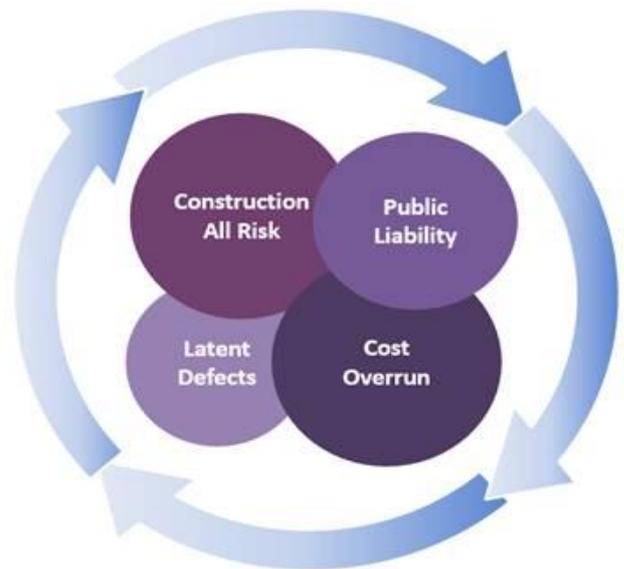


<b>Trial project:</b> Dudley Advance II		<b>New delivery model / procurement route:</b> Integrated Project Insurance		
<b>Cost savings targeted:</b> 15% - 20%				
<b>Other key success criteria:</b> <ul style="list-style-type: none"> <li>• Programme certainty at below Target Cost</li> <li>• Highly efficient methods, including off-site manufacturing where best for project, and new methods of construction, eliminating waste in materials, processes and procedures</li> <li>• Leading BIM methods and technologies from commencement</li> <li>• Flexibility of the facility to be remodelled to meet future changes in demands and training methods</li> </ul>				
<b>Stage at which first report will be published:</b>	Kick off meeting	Brief / Team Engagement	Decision to Build	Build and Occupy
<b>Cost saving basis:</b>	Investment Target	Challenging cost target	Agreed Target Cost	Outturn cost
<b>Trial project details</b>				
<b>Project title</b>	Dudley College Advance II (formerly "CABTech")			
<b>Client department</b>	Dudley College (with regional growth funding via the Black Country LEP)			
<b>Project value</b>	£11.685m			
<b>Form of project</b>	New Build Educational Facility			
<b>Independent facilitator (IF) and risk assurers (TIRA/ FIRA)</b>	Integrated Project Initiatives Technical: SECO (Belgian) / BLP Financial: Rider Levett Bucknall			
<b>Alliance Members</b>	Dudley College Derry Building Services: specialist Fulcro: engineering services and project coordinator Metz: architects Pick Everard: structural Speller Metcalfe: constructor			
<b>IPI Brokers</b>	Griffiths & Armour			
<b>Other Key Suppliers</b>	Adstone: steelwork BC Roofing: hangar cladding H&H: cladding and glazing Glosfords: structural insulated panels Kone: lifts MSW: metal decking SDP: ceilings and partitions Terex Demag: hanger cranes Upanoor: thermally-active building structure			

**The IPI product**



**"Independent Facilitation  
Technical and Financial Risk Assurance"**

**Executive summary:**

Dudley College has selected the Integrated Project Insurance (“IPI”) model to procure and deliver a new Centre for Advanced Building Technologies, termed “Advance II” (was known as “CABTech”). Not only is Advance II approved as a trial project by the Cabinet Office via the Roll Out Management Group but it is now also the primary nominated project under the Innovate UK “Rethinking the Build Process” project 101345 with a consortium of eight industry partners and academic partner University of Reading.

