DARLINGTON PEDESTRIAN HEART

Technical Review of the Project

for

Darlington Borough Council

28 September 2007

Report by [redacted]

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1 INTRODUCTION

1.1 INSTRUCTIONS

1.1.1 This Report has been prepared in response to the instructions given by Darlington Borough Council and detailed within EC Harris' proposal of 29th March 2007.

1.1.2 This Report describes the findings from a technical review of the Darlington Pedestrian Heart project (the Project) in accordance with the investigations described in our proposal. Darlington Borough Council was advised that these investigations were necessary in the first instance in order that it can establish whether the consultants and contractor on the Project have properly undertaken their responsibilities in accordance with the consultants' commissions and construction contract respectively.

1.1.4 We emphasise that this Report has been prepared solely for Darlington Borough Council and it is requested that the Council discusses the matters reviewed in this Report with EC Harris prior to it being disclosed to any other parties.

1.1.5 We understand that the intention of this report is to advise on whether there is any opportunity to reduce the final outturn cost of the scheme or recover any monies in excess of the budget originally allocated to the project by Darlington Borough Council in the event that it is apparent that additional costs have been incurred as a result of the default of the consultants or the contractor.

1.2 THE PARTIES

1.2.1 Employer: Development and Environment, Darlington Borough Council, Town Hall, Darlington DL1 5QT (hereinafter referred to as "the Council").

1.2.2 Landscape Architect, Lead Consultant, Urban Designer, ECC Project Manager, ECC Supervisor and Principal Designer: Gillespies, Minton Chambers, 12 Heatons Court, Leeds LS1 4LJ (hereinafter referred to as "Gillespies").

1.2.3 Contractor: Birse Civils Limited, 3 Grimston Grange, Sherburn Road, Tadcaster, North Yorkshire, LS24 9BX (hereinafter referred to as "Birse" or the "Contractor")

1.2.4 Structural and Drainage Engineer: Faber Maunsell, Royal House, 28 Sovereign Street, Leeds LS1 4BJ (acting as a sub-consultant to Gillespies)

1.2.5 Quantity Surveyor: Kinsler & Partners LLP, 214 Marton Road, Middlesbrough, TS4 2ET (acting as a sub-consultant to Gillespies)

1.2.6 Planning Supervisor: White Young Green, Progress House, Fudan Way, Teesdale, Stockton-on-Tees TS17 6EN.

1.2.7 Replacement ECC Project Manager: [redacted] of Clarus Consulting, Sunlight House, PO Box 85, Quay Street, Manchester, M60 3JA.

1.3 SUMMARY BACKGROUND OF THE PROJECT

1.3.1 Darlington is an important regional shopping and commercial centre in the north-east of England. In 2001, the Council formally adopted its Town Centre Development Strategy. In November 2002 its Town Centre Access Study recommended to the Council that an option to create a new "Pedestrian Heart" should be adopted in order to meet the aspirations of the Council in providing a step improvement in the quality, environment and economy of the town centre.

1.3.2 Briefing Documents were prepared for the appointment of an Urban Designer for the Pedestrian Heart Project in 2003 (the "Project") and after a selective tendering procedure an appointment was made of an Urban Designer was based upon an assessment that considered both a quality evaluation and a cost submission.

1.3.3 Following this submissions procedure, the Council awarded the commission of Urban Designer to Gillespies, a firm of landscape architects whose proposals included working with a team of other designers. Gillespies took the role of Lead Consultant.

1.3.4 We understand that although there was correspondence between the Council and Gillespies and that this continued until recently, no formal agreement between the Council and Gillespies has been executed in respect of the commission. We understand that the latest communication is a letter dated 17th May 2006 in which Gillespies listed a number of conditions that it was not prepared to accept.

1.3.5 We recommend that the Council take legal advice on whether there would be limitation in taking action against Gillespies if it considered that such action was appropriate, as a result of the lack of this formal agreement.

1.3.6 The Urban Designer team proposed by Gillespies incorporated their partners Faber Maunsell (Engineers), Kinsler & Partners (Quantity Surveyors) and Equation (Lighting Consultants). Gillespies retained the Lead Consultant role throughout the project.

1.3.7 Following a competitive tendering procedure that was managed by Gillespies under its role as Urban Designer and Lead Consultant, Birse Construction Limited were employed by Darlington Borough Council to construct the works. Birse commenced the construction works in September 2005 following a period of Early Contractor Involvement (ECI) between July 2005 and September 2005.

1.3.8 The works were due to be completed under Birse's planned programme in October 2006. The Contract Completion Date was 16th March 2007. Birse therefore planned to complete the 80 weeks' programme in 61 weeks.

1.3.9 In January 2006, Birse struck a 12" gas main in one of the proposed working areas and this gas main had to be diverted in order to complete the Project. The diversion of the gas main resulted in a delay to the Project of 16.8 weeks with associated increased costs.

1.3.10 Following concerns within the Council in respect of the apparent cost escalation of the scheme, the Council appointed Clarus Consulting, a management and cost consultancy firm, in June 2006 to undertake an interim report on the increased costs and delays that were apparent at that time.

1.3.11 After considering Clarus Consulting's findings, Darlington Borough Council replaced Gillespies as the Project Manager for the construction works and employed Clarus Consulting to complete this element of the works.

1.3.12 The Pedestrian Heart Scheme has now been completed in July 2007 and along with delays awarded to Birse totalling 42.6 weeks there are significant increases in the cost of the Project.

1.3.13 The latest cost information available to EC HARRIS indicates the following:

- Tender Price £5,369,532
- Current Price for the Work Done to Date (PWDD) £6,891,069
- Estimated Outturn * £7,317,575

* Based upon PWDD plus pending compensation events at June 2007, which could have increased at the date of this Report.

1.4 DOCUMENTS CONSIDERED

1.4.1 The information that was made available for this Report has been identified in Appendix I.

2 CONSULTANT'S BRIEF

2.1 GENERAL

2.1.1 Gillespies were appointed as Lead Consultant to the Project following a competitive fee bid dated 29th August 2003. The fee was £398,060.50 plus an allowance for expenses of £15,922.42, a total of £413,982.92. These fees are as described in Gillespies letter of 1 October 2003.

2.1.2 It was proposed that Gillespies should be appointed under the standard terms and conditions of The Landscape Institute "The Landscape Consultant's Appointment".

2.1.3 The Council's letter of 13th February 2006 entitled "Darlington Pedestrian Heart Fee and Expenses Update" indicates that there were additional works for Gillespies in the Early Contractor Involvement (ECI) process; some redesign and structural design for the Water Feature and Pump Room. These additional services resulted in an increase in fees to £447,939.14.

2.1.4 A memorandum of Agreement dated 17th August 2004 indicates that the Project would be divided into three phases as follows:

Phase 1	Ring Road Works
Phase 2	Core Pedestrian Heart (High Row, Prebend Row, West Row and Prospect Place and permanent enabling works on Northgate, Bondgate, Blackwell Gate)
Phase 3	All remaining works

2.1.5 Phase 2 and 3 arrangements in the Memorandum indicate that Gillespies would delegate powers so that Faber Maunsell (the Consulting Engineers) would be responsible for contract administration, site supervision and resident engineer.

2.1.6 Gillespies were clearly to take the lead in design with Faber Maunsell's and other consultant's input where appropriate. Kinsler would prepare tender documents and the Project phasing with input from Gillespies and Faber Maunsell. However, Gillespies would retain the responsibility for its sub-consultants under its appointment.

2.2 THE COUNCIL'S ROLE

2.2.1 The "Briefing Documents for the Appointment of an Urban Designer for the Public Realm Works in Darlington Town Centre" (the "Briefing Document") outlines the scope of works for the Urban Designer.

2.2.2 These works included a comprehensive list of responsibilities of the Urban Designer , listed in Section 6.2 of the Briefing Document. These included the responsibility to ascertain existence of all statutory service provisions and co-ordinate this information into the project design. It also included but was not limited to the management of traffic within the town centre, and phasing of the works.

2.2.3 It was anticipated that the Council would continue as a partner in all future consultations but that the Urban Designer would take a leading role.

2.2.4 At Section 6.3 of the Briefing Document, the Council's in-house service section provides that the Council would undertake and provide all necessary liaison services in support of the design partner and in project and in project management of procurement and execution of the design process.

2.2.5 These tasks included at 6.3.1 of the Briefing Document, the provision of records and assistance in ascertaining existence of all statutory service provisions, levels and drainage records. The Council would also assist with aspects that would have to be accommodated within the design such as liaison with the Council's public services provision and traffic and transport issues.

2.2.6 The Briefing Document at paragraph 6.5 also identified that the designer would have to consider a wide range of design aspects such as surface treatments, signage, provision for events, traffic management, street furniture and lighting.

2.2.7 Many of these responsibilities and design issues are the subject of later compensation events under the construction contract. In order to establish whether the lead consultant was responsible for any delays and/or additional costs to the Project it would be necessary for the Council to establish whether there was any reasons that could be attributed to either the Council or other third parties whose performance could have adversely affected the ability of the design team to finalise the design.

2.3 TIMING OF WORKS

2.3.1 At paragraph 4 of the Briefing Document the Council set out a timetable for the design and tender process. The appointment of the Urban Designer was to be completed by September 2003 and production of initial design proposals by January 2004.

2.3.2 Significantly, the Detailed Design was to be completed by the Spring/Summer of 2004 prior to the commencement of work on site in Autumn 2004. So, all the detailed design work was to be completed prior to starting work on site.

2.3.3 In fact, Gillespies were appointed following its tender for the commission dated 29th August 2003 and milestone and stage payments were set out in Gillespies letter of 1st October 2003.

2.3.4 Without any information available to EC Harris that would indicate the reasons for any delay to the detailed design, it appears that the construction of the Project commenced approximately one year later than as described in the Briefing Document.

2.3.5 There could be many reasons for this delay, including for example, extended consultation periods, the Early Contractor Involvement period, clarification of client or third party requirements or some delay to the design development into working drawings that may or may not have been due to a default of the designer.

2.3.6 EC Harris has not been able to determine any reasons for this delay. However, it seems that the designer had a much longer period to develop the design to working drawings stage than originally envisaged within the Briefing Document. This should have improved the quality of the tender documentation since there appears to have been more time available for preparation of the detailed design.

2.4 DESIGN RELATED COMPENSATION EVENTS

2.4.1 Since the tender and construction of the Project appears to have been later than planned (September 2005 rather than Autumn 2004), it would be reasonable for the designer to have prepared the detailed design to a more complete state in the additional time, provided that there were no delays that affected progression of the design that were outside Gillespies' control.

2.4.2 EC Harris cannot comment on whether the apparent delay to the tendering and the start of construction was in any way due to a default by Gillespies, since we have been unable to review any information in respect of design delays.

2.4.3 However, under the construction contract, Birse has issued many compensation events that refer to delays and disruption caused to Birse as a result of late or incomplete design information. Further compensation events have been raised for re-work as a result of design changes after construction was started.

2.4.4 There are substantial sums involved in these compensation events relating to time and costs incurred in awaiting design information. For example, compensation event quotation 056 is for the sum of £157,407.03 for additional staff required by Birse on the Project to deal with the drawing and design changes on the scheme.

2.4.5 This compensation event has been accepted by the Project Manager and therefore must stand under the Contract as properly awarded. It is not clear what scrutiny took place by the Project Manager to determine whether these additional costs were actually incurred. Designers are typically reluctant to award variations to a contract (compensation events in this Contract) when there is a possibility that the additional costs applied for are due to the designer's default. In this Contract, however, it appears that Gillespies and/or Clarus accept that the design information was late.

2.4.6 In order to establish any liability for the additional costs on Gillespies behalf, the Council would however, have to satisfy itself that Gillespies were able to control the issue of that information and that Gillespies were not prevented from issuing the correct information in due time as a result of events outside of its control. This may include actions and/or inaction by the Council or other independent third parties.

2.4.7 There are further compensation events currently pending for the Project Manager's agreement amounting to approximately £276,000 (See Section 6 below) that appear to relate to late design and late information for the site works. Further investigation would be required to establish the reasons for the late design and information as this could possibly be due to the Council's requirements or other factors outside Gillespies' control.

2.4.8 EC Harris has considered the information within the Requests for Further Information RFI schedule produced by Birse. Out of 106 requests for information (those with dates in the schedule), 47 were provided later than requested and 20 were provided on the date requested. This would suggest that there may have been difficulties for the Contractor in receiving information either late or just in time.

3 GAS MAIN DIVERSION

3.1 GENERAL

3.1.1 In any infrastructure project that requires excavation of roads and footpaths, existing services present a major factor in the design of the project. In town centre refurbishment, which unavoidably requires some alteration of levels of existing surface finishes; services have to be considered as an integral part of the design process.

3.1.2 Since the presence of services can directly affect the design and construction of new footpaths and road construction, the location of street furniture and in some cases the viability of the design at all; the investigation into services location and position is of paramount importance in preparation of the design. Later during construction, services locations can present a substantial health and safety hazard. Interference with electricity cables and gas mains may present an immediate high risk dangerous hazard to construction operatives, and interference with other services such as water and sewerage, whilst not necessarily presenting immediate danger to construction operatives, presents hazards such as delay and disruption to construction operations and other third parties, including members of the public.

