NATIONAL TREATMENT CENTRE
NHS AYRSHIRE & ARRAN

Economic Case
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Appendices

Appendices referenced in the document are available in electronic form as follows:

Appendix A – Optimism Bias
Appendix B – Non-financial benefits assessment stakeholder list
Appendix C – Risk Register (preferred option)
Appendix D – Generic Economic Model (GEM) including sensitivity analysis

1.0 Context and Background

1.1 Context

The Scottish Government has recognised the challenges faced by NHS Boards in addressing the healthcare demand associated with the projected increase in population and has committed to investment in new elective care capacity through the National Treatment Centre Programme.

Within this context, NHS Ayrshire and Arran, as one of nine Treatment Centre projects, has developed strategic expansion plans to sustainably provide the required elective care capacity to meet the anticipated increasing demand for elective surgery (with the initial focus being on Orthopaedics) across the Board area, and potentially wider West of Scotland, over the next 20 years. Undoubtedly the Covid-19 pandemic has significantly increased the challenge with a sharp rise in the backlog of patients waiting for treatment further increasing the need to expand capacity as rapidly as possible.

Between July and September 2021 the Board worked intensively to prepare a Strategic Initial Agreement (SIA) outlining initial proposal to expand the provision of Elective Orthopaedic services across NHS Ayrshire and Arran. It provides a unique opportunity for the Board, as part of the national programme, to expand the local delivery of elective care for the benefit of its residents and the wider West of Scotland.

Within the relatively short timescale to produce this initial proposal, the Board sought to develop a clinically led model to optimise the expansion proposal. This will ensure that it addresses the accumulated backlog of patients waiting in a timely manner, provides capacity to deal with future demand, uses resources effectively and efficiently and provides for an improved patient experience.

1.2 Approach

Due to the accelerated timescales associated with the project, we are adopting a modified governance approach. The Board has agreed with colleagues from Scottish Government that, following the approval of the SIA (approval letter dated 15 October 2021), there is a requirement to complete a comprehensive and detailed Economic Case assessing options for delivering the proposals followed by a Full Business Case (FBC) setting out funding and delivery arrangements for the preferred option.

This Economic Case forms the second stage of the proposal to develop a Treatment Centre within NHS Ayrshire and Arran. The Board has worked closely with the Health Finance, Corporate Governance & Value Directorate in Scottish Government to agree the scope of the work required and the business case governance and approvals process.

In developing this Economic Case the Board has worked collaboratively with the national team to ensure alignment with the NHS Scotland Treatment Centre Programme. The Board has also engaged with the Scottish Government Access Support team.

1.3 Other Considerations

What makes this project unusual is the potential for the proposed expansion to be delivered through the acquisition and adaptation of a private healthcare facility, Carrick Glen Hospital, located adjacent to the University Hospital Ayr site. Currently under the ownership of BMI Circle initial dialogue has been undertaken with regard to possible acquisition by the NHS. Whilst no final agreement has been reached, in the event that this emerges from the Economic Case as the preferred option, it would be the Board’s intention to progress the acquisition in a timely manner so that this process does not delay the project.

2.0 Approach to Economic Case

2.1 Purpose

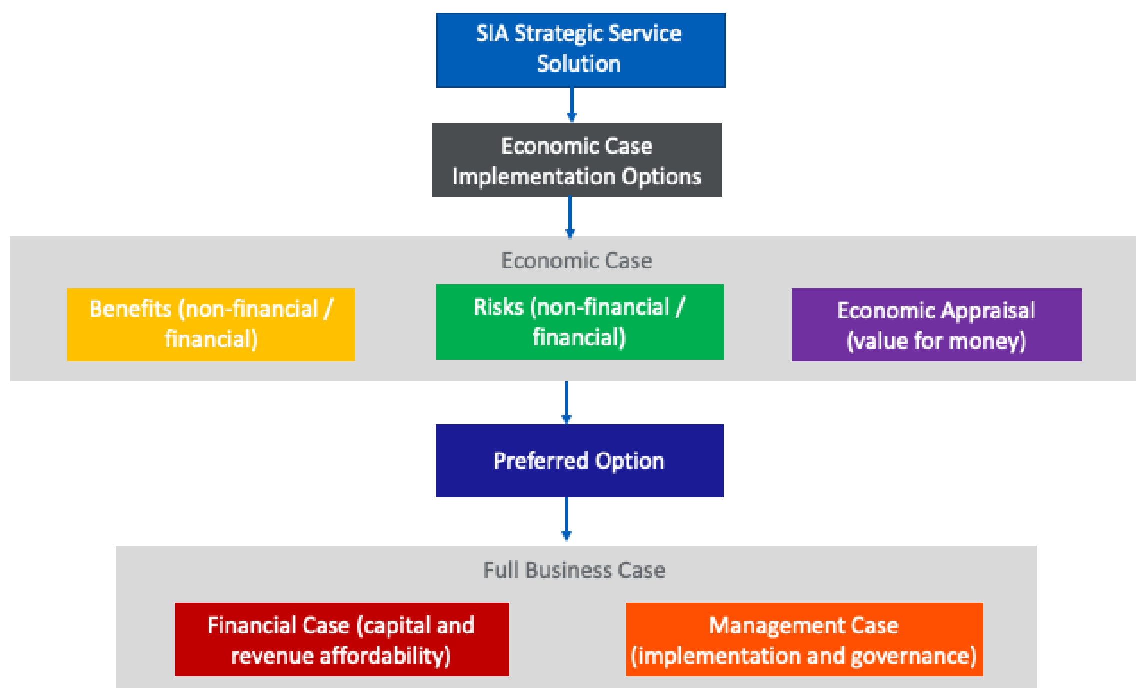
Within the context of this proposal and the approach being undertaken in relation to the business case process, the purpose of the Economic Case is to undertake a detailed analysis of the costs, benefits and risks of a short list of options, including a do nothing and / or do minimum option, for implementing the preferred strategic / service solution(s) identified within the SIA.

The outcome from the Economic Case process is intended to support and justify a decision to proceed with the project. It does this by identifying a preferred option which is expected to demonstrate that the project will deliver the benefits required and provide value for money with an acceptable level of risk in delivering the required outcomes and services.

2.2 Economic Case Components

The diagram below sets out the key components of the Economic Case but sets this in the wider context of the other parts of the investment appraisal process associated with this project. The Strategic Initial Agreement identified the proposed service arrangements to support the project but did not consider how they could be implemented.

The Economic Case stage seeks to establish, describe and evaluate a series of options to deliver the implementation of the project and subsequently identify the option that offers the best overall value for money when considering both financial and non-financial aspects. Once the preferred option has been identified a Full Business Case stage will be developed which will confirm the final affordability of the proposals and set out a detailed implementation plan to deliver a successful outcome for the project.



