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ICP SEMINAR ON LIABILITY FOR DESIGN DEFECTS
IN A COLLABORATIVE, INTEGRATED DIGITAL AGE

THE USE OF BUILDING INFORMATION MODELLING
(“BIM”) THE UK EXPERIENCE

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1. The question we pose ourselves this morning is: to what extent is the use of Building Information Modelling (“BIM”) in the construction industry in the UK, changing the legal landscape for the liability of construction professionals for design defects in construction and engineering projects?
2. The suggestion from the innovators and promoters of BIM is that it will not do so to any great extent. However, when you examine the practical effects of its use in the planning, design, procurement, construction and operation of building and engineering projects, the right answer must be “significantly”, although it will take some time for those involved, and their lawyers, to articulate the legal consequences once we can see and fully understand the implications of its use.
3. The purpose of this paper is to provide an introduction and explanation of the take up and use of BIM in the UK, and to consider in particular the implications for intellectual property rights associated with the use of BIM for the design and construction of projects.
4. It is hardly a surprise that in this digital age, construction professionals have developed new technologies to simplify and

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enhance their ability to develop designs and to co-ordinate the elements of building and engineering developments so as to avoid clashes between the various professional disciplines engaged in the design and delivery of projects. Increasingly construction professionals have had resort to new technologies as an aid to the production and co-ordination of design information.

The Road to BIM

5. Since the early 1980s, UK professionals have used computer software programmes, in particular software known as “AutoCAD”² to produce digitally-drawn technical artwork representing elements of the design of a project. AutoCAD is a computer-aided software program which can be used by construction professionals to create detailed, scaled 2 and 3-dimensional drawings for use in the planning of infrastructure projects and the design of domestic and commercial structures, mechanical services and electrical circuitry.
6. The software was originally capable of generating drawings only in 2D, but the modern AutoCAD includes a full set of basic solid modelling and 3D tools. The 2007 release of AutoCAD included improved 3D modelling and editing features which enabled far greater modelling of curves, surfaces and solids. Its introduction and use revolutionised the production of design information on construction projects.
7. In 2010 AutoCAD became available as a mobile web and cloud-based application. Moreover, the use and development of AutoCAD continues. Recognising in its development the increasing trend towards collaborative design initiatives in construction, it now includes social collaboration tools, time-saving enhancements, live maps, and reality capture capabilities.

² CAD means “computer-aided design”. AutoCAD software is not exclusive to the UK.

8. The new 2014 release is said to comprise:

“...robust 3D tools that can create almost any shape imaginable, AutoCAD helps you create stunning designs. It offers innovations that can help increase design efficiency and speed documentation, and enables you to more smoothly share designs with colleagues. Connect with the cloud to collaborate on designs and access them from your mobile device. With these capabilities and more, AutoCAD delivers the power and flexibility you need to take documentation and design further.

AutoCAD software is used by architects, CAD technicians, designers, engineers, project managers, and CAD/IT managers in a variety of industries, including the manufacturing, building, civil, and mapping industries.

9. For construction industry professionals, specialised software programmes exist for the production of engineering, architectural, project management, mechanical, civil and electrical drawings and information. Without doubt, these software applications have impacted significantly on the design process for construction projects, in terms of both speeding up and simplifying the design phase.
10. Originally, each member of the construction design team developed their own design drawings and once drawn, the CAD drawings then had to be interpreted manually and updated by the marking up of original drawings or by the use of “redlining” software. Therefore there remained considerable scope for human error. Most construction lawyers will have a substantial body of anecdotal evidence of disputes concerning the accuracy of contract drawings, the omission or addition of incorrect services information, the failure to co-ordinate the various elements of the design of projects, be they architectural, civil or structural engineering, or mechanical, electrical, HVAC or BMS systems, and problems concerning the production of the final as built drawings and manuals on completion. The drive to encourage the industry-wide take-up of BIM by construction

professionals is in part fuelled by the belief that many of these disputes will be eradicated in the process.

11. In terms of liability for design defects, in the pre-BIM era, while it was and remains commonplace for one construction professional to blame another for the consequences of design errors; broadly speaking, the limits of the responsibilities of the various professionals were reasonably defined and the professional risks of each were relatively straightforward to evaluate and manage. The advent of the use of BIM in construction projects is said to have a number of benefits, but the clarification, or simplification of liability for design defects might well not be one of them.