3.1.3 EC Harris has been asked to consider the foreseeability of the gas main that caused the predominant disruption and delay to the Darlington Pedestrian Heart project.

3.1.4 Service plans are available from all the statutory undertakers. However, services plans are often limited in their accuracy and the various undertakers will include disclaimers on all plans issued in respect of the exact location and depth of services. Often no depths of services are included, simply because the information is not available to the undertakers themselves. If the service has not been subject to alteration or repair for a significant time and the information was never recorded or records not kept, then there is a risk that the information on the plans, which may be inadequate to properly locate a particular service, is inaccurate.

3.1.5 It is generally insufficient to rely upon assumed depths of services, since ground levels may have been altered several times since the installation of the particular service. In town centres, where services may have been installed more than a century ago, there is a reasonable chance that the depth of a service may have changed. In systems such as water or gas mains surface features such as valve and meter

chambers may indicate the line of the main but not necessarily the depth. These often small chambers may just be constructed near to the ground surface and not extend down the full depth to the pipe. It may not therefore be possible to establish the depth of the main and service depths by a non-intrusive inspection. Depths to mains are less likely to be recorded than for systems such as a sewerage system where the service can be inspected from manhole chambers and easily obtained with reasonable accuracy through level surveys.

3.1.6 Ideally, we understand that gas mains and water mains are constructed at preferred minimum depths of 1200mm and 900mm respectively. The construction depth of the new pavement construction at Darlington was up to 700mm (taken from Faber Maunsell's series 500 drawings), possibly with additional capping depths depending upon the bearing capacity of the formation. In a town centre as established as Darlington, where levels may have changed since the services were installed, in our opinion it was reasonably foreseeable that there was a risk that the new construction could have affected existing services. The information we have seen suggests that the design and construction team also knew this.

3.1.7 Comparing the depth of the replacement road and footpath construction and recognising that there could have been a previous reduction in surface level, it is apparent that there would have been a significant possibility that the new construction could impinge upon existing gas and water services. Therefore it is concluded that in our opinion it was reasonably foreseeable that it would be necessary to establish the location and depth of the gas main so that any requirements of the gas undertaker could be established and designed for the Project.

3.1.8 The statutory undertakers may require that if depths to services are reduced, then some additional protection is provided. For example, an undertaker may require a concrete protection slab over a main that is nearer to a trafficked road surface than prior to construction. Even if the levels were not changed, occasionally, more onerous recent standards are applied where alterations are made near to existing services and undertakers could require enhanced protection over that already existing. Also, new construction may initiate a requirement to protect services due to temporary loadings from construction traffic where there is a potential for overloading pipes.

3.1.9 It is therefore usually necessary to undertake site investigation to establish the depths of services, where these are identified as potentially critical to the new construction or

to establish that there is no such risk. Site investigation of services includes non-intrusive techniques such as CAT scans and surveys of surface features. Trial holes and trenches are required to determine depths of services where the information on depths is not available or depth information cannot be elicited from opening surface features.

3.1.10 Typically, statutory undertakers issue precautions to be taken when it is proposed that works will be undertaken near to their particular services. The requirements for excavating near gas mains, due to the dangerous consequences when such mains are damaged are onerous and are usually issued with services information. This is to both protect the assets and to ensure that health and safety information is available. It would be expected that designers of urban landscape schemes would be familiar with the risks of underground services.

3.1.11 Notwithstanding that EC Harris has no knowledge of the whole of the actual information received by Gillespies' team following their enquiries, typically information supplied by the gas undertaker[1] would include:

- that gas staff will visit the site to assist with location of plant and advise on precautions required
- a requirement that pipes must be located by hand digging before mechanical excavation and mechanical excavation must not be used within 0.5 m of a gas pipe but greater safety distances may be advised
- restrictions of construction plant crossing gas mains with additional protection if necessary
- restrictions on new services being laid near to or on the line of or across existing mains in respect of clearance, the position of new apparatus
- restrictions and/or requirements for backfilling near to gas pipes e.g. compaction and quality of fill requirements

3.1.12 It is usual that there are considerations that would have to be made whilst excavating near to a gas main, even if it was not expected to be within the construction depth.

[1] summary of relevant parts of British Gas (Northern) PLC publication "Precautions to be taken when carrying out work in the vicinity of underground gas pipes"

3.2 PREVIOUS INVESTIGATIONS

3.2.1 In the Council Report of 23rd March 2006, it is stated that on 31st January 2006, a *"12" cast iron gas main was hit by a mechanical excavator, pipe being unexpectedly part embedded in the concrete foundations of the road."*

3.2.2 The document "Council Report 23 March 2006" (marked Appendix 1) was prepared to investigate the circumstances to explain the "unexpectedly shallow gas main" that was found during the course of the Pedestrian Heart works.

3.2.3 Paragraph 2 indicates that Information was obtained during the planning period from all of the utility companies.

3.2.4 In Paragraph 3 there is the statement that plans provided by Transco showed the approximate location of the pipes and the depth at which they had been laid. The report indicates,

"the conclusion was reached that the vast majority of pipes and other underground services were not going to interfere with the proposed works within the town centre".

3.2.5 It is not clear whether there is any evidence to show that Gillespies considered the likely position of the gas main and no evidence was provided in this Council Report to demonstrate that a conscious decision was reached that the works would not affect the gas main. EC Harris has not found any other similar information.

3.2.6 Paragraph 4 refers to a decision that

"In order to verify the information supplied on the utility plans it was decided to also commission a survey, using radar, that is generally able to pinpoint both depth and location of major service pipes"

and that it

"would have been possible to dig a large number of trial pits and trenches ..it was considered this would be unnecessarily disruptive to traffic and that the ground radar would provide sufficient information [but was]……not guaranteed to be 100% accurate."

3.2.7 Whilst Paragraph 5 states that the

"..gas pipe was at about half the depth that had been indicated on the utility plans and the ground radar survey"

it is not clear whether there was any depth of the gas main indicated on the service drawings provided by the undertaker. The only drawing available to EC Harris makes no representation in respect of depth of the gas main. The results of the ground radar survey have not been made available, so these have not been reviewed.

3.2.8 From the information provided including all the reports on the gas main and its unexpected depth, we have been unable to find a statement that indicates what depth of the gas main was expected, why that depth was expected, nor the actual depth of the gas main, other than that it was shallower than expected. Without the factual information it is impossible to establish whether appropriate assumptions were made leading to the decision that the works would not affect the gas main. In any event, it seems that the depth of new construction was sufficient to bring the works sufficiently close to have required precautions to have been taken when excavating near to the line of the main.

3.2.9 The information that the gas main was situated within the existing road construction does suggest that the depth was shallow but not necessarily so shallow as to have been completely unforeseen. It is recommended that the facts relating to the range of depths that were expected and exactly the depth of the main be compared to assess whether it was as a fact, so shallow as to be unforeseen.

3.2.10 EC Harris has not been provided with all the statutory undertaker's information received for the gas main; only a limited plan is available within the Council's Gas Main Review Final Report. The survey drawings have not been made available either, so this review is necessarily limited to the extent that it relies upon information available for consideration.

3.3 DEPTH OF THE GAS MAIN

3.3.1 The information provided of the historical events surrounding the damage to the gas main does not include two key points; what the expected depth of the gas main was; and how the actual depth of the gas main differed from that expected depth.

3.3.2 The documents indicate that the gas main was unexpectedly shallow and that it was assumed that the works would not affect it. There are no site records included within these documents that establish that the gas main was in the road construction or the relative levels of the road; the sectional drawings appear to indicate that the general road levels were increased rather than reduced; the latter would indicate an immediate risk of reducing cover to services.

3.3.3 However, there are some areas where surface levels were reduced and it would be expected that more detailed consideration of the services might have been taken in these areas. On the section drawings seen, there appears to be no information in regard to service locations on the sections, which would have possibly identified the expected location and depths could have been relatively established. However, it is recognised that not all designers would have transferred service information onto contract drawings, partly due to the uncertain nature of the service locations. Nevertheless, it might be regarded as appropriate to do so.

3.3.4 EC Harris has however, been unable to locate any reference to the actual depth of the gas main other than that it was exceptionally or unexpectedly shallow compared to the depth anticipated.

3.3.5 This presents a difficulty in establishing whether the assumptions made on the depth of the main were reasonable. For example, the gas main may have been unexpectedly shallow at 1m depth, since if preferred depths of gas mains were 1.2m for example – it is not possible to ascertain whether the depth of the gas main was within a range that could have been reasonably expected. Indeed, often services are below the preferred depth and it would be expected that this was possible and that trial holes would have been taken to determine this fact.

3.4 SPECIFIED REQUIREMENTS UNDER THE CONTRACT

3.4.1 Where trial trenches and holes are necessary to confirm accuracy and information in respect of the design of a scheme, the location and depth of the holes would be a specified requirement that was quantified within the bills of quantities. If possible and if the information could be critical to the design, it would be usual to not only specify the location and depth of trial trenches and holes but also to provide a specified requirement in respect of the timing of this work. Trial holes and trenches are normally required at the earliest opportunity.

3.4.2 The Darlington Pedestrian Heart Bills of Quantities indicate the following

"*Information: Notes to Contractors*

It is essential that extreme care should be used in any excavations undertaken with regard to underground services. The Contractor shall ascertain for himself the position of all services by liaising with the relevant authorities prior to commencement of any excavation works"

3.4.3 This is a fairly standard contract requirement but in the absence of specific items for the location of services by trial holes and trenches in precise locations, this obligation would be effectively limited to those investigations appropriate for the contractor's own purposes i.e. for construction operations, prevention of damage (since the Contractor would be directly responsible for damage to services) and health and safety.

3.4.4 It would be probably insufficient if the designer was relying upon this item within each bill of quantities to ensure that services were located and that the services would not be affected by the design

3.4.5 The contractor would be expected to check services drawings and would be expected to comply with any precautions specified by the undertaker in respect of excavation near to their service locations for its own purposes. Since service drawings are known to be often inaccurate, then it would be prudent for a contractor to excavate by hand in the first instance where services might be located.

3.4.6 Whilst it appears initially that the above statement in the bills of quantities might transfer some liability to Birse in respect of the location of the services, it would not provide the designer with the detailed information required for design and nor would it relieve the designer of its responsibility to specify those investigations needed. In our opinion Gillespies should have specified the trial holes and trenches to provide the necessary design information and ensured that they were itemised and measured within the Bills of Quantities.

3.4.7 Birse has not priced the general requirement included as an item at the start of each Bill of Quantities in any of the Bills of Quantities. Neither is there any representation that the cost of ascertaining services was included elsewhere within the rates in the Bills.

3.4.8 Birse apparently allowed no monies in its price for locating services for its own purposes. EC Harris is not aware of any work undertaken by Birse to satisfy itself of service locations. We cannot establish from the information provided whether the gas main was on the line indicated on the service drawing. If it was, then it might be reasonable to assume that until it was established that the gas main was not within the proposed construction depth, then appropriate precautions would have been taken to ensure that it was not damaged. The information reviewed indicates that the gas main was damaged by mechanical means rather than during investigatory hand digging undertaken to locate the main's position. This appears to be outside the probable guidance that could have been available from the gas statutory undertaker.

3.4.9 Notwithstanding the items within the Bills of Quantities and the lack of rates for this work, it remained Gillespies responsibility to specify any trial holes and trenches required to provide information for the design.

3.4.10 It is apparent that no such trial holes or trenches were excavated in order to confirm services positions until much later in the project. The cost of the trial holes taken during the Project, including those for the gas main diversion is only in the region of £20,000 in total.

3.4.11 The obvious opportunity to undertake the trial holes and trenches was in the ECI period, when it was still possible to delay the start of the works at minimal cost. This would have allowed any reprogramming of the works prior to the start of the works; a reconsideration of the budget and if necessary, the workscope and if it was considered relevant, possibly a re-tendering procedure. It is regrettable that the opportunity was apparently missed, having planned the ECI period as an advantage to the scheme.

3.4.12 It is unfortunate that whilst the risks of the services' positions was clearly recognised, that the actual instruction to dig those trial holes was apparently not given in time, despite the risk register identifying that there was a risk of services being affected by the proposed construction works.

3.5 COSTS OF THE GAS MAIN DIVERSION

3.5.1 This Report has been commissioned partly to establish whether there may be any liability by the Consultants in respect of the additional costs incurred for the Project.

The presence of the gas main at its actual depth caused a substantial increase in costs of the scheme.

3.5.2 Work that is added to a Project during construction that requires any element of delay and/or disruption will not be procured for the minimum price. The overall costs claimed for delays are discussed at Section 4 in this Report but in summary, it seems that the delay costs included within compensation event quotations may be excessive.

3.5.3 The costs of the quotation for the delay due to the gas main diversion are £524,377.43 (Quotation 052) plus a further £12,000 for a delay/disruption claim from one of Birse's subcontractors (Change 131), as these costs not included within quotation 052.

3.5.4 In order to release funding for part of these additional costs, the Council reduced the workscope of the Project by omitting lighting from the workscope to release funding of £140,000. The remaining £640,000 had to be additional Council funding the Project

3.5.5 There are three categories to the additional costs arising directly from the severance of the gas main:

(i) Costs of repairing the immediate damage to the gas main

(ii) Costs of diverting the gas main

(iii) Costs of delay and/or disruption alleged by the contractor during the gas main diversion works.

