

SOUTHERN GENERAL HOSPITAL
NHS TRUST

BUSINESS CASE
for a
HOSPITAL INFORMATION SYSTEM

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1. EXECUTIVE SUMMARY

1.1 Background and Objectives

The Trust's Information Management & Technology Strategy has set out a comprehensive framework for the development and implementation of information systems to support its clinical and business objectives. The original strategy identified three distinct phases in the process of achieving the ultimate goals of systems integration through an incremental approach. These phases were:-

- consolidation (Year ending March 1994)
- transition (3 Years ending March 1997)
- integration (April 1997 onwards)

The activities and projects proposed and undertaken during the consolidation and transition phases have been successfully implemented and have delivered a range of clinical benefits and in the case of the new Finance and Stores system have provided significant revenue savings.

During 1995 and 1996, the Trust participated in the Resource Management Project. This afforded the opportunity to re-assess the information needs of the Clinical community within the Hospital. It became clear that to continue in an incremental way towards integration, would necessitate the replacement of the Patient Administration System (COMPAS) which was based on old technology, had limited functionality, had no significant investment in recent years and was not Year 2000 compliant. The replacement PAS would need to include all patient attendance types including inpatients, outpatients, day cases and A&E. In order to satisfy the clinical information needs of the Hospital it would be necessary to implement an Order Communications and Results Reporting system, a Clinical Information System and these in conjunction with interface links to existing Laboratory, Theatre and Wheelchair systems would form the core of the new Hospital Information System (HIS). Possible future elements would include Pharmacy, Nursing, Maternity, Therapies and Executive Support systems.

The Trust explored different options to satisfy its requirements including a collaborative venture with Computer Science Corporation (CSC), who provides IT services to the NHSiS and who supported both COMPAS and the HMS outpatients systems. The HMS outpatients system was a modern system specifically developed for the NHSiS as an outpatients module linking with COMPAS. HMS had an inpatients module which had been implemented at St. Thomas' in London. CSC had also acquired the rights to a Software package from Belgium called Crossway which offered the basis of an electronic patient record and seemed consistent with the Trust's direction. However, during negotiations with CSC, the CSC project team was unable to secure their own main board's backing for their product and service proposals. This happened on a number of occasions when fully costed proposals were expected, but CSC failed to deliver. Subsequently, CSC withdrew support for the HMS system for the NHSiS. CSC having been unable to complete commercial negotiations, the Trust decided to go for an open procurement.

An evaluation team consisting of thirty six staff including twenty clinicians, was established. This team participated in the evaluation process leading ultimately to the selection of Data General - Meditech as the preferred bidder.

1.2 Preferred Option.

The preferred solution is a PFI implementation with Data General as Prime Contractors and Meditech as the main Application Software Suppliers. Data General and Meditech have been involved together in the healthcare market for over 20 years and there are over 900 Meditech installations worldwide.

The PFI deal will incorporate a range of services including:-

- Patient Administration
- A&E
- Order Communications and Results Reporting
- Radiology
- Departmental (Clinical Information)
- Interfaces to Telepath 2000 Laboratory system, ORSOS Theatre system, and TIARA Wheelchair system
- Data take on from existing systems

Possible future elements might include Pharmacy, Maternity, Nursing, and Executive Support systems.

The Contractor will provide a fully managed service to meet performance criteria set out in the draft contract

1.3 Summary of Economic and Financial Appraisals

The table below summarises the key aspects of the Economic and Financial Appraisal.

	Option 1	Option 4	
	Do minimum	Implement HIS	
	(8 years)	PFI (8 years)	PSC(10 years)
	£'000	£'000	£'000
Capital Cost	4,060	575	2,452
Revenue Cost	4,997	7,033	7,578
Cash Releasing Benefits	-	630	810
Discounted Cash Flow (6% discount rate)	7,217	5,549	7,324
Financial cost (revenue costs and capital charges, including cash releasing benefits)	-	6,978	9,220
Impact on prices	-	NIL	NIL
Equivalent Annual Cost	-	711	824

The analysis indicates that the Do Minimum option (Option 1) would be unlikely to provide the means of achieving the Trust's IT strategy. On the basis of PSC evaluation the most cost effective means of implementing the HIS is through PFI.

1.4 Key points of PFI deal

- The term for the contract will be eight years, capable of being extended for up to a further two years.
- The Contractor will provide a managed service to the Trust including disaster recovery.
- There will be two separate payment streams throughout the contract period.
 - A delivery stream equal to 70% of the annual contract payment. Payment will commence following acceptance by the Trust of each phase of the implementation.
 - A performance stream equal to 30% of the annual contract payment linked to the performance of the system and the Contractor.
- The implementation will be managed in accordance with the PRINCE project management methodology.

2. STRATEGIC CONTEXT.

2.1 THE STARTING POINT

The Southern General Hospital NHS Trust is a major acute Hospital with the aim of providing a range of high quality, cost effective services to the local catchment population and to the rest of Scotland having regard to the best interests of patients and staff. These services are currently provided from three sites:-

Southern General Hospital
Cowglen Hospital
Belvidere Hospital

The Trust employs 3,500 WTE staff and the anticipated contract income for 1997/98 is £90m

The Trust has developed a comprehensive portfolio of services including:

Core Services

General Surgery
General Medicine
Orthopaedics
Medicine for the Elderly (Assessment and Rehabilitation)
Frail Elderly Continuing Care
Obstetrics
Neo - Natal Paediatrics
Gynaecology
Accident and Emergency
Radiology
Laboratories

Sector Services

Urology
Ophthalmology
Dermatology
Podiatry
Physically Disabled Rehabilitation (Assessment and Rehabilitation)
Physically Disabled Rehabilitation (Continuing Care)
Physically Disabled Rehabilitation (Community Rehabilitation Team)

Regional Services

Neurosurgery
Neurology
Prosthetic and Wheelchair Service

National Services

Spinal Injuries

The catchment populations for these services are:-

Core Services (South West Glasgow)	- population 175,000
Sector Services (South Glasgow)	- population 361,000
Greater Glasgow Health Board	- population 907,000
Regional (West of Scotland)	- population 2,730,000
National	- population 5,146,000

The Trust's first 5 year strategic plan (1992-1997) was prepared at a time when the emerging environment was very much one of competition. Consistent with the Greater Glasgow Health Board strategy, the Trust has taken forward a number of initiatives to achieve the aims and objectives set in 1992. In addition to enhancing the range of services available to the population served, the Trust has invested in upgrading or replacing the infrastructure of the hospital to significantly improve the quality of clinical accommodation used by patients and in doing so improving the working environment for staff. In addition to upgrading work, the Trust has invested in new buildings to meet the requirements of new services transferred onto the campus. This investment over the last four years has totalled some £35m.

In contrast to the period 1992-1997 which was an era of competition between providers, the Trust believes that the next five years will be a period in which there will be strategic alliance and collaboration between providers of health care.

Greater Glasgow Health Board currently has an approved strategy for Acute Services to 2001. This strategy will be subject to further review. In the meantime, the Trust continues with initiatives already underway including the transfer of the West of Scotland Mobility and Rehabilitation Centre from Belvidere hospital to the new build on the Southern General Hospital campus. Development planning also continues on the transfer of Oral and Maxillo Facial Services to the Southern General Hospital campus, PFI for Medicine for the Elderly, and collaboration with GGHB to enact the change set out and approved in the Maternity Services Strategy. Running through all of this is the aim to deliver a high quality service which has been one of the cornerstones of the Trust's success.

Set against this background, it is essential that the Trust's information systems are capable of supporting this drive to improve services and quality of patient care. It has been the objective of the Trust's Information Management & Technology strategy to do just that, and although much has been achieved over the past four years, the next steps in terms of Patient Administration Systems, integration of departmental systems, and clinical information support, will be crucial to establishing a sound information infrastructure for the millennium.

2.2 TRUST MERGERS

Subsequent to the completion of the initial draft Business Case, the Southern General Hospital entered into a period of collaborative working with the Victoria Infirmary as a precursor to a likely merger in April 1999. The purpose of the Glasgow Southside Collaboration Model was to assist in:-

- The development of integrated clinical services across primary and secondary care
- Closer working with GGHB on the development of a Health Improvement Plan
- The development of shared managerial services

The opportunity was taken to review the information systems across both Hospital Trusts to ensure that our HIS proposals were still soundly based. Both Trusts have now implemented a common Finance and Stores system. Both Trusts use the same Radiology, Laboratory and Theatre Management systems and the HIS proposals contain interfaces with the latter two. There is a different PAS in use at the Victoria, but this will be a common feature of merging Trusts and will need to be dealt with in a planned manner, including the resolution of different Case Record numbering systems, increased use of the CHI number and the use of middleware as an interim solution. It is clear that set in the context of a combined South Glasgow Trust, there are considerable additional advantages with the implementation of a HIS:-

- Good starting point to support shared clinical services (Order Comms. and Results Reporting)
- Interfaces to key current systems (cross site access)
- Good framework to support future GP access
- Consistency with the national I.M.&T. strategy and with the direction outlined in the White Paper
- Multi- facility (hospital site) option
- Foundation for electronic patient record established through the implementation of the clinical information systems and Order Comms. and Results Reporting

It is concluded that the business case is strengthened when set in the context of a South Glasgow Trust and indeed underlines the need to remove further delays in implementation since the Do Nothing option jeopardises a combined Trust's ability to satisfy the "Designed to Care" vision of the Health Service in Scotland.

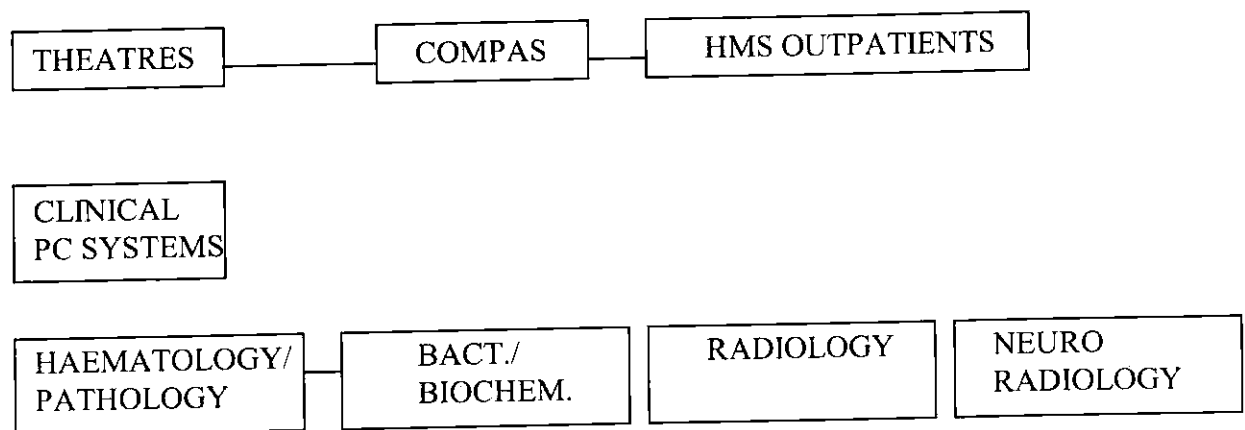
3. THE OUTLINE BUSINESS CASE

In considering the progress of the Trust's IM &T strategy, namely that of an incremental approach to the implementation of Information Systems, there had been a number of achievements

over the past four years that have delivered a range of benefits, and in some cases significant revenue savings. These have included:

- Completion of the implementation of COMPAS, MPI, Inpatients and Waiting lists
- Implementation of Berkeley's Radiology System
- Implementation of Telepath laboratory system in Pathology.
- Migration of other Telepath laboratory systems to an Open System platform.
- Integration of laboratory systems.
- Transmission of laboratory results to GPs.
- Implementation of the HMS Outpatients system.
- Implementation of the ORSOS Theatre Management system.
- Implementation of a networked Works Information Management System(WIMS).
- Implementation of a networked Urology system.
- Technology enhancement to Neuroradiology system.
- Upgrade of all Office systems to use MS- Office
- Implementation of new integrated Finance and Stores System.

