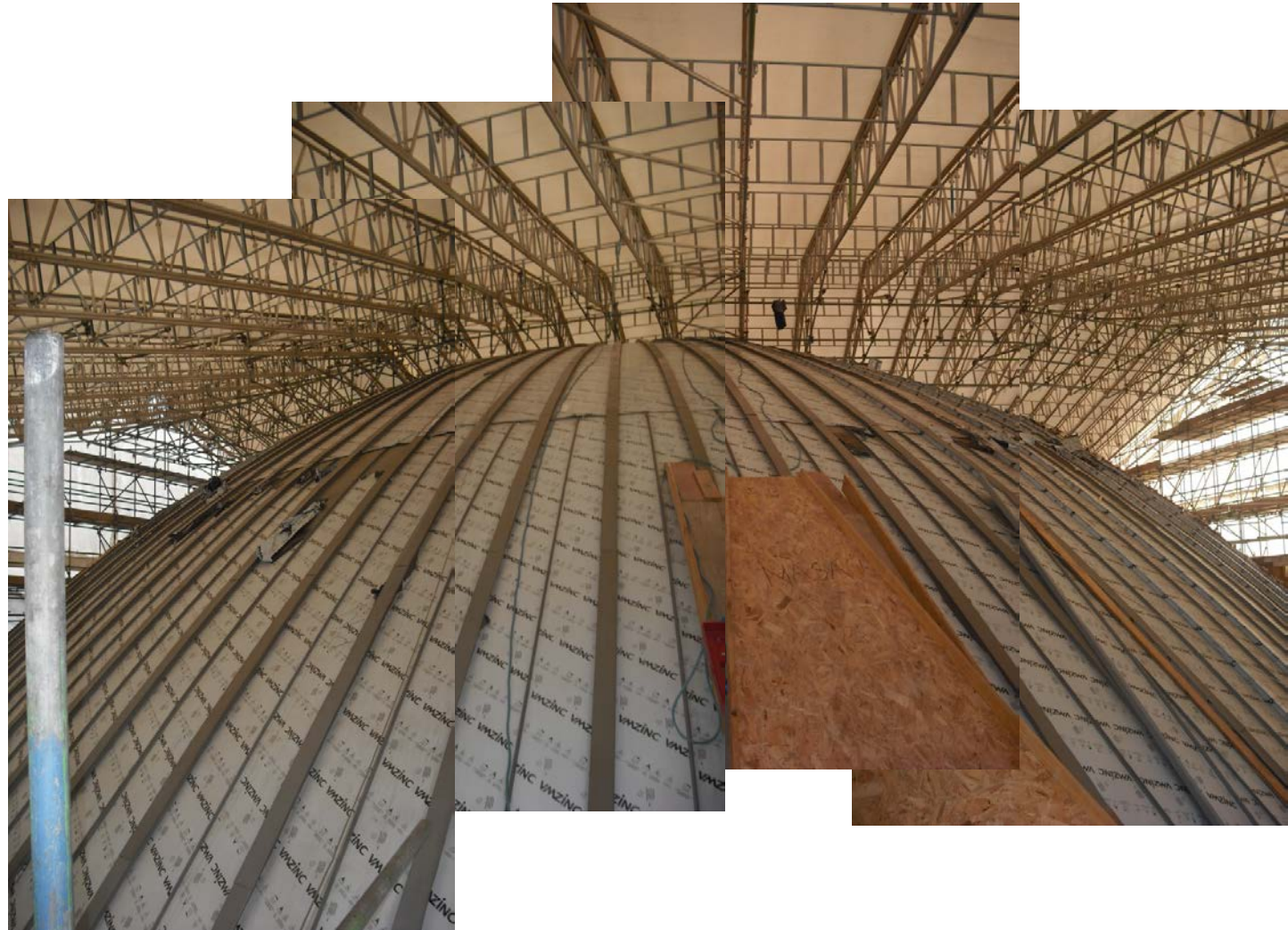
Design – Key challenges

- > Conversion of The International into a new Children's Library



Design – Key challenges

- > Historic Works
- > Archive to BS5454:2000
- > Designing for Facilities Management (27 years)
- > RDD - Reviewable Design Data



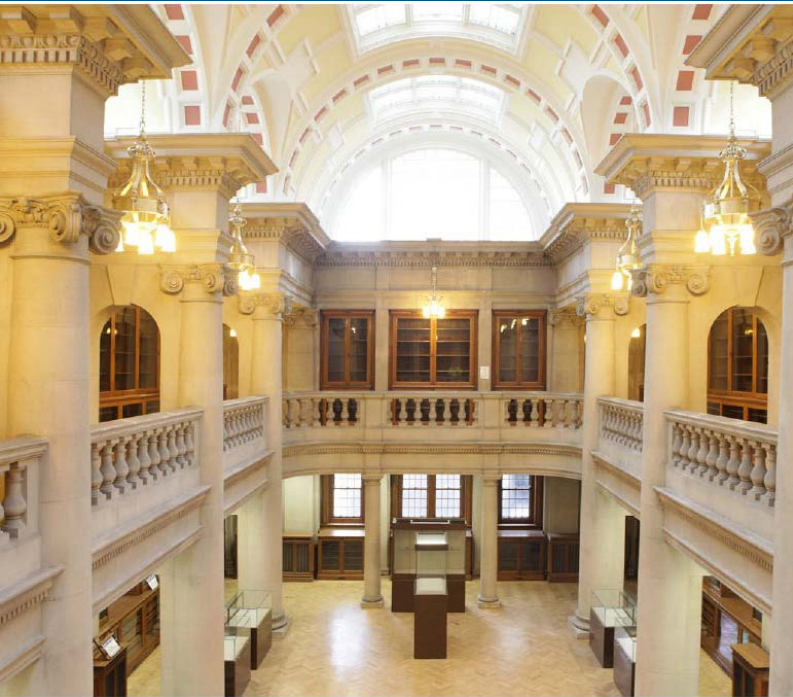
Final Proposals

- > Make sure you answer the questions!
- > A whole team bid – ensure multidisciplinary solutions
- > Track the dialogue process – show how issues have been concluded/resolved
- > Sense check - by someone not blinded by the detail



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Construction Completion & Asset Management