3.5.6 Costs associated with (i) above should be the subject of an insurance claim by the Contractor and the Employer should not be concerned with these costs. It is not possible from the information provided to EC Harris to establish the value of this work. However, the Council should ensure through enquiries to Kinsler (via Gillespies) that it has not met any costs incurred in repairing the damaged gas main, whether or not Birse incurred any uninsured losses.

3.5.7 The Contractor's costs associated with (ii) above for diverting the gas main are included on Compensation Event Quotation No: 041 in the sum of £196,117.61 for the trench excavation and temporary reinstatement works. From Appendix 014 provided there is a cost estimate from Transco for the replacement of the actual gas

main in the sum of £22,105 inc VAT. This cost would have to be met by the Council in addition to the Birse costs.

3.5.8 In any event, these costs would have been properly expended to divert the gas main as part of the scheme design had the actual location of the gas main been determined at the detailed design stage. If the need for the gas main diversion had been identified at design stage, then the required work could have been included within the bills of quantities prepared for the tendering procedure.

3.5.9 Under the Contract, the Project Manager is likely to have agreed a higher price for these works under quotation 041 than the price would have been if Birse (or any other contractor) had priced for the work within its tender. Quotations for compensation events should be priced as either forecast costs in advance of the works or on Actual Cost after the works have been completed. The Contractor takes the risk of the forecast being incorrect but only to the extent that the forecast has incorrectly altered the Target Cost. With the pain/gain share mechanism in this Birse's Contract, this could only be 10% of the overspend.

3.5.10 The third category of costs relating to the gas main is for those allegedly incurred for the delay caused by the gas main diversion. These are costs that arise as a direct consequence from the requirement to divert the gas main in an unplanned sequence as either the result of the gas main being an unforeseeable location or due to the lack of site investigation information that could have identified the location in advance of the start of the Contract.

3.5.11 It is noted that the cost for the trial holes and trenches within this quotation amounts to a total of £8,437.60 (plus 7.5% fee) and the total monies spent on trial holes on the remainder of the Project is in the region of £10,000, making the entire expenditure on trial holes and trenches in the region of £20,000.

3.5.12 It is revealing that the expenditure of £20,000 at an appropriate time on the trial holes and trenches could possibly have saved a substantial proportion, and perhaps all, of the delay and disruption costs incurred as a result of the gas main diversion.

3.5.13 It might be concluded that the absence of the trial holes led to the substantially increased costs of the scheme but also deprived the Council of the opportunity to consider the costs of the diversion works within the available budget and trim any

other areas of the Project accordingly. Also, identification of the gas main diversion requirement at an earlier stage would have allowed for the timing of the diversion work to be included as a constraint upon the contractor's method of working within the tender documents. If this had been so, then under a competitive tender, the Council should have achieved the most advantageous price for this work.

3.6 MITIGATING FACTORS

3.6.1 We understand that providing Gillespies acted reasonably in its decision that the gas main would not affect the design, based upon the typical standard of other designers, then it is unlikely that there would be any lack of duty to the Council in carrying out the design.

3.6.2 EC Harris has considered the information within the document "File Ref: M3913.060330. Statutory Undertakers Note" (Appendix 2) which summarises the process undertaken by Gillespies and the rest of the Project team to establish the extent of services underground and the potential effect of those services on the design and works.

3.6.3 In summary these investigations included a topographical survey to ascertain ground levels and services survey to establish underground utility locations and depths. There appears to have been some discussion over the accuracy of the utilities survey.

3.6.4 The project team decided to proceed with appointing Aedas to undertake these surveys but the survey received did not include all of the information specified in the brief and Aedas undertook additional work.

3.6.5 Aedas did not guarantee that the depths of the services would be accurate due to the techniques employed. The depth of the 12" gas main was not shown on the survey. A radar stats survey was suggested but discounted due to the high cost involved.

3.6.6 It appears that it was decided that trial holes would be taken on site at a later date.

3.6.7 Gillespies state that it checked the design drawings carefully with the services information and adjusted the scheme wherever possible to minimise impact, particularly at features where foundations were required or where there were level changes.

3.6.8 Birse later commissioned 40Seven to carry out a detailed underground service survey.

3.6.9 C2 and C3 notices were issued to the statutory undertaker and plans were received, which included the standard disclaimers as to accuracy. Gillespies identified a number of minor diversions that were required but these did not include the 12" gas main.

3.6.10 To mitigate further problems it was decided to excavate trial holes wherever necessary to confirm the location and depths of services.

3.6.11 Gillespies state that "It has been recognised that many of the services are unusually shallow" and that the statutory undertakers information and Aedas survey were not accurate enough to properly plan and implement the works.

3.6.12 It is clear, however, that despite the decision to undertake trial holes and the inclusion of those trial holes on a risk register for the works, no trial holes were carried out to determine the position of the gas main.

3.6.13 EC Harris' review of other documents shows that there were decisions taken to dig trial holes and trenches. It seems that the design and construction team fully understood that attempting to establish depth of services was crucial. However, neither surveys nor any other investigation identified the depth of the 12" gas main that was too shallow or in a different location to the information on the services drawings and has had to be diverted.

3.6.14 If the trial holes had been carried out during the ECI period prior to commencement of the Contract, mitigating measures could have been taken even at that late stage, such as delaying the start of the Contract until the diversion was complete, or late incorporation of the work into the Contract by negotiation (if this were permitted under the Council's tendering procedures) or if necessary re-tendering the Contract. Appendix 15A (email 19 July 2005 from Birse to Gillespies) indicates that Birse were requesting "stats drawings for advanced trial hole works" although it seems that none were carried out in the ECI period.

3.6.15 The document (referred to in 3.6.2) also states that "What is unusual in this case is the number that has been found that are unusually close to the surface and the poor condition of the major gas main".

3.6.16 This statement is not supported by any evidence that the gas main was particularly shallow – it was damaged within the existing road construction but it is not clear what the depth actually was, or the depth that was expected.

3.6.17 As described above, the relative levels of the new road construction compared to gas main normal depth were not particularly disparate (perhaps up to 700mm plus capping potentially compared to 1200mm).

3.6.18 Furthermore, the gas undertaker did not consider the gas main to be in poor condition; in fact the gas company refused to contribute to the cost of the new main because it was unlikely to replace the main within the next 25 years. The basis for this was that the undertaker was currently replacing mains with a risk factor of 200 and this main had a risk factor of much less.

3.6.19 On discovery of the gas main in its actual location, it seems that Gillespies did go through a process to establish whether the design could be changed to accommodate the actual depth of the gas main (paragraph 21). Any changes were not because levels could not be accommodated without drainage alterations and there was conflict with the planters and water feature on High Row.

3.6.20 However, it is unlikely that the costs of diverting earlier when Birse was not on site would have been as high as those incurred to divert the main.

3.6.21 It remains that in order to construct this particular Project as designed, the gas main would have had to be diverted. However, an unexpected discovery and damage would be more expensive than a planned diversion.

3.6.22 The Council also missed the opportunity to alter the workscope to accommodate the additional costs of diverting the gas main or to have the scheme designed to avoid affecting the main at all.

3.7 OTHER POTENTIAL CLAIMS

3.7.1 It is our understanding that the general position would be that the party that causes damage to services is normally responsible for the damage to the service. Under the New Roads and Streetworks Act, we understand that where damage is caused to a

service, there is also a route to recovery from the Employer for the statutory undertaker. However, we do not believe that this would necessarily relieve the contractor that actually caused the damage of his liability to the statutory undertaker. We recommend that the Council confirms that this is the general legal position.

3.7.2 This risk is not one included in the Employer's risks in Clause 80.1 of Birse's Contract.

3.7.3 Any damage to services would normally be an insurable event under the Contractor's All Risks policy of insurance required under Clause 84.2 of the Birse's Contract and the Contractor would be expected to recover from its insurance company for the costs of the damage. The fact that the Contractor may have to meet a substantial excess on the policy is not a factor that should concern the Employer, if this was the case. The Employer should expect that the Contractor would claim on the insurance policy for the damage to the gas main and any losses arising from directly from it. It is our understanding that the Employer should not have met the cost of damage to the gas main and it is recommended that the records of Actual Cost are scrutinised to ensure that any costs associated with the immediate repair of the severed gas main charged by the undertaker are not included within Actual Cost.

3.7.4 An insurance claim for the damage to the gas main would not include the costs of diversion of the main that was necessary as a result of the discovery that the main was not as deep as expected or that the gas main was to be affected by the designed works.

4 CONTRACT ADMINISTRATION

4.1 THE NEC ENGINEERING AND CONSTRUCTION CONTRACT

4.1.1 The NEC suite of contracts was designed as a "stimulus to good management". Its success is dependent upon the parties to the contact and those with authorities and duties under the Contract to pro-actively manage the Contract, using collaborative foresight to identify potential difficulties in advance. These can then be dealt with in a managed way in order that the excessive costs and time that will inevitably arise from the occurrence of unexpected events are minimised. The intended result is that the opportunity to achieve a profit is enhanced for the Contractor and other supply chain members and the Employer has reduced risks of cost and time overruns.

4.1.2 This pro-active management system that underpins the NEC contracts is fundamentally different to many of the standard form contracts. Most standard form contracts rely on a system in which the time and cost effects are calculated after the event and the cost element is often based upon tendered rates and prices.

4.1.3 The NEC contract procedural requirements require that changes to the Works Information (which incorporates the workscope, specifications and any associated Contract requirements) result in "compensation events", and that where possible, the time and cost effects of compensation events can be agreed in advance. Essentially, each quotation given in advance for a compensation event becomes fixed in both time and cost. This affords the Employer and the Contractor certainty prior to the work being undertaken.

4.1.4 Where it is not possible to agree the time and cost effects in advance of the Contractor undertaking the works, the effect on the cost is based upon Actual Cost (under the NEC ECC 2nd Edition this term is slightly misleading, since Actual Cost is made up of a defined Schedule of Cost Components) and any effect on the Completion Date is established from records and by adjusting the accepted programme with the as-built details.

4.1.5 The advance agreement of cost and time effects for a proposed compensation event does however, present an element of risk to the Contractor, since in theory there is no recourse to the Employer if the quotation for the compensation event should be insufficient to complete the work. Consequently, it is commercially advantageous to

submit compensation event quotations that are not final, even though this is outside the requirements of the Contract.

4.1.6 This is particularly so with the effect on the Completion Date for a compensation event, since the time effect is often more difficult to predict and calculate than the direct costs and requires a revision of the programme. Hence, in order to preserve its position, a Contractor can qualifyits quotation to direct costs only benefits in that it reserves the opportunity to re-visit the compensation event in respect to time and with an alteration to the time effect, an adjustment of costs may follow.

4.1.7 Birse has adopted this method of pricing quotations for compensation events. Each compensation event quotation, with the exception of those specific compensation events entirely concerning delays, has been qualified in the following manner:

"*Please note that this compensation event quotation does not include for any time effect and (if any) time risk to our planned Completion unless expressly stated otherwise in this quotation.*"

4.1.8 This practice is not unique to Birse, since in EC Harris' experience this is a common method employed by Contractors. Nevertheless, it does not comply with the Contract conditions. The Contract provides that the Project Manager can make his own assessment of compensation events in there is a default of the Contractor under Clause 64.1

4.1.9 It appears that neither Project Manager has taken this option (to assess the effects of the compensation event themselves) in respect of compensation event quotations that have been qualified. Whilst this will not necessarily give rise to a deficiency in the overall administration of the Contract, it does mean that the valuation of compensation events has not been fully closed in many instances. It therefore remains an opportunity for the Contractor to re-visit these compensation events in future. This would exclude those Changes that are listed as being included on the delay only compensation events (005; 004A; 052; 055; 072; 073; 074 and 082) as being considered within these specific delay events.

4.1.10 The practice of including a number of changes within one compensation event for delays prevents or obscures the Project Manager from properly interpreting the effect of any one compensation event. It would also arguably allow the Contractor to

obscure the effects of any Contractor culpable delays for which it would not be entitled to a change to the Completion Date.

4.2 THE DARLINGTON PEDESTRIAN HEART CONTRACT

4.2.1 The contract between the Council and Birse is the NEC Engineering and Construction Contract 2nd Edition (the Contract) Main Option D (Target Cost with Bills of Quantities) with Secondary Options G (performance bond), P (retention) and R (delay damages).

4.2.2 The Contract has several main options and depending upon which the contract strategy the Employer adopts, a main option is selected which governs the type of payment method that is to be used; Option D is the Target Cost with Bills of Quantities option. This Target Cost contract bases the Target Cost on a priced Bill of Quantities tendered by the Contractor but payments are made on Actual Cost. Once the difference between the final Actual Cost and the Target Cost is determined, the difference is shared on a pain/gain mechanism that is described in the Contract Data Part one by the Employer.

4.2.3 Under the Contract, the Target Cost is based upon a workscope described in the Works Information. Any alterations to the Works Information or the occurrence of an Employer's risk event are known as "compensation events". Such events are listed in Clause 60.1 and the procedural requirements, evaluation and implementation of compensation events in terms of both time and cost are dealt with under Clauses 61 to 65.

