CRISP Commission 02-08

A review of CRISP Task Group recommendations and action plans 1998-2002

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Background

The Construction Research and Innovation Strategy Panel (CRISP) is charged with developing research priorities for the construction industry in the medium and long term. Between 1998 and 2002, CRISP's sought to influence funders, particularly DTI, about research priorities. CRISP brought together the CRISP panel with representatives from industry, government, clients and the research community at annual Awaydays to identify urgent research challenges. Annual programmes of work were assembled, and time- and task-limited Task Groups were formed, chaired by a subject champion, to address specific areas of concern. Task Groups produced reports containing recommendations for improved policies and potential research projects needed to advance and support the industry. The reports, and associated short research reviews commissioned in support of the Task Groups, were published on the CRISP website and sent to interested parties.

Each year the research priorities of each Task Group were collated and brought together in Funder-Focused Action Plans. The recommendations were mapped against each funder's priority areas – reinforcing funders' priorities and influencing their support for specific projects. Five funders were selected – DTI (previously DETR), EPSRC, ESRC, HA and EA. Between 1998 and 2002, thirteen Task Groups produced 233 recommendations that were mapped in this way.

Mapping CRISP recommendations to funders' priority areas

Many of CRISP's recommendations focus on culture change and business process improvements to help the industry better its performance in the short-term. This resulted in a close fit between CRISP recommendations and DTI priorities, with 71% of the recommendations being relevant to DTI. CRISP's emphases on business issues also resulted in 31% of the recommendations mapping on to ESRC's Thematic Priorities. However, the short-term and applied focus of CRISP recommendations, together with an absence of technical research recommendations, resulted in only 23% of the recommendations mapping on to EPSRC Programme Landscapes whose emphasis is on longer-term scientific and engineering research. The CRISP recommendations that mapped on to the Highways Agency's Research Areas were mostly concerned with supply chain integration, whole life costing, and service-based delivery. And most of the recommendations that mapped on to the Environment Agency's Frameworks for Change were concerned with sustainable construction.

Impact of CRISP on DTI, and M4I & the Housing Forum

CRISP's recommendations have been highly influential on DTI's Research & Innovation Priority Areas, and CRISP's outputs have been referred to and endorsed extensively in the DTI programme. In 2001 Priority Area Managers were asked to respond in detail to the Funder-Focused Action Plan, and the majority of the applicable recommendations were reported as either already addressed, in hand, or under active consideration.

Of all the CRISP Task Group reports, the Knowledge Capture report has had the highest level of reported implementation. It was produced with a very specific remit, its recommendations targeted at the M4I and the Housing Forum, and the majority of them having been taken up and acted on.

Impact of CRISP on other funders – ESRC, EA, HA, and EPSRC

The impact on other funders for whom Action Plans were prepared has been typically much lower. In the case of ESRC, CRISP held a meeting with the research council's Chief Executive prior to the submission of the Action Plan; but when it was forwarded to ESRC it was not passed to the person responsible for built environment research. In the case of the Environment Agency, a change of personnel within the Agency and the Action Plan's arrival at an inappropriate time in the R&D planning cycle resulted in lack of take up of CRISP recommendations. A similar outcome occurred with the Highways Agency, though here the Agency was at the time focusing on research linked to its operational responsibilities and improving internal research management, and so was less concerned

with responding to outside bodies. (Co-incidentally, the HA reports that a number of its research projects do address topics recommended by CRISP.) Both EA and HA are clear that CRISP has to formulate its recommendations through dialogue with them, not independently.

CRISP's relation with EPSRC is varied. EPSRC has good awareness of CRISP and its outputs, and EPSRC representatives have attended CRISP events. Two or three years ago, there was a view within the Research Council that CRISP was largely concerned with short term research needs, did not address longer-term issues that academics tend to be concerned with, and placed little value on the academic research community. If CRISP wishes to engage with the academic construction research community, it needs to understand and accept the motivations and drivers of that community, and to appreciate the long-term nature of academic research.

Nevertheless, CRISP recommendations were taken into account in the construction part of EPSRC's Innovative Manufacturing Initiative (IMI). In 2002, IMI became the Innovative Manufacturing Programme, which now supports Innovative Manufacturing Research Centres (IMRCs), three of which focus specifically on construction and with two or three others also dealing with construction-related research. The IMRCs have the responsibility for the strategic development of the discipline, rather than the research council. If CRISP wishes to influence academic research within the Innovative Manufacturing Programme, it will need to establish direct linkages with the IMRCs rather than with the Research Council.

Climate Change Task Group – a model for effective collaboration

One of the most successful examples of CRISP's relation with funders is the CRISP Climate Change Task Group. This appears to be a model of how CRISP could work with funders to ensure influence and implementation, although success was partly a consequence of good fortune. The formation of the Task Group occurred after EPSRC had started working with UKCIP to introduce a new funding stream for climate change research. Initially, EPSRC did not particularly welcome the Task Group formation, concerned it would produce its recommendations too late to have a beneficial influence. Nevertheless, representatives from EPSRC and UKCIP joined the Task Group. Owing to slippage in EPSRC's programme and prompt publication of the Task Group report, the Task Group positively influenced EPSRC research agenda in the area, and the Task Group report itself (considered to be a valuable state of the art report by both EPSRC and UKCIP) provides an information resource for potential applicants. Both EPSRC and UKCIP are sign-posting it as such.

The views of CRISP chairs and champions

CRISP chairs and champions have been interviewed about the strengths and weaknesses of the Task Group process, and how to improve effectiveness of CRISP. Many strengths were identified – including the involvement of all sides of industry; the engagement of enthusiastic, committed, motivated and lively individuals; Task Groups' speed, intensity and insight; their avoidance of a pre-arranged agenda; their ability to consult widely with corresponding members and/or hold workshops; and their distillation of an informed viewpoint. Being time- and task-limited was widely held to be a good thing (meeting the 80/20 rule by capturing 80% of the key issues but using only modest resources). The commissioned reports were universally commended, although it was suggested by some that they should have been commissioned by the Task Groups themselves once they had started their deliberations. The Management Support Unit was unequivocally commended for its competence and effectiveness.

The major weaknesses reported by chairs and champions concern Task Group topics and recommendations. Topics were described by some as being too broad, and the reports as too long and unwieldy and inadequately published just through the website. Recommendations were criticised by some as being too many in number, too vague and not achievable practically. Weak follow through and lack of implementation of recommendations were also noted. Other reported weaknesses included a lack of women and younger participants in the Groups, and that recruited individuals didn't carry political weight.

Opinions are divided (even within a single respondent!) about whether CRISP Task Groups have 'made a difference', although the majority of respondents report their Group has done so.

CRISP chairs and champions have made a number of suggestions for making CRISP more effective. These include: greater engagement and dialogue with key industry players, engagement with small and occasional clients, raising its profile and brand image, focusing on a smaller number of major issues and driving them through, hooking the research agenda to the fortunes of UK Construction PLC, and becoming 'the engine room for strategic development of the industry'. Other suggestions included committed research-oriented support for each of the Task Groups, better linkages to M4I and CBP to ensure a continuum of initiatives, and minimising the gap between what will be significant expectations and what it can realistically deliver.

The views of CRISP's three Executive Panel chairmen

All three past chairmen consider CRISP to have been highly effective in influencing DETR/DTI – although one added that it had been so successful in doing so that it was seen from outside as a DETR/DTI panel rather than being independent. CRISP's strengths are reported as its independence, its ability to identify and choose interested participants and avoid 'committee men'. They consider it to have been well organised and well-run.

All three agree CRISP has been far less successful in getting industry involved in setting the research agenda. They believe CRISP has to talk to industry leaders, engage more with industry, find out why investment in research is so low, and stimulate industry to participate in research. All three believe more funding is needed to do this, and to implement CRISP's recommendations. While the voluntary efforts are recognised as valuable, CRISP has lacked the resources to turn its recommendations into research proposals and, so long as it remains largely voluntary, is considered unlikely to be able to achieve more than it has already.

For what it should do next, one chairman discussed it in terms of three levels of engagement – strategic, programme and project. He suggested that it had not, and should not, get involved at the project level – but nor should it remain purely strategic. He proposed that within any one topic area, it should focus on a well defined programme area to have most effect. The most recent chairman identified four themes as timely and relevant to carry forward: climate change, customer needs (particularly opening up the design process to user participation and market research), new technologies and materials, and construction futures (to provide an authoritative and long term perspective).

Implementation of the Task Group recommendations

Task Group chairs were asked about the implementation of their recommendations. Overall, only one quarter (47/233) of the recommendations were described as having been implemented, nearly three quarters (172/233) as still needed, and a small number (14) as either obsolete or progress unknown. Although on the face of it, this is disappointing, some respondents conveyed a sense of unwillingness 'to let go' of their recommendations. It seemed as if, having spent intense periods in group discussion to distil key recommendations, even when these were partially implemented by some other body, several chairmen claimed they were 'still needed'. Perhaps the chairs had had very clear ideas not just of what research was needed but also how it should be undertaken; and the implementation only partly met their expectations. The recommendations reported as 'still needed' have been grouped into five clusters and are presented at the end of this executive summary.

Ownership and follow-through of recommendations

Lack of follow-through of recommendations has already been cited as a reported weakness of CRISP. In the case of project-focused recommendations, Task Group members have brainstormed and then distilled their recommendations and feel a sense of participation in the process and ownership of the outcome. Having done so, they (rather than those not involved in the distillation process) seem far

more likely candidates to pursue them than others outside the Groups who lack that sense of ownership. Examples of ownership – and participation in projects to implement the recommendations – can be seen particularly in the Culture Change and Technologies & Components Task Groups.

The chair of the Culture Change TG is participating in a major submission to DTI under the 2002 PII-Programme on People, Culture and Change Management. And the chair of the Technologies & Components is participating in a project team bidding under the PII-Programme on ICT including single project model development. In both cases, they bring the outcomes of their Task Group sessions to the research proposals, achieving clear follow through of the Task Group recommendations. In another case, the author for a commission for the Design Task Group has also bid under PII 2002 for a project linked to the recommendations of that Task Group – here with a two-year time lag.

It therefore seems important that chairs and champions are selected from among those not only who have knowledge of an area but who are in a position to lead, or to participate in, research projects that will implement their Group's recommendations. Groups have the potential to engage directly with research leaders, to brainstorm and identify issues, and to encourage networking among those with appropriate expertise and experience to carry forward the ideas generated. Conversely, there is little incentive for those outside the Group to carry forward the distilled recommendations for, not having been involved in their generation, they lack any sense of ownership of them or responsibility for them.

However, as one of the Panel chairs pointed out when interviewed, it is equally important to avoid the Task Groups simply using CRISP for their own ends. The outcomes should continue to be widely disseminated to potentially interested parties, giving the whole community the opportunity to share the outcome of the Task Groups' deliberations.

Recommendations for nCRISP

CRISP lies at the beginning of a process whose goal is to make the industry more efficient and effective. The process involves initiation, research, diffusion and application in practice, and the timescale for the whole process is measurable in years. CRISP is almost exclusively concerned with the initiation phase of the process, with identifying research needs and promoting their take up. CRISP's *modus operandi* has been highly successful in mobilising industry expertise and influencing research funders (particularly DTI). But, as this review demonstrates, there are further improvements that CRISP could adopt to increase its effectiveness.

nCRISP should:

- Seek better linkages with funders by keeping checks on their programmes, by working more closely with them and in accordance with their time scales, and by ensuring dialogue through engaging their representatives in Task Groups and other CRISP initiatives.
- Synchronise the topics it addresses and its Task Groups with research funders' research programme cycles to ensure they "catch the wave" – neither too far in advance nor after the event.
- Seek to increase the likelihood of implementation of its recommendations, by ensuring the composition of Task Groups includes not only those with subject-specific knowledge, but also those who are in a position to take ownership of and to implement the emerging recommendations.
- Review whether tendered research procurement would lead to greater implementation of CRISP recommendations than challenge-based procurement.
- Consider whether Task Group reports should be published as short accessible digests.
- Review whether publication of Task Group reports via the web-site is sufficient to ensure industry awareness or whether additional publicity and marketing is justified as an to aid implementation of the recommendations.
- Provide better briefing to Task Groups about the form of their recommendations, and/or subject recommendations to a process of review, moderation and prioritisation, prior to publication – with

the aim of ensuring they are SMART (Specific, Measurable, Achievable but challenging, Realistic, and Time-bounded).

- Introduce better methods for monitoring take-up and follow-through, and recording successful implementation of recommendations.
- Engage industry in research through talking to industry leaders, engaging more with industry, finding out why investment in research is so low, and stimulating industry to participate in research.
- Review the implications of operating at the strategic, programme or project level in terms of, on the one hand, industry credibility and, on the other, ability to implement its recommendations and 'make a difference'.
- Review whether it should, within any one topic area, focus on a well-defined programme to have most effect.
- Among the themes which it will carry forward, review as potentially timely those of climate change; customer needs (particularly opening up the design process to user participation and market research); new technologies and materials; and construction futures (to provide an authoritative and long term perspective).

Task Group recommendations awaiting implementation

About three quarters (172/233) of the Task Group recommendations are reported by chairs and champions as 'still needed'. For the purpose of this report, they have been grouped into five clusters of related issues.

In carrying out the clustering exercise, what is most striking is that virtually every CRISP task group highlighted the need for improving the uptake of research findings – that is, for what had been done to be made accessible to the wider industry through improvements in communication and dissemination, and better application of existing knowledge in practice. The Technologies & Components Task Group, for example, in its first two recommendations called for better dissemination and application of existing knowledge to overcome the barriers to its use and improve its impact. The CRISP ICT report (Commission 00/26) goes so far as to say: "if there is a single conclusion to be drawn from this review, it is that the top priority over the next few years should be to extract more economic value from the huge mass of *existing* knowledge …The focus now needs to move clearly towards 'people' issues like design and management processes, motivation, information access, knowledge management and organisational learning". Cluster 1 draws together the recommendations around this theme.

Cluster 1: Communication, dissemination and application of existing and new knowledge

Raise awareness of, and increase the accessibility and diffusion throughout the industry (addressing all relevant stakeholders) of: improvement initiatives, best practice, new knowledge, and R&D outcomes. Investigate the barriers to uptake of existing research knowledge and innovative techniques and materials (including risk-averse contractual conditions), and develop improved knowledge-transfer mechanisms, user-friendly communication strategies, use of intermediaries, promotional practices, and exploitation of varied dissemination routes, in order to promote innovation and raise the application and impact of new knowledge.

Cluster 2: Making the business case

Raise the profile of the industry and how it is perceived and valued, by better understanding of 'risk and reward' principles, by improving understanding of the value of built assets, and through new types of funding and investment, all contributing to increased profitability. Establish a network exchange for information on buildings-in-use for all stakeholders; improve methods for assessing the relationships between cost, value and worth; and develop whole life value methods.

Cluster 3: Sustainable construction

Explore various means to improve sustainable construction through identification of the business benefits of sustainability to the industry, and an understanding of the drivers and motivations within the industry and its clients that encourage sustainable construction. Seek to change the industry's culture towards embracing whole life costing - through development of robust whole life cost and performance data, promotion of off-site assembly, development of specifications for recycled materials, improved supply chain management, and innovative technologies that minimise resource use and improve performance. Demonstrate the business and triple-bottom-line benefits of adopting environmental good practice and respect for people.

Cluster 4: Climate change

Assess risk from climate change nationally, regionally, locally, and sectorally, to both buildings and infrastructure. Evaluate existing policies and develop new ones to aid decision making. Identify and work with stakeholders, including businesses, to assess current knowledge and identify future opportunities for helping the industry through adaptation and mitigation. Devise new technical regulations, codes, guidance, labelling, tools and case studies to improve understanding of climate change, and introduce climate change issues into current design tools and standards. Raise understanding of climate change and its impacts through industry education and training.

Cluster 5: Knowledge management and organisational learning

Raise awareness within the industry of the strategic value of knowledge creation and sharing, and deepen understanding of how to capture and use project-based knowledge. Produce case studies of the successful capture and dissemination of lessons learned within projects and by organisations, including their contribution to organisational business performance. Promote organisational learning, and develop appropriate tools and models of learning to help firms of all types and sizes become learning organisations.

1 Purpose, scope and conduct of this report

1.1 Purpose and scope of this report

The Construction Research and Innovation Strategy Panel (CRISP) is charged with developing research priorities for the construction industry in the medium and long term. This report presents a collation and analysis of CRISP task group and other recommendations (post 1998), and reviews the extent of their implementation. It provides feedback from CRISP's chairs and champions of their views of the strengths and weaknesses of the CRISP Task Group process. And it presents the view of representatives of a number of key funders about whether and how CRISP has influenced their support for construction research at the policy and project level.

The report is intended to be complementary to two other CRISP reports being undertaken at the same time: on Futures and on Sustainability.

Appendices provide a complete listing of all CRISP Task Group recommendations, together with a mapping of how they relate to the themes and priorities of five key funding bodies (DTI, EPSRC, ESRC, EA, and HA), and the views of the CRISP chairs and champions about:

- what recommendations have been taken forward – and, where known, by whom;
- what recommended work is not now necessary, and why;
- most importantly, what recommended work has not been taken forward and is still outstanding.

1.2 Background

In early 2001, CRISP prepared five funder focused Action Plans for DETR, EPSRC, ESRC, the Highways Agency and the Environment Agency which mapped recommendations from five CRISP task groups Meeting customer needs, Design, Sustainable construction, Motivation and communication and the Construction research base against each funder's published research priorities.

The Action Plans identified where recommendations and priorities matched and where recommendations were not being addressed. The Plans were well received by funders. In late 2001, CRISP revisited this exercise and compiled a draft summary Action Plan which included recommendations from four, more recent, task groups – Performance, Process, Technologies & Components, and Futures. In addition to mapping the recommendations to the same funders' priorities, they were grouped by broad category. This work is still in draft final form and has not been published.

In 2002 three further task groups – Capturing knowledge, Climate change and Culture and people – completed their work and published task group reports. These recommendations have not, until now, been collated and matched with funders' priorities or grouped. Since 1998, therefore, twelve task groups have produced over two hundred recommendations. In addition, work has been done on other topics including Housing, Regulation and ICT and this has produced other recommendations.

1.3 Conduct of the study

The work was undertaken between late November 2002 and the end of January 2003. It involved the following:

- Tabulation and mapping of the remaining CRISP Task Group recommendations that had been produced after the preparation of the Funder Focused Action Plans.
- Interviews with CRISP Chairs and Champions about the CRISP Task Group process and the implementation of recommendations.
- Interviews with representatives of the funders who had been sent the Funder Focused Action Plans about the implementation of CRISP recommendations.
- Interviews with the three chairmen of the CRISP Executive.

2 CRISP's process for capturing the construction industry's research and innovation priorities

2.1 CRISP's modus operandi

The following description of CRISP's process for capturing research and innovation priorities is taken directly from Appendix 1 of CRISP's submission to the Fairclough Review:

> Since 1998, CRISP has employed a specific *modus operandi* for capturing research and innovation priorities. Using financial support from Government, it mobilises first class voluntary input from industry, clients and research communities. This process, which has now been worked through two complete iterations, starts with the CRISP annual Awayday in the early spring. The Awayday is intended to review progress over the past year and identify the 'big picture' of what needs to be tackled in the coming year. It brings together the members of the CRISP Panel with invited guests from across the industry, government, clients and the research community. Each year the participants are asked to work in small group and through plenary sessions to address particular questions used to identify specific challenges that can be picked up as individual initiatives by CRISP during the following 12 months. These initiatives are then assembled into a programme of work by the CRISP Executive, endorsed by the Panel, and published in the annual CRISP Priorities document launched early in the following summer.
>
> Task groups are formed to undertake selected initiatives. They are task and time limited. Each is set a specific purpose linked to the Priorities document, asked to achieve it, and report back before the next Awayday. A chair for each task group is appointed by the Executive, selected on the basis of expertise/interest in the topic under examination. The chair is then invited to assemble a small, broadly based, group of experts to serve on the task group, on a voluntary basis. The group usually contains a representative from the DTI and, depending on subject matter, representatives from other major funding sources such as the HA, EA or EPSRC, or other interested official agencies (e.g. UK CIP). The task group makes interim reports to the Executive and is assisted by the CRISP Management Support Unit and, where necessary, external consultants.
>
> Task groups meet regularly. Members are typically at middle to senior management level. The cost of their time is met by their employing organisations, while that of the assistance they receive from the MSU is met by financial support from the DTI. To progress their investigations, task groups may commission work. This can take the form of 'think pieces', surveys, 'state of the art' reviews, or participative workshops, provided by external consultants funded directly by CRISP. The results of these commissions – after quality control review – are made publicly accessible via CRISP's website.
>
> Task Groups are charged to produce a report, containing conclusions and recommendations, clarifying what further research, if any, needs to be undertaken into the topic under examination. Thus the purpose of task group reports is to shed light on what needs to be done – rather than produce answers – and to offer routes for determining solutions. This report is taken and presented to the CRISP Executive by the task group's chair. After discussion and (quality control) modification, the report is made available on the CRISP website. Copies are sent to interested parties, especially those who are potential funders of the research actions proposed. Once a task group has reported, it stands down. Its chair then usually becomes a CRISP champion for the issue that it has investigated, a role that they are expected to play both within CRISP and beyond.
>
> The process developed by CRISP for capturing research priorities, and the support provided to this by the Management Support Unit, have proved not only very efficient but exceptionally good value for money. The lean nature of the process, the finite nature of the remits given to

task groups, and the light steer which these receive, have meant that it has been able to remain both agile and fleet of foot.

2.2 CRISP's emerging research agenda

In 1999, 2000 and 2001, CRISP published its Research Priorities. These documents set out key considerations and broad areas of interest, as well as reporting on progress, and introducing new issues for attention. The following tables attempt a brief overview of the three annual agendas. (Note, the originals are carefully designed and give a much richer picture of CRISP's coverage.)

1999: Acquiring knowledge, developing tools

Key considerations	Broad areas	Cross-cutting themes
Industry improvement Construction Futures Construction Research Base	Customer Needs Design Technologies and Components Process Performance	The Regulatory Framework Sustainable Construction Motivation and Communication Information Technology Housing taken as included under each of the areas and themes.

2000: Knowledge creation and its application for rethinking and sustainability

On-going Topic Areas	On-going	New
Industry improvement Construction Futures The Construction Research Base	<u>Topic areas</u> Design Technologies and Components Process Performance Information Technology Housing	<u>Topic areas</u> Respect for people Technologies and components Process
	<u>Related activities</u> Motivation and Communication	<u>Related activities</u> The Regulatory Framework The Fiscal and Financial Framework

2001: People, knowledge and industry improvement

On-going Topic Areas	Related Activities	Key current issues
Customer needs Sustainable construction Design Technologies and components Process Performance Information and Communication Technology Housing Construction Research Base	The regulatory and financial framework Motivation and communication	Capturing knowledge Changing culture Climate change Construction Futures

2.3 CRISP Task Groups, Chairs, and Key Outputs

In support of CRISP's annual agendas, Task Groups are formed to explore the issues and clarify the research needs. The following table lists CRISP Task Groups, Chairs and Champions. It also lists the reports that have been used as the sources of CRISP recommendations for the Action Plans.

Issue/topic area	**Current status/activities, and interviewee if not Chair/Champion**	**Key output used in this report [see notes below]**	**Number of recommen-dations**	**Actions taken**
Construction research base	Champion: Peter Bransby. Task group reported March 2000.	Task Group report [1]	5	Mapped in 2000
Design	Champion: Giles Oliver. Task group reported March 2000.	Task Group report [1]	39	Mapped in 2000
Meeting customer needs	Champion: David Adamson. [Interviewee James Barlow as report author]	Workshop proceedings report 99/14: Clients' workshop on innovation and research in construction [1]	23	Mapped in 2000
Motivation and communication	Champion: Anne King. Task group reported March 2000.	Task Group report [1]	24	Mapped in 2000
Sustainable construction	Champion: Keith Bull. Task group reported March 2000.	Task Group report and Commissioned Report 99/15 [1]	34	Mapped in 2000
Performance	Champion: Phil Roberts. Task group reported January 2001.	Task Group report 00/17 [2]	10	Mapped in 2001
Process	Champion: Gerry Pape. Task group reported June 2001.	Task Group report [2]	4	Mapped in 2001
Technologies and components	Champion: Roger Blundell. Task group reported June 2001.	Task Group report 01/01 [2]	8	Mapped in 2001
Construction futures	Champion: Tim Broyd. Construction Associate Programme of Built Environment and Transport Foresight Panel reported July 2001.	Foresight Panel report [2]	9	Mapped in 2001
Housing	Champion: Tom Dacey.	Commissioned report 00/01: Housing and Construction: identifying missing research needs and opportunities [3]	17	Mapped in this report
Capturing knowledge	Chair: Robin Nicholson. Task group 2001/2002.	Commissioned Report 01/06: Lessons learned from M4I and Housing Forum demonstration projects [3]	26	Mapped in this report
Changing culture	Chair: Anne King. Task group 2001/2002	Task Group report 02/03 [3]	29	Mapped in this report
Climate change	Chair: Keith Bull, deputy Peter Sharratt. Task group 2001/2002.	Task Group report 02/02 [3]	5 [4]	Mapped in this report
Information and Communications Technology (ICT)	Champion: David Taffs.	Commissioned report 00/26: A 'state of the art' review of	-	No 'recommendatio ns' made

		construction information and communications technologies [5]		
The regulatory and financial framework	No appointment; no current formal programme of work.	Commissioned report 99/12: How can regulations promote construction innovation [6]	-	No 'recommendations' made

Notes:
[1] Recommendations were mapped in the 2000 mapping exercise
[2] Recommendations were mapped in the 2001 mapping exercise
[3] Recommendations are mapped in this report for the first time
[4] This group made some 58 recommendations, but these have been grouped under 5 main headings.
[5] As this group's report made no recommendations, it is not considered further in this report.
[6] As this group's report made no recommendations, it is not considered further in this report.

Appendices 1-13 list all recommendations from the Task Groups, complete with the results of the mapping exercises.

3 Packaging CRISP Task Group recommendations and passing them to funders

3.1 The mapping exercises

Each year, the research priorities identified by the task groups are collated and then synthesised into funder-focused action plans. These cover the construction-related research programmes of the DTI, EPSRC, ESRC, HA and EA. Recommendations for research priorities arising from CRISP are developed in consultation with each funding source. Recommendations are mapped against the funder's own priority areas, with special attention to both fit and gaps. Since CRISP has no authority over these funding sources, it seeks to operate on the basis of influence - gained from the representative nature and the accountability of the process it employs for capturing its consensus formulation of construction's research priorities.

3.2 Mapped recommendations 2000

The following table shows the number of recommendation generated by each task group in 1999/2000.

Construction Research Base	5
Design	39
Motivation and communication	23
Sustainable Construction	34
Meeting Customers' Needs	24
TOTAL	125

Funder-Focused Action Plans were produced mapping these 125 recommendations onto the themes of five funding bodies:

1. DETR's Themes from the Construction Research & Innovation Programme – Prospectus 2000
2. EPSRC's Programme Landscapes 2000-2001, including the three main engineering programmes, and the calls for proposals of the IMI programme Construction as a Manufacturing Process (part of the Engineering for Manufacture programme, EMP) and the joint DETR/EPSRC LINK programme Meeting Clients' Needs through Standardisation (MCNS).
3. ESRC Thematic Priorities 2000
4. Highways Agency's Research Areas and Key Activities based on the HA's Research Strategy 1998-2001, and a report on HA Research Objectives and Priorities provided directly by the HA.

5. Environment Agency's Frameworks for Change, which sets out the scientific knowledge necessary to underpin its Environmental Vision.

Each of the ***Action Plans*** illustrates how CRISP research priorities both fit, and do not fit, within the themes of these funding bodies. Where CRISP recommendations match, they reinforce funders' priorities and can influence the funding bodies' support for specific research projects. Where CRISP recommendations do not fit current themes of the funding bodies, there is the potential to influence funding bodies' future plans.

In the 2000 Mapping Exercise, the 125 recommendations mapped onto the priorities/themes of the funding bodies as shown in the following table.

DETR	EPSRC	ESRC	HA	EA
84	27	44	17	28

In broad brush terms, CRISP recommendations focused primarily on culture-change and business process improvements to help the industry better its performance in the short-term. This led to a close fit between CRISP recommendations and DETR priorities. Differences arose because DETR placed more emphasis on technology and regulation, compared with CRISP's greater focus on business process. CRISP's emphasis on business issues - benchmarking, human resource management, personnel issues, learning organisations, capturing project-based knowledge, risk management, and the impact of IT - mapped more readily onto ESRC's Thematic Priorities and less well onto EPSRC's support for technological innovation. The short-term and applied focus of CRISP recommendations also presented a mismatch with EPSRC's support for strategic and fundamental research, although several CRISP recommendations mapped readily onto EPSRC's Construction as a Manufacturing Process programme. 17 CRISP recommendations mapped onto the Highways Agency Research Areas, in topics like supply chain integration and whole life costing. A large fraction of the 28 CRISP recommendations that mapped readily on the Environment Agency's Frameworks for Change were in the area of sustainable construction.

3.3 Mapped recommendations 2001

In mid-2001 a second mapping exercise was undertaken, drawing on the work of four CRISP Task Groups that met during 2000/2001, resulting in the following numbers of recommendations:

Performance	10
Process	4
Technologies and components	8
Futures	9
TOTAL	31

CRISP Futures Group doubles as the Foresight Construction Associate Programme sub-panel. Within this, individual Issues Groups between them made over 100 recommendations, but these have been condensed in the final Foresight publication *Constructing the Future* into 9 recommendations.

Again the 31 recommendations were mapped onto:

- The unchanged priorities of ESRC, the Highways Agency and the Environment Agency
- The updated priorities of the DTI Construction Research & Innovation Priority Areas 2001, and the EPSRC 2001/2 Research Landscape.