2.3 Stakeholder Engagement

Throughout the duration of this project the Board has sought to ensure that there is effective stakeholder engagement framed within the overall governance arrangements. As part of the Economic Case the Board has sought to widen this engagement to include patient input as well as a broader range of staff representation. This will be maintained and built on through the Full Business Case stage as the design proposals are further developed and finalised.

3.0 Identifying a Shortlist of Implementation Options

3.1 Introduction

Whilst the Strategic Initial Agreement focussed on developing and assessing alternative service solutions relating to the treatment centre, it did provide an indication of the potential options that would be assessed in implementing the proposed solution at the next stage of the business case process. In light of the Board's strategic intent to focus elective Orthopaedic services on the University Hospital Ayr Campus any off site options not in close proximity to Ayr Hospital were not considered. As a result the range of implementation options to be considered would be framed around the following:

- Do nothing (reference position)
- Buy and refurbish Carrick Glen Hospital
- Refurbish another facility owned by NHS Ayrshire and Arran
- New build (including a modular option)

In the period since approval of the SIA, the Board has undertaken a significant amount of work in identifying and evaluating alternative locations and sites for the centre. Whilst the Carrick Glen option is a relatively well defined solution with variation around the extent of refurbishment and extension requirements, the wider refurbishment and new build solutions are less clear. After due consideration it was not possible to identify a wide range of refurbishment options as there was either a lack of availability or the potential locations were unlikely to be part of the Board's strategic long term service or estates strategies. The clinical team did however bring forward the potential to develop around the existing elective orthopaedic ward (Station 16) and it was agreed that this would be considered further as part of the option development process.

In terms of new build solutions due to the layout and configuration of the UHA site, and the need to link with existing hospital infrastructure the location choices are limited. There is a potential development site located immediately adjacent to the Day Surgery Unit at the south-eastern boundary of the existing hospital site which was deemed to be the most feasible solution and capable of accommodating both traditional and modular build construction.

3.2 Longlist of options

Taking due account of the points set out above, the Board developed an initial longlist of six options as set out below.

1. Do nothing
2. Buy and minimally refurbish / extend Carrick Glen
3. Buy and significantly refurbish / extend Carrick Glen
4. Refurbish and extend Station 16 (current Elective Orthopaedic ward)
5. New build on University Hospital Ayr site using traditional construction
6. New build on University Hospital Ayr site using modular construction

3.3 Shortlisting assessment

In developing and assessing the options the Project Team, supported by the Board's appointed Healthcare Planners, developed a Clinical Brief and Schedule of Accommodation. These documents set out the proposed clinical model for the centre as well as providing an indication of the range of accommodation and required building footprint.

Following rigorous testing of the option longlist against these requirements as well as the project Investment Objectives two of the solutions were deemed to be unsuitable and therefore not carried forward to the shortlist. Further details are provided in the table below.

Option	Description	Rational for exclusion
Option 2 – Buy and minimally refurbish / extend Carrick Glen Hospital	The purchase and refurbishment of Carrick Glen, with a modest new build extension to accommodate one new theatre and limited support accommodation. The existing theatre and bed accommodation would be retained and used in their existing form	• Existing bedroom and theatre accommodation are not compliant with current HBN standards requiring significant derogations • Limitations of existing building make it unable to support the proposed model of care e.g. peri operative requirements • Would not provide the required level of support accommodation e.g. storage • Restricted floor to ceiling heights on ground floor limit ability to accommodate service provision for new theatre • ***A combination of the above renders this option non-feasible from a clinical, functional and space standards perspective***
Option 4 – Refurbish and extend UHA Station 16	Extension and refurbishment of current ward accommodation to create a two storey building linked to the main hospital via a corridor. This would involve the full redesign, refurbishment and extension of the internal space at first floor level to	• Would require full decant of current ward accommodation and staff changing facilities during construction for which there is no identified alternative location • Would require redesign and refurbishment of the current ward as part of the

Option	Description	Rational for exclusion
	provide single room inpatient accommodation and a new-build extension on the lower floor providing a new theatre and peri operative suite along with supporting accommodation	proposals, which would be additional compared to other options • Would require full reprovision of existing staff changing accommodation • Would require significant and highly disruptive service diversions and changes to access routes impacting adversely on hospital operation • Would involve a significantly extended programme • Offers limited future expansion • ***A combination of the above renders this option non-feasible from a cost and programme perspective***

On the basis of the above, options 2 and 4 have been excluded and not carried forward into the shortlist. The remaining options have been renumbered and, for the purpose of the remainder of this Economic Case, are referenced as follows:

1. Do nothing
2. Buy and significantly refurbish / extend Carrick Glen

3a. New build on UHA site traditional construction
3b. New build on UHA site modular construction

3.4 Analysis of shortlisted options

In developing and describing the details of the shortlisted options the Project Team has worked closely with the appointed Principal Supply Chain Partner and their Design Team allowing the key features of each option to be set out and also develop design detail that is appropriate for this stage in the business case process.

In addition to key features of each option it has been possible to assess the advantages and disadvantages associated with each option. This, when combined with the outputs of the Design Team, will be an important part of supporting the non-financial aspects of the option appraisal process set out in Section 5 of the Economic Case.

The tables below set out the key information for each option.

Option 1 - Do nothing option

Key features	
Maintain existing arrangements for the delivery of elective orthopaedic care across NHS Ayrshire and Arran concentrated at University Hospital Ayr with the current resources (theatres, beds, staffing etc) thus retaining on-going capacity constraints to deal with backlog, on-going demand and maintaining the requirement to send patients out of area (predominantly Golden Jubilee National Hospital) for treatment.	
Advantages	**Disadvantages**
• Supports reconfiguration of orthopaedics with elective service centred at UHA which will provide some service improvements and additional capacity for treatment • Limited requirement for capital investment	• Continuing with the current arrangements will lead to an inability to deliver the healthcare needs of patients and a failure to meet public expectation • Does not provide adequate capacity to meet on-going demand nor allow the Board to address backlog of cases • Continued capacity constraints will result in an increase in waiting times and a potentially greater need for out of area support • Continued impact of UHA unscheduled care pressures may result in continued need to cancel elective surgery • Likely to be on-going difficulties with staff recruitment and retention • Opportunities for innovation and an enhanced service model cannot be accommodated within the existing configuration • Existing buildings do not provide the scope or flexibility to implement the required service improvements

Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital

Key features	
Create a National Treatment Centre for Ayrshire and Arran by acquiring Carrick Glen Hospital, a facility in close proximity to UHA. Adapt / extend footprint to provide 2 additional theatres, 1 enhanced treatment room, a suite of peri-operative accommodation, an additional 12 inpatient beds and required support accommodation. Provide a drop off area for vehicles and dedicated parking for staff and visitors. A development programme with a total duration of 12 months allowing the facility to become operational by early Autumn 2023.	
Advantages	**Disadvantages**
• Locates service away from acute hospital pressures thus significantly reducing likelihood of elective surgery cancellations arising from future unscheduled care / winter pressures • Provides significantly increased resilience from any future pandemic pressures through creation of separate 'cold' facility • Provides additional post operative inpatient bed capacity (12 places) • Fully supports the proposed peri-operative model of care • There would be no disruption to existing UHA services during construction / refurbishment phase • Provides dedicated parking for visitors and staff • Embodied carbon benefits due to use of existing building • Access to green spaces • Some room for future expansion • Ease of service upgrades due to proximity to main road	• Requires staffing of 2 separate ward and specialist (arthroplasty) theatres areas thus impacting on staff efficiency • Requires overnight staffing of 2 separate areas including dedicated overnight medical cover • Arthroplasty expertise (all staff groups) is more dispersed over 2 sites • May require some duplication of instrumentation and other theatre equipment • Limitations in access to some clinical support services e.g. post operative imaging requirements • Some functional and size limitations within retained estate - inpatient bedrooms, undersized corridors and stairs • No bus drop off (would require route diversion to bring on-site)

Option 3a - New build on UHA site using traditional construction

Key features	
Create a bespoke new build National Treatment Centre for NHS Ayrshire and Arran on the current UHA site using traditional construction methods. The centre would be located adjacent to the existing Day Surgery Unit and be linked to the main hospital via a connecting corridor. Provide 2 additional theatres, 1 enhanced treatment room, a suite of peri-operative accommodation, an additional 12 inpatient beds and required support accommodation. A drop off area for vehicles would be provided with additional parking for staff and visitors as part of the wider site provision. Displaced car parking would be reprovided elsewhere on the UHA site. A development programme with a total duration of 18 months allowing the facility to become operational by early spring 2024.	
Advantages	**Disadvantages**
• Locates service somewhat away from acute hospital pressures thus reducing likelihood of elective surgery cancellations arising from future unscheduled care / winter pressures • Provides some increased resilience from any future pandemic pressures through creation of separate ‘cold’ facility • Provides additional post operative inpatient bed capacity (12 places) • Provides link into main hospital for access to clinical and non clinical support services (e.g. imaging) • Fully supports the proposed peri-operative model of care • Close proximity to UHA would make it easier for theatre nursing cover to be supported in the event of short notice absence • Overnight medical cover could be supported from existing UHA arrangements • Fully compliant in terms of space and area • Good connections to public transport and main campus	• Requires staffing of 2 separate ward and specialist (arthroplasty) theatres areas thus impacting on staff efficiency • Requires overnight staffing of 2 separate areas • Footprint requires some staff areas to be provided on first floor (e.g. staff changing) • There would be some disruption to existing UHA services (e.g. access and car parking) during construction phase • Does not provide dedicated parking for visitors and staff (part of wider UHA provision) • Impact on neighbouring buildings inc access • Limited options for future expansion • Limited access to outside space

Option 3b - New build on UHA site using modular construction

Key features	
Create a bespoke new build National Treatment Centre for NHS Ayrshire and Arran on the current UHA site using modular construction methods. The centre would be located adjacent to the existing Day Surgery Unit and be linked to the main hospital via a connecting corridor. Provide 2 additional theatres, 1 enhanced treatment room, a suite of peri-operative accommodation, an additional 12 inpatient beds and required support accommodation. A drop off area for vehicles would be provided with additional parking for staff and visitors as part of the wider site provision. Displaced car parking would be reprovided elsewhere on the UHA site. A development programme with a total duration of 15 months allowing the facility to become operational by mid winter 2023.	
Advantages	**Disadvantages**
• Locates service somewhat away from acute hospital pressures thus reducing likelihood of elective surgery cancellations arising from future unscheduled care / winter pressures • Provides some increased resilience from any future pandemic pressures through creation of separate 'cold' facility • Provides additional post operative inpatient bed capacity (12 places) • Provides link into main hospital for access to clinical and non clinical support services (e.g. imaging) • Fully supports the proposed peri-operative model of care • Close proximity to UHA would make it easier for theatre nursing cover to be supported in the event of short notice absence • Overnight medical cover could be supported from existing UHA arrangements • Fully compliant in terms of space and area • Good connections to public transport and main campus	• Requires staffing of 2 separate ward and specialist (arthroplasty) theatres areas thus impacting on staff efficiency • Requires overnight staffing of 2 separate areas • Footprint requires some staff areas to be provided on first floor (e.g. staff changing) • There would be some disruption to existing UHA services (e.g. access and car parking) during construction phase • Does not provide dedicated parking for visitors and staff (part of wider UHA provision) • Impact on neighbouring buildings inc access • Limited scope for design changes • Some concerns around floor span to accommodate theatres • Limited options for future expansion • Limited access to outside space

4.0 Economic Appraisal of Shortlisted Options

4.1 Introduction

The economic appraisal of the short-list of implementation options seeks to confirm which of these offers the best overall value for money. It will examine and appraise the options in terms of financial costs (capital and revenue), non-financial benefits and risks. Financial costs have been developed based on the additional activity and associated capacity the new facility is expected to provide for on an annual basis up to 2035 incorporating on-going service demand, demographic growth and management of service backlog.

As the Do nothing option does not involve any additional costs it is excluded from this part of the analysis. The baseline costs (reflecting this option) are however reflected within the Net Present Cost (NPC) analysis set out in Section 6.

All costs are expressed at a common price base which is 2021/22 and are exclusive of VAT.

4.2 Capital costs

Site acquisition costs

As indicated in Section 1.3 one of the options being considered involves the acquisition and adaptation of a private healthcare facility, Carrick Glen Hospital, currently under the ownership of BMI Circle. Initial dialogue has been undertaken with regard to possible acquisition by the NHS and a 'price in principle' of £1.5m (excl VAT) agreed to secure its purchase.

Construction costs

To support the development of the initial capital expenditure, the Board's Healthcare Planners have developed a schedule of accommodation which sets out the spatial requirements required to support the proposed activity and capacity to be delivered within the treatment centre. This identifies a gross internal area of around 2,000m^2 to which the PSCP design team has added an allowance for plant and communications space. This has subsequently been used by the PSCP to provide an initial capital cost estimate for the construction component of the project which incorporates build costs, prelims, furniture and equipment (Group 1), fees and a risk contingency. Costs include provision for current market conditions as well as the anticipated impact of achieving Net Zero Carbon.