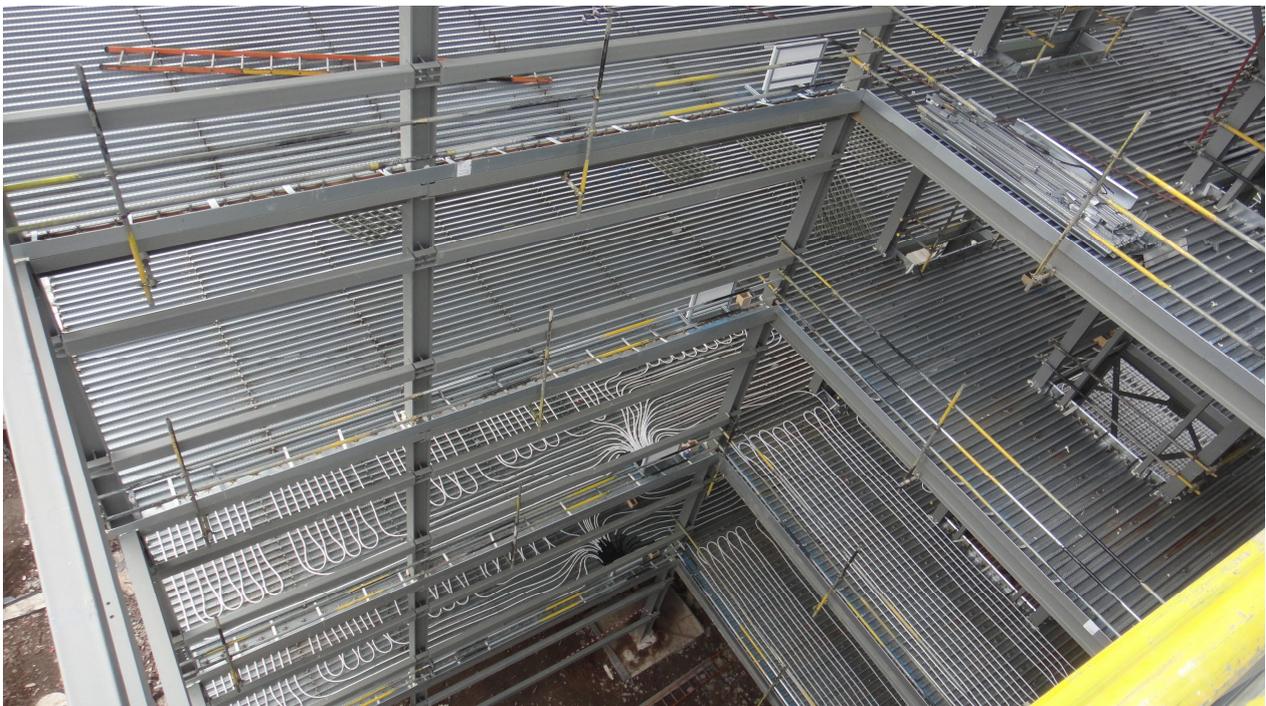
The IPI new model of procurement applies an integrated collaborative working approach throughout to a level which exceeds any other previous procurement routes the College has used. It includes the adoption of a Project Bank Account, BIM, and lean design and implementation practices. Via IPI the College seeks to achieve cost, time and carbon savings in line with the “Government Industrial Strategy: Construction 2025”.

Guidance on the IPI model was published by the Cabinet Office in July 2014 and is accessible at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/326716/20140702\\_IPI\\_Guidance\\_3\\_July\\_2014.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/326716/20140702_IPI_Guidance_3_July_2014.pdf)

The successful designers, specialist contractors, constructors and project coordinator were appointed in compliance with the EU Directive and UK Public Contracts Regulations (current at the time) at the outset under an “Alliance Contract” which has been developed for fully integrated collaborative working under the IPI model. This “Brief/Team Engagement” stage was described in an earlier Case Study

This Case Study describes how the alliance members through their integrated project team (“IPT”) have developed a project solution which (a) has the support of the independent facilitator and risk assurers and (b) is approved by both the Insurers and the College as being “fit for the purpose” set out in the strategic brief at an agreed target cost that has adequate allowance for technical and financial risks. It highlights the further progress in Phase 1 in terms of innovation in various forms, the importance of BIM, and the learnings about how even better results can be achieved next time; it describes the process up to the end of Phase 1 and the inception of the new “Integrated Project Insurance” policy, which led to the “Decision to Build” in the 1<sup>st</sup> quarter 2016; and lastly reports on initial progress through Phase 2 as detailed design and implementation proceed.

