Report on the JCT Sustainability: Lifecycle Consultation

2013

CONSULTATION REPORT

Report on the JCT Sustainability: Lifecycle Consultation

Published March 2013 by Sweet & Maxwell, 100 Avenue Rd, London NW3 3PF
part of Thomson Reuters (Professional) UK Limited
(Registered in England and Wales, Company No 1679046.
Registered Office and address for service:
Aldgate House, 33 Aldgate High Street, London EC3N 1DL)

www.jctltd.co.uk

Report on the JCT Sustainability: Lifecycle Consultation

Introduction

1 Sustainability in design and construction is an issue of major and growing importance. The increasing focus on the cost of carbon, the Government's soft landings and BIM initiatives and recognition of the significance of lifecycle costs will all exacerbate this.

2 JCT originally published a Guidance note – Building a sustainable future together in 2009. The Guidance note was then republished and updated as part of the 2011 Edition. The purpose of that Guidance note was to assist management teams, design teams and the construction industry and its clients (both public and private sector) in dealing with environmental sustainability within contracts used in the procurement of a construction project. Its specific focus was how sustainability may be provided for in JCT contract documentation.

3 JCT's lifecycle consultation was launched to collect data, informed views and opinions from property professionals, the supply chain and other stakeholders on lifecycle matters within the context of sustainability and construction contracts.

4 The purpose was to provide a focus for environmental sustainability to improve performance and to help deliver the Government's Strategy for Sustainable Construction. The consultation ran from October 2011 to April 2012.

5 It is clear that sustainability issues are actively being addressed and sustainable buildings can be and are being delivered with JCT contracts. Please see the Appendix for a JCT sustainability case study in respect of the Brent Civic Centre which is being constructed under a JCT Design and Build Contract and has achieved a BREEAM outstanding rating. For other case studies, please visit www.jctltd.co.uk.

Summary of Findings and Highlights

6 The consultation exercise took place online via the JCT website and was fully completed by 65 respondents. In total 144 individuals either visited the site and partially or fully completed the questionnaire, answers throughout the analysis have been expressed as a percentage.

7 Whilst it was considered that all major stakeholders had been covered within the classification of the respondents through the use of a traditional professional job career categorisation, the majority of respondents classified themselves as 'other' (30%), when completing the questionnaire (Q1), and of this group approximately 30% had 'sustainability' within their job classification. This is thought to reflect the increasing recognition of the importance of the sustainability agenda within the construction industry.

8 86% of respondents considered that integrated procurement facilitates lifecycle matters (Q2). A number of responses highlighted the importance of defining what was meant by "integrated procurement". Integration could take place across a number of different dimensions, across stakeholders, the different elements of construction, the construction process over time and the building as an asset over time from feasibility to end of life. The importance of the client, the client brief, early decision making and the need for the alignment of stakeholder goals frequently featured in the responses.

9 Respondents generally considered that construction contracts should do more to address lifecycle matters (Q3), and that a contractual commitment by all parties to a common approach at the earliest stage will facilitate the transfer of information and the alignment of stakeholder interests across a project. Respondents considered that the procurement process was important as it helped to define how long participants maintained an interest in the project.

10 35%, the largest group, of respondents considered that the principal focus of sustainability went beyond any specified individual option (Q4) and that sustainability should not be reduced to a single issue but be about striving for the ideal balanced approach which will depend on the priorities of individual projects and clients and that accordingly the JCT contract structure should be sufficiently flexible to enable individual priorities to be accommodated.

11 87% of respondents were of the opinion that JCT contracts can assist to achieve sustainable objectives (Q5). 83% believed that if a contract document is to address the performance of the completed works, it should be legally binding (Q9).

12 Respondents considered that other provisions of a construction contract that would encourage a lifecycle approach (Q15) included providing data relating to minimum life for certain elements of the building and ensuring that the lifecycle strategy and associated details are required to form a key component of the building manual.

13 95% of respondents considered that a form of contract, which applies throughout the design and construction phases and into the occupation of the completed works, would facilitate achieving a more sustainable building and more sustainable approach to the procurement of buildings (Q16).

14 The question of barriers to assessing the success of a project on a lifecycle and sustainability basis (Q22) was responded to comprehensively and the responses identified the lack of transparency in relation to lifecycle and operational data and costs to be a barrier. Respondents also considered a barrier was the emphasis on the initial capital costs of a building but that this was understandable given the uncertainty, complexity and lack of knowledge and transparency around anticipated and actual performance during the operational and maintenance phase of the building's life. Working to short timescales and a lack of available suitable assessment models were also identified as issues. (Regarding assessment, CEN Technical Committee for the sustainability of construction works (CEN TC 350) may assist.) A further identified barrier was the differing stakeholder perspective and interests between contractors, designers and product manufacturers, which all contribute to the lack of data transparency. A number of respondents considered whole lifecycle was often not fully considered because key stakeholders were more interested and focused on their inputs during their part of the cycle.

15 95% of respondents were of the opinion that requirements to provide data relating to specific sustainability matters would assist in gaining an understanding of lifecycle matters for the purpose of future projects (Q23).

16 Respondents considered that the data that should be provided (Q24) ought to include schedules identifying (1) When components are likely to require replacement and financial modelling of costs, (2) Anticipated consumption and costs of utilities during occupation, and (3) Total carbon performance at construction stage, during the life of the building and at the end of the building's life. The data ought also to include a metric of social, economic and environmental wellbeing targets.

17 Respondents considered that all stakeholders should provide data (Q24) at the relevant stage of their involvement in a project, e.g. designers to give predicted design performance, contractor to provide data during construction phase and occupier during operation phase. 67% of respondents were of the opinion that the requirement to provide data should be legally binding (Q27) but there was uncertainty as to which was the appropriate contract document to state what data was required (Q26). Approximately 25% of respondents were uncertain or unsure and the remaining respondents made reference to various documents which spread evenly across the specifications, employer's requirements/contractor's proposals or the main building/consultancy contract.

18 89% believed that elements of sustainability that are measurable were likely to be prioritised over those which were not (currently) as easily measured (Q30).

19 94% considered that post occupancy reviews by the project team would facilitate better performance on subsequent projects whether for the same client or otherwise (Q31).

20 Perhaps one of the most poignant statistics worthy of reflection related to respondents' opinion as to the extent that the performance of the completed works met the expectation at design stage (Q8) with respondents' replies as follows: 11% never, 42% occasionally, 42% frequently and 5% always.

21 Perhaps one of the most poignant statistics worthy of reflection related to respondents' opinion as to the extent that the performance of the completed works met the expectation at design stage (Q8) with respondents' replies as follows: 11% never, 42% occasionally, 42% frequently and 5% always.

Methodology

22 The consultation exercise took place online via the JCT website and was fully completed by 65 respondents. In total 144 individuals either visited the site and partially or fully completed the questionnaire, answers throughout the analysis have been expressed as a percentage.