Equipping costs

Equipping costs covering Groups 2, 3 and 4 items have been developed in collaboration with the NHS Scotland Assure – Health Facilities Scotland Procurement, Commissioning and Facilities team. They are built up using the Schedule of Accommodation as a means of assessing equipment requirements for each room type and function. From this assessment, total equipping costs for the treatment centre are estimated to be £2.551m.

Other capital costs

For the Carrick Glen option an allowance of £20k has been made to connect the site to the NHS IT infrastructure via a link to University Hospital Ayr.

Taking together the cost headings set out above a summary of the initial capital cost for each option is provided in the table below.

Capital cost heading	Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital (£000)	Option 3a - New build on UHA site using traditional construction (£000)	Option 3b - New build on UHA site using modular construction (£000)
Site acquisition	1,500.0	-	-
Construction	13,496.6	16,375.0	16,772.9
Fees	1,347.0	1,634.2	1,673.9
Quantified risk contingency	1,484.3	1,800.9	1,844.7
Other provisions	2,040.9	2,476.3	2,536.4
Equipping (Groups 2 to 4)	2,551.1	2,551.1	2,551.1
IT	20.0	-	-
Total initial capital costs	**22,439.9**	**24,837.5**	**25,379.0**

Optimism bias

Optimism Bias (OB) has been calculated in line with the guidance which requires an adjustment to be made to capital costs for OB for all NHS capital projects. This is to compensate for the tendency to overestimate the benefits and underestimate the costs when evaluating publicly funded projects. The Project Team followed the Green Book guidance and the Risk Management guide in SCIM to determine the level of OB that should be applied to the capital costs at this stage of the project. A summary of the OB levels for each of the shortlisted options is provided in the table below with further details provided at **Appendix A**.

Assessment	Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital	Option 3a - New build on UHA site using traditional construction	Option 3b - New build on UHA site using modular construction
Upper Bound	22%	17%	17%
Mitigation	42%	42%	42%
Residual Optimism Bias	**9.28%**	**7.17%**	**7.17%**

Lifecycle replacement cost

Lifecycle replacement costs for all options in respect of building elements are included as high-level estimates based on the initial construction cost of each option and have been provided by the PSCP. Costs cover the major replacement and maintenance of building fabric and engineering elements according to their generally accepted useful lives.

Lifecycle costs for all options in respect of major equipment replacement have been generated internally based on the initial investment requirements allowing for replacement of items at 10 year intervals.

4.3 Revenue costs

As part of the project governance arrangements the Board established a clinically led Programme Project Group the role of which includes consideration of the workforce arrangements required to deliver the proposed clinical model as well as the support arrangements. A number of service areas were involved in this group with representatives from medical, nursing, theatres, allied health professionals, administrative, decontamination, clinical support services, and estates staffing groups. In parallel with this a Finance Sub-group was established whose function is to translate the staffing and support requirements into a set of costs which would support this element of the Economic Appraisal.

Revenue costs reflect the proposed arrangements for phasing activity in the new centre with the initial focus (year 1) being on day surgery activity during which time the planned arthroplasty resources and skills are brought on board and are fully operational from year 2 onwards.

Clinical service costs

This includes all of the resources directly related to the delivery of clinical care within areas such as the theatre and ward settings. Staffing requirements reflect both volume and skills as well as proposed workforce redesign and levels of WTEs relate directly to the anticipated level of demand and associated capacity within the centre.

The staffing model across options 2, 3a and 3b are essentially the same as they deliver similar outputs, however, phasing of recruitment and associated expenditure reflects the different timelines associated with the opening date of the new centre under each option.

Staffing costs have been developed based on 2021/22 pay scale rates with no assumed uplift applied to future years.

Theatre consumables and prescribing costs are also the same for Options 2, 3a and 3b are estimated based on average costs within the existing service applied to the proposed activity in the new centre. This is phased to reflect the proposed build-up of activity.

Pharmacy and ward supplies have been estimated based on the existing orthopaedic service adjusted to reflect the provision of the 12 bedded unit.

Clinical and non-clinical support service costs

These costs include cleaning, catering, portering, transport, ward based administration and medical records functions.

In addition to the above, as a theatre intensive service with often complex and extensive instrumentation there will be a significant impact on decontamination requirements. These are provided from a central facility located at Ayrshire Central Hospital who have assessed the additional requirements based on anticipated activity and case mix within the new centre.

Building related running costs

These cover the costs of planned and reactive maintenance for buildings and equipment, energy costs, IT and rates.

Other costs

Currently the Board send a number of patients to the Golden Jubilee National Hospital (GJNH) for elective orthopaedic care. This is managed through a Service Level Agreement (SLA) the current annual recurrent costs of which are £1.292m. In addition the Board undertakes local waiting list initiatives to address on-going waiting time pressures which are delivered in addition to the base service activity annual expenditure for which is £225k. Both of these are included in the Do Nothing (baseline) option costs on an on-going basis. For the remaining options 2 to 4 this activity is repatriated / consolidated into the new treatment centre from 2026/27 (following elimination of the waiting time backlog) and the associated revenue expenditure reduced.

Taking together the cost headings set out above a summary of the additional recurring revenue costs for each option is provided in the table below. Costs reflect the fully implemented position for each option.

Revenue cost heading	Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital (£000)	Option 3a - New build on UHA site using traditional construction (£000)	Option 3b - New build on UHA site using modular construction (£000)
Clinical service costs	8,712.7	8,712.7	8,712.7
Clinical / non-clinical support costs	1,147.7	982.3	982.3
Building running costs	563.6	506.3	506.3
Other costs	0	0	0
Total revenue costs	**10,424.0**	**10,201.3**	**10,201.3**

Non-recurring revenue costs

In addition to the recurrent revenue costs there are a series of one-off (non-recurring) transitional costs associated with the development of the new treatment centre. A summary of these is included in the table below.

As indicated above, orthopaedic procedures, particularly joint replacement surgery, require complex and extensive instrumentation which need to be decontaminated after use. With the proposed expansion in activity, and a significant proportion of this being for joint replacements, there is a need to significantly enhance the volume of instrumentation in circulation which will require up-front investment.

Revenue cost heading	Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital (£000)	Option 3a - New build on UHA site using traditional construction (£000)	Option 3b - New build on UHA site using modular construction (£000)
Theatre instrumentation	750.0	750.0	750.0
Catering equipment	13.2	13.2	13.2
Domestic equipment	11.0	11.0	11.0
Total Non-recurring	**774.2**	**774.2**	**774.2**

5.0 Non-financial Costs and Benefits of Options

5.1 Introduction

The aim of the non-financial assessment is to find a suitable way to assess non-monetary factors and present them alongside monetary values. In the simplest cases, it may be adequate just to list and describe them however, it will often be appropriate to use a more sophisticated technique. The umbrella term Multi-Criteria Analysis (MCA) is frequently used to describe the range of techniques available and is the recommended approach within the Scottish Capital Investment Manual (SCIM).

