The good, the bad and the darn right impossible.

Hoare Lea – 2017

Agenda

- OUR FIRM
- WHERE WE WERE
- WERE WE ARE AND HOW DID WE GET HERE
- WHERE ARE WE GOING?

Our firm

Specialist MEP designers for over 150 years

We are a highly successful, international firm of MEP consulting engineers.

We are the largest firm of MEP consulting engineers in the UK and provide an expanding range of complementary specialist services to our clients across the entire life span of their projects; from strategic definition through design, handover, occupation and in use.

Our client-focused and design-led service is underpinned by our commitment to collaboration and our passion for innovative sustainable design.

Our firm remains wholly owned by our partners, enabling us to better focus on the needs of our clients.

SUSTAINABILITY • MECHANICAL
INTELLIGENT BUILDINGS • CGI • PERFORMACE OPTIMISATION EXPERT WITNESS • VERTICAL TRANSPORTATION
FAÇADE ACCESS • PROPERTY SERVICES • ELECTRICAL ACOUSTICS • UTILITY AND ENERGY INFRASTRUCTURE
LIGHTING • OPERATIONAL ENGINEERING • PUBLIC HEALTH AIR QUALITY • RESEARCH AND DEVELOPMENT
BUILDING PHYSICS • FIRE ENGINEERING

Our firm

Great people

We use our industry leading professional development scheme to nurture and develop the very best people.

We promote inquisitiveness and innovation.

Within a supportive and collaborative environment we produce individuals who enjoy working with us, delivering simple, elegant and efficient designs.

Respected reputation

We have influence in the wider industry and are in a unique position to make a real difference in the industry.

Connected to decision makers we sit on many advisory committees, contributing to complex agendas and help guide policy.

Industry recognition

We are very proud of the fact that what we do and how we do it gets recognised regularly by the wider construction industry.

We are the current holder of the CIBSE Building Performance Awards: Consultant of the Year, as voted by many of our peers in the industry.

We have been awarded this accolade more times than anyone else since this award was inaugurated.

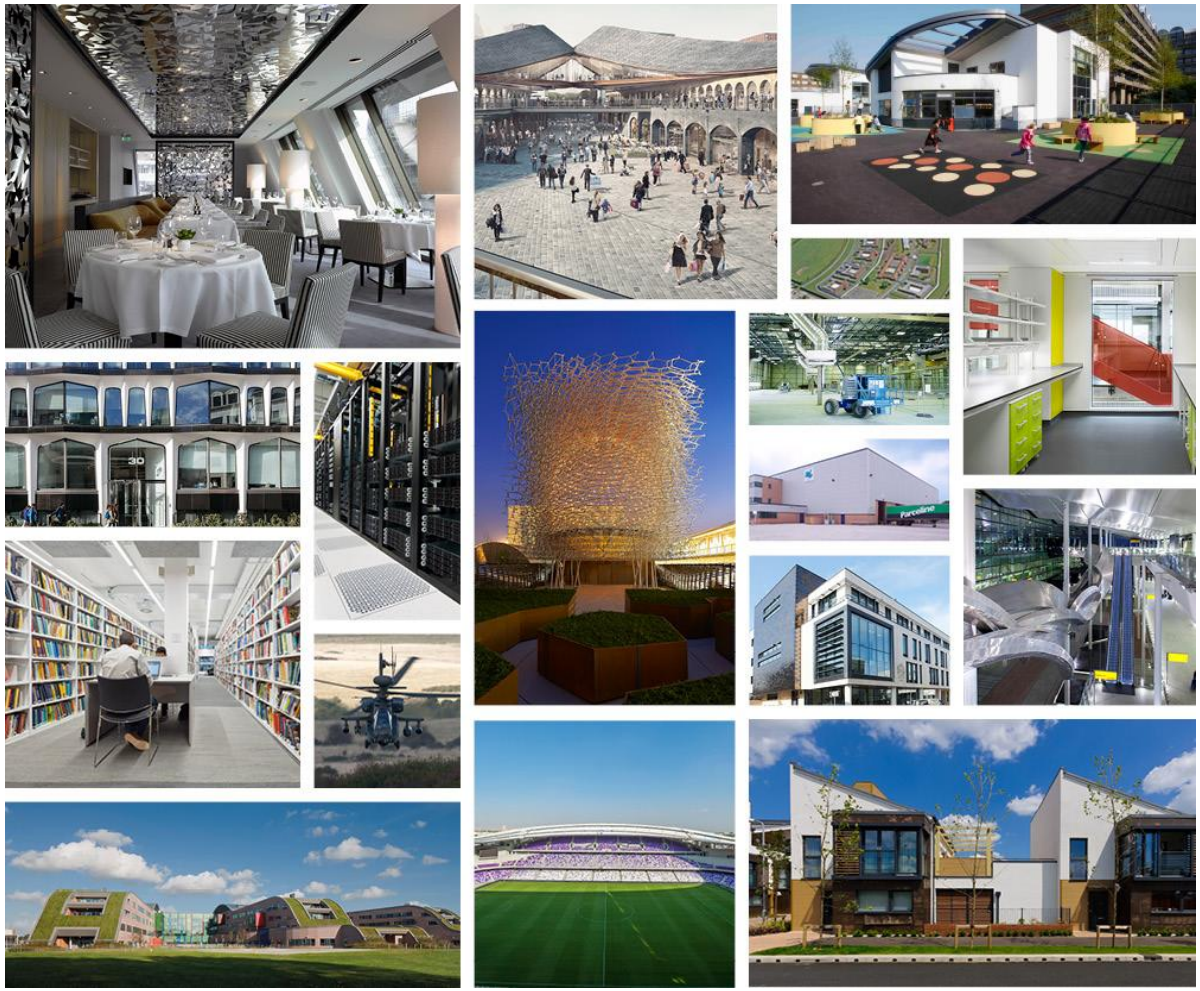
Our firm

Partner led sector expertise

We provide partner led expertise to our clients operating in all of the major construction sectors.

We deliver all this expertise wherever our clients need it through a successful system of sharing sector knowledge, skill and resources around the firm.

We consistently work on a wide range of high quality projects that ensures our sector expertise always remains relevant and valuable to our clients.

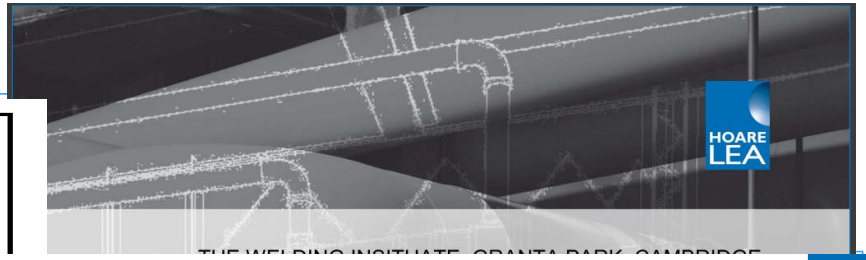


Where We were

Hoare Lea – 2017

Where We Were

AIR HANDLING UNIT SCHEDULE	
PROJECT	Chemical Engineering & Biotechnology
No.	26/01013
SYSTEM	Primary Supply Air



SCHEDULE OF LV SWITCHBOARDS

CHEMICAL ENGINEERING & BIOTECHNOLOGY

26/01013

Schedule: Y71-1
Revision: C1
Made: 25/01/2013
Made: EH
Checked: JMB

Notes:
1. Devices supplying main fire alarm panels are to incorporate a red panel.
2. Each device to be permanently labelled with reference and function.
3. Battery and associated charger to be provided internally to all panels to supply all motorised devices as required.