In the 2001 Mapping Exercise, the 31 recommendations mapped onto the priorities of the funding bodies as follows:

DTI	EPSRC	ESRC	HA	EA
27	9	18	10	5

Here the excellent match between CRISP recommendations and DTI's Construction Research & Innovation Priority Areas arose because DETR had early access to CRISP's outputs and responded to them directly. Again there was an emphasis from CRISP Task Groups on short-term business improvements. These mapped readily onto ESRC's Thematic Priorities; and less emphasis on EPSRC's engineering and technology driven landscapes. Few green issues arose from CRISP in this round and so only a small number of recommendations mapping onto the Environment Agency's Frameworks. CRISP recommendations relating to service-based deliver and whole life costing mapped onto some of the Highways Agency's Research Areas.

One issued arose frequently in different guises among the CRISP recommendations – the importance of improving the accessibility and promotion of research outcomes to ensure that existing knowledge could be applied and exploited. This general recommendation was passed on to all five funding bodies. DTI has already responded to this recommendation by including among its priority areas the targeted repackaging of research knowledge, knowledge management, and learning from experience.

Each Action Plan includes an overview of the mapping exercise, enabling funders to pick up any CRISP recommendations that are of interest to them. However, CRISP has yet to devise how to deal with those outstanding recommendations that have no natural home among the funding bodies. There were 23 of these in the 2000 exercise but none in 2001. These are diverse and range from recommending a scoping study on the barriers to contractors' adoption of latent defects insurance to a call for CRISP to raise its profile by acting as a facilitator to capture a vision of the future of the industry. Finally, it was noted in 2001 that CRISP had yet to establish robust mechanisms for attaching weighting to its recommendations and for identifying its short, medium and long term priorities.

3.4 Other recommendations from 2001-2

The following table shows recommendations that emerged in 2002.

Task Group	Number of recommendations
Housing	17
Capturing knowledge	26
Changing culture	29
Climate change	5
TOTAL	77

A mapping exercise has been undertaken with these 77 more recent recommendations. However the following should be noted:

- No attempt has been made to map them on to the research programmes of the Highways Agency and the Environment Agency as these are believed to have changed since the earlier mapping exercises. Without liaison with these bodies it would be difficult to prepare an up to date mapping.
- The five climate change recommendations have all been mapped on to EPSRC, as they are running a Climate Change programme.
- All 26 recommendations from the Knowledge Capture task group have been mapped on to the DTI, though they were clearly targeted at the M4I and Housing Forum.

With these provisos, the 77 recommendations mapped onto the priorities of the following funding bodies as shown:

DTI	EPSRC	ESRC	HA	EA
56	9	12	N/a	N/a

As in previous mapping exercises, it is apparent that the recommendations to emerge from CRISP Task Groups are of highest relevance to DETR/DTI, with only a small fraction applicable to the Research Councils. In this case the relatively large number mapping on to ESRC arise from the Culture and People Task Group.

3.5 CRISP recommendations 1998-2002 mapped against funders

The following table shows a summary of CRISP recommendations from the two previous mapping exercises, plus the one presented for the first time in this report. It illustrates clearly that CRISP recommendations relate most clearly to the remit of DETR/DTI as a funder. This is only to be expected. However, it is interesting to note that more recommendations map onto the priority areas of ESRC than on to those of EPSRC. This is due to the emphasis on behavioural issues right across CRISP Task Groups.

	Total number	**DETR/DTI**	**EPSRC**	**ESRC**	**HA**	**EA**
2000	125	84	27	44	17	28
2001	31	27	9	18	10	5
2002	77	56	9	12	N/a	N/a
TOTALS	**233**	**167**	**54**	**74**	**27**	**33**

It is also important not to lose sight of those recommendations that do not have a home under any of these five funders. They can be readily identified from Appendices 1-13, which show the mapping for every CRISP recommendation.

4 The influence of CRISP: actions by funders in response to CRISP Task Group recommendations

4.1 DETR/DTI Construction Research programmes 1998-2002

The following table shows how CRISP was cited in the government's construction research business plans between 1998 and 2002.

DETR: Construction Research and Innovation Business Plan, July 1998	Introduction	" …strategic priorities have … been determined following consultation with CRISP …" page 5
	Technology and performance business plan	Theme 2: Whole Life Costs "A workshop … supported by CRISP highlighted WLC and performance issues as being of critical importance to competitiveness …" page 44
	Best Practice business plan	"The plan has continued to be developed with particular assistance from the CRISP Motivation Theme Group." Page 54
DETR: Construction Research and Innovation Business Plan, June 1999	Introduction	"In April 1999, CRISP published a new industry-wide strategy for research and innovation. Many of the priorities set out here reflect closely those in the new strategy." Page 1
	Technology and performance business plan	Theme 2: Whole Life Costs "Work in this area will build on the position paper commissioned by the CRISP Technology and Performance Group." Page 28
	Construction process business plan	"The Construction Process Business Plan … continues to respond to the views of CRISP …" page 33
DETR: Construction Research & Innovation Programme: Prospectus 2000	Chapter 1: Introduction	"We have developed this Prospectus … in consultation with the industry and, in particular, with the Construction Research and Innovation Strategy Panel (CRISP)." Page 5
	Theme 4: Promoting innovation and culture change	"… construction companies as learning organisations (see outputs of CRISP Motivation and Communication task group) …" page 17

(July 2000)	Priority Area 14: Unlocking Knowledge: use of intermediaries	"Investigate opportunities to use intermediaries for targeting relevant research findings. Follow up the work of the CRISP Motivation and Communication task group …" page 23
	Chapter 6: Publicity	"We are continuing to seek improvements in the way that the outputs of the programme are disseminated: In reviewing our arrangements the work of the CRISP Motivation and Communication Task Group has been extremely valuable." Page 25
DTI: Construction Research & Innovation: 2001 Priority Areas & Partners in Innovation 2001	2 Construction Research and Innovation Programme, section 2.1 Key Policy Aims	"Prospectus 2000 … was the result of a comprehensive review of the previous business plans in consultation with industry and, in particular, CRISP." Page 6
	3 Priority Areas 2001	"The priority areas have been developed and refined following consideration of the action plans for construction research drawn up by CRISP, a web-based consultation exercise with the industry and research community … and targeted discussions with key interest groups." Page 8
	Priority Area PA 01/01 Knowledge Management and learning from experience	"CRISP has identified 'making better use of knowledge' as a key challenge facing the industry: how can construction businesses become learning organisations?" "Further background information is available from the CRISP Motivation and Communication Task Group papers …" page 9
	Priority Area PA 01/04 Achieving effective integration throughout the construction process	"Proposers should also refer to a CRISP study, A review of construction-related R&D on information and communications technologies …" page 15
	Priority Area 01/09 Technologies and techniques to minimise energy and resource use in construction	"This priority area has been informed by the outputs and recommendations of a CRISP task group report [99/15 on sustainable construction] …This priority area is also related to CRISP work on pre-assembly and standardisation reported in the 'technology and components' section [of the CRISP web site]" page 20
	Priority Area 01/10 Guidance for innovative use of materials and components in housing	"This priority area has also been informed by the outputs and recommendations of CRISP task group work … see 'technology and components' reports [on CRISP web site] and the report on housing [report 00/01]." Page 21
	Priority Area 01/11 Risk assessment and mitigation of the impacts of climate change	"This research should also take account of work of a recently formed CRISP task group dealing with climate change issues." Page 22
	Priority Area 01/13 Improving building performance	"The CRISP Performance task group has made some recommendations about areas of knowledge that need to be developed in order to improve building performance…For further information see the CRISP Performance task group report, January 2001, available on the CRISP web site." Page 24
	4 Partners in Innovation 2001	"These Priority Areas have been developed and refined following consideration of the CRISP action plans, a web based consultation exercise with the industry in April this year, and targeted discussions with interest bodies such as the Building Regulations Advisory Committee (BRAC)." Page 26
Partners in Innovation 2002	Introduction	"The framework for this years Partners in Innovation competition embraces opportunities and uncertainties created by both the Fairclough Report and the DTI's review of its business support. … A new, strengthened CRISP is part of Sir John's vision, and recently work by the CRISP Task Group in response to the report is addressing this." Page 4
	2 Partners in Innovation 2002 2.1 Key features for 2002	"PII Focus. A directed call, seeking single-project proposals that address pre-specified Priority Areas (PAs). These Pas have been developed and refined following discussions with CRISP …" page 6, repeated on page 19
	3 PII Programmes Programme A1: New Construction Technologies	"The programme could help provide some of the 'visioning' needed by the Strategic Forum (and new CRISP)." Page 9
	3 PII-Programmes Programme A3: People, culture and change management	"Proposers should consult the CRISP Culture and People in Construction Research Strategy …" page 10

	4 PII-Focus 4.2 PII-Focus Priority Areas	"The Priority Areas have been developed and refined following discussions with CRISP, a web based consultation exercise with the Industry … and targeted discussions with interest bodies." Page 6, repeated on page 19
	Priority Area PA 02/01 Knowledge management and learning from experience: Background Information.	"Further information is available from the CRISP Motivation and Communication Task Group papers …" page 20

This table shows how CRISP has clearly been influential on the DETR/DTI construction research programme since 1998, with a build up to an apparent peak of influence in 2001.

In 1998, there were three mentions of CRISP. The influence was at a general level on strategic priorities, but with citations of CRISP's Motivation Theme group and Whole Life Cost workshop.

In 1999, there were again three mentions of CRISP. One was a reference to the newly published CRISP strategy for research and innovation, noting that "many of the priorities … reflect closely those in the new strategy." One was to the Construction Process Business Plan, noting this responded to the views of CRISP. The third was more specific and cited the outputs of the Technology and Performance Task Group. In 1999, the influence of CRISP remained a general, rather than a specific, one.

The DETR Prospectus 2000 was more explicit about the influence of CRISP, and there were four mentions. The Introduction stated "We have developed this Prospectus … in consultation with the industry and, in particular, with the Construction Research and Innovation Strategy Panel (CRISP)." The other three citations were all of CRISP's Motivation and Communication Task Group. It was singled out for its influence in Theme 4 (promoting innovation and culture change) and Priority Area 14 Unlocking knowledge, and was also cited in connection with dissemination of the programme outputs.

In terms of the number of citations, CRISP's influence peaked in 2001, with nine citations. Reference was made to CRISP's influence on Prospectus 2000, but also to the refinement of the 2000 Priority Areas in 2001 arising from CRISP's Action Plans. Individual references were made to the following CRISP outputs: Motivation and Communication Task Group papers; the ICT Task Group commission *A review of construction-related R&D on information and communications technologies*; reports on Technology and Components; report on housing [00/01]; task group work on climate change; and the Performance Task Group report. By 2001 then, CRISP's influence was not only at a strategic level, but also at a practical one. In six of the Priority Areas, bidders to the programme were specifically recommended to consult CRISP outputs.

In 2002, there were 6 citations. Two of these were to the work of the CRISP Task Group preparing a response to Sir John Fairclough's report. Two were to the general influence of CRISP on the development and refinement of the Priority Areas The remaining two citations were to CRISP's Motivation and Communication Task Group's papers, and to the Culture and People research strategy respectively.

Overall, this analysis shows how CRISP's influence has operated throughout the period 1998-2002:

- First, at a general level, CRISP has been cited each year as being influential in informing, developing and refining strategic priorities.
- Second, it has been influential at the detailed level, with variation year on year but peaking in 2001. In 1998 a Whole Life Costs workshop and the Motivation theme group were cited. In 1999 the Technology and Performance group was cited. In 2000, the work of the Motivation & Communication Task Group was cited (three times). Influence peaked in 2001 with references under six Priority Areas to the outputs of relevant CRISP Task Groups. In 2002 the influence seemed to reduce with references made to two Task Groups (Motivation & Communication, and

Culture & People) – although also to the Task Group preparing a response to Sir John Fairclough's report.

The most influential Task Group appears to be that on Motivation & Communication, whose work has been cited every year except 1999.

The peak of influence in 2001 corresponds to the publication in early 2001 of CRISP's Funder-Focused Action Plans. These were passed to all Priority Area managers who were asked to respond to them in detail, and a meeting was held at DTI in March 2001, attended by Priority Area Managers and CRISP MSU representatives, to review their take up. The list of CRISP recommendations from the 2001 DETR Funder Focused Action Plan was marked up by Priority Area Managers indicating whether the recommendation had been addressed and if not why not.

The following table shows the responses to CRISP recommendations:

DETR response to CRISP recommendation	**Number of recommendations to which it applied**
Already addressed under the programme	15
Covered by an existing project or publication	6
This work is already in hand and is either being undertaken or is intended to be undertaken under our existing Priority Areas	36
This is an area of work we are actively considering building into our next research programme	17
Needs further discussion or clarification with CRISP	4
Relevant to some other body: CRISP itself, M4I	2

Again, table illustrates the detailed consideration given to CRISP Task Group recommendations. It also shows that DETR was responsive to the recommendations, had implemented some already, and planned to implement the majority of the others. Reinforcing this acceptance of CRISP's recommendations, at an internal DETR Priority Area meeting held on 27 February 2001, it was agreed there was "a need to consider new areas the CRISP Action Plan has identified"

Finally, it is interesting to note that topic areas that had been addressed by CRISP but *were not covered* by the 2001 Action Plans (that is, ICT, housing and climate change) nevertheless *were still cited* in the DTI programme. This is only to be expected and reflects that both CRISP and DETR/DTI are concerned with highly topical research areas, that need research support whether or not CRISP has had the opportunity to form a Task Group and to prepare recommendations.

Key findings in relation to influence on DETR/DTI

- *CRISP has been highly influential on the DETR/DTI Research & Innovation Priority Areas.*

4.2 EPSRC

At the time when the CRISP Funder-Focused Action Plan for EPSRC was produced in early 2001, EPSRC was in the process of changing substantially its support for construction research. Between 1995 and 2000, EPSRC had operated, under its Innovative Manufacturing Initiative, the managed programme *Construction as a Manufacturing Process*. There were also two joint DETR/EPSRC LINK managed programmes in construction – *Meeting Client Need through Standardisation* and *Integration in Design & Construction*. All three of these programmes had operated for about five years and were coming to an end. Replacing them, EPSRC had decided (within its Innovative Manufacturing Programme) that rather than operating open calls for proposals, it would instead focus its funding within centres of excellence - Innovative Manufacturing Research Centres. It looked back at those academic institutions that had won the highest levels of funding and invited then to submit bids for centres.

The centres appointed include some dedicated to construction research, as well as others that are primarily engineering centres but whose remit includes construction. At the same time, EPSRC decided it no longer required Sector Programme Managers (SPMs, who had been seconded from industry) in the sectors being supported, including construction, but it asked the SPM in construction to prepare a Strategic Framework for Innovative Construction. As it happened, the SPM in construction was also responsible for the CRISP Funder Focused Action Plans. Therefore the EPSRC Strategic Framework was able to draw directly from CRISP Action Plans and to incorporate Task Group recommendations (as well as inputs from various other relevant sources).

At EPSRC two interviews were undertaken – of the Associate Programme Manager responsible for construction who was in post from 1997 until 2001, and with her successor.

The first APM said that they had looked at CRISP recommendations as they had emerged from the Task Groups. She had looked at the CRISP web-site and also participated in a CRISP workshop in June 1999 (on Linking construction research and innovation to research and innovation in other sectors) which had involved academics. She said that she thought the material on the website was interesting and valuable. The Construction Research Base recommendations were discussed with the EPSRC-supported academic network in the built environment URG(B)E.

However she often felt there was not much that could be taken on board, and had found it difficult to work with CRISP. She made three points:

- that CRISP recommendations often coincided with what EPSRC was already doing anyway in construction research
- that while CRISP should have given recognition to and been working with key academics, it placed little or no value on academic research and the academic research community
- that CRISP recommendations seemed focused on the immediate issues facing the industry, with no emphasis on how academic and industry research could be taken up in the longer term.

There had been a plan within EPSRC to have a programme on sustainable construction, that would have drawn on the CRISP TG work, but DETR argued that they were also addressing sustainability issues under Partners in Innovation and there was not need for an additional programme. The outcome was that sustainability was added to the remit of the Construction as a Manufacturing Process (but with no specific reference to the work of CRISP).

The Associate Programme Manager (APM) responsible for construction research was interviewed on 2 December 2002 about the implementation of CRISP recommendations. He himself has been in post only since 2001. He was well aware of the CRISP Culture & People report, which had been passed to him by the Programme Manager for Infrastructure and Environment. He explained that EPSRC was ‘taking the report on board and working out how to implement it.’ He had also discussed it with ESRC, and with the Task Group chair. He explained that Programme Managers have a Strategic Advisory Team to advise them, and the report would have been made available to the team; however the teams are cross-sectoral rather than sector focused. From this, it appears that CRISP Culture & People report has been influential within EPSRC, although it is difficult to identify any specific impacts.

The APM went on to point out that the IMRCs each have an Executive Steering Committee, and the centres’ remit includes that they should address strategic ideas of key groups in the sector when planning their own internal strategies. He explained that EPSRC has moved beyond the ‘managed programme’ to the point where responsibility for centres’ strategies has been devolved to centres themselves, which are all expected to have ‘their ear to the ground’. Where in the past EPSRC focused on assessing proposals, with IMRCs the emphasis has switched to monitoring their outputs. They are expected to work with the industry, with others in the research community, with relevant parties internationally, and other key players.

There is some cross-membership across the members of the IMRCs' Executive Steering Committees - which is expected to help ensure an outward focus and co-ordinated effort. The APM went on to advise that for all these reasons – but particularly the move beyond a managed programme to devolvement of strategic responsibility to centres – centres are regarded as first line suppliers and CRISP should pass recommendations direct to the Centres. He was unable to say whether EPSRC's own Strategic Framework for Innovative Construction (which incorporates selected CRISP recommendations) had in fact been passed to the Centres.

See also section 4.6 for a discussion about the Climate Change Task Group, EPSRC and UKCIP.

Key findings in relation to influence on EPSRC

- *EPSRC has sought to engage with CRISP Task Groups, is aware of their outputs and has, on occasion, discussed them internally and with the academic community.*
- *In part, EPSRC believes that CRISP's recommendations relate to short term research needs, often coincide with what EPSRC is already doing, and do not address longer term issues that academic research tends to be concerned with.*
- *In part, EPSRC believes that CRISP places little value on academic research and on the academic research community.*
- *Changes within EPSRC have, since 2001, led to funding for centres of excellence which themselves are expected to take responsibility for strategic development of the subject: EPSRC's recommendation is for CRISP to try to influence the centres directly, not through the Council itself.*

Recommendations emerging from contact with EPSRC

- *If CRISP wishes to engage with the academic research community, it needs to understand and accept the motivations and drivers of that research community, and to appreciate the long term focus of much of that community's research effort.*
- *In order to influence EPSRC-funded academic Centres of Excellence in construction, CRISP cannot rely on doing so via EPSRC but must liase directly with the Centres themselves.*

4.3 ESRC

The relevant representative from ESRC was interviewed by telephone on 2 December. Her responsibilities include construction, human geography, sustainability and environment. She reported that she had not seen the CRISP Funder Focused Action Plan. She also checked with a colleague whose responsibilities were in management and to whom, she thought, it might have been sent. He had not seen it either. This was despite a meeting between the CRISP Management Support Unit and the Chief Executive of ESRC prior to the preparation of the Funder Focused Action Plan for ESRC.

This finding suggests either that there are some barriers within the internal communication system in ESRC, or perhaps CRISP recommendations were not considered (at high level within ESRC) as worthy of passing to the relevant programme managers. Whether accidental or deliberate, it is to be regretted that that the Action Plan did not reach the person who would have been best able to implement the recommendations. As soon as this lack of communication from CRISP to ESRC was discovered, the Management Support Unit forwarded a copy of the Action Plan direct to Lisa Hill with a covering note about the future of CRISP.

Key findings in relation to influence on ESRC:

- *Despite a meeting between the CRISP Management Support Unit and ESRC's Chief Executive prior to the delivery of the Funder Focused Action Plan, in practice CRISP's influence on ESRC as a research funder appears to have been minimal, potentially through lack of internal communication with the Research Council*
- *Sending a CRISP report 'cold' to a funder, (which is likely to be a large bureaucratic organisation) is insufficient to ensure it reaches the intended reader.*

Recommendations emerging from contact with ESRC:

- *CRISP should ensure it identifies the appropriate recipient of its recommendations and sends them a copy of its reports individually addressed.*
- *Following the sending of CRISP recommendations to funders, a check should be made that the appropriate recipient has, in fact, received them successfully.*

4.4 ENVIRONMENT AGENCY

The Head of R&D at the Environment Agency was interviewed on 23 December 2002. He said that the CRISP recommendations came to the Agency at a time when there was a period of change in R&D at the Agency, including a move from R&D to flood defence by the EA staff member who had been the liaison between the agency and the CRISP Sustainable Construction Task Group, and his own appointment as Head of R&D.

He said that the way the CRISP recommendations had been packaged was both sensible and useful. The report had now been archived at the EA – here it was unclear whether he was referring to the Sustainable Construction Task Group report, or the Funder Focused Action Plan. Copies of [whichever] report had been circulated to 'one or two members' of staff, but it was not systematically reviewed to feed into EA's forward planning, nor had CRISP recommendations ever really been formally taken up. He also said that the issues around sustainable construction were not a core part of the R&D programme (which is mostly concerned with the quality of air, land and water, and flood defence), although urban drainage was important to the Agency. The previous level of interest in sustainable construction had arisen because of the enthusiasm of the particular EA staff member. He did however, suggest that the CRISP work might be revisited in the next 12 months – as part of the development of a 5-year plan at which they are at the start.

The Head of R&D argued that it was accepted that external input to the Agency's R&D programmes were needed, but that the process of devising research needs to be by means of a mixed group that includes an Environment Agency representative as well as others who bring different perspectives from outside government. But what was preferred was close engagement in any task group by the relevant focal person in the EA right from the start - working through what research is required. He reported they were not short of reports and documents recommending what the Agency should do. Where these reports were influential is where the Agency had worked with the organisation to develop them.

He concluded that, with the Agency being now at the start of developing a 5-year plan for R&D, it would be a good time for CRISP to get in at the beginning. It would be far less useful if, towards the end of the development period, a report were to arrive with new recommendations. These would be unlikely to have much influence. He concluded that bodies like CRISP can fulfil a useful role, providing an external perspective, but that a dialogue is essential over how recommendations are formulated – external views are valuable but they have to be developed through dialogue.

Key findings in relation to influence on the Environment Agency

- *CRISP's influence on the Environment Agency's R&D programme appears to have been minimal. This was due to a combination of negative circumstances including change in personnel and the point in the Agency's R&D cycle at which the CRISP recommendations arrived.*
- *CRISP recommendations may arrive at more or less propitious times for take up by funders, and this can strongly affect the extent to which they are implemented.*
- *Funders develop R&D programmes in cycles - and recommendations which arrive at the wrong time in the cycle are unlikely to have much influence.*
- *Funders welcome external input to their R&D programmes from bodies like CRISP, but recommendations have to be formulated through dialogue with the Agency if they are to be implemented.*
- *The Environment Agency is just embarking on a 5-year plan for R&D and there is an opportunity for CRISP to be engaged right from the start*

Recommendations emerging from contact with the Environment Agency

- *CRISP needs to be aware of funders' R&D cycles and, if possible, work in accordance with them if it is to have the maximum impact.*
- *CRISP needs to ensure it invites representatives from relevant funders to participate in its deliberations and to ensure there is genuine dialogue with funders.*
- *The Environment Agency is at the start of a 5-year plan for R&D, and this is a propitious time to begin a dialogue with the Agency.*

4.5 Highways Agency

The CRISP Funder Focused Action Plan 2000 for the Highways Agency was forwarded to the Agency in a draft form and valuable feedback was obtained from the Head of R&D. He identified the increasing importance of sustainability as a cross-cutting theme, and recommended that more of the recommendations in the CRISP 99/15 report be show as generally relevant to their programme. He also noted that many of the general recommendations were already being tackled by the Agency in-house. The Action Plan was duly updated to take account of his comments.

The Head of R&D changed between the receipt of the original Action Plan and the this review, and both Heads were interviewed about CRISP and its influence.

The former Head said that the CRISP Action Plan had not had any influence at all on their R&D. He went on to explain the reason for this. At the time the Action Plan arrived at the Agency, he was primarily concerned with improving the internal organisation of R&D within the Agency. He wished to improve research management and communication internally, and to ensure the Agency's research responded to the needs of its operations, not allow it to become self-referential. He had focused primarily on the production of a guide to the management of research within the Agency, together with a compendium of its research projects to aid research management and high level reporting. Once these had been achieved, the possibility of a more outward focus would have been a next step. But he also said that, while he welcomed good papers from outside bodies, responding to them was only a secondary priority. The HA is encouraged to work on research that is linked to its operations (the transport network) whereas strategic and policy issues are the responsibility of the Department for Transport, and this defines (or limits) the scope for R&D topics.

The former head said that the Action Plan did have value and that there were big issues like sustainability and climate change that were important to the Agency, and where it needed to be outward looking and to work with others, particularly in problem definition, and dissemination of the outcomes.

His successor was appointed in September 2001. He reported that he did see the CRISP Action Plan but had not made much use of it. He was able to report, however, that many of its relevant recommendations are actually being implemented within the Agency's R&D programme. He was also very interested to receive recent Task Group reports on Climate Change, Culture and People, and Capturing Knowledge.

Key findings in relation to influence on the Highways Agency

- *CRISP's influence on the Highways Agency's R&D programme appears to have been minimal. This was due to an inward focus at the time of the Action Plan within the Agency towards improving its management of research.*
- *The Agency is limited in its research to those issues of direct relevance to the road network – strategic issues are the responsibility of the Department of Transport.*
- *Many of the CRISP recommendations are being researched within the Agency.*
- *The Agency needs to be engaged in the process of identifying research issues rather than the passive recipient of an externally produced report.*
- *The Agency is interested in climate change, sustainable development, culture & people and capturing knowledge.*

Recommendations emerging from contact with the Environment Agency

- *CRISP needs to ensure dialogue with funders, not treat them as passive recipients of recommendations.*

4.6 EPSRC, UKCIP and the CRISP Climate Change Task Group

A very positive picture of how CRISP can influence the construction research agenda emerges from the CRISP Climate Change Task Group and its relationship with EPSRC and UKCIP.

The EPSRC representative was interviewed on 6 January 2003. He said that prior to the formation of the CRISP Task Group, EPSRC had already been in discussion with UKCIP on climate change in the built environment, and initially did not welcome being advised by CRISP that they had a Task Group starting to identify the research needs and issues. Initially it appeared that the EPSRC Programme would commence before the CRISP TG had produced its report, with the potential consequence that the CRISP recommendations would be too late to have any influence. However, representatives from EPSRC and UKCIP both joined the CRISP Task Group and there was slippage in the EPSRC programme, with EPSRC launching its climate change programme in mid-2002. Proposals were invited for the end of October 2002. Meanwhile, the CRISP TG report had been developed in time to influence EPSRC's agenda, and published both to coincide with the EPSRC call for proposals and to be a resource for applicants. Both EPSRC and UKCIP were able to point potential applicants to the CRISP report for background information.

The EPSRC representative said there was good interactive working in the Task Group – the DTI representative was involved in both the EPSRC programme and the Group, while one academic who was on the TG was successful in obtaining funding. He said he thought the Task Group has been useful, he had obtained some good messages from it, and was able to inform the Group of what EPSRC was doing. It had had a positive effect. He said it was, however, hard to say whether the TG recommendations were influential or not in practice.

The EPSRC representative said EPSRC recognise that climate change will not go away, and they are planning to fund further research in this area, specifically on the subjects of climate change and

transport, and climate change and building design & construction (though this latter may alternatively be funded by DTI). There is therefore continuing scope for CRISP's Climate Change Task Group's recommendations to be influential in future. He recommended that, because climate change will not go away, new CRISP should not lose sight of it as an issue.

UK CIP is providing the climate change expertise. Eg climate change scenarios. A representative from UKCIP who was also on the CRISP Task Group was also interviewed. She reported that UKCIP acts as a facilitator to encourage climate change research that is stakeholder led. In Built Environment, there is a paucity of information on the impact of climate change, and that the CRISP report set a base line, a research agenda, and the scale and scope of issues. It is one of the few reports that the UKCIP web-site had a web-link to – evidence of its endorsement. It had also been drawn to the attention of 4000 people on their electronic mailing list. She said that when people asked UKCIP about the state of knowledge of climate change research in the built environment, they were pointed to the Task Group report. She said that she considered the Task Group to have been run very impressively, its time limited nature was good, and the CRISP commissions in support of the Task Group were very good value for money. She concluded that climate change is a big issue and unlikely to go away; so that in terms of new CRISP, it should be retained as an important topic.

Key findings in relation to EPSRC, UKCIP and Climate Change

- *CRISP's Climate Change Task Group appears to be a model of how CRISP could work with funders to ensure influence and implementation, although this was partly a consequence of good fortune. The formation of the Task Group occurred after EPSRC had started working with UKCIP to introduce a new funding stream for climate change research. Nevertheless, representatives from EPSRC and UKCIP joined the Task Group. Owing to slippage in EPSRC's programme and prompt publication of the Task Group report, the Task Group influenced the research agenda, and the Task Group report (considered to be a valuable state of the art report) provided an information resource for potential applicants.*

Recommendations emerging from contact with EPSRC and UKCIP regarding the Climate Change Task Group

- *As identified in other recommendation elsewhere, where CRISP is working on highly topical areas, it should liase with funders to identify their relevant programmes, invite funders to send representatives (or corresponding members) to join its Task Groups, and ensure its Task Group reports are definitive. These steps will ensure maximum impact.*

5 An analysis of CRISP recommendations, and reported implementation

5.1 Policy and project-related implementation

The CRISP Executive and the Management Support Unit considered the first batch of 156 recommendations and separated them into:

- those which are primarily intended to influence policy
- those which are expected to lead to projects to acquire the knowledge needed.

The remainder of the recommendations have been analysed in the same way, so that all Task Group recommendations have been classified as either policy-related or project-related.