MCA brings structure and transparency to judgement of how options compare on a non-monetary basis. It should relate closely to the stated objectives of the project and consist of comparative assessments, both quantitative and qualitative, of how well each option meets the objectives.

In line with the SCIM, the weighted scoring method approach is the preferred methodology for undertaking non-financial option appraisal. It involves identification of the non-monetary factors (benefit criteria) that are related to the project's stated investment objectives. These criteria then have weights allocated to each of them to reflect their relative importance; and the allocation of scores to each option to reflect how it performs in relation to each criterion.

The result is a single weighted score for each option, which may be used to indicate and compare the overall performance of the options in non-monetary terms. This process involves five key stages as indicated below:

- Identify the relevant non-monetary criteria;
- Rank and weight the criteria to reflect their relative importance;
- Score the options to reflect how each option performs against each criterion;
- Calculate the weighted scores; and
- Interpret the results

In order to undertake the non-financial assessment two stakeholder workshops were held involving a wide range of representatives from the Project Team, clinical and non-clinical staff as well as patients.

The first workshop was split into two parts. Part 1 focussed on a detailed analysis of the option shortlist covering their key features, advantages and disadvantages (utilising the information presented in Section 3.4 above) and also input from the Design Team to provide illustrative floor layouts. This also included a clinically led description of the anticipated patient pathways through the treatment centre. Part 2 covered identification, ranking and weighting of the benefit criteria.

Workshop 2 focussed on the arrangements for scoring the options against the benefit criteria. Once complete the scoring results were shared with participants and subsequently the factors contributing towards the overall scores were discussed and documented.

In addition to the non-financial assessment a qualitative risk assessment was undertaken to assess the comparative risk of the shortlisted options. Further details of this assessment is provided at section 5.5.

5.2 Developing the benefit criteria

Building on the work undertaken in the SIA (particularly in developing the Investment Objectives), the extensive clinical engagement undertaken in the intervening period and learning from some of the other Elective Care projects across Scotland, the following headings and descriptions provide details of the Non-financial benefit criteria to be used in the non-financial benefits appraisal.

Criterion	Key features
Capacity to meet anticipated elective care service demand in a timely manner	• Provides capacity to meet on-going demand and meet waiting time targets • Minimises the time taken to address the waiting list backlog • Ability to meet future growth in demand arising through demographic changes • Contribute towards wider service expansion in other specialties and / or across the West of Scotland
Ability to protect elective service delivery	• Protects the capacity from the impact of wider service pressures (e.g. unscheduled care) • Supports Covid green status in the event of continued / future pandemic impact • Minimises likelihood of resources being diverted to other functions
Patient care and safety	• Patient care and safety is optimised through innovative service solutions and infrastructure designed to the most modern standards • Reduced risk of healthcare acquired infection through better use of space and minimisation of patient movement • Protects patient confidentiality
Patient experience	• Supports a positive patient experience and respects dignity across the entire admitted care pathway • Delivers more care locally reducing the travel burden on patients requiring surgery • Reduces patient anxiety by simplifying pathway and minimising time spent in hospital environment • Provides access to external open space
Efficiency and productivity	• Supports the greatest number of patient procedures at the optimum level of quality whilst making best use of time and resources • Should ensure throughput is optimised and there are no undue delays across the patient pathway

Criterion	Key features
	from admission to discharge • There is minimal duplication in functions and processes • Staffing resources are used flexibly with effective cross cover arrangements • Embed the use of digital solutions to improve inter and intra hospital and wider system interaction
Enhances the developing Centre of Excellence as a focus for staff recruitment retention and development	• Allows staff to feel valued and see the centre as a good place to work • The centre is seen as an attractive place to work thus assisting the Board in attracting / retaining staff with the right skills and experience • Provides development opportunities for staff of all disciplines, seniority and experience
Function, quality and sustainability of the physical environment	• Delivers both improved functional suitability and better utilisation of space, effective patient flow, easy accessibility and optimal adjacencies • This should be achieved through ensuring there is the appropriate co-location, proximity and inter-relationships of the key departments being considered and with other supporting services • Adherence to current accommodation standards (level of derogations) • Access to the building is optimised through adequate drop off arrangements and accessible parking • Supports the move to carbon neutrality
Minimises disruption to services and environment	• Level of disruption to current services e.g. need to relocate current services • Disruption to existing services during construction are manageable and do not risk patient safety • Impact on current environment e.g. reductions in natural daylight

5.3 Ranking and weighting the criteria

At Workshop 1 the benefit criteria presented above were reviewed, and, on a consensus basis, an initial ranking of the criteria was undertaken to assess the order of importance. Following which the 'paired' comparison approach was used to weight the criteria to establish their relative importance out of a total of 100 points. A summary of results of the ranking and weighting exercise is provided in the table below.

Criterion	Ranking	Weighting
Capacity to meet elective care service demand in a timely manner	1	18.1
Ability to protect elective service delivery	2	17.2
Patient care and safety	3	16.3
Efficiency and productivity	4	13.1
Patient experience	5	11.8
Function, quality and sustainability of the physical environment	6	11.2
Enhances the developing Centre of Excellence as a focus for staff recruitment retention and development	7	9.5
Minimises disruption to services and environment	8	2.8
Total weighting		100.0

In terms of the rationale for the ranking and weighting the following points were noted:

- The ability to align capacity with demand, address the significant and growing service backlog and protecting this from other priorities was the primary aim of the national programme and should be reflected in local delivery;
- Patient care and safety is a critical factor and will influence patients who can receive their treatment in the new centre;
- Efficiency and productivity is closely aligned to the function, quality and sustainability of the physical environment which should be reflected in the ranking and weighting;
- Whilst the new centre will help to augment the Centre of Excellence, it can be developed independently from and in advance of the new facility being in place; and
- Disruption to services, whilst potentially challenging, would be mainly confined to the short term whereas other criteria would be relevant throughout the economic life of the project.

5.4 Scoring the shortlisted options

Workshop 2 was used to set out the arrangements for scoring the options against the benefit criteria. This allowed individuals to assess the extent to which they felt the shortlist of options met the benefit criteria. A full recap of the shortlisted options was provided along with a review of the results of the criteria ranking and weighting from the previous workshop.