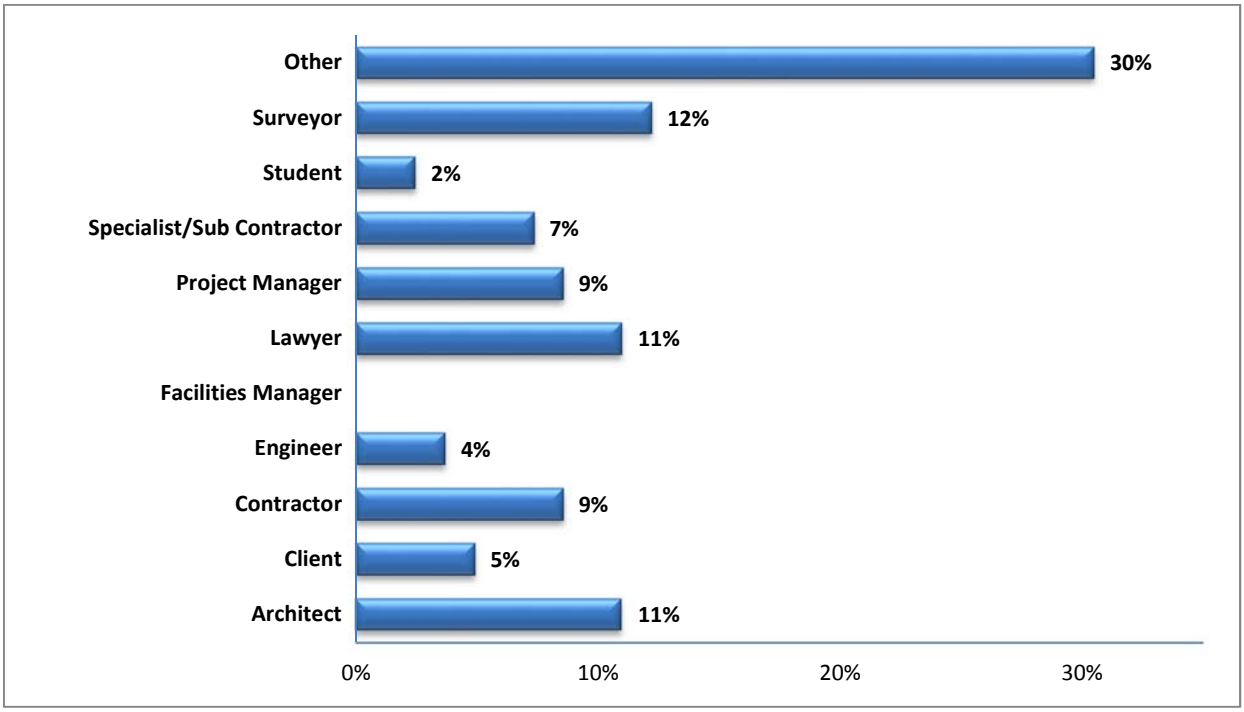
23 The survey comprised a total of 32 questions and considered 4 themes around integrated procurement, integration of design and construction, the relationship between construction and occupational phases, and the assessment of lifecycle matters. The survey generated both quantitative and qualitative data, the former generally presented in the form of:

- Bar charts to Questions 1, 2, 4 and 8
- Table 1: Yes or no responses to Questions 5, 9, 16, 17, 19, 23, 27, 30 and 31
- Table 2: Encourages, discourages or neither responses to Questions 10 and 14

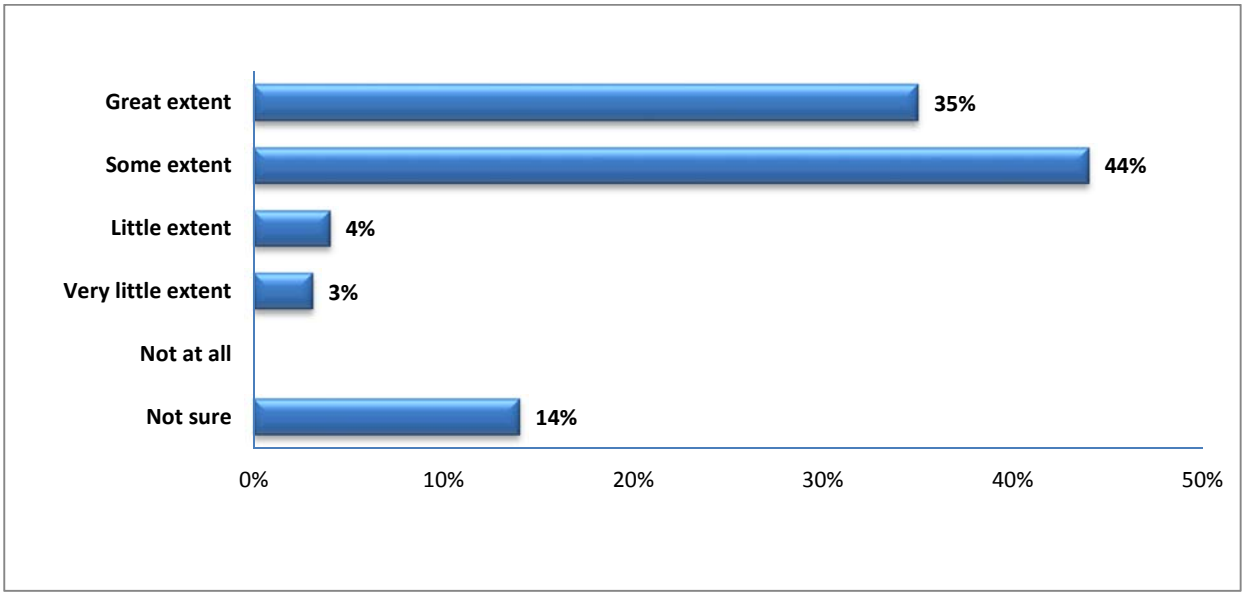
The Data Gathered

24 The quantitative data produced by the responses to the survey is detailed below:

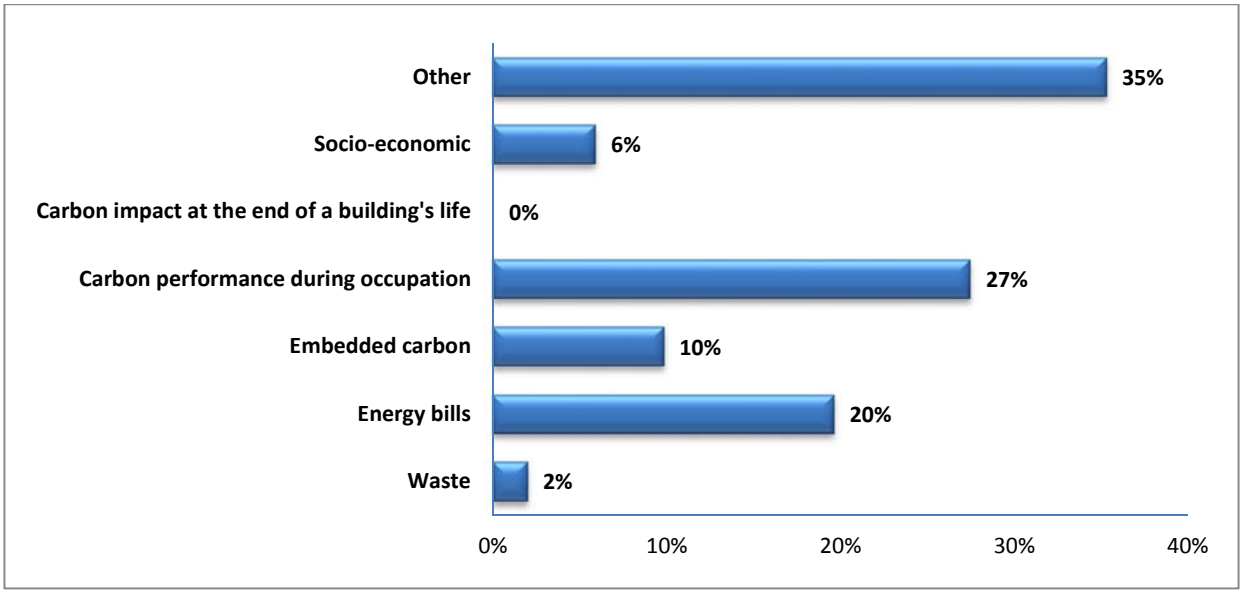
Q1. I would classify myself as…



Q2. To what extent does integrated procurement facilitate lifecycle matters?