With regard to our Patient based systems, this had led to the situation as depicted below:

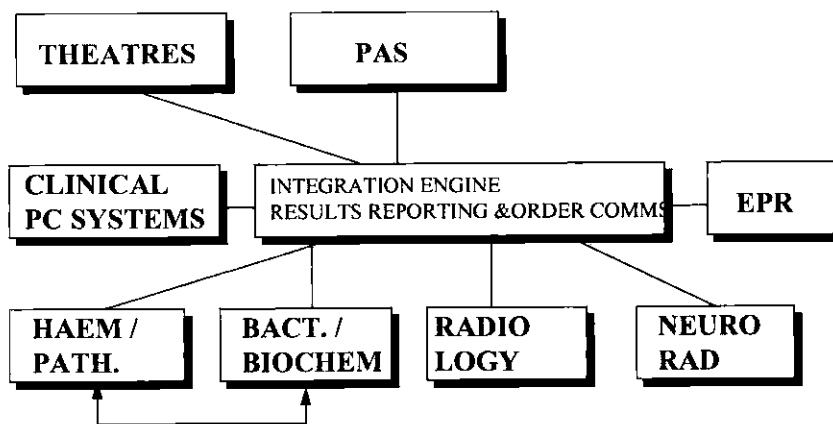


Whilst the implementation of each of the above elements had delivered benefits, there were still obvious gaps to be filled. A major next step was the need to resolve our PAS strategy. COMPAS was based on old technology; had limited functionality; had not had significant investment in recent years (apart from COPPISH); was unlikely to have significant investment in the coming years and was therefore unlikely to be able to support the next steps in our integration strategy.

We wanted to ensure that the investments already made were fully exploited. This would mean:

- The elimination of a multiple Master Patient Index, through the implementation of a single PAS linked with or interfaced to other departmental systems.
- The implementation of an Order Communications and Results Reporting system.
- The implementation of a Clinical Information System as a basis for establishing a framework for an electronic patient record.

This would lead to a scenario which could be depicted as follows:-



Four main options were considered which might lead to the desired goal of the Trust with regard to its Information Management & Technology Strategy. These options were:

1. Do Minimum.
2. Add a CRIS to the existing systems portfolio.
3. Replace all current systems with a fully integrated set of Hospital Systems (Big Bang).
4. Compromise on 3 above by replacing the core PAS and include the integration engine as a means of interfacing with certain key systems thus ensuring protection of some investments already made.

3.1 Do Minimum (Option 1)

Under this option, the Trust would continue to use the existing set of systems, only replacing them when technically obsolete. Where replacement was not an economic option, the existing systems would require amendment to be year 2000 compliant. Departmental systems would remain independent of each other with no integration.

This option would sustain the current levels of benefits, but would obviously be inconsistent with the Trust's strategy of improved services and quality of patient care through better information. Deficiencies within the current scenario would also be sustained (e.g. multiple instances of data entry, inconsistent data across different systems). Opportunities to eliminate inefficiencies in current clerical procedures would be lost. The ability to pull together Patient episodic data would be diminished with resultant adverse effects on clinical audit and resource planning. The unknown level of resource required to amend systems for year 2000 compliance has moved this option from a low risk category into a high risk category.

3.2 IMPLEMENT A CLINICAL RESOURCE INFORMATION SYSTEM (CRIS). (Option 2)

Implementation of a CRIS has, in the past, been the standard model within Resource Management projects of providing a database of casemix information to support clinical audit, costing and resource planning. Typically, this would involve the extraction of data from "feeder" departmental systems and the PAS, and the construction and maintenance of a database for the above purposes. An essential prerequisite for a CRIS was the existence of a sufficient number of feeder systems.

Theoretically, a CRIS would provide a range of benefits. In practice, and using other Resource Management sites as examples, these benefits have been difficult to achieve. Indeed in many cases, the system has failed, software licences have been cancelled, and hardware has been redeployed for other purposes. The reasons for this are many, and include organisational (e.g. lack of sponsorship, ownership, management change); technical (e.g. insufficient feeders, inconsistent data, interface problems, user unfriendly front end); and economic (e.g. ongoing revenue costs outweigh perceived benefits).

There is nothing to suggest that the Southern General would fare any better than other Trusts. In any event, the implementation of a CRIS would not address the operational and clinical needs of the Trust.

The implementation of a CRIS would be an additional investment over and above the investments for the Do Minimum option.

3.3 "Big Bang" HISS (Hospital Information Support System) (Option 3)

A commonly accepted definition of a HISS is that it is characterised by a single one time data entry of patient information, by a single patient database, and by communication of orders and results. A HISS allows every user to have access to the data they require to carry out their work, regardless of where in the hospital that information was generated.

A HISS is described as an "integrated" system which means that different modules of the system will be linked together and will use a common database.

All software is provided by the one supplier. Any exception to this will be minimal. There is a commitment to implement a large portion of the system within a (relatively) short timescale.

The advantages of this option, if successful, would be that it would satisfy the system integration aims of the Trust and all the attendant benefits (e.g. single point of data entry, single MPI, access to patient episodic data etc.)

There are a number of disadvantages or risks associated with this option:-

A substantial IT replacement programme disregards the investment made to date in hospital systems.

Big Bang HISS implementations in the UK have not been universally successful.

Users have to accept that departmental modules are not necessarily "best of breed", and may have to compromise on functionality.

3.4 Implementation of a Hospital Information System (HIS) with interfaces to key current systems. (Option 4)

This option is consistent with the Trust's current IM&T strategy. Specifically, however, it recognises that there is a weakness in the inherited position with regard to the PAS which needs to be addressed. For the reasons mentioned earlier COMPAS is not seen as a good base on which to build our future systems. A key feature of this strategy would be the replacement of COMPAS along with a Results Reporting and Order Communications system and the implementation of a Clinical Information System which would capture Speciality specific data. Included also in this strategy would be the replacement of the two Radiology systems which would be difficult to interface to a new Hospital Information System. This would then provide a solid base for the gathering of other clinical and Patient episodic data.

The advantages of this option are:

- The Trust would replace its core system with an appropriate commercially sound product which has the functionality to extend the Patient Administration functions to incorporate the key Clinical aspects required by the Information Management & Technology Strategy of the Scottish Health Service
- Previous key investments would be safeguarded. These include the TELEPATH 2000 Laboratory System, the INTEGRA Finance & Stores System, the ORSOS Theatre Management System, and the TIARA System that has been adapted for the administration of Wheelchairs and Prosthetics.

Option 4 is the preferred option and is the subject of this Business Case.

4. THE PUBLIC SECTOR COMPARATOR

The Public Sector Comparator has been evaluated under the Financial and Economic Appraisals sections.

5. THE PFI PROCUREMENT PROCESS.

The Trust has undertaken the procurement of a Hospital Information System in accordance with the guidelines produced by the Scottish Health Service's Information Systems Support Group (ISSG). Throughout the process, guidance and advice has been given by ISSG and the Central Legal Office.

The Trust placed an advert in the European Journal in early October 1996 under a negotiated procedure. (see Appendix 1).

A Financial, Economic and Technical Questionnaire was issued to interested parties. Thirteen responses were received and these were evaluated against a pre-set range of weighted criteria. As a result of this, seven were eliminated and an Operational Requirement (OR) was sent out to the remaining six at the end of October. The Operational Requirement had been produced in consultation with thirty six Trust staff who also agreed the weightings for the scoring of the OR. This group formed the **Full Evaluation Team** which consisted of twenty Consultants, three Senior Nurse Managers, and other Professionals and Managers.

Five responses were received and these were scored by the **Full Evaluation Team** early in December. It was unanimously agreed to eliminate two Suppliers at this stage.

The next step in the evaluation process consisted of demonstrations and site visits. The attendees at the site visits (**the Core Visiting Team**) consisted of a subset of eight members of the Full Evaluation Team. The members of this team were three Hospital Consultants, the HIS Project Doctor, a Senior Nurse Manager, the Chief Biochemist, the Health Records Manager and the IT Manager.

Each on-site demonstration was attended by more than fifty members of staff who provided feedback to the **Full Evaluation Team**. Following this step, which was completed by mid February, it was agreed to eliminate one Supplier. However it was felt that a further evaluation step would be required before entering into draft negotiations.

The further evaluation step consisted of additional demonstrations, site visits by both the **Core visiting Team** and a group of Trust Directors (**the Executive Team**), service proposals and other confidence checks. This step was completed by mid June when the **Full Evaluation Team** met to review the results and to determine the way forward. There was a prevailing view that despite one of the Suppliers proposals looking attractive on paper and at demonstrations, visits to four hospital sites failed to reassure the team that what was on offer had been realised anywhere. Following advice from ISSG procurement team and the Central Legal Office that we should be confident that any Supplier taken to final tender could satisfy our requirements, and based on the fact that in some recent procurements the losing Supplier had threatened legal actions, the team agreed that we would only invite one Supplier to negotiate a draft contract on the basis that the unsuccessful Supplier had not demonstrated that certain aspects of their proposals had adequately been implemented at any of their reference sites.

Negotiations on the draft contract have incorporated a number of concurrent activities which have included:-

- Draft Terms and Conditions through consultation with the Central Legal Office.
- Clarification of the Contractor's responses to the Operational Requirement.
- Discussions on all other parts to the draft schedules.
- Specification of the interface to the TELEPATH laboratory system, and to the other interfaced systems.
- Specification of the data take-on requirements from the current PAS and Radiology systems.

6. THE PREFERRED PFI SOLUTION.

6.1 The Consortium

The preferred PFI solution is the one proposed by Data General as Prime Contractor and Meditech as the main Application Software Suppliers. Data General and Meditech have been involved together for over 20 years in the supply of hardware and software to service the information needs of healthcare organisations. Meditech focuses solely on the design, installation and service of such systems to the Healthcare market. There are over 900 Meditech installations worldwide. Meditech thus has a well documented strategy for the development of their integrated suite of information systems for healthcare. This includes both development in the technical aspects of the solution and in the functionality provided.

The Healthcare market sector accounts for approximately 20 % of Data General's turnover, therefore there is a clear strategy and commitment to this marketplace. In Scotland and Northern Ireland Data General has a framework agreement with the Health Services allowing Hospitals to purchase open systems without having to go to the European Journal.

Data General - Meditech have six live HISS installations in the UK, at Burton Hospitals NHS Trust, Sunderland City Hospitals NHS Trust, Liverpool Women's, Royal Liverpool Children's, Warrington and Yorkhill NHS Trust in Glasgow. These include PFI compliant contracts in the latter four..

6.2 The PFI Solution

Data General as prime contractor will deliver a range of services as per the draft contract which include:

Baseline Application Software

- Patient Administration System
- Order Communications and Results Reporting
- Departmental System
- Radiology
- Interfaces to TELEPATH 2000 Laboratory system, ORSOS Theatre system, and TIARA Wheelchair System
- A&E
- Data take-on from existing systems.

Possible future elements might include:

- Pharmacy
- Maternity
- Nursing
- Executive Support System

The Contractor will provide a fully managed service to meet performance criteria set out in the draft contract.

6.3 Funding Structure of the Project

Data General will initially fund the project from their own resources until acceptance of the first phase has been reached. Thereafter through arrangements with banks, there will be an assignation of the delivery payment stream.

6.4 Timetable from FBC to Financial close and Delivery of Services

Provided that all other contractual issues have been resolved, Financial close should be immediate after signing of contracts. The Delivery of Services should follow the Project Implementation Plan with the Acceptance of phase 1 signalling the commencement of the delivery payment stream.

7. ECONOMIC APPRAISAL.

The Capital and Revenue costs of the Do Minimum option and the HIS implementation option were evaluated, these being the only two options considered to be practical in terms of meeting the Trust's requirements.

The economic analysis only takes account of actual Cash Flows and consequently non-cash transfers, such as Capital Charges, are excluded. The calculation adjusts future values for the time value of money by applying a discount factor.

The basis of any option appraisal is to make a comparison on fair and equal terms. A discount rate of 6% is applied to all cashflows in accordance with the SCIM and PFI evaluation guidance.

Under the Do Minimum option (Option 1) there would be considerable ongoing capital investment in developing the existing systems to resolve the problems of obsolete technology and the year 2000. The COMPAS and Radiology systems would also have to migrate from current hardware platforms. The current level of FM support costs is assumed to increase exponentially in line with ongoing investment.

The HIS Implementation option (Option 4) has been evaluated assuming PFI funding. Under this option there would be a minimal capital requirement over the 8 year contract period with an estimated annual expenditure of £50K for PC's etc.

The FM costs include LAN support on the basis of 8 am to 8 pm, 7 days per week cover.

Training on the new system would cover an 18 months period from installation which is assumed to be mid way through 1998/99. Total cost of the training will be £300,000 over the 18 month period and it is intended to fund this expenditure from the Formula Capital Allocation. In addition to the initial training, an ongoing Helpline will be established. This will be staffed by 3 x A&C grade 6 at an annual cost of £60K.

The revenue savings to be derived from the HIS implementation are potentially significant. These are detailed in the Cash Releasing Benefits table. The major benefit will be in reducing time spent throughout the trust in re-entering patient details to different systems and in providing direct access for clinical staff to laboratory results. The total value attached to time savings is calculated as approximately £450k p.a. It is estimated that approximately 20% of identified savings would result in a cash releasing saving with the balance of time saved being used to improve service quality. These non cash releasing benefits have not been taken into account in the economic and financial appraisals.