Scoring was undertaken on an individual basis using the assessment scale set out below. As the workshops were all undertaken virtually (as a consequence of Covid-19) scoring was undertaken post workshop and the results submitted through the independent Healthcare Planner. Scoresheets were distributed to all participants

which incorporated capturing the relevant stakeholder group to which the individual belonged. This would allow further analysis of the results of the scoring to be made.

Assessment	Score
Could hardly be better	10
Excellently	9
Very Well	8
Well	7
Quite Well	6
Adequately	5
Somewhat Inadequately	4
Badly	3
Very Badly	2
Extremely Badly	1
Could hardly be worse	0

The outputs of the scoring exercise are summarised in the table below.

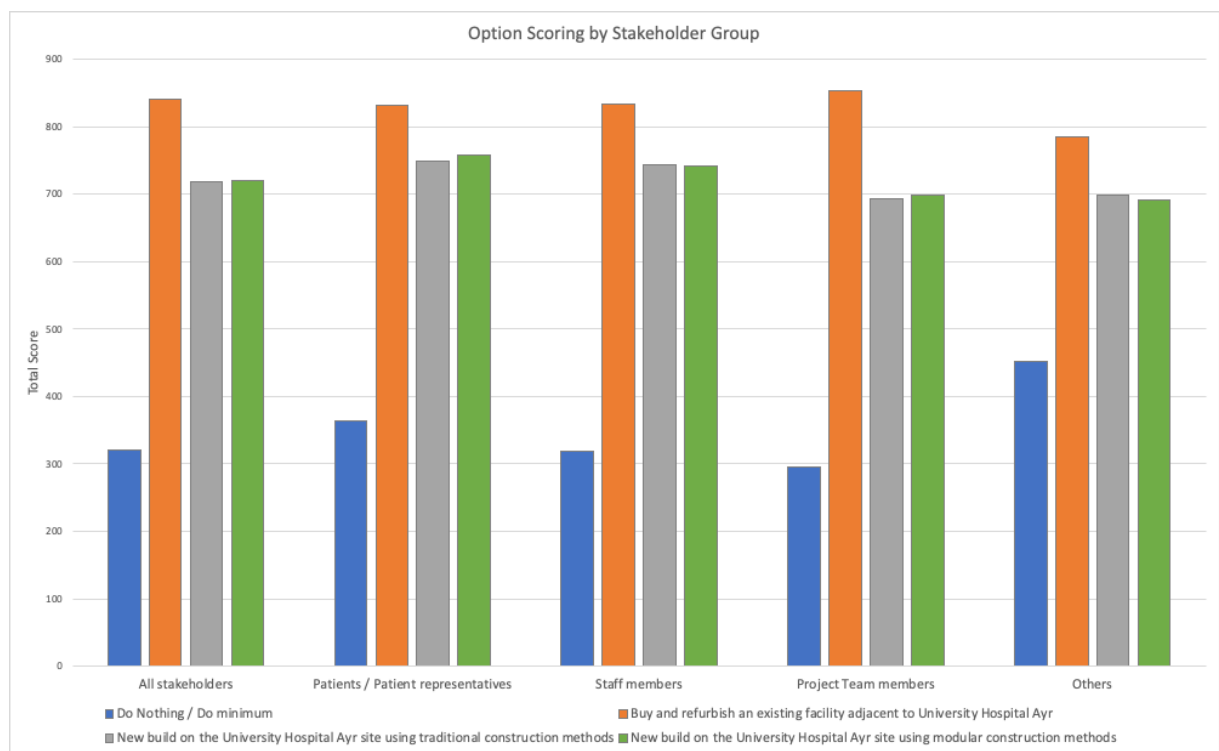
Criterion	Weight	Option 1 – Do nothing		Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital		Option 3a - New build on UHA site using traditional construction		Option 3b - New build on UHA site using modular construction	
		Score	W x S	Score	W x S	Score	W x S	Score	W x S
Capacity to meet elective care service demand in a timely manner	18.1	1.6	29.3	8.7	157.8	7.7	138.8	7.9	142.2
Ability to protect elective service delivery	17.2	1.5	26.2	9.0	154.8	6.2	107.3	6.2	107.3
Patient care and safety	16.3	4.9	80.1	8.0	130.7	8.1	133.0	8.0	131.5
Efficiency and productivity	13.1	3.2	42.3	8.0	104.6	7.3	95.9	7.2	94.6
Patient experience	11.8	4.0	47.1	8.4	99.2	7.5	87.9	7.5	87.9
Function, quality and sustainability of the physical environment	11.2	3.7	41.0	8.0	89.9	7.1	79.8	7.0	78.8
Enhances the developing Centre of Excellence as a focus for staff recruitment retention and development	9.5	3.0	28.0	8.3	78.7	7.1	67.4	7.1	67.4
Minimises disruption to services and environment	2.8	9.3	26.6	8.6	24.6	2.8	7.9	3.9	11.0
Total	**100.0**		**320.7**		**840.2**		**718.0**		**720.7**
Ranking			**4**		**1**		**3**		**2**

The results of the scoring exercise concluded that Option 2 is the highest scoring in non-financial benefit terms and scored higher than the other 'do something' options (3a and 3b). In terms of the key differentiating factors impacting on the higher scores for Option 2, from the stakeholder feedback, these can be summarised as follows:

- the added protection from being off the main hospital site
- the shortest overall programme with earliest opportunity to address backlog
- the ability to create a dedicated elective care environment away from other service pressures and distractions
- better efficiency through the larger footprint and optimised configuration / departmental relationships
- it is also seen as being significantly less disruptive and more environmentally friendly

Options 3 and 4 are not materially separated in their scores with the main difference being indicative of the shorter timeframe for delivering Option 4.

By way of further analysis the scores returned for each stakeholder group were analysed and presented and this is shown below.



The results indicate a clear pattern of results across the options in terms of both overall score and ranking.

It was therefore concluded from the results of the non-financial assessment that Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital was the clear top ranked solution for implementing the National Treatment Centre – Ayrshire and Arran project. **Appendix B** lists the stakeholders who were involved in the Non-Financial Options Appraisal Process.

5.5 Non-financial risk assessment

The project cost identified in the Economic Appraisal includes risks which can be quantified in financial terms risks e.g. optimism bias. However, as not all risks can be quantified in monetary terms, the non-financial risks associated with the shortlisted options have been assessed to establish both the absolute level of risk as well as provide as comparison across the shortlisted options.

In developing the risk register for the non-financial assessment the Board has used a combination of the standard OBC stage risks as set out in the SCIM Risk Management guidance and some project specific factors. Risks have been allocated to a range of categories covering business, demand, operational, procurement, technology, construction, design, planning, funding and policy areas.