As part of the present report, each of the Task Group chairs and champions (or in one or two cases, the author of the Task Group's report) were interviewed in person or by telephone between December 2002 and January 2003 about each of the recommendations. They were asked whether they had been implemented, were rendered obsolete by changing circumstances, or were still needed. For some of the recommendations, the chairs reported that they did not know what progress had been made.

This section of the report presents an analysis of reported implementation, Group by Group. A summary is given in section 5.15. Section 5.16 presents an analysis of Task Group recommendations by primary focus. Appendix 14 contains all the data.

5.2 Construction Research Base

The following table shows progress towards implementation of recommendations from the Construction Research Base Task Group

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	0	2	**2**
Obsolete	0	0	**0**
Don't know	0	0	
Still needed	1	2	**3**
Total	**1**	**4**	**5**

The Task Group chair reported that two of the five recommendations had been implemented, both were project related. He added that Group's recommendations had been influential and taken forward in various ways. The first recommendation, the need for a 'research champion' even if not implemented to the letter, anticipated parts of the Fairclough Report and the role that Sir John himself might have played. Again the second recommendation was concerned with statistical data on the research base, which the appendices of the Fairclough Report go some way to fulfilling.

5.3 Design

The following table shows progress towards implementation of recommendations from the Design Task Group, as reported in an interview.

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	6	0	**6**
Obsolete	0	0	**0**
Don't know	1	2	**3**
Still needed	8	22	**30**
Total	**15**	**24**	**39**

The Design Task Group chair referred to a number of initiatives that had begun to address the recommendations of this task group, including DETR's Fast Track, the PII project on Design Quality Indicators, publications emerging from CABE, studies of building performance by PROBE, workshops led by EDGE, support for interdisciplinary research by EPSRC, and actions in certain sectors such as health. It remains unclear the extent to which these are results of the Task Group's report, although members of the Task Group have been actively involved in some of these initiatives.

While he identified a total of 30 recommendations that are still needed, for several of these he suggested that a start had been made. His overall comment was: 'There are many signs of movement but we should not be complacent.'

5.4 Meeting customers' needs

The following table shows progress towards implementation of recommendations from the Clients' Workshop, as reported in a telephone interview by the author of the workshop report.

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	2	5	**7**
Obsolete	0	2	**2**
Don't know	0	3	**3**
Still needed	1	10	**11**
Total	**3**	**20**	**23**

The respondent pointed out in his interview that clients divided into two types – major repeat clients and small occasional clients. While many of the Task Group recommendations had been implemented for major clients, there was another important part of the industry, the small end of the market, which needed to addressed. Many of the recommendations which were still needed, were need to support small and occasional clients. He said there was no evidence of effective trickle down of information.

5.5 Motivation and communication

The following table shows progress towards implementation of recommendations from the Motivation and Communication Task Group, as reported by the Task Group chair.

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	6	5	**11**
Obsolete	1	0	**1**
Don't know	0	0	**0**
Still needed	5	7	**12**
Total	**12**	**12**	**24**

The Task Group chair reported that she thought the Group had given more credibility to DETR to the issue of Motivation and Communication; while DETR had been going in this direction, the Group's endorsement encouraged and accelerated it and gave the topic respectability. In particular, all DETR/DTI projects now had to have detailed communication plans. Nevertheless, there were some recommendations that remained outstanding: specifically the need for better organisational learning and improved knowledge management in the industry, and a continuing need to communicate research results to industry effectively.

5.6 Sustainable construction

Unfortunately the chair of the Task Group moved to Hong Kong and he now feels insufficiently close to UK research to be able to offer an opinion on the implementation of the Task Group's recommendations and those of the commissioned report from Stanger (CRISP commission 99/15). Rather than risk these carefully compiled recommendations being lost, they have been treated in the rest of this report as 'still needed'. It is to be hoped that some have been implemented through PII and through EPSRC's programme on Sustainable Urban Environments. This latter is underway in its pilot phase with four leading groups acting as co-ordinators for consortia addressing specific areas.

	Number of policy-related	Number of project related	TOTAL
Implemented	0	0	**0**
Obsolete	0	0	**0**
Don't know	0	0	**0**
Still needed	11	23	**34**
Total	**11**	**23**	**34**

5.7 Performance Task Group

The following table shows progress towards implementation of recommendations as reported by the Task Group chair.

	Number of policy-related	Number of project related	TOTAL
Implemented	0	2	**2**
Obsolete	0	2	**2**
Don't know	0	1	**1**
Still needed	0	5	**5**
Total	**0**	**10**	**10**

Only 2 of the Group's recommendations were reported as having been implemented – on the implications of PFI for performance, and on the match between the service life of products and their specification. However, the Task Group chair did report that he was himself chairing a PII-funded project on managing the sustainability of buildings (involving ECD and FaberMaunsell) that addressed one of the recommendations at least in part, but added he was unsure whether the recommendation as a whole had been implemented. 5 recommendations were, in his view still needed.

5.8 Process

The Process Task Group made just four recommendations. None was reported by the Task Group chair as having been implemented. Three were still needed, the fourth was described as implicit in another and so was in effect obsolete. The recommendations call for process research to support the whole team in the early stages of projects, for improving the accessibility of existing research outcomes, for identifying gaps, and for demonstrating the benefits of application of the application of process models in practice. [These recommendations have been made in spite of several projects on process modelling and mapping supported under IMI, LINK IDAC and LINK MCNS – The Author]

	Number of policy-related	Number of project related	TOTAL
Implemented	0	0	**0**
Obsolete	1	0	**1**
Don't know	0	0	**0**
Still needed	3	0	**3**
Total	**4**	**0**	**4**

5.9 Technologies and components

The following table shows progress towards implementation of recommendations from the Technologies and Components Task Group. When asked about implementation of his Task Group's recommendations, the chair replied:

"The Group's original steer had been towards technology research needs, but we shifted away from technology towards organisational and structural issues that militated against the adoption of new ideas. We were surprised in the sort of recommendations, and their direction, that we came up with."

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	0	0	**0**
Obsolete	0	0	**0**
Don't know	0	0	**0**
Still needed	5	3	**8**
Total	**5**	**3**	**8**

The chair reported that all the recommendations were still needed. He did talk through some initiatives that were beginning to address them, but believes they are all still needed.

5.10 Construction Futures

The following table shows progress towards implementation of recommendations from the Construction Futures Task Group, Foresight. This is a slightly different case from other Task Groups, in that more than 100 recommendations were originally made by sub-groups, but these were all brought together and merged in the final Foresight publication. The Task Group chair said that the report was a distillation from six original reports. He said it was difficult to point to any current programme and say that it came directly out of Foresight.

However, it was possible to see connections between Foresight and current research. He gave the following examples:

- Parts of Foresight had fed into EPSRC's Sustainable Urban Environments programme. Under this programme there was a project from CIRIA and the University of Dundee, but it was unclear whether this had been influenced by Foresight or not.
- Foresight recommendation 1 had included the promotion of standardised pre-fabricated components off site, which was politically desirable on health and safety grounds, and PII had given this priority.
- The 'performance of built assets' had been established as a programme in PII-Programmes, but not a single proposal had got through to the second round.

Conversely, the fifth Foresight recommendation was about research to support renovation and repair, in recognition that we spend £30bn per year on refurbishment, but there is hardly any research in those areas.

In his view, because Foresight uses people in the industry it is unlikely to come up with something entirely new. Nor are its recommendations intended to be framed as research topics to go forward as research projects. What Foresight offers is, through the consultation process, recommendations that have a high degree of credibility, value and acceptance. However, he said there was no effective feedback loop that would enable him to report on the extent to which people were aware of Foresight and were implementing its recommendations. He was aware of some issues where Foresight had reinforced present concerns, such as whole life costing.

Because Foresight used people in the industry, you couldn't expect it to come up with something entirely new, but rather tends to reinforce present concerns, such as whole life costing. These were valid when the Foresight report was written and are still valid now. The question, as he explained, is 'What do we do about them?' He went on to suggest that the Task Groups are not fettered with responsibility and they can come up with anything they like including things that are not 'handleable'. And, other than passing recommendations to potential funders, there is no linkage – no process for carrying forward recommendations or encouraging implementation, it was just a case of waiting to see who wants to grab them. He said he considered this a strength of CRISP, but also a weakness.

For all these reasons, the Futures group's recommendations have all been defined in this report as 'still needed' (as shown in the following table) even though some have clearly been influential.

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	0	0	**0**
Obsolete	0	0	**0**
Don't know	0	0	**0**
Still needed	9	0	**9**
Total	**9**	**0**	**9**

5.11 Housing and Construction

In order to enquire about implementation of recommendations in the CRISP Housing report, the CRISP Housing Champion was contacted. However, he replied:

"I was a member of the CRISP Executive and the CRISP Panel , having been appointed Housing Champion, but my experience was that CRISP wasn`t very interested in housing or housebuilding but rather created the post of Housing Champion because they didn`t want to be completely in the dark about the work of the Housing Forum, on which I sat as a Director at that time."

For this reason, the author of the report, an academic from the Science Policy Research Unit at the University of Sussex was contacted to respond about implementation of his report's recommendations. The following table summarises his replies.

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	2	1	**3**
Obsolete	0	0	**0**
Don't know	0	0	**0**
Still needed	8	6	**14**
Total	**10**	**7**	**17**

Of the 17 recommendations, the respondent argued that 14 were still needed, with only 3 implemented. These were an academic study at the University of Greenwich, and two DETR supported planning studies. All the remainder, a mixture of policy recommendations and projects, are reported as still needed.

5.12 Knowledge capture

The Knowledge Capture Task Group concentrated on how to capture knowledge from the M4I demonstration projects. It identified a number of concerns about the demonstration projects, and questioned the extent to which the knowledge was being captured effectively even with the participating companies, let alone to a wider audience. 26 detailed recommendations were made about how to improve the selection of demonstration projects and capture and disseminate knowledge from them effectively.

Following the Knowledge Capture Task Group report, a further report was commissioned from Taywood & Consensus to investigate the issues of knowledge capture and organisational learning in more detail. This endorsed the findings of the Task Group report. However, for the purposes of this report, only the original recommendations from the original Task Group report have been explored. A former M4I representative was interviewed about implementation, rather than the chair of this Group.

He also recommended interviewing a Housing Forum representative but this has not yet been done. [Required?].

The following table summarises his replies. It shows that more than two-thirds of the recommendations have been implemented. This is a much higher fraction than for any of the other Task Groups and is, perhaps, a consequence of recommendations being targeted at a specific audience – the Movement for Innovation and the Housing Forum.

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	12	5	**17**
Obsolete	1	0	**1**
Don't know	0	0	**0**
Still needed	2	6	**8**
Total	**15**	**11**	**26**

5.13 Culture and People

The Chair of the Changing Culture Task Group was interviewed about the recommendations from this Task Group. She reported that it was still early days to examine implementation. She believes the recommendations are relevant to the theme of Respect for People widening it in the process, and she has already approached those with responsibility for the Respect for People theme.

CRISP recommendations have fed forward into a major bid being prepared by Rethinking Construction for the second round of PII-Programmes 2002 under Programme Area A3 'People, Culture and Change Management'. Other CRISP work has also been influential in formulating the components of the bid, specifically the study of 'Project Chemistry' in the demonstration schemes. A facilitated workshop was held in early January at which consortium members planned the objectives and programme of work.

The Task Group chair also believes it is important to keep talking to the research councils – EPSRC and ESRC – a process that has already started, to keep them on board. ESRC in particular needs to be encouraged to see construction as a sector worthy of research and case study. She considers all the recommendations as being still necessary and still needed. The following table summarises this:

	Number of policy-related	**Number of project related**	**TOTAL**
Implemented	0	0	**0**
Obsolete	0	0	**0**
Don't know	0	0	**0**
Still needed	15	14	**29**
Total	**15**	**14**	**29**

Four out of five of this group's recommendations were project related. According to the Task Group chair, only one has been implemented. However the Task Group chair made the point that the Group's recommendations had been influential and taken forward in various ways even if not implemented to the letter.

5.14 Climate change

The Climate Change Task Group has been treated slightly differently in this report, from other Task Groups. The Task Group report actually contains 58 detailed recommendations. However, these have

been summarised under just 5 main headings. As headings, they are all policy-related, although many of the individual recommendations refer to the need for specific research projects.

All the recommendations are reported as 'still needed'. And, as set out in section 4.6 of this report, the participation of both EPSRC and UKCIP in the production of the Task Group report has resulted in a high level of endorsement from these influential bodies. It seems likely that the report will be highly influential and a high proportion of the recommendations will be implemented.

5.15 Summary of implementation across all the Task Groups

The following summary table shows for each of the CRISP Task Groups, the total number of recommendations they made, these extent to which these were project or policy related, and the reported level of implementation. This summarises the information in sections 5.2 to 5.14.

	Number of policy related recommendations					Number of project-related recommendations					Total number of recommendations				
Task Group	Implemented	Obsolete	Don't know	Still needed	Total	Implemented	Obsolete	Don't know	Still needed	Total	Implemented	Obsolete	Don't know	Still needed	Grand total
Construction Research Base	0	0	0	1	1	2	0	0	2	4	2	0	0	3	5
Design	6	0	1	8	15	0	0	2	22	24	6	0	3	30	39
Meeting customers' needs	2	0	0	1	3	5	2	3	10	20	7	2	3	11	23
Motivation & communication	6	1	0	5	12	5	0	0	7	12	11	1	0	12	24
Sustainable Construction	0	0	0	11	11	0	0	0	23	23	0	0	0	34	34
Performance	0	0	0	0	0	2	2	1	5	10	2	2	1	5	10
Process	0	1	0	3	4	0	0	0	0	0	0	1	0	3	4
Technologies and components	0	0	0	5	5	0	0	0	3	3	0	0	0	8	8
Constructing the Future	0	0	0	9	9	0	0	0	0	0	0	0	0	9	9
Housing and Construction	2	0	0	8	10	1	0	0	6	7	3	0	0	14	17
Capturing knowledge	12	1		2	15	5	0	0	6	11	17	1	0	8	26
Changing culture	0	0	0	15	15	0	0	0	14	14	0	0	0	29	29
Climate change	0	0	0	0	0	0	0	0	5	5	0	0	0	5	5
TOTALS	26	3	1	67	97	23	4	7	102	136	49	7	8	169	233

This table shows that::

- Of the 233 recommendations made, 97 have policy implications, whereas 136 are expected to lead to projects to provide the new knowledge needed.
- Of the 97 recommendations with policy implications, 67 are reported as still needed, with only 26 (one quarter) implemented.
- Of the 136 project-related recommendations, 102 are reported as still needed with only 23 (again about a quarter) implemented

The Task Groups with the highest levels of implementation are:

- Motivation & communication (11/24 implemented) – this is consistent with the frequency and regularity with which this group's outputs have been cited in the DETR/DTI construction research programme.
- Knowledge capture (17/26 implemented) – whose report had a very specific target audience in M4I and the Housing Forum.

One overwhelming conclusion is, however, apparent - most chairs and champions report that only a small fraction of their recommendations have been implemented, with the majority still needed. It was noticeable in the interviews that several respondents conveyed a sense of unwillingness 'to let go' of

their recommendations. It seemed as if, having spent intense periods in group discussion to distil key recommendations, even when these were partially implemented by some other body, several chairmen claimed they were 'still needed'. Perhaps the chairs had had very clear ideas not just of what research was needed but also how it should be undertaken; and the implementation only partly met their expectations.

5.16 Classification of Task Group recommendations by primary focus.

All CRISP recommendations have been classified by their 'primary focus'. The following table shows the primary focus tabulated by Task Group. Some caution is needed in interpreting this table because of the way the classification has been undertaken. Specifically, a large fraction of the recommendations from the Knowledge Capture group have been classified as concerned with Knowledge Management. From the Sustainable Construction Group, most of the recommendations are sustainability specific, and similarly from the Climate Change group, all five have been classified as climate change specific.

Reference	Policy	Project	Communication	Knowledge Mgt	Business case	Improved data	Sustainability	Improved processes	Networks	Guidance	Education and training	Improved performance	Culture	Climate change	Building teams	Industry studies	Technical	Non specific	Implemented	Obsolete	Don't know	Still needed
Research base	1	4	2	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3
Design	15	24	5	0	5	5	0	0	7	4	9	2	0	0	0	0	0	2	6	0	3	30
Customers needs	3	20	2	3	6	4	0	3	1	0	1	1	0	0	2	0	0	0	7	2	3	11
Motivation	12	12	7	6	1	1	0	1	1	2	0	0	0	0	0	0	0	5	11	1	0	12
Sustainable const	11	23	4	0	5	1	17	0	0	0	0	1	2	0	0	1	0	3	0	0	0	34
Performance	0	10	0	0	0	0	1	2	0	0	0	6	0	0	0	0	1	0	2	2	1	5
Process	4	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3
Technologies	5	3	1	1	1	0	0	2	0	0	0	1	1	0	0	0	1	0	0	0	0	8
Futures	9	0	0	0	1	0	1	2	0	0	0	1	2	0	0	2	0	0	0	0	0	9
Housing	10	7	2	0	1	6	0	3	1	3	1	0	0	0	0	0	0	0	3	0	0	14
Knowledge capture	15	11	6	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	0	9
Culture	15	14	5	1	3	1	0	3	3	4	2	0	7	0	0	0	0	0	0	0	0	29
Climate change	0	5	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5
TOTAL	**100**	**133**	**36**	**32**	**23**	**20**	**19**	**16**	**14**	**13**	**13**	**12**	**12**	**5**	**3**	**3**	**2**	**10**	**47**	**7**	**7**	**172**

The table above gives an indication of the spread of CRISP recommendations. It suggests that the most frequently cited primary focus of CRISP recommendations is concerned with the communication, dissemination and impact of new knowledge. If any one single concern needs to be drawn attention to among policy makers, it is the frequency with which communication and dissemination issues are emphasised right across CRISP task groups.

The second most frequently cited focus of the recommendations is knowledge management. This arises partly because so many recommendations from the Knowledge Capture Task Group were concerned with knowledge management. However, several of the other groups also included knowledge management issues among their recommendations.

At the other end of the spectrum, technical studies were the focus of only two recommendations. And, as the Technologies & Components Task Group explained, while they had intended to make technological recommendations, when they came to it they found that their recommendations were better focused on addressing the organisational and structural issues that militated against the adoption of new technologies.

6 Feedback from Task Group chairs and champions

The interviews with CRISP Task Group chairs and champions included questions about the strengths and weaknesses of CRISP, and how it could be more effective. Again (see section 5.2) there are no replies from the champion for sustainable construction and climate change, nor from housing.

6.1 How could CRISP become more effective in influencing construction research?

Task Group chairs and champions were asked: "What actions could CRISP take to become more effective in influencing construction research?" Their replies are given in the following table

Task Group	Reply from chair/champion
Construction research base	Three things First, more engagement of key players from industry, among clients, and government – whoever is influential. Need engagement with individual companies to obtain the support and involvement of key players from industry. CRISP should be a critical sounding board to help powerful and influential bodies know whether their new initiatives are soundly based and are likely to succeed. CRISP should be a critical yet supportive friend and take a critical stance over whether what they are doing represents evidence-based policy and will achieve its objectives. Second it should focus on the most important of its Task Group recommendations. 100's of recommendations were made across the Task Groups – these were far too wide and not prioritised. CRISP should address the big issues and drive them through. Third, it should promote a shared vision for the industry as a whole and identify an appropriate development path for it. It should be the engine room for strategic development of the industry and identify the building blocks needed to achieve it. For the Strategic Forum, CRISP would provide a thoughtful approach to vision and how to achieve it.
Design	Short studies and publicising them well with an identifying brand – to ensure they are familiar and people know where to look for them - accessibility.
Meeting customer needs	CRISP is very well connected to umbrella bodies and has access to movers and shakers. But no evidence of connection to organisations like the Federation of Master Buildings, nor to construction committee of Federation of Small Businesses. CRISP could usefully broaden its engagement towards small and occasional clients through, for example, Chambers of Commerce. Ask them what they think of the construction industry and what could be done to improve its performance.
Motivation & communication and Changing Culture	CRISP should get more involved, and be seen to be more involved with real industry and industry bodies. It is not well enough known and should become a better known brand.
Sustainable construction	
Performance	It has been quite effective, especially influencing DTI, although the DTI programme will change so the opportunities will change. Whereas DETR was construction focused, now construction will have to fight against other sectors. Therefore it will be important how themes are chosen. Construction related themes may not be enough – it will need to be more broadly based on the built environment as a whole. Performance is about people, work organisations and people organisations – much broader than the performance of one component. CRISP has been less successful in getting the industry to take more control over, and involvement with, agenda setting. CRISP has not been successful in that way. The Strategic Forum and Accelerating Change are helpful in their recognition of the importance of research, but there is a lot to take forward. CRISP has to get to the leadership of the construction industry, and try to understand why investment in research is so abysmal. What is the industry doing and the professions doing to set industry-wide priorities? Industry tends to sit back and let government sort it out. Instead, we've got to take the agenda to industry. The link with the Strategic Forum is valuable.
Process	CRISP needs to become more well known – there is a lack of understanding in the industry of what CRISP is and what its function is. It is not well known among practitioners.
Technologies and components	There is a need to establish more substantive dialogue with industry. Old Crisp there was a disengagement between what CRISP was seeking to do and industry's perception. PFI has brought about major changes in relationships between the parties. CRISP needs to establish dialogue with premier league, with organisations that see wider challenges and it needs to help change and improve that cohort. After Fairclough Report, under the RCF we formulated a response and got together to make a PII proposal to look at communication and project modelling in the project arena. We were a dozen. 6 major consultancies recognised commonality of purpose, in terms of key issues, common objectives, and the need to be supported by research. Through Industry Network for Construction Research. (INCR) we responded to Fairclough. We meet fairly regularly to discuss challenges. We

	consider ourselves to be 'at the sharp end'. We are not a competitor to CRISP, in fact I saw Michael Dickson recently and we regard ourselves as part of a broad church that is a constituent part of CRISP. There is a meaningful dialogue in which industry develops a picture and then passes it to academia. The Built Environment Foundation was launched a week ago – formed by the RCF and DBF. Malcolm Dodds facilitated a workshop following which we responded to Fairclough.
Construction futures	There are many public sector bodies with research budgets – HA, EA etc. CRISP should get round them who set strategy and who want auditable recommendations for R&D. Ensure they get to hear about the v well locked in, esp with organisations like EPSRC and DTI. Old CRISP engaged with HA Has nCRISP got it? NCRISP seems even more locked into buildings that it engagement with HA, EA, HSE, let alone water. Where is TRL? On private sector, Fairclough says got to get a mandate from industry. How get them in? Questions at board level (as we heard from Roger Flanagan) are all risk-averse. Companies are increasingly driven by fear – not healthy. CRISP could try to engage more with industry, but would spend a lot of time to no effect. The original CRISP run at BRE by Richard John went on about the benefits to industry of innovation. DLC-based CRISP switched to influencing government programmes. A lot of time has been wasted thinking we've got to do things with SMEs. Fairclough says we should work with the 100 best companies – define them and then work with them.
Housing	
Capturing knowledge	Case studies are always helpful and I think I saw that David Gann was on new-Crisp so that could be good. I would aim to hook the research agenda onto the fortunes of UK Construction plc - we seem to have missed the whole alternative power market and yet think back to Architectural Design in '60s!
Climate change	

Key findings and recommendations made by CRISP Chairs and Champions about how to make CRISP more effective

To be more effective, CRISP should

- *engage more with real industry and industry bodies, obtain greater engagement of key players from industry, and engage in more substantive dialogue with industry's major players.*
- *engage with small and occasional clients through, for example, Chambers of Commerce and Federation of Small Businesses*
- *become a better known brand, particularly among industry.*
- *be the engine room for strategic development of the industry.*
- *hook the research agenda more closely to the fortunes of UK Construction plc.*
- *make fewer recommendations, prioritise them, and focus on the more important – address the big issues and drive them through.*
- *produce short studies and publicise them under a clearly identifiable brand.*
- *produce case studies.*
- *liase with public sector bodies that have research budgets to provide them with auditable recommendations for R&D*

6.2 Strengths of the CRISP Task Group process

Task Group chairs and champions were asked: "What do you consider the strengths of the CRISP Task Group process?" Their replies are given in the following table

Issue/topic area	**Reply from chair/champion**
Construction research base	Individual engagement of enthusiastic and committed individuals. All sides involved – clients, contractors, consultants. Structure – Task Groups were expected to come up with concrete recommendations, which was a good discipline for them. The ability to consult – it ran workshops and circulated material. For all these reasons, it has been pretty effective.
Design	Brevity, and the MSU was very good, it got the best from volunteers. Briefing support from MSU was good – without it, you could go off at a tangent. The Commissions were very good.
Meeting customer needs	The ones I was involved in allowed things to take their own course. The TG was responsive and had ideas, but did not have a pre-arranged agenda. It was not just a means of giving credibility to a fix

	agreed in advance.
Motivation & communication and Changing Culture	Being time limited, not open ended, not have a committee for its own sake. Addressing topics that are relevant and appropriate to industry. Having a distinctive and clear structure Short commissions are highly valued as part of the Task Group process – think pieces are very good
Sustainable construction	
Performance	The strengths of the Task Groups are they are intense, time & task-limited, not standing committees, a freely selected group with voluntary support of lively committed people, that have worked by brainstorming. It worked really well. When you make a standing committee that is politically representative it can just grind into the ground.
Process	Its potential strength is that it pulls together work from other parties that is not well known. CRISP has, or historically had, a lot of contacts among government bodies. It had not distilled out its messages to industry as well as it could. A web site is not sufficient. It has to raise its profile at the grass roots level. Industry is not aware of what it has to offer.
Technologies and components	Powerful tool for bringing together a disparate group around a specific theme and which distils a view. TGs are one of the strongest parts of CRISP, they engage with industy and are decisively not an 'ivory tower'. Quality of debate is high, as is the level of commitment and engagement – although it remains largely the usual R&D mafia. I was pleased at the BE Foundation launch conference attended by RCF and DBF – to find many unfamiliar faces – it's breaking out of the mould. M4I is the usual mafia.
Construction futures	Enables people to address a specific purpose, over a limited time and to a fixed budget. Therefore achieved strong focus. Can attract individuals who would not be attracted to standing committees. You can get the right sort of people and also flexibility in a task force.
Housing	
Capturing knowledge	Fast, low cost and effective; well it is as fast and effective as the three constituents - the (intelligence and focus of the) members, the DLC manager (and of course Jim Meikle is brilliant) and the calibre and focus of the researchers (I think I have chaired 2 enjoyable and insightful short sharp exercises and one less successfully). The effectiveness of the CRISP process is subject to a funding regime that allows for the work identified to be followed up.
Climate change	

Key findings and recommendations about the strengths of the Task Group process

According to the CRISP Chairs and Champions, the strengths of the Task Group process were:

- *The engagement of enthusiastic, committed, motivated and lively – but also often disparate – individuals. Quite different ethos from a standing committee that is politically representative.*
- *To be fast, low cost and insightful – arising from the intelligence of the members, good management, and the focus of the researchers – and potentially effective, subject to a funding regime that allows the work identified to be followed up.*
- *The engagement of all sides of the industry – clients, contractors, consultants.*
- *The briefing to Task Groups, and the discipline of requiring them to formulate recommendations.*
- *The ability to consult, through workshops and by circulating material.*
- *The addressing of topics that are relevant and appropriate to industry.*
- *Genuine responsiveness, and the avoidance of merely giving credibility to a pre-arranged agenda*
- *The intensity of the time and task-limited brainstorming process.*
- *Their ability to focus on a set of related issues and to distil a viewpoint.*

Recommendation about the strengths of the CRISP Task Group process

- *In establishing its modus operandii, new CRISP should be aware that the CRISP Task Group process has many strengths*

6.3 Reported weaknesses in the Task Group process

Task Group chairs and champions were asked: "Were there any weaknesses?" Their replies are given in the following table

Issue/topic area	Reply from chair/champion
Construction research base	The individuals are just that – they speak for themselves but don't carry political weight. Lack of focus – too many recommendations, some of which were vague, some of which were not achievable. TGs should have focused on practical, achievable things. On the whole its been very effective.
Design	It needs younger participants. The invitation was very powerful. A wide spread of professional and appropriate membership is needed to avoid the usual suspects. There was a shortage of women. The MSU provided marvellous consultancy support for the TG chairs.
Meeting customer needs	The major weakness was that it was almost impossible to have all the right people involved. You could get quite a few of the right ones, but often lacked someone it would be good to involve. CRISP has achieved real engagement – although not with the whole sector (as noted above).
Motivation & communication and Changing Culture	a) topics for Task Groups too broad. b) the difficulty of keeping industry people on board and interested over an extended period (although the time limited nature is a strength) c) lack of continuing industry input d) production of long and unwieldy TG reports e) web-site publishing is not sufficient and serious enough when trying to wield influence f) weak follow through of recommendations – although valuable to have champions to take them forward, the champions themselves may have this as one of half a dozen out of hours jobs – needs serious executive role to make it work.
Sustainable construction	
Performance	It was all done by volunteers, and the problem is you need solid thinking. The Commissioned think pieces were not the same as having a committed research oriented support in the TG to help shape the issues. Ideally the TG would have a) management support like DLC, b) a research-oriented support post, c) the industry TG members.
Process	The TG's main weakness was a lot of reinvention. We were talking about problems that the main contractor has at the professional level, but some of the solutions need to be brought out further down the supply chain – there is a need for more involvement right down the supply chain for example to trade subcontractors and suppliers.
Technologies and components	Setting of themes could be more rigorous and they could reflect the more substantive views of the wider industry. The other weakness is the implementation of recommendations – CRISP is not good at downstream implementation. We thought we would be recommending the need for particular technological innovations, but we ended up focusing on cultural and organisational issues. CRISP needs better engagement with M4I and CBP to provide a continuum of initatives rather than disjointed ones. Industry gets befuddled with too many initiatives. Some recommendations from CRISP TGs don't set out guideance for R&D but instead they set out challenges. Take new developments in the technology of self-opening doors, or something. There is a huge amount going on, but a lack of awareness of it within SMEs, particularly small architects. It's not easy for them to know about it.
Construction futures	Time pressures. And maybe you had to do a £50k job for £5k. So you knew you were on a route to frustration because you couldn't see them through. There is a question whether the expertise of the TG has been fully exploited. But in the context of what CRISP's had available to it, the plusses have outweighed the minuses.
Housing	
Capturing knowledge	I have identified some weaknesses above but after 3 years of annual away-days, I thought the products were a bit mixed, given the available grey matter. I felt that some projects were well stuck in the treacle and trying to convince everyone that it was all going somewhere. I guess that the constant competition for funding has a dulling effect and certainly does not allow you to criticise other researchers let alone put the boot into a poor piece of work (unless you are the BRE trying to re-establish your hegemony).
Climate change	