The UK Government's initiative to promote the use of collaborative working and the advent of BIM

12. The rise and rise of the UK Government's desire to change the way construction projects are procured in the UK is well documented. I mention in passing only the Latham Report of July 1994, commissioned by the UK Government to review procurement and contractual arrangements in the UK construction industry, in which Sir Michael Latham urged the reform of the construction procurement process and advocated partnering and collaboration by construction companies. His report lent force to a new form of construction contract, the New Engineering Contract of 1993, which championed a collaborative and integrated approach to procurement. Anecdotally, my recollection at the time was that the first NEC had not been well received in the construction industry and it was subject to extensive revision in the following decade.
13. But partnering and collaborative working initiatives continued, and in 2005 the updated NEC3 form was published with the fully backing and endorsement of the UK Office of Government Commerce (OGC). The endorsement was fulsome and compelling, it read:

‘OGC advises public sector procurers that the form of contract used has to be selected according to the objectives of the project, aiming to satisfy the Achieving Excellence in Construction (AEC) principles. This edition of the NEC (NEC3) complies fully with the AEC principles. OGC recommends the use of NEC3 by public sector construction procurers on their construction projects.’

14. The Government’s objective was a familiar one, it saw NEC3 as a better way to achieve substantial savings and contribute towards its £21.5 billion efficiency target set in connection with its expenditure on building and maintaining public property and infrastructure each year. It recommended that public-sector construction procurers should use NEC3.
15. Attention then focussed on the design process and the management of construction information. In 2007, the Government published the code of practice BS1192:2007 titled “Collaborative Production of Architectural, Engineering and Construction information”³. The purpose of BS 1192:2007, with its emphasis on collaborative production, was to establish the methodology for managing the production, distribution and quality of construction information, including that generated using CAD systems.
16. The Government recognised that a key requirement of successful working in a collaborative environment was the ability of construction professionals to communicate, share and re-use construction information and data without loss, conflicts and misinterpretations. A failure to address these core issues was seen as an impediment to both the productivity and profitability of project teams.
17. But technically the techniques available for the production of construction information have moved on. Over the last 12 years or so, BIM technology has been developed and is increasingly favoured for

³ This was a new version of the earlier BS of 1998 which was a Guide to the structuring and exchange of CAD information, elevated also to a Code of Practice to increase the pressure on design teams to implement it.

use on large scale construction and engineering projects. BIM has resulted in a transformation of the way in which building and engineering projects are designed and constructed.

18. Described by the Government's BIM Task Group as: *"...essentially value creating collaboration through the entire life-cycle of an asset, underpinned by the creation, collation and exchange of shared 3D models and intelligent, structured data attached to them."* The key feature of BIM is the bringing together of information from all members of the BIM team⁴ to produce a database of the building objects comprising the project. The database, generally known as a "federated model", is capable of interacting with many other BIM processes and applications and can be used by the project professionals in an automated format to guide and develop a project from its conception and early design stages through to completion and the monitoring of its subsequent performance throughout its life cycle.

BIM, levels 0, 1, 2, 3

19. Depending on the technical level of the model, BIM enables parties to generate information in 2D, 3D, 4D (which includes time and scheduling information), or 5D (which includes information about both time and money) and Dn (to include information on energy, materials etc). Its ambitious objective ultimately at the higher levels is to establish collaboration through the entire life cycle of an asset to achieve maximum value in its design, construction and subsequent operation.
20. So what do the various levels of BIM mean in practice:
 - a. **Level 0:** Unmanaged CAD, in 2D, with paper (or electronic paper) data exchange, i.e. this is not BIM but it is the level at which many UK construction firms operate, particularly in the

⁴ Usually comprising the project owner, design professionals, the contractor and principal sub-contractors.

private sector and on small to medium projects where the resources required to develop and implement a design by BIM cannot be justified.

- b. **Level 1:** Managed CAD in 2D or 3D format with a collaborative tool providing a common data environment with a standardised approach to data structure and format. Commercial data will be managed by standalone finance and cost management packages with no integration. This is effectively a “CAD plus” solution.