Q4. What do you see as the principal focus of sustainability?



Q8. In your experience to what extent does the performance of the completed works meet the expectation at design stage?

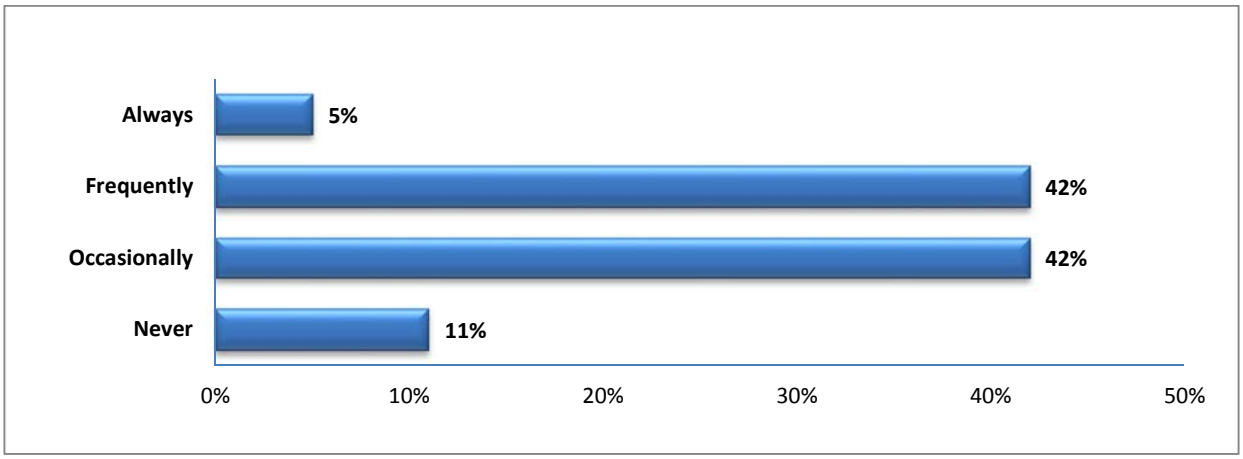


Table 1: Yes or no responses

QUESTION	Yes %	No %
Q5. Can JCT contracts assist to achieve sustainable objectives?	87%	13%
Q9. b) If construction contracts are to address the performance of the completed work, should this be done in a manner which is legally binding?	83%	17%
Q16. Do you consider that a form of contract, which applies throughout the design and construction phases and into the occupation of the completed works, would facilitate achieving a more sustainable building and more sustainable approach to the procurement of buildings?	95%	5%

QUESTION	Yes %	No %
Q17. a) Should the contractor role be to provide training and advice to a facilities manager before and in the months following practical completion?	84%	16%
b) Should the contractor be a specialist contractor/sub-contractor and act as the facilities manager for certain elements, e.g. M&E systems for a number of years following practical completion?	43%	57%
c) Should the contractor act as both contractor and sole facilities manager	49%	51%
Q19. Do you consider there is sufficient expertise and/or interest in the market to provide such services?	61%	39%
Q23. Would requirements to provide data related to specific sustainability matters assist in gaining an understanding of lifecycle matters for the purposes of future projects?	95%	5%
Q27. Should the requirement to provide data be legally binding?	67%	33%
Q30. Do you consider that elements of sustainability which are measurable are likely to be prioritised over those which are not (currently) as easily measured?	89%	11%
Q31. Do you consider that post-occupancy reviews by the project team facilitate better performance on subsequent projects (whether for the same client or otherwise)?	94%	6%

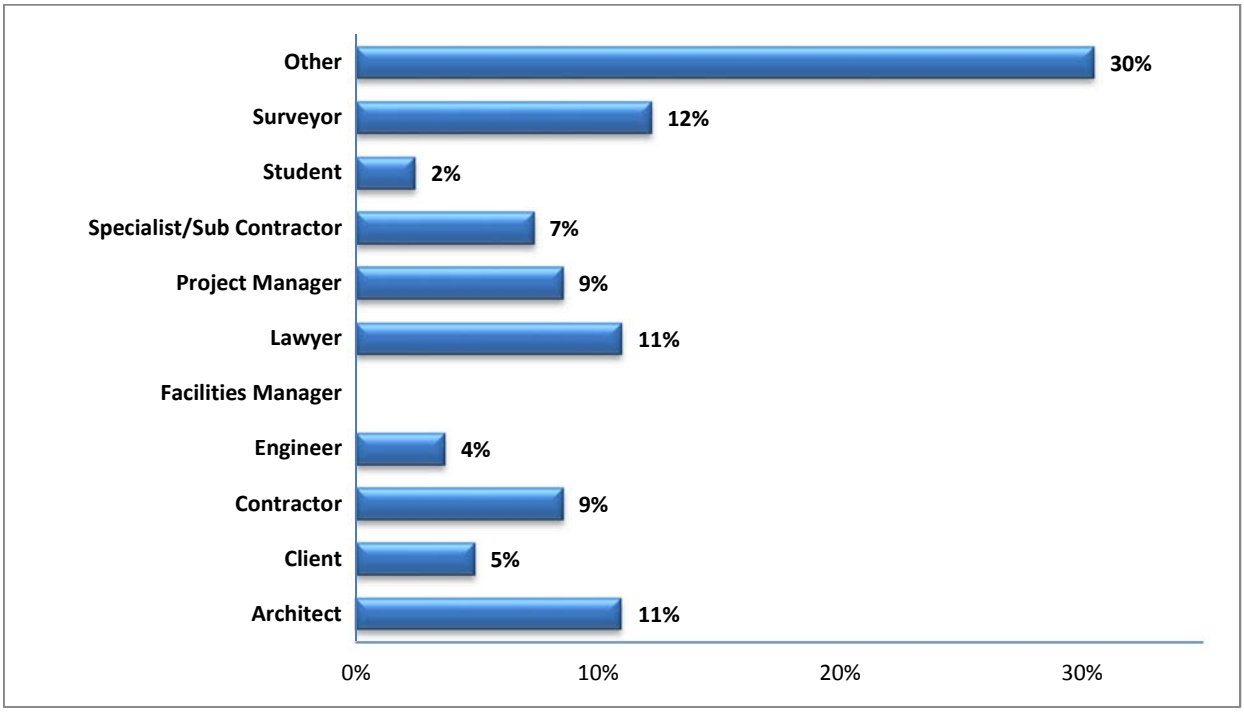
Table 2: Encourages, discourages or neither responses

QUESTION	Encourages	Discourages	Neither
Q10. Do you consider that including any of the following contractually binding clauses would encourage or discourage performance outcomes during the design and construction phases?			
a) Payment against key performance indicators	79%	2%	19%
b) Payments based on the taking of specific steps intended to maximise sustainability (rather than based on the achievement of particular outcomes)?	76%	5%	19%
Q14. Do you consider that including any of the following contractually binding clauses would encourage or discourage performance outcomes during the design and construction phases?			
a) Payment of liquidated damages in the event the completed works failed to meet a particular standard	70%	5%	25%
b) Payment of a bonus if the completed works exceed a particular standard	66%	5%	29%
c) Extended defect correction period for operational elements of the works	45%	13%	42%