4.2.4 The Bills of Quantities are effectively limited to the tendering procedure and for use in calculating the costs of changes to the Works Information. However, the rates incorporated within the Bills of Quantities do not apply to changes to the Works Information, since compensation events are priced on Actual Cost.

4.2.5 In this contract, the pain/gain share mechanism was split with the Employer taking 90% of the pain or gain share and the Contractor the remaining 10%. This means that if the final Actual Cost was less than the Target Cost, the Employer would have taken 90% of the difference but would have taken 90% of any overspend if the final Prices (based on Actual Cost) been greater than the Target Cost.

4.2.6 We understand that the reasoning behind this particular selection of percentages was that the Council could substantially benefit from any savings made; and it was planned that any such savings could be directed back into the scheme for additional enhancements. If the Contract was predicted to overspend, then it was planned that the project scope of works would be reduced, so that the Council would not have to meet any additional costs.

4.2.7 Whilst it is recognised that this general principle could work in theory, in practice for any compensation event that increased the Target Cost under the Contract, in order to maintain the overall Contract value, there would have to be a corresponding reduction in workscope (which may in itself cause a slight increase in cost). The use of the pain/gain mechanism does not necessarily assist with reduction in overspending and in this Contract the percentage distribution ensures that the Contractor is taking only a minor risk in overspending the Target Cost.

4.2.8 In Section 7 below the current Contractor's account would indicate that the Project is overspent compared to the Target Cost, so the Council will have to meet 90% of that overspend.

4.2.9 The Target Cost is adjusted to account for any increased costs as a result of compensation events issued under the Contract. Therefore, whilst the Council was expecting some element of control over any expenditure over the project budget by deleting works if an overspend was anticipated, the control would have to be by altering the workscope by the issue of further compensation events reducing the scope of work.

4.2.10 Under the Contract clause 63.3, no compensation event can reduce the time for Completion. So, if a compensation event was issued that increased the workscope and resulted in the award of an extension to the Contract period and a delay to the Completion Date, it would not be possible by reducing workscope to reduce the Contract Period.

4.2.11 The only means of reducing the Time for Completion is to enter into an acceleration agreement under clause 36. So, the issue of a compensation event that extends the time for Completion incurs prolongation costs and the delay to the Project unless the Contractor is willing to enter into an acceleration agreement, for which the Employer would usually pay an enhanced rate. It was therefore desirable under the particular

conditions and pain/gain share arrangements that the Project did not suffer from delays at the expense of workscope.

4.2.12 It is concluded that whilst there were reasons for the particular pain/gain share arrangements, the chosen arrangement did not really reflect the Council's requirements and exposes the Council to any costs overspend to a far greater extent than the Contractor. However, there is correspondence that suggests that the Council was consulted on this percentage arrangement and in principle agreed it. Whether the implications of it were fully understood is a different matter.

4.2.13 A more appropriate arrangement might have been to consider the Contractor's pain share to have been much higher, or as much as 100% over a specified limit above the Target Cost. However, there is some evidence that the actual percentages were discussed with the Council prior to their inclusion in the Contract.

4.2.14 From Clarus Consulting's Report on the Project, it appears that the design team may have had limited experience in this type of Contract. It is not clear which party suggested its use. For example, the Contract data part one includes the amendment that the Employer's Quantity Surveyor will be Kinsler & Partners. This amendment has no effect on the Contract whatsoever, since corresponding responsibilities and authority have not been established (or perhaps even delegated under the Contract).

4.2.15 The Contract Data part one also includes contractual possession dates, which could have been used to provide constraints to Birse's sequence of working.

4.3 COMPENSATION EVENTS

4.3.1 Under the Contract, changes to the Works Information are compensation events. These events can give rise to a change to the Prices and a change to the Completion Date.

4.3.2 Compensation events are to be priced on the Schedule of Cost Components (SCC). The SCC is made up of various cost heads and the elements payable under each head of cost is described in the SCC. These include but are not limited to People, Equipment, Plant, Materials, Charges, with the addition of percentage additions for the Contractor's Fee (which includes items such as part-time management staff and head office overheads) and Working Area Overheads.

4.3.3 In respect of People, this is a standard list of items that may be included within the cost. In the evaluation of cost components under this Contract, standard rates have been used to determine the additional costs of People. We have not seen any evidence as to the development and build-up of the rates charged and that these rates do represent the Actual Cost of the people that are charged.

4.3.4 If the rates for People exceed the Actual Cost of People and have been accepted, the Contractor would benefit further because the Working Area Overheads is based upon a percentage of the People Cost. This would have the effect of disproportionately increasing the Target Cost and therefore the likelihood of the Contractor making a gain share.

4.3.5 The SCC also requires that payments for Equipment be charged at specified actual hire rates, where plant is hired. It is not clear that the rates included within Birse's compensation events are actual hire rates supported by invoices, although they could have been audited by Kinsler and/or the Project Manager.

4.3.6 Under Clause 63.11 by agreement between the Project Manager and the Contractor, the Shorter SCC may be used. The Shorter SCC provides a different mechanism for the evaluation of Equipment, since it relies on the use of a standard List of Equipment, described in the Contract Data part two. In this Contract, the standard list is the Civil Engineering Contractors Association Schedules of Daywork Carried Out Incidental to Contract Work (the CECA Daywork Rates) for Equipment Costs. In its tender, Birse tendered for the use of these rates less 25%.

4.3.7 The CECA daywork rates are often high compared to actual hire rates even with a deduction because the rates include elements of overheads. The use of the Shorter SCC in the evaluation of compensation events could therefore and is likely to have increased the Target Cost by a higher figure than was necessary, (since it is unlikely that Birse would prefer to use the CECA rates if using those rates would not recover the actual hire charges of Equipment used).

4.3.8 The evaluation of compensation events seems to have been carried out using the Shorter SCC, which means that at least a proportion of the Equipment element of the compensation events evaluation is based upon rates rather than Actual Cost.

4.3.9 This makes it impossible to establish whether the price for the compensation event is the Actual Cost in retrospective compensation event evaluation.

4.3.10 In EC Harris' experience, other employers often make alterations to the Schedule of Cost Components so that Actual Cost as defined under the Contract is the actual costs incurred on items such as preliminaries but this is by no means a standard practice.

4.3.11 If there was an overspend to the Target Cost, then Birse would only take 10% of the burden of the additional cost, with the Council taking the burden of 90% of the overspend.

4.3.12 If the Target Cost is increased by the value of a compensation event that is based on rates, the value of which is higher than Actual Cost, then the Target Cost is increased at a higher rate than it should have been increased. When Actual Cost is then compared to Target Cost, the Contractor would effectively gain 10% of the difference between Actual Cost and the compensation event quotation without saving any monies.

4.3.13 It would require a significant amount of work at this stage to establish whether the Actual Cost of any compensation event has been accepted at a higher cost using set rates rather than Actual Cost.

4.3.14 Since the acceptance of a compensation event quotation is supposed to be final, then in any event, the Council would have limited opportunity to ensure with future compensation events those are based upon Actual Cost.

4.3.15 Since the pain/gain share is 90% for the Council, then where the Price for the Work Done to Date is less than the Target Cost, the Council should take the benefit of 90% of the saving. Of course, the Council also meets 90% of any overspend, so we recommend that the Council should satisfy itself that Kinsler has properly established the Price for the Work Done to Date.

4.3.16 Further consideration of compensation events is included in an overall review in Section 6.

4.4 BILLS OF QUANTITIES

4.4.1 Under the NEC form of Contract Option D, the Contractor prices the bills of quantities prepared for the scheme mainly for tendering purposes but the bills are of limited use when determining the changes in the Prices for compensation events.

4.4.2 The method of measurement used, SMM7, the building works method of measurement would not normally be considered appropriate for the type of work involved as CESMM3, the civil engineering would be more suitable for the type of work measured.

4.4.3 Although unusual, due to the limited use of the bills of quantities, this is unlikely to have made a significant difference to any aspect of the measurement and valuation of the works.

4.5 OTHER

4.5.1 As previously stated, we understand that the strategy behind controlling the Project budget was based on the assumption that in the event of an identified potential overspend, then the Council would be able to reduce the scope of the works so that the Project was kept within approved budget limits.

4.5.2 Under Option D, Clause 60.4 a difference between the final quantity of works from and a quantity for an item stated in the bill of quantities at the Contract Date is a compensation event if the difference caused the Actual Cost of the unit price to change or the rate multiplied by the final total quantity of work done is more than 0.1% of the total of the Prices at the Contract date.

4.5.3 It is likely that most of the work in a specific area would fall into the latter category, so there may effectively be a charge for deleting work out of the Project. EC Harris has not seen any compensation events for this element but there is no reason why Birse could not raise further compensation events.

5 DELAYS AND DISRUPTION

5.1 GENERAL

5.1.1 The question of how delay is addressed under the Contract is dealt with under the NEC compensation event clauses 60 to 65. Any change to the Completion Date arising as a result of a compensation event is supposed to be included within each compensation event quotation under Clause 62. An assessment of each is to be included within each compensation event. This is mechanism under the Contract to enable the Date for Completion to be adjusted in the event of critical delay as a result of compensation events. The compensation event procedure is written into the Contract to protect the Employer's right to deduct delay damages in the event that the Contractor does not achieve Completion by the revised Completion Date.

5.1.2 The occurrence of a compensation event that causes delay does not automatically give rise to a corresponding delay to the Completion Date. A number of questions must be considered to determine what, if any extension of time, for example:

- Is the event in actual fact a compensation event under the contract?
- Is there evidence that the compensation event actually caused a delay to certain or any part of the Works?
- If so, was the extent of the actual delay due solely to the compensation event or is there evidence that the Contractor was contributing to the delay or failing to use best endeavours to mitigate the delay?
- If the delay is solely due to the compensation event, did the delay affect activities that were on the critical path (and so impact the end date)?
- If so, was there concurrent delay to other activities that was the Contractor's responsibility? (This latter point does not necessarily mean that no extension of time is awarded, but it may affect the Contractor's Actual Cost).

5.1.3 Quotations prepared in advance of the work carried out under the compensation event are Forecast Actual Cost and change to the Completion Date. After the event, the Contract requires that these are established on what actually happened.

5.1.4 Clause 63.3 provides that

"A delay to the Completion Date is assessed as the length of time that, due to the compensation event, planned Completion is later than planned Completion as shown on the Accepted Programme."

5.1.5 The programmes inspected by EC Harris do not comply with the full requirements of Clause 31.2.of the Contract. Whilst this is not unusual in our experience, since few contractors, if any, comply with the fairly onerous requirements of Clause 31.2; it remains a Contract obligation.

5.1.6 Clause 62.2 requires that the Contractor submits a revised programme in its quotation showing any effects of the compensation event on the programme with its quotations for compensation events.

5.1.7 Under Clause 64.2, in the absence of a revised programme for acceptance as required by the Contract requires the Project Manager to assess a compensation event using his own assessment for the remaining work.

5.1.8 It appears that Birse did not comply with the requirements for submitting revised programmes with compensation events; rather it submitted a total of 12 revisions up to 22 November 2006, each revision combining the effects of several changes in one programme.

5.1.9 The programmes have been submitted in hard copy, so it is difficult to scrutinise any changes by assessment of internal logic within the programme. It appears that these programmes, along with the delays to the Completion Date have all been accepted. EC Harris has not investigated whether there was any independent delay analysis or how any assessment of the delay to ensure that critical delays were caused by the compensation events to the extent claimed.

5.2 EVALUATION OF THE ACTUAL COST OF DELAY

5.2.1 Compensation events have to be evaluated on the basis of Actual Costs incurred rather than using rates and prices in the Bills of Quantities. This avoids any disputes that could arise over the applicability of the rates, for example whether the work within the compensation event is similar in respect of location, quantity or complexity.

5.2.2 Actual Cost arising from prolongation of parts of the Works due to compensation events requires proper consideration in respect of its correct valuation.

5.2.3 Essentially, under each of the delay compensation events, it appears that Birse has claimed for his entire management, staff, labour and plant costs with the application of the Working Area Overheads percentage on the People costs. This is more of a disruption claim than a delay claim. Prolongation costs are normally limited to the extension of time-related preliminaries plus additional costs due to time-related general attendance of labour and plant where appropriate. Additional disruption costs may be incurred.

5.2.4 Traditionally, disruption claims are difficult to prove. This is because in order to establish the true effect of delay and disruption to the works, the Contractor's records would have to be sufficient to make proper calculations of the loss in productivity that it is claiming. Here, it seems that Birse is claiming effectively that it lost the entire site resources production for the whole of the delay period claimed.

5.2.5 It is vital to ensure that there is no duplication between the evaluated delay and disruption costs and the original compensation events.

5.2.6 For example, on damaging the gas main, we understand that Birse did redeploy its labour and resources around the site to other work areas, so even if the overall Completion Date would be properly extended, the associated Actual Cost related to that delay could not be the entire site cost, if that is what is claimed, since Birse was working productively elsewhere.

5.2.7 Also, since the actual damage to the gas main is likely to be Birse's responsibility rather than the Council's responsibility under the Contract, there was probably some delay and disruption arising as an immediate consequence of that damage and its repair. This would be separate from the delays caused as a result of the need to divert the main.

5.2.8 Where a contractor considers that he has suffered disruption or lost productivity as a result of a change to a contract, the contractor would normally be expected to prove that it had suffered the losses claimed. This usually involves some comparison between the planned and actual productivity achieved on the site to demonstrate that there were in fact losses.