In addition to the ongoing revenue savings a one off saving of £12,000 has been identified. As the integrated system will improve communications between departments it will be possible to reduce Pharmacy stock levels by this amount. This would be a subsequent phase.

It is assumed that savings generated would be released 12 months after implementation of the system.

On the basis of the foregoing revenue effects the NPV of the Do Minimum option (Option 1) is £7.217m compared to an NPV of £5.549m for the HIS Implementation option (Option 4) Appendix 1. On the basis of the economic appraisal it is clearly advantageous to proceed with Option 4 and implement the HIS.

8. RISK ANALYSIS.

The PFI Proposal demonstrates significant transfer of risk from the public to the private sector.

	AREA OF RISK	£'000	DESCRIPTION OF COST	TRANSFER TO PRIVATE SECTOR
1	Non Availability of Capital funding	1,777		100%
2	Delay in implementation	150	Cost of additional training required.	This represents an equivalent cost of the Trust's investment in staff time. The Contractors additional costs would be borne fully by the Contractor
3	Systems Failure	642	Annual FM Cost	30%
4	Cash Releasing savings not realised	90		-
5	Inflation > GDP	-	Not quantifiable	100%

1. The availability of Capital Funding within the proposed 18 month timescale is not known. any delay in implementation would substantially increase costs to the trust with additional expenditure being required to maintain existing systems to an acceptable standard. There would also be a delay in realising the proposed Cash Releasing savings.

The PFI proposal would transfer this risk in its entirety to the private sector.

2. Any substantial delay in the proposed implementation plan would incur additional training costs. A minor delay would not incur additional costs.
It should be noted that the Trust would not pay any of the Delivery Payment until the system passes Initial Acceptance. This Delivery Payment represents 70% of the annual cost. The performance stream which represents 30% of the annual cost would not be triggered in the event of non delivery. Therefore, 100% of the annual cost is transferred to the Contractor. The Trust has the option to terminate the contract.

3. System failure in this context does not mean total irretrievable breakdown of service, but refers to the the failure of the system to meet specified performance criteria including system availability, problem resolution, transaction response times, usage and the ability of the Contractor to respond to statutory changes and other software upgrades within agreed timescales. This amounts to 30% of the annual cost.

There is provision within the draft contract for the Trust to terminate the agreement upon Contractor default which includes:-

- (i) Gross or persistent breaches by the Contractor or the Contractor's personnel of the provisions of Clause 16 (Confidentiality) insofar as they relate to Patient Information.
- (ii) Failure of the Contractor to achieve 15% of the 30% Performance stream payments in any four consecutive quarters of the Agreement (such an event is deemed not capable of remedy).
- (iii) Failure of the Contractor to achieve 5% of the 30% Performance Stream Payments in any two quarters in any twelve consecutive months period of the Agreement (such an event is deemed not capable of remedy). For the avoidance of doubt, any Performance Stream Payment achieved by default (e.g. No Statutory changes due to be delivered in the quarter) will not count toward this 5%.
- (iv) Failure of the Contractor to achieve Acceptance in respect of phase 1 of implementation of the Services (as defined in the implementation plan) within a six month period after the Planned Acceptance Date for phase 1 (other that where such failure is due to an event of Force Majeure). Under these circumstances, the Trust pays nothing due to Contractor default.

9. FINANCIAL APPRAISAL

The revenue implications of the HIS implementation were quantified for both the Public Sector Comparator (PSC) and PFI options.

The publicly funded option assumes that Capital funding for the HIS implementation would be made available in 1998/99 in line with the proposed timescale for implementation under the PFI option. Any delay in obtaining capital funding would result in significant additional capital expenditure being incurred by the Trust in order to maintain existing systems at an acceptable standard. The asset acquired under the PSC would be depreciated over a period of 10 years in accordance with SCIM. The residual value at the end of this period is assumed to be NIL. This option has therefore been evaluated over the asset life of 10 years.

The PFI option is for an initial contract period of 8 years and has therefore been evaluated over this shorter period.

The impact of the proposal under both options on the Trust's Income and Expenditure Account is shown at Appendix 2. The Equivalent Annual Cost of the PSC is £824K compared to £711K under PFI.

The cash flow generated by both options, omitting capital charges implications, is shown at Appendix 3. The Equivalent Annual Cost of the PSC is £823K compared to £711K under PFI.

AFFORDABILITY

The affordability issue within the Trust's income and expenditure profile is seen as key to the viability of the project.

Two years have been evaluated for affordability namely 1999/2000 and 2000/01. The expenditure profile of these years covers the peak expenditure incurred in 1999/2000 and the typical recurring expenditure of 2000/01. The effect on the Income and expenditure is NIL in both years therefore there is no impact on Hospital Running Costs (Appendix 4)

FUNDING ARRANGEMENTS

Under the PFI option the HIS will initially be funded by the supplier Data General. Once the system is fully operational this will be factored by a finance house to be determined by Data General.

The FM costs have been linked to a GDP deflator of 2% over the initial contract period of 8 years.

10. SUMMARY OF THE CONTRACT STRUCTURE.

The Terms and Conditions of the PFI contract will be set out as per the guidance from the Central Legal Office. The Schedules to the contract will cover:-

Schedule A Trust Requirements and Contractor's Response.

Schedule B Deliverables including baseline software, Implementation Services,
Documentation and all managed services.

Schedule C Other Responsibilities of the Contractor.

Schedule D Trust's Responsibilities.

Schedule E Project Timetable.

Schedule F Software Delivery and Acceptance Testing.

Schedule G Financial Obligations. (see note below)

Schedule H Change Control.

Schedule I Escrow Agreement.

Schedule J Specially Written Software.

Schedule K Managed Services.

Schedule L Project Management.

Schedule M Conditions for Use of Software.

Note:

With regard to the payment mechanism, there will be two separate payment streams throughout the contract period. These will be:

- (i) A delivery stream consisting of 70% of the annual contract payment. This is linked to the delivery of application software services. These sums will be authorised immediately following Initial Acceptance of each phase.
- (ii) A performance stream consisting of 30% of the annual contract. This is linked directly to the performance of the system and the Contractor. There are three payment drivers:-
 - System and Performance availability (including Help Desk resolution times, system availability, and system response times)
 - Usage
 - Cost of change (including statutory changes, general upgrades and minor software changes).

For the delivery stream, payment will commence at the end of the month in which Initial Acceptance for the relevant phase occurs. It should be noted that no payment is made until Initial Acceptance is given. If a phase does not satisfactorily pass the Final Acceptance within two months of Initial Acceptance, 25% of the Delivery stream payment will be reimbursed by the Contractor to the Trust. This sum will be retained by the Trust until the phase satisfactorily passes the Final Acceptance test. Failure of the Contractor to achieve Acceptance of the first phase within six months of the Planned Acceptance Date puts the Contractor in default and entitles the Trust to terminate and obtain a full rebate.

For the Performance stream, payment will be made after the end of the quarter to which the performance relates, subject to agreement of the service levels and payment drivers. The amount of the payment is dependent on the level to which the performance criteria is met. Failure to achieve specified levels either on four consecutive quarters or in any two quarters within twelve consecutive months puts the Contractor in default and entitles the Trust to terminate.

11. ACCOUNTING TREATMENT.

Under the PFI option, the asset at no time vests in the Trust. The project is therefore treated as wholly off Balance Sheet.

12. PROJECT MANAGEMENT ARRANGEMENTS.

12.1 ORGANISATIONAL STRUCTURE

The Trust has an Information Steering Group chaired by the Chief Executive through which all Information System projects are reported. This will remain in place for the HIS implementation. It will be the responsibility of the Information Steering Group to review critical issues raised by the Project Board (see below) and to provide strategic direction as required.

In addition, and in accordance with the principles of the PRINCE project management methodology, there will be a Project Board established which will contain representation from both the Trust and the Contractor. It will be the responsibility of the Project Board to:-

- Review high level project plans
- Undertake contract reviews
- Review the Service level reports produced by the Contractor and agree payment and penalties
- Review benefits realisation reports
- Escalate critical issues to the Information Steering Group

The project will have a single Contractor Project Manager, and a deputy.

The Trust will have an overall Project Manager and a sub-project manager for each main module of the HIS.

12.2 CONTRACTOR'S RESPONSIBILITIES

The Contractor will act as Prime Contractor for the managed service delivery to the Trust and will manage all projects with its sub contractors accordingly.

The Contractor will be required to demonstrate that it has contracts in place with all relevant 3rd party contractors.

The Contractor will be required to demonstrate that the plans it has with 3rd party contractors are consistent with its own joint project plans with the Trust.

The Contractor is required to ensure that its project managers have training and experience in the use of the PRINCE project management methodology.

The Contractor's project Manager will present the Trust with the project plans the Contractor has with subcontractors if required by the Trust.

12.3 PLANNING AND CONTROL

In accordance with PRINCE, there will be project plans for:-

- the overall project
- each implementation phase
- each module within each phase
- introduction of application software changes
- system events(e.g. hardware and operating system upgrades)
- ad hoc projects (e.g. data take on)
- software acceptance
- core and end user training

Gantt charts showing tasks, milestones and dates will be prepared and reviewed at each project meeting

Resource plans will also be prepared and reviewed at each project meeting.

Both Project Managers will be responsible for updating the plans and for agreeing the meeting agendas.

13. BENEFITS ASSESSMENT AND BENEFITS REALISATION PLAN.

It is anticipated that the implementation of the HIS will attract a wide range of benefits. This will include:-

- Improved clinical decision making through the implementation of Order Communications and Results Reporting allowing easier and quicker access to patient information.
- Improved support for clinical audit and research with all patient activity integrated within the one system.
- Improved clinical coding through the implementation of an encoder and direct access to patient information.
- Improved communication between departments through the appropriate sharing of information.
- More responsive service to patients through improved communications and an enhanced ability to book resources and appointments.
- Improvements to health records management through the implementation of casenote tracking.
- Improved bed management through the implementation of ward level admissions discharges and transfers.
- By recording patient demographics only once there will be an improvement in data quality and a vast saving in staff and patient time by not having to repeat the same information over and over again.
- Improved service to general practitioners through better patient booking systems and more timely and accurate communications. Future developments might include direct access to the HIS for GPs.
- Better support to the Hospital's Integrated Care Pathways programme through the implementation of multi-disciplinary care plans.
- Improved management information to assist in service planning, costing and contracting/commissioning processes.

CASH RELEASING BENEFITS

Department/ Staff Group	Systems Facility/ Benefit	Savings	£ pa
Wards (43 wards)	An integrated system will remove the necessity of entering patient details into different systems	1 hour per day Grade D Nursing time.	84,968
	On line provision of patient details and test results will reduce clerical time tracking and locating casenotes	½ hour per day A&C Grade 2 x 43	29,236
Wards/Clinics	Consultant time will be saved through availability on line of test results and improved casenote tracking.	¼ hr per day x 126	228,992
	Secretarial time saved through improved casenote tracking facility	½ hr per day A&C Grade 3 x 120	93,756
Radiology Dept	Clerical time saved through not having to re-input patient details	3 hours per day A&C Grade 3	4,683
Laboratories	Clerical time saved through not having to re-input patient details.	6 hours per day A&C Grade 3	9,372
	Saving in test report bags		5,000
Nuclear Medicine	Clerical time saved through not having to re-input patient details	½ hour per day A&C Grade 3	781
ECG	Clerical time saved through not having to re-import patient details	1 hour per day A&C Grade 3	<u>1,563</u>
		TOTAL	458,356

Pharmacy Reduction in stockholding (subsequent phase)

12,000

It is estimated that 20% of the identified benefits would result in a cash releasing saving.

14. RISK MANAGEMENT STRATEGY.**14.1 Pre-Implementation**

The essence of a PFI approach is to transfer risk to the Supplier of the service. Failure to deliver in accordance with the contract results in non payment. The delivery stream payment does not commence until after acceptance by the Trust following an agreed go live date. Any risks retained by the Trust are summarised below:-

Risk Area	Avoidance strategy
Supplier fails to implement	This is a low risk scenario given the track record of the Supplier. The Trust would continue to use current systems supported by current contractors until an alternative was procured. Any investment in infrastructure would be utilised in a future alternative.
There is a delay in implementation.	The project will be managed by a project board of senior staff. Any potential delays will be highlighted in advance. For the first phase, the Trust plans a system support overlap for current systems being replaced.
There is insufficient local IT staff to support the HIS.	The Trust plans to recruit additional staff to avoid this scenario.
Interfaces to other Suppliers software might not work satisfactorily.	The Trust plans to have the prime contractor sub-contract with the interfacing supplier of the TELEPATH laboratory system, and the interface will therefore be subject to the PFI contract conditions.