**Thermal adaptive building structure awaiting concrete pour**



## Project summary

### Project time-line

- 30 July 2014: Acceptance on the Cabinet Office Trial Projects Delivery Programme
- 12 September 2014: Invitation for Expressions of Interest (“EOI”) in OJEU
- 24 October 2014: Return of Prequalification Questionnaires (“PQQ”)
- 19 December 2014: Return of Invitations to Tender (“ITT”)
- 12 February 2015: Announcement of Award under OJEU
- 24 March 2015: Commercial Alignment of Alliance Partners completed
- 8 May 2015: Alliance Contract signed by all the Alliance members and Phase 1 commencement
- 23 February 2016: Phase 2 commencement (IPI policy inception)
- Second quarter 2017: planned completion

### Key project features

- Integrated collaborative working assured
- Strategic brief that includes affordable investment target
- An IPI “Alliance Contract” that empowers the team
- Alliance owns solutions and outcomes
- Financial exposure capped to insured limit, client financially responsible in the unlikely event it exceeds this limit
- Outcomes insured – including overspend
- Fitness for purpose as defined in the Strategic Brief
- Reduction in periods of design, construction and proving
- Efficiency gains whilst cutting process waste
- Free of liability inhibitions to BIM
- Free of insurance limitations for SMEs

## Client objectives and vision

The project is being procured using the Integrated Project Insurance (IPI) methodology. A key element of the IPI

process involves appointing the whole project team, including the constructors and specialists, at inception.

The building will consist of several modern construction method training facilities, some of which are the first of their kind in the FE sector in the UK. Examples include a multi-storey ‘hangar’ in which students will learn how to fabricate and assemble buildings using the latest available technologies. There will also be a ‘digital centre’ in which innovative Building Information Modelling (BIM) and digital environment software packages will be used.

Other facilities include a ‘carbon-friendly technology centre’ where students will acquire skills in, among other things, the installation of air source heat pumps and photo-voltaic technologies and a ‘construction manufacturing and assembly centre’ where they will develop their building engineering skills.

The building will also itself be a teaching resource. Not only will students experience the sustainable naturally ventilated and adaptive thermal mass environment, they will be hands-on in learning how to optimise its performance and be able to explore a range of examples of innovation in design and logistics, including a teaching version of the 3D model.

The predicted outputs of the venture by 2020-21 are:

Jobs created: 390  
Jobs safeguarded: 765  
Number of new enterprises supported: 25  
Number of enterprises receiving non-financial support: 1405  
Number of learners: 3250  
Number of apprenticeship starts: 725

The success criteria include:

- Cost and programme certainty;
- Inspirational innovation, as an exemplar to students;
- “Function over form”;

- Off-site manufacturing and new construction methods to eliminate waste in materials, processes and procedures;
- Apprenticeships and other employment/ training opportunities;
- Leading BIM methods and technologies with BSRIA Soft Landings;
- Flexibility for changes in demand and training methods;
- Aesthetic quality statement for Dudley Learning Quarter;
- Low carbon and reduced prospective operating costs;
- Opportunities for local and regional businesses.

### Previous Case Study

The previous Case Study, issued at the “Brief/Team Engagement” stage, detailed

- how procurement was conducted under the IPI model
- the key features of the Alliance Contract for use with the IPI model and
- progress through Phase 1 when solutions are being explored that have to be
  - (a) “fit for the purpose defined in the strategic brief” and
  - (b) capable of being implemented at an agreed target cost that has adequate allowance for technical and financial risks and is within the investment target.

The link is:

[http://constructingexcellence.org.uk/wp-content/uploads/2015/12/Trial-Projects-Dudley-College-Advance-II-Case-Study\\_Final.pdf](http://constructingexcellence.org.uk/wp-content/uploads/2015/12/Trial-Projects-Dudley-College-Advance-II-Case-Study_Final.pdf)

### Phase 1 – Further Progress

The highlights below focus particularly on innovation in various forms facilitated by the IPI model, noting how in many cases there came learnings about how even better results can be achieved next time. This should be the essence of a trial project.

Underlying the transformation embedded within IPI is recognition that an alliance is a “business” or “virtual company” (Movement for Innovation 1998) and as such offers both the responsibility and wherewithal to take all necessary decisions to survive and prosper that is rarely afforded to a multidisciplinary cross industry team.