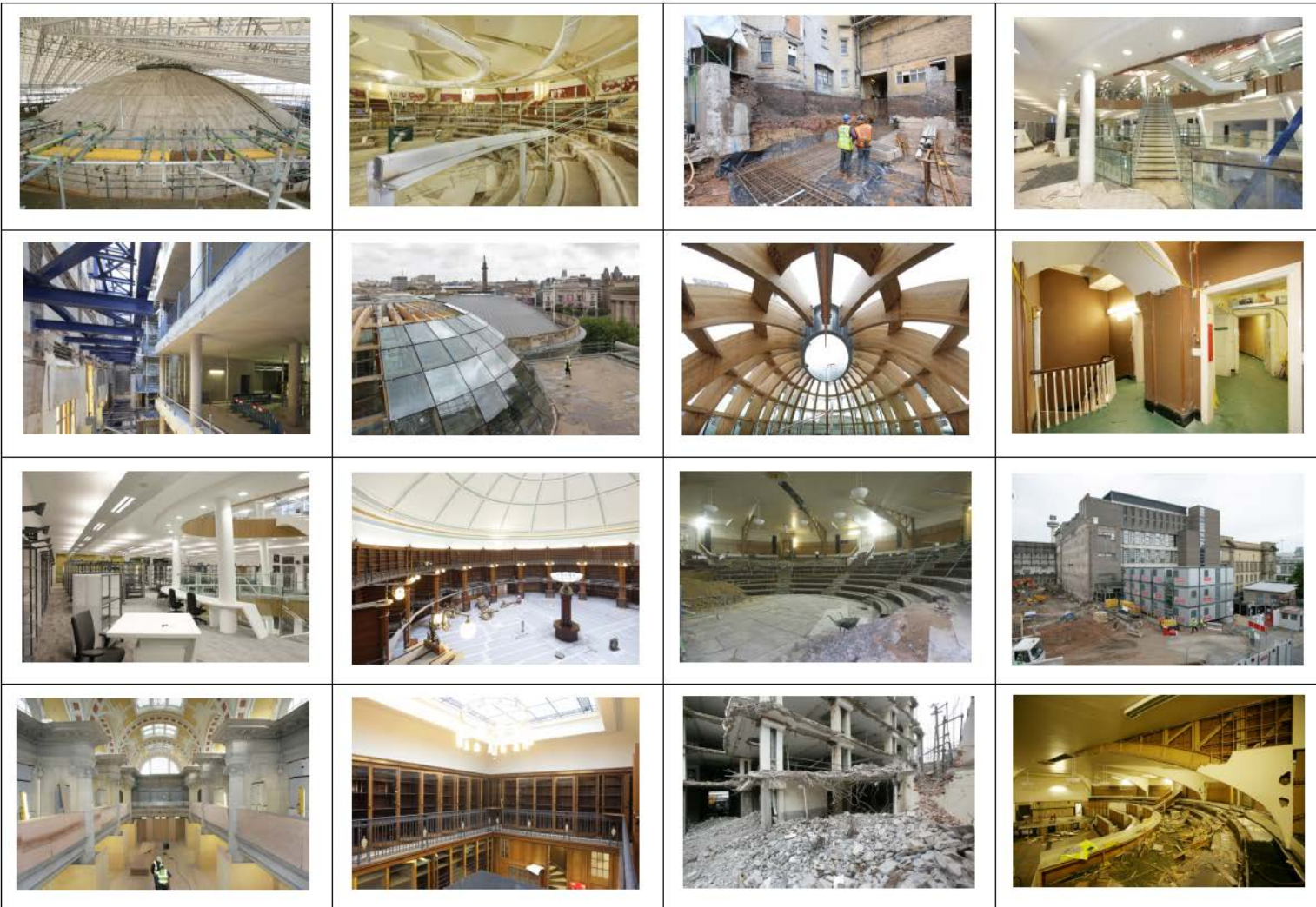
Ben Tanner

Amber Infrastructure Limited

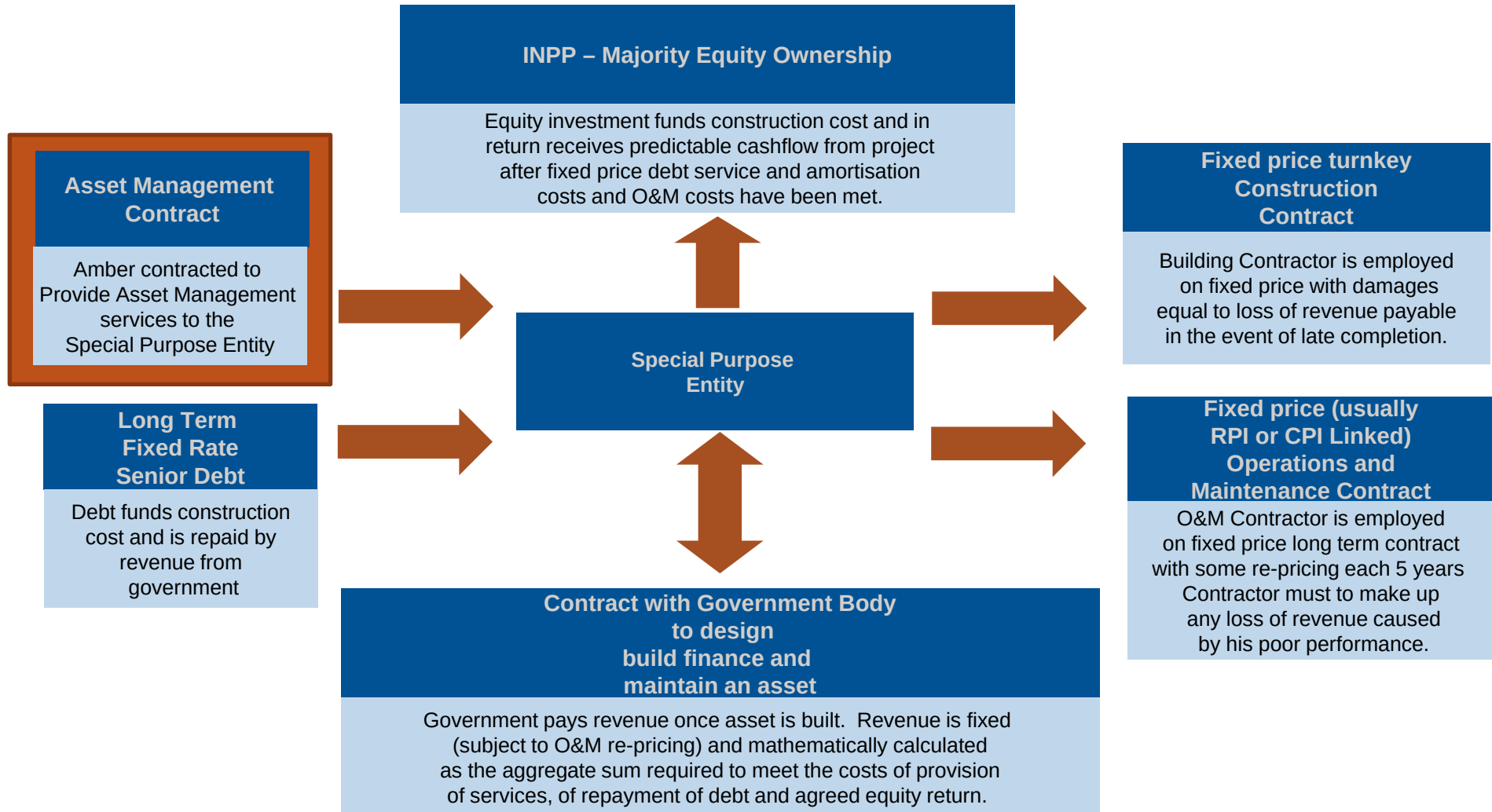
What Is A Successful Project ?

- > Within Budget
- > To The Required Programme
- > Reaching The Required Contracted Quality
- > Ensuring A Safe Working Environment For All Operatives
- > Maintaining / Enhancing Reputational Standing
- > No Defects / In Design Or Construction
- > No Disputes
- > Maintaining / Minimising The Risk Profile
- > Realising / enhancing Investment Returns
- > No surprises.....

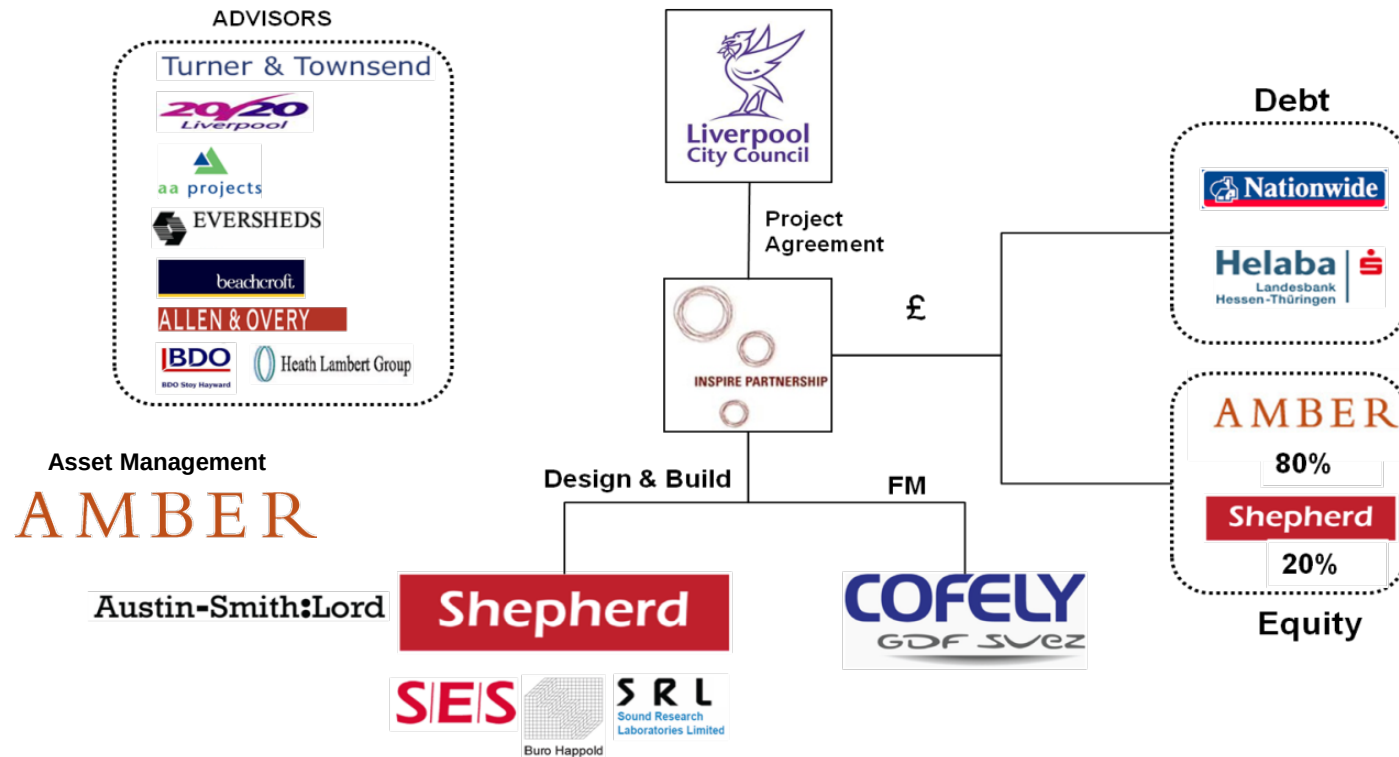
Construction Completion



The Operating Environment....



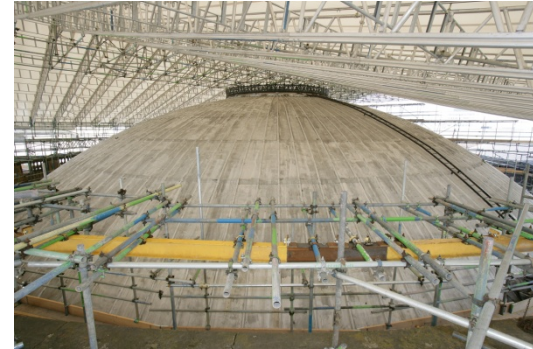
The Parties.....



- > Prevention Not Cure
- > Completion Focus Commenced & Communicated Pre Close
- > Service Availability At The Fore In All Stakeholders Decision Making
- > A True Collaboration

The Key Risks

- > Vibration Protocol
- > Authority Decant / Recant
- > Historic Fabric & Retained Elements
- > Counter Party
- > Specialist Design & Co-ordination
- > Structural Collapse / Major Failure
- > Loss of Irreplaceable Elements
- > Reputational
- > Interface Management
- > Completion Test Compliance



Interdisciplinary Management



Active Asset Management

- **Performance**

.....is to manage expectations and DELIVER the CONTRACTED OUTCOMES

- Multi Disciplinary Approach

‘The Amber Asset Manager – Interdisciplinary Manager of Projects’

Constructor, Facilities Manager, Architect, Engineer, Whole Life Cost Assessor, Compliance Assessor, Programmer, Auditor, Politician, Peace Maker, Lawyer, Modeller, Quantity Surveyor, Marketing, Insurance Advisor, Analyst, Accountant, Health & Safety Advisor..... Many more

....to deliver the PROJECT RETURN. No Surprises.

- **Out Performance**

..... is to deliver on core performance requirements whilst creating SUSTAINABLE long term RELATIONSHIPS, ADDING VALUE and ENHANCING RETURNS over model assumptions.

The Vision.....

5 – Key Drivers for Change

Committed leadership

Focus on the customer

Product Team Integration

Quality driven agenda

Commitment to people

4 – Key Project Processes

Product development

Partnering the supply chain

Product implementation

Production of components

7 – Key targets for improvement

Budget / WLC

Construction time

Predictability

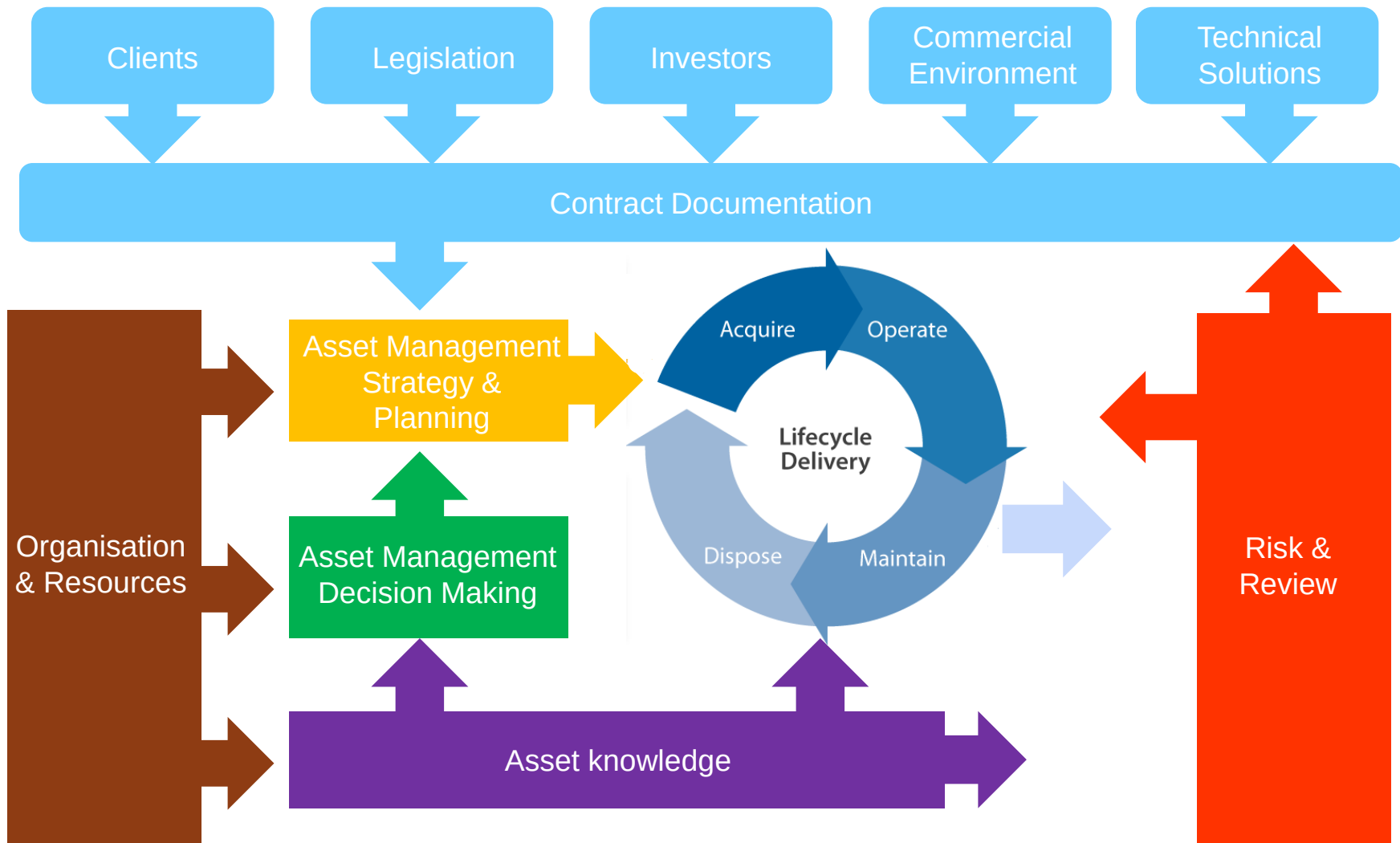
Defects

Accidents

Productivity

Returns

Asset Management Model



Adapted from Institute Asset Management Model

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Cofely

Chris Lester

How Cofely Got Involved

- > All stories have a start.....
 - Mike Leto & Simon Yates
 - British Library & V&A Museum
- > Invited to be part of the team
- > Develop an FM solution