14.2 Post Implementation.

Due to the nature of the PFI contract, any Post implementation performance degradation of the system or the Supplier will be subject to appropriate penalties amounting to 30% of the annual contract arrangements. Consistent failure to meet specified performance levels might precipitate contract termination with appropriate safeguards for the Trust. Other risks to be managed by the Trust are:-

Risk Area	Avoidance Strategy
The LAN has a single point of failure.	For historical reasons, the existing structured cabling is based on a star shaped topology with a single point of failure at the main communications node. Prior to implementation, the Trust will improve the resilience of the network by implementing a ring shaped topology which will protect the major segments of the network.
Maintenance of the LAN is not included as part of the PFI contract.	To have incorporated the maintenance of the LAN as part of the PFI deal would not be value for money. The implementation of the resilience features mentioned above will reduce the risk of overall failure. The Trust will extend its existing network support arrangements to encompass the increased demands of the HIS. (see note below).

Note:

The Trust's LAN will be used for systems other than the Hospital Information System (HIS). For the HIS Contractor to have included support for the LAN, they would insist on a wide margin of capacity to ensure meeting the Performance criteria. Additionally, the Contractor would insist on strict control of changes which might constrain the Trust's plans for implementation of new systems or changes to existing systems. Under the scenario of the LAN supporting systems other than the HIS, it would be difficult for the Trust to invoke availability and response time penalties against the Contractor due to faults in the main system.

15. POST PROJECT EVALUATION PLAN.

The implementation of the proposed Hospital Information System will affect most parts of the organisation and there will be a gradual impact as the system is rolled out. There is no doubt that the roles and responsibilities of large numbers of Trust staff will change. These changes need to be clearly communicated and agreed prior to implementation and a comprehensive training plan put in place as part of the implementation process.

It is intended that the Project Board will not be abandoned at implementation time but will continue to monitor the post implementation activities to ensure that there will be an ongoing assessment of the benefits realisation programme.

16. INFORMATION MANAGEMENT AND TECHNOLOGY STRATEGY.

In September 1993, the Trust established an Information Management & Technology Strategy which set out how it intended to approach the provision of information to support its clinical and business objectives.

This strategy was subsequently reviewed in 1994 to ensure that it properly reflected the ongoing needs of the Trust and that it took into account any significant changes in direction and any new opportunities.

The original strategy described a comprehensive framework for the development and implementation of information systems and included details of supporting technologies, principles and practices.

The strategy:

- summarised the Trust's information needs
- outlined the issues involved in achieving the Trust's IS/IT Strategy;
- assessed the current investments in systems, infrastructure and staffing against their ability to meet the Trust's needs;
- defined actions and priorities;
- outlined standards, including technology and methodology;
- outlined a three year plan and the related capital and revenue cost implications.

In formulating the strategy, cognisance had been given to:

- the Trust's business plan;
- the information strategy for the NHS in Scotland;
- the clinical and business information requirements;
- current industry standards;
- principles representing best practice

The original strategy identified three distinct phases in the process of achieving the ultimate goals of systems integration. These phases were:-

- consolidation (year ended 31 March 1994);
- transition (3 years ended 31 March 1997);
- integration (after year ended 31 March 1997).

The purpose of separating the Strategy into these phases was to facilitate a controlled delivery of information systems to match the business plans of the Trust, subject to the funding constraints which were in place at that time.

Progress and Alterations to the Strategy

The activities and projects proposed for the consolidation period were achieved. Some of the system initiatives originally proposed for the transition period (1994 -97) have been successfully implemented. Others have been subject to ongoing review.

An Information Steering Group comprising the Chief Executive, the Director of Medical Services, the Director of Finance and Technology and the Information Technology Manager has been established since July 1993. This Group has been responsible for the creation and execution of the Trust's Information Management & Technology Strategy. This strategy has proved to be robust, successful and has delivered a range of tangible benefits to the organisation.

As part of the Resource Management Initiative, an additional group was formed to investigate the information needs of the clinical community. This Group, chaired by the Director of Medical Services, looked at how information may be best obtained and used within the total Patient episode to maximise care, making best use of scarce resources.

The conclusion drawn from these exercises is that the Trust requirements would best be satisfied by the replacement of the PAS and Radiology systems, the implementation of an Order Communications and Results Reporting System, and the implementation of a Clinical Information System and these in conjunction with links established to existing Laboratory, Theatre and Wheelchair systems would form the core of a new Hospital Information System (HIS).

In addition, the HIS would be extended in the future to include Pharmacy, A&E, Nursing, Therapies, Maternity and Executive Support.

The Trust has now entered its System Integration phase and this Business Case calling for further investment in Information Technology, embodies the strategic direction of the Information Steering Group, and the key interests of the Clinical working Group and is consistent with the Trust's I.M.&T Strategy.

17. EQUIPMENT.

The system will be run as a fully managed service with IT Services Ltd. (a subsidiary of BNFL) being sub contracted to provide the facilities management. The service will include a 24 hour Help Desk, resilient telecommunications links and a fully tested disaster recovery service. It will be the responsibility of the Prime Contractor to provide whichever equipment is necessary to meet the performance criteria set out in the contract.

The Trust's own LAN will be enhanced to ensure that there is no single point of failure, and the Trust's existing stock of PCs will be utilised and enhanced to deliver the service to the desktop. This will be funded from the Trust's agreed Capital Spend.

18. CONCLUSION.

The clinical and business needs of the Southern General Hospital will not be satisfied by the current range of computerised information systems. The various options to satisfy these needs have been explored. A full and comprehensive evaluation of the market has been undertaken by a wide cross section of staff from within the Trust. They have concluded that the solution from Data General - Meditech best meets these needs, and would provide the Trust with a range of benefits for the future. The consortium represents a stable partnership, dedicated and committed to the healthcare market, with whom the Trust would feel comfortable over an extended period of time. The PFI option has been explored and it is concluded that this represents an acceptable level of risk transfer.

SOUTHERN GENERAL HOSPITAL
NHS TRUST

BUSINESS CASE
for a
HOSPITAL INFORMATION SYSTEM

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1. EXECUTIVE SUMMARY

1.1 Background and Objectives

The Trust's Information Management & Technology Strategy has set out a comprehensive framework for the development and implementation of information systems to support its clinical and business objectives. The original strategy identified three distinct phases in the process of achieving the ultimate goals of systems integration through an incremental approach. These phases were:-

- consolidation (Year ending March 1994)
- transition (3 Years ending March 1997)
- integration (April 1997 onwards)

The activities and projects proposed and undertaken during the consolidation and transition phases have been successfully implemented and have delivered a range of clinical benefits and in the case of the new Finance and Stores system have provided significant revenue savings.

During 1995 and 1996, the Trust participated in the Resource Management Project. This afforded the opportunity to re-assess the information needs of the Clinical community within the Hospital. It became clear that to continue in an incremental way towards integration, would necessitate the replacement of the Patient Administration System (COMPAS) which was based on old technology, had limited functionality, had no significant investment in recent years and was not Year 2000 compliant. The replacement PAS would need to include all patient attendance types including inpatients, outpatients, day cases and A&E. In order to satisfy the clinical information needs of the Hospital it would be necessary to implement an Order Communications and Results Reporting system, a Clinical Information System and these in conjunction with interface links to existing Laboratory, Theatre and Wheelchair systems would form the core of the new Hospital Information System (HIS). Possible future elements would include Pharmacy, Nursing, Maternity, Therapies and Executive Support systems.

The Trust explored different options to satisfy its requirements including a collaborative venture with Computer Science Corporation (CSC), who provides IT services to the NHSiS and who supported both COMPAS and the HMS outpatients systems. The HMS outpatients system was a modern system specifically developed for the NHSiS as an outpatients module linking with COMPAS. HMS had an inpatients module which had been implemented at St. Thomas' in London. CSC had also acquired the rights to a Software package from Belgium called Crossway which offered the basis of an electronic patient record and seemed consistent with the Trust's direction. However, during negotiations with CSC, the CSC project team was unable to secure their own main board's backing for their product and service proposals. This happened on a number of occasions when fully costed proposals were expected, but CSC failed to deliver. Subsequently, CSC withdrew support for the HMS system for the NHSiS. CSC having been unable to complete commercial negotiations, the Trust decided to go for an open procurement.

An evaluation team consisting of thirty six staff including twenty clinicians, was established. This team participated in the evaluation process leading ultimately to the selection of Data General - Meditech as the preferred bidder.

1.2 Preferred Option.

The preferred solution is a PFI implementation with Data General as Prime Contractors and Meditech as the main Application Software Suppliers. Data General and Meditech have been involved together in the healthcare market for over 20 years and there are over 900 Meditech installations worldwide.

The PFI deal will incorporate a range of services including:-

- Patient Administration
- A&E
- Order Communications and Results Reporting
- Radiology
- Departmental (Clinical Information)
- Interfaces to Telepath 2000 Laboratory system, ORSOS Theatre system, and TIARA Wheelchair system
- Data take on from existing systems

Possible future elements might include Pharmacy, Maternity, Nursing, and Executive Support systems.

The Contractor will provide a fully managed service to meet performance criteria set out in the draft contract

1.3 Summary of Economic and Financial Appraisals

The table below summarises the key aspects of the Economic and Financial Appraisal.

	Option 1	Option 4	
	Do minimum	Implement HIS	
	(8 years)	PFI (8 years)	PSC(10 years)
	£'000	£'000	£'000
Capital Cost	4,060	575	2,452
Revenue Cost	4,997	7,033	7,578
Cash Releasing Benefits	-	630	810
Discounted Cash Flow (6% discount rate)	7,217	5,549	7,324
Financial cost (revenue costs and capital charges, including cash releasing benefits)	-	6,978	9,220
Impact on prices	-	NIL	NIL
Equivalent Annual Cost	-	711	824

The analysis indicates that the Do Minimum option (Option 1) would be unlikely to provide the means of achieving the Trust's IT strategy. On the basis of PSC evaluation the most cost effective means of implementing the HIS is through PFI.

1.4 Key points of PFI deal

- The term for the contract will be eight years, capable of being extended for up to a further two years.
- The Contractor will provide a managed service to the Trust including disaster recovery.
- There will be two separate payment streams throughout the contract period.
 - A delivery stream equal to 70% of the annual contract payment. Payment will commence following acceptance by the Trust of each phase of the implementation.
 - A performance stream equal to 30% of the annual contract payment linked to the performance of the system and the Contractor.
- The implementation will be managed in accordance with the PRINCE project management methodology.

2. STRATEGIC CONTEXT.

2.1 THE STARTING POINT

The Southern General Hospital NHS Trust is a major acute Hospital with the aim of providing a range of high quality, cost effective services to the local catchment population and to the rest of Scotland having regard to the best interests of patients and staff. These services are currently provided from three sites:-

Southern General Hospital
Cowglen Hospital
Belvidere Hospital

The Trust employs 3,500 WTE staff and the anticipated contract income for 1997/98 is £90m

The Trust has developed a comprehensive portfolio of services including:

Core Services

General Surgery
General Medicine
Orthopaedics
Medicine for the Elderly (Assessment and Rehabilitation)
Frail Elderly Continuing Care
Obstetrics
Neo - Natal Paediatrics
Gynaecology
Accident and Emergency
Radiology
Laboratories

Sector Services

Urology
Ophthalmology
Dermatology
Podiatry
Physically Disabled Rehabilitation (Assessment and Rehabilitation)
Physically Disabled Rehabilitation (Continuing Care)
Physically Disabled Rehabilitation (Community Rehabilitation Team)

Regional Services

Neurosurgery
Neurology
Prosthetic and Wheelchair Service

National Services

Spinal Injuries

The catchment populations for these services are:-

Core Services (South West Glasgow)	- population 175,000
Sector Services (South Glasgow)	- population 361,000
Greater Glasgow Health Board	- population 907,000
Regional (West of Scotland)	- population 2,730,000
National	- population 5,146,000

The Trust's first 5 year strategic plan (1992-1997) was prepared at a time when the emerging environment was very much one of competition. Consistent with the Greater Glasgow Health Board strategy, the Trust has taken forward a number of initiatives to achieve the aims and objectives set in 1992. In addition to enhancing the range of services available to the population served, the Trust has invested in upgrading or replacing the infrastructure of the hospital to significantly improve the quality of clinical accommodation used by patients and in doing so improving the working environment for staff. In addition to upgrading work, the Trust has invested in new buildings to meet the requirements of new services transferred onto the campus. This investment over the last four years has totalled some £35m.

In contrast to the period 1992-1997 which was an era of competition between providers, the Trust believes that the next five years will be a period in which there will be strategic alliance and collaboration between providers of health care.