Questions and Responses

25 This section summarises the responses to the questions.

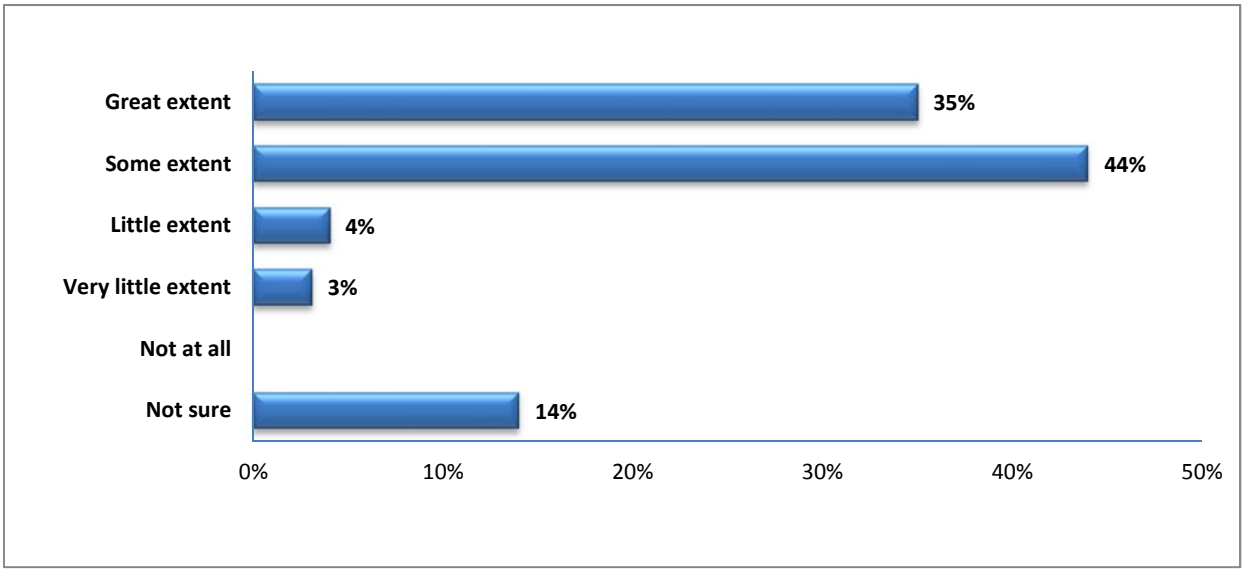
Q1. I would classify myself as…



26 Whilst it was considered that all major stakeholders had been covered within the classification of the respondents through the use of a traditional professional job career categorisation, e.g. surveyors (12%), lawyers (11%) and architects (11%), the majority of respondents classified themselves as 'other' (30%), when completing the questionnaire (Q1), and of this group approximately 30% had 'sustainability' within their job classification. This is thought to reflect the increasing recognition of the importance of the sustainability agenda within the construction industry.

Q2. To what extent does integrated procurement facilitate lifecycle matters? Please add further relevant contextual comment.

27 No respondent selected the response "not at all", although 14% were unsure. As illustrated in the chart 86% considered that integrated procurement facilitates lifecycle matters.



28 Analysis of the invited comments indicated that it was important to define what was meant by “integrated procurement” as this term could be interpreted in a number of different ways and therefore have different characteristics according to the definition.

29 Integration could take place across a number of different dimensions, across stakeholders, the different elements of construction, the construction process over time and the building as an asset over time from feasibility to end of life.

30 The importance of the client and client brief, early decision making and the need for the alignment of stakeholder goals frequently featured in the responses.

31 One respondent stated that if it was in relation to design and build without the incorporation of "cost in use" or "lifecycle cost matters", then arguably it might be considered as not being "integrated". One respondent was not persuaded that this is the one single improvement that will make the greatest difference as there were problems associated with integrated procurement. Another considered that with the still limited use of fully integrated procurement with full transparency and integrated working by all parties in a construction process it remains unclear how lifecycle will feature.

32 Key is decision making in the earliest stages of the project (brief) which should inform the procurement process and facilitate the alignment of goals between all stakeholders, so that stakeholders act in an appropriate manner to achieve shared goals.

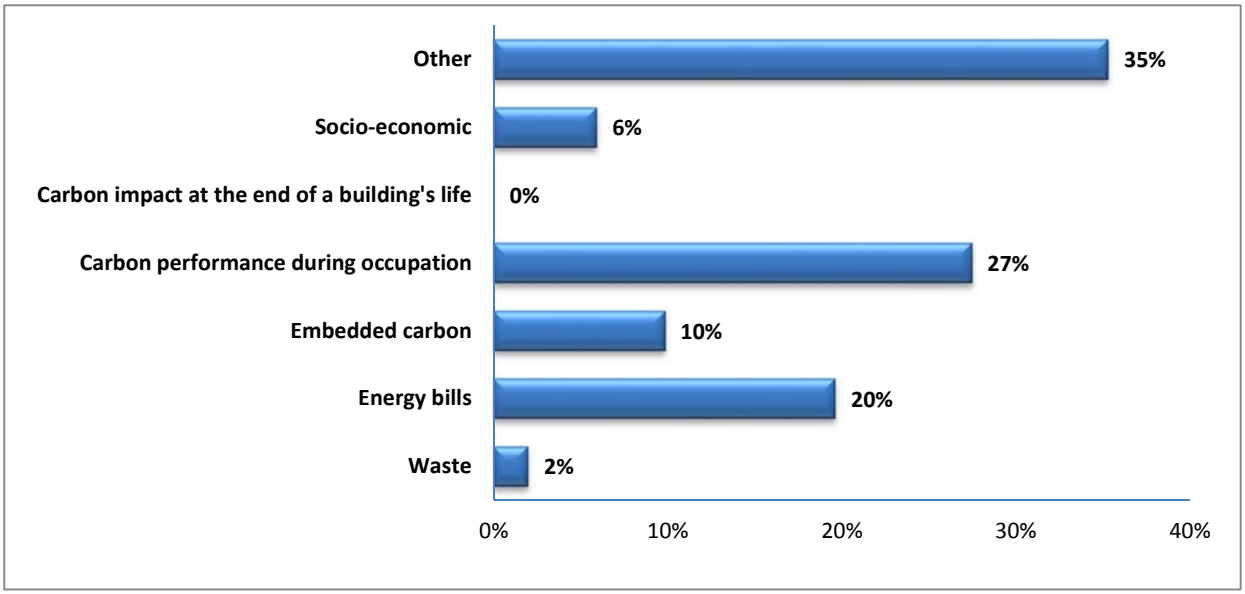
Q3. How could or should construction contracts do more to address lifecycle matters?

33 Most comments stated that construction contracts should do more to address lifecycle matters. It was however pointed out that it is easy to say “do it”, but this can be done well or badly, and it may be difficult to do well as it ultimately boils down to measurement and assessment and there is a lack of a common reference point for assessment. What is good or bad also depends on the stakeholder perspective. One respondent suggests there is no commonality across projects or building elements and that everything is a one off, but this seems unlikely.

34 Respondents also considered that contractual commitment by all parties to a common approach at the earliest stage will facilitate the transfer of information between stakeholders and the alignment of stakeholder interests across a project. It is the procurement process that matters and how long the participants maintain an interest in the project. Changes in procurement could mean that contracts would need to address lifecycle matters differently. However, it is still likely that the contract documentation rather than contract alone that would cover most of the issues.

Q4. What do you see as the principal focus of sustainability?

35 Largest group of respondents, 35%, considered that the principal focus of sustainability went beyond any specified individual option (Q4).



36 Respondents considered sustainability cannot, and should not, be reduced to single issues. Environmental, social and economic impacts must all be considered plus ensuring that the capacities and renewal rates of natural systems are respected and creating a sustainable planet.

37 Respondents considered "It is about striving for the ideal balanced approach", a balance of the various environmental impact categories with an inclusion on each procurement decision of their social impacts. Focus will depend on the priorities of individual projects and clients. The JCT contract structure should therefore be sufficiently flexible to enable individual priorities to be accommodated, rather than stipulating particular components to be addressed. Resource efficiency during construction phase to minimise the embedded carbon footprint should also be considered.

