In consultations prior to the UK government’s response to changes to the EU procurement directives, the impact and innovation of small to medium-sized enterprises (SMEs) were examined to try to ensure a positive impact across the industry. To produce innovation, a new innovation partnership procedure was introduced. Subsequent to publication of the procedure, this paper examines perceptions from tenderers and the government. Seventy-one completed questionnaire responses were received from tenderers, with a further 19 from government procurers. The findings indicate that 69% of tenderers intend involvement in the future, but the government is evenly split on the ability to use the procedure and is unsure as to its benefits. While the majority considered that little change would result in relation to value for money, speed of innovation to market and increase in innovative solutions, more were positive than negative towards the procedure. Even though economic operators are keen to use it, there is little desire for its use within government departments, despite the fact that considering it would increase SME involvement.

1. Background

1.1 EU procurement processes for public sector contracts

The innovation partnership procedure has been recently added to the existing procurement procedures across Europe and, as such, there is little existing data on whether tenderers are likely to use it. The euro value of expense under all these procedures is around €2 trillion (PoIP, 2014). This expense on works, services and supply contracts including construction and civil engineering equates to around 19% of the gross domestic product (GDP), and the EU hopes that procurement expense specifically on innovation projects will increase to around 3% of the GDP (EC, 2015). However, innovation expense is starting at a very low base of around 2.5% of the overall procurement expense in the UK (Nesta, 2007). The innovation partnership procedure can be used to improve works, services and supply contracts in construction and civil engineering.

Until 2015 the processes used in the procurement process across the EU were controlled by two EU directives: (a) 2004/17 indicated the procurement procedures for entities operating in the water, energy, transport and postal services sectors (EPCEU, 2004a) and (b) 2004/18 organised processes for public works contracts, public supply contracts and public service contracts (EPCEU, 2004b). Substantial consultation across the EU suggested that a revision to the EU procurement directives was required to allow for more flexibility. Increased involvement from small to medium-sized enterprises (SMEs) and the innovation this would bring were considered essential (Arrowsmith, 2012).

On 11 February 2014, revisions to the directives were adopted and three new directives published: (a) EU directive 2014/23, which for the first time provided specific procedures for concession contracts (EPCEU, 2014a); (b) EU directive 2014/24, which incorporated the amendments and replaced EU directive 2004/18 (EPCEU, 2014b); and (c) EU directive 2014/25, which replaced EU directive 2004/17 (EPCEU, 2014c) for utility contracts. In the UK, England, Wales and Northern Ireland incorporated these directives into law through the Public Contracts Regulations (PCR) 2015 (HMG, 2015). In Scotland they were incorporated into law by the Public Contracts (Scotland) Regulations 2015 (Scottish Government, 2015). This was before the April 2016 deadline set by the EU (EC, 2014a).
1.2 The need for innovation in public procurement

As far back as Rothwell (1984: p. 330), innovation was identified as a result of state procurement. Rothwell (1984) also suggested that research and development money as grants did not produce as much innovation as procurement. However, the Community Research and Development Information Service (Cordis, 2004) suggested that the rigour and rigidity of the EU procurement directives stifled innovation. Swinney (2011: p. 4), a minister in the Scottish devolved administration, suggested that ‘[t]he cycle of competition and constraints of tightly drawn contracts can stifle innovation and can lead to ineffective working relationships which are often adversarial in nature’. The Local Government Group (LGG, 2011) confirmed that this was the case and suggested that this should be remedied in the revision to the EU directives. Edquist and Zabala-Iturriagagoitia (2012) argued that public procurement could be altered to remove systemic failures hindering innovation. Uyarra et al. (2014) described the barriers to innovation. These were defined as a lack of interaction with procuring organisations, the use of overspecified tenders rather than performance specifications, low competences of procurers and a poor management of risk. The European Commission (EC) states that its second main objective in its green paper on revising environmental aspects and innovation. As a result of the consultation on the revision of the EU directives, the innovation partnership procedure was introduced in order to overcome these issues. The typical PPI process according to Edquist and Zabala-Iturriagagoitia (2012) progresses in the following way.