Greater Glasgow Health Board currently has an approved strategy for Acute Services to 2001. This strategy will be subject to further review. In the meantime, the Trust continues with initiatives already underway including the transfer of the West of Scotland Mobility and Rehabilitation Centre from Belvidere hospital to the new build on the Southern General Hospital campus. Development planning also continues on the transfer of Oral and Maxillo Facial Services to the Southern General Hospital campus, PFI for Medicine for the Elderly, and collaboration with GGHB to enact the change set out and approved in the Maternity Services Strategy. Running through all of this is the aim to deliver a high quality service which has been one of the cornerstones of the Trust's success.

Set against this background, it is essential that the Trust's information systems are capable of supporting this drive to improve services and quality of patient care. It has been the objective of the Trust's Information Management & Technology strategy to do just that, and although much has been achieved over the past four years, the next steps in terms of Patient Administration Systems, integration of departmental systems, and clinical information support, will be crucial to establishing a sound information infrastructure for the millennium.

2.2 TRUST MERGERS

Subsequent to the completion of the initial draft Business Case, the Southern General Hospital entered into a period of collaborative working with the Victoria Infirmary as a precursor to a likely merger in April 1999. The purpose of the Glasgow Southside Collaboration Model was to assist in:-

- The development of integrated clinical services across primary and secondary care
- Closer working with GGHB on the development of a Health Improvement Plan
- The development of shared managerial services

The opportunity was taken to review the information systems across both Hospital Trusts to ensure that our HIS proposals were still soundly based. Both Trusts have now implemented a common Finance and Stores system. Both Trusts use the same Radiology, Laboratory and Theatre Management systems and the HIS proposals contain interfaces with the latter two. There is a different PAS in use at the Victoria, but this will be a common feature of merging Trusts and will need to be dealt with in a planned manner, including the resolution of different Case Record numbering systems, increased use of the CHI number and the use of middleware as an interim solution. It is clear that set in the context of a combined South Glasgow Trust, there are considerable additional advantages with the implementation of a HIS:-

- Good starting point to support shared clinical services (Order Comms. and Results Reporting)
- Interfaces to key current systems (cross site access)
- Good framework to support future GP access
- Consistency with the national I.M.&T. strategy and with the direction outlined in the White Paper
- Multi- facility (hospital site) option
- Foundation for electronic patient record established through the implementation of the clinical information systems and Order Comms. and Results Reporting

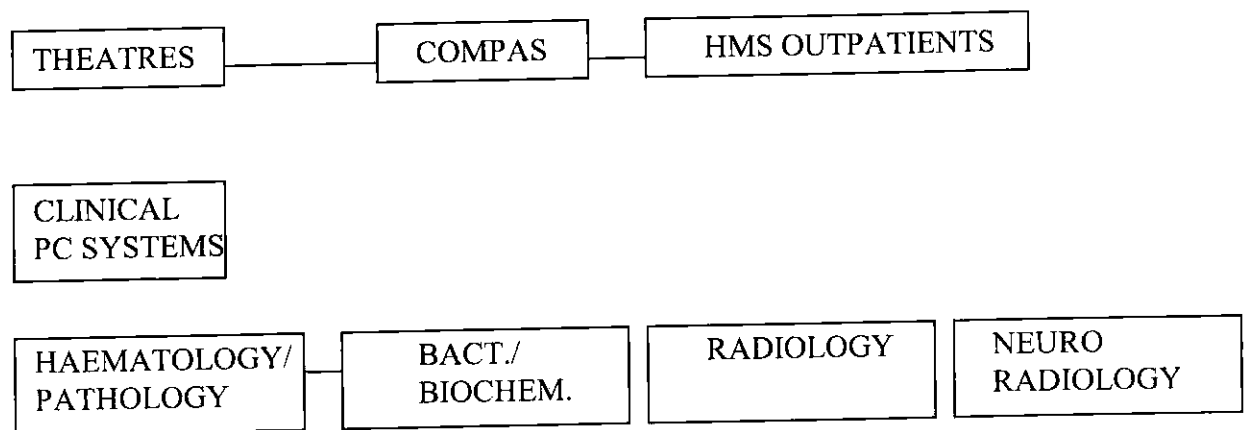
It is concluded that the business case is strengthened when set in the context of a South Glasgow Trust and indeed underlines the need to remove further delays in implementation since the Do Nothing option jeopardises a combined Trust's ability to satisfy the "Designed to Care" vision of the Health Service in Scotland.

3. THE OUTLINE BUSINESS CASE

In considering the progress of the Trust's IM &T strategy, namely that of an incremental approach to the implementation of Information Systems, there had been a number of achievements over the past four years that have delivered a range of benefits, and in some cases significant revenue savings. These have included:

- Completion of the implementation of COMPAS, MPI, Inpatients and Waiting lists
- Implementation of Berkeley's Radiology System
- Implementation of Telepath laboratory system in Pathology.
- Migration of other Telepath laboratory systems to an Open System platform.
- Integration of laboratory systems.
- Transmission of laboratory results to GPs.
- Implementation of the HMS Outpatients system.
- Implementation of the ORSOS Theatre Management system.
- Implementation of a networked Works Information Management System(WIMS).
- Implementation of a networked Urology system.
- Technology enhancement to Neuroradiology system.
- Upgrade of all Office systems to use MS- Office
- Implementation of new integrated Finance and Stores System.

With regard to our Patient based systems, this had led to the situation as depicted below:

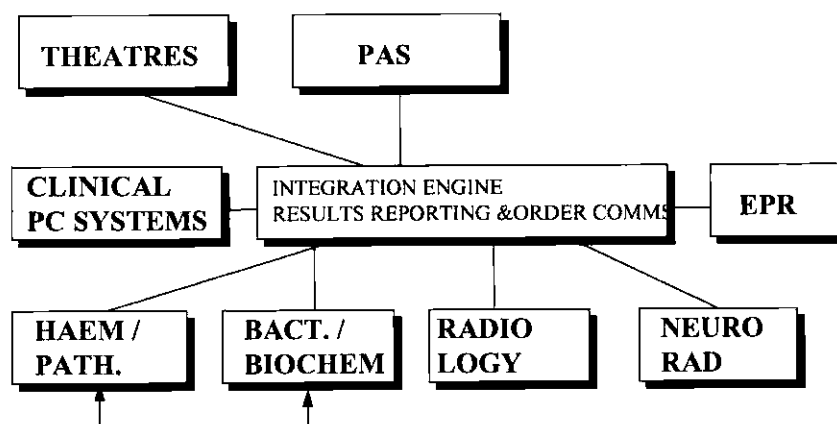


Whilst the implementation of each of the above elements had delivered benefits, there were still obvious gaps to be filled. A major next step was the need to resolve our PAS strategy. COMPAS was based on old technology; had limited functionality; had not had significant investment in recent years (apart from COPPISH); was unlikely to have significant investment in the coming years and was therefore unlikely to be able to support the next steps in our integration strategy.

We wanted to ensure that the investments already made were fully exploited. This would mean:

- The elimination of a multiple Master Patient Index, through the implementation of a single PAS linked with or interfaced to other departmental systems.
- The implementation of an Order Communications and Results Reporting system.
- The implementation of a Clinical Information System as a basis for establishing a framework for an electronic patient record.

This would lead to a scenario which could be depicted as follows:-



Four main options were considered which might lead to the desired goal of the Trust with regard to its Information Management & Technology Strategy. These options were:

1. Do Minimum.
2. Add a CRIS to the existing systems portfolio.
3. Replace all current systems with a fully integrated set of Hospital Systems (Big Bang).
4. Compromise on 3 above by replacing the core PAS and include the integration engine as a means of interfacing with certain key systems thus ensuring protection of some investments already made.

3.1 Do Minimum (Option 1)

Under this option, the Trust would continue to use the existing set of systems, only replacing them when technically obsolete. Where replacement was not an economic option, the existing systems would require amendment to be year 2000 compliant. Departmental systems would remain independent of each other with no integration.

This option would sustain the current levels of benefits, but would obviously be inconsistent with the Trust's strategy of improved services and quality of patient care through better information. Deficiencies within the current scenario would also be sustained (e.g. multiple instances of data entry, inconsistent data across different systems). Opportunities to eliminate inefficiencies in current clerical procedures would be lost. The ability to pull together Patient episodic data would be diminished with resultant adverse effects on clinical audit and resource planning. The unknown level of resource required to amend systems for year 2000 compliance has moved this option from a low risk category into a high risk category.

3.2 IMPLEMENT A CLINICAL RESOURCE INFORMATION SYSTEM (CRIS). (Option 2)

Implementation of a CRIS has, in the past, been the standard model within Resource Management projects of providing a database of casemix information to support clinical audit, costing and resource planning. Typically, this would involve the extraction of data from "feeder" departmental systems and the PAS, and the construction and maintenance of a database for the above purposes. An essential prerequisite for a CRIS was the existence of a sufficient number of feeder systems.

Theoretically, a CRIS would provide a range of benefits. In practice, and using other Resource Management sites as examples, these benefits have been difficult to achieve. Indeed in many cases, the system has failed, software licences have been cancelled, and hardware has been redeployed for other purposes. The reasons for this are many, and include organisational (e.g. lack of sponsorship, ownership, management change); technical (e.g. insufficient feeders, inconsistent data, interface problems, user unfriendly front end); and economic (e.g. ongoing revenue costs outweigh perceived benefits).

There is nothing to suggest that the Southern General would fare any better than other Trusts. In any event, the implementation of a CRIS would not address the operational and clinical needs of the Trust.

The implementation of a CRIS would be an additional investment over and above the investments for the Do Minimum option.

3.3 "Big Bang" HISS (Hospital Information Support System) (Option 3)

A commonly accepted definition of a HISS is that it is characterised by a single one time data entry of patient information, by a single patient database, and by communication of orders and results. A HISS allows every user to have access to the data they require to carry out their work, regardless of where in the hospital that information was generated.

A HISS is described as an "integrated" system which means that different modules of the system will be linked together and will use a common database.

All software is provided by the one supplier. Any exception to this will be minimal. There is a commitment to implement a large portion of the system within a (relatively) short timescale.

The advantages of this option, if successful, would be that it would satisfy the system integration aims of the Trust and all the attendant benefits (e.g. single point of data entry, single MPI, access to patient episodic data etc.)

There are a number of disadvantages or risks associated with this option:-

A substantial IT replacement programme disregards the investment made to date in hospital systems.

Big Bang HISS implementations in the UK have not been universally successful.

Users have to accept that departmental modules are not necessarily "best of breed", and may have to compromise on functionality.

3.4 Implementation of a Hospital Information System (HIS) with interfaces to key current systems. (Option 4)

This option is consistent with the Trust's current IM&T strategy. Specifically, however, it recognises that there is a weakness in the inherited position with regard to the PAS which needs to be addressed. For the reasons mentioned earlier COMPAS is not seen as a good base on which to build our future systems. A key feature of this strategy would be the replacement of COMPAS along with a Results Reporting and Order Communications system and the implementation of a Clinical Information System which would capture Speciality specific data. Included also in this strategy would be the replacement of the two Radiology systems which would be difficult to interface to a new Hospital Information System. This would then provide a solid base for the gathering of other clinical and Patient episodic data.

The advantages of this option are:

- The Trust would replace its core system with an appropriate commercially sound product which has the functionality to extend the Patient Administration functions to incorporate the key Clinical aspects required by the Information Management & Technology Strategy of the Scottish Health Service
- Previous key investments would be safeguarded. These include the TELEPATH 2000 Laboratory System, the INTEGRA Finance & Stores System, the ORSOS Theatre Management System, and the TIARA System that has been adapted for the administration of Wheelchairs and Prosthetics.

Option 4 is the preferred option and is the subject of this Business Case.

4. THE PUBLIC SECTOR COMPARATOR

The Public Sector Comparator has been evaluated under the Financial and Economic Appraisals sections.

5. THE PFI PROCUREMENT PROCESS.

The Trust has undertaken the procurement of a Hospital Information System in accordance with the guidelines produced by the Scottish Health Service's Information Systems Support Group (ISSG). Throughout the process, guidance and advice has been given by ISSG and the Central Legal Office.

The Trust placed an advert in the European Journal in early October 1996 under a negotiated procedure. (see Appendix 1).

A Financial, Economic and Technical Questionnaire was issued to interested parties. Thirteen responses were received and these were evaluated against a pre-set range of weighted criteria. As a result of this, seven were eliminated and an Operational Requirement (OR) was sent out to the remaining six at the end of October. The Operational Requirement had been produced in consultation with thirty six Trust staff who also agreed the weightings for the scoring of the OR. This group formed the **Full Evaluation Team** which consisted of twenty Consultants, three Senior Nurse Managers, and other Professionals and Managers.

Five responses were received and these were scored by the **Full Evaluation Team** early in December. It was unanimously agreed to eliminate two Suppliers at this stage.