The Collegiate Approach

- > Cofely work on and own a number of different scheme
 - Able to compare project approaches
 - Seen what works and what doesn't
- > Amber marked out by their inclusive culture and approach
 - Involving the parties from the start
 - Long term
 - Active management of their investments
 - Facilitate genuine partnership
 - Passion and commitment
- > Choosing the right partners
 - Shepherds, ASL & Buro Happold
 - Compass
 - Cofely!

Early Involvement

- > Inception to Delivery
- > Development of the FM solution & building design
- > Attendance of design meetings hosted by ASL & Shepherds
- > Support from Amber
 - Integrate lessons learnt from existing portfolio
 - Approved supplier list
 - Design Guide
 - Facilitation and negotiation of Interface Agreement
- > Active involvement in Reviewable Design Data process
- > Working with Buro Happold on the energy strategy

A Partner in Energy

> Energy Strategy

- Consumption Target
- Renewable solution
- Carbon Tax and Change Levee

> Energy Management

- Utility Tenders
- Efficient complicated buildings need expert management
- Long term improvements

> A Stable Energy Environment

- Risk was managed through close involvement and design influence
- Able to provide price certainty for the Initial Period

Mobilisation

> Mobilisation Meetings & Documentation

- Monthly and Ad-Hoc Mobilisation Meetings
- Nominated Removals Contractor (Andrew Porter)
- Revision of SDP's
- H&S: Fire Risk Assessment and Legionnaire provisions
- Site Manuals

> Recruitment Plan

- CRB Check procedure in place with HR
- Staff Appointments
- Company Induction Programme in place

> Commissioning

- Witness Commissioning
- Specialist Resources
- Working with the Independent Certifier

Decant & Recant

> Crucial work-stream for the Authority

- Security & Access Protocol
- Book stock is the main function of the library
- Building systems going live
- Achieving the right environmental conditions for the archived stock BS5454

> What we did

- Recant meetings prior to SAD
- Established a security management plan specifically for the recant period
- Separate entrances (for staff and subcontractors)
- Weekly progress meeting

> Completion

- Expected to be complete by Thursday 25th 2013
- Repository stack is complete
- Audubon Book installed

Preparing for the Public

> Cofely Staff Preparation

- Training including Customer Service, Fire Marshall & First Aid training
- Fire alarm protocol and testing
- Final deep clean including internal and external glazing

> Health and Safety

- Cofely SHEQ weekly attendance
- Assessing method statements
- Correct PPE
- Developed Cable Management Solution

> Partnering with Liverpool Central Library

- Work Place Risk Assessment developed in conjunction with the Authority
- Attendance with the Liverpool Cultural Committee meetings
- Working hand in glove with the Authority to fully understand the way the Authority want to work and use the facility

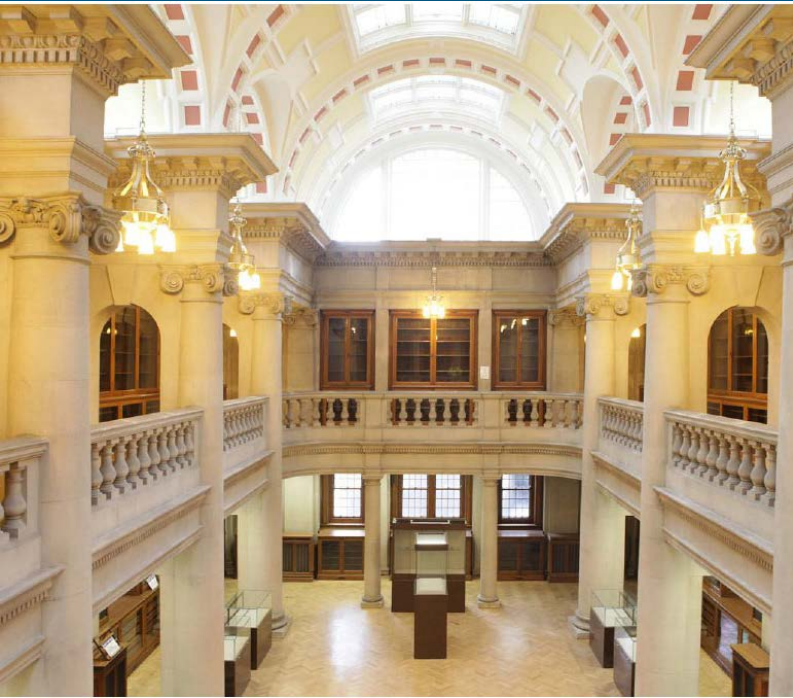
The Team

- > This may feel like the end of the journey..... but it is the start
- > Here are the people that will make that journey a success: The Facilities Manager Sue Griffin and her team



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Valuation

Jamie Hossain

Amber Infrastructure Limited

Approach to Valuation

NAV

- > INPP reports an investment NAV every six months
- > Uses discounted cash flow (DCF) methodology – suitable for long term, predictable cash flows
- > NAV is reviewed¹ by INPP's auditor EY every six months

Cash flows

- > INPP continues to report a 'base case' NAV which incorporates:

Included in INPP NAV	Excluded in INPP NAV
✓ Contracted revenue streams only	✗ No additional revenue from future variations or third party revenue
✓ Existing debt structures	✗ No additional revenue from future refinancing or regearing opportunities
✓ Long-term static inflation forecast of 2.5%	✗ No additional revenue as a result of higher inflation
✓ Existing portfolio composition	✗ No incremental growth from new acquisitions
✓ Static discount rate of 8.3%	✗ No portfolio derisking or future reductions in discount rates assumed until assets mature

¹ Estimated NAV is reviewed but not audited

Approach to Valuation

Discount Rates – two approaches utilised:

- > Build up approach to derive a risk-adjusted discount rate for each project

Risk Premium Considerations	Indicative Range (bps)	Notes
Government Bond Yield (Risk Free Rate)	x%	Country specific, similar to project maturity
Asset Premium	0 – 600	Underlying risk profile beyond investing in a gov't bond
Construction Premium	0 – 300	Unwinds over construction and defects liability period
FX Premium	0 – 100	Applied to international assets to reflect FX risks
Material Asset Premium	0 – 50	Materiality of asset cash flows and value to the portfolio
Minority Lack of Control Premium	0 – 100	Reflects risk of reduced influence in day to day management
Total Discount Rate	= x%	

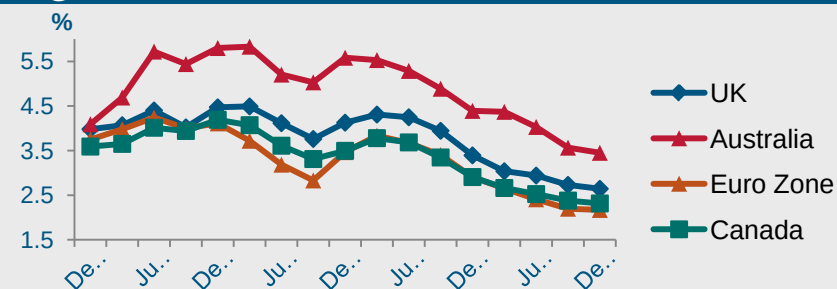
- > Market based evidence

- Discount rate build up benchmarked with rates and valuations observed in the market

Market Volatility Premium

Reduction in government bond yields not entirely observed in market prices

Long Term Govt Bond Rate

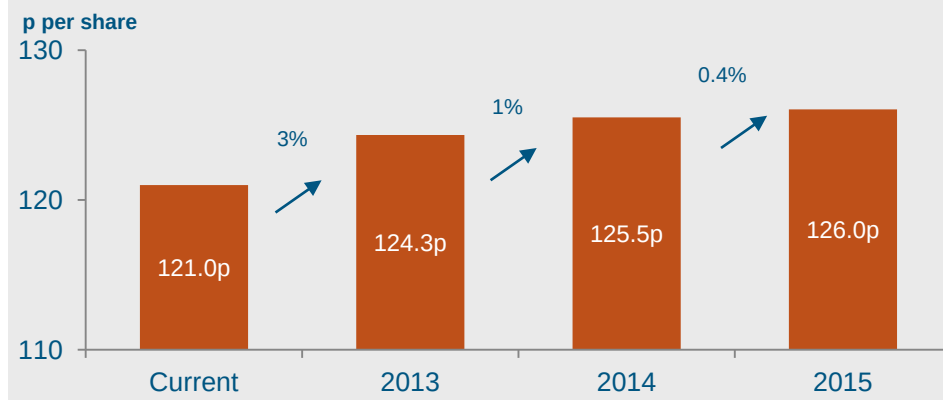


Approach to Valuation

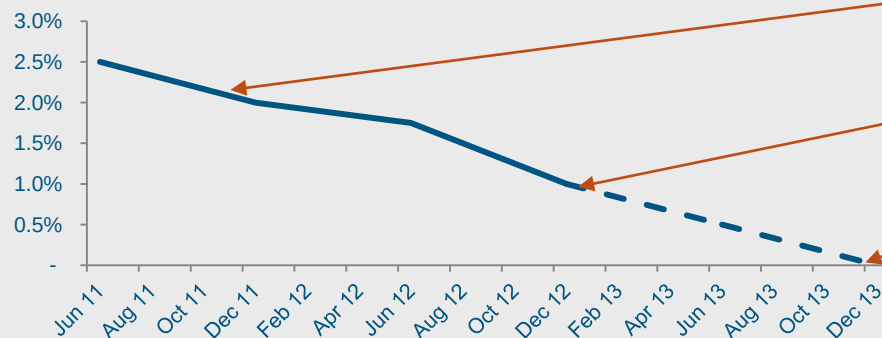
Construction Risk Premium

- > Risks mitigated through contracts and active management
- > But not all risk can be mitigated
- > Considerations for construction risk premium:
 - > Size and complexity
 - > Length
 - > Contractor

Illustrative Projected NAV Growth from De-risking



Liverpool Library Construction Risk Premium



Project progresses through high risk work stages and into lower risk 'fit out' and finishing activities