(a) Identification of a grand challenge (or a public agency/mission need): this demand-side problem relates to a process or product requirement by the department.
(b) The challenge is then worked into a functional specification.
(c) A tendering process takes place that identifies the problem and provides a brief on how to develop a solution with a product or process that can go to market in the submission of a formal bid.
(d) The department then assesses the tender and awards contracts.
(e) The delivery process has three stages: product development, production of the product and final delivery to the department.

This correlates directly with the new innovation partnership procedure in the EU directive (EPCEU, 2014b: article 65). However, not all types of PPI can be attained under this arrangement. Hommen and Rolfstam (2009) were the first to define the types of PPI as ‘direct PPI’, ‘co-operative PPI’ and ‘catalytic PPI’.

Direct PPI is when only the needs of the procuring department are met, co-operative PPI is where the results are shared between the buyer and other organisations for the use of the procuring organisation and, lastly, catalytic PPI results in the innovation reaching to other procuring organisations.

While PPI relates to the ‘demand side’ of procurement, pre-commercial procurement (PCP) looks at the ‘supply side’. The European Parliament and Council of the European Union (EPCEU, 2004a) stated that the commercial development of new products is not part of the scope of the EU directive. Article 16f of EU directive 2004/17 specifically states that the directive does not apply to ‘research and development services other than those where the benefits accrue exclusively to the contracting authority for its use in the conduct of its own affairs, on condition that the service provided is wholly remunerated by the contracting authority’. However, the new EU directive 2014/24, which replaced it, removed this clause. It was replaced with a clause in the revised EU directive 2014/23 which states that any research benefits must go solely to the contracting authority and the service must be paid for (EPCEU, 2014b: article 14). Therefore, the only two types of PPI falling under the directive are direct and co-operative, hence the need for PCP, which allows for more basic...
research to be carried out on the development of products and services and sits outside the scope of the EU directive.

While the innovation partnership procedure itself is well documented, little research has been carried out into the perceptions of its workability, likely impact on SMEs and the knowledge of its inclusion in the new regulations.

1.3 The types of public procurement intended to support innovation

PCP funding is available through the EU’s Horizon 2020 scheme. The EU defines seven technology readiness levels (TRLs) (EC, 2014b). The P4ITS Consortium (2015) defined the levels of research applicable to PPI and PCP: the basic research levels are TRLs 1–3, applied research is identified by TRLs 4 and 5 and TRLs 6 and 7 denote experimental development. Figure 1 indicates how these levels relate to PCP and PPI. The TRLs stated are those generally used for PCP and PPI. However, the P4ITS Consortium (2015) indicated that some levels of the two procedures may overlap with PCP encompassing TRLs 2–7 and PPI levels 5–9. Thus, the distinction between PCP and PPI cannot be made on TRLs alone.

As this paper investigates the impact of the EU directive changes, it is important to draw a distinction between the two procedures. The main defining difference between the two procedures is the scale and implementation required. PCP is defined as procuring research and development services, up to the prototyping or later EU document shows PCP as a precursor to PPI (EC, 2016a).

It can therefore be determined that PCP involves the pre-concept phase through to the engineering development phase but does not cover production or deployment. Should there be a proof of concept in existence and deployment is required, then PPI should be used. A later EU document shows PCP as a precursor to PPI (EC, 2016a).

This document shows that PPI is used when innovations are ‘nearly or already in small quantity in the market and don’t need new Research & Development’, whereas PCP ‘can be used when there are no near-to-the-market solutions yet and new Research and Development is needed’, thus segregating the two. When TRLs 8 and 9 are achieved, the innovation partnership procedure can be used.

While there is an amount of overlap between PCP, PPI and the innovation partnership procedure, this paper concentrates on the introduction of the innovation partnership procedure under the EU directives, as little research has been carried out on its perceived impact on smaller regions within the EU.

1.4 The role of the innovation partnership procedure

The innovation partnership procedure was brought into the EU regulations to increase innovation within procurement. The EC (2016b) has just published a report on research and development in smaller EU countries of less than 3 million in population. It examined five countries: Latvia, Slovenia, Estonia, Malta and Iceland. Northern Ireland was not counted, as it was seen as a region within the UK. However, many similarities exist between these countries and Northern Ireland.