### Design process and BIM

The strategic commitment to utilise BIM from the outset has put both the industry’s BIM precepts (COBie, CDE etc.) and the associated software tools to challenging practical test. Three specific issues are noted:

- (i) CDE (common data environment) products need to have data (not “deliverables”) exchange via models at their core
- (ii) Suppliers have not readily adopted the information management processes defined as part of Level 1 BIM (BS1192:2007 + A2 2016), although all files are now named in accordance with the standard
- (iii) Information planning (to ensure proactive delivery and management) has been a challenge, both because it requires focus on the minimum information required and also it does not come naturally.

The highlights below illustrate the benefits and the further opportunities for future IPI projects

- Because the alliance has embraced all the key parties from the outset, a single BIM Execution Plan was able to be produced representing the whole of the supply chain process rather than the more usual two BEPs, one pre-contract version and one post-contract version.
- Key suppliers were selected as soon as it was recognised that their products and contributions to the design were what was required. Following initial thermal modelling by

alliance members in terms of achieving target daylighting/solar control, H&H responded by saving the project significant time and cost in the areas of panel sizing, window openings and positioning, together with interfaces with steelwork. These savings far exceeded the traditional and divisive savings of “dutch-auctioning” - which would have postponed involvement into Phase 2, too late to influence design

- The knowledge and financial data forthcoming from the selected suppliers was invaluable to the decision-making. But traditions die hard: at first the designers wished to wait for suppliers to assist with design solutions, whereas the constructors wanted to wait for designs as the basis for appointing suppliers.
- The collaborative design approach using BIM has also reduced the amount of documentation that typically needs to be produced during the project to transfer risk and exchange requirements between various delivery team members. In particular, the need for tender drawings and specifications to prescribe what the constructors are required to deliver is largely redundant as they were involved in arriving at the design solution.
- Because under the Alliance Contract all partners waive their right to make claims against or sue each other save in the case of “wilful default”, documentation is not required to protect against liability, and BIM can be used without the liability constraints under traditional contracts.
- But again, traditions die hard, and pressures such as for planning have caused temporary recourse to drawing production by individual partners in isolation – only to be unwound at wasted time and cost because they were not based on an

integrated design commanding the ownership of all partners.

- Optioneering with innovative solutions has been practised, with assurance from dialogue with SECO, the Belgian technical independent risk assurer. For example, passive design measures of thermal adaptive building structure (TABS) and a natural ventilation strategy have been adopted.

### **Project coordination, alliance management, and leadership**

All alliance/IPT members have spent more time in meetings than would be the case on traditional projects. There have been two reasons for this: (a) building confidence in unconstrained and effective collaboration, and (b) carrying out the design work etc. in workshops, rather than in silos. Both the partners and the suppliers have generally welcomed the fact that their early involvement has translated into the chance to be involved in decisions, but look for a methodology that will – on future IPI projects - reduce the wasted time from being asked their opinion about matters on which they have no input. An early workshop “fired up” the alliance to develop governance principles (on matters such as reporting, authorization, and operating principles) but other events distracted follow through.

Walking the talk of collaboration does indeed create a dilemma: if you limit your involvement to discussions directly relevant to you, you run the risk of other decisions being made in isolation which may have an unwelcome impact back upon you. In contrast, your presence at the periphery of certain decisions creates opportunities for “off-piste” questions to be raised, innovations to be suggested, and better overall solutions to be developed.

The highlights below focus on some key challenges which have emerged as the team seek to optimise collaborative working