Board Ref.	Function	Construction	Form	IP	Device Pattern	Access	Cabling		Finish
							Power	Controls	
W111/LV1	Main LV Panel within Services Compound	Indoor multicubical, freestanding	4b Type 2	31	ACBs withdrawable, all others fixed	Front and Rear	In: Down, Out: Up	In/Out: Up	Standard
W111/LV2	2nd Floor Plantroom LV Panel	Indoor multicubical, freestanding	4b Type 2	31	ACBs withdrawable, all others fixed	Front and Rear	In/Out: Up	In/Out: Up	Standard
W111/ACO	Autochangeover panel supplying W111/ESB from either normal or generator sources.	Indoor wall mounted panel board	2 Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
W111/ESB	Generator LV Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
L/LG/NSB	Lab Block LG Floor North Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
L/LG/SSB	Lab Block LG Floor South Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
L/UG/NSB	Lab Block UG Floor North Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
L/UG/MRRC	Lab Block UG Floor NMR Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In/Out: Up	In/Out: Down	Standard
L/UG/SSB	Lab Block UG Floor South Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
L/01/NSB	Lab Block First Floor North Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
L/01/SSB	Lab Block First Floor South Panel Board	Indoor wall mounted panel board	4b Type 2	31	Fixed	Front Only	In: Down, Out: Up	In/Out: Down	Standard
R/ACO1	Autochangeover panel located at the top of Researchers' House North Lift shaft to changeover from normal to emergency supply	Indoor wall mounted panel	2 Type 2	31	Fixed	Front Only	In/Out: Down	In/Out: Down	Standard
R/ACO1	Autochangeover panel located at the top of Researchers' House South Lift shaft to changeover from normal to emergency supply	Indoor wall mounted panel	2 Type 2	31	Fixed	Front Only	In/Out: Down	In/Out: Down	Standard

	MAX INITIAL FLOW RESISTANCE	100 Pa
	MAX FINAL FLOW RESISTANCE	250 Pa
	FILTER TYPE	Bag
ACCESS SECTION	WIDTH: 600 mm	Inspection window and internal light

DECEMBER 2013	NTS @ A0	CAMBRIDGE

DRAWING NUMBER

Volume	Level	Type	Role	Number	Revision
26-01040	HL	XX	XX	SM	M	S33	0001	C1

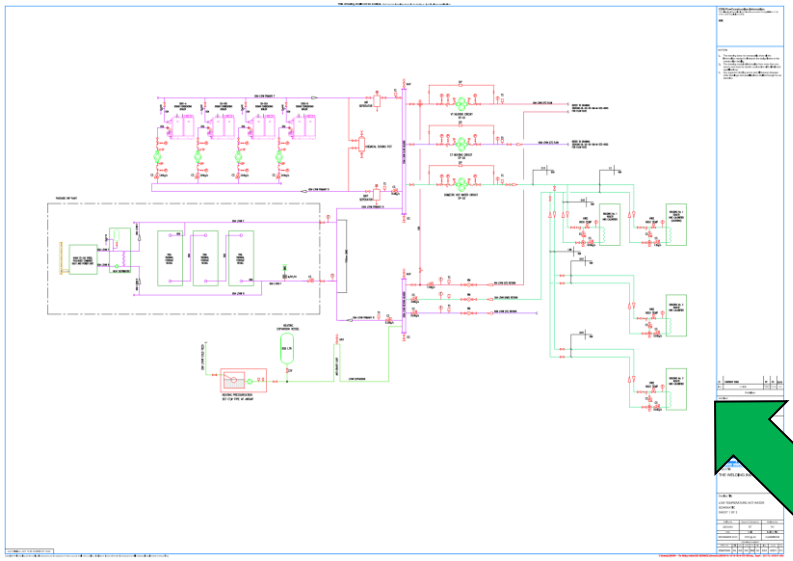
Drawing Title
RAIN WATER & WATER SERVICES
THE STREET LEVEL 01

Project No.	Drawn & Checked by	Reviewed by
26/01040	KS	DB
Date	Scale	Hoare Office
DEC 2013	1:100 @ A0	CAMBRIDGE