The EC (2016b) suggested that Slovenia had a semi-centralised procurement structure, where decision-making for individual procurements is the responsibility of various ministries. This is similar to the case of Northern Ireland, where the Central Procurement Directorate (CPD) sets ‘overarching’ policy, but the Centres of Procurement Expertise (Copes) listed by the Department of Finance and Personnel for Northern Ireland (DFP, 2012) take responsibility for individual procurements.

Furthermore, the EC (2016b) suggested that international collaboration was identified as a means of achieving better value for money (VFM), access to expertise, bigger and more competitive markets and support for innovation. However, for Northern Ireland, none of these have been examined in the
international context of the EU procurement regulations and procedures (EPCEU, 2014a).

Furthermore, little assessment has been carried out into innovation and the link with VFM. Erlendsson (2002) defined VFM as the assessment of an organisation achieving ‘the maximum benefit from the goods and services both acquired and provided, within the resources available to it’. Her Majesty’s Treasury (HMT, 2007) identifies that the UK government’s main objective in procurement decision-making is to secure best VFM. Therefore, this needs to be assessed in relation to the innovation partnership procedure.

This paper seeks to fill this knowledge gap by examining the proposed use of the innovation partnership procedure, its VFM, the perceived speed with which it will produce innovations in a small country and whether it will achieve the EU target of increasing SME involvement.

1.5 Engaging SMEs to improve levels of innovation
EU governments, by their response to the consultation on the revision to the EU directives, acquiesce in the idea that getting SMEs involved in government contracts will result in increased innovation and improve the end product (HMG, 2013). Interact (2013) showed that involvement of SMEs in EU procurement resulted in the promotion of greater entrepreneurship and facilitated greater development of growth clusters.

In recognition of the impact that SMEs can have on innovation, Europe has provided a specific Horizon 2020 funding scheme in order to increase the innovation capacity of SMEs (EC, 2014c). The SME-specific instrument will result in about €3 billion in funding between 2014 and 2020 (EC, 2014d).

However, there has been little research with empirical data into whether this will have the impact of increased SME participation in innovation. This paper seeks to fill this knowledge gap.

1.6 Previous consultation on innovation in procurement
In the UK, the Cabinet Office consulted on the revisions to the EU procurement directives. The feedback and the UK government’s result from this consultation were published on 30 January 2015 (Cabinet Office, 2015). While the consultation contained 204 responses, only 15 came from businesses rather than interest groups (Cabinet Office, 2015: p. 3; Table 1). There was therefore a need to identify the perceptions of those involved from a construction-related business perspective, as the Cabinet Office clearly stated that the views of economic operators are valuable.

2. Methodology
The LimeSurvey software was used to disseminate and collect the empirical data for this study. Initially, the surveys underwent a pilot by using SMEs who had tendered for work above the European threshold and academics with above-threshold European procurement experience. Two questionnaire instruments were developed: the first gathered the views of private sector economic operators and the second collected information from the public sector client side. The LimeSurvey software platform is written in PHP, which interrogates an online MySQL database to collect responses to questionnaires and analyse the data received.

In the last year

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage: %</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
<td>0·00</td>
</tr>
<tr>
<td>1–3</td>
<td>9</td>
<td>12·68</td>
</tr>
<tr>
<td>4–6</td>
<td>6</td>
<td>8·45</td>
</tr>
<tr>
<td>&gt;6</td>
<td>56</td>
<td>78·87</td>
</tr>
</tbody>
</table>

Table 1. Number of applicable tenders from economic operators in the last year
therefore 104 organisations. Based on the possible population of 339, the 104 remaining organisations is more than that required for a 10% precision (78) (Smith (1983) cited by Taylor-Powell (1998: p. 10)). The final response rate was 68%, which is regarded as good and is close to the very good value of 70% prescribed by Rubin and Babbie (2009). Figure 2 indicates these figures graphically. No contracts have yet been advertised under the innovation partnership procedure, and the questionnaire sought the views of all potential tenderers who already had general experience in tendering for contracts above the EU threshold.