- c. **Level 2:** (the UK Government’s target for 2016) this involves the presentation of data in specific databases which might also include information about costs, or programming/time lines, but without one single database for all information. The definition given by the Government’s Taskforce is: *“Level 2 BIM is a series of domain specific models (e.g. architectural, structural, services etc.) with the provision of a single environment to store shared data and information, in our case COBie UK 2012.”* The intention therefore is for design information held in separate design databases to be integrated on the basis of proprietary interfaces, or bespoke “middleware” operated by a BIM co-ordinator. Commercial data is held separately.

- d. **Level 3:** As currently understood, the “ultimate” BIM solution. A fully integrated and collaborative process enabled by 'web services' and compliant with emerging Industry Foundation Class (IFC) standards. This level of BIM will utilise 4D construction sequencing, 5D cost information and 6D project lifecycle management information.

21. In the UK, level 3 BIM is under discussion but the focus of the Government’s drive to introduce BIM as an industry norm, is focussed

on the implementation of BIM level 2. While promoting the take-up of BIM and emphasising the considerable savings in time and costs which can be achieved with its use, the Government is also at pains to demonstrate that the effects on the legal responsibilities of those responsible for the design, construction and operation of projects is at best minimal, or at worst, easily managed.

The “Government Construction Strategy”: a report published by the Cabinet office on 31 May 2011.

22. The UK Government, in yet a further drive to reduce the cost of public construction projects, has committed itself to embracing BIM and mandating its use in all centrally procured Government construction projects at Level 2⁵ by 2016. The Government’s plan was rolled out in its “Government Construction Strategy” report which was published by the Cabinet office on 31 May 2011.
23. The report announced the Government’s intention over the next 4 years, to embark on an industry modernization drive so as to require: as a minimum, collaborative 3D BIM (with all project and asset information, documentation and data being electronic) on its projects by 2016. The strategic objective of this initiative is to deliver up to 20% sustainable savings in the cost of central government construction projects by the end of the current Parliament.
24. In 2012 the UK Government produced a further report; “Government Construction Strategy: One Year on Report and Action Plan Update”. It states: *“Great strides have been made over the past year to prepare for this... Four pathfinder trial projects are underway in the Ministry of Justice (MOJ) and other departments are developing their implementation plans. The expectation is that all seven major [government] departments that procure construction will be engaged by the end of 2013.”*

⁵ Described as “file based collaboration and library management”.

25. Specifically the MOJ is publicising the success of its BIM initiative for the Cookham Wood Prison and states that it is one of the first clients in Europe to issue BIM Employer's Requirements with the tender. The UK MOJ aims to be BIM-enabled for all future projects by the end of 2013. The MOJ's Head of Project Delivery Unit has stated:

“Our implementation of BIM has given us a focus on driving out waste through improved standardisation, better stakeholder engagement and improved asset data gathering. All of this underpins our aim for continuous improvement, which in turn plays a major part in reaching our savings targets of 20%.”⁶

26. In mid 2012, the structured digital data exchange format known as “COBie UK 2012” had been prepared; legal, commercial and insurance protocols were in the course of preparation and a Publicly Available Standard (PAS) 1192-2:2012 (documenting the delivery of BIM-enabled design and construction information) was under public consultation.
27. Crucially the report indicated that links were being forged with complementary programmes for developing private and public-private sector collaborations on BIM for retail, rail and developers. Summary reports from David Miller Architects and Balfour Beatty confirmed the enthusiasm of professionals and contractors/developers for BIM. Ian Tyler, CEO of Balfour Beatty highlighted the company's use of BIM on a number of high profile projects, including:
- a. The San Francisco Bay Bridge
 - b. The widening of the M25 motorway outside London;
 - c. The design and construction for the replacement for Terminal 2 at Heathrow – noting that for the new Terminal 2B *“...the use of BIM helped the company coordinate over 30 active stakeholders through 13 interfacing projects and enabled a peak workforce of*

⁶ The statement of Mr. Terry Stocks, see the Report at page 16.

1,600 to complete work, including a 2 km diaphragm wall, the largest in Europe, ahead of schedule.”