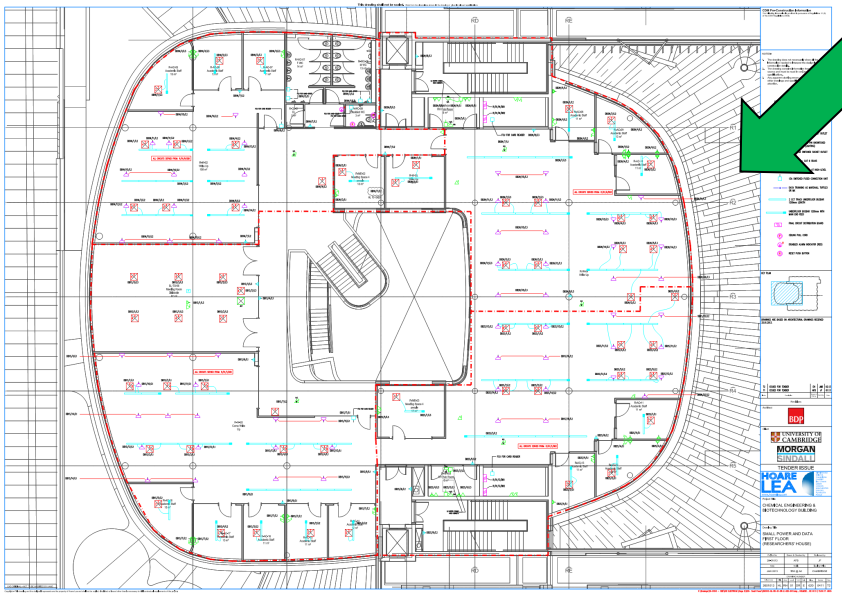
DRAWING NUMBER

Volume	Level	Type	Role	Number	Revision
26-01040	HL	04	01	DR	P	S20	4001	T1

Where We Were

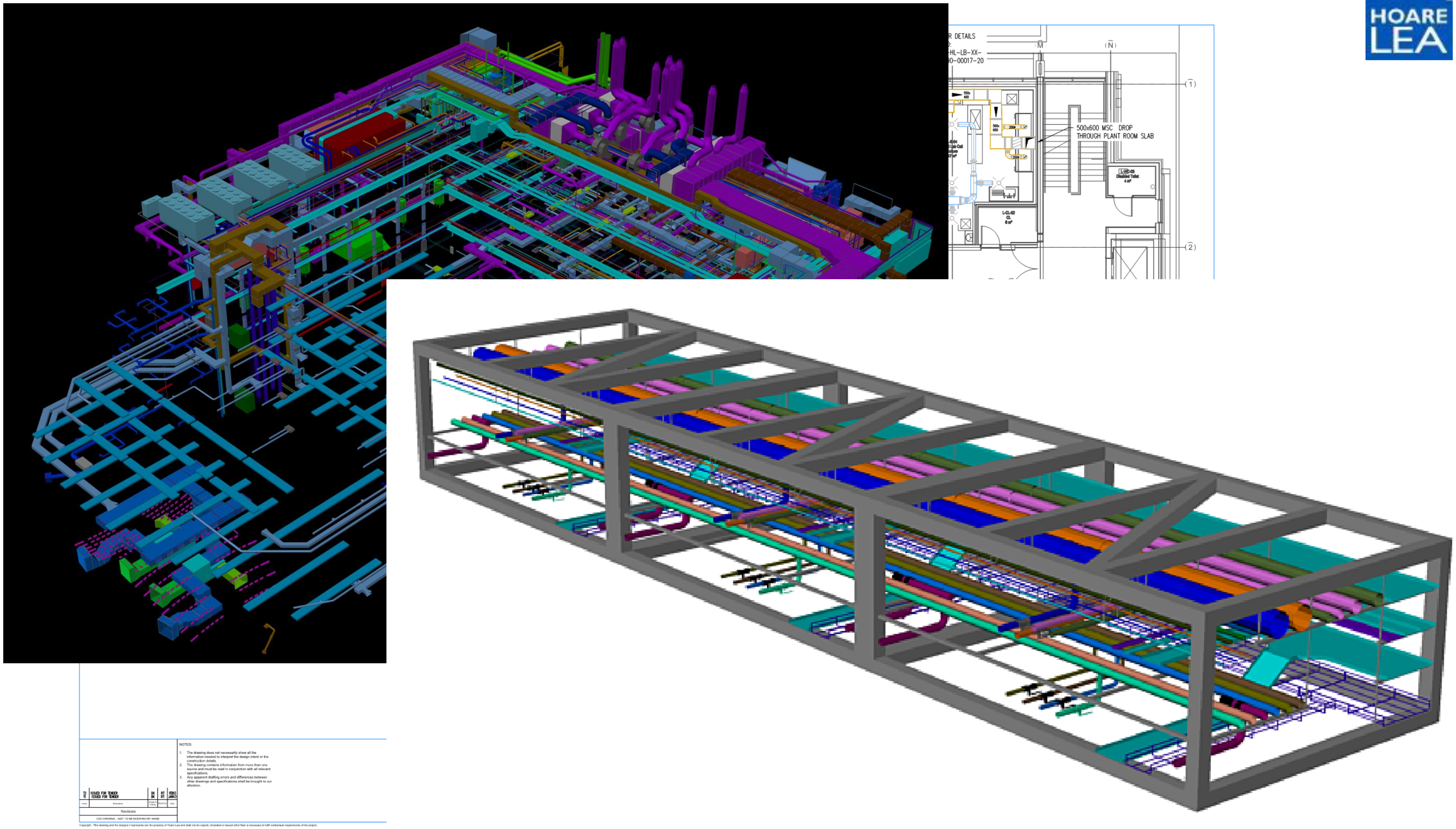


AIR HANDLING UNIT SCHEDULE		
PROJECT	Chemical Engineering & Biotechnology	
No.	26/01013	
SYSTEM	Primary Supply Air	
REFERENCE	U10-03	
GENERAL INFORMATION		
CONSTRUCTION	PURPOSE/ DECK	**Primary Supply Air - Variable volume (AH-L3)**
	BASE FRAME HEIGHT	**150** mm
	PANEL THICKNESS - DOUBLE SKINNED	**50** mm
	WEATHERPROOF CONSTRUCTION	Yes
	SINGLE OR DOUBLE STACKED	No
MAXIMUM DIMENSIONS	LENGTH	**9000** mm
	WIDTH	**1700** mm
	HEIGHT	**2300** mm
ACCESSORIES	INSPECTION PORTS TO FAN	Yes
	BULKHEAD LIGHTS TO FILTER/ FAN	Yes
	MOUNTING POINTS FOR CONTROLS/ INSTRUMENTS	Yes
	CLEAN FILTERS AT COMPLETION	Yes
	SPARE SET OF FILTERS AT COMPLETION	Yes
	PRESSURE GAUGE ON EACH FILTER BANK	Yes - Magnahelic
	CARTRIDGE TYPE HTG/ COOLING COILS ON RAILS	Yes
	HUMIDIFIER SECTION VENTURI INLET/ WHIRL PLATE	N/A
	COOLING COIL SECTION ELIMINATORS	Yes
	MELINEX LINING TO ACOUSTIC SPLITTERS	No
	LOW LEAKAGE DAMPERS	Yes
	DAMPER ACTUATORS	Yes - By Controls Specialist
LEAK TEST	AHU LEAK TEST REQUIRED	Yes
DUTY	SYSTEM DESIGN AIR FLOW RATE	5.550 m³/s
	AIR FLOW RATE CAPABILITY MARGIN	5.0 %
	AHU COMPONENT SELECTION AIR FLOW RATE	**5.828** m³/s
PERFORMANCE	USE DEFAULT PERFORMANCE CRITERIA IN SPECIFICATION CLAUSE Y40.4000	Yes
COMPONENTS GENERALLY IN DIRECTION OF AIRFLOW		
INLET DAMPER	TYPE	**Multi-leaf OBD low leakage extended spindle**
ACCESS SECTION	WIDTH: 600 mm	**Inspection window and internal light**
RUN ROUND COIL (HEATING / RECOVERY)	AIR DENSITY	**1.20** kg/m³
	AIR TEMPERATURE ON	**5.0** °C
	AIR TEMPERATURE OFF	**10.0** °C
	HEATING/HEAT-RECOVERY CAPACITY (+kW/-kW)	0 kW
	PERCENTAGE PROPYLENE GLYCOL	**0.0** %
	ANTICIPATED GLYCOL TEMPERATURE ON	**19.5** °C
	ANTICIPATED GLYCOL TEMPERATURE OFF	**16.0** °C
	SPECIFIC HEAT FOR GLYCOL/WATER MIX	**4.2** kJ/kg°C
	GLYCOL FLOW RATE	0.0 kg/s
RUN ROUND COIL (HEATING / RECOVERY) POWER AIRSTREAM	REFER TO RECEIVING AIRSTREAM SECTION FOR PERFORMANCE DATA	
ACCESS SECTION	WIDTH: 600 mm	**Inspection window and internal light**
	AIR DENSITY	**1.200** kg/m³
	AIR TEMPERATURE ON	**-10.0** °C
	AIR TEMPERATURE OFF	**5.0** °C
	HEATING CAPACITY	**107** kW
	HEATING FLUID SPECIFIC HEAT CAPACITY	**4.2** kJ/kg°C
	HEATING FLUID TEMPERATURES FLOW	**80** °C
	RETURN	**60** °C
	HEATING FLUID FLOW RATE	1.3 kg/s
ACCESS SECTION	WIDTH: 600 mm	**Inspection window and internal light**
PREFILTER	FILTER CLASS	**G4** BS EN 779
	MAX INITIAL FLOW RESISTANCE	**50** Pa
	MAX FINAL FLOW RESISTANCE	**150** Pa
	FILTER TYPE	**Panel**
FILTER	FILTER CLASS	**F8** BS EN 779
	MAX INITIAL FLOW RESISTANCE	**100** Pa
	MAX FINAL FLOW RESISTANCE	**250** Pa
	FILTER TYPE	**Bag**
ACCESS SECTION	WIDTH: 600 mm	**Inspection window and internal light**