Service availability achieved and Unitary Charge payment commences (100%)

End of 12 month construction defect liability period (DLP)

Reduction in Liverpool Library construction risk premium has increased valuation by c.30%

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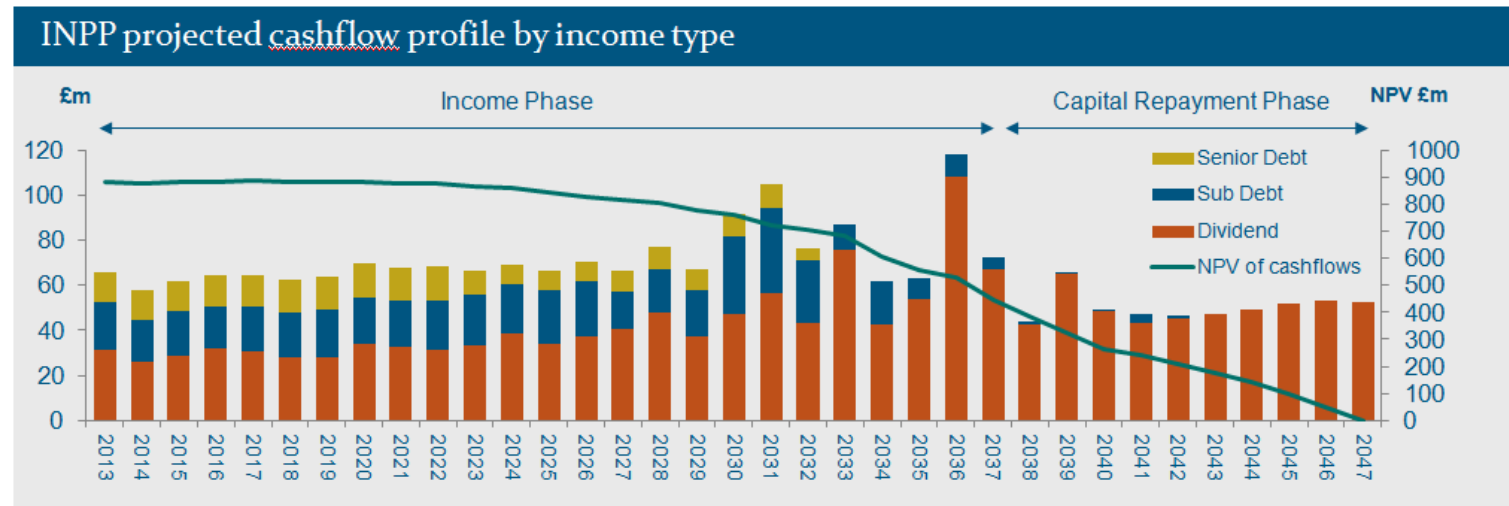
INPP Strategy & Plan

Giles Frost

Amber Infrastructure Limited

INPP Strategy

- > To provide long term sustainable and growing dividends to investors
- > To provide returns that are not correlated to wider economic markets or to GDP changes
- > Dividends sourced from well structured public private partnerships with highly creditworthy public sector bodies
- > Revenues dependent principally on the availability of the asset not the demand for the asset
- > To seek maximum protection from future inflation
- > To benefit from the international flow of infrastructure opportunities while avoiding political risk



INPP Strategy

- > Revenues sourced from a significant and diverse portfolio of assets in the UK and overseas
- > Over 120 individual assets in INPP's portfolio
- > Very experienced team of asset managers both in UK and overseas – over £2bn of transactions successfully managed through from construction to operational phase
- > Significant inflation linkage in revenues from most investments
- > Majority of assets “self sourced” (for instance Liverpool Library)
- > Antipathy to auctions save where strong strategic or other synergetic justifications exist
- > Significant access to new opportunities and sectors through the asset origination capabilities of Amber Infrastructure
- > The best assets often have very long gestation periods – most funds and managers have shorter term outlook

The Outlook for Infrastructure

- > Infrastructure investment continues to gain traction amongst a diverse range of investors with both institutional and private increasing allocations to the sector
- > Governments continue to encourage private sector investment in to the sector
 - UK government – initiatives include £250bn National Infrastructure Plan and £40bn infrastructure guarantees
 - Australia – calls for reform including government/private sector co-funding on nationally significant PPP projects
- > Most future infrastructure projects likely to be financed with private sector capital
- > Issues that were ‘overhanging’ the sector have been resolved during the year and are overall positive:
 1. UK government’s announcement of “PF2” positive for the sector
 - Continues to encourage private sector involvement in provision of public infrastructure, balanced by greater government equity participation in projects – similar to NHS LIFT and BSF models – which INPP is familiar with
 - Should see backlog of schemes starting to be delivered although extent of new schemes remains unclear
 - No retrospective changes announced
 2. Office of National Statistics review of RPI calculation methodology are favourably resolved with no changes
- > Increased competitive pressures likely to reward those investment funds who can access opportunities in new markets – eg offshore transmission cables

Future Plans

- > Early identification of new areas for potential investment and proprietary pipeline by Amber is beneficial and a key differentiator for INPP
- > INPP will continue to be disciplined in its approach to auction-based processes
- > Any shortfall in traditional PPP/PFI pipeline is likely to be offset by opportunities in utilities (including transmission), community health infrastructure, additional “follow on” investments and overseas investments

Opportunity	Comments
INPP has a strong position in UK offshore transmission and will look to develop this further in 2013	> Currently preferred bidder on a fifth OFTO project > Shortlisted for another project under first tranche of second round tenders
Strong pre-emptive positions and follow-on investment opportunities	> Building Schools for the Future Investment – c.£300m of pre-emptive rights on residual portfolio and other follow-on investment > Other investment opportunities also provide pre-emption opportunities
Wider regulated utility market both in the UK and elsewhere	> Offers attractive returns from assets with low risk profiles (i.e. interconnectors) where developments in the utility industry are likely to provide a good pipeline of opportunities
UK health and social care infrastructure	> Active pipeline of small to medium sized opportunities continue to exist
Re-pricing of capital in the debt capital markets	> Opportunity to benefit from enhanced RPI linked revenues and invest across the capital structure
Social infrastructure projects Germany, Canada, Ireland, Australia and other international markets	> Opportunities exist which match INPP's existing risk including government accommodation, education and health
Expect steady flow of opportunities in existing infrastructure projects/secondary sales	> Construction companies and others with shorter investment horizon continue to divest mature assets > Banks continue to divest non-core assets

Pipeline Opportunities

- > Amber is bidding on, developing, or in discussions in relation to, a number of other projects with aggregate estimated capital value in excess of £2.0bn¹
- > Over £200m (equity value) of opportunities at “preferred bidder” stage and likely to be invested in by INPP in the course of 2013²

Project	Location	Investment/ Gross Capital Value ¹ (est.)	Expected Concession Length	Project Description
BMBF	Germany	£80m	27 years	Construction and operation of new office facilities for the Federal German Ministry of Education and Research in Berlin. Preferred bidder – currently under construction.
OFTOs - Lincs	UK	£360m	20 years	Consortium including INPP named preferred bidder on the Lincs OFTO, North Sea
Healthcare projects	UK	£50m	25 years	Two community health projects in the UK. Preferred bidder status.
Various medium-term pre-emption opportunities	UK and Belgium	c.£300m (equity value)	25 years	Company has the benefit of short medium and long term pre-emption opportunities in respect of a number of projects within the existing portfolio
OFTOs	UK	£650m	20 years	Consortium including INPP shortlisted for several Round 2 OFTO transactions
Offshore transmission	Europe	£400m	20 years	Developing bids for European transmission cables
Hospital	Germany	£290m	27 years	Short listed for bidding a design, build , finance and operate hospital in Germany
Hub	Scotland	£50m	27 years	Developing various scheme under the Hub framework
Education	Scotland	£40m	27 years	Short listed for BAFO on college facility in Scotland

1. Represents opportunities currently under review by Amber Infrastructure Group including current bids, preferred bidder opportunities and estimated value of opportunities to acquire additional investments under pre-emption/first refusal rights. There is no certainty these will translate to investment opportunities for INPP. The value referenced in relation to the pre-emption opportunities represents the potential investment value which reflect the current unaudited estimate of the total likely acquisition price at the time of investment. In relation to the remaining assets, the figure represents the current unaudited gross value of the relevant project and therefore includes both debt and equity and is not necessarily indicative of the eventual acquisition price for, or the value of, any interest that may be acquired.
2. Subject to due diligence etc. There is no certainty such assets will be acquired by INPP

AMBER

INTERNATIONAL PUBLIC PARTNERSHIPS



Q&A's

The Directors
International Public Partnerships

Investment Advisors
Amber Infrastructure Limited

AMBER

INTERNATIONAL PUBLIC PARTNERSHIPS

Lunch



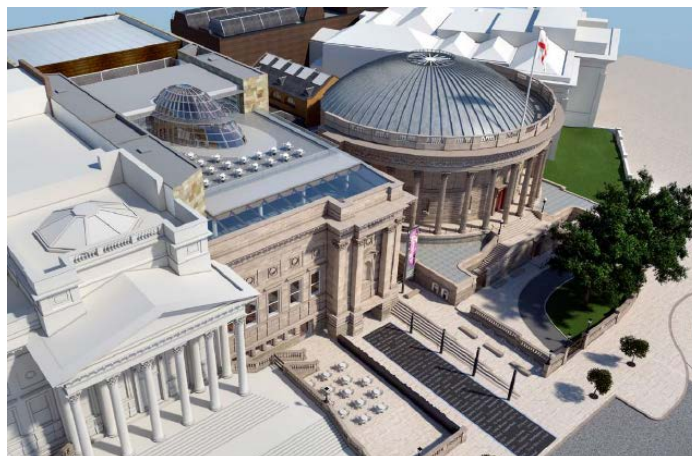
AMBER

INTERNATIONAL PUBLIC PARTNERSHIPS



Full presentations will be available online at
www.internationalpublicpartnerships.com

LIVERPOOL CENTRAL LIBRARY AND ARCHIVE STORE



KEY INFORMATION

Client:	Liverpool City Council/ Liverpool Libraries & Information Services
Contract Value:	£50m
Construction Period:	108 weeks
Start on Site:	8 th November 2010
Public Opening:	17 th May 2013
M ² :	12,583m ² (approx. 8,200m ² new build and 4,500m ² historic refurb)
Contract type:	PFI
BREEAM:	'Very Good'
RIBA Stage involvement	All stages

KEY PARTIES

SPV:	Inspire Partnership
End User:	Liverpool City Council
Main Contractor:	Shepherd Construction
Architect (inc Conservation/Landscaping/Interior):	Austin-Smith Lord
Building Services Engineers:	Buro Happold
Mechanical & Electrical:	SES
Civil & Structural Engineers:	RoC Consulting
Access & Fire Consultants:	Buro Happold/FEDRA
Acoustic Engineers:	SRL
CDM Coordinators:	Tweeds
Facilities Management:	Cofely
Independent Certifier:	AA Projects
Employers Agent:	Turner & Townsend
Asset Management:	Amber Asset Management

AWARDS TO DATE

2012 Considerate Constructor Bronze Award

2012 Considerate Constructor Performance Beyond Compliance Certificate

2013 Short listed For LABC Regional Awards, on-going

PROJECT OVERVIEW

Providing a 'World Class' serviced accommodation capable of supporting the Central Library and Archive Service Concept into 2012 and beyond.