28. More recently still it has been confirmed that BIM is being used on the long awaited and much heralded “Crossrail” project which is described⁷ as:

“...the first complete new underground line in more than 30 years. It is one of the most ambitious transport construction projects undertaken in London since the original Paddington to Farringdon section of the Underground opened in 1863 or the deep-level Tube boom of the early 1900s which saw the construction of the Bakerloo, Central and Piccadilly lines.”

29. Crossrail is currently the biggest construction project in Europe and one of the largest single infrastructure investments to be undertaken in the UK. The project includes the construction of 42 km of new tunnels under London. It currently employs over 10,000 people and will employ thousands more in the supply chain.
30. The 2012 report goes on to discuss also the progress of the “Soft Landings” process which seeks to align the interests of the designers and constructors of assets, with those of the users and managers of them, which is based on the Building Services Research and Information Association’s (BSRIA) soft landings framework. This is discussed by my colleague Rupert Choat in his paper.
31. The feedback helpfully supplied by Richard Shennan, Group practice manager of Mott MacDonald, and since 2011, that company’s first Group Building Information Modelling (BIM) champion, implementing the consultancy’s strategy to make BIM the technology of choice on all major engineering projects by the end of 2013, is very supportive of the process. Mott MacDonald was an early adopter of BIM and believes that it saves time and money and adds value. He explained that it was important to get a clear definition of what BIM means

⁷ By Crossrail – see the Company’s website at <http://www.crossrail.co.uk/construction>.

within a company, and then set up a risk assessment team to work through the contractual implications, including the intellectual property rights. His view is that if Mott MacDonald are able to achieve BIM working properly at level 2 (as they are), the move to level 3 will be seamless and automatic. BIM has been adopted for use on London Undergrounds £700million upgrade of Victoria Station in London where Mott MacDonald are the lead consultants for civil, mechanical, electrical, environmental traffic and utility works. Mott MacDonald are also engaged in various consulting roles on significant international projects using BIM such as the Adelaide Oval project in Australia and Port Mann/Highways 1, Vancouver, Canada.

32. In 2013, as already foreshadowed, the Government Task Group on BIM has produced a number of further documents to facilitate the introduction and use of BIM⁸, with its focus already moving on from project setting up processes to project implementation. The BIM Task Group and the Construction Industry Council (CIC) has produced a BIM Protocol in response to the Government's BIM Strategy that is designed for use on all common construction contracts intended to support BIM working at level 2: CIC/BIM Pro, First Edition 2013. The purpose of the Protocol is to encourage the industry, especially those elements outside the major infrastructure sector who are not directly engaged in the Government's initiative, to adopt BIM so that it meets the Government's objective as the norm in the UK construction industry.
33. The same parties have also produced documents setting out the Scope of Services for Information Management that provides details of the Information Management role that is fundamental to BIM delivery on a project, and a Best Practice Guide for Professional Indemnity

⁸ Including the production of PAS 1192-3, to provide guidance on the use of the Asset Information Model (AIM), and provide assistance to owners and asset operators on best practice in portfolio management for the life of the asset.

Insurance when using BIM, that addresses the needs of insured professionals engaged in the production of information using BIM.

34. The PAS mentioned in the 2012 update of the Government's Construction Strategy has now been published. PAS1192-2/2013, Specification for Information Management for the Capital/Delivery Phase of Construction Projects Using Building Information Modelling, became effective on 28 February 2013. It is produced by the British Standards Institution and sponsored by the Construction Industry Council. PAS 1192-2/2013 builds on the existing BS1192:2007 titled "Collaborative Production of Architectural, Engineering and Construction information" discussed above.
35. PAS 1192-2/2013 is not a British Standard, but may become so or be incorporated into one in due course. It is however a Code of Practice. The purpose of PAS 1192-2/2013 is to provide guidance about the information management requirements for projects which are to be delivered using BIM. It is a framework document from which other, supplementary documents have and are being produced to provide detailed guidance. Importantly, the PAS assumes that non-BIM information exchanges will be managed using equivalent information management standards and that all project information, whether emanating from BIM or traditional data formats, will be shared by the project team using a single collaborative data environment (CDE).
36. As to the CIC/BIM Protocol, the way in which the Protocol is intended to become effective is by its inclusion as a contract document by the parties and for the its contents to rank in priority over all other contract documents.⁹ The essential features and objectives of the Protocol are set out in the Guidance at the beginning of the document. These are:

⁹ Protocol, clause 2.