	Yes %	No %
Q5. Can JCT contracts assist to achieve sustainable objectives?	87%	13%

Q6. Should existing JCT contracts be amended, or should there be a specific contract to address lifecycle matters (e.g. a contract whose scope includes construction and maintenance phases)?

38 The answers varied between either a specific contract or an option within existing forms and both. One respondent considered amending was best in order to support the JCT brand and that it ought not to be undermined by repeated "new" contracts.

39 An interesting example of the both responses for JCT to consider is as below, which moves the lifecycle matters debate and terminology towards "resource efficiency" and the terminology used by WRAP.

"Yes to both and this is because the industry may not be quite ready (this year) to make a full change. We require a steady stream of changes that will inform/re-educate all parties on projects of behavioural changes required to achieve sustainable projects but we also require a vision of the 'wider view' of what a truly sustainable approach is, to define where we should be heading to. JCT contracts could potentially introduce a step up in thinking that covers strategic decisions such as how frequently does a retail store get refurbished and not just how was the store refurbished (i.e. prevent owners refurbishing interiors every year instead of designing for longer and smaller environmental impacts and cycles). The contracts could as suggested in the question look at the wider lifecycles of projects that include soft landings and ongoing maintenance contracts, following on the knowledge that the greatest resource impacts happen through occupation and not design and build stages."

Q7. What do you consider would assist to achieve sustainability objectives?

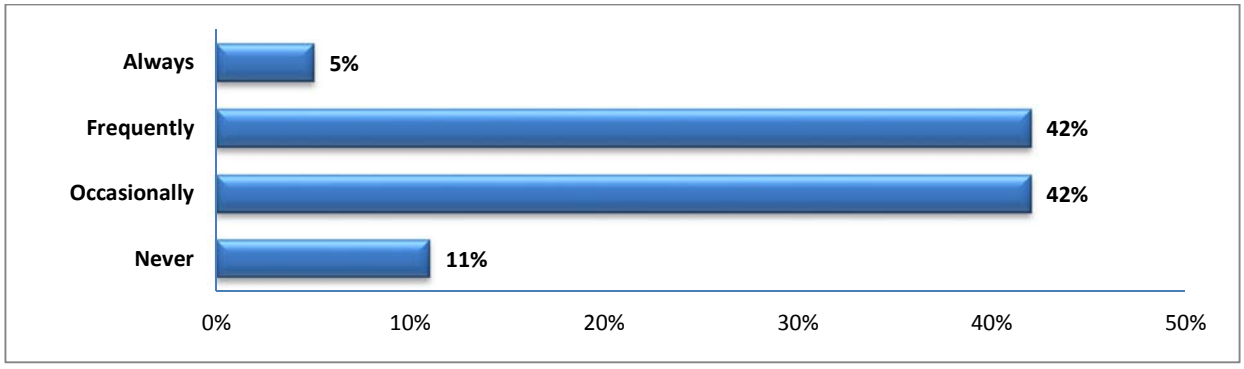
40 One respondent considered this should be dealt with at technical level and be bespoke for each contract, another by changing the materials used to construct and styles of construction, and another by "better understanding of the issues, most don't get it."

41 Other responses included:

- Clients putting greater requirement on buildings that use less energy and waste and greater re-use of materials.
- Through business leadership, a change in accounting to reflect the true cost of all operations and Government regulation.
- Generally by adopting a whole life approach to construction: say, a PFI contract which involves facilities management and ongoing maintenance of the building gives the PFI Co a greater incentive to (a) specify the correct product in the first instance; and (b) maintain the building properly, monitoring energy use etc. and jumping on problems before they become too unwieldy to deal with.

Q8. In your experience to what extent does the performance of the completed works meet the expectation at design stage? Please provide further relevant contextual comment.

42 Perhaps one of the most poignant statistics worthy of reflection related to this answer to which 5% replied always, 11% never, 42% frequently and 42% replied occasionally. So 53% considered that performance either never or occasionally met the expectations at design stage.



43 Respondents provided an explanation to the context and why. Reasons given were:

- The lack of publically available data regarding the performance of buildings in use comparative to designed performance makes it difficult to answer this question with any certainty.
- Due to the large number of variations that often occur during the construction stages often the completed works do not reflect the aspirations at design stage. This is often due to extensive value engineering exercises which can result in an Employer compromising on performance to achieve a saving or it can lead to construction failures when material substitutions result in changes to the interface details which may be inappropriate or have an inferior performance.
- We don't effectively measure the performance of buildings ... we don't close the loop on learning from the past! We create the model of the model and then don't measure how effective this model was and where it can be improved.

44 Other reasons cited were:

- Many clients do not carry out checks which identify whether the performance is as designed. Opinion is based on perception and anecdotal evidence rather than any specific performance data, measures or indicators.
- This is a difficult question to answer as a lack of post completion testing and building control enforcement means there is little evidence to support any answer.
- There are 4 huge gaps, the software used to calculate design performance, product manufactures claims and workmanship. Then comes the way in which the building is occupied and used. Without a POE process and some form of agreed link to the contract these gaps will take a long time to close.
- Poor execution, inadequate understanding by the contractor and sub-contractor, incomplete solutions specified at the outset.
- Many design decisions (particularly regarding sustainability) are carried out too late. The inherent complexity in modern buildings and our methods of procuring and delivering them often means that there is some deviation perceived between design intent and reality. Energy performance in use research by Leeds Metropolitan and UCL has highlighted a considerable performance gap between predicated and actual energy use in modern homes built to Building Regulations standards and better.

Q9. If construction contracts are to address the performance of the completed works; which contract document(s) should do this and should this be done in a manner that is legally binding?

45 Approximately a third of the comments stated they were unsure or had no idea, and a third cited a specification of some sort, e.g. architect's specification, performance specification and employer's requirements. The remaining third either stated or implied all of the contract documents. Comments included that there ought to be a cross reference between the contract and specifications to enable performance to be project specific.

	Yes %	No %
Q9. b) If construction contracts are to address the performance of the completed work, should this be done in a manner which is legally binding?	83%	17%

	Encourages	Discourages	Neither
Q10. Do you consider that including any of the following contractually binding clauses would encourage or discourage performance outcomes during the design and construction phases?			
a) Payment against key performance indicators	79%	2%	19%
b) Payments based on the taking of specific steps intended to maximise sustainability (rather than based on the achievement of particular outcomes)?	76%	5%	19%

Q11. What type of steps should be followed to maximise sustainability?

46 Many of the comments referred to items previous identified; namely, requirements set out clearly from the start within the brief, with key performance indicators and measures, established targets with performance measured and monitored against targets, and through standardisation.

Q12. Are the steps best set out in the pricing documentation or elsewhere in the contract documents?

47 Answers varied from yes, elsewhere, both, no particular view, in the specification, in the 'Sustainability brief' for the project, in the specification and brief and the Provider's/Contractor's proposals and they should be costed and financially modelled in a standard format so that they can be compared on a like for like basis. One respondent stressed that it is imperative that the obligations are placed with the parties best placed to handle them.

Q13. How should the payments be structured, e.g. as pre-conditions to payment for works generally, as separate payments in their own right or in some other way?

48 Small majority of respondents were in favour of it being a pre-condition to payment for works with a substantial number of respondents considering separate or milestone payments as being best. Profit share or bonus was also referred to. Some responses also included "not sure how this affects sustainability or lifecycle" and "not as a pre-condition to payment as that would cause more problems and not act in a unifying way".