5.2.9 It is appreciated that in the event that a Contractor is unable to work in its planned sequence the redistribution of its resources to other workfaces and/or more workfaces

could lead to an element of lost productivity. However, whilst this lost productivity may occur, the demonstration of that lost productivity is what must be required in the evaluation of Actual Cost.

5.2.10 Birse has apparently made no attempt to demonstrate that there was an Actual Cost in under-utilised or unutilised resources throughout the period of delay. Indeed, it rather appears that Birse properly attempted to mitigate its costs by opening up alternative workfaces whilst the delaying events took place e.g. whilst the diversion of the gas main took place. If Birse did redistribute its labour and the labour was productive, Birse has been paid under the measured work for its resources time.

5.2.11 It is not clear if and how it has been established that the costs of the whole of the site resources were effectively idle throughout the entire delay period but in order to establish Actual Cost for the delay and/or disruption, Birse might be expected to provide:

- comprehensive records for the actual cost during the period of delay;
- costs demonstrated must be reasonably incurred and not due to Contractor culpable issues;
- subcontractors affected also need to provide the same records to demonstrate any costs they have incurred.

5.2.12 It would be expected that to demonstrate delay and disruption to activities it would require the following:

- Identify and evidence each valid cause
- Identify the part of work affected
- Identify the manner in which the work was affected
- Set out any consequential effect on succeeding trades
- Set out any effect on allied trades in the vicinity
- Demonstrate inability to divert labour/plant to other parts of site or even to other contracts
- Demonstrate any other efforts made to mitigate the delay on disruption
- Identify additional labour/plant hours
- Length of delay to section and overall
- Identify relevant contract clauses relied upon
- Demonstrate production achieved on affected operations when disrupted and compare with period when no disruption

- Set out records relied upon in each case

All the above should be supported with evidence from the following sources:

- Site diaries
- Labour and plant allocation records
- Other hard backed site notebooks
- Within the above records the Contractor needs to identify resources used (including Subcontractors) in each location and on which operation together with reference to specific delaying events
- Dated photographs
- Signed record sheets/daywork sheets
- As built drawings
- Measurement records
- Information Required Schedules and RFI's
- Written instructions/variations
- Correspondence & Minutes of meetings
- Recording of progress against programme (supported by above site records)

5.2.13 It is also necessary for the contractor to prove that in suffering the alleged lost productivity that it was entirely due to the employer's default. Normally an evaluation of disruption would be expected to take account for inefficiency by the contractor and an appropriate abatement made against the amount claimed.

5.2.14 In the original assessment of the compensation event the costs of each event are calculated using the SCC or the shorter SCC.

5.2.15 In the method of evaluating compensation events under the SCC or shorter SCC, preliminaries and/or site overheads are calculated by the addition of the Working Area Overheads percentage, in this case the percentage is 27.5%.

5.2.16 This means that for each compensation event, there is an element of thickening for the site establishment and additional costs that may have been incurred as a result of the work under the compensation event. It is not necessary under this method of evaluation for this to have been an actual loss or expense, since this part of the SCC is

not related to actual costs spent but to the cost of People. This is dissimilar to other standard forms of contract, where additional loss and expense on costs for time-related preliminaries and general attendance must be proved.

5.2.17 Therefore, the price for a compensation event is not necessarily the actual costs incurred but the Actual Cost as determined under the Contract.

5.2.18 Since Birse seems to have claimed for its entire cost of its resources for the entire period of delay, it is possible that unless there are contemporaneous records to prove that during the periods of delay claimed, the Contractor was unable to undertake any other work on the site, the calculation of delay costs may be flawed.

5.2.19 Even if it were true that during these periods of delay, the Contractor was unable to undertake any other work, it does not appear to have undertaken its general duty to mitigate its costs by redeployment on other work areas on this site or on other projects.

5.2.20 The premise that the Actual Cost of the entire site resources were idle over the entire period of delay (as it seems is claimed), representing some 42.6 weeks of lost productivity for the entire site resources does appear to be probably incorrect.

5.2.21 We therefore recommend that the Council undertakes further investigations into the relevant quotations for compensation events for delay and requests that the Project Manager considers carefully the Actual Costs claimed for any delay compensation events that remain outstanding.

5.2.22 It is not clear under the Contract, since the Contract does not allow for a method of evaluation of delay that is separate from the Actual Costs of a compensation event, how just the costs of prolongation to the Completion Date would be evaluated. The Contractor could provide records of actual cost (as opposed to Actual Cost) but it would be difficult to establish just the additional costs of delay and that a proportion of those costs were not included within the original evaluation of the compensation event.

5.2.23 The practice, which is not in accordance with the Contract, of amalgamating the delay analysis of several changes in one revised programme will inevitably obscure the individual time effects of a single change. It also would make it more difficult to

extract any delay due to contractor culpability. The individual effects of each compensation event are what should have been required from the Contractor in order to prove the alteration to the Completion Date.

5.2.24 We recommend that the Council establishes with the Project Managers that the delay costs have been properly evaluated.

5.2.25 However, delay costs are included on compensation event quotations that alter the Target Cost. When the pain/gain share mechanism is calculated, these costs fall into the calculation and if the Contractor has incurred costs above the Target Cost, the Council would still meet 90% of the overspend. If less than Target Cost, the Council will gain 90% of the saving but would still have paid 100% of the cost of the compensation event. What the Council retains, however, is the benefit of delay damages, if the whole delay is not accepted.

5.2.26 It is assumed that since there are compensation events pending acceptance that the Council may be presented with further delay analyses that will seek to extend the theoretical Completion Date even further.

6 PROGRAMME ANALYSIS

6.1 GENERAL

6.1.1 EC Harris has undertaken a programme analysis as part of its technical review to critically assess whether the delays claimed and accepted by the Project Manager under the Contract have been properly calculated. This was considered important due to the high costs associated with delays that have contributed significantly to the overspend on the Project.

6.1.2 We have examined each programme revision with the intention of ascertaining whether the extensions of time awarded were based on reasonable and realistic decisions. We have been provided with contemporary project information that we believe has been in the available to all parties throughout the duration of the Contract.

6.1.3 The question to be answered is essentially; "what extension to the Completion Date should have been awarded to Birse as a result of compensation events to the intended sequence of its work?" For clarity of the analysis conducted, this issue will be sub-divided into an examination against each programme revision, since this should reveal the progression of delays awarded throughout the Contract.

6.1.4 Programmes are divided into activities, which are each a part of the workscope under the Contract. The Contractor determines the detailed activities and how the actual work is divided within activities.

6.1.5 The effect on the programme activities of a compensation event is, under the Contract to be evaluated within each compensation event, so that the effect of individual compensation events can be discretely identified.

6.1.6 There is only a change to the Completion Date if the critical path is affected by a compensation event. The critical path is a logical sequence of activities that are interlinked to the extent that the overall Project duration is determined by the sum of the durations of the activities on the critical path. There may be more than one path of activities through the project sequence that each may become the critical path depending upon events during the project (either contractor or employer culpable events or events arising that are outside the control of either party), so the critical path can move amongst activities within the duration of a project.

6.1.7 The effect on the Completion Date is determined by a critical path analysis that deduces whether events affect activities on the critical path (critical activities). There are different methods in assessing the changes to the Completion Date, depending upon the information available and the point in time at which the assessment is made.

6.1.8 Completion under the Contract is reached when the *Contractor* has

- done all the work which the Works Information states he is to do by the Completion Date and
- corrected notified Defects which would have prevented the Employer from using the *works*.

6.1.9 The Contract provides that a contractor must pay delay damages if it does not reach Completion by the Completion Date. Delay damages are the optional clause R1 in the Contract. The Contractor pays delay damages at the rate stated in the Contract Data from the Completion Date until the earlier of Completion or the date on which the *Employer* takes over the *works*. A change to the Completion Date therefore relieves the contractor of the liability to pay delay damages in the event of an overrun.

6.1.10 Assessment of delay under the Contract is within Clause 63.3:

"A delay to the Completion Date is assessed as the length of time that, due to the compensation event, planned Completion is later than planned Completion as shown on the Accepted Programme".

6.1.11 The general intention of the Contract is that if possible, the cost and time effects of a compensation event are agreed prior to the work being undertaken. Where cost has been already incurred, it is reimbursed at its actual cost; the remainder is forecast. The same principle applies to time effects; where work is completed, the Contractor should be able to confirm the time effects by applying the as-built information to the programme; the effects of future work can be forecast.

6.2 INVESTIGATION OF THE FACTS

6.2.1 Birse has been awarded a total of 42.6 weeks extension of time to its Planned Completion date and 40.6 weeks to its Latest Completion date as a result of delays to the critical sequences of its work. This has been expressed through a series of programme updates presented to the Project Manager.

6.2.2 The programmes have been updated regularly but apparently not in accordance with the Contract, since if a compensation event was predicted to change the Completion Date, a revised programme should have been provided to the Project Manager with the compensation event quotation.

6.2.3 There are twelve (12) programme revisions. Each has been presented in 'hard copy' format and includes for all outstanding work in addition to the changes relied upon in each period.

6.2.4 The programme analysis investigations have relied upon the documents listed within Appendix 1 under the heading "Programming Information".

6.2.5 EC Harris believes that the original Contract Programme, which we have used as a 'baseline' for our analysis is Birse's Tender Programme as submitted with Birse's tender of 16th June 2005.

6.2.6 It would be preferable to use this baseline programme and impact onto it, the changes and compensation events issued on the Project in order to assess their effect on the Project critical path. However, there were very significant changes to the original construction strategy and subsequent programme amendments due, we believe, to the requirement to divert the gas main, that the baseline programme is only suitable analyse early changes to the works.

6.2.7 We have assumed that since the compensation events have been accepted under the Contract, then there was a valid entitlement to the compensation event. The acceptance of a compensation event by the Project Manager finalises it under the Contract.

6.2.8 EC Harris has not been able to scrutinise whether each activity is a valid activity and because the programme has been issued in hard copy only, it is not possible to establish whether inter-relationships between activities are correct. In response, we have assumed that since the programme has been submitted to the Project Managers under the Contract, that the activities and their inter-relationships would have been assessed as realistic at the time of each revision. We have seen no evidence that the programmes were challenged.

6.2.9 The revised programmes do not include any measurement of progress for the activities and in some revisions, earlier activities have been deleted. No progress is reported on the programme against activities in any revision, so it has been assumed that if an activity has been deleted within a later programme revision, then it was either deleted as a result of a compensation event or completed.

6.3 PROGRAMME ANALYSIS

6.3.1 Our examination and analysis of the project programme and subsequent programme revisions has been undertaken to assess the impact of compensation events on the Project Completion Date and to consider any effect each has had on the regular and intended sequence of work. There are principally two possible effects on the programme for each compensation event; a delay to the planned Completion Date and/or the disruption of the intended sequence of events.

6.3.2 In accordance with the Contract principles, assessments of delay after work has been completed should be carried out retrospectively. Where the time effects are being calculated in advance, the effects can be forecast. It is not clear that Birse has undertaken its programme analysis on this principle; it seems that the programme analysis has been carried out after the events considered but on a forecast basis. It is however, difficult to confirm this and further investigations may be necessary to establish the actual method used.

6.3.3 In order to make a retrospective assessment of effects on the programme it is usual to have a contract programme which demonstrates the original assumptions and activity interdependencies, periodic updates of the contract programme that show actual work completed for each progress period, together with supporting contemporary data such as minutes of meetings, correspondence and drawing issue schedules. The availability of such data makes it possible to make a factual assessment of the effects of each compensation event on the programme and to subsequently comment on the reasonableness of each effect against the known circumstances at that time.

6.3.4 However, the Birse programme updates fail to provide a sufficient view of contemporary progress and furthermore have, at times, been amended significantly such that a reasonable view of causation, from one progress period to the next, cannot be factually established.

6.3.5 This means that EC Harris has been unable to assess the programmes in a retrospective manner and in order to develop a view of compensation events and associated causation, it has been necessary to adopt a more theoretical form of programme analysis, known commonly as an 'as-planned impact' analysis. This is the appropriate analysis that should have been used in order to forecast the time effect of compensation events in advance.

6.3.6 The methodology used for this assessment of extensions of time is in accordance with the Society of Construction Law's Delay and Disruption Protocol, October 2002 ('the Protocol'). The Protocol document is one widely used within the construction industry and has been developed to provide guidance in conducting delay analysis dependent upon the level of factual information available. The Protocol is not a contract document and is not a statement of law.

6.3.7 The 'as-planned impacted' analysis uses as its basis, the Contract programme and seeks to incorporate each cause of delay into the activity network at an appropriate point in time. The pre-requisites for this method are a baseline critical path programme that shows the contractor's planned sequence of working along with a schedule of delay events. Unfortunately, given the absence of contemporary progress data into this form of analysis, the resultant movement in the project completion date is somewhat theoretical, the factual date for project completion being, at that time, potentially different.

6.3.8 EC Harris has been provided with hard copy programmes only and because the programme logic has actually been amended significantly from revision to revision, it has not been practical or necessary to reconstruct Birse's programme electronically.