Works include the demolition of the existing Brown Library and its extension, the construction of a new five-storey Library (concrete post tensioned frame) behind a retained historic façade and the restoration and conservation of the remaining Grade II* listed buildings. New construction is approximately 8,000m² and refurbishment to retained areas approximately 4,500m².

The main focus of the refurbishment works was uncovering and restoring the original fabric, and where required, incorporating new design features to make better use of the space coupled with greater accessibility.

Key interface areas between new build and restoration include the façade retention scheme, party wall restraint system with the World Museum Liverpool, as built interface between the current library and restoration areas and the associated deconstruction methodology.

In addition a vibration monitoring protocol was developed and put in place throughout the project development.

In summary the project includes:

- Demolition of the existing 1950's Brown Library and the 1978 eight-storey extension between the Walker Art Gallery and National Museum Liverpool (NML).
- Construction of a new five storey library behind a retained historic façade with new entrance on William Brown Street, a new central atrium with large domed cap, new rear vehicle entrance to a new five storey archive and a specialist repository with space saving mobile shelving at the rear to replace the demolished buildings to house the 'Treasures of Liverpool', archives and rare books
- Restoration of the historic Picton Library, Hornby Library and the Oak Room.
- Refurbishment of the Clayton Stack Storage area.
- The provision of new furniture and equipment.

NOTABLE ACHIEVEMENTS/CHALLENGES

- Delivering a best value for money solution, which included a greater level of public to private sector risk transfer than client advisors initially thought possible or bankable.
- Establishing a partnership with key local conservation specialists and designers to enable a coordinated value for money proposal that would meet the strict PFI performance and programme standards.
- The intricacies of restoring a Grade II* listed building involved seeking numerous planning consents signed-off by a conservation officer.
- Successfully negotiating sympathetic alterations with key third party stakeholders (English Heritage, the Victorian Society and Liverpool Planning Authority) to the existing fabric, whilst also decommissioning, restoring and reinstalling significant existing features and fittings.
- Coordinating phased decanting operations with the Library Services to ensure asbestos removal programme and associated survey and health & safety risks (non-intrusive type 2 versus intrusive type 3) did not compromise the scheme's overall completion.
- Strict vibration protocols and party wall considerations during the demolition phase.

- The repository was built to the latest British Standards for Repository and Archive storage BS5454. For long-term preservation, gas suppression ensures that the internal environment can be controlled to protect priceless collections (maintained in a steady state). M&E partner Shepherd Engineering Services (SES) designed a modular system solution and the structure was built to extremely tight tolerances to ensure a constant temperature and level of ventilation and humidity can be maintained.
- The roof section of the existing building including the Picton Library dome presented a considerable challenge as the temporary roof scaffold had to allow extensive specialist restoration work to be carried out and therefore a clear span was needed. A bespoke solution was created by HT Scaffolding.
- The nature of the internal building ruled out using equipment such as Mobile Elevated Working Platforms (MEWPs) and cherry pickers. Therefore alternative strategies had to be put in place using temporary works structured scaffolding.
- SES manufactured more than 60% of its components in a factory setting using its off-site facility, PRISM in a bid to reduce its carbon footprint and protect the original features of the building.
- The use of Building Management Systems (BMS) aided the achievement of a BREEAM 'Very Good' rating. The BMS is linked to meters which monitor the consumption of water/gas electricity etc. This allows the consumption levels to be fully monitored and if required adjusted to maintain energy levels/changes in the use of the building e.g. when the building is shut to the public.

KEY FACTS

Liverpool was one of two major Library Central developments opened in 2013 and the largest standalone library development undertaken in the UK in 2012.

Background Information

Liverpool Central Library is one of the largest archive centres outside of London. There are 14kms of archives housed in the library. The library expects to receive 800,000 visitors per annum.

The library is located in the city's Cultural Quarter on William Brown Street within a UNESCO World Heritage location, an area dominated by several neo-classical buildings including the Walker Art Gallery, National Museum Liverpool and the world famous Grade I-listed St George's Hall.

It comprises a number of buildings, that have been added to over the decades. The first, the William Brown Library and Museum, completed in 1860, stretches along the main William Brown Street frontage and is shared with the World Museum Liverpool. In 1875, this was extended on the eastern side to create the Picton Reading Room, designed by Cornelius Sherlock to mirror the rotunda of the British Museum in London. Then, in 1906, the Hornby Library was added to the north. All three buildings are Grade II* listed and built in the neo-classical style. The adjoining Oak Room was built in 1914.

Bombing during the Second World War meant that much of the William Brown Library and Museum was destroyed, apart from the facade, which still stands, and this was rebuilt and extended in the 1950s and 1970s.

In the new refurbishment historic areas will be renovated or restored, and the 1950's/1970's buildings will be replaced.

The new refurbishment has brought space back into the public realm:

- The developer has linked with a cafe franchise (Compass), bringing a 21st century feel with game/teenagers area/children's discovery area.
- The number of public access computers has doubled.
- The restoration of the Hornby library and Oak Room has opened up the rooms for public viewing/use – previously the rooms were only accessible by appointment only.

- In the International Picton Hall area, the windows had been bricked up since the area was used as a cinema. These were opened up and with the atrium in the centre means that the library is now flooded with light. Original girders and Balustrades were also uncovered.

The new look Central Library includes:

- New entrance to main library, including a 'literary carpet' and front and rear access
- Five new floors showcase books with better access including escalators, lifts, toilets, meeting rooms and café
- A new purpose built climate-controlled, airtight and humidity controlled repository, providing additional storage for Liverpool Record Office where 14km of archives and historic treasures are housed
- Conservation studio for repairs to the city's literary heritage
- New rooftop atrium and terrace overlooking St. John's Gardens
- The re-opening of historic internal entrances to the Picton Library
- The re-opening of International Library as 'Discover', a new Children's library
- Dedicated room to house John James Audubon's celebrated book - Birds of America
- Doubling the number of public computers
- New light wells at front and rear to allowing the library to be naturally lit
- New 24 hour external drop-off book service

Tender Timeframe

Stage	Time	Bidders
Issue OJEU	22 Nov 2008	
Pre-Qualification	5 weeks	4
ITPD – Commence Dialogue	4 weeks	4
ITCD – Continue Dialogue	15 weeks	3
ITSFB – Submit Final Bids	10 weeks	2
Close Dialogue	30 July 2009	
Approvals planning/LBC judicial review (Final Business Case)	36 weeks	1
Contract Award	19 July 2010	

PFI

Plans to restore the library date back to the early 2000s when a complete refurbishment was proposed, but the council struggled to find a builder willing to undertake the complicated remodelling and the project was reviewed. A return to the drawing board resulted in the current, more ambitious 27-year PFI project.

A PFI is unusual (for historic buildings) but the award for 2008 European Capital of Culture drew a new found focus to this much loved building.

Whole Life Costing

As part of the Inspire Partnership Consortium, we worked alongside our Facilities Management Provider Cofely; long-term service delivery was carefully considered and developed as an integral part of the design process.

Our aim was to develop, implement and maintain an Energy Policy that would:

- Set energy/utility savings and targets
- Develop energy datum using measured values and data
- Provide key benchmark and tariff data
- Monitor energy use and compare results with benchmarks and targets
- Use resources efficiently and reduce avoidable waste
- Encourage a 'Whole Library Service' approach to energy efficiency

The heating and air conditioning, with particular emphasis on the historic fabric and the specialist requirements within the Repository was also interrogated. The result has been the inclusion of robust and proven suppliers of efficient and reliable heat generating equipment enabling both maintenance and control to be better understood, together with longevity in plant life driving better value for money within the lifecycle model.

Collaborative working with Client/client body

Our design solution was based on the Authority's Output Specification, developed through a series of consultations with the Authority's Libraries' team, professional advisors and other key stakeholders.

Our preferred bidder stage End-User meetings with the Authority, held every 2 weeks were in the form of workshops and feedback sessions attended by the Library Manager, Project Manager, Stakeholders and various members of the design team.

During preferred bidder stage a 'Client Clarifications' schedule was circulated to the team and the Local Authority enabling us to record all general comments, actions and feedback. The document was also used to programme engagement meetings with the Local Authority and key consultants. Drawings and specifications were then updated to incorporate the Local Authority's feedback from these engagement meetings. In addition, examples of other regular consultations held include; defining party wall agreements, oversailing licensing and agreement of security and health & safety proposals.

BREEAM

The Building Research Establishment (BRE) created a Bespoke 2008 credit criteria for this project to incorporate the singular nature of the Library new build and historic works. Shepherd worked closely with our external BREEAM Consultant (URS Infrastructure & Environmental Ltd) leading BREEAM Bespoke Kick-Off Workshops with the design team to review progress against these criteria. As part of the assessment the design and construction team has confirmed that all BREEAM minimum standards will be met for mandatory credits associated with attaining BREEAM 2008 Very Good. These include issues such as Best Practice Commissioning, Lighting, Microbial Contamination, metering (water and energy) and ecological impact as well as CO² emissions and water consumption.

Design/Architectural Vision

Austin-Smith Lord's design strikes a balance between a painstakingly authentic restoration of the library's original imposing architecture and the introduction of bold contemporary spaces.

Part of the architectural challenge was to create a grand entrance to the library, whilst working within the guidelines of listed building consent. The design needed to draw people into what is a relatively small entrance and so the forecourt became a key focus.

Making such a striking a feature of the walkway has a 'red carpet' effect, which engages and entices people into the newly refurbished library. The granite literary pavement also offers a snapshot in time of current public taste and popularity.

Austin-Smith:Lord arrived at a design which strikes a fitting balance between restoring and celebrating the Grade II listed library's original architecture and introducing new 21st century spaces. The authentic restoration includes retaining and re-using historic features where appropriate and the

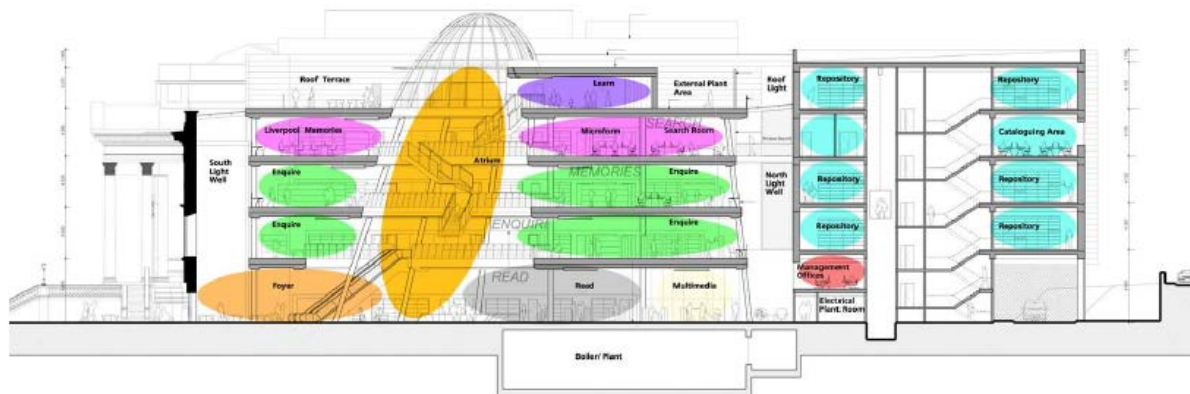
new elements of the design which complement the historic fabric of the building but are bold and contemporary in design and style.