Key findings about weaknesses in the Task Group process

According to the Task Group Chairs and Champions, the Task Groups suffered from the following weaknesses:

- *Individuals recruited to the Task Groups speak for themselves and don't carry political weight.*
- *Too many recommendations, some of which were vague rather than being practical achievable things*
- *Lack of younger participants, and a shortage of women, an absence of involvement right down the supply chain.*
- *It was almost impossible to have all the right people involved.*
- *The difficulty of retaining industry representatives on board, and lack of continuing industry input*
- *Topics for Task Groups were too broad.*
- *Task Group reports were long and unwieldy, and the web-site is not serious enough when trying to wield influence.*
- *Weak follow-through of recommendations, despite the champions, and a need for a serious executive role to promote implementation.*
- *It was all done by volunteers. Even commissioned reports, though valuable, were not the same as have committed research-oriented support in the Task Group to help shape the issues – ideally each Task Group would have its own management support plus a research-oriented support post.*
- *Lack of engagement with M4I and Construction Best Practice to ensure a continuum of initiatives rather than disjointed ones.*

6.4 Time and task limiting

Task Group chairs and champions were asked: "Do you consider the time and task limited aspect of the Task Group a good thing?" Their replies are given in the following table

Issue/topic area	Reply from chair/champion
Construction research base	Definitely. But, apart from the lack of follow up, there were too many recommendations and not enough driving through of a selected few key ones. A few should be chosen for taking forward in a more focused way.
Design	Yes.
Meeting customer needs	Yes, essential.
Motivation & communication and Changing Culture	Yes
Sustainable construction	
Performance	Yes, see Q14
Process	Yes
Technologies and components	Yes, extremely good thing. There is a discipline involved here – what we got wasn't perfect, but it met the 80/20 rule – it was 80% there and if you sought the remaining 20% it would take too long and by the time it was ready, you'd have missed the boat.
Construction futures	Yes and no. Generally good, and you can keep something going if it's done a good job.
Housing	
Capturing knowledge	Yes - with the proviso that there must be proper funding available for the research identified in the process.
Climate change	

Key findings about the time- and task-limited aspect of the Task Group process

- *The time and task-limited aspects of the Task Groups are widely held to be a good thing, meeting the 80/20 rule. However:*
- *There was a lack of follow-up.*
- *There were too many recommendations.*
- *There must be proper funding available for the research identified in the process and/or driving through of a selected few key recommendations.*

6.5 The secretariat function

Task Group chairs and champions were asked: "Do you have any views on the DLC secretariat function?" Their replies are given in the following table:

Issue/topic area	Reply from chair/champion
Construction research base	A secretariat is definitely needed, it is vital, and needs proper funding. You might as well give up unless you've got this. The present secretariat has been competent and effective, but DLC is not unique in being able to provide it. Nor are they completely impartial and disinterested – they manage PII projects and apply for funding. Many bodies could do it, and it should be let by competition. However, no one body that is competent is likely to be entirely impartial.
Design	It was exceptional – supportive, efficient, good value for money, and transformed the whole opportunity through wise counsel.
Meeting customer needs	It's a difficult role to fulfil. Compared with the previous BRE-based CRISP where three or four full-time staff committed almost all their effort to CRISP, DLC have spread across a wider number of their staff – perhaps reducing the depth of experience, but enabling wider expertise and novel ideas. New CRISP should reflect on what it wants. It will need someone whose job is running CRISP. One problem is there will be significant expectation but inadequate resources to meet it. New CRISP should try to minimise the gap between expectation and what it can realistically deliver.
Motivation & communication and Changing Culture	What they did was efficiently done. Excellent. [A DLC employee] was marvellous. But it needs an Executive. You need the continuity which an executive gives. Over the summer of 2002 the secretariat had to take on an executive function. There are differences between being a secretariat to an executive and a secretariat to a voluntary chairman.
Sustainable construction	
Performance	They gave excellent support, did a very good job, and were very efficient. It was also helpful having a good base in London that was easy to get to.
Process	Fine.
Technologies and components	I was very impressed by it. [A DLC employee] was excellent. He gave huge support to our TG though he left part way through, but [another DLC employee] did an excellent job continuing with it.
Construction futures	It's a lot better than when based at BRE. Having an amount of money for Commissions has been excellent. (There is a frustration that the TG could not take them further.) At BRE, everything was done by the three staff, despite their inexperience. Now it's got to the point where people are commissionable. [A DLC employee] runs it well, though not as well since [another DLC employee] left. [A DLC employee] doesn't have the understanding [the previous DLC employee] had. She's not a replacement. There are a number of times when the secretariat has not been neutral. Can you expect someone with the intellect of [a certain DLC employee] just to be an observer and a scribe. He championed the specification on Futures work – that was an executive function no just secretariat. A perfect secretariat is something you don't see but can sense. The majority of things they've done have been done well, but on occasion they've been intrusive.
Housing	
Capturing knowledge	Of course one can criticise any organisation but DLC secretariat is both excellent and some such body is essential. You cannot get the right calibre of person unless they get properly managed/massaged.
Climate change	

Key findings about the secretariat function supporting CRISP

- *The present secretariat function is considered by all respondents to be competent and effective, with some respondents going further and describing it as impressive, excellent and exceptional.*
- *The convenience of an organisation with a London base was identified.*

However it was also noted:

- *That organisations other than the present one could provide an equivalent service.*
- *That so far as possible an impartial organisation should be chosen, though this was acknowledged to be difficult to achieve.*
- *That the present secretariat has, on occasion, gone beyond the secretariat function to assume an executive function.*
- *It is important for new CRISP to reflect and decide on what it wants; it should try to minimise the gap between what will be significant expectations and what it can realistically deliver.*

6.6 The perceived value of commissioned reports

Task Group chairs and champions were asked: "Were the commissioned reports useful in supporting your Task Group?" Their replies are given in the following table

Issue/topic area	Reply from chair/champion
Construction research base	Yes, there were some done. They are vital. This is something that set CRISP apart – because TGs could have pieces of work done, and with a professionalism and depth of thought that made them hugely valuable. It is vital that there is support of this kind in future. However, there was a presumption that commissions would be required, and there was a budget to be spent - and the commissions could have been ever better focused and more challenging.
Design	Yes, vital
Meeting customer needs	The client workshop grew out of the CCF's Research and Innovation committee. CRISP contributed to the cost of the workshop and the write-up. In so far as it addressed and influenced DETR and EPSRC it was influential, but after the merger to form CCC, the focus switched to future survival, CCC lost those who had the motivation and influence to drive it forward, the R&I committee ceased, and there was no-one to promote the report's recommendations.
Motivation & communication and Changing Culture	They were useful, but they might have been even more useful if they had been commissioned by the Task Groups themselves once they had started to meet, rather than being commissioned before the TGs were inaugurated.
Sustainable construction	
Performance	All three in support of the performance TG were very good pieces of work. A) a survey of how much was going on; b) a case study of change over time; c) an in-depth study around POE.
Process	Yes, to a degree – fairly useful.
Technologies and components	Yes excellent work was done by Gann and Gibb, which greatly reduced our workload.
Construction futures	Yes, but the process of doing the work is probably more valuable than the report itself. The journey is more important than the destination. The value is in the interaction between the TG and the author.
Housing	
Capturing knowledge	Yes in 2.5 out of 3 cases. I have had previous experience of an m4I project that was a disaster and a waste of (quite a lot of) money because it was too slow and far too late because it had not been managed properly. Those of us outside the research community need the protection of a DLC to ensure that timetables are kept to, since for example a University-based research on a sliding programme is a recipe for disaster. On reflection about your question of 'commissioned reports', I think that the process only works if the group can identify a short piece of research that needs doing; perhaps some of the 'failures' are a result of the task group not identifying a suitable piece or there not being such an animal.
Climate change	

Key findings about the value of commissioned reports

- *Commissioned reports were described in all cases positively, with comments ranging from 'fairly useful' to 'hugely valuable'.*
- *It was suggested that the commissioned reports should have been commissioned by Task Groups themselves once they had started to meet, rather than earlier [this would, however, delay their production], and the process only worked if the Group could identify a short piece of research that needed doing.*
- *It was noted that the process of doing the work was more valuable than the report itself, and that the value was in the interaction between the Task Group and the report author.*

6.7 Have the Task Groups 'made a difference'?

Task Group chairs and champions were asked: "Do you think your Task Group has 'made a difference'?" Their replies are given in the following table.

Issue/topic area	
Construction research base	At one level 'no', and at another level 'quite a lot'. Some of the thinking of the TG re-appeared in the Fairclough Report. Task Groups get people thinking – but it is not always possible to see a clear path linking an earlier idea to a later one even when there are connections. The TG's recommendations were pretty important in the general policy making framework. [Compare the CBPP – CRISP was thinking along these lines long before CBPP was launched. Ideas often surface in strange ways.] Overall CRISP has made a difference.
Design	Yes. The TG report was widely read. It influenced research direction in design quality and gave some support to initiatives promoting post occupancy evaluation.
Meeting customer needs	I think it has made a difference. It influenced PII calls for proposals and EPSRC. Perhaps the influence has been less than some other TGs, but it provided DETR with credible guidance of what clients wanted to see in the research programme. And in terms of leverage, it represents very good value for money.
Motivation & communication and Changing Culture	For the Motivation TG – yes, in so far as we gave more credibility to DETR to go more across to motivation as an issue. DETR, through the DETR representative in the group, was moving in that direction but we gave her a nudge and we probably accelerated it a little and gave the topic respectability. All projects have to have communication plans. For the Culture & People TG, this is new and there has been less time. If C&P gets accepted in DTI, we shall have made some difference. Here the DTI representative said if the issue hadn't existed, DTI would have had to invent it. But without the group, DTI would not have had anything on the subject. This area links to the Respect for People theme.
Sustainable construction	
Performance	Yes. As a result of chairing the Performance TG, I had the opportunity to be an assessor on PII and a number of TG recommendations were included in the PII Call for Proposals. I was involved in evaluating bids under that theme and to advocate the better ones.
Process	No, I've had no involvement since. I probably don't feel it's made a difference because the group identified that more work was needed. CRISP isn't close enough to real practitioners in industry. The process TG had me as a main contractor, three designers and a client (who later dropped out). People need to understand that being part of CRISP is not just a theoretical activity – industry has to be persuaded that engaging in CRISP is necessary to achieve change. CRISP suffers in that it is one of a number of industry initiatives – but is not in the same league as M4I. Industry suffers in that it does not have a single body promoting change all the way through, instead there are several initiatives. People don't feel there is one common them. And what comes out looks like regurgitation. The industry suffers from initiative fatigue.
Technologies and components	I would like to think it was. I don't think the recommendations have been taken up. But they turned out to be about the need to increase awareness and knowledge – rather than being concerned with research requirements. Our recommendations don't rest easily with CRISP or anyone else.
Construction futures	Yes it is making a difference.
Housing	
Capturing knowledge	I think it affected all of those involved but I would hesitate to say that we had had any major influence, however just our cause, sadly.
Climate change	

Key findings and recommendations about whether Task Groups have 'made a difference'

- *Opinions are divided (even within a single respondent!) about the extent to which Task Groups have made a difference, although the majority of respondents say their Group has made a difference.*
- *Task Groups are considered to get their members thinking, even though it is difficult to see a clear path linking an earlier idea to a later one even when there are connections.*
- *The Groups whose chairs/champions were unequivocal in believing they have made a difference through influencing research directions were: Construction Research Base; Motivation; Design; Performance; and Construction Futures.*
- *In the case of Meeting Customer Needs, the outcome is reported as having influenced DETR and EPSRC, but to have suffered from changes within the Confederation of Construction Clients (and its eventual disappearance in November 2002) that left it without a champion to promote the recommendations.*

- *In the case of Changing Culture, insufficient time is through to have elapsed for the work to be influential yet.*
- *The Process Task Group was reported as not being close enough to practitioners and not having had an influence as it identified that more work was needed.*
- *The Technologies & Components Task Group was thought to have had limited influence, for the recommendations were mostly about increasing awareness and knowledge, rather than (as initially anticipated) identifying needs for new technical research.*
- *The Capturing Knowledge Task Group was describing as having affected those involved, but not a major influence beyond that.*

6.8 Briefing for Task Groups about funders, and the form of recommendations

In bringing together Task Groups, CRISP did not give them guidance about how their report might be used. They were able to determine their own terms of reference and direction, with the consequence that their coverage of the topic area was not necessarily comprehensive. Some of the Task Group chairs and champions were asked in retrospect: "Would it have been useful to be briefed about the themes and priorities of various funders, and to have had a 'standard model' for your recommendations?" Their replies are given in the following table

Issue/topic area	
Construction research base	It would be beneficial if members of CRISP were briefed about the research world. They don't inhabit this world, and have little understanding of the drivers and responsibilities of funders. Instead there is a lot of ignorance and prejudice - which needs to be dispelled. CRISP needs to change the mind set of the industry towards the universities for example – and if industry feels academia is not adequately engaged it needs to tell academia what it wants and what it thinks academia should do. Briefing for CRISP on the subtleties of the research scene and funding would be valuable. As for a standard model, it is useful to have expectations about the form in which the TG's should report, but to take it as far as a 'standard model' would be wrong.
Meeting customer needs	Briefing could have got interesting! A standard model is not required. However, a short checklist for the authors would have been useful. This might have said something along the lines: 'Please make sure you address the following points: please state who is the target audience for the report; make it clear who the recommendations are aimed at; etc.' If too much prescription is provided, it would risk being ignored.
Process	Yes
Construction futures	you need a two-stage process. These are the recommendations, need a way to help the HA see what their implications are for them, e.g. have a structured meeting. Here there was no follow through to the next stage. There was a tacit view that having a member of the HA on the TG meant that the HA knows what this is all about. The mapping exercise was good – but it's only one part of a several-part process. It's a push process, but there is a certain arrogance attached to it – that what we're doing is useful to you. It needs more face to face contact to deliver the recommendations. New CRISP needs to forge links with R&D Co-ordinators eg Mark Neave at HA, to make sure they are on board. Various funders have different structures – you've got to spend time to identify the right person then forge relationships with them. CRISP is actually about marketing. You've got to get to know these people, understand their drivers and responsibilities Get their buy-in. We're OK with DTI in Foresight.

Key findings and recommendations about a 'standard model' for Task Group recommendations

[This question was asked of only a limited sample of respondents.]

- *A general observation was made by the chair of the Construction Research Base TG that the members of CRISP should be briefed about the research world, including the drivers and responsibilities of funders, and the motivations and activities of researchers.*
- *It is considered useful to brief Task Groups about the form which their recommendations should take, but not prescribe a standard model.*
- *It was recommended that new CRISP forges links with funders' R&D co-ordinators, since they have different structures and it is important to establish a connection with the relevant individual – to get their buy-in.*

7 The views of the chairs of the CRISP Executive

The three chairs of the CRISP Executive were asked about the strengths and weaknesses of CRISP and its operations. There is a high degree of similarity in their responses, which have therefore been merged.

7.1 CRISP's influence

All three agreed that CRISP had been highly effective in influencing DETR/DTI – although one added that it had been so successful in doing so that it was seen from outside as a DETR/DTI panel rather than being independent.

7.2 Weaknesses

All three also agreed unprompted that it had been far less successful in getting industry involved in setting the research agenda. Between them, they identify that CRISP has to talk to industry leaders, engage more with industry, find out why investment in research is so low, and stimulate industry to participate in research, not sit back and rely on government doing so. Unfortunately, as one of the chairmen reported 'The problem is that when you talk to industry, they want short term problem solving, more like consultancy than research.'

7.3 Strengths

CRISP is considered by its three chairs as being well organised and well-run. The secretariat was described as a great strength, efficient, and giving excellent support. CRISP's strengths are reported as its independence, its ability to identify and choose interested participants and bring them together because they were helpful. It avoided committee members holding back progress by spending all their time talking about voting rights. Task Groups was commended by all three chairs as successful.

7.4 Steps to increase effectiveness

All three Executive chairmen identified that to become more effective in influencing construction-related research, CRISP needs more funding with which to go out and influence industry and implement its recommendations. The commissioned think pieces were considered useful (if of variable quality) but not the same as having committed research oriented support for each Task Group, which is needed. While the voluntary efforts were recognised as valuable, CRISP did not have the resources to turn recommendations into research proposals, let alone to find leaders and take them to funders. So long as it remained largely voluntary, it is considered unlikely to be able to achieve more than it has already.

7.5 What should CRISP do next.

Between them, the three past chairman suggest that CRISP has been marking time for the last 18 months while it rethinks itself, and needs to get back on track with its business. One chairman

identified three levels of engagement – strategic, programme and project. He suggested that it had not, and should not, get involved at the project level – but conversely if it remained purely strategic it would be considered 'airy-fairy'. He proposed that within any one topic area it should home in on a well defined programme area to have most effect. As for subject matter, one past chair said everything should be carried forward as nothing was every really finished. Another identified five themes that are timely and relevant to carry forward: climate change, customer needs (particularly opening up the design process to user participation and market research), new technologies and materials, and Construction Futures (to provide an authoritative and long term perspective)

8 Summary of findings

8.1 CRISP's modus operandi

Since 1998, CRISP has employed a modus operandi for capturing research and innovation priorities, through engagement with industry, clients, government and the research community. The process starts with the CRISP Awayday, at which a big picture is identified of what needs to be tackled during the following 12 months. The Awayday brings together members of the CRISP Panel with invited guests from across the industry, government, clients and the research community, to identify urgent research challenges facing the sector. These are assembled into a programme of work by the CRISP Executive and published. Task- and time-limited Task Groups are formed to undertake selected initiatives. A chair is appointed, and invited to assemble a small broadly-based group of experts. Task Group members participate voluntarily. The Groups usually include a representative from the DTI and from other relevant government bodies, such as the Research Councils. The Groups are assisted by the Management Support Unit, and may commission short 'state of the art' reviews or 'think pieces' to assist them in their work.

Task Groups are charged to produce a report, containing recommendations for improved policies and potential research projects needed to advance and support the industry. Reports are presented to the CRISP Executive by the Task Group chairs, and after discussion, review and modification (if necessary) are made available on the CRISP website. Copies are sent to interested parties, especially those who are potential funders of the research actions proposed. Once a task group has reported, it stands down. Its chair then usually becomes a CRISP champion for the issue that it has investigated.

Each year, the research priorities identified by the task groups are collated and then synthesised into *Funder-focused Action Plans*. These cover the construction-related research programmes of the DTI, EPSRC, ESRC, HA and EA. Recommendations are mapped against the funder's own priority areas, with special attention to both fit and gaps. Since CRISP has no authority over these funding sources, it seeks to operate on the basis of influence - gained from the representative nature and the accountability of the process it employs for capturing its consensus formulation of construction's research priorities. Each of the *Action Plans* illustrates how CRISP research priorities both fit, and do not fit, within the themes of these funding bodies. Where CRISP recommendations match, they reinforce funders' priorities and can influence the funding bodies' support for specific research projects. Where CRISP recommendations do not fit current themes of the funding bodies, there is the potential to influence funding bodies' future plans.

8.2 CRISP Task Groups

The following table summarises this cyclical process. It lists CRISP's Task Groups, the numbers of recommendations they made, and the mapping that was undertaken of their recommendations against funders' priority areas.

Task Group	Number of recommendations	Actions taken
Construction research base	5	Mapped in 2000
Design	39	Mapped in 2000
Meeting customer needs	23	Mapped in 2000
Motivation and communication	24	Mapped in 2000
Sustainable construction	34	Mapped in 2000
Performance	10	Mapped in 2001
Process	4	Mapped in 2001
Technologies and components	8	Mapped in 2001
Construction futures	9	Mapped in 2001
Housing	17	Mapped in this report
Capturing knowledge	26	Mapped in this report
Changing culture	29	Mapped in this report
Climate change	5	Mapped in this report
Information and Communications Technology (ICT)	-	No 'recommendations' made
The regulatory and financial framework	-	No 'recommendations' made

Appendices 1-13 provide the mapping of all 233 recommendations.

8.3 Results of the mapping exercises

The following table shows for the 233 recommendations how they mapped on to the priority areas of the five funders:

	Total number	DETR/DTI	EPSRC	ESRC	HA	EA
2000	125	84	27	44	17	28
2001	31	27	9	18	10	5
2002	77	56	9	12	N/a	N/a
TOTALS	**233**	**167**	**54**	**74**	**27**	**33**

In broad brush terms, many of the CRISP recommendations focus on culture-change and business process improvements to help the industry better its performance in the short-term. This has resulted in a close fit between CRISP recommendations and DTI priorities, with 71% of the recommendations being relevant to DTI. CRISP's emphases on business issues - benchmarking, human resource management, personnel issues, learning organisations, capturing project-based knowledge, risk management, and the impact of IT – resulted in 31% of the recommendations mapping on to ESRC's Thematic Priorities. The short-term and applied focus of CRISP recommendations, and the emphasis on business processes, resulted in only 23% of recommendations mapping on to EPSRC's support for strategic and fundamental research, and its engineering and technology driven landscapes.

Most of the CRISP recommendations that mapped on to the Highways Agency's Research Areas were concerned with supply chain integration, whole life costing, and service-based delivery.

Most of the CRISP recommendations that mapped on to the Environment Agency's Frameworks for Change were concerned with sustainability issues.

8.4 Impact of CRISP recommendations on Funders

DTI

A detailed analysis of DTI's support for construction research shows how CRISP has become highly influential in the Department's Research & Innovation Priority Areas. The following table shows the number of references to CRISP outputs in the DTI programme:

Year	1999	2000	2001	2002
No. of references	3	4	9	6

In 1999, it was reported that 'many of the priorities … reflect closely in the new [CRISP] strategy'. The 2000 Prospectus reported: "We have developed this Prospectus … in consultation with the industry and, in particular, with the Construction Research and Innovation Strategy Panel (CRISP)." In 2001 there were 9 citations. That year, the publication of CRISP's first funder focused action plan, DTI Priority Area managers were asked to respond in detail to each recommendation indicating whether it had been addressed or not. The majority of the applicable recommendations were reported as already addressed, in hand, or under active consideration. This was reported back to CRISP at a DTI/CRISP meeting held specifically to review the extent of implementation.

EPSRC

EPSRC has good awareness of CRISP, its Task Groups and their outputs, and has engaged on occasion with them in areas of common interest. The most successful collaboration has emerged from CRISP's Climate Change Task Group, which appears to be a model of how CRISP could work with funders to ensure influence and implementation, although this was partly a consequence of good fortune. The formation of the Task Group occurred after EPSRC had started working with UKCIP to introduce a new funding stream for climate change research. Nevertheless, representatives from EPSRC and UKCIP joined the Task Group. Owing to slippage in EPSRC's programme and prompt publication of the Task Group report, the Task Group influenced the research agenda, and the Task Group report (considered to be a valuable state of the art report) provides an information resource for potential applicants, and is being signposted by both EPSRC and UKCIP.

However, there is evidence that earlier collaboration between CRISP and EPSRC was less positive. Although this may now be historical, there was a view within EPSRC that CRISP recommendations are largely concerned with short term research needs, often coincide with what EPSRC is already doing, and do not address longer term issues that academic research tends to be concerned with. In part, EPSRC believes that CRISP places little value on academic research and on the academic research community. Finally, changes within EPSRC have, since 2001, led to funding for centres of excellence which themselves are expected to take responsibility for strategic development of the subject: EPSRC's recommendation is for CRISP to try to influence the centres directly, not through the Council itself.

ESRC

Despite a meeting between the CRISP Management Support Unit and ESRC's Chief Executive prior to the delivery of the Funder Focused Action Plan, in practice CRISP's influence on ESRC as a research funder appears to have been minimal, potentially through lack of internal communication within the Research Council. The Funder-focused Action Plan for ESRC was not passed to the relevant individual responsible for built environment issues within the Council, who therefore did not have any opportunity to consider implementing its recommendations. To ensure influence, CRISP should ensure it identifies the appropriate recipient of its recommendations and sends them a copy of its reports individually addressed. And, following the sending of CRISP recommendations to funders, a check should be made that the appropriate recipient has, in fact, received them successfully.

Environment Agency

CRISP's influence on the Environment Agency's R&D programme appears to have been minimal. This was due to a combination of negative circumstances including change in personnel and the point in the Agency's R&D cycle at which the CRISP recommendations arrived. The Environment Agency reports that it welcomes external input to its R&D programmes from bodies like CRISP, but recommendations have to be formulated through dialogue with the Agency if they are to be implemented. The Environment Agency is just embarking on a 5-year plan for R&D and there is an opportunity for CRISP to be engaged right from the start

Highways Agency

The Highways Agency welcomed the Action Plan when it was first delivered and provided valuable feedback to CRISP at the time, particularly identifying the increasing importance of sustainability to its R&D programme. In practice, however, the Head of R&D at that time was primarily concerned with improving the internal organisation of R&D within the Agency. He wished to improve research management and communication internally, and to ensure the Agency's research responded to the needs of its operations, not allow it to become self-referential. Therefore, although he welcomed good papers from outside bodies, responding to them was only a secondary priority. He also said that the HA was encouraged to work on research that was linked to its operations (the transport network) whereas strategic and policy issues were the responsibility of the Department for Transport. He left in September 2001. His successor did see the Action Plan but reported he had not made much use of it. He did report, however, that many of its relevant recommendations are actually being implemented within the Agency's R&D programme. He was also very interested to receive recent Task Group reports on Climate Change, Culture and People, and Capturing Knowledge.

General recommendations about influencing funders

- CRISP recommendations may arrive at more or less propitious times for take up by funders, and this can strongly affect the extent to which they are implemented.
- Funders develop R&D programmes in cycles - and recommendations which arrive at the wrong time in the cycle are unlikely to have much influence.
- CRISP should liase with funders to identify their relevant programmes, invite funders to send representatives (or corresponding members) to join its Task Groups, and ensure its Task Group reports are definitive. These steps will ensure maximum impact.

8.5 The views of CRISP chairs and champions

CRISP's effectiveness

According to the chairs and champions, to be more effective, CRISP should

- engage more with real industry and industry bodies, obtain greater engagement of key players from industry, and engage in more substantive dialogue with industry's major players.
- engage with small and occasional clients through, for example, Chambers of Commerce and Federation of Small Businesses
- become a better known brand, particularly among industry.
- be the engine room for strategic development of the industry.
- hook the research agenda more closely to the fortunes of UK Construction plc.
- make fewer recommendations, prioritise them, and focus on the more important – address the big issues and drive them through.
- produce short studies and publicise them under a clearly identifiable brand.
- produce case studies.
- liase with public sector bodies that have research budgets to provide them with auditable recommendations for R&D

Strengths of the Task Group process

According to the CRISP Chairs and Champions, the strengths of the Task Group process were:

- The engagement of enthusiastic, committed, motivated and lively – but also often disparate – individuals. Quite different ethos from a standing committee that is politically representative.
- To be fast, low cost and insightful – arising from the intelligence of the members, good management, and the focus of the researchers – and potentially effective, subject to a funding regime that allows the work identified to be followed up.
- To have the engagement of all sides of the industry – clients, contractors, consultants.
- The briefing to Task Groups, and the discipline of requiring them to formulate recommendations.

- The ability to consult, through workshops and by circulating material.
- The addressing of topics that are relevant and appropriate to industry.
- Genuine responsiveness, and the avoidance of merely giving credibility to a pre-arranged agenda
- The intensity of the time and task-limited brainstorming process.
- Their ability to focus on a set of related issues and to distil a viewpoint.

Weaknesses in the Task Group process

According to the Task Group Chairs and Champions, the Task Groups suffered from the following weaknesses:

- Individuals recruited to the Task Groups speak for themselves and don't carry political weight.
- Too many recommendations, some of which were vague rather than being practical achievable things
- Lack of younger participants, and a shortage of women, an absence of involvement right down the supply chain.
- It was almost impossible to have all the right people involved.
- The difficulty of retaining industry representatives on board, and lack of continuing industry input
- Topics for Task Groups were too broad.
- Task Group reports were long and unwieldy, and the web-site is not serious enough when trying to wield influence.
- Weak follow-through of recommendations, despite the champions, and a need for a serious executive role to promote implementation.
- It was all done by volunteers. Even commissioned reports, though valuable, were not the same as have committed research-oriented support in the Task Group to help shape the issues – ideally each Task Group would have its own management support plus a research-oriented support post.
- Weak implementation of recommendations.
- Lack of engagement with M4I and Construction Best Practice to ensure a continuum of initiatives rather than disjointed ones.

The time- and task-limited aspect of the Task Group process

According to the Task Group Chairs and Champions, their time and task limited aspects were widely held to be a good thing, meeting the 80/20 rule (achieving 80% of what was needed, while the remaining 20% would have taken too long, used too many resources, and arrived too late to be useful). However, there were some criticisms:

- There were too many recommendations.
- There was a lack of follow-up.
- There must be proper funding available for the research identified in the process and/or driving through of a selected few key recommendations.