	Encourages	Discourages	Neither
Q14. Do you consider that including any of the following contractually binding clauses would encourage or discourage performance outcomes during the design and construction phases?			
a) Payment of liquidated damages in the event the completed works failed to meet a particular standard	70%	5%	25%
b) Payment of a bonus if the completed works exceed a particular standard	66%	5%	29%
c) Extended defect correction period for operational elements of the works	45%	13%	42%

Q15. Are there any other provisions which you consider should be included in the conditions of a construction contract to encourage a lifecycle approach? If so, what are they?

49 Respondents' comments included: timetable for meetings, to guarantee running cost for a period, and to provide minimum life for certain elements of the building. One respondent stated that this would be data that every project team uses in the UK/Europe: current benchmarked data on the cost of maintenance tasks location specific, quality assured data on the lifespan of products – particularly, renewable technologies, agreed projected energy, water, waste costs in agreed units for XX number of years. It won't be perfect data but a starting point is required.

50 Respondents provided extensive comments that included the following:

- There is scope to record anticipated life and programme for subsequent replacement of various elements and components.

- The need to address sustainability at the earliest available opportunity and at the latest (i.e. post completion/handover, i.e. in line with the requirements of the Soft Landings framework which ensures appropriate commissioning/awareness/ownership of the operation of the building).

- Ensuring that the lifecycle strategy and associated details are required to form a key component of the building manual, and that furthermore there is a requirement for a handover meeting on the topic between the contractor, client and operator (when available) post PC.

- The implication is that by imposing these types of clauses you will induce a change in behaviour; my view is that whatever measures you incorporate could encourage the behaviour desired, but is it delivering customer value? Are you being too prescriptive and is it appropriate for the contract to be dictating this in the first place? We need to change, but I'm not convinced this is the right approach. It requires more collaborative approaches that align the supply chain and encourage innovation, so contracts that do this are what is required, not prescriptive clauses dictating specific measures.

- The adoption of construction project insurance to combat the risk-averse nature of construction contractors could be encouraged.

	Yes %	No %
Q16. Do you consider that a form of contract, which applies throughout the design and construction phases and into the occupation of the completed works, would facilitate achieving a more sustainable building and more sustainable approach to the procurement of buildings?	95%	5%

	Yes %	No %
Q17.a) Should the contractor role be to provide training and advice to a facilities manager before and in the months following practical completion?	84%	16%
b) Should the contractor be a specialist contractor/sub-contractor and act as the facilities manager for certain elements, e.g. M&E systems for a number of years following practical completion?	43%	57%
c) Should the contractor act as both contractor and sole facilities manager	49%	51%

51 The responses indicate support for the role of the contractor to be to provide training and advice to a facilities manager before and in the months following practical completion. Views are, however, divided whether the contractor's role should be extended into facilities management. Small majority of respondents were in favour of it not to be extended into facilities management.

Q18. Do you consider that there are any other roles for the contractor? If so, what are they and what duration should they cover?

52 There were a variety of responses with regards to the roles; for example, in certain circumstances and major builds, there may be benefits in making the Contractor (Specialist Contractor) responsible for the maintenance of key elements including M & E services during the occupation of the building for an initial minimum 3 year contract period. Also commented upon was more engagement with tiered contractors on meeting sustainability.

53 Respondents generally, however, pointed out the need for a contract not to be too prescriptive.

	Yes %	No %
Q19. Do you consider there is sufficient expertise and/or interest in the market to provide such services?	61%	39%

Q20. How should the contractor be paid for such services? For example, should the contractor be paid based on rates for conducting planned and unplanned maintenance, rates for equipment remaining operational, rates for the efficiency of the equipment and/or some other means?

54 A number of the respondents were uncertain or unsure. Some considered payment should be on the basis of operational efficiency whilst others considered it should be paid on the basis of planned maintenance as per model at design stage and that unplanned maintenance should be reimbursed and covered by insurances.

55 A number suggested that this is a complicated question for which there are a multitude of answers and that it therefore depends. But it was suggested that some connection between operational performance and installation costs would provide a greater focus on the lifecycle costs. It was considered that presently there is too much emphasis on installation costs. How this changes and how the contractor ultimately gets paid is the commercial arrangement between the client and the supplier – the contract should then reflect this and ensure it protects both parties to their side of the bargain.

Q21. What other measures do you consider would facilitate a 'lifecycle' approach and sustainable buildings?

56 Very few comments received.

Q22. Are there any barriers to assessing the success of a project on a lifecycle and sustainability basis, and if so, what are they?

57 The question of barriers was responded to comprehensively with consistent response highlighting:

- Lack of transparency in relation to lifecycle and operational data.
- Emphasis for new and existing buildings is initial capital cost of building at the end of the design and construct phase, particularly given the uncertainty, complexity and lack of knowledge and transparency around anticipated and actual performance (whether carbon footprint or cost) associated with the operational and maintenance phase of the building's life.
- Differing stakeholder perspective and interest between contractors, designers and product manufacturers add to the lack of transparency.
- An additional barrier is the life span of interested parties in that often the whole lifecycle is not considered because people (stakeholders) are only interested in their inputs and the benefits to them during their part of the cycle.
- Timescales and lack of suitable assessment models were also identified. (Regarding assessment, CEN Technical Committee for the sustainability of construction works (CEN TC 350) may assist.)

	Yes %	No %
Q23. Would requirements to provide data related to specific sustainability matters assist in gaining an understanding of lifecycle matters for the purposes of future projects?	95%	5%

Q24. What data should be provided?

58 Reference was made to data previously mentioned and responses also included:

- 1. Reference as to when components are likely to require replacement and financial modelling of costs, 2. Anticipated consumption and costs of Utilities during occupation, and 3. Total carbon performance at construction stage, during life of building and at end of building life.
- Full data across the board (possibly like BIM aims to do), this would include key data such as embodied carbon of materials, maintenance requirements, supplier information etc.
- Lifetime, Maintenance schedule, Capital cost, Cost of maintenance, Degradation of performance (where applicable), Potential resource scarcity (i.e. how the value of the materials may increase as natural resources are depleted), End of life impact (i.e. ability to reuse/reprocess).
- All of the key LCA data including Carbon: Sequestered, embodied and 'in-use' and a plan for how a building can be recycled, reused, extended, etc.
- Resource efficiency data (relating to materials/waste, water and energy, possibly embodied carbon). Operational performance e.g. electricity, water, gas, waste, etc., occupier satisfaction.
- A level playing field that allows for valid comparison across all materials and products. Any performance data related to significant matters.

- A metric of achieved wellbeing and social targets. Additional socio-economic benefits such as acoustic performance and resistance to fire.

Q25. Who should provide the data?

59 A varied response with most parties identified as being the one to provide data and often individually cited across the different responses. A good proportion of the responses, however, considered the complexity and stated that:

- All the parties involved should be contracted to provide such data. A formal process of data collection must be created. One central matrix managed by an educated party (environmental assessor, PM, FM or any of consultants/CDM) with data clearly identified under each team member.
- Anyone who has access to it, i.e. Contractor, Cost consultant, Supplier/manufacturer, Sustainability specialist, Delivery bodies (i.e. WRAP).
- All stakeholders at the relevant project stage, e.g. designers to give predicted design performance, contractor to provide data during construction phase, occupier during operation phase. This should encourage an ethos of continual improvement: using past performance to improve future performance.
- It's up to business to appreciate that by collating appropriate data, this provides information that drive improvement. The industry has failed to effectively collate data in the past few decades – mainly because we've sub-contracted everything. Repeat clients should ensure appropriate data is collated for them, but as Government Construction Strategy indicates, the client needs to get better at buying and this includes ensuring the appropriate data is bought!

Q26. Which is the appropriate contract document to state what data is required?

60 Around 25% of respondents were uncertain or unsure and the remaining respondents' reference spread evenly across the specifications, employer's requirements/contractor's proposals or the main building/consultancy contract.