In order to verify the results of the sift and ensure that the organisations were actively involved in procurement, the questionnaire had a question on the amount of applicable tenders that the organisation had been involved in during the past 12 months. It can be seen from Table 1 that all of the organisations passed this test and had current experience of procurement and the processes involved.

### Findings

#### 3.1 The innovation partnership procedure usage

There are currently no data on whether the organisations tendering for work in Northern Ireland perceive that they might...

### Table 2. Respondents by Centre of Performance Expertise (Cope)

<table>
<thead>
<tr>
<th>Cope</th>
<th>Number of staff provided</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nihe</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>NIW</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>TransportNI total (two from Roads, one from Translink)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Department of Health, Social Services and Public Safety Bodies</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Education and Library Boards (five)</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>DFP CPD and Health Estates</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Procurement and Logistics Service</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>19</td>
</tr>
</tbody>
</table>

### Table 3. Likelihood of future tenders under the innovation procedure

<table>
<thead>
<tr>
<th>Answer</th>
<th>SME likelihood to tender under innovation procedure</th>
<th>Government procurer putting out documentation under innovation procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage: %</td>
</tr>
<tr>
<td>Very likely</td>
<td>23</td>
<td>32.39</td>
</tr>
<tr>
<td>Likely</td>
<td>26</td>
<td>36.62</td>
</tr>
<tr>
<td>Unlikely</td>
<td>8</td>
<td>11.27</td>
</tr>
<tr>
<td>Very unlikely</td>
<td>2</td>
<td>2.82</td>
</tr>
<tr>
<td>Do not know</td>
<td>12</td>
<td>16.90</td>
</tr>
</tbody>
</table>

This provided a 90% response rate for the survey, which is deemed very good for analysis by Rubin and Babbie (2009).
be involved in innovation-related procurement exercises. This paper seeks to fill this knowledge gap in that it can be seen from Table 3 that 69·01% considered that their organisation would be involved in such a procedure in the future. With only 14·09% considering it unlikely, the perception is that the procurers will put documentation out under this process and shows willingness for SMEs to get involved.

However, while there is willingness for the organisations tendering for work to get involved in innovation through the expectation of documents under the innovation procedure, Table 3 shows that this is not replicated on the procurer side.

This identifies an issue in relation to government procurement officials. While the UK government policy during the consultation suggested that more innovation was required and the innovation procedure was placed into the documentation to deliver this, there appears to be little desire to use a procedure at the lower levels within the Copes. A paradigm shift in relation to the culture within the government departments is therefore required in order to maximise the benefits of innovation.

### 3.2 Benefits of the innovation partnership procedure to the organisations involved

There is currently a high level of uncertainty (65%) in relation to whether those tendering for work in smaller countries will benefit from the innovation partnership procedure: (Table 4). This uncertainty exists due to the procedure being new. Experience of it, based on organisations’ willingness to try it, shown in Section 3.1, should assist in overcoming this. While those who think it will benefit their organisation are outnumbered by those who think the opposite (12·68% against 22·54%), it should be borne in mind that the innovation partnership procedure is only to bring innovation into the procurement. Therefore, if organisations are content to provide a service or a product as they have always done, then they will not benefit from the procedure.

On the procuring organisation side, it is disappointing to see the high level of those in Table 4 who do not consider that they will benefit from the procedure: 42·10%. However, this is not surprising as a large amount of uncertainty exists (among 47·37% of respondents). However, there is an element within the procuring organisations that considers that there can be benefits accrued by using the procedure (10·52%).

The interesting element about Table 4 is that it shows that there is a small minority of organisations on both sides, procuring organisations and economic operators, who will now have a procedure at their disposal to bring the innovation into schemes to meet their needs. This has to be welcomed and the increased expense from the EU will make it worth their while to invest in innovation.

### 3.3 The innovation partnership procedure and VFM

There is currently little research into the innovation partnership procedure and VFM for taxpayers as the end result. This paper seeks to fill this knowledge gap, and the findings from tendering organisations indicated in Table 5 show that 42·25% consider that there will be little change with its introduction. However, there are more who consider that it will provide an increase in VFM (16·90%) than those who consider that it will produce a decrease (7·04%).