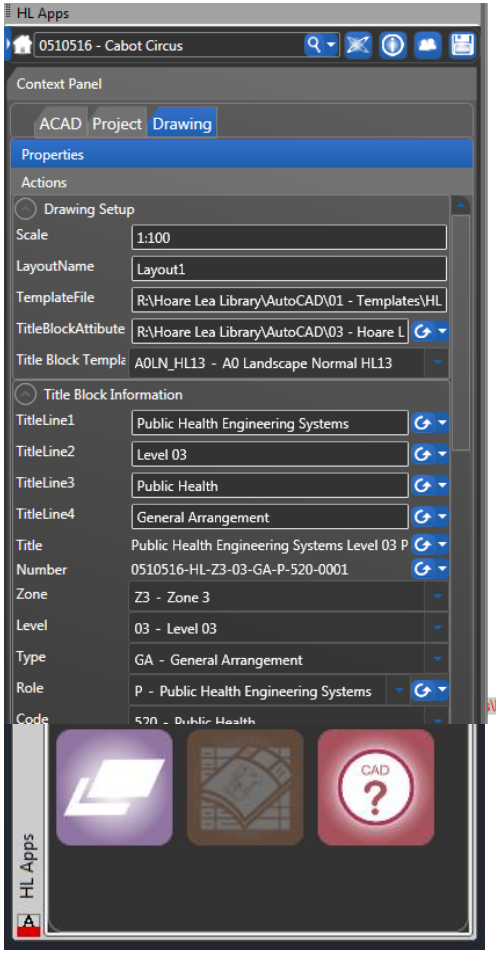
Where We Were

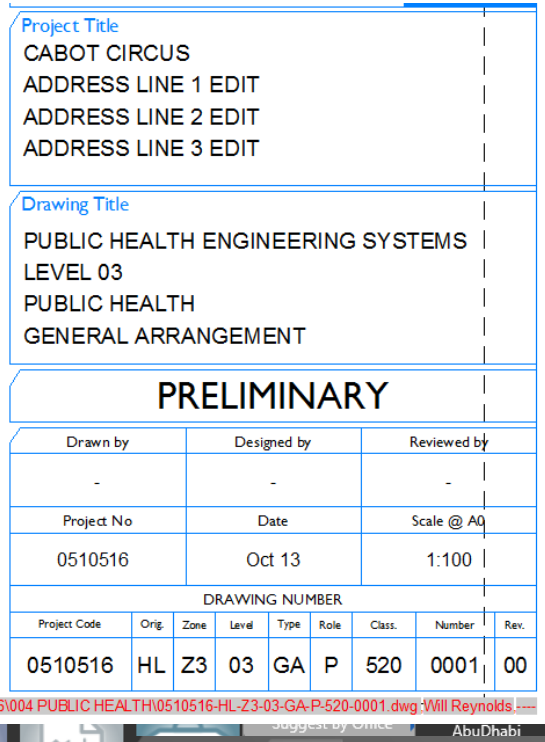
HOARE LEA

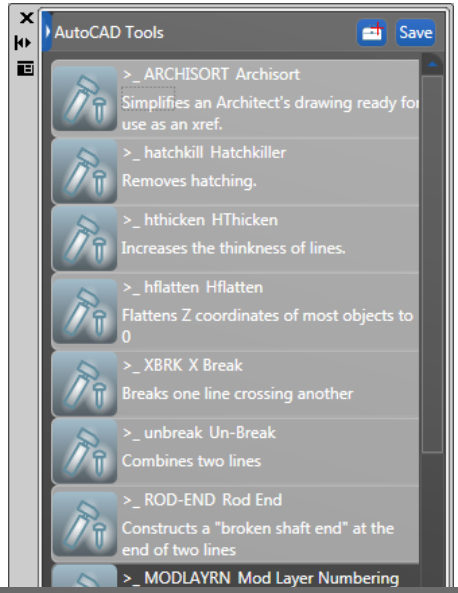


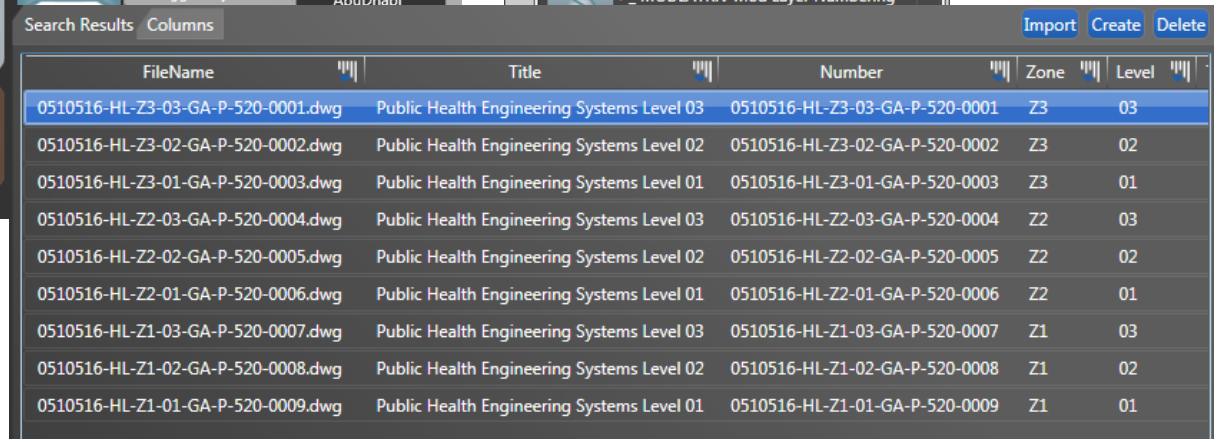
Where We Were

Creating Project Awareness









Where We Were

Whilst this is not "BIM".

It was the start of us trying to create and manage information and drawings from one source and use that information in multiple places.

Our First Revit Project Was in 2009?

- **We have since worked on over 300 Revit (BIM) projects across the firm**

- **Things have changed and moved on a huge amount!**

WERE WE ARE AND HOW DID WE GET HERE

Hoare Lea – 2017

Getting to where we are

We we're early adopters

As an industry leader we adopt BIM technologies early enabling us to provide our clients with the latest services.

We had revit templates and a family library with about 1500 objetcs.

A huge shared parameter file.

We were starting to automate scheduling and performing some calculations directly in Revit.

We were delivering regular 2 day Revit training courses. Half of our employees were trained.

Use of Revit was starting to catch and in some office overtake the use of AutoCAD

We were pretty proud of our efforts.

Getting to where we are

BUT!

PAS 1192-4 Came out

We started to get requests for COBie and delivering models with all sorts of classification systems embedded

We were seeing more and more EIRs

Projects were getting bigger and more complex. = Bigger more complex model.

We were delivering more projects form multiple locations

And cracks in our methods, family libraries and templates started to show

We also realised that too much knowledge and knowhow sat within a small group of people who were spread around the business.

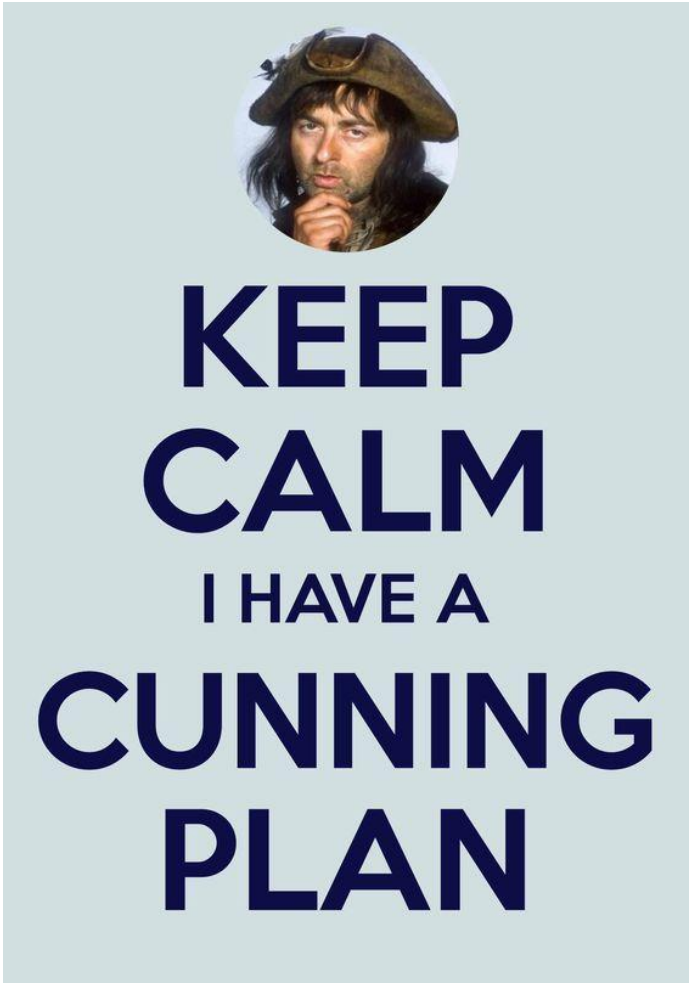
SOMEONE HAD A CUNNING PLAN!

We'll just make our families Level 2!

By adding Uniclass 1.4 & 2015 Parameters to our familis

And the fields from COBie as shared parameters to our families and project templates, use the (old version of the) COBie toolkit and we'll be fine.

No one checks the COBie anyway!!! Right



Getting to where we are

A MORE THOROUGH PLAN WAS REQUIRED

A steering group consisting of delegates from all levels was formed

The business was consulted to identify key challenges and areas of main concern

Key challenges were identified and prioritised

Steering groups were formed at the requisite levels

A thorough strategy and business plan was proposed, reviewed many times and finally signed off a year after it's inception.

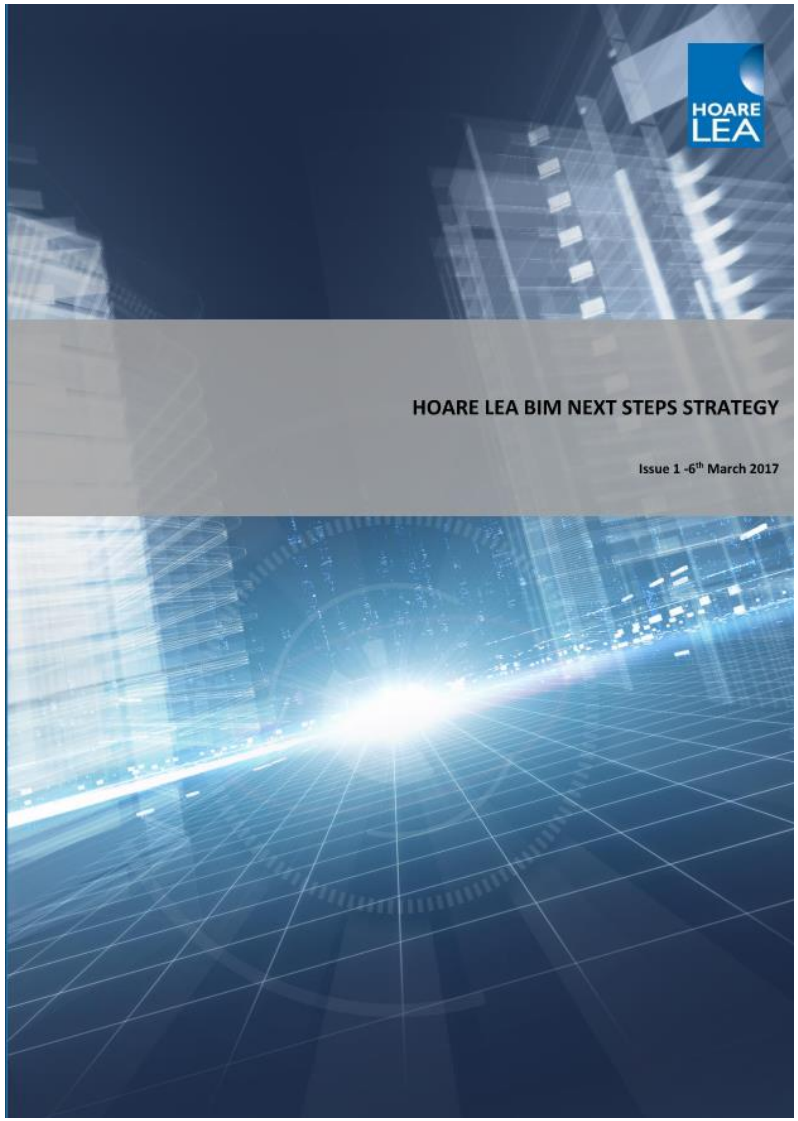
During this time many of the critical items were beginning to be addressed.