The next step in the evaluation process consisted of demonstrations and site visits. The attendees at the site visits (**the Core Visiting Team**) consisted of a subset of eight members of the Full Evaluation Team. The members of this team were three Hospital Consultants, the HIS Project Doctor, a Senior Nurse Manager, the Chief Biochemist, the Health Records Manager and the IT Manager.

Each on-site demonstration was attended by more than fifty members of staff who provided feedback to the **Full Evaluation Team**. Following this step, which was completed by mid February, it was agreed to eliminate one Supplier. However it was felt that a further evaluation step would be required before entering into draft negotiations.

The further evaluation step consisted of additional demonstrations, site visits by both the **Core visiting Team** and a group of Trust Directors (**the Executive Team**), service proposals and other confidence checks. This step was completed by mid June when the **Full Evaluation Team** met to review the results and to determine the way forward. There was a prevailing view that despite one of the Suppliers proposals looking attractive on paper and at demonstrations, visits to four hospital sites failed to reassure the team that what was on offer had been realised anywhere. Following advice from ISSG procurement team and the Central Legal Office that we should be confident that any Supplier taken to final tender could satisfy our requirements, and based on the fact that in some recent procurements the losing Supplier had threatened legal actions, the team agreed that we would only invite one Supplier to negotiate a draft contract on the basis that the unsuccessful Supplier had not demonstrated that certain aspects of their proposals had adequately been implemented at any of their reference sites.

Negotiations on the draft contract have incorporated a number of concurrent activities which have included:-

- Draft Terms and Conditions through consultation with the Central Legal Office.
- Clarification of the Contractor's responses to the Operational Requirement.
- Discussions on all other parts to the draft schedules.
- Specification of the interface to the TELEPATH laboratory system, and to the other interfaced systems.
- Specification of the data take-on requirements from the current PAS and Radiology systems.

6. THE PREFERRED PFI SOLUTION.

6.1 The Consortium

The preferred PFI solution is the one proposed by Data General as Prime Contractor and Meditech as the main Application Software Suppliers. Data General and Meditech have been involved together for over 20 years in the supply of hardware and software to service the information needs of healthcare organisations. Meditech focuses solely on the design, installation and service of such systems to the Healthcare market. There are over 900 Meditech installations worldwide. Meditech thus has a well documented strategy for the development of their integrated suite of information systems for healthcare. This includes both development in the technical aspects of the solution and in the functionality provided.

The Healthcare market sector accounts for approximately 20 % of Data General's turnover, therefore there is a clear strategy and commitment to this marketplace. In Scotland and Northern Ireland Data General has a framework agreement with the Health Services allowing Hospitals to purchase open systems without having to go to the European Journal.

Data General - Meditech have six live HISS installations in the UK, at Burton Hospitals NHS Trust, Sunderland City Hospitals NHS Trust, Liverpool Women's, Royal Liverpool Children's, Warrington and Yorkhill NHS Trust in Glasgow. These include PFI compliant contracts in the latter four..

6.2 The PFI Solution

Data General as prime contractor will deliver a range of services as per the draft contract which include:

Baseline Application Software

- Patient Administration System
- Order Communications and Results Reporting
- Departmental System
- Radiology
- Interfaces to TELEPATH 2000 Laboratory system, ORSOS Theatre system, and TIARA Wheelchair System
- A&E
- Data take-on from existing systems.

Possible future elements might include:

- Pharmacy
- Maternity
- Nursing
- Executive Support System

The Contractor will provide a fully managed service to meet performance criteria set out in the draft contract.

6.3 Funding Structure of the Project

Data General will initially fund the project from their own resources until acceptance of the first phase has been reached. Thereafter through arrangements with banks, there will be an assignation of the delivery payment stream.

6.4 Timetable from FBC to Financial close and Delivery of Services

Provided that all other contractual issues have been resolved, Financial close should be immediate after signing of contracts. The Delivery of Services should follow the Project Implementation Plan with the Acceptance of phase 1 signalling the commencement of the delivery payment stream.

7. ECONOMIC APPRAISAL.

The Capital and Revenue costs of the Do Minimum option and the HIS implementation option were evaluated, these being the only two options considered to be practical in terms of meeting the Trust's requirements.

The economic analysis only takes account of actual Cash Flows and consequently non-cash transfers, such as Capital Charges, are excluded. The calculation adjusts future values for the time value of money by applying a discount factor.

The basis of any option appraisal is to make a comparison on fair and equal terms. A discount rate of 6% is applied to all cashflows in accordance with the SCIM and PFI evaluation guidance.

Under the Do Minimum option (Option 1) there would be considerable ongoing capital investment in developing the existing systems to resolve the problems of obsolete technology and the year 2000. The COMPAS and Radiology systems would also have to migrate from current hardware platforms. The current level of FM support costs is assumed to increase exponentially in line with ongoing investment.

The HIS Implementation option (Option 4) has been evaluated assuming PFI funding. Under this option there would be a minimal capital requirement over the 8 year contract period with an estimated annual expenditure of £50K for PC's etc.

The FM costs include LAN support on the basis of 8 am to 8 pm, 7 days per week cover.

Training on the new system would cover an 18 months period from installation which is assumed to be mid way through 1998/99. Total cost of the training will be £300,000 over the 18 month period and it is intended to fund this expenditure from the Formula Capital Allocation. In addition to the initial training, an ongoing Helpline will be established. This will be staffed by 3 x A&C grade 6 at an annual cost of £60K.

The revenue savings to be derived from the HIS implementation are potentially significant. These are detailed in the Cash Releasing Benefits table. The major benefit will be in reducing time spent throughout the trust in re-entering patient details to different systems and in providing direct access for clinical staff to laboratory results. The total value attached to time savings is calculated as approximately £450k p.a. It is estimated that approximately 20% of identified savings would result in a cash releasing saving with the balance of time saved being used to improve service quality. These non cash releasing benefits have not been taken into account in the economic and financial appraisals.

In addition to the ongoing revenue savings a one off saving of £12,000 has been identified. As the integrated system will improve communications between departments it will be possible to reduce Pharmacy stock levels by this amount. This would be a subsequent phase.

It is assumed that savings generated would be released 12 months after implementation of the system.

On the basis of the foregoing revenue effects the NPV of the Do Minimum option (Option 1) is £7.217m compared to an NPV of £5.549m for the HIS Implementation option (Option 4) Appendix 1. On the basis of the economic appraisal it is clearly advantageous to proceed with Option 4 and implement the HIS.

8. RISK ANALYSIS.

The PFI Proposal demonstrates significant transfer of risk from the public to the private sector.

	AREA OF RISK	£'000	DESCRIPTION OF COST	TRANSFER TO PRIVATE SECTOR
1	Non Availability of Capital funding	1,777		100%
2	Delay in implementation	150	Cost of additional training required.	This represents an equivalent cost of the Trust's investment in staff time. The Contractors additional costs would be borne fully by the Contractor
3	Systems Failure	642	Annual FM Cost	30%
4	Cash Releasing savings not realised	90		-
5	Inflation > GDP	-	Not quantifiable	100%

1. The availability of Capital Funding within the proposed 18 month timescale is not known. any delay in implementation would substantially increase costs to the trust with additional expenditure being required to maintain existing systems to an acceptable standard. There would also be a delay in realising the proposed Cash Releasing savings.

The PFI proposal would transfer this risk in its entirety to the private sector.

2. Any substantial delay in the proposed implementation plan would incur additional training costs. A minor delay would not incur additional costs.
It should be noted that the Trust would not pay any of the Delivery Payment until the system passes Initial Acceptance. This Delivery Payment represents 70% of the annual cost. The performance stream which represents 30% of the annual cost would not be triggered in the event of non delivery. Therefore, 100% of the annual cost is transferred to the Contractor. The Trust has the option to terminate the contract.

3. System failure in this context does not mean total irretrievable breakdown of service, but refers to the the failure of the system to meet specified performance criteria including system availability, problem resolution, transaction response times, usage and the ability of the Contractor to respond to statutory changes and other software upgrades within agreed timescales. This amounts to 30% of the annual cost.

There is provision within the draft contract for the Trust to terminate the agreement upon Contractor default which includes:-

- (i) Gross or persistent breaches by the Contractor or the Contractor's personnel of the provisions of Clause 16 (Confidentiality) insofar as they relate to Patient Information.
- (ii) Failure of the Contractor to achieve 15% of the 30% Performance stream payments in any four consecutive quarters of the Agreement (such an event is deemed not capable of remedy).
- (iii) Failure of the Contractor to achieve 5% of the 30% Performance Stream Payments in any two quarters in any twelve consecutive months period of the Agreement (such an event is deemed not capable of remedy). For the avoidance of doubt, any Performance Stream Payment achieved by default (e.g. No Statutory changes due to be delivered in the quarter) will not count toward this 5%.
- (iv) Failure of the Contractor to achieve Acceptance in respect of phase 1 of implementation of the Services (as defined in the implementation plan) within a six month period after the Planned Acceptance Date for phase 1 (other that where such failure is due to an event of Force Majeure). Under these circumstances, the Trust pays nothing due to Contractor default.

9. FINANCIAL APPRAISAL

The revenue implications of the HIS implementation were quantified for both the Public Sector Comparator (PSC) and PFI options.

The publicly funded option assumes that Capital funding for the HIS implementation would be made available in 1998/99 in line with the proposed timescale for implementation under the PFI option. Any delay in obtaining capital funding would result in significant additional capital expenditure being incurred by the Trust in order to maintain existing systems at an acceptable standard. The asset acquired under the PSC would be depreciated over a period of 10 years in accordance with SCIM. The residual value at the end of this period is assumed to be NIL. This option has therefore been evaluated over the asset life of 10 years.

The PFI option is for an initial contract period of 8 years and has therefore been evaluated over this shorter period.

The impact of the proposal under both options on the Trust's Income and Expenditure Account is shown at Appendix 2. The Equivalent Annual Cost of the PSC is £824K compared to £711K under PFI.

The cash flow generated by both options, omitting capital charges implications, is shown at Appendix 3. The Equivalent Annual Cost of the PSC is £823K compared to £711K under PFI.

AFFORDABILITY

The affordability issue within the Trust's income and expenditure profile is seen as key to the viability of the project.

Two years have been evaluated for affordability namely 1999/2000 and 2000/01. The expenditure profile of these years covers the peak expenditure incurred in 1999/2000 and the typical recurring expenditure of 2000/01. The effect on the Income and expenditure is NIL in both years therefore there is no impact on Hospital Running Costs (Appendix 4)

FUNDING ARRANGEMENTS

Under the PFI option the HIS will initially be funded by the supplier Data General. Once the system is fully operational this will be factored by a finance house to be determined by Data General.

The FM costs have been linked to a GDP deflator of 2% over the initial contract period of 8 years.

10. SUMMARY OF THE CONTRACT STRUCTURE.

The Terms and Conditions of the PFI contract will be set out as per the guidance from the Central Legal Office. The Schedules to the contract will cover:-

Schedule A Trust Requirements and Contractor's Response.

Schedule B Deliverables including baseline software, Implementation Services,
Documentation and all managed services.

Schedule C Other Responsibilities of the Contractor.

Schedule D Trust's Responsibilities.

Schedule E Project Timetable.

Schedule F Software Delivery and Acceptance Testing.

Schedule G Financial Obligations. (see note below)

Schedule H Change Control.

Schedule I Escrow Agreement.

Schedule J Specially Written Software.

Schedule K Managed Services.

Schedule L Project Management.

Schedule M Conditions for Use of Software.

Note:

With regard to the payment mechanism, there will be two separate payment streams throughout the contract period. These will be:

- (i) A delivery stream consisting of 70% of the annual contract payment. This is linked to the delivery of application software services. These sums will be authorised immediately following Initial Acceptance of each phase.
- (ii) A performance stream consisting of 30% of the annual contract. This is linked directly to the performance of the system and the Contractor. There are three payment drivers:-
 - System and Performance availability (including Help Desk resolution times, system availability, and system response times)
 - Usage
 - Cost of change (including statutory changes, general upgrades and minor software changes).

For the delivery stream, payment will commence at the end of the month in which Initial Acceptance for the relevant phase occurs. It should be noted that no payment is made until Initial Acceptance is given. If a phase does not satisfactorily pass the Final Acceptance within two months of Initial Acceptance, 25% of the Delivery stream payment will be reimbursed by the Contractor to the Trust. This sum will be retained by the Trust until the phase satisfactorily passes the Final Acceptance test. Failure of the Contractor to achieve Acceptance of the first phase within six months of the Planned Acceptance Date puts the Contractor in default and entitles the Trust to terminate and obtain a full rebate.