The new Liverpool Central Library and Archive will stand as one of the leading public library and archive services and will further Liverpool's vision of being an international city of world status.

The design proposals were developed in conjunction with our design partner, Architect Austin Smith Lord, and carefully selected Structural and M&E Specialists. The design was developed through a series of consultations with key project stakeholders. Key design features include a 'Literary Carpet', consisting of dark grey Granite, leading visitors from the footpath to the new entrance door. The text comprises of lettering inset with titles of famous literary Cinematic and film works facilitated by public consultation for the selection of titles. This feature is repeated around the building with different themes. Other design features include a café, roof terrace and the transformation of the Picton International Library as a new 'Discovery' children's library. Shepherd also liaised with specialist subcontractors to progress the design of the external envelope, glazing specialist for the dome and internal atrium fascia and the advice of a specialist conservation contractor on the refurbishment of the listed structures.

The design has taken account of the guidance within 'Better Public Buildings' (DCMS) and the 4Ps publication, 'Achieving Quality in Local Authority PFI Building Projects', along with ongoing consultation with English Heritage and the Victorian Society.

The client was consulted throughout the process and given illustrated design concepts to aid communication and generate a consensus going forward.



Tight site/logistics

The site is located on William Brown Street in the Liverpool City Centre within a UNESCO World Heritage Site. Site access was restricted with the main vehicle access via Cuerden Street and additional supplementary access on William Brown Street only during agreed allocated hours.

The site's immediate neighbours were National Museums Liverpool, The World Museum Liverpool and the Walker Art Gallery (connected via two party walls), who were closely consulted with from preferred bidder stage through to project completion.

All logistics proposals were discussed and agreed with Liverpool City Council Highways Department. We liaised with the Health and Safety Executive (HSE) prior to works commencing to introduce them to the scheme, and discuss the complex temporary works requirements.

Due to the site constraints and access limitations a decision was taken to rent an off-site storage facility within the City for the cladding package. As the bulky cladding package required vast amounts of individual material deliveries the off-site location was the ideal solution, ensuring sorting was carried out off-site and coordinated 'just in time' deliveries arrived to site when required.

Unique Hoardings



Shepherd's Project Leader, Steve Gerard, along with their Marketing Team, worked closely with staff from Liverpool's Central Library and Archive to produce colourful and vibrant site hoardings. The hoardings outline various milestones in the history of both Liverpool and the 150-year old Library, as well as reminders of the major landmark – the library's reopening in 2013.

Liverpool City Council's cabinet member for culture and tourism, Councillor Wendy Simon, said: "The restoration work will continue until 2013, so introducing these hoardings is a fantastic way of brightening up the work area and also giving people the opportunity to learn something they may never have known about this great city. Liverpool Central Library is one of the UK's most celebrated public libraries and its regeneration will not only restore the building's beautiful historic elements, but will also create a 21st century facility for all library users."

Decant



Shepherd met with Liverpool Central Library and Harrow Green their Decant Specialists during preferred bidder period on a monthly basis to develop the Library Decant Strategy and programme targets.

Together we subsequently developed a detailed programme for the decant period which also involved advancing the enabling works schedule, thus providing programme benefits.

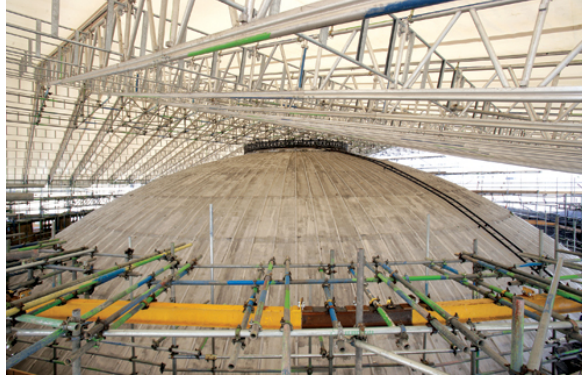
During this period we also needed to undertake intrusive survey works within the live library, which required regular dialogue and coordination with the Library staff.

Temporary structure – scaffolding

HT Scaffolding Systems Ltd was appointed to provide a full access and temporary roof scaffold. Their brief was to provide a scaffold that fully encapsulated the building to allow extensive specialist restoration works to be carried out on the Oak Room, Picton, Hornby and William Brown libraries. The design had to take into account the fact that very limited physical ties could be fixed in to the building façade.

HT specified the Haki 750 deep beam roll out roofing system to accommodate the 36-metre clear span and was built progressively over the double width heavy-duty scaffold on one elevation.

The full system was completed with Kadar sheeting fitted progressively as the system was rolled into position using specialist purpose nylon wheels and heavy duty track system. Twenty-four No 1.65m bays were used to fully cover the roof. Spine beams of up to 14m spans were installed to support the temporary roof allowing the adjoining demolition works to be carried out unimpeded enabling the main contractor to hit very tight deadlines.



Dwayne Seymour, managing director of HT Scaffolding Systems Ltd, said the team is proud to have been able to deliver a first-class scaffold solution to considerable technical and operational challenges. "We believe we have also provided a scaffold with an aesthetically pleasing and acceptable appearance for the city of Liverpool, and feel very humbled to contribute to a project which is an outstanding feature of historical and cultural importance to the Liverpool landscape."

Modular Plant



A 6.5 tonne modular boiler room was installed onto the roof of the library, with the help of two tower cranes. This lift was particularly complex due to the challenging layout of the site. SES PRISM, part of the Shepherd Group, constructed the boiler house off-site.

By constructing the module off-site the advantages gained included; safer working conditions for the site team, increased productivity and a significant reduction in waste.

Demolition

Demolition was complex as it involved the retention of the façade of the William Brown building and carefully separating the side walls from the adjoining buildings, which are occupied by the World Museum Liverpool and the Walker Art Gallery.

On parts of the building the programme also needed to be altered to adhere to gull breeding disturbance restrictions.

A vibration monitoring protocol (placement of vibration monitoring equipment) was developed to ensure minimum disruption to the neighbouring buildings – particularly important given the priceless artefacts and painting on the walls of the museum and gallery just feet away from where work was taking place.

With no accepted British standards or guidance for this type of monitoring, a professor of acoustics from Liverpool University was called in. He recommended that several seismographs linked to computers be installed in the two neighbouring buildings. If the Scientific PPV monitoring levels were triggered, the computer would send text messages to the neighbouring buildings, the council and Shepherd's construction manager and work was to be suspended until the cause of the vibration was investigated. The data from this exercise has been collated to capture best practice that can be used to benefit future similar projects.

"Unfortunately, the vibration trigger was probably set too low and there have been hundreds of triggers throughout the project, which disrupted work to the extent that we had to frequently liaise with client team over course of the first couple of months. However, the client has gained an understanding and trust that Shepherd were not doing anything dangerous or outside of our method statement and work has always been able to continue." says Steve Gerard of Shepherd.

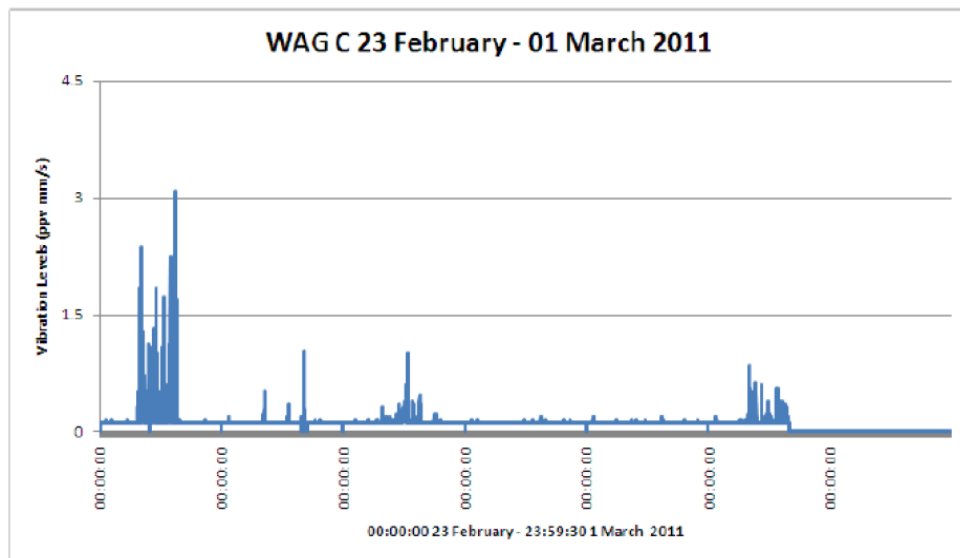
Using computer controlled Brokk demolition equipment, a 30-tonne excavator and long reach excavator fitted with a rotating pulveriser carefully separated the side walls of the library from the adjoining buildings.



Demolition Equipment



Vibrock Monitors



Vibration levels report

Historic Details

Restoring the original fabric of the library's Grade II listed sections, from the external stonework to the internal plaster mouldings, fixtures and bookcases, involved seeking numerous planning consents for the hundreds of historic details, each of which had to be recorded by Shepherd and the historic works specialist William Anelay, and then signed off by the council's Conservation Officer.*

Hornby Library



Before restoration



Work in progress;

Oak Room



Before restoration

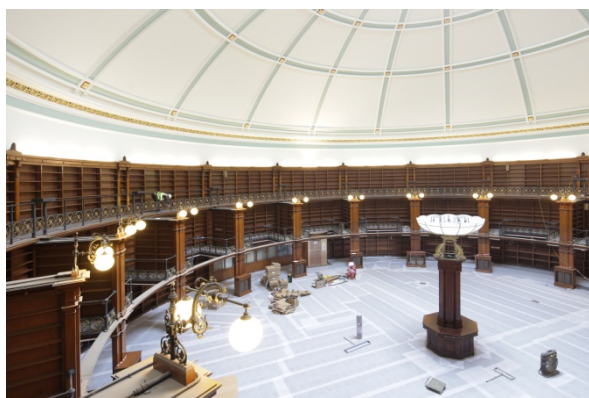


Work in progress;

Picton Library



Before restoration



Work in progress;

The conservation ethos was if it's not a danger to the structure or likely to create problems in future, it has to be retained. Hence many areas of the building resemble a patchwork of old and new.

For the details that needed restoration, consents had to be signed off, which meant getting a standard detail drawn by the architect or William Anelay and submitting it to Liverpool's Conservation and Planning Officers. Following approval a sample was made, which was then either approved or reworked and eventually signed off. This painstaking attention to detail can be seen in the many bottle-shaped stone balusters that support the external balustrade surrounding the Picton Library, each of which comprise three separate elements that had to be sampled and signed off.