The value of commissioned reports

According to the chairs and champions:

- Commissioned reports were described in all cases positively, with comments ranging from 'fairly useful' to 'hugely valuable'.
- It was suggested that the commissioned reports should have been commissioned by Task Groups themselves once they had started to meet, rather than earlier [this would, however, delay their production], and the process only worked if the Group could identify a short piece of research that needed doing.
- It was noted that the process of doing the work was more valuable than the report itself, and that the value was in the interaction between the Task Group and the report author.

The secretariat function supporting CRISP

The present secretariat function is considered by all respondents to be competent and effective, with some respondents going further and describing it as impressive, excellent and exceptional. The convenience of an organisation with a London base was identified. However it was also noted:

- That organisations other than the present one could provide an equivalent service.
- That so far as possible an impartial organisation should be chosen, though this was acknowledged to be difficult to achieve.
- That the present secretariat has, on occasion, gone beyond the secretariat function to assume an executive function.

It is important for new CRISP to reflect and decide on what it wants; it should try to minimise the gap between what will be significant expectations and what it can realistically deliver.

Have Task Groups have 'made a difference'

- Opinions are divided (even within a single respondent!) about the extent to which Task Groups have made a difference, although the majority of respondents say their Group has made a difference.
- Task Groups are considered to get their members thinking, even though it is difficult to see a clear path linking an earlier idea to a later one even when there are connections.
- The Groups whose chairs/champions were unequivocal in believing they have made a difference through influencing research directions were: Construction Research Base; Motivation; Design; Performance; and Construction Futures.
- In the case of Meeting Customer Needs, the outcome is reported as having influenced DETR and EPSRC, but to have suffered from changes within the Confederation of Construction Clients (and its eventual disappearance in November 2002) that left it without a champion to promote the recommendations.
- In the case of Changing Culture, insufficient time is through to have elapsed for the work to be influential yet.
- The Process Task Group was reported as not being close enough to practitioners and not having had an influence as it identified that more work was needed.
- The Technologies & Components Task Group was thought to have had limited influence, for the recommendations were mostly about increasing awareness and knowledge, rather than (as initially anticipated) identifying needs for new technical research.
- The Capturing Knowledge Task Group was describing as having affected those involved, but not a major influence beyond that.

A 'standard model' for Task Group recommendations?

- A general observation was made by the chair of the Construction Research Base TG that the members of CRISP should be briefed about the research world, including the drivers and responsibilities of funders, and the motivations and activities of researchers.
- It is considered useful to brief Task Groups about the form which their recommendations should take, but not prescribe a standard model.
- It was recommended that new CRISP forges links with funders' R&D co-ordinators, since they have different structures and it is important to establish a connection with the relevant individual – to get their buy-in.

Views of the chairs of the CRISP Executive

There was strong agreement in the replies of the three chairmen of CRISP. All agreed that CRISP had been highly effective in influencing DETR/DTI – although one added that it had been so successful in doing so that it was seen from outside as a DETR/DTI panel rather than being independent.

All also agreed that CRISP had been far less successful in getting industry involved in setting the research agenda. They believe CRISP has to talk to industry leaders, engage more with industry, find out why investment in research is so low, and stimulate industry to participate in research,

CRISP is considered by its three chairs as being well organised and well-run. The secretariat was described as a great strength, efficient, and giving excellent support. CRISP's strengths are reported as its independence, its ability to identify and choose interested participants and avoid 'committee men'.

All three Executive chairmen identified that to become more effective in influencing construction-related research, CRISP needs more funding both to influence industry and to implement its recommendations. While the voluntary efforts were recognised as valuable, CRISP did not have the resources to turn recommendations into research proposals, and so long as it remains largely voluntary, it is unlikely to be able to achieve more than it has already.

For what it should do next, one chairman identified three levels of engagement – strategic, programme and project. He suggested that it had not, and should not, get involved at the project level – but conversely if it remained purely strategic it would be considered 'airy-fairy'. He proposed that within any one topic area it should focus on a well defined programme area to have most effect. The most recent chairman identified four themes as timely and relevant to carry forward: climate change, customer needs (particularly opening up the design process to user participation and market research), new technologies and materials, and construction futures (to provide an authoritative and long term perspective).

8.6 Implementation of recommendations

Chairs and champions were asked about implementation of their Task Group's reports. The following table summarises the replies:

	Number of policy related recommendations					Number of project-related recommendations					Total number of recommendations				
Task Group	Implemented	Obsolete	Don't know	Still needed	Total	Implemented	Obsolete	Don't know	Still needed	Total	Implemented	Obsolete	Don't know	Still needed	Grand total
Construction Research Base	0	0	0	1	1	2	0	0	2	4	2	0	0	3	5
Design	6	0	1	8	15	0	0	2	22	24	6	0	3	30	39
Meeting customers' needs	2	0	0	1	3	5	2	3	10	20	7	2	3	11	23
Motivation & communication	6	1	0	5	12	5	0	0	7	12	11	1	0	12	24
Sustainable Construction	0	0	0	11	11	0	0	0	23	23	0	0	0	34	34
Performance	0	0	0	0	0	2	2	1	5	10	2	2	1	5	10
Process	0	1	0	3	4	0	0	0	0	0	0	1	0	3	4
Technologies and components	0	0	0	5	5	0	0	0	3	3	0	0	0	8	8
Constructing the Future	0	0	0	9	9	0	0	0	0	0	0	0	0	9	9
Housing and Construction	2	0	0	8	10	1	0	0	6	7	3	0	0	14	17
Capturing knowledge	12	1		2	15	5	0	0	6	11	17	1	0	8	26
Changing culture	0	0	0	15	15	0	0	0	14	14	0	0	0	29	29
Climate change	0	0	0	0	0	0	0	0	5	5	0	0	0	5	5
TOTALS	26	3	1	67	97	23	4	7	102	136	49	7	8	169	233

This table shows that::

- Of the 233 recommendations made, 97 have policy implications, whereas 136 are expected to lead to projects to provide the new knowledge needed.
- Of the 97 recommendations with policy implications, 67 are reported as still needed, with only 26 (one quarter) implemented.

- Of the 136 project-related recommendations, 102 are reported as still needed with only 23 (again about a quarter) implemented

The Task Groups with the highest levels of implementation are:

- Motivation & communication (11/24 implemented) – this is consistent with the frequency and regularity with which this group's outputs have been cited in the DETR/DTI construction research programme.
- Knowledge capture (17/26 implemented) – whose report had a very specific target audience in M4I and the Housing Forum.

One overwhelming conclusion is, however, apparent - most chairs and champions report that only a small fraction of their recommendations have been implemented, with the majority still needed. It was noticeable in the interviews that several respondents conveyed a sense of unwillingness 'to let go' of their recommendations. It seemed as if, having spent intense periods in group discussion to distil key recommendations, even when these were partially implemented by some other body, several chairmen claimed they were 'still needed'. Perhaps the chairs had had very clear ideas not just of what research was needed but also how it should be undertaken; and the implementation only partly met their expectations.

The chairman of the Sustainable Construction Task Group, having moved abroad, felt too distant from CRISP now to comment on the extent of implementation of his Task Group's recommendations. This illustrates clearly the lack of follow-through by the Task Groups. He emailed to say "what is clear is that it is for CRISP to follow through and drive the recommendations wherever needed. Certainly there will be little action unless someone becomes the 'Champion' and drives the process."

8.7 The primary focus of CRISP recommendations

All CRISP recommendations have been classified by their 'primary focus'. The following table shows the primary focus tabulated by Task Group. Some caution is needed in interpreting this table because of the way the classification has been undertaken. Specifically, a large fraction of the recommendations from the Knowledge Capture group have been classified as concerned with Knowledge Management. From the Sustainable Construction Group, most of the recommendations are sustainability specific, and similarly from the Climate Change group, all five have been classified as climate change specific.

Reference	Policy	Project	Communication	Knowledge Mgt	Business case	Improved data	Sustainability	Improved processes	Networks	Guidance	Education and training	Improved performance	Culture	Climate change	Building teams	Industry studies	Technical	Non specific	Implemented	Obsolete	Don't know	Still needed
Research base	1	4	2	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3
Design	15	24	5	0	5	5	0	0	7	4	9	2	0	0	0	0	0	2	6	0	3	30
Customers needs	3	20	2	3	6	4	0	3	1	0	1	1	0	0	2	0	0	0	7	2	3	11
Motivation	12	12	7	6	1	1	0	1	1	2	0	0	0	0	0	0	0	5	11	1	0	12
Sustainable const	11	23	4	0	5	1	17	0	0	0	0	1	2	0	0	1	0	3	0	0	0	34
Performance	0	10	0	0	0	0	1	2	0	0	0	6	0	0	0	0	1	0	2	2	1	5
Process	4	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3
Technologies	5	3	1	1	1	0	0	2	0	0	0	1	1	0	0	0	1	0	0	0	0	8
Futures	9	0	0	0	1	0	1	2	0	0	0	1	2	0	0	2	0	0	0	0	0	9
Housing	10	7	2	0	1	6	0	3	1	3	1	0	0	0	0	0	0	0	3	0	0	14
Knowledge capture	15	11	6	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	0	9
Culture	15	14	5	1	3	1	0	3	3	4	2	0	7	0	0	0	0	0	0	0	0	29
Climate change	0	5	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5
TOTAL	100	133	36	32	23	20	19	16	14	13	13	12	12	5	3	3	2	10	47	7	7	172

The table above gives an indication of the spread of CRISP recommendations. It shows the most frequently cited primary focus of CRISP recommendations is concerned with access to new knowledge: its communication, dissemination impact. The second most frequently cited focus of the recommendations is knowledge management. (This arises partly because so many recommendations from the Knowledge Capture Task Group were concerned with knowledge management. However, several of the other groups also included knowledge management issues among their recommendations.). These findings reveal the huge concern there is right across CRISP with the capture of new knowledge, the importance of its communication and dissemination across the industry, and its effective management within organisations.

8.8 Task Group recommendations awaiting implementation

About three quarters (172/233) of the Task Group recommendations are reported by chairs and champions as 'still needed'. For the purpose of this report, they have been grouped into five clusters of related issues. Appendix 15 shows the full set of 'still needed' recommendations and how they have been clustered.

In carrying out the clustering exercise, what is most striking is that virtually every CRISP task group highlighted the need for improving the uptake of research findings – that is, for what had been done to be made accessible to the wider industry through improvements in communication and dissemination, and better application of existing knowledge in practice. The Technologies & Components Task Group, for example, in its first two recommendations called for better dissemination and application of existing knowledge to overcome the barriers to its use and improve its impact. The CRISP ICT report (Commission 00/26) goes so far as to say: "if there is a single conclusion to be drawn from this review, it is that the top priority over the next few years should be to extract more economic value from the huge mass of *existing* knowledge …The focus now needs to move clearly towards 'people' issues like design and management processes, motivation, information access, knowledge management and organisational learning". Cluster 1 draws together the recommendations around this theme.

Cluster 1: Communication, dissemination and application of existing and new knowledge

Raise awareness of, and increase the accessibility and diffusion throughout the industry (addressing all relevant stakeholders) of: improvement initiatives, best practice, new knowledge, and R&D outcomes. Investigate the barriers to uptake of existing research knowledge and innovative techniques and materials (including risk-averse contractual conditions), and develop improved knowledge-transfer mechanisms, user-friendly communication strategies, use of intermediaries, promotional practices, and exploitation of varied dissemination routes, in order to promote innovation and raise the application and impact of new knowledge.

Cluster 2: Making the business case

Raise the profile of the industry and how it is perceived and valued, by better understanding of 'risk and reward' principles, by improving understanding of the value of built assets, and through new types of funding and investment, all contributing to increased profitability. Establish a network exchange for information on buildings-in-use for all stakeholders; improve methods for assessing the relationships between cost, value and worth; and develop whole life value methods.

Cluster 3: Sustainable construction

Explore various means to improve sustainable construction through identification of the business benefits of sustainability to the industry, and an understanding of the drivers and motivations within the industry and its clients that encourage sustainable construction. Seek to change the industry's culture towards embracing whole life costing - through development of robust whole life cost and performance data, promotion of off-site assembly, development of specifications for recycled materials, improved supply chain management, and innovative technologies that minimise resource

use and improve performance. Demonstrate the business and triple-bottom-line benefits of adopting environmental good practice and respect for people.

Cluster 4: Climate change

Assess risk from climate change nationally, regionally, locally, and sectorally, to both buildings and infrastructure. Evaluate existing policies and develop new ones to aid decision making. Identify and work with stakeholders, including businesses, to assess current knowledge and identify future opportunities for helping the industry through adaptation and mitigation. Devise new technical regulations, codes, guidance, labelling, tools and case studies to improve understanding of climate change, and introduce climate change issues into current design tools and standards. Raise understanding of climate change and its impacts through industry education and training.

Cluster 5: Knowledge management and organisational learning

Raise awareness within the industry of the strategic value of knowledge creation and sharing, and deepen understanding of how to capture and use project-based knowledge. Produce case studies of the successful capture and dissemination of lessons learned within projects and by organisations, including their contribution to organisational business performance. Promote organisational learning, and develop appropriate tools and models of learning to help firms of all types and sizes become learning organisations.

APPENDIX 0 List of CRISP reports used in preparing this report

Clients' workshop on innovation and research in construction: Report of proceedings (99/14)
Design task group report
Sustainable construction task group report
Construction research base task group report
Motivation and communications task group report
Performance task group report (00/17)
Process task group report
Technologies and components task group report (01/01)
Lessons learned from M4I and Housing Forum demonstration projects (01/06)
Climate change task group report (02/02)
Culture and people task group report (02/03)
Housing and Construction: Identifying missing research needs and opportunities (00/01)
How can regulations promote construction innovation? (99/12)
A 'state of the art' review of construction information and communications technologies (00/26)
Action plans for the DETR (00/14)
Action plans for EPSRC (00/13)
Action plans for the Environment Agency (00/29)
Action plans for the Highways Agency (00/22)
Action plans for ESRC (00/23)
CRISP summary action plan (01/08) - unpublished
Fairclough Task Group report
Review of Construction Futures
Review of sustainability in construction

APPENDIX 1 Recommendations from the Construction Research Base Task Group

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from the Task Group chair
1.	Develop, agree, and oversee the role of a champion for the research base: mobilise sufficient resources for making appropriate and convincing cases for research funding to funding bodies; collect informed opinion on significant trends and issues in research base; monitor effectiveness of mechanisms to maintain and develop research base; identify and promote opportunities for construction industry to benefit from the contribution of the research base.	Construction Research Base 1	Communicatio n [project]						This was not well received by DETR (DTI) and was dropped. However, Fairclough picked it up again – his report says set a strategy then define research needs to deliver it. So similar ideas are taken forward in different ways. While the recommendation has not been implemented in its original form, it has had an impact.
2.	Improve the quality, relevance and accessibility of statistical data on the research base.	Construction Research Base 2	Improved data [project]			Economic Performance and Development			Little happened, although Appendix C of the Fairclough Report does bring together a good deal of data on the research base. This recommendation is still desirable, but it is not essential. [Classified as implemented]
3.	Explore desirability and feasibility of developing a set of KPIs for research organisations.	Construction Research Base 3	Improved data [project]			Economic Performance and Development			It was hard to justify the effectiveness of the research base – this recommendation would help to justify it and provide targets. There are many indicators, such as DTI's performance measures of research contractors – however these are very management oriented and miss the point. There is a need to look at impact as a critical indicator. We need a small number of better developed indicators – such as how many people read a research paper, and how many do something differently as a result. This recommendation has not been implemented and would be useful.
4.	Encourage companies to develop and focus more beneficial contact with the	Construction Research Base	Encourage networks			Economic Performance			This is very worthy. But extremely difficult to achieve. It is still worth carrying

	research base by appointment, for example, of a Director of Innovation.	4	[policy]			and Development			forward, but you have to consider what you can realistically do. Would this make a difference. Organisations that have a belief and a culture do well, but those that are financially driven are fragile. There is some useful research to carry out here – to study the impact of appointing a Director of Innovation, although it is a difficult study in terms of proving it made a difference. A valuable outcome would be exhortation from DTI to organisations to appoint a Director of Innovation. [Classified as still needed]
5.	Produce and widely distribute a simple description of the nature, role activities and achievements of the research base.	Construction Research Base 5	Communication [project]		General Engineering				This was not well received at DETR (DTI). A start was made on a ladybird book, but its scope was altered so it was no longer what the TG envisaged, and it was eventually dropped. The intention was to address the lack of understanding and prejudice about the research base from industry. The culture of industry in not understanding the research base is a long-lasting blight. It is less severe on the technical side (concrete, soil mechanics etc) but more on the management side where research is criticised for lack of relevance. This recommendation would have helped describe the distinct roles of the different players in research, and their drivers. [Classified as still needed]

APPENDIX 2 Recommendations from the Design Task Group

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from Task Group chair, Dec 2002 Overall view: 'Many signs of movement, but we should not be complacent.'
6.	Examine effectiveness of establishing a networking exchange on buildings in use for all stakeholders.	Design 1/1	Encourage networks [project]	Construction process					Not seen, still needed.
7.	Commission scoping studies into existing methodologies for assessing value in buildings.	Design 1/2	Business case [project]	Social impacts					DQI doesn't solve this – there is still a real need for this.
8.	Examine current cost-in-use studies in practice, their limitations and areas requiring refinement.	Design 1/3	Business case [project]	Business improvement					Still difficult to find. Major QS firms have databases, but the information needs to be shared.
9.	Investigate flexibility of building uses, to encourage sustainable design through time, to develop a rating system accessible to owners, users and planners.	Design 1/4	Improved data [project]	Construction process		Environment and Human Behaviour			Still needed.
10.	Test methods for improving industry's capacity to express its needs – in particular workshops, dialogue, deepening understanding between estranged parties.	Design 1/5	Communication [project]						Don't know.
11.	Conduct research into how can understanding of cost, value and worth be improved throughout the project team.	Design 1/6	Business case [project]	Construction process					Could be explored more widely – means management training. See for example 'What Management Is' published by Harvard Business Review.
12.	Invite proposals to research and establish Design KPI's from all (construction) sectors.	Design 1/7	Improved data [policy]	Social impacts					DQI's doing this, though it is not the end of the story.
13.	Conduct longitudinal research into building performance over time, including historical and contemporary post-occupancy analysis.	Design 1/8	Improved building performance [project]		Engineering for Infrastructure, the Environment and Healthcare	Lifecourse, Lifestyles and Health			Still needed.
14.	Integrate building economics into parameters for change on terms understood by all stakeholders.	Design 1/9	Improved data [project]	Business improvement					Emerging in the health sector, but still needed.
15.	Establish appropriate and new ways of approaching post-occupancy assessment	Design 1/10	Improved building			Lifecourse, Lifestyles and			Post Occupancy Evaluations are vital, the existence of PROBE as one

			performance [project]			Health			approach is not enough.
16.	Conduct research into sectoral initiatives to establish design value, with systematic ordering of criteria to assist comparison and respect differences	Design 2/1	Improved data [project]	Business improvement					Still needed.
17.	Investigate successes and failures at a design level of the PFI initiatives commissioned by government to date, by sector.	Design 2/2	Good practice guidance/case studies [project]		Construction as a Manufacturing Process (IMI)		Asset Management		Taken up by CABE but more needed.
18.	Integrate urban design into the emerging matrix of building studies.	Design 2/3	Encourage networks [policy]						Taken up by CABE but more needed.
19.	Encourage dialogue between sectors to learn from each other's evaluation systems.	Design 2/4	Encourage networks [policy]	Business improvement			GENERAL		Still needed.
20.	Commission international scoping comparison of design assessment methods in practice including cultural identifiers (Japan, Holland, Scandanavia)	Design 2/5	Good practice guidance/case studies [project]	Business improvement					Not seen, valuable, still needed.
21.	Commission scoping review how professional institutes in other countries contribute to design awareness and value definition.	Design 2/6	Business case [project]	Business improvement					Not seen, valuable, still needed.
22.	Conduct research into the effective communication of complex processes with trans-sectoral comparisons.	Design 2/7	Good practice guidance/case studies [project]						Not seen, still needed.
23.	Conduct research into the design values of the demonstration projects offered by industry, including conception, development, construction and post-occupancy stages.	Design 3/1	Improved data [project]	Business improvement					Still needed.
24.	Establish 'Quick Response' funding for sectoral project-based research, allowing 'up-front' innovation support on a project by project basis: inception research: design experiment with operational testing.	Design 3/2	Non-specific	Fast Track			GENERAL	GENERAL	Taken up by Fast Track.
25.	Establish connecting feedback loops so studies take effect and are seen to do so.	Design 3/3	Communication [policy]	Promoting innovation and culture change					More needed.
26.	Raise the profile of Built Environment	Design 4/1	Education and						CABE doing good work, but more

	design within National Curriculum to equal the enthusiasm accorded to the Natural Environment.		Training [policy]						needed.
27.	Provide public educational support through regional architecture centres as crucibles for change, debate and visualisation.	Design 4/2	Education and Training [policy]						Excellent work being done by CABE.
28.	Commission international survey of educational institutes' initiatives at developing common design language – at primary, secondary and tertiary levels.	Design 4/3	Education and Training [project]						Not seen, valuable, still needed.
29.	Promote education of design professionals in production management with cross-industry placements to fertilise the construction field.	Design 4/4	Education and Training [policy]		Engineering for Manufacture				More needed.
30.	Expand education of design professionals to include methods of thinking, ethics, social context, communication, as fundamental	Design 4/5	Education and Training [policy]		Engineering for Manufacture				Outstandingly needed.
31.	Conduct research into obstacles to raising profile and status of Building Services as a career; sustainability champions.	Design 4/6	Communicatio n [project]						Still needed.
32.	Re-integrate architectural research into the demand led improvement of building quality, usefulness and delight; building types, symbolic and aesthetic contribution of architecture are all valuable and sought after.	Design 4/7	Education and Training [policy]						DQI does some of it.
33.	Educate current players, encouraging continuing professional education for change and feedback, using trans-disciplinary events and seminars providing specific merit awards.	Design 4/8	Education and Training [project]						Not seen, still needed.
34.	Provide support for communicating research efforts to all stakeholders.	Design 5/1	Non-specific	Promoting innovation and culture change		GENERAL	GENERAL	GENERAL	More needed.
35.	Investigate inhibitors to team working training during design professionals; 'whole-life' education and illustrate successful initiatives that break this mould.	Design 5/2	Education and Training [project]		Engineering for Manufacture				Essential.
36.	Assess effectiveness of 'learned society'	Design 5/3	Business case						Not seen, except EDGE initiative.

	model for inter-specialist tasks and interdisciplinary challenges.		[project]						
37.	Investigate and monitor institutional (City) inhibitors to client-centred improvement and demonstrate positive alternatives.	Design 5/4	Communicatio n [project]						Don't know what progress made.
38.	Encourage cross-disciplinary learning from other sectors (medicine, manufacturing, psychology)	Design 5/5	Education and Training [project]		Engineering for Manufacture				Urgent, still needed especially in terms of new professional visions.
39.	Establish best practice for briefing languages and value-systems by means of successful examples/case studies.	Design 5/6	Good practice guidance/case studies [project]	Construction process					Essential. DQI's meet this to some extent. There are some sectoral initiatives.
40.	Conduct research into effectiveness of establishing a think-tank for industry wide research into design, embracing all disciplines across the asset/revenue divide.	Design 5/7	Encourage networks [project]						Essential task for nCRISP, and not met by Strategic Forum.
41.	Extend government sponsorship of design champions in the field of the built environment linking CABE, Design Council and regional initiatives.	Design 5/8	Encourage networks [policy]						CABE doing this – with Design Champions.
42.	Encourage EPSRC/ESRC and other key research sponsors to communicate more widely their current support for interdisciplinary research teams, since such teams are necessary to capture answers to interdisciplinary problems.	Design 5/9	Encourage networks [policy]		GENERAL	GENERAL			Beginning to happen with EPSRC.
43.	Encourage research sponsors to develop specific policies for design research to guide and invite the issues raised [by the Design Task Group].	Design 5/10	Communicatio n [policy]		GENERAL				Hard to answer – the more the better in Government and NGOs.
44.	Encourage research sponsors to call for 'outside the box' research into interdisciplinary design issues, with experimental funding outside the conventional research review time cycle, to underpin longitudinal research, encourage short penetrative research commissions that publish and be damned. The industry can provide a wealth of committed individuals prepared to offer valuable support in kind provided their contribution is time limited.	Design 5/11	Encourage networks [policy]	Fast track					This is an opportunity for nCRISP.

APPENDIX 3 Recommendations from a Construction Clients Forum workshop on innovation

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	
45.	Examining point of entry to construction process relative to client satisfaction.	Meeting customers' needs 1/1	Improved process [project]	Construction process					For major clients, this has been implemented, but is still needed for small and occasional clients.
46.	Investigate the influence of supply chain integration on costs of ownership.	Meeting customers' needs 1/2	Business case [project]	Construction process			Asset Management		Implemented for major clients.
47.	Study potential impact of greater standardisation and factory/off-site fabrication on image and appeal of industry, especially to new entrants.	Meeting customers' needs 1/3	Communication [project]						More needed – ought to be taken up with CITB.
48.	Promote adoption of whole life costing as basis of procurement decisions.	Meeting customers' needs 1/4	Improved process [policy]	Business improvement		Environment and Human Behaviour	Asset Management		Still needed – the data is there, but promotion is required.
49.	Develop standard system for preparation and presentation of Whole Life Cost data	Meeting customers' needs 1/5	Improved data [project]	Business improvement		Environment and Human Behaviour	Asset Management	Greening the business world	Promotion is still needed, particularly to public sector clients.
50.	Increase awareness of manufacturers of the need to demonstrate the reliability of whole life costs and performance predictors in relation to international standards.	Meeting customers' needs 1/6	Business case [project]	Business improvement			Asset Management		Some manufacturers are very good, but may be room for others to adopt better practices. [Still needed]
51.	Expand coverage of existing databases of whole life costs and performance information.	Meeting customers' needs 1/7	Improved data [project]	Business improvement				Greening the business world	Lots is happening at the commercial level – PFI contractors are doing this – but it's commercially sensitive and government support is required for standardisation and publically available information. [Still needed]
52.	Research and map sources of [building] defects.	Meeting customers' needs 1/8	Improved data [project]	Construction process					Progress since the workshop should be reviewed before further action is taken.
53.	Research application of Business Excellence Model to construction to achieve zero defects.	Meeting customers' needs 1/9	Improved process [project]	Business improvement					I question the relevance and continuing need for this. Obsolete.
54.	Improve definition and benchmarking of client skills.	Meeting customers'	Improved data [project]						Some progress has been made (through the Clients Charter) but there is a need

		needs 2/1							for consolidation, and to get what's been done used in practice. [Implemented]
55.	Promote the development of defining client requirements.	Meeting customers' needs 2/2	Improved building performance [policy]	Construction process					As previous. [Implemented]
56.	Examine incentives for providing innovative high quality design.	Meeting customers' needs 2/3	Encourage networks [project]	Promoting innovation and culture change		Work and Organisations			I'm not aware of anything significant, although DQI's touch on this. Still needed.
57.	Investigate the feasibility of establishing a 'virtual learning organisation' to identify clients' dissatisfaction using post occupancy satisfaction evaluation.	Meeting customers' needs 2/4	Communicatio n [project]	Promoting innovation and culture change					Implemented – through support for the CCC research project by Bill Bordass.
58.	Investigate barriers to the uptake and application of existing research knowledge, particularly management and human factors.	Meeting customers' needs 3/1	Knowledge management [project]	Promoting innovation and culture change		Work and Organisations			Not a lot has been done. There's lots of research knowledge not being used and the question is why not? Still needed.
59.	Integrate existing information and assistance sources to provide 'one stop shop' access.	Meeting customers' needs 3/2	Knowledge management [project]	Promoting innovation and culture change					Still needed.
60.	Investigate the feasibility of establishing a small and occasional client-friendly access route to best practice information.	Meeting customers' needs 3/3	Knowledge management [project]	Promoting innovation and culture change					Some evidence of this through CBP's proposal to address the needs of SMEs. But still needed.
61.	Investigate insurance and project funding barriers to the adoption of innovative approaches.	Meeting customers' needs 4/1	Business case [project]	Promoting innovation and culture change					Implemented. Two projects: BSRIA project with HVCA on Design Checks; and BRE POE project which includes negotiations with ABI about insurance wording on feedback.
62.	Examine the impact of risk management and risk transfer policies on integration.	Meeting customers' needs 4/2	Business case [project]		Construction as a Manufacturing Process (IMI)	Work and Organisations			Implemented. CIRIA has a major project on risk management, outcome is written in way to be passed around the supply chain.
63.	Conduct scoping study of the barriers to adopting voluntary latent defects insurance for contractors.	Meeting customers' needs 4/3	Business case [project]						Not aware of much progress. Still needed.
64.	Review, with professional institutions, the function of clients' advisers and changing duties towards clients.	Meeting customers' needs 5/1	Business case [project]	Construction process					Obsolete – overtaken by Accelerating Change.
65.	Ensure training and education encourage and support innovation.	Meeting customers' needs 5/2	Education and Training [policy]	Promoting innovation and culture change					Implemented. Though could do better.
66.	Investigate the management of cultural and personnel issues within procurement	Meeting customers'	Building effective teams			Work and Organisations			Not aware of what's happened since workshop.

	teams.	needs 6/1	[project]						
67.	Examine the impact of ICTs and object modelling on the structure of project teams.	Meeting customers' needs 6/2	Building effective teams [project]	Construction process		Work and Organisations			Not aware of what's happened since workshop.