For the Performance stream, payment will be made after the end of the quarter to which the performance relates, subject to agreement of the service levels and payment drivers. The amount of the payment is dependent on the level to which the performance criteria is met. Failure to achieve specified levels either on four consecutive quarters or in any two quarters within twelve consecutive months puts the Contractor in default and entitles the Trust to terminate.

11. ACCOUNTING TREATMENT.

Under the PFI option, the asset at no time vests in the Trust. The project is therefore treated as wholly off Balance Sheet.

12. PROJECT MANAGEMENT ARRANGEMENTS.

12.1 ORGANISATIONAL STRUCTURE

The Trust has an Information Steering Group chaired by the Chief Executive through which all Information System projects are reported. This will remain in place for the HIS implementation. It will be the responsibility of the Information Steering Group to review critical issues raised by the Project Board (see below) and to provide strategic direction as required.

In addition, and in accordance with the principles of the PRINCE project management methodology, there will be a Project Board established which will contain representation from both the Trust and the Contractor. It will be the responsibility of the Project Board to:-

- Review high level project plans
- Undertake contract reviews
- Review the Service level reports produced by the Contractor and agree payment and penalties
- Review benefits realisation reports
- Escalate critical issues to the Information Steering Group

The project will have a single Contractor Project Manager, and a deputy.

The Trust will have an overall Project Manager and a sub-project manager for each main module of the HIS.

12.2 CONTRACTOR'S RESPONSIBILITIES

The Contractor will act as Prime Contractor for the managed service delivery to the Trust and will manage all projects with its sub contractors accordingly.

The Contractor will be required to demonstrate that it has contracts in place with all relevant 3rd party contractors.

The Contractor will be required to demonstrate that the plans it has with 3rd party contractors are consistent with its own joint project plans with the Trust.

The Contractor is required to ensure that its project managers have training and experience in the use of the PRINCE project management methodology.

The Contractor's project Manager will present the Trust with the project plans the Contractor has with subcontractors if required by the Trust.

12.3 PLANNING AND CONTROL

In accordance with PRINCE, there will be project plans for:-

- the overall project
- each implementation phase
- each module within each phase
- introduction of application software changes
- system events(e.g. hardware and operating system upgrades)
- ad hoc projects (e.g. data take on)
- software acceptance
- core and end user training

Gantt charts showing tasks, milestones and dates will be prepared and reviewed at each project meeting

Resource plans will also be prepared and reviewed at each project meeting.

Both Project Managers will be responsible for updating the plans and for agreeing the meeting agendas.

13. BENEFITS ASSESSMENT AND BENEFITS REALISATION PLAN.

It is anticipated that the implementation of the HIS will attract a wide range of benefits. This will include:-

- Improved clinical decision making through the implementation of Order Communications and Results Reporting allowing easier and quicker access to patient information.
- Improved support for clinical audit and research with all patient activity integrated within the one system.
- Improved clinical coding through the implementation of an encoder and direct access to patient information.
- Improved communication between departments through the appropriate sharing of information.
- More responsive service to patients through improved communications and an enhanced ability to book resources and appointments.
- Improvements to health records management through the implementation of casenote tracking.
- Improved bed management through the implementation of ward level admissions discharges and transfers.
- By recording patient demographics only once there will be an improvement in data quality and a vast saving in staff and patient time by not having to repeat the same information over and over again.
- Improved service to general practitioners through better patient booking systems and more timely and accurate communications. Future developments might include direct access to the HIS for GPs.
- Better support to the Hospital's Integrated Care Pathways programme through the implementation of multi-disciplinary care plans.
- Improved management information to assist in service planning, costing and contracting/commissioning processes.

CASH RELEASING BENEFITS

Department/ Staff Group	Systems Facility/ Benefit	Savings	£ pa
Wards (43 wards)	An integrated system will remove the necessity of entering patient details into different systems	1 hour per day Grade D Nursing time.	84,968
	On line provision of patient details and test results will reduce clerical time tracking and locating casenotes	½ hour per day A&C Grade 2 x 43	29,236
Wards/Clinics	Consultant time will be saved through availability on line of test results and improved casenote tracking.	¼ hr per day x 126	228,992
	Secretarial time saved through improved casenote tracking facility	½ hr per day A&C Grade 3 x 120	93,756
Radiology Dept	Clerical time saved through not having to re-input patient details	3 hours per day A&C Grade 3	4,683
Laboratories	Clerical time saved through not having to re-input patient details.	6 hours per day A&C Grade 3	9,372
	Saving in test report bags		5,000
Nuclear Medicine	Clerical time saved through not having to re-input patient details	½ hour per day A&C Grade 3	781
ECG	Clerical time saved through not having to re-import patient details	1 hour per day A&C Grade 3	<u>1,563</u>
		TOTAL	458,356

Pharmacy Reduction in stockholding (subsequent phase)

12,000

It is estimated that 20% of the identified benefits would result in a cash releasing saving.

14. RISK MANAGEMENT STRATEGY.

14.1 Pre-Implementation

The essence of a PFI approach is to transfer risk to the Supplier of the service. Failure to deliver in accordance with the contract results in non payment. The delivery stream payment does not commence until after acceptance by the Trust following an agreed go live date. Any risks retained by the Trust are summarised below:-

Risk Area	Avoidance strategy
Supplier fails to implement	This is a low risk scenario given the track record of the Supplier. The Trust would continue to use current systems supported by current contractors until an alternative was procured. Any investment in infrastructure would be utilised in a future alternative.
There is a delay in implementation.	The project will be managed by a project board of senior staff. Any potential delays will be highlighted in advance. For the first phase, the Trust plans a system support overlap for current systems being replaced.
There is insufficient local IT staff to support the HIS.	The Trust plans to recruit additional staff to avoid this scenario.
Interfaces to other Suppliers software might not work satisfactorily.	The Trust plans to have the prime contractor sub-contract with the interfacing supplier of the TELEPATH laboratory system, and the interface will therefore be subject to the PFI contract conditions.

14.2 Post Implementation.

Due to the nature of the PFI contract, any Post implementation performance degradation of the system or the Supplier will be subject to appropriate penalties amounting to 30% of the annual contract arrangements. Consistent failure to meet specified performance levels might precipitate contract termination with appropriate safeguards for the Trust. Other risks to be managed by the Trust are:-

Risk Area	Avoidance Strategy
The LAN has a single point of failure.	For historical reasons, the existing structured cabling is based on a star shaped topology with a single point of failure at the main communications node. Prior to implementation, the Trust will improve the resilience of the network by implementing a ring shaped topology which will protect the major segments of the network.
Maintenance of the LAN is not included as part of the PFI contract.	To have incorporated the maintenance of the LAN as part of the PFI deal would not be value for money. The implementation of the resilience features mentioned above will reduce the risk of overall failure. The Trust will extend its existing network support arrangements to encompass the increased demands of the HIS. (see note below).

Note:

The Trust's LAN will be used for systems other than the Hospital Information System (HIS). For the HIS Contractor to have included support for the LAN, they would insist on a wide margin of capacity to ensure meeting the Performance criteria. Additionally, the Contractor would insist on strict control of changes which might constrain the Trust's plans for implementation of new systems or changes to existing systems. Under the scenario of the LAN supporting systems other than the HIS, it would be difficult for the Trust to invoke availability and response time penalties against the Contractor due to faults in the main system.

15. POST PROJECT EVALUATION PLAN.

The implementation of the proposed Hospital Information System will affect most parts of the organisation and there will be a gradual impact as the system is rolled out. There is no doubt that the roles and responsibilities of large numbers of Trust staff will change. These changes need to be clearly communicated and agreed prior to implementation and a comprehensive training plan put in place as part of the implementation process.

It is intended that the Project Board will not be abandoned at implementation time but will continue to monitor the post implementation activities to ensure that there will be an ongoing assessment of the benefits realisation programme.

16. INFORMATION MANAGEMENT AND TECHNOLOGY STRATEGY.

In September 1993, the Trust established an Information Management & Technology Strategy which set out how it intended to approach the provision of information to support its clinical and business objectives.

This strategy was subsequently reviewed in 1994 to ensure that it properly reflected the ongoing needs of the Trust and that it took into account any significant changes in direction and any new opportunities.

The original strategy described a comprehensive framework for the development and implementation of information systems and included details of supporting technologies, principles and practices.

The strategy:

- summarised the Trust's information needs
- outlined the issues involved in achieving the Trust's IS/IT Strategy;
- assessed the current investments in systems, infrastructure and staffing against their ability to meet the Trust's needs;
- defined actions and priorities;
- outlined standards, including technology and methodology;
- outlined a three year plan and the related capital and revenue cost implications.

In formulating the strategy, cognisance had been given to:

- the Trust's business plan;
- the information strategy for the NHS in Scotland;
- the clinical and business information requirements;
- current industry standards;
- principles representing best practice

The original strategy identified three distinct phases in the process of achieving the ultimate goals of systems integration. These phases were:-

- consolidation (year ended 31 March 1994);
- transition (3 years ended 31 March 1997);
- integration (after year ended 31 March 1997).

The purpose of separating the Strategy into these phases was to facilitate a controlled delivery of information systems to match the business plans of the Trust, subject to the funding constraints which were in place at that time.

Progress and Alterations to the Strategy

The activities and projects proposed for the consolidation period were achieved. Some of the system initiatives originally proposed for the transition period (1994 -97) have been successfully implemented. Others have been subject to ongoing review.

An Information Steering Group comprising the Chief Executive, the Director of Medical Services, the Director of Finance and Technology and the Information Technology Manager has been established since July 1993. This Group has been responsible for the creation and execution of the Trust's Information Management & Technology Strategy. This strategy has proved to be robust, successful and has delivered a range of tangible benefits to the organisation.

As part of the Resource Management Initiative, an additional group was formed to investigate the information needs of the clinical community. This Group, chaired by the Director of Medical Services, looked at how information may be best obtained and used within the total Patient episode to maximise care, making best use of scarce resources.

The conclusion drawn from these exercises is that the Trust requirements would best be satisfied by the replacement of the PAS and Radiology systems, the implementation of an Order Communications and Results Reporting System, and the implementation of a Clinical Information System and these in conjunction with links established to existing Laboratory, Theatre and Wheelchair systems would form the core of a new Hospital Information System (HIS).

In addition, the HIS would be extended in the future to include Pharmacy, A&E, Nursing, Therapies, Maternity and Executive Support.

The Trust has now entered its System Integration phase and this Business Case calling for further investment in Information Technology, embodies the strategic direction of the Information Steering Group, and the key interests of the Clinical working Group and is consistent with the Trust's I.M.&T Strategy.

17. EQUIPMENT.

The system will be run as a fully managed service with IT Services Ltd. (a subsidiary of BNFL) being sub contracted to provide the facilities management. The service will include a 24 hour Help Desk, resilient telecommunications links and a fully tested disaster recovery service. It will be the responsibility of the Prime Contractor to provide whichever equipment is necessary to meet the performance criteria set out in the contract.

The Trust's own LAN will be enhanced to ensure that there is no single point of failure, and the Trust's existing stock of PCs will be utilised and enhanced to deliver the service to the desktop. This will be funded from the Trust's agreed Capital Spend.

18. CONCLUSION.

The clinical and business needs of the Southern General Hospital will not be satisfied by the current range of computerised information systems. The various options to satisfy these needs have been explored. A full and comprehensive evaluation of the market has been undertaken by a wide cross section of staff from within the Trust. They have concluded that the solution from Data General - Meditech best meets these needs, and would provide the Trust with a range of benefits for the future. The consortium represents a stable partnership, dedicated and committed to the healthcare market, with whom the Trust would feel comfortable over an extended period of time. The PFI option has been explored and it is concluded that this represents an acceptable level of risk transfer.

**SUPPLEMENT TO THE BUSINESS CASE
for a
HOSPITAL INFORMATION SYSTEM**

1. INTRODUCTION

In November 1997, the Trust submitted its Business Case for a Hospital Information System. The background to the procurement is clearly set out in that document. The purpose of this supplement is to provide additional information within the context of the collaborative work being undertaken with the Victoria Infirmary NHS Trust and to reinforce the conclusions of the Business Case.

2. CURRENT SYSTEMS OVERVIEW

Over the past few months, the Southern General Hospital and the Victoria Infirmary have been engaged in the Glasgow Southside Collaboration Model whose purpose is to assist in:-

- the development of integrated clinical services across primary and secondary care
- closer working with GGHB on the development of a Health Improvement Plan
- the development of shared managerial services

The information systems across both Hospital Trusts have been examined, and a number of initiatives are underway or planned which will support the above objectives.