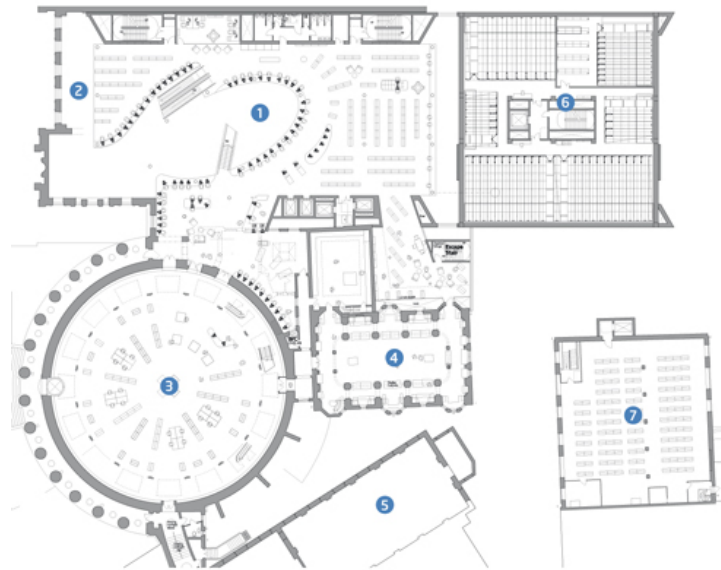
The Picton Library presents visitors with a master class in restoration. The top of the exterior stone colonnade surrounding the room features many exquisite details including a repeated corbel pattern with 15 liver birds incorporated into the design. The timber book cases lining the walls of the mezzanine level have been repaired and even the original radiators and their timber enclosures have been recreated to match the original designs.

Attention to detail is such that a material particle analysis was carried out to determine the original 1879 paint scheme — layered over several times during previous refurbishments — and recreate the blue, white and red colours using modern paints. The results are almost exactly similar to what the Victorians would have seen.

One of the biggest challenges was achieving the building's sensitive restoration whilst incorporating and concealing the many services and other features expected of a 21st Century library. The Hornby Library and Oak Room, closed to the public for many years, will now be re-opened. Increased access to the Picton Hall, the new Discover area for children meant creating new entrances and knocking through certain existing walls to allow visitors to access from other areas of the library; installing security systems including access controls and CCTV to protect the many valuable books on display; plus other environmental and M&E systems.

Sometimes, this strategy meant making some tough decisions, such as when, late in the design, it was discovered that the plaster-boarded ceiling of the corridor running around the outside of the Picton Hall hid a beautiful and ornate barrel vault. However, the M&E was fundamental to the building's operation and there was no alternative route, so the vaulted ceiling has to remain concealed in the finished building.

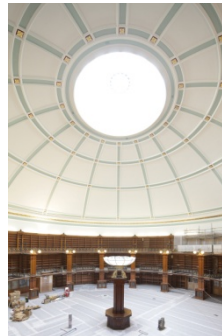
The architect's aspiration to create contemporary spaces that both complement and contradict the existing architecture has been successful. This is most apparent in the newly created children's library in the basement level of the Picton Library. Previously closed to the public, this sunken, circular amphitheatre-like space restored retains many of its unique features, which include ornate architraving, steel ceiling trusses and a tiered layout, but it has now been enlivened with a performance stage, disabled access ramps that swirl down Picton Hall, towards the centre, modern ICT stations and feature lighting.



First floor plan

- | | |
|---------------------------------------|--------------------------------|
| 1. Atrium within main library | 2. South light well |
| 3. Picton library reading room | 4. Hornby library |
| 5. Oak | 6. New archive building |
| 7. Clayton Stack | |

Picton Dome



Repairs to the domed roof of the Picton Library over the years had created a patchwork of zinc, pieces of lead, Georgian wiring and pieces of perspex covering holes in the glazed oculus. The dome has now been re-clad in 850m² of zinc and a new glazed oculus light has been installed at the apex. To match the original materials new lath and lime plaster have been used on external colonnades and the exquisite corbel detailing featuring 15 liver birds within the stone masonry has been restored.

To restore the roof and ceiling in its entirety, a huge 36m-wide trussed tent structure was installed, designed to span the Picton Library building and allow the roof to be dismantled and repaired without work being affected by the elements. The bespoke tent structure was one of the largest in Europe when it was erected.

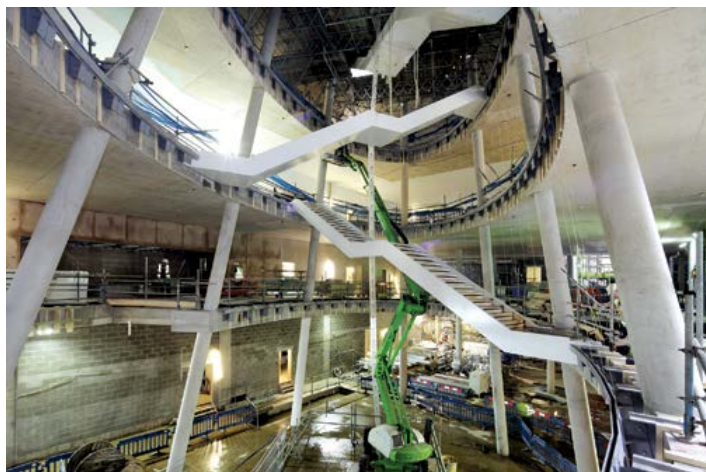
The problem was that the scaffolding needed to create the support for the tent structure had to be tied in to the existing buildings to provide support, but listing consents made it near impossible to find appropriate locations to land tubes/strut bars.

On a typical build you would fix into a concrete column or wall but the dome had 1875-9 listed stone, which meant limiting to much fewer fixing locations, each one agreed with the Conservation Officer and the neighbouring buildings. This meant scaffolding provider HT Scaffolding had to devise a very elaborate and technical design for the temporary works.

New Build Element

The new sections of the library includes a roof terrace featuring a 174.7m² dome constructed of structural glazing and glulam structural members creating a 'ribcage' effect.

The repository is being built to the latest British Standards for Repository and Archive storage (BS5454) that will ensure the internal environment can be controlled to protect priceless collections maintained in a steady state. M&E partner Shepherd Engineering Services designed a modular system solution and the structure was built to extremely tight tolerances to ensure a constant temperature and level of ventilation and humidity can be maintained.



A post-tensioned concrete solution has been utilised on the main library and repository floors to deliver open span spaces without the need for excessive columns and supporting beam structures. The concrete structure will remain exposed so that it acts hygroscopically – to allow the breathing process of the BS 5454 structure to perform.

The use of Building Management Systems (BMS) aided the achievement of a BREEAM 'Very Good' rating. The BMS is linked to meters which monitor the consumption of water/gas electricity etc. This allows the consumption levels to be fully monitored and if required adjusted to maintain energy levels/changes in the use of the building e.g. when the building is shut to the public.

Environmental Overview

Timber – 100% timber sourced from sustainable sources

Biodiversity – 100%

Carbon emissions

Current Tonnes per £100k	% Reduction Target	Target Tones per £100k
2371.00	15.00	2370.85

Waste diversion from landfill

Construction %	Demolition %	Excavation %
96.20	100.00	100.00

Water Usage

M3 Water per £100k
3.80

CSR

Local Labour

At its peak nearly 200 people were working on the library at any one time, of which around 43% were from Merseyside. Breakdown below:

- No. from Liverpool - 60
- No. from wider Merseyside - 25
- Total no. on site – 196 peak
- Total no. of local labour – 43%

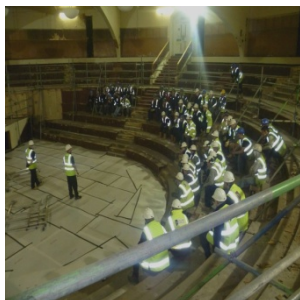
Considerate Constructor

To assist our neighbour, National Museums Liverpool (NML), we loaned them the use of our tower cranes to complete their roof level plant renewal scheme.

Workforce Engagement/Training

Monthly workforce consultation meetings - The aim of the consultations is to engage the whole workforce from the outset to their involvement in decision making on health and safety matters. These regular monthly meetings, chaired by Shepherd and UCATT (and when possible the HSE), provide an open forum for issues to be discussed amongst the wider site team and contribute to the overall aim of striving for an incident free project.

Best Practice Demonstrations including:



- **Access Equipment Demonstration hosted by Supply UK.** The demonstration highlighted safe working best practices for erection and use of BetaGuard Mobile Aluminium Towers and Delta Decks, which were used on the site.
- **Safe Practice Demonstration.** Shepherd partnered up with Speedy Hire to outline the importance of health and safety on site. There were a number of presentations throughout the day, followed by two safety prizes awarded to Karl Nixon from HT Scaffolding and Matthew Behenna from William Anelay for executing consistent behavioural safety standards.
- **Temporary Electrics Demonstration.** The demonstration highlighted best practice protocols to be used to ensure safety and continuous working.
- **Tool Supplier Demonstration Day.** Numerous tool suppliers attended a site open day to promote and demonstrate their wares.

Education Engagement

Liverpool John Moores University (LJMU)

- Use of the project supply chain organisations for work experience for final level QS and CM students.
- Stephen Kennedy, a PhD student, funded by LJMU, has shadowed the project and its supply chain to investigate sustainable design, construction and management.
- Shepherd sponsored the prize for 'Best final year student at part-time level in Quantity Surveying' at the Universities 2011 Achievement Awards Ceremony.

Student Placements on Liverpool Central Library

- Nathan O'Prey, currently undertaking a BSc (Hons) Construction Management degree at LJMU joined the project team to undertake work experience in August 2011. Shortly after he commenced his work experience, the opportunity arose for him to gain hands on experience working with the substructure subcontractor, shadowing their Site Engineer and as a result of his progress he was offered full time paid employment with the subcontracting company for the duration of their time on the project. Nathan commented "I am confident that I will go back to university next year with an advantage over others who haven't had this opportunity."
- Leigh Fitzpatrick, undertaking a BSc (Hons) Construction Management degree at LJMU joined the project team in October 2011. Working two days a week with the historic works site Management team to gain exposure to collaborative planning, safety and quality management in practice.
- Fred Sherratt, undertaking a five year PhD study for the University of Bolton, exploring safety on UK construction sites operated by main contractors in the North West of England. The aim of his study is to produce practical recommendations around safety on sites, through an improved understanding of what safety looks like within the current site environment. Fred undertook interviews with site management and operatives and these interviews formed part of his primary research that has facilitated his analysis and findings. Fred now intends to validate her findings in industry, and Shepherd is helping him facilitate this.
- Presentation undertaken on risk management and project challenges given to LJMU MSc Construction Project Management and Commercial Management students as part of their Risk and Value Management module.
- Neston High School Year 10 - work experience giving pupils insight in to construction site management roles.

Site visits – due to the number undertaken a sample is listed below:

- Construction Best Practice Club - giving an overview of the project and key challenges faced.
- Site visit for visiting LJMU German post graduate students
- CIOB Liverpool Branch - Talk & Tour of Liverpool Central Library
- LJMU site tour and architectural talk for level 2 building surveying students to assist with their module on historic works.

Apprenticeships



The site has partnered with North Liverpool Regeneration Company to give construction apprentices site work experience in the following trades; Plastering, Concreting and Joinery.

Executive member for culture, Cllr Stuart Parker said; *"I appreciate the willingness of companies like Shepherd to offer trainees work placements, which are essential to learn their skills."*

Charity

Claire House Children's Hospice

- July 2011 - 40,000 ducks took to the water on the Liverpool/Leeds canal in a special event to raise money for the charity, Claire House Children's Hospice. Shepherd participated in the event, entering a personalised duck in a specially designed high-vis jacket and hard hat, inevitably going on to win the prize for 'best dressed duck'! This large-scale duck race brought

together over a hundred businesses to fundraise for the charity, raising a grand total of £40,000.