- The project coordinator (a term chosen to welcome bidders to the alliance from both the consultancy/project management and the contracting/construction management stables) was expected to lead on design/BIM management, logistics, waste reduction and associated cost control. The successful bidder, Fulcro, has been primarily responsible for enabling BIM and motivating the IPT to utilize it to the fullest extent possible.
- The “alliance manager” is chosen by the alliance board to be, in short, the “business manager” for the alliance, standing for transparency and fair play, certifying costs, and ensuring the processes of the alliance contract are followed. Whilst IPI initiatives’ role as independent facilitator (IF) was not envisaged to extend to leading, their knowledge as creators of the IPI model has also been regularly in demand in the context of Advance II being the first IPI trial project.
- Embedded in the IPI model is the management of opportunities and risks – the importance of which has only slowly been realised. Leadership here has come from different quarters, depending on the issues: from the project/BIM coordinator when it was time to tie down competing technical options; from the IF when traditional cultures have tried to creep back in and positive attitudes have been marginalised. The traditional “lowest cost” culture would often cause undue focus on price, whereas VFM has come from evaluation of both opportunities and risks, e.g. innovative design solutions, prefabrication options and site installation techniques. Many of the selected suppliers are SMEs, and when liberated to contribute, their input has exceeded all expectations.
- In the closing stages of Phase 1 and the lead up to IPI policy inception

perceptions of readiness varied, with differing expectations amongst both partners and Insurers as to the level of design information required at this stage (BIM versus Stage D) and the apparent “accuracy” often incorrectly associated with it. “Competitive tension” was palpable as the concerns of individual partners have been countered by the collective desire of the alliance for a successful transition into Phase 2 and the client’s and Insurers’ “green light” for implementation.

- Agreements made progressively through Phase 1 were duly formalised as required under the Alliance Contract in the Phase 2 Project Execution Plan, which included:
  - ✓ BIM Execution Plan
  - ✓ Procurement and contracting strategy
  - ✓ Cost management procedures
  - ✓ Supplier engagement plan
  - ✓ Programme (with partial modelling of resources).

#### IPI policy inception

IPI policy inception is a crucial milestone, when the design solution, programme and target cost are agreed, and

- the client gains the security of the policy’s cost overrun cover
- each alliance member agrees the benefits of gain-share and the risks of pain-share (subject to the limits), and
- the Insurers commit to the risks of overspend above the pain-share (subject to the limit of their indemnity)

A new “partnership” with Insurers, essential under IPI, is evolving:

- The principles of IPI with its unique cost overrun cover had their origin in discussions between Griffiths & Armour and Insurers at the start of this Millennium, and were formally

presented to a number of interested insurers in 2006. Policy drafts have since been exchanged but insurers have not been ready to address the risk and policy terms in fully formal terms until in the context of a specific IPI pilot project when risks become more real.

- Normally Insurers have the comfort of historic statistics when evaluating risks. These were available in the case of the normal elements of the overall IPI policy: construction all risks, 3rd party liability, and latent defects, but not in the case of the cost overrun cover. (which replaces liability-based professional indemnity).
- With IPI and its new “partnership” with Insurers, the open culture prevents risks from being hidden until a claim notification appears; a transparent culture is embedded, with the IF, TIRA and FIRA sharing information and advice between the alliance/IPT and the Insurers, with the objective of avoiding surprises and instead collaborating in managing both opportunities and risks.
- When the alliance was ready, reports were called for from (a) the IF as to whether the alliance/IPT was working collaboratively and likely to remain so, and (b) the TIRA/FIRA as to whether the chosen design solution was suitable and the associated target cost included adequate allowance for risk
- These reports were favourable, and the client and insurers gave their approval to proceed, with the result that savings of about 6.5% were “locked in” against the investment target of £11.685m
- Policy inception did however inevitably entail a “leap of faith”, which was eventually taken due to commitment to the future of IPI and the belief that risks could be contained and opportunities realised under the motivation of the “no blame/no claim” agreement and the collective gain/pain mechanism. The client’s primary motivation for policy inception was the security of the cost

overrun cover – in contrast to the risk of final account escalation.

- A fundamental shift of approach is required and underway over premium and “normalisation” of risk. Under IPI about half of the traditional cost of insurances (including latent defects) is invested into independent facilitation and risk assurance. As confidence in the positive effects of removal of the liability culture and the normalisation of risk grows, so the current perception of the need for premium contingencies and special exclusions should gradually disappear.

#### Phase 2 – initial progress

Following IPI policy inception, Phase 2 commenced on 23 February 2016.