6.3.9 On this Project many programme activities have been re-arranged between each programme update, possibly to reflect the re-arrangement of work at that time, it has not been possible to confirm the conclusions of the revised programmes as to the precise causes of delay on the planned completion dates. As such, the analysis conducted has considered a 'reasonable' impact for each programme with reference to the last intended sequence of work. Some of the assumptions made however may require further testing, if it was considered that further scrutiny of the delays should be necessary.

6.3.10 Though those compensation events that have had an effect on the Project critical path have been principally examined, there are a range of additional compensation events that were concurrent to those having critical effect, which could also have affected the regular progress of the work and these too have been highlighted within the analysis.

6.3.11 Our analysis has used as its basis the original Tender Programme and has maintained all associated activity logic, durations and periods of available float (float is a period of available time that is in excess of the duration required to complete an activity). Birse has re-sequenced much of its early work to accommodate the revised construction strategies, and possibly to reflect advantageous working patterns, so it has not been possible to make an accurate assessment of the effects of each compensation event with reference to the original baseline.

6.3.12 It is important to recognise that only compensation events that appear to affect the critical sequence of activities for each programme revision have been considered. Birse applied for other compensation events that may have given rise to a concurrent delay i.e. one that delays a particular work activity but does not affect the critical path and therefore will not affect the overall Completion Date It may be necessary at a later stage to consider whether these delays could have impacted the critical path if it is determined that an apparently critical delay be found to be non-critical.

Contract Programme (Baseline Programme)

6.3.13 The Contract was due to commence on site on 5th September 2005 and to commence with a 13-days enabling period prior to site possession on 22nd September 2005. Planned Completion was 30th October 2006 and the Contract Completion Date was 16th March 2007. The difference between the planned and latest completion is called 'terminal' float and is available for the benefit of the Contractor i.e. any delays caused by the Contractor can use the terminal float without affecting the Contractor's liability to pay delay damages. Any delay due to compensation events will have the effect of extending both dates.

6.3.14 The baseline critical path through the works is shown as follows:

- Key dates & durations (site establishment)
- Core works, phase 1
- Northgate, Lower Northgate

- Core works, phase 1 to the milestone completion of phase 1/start of phase 2
- Core works, phase 2 to the milestone completion of phase 2/start of phase 3
- Tubwell Row, phase 1
- Tubwell Row, phase 2
- Tubwell Row, phase 3
- Planned Completion of 30 October 2006

6.3.15 A summary diagram of the changes to the Completion Date is included in Appendix 3. This was produced by Birse to show the changes over all the programmes.

Programme P03

6.3.16 Programme P03 (20th December 2005) is the first available programme revision. It has two parallel sequential paths of activities. The first on this programme indicates that change 57; a delay to a water main diversion affected the early works. This change has been deleted from the compensation event schedule at £nil value, so it is assumed that no overall delay was caused.

6.3.17 However, this change affected the water feature area that was planned in the baseline programme to start at the end of September 2005 and to be constructed over a period of 36 weeks (including Christmas). By P03 the start of this work had been amended to 19th January 2006 for a period of 30 weeks (including holidays), plus 8 weeks period prior to construction for design.

6.3.18 At the time change 57 impacted the programme 8.5 weeks of construction should have been undertaken to this area but it is not possible to determine whether work had started and progressed prior to the delay.

6.3.19 The second path of activities through the works has been constrained by work in the first path of activities. It is clear in this sequence of activities that certain areas had been rescheduled, for example Northgate having been scheduled to commence on 1st November 2005 on the baseline programme and had been moved to 10th May 2006 in P03.

6.3.20 Similarly Blackwellgate and Houndsgate, both on the critical path, were scheduled to commence on 27th October 2006 on the baseline programme and were changed in P03 to 9th May 2006.

6.3.21 It is concluded therefore that at the time of issue of P03, the contractor had probably decided to significantly amend the planned sequence of working. It is not clear why Birse had made this decision but it does means that the opportunity to undertake a logical analysis of changes based solely on the baseline programme and the impact of compensation events is difficult to achieve, notwithstanding that it may just be unclear that the changes were actually the result of compensation events.

6.3.22 Quotation numbers Q/004A and Q/005 provide details of the delays and costs through to P03. The former details delay being attributed to:

- 6 week contract award and ECI period delay
- 2 week construction period delay
- 1.4 week Easter delay

6.3.23 The influence of the ECI period on the Contract commencement date is not clear nor is the reason why any delay could be awarded under the Contract for any difference in an ECI duration. Whilst it is recognised that there is reference to the ECI stage being a "working area" in the Contract data part two, we have been unable to find sufficient information on the ECI period to consider any effects it may have had on the Contract.

6.3.24 If the Council considers that it would be appropriate to investigate delay awards further, we recommend that consideration be made to the ECI period; its terms, scope, intentions, the contractual arrangements for it and other appropriate elements. EC Harris has no particular details of the scope and cannot therefore comment, other than that it is unclear how the ECI period can affect the Contract itself.

6.3.25 Quotation Q/005 provides for 11 weeks of delay, which Birse mitigated down to 6 weeks. This period of delay appears to be attributed to the late delivery of street lighting columns (a period of 8 weeks was provided in the programme), associated re-organisation of sub-contractors and the Council's alleged failure to comply with street lighting / notice periods. Again this cannot be verified with the information current available to EC Harris. However, this would seem likely to be an Employer culpable event.

6.3.26 Given that the delays relied upon by Birse are not transparent in programme PO3 (PO1 & 2 being unavailable to EC Harris) and that PO3 has been significantly re-configured, it is not possible to ratify, or otherwise, the award of time given to PO3.

6.3.27 Although Birse have applied for a 15.4 weeks extension of time, the actual difference between the planned completion date in PO3 and the contract programme is 13.1 weeks and it would appear therefore that an award could have been made above that entitled. The value of this award is further confused by Birse's summary diagram, which presents a figure of 12.4 weeks.

Programme PO4

6.3.28 PO4 also demonstrates two parallel sequences of activities. Change 69, the issue of late design information affects the first path but this path still retains float to the completion of the works. The change was incorporated into P03 as well but durations have changed in P04.

6.3.29 The second path extends the planned Completion Date to 30th January 2007. Changes incorporated into this programme appear to be mainly related to the issue of design information such as the revised approach to steps and road in area HRS1, raising levels of existing manholes (Change 77); design details (Changes 73, 69, 78 and 81).

6.3.30 Significantly, there are also changes due to the need to divert an NTL cable at High Row (Change 82) and the changes needed to accommodate the gas main damage (Change 82) and for Birse awaiting information on the gas main diversion (Change 84).

6.3.31 Whether the Council should be responsible for the damage to the gas main is arguable and discussed in Section 3 above.

6.3.32 There is no delay to the Completion Date as a result of changes to this programme. This is corroborated by the absence of a Birse quotation against this programme revision and further by the absence of any time extension of Birse's summary diagram. It is noted however that changes appear in this revision with respect to the gas main diversion, which has a significant effect on the subsequent programme revisions.

Programme PO5 (8 May 2006)

6.3.33 PO5 introduces the effect of the gas main diversion change. The critical path alters as a result of the gas main diversion (Changes 111 and 112). The start of the diversion is constrained by seven weeks, which is attributed to awaiting design information.

6.3.34 The critical path is through the gas main diversion and the core works phase 1 are delayed by the gas main diversion. The critical path still goes through the core areas phase 1 and the delay is that suffered as a result of the diversion works.

6.3.35 The Prebend Row works appear within the critical path affected by the diversion works but essentially, this sequence of activities continues to be predominant throughout the remainder of the programmes, although further delaying events within this critical path do occur.

6.3.36 Planned completion as a result of the gas main diversion was 22nd June 2007. Birse calculates in Quotation 052 that the diversion had affected the Planned Completion date by 17.8 weeks and 16.4 weeks for Latest Completion (the difference between the two periods being to take account of statutory holidays).

6.3.37 Other changes incorporated into programme P05 include the late receipt of information (Changes 70, 11, 71, 110, 55, 98, 113 and 95), additional scope (Changes 104, 118 and 92) and the redirection of resources to other areas (change 116) and for Birse to await third party action (Changes 119, 117 and 115). These changes did not have an effect on the critical path.

6.3.38 In addition to the time and costs provided within Quotation 052 a further 2.8 weeks and £88,248.66 is allocated to this programme revision within Quotation 055. This doesn't appear to have any relationship to any critical path item and, it would seem, simply makes up the balance of time between this and the previous programme revision.

6.3.39 Quotation 052 provides for such a significant amount of time against the critical path, and indeed a significant value of £524,377.43, EC Harris recommends that further examination of the build-up of programme activities and its associated cost.

Programme P06 (20 June 2006)

6.3.40 The critical path in P06 appears only to be affected by change 144, switching bus stops in Prebend Row. The Completion Date is delayed further to 3rd July 2007.

6.3.41 Changes to this programme include those relating to awaiting design information or changes to it (Changes 143, 70, 141, 129, 123, 122, 116, 146, 118, 135 and 143); alteration of statutory services (Changes 139, 45, 120, 111, 140); unforeseen ground conditions (Change 142); weather (Change 130) and third party issues (Changes 144, 124, 145 (possibly) and 92)

6.3.42 If Change 144, relating to bus stop location is accepted as reasonable (though the critical effect of transferring the location of a bus stop may be debatable), the extension of time associated with this programme would have been reasonable to accept.

6.3.43 The period of 1.6 weeks associated with Quotation 072 for time associated with PO6 corroborates with both the programme dates and the summary diagram

6.3.44 Note that programme PO7 has not been made available to EC Harris and in fact no extension of time has been attributed to PO7 in the Birse summary diagram.

Programme PO8 (31 July 2006)

6.3.45 At P08, a further critical delay occurs, which appears in this and later programmes, that is delays associated with the water feature, ramp and associated plant room. It appears that the plant room being located within an existing structure that was in a structurally poor condition and required various activities due to planning constraints on cataloguing stone and other ornamental features caused a further critical delay to the works.

6.3.46 Changes incorporated within P08 were still evidently associated with design information (Changes 182, 169, 149 and 183); the plant room and water feature (Changes 131 and 158); unforeseen ground conditions (Changes 150 and 165), street lighting (Changes 168, 70, 170 and 175) and third party issues (Changes 154 and 155).

6.3.47 Making certain assumptions over activity references relating to the plant room, it appears that the plant room activities were amended to commence later than the

planned 30th May 2006 to 10th July 2006. As no progress information is available it would seem that this area has suffered from a progress delay, followed by the impact of the changes.

6.3.48 The difference between the planned completion dates on the two programme revisions is 2.9 weeks. However, Birse have applied for only 0.8 weeks for this period in its quote Q/073 with an associated value of £31,493.26 (amended from £33,993.26) and appear therefore to have accepted 2.1 weeks of culpable delay.

6.3.49 Birse have associated delays in this period with changed sequence of tarmac construction in lieu of setts to Prebend Row and design delays to balustrading at the water feature. Also associated in this period is the impact of cataloguing stonework and removing tiles from toilet block for the Structural Engineer to assess the water feature plant room.

Programme P09 (1 August 2006)

6.3.50 The critical path for P09 is delayed from P08 and the Completion Date extends to 28th August 2007. This is beyond the actual Completion Date.

6.3.51 Change 191 affects the water feature structure and concerned the construction of a new reinforced concrete wall to the plant room. EC Harris believes that this was the result of the structural condition of the existing public toilets that were altered to accommodate the plant room, so it is probably reasonable that such work would require an extension of time (unless there are other reasons why identification of this work had been delayed). Nevertheless, if the work were additional to the Contract, Birse would be entitled to a delay to the Completion Date.

6.3.52 Changes incorporated into the programme P09 include those related to design information (Changes 171 and 187); deletion of work (Change 173); and statutory undertakers (Changes 193 and 192)

6.3.53 The planned Completion Date has extended by 36 calendar days or 5.1 weeks. More specific detail is provided in the summary diagram with respect to the delay of 5 weeks in this period, being stated as *"critical delay of 5 weeks due to time taken to design & issue construction drawings for eastern toilet block wall. The toilet block is to act as the new plant room for the water feature. Thus the critical delay is to the new water feature. Work to this wall originally involved blocking up a doorway.*

However the masonry wall required to be carefully dismantled, catalogued and stored. The resulting gap in the wall was breached with a new rc wall." Again, the reasonableness of this explanation has not yet been tested though it would appear, on the face of it, this is a valid explanation of an event impacting the critical path at this time.

Programme P10 (11 August 2006)

6.3.54 The critical path for P10 does not change essentially from P09 and there are no changes or compensation events incorporated into this programme revision.

Programme P11 (14 November 2006)

6.3.55 The critical path for programme P11 does not extend the Completion Date from 28th August 2007.

6.3.56 Change 221, for inefficient / disrupted construction operation due to maintaining pedestrian access through work areas, Change 230 for delay and disruption to construction operations through public vehicles preventing access in core areas and Change 208 for changing 8" pipework details followed by finishes to the water feature, road pavement and adjacent footpath are the only changes included.

Programme P12 (22 November 2006)

6.3.57 The critical path for P12 alters the Completion Date to 7th August 2007 but there is no authority in the Contract to alter the Completion Date to an earlier date.

6.3.58 It is noted that P12 is the latest programme revision examined and that the date of this programme at November 2006 is approximately 7-8 months prior to actual completion of the Project.