APPENDIX 4 Recommendations from Motivation & Communication Task Group

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from Task Group chair
68.	Commission scoping study to provide more detail about real issues and generate understanding of what is needed for SMEs and others and identify 'owners' who will deliver different approaches. Study best practice in learning and knowledge sharing (including the use of case studies) and promote appropriately.	Motivation 1/1	Knowledge management [project]	Promoting innovation and culture change					In terms of DTI funded projects, there is a change showing through, which is not entirely coincidental, although it might have happened anyway. There are some projects being done.
69.	Promote general awareness of the importance and benefits of learning and knowledge creation and sharing.	Motivation 1/2	Knowledge management [policy]	Promoting innovation and culture change		Knowledge, Communication and Learning			Still needed.
70.	Promote the idea of a strategic approach to knowledge and understanding that knowledge is value.	Motivation 1/3	Knowledge management [policy]	Promoting innovation and culture change		Knowledge, Communication and Learning			Still needed.
71.	Promote work to understand how firms can be changed into learning organisations.	Motivation 1/4	Knowledge management [policy]	Promoting innovation and culture change		Work and Organisations			Still needed.
72.	Deepen understanding of how to capture and use project-based knowledge.	Motivation 1/5	Knowledge management [project]	Promoting innovation and culture change		Knowledge, Communication and Learning			Still needed.
73.	Develop the wider use of independent post-occupancy reviews.	Motivation 1/6	Improved data [project]	Business improvement					There has been a major step forward from the Post Occupancy Evaluation Task Group.
74.	Change research assessment process in line with Royal Academy of Engineering recommendations.	Motivation 2/1	Non-specific						Obsolete.
75.	Require communication plans for all research bids in business language, to cover target audience and benefits to each. The communication plan should be supported by a high level of experience among staff as in the research work. Similarly all other funding bodies to require a communication plan.	Motivation 2/2	Communication [policy]	GENERAL	GENERAL	GENERAL		GENERAL	The top third of research projects do now do this. It is not clear whether we should say it's no longer necessary, or if we should retain it.
76.	Provide funds for the synthesis of	Motivation 2/3	Knowledge	Promoting		GENERAL			Needs to be done more obviously.

	research outputs and highlight issues from range of sources into a form usable by the construction industry.		management [project]	innovation and culture change					
77.	Commission guidance on how to communicate research findings to meet the needs of industry to demonstrate the benefits and develop new criteria for successful communications.	Motivation 2/4	Communication [project]	Promoting innovation and culture change					There is a current bid in to PII 2002.
78.	Fund intermediaries to undertake 'user friendly' communication.	Motivation 3/1	Communication [policy]	Promoting innovation and culture change					Still needed.
79.	Co-ordinate more active communication by professional institutions.	Motivation 3/2	Communication [policy]	Promoting innovation and culture change					The institutions are getting better.
80.	Develop merchants and DIY stores and channels of communication.	Motivation 3/3	Communication [policy]	Promoting innovation and culture change					There is now a project on this.
81.	Produce case studies of successful interactions.	Motivation 4/1	Good practice / case studies [project]	Promoting innovation and culture change					There is a current bid in to PII 2002 – same as Recommendation 10 and 21.
82.	Unbiased research on which types of transfer work best and highlighting success and benefits.	Motivation 4/2	Communication [project]	Promoting innovation and culture change					Still needed.
83.	Encourage development of networks.	Motivation 4/3	Non-specific	Promoting innovation and culture change					This has happened.
84.	Raise awareness and profile of CRISP in industry	Motivation 5/1	Non-specific						Still needed.
85.	Act as a facilitator to capture vision of future construction industry and the research required to deliver it.	Motivation 5/2	Non-specific						We invented the notion of a Think Tank! It may be lost in nCRISP unless we keep shouting for it.
86.	Develop 'learning toolkit' from [vision-of-future research] and promote to firms (CEO, Human Resource managers) and individuals (through professional institutions and journals), thus moving CRISP from being an industry follower to a leader.	Motivation 5/3	Encourage networks [project]	Promoting innovation and culture change					Don't know.
87.	Repackage to add more business emphasis to CRISP topics and papers.	Motivation 5/4	Non-specific						CRISP has to become more business specific – to have more of a business slant.
88.	Demonstrate the benefits of research in a business context and compile a clear	Motivation 5/5	Business case [project]	Promoting innovation and			GENERAL		There is a current bid in to PII 2002 – same as Recommendations 10 and 14.

	roadmap of industry research needs.			culture change					
89.	Compare other industries and countries experience.	Motivation 6/1	Good practice / case studies [project]	Business improvement			GENERAL	GENERAL	Still needed.
90.	Investigate US PAIR (Partnership for the Advancement of Infrastructure and its Renewal) as a catalyst for implementing innovation in practice.	Motivation 6/2	Improved process [project]	Business improvement			GENERAL		Still needed. Reading Construction Forum may be doing something on this.
91.	Investigate a broker body to negotiate between researchers and industry (cf US National Science Foundation).	Motivation 6/3	Communicatio n [project]	Business improvement					Still needed. Reading Construction Forum may be doing something on this.

APPENDIX 5 Recommendations from Sustainable Construction Task Group

	Recommendation	CRISP reference	Primary focus and project or policy related	DTI	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from Task Group chair on implementation
92.	Increase the effectiveness of communication and dissemination of best practice and research outputs [for sustainable construction] through improved dissemination routes and communication strategies and practices.	CRISP 99/15 Objective 1, item 1	Communication [policy]	Promoting innovation and culture change		GENERAL		Protecting and restoring the land	
93.	Develop objective methods to assess the social impacts of the construction process.	CRISP 99/15 Objective 1, item 2	Cultural studies [project]	Social impacts	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour			
94.	Prove and inform the business case for the construction industry to contribute to the aims of sustainable development – through improved understanding of the business benefits of sustainable construction practices, and industry's financial concerns and motivations.	CRISP 99/15 Objective 2, item 1	Sustainability [policy]	Promoting innovation and culture change	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Greening the business world	
95.	Develop a framework of economic & business assessment methods to assess costs and benefits of sustainable construction practices.	CRISP 99/15 Objective 2, item 2	Sustainability [policy]	Promoting innovation and culture change	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour			
96.	Understanding the key features of the construction industry and how these enable/prevent sustainable construction	CRISP 99/15 Objective 2, item 3	Sustainability [policy]	Promoting innovation and culture change	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Greening the business world	
97.	Prove and inform the business case for sustainable development – devise funding arrangements to promote innovative technologies.	CRISP 99/15 Objective 2, item 4	Business case [project]	New and improved technologies and techniques		Environment and Human Behaviour		Greening the business world	
98.	Improve the quality and form of information to communicate technical and business data to influence key decision-makers of the benefits of a more sustainable approach – through improved stakeholder communications.	CRISP 99/15 Objective 3, item 1	Business case [project]	Promoting innovation and culture change				Protecting and restoring the land	
99.	Improve the quality and form of	CRISP 99/15	Improved Data	Business			Customer &	Protecting and	

	information to communicate technical and business data to influence key decision-makers of the benefits of a more sustainable approach – through quantified targets/indicators.	Objective 3, item 2	[project]	improvement			Market Research	restoring the land	
100.	Develop risk management techniques for sustainable construction.	CRISP 99/15 Objective 3, item 3	Sustainability [project]	Business improvement	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour	Customer & Market Research	Using natural resources wisely	
101.	Understand cultural barriers in construction industry and what the most effective drivers for moving construction industry to sustainable construction – cultural characteristics of the construction industry	CRISP 99/15 Objective 4, item 1	Cultural studies [project]	Promoting innovation and culture change	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Using natural resources wisely	
102.	Understanding the role of legislation and market forces to promote change (towards sustainable construction)	CRISP 99/15 Objective 4, item 2	Industry Studies [project]	Codes and standards		Environment and Human Behaviour		Using natural resources wisely	
103.	Develop and interpret whole life costing techniques.	CRISP 99/15 Objective 5, item 1	Business case [project]	Business improvement	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour	Asset Management	Using natural resources wisely	
104.	Improved management of the existing built environment and infrastructure into the future – through a mixture of building and infrastructure re-use and refurbishment, including impact assessment of refurbishment on sustainable urban development.	CRISP 99/15 Objective 6, item 1	Business case [project]	New and improved technologies and techniques	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Using natural resources wisely	
105.	Materials management – assess the sustainability costs and benefits of off-site assembly, trial standard specifications for recycled materials.	CRISP 99/15 Objective 6, item 2	Sustainability [project]	New and improved technologies and techniques	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Using natural resources wisely	
106.	Use of innovative technologies to minimise resource use.	CRISP 99/15 Objective 6, item 3	Sustainability [project]	New and improved technologies and techniques	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour	Asset Management	Using natural resources wisely	
107.	Understand impact of IT and societal and organisational changes on building requirements, construction industry practices, and design and construction of buildings and infrastructure ('City of Tomorrow').	CRISP 99/15 Objective 6, item 4	Improved building performance [project]		Construction as a Manufacturing Process (IMI)	Lifecourse, Lifestyles and Health			

108.	Understand and use supply chain management to promote the construction industry's contribution to sustainable development.	CRISP 99/15 Objective 7, item 1	Sustainability [project]	Construction process	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Using natural resources wisely	
109.	Understand the impact of domestic construction activities on the UK environment.	CRISP 99/15 Objective 8, item 1	Sustainability [project]	Promoting innovation and culture change	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Protecting and restoring the land	
110.	Inform and influence the decision making processes of construction industry's SMEs towards sustainable construction.	CRISP 99/15 Objective 8, item 2	Sustainability [policy]	Promoting innovation and culture change	Construction as a Manufacturing Process (IMI)	Environment and Human Behaviour		Using natural resources wisely	
111.	Disseminate convincing evidence of the business (the business and triple bottom line) benefits of environmental good practice throughout construction industry, recognising the nature of SMEs in meeting customers' needs.	Sustainable construction 1/1	Business case [project]	Promoting innovation and culture change		Environment and Human Behaviour		Using natural resources wisely	
112.	Develop tools to implement environmental good practice throughout construction industry including Learning by Doing and the application of Whole Life Costing	Sustainable construction 1/2	Sustainability [project]	Business improvement		Environment and Human Behaviour	Asset Management	Using natural resources wisely	
113.	Develop explanation of 'what is' sustainable construction.	Sustainable construction 1/3	Sustainability [project]	Business improvement		Environment and Human Behaviour		Protecting and restoring the land	
114.	Provide information on who is taking effective action with a more effective network of players including champions – examine interaction between the construction industry and key players (planners, utilities, regulators, etc.)	Sustainable construction 1/4	Communication [project]	Business improvement		Environment and Human Behaviour			
115.	Embed sustainability within the core remit of research funders and develop a more effective taxonomy of industry structure to inform decisions about the applicability of sustainability research.	Sustainable construction 2/1	Sustainability [policy]	Business improvement	GENERAL	Environment and Human Behaviour			
116.	Investigate how to achieve maximum leverage within industry to achieve best diffusion of R&D through sector, especially SMEs with housing, repair, maintenance and refurbishment, respect for people and land use planning.	Sustainable construction 2/2	Communication [project]	Promoting innovation and culture change				Using natural resources wisely	

117.	Develop appropriate sustainability tests for assessing priorities and research projects. Focus on developing issues and research issues of interest to business, that impact on the triple bottom line.	Sustainable construction 2/3	Sustainability [project]			GENERAL			
118.	M4I to operationalise and demonstrate the work done by Theme Group and not 'go it alone'	Sustainable construction 2/4	Non-specific	Business improvement					
119.	Develop and adopt mechanisms for keeping in touch with global developments in sustainable construction and wider sustainability issues.	Sustainable construction 3/1	Sustainability [project]	Business improvement			GENERAL		
120.	Set up email discussion group and linked web pages.	Sustainable construction 3/2	Communicatio n [policy]	Promoting innovation and culture change					
121.	Develop appropriate sustainability tests for assessing priorities and research projects.	Sustainable construction 3/3	Sustainability [project]	Business improvement	GENERAL				
122.	Develop appropriate sustainability tests for assessing priorities and research projects and develop sustainability index and criteria covering all drivers relevant to all CRISP key priorities and themes. Make sustainability an intrinsic driver behind each priority.	Sustainable construction 4/1	Sustainability [project]	Business improvement				Using natural resources wisely	
123.	Place theme group member on each of the Groups	Sustainable construction 4/2	Non-specific						
124.	Identify champions for the sustainability agenda.	Sustainable construction 4/3	Sustainability [policy]					Using natural resources wisely	
125.	Create new themes on: industry positioning; globalisation and industry structures; respect for people focusing on diversity, equality and quality of life issues for construction staff/employees, end users, and wider communities; regulatory codes; financial/fiscal theme.	Sustainable construction 4/4	Non-specific						

APPENDIX 6 Recommendations from the Performance Task Group

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DTI Construction Research & Innovation Priority Areas	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Task Group chair comments
126.	Improve the systematic organisation of building performance feedback (identify benefits; articulate methods for post-occupancy evaluation; make feedback integral to construction culture; consider practices in other industries; undertake case studies).	Performance Task Group	Improved building performance [project]	Improving building performance		Environment and Human Behaviour	Whole life cost (WLC) management; Reliability based bridge management		Still needed. This did feed into PII programme and I believe there were successful bids on the back of it. It's part of a broader debate about knowledge management. This is a key underlying issue and a challenge for the whole industry – how to create learning organisations. There are some major research council programmes on this. But it is still relevant.
127.	Improve understanding of the complex interrelationships between buildings and organisations (identify how adaptability and flexibility strategies work in practice; study relationship between building performance and business performance; identify tools to help organisations develop strategies for change; prepare case studies to illustrate good practice; carry out longitudinal studies, of buildings and their occupiers over 5-yrs and 30-yrs to capture lessons).	Performance Task Group	Improved building performance [project]	Improving building performance		Economic Performance and Development			Still needed, and still valid. We need longitudinal studies. I'm not sure that they are happening. We talk about whole life costs but experts have little knowledge of how long buildings last for. It should be of interest to PFI investors with their 30-year deals, but it's not there. It's important for the sustainability agenda, but doesn't seem to have captured the imagination of those concerned with it.
128.	Deepen understanding of the match between the service life of products, components and systems and their specification (compare design life with actual service life; study how products, systems and components are serviced in various construction sectors, hotels, hospitals, schools etc)	Performance Task Group	Technical recommendation [project]	Improving building performance			Smart monitoring	Greening the business world	This is progressing – there is some PII work that is helpful.
129.	Economic and environmental impact of increased utilisation of buildings – is this detrimental to their long-term use.	Performance Task Group	Improved building performance [project]	Improving building performance		Environment and Human Behaviour	Urban environment improvement	Using natural resources wisely	I'm not sure if anything is happening. It's a sustainability issue. It's still a valid question but I'm not sure of its wider relevance.
130.	Long term comparative monitoring of buildings – the feasibility and potential	Performance Task Group	Improved building	Improving building			Smart monitoring		This is about understanding the performance of buildings in use – wiring

	benefits of wiring up to central monitoring stations.		performance [project]	performance					up buildings and monitoring. I'm not sure this has been done. It's still a valid question, but less relevant than some of the others.
131.	Who holds the key information on the performance of buildings – and who needs it?	Performance Task Group	Improved building performance [project]	Improving building performance		Knowledge, Communication and Learning			I'm note sure if this has been taken forward. I've been chairman of a PII funded project involving ECD and FaberMaunsell on managing the sustainability of buildings.
132.	Implications of service-based delivery in the construction sector – for how buildings are specified, delivered and managed?	Performance Task Group	Improved processes [project]	Improving building performance			Whole life cost (WLC) management; Reliability based bridge management		Still needed. This is concerned with buildings as products. No-one had the nerve to follow this through. The debate has been taken over by the PFI debate.
133.	Impact of PFI procurement on user satisfaction – how is this type of service provision meeting need in practice?	Performance Task Group	Improved processes [project]	Improving building performance					Implemented. It was a good question at the time, but PFI has been explored in reports and detailed studies have been done.
134.	Financial performance of buildings – to what extent is the adaptation of buildings driven by financial performance?	Performance Task Group	Improved building performance [project]	Improving building performance					Still needed. This is a sub-set of recommendation 2 above.
135.	Changes of use over time – what are the implications for local infrastructure as building uses change through conversion and adaptation?	Performance Task Group	Sustainability [project]	Improving building performance		Environment and Human Behaviour			Still needed. This is a sub-set of recommendation 2 above.

APPENDIX 7 Recommendations from the Process Task Group

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from Task Group chair (6 Jan 2003)
136.	Focus process research on team engagement in the early stages of project development (better customer focus, early engagement of supply chain, forms of contract).	Process Task Group	Building effective teams [policy]	Achieving effective integration throughout the construction process		Work and Organisations			Should be taken forward by nCRISP.
137.	Provide evidence from action based research that process models can be implemented in real projects.	Process Task Group	Communicatio n [policy]	Achieving effective integration throughout the construction process					Worthwhile, but not necessary to carry forward – if recommendation 1 is carried forward, 2 would follow. Commitment to this depends on whether you are a believer [in process modelling and its benefits.]
138.	Investigate the gaps that exist in process research to provide a much clearer road map for future research effort.	Process Task Group	Knowledge mnagement [policy]	Achieving effective integration throughout the construction process					When we tried to find evidence of use of process maps, it was difficult to obtain information. Prof. Rachel Cooper's Process Protocol looked fine, but was not quite complete. This recommendation should be taken forward.
139.	Improve the accessibility of existing research outcomes.	Process Task Group	Communicatio ns [policy]	Targeted repackaging of research knowledge	GENERAL	GENERAL	GENERAL	GENERAL	The CRISP Commission to review process modelling research showed that the use of process modelling in practice was not well documented, nor easy to access. Tangible evidence was difficult to supply. This recommendation should be taken forward.

APPENDIX 8 Recommendations from the Technologies & Components Task Group

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from Task Group chairman, Dec 2002 General comment: Our original steer was towards technology research needs, but we shifted away from technology towards organisational and structural issues that militated against the adoption of new ideas. We were surprised in the sort of recommendations, and their direction, that we came up with.
140.	Disseminating and applying existing knowledge 1): There is a substantial volume of research undertaken on new technologies and components by research organisations and trade associations which has little beneficial impact on industry. Funding should be directed at both determining impacts and disseminating these widely by for example fact sheets defining tangible benefits in terms of cost, programme and quality.	Technologies and Components Task Group	Communications [policy]	Targeted repackaging of research knowledge					Not been fully implemented. Through being chair of the Research & Innovation Committee of ICE, I found out that within EPSRC there are apparently 250 projects concerned with Knowledge Management. I was staggered! There is a lot going on, that ought to help facilitate this recommendation. There is the A-site 'portal' a knowledge sharing pool through which to gain access to products and systems. But it is not as a result of our TG. But it is addressing the issue we think is important. Industry is starting to take responsibility for this itself, which it needs to.
141.	Disseminating and applying existing knowledge 2) Promotion and application of knowledge: There is a lack of awareness by clients and particularly their professional advisors many of whom are SME's on the availability and benefits to be gained from using new materials and components. Funding should be directed toward demonstration and innovation projects from which measured benefits are established.	Technologies and Components Task Group	Knowledge management [policy]	Targeted repackaging of research knowledge					Still needed. A lot of organisations need hard evidence before moving towards this. M4I and CBPP, for example, should help stimulate adoption of new technologies by capturing the impacts and benefits in terms of time and cost. Not having the information on benefits militates against it.
142.	The method of procurement of	Technologies	Improved	Achieving		Environment			Still needed.

	construction services was seen as frequently militating against the adoption of new technologies and components. Research should be undertaken into:-a) Determining the extent to which partnering arrangements improve the adoption of new technologies and b) The extent to which current conditions of contract act as a barrier to use of new materials and components.	and Components Task Group	processes [project]	effective integration throughout the construction process		and Human Behaviour			There is a lot going on that shows greater willingness to share ideas and adapt them. These changed relationships are having an impact, speeding up adoption. There is a need to quantify the benefits. CBPP and M4I should be involved.
143.	To overcome concerns related to repetitive/boring design, case histories should be promoted and funded to show how standardisation can provide greater freedom of choice.	Technologies and Components Task Group	Improved building performance [project]	Technologies and techniques to minimise energy and resource use in construction					Still needed. Adoption of off site prefabrication and standardisation should be promoted by the Strategic Forum. There is a need to engage the architectural profession as active promoters, not bystanders. This has been discussed by the BE Foundation, which could play a role here.
144.	Research should be undertaken to provide better substantiated data for whole life costing. In particular this should provide evidence for the improved value that factory based processes can achieve such as predictability, shorter programmes, less waste and lower energy requirements.	Technologies and Components Task Group	Business case [project]	Guidance for innovative use of materials and components in housing	Infrastructure and environment programme		Whole life cost (WLC) management; Reliability based bridge management	Greening the business world	Still needed. This needs fundamental research and should be passed to DTI and EPSRC. A database is also needed.
145.	Substantial research has been undertaken into advanced composite materials, adhesives and bonding technologies in both the aerospace and automotive industries. Funding should be devoted to establishing the extent to which this can be applied in construction.	Technologies and Components Task Group	Technical recommendation [project]	Guidance for innovative use of materials and components in housing	Innovative Manufacturing Programme		Innovation in bridge construction		Still needed. A lot has been done already in Europe, but this is still needed.
146.	Support for moving the 'Construction' process towards a 'manufacturing' process needs to be encouraged i.e. learning from the automotive industry. Many module manufacturers have, for example, taken traditional 'on site' activities and simply moved them into a factory environment.	Technologies and Components Task Group	Improved processes [policy]	Guidance for innovative use of materials and components in housing	Innovative Manufacturing Programme				Still needed in part. There is a lot going on. It's been driven by the Housing Forum for social housing. Some of the learning needs to be extrapolated to the rest of construction. There is still a way to go in demonstration, and in impact assessment.
147.	More research resource should be devoted to addressing the relationship	Technologies and	Culture [policy]	Guidance for innovative use		Work and Organisations			Still needed. This is a big issue and profoundly

	between skills availability in the sector and the direction of new construction processes which will increasingly require a multi-skilled workforce with long term employment and good development prospects. This is a cross-cutting and important theme.	Components Task Group		of materials and components in housing					important. Multi-skilling is a key challenge that lies ahead especially in view of the reduction in the labour force. We have to think about the whole way we train people. CITB needs to be engaged in this.

APPENDIX 9 Recommendations from Construction Foresight report 'Constructing the Future'

	CRISP recommended action	CRISP reference	Primary focus and project or policy related	DETR Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from Task Group chair about implementation
148.	**Promote 'smart 'buildings and infrastructure:** Accelerate the introduction of new technologies, 'intelligent 'products, standardised, pre-assembled components and advanced materials into every level of the built environment. This will create new business opportunities, improve living /working environments and enable information feedback to improve construction quality.	Constructing the Future	Improved processes [policy]	Technologies and techniques to minimise energy and resource use in construction	Innovative Manufacturing Programme	Environment and Human Behaviour	Smart monitoring		The report was a distillation and a lot was lost from the original six reports. It is difficult to point to any current programme and say that comes directly out of Foresight. Compare the IMI Review – it assumes a linear process. There are bits of Foresight that have gone into the Sustainable Urban Environments programme of EPSRC. Because of the process of Foresight, the recommendations have a credibility, value and acceptance that people can hang things from – e.g. Peter Hedges – and an audit trail. The process of consultation etc gives credibility. Some don't come out of Foresight. Pulling together things already happening. The Construction Industry is reactive and responsive rather than proactive and innovative. Though it innovates within the framework of the industry. I'm not aware of the extent to which people are aware of Foresight and using it – we lack a feedback loop. Recurring issues eg WLC. Performance of built assets was programme in PII-Programmes, but not a single proposal got through to the second round. SUE – Malcolm Horner's project with CIRIA on metrics and models to unite the three legged stool of sustainable construction – was that influenced by Foresight? I've no idea!
149.	**Improve health and safety** Improve the health and safety of people working on site. Enhance safety awareness and thinking throughout the construction process - design, manufacturing, build, operations and maintenance. Ensure better safety training, health monitoring and near-miss reporting, and introduce safety-driven construction automation. This will save lives, minimise health problems and improve productivity.	Constructing the Future	Culture [policy]	Designing for safe construction	Infrastructure and environment programme	Lifecourse, Lifestyles and Health			
150.	**Enable supply chain integration** Advance technology-driven thinking and practice across design, production, build, operations and maintenance. Joining up web-enabled supply chain processes and communication standards will cut construction costs and promote seamless customer solutions throughout the construction lifecycle.	Constructing the Future	Improved processes [policy]	Achieving effective integration throughout the construction process	Innovative Manufacturing Programme	Work and Organisations			

151.	**Invest in people** Improve the learning and welfare of people in the industry. Define future people skills and integrate education, knowledge and learning throughout the construction process - design, production, building, operations and maintenance. Investing in lifelong learning, knowledge management and the welfare of people, will enhance industry standards, improve profitability and attract better people to the industry.	Constructing the Future	Culture [policy]	Knowledge management and learning from experience		Work and Organisations			influenced by Foresight? I've no idea! We spend £30bn per year on refurb and repair – there's hardly any research in those areas. Tendency is to go after the new. Recomm 1 Pre-assembly of components off site is politically desirable on health and safety grounds. PII programme assessed this issue as top priority. Because Foresight used people in the industry, you couldn't expect it to come up with something entirely new. Foresight was not intended to be framed as research topics to go forward as research projects. They provide a conscience list for new CRISP – recently produced. They were valid then, they are valid now. What do we do about them? The weakness of the TG process is there is no linkage – no process for handling recommendations. We'll see who wants to grab them. TGs are not fettered with responsibility they can come up with anything they like including things that are not handleable. It's a strength but also a weakness. But it's wrong to assume a link between recommendation and take up as there is no process to encourage that. [All defined as still needed]
152.	**Improve existing built facilities** Improve renovation and repair methods and practices. Ensure Research and Development (R&D)looks specifically at technologies and components for repair and refurbishment. Better refurbishment 'processes 'and improved standards for their supply will enhance living conditions and add value to existing built facilities.	Constructing the Future	Improved building performance [policy]	Improving performance – work in existing buildings	Innovative Manufacturing Programme	Environment and Human Behaviour	Smart monitoring		
153.	**Exploit global competitiveness** Recognise the impact of globalisation and exploit flexible, collaborative, business frameworks and information sharing. Helping all construction businesses, from research and design to manufacturing and supply, to cope with globalisation and to harness the technology required to manage it will improve business co-operation and create competitive advantage.	Constructing the Future	Industrial studies [policy]			Work and Organisations			
154.	**Embrace sustainability** Sustainable construction and whole-life principles will increasingly be client-driven. By shifting its culture to embrace sustainable thinking at every level, the industry can save energy, reduce waste and pollution and cut the lifetime costs of property ownership.	Constructing the Future	Sustainability [policy]		Infrastructure and environment programme	Environment and Human Behaviour		Using natural resources wisely	

155.	**Increase investment returns** Seek innovative methods of demonstrating the value of built assets and lessening project risk. By better understanding 'risk and reward 'principles the industry will increase profitability, improve the way it is perceived and valued, and encourage new types of funding and investment.	Constructing the Future	Business case [policy]			Work and Organisations			
156.	**Plan ahead** Anticipate and plan for change. Greater awareness of the cyclical nature of construction economics, better long-term strategic thinking, future forecasting and co-ordinated planning will enable the industry to better meet future customer needs, remain competitive and improve its contribution to the UK economy.	Constructing the Future	Industrial studies [policy]			Work and Organisations			

APPENDIX 10 Recommendations from the Housing & Construction Task Group

No.	Recommendation	CRISP reference	Primary focus and project or policy related	DTI Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from report author
157.	There is a need for more work on understanding customer needs and ways to improve *customer service* in the private sector of the housebuilding industry.	Housing 1/1	Improved process [project]	Yes					Still needed. Requires sociologists approach – supported by ESRC, Rowntree, or possibly ODPM.
158.	The question of *customisation* needs more attention, including alternative approaches to customisation, methods for effectively capturing user requirements, differences in approaches between the RSL and private sectors, and ways of overcoming the regulatory, perceptual and funding barriers.	Housing 1/2	Improved process [project]	Yes					Still needed. Probably DTI funding.
159.	There is a need to assess the relationship between disposable income, household type and aspirations for space in and outside the home, including the range of trade-offs people are prepared to make over different levels of choice.	Housing 1/3	Improved data [project]			Yes			Still needed. Links to recommendation 1. Requires sociologists approach – supported by ESRC, Rowntree, or possibly ODPM.
160.	Lessons from the management of the customer-supplier interface in housing need to be transferred from mainstream construction, especially in terms of managing customer expectations.	Housing 1/4	Communication [policy]	Yes					Still needed. This is concerned with the briefing literature in construction – collating and disseminating it to influence housing. DTI or ODPM.
161.	Customisation of home-related services may be just as important as customisation of the dwelling itself in the future; understanding the economics of service customisation needs research.	Housing 1/5	Improved process [project]						Still needed. Relates to Smart Homes. Needs DTI support.
162.	There is a need to research the barriers to the adoption of open building systems in residential development.	Housing 1/6	Providing the business case [project]	Yes					Still needed. Involves gathering intelligence from abroad, especially the Netherlands. PII – probably too near-market for research council support.
163.	Lessons from research projects on *standardisation and prefabrication*, and	Housing 2/1	Communication [policy]	Yes					Still needed. This task involves collating and

	on *site processes*, need to be captured and disseminated to both housing and mainstream construction.								disseminating existing information. Not a research council task. There is an EPSRC project at Loughborough on off-site manufacturing for housebuilding.
164.	Housebuilding could benefit from research and implementation lessons on *integration across the supply chain* from mainstream construction and other industries.	Housing 2/2	Encouraging networks [policy]	Yes					Still needed. There is a vast literature on partnering and supply chain management, but it needs to be drawn to the attention of house-building, perhaps via an EPSRC network.
165.	Research into *performance measurement* in housebuilding should focus on identifying appropriate benchmarks, applying key performance indicators and approaches to measuring performance consistently.	Housing 2/3	Improved data [project]	Yes					Implemented. This has been implemented in social housing through an EPSRC project at University of Greenwich.
166.	There is therefore a need for more work on the specific impact of brownfield development on housebuilding economics, and technical ways of overcoming problems.	Housing 2/4	Good Practice Guidance and case studies					Yes	Implemented. DETR funded a lot of work on this from the planning side.
167.	There is a need to explore technologies for improving the convertibility of non-residential buildings into housing.	Housing 2/5	Good Practice Guidance and case studies	Yes					Still needed. Partly implemented. There is a lot of work on the planning and financial side which we've done. But still needs further work, for example a literature review of what is going on, supported by PII.
168.	Research on residential design and site layout should focus on solutions for achieving acceptable high-density housing.	Housing 2/6	Good Practice Guidance and case studies						Implemented. Implemented by former DETR in projects by Llewelyn Davies.
169.	The relationship between *regulations and innovation* remains under-researched, and should include coverage of cultural and perceptual barriers – such as the perceptions of risks held by insurers, valuers, lenders, and owner-occupiers.	Housing 3/1	Improved data [policy]	Yes					Still needed. Scope for theoretical work that refers to the innovation literature, but which has practical implications. This is primarily academic study and needs ESRC type support.
170.	Research is needed into how regulations can promote change, for example by providing consumer information on design, space and energy performance standards, and the extent to which such	Housing 3/2	Improved data [policy]	Yes					Still needed. This is an industrially relevant project and needs PII support. It is concerned with promoting information to support customer choice and enable customers

	consumer information influences consumer choice.								to make comparisons.
171.	The possibilities of providing beneficial competition for the housebuilding industry through greater *diversity of housing supply routes* needs to be explored.	Housing 4/1	Improved data [policy]						Still needed. This is a long term macro-economic study that needs academic work supported by ESRC.
172.	There is a need for more research on attitudes to investment in training and innovation and training in the housebuilding sector, including future skills and training needs.	Housing 4/2	Education and training [project]						Still needed. It is concerned with the changing skills implied by increased pre-fabrication. CITB should be involved. The Housing Forum and ODPM are considering funding work along these lines.
173.	The *optimum housing replacement rate* – the social, economic, sustainability costs of new housebuilding versus refurbishment of the existing stock – remains a critical area for research and policy debate, as do the planning and financial mechanisms for redevelopment of the existing private sector stock.	Housing 5/1	Improved data [policy]						Still needed. Like 15, this is concerned with macro-economics. It needs support from ODPM or ESRC.