- The procurement and contracting strategy has already been put into practice as the early supplier involvements are confirmed and other suppliers are selected:
  - Decisions are taken as to the appropriate degree of affinity to partner status – e.g. degree of access to the “4Projects” system; whether to be “named” as beneficiaries of the Project Bank Account; whether they should be paid on a reimbursable, measured or lump sum basis; and if/how they should be incentivised in relation to any of the project’s success criteria
  - During induction and ongoing the IF has been drawing those that need it out of the “subservient shell”, with lasting benefit to the alliance
- The IPT has settled into two types of meetings:
  - 3D model reviews, with the up to date BIM design details on screen (and visible also to distant participants on Skype) where all key design issues are addressed, and

- progress monitoring and reporting, including opportunity development and risk mitigation.
- The Alliance Board has a monthly monitoring and decision-making meeting based on the IPT reporting.
- Workshops are still held with particular areas of focus as required. For example, from a “Build in a Day” workshop using the 4D models, a change in the sequence of the hangar installation was evolved to suit the optimal installation of the façade and water tightness of the teaching block.
- In “Plan in a Day” workshops, the team including the suppliers agree the optimal installation sequences based on time, cost and interfaces; this leads to improvement in the details, innovations being identified, and advance resolution of the kind of issues which normally come to light during the actual installation process.
- Continuity of information is preserved: 3D is generating coordinated drawings and schedules; and a 5D (cost) model is being used to analyse quantities and support the cost plan. The team has worked through process and procedure issues to ensure they do not delay progress.
- Opportunities and risks are identified through a combination of BIM and the focused scrutiny and human intervention it facilitates. The IPT intends to adopt a mix of Soft Landings and GSL, and with the help of both the IF and BSRIA a start is now being made. The Organisational Information Requirements (OIR) and Asset Information Requirements (AIR) have been defined. The use of the risk register and continuous design review via the 3D model review and progress monitoring and reporting meetings described earlier go some way to fulfilling the ‘reality checking’ component of Soft Landings. This is vital in ensuring that the final design solution is practical and achievable,

- and by constantly comparing the design solutions with the client’s success criteria the outcome should meet the client’s needs
- SMEs, who are a predominant element of the IPT, are responding variously. Many are coming alive in a way not normally experienced on projects – and enjoying the process! Others tend to hold back and await instructions – but ongoing facilitation is gradually raising confidence and drawing them into full collaboration.
  - But the work of the IF does not diminish: as one new door of opportunity opens, so more come into view. During the delivery phase there is a natural propensity to return to type/custom and practice, being more comfortable with “business as usual” rather than open full collaboration. It is a matter of reminders: there is no resistance to collaboration, as the IPI model removes the business case for confrontation.
  - There is also a natural tendency to dwell more on the obvious risks than the more innovative opportunities. The traditional divide between design and construction has resulted in some members of the team being unfamiliar with elemental cost planning (as opposed to estimating given designs), whereas cost planning must be integral to all members’ decisions. There has been a need to remind the team about “affordability” – which is not just about cost but also the time and effort to make balanced decisions, taking into account the consequences on programme, progress and quality of outcomes.
  - The interaction with insurers has not stopped with policy inception. Griffiths & Armour have been instrumental in promoting regular contact with the IF/TIRA/FIRA, initially in agreeing the nature and regularity of reporting, but also through meetings so that the status of opportunities and risks may be

openly discussed. This is essential to enable insurers to gain greater understanding - and hopefully confidence - in the power of the collaborative approach, without the diversion of protectionism due to the traditional liability culture. This approach is being warmly welcomed by the insurers.

#### Notable Achievements & Lessons Learned

The Advance II case study is inherently innovative by nature. Good progress has been noted in the following areas:

- Embedding new work processes, team behaviours and expectations amongst Alliance partners & suppliers
- Orientating and mobilising all project partners around an interactive 3D BIM model
- Further IPT model reviews (with suppliers & specialists) should reduce process time and waste in design and on site execution
- Creation of a “Trinity” for each project Work Package (i.e. Design Leader; Delivery Leader; Commercial Manager) has facilitated programme, commercial & delivery issues to be effectively addressed
- Alliance team commitment and morale remains positive and robust despite the challenges to more familiar modes of working inherent in the IPI approach
- Collective belief amongst Alliance members that positive outcomes will result from the hard work done once the delivery phase accelerates