The figures from the tendering organisations are compared to the results from the procuring organisations in Table 5. Those considering that there will be little change in VFM are 42·10% for procuring organisations in comparison with 42·25% for tendering organisations in Table 5. However, there is a slightly bigger percentage from the procuring organisations considering
that it will produce an increase in VFM: 21.05% against 16.90% from tendering organisations (Table 5).

3.4 The innovation partnership procedure and provision of faster innovation solutions

The need for speed in the provision of innovation has been little examined in research in relation to the innovation partnership procedure. The findings in Table 6 from the tendering organisation’s perspective are very positive in relation to increasing the speed of innovations to market. Only 1.41% consider that it will slow down innovations in reaching the market. On the positive side, 26.76% consider that it will increase the speed of provision of innovation. What is worrying is that 40.85% consider that it will provide little change.

On the procuring organisation side, the results are even more positive. It can be seen from Table 6 that there are no procuring bodies who consider that the introduction of the innovation partnership procedure will result in a decrease in the speed of innovations to the market. On the positive side, 21.05% consider that it will produce a substantial increase in speed to market, with 26.32% considering that the result will be an increase. This indicates that the ideal of the EU directive in relation to increasing innovation speed to market can be accomplished through the innovation procedure.

3.5 The innovation partnership procedure and an increase in innovative solutions

The literature shows that the main aim of the introduction of the innovation partnership procedure was to increase the amount of innovative solutions and break the shackles of an overmoderated procurement system. The findings show that it is perceived that the result will accomplish this. Only one tenderer considered that it would result in less innovation (Table 7). On the positive side, 28.17% considered that it would result in an increase in innovation.

On the procuring side, the results are again more positive. On the positive side, 5.26% consider that it will produce a substantial increase in innovations reaching the market, with 21.05% considering that the result will be an increase (Table 7). Nobody considered that it would reduce the amount of innovations reaching the market.

3.6 The innovation partnership procedure and an increase in SME involvement

Since the publication of the revised procurement regulations, there has been little examination of whether the changes will be perceived to have the desired impact in increasing the participation of SMEs. It can be seen from Table 8 that the tenderers are reasonably evenly split regarding whether it will increase or decrease SME involvement (26.76% for an increase

Table 6. Speed to provide innovative solutions

<table>
<thead>
<tr>
<th>Answer</th>
<th>Tendering organisation’s perspective</th>
<th>Procuring organisation’s perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage: %</td>
</tr>
<tr>
<td>Substantial increase</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Increase</td>
<td>19</td>
<td>26.76</td>
</tr>
<tr>
<td>Little change</td>
<td>29</td>
<td>40.85</td>
</tr>
<tr>
<td>Decrease</td>
<td>1</td>
<td>1.41</td>
</tr>
<tr>
<td>Substantial decrease</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Do not know</td>
<td>22</td>
<td>30.99</td>
</tr>
</tbody>
</table>

Table 7. Increase in the number of innovative solutions

<table>
<thead>
<tr>
<th>Answer</th>
<th>Tendering organisation’s perspective</th>
<th>Procuring organisation’s perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage: %</td>
</tr>
<tr>
<td>Substantial increase</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Increase</td>
<td>20</td>
<td>28.17</td>
</tr>
<tr>
<td>Little change</td>
<td>28</td>
<td>39.44</td>
</tr>
<tr>
<td>Decrease</td>
<td>1</td>
<td>1.41</td>
</tr>
<tr>
<td>Substantial decrease</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Do not know</td>
<td>22</td>
<td>30.99</td>
</tr>
</tbody>
</table>
The innovation partnership procedure was brought in by way of a revision to the EU procurement directives, resulting in the publication of EU directive 2014/23 (EPCEU, 2014b) and transposed into UK law by way of the PCR 2015 (HMG, 2015). However, since its publication, its perceived impact has been inadequately researched. This work aimed to examine it from both the procurer’s and a government procurer’s perspective.

Subsequent to a telephone sift, 71 completed responses to a structured online questionnaire were received from 107 tenderers. Nineteen experts from the Northern Ireland government Copes also responded to the questionnaire.