- **Re-organisation of project teams to align with PAS 192-2 Roles**
- **Training and guidance**
- **Fixing out libraries and templates**

A total of 16 actions were identified.

Split into dealing with External and Internal issues

And how we would and who was responsible for addressing an issue



Where are we?

We strive to have the best staff with the best training in all areas of the firm. BIM Is no different.

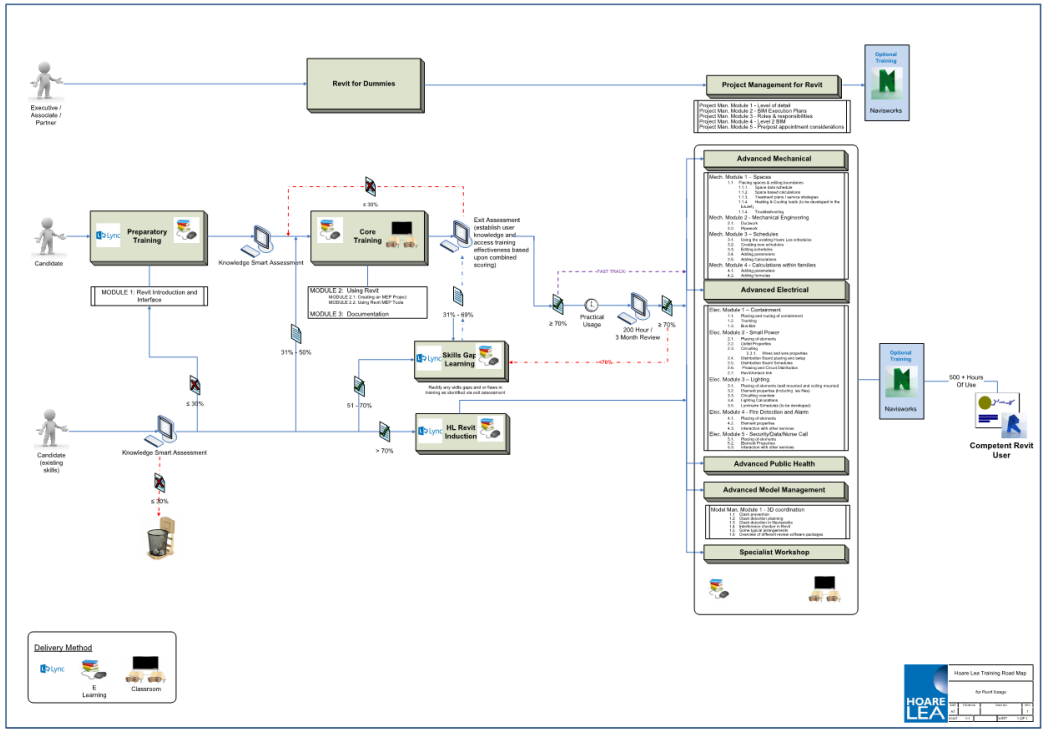
Over 75% of our Staff are trained to use Revit.

We deliver much of training to our people in-house using best practice knowledge at all levels.

Our training programme includes:

- Revit basics
- Advanced Revit use
- BIM Project Management
- Partner level training

Our BIM training is tailored to integrate with our ways of working.



Where are we?

We have a comprehensive suite of guidance documents

These are aimed at 3 Levels.

Partners and Senior Management

Project Managers and Engineers

Technical Staff

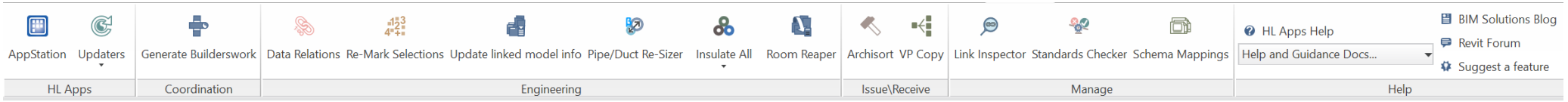
These documents are under constant review and regularly revised

Many of these documents have now become integrated with our standard business and operating procedures blurring the lines between BIM and non BIM projects

Topic	Author	Type	Document / Location	Priority	Status
Fees and Our Commercial Offer	Andrew Krebs	Principles	Document Store\Management Groups\BIM Solutions\Management Guidance	A	Published
Appointments and Duties	Matthew Hearnan	Standard Fee Proposal	Document Store\Management Groups\Marketing\External Marketing Kit\Kit of Parts\7 - Bespoke Bid Material\7c - Fee Proposal	A	Published
Capability Brochure	Richard Harryman	Marketing Brochure	Document Store\Management Groups\Marketing\External Marketing Kit\Kit of Parts\4 - Generic Capability Statement	A	Published
PQQ standard responses on Nexus	Andrew Krebs	Nexus Page	Can be found on the Marketing Nexus page under Submissions/PQQs - PQQ Database - BIM Solutions	A	Published
Managing External expectations	Richard Dunne	Principles	Document Store\Management Groups\BIM Solutions\Management Guidance	A	Published
BIM - A Quick reference Guide	Ben Roberts	Powerpoint	Document Store\Management Groups\BIM Solutions\Management Information\Guidance	A	Published
Project Mobilisation and Setup	Darren Quigley	Principles	Document Store\Management Groups\BIM Solutions\Project Leader Information\Guidance	A	Published
Graphical Output Quality	Andy Hill	Methods	Document Store\Management Groups\BIM Solutions\Technical Guidance	A	Published
Model Elements/Families	Paul Cooper	Principles	Document Store\Management Groups\BIM Solutions\Technical Information\Guidance	A	Published
Model Elements/Families	Grayham Roper	Methods	Document Store\Management Groups\BIM Solutions\Technical Information\Guidance	A	Published
Why We Need to Manage Models	Andrew Krebs	Principles	Document Store\Management Groups\BIM Solutions\Project Leader Guidance	A	Published
Model Performance	Andy Hill	Methods	Document Store\Management Groups\BIM Solutions\Technical Information\Guidance	A	Published
How To Use The BIM Protocol	Andrew Krebs	Methods	Document Store\Management Groups\BIM Solutions\Project Leader Information\Resources	A	Published

Where are we?

We have a central BIM team that includes software developers, engineers, content creation and training specialists.



We have a network of champions in each office representing every level of the business