APPENDIX 11 Recommendations from the Knowledge Capture Task Group

No.	Recommendation	CRISP reference	Primary focus and project or policy related	DTI	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	
174.	• M4I and the Housing Forum need to spend more resource on discovering how the lessons learned about innovation and performance improvement from demonstration projects can be disseminated effectively:	Knowledge capture 1	Communication (policy)	Yes					M4I is revising its outputs to reflect this. Implemented.
175.	- M4I and HF should prioritise investment of resources in data capture and dissemination	Knowledge capture 1/1	Communication (policy)	Yes					As above, implemented.
176.	- M4I and HF should prioritise the evaluation of the take-up and impact of the key messages	Knowledge capture 1/2	Communication (policy)	Yes					Implemented. Publications are being grouped under themed documents. 4-8 page histories of 'how to do it' including problems and what to look for. Toolkits rather than case studies.
177.	- Carrying out research into how transfer mechanisms can work effectively	Knowledge capture 1/3	Communication (policy)	Yes					Not specifically implemented. Still needed.
178.	- Identifying a 'learning strategy' for organisations	Knowledge capture 1/4	Communication (policy)	Yes					Beyond the remit of M4I, but could be taken up by Rethinking Construction. Still needed.
179.	- Evaluating effective sizes of cluster / regional groups that enable learning, feedback and discussion, and how to set up parallel groups to cater for larger numbers of projects	Knowledge capture 1/5	Communication (policy)	Yes					Implemented. These are now much better.
180.	Identify best practice templates for organisational learning	Knowledge capture 2	Knowledge management (policy)	Yes					M4I and HF beginning to get into this – why projects work. A company can now be a 'demonstration' not just a project.
181.	• A clear 'best practice' template should be assembled by M4I and	Knowledge capture 2/1	Knowledge management	Yes					Still needed.

	the Housing Forum of the knowledge management roles, mechanisms and structures required within a company for it to be capable of capturing and disseminating lessons learned effectively from demonstration projects by:		(project)						
182.	- Evaluating how different organisations effectively manage 'learning'	Knowledge capture 2/2	Knowledge management (project)	Yes					Can M4I find exemplars? Still needed.
183.	- Setting down models of learning for different types of organisation that others can use	Knowledge capture 2/3	Knowledge management (project)	Yes					Still needed
184.	- Identifying how organisations can evaluate learning progress	Knowledge capture 2/4	Knowledge management (project)	Yes					Still needed.
185.	- Identifying 'best practice' lessons	Knowledge capture 2/5	Knowledge management (project)	Yes					Implemented.
186.	Use 'best practice' model as eligibility criterion for demonstration projects	Knowledge capture 3	Knowledge management (policy)	Yes					Implemented. They're getting tougher, only 70 case studies will be prepared across 400 demonstration projects.
187.	• Adoption of this 'best practice' should be used as an eligibility criterion by M4I and the Housing Forum for organisations seeking to take part in demonstration projects document format by:	Knowledge capture 3/1	Knowledge management (policy)	Yes					Still needed.
188.	- Asking organisations to prioritise learning – ask for senior managers to underwrite this objective (devise a learning charter?)	Knowledge capture 3/2	Knowledge management (policy)	Yes					Implemented – they are asking for evidence.
189.	- Requiring organisations to follow one of the models of learning	Knowledge capture 3/3	Knowledge management (policy)	Yes					Not implemented. [Classed as obsolete.]
190.	- Inviting organisations to evaluate their learning against business performance	Knowledge capture 3/4	Knowledge management (policy)	Yes					Not implemented. [Classed as obsolete.]

	business performance								
191.	• Monitoring should be undertaken by M4I and the Housing Forum to ensure these knowledge management roles, mechanisms and structures operate effectively in organisations engaged in demonstration projects by:	Knowledge capture 3/5	Knowledge management (policy)	Yes					Still needed.
192.	- Periodically reviewing demonstration project organisations' evaluation of learning at group meetings	Knowledge capture 3/6	Knowledge management (policy)	Yes					Still needed.
193.	- Revisiting 'best practice' models after 6-12 months and re-evaluating them.	Knowledge capture 3/7	Knowledge management (policy)	Yes					Still needed.
194.	Produce case studies of successful capture and dissemination	Knowledge capture 4	Knowledge management (project)	Yes					Beginning to address this, but still needed.
195.	• Case studies should be published by M4I and the Housing Forum of the successful capture and dissemination of lessons learned by organisations involved in demonstration projects. Case studies should identify:	Knowledge capture 4/1	Knowledge management (project)	Yes					Implemented
196.	- The model of learning most appropriate to the type of organisation under review	Knowledge capture 4/2	Knowledge management (project)	Yes					Implemented
197.	- Evaluate against each best practice criteria	Knowledge capture 4/3	Knowledge management (project)	Yes					Implemented
198.	- Report where the problems are	Knowledge capture 4/4	Knowledge management (project)	Yes					Implemented
199.	- Evaluate against organisational business performance	Knowledge capture 4/5	Knowledge management (project)	Yes					Implemented

APPENDIX 12 Recommendations from the Culture and People Task Group

	Recommendations	CRISP reference	Primary focus and project or policy related	DTI Themes	EPSRC Programme Landscapes	ESRC Thematic Priorities	Highways Agency Research Areas	Environment Agency Frameworks for Change	Comments from the Task Group Chair
200.	Assess the benefits of different knowledge transfer mechanisms, eg CPD, masters' courses, job-exchange, mentoring, construction industry 'culture and people' forum	Culture and People 1/1	Communicatio n [policy]	Yes		Yes			Recommendations 1 to 5 are in the melting pot. The drive was looking at other industries. CRISP as a whole needs to approach the Research Councils and keep talking to them. A meeting was set up with EPSRC and ESRC. We need to keep both these Research Councils on board. ESRC in particular needs to see construction as a sector [worthy of research and case study]. For the remainder of the recommendations it is still early days. They are most likely to go down the Respect for People route. We've woken up RfP to these things. Some of the ideas will be picked up – widening RfP in the process. All the recommendations are still necessary.
201.	Raise awareness of existing work and ideas and build on them by maintaining, publishing and promoting information sources for culture and people research.	Culture and People 1/2	Communicatio n [policy]	Yes	Yes	Yes			
202.	Improve the dissemination of good 'people' practice by creating practical examples – independently verified – to show what can be changed and how. Include examples from construction (all parts of the supply chain, including clients) and from other sectors.	Culture and People 1/3	Good Practice Guidance [policy]	Yes		Yes			
203.	Compare culture and people management practices in construction with those in other industries. Include HR practices, leadership and organisational learning.	Culture and People 1/4	Good Practice Guidance [policy]	Yes		Yes			
204.	Develop tools to help firms become learning organisations.	Culture and People 1/5	Knowledge management [policy]	Yes		Yes			
205.	Develop strong business cases – related to bottom line impact – to encourage the industry to improve its respect for its people.	Culture and People 2/1	Providing the business case [project]	Yes		Yes			
206.	Design, pilot and assess schemes that provide incentives for firms to invest in HR development. Incentives might include tax breaks, loans, and subsidies. Include communication of the results.	Culture and People 2/2	Providing the business case [project]	Yes					

207.	Run a series of makeover projects, focusing on change rather than on best practice, and publicise the results to reach firms who would not otherwise engage with improvement initiatives.	Culture and People 2/3	Good Practice Guidance [project]	Yes					
208.	Test and demonstrate the business case for greater diversity both in terms of the widening of the skills base from which to employ, and also the benefits of the different approaches, often including a much greater understanding of client needs.	Culture and People 2/4	Providing the business case [project]						
209.	Compare UK construction employment conditions and industrial relations with those in other industries and other countries and assess impact on performance.	Culture and People 3/1	Good Practice Guidance [project]	Yes		Yes			
210.	Find out what attracts people into the construction industry and what puts them off. What is the image of the construction industry in the UK and how could it be improved?	Culture and People 3/2	Cultural issues [project]			Yes			
211.	Using the results of research under recommendation 3/2), produce information to improve the image of construction – for use in schools, universities, colleges, and job centres.	Culture and People 3/3	Cultural issues [project]						
212.	Building on, and extending if necessary, information on the size and structure of the construction industry, identify trends that are affecting and will affect structure in the future. What are the implications for people and culture issues, and especially for behaviour?	Culture and People 4/1	Cultural issues [project]	Yes					
213.	Study the effects of our schools system on the image of construction and its attractiveness to school leavers.	Culture and People 4/2	Cultural issues [project]						
214.	Study the effects of our chartered institutions and trade bodies on the industry.	Culture and People 4/3	Cultural issues [project]	Yes					

215.	Investigate ways of keeping teaching staff in universities and colleges up to date so that students receive up to date training.	Culture and People 4/4	Education and training [policy]						
216.	Study the effectiveness, appropriateness and current relevance of CPD for trade and professional groups: does CPD work?	Culture and People 4/5	Education and training [policy]	Yes					
217.	Evaluate the impacts of recent health and safety legislation and policies on working practices and accident rates.	Culture and People 5/1	Improved processes [project]	Yes					
218.	Test arguments for changes in government intervention and expenditure on enforcement of health and safety practices. Would legislation improve the performance of the industry? Could an enhanced campaign of legislation, publicity and enforcement (such as the drink driving campaign) be devised to improve health and safety practices in construction?	Culture and People 5/2	Improved processes [project]	Yes					
219.	Evaluate the impact of the public sector as a construction client in changing employment culture and practices. Is the public sector really leading the way?	Culture and People 5/3	Cultural issues [project]						
220.	Explore the combined effects of legislation and practice on the supply chain. For example, how does the government target of degrees for 50% of 18-30 year olds affect recruitment and retention practices in construction? And how do these practices affect performance?	Culture and People 5/4	Improved processes [project]						
221.	Encourage construction and engineering departments in universities to collaborate with management departments and business schools when bidding for research funding.	Culture and People 6/1	Encouraging networks [policy]	Yes	Yes	Yes			
222.	Make consideration of people issues a requirement when bidding for research funds, in the same way that dissemination is a requirement.	Culture and People 6/2	Cultural issues [policy]	Yes	Yes	Yes			

223.	Break down barriers between EPSRC and ESRC to encourage truly cross-disciplinary work.	Culture and People 6/3	Encouraging networks (policy]		Yes	Yes			
224.	Produce better information on existing improvement initiatives – what they are, who runs them, how they can help industry, what their outputs are, and how to find out more.	Culture and People 6/4	Communicatio n [policy]	Yes					
225.	Reduce the number of improvement initiatives and improve co-ordination between them.	Culture and People 6/5	Communicatio n [policy]	Yes					
226.	Develop existing forums so that contractors can talk with clients and government bodies and discuss the practical effects of policies, legislation and contract practices.	Culture and People 6/6	Encourage networking [policy]						
227.	Extend the *Respect for People* initiative to include employment practices (recruitment and retention procedures, labour-only subcontracting, and self-employment). Create some KPIs and set targets for reducing use of self-employed people.	Culture and People 6/7	Improved data/KPIs and measurement	Yes					
228.	Acknowledge the diversity of the industry when planning research and improvement activities. Segment the industry and identify target groups for improvement.	Culture and People 6/8	Communicatio n [policy]	Yes					

APPENDIX 13 Recommendations from the Climate Change Task Group

	CRISP recommended action	
229.	**Assessment of risk, nationally, regionally and locally; and sectorally – covering both buildings and infrastructure** • Better understanding of the long-term impacts and economic consequences of all climate change impacts required to confirm overall priorities • Risk profiling for industrial sectors • Event mapping • Priority targeting of most vulnerable sectors and geographical regions • Development of a 'climate change vulnerability index' and assessment scheme with appropriate demonstration schemes. • Assess the impacts of fuel poverty and building related health of milder and moister winters • Decision-making and risk assessment tools on the uncertainty of climate change. • Research on the likelihood of combined events, e.g. extreme weather phenomena occurring simultaneously, and the problem posed by these and other combined phenomena. • Research needed on retrofitting existing building stock for climate change. • Undertake risk assessments on a regional basis for the transport and utility infrastructures across the UK using the 2002 UKCIP scenarios, leading to guidance for regional and local administrations on new construction works and on adapting existing structures. Where possible performance indicators should be established for both new and upgrading works. • Detailed review of the likely impact of climate change on the infrastructure in particularly vulnerable areas, e.g. coastal areas and floodplains, especially the robustness and durability of drainage and flood defence systems. • Assessment of the likely impact of climate change on the planning and execution of construction works to cover, *inter alia*, safety, demand, design, planning, construction and maintenance. • Review of relationship between weather conditions and accident rates to predict the likely change in the accident rate resulting from a change in climate and the implications this has for accident reduction targets. • Additional research required to develop models for assessing vulnerability of the transport and utility infrastructures and the cost effectiveness of necessary adaptation. • Undertake research to devise adaptation strategies and develop methods for quantifying the adaptive capacity of various components of the built environment, significantly the infrastructure located in river valleys and on the coastline. • Undertake cost-benefit analysis for the components of the transport and utility infrastructures that might require adaptation to cope with regional effects of climate change. • Review the capacity of in-service drains, options of installing additional drainage to structures, earthworks etc and the appropriateness of current inspection and maintenance methods.	**All classified as still needed.** **There are 58 items across 5 recommendations.** **This recommendation contains 17 items.**
230.	**Evaluation of existing policies and development of new ones** • Evaluate the success of PPG25 on the planning of settlements to minimise flood risk • Role of Planning Policy in addressing land bank values, development consents, flood risk, impact on existing infrastructure • Improve the tools available for assessing the interaction between the infrastructure and the environment, e.g. to investigate the sensitivities of different policies on climate change for the built environment. • Address barriers to revising BSI and CEN standards to include future scenarios of climate change. • An examination of the opportunities for including an assessment of the consequences of climate change (including impact, vulnerability and adaptation) in decision making processes, risk management, sustainable development initiatives and the like for the construction industry. • More demanding regulations should be developed and imposed for construction works on floodplains and in coastal areas; these should be based on the flood maps issued by the Environment Agency.	This recommendation contains 6 items.
231.	**Identify and work with stakeholders, including with businesses, to assess current knowledge and identify future opportunities** • Establish cross sector forum for climate change interests • Develop a multi-disciplinary 'think-tank' approach	**This recommendation contains 9 items.**

	• Identify relevant stakeholders in climate change issues for tracking and feedback of Built Environment and infrastructures research • Establish formal structures or cross industry sector research bodies / national network of interdisciplinary climate change champions to promote exchanges and ideas • Identify consensus and/or divergence of stakeholder agendas, e.g. the insurance industry and house builders, and develop strategies to reconcile differing points of view • Raise awareness of clients to help shape the industry response in adaptation and mitigation, e.g. on longer-term contracts (ca. 30 years) where performance delivery is likely to be affected by climate change. A detailed study of client perceptions as a precursor to guidance for clients in order to raise awareness and challenge the construction supply-side. • Develop adaptation strategies for industry focused on practical solutions • Formation of practitioners clubs • Identify gaps in industry knowledge, and match technical research to them	
232.	**New technical regulations, codes, guidance, labelling, tools; and case studies** • Improve understanding of the implications of climate change through specific technical literature, revised design codes and regulations. • Apply regional UKCIP scenarios to the design and maintenance of roads, particularly drainage of the running surface, winter maintenance operations, skid resistance and increase in associated risks. • Review current storm profile frequencies adopted in design using predicted climate changes. Include design of the drains to roads, rail tracks, earthworks, retaining walls etc. • Integrate climate change into design tools that support standards as an interim step to the amendment of the standards themselves • New/revised labelling systems • Identification ways to measure performance such as Key Performance Indicators (KPIs) • Audit and verification of protocols • Case studies/ demonstration projects for new products and services • Multi & inter-disciplinary research to develop predictive tools on interactions between development and riverine flooding • Work to control run-off from large impermeable areas eg car parks • Work to inform the improved design of foundations in new construction projects to offset increased risk of subsidence • Examination of existing codes of practice for structures to ensure adherence to the existing guidance to avoid increased risk of storm damage • Better understanding of the impacts of warmer summers on thermal comfort in buildings, especially options for passive and semi-passive approaches and their regional viability based on UKCIP scenarios • Development of passive methods of limiting heat gains in all buildings • Develop techniques for water re-use to enable existing supply capacity to cope with prolonged drought • Evaluation of plastics and coatings to address the longer term impact of cumulative UV exposure on the lifetime of related building products. • Design methods and standards to account for predicted climatic extremes rather than historical data. Review safety margins for current methods of design regarding, e.g. wind strengths and water flows, for existing structures to maintain adequate levels of safety and serviceability. • Review the design of foundations, buried and earth retaining structures in the light of the likely changes in (a) soil moisture content, (b) the depth and intensity of cracking of soils in summer and (c) the depth of penetration of frost. • Review the effects of climate change on the durability of construction materials and products, e.g. research into the development and use of more durable materials. • Current inspection and maintenance regimes for various components of the infrastructure should be reviewed, taking account of the likely changes in the ambient in-service conditions as well as the incidence of extreme weather events. Particularly important issues include scour at bridge piers, de-icing operations on highways and runways, and the blocking of drains and sewers. • The potential for increasing the use of monitoring systems should be investigated as a means of detecting or anticipating in-service problems.	**This recommendation contains 21 items.**
233.	**Knowledge management, shared learning, education and training** • Understanding of the processes and dynamics for change within the industry. • Explore the impacts and requirements of education and training on the industry's capacity for change • Thorough understanding of the European perspective as part of the formation of a UK strategy. • Knowledge transfer of significant events and occurrences across the industry • Establish cross-sectoral research database, to support further research policy.	**This recommendation contains 5 items.**

Appendix 14 Summary table of all recommendations

Number	Reference	Policy	Project	Communication	Business case	Sustainability	Improved data	Impoved performance	Knowledge Mgt	Education and training	Networks	Improved processes	Guidance	Culture	Building teams	Industry studies	Technical	Climate change	Non specific	Implemented	Obsolete	Don't know	Still needed
1	Construction Research Base 1		1	1																1			
2	Construction Research Base 2		1				1													1			
3	Construction Research Base 3		1				1																1
4	Construction Research Base 4	1									1												1
5	Construction Research Base 5		1	1																			1
6	Design 1/1		1								1												1
7	Design 1/2		1		1																		1
8	Design 1/3		1		1																		1
9	Design 1/4		1				1																1
10	Design 1/5		1	1																		1	
11	Design 1/6		1		1																		1
12	Design 1/7	1					1													1			
13	Design 1/8		1					1															1
14	Design 1/9		1				1																1
15	Design 1/10		1					1															1
16	Design 2/1		1				1																1
17	Design 2/2		1										1										1
18	Design 2/3	1									1												1
19	Design 2/4	1									1												1
20	Design 2/5		1										1										1
21	Design 2/6		1		1																		1
22	Design 2/7		1										1										1
23	Design 3/1		1				1																1
24	Design 3/2	1																	1	1			
25	Design 3/3	1		1																			1
26	Design 4/1	1								1													1
27	Design 4/2	1								1										1			
28	Design 4/3		1							1													1
29	Design 4/4	1								1													1
30	Design 4/5	1								1													1
31	Design 4/6		1	1																			1
32	Design 4/7	1								1										1			

33	Design 4/8		1							1												1
34	Design 5/1	1																1				1
35	Design 5/2		1							1												1
36	Design 5/3		1		1																	1
37	Design 5/4		1	1																	1	
38	Design 5/5		1							1												1
39	Design 5/6		1										1									1
40	Design 5/7		1								1											1
41	Design 5/8	1									1								1			
42	Design 5/9	1									1								1			
43	Design 5/10	1		1																	1	
44	Design 5/11	1									1											1
45	Meeting customers' needs 1/1		1									1										1
46	Meeting customers' needs 1/2		1		1														1			
47	Meeting customers' needs 1/3		1	1																		1
48	Meeting customers' needs 1/4	1										1										1
49	Meeting customers' needs 1/5		1				1															1
50	Meeting customers' needs 1/6		1		1																	1
51	Meeting customers' needs 1/7		1				1															1
52	Meeting customers' needs 1/8		1				1														1	
53	Meeting customers' needs 1/9		1									1								1		
54	Meeting customers' needs 2/1		1				1												1			
55	Meeting customers' needs 2/2	1						1											1			
56	Meeting customers' needs 2/3		1								1											1
57	Meeting customers' needs 2/4		1	1															1			
58	Meeting customers' needs 3/1		1						1													1
59	Meeting customers' needs 3/2		1						1													1
60	Meeting customers' needs 3/3		1						1													1
61	Meeting customers' needs 4/1		1		1														1			
62	Meeting customers' needs 4/2		1		1														1			
63	Meeting customers' needs 4/3		1		1																	1
64	Meeting customers' needs 5/1		1		1															1		
65	Meeting customers' needs 5/2	1								1									1			
66	Meeting customers' needs 6/1		1												1						1	
67	Meeting customers' needs 6/2		1												1						1	
68	Motivation 1/1		1						1										1			
69	Motivation 1/2	1							1													1
70	Motivation 1/3	1							1													1
71	Motivation 1/4	1							1													1
72	Motivation 1/5		1						1													1
73	Motivation 1/6		1				1												1			
74	Motivation 2/1	1																1		1		
75	Motivation 2/2	1		1															1			
76	Motivation 2/3		1						1													1
77	Motivation 2/4		1	1															1			
78	Motivation 3/1	1		1																		1

79	Motivation 3/2	1		1															1			
80	Motivation 3/3	1		1															1			
81	Motivation 4/1		1									1							1			
82	Motivation 4/2		1	1																		1
83	Motivation 4/3	1																1	1			
84	Motivation 5/1	1																1				1
85	Motivation 5/2	1																1	1			
86	Motivation 5/3		1								1											1
87	Motivation 5/4	1																1	1			
88	Motivation 5/5		1		1														1			
89	Motivation 6/1		1									1										1
90	Motivation 6/2		1								1											1
91	Motivation 6/3		1	1																		1
92	CRISP 99/15 Objective 1, item 1	1		1																		
93	CRISP 99/15 Objective 1, item 2		1										1									
94	CRISP 99/15 Objective 2, item 1	1				1																
95	CRISP 99/15 Objective 2, item 2	1				1																
96	CRISP 99/15 Objective 2, item 3	1				1																
97	CRISP 99/15 Objective 2, item 4		1		1																	
98	CRISP 99/15 Objective 3, item 1		1		1																	
99	CRISP 99/15 Objective 3, item 2		1				1															
100	CRISP 99/15 Objective 3, item 3		1			1																
101	CRISP 99/15 Objective 4, item 1		1										1									
102	CRISP 99/15 Objective 4, item 2		1												1							
103	CRISP 99/15 Objective 5, item 1		1		1																	
104	CRISP 99/15 Objective 6, item 1		1		1																	
105	CRISP 99/15 Objective 6, item 2		1			1																
106	CRISP 99/15 Objective 6, item 3		1			1																
107	CRISP 99/15 Objective 6, item 4		1					1														
108	CRISP 99/15 Objective 7, item 1		1			1																
109	CRISP 99/15 Objective 8, item 1		1			1																
110	CRISP 99/15 Objective 8, item 2	1				1																
111	Sustainable construction 1/1		1		1																	
112	Sustainable construction 1/2		1			1																
113	Sustainable construction 1/3		1			1																
114	Sustainable construction 1/4		1	1																		
115	Sustainable construction 2/1	1				1																
116	Sustainable construction 2/2		1	1																		
117	Sustainable construction 2/3		1			1																
118	Sustainable construction 2/4	1																1				
119	Sustainable construction 3/1		1			1																
120	Sustainable construction 3/2	1		1																		
121	Sustainable construction 3/3		1			1																
122	Sustainable construction 4/1		1			1																
123	Sustainable construction 4/2	1																1				
124	Sustainable construction 4/3	1				1																

125	Sustainable construction 4/4	1																1				
126	Performance Task Group		1					1														1
127	Performance Task Group		1					1														1
128	Performance Task Group		1													1			1			
129	Performance Task Group		1					1												1		
130	Performance Task Group		1					1												1		
131	Performance Task Group		1					1													1	
132	Performance Task Group		1									1										1
133	Performance Task Group		1									1							1			
134	Performance Task Group		1					1														1
135	Performance Task Group		1			1																1
136	Process Task Group	1												1								1
137	Process Task Group	1		1																1		
138	Process Task Group	1						1														1
139	Process Task Group	1		1																		1
140	Technologies and Components	1		1																		1
141	Technologies and Components	1						1														1
142	Technologies and Components	1										1										1
143	Technologies and Components		1					1														1
144	Technologies and Components		1		1																	1
145	Technologies and Components		1													1						1
146	Technologies and Components	1										1										1
147	Technologies and Components	1												1								1
148	Constructing the Future	1										1										1
149	Constructing the Future	1												1								1
150	Constructing the Future	1										1										1
151	Constructing the Future	1												1								1
152	Constructing the Future	1						1														1
153	Constructing the Future	1														1						1
154	Constructing the Future	1				1																1
155	Constructing the Future	1			1																	1
156	Constructing the Future	1														1						1
157	Housing 1/1		1									1										1
158	Housing 1/2		1									1										1
159	Housing 1/3		1				1															1
160	Housing 1/4	1		1																		1
161	Housing 1/5		1									1										1
162	Housing 1/6		1		1																	1
163	Housing 2/1	1		1																		1
164	Housing 2/2	1									1											1
165	Housing 2/3		1				1												1			
166	Housing 2/4	1										1							1			
167	Housing 2/5	1										1										1
168	Housing 2/6	1										1							1			
169	Housing 3/1	1					1															1
170	Housing 3/2	1					1															1

171	Housing 4/1	1					1															1
172	Housing 4/2		1							1												1
173	Housing 5/1	1					1															1
174	Knowledge capture 1	1		1															1			
175	Knowledge capture 1/1	1		1															1			
176	Knowledge capture 1/2	1		1															1			
177	Knowledge capture 1/3	1		1																		1
178	Knowledge capture 1/4	1		1																		1
179	Knowledge capture 1/5	1		1															1			
180	Knowledge capture 2	1							1										1			
181	Knowledge capture 2/1		1						1										1			
182	Knowledge capture 2/2		1						1										1			
183	Knowledge capture 2/3		1						1										1			
184	Knowledge capture 2/4		1						1										1			
185	Knowledge capture 2/5		1						1													1
186	Knowledge capture 3	1							1													1
187	Knowledge capture 3/1	1							1										1			
188	Knowledge capture 3/2	1							1										1			
189	Knowledge capture 3/3	1							1											1		
190	Knowledge capture 3/4	1							1										1			
191	Knowledge capture 3/5	1							1										1			
192	Knowledge capture 3/6	1							1										1			
193	Knowledge capture 3/7	1							1										1			
194	Knowledge capture 4		1						1										1			
195	Knowledge capture 4/1		1						1													1
196	Knowledge capture 4/2		1						1													1
197	Knowledge capture 4/3		1						1													1
198	Knowledge capture 4/4		1						1													1
199	Knowledge capture 4/5		1						1													1
200	Culture and People 1/1	1		1																		1
201	Culture and People 1/2	1		1																		1
202	Culture and People 1/3	1											1									1
203	Culture and People 1/4	1											1									1
204	Culture and People 1/5	1							1													1
205	Culture and People 2/1		1		1																	1
206	Culture and People 2/2		1		1																	1
207	Culture and People 2/3		1										1									1
208	Culture and People 2/4		1		1																	1
209	Culture and People 3/1		1										1									1
210	Culture and People 3/2		1											1								1
211	Culture and People 3/3		1											1								1
212	Culture and People 4/1		1											1								1
213	Culture and People 4/2		1											1								1
214	Culture and People 4/3		1											1								1
215	Culture and People 4/4	1								1												1
216	Culture and People 4/5	1								1												1