A workshop involving the Project Team was held to assess each of the options against the risk register. For each risk the following was assessed:

- the impact should the risk arise
- the probability or likelihood of the risk arising
- the risk exposure expressed as a product of impact and probability

Ratings were assessed using the scale set out below.

Score	Impact / consequence	Likelihood of occurrence
5	Negligible	Rare
4	Minor	Unlikely
3	Moderate	Possible
2	Major	Likely
1	Extreme	Almost Certain

For each risk the exposure can be categorised into 4 ratings – low, medium, high and very high as illustrated on the scale below. In presenting the results of the qualitative risk assessment each risk has been graded to show where it falls on the scale. This is a useful visual indicator and a likely pointer to where the focus of mitigating actions needs to fall.

Likelihood	Potential Consequences				
	Negligible (1)	Minor (2)	Moderate (3)	Major (4)	Extreme (5)
Almost Certain (5)	Medium	High	High	Very High	Very High
Likely (4)	Medium	Medium	High	High	Very High
Possible (3)	Low	Medium	Medium	High	High
Unlikely (2)	Low	Medium	Medium	Medium	High
Rare (1)	Low	Low	Low	Medium	Medium

The result of the assessment is summarised in the table below.

Risk	Impact	Option 1 – Do nothing		Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital		Option 3a - New build on UHA site using traditional construction		Option 3b - New build on UHA site using modular construction	
		Prob	Score	Prob	Score	Prob	Score	Prob	Score
The project disrupts day to day business operations	3	1	3	2	6	5	15	5	15
The Board doesn't have the capacity or capability to deliver the project	4	N/A	N/A	3	12	3	12	3	12
Poor stakeholder involvement results in a lack of continued support for the project	2	N/A	N/A	1	2	1	2	1	2
New Treatment Centre substantially fails to meet stakeholder expectations in terms of benefits	2	N/A	N/A	2	4	2	4	2	4
Demand for accommodation does not match the levels planned, projected or presumed	3	2	6	2	6	2	6	2	6
Capacity within the NTC is required for other purposes impacting on the delivery of elective care	4	4	16	2	8	3	12	3	12
Inability to secure adequate numbers of appropriately trained and experienced staff	4	3	12	4	16	3	12	3	12
Service provision or performance is below that assumed within the capacity planning assumptions	2	3	6	2	4	2	4	2	4
New Peri-operative service model cannot be implemented	3	5	15	1	3	1	3	1	3
Patient safety is compromised by access to services	5	3	15	2	10	1	5	1	5
There is a significant delay in accessing	3	N/A	N/A	1	3	4	12	4	12

the proposed site which impacts on programme									
It is not possible to acquire the proposed site	4	N/A	N/A	3	12	N/A	N/A	N/A	N/A
The Contractor's involvement in the project is too late to impact on the design solution	3	N/A	N/A	2	6	2	6	2	6
Assumptions regarding use of technology to support service model are not met	2	2	4	3	6	3	6	3	6
Information used as part of the strategic & project brief is inadequate to support the design process	3	N/A	N/A	2	6	2	6	2	6
Critical programme construction dates are unrealistic	3	N/A	N/A	3	9	3	9	4	12
Proposal will not receive approval - inconsistent with policy and plans	3	N/A	N/A	2	6	2	6	2	6
Total			**77**		**119**		**120**		**123**
Ranking			**1**		**2**		**3**		**4**

The results from the non-financial risk appraisal highlight that Option 1 has the lowest overall non-financial risk primarily as a result of many of the risks not being applicable. In terms of the ‘do something’ solutions, the overall risk scores are closely grouped reflecting a number of common risk areas. Option 2 does have a specific risk relating to site acquisition which is not present in the UHA options. On the other hand Options 3a and 3b have a higher risk of disruption to other services and in delays to accessing the development site as a result of a currently unknown requirement for service diversions.

A full risk register for the preferred option has been developed and can be found in **Appendix C**. This is a live document and will be updated and reviewed throughout the lifecycle of the project.

6.0 Net Present Costs and Assessing Uncertainty

6.1 Introduction

This section of the case outlines the methodology for assigning and calculating an economic cost in relation to the implementation options with the use of the Generic Economic model (GEM). This allows us to derive comparative costs in the form of a Net Present Cost (NPC) across the economic life of the options and allows comparison of projects with the same lifespan. In line with the SCIM guidance the analysis focusses on future cash flows which add economic value and therefore excludes elements such as depreciation, VAT, and general inflation.

For the purpose of the analysis all costs are expressed in gross terms so that the Do nothing option reflects the baseline costs and, for the other options, they reflect the baseline plus their additional costs. Sunk costs associated with expenditure already incurred or committed on the project have been excluded.

All options are appraised over the construction period plus a 60 year estimated useful life of the asset once operational. The final cost analysis is discounted in line with SCIM guidance at 3.5% for years 1-30 and 3% for years 31-60. The NPC can then be used in conjunction with the non-financial benefits score to calculate the NPC per weighted benefit score as an indicator of overall value for money.

6.2 Net present costs

The results of the Economic Appraisal is summarised in the table below with full analysis provided in the GEM which is included at **Appendix D**.

	Option 1	Option 2	Option 3a	Option 3b
Net present cost (£m)	323.963	597.627	589.992	592.838
Non-financial benefits score	320.7	840.2	718.0	720.7
NPC per weighted benefit score	**1.010**	**0.711**	**0.822**	**0.823**
Value for money ranking	**4**	**1**	**2**	**3**

The results of the combined financial costs and non-financial benefits indicate that Option 2 is the best value for money as it provides the best ratio of costs to benefits as measured by the Net Present Cost per weighted benefit score. Of the ‘do something’ options it also has the lowest level of qualitative risk.

In order to test the robustness of the outcome, sensitivity analysis has been carried out with the details provided below.

6.3 Assessing uncertainty

The Option Appraisal guide details the need to assess uncertainty in relation to the outputs of the Economic Appraisal. No matter how thoroughly costs, benefits, risks and timing are identified and analysed and, even after best efforts have been made to adjust for Optimism Bias, there will remain uncertainty over the accuracy of the

assumptions made. It is therefore essential to test how these uncertainties may affect the choice across the range of options.

6.4 Sensitivity analysis

Sensitivity analysis is the key technique for this purpose and is the process of examining how the options are affected by reasonable variations in a range of key assumptions. The basic approach is to alter an assumption, recalculate the NPC for each option and consider the impact on both costs and non-financial benefits.

Sensitivity analysis on the shortlisted implementation options has been undertaken in two stages:

- Scenario Analysis – examining the impact of changing financial costs and non- financial benefits through a number of alternative scenarios; and
- Switching Values – computing the extent of change required to bring about a change in the ranking of the options.