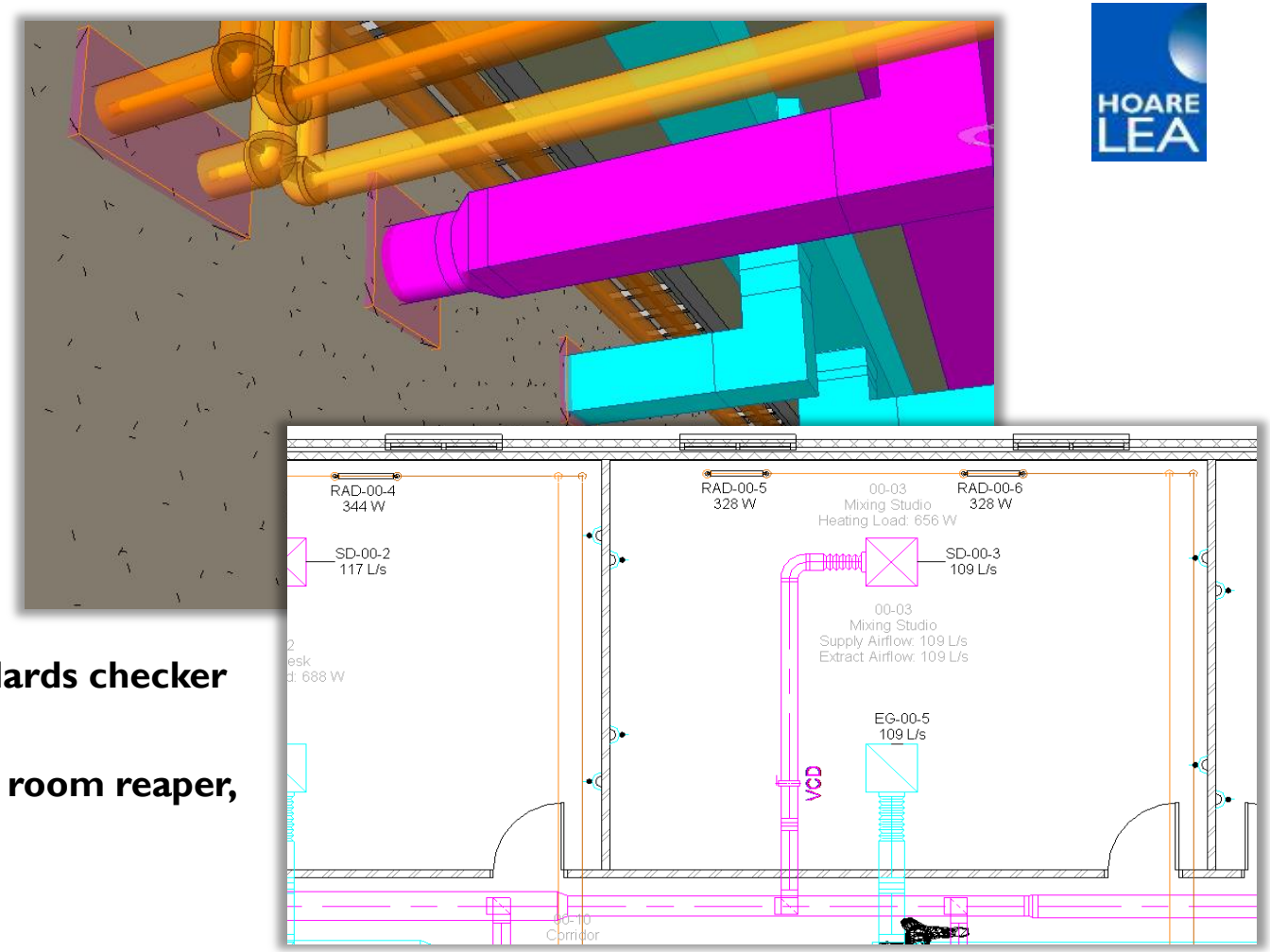
Office	Managing Partner	Partner Champion	Project Manager Champion	Engineering BIM Champion	BIM Manager
Oxbridge	Matt Jones	Matt Chambers	Paul Cooper	E – Jordan Mason M – Monika Nowak	Grayham Roper Deputy - Craig Hobbs
		Partner BIM Steering Group	BIM Project Management Forum	Technical BIM Champions	

We have in house visualisation, R&D, technical control property services and many other teams all looking a the best way to leverage models and data to deliver better projects and value to our clients

These groups do all try and work together and share information and development.

We have even recently employed an external BIM consultant to came and work in our Bristol office to critique what we do!

Our Approach



Automation of routine tasks

Revit to Excel two-way link

Automated builders' work holes

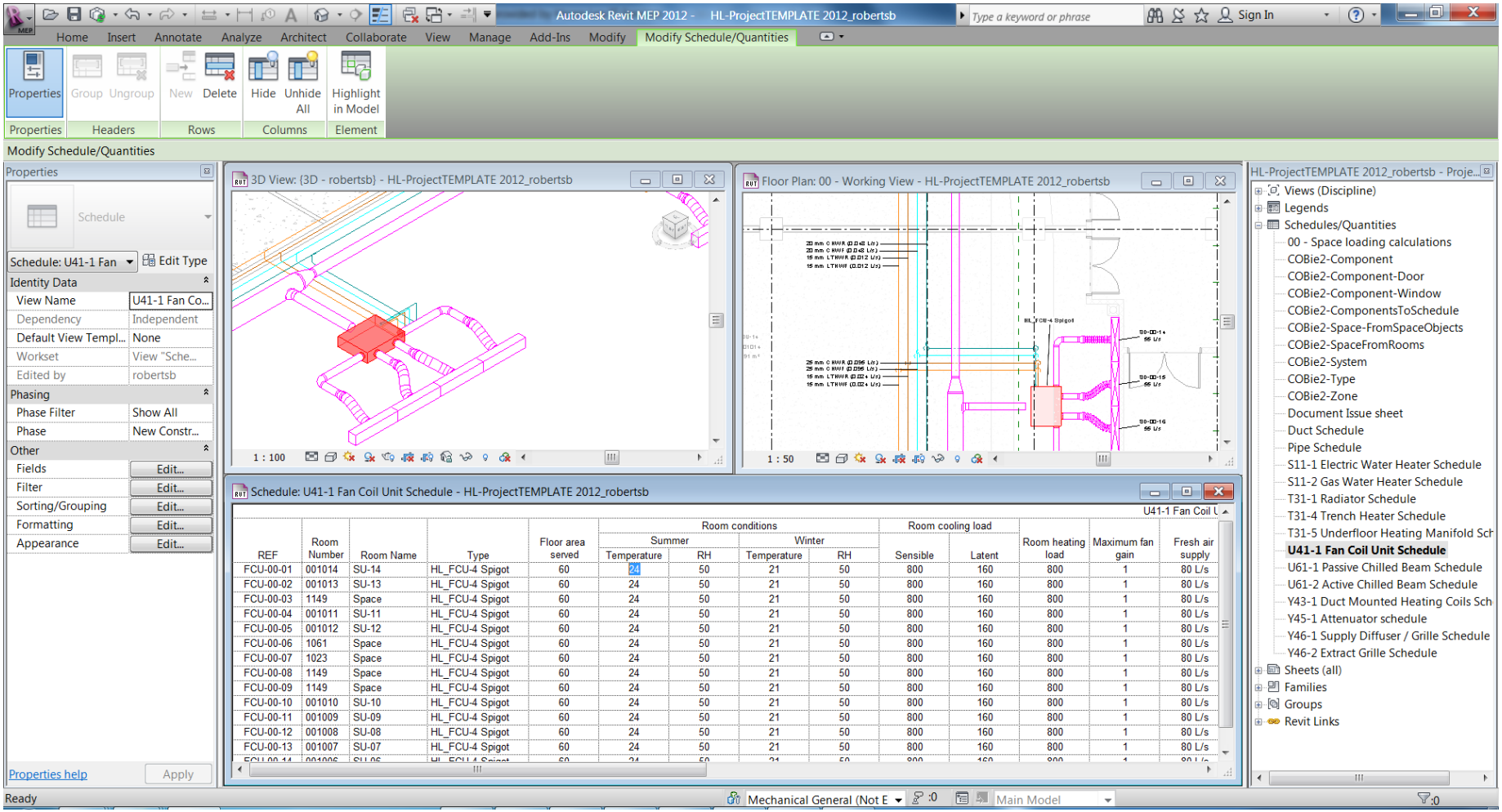
Automated pipe insulation

Model management tools such as standards checker

viewport copy, archisort, mark updater, room reaper, etc.