217	Culture and People 5/1		1								1											1
218	Culture and People 5/2		1								1											1
219	Culture and People 5/3		1										1									1
220	Culture and People 5/4		1								1											1
221	Culture and People 6/1	1								1												1
222	Culture and People 6/2	1											1									1
223	Culture and People 6/3	1								1												1
224	Culture and People 6/4	1		1																		1
225	Culture and People 6/5	1		1																		1
226	Culture and People 6/6	1								1												1
227	Culture and People 6/7	1					1															1
228	Culture and People 6/8	1		1																		1
229	Climate change 1		1														1					1
230	Climate change 2		1														1					1
231	Climate change 3		1														1					1
232	Climate change 4		1														1					1
233	Climate change 5		1														1					1
	TOTALS	100	133	36	23	19	20	12	32	13	14	16	13	12	3	3	2	5	10	47	7	7	172

	TOTAL OF THOSE STILL NEEDED	69	103	22	18	19	14	8	18	10	12	14	10	12	1	3	1	5	5			172

Appendix 15 Recommendations 'still needed' clustered by 'primary focus'

Recommendation number	Recommendation	Reference	Policy	Project	Communication	Business case	Sustainability	Knowledge Mgt	Improved data	Improved processes	Networks	Culture	Guidance	Education and training	Impoved performance	Climate change	Industry studies	Building teams	Technical	Non specific
25	Establish connecting feedback loops so studies take effect and are seen to do so.	Design 3/3	1		1															
78	Fund intermediaries to undertake 'user friendly' communication.	Motivation 3/1	1		1															
92	Increase the effectiveness of communication and dissemination of best practice and research outputs [for sustainable construction] through improved dissemination routes and communication strategies and practices.	CRISP 99/15 Objective 1, item 1	1		1															
120	Set up email discussion group and linked web pages.	Sustainable construction 3/2	1		1															
139	Improve the accessibility of existing research outcomes.	Process Task Group	1		1															
140	Disseminating and applying existing knowledge 1): There is a substantial volume of research undertaken on new technologies and components by research organisations and trade associations which has little beneficial impact on industry. Funding should be directed at both determining impacts and disseminating these widely by for example fact sheets defining tangible benefits in terms of cost, programme and quality.	Technologies and Components	1		1															
160	Lessons from the management of the customer-supplier interface in housing need to be transferred from mainstream construction, especially in terms of managing customer expectations.	Housing 1/4	1		1															
163	Lessons from research projects on standardisation and prefabrication, and on site processes, need to be captured and disseminated to both housing and mainstream construction.	Housing 2/1	1		1															
177	Carrying out research into how transfer mechanisms can work effectively	Knowledge capture 1/3	1		1															
178	Identifying a 'learning strategy' for organisations	Knowledge capture 1/4	1		1															
200	Assess the benefits of different knowledge transfer mechanisms, eg CPD, masters' courses, job-exchange, mentoring, construction industry 'culture and people' forum	Culture and People 1/1	1		1															
201	Raise awareness of existing work and ideas and build on them by maintaining, publishing and promoting information sources for culture and people research.	Culture and People 1/2	1		1															
224	Produce better information on existing improvement initiatives – what they are, who runs them, how they can help industry, what their outputs are, and how to find out more.	Culture and People 6/4	1		1															
225	Reduce the number of improvement initiatives and improve co-ordination between them.	Culture and People 6/5	1		1															
228	Acknowledge the diversity of the industry when planning research and improvement activities. Segment the industry and identify target groups for improvement.	Culture and People 6/8	1		1															
5	Produce and widely distribute a simple description of the nature, role activities and achievements of the research base.	Construction Research Base 5		1	1															
31	Conduct research into obstacles to raising profile and status of Building Services as a career; sustainability champions.	Design 4/6		1	1															
47	Study potential impact of greater standardisation and factory/off-site fabrication on image and appeal of industry, especially to new entrants.	Meeting customers' needs 1/3		1	1															
82	Unbiased research on which types of transfer work best and highlighting success and benefits.	Motivation 4/2		1	1															
91	Investigate a broker body to negotiate between researchers and industry (cf US National Science Foundation).	Motivation 6/3		1	1															

114	Provide information on who is taking effective action with a more effective network of players including champions – examine interaction between the construction industry and key players (planners, utilities, regulators, etc.)	Sustainable construction 1/4		1	1																
116	Investigate how to achieve maximum leverage within industry to achieve best diffusion of R&D through sector, especially SMEs with housing, repair, maintenance and refurbishment, respect for people and land use planning.	Sustainable construction 2/2		1	1																
155	Increase investment returns Seek innovative methods of demonstrating the value of built assets and lessening project risk. By better understanding 'risk and reward 'principles the industry will increase profitability, improve the way it is perceived and valued, and encourage new types of funding and investment.	Constructing the Future	1			1															
7	Commission scoping studies into existing methodologies for assessing value in buildings.	Design 1/2		1		1															
8	Examine current cost-in-use studies in practice, their limitations and areas requiring refinement.	Design 1/3		1		1															
11	Conduct research into how can understanding of cost, value and worth be improved throughout the project team.	Design 1/6		1		1															
21	Commission scoping review how professional institutes in other countries contribute to design awareness and value definition. [also in IMI]	Design 2/6		1		1															
36	Assess effectiveness of 'learned society' model for inter-specialist tasks and interdisciplinary challenges.	Design 5/3		1		1															
50	Increase awareness of manufacturers of the need to demonstrate the reliability of whole life costs and performance predictors in relation to international standards.	Meeting customers' needs 1/6		1		1															
63	Conduct scoping study of the barriers to adopting voluntary latent defects insurance for contractors.	Meeting customers' needs 4/3		1		1															
97	Prove and inform the business case for sustainable development – devise funding arrangements to promote innovative technologies.	CRISP 99/15 Objective 2, item 4		1		1															
98	Improve the quality and form of information to communicate technical and business data to influence key decision-makers of the benefits of a more sustainable approach – through improved stakeholder communications.	CRISP 99/15 Objective 3, item 1		1		1															
103	Develop and interpret whole life costing techniques.	CRISP 99/15 Objective 5, item 1		1		1															
104	Improved management of the existing built environment and infrastructure into the future – through a mixture of building and infrastructure re-use and refurbishment, including impact assessment of refurbishment on sustainable urban development.	CRISP 99/15 Objective 6, item 1		1		1															
111	Disseminate convincing evidence of the business (the business and triple bottom line) benefits of environmental good practice throughout construction industry, recognising the nature of SMEs in meeting customers' needs.	Sustainable construction 1/1		1		1															
144	Research should be undertaken to provide better substantiated data for whole life costing. In particular this should provide evidence for the improved value that factory based processes can achieve such as predictability, shorter programmes, less waste and lower energy requirements.	Technologies and Components		1		1															
162	There is a need to research the barriers to the adoption of open building systems in residential development.	Housing 1/6		1		1															
205	Develop strong business cases – related to bottom line impact – to encourage the industry to improve its respect for its people.	Culture and People 2/1		1		1															
206	Design, pilot and assess schemes that provide incentives for firms to invest in HR development. Incentives might include tax breaks, loans, and subsidies. Include communication of the results.	Culture and People 2/2		1		1															
208	Test and demonstrate the business case for greater diversity both in terms of the widening of the skills base from which to employ, and also the benefits of the different approaches, often including a much greater understanding of client needs.	Culture and People 2/4		1		1															
94	Prove and inform the business case for the construction industry to contribute to the aims of sustainable development – through improved understanding of the business benefits of sustainable construction practices, and industry's financial concerns and motivations.	CRISP 99/15 Objective 2, item 1	1				1														
95	Develop a framework of economic & business assessment methods to assess costs and benefits of sustainable construction practices.	CRISP 99/15 Objective 2, item 2	1				1														
96	Understanding the key features of the construction industry and how these enable/prevent sustainable construction	CRISP 99/15 Objective 2, item 3	1				1														
110	Inform and influence the decision making processes of construction industry's SMEs towards sustainable construction.	CRISP 99/15 Objective 8, item 2	1				1														

115	Embed sustainability within the core remit of research funders and develop a more effective taxonomy of industry structure to inform decisions about the applicability of sustainability research.	Sustainable construction 2/1	1				1															
124	Identify champions for the sustainability agenda.	Sustainable construction 4/3	1				1															
154	Embrace sustainability Sustainable construction and whole-life principles will increasingly be client-driven. By shifting its culture to embrace sustainable thinking at every level, the industry can save energy, reduce waste and pollution and cut the lifetime costs of property ownership.	Constructing the Future	1				1															
100	Develop risk management techniques for sustainable construction.	CRISP 99/15 Objective 3, item 3		1			1															
105	Materials management – assess the sustainability costs and benefits of off-site assembly, trial standard specifications for recycled materials.	CRISP 99/15 Objective 6, item 2		1			1															
106	Use of innovative technologies to minimise resource use.	CRISP 99/15 Objective 6, item 3		1			1															
108	Understand and use supply chain management to promote the construction industry's contribution to sustainable development.	CRISP 99/15 Objective 7, item 1		1			1															
109	Understand the impact of domestic construction activities on the UK environment.	CRISP 99/15 Objective 8, item 1		1			1															
112	Develop tools to implement environmental good practice throughout construction industry including Learning by Doing and the application of Whole Life Costing	Sustainable construction 1/2		1			1															
113	Develop explanation of 'what is' sustainable construction.	Sustainable construction 1/3		1			1															
117	Develop appropriate sustainability tests for assessing priorities and research projects. Focus on developing issues and research issues of interest to business, that impact on the triple bottom line.	Sustainable construction 2/3		1			1															
119	Develop and adopt mechanisms for keeping in touch with global developments in sustainable construction and wider sustainability issues.	Sustainable construction 3/1		1			1															
121	Develop appropriate sustainability tests for assessing priorities and research projects.	Sustainable construction 3/3		1			1															
122	Develop appropriate sustainability tests for assessing priorities and research projects and develop sustainability index and criteria covering all drivers relevant to all CRISP key priorities and themes. Make sustainability an intrinsic driver behind each priority.	Sustainable construction 4/1		1			1															
135	Changes of use over time – what are the implications for local infrastructure as building uses change through conversion and adaptation?	Performance Task Group		1			1															
69	Promote general awareness of the importance and benefits of learning and knowledge creation and sharing.	Motivation 1/2	1					1														
70	Promote the idea of a strategic approach to knowledge and understanding that knowledge is value.	Motivation 1/3	1					1														
71	Promote work to understand how firms can be changed into learning organisations.	Motivation 1/4	1					1														
138	Investigate the gaps that exist in process research to provide a much clearer road map for future research effort.	Process Task Group	1					1														
141	Disseminating and applying existing knowledge 2) Promotion and application of knowledge: There is a lack of awareness by clients and particularly their professional advisors many of whom are SME's on the availability and benefits to be gained from using new materials and components. Funding should be directed toward demonstration and innovation projects from which measured benefits are established.	Technologies and Components	1					1														
186	Use 'best practice' model as eligibility criterion for demonstration projects	Knowledge capture 3	1					1														
204	Develop tools to help firms become learning organisations.	Culture and People 1/5	1					1														
58	Investigate barriers to the uptake and application of existing research knowledge, particularly management and human factors.	Meeting customers' needs 3/1		1				1														
59	Integrate existing information and assistance sources to provide 'one stop shop' access.	Meeting customers' needs 3/2		1				1														

60	Investigate the feasibility of establishing a small and occasional client-friendly access route to best practice information.	Meeting customers' needs 3/3		1				1													
72	Deepen understanding of how to capture and use project-based knowledge.	Motivation 1/5		1				1													
76	Provide funds for the synthesis of research outputs and highlight issues from range of sources into a form usable by the construction industry.	Motivation 2/3		1				1													
185	Identifying 'best practice' lessons	Knowledge capture 2/5		1				1													
195	Case studies should be published by M4I and the Housing Forum of the successful capture and dissemination of lessons learned by organisations involved in demonstration projects. Case studies should identify:	Knowledge capture 4/1		1				1													
196	the model of learning most appropriate to the type of organisation under review	Knowledge capture 4/2		1				1													
197	evaluate against each best practice Criteria	Knowledge capture 4/3		1				1													
198	Report where the problems are	Knowledge capture 4/4		1				1													
199	evaluate against organisational business performance	Knowledge capture 4/5		1				1													
169	The relationship between regulations and innovation remains under-researched, and should include coverage of cultural and perceptual barriers – such as the perceptions of risks held by insurers, valuers, lenders, and owner-occupiers.	Housing 3/1	1						1												
170	Research is needed into how regulations can promote change, for example by providing consumer information on design, space and energy performance standards, and the extent to which such consumer information influences consumer choice.	Housing 3/2	1						1												
171	The possibilities of providing beneficial competition for the housebuilding industry through greater diversity of housing supply routes needs to be explored.	Housing 4/1	1						1												
173	The optimum housing replacement rate – the social, economic, sustainability costs of new housebuilding versus refurbishment of the existing stock – remains a critical area for research and policy debate, as do the planning and financial mechanisms for redevelopment of the existing private sector stock.	Housing 5/1	1						1												
227	Extend the Respect for People initiative to include employment practices (recruitment and retention procedures, labour-only subcontracting, and self-employment). Create some KPIs and set targets for reducing use of self-employed people.	Culture and People 6/7	1						1												
3	Explore desirability and feasibility of developing a set of KPIs for research organisations.	Construction Research Base 3		1					1												
9	Investigate flexibility of building uses, to encourage sustainable design through time, to develop a rating system accessible to owners, users and planners.	Design 1/4		1					1												
14	Integrate building economics into parameters for change on terms understood by all stakeholders.	Design 1/9		1					1												
16	Conduct research into sectoral initiatives to establish design value, with systematic ordering of criteria to assist comparison and respect differences	Design 2/1		1					1												
23	Conduct research into the design values of the demonstration projects offered by industry, including conception, development, construction and post-occupancy stages.	Design 3/1		1					1												
49	Develop standard system for preparation and presentation of Whole Life Cost data	Meeting customers' needs 1/5		1					1												
51	Expand coverage of existing databases of whole life costs and performance information.	Meeting customers' needs 1/7		1					1												
99	Improve the quality and form of information to communicate technical and business data to influence key decision-makers of the benefits of a more sustainable approach – through quantified targets/indicators.	CRISP 99/15 Objective 3, item 2		1					1												
159	There is a need to assess the relationship between disposable income, household type and aspirations for space in and outside the home, including the range of trade-offs people are prepared to make over different levels of choice.	Housing 1/3		1					1												
48	Promote adoption of whole life costing as basis of procurement decisions.	Meeting customers' needs 1/4	1							1											
142	The method of procurement of construction services was seen as frequently militating against the adoption of new technologies and components. Research should be undertaken into:-a) Determining the extent to which partnering arrangements improve the adoption of new technologies and b) The extent to which current conditions of contract act as a barrier to use of new materials and components.	Technologies and Components	1							1											

146	Support for moving the 'Construction' process towards a 'manufacturing' process needs to be encouraged i.e. learning from the automotive industry. Many module manufacturers have, for example, taken traditional 'on site' activities and simply moved them into a factory environment.	Technologies and Components	1							1											
148	Promote 'smart 'buildings and infrastructure: Accelerate the introduction of new technologies, 'intelligent 'products, standardised, pre-assembled components and advanced materials into every level of the built environment. This will create new business opportunities, improve living /working environments and enable information feedback to improve construction quality.	Constructing the Future	1							1											
150	Enable supply chain integration Advance technology-driven thinking and practice across design, production, build, operations and maintenance. Joining up web-enabled supply chain processes and communication standards will cut construction costs and promote seamless customer solutions throughout the construction lifecycle.	Constructing the Future	1							1											
45	Examining point of entry to construction process relative to client satisfaction.	Meeting customers' needs 1/1		1						1											
90	Investigate US PAIR (Partnership for the Advancement of Infrastructure and its Renewal) as a catalyst for implementing innovation in practice.	Motivation 6/2		1						1											
132	Implications of service-based delivery in the construction sector – for how buildings are specified, delivered and managed?	Performance Task Group		1						1											
157	There is a need for more work on understanding customer needs and ways to improve customer service in the private sector of the housebuilding industry.	Housing 1/1		1						1											
158	The question of customisation needs more attention, including alternative approaches to customisation, methods for effectively capturing user requirements, differences in approaches between the RSL and private sectors, and ways of overcoming the regulatory, perceptual and funding barriers.	Housing 1/2		1						1											
161	Customisation of home-related services may be just as important as customisation of the dwelling itself in the future; understanding the economics of service customisation needs research.	Housing 1/5		1						1											
217	Evaluate the impacts of recent health and safety legislation and policies on working practices and accident rates.	Culture and People 5/1		1						1											
218	Test arguments for changes in government intervention and expenditure on enforcement of health and safety practices. Would legislation improve the performance of the industry? Could an enhanced campaign of legislation, publicity and enforcement (such as the drink driving campaign) be devised to improve health and safety practices in construction?	Culture and People 5/2		1						1											
220	Explore the combined effects of legislation and practice on the supply chain. For example, how does the government target of degrees for 50% of 18-30 year olds affect recruitment and retention practices in construction? And how do these practices affect performance?	Culture and People 5/4		1						1											
4	Encourage companies to develop and focus more beneficial contact with the research base by appointment, for example, of a Director of Innovation.	Construction Research Base 4	1								1										
18	Integrate urban design into the emerging matrix of building studies.	Design 2/3	1								1										
19	Encourage dialogue between sectors to learn from each other's evaluation systems.	Design 2/4	1								1										
44	Encourage research sponsors to call for 'outside the box' research into interdisciplinary design issues, with experimental funding outside the conventional research review time cycle, to underpin longitudinal research, encourage short penetrative research commissions that publish and be damned. The industry can provide a wealth of committed individuals prepared to offer valuable support in kind provided their contribution is time limited.	Design 5/11	1								1										
164	Housebuilding could benefit from research and implementation lessons on integration across the supply chain from mainstream construction and other industries.	Housing 2/2	1								1										
221	Encourage construction and engineering departments in universities to collaborate with management departments and business schools when bidding for research funding.	Culture and People 6/1	1								1										
223	Break down barriers between EPSRC and ESRC to encourage truly cross-disciplinary work.	Culture and People 6/3	1								1										
226	Develop existing forums so that contractors can talk with clients and government bodies and discuss the practical effects of policies, legislation and contract practices.	Culture and People 6/6	1								1										
6	Examine effectiveness of establishing a networking exchange on buildings in use for all stakeholders.	Design 1/1		1							1										
40	Conduct research into effectiveness of establishing a think-tank for industry wide research into design, embracing all disciplines across the asset/revenue divide.	Design 5/7		1							1										

56	Examine incentives for providing innovative high quality design.	Meeting customers' needs 2/3		1							1									
86	Develop 'learning toolkit' from [vision-of-future research] and promote to firms (CEO, Human Resource managers) and individuals (through professional institutions and journals), thus moving CRISP from being an industry follower to a leader.	Motivation 5/3		1							1									
147	More research resource should be devoted to addressing the relationship between skills availability in the sector and the direction of new construction processes which will increasingly require a multi-skilled workforce with long term employment and good development prospects. This is a cross-cutting and important theme.	Technologies and Components	1									1								
149	Improve health and safety Improve the health and safety of people working on site. Enhance safety awareness and thinking throughout the construction process - design, manufacturing, build, operations and maintenance. Ensure better safety training, health monitoring and near-miss reporting, and introduce safety-driven construction automation. This will save lives, minimise health problems and improve productivity.	Constructing the Future	1									1								
151	Invest in people Improve the learning and welfare of people in the industry. Define future people skills and integrate education, knowledge and learning throughout the construction process -design, production, building, operations and maintenance. Investing in lifelong learning, knowledge management and the welfare of people, will enhance industry standards, improve profitability and attract better people to the industry.	Constructing the Future	1									1								
222	Make consideration of people issues a requirement when bidding for research funds, in the same way that dissemination is a requirement.	Culture and People 6/2	1									1								
93	Develop objective methods to assess the social impacts of the construction process.	CRISP 99/15 Objective 1, item 2		1								1								
101	Understand cultural barriers in construction industry and what the most effective drivers for moving construction industry to sustainable construction – cultural characteristics of the construction industry	CRISP 99/15 Objective 4, item 1		1								1								
210	Find out what attracts people into the construction industry and what puts them off. What is the image of the construction industry in the UK and how could it be improved?	Culture and People 3/2		1								1								
211	Using the results of research under recommendation 3/2), produce information to improve the image of construction – for use in schools, universities, colleges, and job centres.	Culture and People 3/3		1								1								
212	Building on, and extending if necessary, information on the size and structure of the construction industry, identify trends that are affecting and will affect structure in the future. What are the implications for people and culture issues, and especially for behaviour?	Culture and People 4/1		1								1								
213	Study the effects of our schools system on the image of construction and its attractiveness to school leavers.	Culture and People 4/2		1								1								
214	Study the effects of our chartered institutions and trade bodies on the industry.	Culture and People 4/3		1								1								
219	Evaluate the impact of the public sector as a construction client in changing employment culture and practices. Is the public sector really leading the way?	Culture and People 5/3		1								1								
167	There is a need to explore technologies for improving the convertibility of non-residential buildings into housing.	Housing 2/5	1										1							
202	Improve the dissemination of good 'people' practice by creating practical examples – independently verified – to show what can be changed and how. Include examples from construction (all parts of the supply chain, including clients) and from other sectors.	Culture and People 1/3	1										1							
203	Compare culture and people management practices in construction with those in other industries. Include HR practices, leadership and organisational learning.	Culture and People 1/4	1										1							
17	Investigate successes and failures at a design level of the PFI initiatives commissioned by government to date, by sector.	Design 2/2		1									1							
20	Commission international scoping comparison of design assessment methods in practice including cultural identifiers (Japan, Holland, Scandanavia)	Design 2/5		1									1							
22	Conduct research into the effective communication of complex processes with trans-sectoral comparisons.	Design 2/7		1									1							
39	Establish best practice for briefing languages and value-systems by means of successful examples/case studies.	Design 5/6		1									1							
89	Compare other industries and countries experience.	Motivation 6/1		1									1							
207	Run a series of makeover projects, focusing on change rather than on best practice, and publicise the results to reach firms who would not otherwise engage with improvement initiatives.	Culture and People 2/3		1									1							
209	Compare UK construction employment conditions and industrial relations with those in other industries and other countries and assess impact on performance.	Culture and People 3/1		1									1							

26	Raise the profile of Built Environment design within National Curriculum to equal the enthusiasm accorded to the Natural Environment.	Design 4/1	1												1						
29	Promote education of design professionals in production management with cross-industry placements to fertilise the construction field.	Design 4/4	1												1						
30	Expand education of design professionals to include methods of thinking, ethics, social context, communication, as fundamental	Design 4/5	1												1						
215	Investigate ways of keeping teaching staff in universities and colleges up to date so that students receive up to date training.	Culture and People 4/4	1												1						
216	Study the effectiveness, appropriateness and current relevance of CPD for trade and professional groups: does CPD work?	Culture and People 4/5	1												1						
28	Commission international survey of educational institutes' initiatives at developing common design language – at primary, secondary and tertiary levels.	Design 4/3		1											1						
33	Educate current players, encouraging continuing professional education for change and feedback, using trans-disciplinary events and seminars providing specific merit awards.	Design 4/8		1											1						
35	Investigate inhibitors to team working training during design professionals; 'whole-life' education and illustrate successful initiatives that break this mould.	Design 5/2		1											1						
38	Encourage cross-disciplinary learning from other sectors (medicine, manufacturing, psychology)	Design 5/5		1											1						
172	There is a need for more research on attitudes to investment in training and innovation and training in the housebuilding sector, including future skills and training needs.	Housing 4/2		1											1						
152	Improve existing built facilities Improve renovation and repair methods and practices. Ensure Research and Development (R&D)looks specifically at technologies and components for repair and refurbishment. Better refurbishment 'processes 'and improved standards for their supply will enhance living conditions and add value to existing built facilities.	Constructing the Future	1													1					
13	Conduct longitudinal research into building performance over time, including historical and contemporary post-occupancy analysis.	Design 1/8		1												1					
15	Establish appropriate and new ways of approaching post-occupancy assessment	Design 1/10		1												1					
107	Understand impact of IT and societal and organisational changes on building requirements, construction industry practices, and design and construction of buildings and infrastructure ('City of Tomorrow').	CRISP 99/15 Objective 6, item 4		1												1					
126	Improve the systematic organisation of building performance feedback (identify benefits; articulate methods for post-occupancy evaluation; make feedback integral to construction culture; consider practices in other industries; undertake case studies).	Performance Task Group		1												1					
127	Improve understanding of the complex interrelationships between buildings and organisations (identify how adaptability and flexibility strategies work in practice; study relationship between building performance and business performance; identify tools to help organisations develop strategies for change; prepare case studies to illustrate good practice; carry out longitudinal studies, of buildings and their occupiers over 5-yrs and 30-yrs to capture lessons).	Performance Task Group		1												1					
134	Financial performance of buildings – to what extent is the adaptation of buildings driven by financial performance?	Performance Task Group		1												1					
143	To overcome concerns related to repetitive/boring design, case histories should be promoted and funded to show how standardisation can provide greater freedom of choice.	Technologies and Components		1												1					
229	1. Assessment of risk, nationally, regionally and locally; and sectorally – covering both buildings and infrastructure Better understanding of the long-term impacts and economic consequences of all climate change impacts required to confirm overall priorities Risk profiling for industrial sectors Event mapping Priority targeting of most vulnerable sectors and geographical regions Development of a 'climate change vulnerability index' and assessment scheme with appropriate demonstration schemes. Assess the impacts of fuel poverty and building related health of milder and moister winters Decision-making and risk assessment tools on the uncertainty of climate change. Research on the likelihood of combined events, e.g. extreme weather phenomena occurring simultaneously, and the problem posed by these and other combined phenomena. Research needed on retrofitting existing building stock for climate change. Undertake risk assessments on a regional basis for the transport and utility infrastructures across the UK	Climate change 1		1													1				

230	1. Evaluation of existing policies and development of new ones Evaluate the success of PPG25 on the planning of settlements to minimise flood risk Role of Planning Policy in addressing land bank values, development consents, flood risk, impact on existing infrastructure Improve the tools available for assessing the interaction between the infrastructure and the environment, e.g. to investigate the sensitivities of different policies on climate change for the built environment. Address barriers to revising BSI and CEN standards to include future scenarios of climate change. An examination of the opportunities for including an assessment of the consequences of climate change (including impact, vulnerability and adaptation) in decision making processes, risk management, sustainable development initiatives and the like for the construction industry. More demanding regulations should be developed and imposed for construction works on floodplains and in coastal areas; these should be based on the flood maps issue	Climate change 2		1													1				
231	1. Identify and work with stakeholders, including with businesses, to assess current knowledge and identify future opportunities Establish cross sector forum for climate change interests Develop a multi-disciplinary 'think-tank' approach Identify relevant stakeholders in climate change issues for tracking and feedback of Built Environment and infrastructures research Establish formal structures or cross industry sector research bodies / national network of interdisciplinary climate change champions to promote exchanges and ideas Identify consensus and/or divergence of stakeholder agendas, e.g. the insurance industry and house builders, and develop strategies to reconcile differing points of view Raise awareness of clients to help shape the industry response in adaptation and mitigation, e.g. on longer-term contracts (ca. 30 years) where performance delivery is likely to be affected by climate change. A detailed study of client perceptions as a precursor to guidance for clients in order to raise awareness a	Climate change 3		1													1				
232	1. New technical regulations, codes, guidance, labelling, tools; and case studies Improve understanding of the implications of climate change through specific technical literature, revised design codes and regulations. Apply regional UKCIP scenarios to the design and maintenance of roads, particularly drainage of the running surface, winter maintenance operations, skid resistance and increase in associated risks. Review current storm profile frequencies adopted in design using predicted climate changes. Include design of the drains to roads, rail tracks, earthworks, retaining walls etc. Integrate climate change into design tools that support standards as an interim step to the amendment of the standards themselves New/revised labelling systems Identification ways to measure performance such as Key Performance Indicators (KPIs) Audit and verification of protocols Case studies/ demonstration projects for new products and services Multi & inter-disciplinary research to develop predictive tools on interactions b	Climate change 4		1													1				
233	1. Knowledge management, shared learning, education and training Understanding of the processes and dynamics for change within the industry. Explore the impacts and requirements of education and training on the industry's capacity for change Thorough understanding of the European perspective as part of the formation of a UK strategy. Knowledge transfer of significant events and occurrences across the industry Establish cross-sectoral research database, to support further research policy.	Climate change 5		1													1				
153	Exploit global competitiveness Recognise the impact of globalisation and exploit flexible, collaborative, business frameworks and information sharing. Helping all construction businesses, from research and design to manufacturing and supply, to cope with globalisation and to harness the technology required to manage it will improve business co-operation and create competitive advantage.	Constructing the Future	1															1			
156	Plan ahead Anticipate and plan for change. Greater awareness of the cyclical nature of construction economics, better long-term strategic thinking, future forecasting and co-ordinated planning will enable the industry to better meet future customer needs, remain competitive and improve its contribution to the UK economy.	Constructing the Future	1															1			
102	Understanding the role of legislation and market forces to promote change (towards sustainable construction)	CRISP 99/15 Objective 4, item 2		1														1			
136	Focus process research on team engagement in the early stages of project development (better customer focus, early engagement of supply chain, forms of contract).	Process Task Group	1																1		
145	Substantial research has been undertaken into advanced composite materials, adhesives and bonding technologies in both the aerospace and automotive industries. Funding should be devoted to establishing the extent to which this can be applied in construction.	Technologies and Components		1																1	

125	Create new themes on: industry positioning; globalisation and industry structures; respect for people focusing on diversity, equality and quality of life issues for construction staff/employees, end users, and wider communities; regulatory codes; financial/fiscal theme.	Sustainable construction 4/4	1																		1
123	Place theme group member on each of the Groups	Sustainable construction 4/2	1																		1
118	M4I to operationalise and demonstrate the work done by Theme Group and not 'go it alone'	Sustainable construction 2/4	1																		1
84	Raise awareness and profile of CRISP in industry	Motivation 5/1	1																		1
34	Provide support for communicating research efforts to all stakeholders.	Design 5/1	1																		1
	TOTALS		69	103	22	18	19	18	14	14	12	12	10	10	8	5	3	1	1	5	