	Yes %	No %
Q27. Should the requirement to provide data be legally binding?	67%	33%

Q28. What should be the sanction for non-performance?

61 Responses tended to highlight financial penalties, others suggested downgrading of some form of company 'performance-rating', or depending upon the scale of the non-compliance, possibly linking it to cost, reputation, future work with client, opportunity to compensate or rectify. Other comments included: it depended on how serious the non-performance is; Contract law covers this; no sanctions because of many unknowns.

Q29: Are there other measures you consider would assist in gaining such an understanding?

62 No responses or answers given.

	Yes %	No %
Q30. Do you consider that elements of sustainability which are measurable are likely to be prioritised over those which are not (currently) as easily measured?	89%	11%

	Yes %	No %
Q31. Do you consider that post-occupancy reviews by the project team facilitate better performance on subsequent projects (whether for the same client or otherwise)?	94%	6%

Q32. If you have any other comments relating to construction contracts, lifecycle and sustainability matters, please state:

63 Respondents considered Industry wants a level playing field and simple tools for decision making and to make it happen. Tools included contracts.

64 Joined up thinking should be the way forward and was referred to by a number of respondents. Additionally 2 respondents considered that there is a significant crossover between what the JCT doing and where the Waste and Resources Action Programme (WRAP) is heading with their Design for Resource Efficiency (DfRE) agenda and thought collaboration should be encouraged.

65 Other comments included the following:

- The entire construction team – client down to subcontractors – need to buy into sustainability completely. Education is key, but until more organisations/clients are adequately educated on sustainability issues, the carrot and stick approach could work to a limited extent to focus the minds, and will hopefully lead to questions being asked internally which lead to self-education.

- We need to get better at lifecycle project management. Contracts facilitate this but not by prescribing what is required as core clauses.

Conclusion

66 All parts of the construction industry now recognise the increasing importance of sustainability and lifecycle matters. JCT contracts and the existing Guidance Note, as the case study illustrates, can be used to deliver outstanding sustainable buildings. A key common theme across a number of the question responses related to the need for flexibility to enable client priorities to be met. There are a range of different approaches to and contractual provisions for dealing with sustainability. It is ultimately for the client organisation to determine what approach it wishes to adopt. The client's commitment and early involvement of the supply chain are however essential to achieve sustainability and reflect lifecycle costs both in the design and construction process.

Appendix – Brent Civic Centre: A JCT Sustainability Case Study

67 Brent Civic Centre is an £85m public sector project located in the area of Brent, West London, near Wembley. The building is designed by Hopkins Architects and the main contractor is Skanska. When completed, Brent Civic Centre will become the first public building in the UK to achieve a BRE Environmental Assessment Method (BREEAM) Outstanding rating, and join an elite group as one of the world's most sustainable projects.

68 Brent Council, the client, set out a clear brief: to build the UK's most sustainable public building. The benchmark for this objective was for the project to achieve a BREEAM Outstanding rating. In order to achieve this however, a willingness and a strong level of commitment from the client, main contractor and all other contracting parties was needed. The requirements for BREEAM Outstanding go beyond any standard requirements set out in, for example, building regulations and particular objectives need to be met in the design, supply chain, construction, and occupancy phases.

69 Genuine collaborative working, a fully integrated project team, community engagement, innovation in design, delivery and occupancy, and clearly defined contractual arrangements are key elements required to bring a project of this scale together. The JCT Design and Build Contract facilitated the solution.

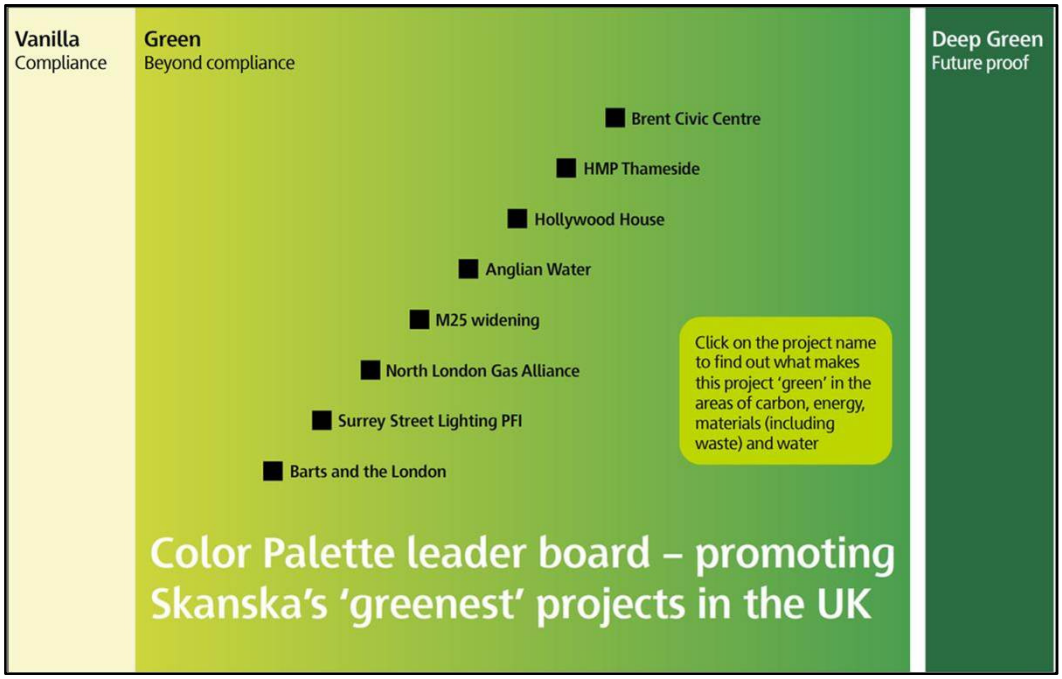
Achieving BREEAM Outstanding

70 In order to achieve BREEAM Outstanding, a number of specific criteria must be met in respect of the building's design, construction and performance. A minimum 'A' rated Energy Performance Certificate (EPC) CO_2 index of 25 (0 is carbon neutral) must be obtained. Brent Civic Centre's design stage submission indicated a CO_2 index of 22.

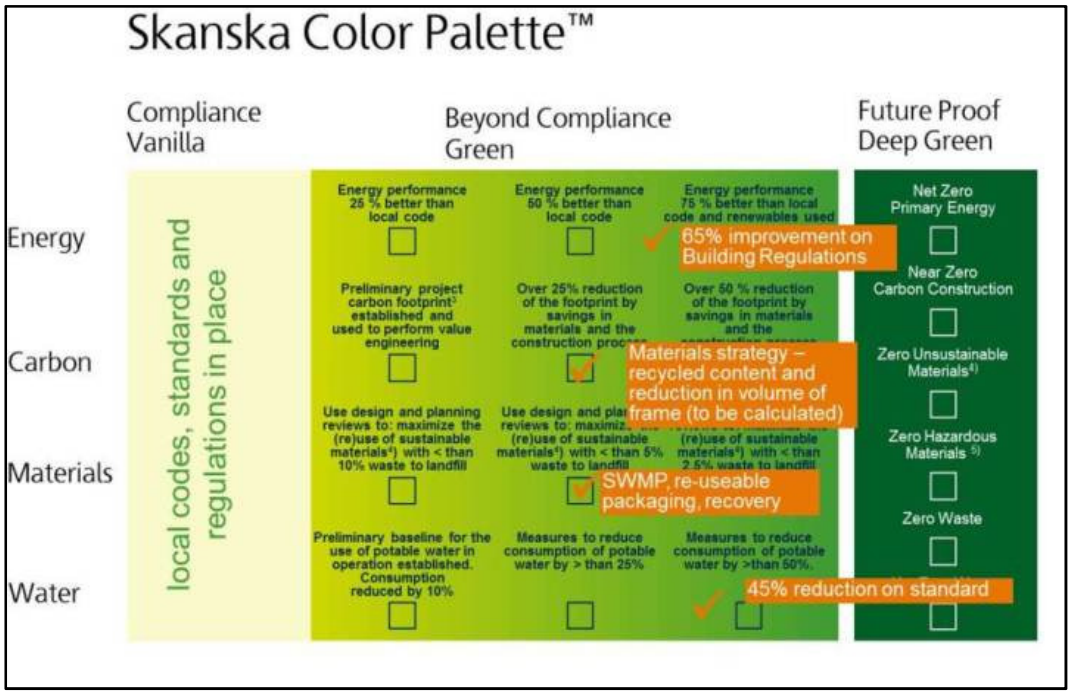
71 In addition, for BREEAM bespoke 2008, a minimum of 85% of the available credits must be obtained. Once again, Brent Civic Centre aims to exceed this, currently targeting 94.8%.