Significant Lessons Learned have also been noted to take forward to future trial projects, including the need for:

- Improved initial project documentation for project partners covering key operating issues (e.g. a collective Communication protocol; Project Bank Account arrangements)

- Smoother Alliance Board reporting process (formatting & techniques)
- Smoother supplier engagement process (i.e. covering the timing, content and mode of engagement)
- Better integration of project Opportunities & Risks with design development (including improved arrangements for financial interrogation)
- More robust decision and action taking on behalf of IPT & suppliers
- Improved frequency and timing of IPI coaching sessions, especially in the early stages of team formation and design development
- More frequent peer-review of project arrangements, including those covering cost accounting in the Alliance (e.g. people costs)
- Managing decision-making so that individual project partners do not take action that can be detrimental to the collective ethos of the IPI ‘philosophy’ (e.g. ensuring that the IPT members collaborate on all key aspects of design)

#### Monitoring outcomes

The Academic Partner in Innovate UK project 101345 is the School of Construction Management and Engineering, University of Reading who are responsible for monitoring the successes - and analysing the reasons for shortcomings - against defined deliverables.

The consortium’s deliverables include:

- Updating and making “inter-active” the integration toolkit for the Strategic Forum for Construction
- Developing and testing a new “Alliance Contract” for use with the IPI model
- Developing and testing a new “Integrated Project Insurance” policy
- Use of an appropriate level of BIM to assist a fully integrated collaborative approach
- Critical review of codes and standards, and recording reasons why some inhibit innovation, sustainability, speed and efficiency

- Reviews of product selection, and whether criteria of whole life cost and sustainability are being applied
- Effectiveness of the Alliance Contract, IPI Policy and independent facilitation at engendering behavioural change and innovation
- Effectiveness of the independent risk assurance at engendering improvements in efficiency and risk management
- The role of leadership and incentives towards enabling the success criteria to be achieved in their priority

A wide range of expertise in support of these activities is available from the consortium for project 101345, for example the lead partner Rider Levett Bucknall and another industry partner, the Building Services Research and Information Association.

#### Guidance on the IPI Model

Guidance on the IPI Model is complementary to this case study, and is accessible at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/283331/IPI\\_Guidance.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283331/IPI_Guidance.pdf)

Of particular interest will be Section 9 which identifies the benefits the IPI Model is expected to bring for:

- The Client Group
- Lead Constructor/Project Manager
- Design Consultants
- Specialist Contractors
- Other supply chain members
- Insurers
- Funders
- The Local Community

For change to take off and become “Business as Usual”, there must be seen to be benefits for all parties involved. The outcomes in this context will be reported at the end of the project.

#### Cost targets and savings

Cost savings targeted: 15% - 20%

#### Miscellaneous

##### Authors

- This case study has been developed for Constructing Excellence by Martin Davis, as IPI Mentor, with invaluable assistance from his IPInitiatives’ colleagues Kevin Thomas and Louise Lado-Byrnes (who act jointly as project IF), the Alliance, and in consultation with Professor John Connaughton and researcher Dr William Collinge of the School of Construction Management and Engineering, University of Reading and other members of the IUK consortium

#### Background: Trial Projects programme

The Government Construction Strategy aims to change the relationship between clients and the entire supply chain within the industry. The trial projects perform a central role in delivering the Strategy’s sustainable 15-20% reduction in costs and are currently testing three new procurement models (Cost-Led Procurement; Integrated Project Insurance; Two Stage Open Book) that were proposed by industry and developed by a joint task group. Case study reports are therefore an output of monitoring the progress and outcomes of the trial projects. They are produced at four stages: Kick-off Meeting; Brief/Term Engagement; Decision to Build; Build and Occupy. Other case study reports can be found at:

<https://www.gov.uk/government/publications/government-construction-strategy-trial-projects>

#### Project contacts

For further information on the IPI Model, please contact: Martin Davis, Integrated Project Initiatives and Mentor for the IPI Model at [martin.davis@ipinitatives.com](mailto:martin.davis@ipinitatives.com)

[5 December 2016](#)