6.3.59 Potentially, therefore, further programme revisions with delay claims may be put forward, although the actual completion date was earlier than the Completion Date of 28th August 2007 in programme P11.

6.4 PROGRAMME SUMMARY

6.4.1 The programme analysis conducted has considered the range of Compensation Events, which have had an impact on the programme of work, either on to the critical

sequence of events for each programme revision or as disruption on to the intended sequence of work.

6.4.2 The principal change to the intended sequence of work was as a result of the gas main diversion, this resulting in 17.8 weeks delay to the planned completion date and £524,377.43 additional cost. The effect of the gas main diversion was also to significantly amend the planned sequence of work, diverting resources as it did from the core of the scheme to peripheral areas. However, those areas against which Birse diverted its labour were always incorporated into its programme of work, the revised programme of work being an effective mitigation strategy in the face of an emergent problem.

6.4.3 It could be argued that the gas main diversion, though unexpected at that time, was always necessary, and would have been included in Birse's known scope of work, although possibly in a more efficient manner, had it been identified within pre-construction design activities.

6.4.4 Though attention has been paid to those compensation events that have had an impact on to the programme, either critically or concurrently, within this analysis, it is noted that all other compensation events have been qualified in respect to time effects. There is still the potential therefore for Birse to make an assessment of time for all other compensation events, as either delaying or disrupting its programme of work.

6.4.5 The range of compensation events relied upon as having an effect on the planned and latest completion dates, based on the programme data available, would appear reasonable, its effect being somewhat confused however due to major re-configurations of the contract programme.

6.4.6 In broad terms the compensation events provide for late design, amendments to existing work and emergent work. Of these, late design is probably the most unexpected area of delay given that all design activities should have been concluded prior to the commencement of any work on site. Though construction activities were heavily amended as a result of the gas main diversion, this should not have presented any significant difficulty in re-arranging design priorities given that all design packages should have been completed by then.

6.4.7 Lack of contemporary progress data against each programme revision has presented the greatest deficiency in the analysis conducted. Without such records it has been

difficult to assess Birse's own culpability. This, combined with the significant re-arrangement of the contract programme, has resulted in the review being restricted to a broad assessment of 'reasonableness' only. Based on this however, Birse have at least identified the events relied upon for its extension of time applications and have demonstrated the impact of each on the critical sequence of events, or alternatively in relation to concurrent delaying events which may be relied upon for additional costs.

6.4.8 Awards given for time generally concur with the information presented for their consideration and as such are not considered to be unreasonable project management actions.

7 REVIEW OF COMPENSATION EVENTS

7.1 GENERAL

7.1.1 The Birse contract for the site works had an initial price of £5,369,532 at contract award. This price in the Birse contract included £100,000 contingencies.

Principal contract prices were:-

Preliminaries	£648,521
Site Clearance	£27,532
Roads & Pavements	£2,346,997
Drainage	£113,354
Steps, Ramps and Planting Boxes	£442,118
Street Furniture	£476,802
Street Lighting	£269,456
Signage	£21,175
Planting	£11,969
Provisional Sums (including £100K contingencies)	£629,000
Bond	£8,588
Birse Fee (7.5%)	£374,019
	£5,369,532

7.1.2 The Birse contract is NEC ECC 2nd Edition Target Cost with Bill of Quantities (the Contract). Birse will therefore be paid their Actual Cost of work performed, plus their fee. Actual Cost is a defined term under the Contract and is not the actual cost incurred but a value determined in a specified manner, part of which is made up of actual costs incurred.

7.1.3 The indications within the cost reports that have been made available to EC Harris are as follows:-

Original Target Cost (Birse Initial Price)		£5,369,532
Plus Adjustments		£1,465,042
Revised Target Cost		£6,834,574
Anticipated Final Price for Work Done		**£6,891,069**
Overspend v. Target Cost		£56,495
Of which	Birse to Pay 10%	£5,650
	and Darlington BC to pay 90%	£50,845

7.1.4 The nature of the adjustments to the Target Cost are:

Agreed Compensation Events	£1,312,317
Pending Compensation Events	£635,725
Adjust Provisional Sums	-£483,000
	£1,465,042

7.1.5 Although no in-depth examination into the details of the agreed compensation events has been carried out, they generally fall into the following categories:

Changes to the Specification of the Works	-£194,845
Changes to the Extent of the Works	-£111,054
Pease Statue Work	£28,240
Surveying	£27,622
Acceleration (Overtime Working)	£40,502
Reprogramming of Work	£62,924
Delays due to Late Information	£133,996
Delays due to General Causes	£485,809
Delays due to the Gas Main	£524,377
Gas Main Works	£197,272
Testing	£5,357
Additional Temporary Works	£77,982
Additional Demolitions	£912
Spare Materials for Darlington BC	£11,121
Work Omitted from the Tender Bill of Quantities	£30,759
Omission of the Bond Requirement	-£8,658
Total	**£1,312,317**

7.1.6 As indicated above there is a considerable sum being allowed within the current cost plan for "Pending Compensation Events", these being items that have not yet been agreed with Birse. They fall into two sub-categories, items for which Birse has submitted a quotation but there is not yet an agreement (£461,941) and items for which there is not yet a firm quotation but merely a budget price allowance (£173,785).

7.1.7 Although no in-depth examination of the Pending Compensation Events has been carried out, they generally fall into the following categories:

	Unagreed Quotations	Budget	Total
Changes to the Work Specification	£170,964	£25,600	£196,564
Changes to the Extent	£64,768	£23,339	£88,107
Surveying		£1,000	£1,000
Acceleration (Overtime Working)		£1,500	£1,500
Delays due to Late Information	£142,243		£142,243
Delays due to General Causes	£83,965	£21,900	£105,865
Gas Main Works		£10,000	£10,000
Additional Temporary Works		£37,800	£37,800
Use DBC for Street Lighting *		£52,636	£52,636
Totals	£461,941	£461,941	£635,726

*Note – this item relates to an instruction to Birse to employ Darlington BC "Community Services" department in lieu of Birse's preferred subcontractor, and the consequent additional cost of the purchase.

7.1.8 Therefore currently the overall perspective is that the total of changes is expected to be in the order of:

	Agreed	Pending	Total
Changes to the Work Specification	-£194,845	£196,564	£1,720
Changes to the Extent of the Works	-£111,054	£88,107	-£22,947
Pease Statue Work	£28,240		£28,240
Surveying	£27,622	£1,000	£28,622
Acceleration (Overtime Working)	£40,502	£1,500	£42,002
Reprogramming of Work	£62,924		£62,924
Delays due to Late Information	£133,996	£142,243	£276,239
Delays due to General Causes	£485,809	£105,865	£591,674
Delays due to the Gas Main	£524,377		£524,377
Gas Main Works	£197,272	£10,000	£207,272
Testing	£5,357		£5,357
Additional Temporary Works	£77,982	£37,800	£115,782
Additional Demolitions	£912		£912

Spare Materials for Darlington BC	£11,121		£11,121
Work Omitted from the Tender BoQ	£30,759		£30,759
Omission of the Bond Requirement	-£8,658		-£8,658
Work Omitted from the Tender BoQ	£30,759		£30,759
Use DBC for Street Lighting		£52,636	£52,636
Total	£1,312,317	£635,726	£1,948,043

7.1.9 As may be seen from the above data, the reason for the increase in cost to the Council is not that the design team has expanded the contractor's workscope without authorisation or that it has enhanced the specification without authorisation. It seems that, in fact, the design team has sought savings to compensate for unforeseen additional expenditure.

7.1.10 What is clearly at the root of the additional spending is the prolongation of the contract period.

7.1.11 One legitimate indicator is the Birse cost for management and staff, which is clearly directly related to duration of the work. The relevant figures are:-

Birse Tender Allowances		
Management & Staff	£322,500	
Public Liaison	£ 49,500	£372,000
Birse Forecast Cost		
Staff	£504,734	
Cars etc	£183,075	
Agency Staff	£115,990	£803,799

7.1.12 This is an increase of 116%. This is a greater proportional increase than the increase to the Completion Date from 61 weeks to 80 weeks. It is noted that within Birse's quotations for compensation events, increases were claimed for additional staff resources to deal with the amount of design changes and details that were issued throughout the Contract period.

7.1.13 Even before any investigation is carried out, the initial indication is that a considerable amount of the prolongation is not the contractual responsibility or risk of Birse. If it were Birse's responsibility and risk then the Project Managers would not have agreed to compensation events of almost £1.2 million (items 6 to 9 above), and possibly a further £250K remaining to be agreed, in respect of delays and reprogramming.

7.1.14 The Council must keep in mind that as a result of the form of contract used, the Council must pay Birse's price for work done (Birse Actual Cost (defined costs) plus the fee) for the work up to the target cost, plus 90% of the cost in excess of the Target Cost. Therefore, the effect of a compensation event is that Birse is entitled to take more time and use more money and the Council will meet 100% of that cost and a removal (or reduction) of the Council's entitlement to receive damages for late completion. In the event the Target Cost is exceeded, the Council must still pay 90% of the overspend but would retain its entitlement to delay damages.

7.1.15 EC Harris could usefully examine all revised programmes and relevant compensation events that have accumulated to the potential sum of £1.45 million associated with delays and reprogramming. The results of that analysis will provide a more detailed picture of what events caused the delay to completion and the additional cost burden on the Council.

7.1.16 At this stage it appears that the financial administration of the contract in respect of determining the amounts due to Birse has generally been correct in accordance with the Contract and that the Price for Work Done to Date (the overall cost of £6,891,069) has been generally been calculated correctly, though there are some possible exceptions. A more detailed audit of this calculation and supporting documentation could be beneficial to the Council.

7.2 SPECIFIC COMPENSATION EVENT ISSUES

7.2.1 EC Harris has not been able to review all the compensation events, so the comments in this report reflect our opinion based on those that we have been able to review so far. This has revealed certain patterns of valuation etc that have also been discussed in section 4.3 and 5.2 above.

7.2.2 It is not clear whether there has been any negotiation over the value of compensation events prior to their approval. In the event that the Project Manager does not agree with a compensation event, he is able to make his own assessment under Clause 64.1.

7.2.3 EC Harris has inspected a significant proportion of the compensation events and it seems that the valuation of the events has been generally based on using specific rates for labour and staff rather than Actual Cost in the People element of the

compensation event. In evaluation of the plant costs, again rates are used. In the information made available to EC Harris it is unclear whether these rates have been developed by Birse based on Actual Cost and approved by Kinsler. In the case of plant costs, actual hire costs are applicable for hired plant.

7.2.4 There are also potential anomalies in the pricing of compensation events but the information made available has not allowed detailed scrutiny of any costs associated with compensation events.

7.2.5 For example, Quotation 057 is for the alleged additional cost of Easter working. It includes costs for the labour to be paid as their normal holiday plus hours worked at double time. It also alleges that Birse staff were paid double time for the Easter week. The period claimed does not include the bank holidays. The quotation is for £22,460.11 and has been approved.

7.2.6 The Working Rule Agreement (WRA) Rule 18 regards the four days following Easter bank holidays as paid holiday. However, the WRA provides that the week can be worked and holidays taken at another time by arrangement with the employer (Birse). There is no WRA requirement that working these days would entitle the operatives to double time payment.

7.2.7 Salaried staff would normally be entitled to a set allocation of holiday days to be taken as and when agreed with the company. Normally, staff would not be entitled to double time for working this period, since they would be able to take the holiday allocation at an alternative time.

7.2.8 Notwithstanding that Birse may have actually incurred these additional costs, unless Birse proved that it actually did incur these additional labour and salary costs, then the Actual Cost of the compensation event should have been limited to proven costs. The compensation event quotation was prepared after Easter, so costs records should have been required from Birse in order to prove Actual Cost before acceptance. The Council should investigate whether appropriate evidence was provided by Birse and audited by the Project Manager.

7.2.9 However, the quotation has been approved under the Contract, so there is no method of recovery from the Contractor, unless the disputes procedure is invoked.

7.2.10 We understand that within the Price for the Work Done to Date, Birse has claimed for the time spent by some head office staff that visited the site. Under the Schedule of Cost Components People not employed full time on the Project are not reimbursable under the Actual Cost of the Project but are included within the Fee.

7.2.11 We understand that the Project Manager has already indicated to Birse that these people are not properly within the People category of the Schedule of Cost Components but we understand that the Contractor was of the view that unless the Project meets the part-time costs of these staff then it could employ them full-time on the Project in order that they come within the definition of People under the SCC.

7.2.12 It is recommended that if there are any instances of costs being claimed that are not valid under the SCC, then the Project Manager should take the opportunity to remove these staff from the Actual Cost of the Project, since it seems that the Contractor is not entitled to these monies under the Contract.

7.2.13 It is also worth considering, however, that if Birse took the view that in this instance these staff would become full-time under the Project, Birse might consider either invoking the dispute resolution procedure or raise a compensation event for an alleged increased involvement.

7.2.14 EC Harris has not been able to consider specific disallowed costs under the Price for the Work Done to Date but the Council may decide that Kinsler should review any items of disallowed costs to ensure that all costs have been paid in accordance with the Contract.

8 SUMMARY

Gas Main

8.1 The information available to EC Harris suggests that the relevant parties, Gillespies team and Birse had sufficient information to establish that there was a gas main that could be affected by the works.