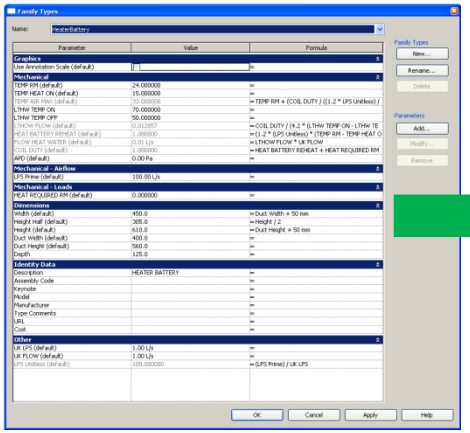
This allows us to spend more time concentrating on design

Our Approach – Using Revit as a design tool

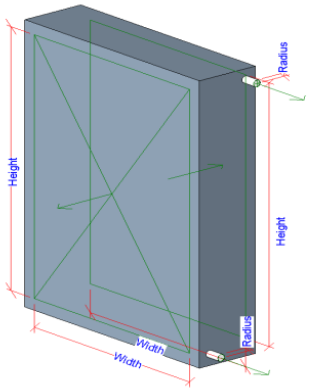


Our Approach – Using Revit as a design tool

Calculations

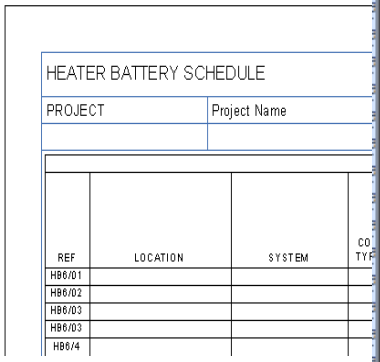


Intelligent Objects



Typical calculations

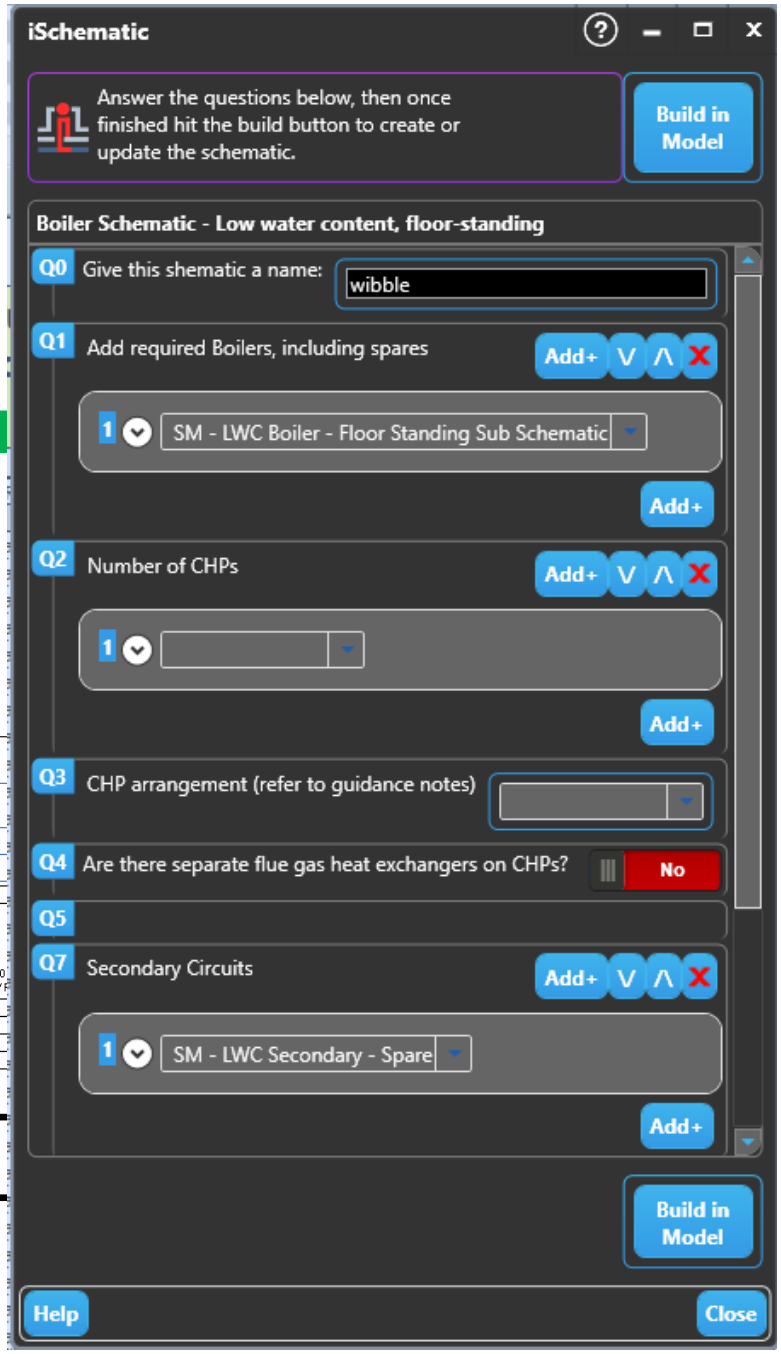
Flowrates
Coil Duties
Physical sizing



HEATER BATTERY SCHEDULE

PROJECT	Project Name

REF	LOCATION	SYSTEM	CO TY
HB6/01			
HB6/02			
HB6/03			
HB6/03			
HB6/4			



Our Approach – Interoperability

Bond Bryan
Digital

Our People

Back

Rob Jackson
BA Hons Dip Arch
Associate Director

Contact Rob:
+44 (0)114 2662040
digital@bondbryan.co.uk

THE COBIENATOR

RISE OF INDUSTRY FOUNDATION CLASSES

Our Approach – Interoperability

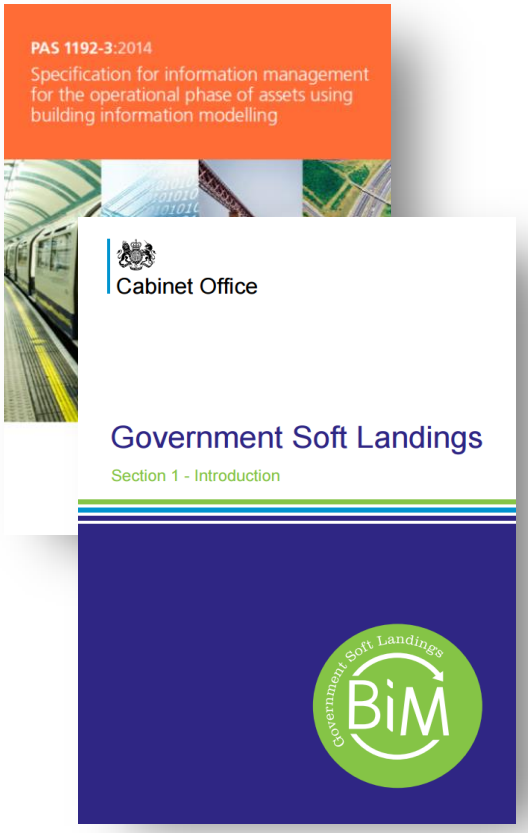
Compliant Services

Level 2 BIM Compliance

Our range of BIM services are compliant with all current regulations and guidelines.

These include:

- PAS1192 compliant team structures and information sharing processes.
- BS1192 & BS8541 compliant naming standards.
- Regular use of Common Data Environments on all our BIM projects.
- COBie parameters and Uniclass 2015 classification codes embedded in all our content.



3D Modelling

Immersive Design Experience

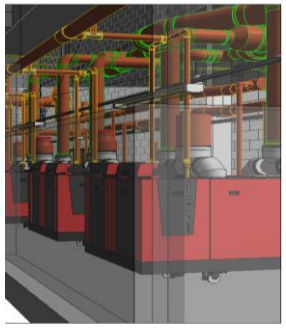
3D modelling is a key part of our BIM offering.

We use these models to help our clients:

- Visualise designs
- Take virtual tours of plant spaces
- Coordinate services

By enabling clients to fully understand their decisions during the design stage we help to ensure that the right decisions are made at the right time.

This in turn reduces the need for future changes and helps to effectively manage project costs.



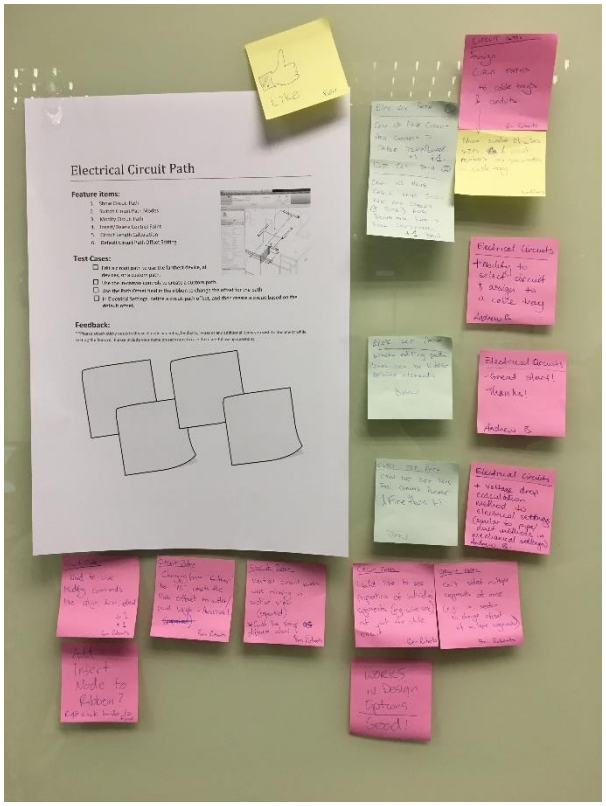
BIM Leader

Contributing to the future of BIM

We pride ourselves on being at the forefront of BIM development and are recognised in the industry as a leader.