- a. *The Protocol makes the minimum changes necessary to the pre-existing contractual arrangements on construction projects;*
- b. *The Protocol ensures that there is an obligation on parties to provide defined elements of their works/services using models;*
- c. *The Protocol is a contractual document which takes precedence over existing agreements; and;*
- d. *The Protocol is flexible and should be suitable for use on all Level 2 BIM projects.¹⁰*

37. There are a number of BIM-related issues to be resolved by professionals engaged in procuring, designing, contracting and operating projects, including the potential impact on design responsibilities; related insurance implications for professionals; and intellectual property ownership rights. New liabilities might be created, for example, through the provision of life-costings for projects which in a BIM environment can be accurately monitored once the project is complete. As far as design liability is concerned, where a project has been designed using BIM, it might prove difficult to allocate responsibility for a defect in the design and its consequences where design information is fed into the BIM model by one professional, and then adapted or added to by another or other designers engaged on the project. Given the necessity to work in a substantially collaborative environment, there are already discussions about the use of joint insurance provisions; how risks can be allocated between the stakeholders; and possible limitations on parties' rights to sue, which may have a significant impact on the legal framework within which construction professionals work in the future.

38. There are also concerns about data corruption which need to be managed, but these ought not to be overstated. The provisions of the Protocol are intended to remove the need for separate Electronic Data Exchange Agreements between the members of the BIM Team. In

¹⁰ Protocol, Introduction and Guidance, paragraph 2.

particular, the BIM Protocol deals with the risk of corruption of data following its transmission.

39. Clause 5 provides:

5. ELECTRONIC DATA EXCHANGE

5.1 Without prejudice to the Project Team Member's obligations under this Protocol and the Agreement, the Project Team Member does not warrant, expressly or impliedly, the integrity of any electronic data delivered in accordance with this Protocol.

5.2 The Project Team Member shall have no liability to the Employer in connection with any corruption or any unintended amendment, modification or alteration of the electronic data in a Specified Model which occurs after it has been transmitted by the Project Team Member, save where such corruption, amendment, modification or alteration is a result of the Project Team Member's failure to comply with this Protocol.

40. Clause 5.1 therefore makes clear that, without prejudice to its obligations under the Agreement, the Project Team Member gives no warranty as to the integrity of electronic data. Clause 5.2 goes on to exclude liability for any corruption or unintended amendment etc. of the electronic data which occurs after the transmission of a Model by the Project Team Member, unless caused by a failure to comply with the Protocol. Unsurprisingly given the infancy of working in the BIM environment and with these new regimes, neither of these limitations on liability have yet been tested in Courts, but they seem reasonable limitations for professionals working in the BIM environment and no doubt the risks of data corruption are issues which can be managed by insurance and/or within the parties contracts by agreement.

Intellectual Property Rights

41. There is widespread interest and some concern about the impact of BIM on intellectual property rights in construction design data and information. Consultants are concerned to protect the intellectual property rights in their designs. Others are suggesting that the more

important issue surrounds the ownership of intellectual property rights for designs produced in a collaborative BIM environment.

42. In the light of the concerns expressed by those in the industry about infringement of intellectual property rights which could arise by the implementation of BIM forms of collaborative working, the Protocol has laid down clear provisions about the management and licensing of those rights which on the one hand enables the Model to be used by the project team and others as intended but on the other hand, safeguards the intellectual property rights of the members of the project team. The text of clause 6 is set out below. It remains to be seen whether it works in practice or whether, as some would suggest, the incidence of infringement of intellectual property rights is no more or less likely to arise in a BIM working environment, than it is using existing and traditional working practices.

43. The BIM Protocol addresses intellectual property issues head on and prescribes a regime to deal with them in clause 6 in the following way:

6. USE OF MODELS

6.1 The Employer and the Project Team Member agree that any provisions in the Agreement concerning the copyright (or any other rights) in and licence to use the Material, the Federated Models, the Project Team Models, any material forming part of the Specified Models which is provided to the Project Team Member by or on behalf of the Employer and any proprietary work contained therein shall be varied to the extent necessary so that sub clauses 6.2 to 6.8 apply to the Material, the Federated Models, the Project Team Models, any material forming part of the Specified Models which is provided to the Project Team Member by or on behalf of the Employer and any proprietary work contained therein but if there are no such provisions sub-clauses 6.2 to 6.8 shall apply.