- a. A first phase in the establishment of shared services will include the finance and personnel functions. A project is underway to migrate the Victoria's Finance and Stores systems (FMS and ICSIS) to the Southern General's integrated Finance & Stores system (INTEGRA). The planned implementation date for this is 1st quarter 1998.
- b. The Victoria uses the PWA Personnel system. This is being investigated with a view to implementation over both sites.
- c. Both the Victoria and the Southern General use the ORSOS Theatre system and would plan to move to the Windows version which is year 2000 compliant. The Victoria's system administrator is providing additional support to the Southern General's implementation.
- d. Both the Victoria and the Southern General use the TELEPATH laboratory system. The Southern General transmits laboratory results to GPs using different GP systems (VAMP, EMIS and GPASS). The Southern General is currently implementing TELEPATH 2000 with a go-live date planned for 1st quarter 1998. When the shape of shared laboratory services becomes clear, and after TELEPATH 2000 is successfully implemented, this system will be used by both Trusts.
- e. The Southern General uses an adaptation of the TIARA system for the administration of wheelchairs and prosthetics for WESTMARC (West of Scotland Mobility and Rehabilitation Centre). The Therapy Services across both sites are investigating the options for an extended use of TIARA.

It should be noted that the draft contract with DG-Meditech includes interfaces with ORSOS, TELEPATH 2000, and TIARA.

In terms of current major hospital systems, this leaves Radiology and PAS. Both Hospitals use the Berkeley Radiology system. It is part the Southern General's proposal for the HIS to implement the integrated Meditech Radiology module.

The Southern General currently uses COMPAS. The Victoria have recently implemented BULL.

It needs to be emphasised that the Victoria's procurement for a replacement PAS is in no way comparable with the Southern General's procurement for a HIS.

The Victoria's PAS procurement was focused on patient administration and was technically and economically constrained to interface with the BULL CRIS. There was little or no clinical involvement in the process.

The Southern General's procurement has focused on the clinical perspective of patient care and while certainly replacing the PAS, has included Radiology, Order Comms. and Results Reporting, Clinical departmental systems, and interfaces to key current systems (TELEPATH 2000, ORSOS and TIARA) with options for the future in Pharmacy, Maternity & Neonatal Paediatrics and Nursing including Integrated Care Pathways. The licencing arrangements allow for GP access. The procurement has been open and thorough, with all major Suppliers participating. The evaluation team has had a broad and enthusiastic Clinical representation and site visits have been undertaken throughout the U.K. There have been prolonged and concentrated discussions and negotiations to ensure that most of the functionality issues have been covered. The Southern General is confident that the DG - Meditech solution is the one which best fits its requirements.

It should be emphasised that BULL did not get beyond the Financial, Economic and Technical Questionnaire stage of the Southern General's procurement (ninth out of thirteen). Under procurement law alone, implementation of the BULL system IS NOT AN OPTION.

3. OPTIONS FOR THE FUTURE

It is clear that for the Southern General NHS Trust, there are still only two options for progress, namely, do nothing or implement the HIS as per the proposal.

3.1 DO NOTHING

For the Southern General as a standalone Trust, the disadvantages of this approach are fairly obvious and are touched upon in the main business case.

- Inconsistency with the Trust's strategy for improved services and quality of patient care through better information.
- Re injection of risk due to year 2000 issues.
- Re injection of risk due to IT services retender.
- Further investment required in ageing technology due to capacity requirements.
- Loss of morale and motivation by large numbers of staff who have participated in a time consuming procurement.

Set against the context of a South Glasgow combined Trust, the situation becomes even worse:

- Poor starting point to support shared clinical services.
- Poor framework to support access from GPs and Primary Care.
- Protracted timescale to move towards common MPI

3.2 IMPLEMENT HIS

For the Southern General Hospital as a standalone Trust this option would realise the benefits which are set out in the main Business Case.

Set against the context of a combined South Glasgow Trust, there would be considerable other advantages:

- Good starting point to support shared clinical services (Order Comms. and Results Reporting)
- Interfaces to key current systems (cross site access)
- Good framework to support future GP access
- Consistency with the national IM&T strategy and with the direction outlined in the recent White Paper
- Meditech system includes a multi facility (hospital site) option
- Foundation for electronic patient record established through the implementation of the clinical information systems and Order Comms. and Results Reporting.
- Same HIS as Yorkhill (consistency in South Glasgow)

There remains the issue of the duplication between the Meditech and the BULL PAS. This duplication of PAS systems will not be an uncommon feature of merging Trusts and will need to be dealt with in a planned manner. This will include the resolution of Case Record Numbering systems. The BULL PAS will have provided the Victoria with some interim advantages (Outpatients system), but to realise the benefits of the HIS and to capitalise on the above advantages, the Meditech system would need to be implemented on a combined Trust wide basis as a natural transition. Work requires to be done on the detailed planning of this, and the plan needs to be dovetailed with the implementation of shared clinical services, but major events and possible timescales might be as follows:

- | | |
|--|-----------------------------|
| • Both Trusts increase use of CHI | During 1998/1999 |
| • Victoria implements TELEPATH | End 1998 |
| • Southern General implements Meditech HIS | End 1998 |
| • Gradual population of Meditech MPI with Victoria patients through Order Comms. | During 1999 |
| • Full transition to Meditech system | Either before or after 2000 |

4. CONCLUSION

The case for the Southern General to implement the DG-Meditech HIS is very clear. The clinical needs of the Hospital will not be satisfied by the current range of computerised systems and the procurement process has found the best fit to meet the Trust's requirements. Consideration of the business case in the context of the South Glasgow Collaboration serves only to strengthen the case and indeed underlines the need to remove any delays in implementation since the Do Nothing option jeopardises a combined Trust's ability to satisfy the "Designed to Care" vision of the Health Service in Scotland.

APPENDIX 5

Letter from External Auditors

PricewaterhouseCoopers
1 Blythswood Square
Glasgow G2 4AD
Telephone +44 (0) 141 226 4593
Facsimile +44 (0) 141 221 6970

F Seal Esq
Director of Finance
Southern General Hospital NHS Trust
1345 Govan Road
GLASGOW
G51 4TF

11 February 1999

Reference : CDR/CM

Dear Sir

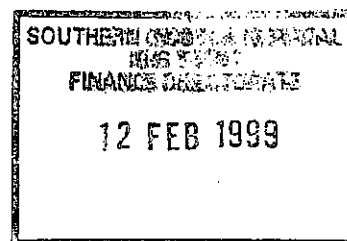
Proposed Accounting Treatment relating to the provision of a Hospital Information System under the PFI

You have requested that, in our capacity as your external auditors, we provide you with a short letter summarising our view on your proposed accounting treatment relating to the provision of a Hospital Information System under the Private Finance Initiative ("PFI").

The primary responsibility for the preparation of the Trust's accounts lies with management and it is therefore for you to determine your views on proper accounting in the context of NHS accounting arrangements.

It is not our duty to provide financial advice and therefore any letter that we submit, whilst intended to be part of a constructive debate, should not be regarded as advice. In addition, this letter is provided solely for the benefit of the Trust and we accept no responsibility to any third party who might seek to place reliance on its contents.

Our audit responsibilities are set out in the Code of Audit Practice published by the Accounts Commission. Part of our responsibilities is to give an independent assessment of whether the statement of accounts present a true and fair view of the financial position of the Trust and its income and expenditure for the year.



F Seal Esq
Reference : CDR/CM
11 February 1999

With this responsibility in mind, we have monitored the development of the proposals for this PFI scheme. We have achieved this by reviewing documentation at key stages, attending meetings to obtain clarification and monitoring the status of general PFI accounting guidance as it develops.

In order to assess whether the statement of accounts is true and fair, we have to take a view on the proposed accounting treatment for all key transactions. In certain cases, such as a Hospital Information System, there is little accounting precedent, although Financial Reporting Standard 5 (amended) and Treasury Guidance PFI Technical Note 1 (issued September 1997) provide relevant guidance relating to the accounting treatment for PFI.

Financial Reporting Standard 5 (amended) applies to PFI schemes that had not reached the stage of Best and Final Offer by 30 September 1998. Your scheme had passed this stage by 30 September 1998 and, as a result, we focused our attention on Treasury Guidance – PFI Technical Note 1.

You propose to account for the project, as it is currently documented, on an "off balance sheet" basis.

Stage 1 of Treasury Guidance – PFI Technical Note 1 states that, should the initial capital cost of the underlying asset be less than 10% of the net present value of the expected service payments, then the procuring entity should not recognise the underlying asset.

Based on the assurances you have provided and the evidence made available for our audit, the cost of the underlying asset in this case is considerably less than 10% of the net present value of the expected service payments.

Therefore, we have no reason to believe that it would be necessary for us to issue a qualified audit opinion on the accounts should you decide to proceed on the basis of an "off balance sheet" treatment.

Clearly, we will review this position as the project develops past Final Business Case status and our views may change if any of our key assumptions alter. Similarly, it may be necessary to reassess the position should any conflicting accounting regulations or guidance be issued by the Accounting Standards Board or any other relevant body.

PRICEWATERHOUSECOOPERS 

F Seal Esq
Reference : CDR/CM
11 February 1999

Should you wish to discuss any aspect of this letter, please do not hesitate to contact either
Cameron Revie or Lindsey Paterson.

Yours faithfully

Price Waterhouse Coopers

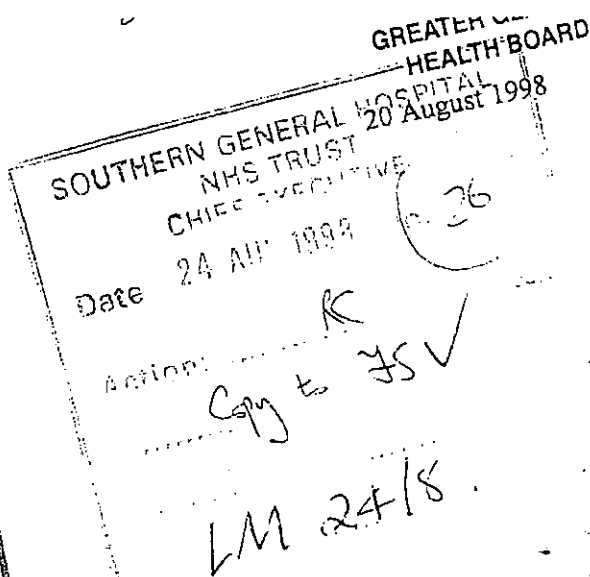
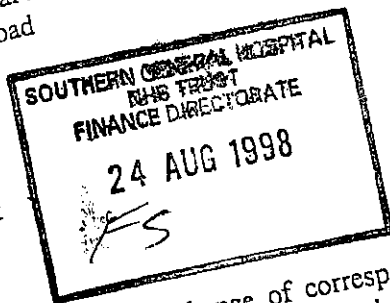
APPENDIX 6

Letter of support from GGHB

STH/SG/CONTRACTS 98/99 - S GENERAL
DOFL5CONTSTH.DOC

Mr R Calderwood
Chief Executive
Southern General Hospital NHS Trust
1345 Govan Road
Glasgow
G51 4TF

Dear Robert



HISS PFI

Further to the recent exchange of correspondence and my telephone conversation with Frank last Tuesday, I now wish to formally confirm the Board's support to the Trust's HISS PFI proposals. This support is conditional on the following caveats:-

1. The financial projections contained within the full business case are delivered ie. no-one off or recurring costs will fall to be met by GGHB (indeed, it is expected that further savings will appear as a contribution towards the CRES programme of the new Trust as future efficiencies begin to take effect).
2. The system remains compatible with the information requirements that will be identified as part of a Glasgow-wide information strategy. In this respect I note the confirmation that has previously been supplied by Meditech/Data General.
3. Support to this project should not be taken as tacit support to any extension within the Victoria, which would need to be subject to the same Business Case formalities of the Southern's project.
4. The data take-on and SMR reporting requirements are explicitly identified and managed prior to the implementation phase of the project, in order to avoid the "dip" in essential information experienced with the Yorkhill system. (Frank has assured me that this will be emphasised and incorporated within the legal agreement between yourselves and Meditech/Data General). We are reassured by the Trust's action on this particular issue.

I know that you have been in correspondence with Charlie Knox at the Management Executive over certain technical issues which his Directorate have raised, and I trust that these matters have now been addressed to his satisfaction. For completeness, you will see I have taken the liberty of copying this letter to Charlie expressing our support to this project, based on the above caveats. I trust that matters can now move ahead without any further delay.

Dalian House, PO Box 15326, 350 St Vincent Street, Glasgow G3 8YT
Switchboard: 0141-201 4444 Minicom: 0141-201 4400

As a last point, I feel it would be extremely helpful if you would confirm that the Board w
represented in any implementation phase in order to ensure that points two and four above re
prominent objectives. It would be useful if either Frank or Tom MacNamara could make contact
Robert Murdoch or through the sector team to ensure their involvement.

Yours sincerely



S T Haldane
Director of Finance

cc C J Spry
C Renfrew
D Lease
R Murdoch
C Knox