In particular, we are continuously pushing the boundaries of using Revit as a design tool, helping Autodesk to improve software capability, and writing our own bespoke add-ins.

We have contributed substantially to BSRIA BG6, helping to shape BIM in the industry today. We continuously offer guidance to the industry through regular worldwide speaker slots, debate panels and journal articles, and we are an active member of the CIBSE Digital Steering Group.



Challenges and Barriers

INTERNAL

Resistance to change

Doing what we've always done is easy

Conflicting opinions

Budgets

EXTERNAL

Resistance to change

Conflicting opinions

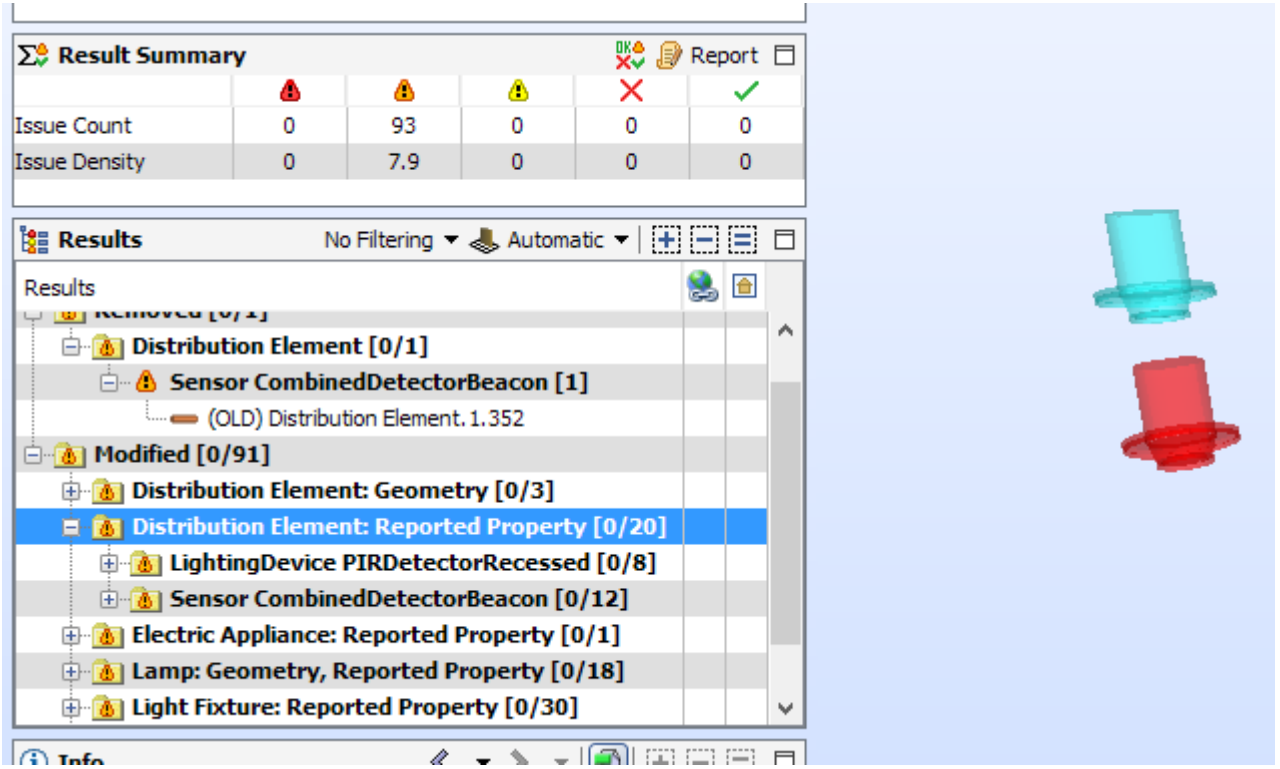
Managing Change (Incoming Models)

Differing Knowledge and skill levels

Managing expectations

Changing technology

Changing standards

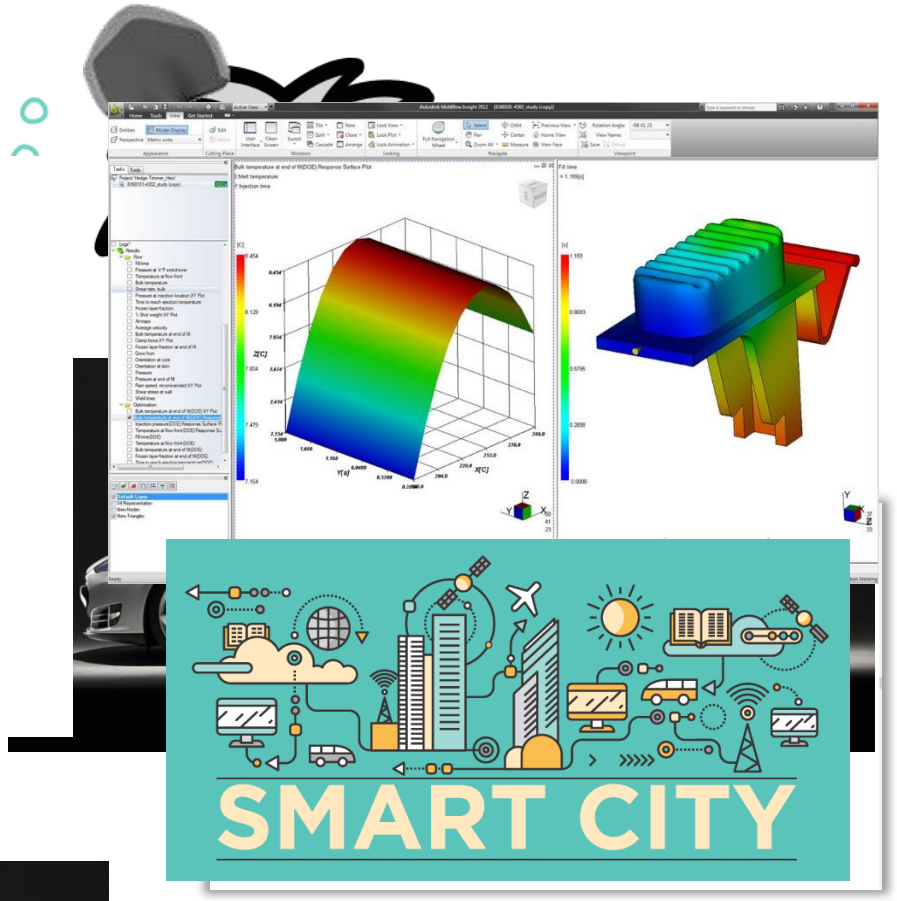


WERE ARE WE GOING

Hoare Lea – 2017

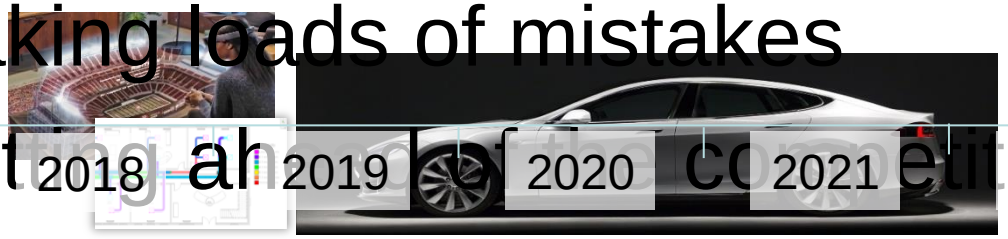
Timeline of Digital Innovation

- 10 Years: Agile, Immediate and Informative
  - Computers will optimise rather than just test
  - Instant feedback on design decisions
  - Close collaboration with team members
  - Designing directly in the virtual environment
  - We will be very involved with in-use data
  - Integrating buildings into smart cities
  - Construction will be modular prefab, carried out by robots and 3D printers



– Making loads of mistakes

– Getting ahead of the competition



– Pushing the boundaries of Revit's capabilities

2017 2018 2019 2020 2021 2022 2023