6.2 Any rights (including but not limited to any copyright) subsisting in the Material and any proprietary work contained in the Material shall, as the case may be, vest or remain vested in the Project Team Member.

6.3 Subject to clause 6.4 and 6.5, the Project Team Member grants to the Employer a nonexclusive licence and, to the extent that the Material and any rights subsisting therein are owned by third parties, a sub-licence, (including the right to grant sub-licences on identical terms to

Other Project Team Members, which shall include the right to grant sub-sub licences on identical terms to Other Project Team Members' sub-contractors) to transmit, copy and use the Material and any proprietary work contained in the Material for the Permitted Purpose.

6.4 The licence and sub-licence (if any), granted in clause 6.3 may be suspended or revoked in the event of non-payment to the extent that any licence in the Agreement provides for such suspension or revocation.

6.5 The licence in clause 6.3 shall not include the right to:

6.5.1 amend or modify the Material without the Project Team Member's written consent (not to be unreasonably withheld), save where such amendment or modification is:

- a. provided for in the Information Requirements; or*
- b. made for the Permitted Purpose following the termination of the Project Team Member's employment under the Agreement; or*

6.5.2 reproduce any proprietary work contained in the Material for any extension of the Project.

6.6 Subject to clause 6.8 and any right of revocation contained in the licence granted to the Employer in respect of the same, the Employer grants to the Project Team Member a nonexclusive sub-licence (including the right to grant sub-sub-licences on identical terms to the Project Team Member's sub-contractors) to transmit, copy and use for the Permitted Purpose:

6.6.1 any material forming part of the Specified Models which is provided to the Project Team Member by or on behalf of the Employer;

6.6.2 the Project Team Models (and any part thereof);

6.6.3 any Federated Model (and any part thereof); and

6.6.4 any proprietary work contained in the same, to the extent that the same or any rights subsisting therein are owned by Other Project Team Members or any other third party.

6.7 Insofar as the Employer owns:

6.7.1 any material forming part of the Specified Models which is provided to the Project Team Member by or on behalf of the Employer;

6.7.2 the Project Team Models (or any part thereof);

6.7.3 any Federated Model (or any part thereof);

6.7.4 *any proprietary work contained in the same; or*

6.7.5 *any rights subsisting in any of the above, subject to clause 6.8, the Employer grants to the Project Team Member a non-exclusive licence (including the right to grant sub-licences on identical terms to the Project Team Member's sub-contractors) to transmit copy and use the same for the Permitted Purpose.*

6.8 *The licence and sub-licence (if any) granted in clauses 6.6 and 6.7 shall not include the right to:*

6.8.1 *amend or modify a Model without the written consent (not to be unreasonably withheld) of the Employer or the Other Project Team Member who produced and delivered that Model (or the relevant part thereof), save where such amendment or modification is:*

- a. provided for in the Information Requirements; or*
- b. in respect of material produced or delivered by an Other Project Team Member, made for the Permitted Purpose following the termination of the Other Project Team Member's employment under the Agreement; or*

6.8.2 *reproduce any proprietary work contained in a Model for any extension of the Project.*

6.9 *The Project Team Member represents to the Employer that it has, or that it will procure, the right to grant either a licence or sub-licence in the form granted in clause 6.3 in respect of the Material and any proprietary work contained therein.*

6.10 *The Employer represents to the Project Team Member that it has, or that it will procure, the right to grant either a sub-licence in the form granted in clause 6.6 or a licence in the form granted in 6.7 in respect of:*

6.10.1 *the Project Team Models (and any part thereof);*

6.10.2 *any Federated Model (and any part thereof) which does not form part of the Material;*

6.10.3 *any material forming part of the Specified Models which is provided to the Project Team Member by or on behalf of the Employer; and*

6.10.4 *any proprietary work contained in the same.*

44. Under Clause 6.2 'any rights (including but not limited to any copyright) remains vested in the Project Team Member'. Accordingly, if

the intention is for the Employer to take ownership of the intellectual property rights then it is necessary to amend the Protocol and make other ancillary changes to the project team terms of appointments. The means of licensing the use of the various project team members is largely self-explanatory. However should the Employer wish to grant a licence to use the material in the Model to other parties, then further contractual arrangements will have to be included. These might take the form of collateral warranties or some extension of the benefit of the Protocol. These are the kind of issue which can be adequately governed by the existing law of contract.