8.2 It is not clear how the decision not to proceed with taking trial holes was made or who made it. In respect of the design aspect, it is our opinion that the actual position (in depth and location) of the main could have been identified as critical to the design of the scheme. The documents inspected do not appear to include the reasons why it was considered that the gas main would not be affected by the works.

8.3 It is our opinion that it may be arguable that Birse would be responsible for the damage to the gas main directly as an insurable event, rather than the Council meeting the costs of the damage, if the Council has actually met those costs (which is unclear).

8.4 To construct the scheme as designed the gas main would always have had to be diverted, so diversion costs would always have had to be incurred, whether or not the position of the main was identified earlier.

8.5 The most significant costs relating to the gas main are those corresponding to the associated delay. If possible i.e. if the Project Manager has not accepted the relevant compensation events at this time, an exercise to establish Actual Cost should be undertaken, which specifically investigates the cost of the alleged disruption.

8.6 Whilst the delay costs incurred might be in excess of those that would have been incurred had the diversion been identified earlier, the Council may have still incurred a proportion of those costs, for example, by inserting constraints to working in the Contract.

Programming Analysis

8.7 The programme analysis conducted has considered compensation events, which have had an impact on the programme of work, either on to the critical sequence of events for each programme revision or as disruption on the intended sequence of work.

Much of the time claimed under compensation events has already been accepted so there may be very limited opportunity to revisit the decisions already made.

8.8 The principal change to the intended sequence of work was as a result of the gas main diversion, this resulting in 17.8 weeks delay to the planned completion date and £524,377.43 additional cost. The effect of the gas main diversion was also to significantly amend the planned sequence of work, diverting resources as it did from the core of the scheme to peripheral areas.

8.9 Though attention has been paid to those Compensation Events that have had an impact on to the programme, either critically or concurrently, within this analysis, it is noted that there is still the potential for Birse to make an assessment of time for all other compensation events, as either delaying or disrupting its programme of work.

8.10 The range of compensation events relied upon as having an effect on the planned and latest completion dates, based on the programme data available, would appear reasonable, its effect being somewhat confused however due to major re-configurations of the contract programme.

8.11 In broad terms the compensation events provide for late design, amendments to existing work and emergent work.

8.12 Lack of contemporary progress data against each programme revision has presented the greatest deficiency in the analysis conducted. Without such records it has been difficult to assess Birse's own culpability.

8.13 Awards given for time generally concur with the information presented for their consideration and as such are not considered to be unreasonable project management actions.

Compensation Events

8.14 The value of compensation events agreed is significant and once accepted, a compensation evaluation is intended to be final. There may be options available to review compensation events under the dispute resolution procedure in the Contract but at this stage, no specific consideration has been given to that option.

8.15 If it were decided that the value of accepted or pending compensation events was incorrectly calculated then a review of these values will not recover the full value of any compensation event for the Council. This is because the value of a compensation event alters the Target Cost up to which the contractor is reimbursed his Actual Cost (i.e. 100% of the cost) whereas under this particular Contract's pain/gain share arrangement, if the value were not accepted, the Council would still meet 90% of the cost expended above the Target Cost. It would gain 90% of the saving if the Prices were less than the Target Cost, but would still have met the full cost of the compensation events.

8.16 However, we recommend that the Council undertakes further investigations into the relevant quotations for compensation events for delay and requests that the Project Managers consider carefully the Actual Costs claimed for any delay compensation events that remain outstanding, since these costs have been by far the most significant increase on the Project.

8.17 EC Harris could usefully examine all revised programmes and relevant Compensation Events that have accumulated to the potential sum of £1.45 million associated with delays and reprogramming. The results of that analysis will provide a more detailed picture of what events caused the delay to completion and the additional cost burden on the Council.

8.18 The benefit of reducing delay costs and time to the Council would be that even though it will meet 90% of any overspend on the Project, it would retain a right to delay damages if the Project goes beyond the Completion Date. However, since most compensation events include a qualification as to time effects, the likelihood of being able to recover delay damages is minimal because it is likely that if there was any risk of having to meet delay damages, the Contractor would try to secure its position by further delay compensation events.

8.19 Where compensation events have been awarded as a result of late or incomplete design information, the Council should investigate if these costs have been incurred due to a default by the design team and/or whether there are any relevant factors for which the Council would retain liability e.g. late approval of design proposals.

8.20 Due to the pain/gain share mechanism this is one of the few areas where the Council may be able to recover costs because if the design had been correct and issued in a

timely fashion, then no costs would have been incurred under this item. However, the Council would have to satisfy itself that the design team had failed to use reasonable skill and care in carrying out its duties under the consultant's appointments.

8.21 The Council would also have to be satisfied that it was not responsible for any factors that affected the performance of the design team and its ability to design the scheme so that these costs were not incurred.

Target Cost

8.22 The pain/gain share mechanism in the Contract is not particularly beneficial to the Council because in the event of a Project overspend, the Council has to meet 90% of the overspend. There is no great incentive to the Contractor to complete within the Target Cost as the Council meets 90% of any overspend.

8.23 The information provided indicates that the percentages used for the pain/gain share mechanism was discussed with the Council, so even if the implications were not clear, then it appears that there had been some agreement in principle to the percentage split as used in the Contract.

APPENDIX 1 – DOCUMENTS MADE AVAILABLE

APPENDIX 1

DARLINGTON PEDESTRIAN HEART: DOCUMENTS AVAILABLE

DARLINGTON BOROUGH COUNCIL

DARLINGTON BOROUGH COUNCIL: DARLINGTON TOWN CENTRE: "THE PEDESTRIAN HEART – Briefing Documents for the Appointment of an Urban Designer for the Public Realm Works in Darlington Centre

DBC: PEDESTRIAN HEART AUDIT SERVICES REPORT

DBC: PEDESTRIAN HEART GAS MAIN REVIEW FINAL REPORT

DBC: COUNCIL PAPER 28 SEPTEMBER 2006: PEDESTRIAN HEART BUDGET

GILLESPIES

Letter dated 17 May 2006 Gillespies to Darlington Borough Council

Letter dated 1st October 2003 Gillespies to Darlington Borough Council

Compensation Event Schedule

Contract Drawings – Gillespies, Faber Maunsell and Others (CD provided by Clarus Note: no survey or statutory authority/undertakers drawings can be read on this CD)

Project Manager's Instruction list

GAS MAIN DOCUMENTS

Note: some are extracts from other documents.

Council Report 23 March 2006 (Appendix 1)
Minute Extract from Council 23 March 2006
Minute Extract from Monitoring and Co-ordination Group 3 April 2006
Pedestrian Heart Gas Main Review Group 28th April 2006
Pedestrian Heart Gas Main Review 9 June 2006
Pedestrian Heart Gas Main Review Group 9 June 2006
Briefing Document
Appendix 004
Bills of Quantities

CLARUS CONSULTING

REPORT: Darlington Pedestrian Heart: Report and Recommendations dated June 2006

PROGRAMMING INFORMATION

Birse Tender documentation

Tender programme

Quotations for Compensation Events

Programme revisions (P03 to P012)

Contemporary project records, including;

- Miscellaneous correspondence between the Employer and the Contractor
- Drawing issue and receipt schedules

BIRSE INFORMATION

Compensation Event Quotations

Signed NEC ECC 2nd Edition Contract Documents

Contract Data Part One – (incorrect version showing Option C)

RFI Register

APPENDIX 2 – File Ref: M3913.060330. Statutory Undertakers Note"

GILLESPIES - STATUTORY UNDERTAKERS NOTE

This note aims to summarise the process that was undertaken by Gillespies and the rest of the project team to establish the extent of services that were present underground and the assessment of their affect on the proposed design and works. Items marked with an asterisk * have already been handed to DBC on a CD on 30/03/06

Aedas Survey

1. It was agreed by the client and design team at the monthly progress meeting (dated 25.11.03) that a topographical survey to ascertain the details of ground levels and an additional services survey to establish underground utility locations and depths would be carried out. The Utility survey was not originally specified in the brief and TW expressed reservations that the services survey would not be 100% accurate as they were relatively untested at that time. However, DBC and the design team all regarded it as being better then having just the C2 Notice statutory undertaker's information to work from.

2. Quotes were presented by Gillespies at the monthly progress meeting (08.01.04). DBC confirmed in the meeting minutes that the brief* was satisfactory and that Gillespies were to proceed with commissioning Aedas to carry out the survey works.

3. Commission letter* sent to Aedas (12.01.04) along with the agreed survey brief * and survey area extents*.

4. Survey received by Gillespies, apparent that information was missing such as spot heights, depths of services and description of services. Letter* sent by Gillespies to Aedas (08.03.04) requesting further information

5. Aedas agreed to redo the survey and provided email response (dated 15.03.04)* regarding errors made and limitation of the survey. They stated that their 'Documented Site Procedures for such surveys indicate the methodologies and techniques applied to such surveys and do not guarantee depths on every service. Where depths have been possible and we are confident to report them, depths have been shown'.

6. Revised survey received (08.04.04) and was checked by Gillespies. Additional information had been added to survey as requested; however, the depth of the 12 inch gas main was not shown.

7. A quotation for a further detailed underground utilities survey for Bondgate, Blackwellgate, Northgate and Tubwell Row was provided by Aedas and it was presented at the monthly progress meeting (13.05.04). The progress note* outlined that the cost was very expensive. It was agreed that a radar stats survey for these areas would not be undertaken due to the cost but would be dealt with on site at a later date through the use of trial holes (this decision was not minuted).

On receipt of the survey information, the design drawings were checked carefully to ensure that the scheme did not impact upon services and the scheme adjusted wherever possible to minimise potential impacts. Extra attention was given to dealing with scheme features that required significant foundations (i.e. street lighting columns, the steps, planters, water feature etc.) and areas where there were significant level changes.

8. Birse later commissioned 40Seven to carry out a detailed underground service survey for the whole town centre (Aug 2005)* and it was noted that there was also a disclaimer on the drawings as to the limitations of the survey.

It should be noted that all forms of non intrusive underground services survey feature disclaimers and are a relatively new and untested.

Statutory Undertakers Information

9. C2 and C3 notices were issued to Utility companies to identify the impact of the proposed DPH scheme on underground utilities and how much it would cost if diversion works were necessary. C2 notices* were issued to Transco, BT, Cable and Wireless, Electric and Gas, Northumbria Water and NTL (on 13.08.04). C3 notices* issued (on 16.02.05) to all utility companies as mentioned previously. For both notices plans were received showing the locations of relevant equipment but it is widely regarded that these cannot be relied on to be accurate in terms of both location and depth and that issues may need to be dealt with on site following excavation.

10. The C3 notices received from utility companies outline where underground stats may be affected, and the approximate quotations for diversion works; the C3 letters and the plans have been forwarded already*. From the information returned it was apparent that there were a number of minor diversions required which were outlined at the April 2005 and May 2005 progress meetings and were included in the tender pack. The responses did not reveal the gas main issues that eventually surfaced on site once works had started.

Comment

11. To mitigate further problems the team has agreed that trail holes are to be excavated wherever necessary to confirm the location and depths of services in the town centre. This is because:

    - It has been recognized that many of the services are unusually shallow. They have even impacted upon areas where the only change has been the increased construction depth of the paving; and,
    - It has become clear that the statutory undertakers information and Aedas survey are not accurate enough to properly plan and implement the works.

Trial holes will be carried out wherever there is a high likelihood that the services may disrupt progress on site. Although a cost to the project these should reduce the risk of further problems arising during the life of the project. However service condition, location and depths are the key area of risk in streetscape schemes and often cause delays and extra cost. What is unusual in this case is the number that has been found that are unusually close to the surface and the poor condition of the major gas main.

APPENDIX 3-BIRSE SUMMARY DIAGRAM OF CHANGES TO THE CONTRACT COMPLETION DATE

DARLINGTON PEDESTRIAN HEART - PROGRAMME DURATION COMPARISON

PROGRAMME REFERENCE	CRITICAL DELAY CAUSED BY THESE CHANGES
P01	APPROVED
P02	APPROVED
P03	APPROVED
P03 + mitigation	APPROVED
P04	APPROVED
P05	APPROVED
P05 + changes to 119	Late issue (instruction) of phase 2 works to give main diversion
P06	Unable to mitigate delay
P06 + changes to 146	A: Part(s) historical surfacing layers (HSL) connections/ weather/ working/ works delayed by Boundary
P07	Unable to mitigate delay
P08	Complete P07 + [1] Changed sequence/ access in/out of waste to 7/8 [2] P08 design delayed by/ underlying to water feature]
P08 + changes to 183	Critical delays (2 weeks) complete sub-lagging of abutments & new pedestrian from wall block for structural engineer's revision of water feature plant room
P09	Unable to mitigate delay
P09 + changes to 193	Critical delay of 3 weeks due to late issue to design & [note on intervention drawing for] revision to [ ] block wall. The [ ] block is to retain the complex groups for the water feature. Thus the critical delay is to the new water-feature structure. Work to this and originally involved stacking up in courses. However the masonry could not/ found to be [ ] currently of poor fabric, unbalanced and skewed. The new [ring beam] at the wall was breached with a door [ ] cast.
P10	Unable to mitigate delay
P10 + changes to 205	No critical delays
P11	No critical delays