- Supported charity golf day by entering a team and supplying raffle prizes.
- Staff on site collected money together before Christmas 2011 in order to present a LCD 22inch TV with built in DVD player to Claire's House Hospice for use in their refurbished lounge.



Other Charity Events

- April 2012 – A team from site completed a 13 mile half marathon raising over £1,200 for the charity. The runners included representatives from subcontractors Heyrods, SES, Blundell Cleaning Services, as well as Shepherd Construction's work placement student, Leigh Fitzpatrick, from LJMU.
- Participated in the 2012 three peaks challenge raising £7,000 for the cause
- Competed in the 2012 Liverpool Dragon Boat Race

QUOTES

"I'm pleased to confirm that most of the new Library's plantroom and mechanical & electrical services will be pre-built using our offsite facility (SES PRISM) before we even step foot on site. All the components are then transported to the site, before lifting them safely into place. This will avert any risk to the structure of the old building or the workforce on site, whilst also dramatically reducing our carbon footprint, compared to a traditional installation of this type."

Steve Wallwork – Shepherd Engineering Services Operations Director – October 2010

"This is a fantastic library and it's going to be an even bigger asset once its finished. It's a really important resource for people to use, and the new roof-top terrace is going to give some of the best views in the city."

Councillor Wendy Simon – Liverpool Council cabinet member for culture & tourism – Nov 2010

"The restoration work will continue until 2013, so introducing these hoardings is a fantastic way of brightening up the work area and also giving people the opportunity to learn something they may never have known about this great city. Liverpool Central Library is one of the UK's most celebrated public libraries and its regeneration will not only restore the building's beautiful historic elements, but will also create a 21st century facility for all library users."

Councillor Wendy Simon – Liverpool Council cabinet member for culture & tourism – March 2011

"The deconstruction stage has been an extremely complex part of the programme as we have had to protect the façade and neighbouring buildings, particularly considering the priceless artefacts and paintings on the walls of the museum and gallery just feet away from where we have been working on the separation of the library's structure. To help us we've enlisted the latest equipment that has been stationed in the neighbouring buildings to monitor vibration levels."

Peter Millett, Shepherd Construction's West Division managing director - April 2011

"We would like to take this opportunity to thank you for allowing our students to be placed with you for their Year 10 Educational based Work Experience. As a school we very much appreciate your help and without you, our young people would not have the opportunity of experiencing the world of work at first hand."

Mr S Dool, Headteacher, Neston High School – June 2011

"Thank you ever so much for facilitating our visit earlier this afternoon. It was a real pleasure and a great opportunity to get some excellent photographs to aid my teaching adding to the value of my lecture slides."

Russell Bennett, Senior Lecturer, School of Built Environment, Liverpool John Moores University – Feb 2012

"I appreciate the willingness of companies like Shepherd to offer trainees work placements, which are essential to learn their skills."

Councillor Stuart Parker – Liverpool Council executive member for culture – March 2012

"Shepherd Construction are really setting a precedent for companies going forward on how to engage their employees with their local community. I am just happy Claire House are able to be part of such a rewarding partnership! We are lucky to have you! Without our supporters, like you, we really would not be able to assist our children and their families so please do know what a difference you are making not just today but also through leaving a footprint tomorrow. THANK YOU."

Helen Carson, Northern Area Manager, Claire House Hospice – April 2012

"Partaking in work experience with William Anelay, alongside Shepherd has provided me with an invaluable insight into how restoration works are undertaken. The complexity of the work teamed with delegation of tasks and time management has opened my eyes further to this industry and its multiple components. Within my time on this site I have been introduced to different tasks by WAL, some specialist and some more basic. The time given to this project has without a doubt boosted my knowledge of the industry and provided me with a good starting point in which to pursue my career."

Barney Donlen, work placement student – May 2012

“The presentation on Saturday morning was fascinating and it was inspiring to hear Peter and Steve talk with such enthusiasm and passion about the project, and explain some of the logistical and financial complexities associated with it. The group is very fortunate to have talented and committed professionals on board. It was fascinating for the FSG members to see the progress made on the project since our first visit in January! We all came away feeling immensely proud of all that the Group are achieving.”

Sara Dickson, Family Social Group – May 2012

“I drive past the building everyday and see the outside develop, but to come inside and see the work that has gone on is really exciting. A lot of progress has been made and it will be a fantastic day for the city when it opens.”

Mayor of Liverpool Councillor Joe Anderson – September 2012

“The Picton Library reading room very much engenders the traditional idea of a library as a quiet and austere place for study, but the modern building next door is very open and light and designed to be both grand and welcoming, so it doesn’t feel unfamiliar to the regular public. To some extent there is a juxtaposition between the past and the present.”

Angela Pownell, Architect, Austin-Smith:Lord – September 2012

INTERESTING FACTS

- The new roof terrace includes a 174.7m² (1,880 sqft) glass dome.
- 3497m³ of concrete was poured, including all floor slabs and columns.
- 253 concrete columns were constructed on the project.
- Over 4000 reconstituted stone and rain screen cladding tiles were used to clad the East and West façade of the repository. The North elevation cladding contains a Literary panel consisting of 53 names, of those writers who were influenced by the city or were born, lived and worked in Liverpool.
- 91 granite paving flags make up the main entrance literary carpet.
- The flag pole erected on the Picton Reading Room roof is 9 metres high and supports a 4 yard flag.
- The Picton Reading Room roof is covered by 850m² of zinc.
- Internally 15,393 linear metres of shelving has been installed to hold approximately 355,000 books. And within the archive holdings there will be over 3.2 million individual items.

STEPS TAKEN DURING THE CONSTRUCTION PROCESS TO REDUCE ENVIRONMENTAL IMPACTS

Shepherd Construction operates a sustainability policy which has been implemented on the Liverpool Library project. A sustainable procurement plan was put in place at the start of the project. Listed below are the key items which have been carried out on the project:

Offsetting 100% of the waste landfilled with materials with equivalent recycled content

- Reduction in the reliance on car travel and therefore congestion and localised air pollution
- Considerate Constructors scheme
- Demonstration of the recruitment and training of local people.

Below is extracting of sustainable procurement plan high-lighting the items which were carried out by Shepherd Construction Ltd.

TOWARDS ZERO NET WASTE

In line with BREEAM waste credits and Site Waste Management Plan requirements Shepherd construction Ltd monitored the waste using five, mixed waste skips. Working with the appointed waste services provider, Shepherds diverted 100 percent of construction waste from landfill.

Shepherd construction working with British Gypsum on the project, minimise the amount of plasterboard required for construction by agreeing optimum sheet sizes and then recycle 100 percent of the waste produced on site. A Waste Management Strategy had been developed at tender stage of the project to identify areas on where waste could be reduced. Once the project had commenced Shepherd construction monitored the waste using the online SMART Waste tool developed by BRE.

TRANSPORT, ENERGY AND WATER

Shepherd Construction committed to achieve material credit BREEAM by setting key K.P.I targets for transport, energy and water throughout the project using smarter waste system also set up by BRE.

All targets was monitored and displayed on the environmental site notice board.

TRANSPORT

Liverpool Central Library is located in Liverpool city centre and is well served by the city's public transport that includes train, bus and ferry services. A green travel plan has been developed for the operation of the building, during construction Shepherds have put in place car sharing and public transport information on the notice board for site workers.

COMMUNITIES

The current target with respect to community considerations is to score at least 32 points on the considerate constructor's scheme and BREEAM requires that the contractor should achieve a score of between 32 and 40.

Shepherd's have a Corporate Social Responsibility Plan that includes a community action plan for each project, provision of local jobs and to minimise the impact on the local environment of the project.

Shepherd's have a proven track record with the Considerate Constructors scheme, routinely obtaining 32 points and they have been awarded gold awards in the past. On the project Shepherd site team achieved a score of 36 points and was awarded a bronze award.

BUSINESS

During construction Shepherds procured raw materials and waste services locally, where possible. They have already identified at the start of the project where there a number of local services were available.

EMPLOYMENT AND TRAINING

Shepherds have an established record at employing and training local people and have set targets for providing training positions and apprenticeships, along employing a number of people that have been out of work for more than 6 months during the construction stage of the project.

REDUCING ENVIRONMENTAL IMPACTS ON THE PROJECT

During the construction stage the following was completed throughout the project to aid with the environmental impacts to the site as construction works progressed.

- Project environmental register- Shepherd construction have carried out a formal review of the aspects register every two weeks to review if there was any significant changes up and coming to the project which could impact on the environmental aspects of the project.
- Environmental tool box talks- Throughout the project Shepherd and there supply chain have carried out specific tool box talks relating to environmental aspects on the project.

METERING, MONITORING AND TARGETING

The average consumption targets for the Liverpool Central Library project are as follows:

Fossil Fuel Consumption (Kwh/m2)	Electricity Consumption (Kwh/m2)	Water Consumption (M3)
24.31	71.06	4.21m3 per person per year

There is a further breakdown of the gas and electricity into old and new as per the table below. The breakdown of the electricity consumption includes for a contribution of 216,384 Kwh from the BDG.

Fossil Fuel Consumption (Kwh)		Electricity Consumption (Kwh)	
<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>
855,330	828,873	449,673	862,695.50

BASIC BUILDING COSTS

Below is a summary for the basic building costs, Service costs per m2 and external works for the Liverpool Central Library project.

Basic Building Costs	£2,400 m2
Services Costs	£650 m2
External Works	£60 m2

Predicated renewable Energy generation	Percentage of predicted water usage
8.64Kwh/m2	6.4%

SYSTEMS OVERVIEW ON KEY INNOVATIVE AND LOW IMPACT DESIGN FEATURES

The key energy efficient features of the building are as follows:

Low infiltration rates reduce unwanted heat loss and heat gain Solar protection to glazing reduces unwanted heat gains Conservation heating is provided to historic areas to minimise energy consumption whilst being sympathetic to the building fabric and its contents Heat recovery to all air handling plant High efficiency boilers AHU's are arranged to provide free cooling whenever outside air permits High efficiency lighting is adopted throughout Extensive lighting control is provided BMS energy management software is provided Biodiesel generator provides 10% renewable electricity

ELECTRICITY GENERATION PLANT

A bio-diesel generator will be sized to achieve a minimum of 10% renewable energy for the Library overall, based on part L calculations. A connection is provided for the bio-diesel generator into the LV distribution system.

WATER LEAK DETECTION

Major water leak detection has been provided to secure BREEAM credit WAT 3. This has been achieved through BMS monitoring of the site utility meter and building sub-meters to detect any unusual patterns of flow.

RAINWATER HARVESTING

Rainwater harvesting has been provided to collect water from the roof and supply Wc's throughout the building to minimise the buildings demand on mains water supply.

A rainwater recovery system has been provided. The system will recycle the rain water collected from the roof to provide a clean and clear water supply for flushing toilets and urinals.

Rainwater pipework collecting rainwater runoff from the roof only will be routed to a below ground GRP tank located beneath the external service yard at the rear of the building.

COMMUNITY AREAS IN THE BUILDING INCLUDING CIRCULATION REQUIREMENTS

The total area for circulation in the Library is 2060 m2.

The percentage of the grounds to be used by the community within the library is

Ground Floor	50%
Mezzanine Floor	0%
First Floor	90%
Second Floor	85%
Third Floor	70%
Fourth Floor	70%
Externals	40%

The area of the whole site is 2.1 acres or 0.84984 hectares.