45. It is important to recognise at this point that the UK Government's initiative to achieve level 2 BIM take-up by the industry can be achieved without radically altering the existing rights and obligations of the parties to the contract. The Protocol makes this clear. What is not available therefore is any serious consideration on the wider effects on intellectual property rights which will become engaged at each successive level of BIM take-up, in particular the issues that will arise for consideration as the construction industry moves from BIM level 2 to BIM level 3.
46. Traditionally a designer owns the copyright of his designs and resultant plans and specifications for the works and the owner is granted a licence to use them for the project. Depending on the level of collaboration, it is also possible for the design team to agree joint ownership of the design.
47. At Level 3 BIM, the designers produce a model which is intended to function throughout the life cycle of the project. In this situation, a licence may be insufficient for the owner's purposes post construction, i.e. during the operational phase of the project, so that the better option might be for the employer to become the owner of the model

and for the principal designer, or the designers jointly to retain copyright in the original design work.

48. What the employer needs in the form of intellectual property rights or a licence, is the right to generate and manage data relevant to the building throughout its lifecycle on operating and maintenance issues, energy efficiency and such matters which are an integral part of the enhancements which come with the use of BIM level 3. These matters need to be considered and managed at the outset in the contract/consultant appointments, when each party can confirm its present and future rights and obligations in relation to the model and the data within it.

Conclusion:

49. Undoubtedly the technology will develop and its use and application will spread throughout the construction industry in the UK. There will be no going back, the rate of progress will depend on perceived and actual benefits to the industry and the take-up beyond the public sector. The determination of the present and successive UK governments to drive through changes in project procurement to derive savings both in the cost of the delivery of major projects, and also their maintenance and operation during their working life, is key to future progress.
50. The main reason for the UK's rapid progress in the takeup and development of BIM has been the enthusiasm of the Government to promote and adopt its use on all major infrastructure projects. The degree of takeup in the private sector is less encouraging and the Government's Task Group in conjunction with other industry organisations is working hard to promote its adoption in all sectors. As observed, there are some striking examples of the use of BIM in landmark construction projects in the UK.

51. The legal ramifications for BIM project team members will unfold as processes develop and lessons are learned. But the overriding objective of BIM is to make life easier not more difficult for the employers or the BIM team and therefore parties need to implement clear contractual arrangements which take account of their use of BIM, and settle and manage their responsibilities to each other and the employer/building owner.
52. Practically, in order to maximise the benefits associated with BIM, BIM documents need to be carefully drafted to ensure the inclusion of all BIM-related activities and the parties need to establish a clear notification and review procedure as the model develops and other designers add their input. The UK is managing these challenges with the support of the Government and its BIM Task Group working in conjunction with construction industry bodies such as the CIC.
53. What needs to be stressed is that BIM is a tool, a new way of working to achieve what is already being achieved by other means. It is hoped that it will simplify and enhance the design process, especially its co-ordination, leading to substantial savings in both time and money.
54. Is it working and achieving the Government's stated objectives?
55. In a recent interview¹¹, Haley Miller, head of Construction, Cabinet Office of the UK Government was asked how the Government's Construction Strategy (the key but not the only element of which is the adoption and use of BIM Level 2 by 2015/6) is working, she said:
Well as the case studies demonstrate, we are already seeing tangible outcomes from the trial projects; what's rewarding is that this is not just being seen in central government projects, e.g. MoJ's Cookham Wood, but we are joining forces with those delivering best practice in Local Government. What we're finding is that the more you embrace the key principles, the greater the potential impact. This is not just about

¹¹ BIM Task Group Weekly Newsletter, week ending 22 September 2013.

process, this is about behavioural change. From a hard numbers perspective, the GCS has delivered over £0.5bn of savings thus far and as the benefits of early initiatives start to flow through, we are confident that we can reach our target to deliver £1.2bn of savings in 2014/15.

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