The findings show a strong support from tenderers, with 69% suggesting that they hoped they would be involved with the innovation partnership procedure in the future. Procuring organisations, however, were evenly split on whether they will put out documentation under the procedure. This may cause issues, as the UK government’s response suggested the need for innovation in procurement to keep specifications and procedures up to date. The innovation partnership procedure was placed into EU directive 2014/23 to deliver this. Considering that each year there are around 250,000 public authority contracts across the EU and expense on innovation is set to be increased, the findings indicate that supportive organisations have a chance as early adopters to make a large impact. These will also be the organisations with a chance of accessing the EU’s increased 3% of GDP innovation procurement expense. Yet there appears to be little desire to use this procedure at the level of those writing the documentation within the Copes. This is further supported by the response to the question regarding the realisation of the benefits to the organisation, with over 40% suggesting that it will bring little benefit. This would suggest the need for a paradigm shift in relation to the culture within the government departments in order to maximise the benefits of innovation. Promotion of high-level policy in training to procurement document writers should accomplish this.

Again, on the tenderer side, more considered that it would bring little benefit to their organisation than those who considered it would benefit the organisation (22.54% against 12.68%). However, the fact that innovation procurement only has 2.5% of the overall budget for public sector procurement in the UK and many are content to produce products that they have always used successfully in the past contributes to this result, these type of organisations will not benefit from the new procedure. However, organisations willing to innovate (12.68% of the sample) have a chance to use this procedure to improve processes and services within government procurement.

Some comparisons can be drawn between Northern Ireland Cope procurement and smaller EU countries examined by the EC (2016b). That document found that innovation procurement is starting to impact on policy in smaller countries and will increase through EU activities. While the majority in this study considered that little change would result in relation to VFM, speed of innovation to market and increase in innovative solutions, more were positive than negative in relation to the procedure. Even a small amount of improvement in any of these issues can achieve great savings due to the extraordinarily high amounts of government procurement expense across the EU. Therefore, in a similar situation to other smaller countries, it is likely to increase in use in Northern Ireland, as 21.05% of procuring organisations consider that the innovation partnership procedure will result in increased VFM.

On a more positive note, one of the main impacts of the consultation appears to have been achieved as government departments considered it would produce a positive impact on

<table>
<thead>
<tr>
<th>Table 8. Increase in small to medium-sized enterprise involvement in innovative solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
</tr>
<tr>
<td>Substantial increase</td>
</tr>
<tr>
<td>Increase</td>
</tr>
<tr>
<td>Little change</td>
</tr>
<tr>
<td>Decrease</td>
</tr>
<tr>
<td>Substantial decrease</td>
</tr>
<tr>
<td>Do not know</td>
</tr>
</tbody>
</table>

and 18.31% for a decrease with 26.76% remaining static). However, again it shows a slight weighting towards an increase, 8.45%, which gives cause for optimism.
SME involvement. A slight weighting towards an increase in SME involvement (8.45%) from a tenderer perspective also gives cause for optimism.

The high percentage of those surveyed who responded to questions with a ‘don’t know’ response suggests that there is further work to be done once the innovation partnership procedure becomes commonplace within the industry, as many are in fact unaware of the new procedure and its implications.

Further work needs to be carried out in relation to the innovation partnership procedure to identify whether these perceptions remain similar after the procedure has been used a substantial number of times within the industry. This could be carried out using a more qualitative method such as interviews to probe the respondents in depth on the reasons behind their responses in this more qualitative study. The new procedure had not been advertised on the Tenders Electronic Daily website prior to the start of 2016. Once a number of contracts are awarded under the procedure, a fuller analysis of the benefits will be able to be examined.

REFERENCES
Offprint provided courtesy of www.icevirtuallibrary.com
Author copy for personal use, not for distribution


HOW CAN YOU CONTRIBUTE?
To discuss this paper, please email up to 500 words to the editor at journals@ice.org.uk. Your contribution will be forwarded to the author(s) for a reply and, if considered appropriate by the editorial board, it will be published as discussion in a future issue of the journal.

Proceedings journals rely entirely on contributions from the civil engineering profession (and allied disciplines). Information about how to submit your paper online is available at www.icevirtuallibrary.com/page/authors, where you will also find detailed author guidelines.