Scenario analysis – Financial

The areas of uncertainty considered in the scenario analysis for financial costs include variations in assumptions in respect of the initial capital costs, Optimism Bias and site acquisition costs.

The scenarios chosen are as follows:

- Scenario 1 – no change, providing a baseline against which all other scenarios can be measured
- Scenario 2 – 10% increase in initial capital costs on Option 2
- Scenario 3 – 10% decrease in initial capital costs on Option 3a
- Scenario 4 - remove quantified risk and OB from all options
- Scenario 5 – 20% increase in site acquisition and IT costs for Option 2

A summary of the results is shown in the table below, with further details found in **Appendix D**. The table shows the results in relation to the NPC per weighted benefit score and ranked in order of least cost per benefit.

Scenario	Option 1		Option 2		Option 3a		Option 3b	
	NPC / WBS	Rank	NPC / WBS	Rank	NPC / WBS	Rank	NPC / WBS	Rank
Scenario 1	1.010	4	0.711	1	0.822	2	0.823	3
Scenario 2	1.010	4	0.714	1	0.822	2	0.823	3
Scenario 3	1.010	4	0.711	1	0.818	2	0.823	3
Scenario 4	1.010	4	0.707	1	0.817	2	0.818	3
Scenario 5	1.010	4	0.712	1	0.822	2	0.823	3

The results of the scenario analysis show that Option 2 remains the top ranked option in all scenarios and Option 1 remains the lowest ranked option in all scenarios. None of the scenarios change the ranking from the baseline position.

Scenario analysis – Non-financial

In order to test the robustness of the results of the scoring exercise it is important to examine how reactive the results are to changes in the weights and scores used. This can be done with the aid of sensitivity analysis which can be compared against the base position. For the purposes of this exercise, two sensitivities have been run as follows:

- Apply equal weights to all the benefit criteria
- Exclude the scores against the highest ranked criterion (Patient care and experience).
- Exclude the scores from the members of the Project Team

The results of the sensitivity testing are shown in the table below.

Scenario	Option 1	Option 2	Option 3a	Option 3b
Baseline scores	320.7	840.2	718.0	720.7
Ranking	4	1	3	2
Equal weighting applied to criteria	390.5	838.7	673.2	685.7
Ranking	4	1	3	2
Exclude scores for top ranked criterion	291.3	682.4	579.2	578.5
Ranking	4	1	2	3
Exclude scores from Project Team	343.7	828.7	740.6	741.2
Ranking	4	1	2	3

The results show that none of the sensitivity tests alter the position of the top or bottom ranked option. The second test does change the order of the options ranked second and third, however, their baseline scores are extremely close increasing the likelihood that the sensitivities will have an impact.

Switching analysis

Switching analysis is a form of sensitivity test which shows by how much a variable (non-financial or financial) would have to change to switch the balance of advantage (ranking) from one option to another.

Switching value calculations have been carried out between Option 2 and Option 3a as they are first and second ranked in terms of baseline value for money. The following variables were chosen for testing:

- Scenario 1 – no change, providing a baseline against which all other options can be measured
- Scenario 2 – by how much would the weighted benefit score in Option 2 have to fall in order to change the ranking
- Scenario 3 – by how much would the weighted benefit score in Option 3a have to rise in order to change the ranking
- Scenario 4 – by how much would the capital costs (excluding the costs of site acquisition) in Option 2 have to rise in order to change the ranking
- Scenario 5 – by how much would the operational revenue costs in Option 2 have to rise in order to change the ranking.

A summary of the results is shown below, with further details found in **Appendix D**.

- Scenario 2 - The weighted benefit score for Option 2 would have to fall by 13.5% to switch its ranking to 2
- Scenario 3 – The weighted benefit score for Option 3a would have to increase by 15.7% to switch its ranking to 1
- Scenario 4 – The initial capital costs of Option 2 would have to rise by 415% to switch its ranking to 2
- Scenario 5 – The operational revenue costs of Option 2 would have to rise by 16.5% to switch its ranking to 2.

The results of the sensitivity analysis indicate that major changes would be required to either the capital costs, operating expenditure or the weighted benefits scores in order to switch the preferred option from Option 2 to Option 3a.

7.0 Summary of Results

7.1 Introduction

Throughout the development of the Economic Case the Board has sought to set out a clear approach, ensure effective engagement with a wide range of stakeholders and follow the established guidance set out in the SCIM.

This approach taken in developing the Economic Case is outlined in Section 2 which is followed by a series of chapters which provide details of the key components of the case along with the results of the assessment undertaken. The purpose of this part of the case is to provide an overall summary of these results and explain how they have been used to inform the selection of the preferred option.

7.2 Summary of Economic Appraisal

Taking together the core elements of the Economic Case the key metrics and results are summarised in the table below.

Scenario	Option 1	Option 2	Option 3a	Option 3b
Initial capital costs	0	22,440	24,838	25,379
Total operating costs (gross)	12,352	21,396	21,164	21,164
Net present cost (£m)	323.963	597.627	589.992	592.838
Non-financial benefits score	320.7	840.2	718.0	720.7
NPC per weighted benefit score	1.010	0.711	0.822	0.823
Value for money ranking	**4**	**1**	**2**	**3**
Qualitative risk ranking	**1**	**2**	**3**	**4**

Based on the overall results of the Economic Case it is recommended that implementation Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital is taken forward to FBC stage as the preferred implementation option. The main reasons for reaching this conclusion are as follows:

- It demonstrates the best value for money as evidenced by the summary results from the Economic Case.
- It can be delivered more quickly than the other ‘do something’ options, offers more resilience with significantly less disruption to on-going service delivery.
- Following the financial sensitivity analysis Option 2 remains the top ranking option in all of the scenarios tested.

- In non-financial benefits terms, Option 2 emerges as a clear and conclusive top scoring solution. The results stand up to scrutiny both through sensitivity testing and stakeholder group scoring analysis.

Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital remains the preferred option throughout the appraisal.

8.0 Conclusion and Next Steps

8.1 Introduction

The purpose of this part of the Economic Case is to confirm the Board's preferred option to implement the service proposals set out in the Strategic Initial Agreement and set out the next steps in the process towards delivery of the National Treatment Centre – NHS Ayrshire and Arran.

8.2 Identification of preferred option

As indicated in Section 7, following a robust process and subsequent analysis of the results of the Economic Case the preferred implementation option is Option 2 - Buy and significantly refurbish / extend Carrick Glen Hospital.

8.2 Next steps

Subject to approval of the Economic Case the Board proposes the following:

- Conclude the negotiations with BMI Circle to acquire Carrick Glen Hospital.
- Proceed with the development of the Full Business Case which it is anticipated will be completed by the end of June 2022.