Skanska's Green Credentials

72 Skanska has a strong reputation for green building, which was highlighted when Skanska UK Chief Executive, Mike Putnam, delivered the JCT 2011 Povey lecture, "The Journey to Deep Green™". In 2011 Skanska was named by the Sunday Times as the greenest company in the UK, across all industries. In his lecture, Mike Putnam spoke specifically about the Skanska Color Palette™, a communication and framework tool to demonstrate Skanska's strategy for achieving 'deep green' and a representation of Skanska's sustainable projects in the context of current industry standards.



73 The above representation shows where Brent Civic Centre appears in relation to Skanska's other UK projects. As well as highlighting Skanska's overall commitment to sustainability across their range of projects, it clearly demonstrates how far beyond compliance the Brent Civic Centre goes in achieving its sustainable objectives.



74 The above diagram shows the predicted forecast of sustainable performance of Brent Civic Centre mapped onto the Skanska Color Palette™. In terms of energy performance, the building is expected to be 65% more efficient than the standard set by current building regulations. Keeping the supply chain as local as possible, with the sourcing of local

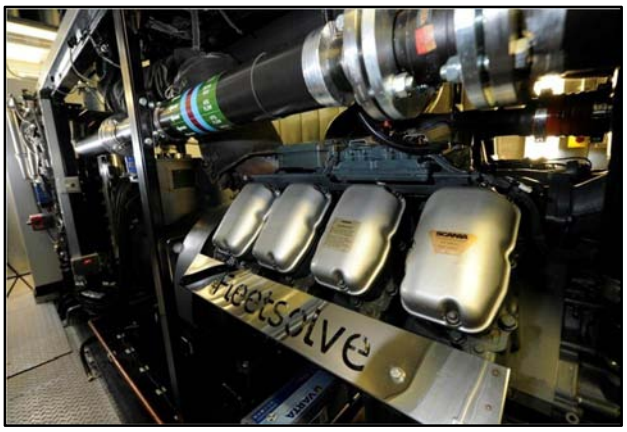
materials, using recycled content, tracking vehicle movements and a reduction in the volume of the building frame is predicted to reduce the carbon footprint of the project by 25%.

75 Less than 5% of waste is expected to go to landfill, due to the implementation of a Site Waste Management Plan (SWMP), along with a significant level in the use of recycled materials, including 50% recycled aggregate. The reduction in consumption of potable water is anticipated to be a 45% greater reduction than the standard, and BREEAM innovation credits have been awarded for an innovative water re-use system during construction.

Brent Civic Centre's Sustainable Solutions

76 Several innovative solutions have been developed and brought together on the Brent Civic Centre Project in order to maximise its sustainable performance. These include:

Bio-fuel Combined Heat and Power (CHP) Solution



- A multi-fuel design means the CHP unit can run on 11 different fuels. The plan is to use waste fish oil as the primary fuel.
- The solution can be run as a single modulating CHP engine, or a single absorption chiller.
- Customisation of the system means that it meets double the requirements for Ofgem and Renewable Obligation Certificate (ROC) accreditation.

Integrated Air Source Heat Pumps (AHU) and Whole Building COP

- Uses both pressure independent control valves and pressure independent controllable heat meters.
- A Remote Commissioning, Open Architecture Enterprise BMS system ensures that adjustments in water, heat and light can be made remotely from any location, and easy integration with other third-party solutions saves time, costs and energy.

Innovative Water Treatment Solution

- Freshwater use is reduced by 99% due to a rainwater harvesting system.
- Effluent use has been reduced by 99%, as well as reducing the risk of disposing effluent.
- Chemical usage has been reduced.

Construction elements

- 85% of the building structure is exposed as 'fair-faced' concrete. 50% of the aggregate is recycled, and the way it is finished means that extra materials, such as plasterboard, are not required.
- Passive design, with natural daylight and ventilation, and efficient building fabric helps reduce the need for artificial lighting and cooling.

Community Engagement

77 When Brent Civic Centre opens it will be a mixed-use public building which, as well as providing office space for 2,300 staff and councillors, will also provide quality community facilities, including an arts space, library, shops and eating facilities. The project team has been proactive in engaging the local community throughout the project from its inception. This not only includes the final users of the building, but also the supply chain, where the procurement of local materials and tender of packages of work to local businesses has been designed to keep as much of the spend within the community as possible.

78 A core priority of the project team however has also been to reach out to the community through education programmes and work opportunities. In total, by working through the council's regeneration programme, the project team has been able to provide:

- Engagement with 926 students
- Engagement with 449 adults
- 47 weeks' worth of work experience
- 838 weeks' worth of training

Contractual Matters

79 Brent Civic Centre has been built using a JCT Design and Build Contract (2005 edition, revision 2: 2009). Integration of the design team through the construction phase is important for the project team, for which the JCT DB form provides.

80 The flexibility of the contract has also allowed for bespoke provisions to be written in respect of the sustainability requirements and in particular, the target of achieving BREEAM outstanding. Two clauses specifically highlight the contractor's requirements, that a) they will use "all reasonable endeavours" to assist the employer in achieving 5 BREEAM credits, and b) the contractor themselves "shall obtain at least 108 BREEAM credits".

81 As well as expressly detailing the requirements in the contract, it has also been the approach to the contract which has been a defining feature for the project. Brent Council's Assistant Director – Civic Centre and Major Projects, Aktar Choudhury explained:

"We have an excellent team from Skanska, which is making everything work very smoothly. We are delighted with progress made so far. We regard it as more of a partnership rather than a contract between two parties. It's an open doors type of arrangement that we have. I can come and see the Project Director any time and likewise the Project Director can call me, so it's a very good healthy relationship."

82 Brent Civic Centre is an ambitious, landmark project that could set a benchmark for the way that the industry performs on future schemes. Sustainability is the key driver here, and striving for a BREEAM Outstanding rating is no doubt the key focus that has enabled this level of integration, team work, and communication to take place amongst all parties involved.

83 The example has been set by the project team with the contractual arrangements, which not only allow the requirements to be expressly set out, but also allow the parties to carry out the project in a way that is most effective to achieve the project's ambitious targets. This communication has permeated throughout the project however, and the community engagement on a broader scale, coupled with the specific technical innovations, helps to reinforce the holistic approach to sustainability that this project represents.

Report on the JCT Sustainability: Lifecycle Consultation

MEMBERS

British Property Federation Limited
Contractors Legal Grp Limited
Local Government Association
National Specialist Contractors Council Limited
Royal Institute of British Architects
The Royal Institution of Chartered Surveyors
Scottish Building Contract Committee Limited

SWEET & MAXWELL

THOMSON REUTERS